RISE OF FLIGHT

The First Great Air War



User Manual

Only practice will make you an Ace!

EVERYONE 10+
CONTENT RATED BY ESRB

777 STUDIOS

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1.0 INSTALLATION & REGISTRATION

Rise of Flight: The First Great Air War is a state of the art PC combat flight-simulation title. Rise of Flight utilizes the Free2Play business and distribution model. This means there are a few different ways in which you can obtain and get started with a copy of ROF. Every copy of ROF can have additional content added to it by purchasing content (Airplanes, Field-Mods, and Campaigns) from the ROF Store (http://riseofflight.com/en/store). The only difference between the different versions of ROF is what content is included with your copy. All versions of ROF are fully compatible with each other. All the features and base content is identical.

The different paths to owning ROF are simple and easy to follow. Just remember that ROF is a modular system that allows users to add content in both bundles or individually. The important thing to remember is that ROF uses key-codes to determine access to content you purchased. We use an unlock system, not a downloadable content system like other games. Every user gets the same updates and content at the same time. As a result, you only need to install ROF one time and register one User Account. All your purchased content is connected to your User Account, not the particular install on your computer. The result is you can have ROF installed multiple times on multiple computers. All you need to do is login online once to unlock your content. It is a very flexible system.

It is important to remember that your ROF User Account includes the login and password for both the game AND the official website where you can purchase additional content. This connects your purchased content with the game itself and identifies what content you own.

Note: In order to complete the registration process and activate any version of Rise of Flight, you must be connected to the Internet. This process ensures you have a legal copy of the game and registers you for the Rise of Flight website and community forum. Your login and password information also grants you access to the Rise of Flight Store, where you can purchase additional aircraft and other content. These purchases are automatically added to your User Account and unlocked the next time you launch the game. To successfully unlock your purchases, you must log in at least once with the Login Online option.
The different paths to owning and playing ROF:

Free2Play - Download the *Unlimited Demo* from the official Rise of Flight website and give ROF a try. There is no time limit. This is the base install of ROF and the starting point for many users. From here, you can upgrade your install a few different ways. Choose which one is best for you and your budget. http://riseofflight.com/tryrof/en ***(See Section 1.1)***

Free2Play Upgrade – Purchase a Free2Play Upgrade from the ROF Store to rapidly unlock new content in your Free2Play copy. http://riseofflight.com/en/store/demoupgrades. This method is popular with users who cannot locate a retail copy near them or do not wish to purchase from a third party digital download store. It is also very quick and easy way to rapidly increase the number of aircraft in your hangar with one purchase. ***(See Section 1.2)***

Retail Copy - Purchase a physical retail copy for a store and install from the disk. http://riseofflight.com/en/about/where2buy. This is the traditional way of purchasing a PC game. Your Retail box may have come with some additional printed materials inside. Buying a retail copy is popular with those users who do not have a fast Internet connection. ***(See Section 1.3)***

Digital Copy – Purchase a digital copy from a digital download store. http://riseofflight.com/en/about/where2buy. This is a popular way to purchase ROF without having to travel to the store. ***(See Section 1.4)***

Retail Upgrade from Free2Play – Purchase a Retail copy and use key-code to upgrade from the Free2Play version. This is also a way to rapidly increase the number of planes in your hangar. In this situation, you do not need to re-install the game from the disk, simply enter the included key-code into the game to unlock the proper content. ***(See Section 1.5)***

Digital Upgrade from Free2Play – Purchase a Digital copy and use key-code to upgrade from the Free2Play version. This is also a way to rapidly increase the number of planes in your hangar. In this situation, you do not need to re-install the game from provided install executable, simply enter the key-code given to you by the seller, usually in an email, into the game to unlock the proper content. ***(See Section 1.6)***

Adding Individual Content to Free2Play – Purchase individual content items (Airplanes, Field-Mods, and Campaigns) and add them to your Free2Play copy of ROF. This is an easy way to move beyond the *Unlimited Demo* stage and experience more of what ROF has to offer. Remember every copy of ROF is a full copy of the game so you are allowed to add new content to your Free2Play copy any time you want. This can be an inexpensive way to add content. All you need to do is visit the ROF Store (http://riseofflight.com/en/store) and purchase some content. The content will be automatically added to your User Account and unlocked for you next time you play ROF. ***(See Section 1.7)***

Please identify which path you are going to follow and skip to the appropriate section below to learn how to install and activate your copy of ROF or add new content from the ROF Store.

1.1 Downloading, Installing and Activating the Free2Play Version: The Free2Play version of Rise of Flight can be played for an unlimited amount of time and features two flyable aircraft – the SPAD S.XIII and the Albatros D.Va. Unlike traditional game demos, Free2Play Rise of Flight is in effect a limited version of the full game. In addition, you can

purchase and add new aircraft and other content to the Free2Play version, access all single player and multiplayer modes for each aircraft and play as a gunner in multi-crew aircraft in multiplayer. Please follow these steps in order to download and install the Free2Play version:

Note: you must use the "Administrator" account in Windows in order to install the game correctly. If using Windows 7 or Windows Vista, you should disable User Account Control (UAC) during installation. Otherwise, Windows may not allow you to install all files, and you will receive an error message.

1. Download and the **Unlimited Rise of Flight Demo.exe** from http://riseofflight.com/tryrof/en.

2. Double-click the executable file; this will unpack all necessary files to your hard disk. The game's installer will run automatically once unpacking is complete. Follow the prompts on the screen to complete the installation of the game. Once installation is complete, a shortcut to the **Rise of Flight Game Launcher** will be placed on your desktop.

3. Once the game files have been installed, you will be prompted to install some **additional Microsoft and Adobe components**. We highly suggest you install these files, even if you think you do not need them. Rise of Flight will fail to run properly if you do not install the Microsoft Libraries, and you will not be able to read additional documentation in the game if you do not have Adobe reader installed on your machine.

4. Run the **ROF Launcher** by double-clicking on the **ROF shortcut** placed on your desktop.

5. Once you open the ROF Launcher for the first time, you should check for an update, click on **Update**. If an update is available, the system will prompt you to choose an update server from the list. Select a server and click **OK**; this will begin the update process, which will automatically update your game to the latest version. Once the update is complete, click the **Start** button at the bottom of the Game Launcher screen to return to the main launcher screen.

6. Once back on the main launcher screen click on **Settings** and choose the settings for the game

7. You can also click on the **News** tab and learn about any new developments regarding ROF.

8. After you have selected your settings and checked the news, you can launch the game by clicking on the **Start** button.

9. Once you have successfully launched the game for the first time, you will be presented with the **User Authorization** screen. At this point, you will be prompted to activate your copy of the game. Click **Register Retail Copy or Activate Demo Access** from the menu at the lower left and then accept the **End-User License Agreement**. Then fill in all fields in the activation form and click **Register**. Please be careful when choosing an e-mail address and password for your User Account, as this information will be needed in the future when accessing the game and services on the official Rise of Flight forums. During registration enter the following **key-code to activate the Free2Play version: 77777-77777-77777-77777-77771**. Do not enter this code if you have purchased a Retail or Digital copy of the game. If you have a Retail or Digital copy of the game see sections 1.3 and 1.4 below.

1.2 Upgrading the Free2Play Version: If you wish, you can upgrade your Free2Play version to include many more airplanes with one simple purchase. This is a good option if you cannot easily obtain a Retailer or Digital copy of ROF. There are a couple different options for you to choose from. Each option gives you a discounted bundle of planes. Choose which one is best for you. Do not attempt to purchase a Free2Play upgrade if you purchased a Retail or Digital copy of ROF. They are intended only for the Free2Play version and are incompatible with Retail or Digital versions.

Note: you do not need to re-download and re-install the game nor register a User Account again if purchasing an upgrade. Your Free2Play download is the full game; when you purchase an upgrade, you are simply unlocking access to the appropriate additional content you just purchased.

1. Log into the official ROF website (www.riseofflight.com) using your User Account details you provided when you registered your Free2Play version of ROF.

2. Navigate to the **Free2Play Upgrades** (http://riseofflight.com/en/store/demoupgrades) page (formerly called Demo Upgrades) in the ROF Store. Once there choose which upgrade you prefer.

3. Click the **Buy** button on the appropriate upgrade page. One you make the purchase your ROF User Account will be automatically upgraded and the new content you just purchased will be made available to you in the game.

4. If you have previously installed and activated the Free2Play version, simply start the game as usual. At the Login screen, use the same e-mail address and password that you previously used to access the game. Once you do that all the content you just purchased in your upgrade will be unlocked.

1.3 Installing and Activating the Retail Version: To install the Retail (DVD) version of ROF you will need a DVD-ROM drive. Installation of ROF from the DVD is rather simple, but you need to follow the steps below to ensure proper installation.

Note: you must use the "Administrator" account in Windows in order to install the game correctly. If using Windows 7 or Windows Vista, you should disable User Account Control (UAC) during installation. Otherwise, Windows may not allow you to install all files, and you will receive an error message.

1. Purchase the DVD version of ROF from a retail store.

2. Put the DVD in the drive, and the auto-play feature of your disk drive should automatically execute the **setup.exe** file. If this does not happen, open the contents of the DVD disk via **My Computer** and then double-click on **setup.exe**. Follow the prompts

on the screen to complete the installation of the game. Once installation is complete, a shortcut to the Rise of Flight Game Launcher will be placed on your desktop.

3. Once the game files have been installed, you will be prompted to install some **additional Microsoft and Adobe components**. We highly suggest you install these files, even if you think you do not need them. Rise of Flight will fail to run properly if you do not install the Microsoft Libraries, and you will not be able to read additional documentation in the game if you do not have Adobe reader installed on your machine.

4. Run the **ROF Launcher** by double-clicking on the **ROF shortcut** placed on your desktop.

5. Once you open the ROF Launcher for the first time, you should check for an update, click on **Update**. If an update is available, the system will prompt you to choose an update server from the list. Select a server and click **OK**; this will begin the update process, which will automatically update your game to the latest version. Once the update is complete, click the **Start** button at the bottom of the Game Launcher screen to return to the main launcher screen.

6. Once back on the main launcher screen click on **Settings** and choose the settings for the game.

7. You can also click on the **News** tab and learn about any new developments regarding ROF.

8. After you have selected your settings and checked the news you can launch the game by clicking on the **Start** button.

9. Once you have successfully launched the game for the first time, you will be presented with the **User Authorization** screen. At this point, you will be prompted to activate your copy of the game. Click **Register Retail Copy or Activate Demo Access** from the menu at the lower left and then accept the **End-User License Agreement**. Then fill in all fields in the activation form and click **Register**. Please be careful when choosing an e-mail address and password for your User Account, as this information will be needed in the future when accessing the game and services on the official Rise of Flight forums. During registration enter the **key-code found on the back of your User Manual**. It will be a unique 25 digit code that will unlock all of the content that is included in the retail version your purchased. There are different retail versions on the market. Consult your packaging to see what is included in your copy.

1.4 Installing and Activating the Digital Version: To install the Digital version of ROF you will need a confirmation email from the seller that includes the proper key-code and have downloaded the install executable file. Installation of the Digital Copy is rather simple, but you need to follow the steps below to ensure proper installation.
Note: you must use the "Administrator" account in Windows in order to install the game correctly. If using Windows 7 or Windows Vista, you should disable User Account Control (UAC) during installation. Otherwise, Windows may not allow you to install all files, and you will receive an error message.

1. Purchase the Digital version of ROF from an online digital download retail store.

2. Once you have downloaded the executable, double-click on **setup.exe**. Follow the prompts on the screen to complete the installation of the game. Once installation is complete, a shortcut to the Rise of Flight Game Launcher will be placed on your desktop.

3. Once the game files have been installed, you will be prompted to install some **additional Microsoft and Adobe components**. We highly suggest you install these files, even if you think you do not need them. Rise of Flight will fail to run properly if you do not install the Microsoft Libraries, and you will not be able to read additional documentation in the game if you do not have Adobe reader installed on your machine.

4. Run the **ROF Launcher** by double-clicking on the **ROF shortcut** placed on your desktop.

5. Once you open the ROF Launcher for the first time, you should check for an update, click on **Update**. If an update is available, the system will prompt you to choose an update server from the list. Select a server and click **OK**; this will begin the update process, which will automatically update your game to the latest version. Once the update is complete, click the **Start** button at the bottom of the Game Launcher screen to return to the main launcher screen.

6. Once back on the main launcher screen click on **Settings** and choose the settings for the game.

7. You can also click on the **News** tab and learn about any new developments regarding ROF.

8. After you have selected your settings and checked the news you can launch the game by clicking on the **Start** button.

9. Once you have successfully launched the game for the first time, you will be presented with the **User Authorization** screen. At this point, you will be prompted to activate your copy of the game. Click **Register Retail Copy or Activate Demo Access** from the menu at the lower left and then accept the **End-User License Agreement**. Then fill in all fields in the activation form and click **Register**. Please be careful when choosing an e-mail address and password for your User Account, as this information will be needed in the future when accessing the game and services on the official Rise of Flight forums. During registration enter the **key-code found in your confirmation email from the seller**. It will be a unique 25 digit code that will unlock all of the content that is included in the digital version your purchased. There are different retail versions on the market. Consult your seller's website to see what is included in your copy.

1.5 Retail Upgrade from Free2Play Version: If you wish, you can upgrade your Free2Play version by buying the Retail version and using the provided key-code to unlock the Retail content. There is no need to install the game again from the disk if you already have the Free2Play version installed.

Note: you do not need to re-download and re-install the game nor register a User Account again if using the Retail key-code as an upgrade. Your Free2Play download is the full game; when you purchase an upgrade such as the Retail version, you are simply unlocking access to the appropriate additional content you just purchased.

1. Install the Free2Play version as described in **Section 1.1** above.
2. Locate the **Retail Key-Code** on the back of the User Manual.
3. Launch ROF and choose **Login Online**.
4. Locate the **ROF Demo Badge (Winged Angel)** on the Main Screen. Double-click the badge to enter the Upgrade Screen.



5. Enter the **Retail Key-Code** from the back of the User Manual and click **Register**.
6. You should receive a message saying you have activated a Retail Copy or ROF.

1.6 Digital Upgrade from Free2Play Version: If you wish, you can upgrade your Free2Play version by buying the Digital version and using the provided key-code to unlock the Digital content. There is no need to install the game again if you already have the Free2Play version installed.

Note: you do not need to re-download and re-install the game nor register a User Account again if using the Digital key-code as an upgrade. Your Free2Play download is the full game; when you purchase an upgrade such as the Digital version, you are simply unlocking access to the appropriate additional content you just purchased.

1. Install the Free2Play version as described in **Section 1.1** above.
2. Locate the **Digital Key-Code** from your confirmation email from the seller.
3. Launch ROF and choose **Login Online**.
4. Locate the **ROF Demo Badge (Winged Angel)** on the Main Screen. Double-click the badge to enter the Upgrade Screen.



5. Enter the **Digital Key-Code** from your confirmation email from the seller.
6. You should receive a message saying you have activated a Digital Copy or ROF.

1.7 Adding Individual Content to Free2Play Version: If you wish, you can add additional content (Airplanes, Field-Mods, and Campaigns) to your install and build up your Free2Play version at your own pace. To do this you must purchase the content directly from the ROF Store.

Note: Once you have purchased an individual content item such as an airplane, you cannot upgrade your install further via a Retail or Digital key-code or Free2Play Upgrade package. This is necessary to prevent users from paying twice for the same item. However, you can always add additional individual content to your Free2Play, Retail or Digital copy after initial activation.

1. Log into the official ROF website (www.riseofflight.com) using your User Account details you provided when you registered your Free2Play version of ROF.
2. Navigate to the **ROF Store** page (http://riseofflight.com/en/store). Once there choose which type of content you would like to purchase: Airplanes, Field-Modifications or Campaigns.
3. Select the content you would like to purchase and click the **Buy** button. Once you make the purchase, your ROF User Account will be automatically updated and the new content you just purchased will be made available to you in the game.
4. Simply start the game as usual. At the Login screen, use the same e-mail address and password that is associated with your User Account and all the content you just purchased will be unlocked.

1.8 Recovery Option: If your game becomes unplayable after installing an update, click on the **Recovery** button, which can be found by clicking on the **Update** button. This function will determine what data is corrupted or missing and will prompt you to download the correct files from the update servers. Select a server and click **OK**; this will begin the recovery process.



2.0 ROF WEBSITE

There is much more to Rise of Flight than just the simulation or game, it also has a companion website that is very important to the ROF entire experience. The website is located at www.riseofflight.com. The ROF website allows you to do many important things such as:

- Purchase Content such as Airplanes, Field Mods and Campaigns

- Purchase Gifts for friends
- Track your purchases and gifts
- Get the latest News about ROF development
- Download Useful Materials such as User Manuals, Artwork and Photoshop Templates
- Check out the ROF Leaderboards
- Participate in our Community Forum



Figure 2.0

2.1 Login to Website: Your User Account information which you provided during the ROF registration process is what you will use to access the ROF website and all its features. Your Login ID is the email you registered in the game and the Password is also the one you registered within the game. One login and password gives you access to both the game and the website.

2.2 Navigation: Navigating the ROF website is very easy. Simply click on the Navigation bar at the top of the screen. There you can access all areas and sub-sections of the website. Some areas will not be visible to you unless you are logged in as described above.

2.3 Purchasing Content: You can purchase additional content such as Airplanes, Field Mods, Campaigns and Demo Upgrades in the ROF Store. Just click on the **Store** button to visit. You can purchase more than one item at a time. We do offer a quantity discount on most items. This is especially helpful when purchasing airplanes and field modifications.

To purchase an item simply check the box and click **Buy** or **Buy as a Gift**. In some cases when you buy more than one item you will receive a quantity discount. The more you buy the bigger the discount. Then select the method of payment you prefer. We accept most major credit cards and PayPal. You can also pay via credit card with PayPal if you wish. Fill out the necessary information and complete the purchase. Once the purchase is successful you'll be directed back to the ROF website and you'll see a message confirming your purchase.

Note: We do not retain your credit card or personal information. Every purchase is encrypted and the information is deleted after each purchase. We do not keep any personal records after your transaction. We use trusted Authorize.net for our credit card gateway and the PayPal payment processing system to ensure safe and secure transactions.

2.4 Purchasing and Sending a Gift: One special feature of our Store is that you can purchase an airplane as a gift and send it to a friend electronically on the ROF website. This is a first for a flight-sim product and is an amazing way to help your fellow flight-simmer enjoy ROF even more. To purchase and send gifts please follow the instructions below.

1. In the ROF Store you will see an option to **Buy as a Gift** listed for airplanes. Currently Field Mods and Demo Upgrades cannot be purchased as a gift. We hope to change that in the future. You can purchase more than one plane if you would like. Simply follow the usual procedure for purchasing a plane from our website using a credit card or PayPal.

2. After purchase your account will now list the license(s) available to send to your friend or family member. To see the license(s) simply click on **Profile** and then **Gifts** while logged into the ROF website. You will see a list of codes purchased by you and whether or not they have been activated yet.

3. To send a Gift code to a friend click on **Send** and then enter the person's **Forum Nickname**. Hit **Send** and an email will be sent to the email address associated with that person's ROF account notifying them that you send a gift.

4. If the notification email fails to reach that person, you can always send an email to them yourself or send a PM through the forum with the proper code. Just copy and paste the code into the email or Private Message.

5. To activate a Gift code, simply click on **Profile** and then **License** while logged into the ROF website. Then enter the code into the **Gift Activation** box and click on **Activate**. Now launch ROF and **Login Online** one time to sync your account and then that plane is available to your ROF account forever.

6. Once a code is activated by a recipient, the code will show as *Activated* on your **Gifts** page.

2.5 Track Purchases: In addition to purchasing items in the ROF Store you can also track the purchases you have made by viewing the licenses you currently own within ROF. All items you purchase come with a unique identifying code that is stored in our database. You can view all of your purchases and corresponding codes by clicking on the **Profile** button and then the **License** button.

2.6 News Blog: We post important news and updates about ROF developments frequently on our website. To view the news updates simply click on **News** button in the navigation bar. The latest news will be posted at the top usually with accompanying screenshots. You can also view previous news and see how ROF has developed over time.

2.7 Useful Materials: We also make certain helpful materials such as artwork, Photoshop templates, game maps and user manuals available for download from the ROF website. These materials can be used on squadron websites or improved by users for a wide variety of purposes. To download them click on the **Community** button in the navigation bar and then **Useful Materials** button.

2.8 Leaderboards: Another unique feature of ROF is that we collect in-game statistics from ROF users and we display them on the ROF website. There you can see who the best pilots are from around the world. Stats are updated regularly and the system is always evolving.

2.9 Community Forum: We offer all ROF users the opportunity to have their voice heard and participate in our community forum. To enter the ROF forum just click on the **Community** button on the navigation bar. The ROF forum is a great place to learn more about ROF and chat with like-minded flight sim enthusiasts from around the world. The ROF team also uses the forum to make special announcements and discuss future development issues surrounding ROF. Please read and understand the forum rules and if you participate in the forum remember to be friendly and kind to your fellow simmer. The ROF community is a very friendly and helpful bunch.



3.0 ROF LAUNCHER

Rise of Flight comes with an external app called the **ROF Launcher**. After installation a shortcut will be placed on your desktop and when you double-click on it will start the Launcher. The Launcher allows the user to manage all the necessary graphical and technical settings for ROF. It also updates you on happenings in ROF development and it is the portal in which you can update ROF to the latest version. Links to different sections of the Rise of Flight website can also be found at the top of the ROF Launcher. For more information about the Rise of Flight website, please see section 2.0.

3.1 News: (Figure 3.1) When you start the launcher you will be greeted by the News tab. The news tab gives you information about new ROF developments and other special news the team wishes to share such as new features and airplanes.



Figure 3.1

3.2 Graphics: (Figure 3.2) The graphics tab is where you can set your graphics settings in ROF. You can adjust the following settings.

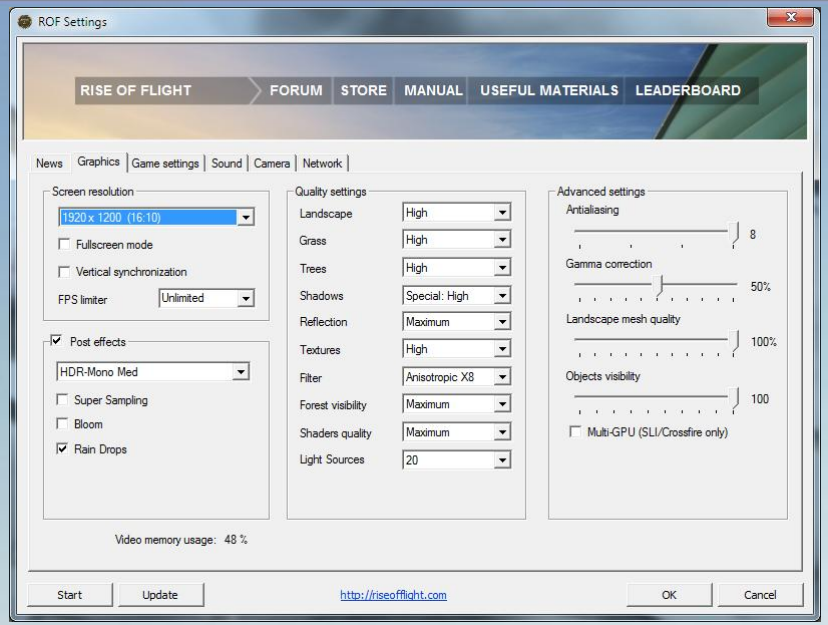


Figure 3.2

Screen Resolution

- Resolution. Choose the resolution that matches your monitor.

- Windowed Mode. For those users that prefer a windowed game.

- Vertical Sync. This setting syncs your frame rate in the vertical to allow for a smooth picture without image tearing.

- FPS Limiter. This limits the maximum frame rate. This may help limit stutters.

Post Effects

- Post Effects. This setting allows for special graphical effects. Some post effects may slow performance, but with a more beautiful picture.

- HDR or High Dynamic Range Lighting. This setting allows for special lighting. Choose the one that is the most pleasing to you. Some HDR settings may have a bigger impact on performance than others. Regular HDR uses a blend of Red, Yellow and Green filter to affect the image depending on the lighting angle. Mono applies a monochromatic filter the entire image regardless of the lighting angle. Also, the intensity of the HDR can affect the appearance of the sun. High HDR the sun appears as if you are wearing sunglasses.

- Super Sampling. This setting turns on an antialiasing technique that draws the image at a higher resolution and then down-samples the image. The process helps eliminate jagged and pixelated edges and helps eliminate shimmer on the horizon in ROF. In ROF Super Sampling is drawn at 2x and can have a big impact on performance.

- Bloom. This setting adds a reflective lighting effect to various surfaces and light sources in the game.

- Rain Drops. If it is raining you will see a realistic water droplet effect on your screen. The rain drops are dynamic and affected by the wind and the position of your head. The effect is quite realistic looking.

Quality Settings

- Landscape. You can choose Low, Medium or High. This affects the detail of the landscape textures and the higher the setting the bigger the impact on performance.

- Grass. This setting will place grass on the ground. You can choose Off, Low, Medium and High. This affects the amount of grass that is visible.
-Trees. You can choose Low or High.

-Shadows. You can choose Off, Common Medium, Common High, Special Medium and Special High. Special shadows are meant for use with NVIDIA 4xx and 5xx series video cards.

- Reflection. You can choose Off, Medium, High and Maximum and this affects how sharp the reflections are off of water and shiny surfaces. The Maximum setting also allows the surrounding environment such as the sky, ground and sunlight to reflect off of objects just as in real life.

-Textures. This setting can be set to Low, Medium and High and it directly affects the detail found in all textures such as the paint schemes on airplanes and vehicles. The lower the setting the more performance you will gain, but textures may look blurry. Most systems can handle High textures without problems.

-Filter. This is the setting for in-game Anisotropic Filtering (AF) and the setting affects the overall appearance of the scene. It can help smooth the image and make textures further away look sharper.

- Forest Visibility. This affects the distance at which the trees and forests are drawn. You can choose Medium, Far, Very Far and Maximum. The further out you draw the trees the bigger the hit on performance. At maximum settings trees are drawn out to approximately 8km.

- Shader Quality. This setting affects the appearance of certain graphical effects such as the appearance of the water, lighting and ground. You can choose from Low, Medium, High and Maximum. When you choose maximum the ground will have a special texture applied to it to look bumpy and this is called Parallax Mapping. Parallax mapping is triggered when you fly close to the ground.

- Light Sources. This setting determines how many light sources can be drawn at any one time. You can choose from 4, 8, 10, 15 and 20 light. This is most noticeable at night time and

most systems can handle 20 lights. If more than 20 lights are visible at one time, some light sources will be turned off for performance reasons. However, this is a rare occurrence.

Advanced Settings

- Antialiasing. This setting determines the level of AA that is applied to the game image. The higher the AA the fewer jaggies and shimmer the picture will have. The higher the setting also affects performance. Most systems can run with 4x or 8x. If you want to use Super Sampling we recommend an AA setting of only 2x.

- Gamma Correction. This setting determines the brightness of the image. Most users like between 30-50% Gamma.

- Landscape Mesh Quality. This setting affects how detailed the terrain will look in the distance. This feature has a significant impact on performance and picture quality. Most users prefer a setting between 80-100%. Lowering this setting can give a good boost to frame rates, but the terrain in the distance will be less detailed.

- Objects Visibility. This setting determines the maximum range that buildings, vehicles and airplanes are drawn. At 100% these are drawn out to approximately 8km. This increases realism, but can have a negative impact on performance. Most users prefer a setting somewhere between 50-100%.

- Multi-GPU (SLI/Crossfire). This setting when turned on loads special multi-GPU optimizations for ROF that increases performance. This setting can be used with a single GPU, but may cause stutters. We suggest only using this setting with multi-GPU setups.

3.3 Game Settings

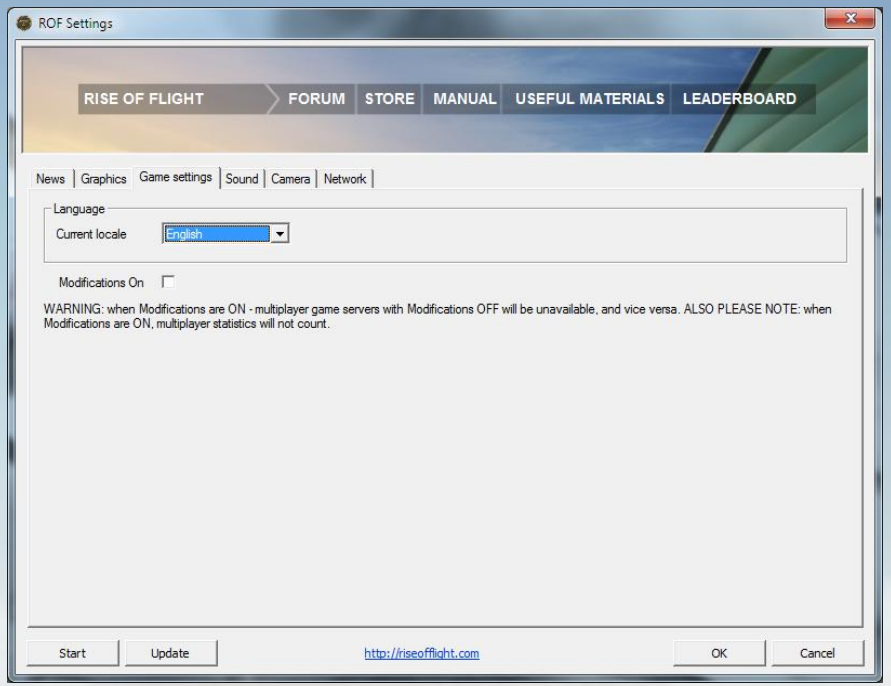


Figure 3.3

- Current Locale. (Figure 3.3) This setting changes the language the game will be presented in. You can choose from English, French, German, Russian or Spanish.

- Modifications On. This check box determines whether or not you can use custom 3rd Party mods within ROF. This is to prevent cheating, but still gives the user the ability to use modified files in ROF. Multiplayer servers with Mods On or Off are not compatible with each other. Also note that when Mods On is checked multiplayer statistics are not recorded.

3.4 Sound

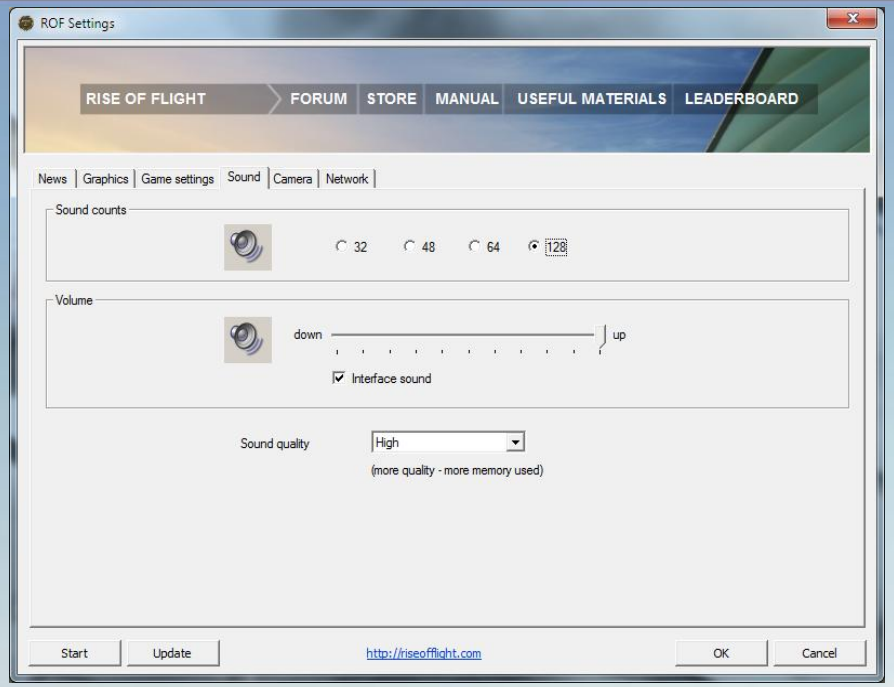


Figure 3.4

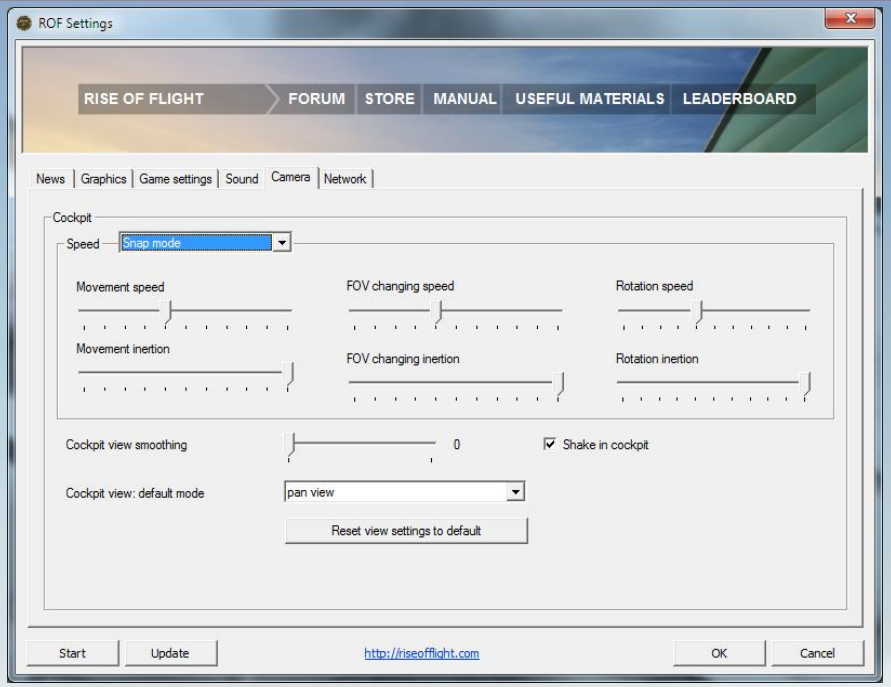


Figure 3.5

- Sound Counts. (Figure 3.4) This setting determines how many sounds can be played and therefore heard at one time. You can choose from 32, 48, 64 and 128. If more sounds are trying to play than what you have chosen you will not hear all sounds. The more sounds you choose, the more processing and memory is needed, but most users can play with 64 or 128 no problem with a modern sound card.

- Volume. This setting determines the overall sound level for the game. You can also choose to disable the User Interface sound by checking the box.

- Sound Quality. This setting determines the level of detail your sounds will have. Most users can fly with Medium or High with no problem. Although the higher the setting the more memory your sounds will use as the sound files are larger due to the increased quality. If you run into memory errors while flying ROF try lowering this setting.

3.5 Camera

- Cockpit. (Figure 3.5) There are several settings that affect how the in-cockpit camera behaves and you can change these settings to best match your personal preferences. There are two major types of cockpit view modes - Snap and Pan. Snap View means the camera instantly snaps to the position you with to see and Pan View means the camera rotates to the position you wish to see. Each view mode has several settings that can be changed. They are Movement Speed, Movement Inertia, FOV Change Speed, FOV Change Inertia, Rotation Speed and Rotation Inertia. Adjust each setting to the one you like. These settings are meant to be used in conjunction with a Hat Switch or Key Presses. These settings do not interact with the mouse look or if you are using a TrackIR.

- Cockpit View Smoothing. This setting smooths out the camera as it swings around in the cockpit. This can help with mouse look or TrackIR usage. The higher the smoothing setting the more sluggish the camera can seem.

-Shake in Cockpit. This setting determines if the cockpit camera will shake to mimic the effect as if your body was really shaking due to being inside the real cockpit. Situations where the aircraft can shudder and shake are stalls, turbulence and landings.

- Cockpit View: Default Mode. This setting simply determines which view mode will be default upon entering the cockpit during a flight. You can choose from Centered Snap View, Fixed Snap View, Additive Snap View and Pan View.

3.6 Network

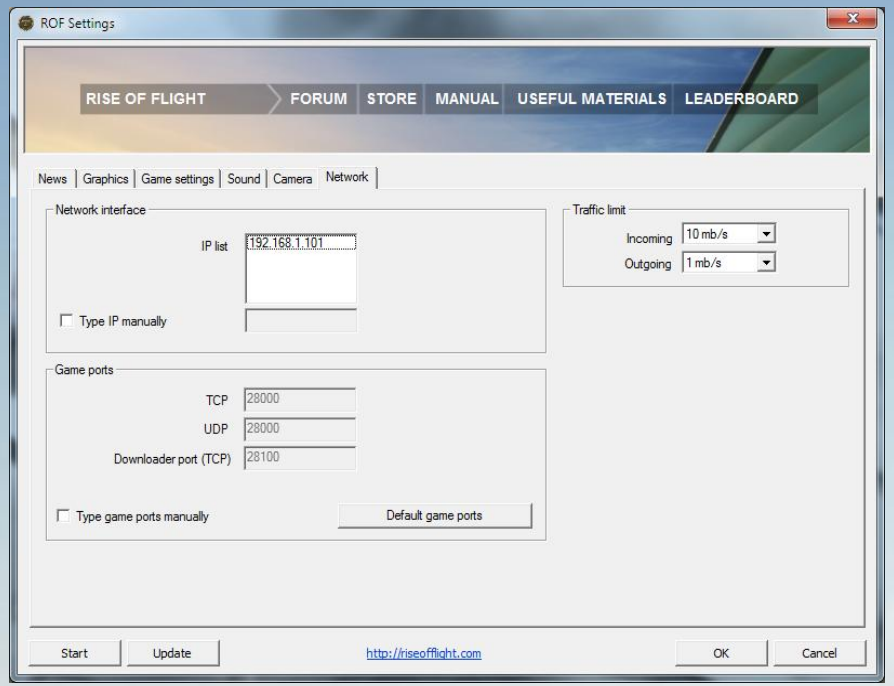


Figure 3.6

- Network Interface. (Figure 3.6) This is where you can either see your IP Address or manually enter it. In most cases leaving the IP address alone is fine. To manually enter your IP address check the box and type in your desired IP address. Manually entering your IP address is only recommended to experienced network users.

- Game Ports. The game port settings are necessary for ROF Multiplayer to function properly. If these ports are not open then you may not be able to join or host a multiplayer match. By the Default game ports are as follows: TCP – 28000 UDP – 28000 Downloader Port (TCP) – 28100. You may need to manually open or forward these ports on your internet router. Please refer to your router manual or your ISP for instructions on how to do this. If you need to manually enter the game ports just check the box and type them in.

- Traffic Limit. This setting allows you to set the maximum traffic limit for you in an ROF multiplayer environment. Choose the setting that best matches your type of internet connection. You can choose from 256Kb/s, 512Kb/s, 1Mb/s, 2Mb/s, 4Mb/s and 10Mb/s. If you do not know the speed of your Incoming and Outgoing internet bandwidths choose 1Mb/s. This should work for most users.



4.0 PILOT PROFILES, STATS, AWARDS AND REFERENCES

4.1 PROFILE CREATION

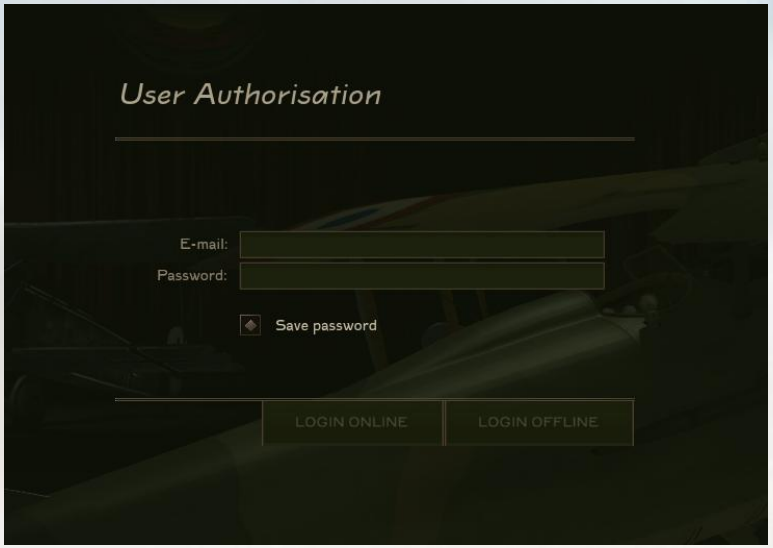


Figure 4.1

Once you have successfully activated the game (Figure 4.1), you will be prompted to create a pilot profile. Your profile keeps track of your in-game statistics (including any awards earned) and shows the user name by which you will be seen by others in multiplayer. Up to three user profiles, each independent from the others, can be created with each activated user account. To create a pilot profile, please perform the following steps:

1. If you are not already on the pilot profile screen, click on the Profiles link at the bottom of the main game screen.

2. Click on the **Create New Profile** button.

3. On the **New Profile**, **Select Country** screen, select the country by which you want to be known. This will be displayed alongside your profile for multiplayer statistics.

4. On the **New Profile** screen, enter the pilot name by which you want to be known. You can also enter an optional motto at this point.

5. Once you have entered in your information on the **New Profile** screen, click on the **Ready** button. This will successfully create your pilot profile, and you will then be returned to the main screen.

6. If, at any point you wish to cancel the creation of a new pilot profile, click on the **X** button. This action will return you to the main game screen.

7. To switch between profiles, click on the **Profiles** link on the main game screen, select the profile you wish to use, and click on the **Select** button. Your currently active profile will be noted below the words "Current Profile."

   *Note: once you have created a pilot profile, you cannot modify any of its details. In such a case, you will need to delete the profile in question with the **Delete** button and create a new one. You can have a maximum of 3 pilot profiles created at any one time.*

4.2 ACCESSING THE GAME & PROFILE SYNCHRONIZATION

When you load Rise of Flight, you will be given two choices at the User Authorization screen by which you may log in to the game: Online Mode and Offline Mode.

- Online Mode allows you access all features offered by the game, including Single Missions, Quick Missions, Campaigns, Career, and Multiplayer. An Internet connection is required to log in via online mode and at all times during the gaming session. Your game statistics are communication to the Rise of Flight master server, and awards are given based on your performance.

- Offline Mode allows you to log in to the game without the requirement of an Internet connection. This mode limits your access to Single Missions, Quick Missions, and Campaign missions. Career and Multiplayer modes cannot function in offline mode due to technical limitations. Statistics you accumulate while flying in Offline Mode are saved on your machine until you synchronize them with the Master Server the next time you log in via Online Mode.

- When you log in for the first time in Online Mode after playing in Offline Mode, you will be prompted to synchronize your pilot profile. Portions of your pilot profile are stored on the Rise of Flight server network, which allows you to maintain your unique game settings, to access to the game from any computer using your Player Account, and to view your ranking on the Online leader boards. You may cancel the synchronization process, but in so doing you will lose any achievements and statistics accumulated while playing in Offline Mode.

  Note: you should always start the game in Online Mode after installing the game for the first time, after re-installing the game, or after upgrading the hardware on your computer. The use of Online Mode is only possible after a one-time validation of your copy of the game. You do not need to reactivate your copy should you need to re-install it; you simply need to log in one time with your Player Account information in order to unlock the new installation. This allows unlimited installations and un-installations of Rise of Flight on your machine.

4.3 STATISTICS



Figure 4.3

The **Statistics** screen (Figure 4.3) maintains the statistics for the pilot profile you currently have selected, and it is divided between single player (for Campaign and Career mode only) and multiplayer game play. Statistics for multiplayer are updated once a day by the Rise of Flight master server. This screen can be accessed by clicking on the **Statistics** link at the bottom of the main game screen and is divided up into the following categories:

- **Flight Time:** this section notes how much time you have flown a particular aircraft. The time shown uses the hours : minutes : seconds format.

- The next section lists a number of miscellaneous statistics, including total landings, total crash landings, sorties flown, total successful & failed missions, secondary objectives completed, number of careers created, and total successful and failed careers.

- **Air Victories:** this section notes how many aircraft you have shot down, how many aircraft you have assisted in shooting down, and how many pilots you have killed. Air victories are further subdivided into AI-flown & human-flown aircraft shot down, fighter planes shot down, bombers shot down, and recon planes shot down.

- **Defeats:** this section notes how many times you have been wounded in action, killed in action, taken prisoner by the enemy, and how many planes & wingmen you have lost.

- **Enemies Killed:** this section lists the ground targets you have destroyed by type.

- **Friendly Fire:** any friendly aircraft, balloons, and ground targets destroyed will be listed in this section.

- **Effectiveness:** this section notes your current kill streak (multiplayer only), kill/death ratio, total machine gun rounds fired, gunnery accuracy, total bombs dropped, and bombing accuracy.

- **Favorite Plane Description:** this section shows the detailed history for the aircraft you have flown for the longest in either single player or multiplayer mode.

4.4 AWARDS

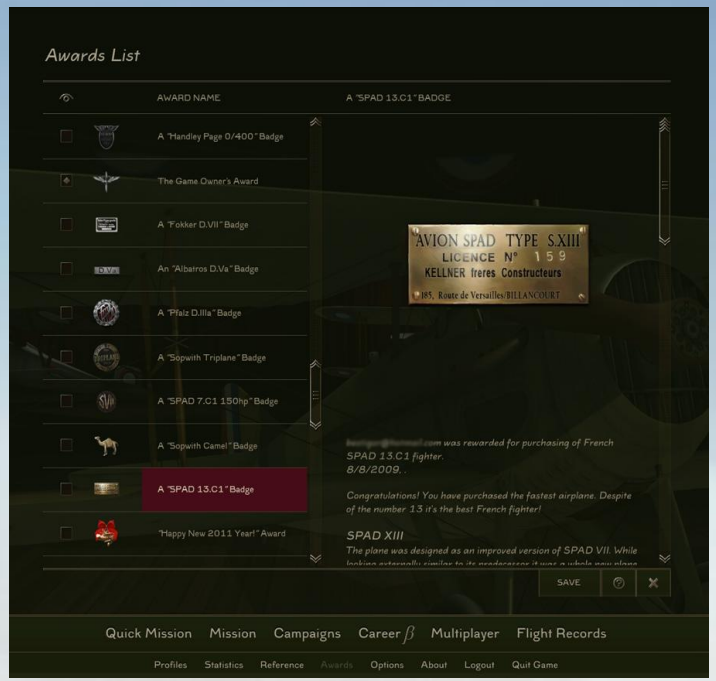


Figure 4.4

The **Awards** screen (Figure 4.4) lists all of the medals, badges, trophies, and souvenirs you have earned with your currently enabled profile in both single player and multiplayer game play. This screen can be accessed by clicking on the **Awards** link at the bottom of the main game screen. There are four different types of awards you can earn: Souvenirs, Historical Awards, Trophies, and Pilot Class:

- **Souvenirs:** these are awarded for purchasing planes, playing campaigns, participating in online competitions, or for being a productive member of the Rise of Flight community. For instance, the silver Rise of Flight Owner's Wings, which are given to people who register a copy of the game, is a souvenir. Some of awards in this category are unique and given to very few people.

- **Historical Awards:** these awards can only be earned in the Campaign and Career modes of the game and are awarded based on historical criteria. Earning an award in this category is determined by your compliance with mission objectives, by how well you followed your orders, and by which awards were available on the historical date on which you flew your mission.

- **Trophies:** trophies are awarded only for multiplayer game play, and they are a reflection of your success in battle with other players. Historically, WWI pilots often took a souvenir trophy from an aircraft they had downed, whether it be a simple part or

ornament, a personal effect from the enemy pilot, a salvaged weapon, or an instrument that could then be fitted to the victor's plane. In Rise of Flight, some trophies can be earned simply by downing a certain number of a particular type of aircraft, while other trophies require a tremendous amount of skill or luck to earn.

- **Pilot Class:** this type of award is also given for multiplayer game play only. It reflects your current level in one of four categories: Fighter Pilot, Bomber Pilot, Commander, or Server Owner. The levels for this type of award are Bronze, Silver, Gold, and Ace.

  - To the view the description of an award, click on the name of the medal in the left-hand column; this will display information about the award (such as date earned and historical background) in the right-hand column.

  - The Awards screen also allows you to control which awards you wish to display on the main game screen. To enable the display of an award, click on the check box to the left of award's name; likewise, to remove a medal from the main screen display, clear the check box. Once you are finished, be sure to click on the **Save** button in order to apply your preferences.

  - On the main game screen, you can view the information about any awards displayed by double-clicking on the item. If you wish to remove the award in question from the main game screen, clear the **Show on Desktop** check box.

4.5 REFERENCE

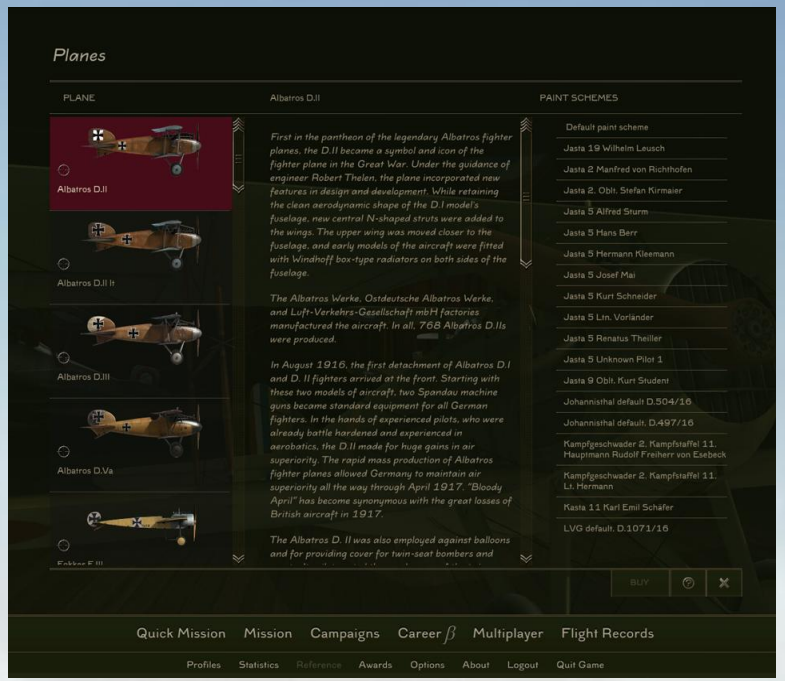


Figure 4.5

The **Reference** screen (Figure 4.5) lists and displays historical information about each aircraft currently available in the user's version of the game. This screen can be accessed by clicking on the **Reference** link at the bottom of the main game screen.

To view the information about a particular aircraft, click on the aircraft's name in the left-hand column; this will show the pertinent historical information in the center column.

This screen also allows the user to see a preview of any custom skins installed for a particular aircraft. To see the thumbnail preview for a particular skin, place your mouse cursor over the textual description for the skin.



5.0 OPTIONS, SETTINGS, AND AIRCRAFT CUSTOMIZATIONS

5.1 IN-GAME OPTIONS

The **Options** screen allows you to customize a number of settings for the game with your currently selected pilot profile, including controller settings, keyboard assignments, and the way certain features are displayed in the game. This screen is divided into eight tabs: **General**, **Camera**, **Input**, **Controls**, **Responses**, **Video**, **Audio**, and **Network**. To access this screen, click on the **Options** link at the bottom of the main game screen.

The **General** tab (Figure 5.1.1) is divided into four sections: **Internalization**, **Customizations, Flight recording**, and **Profile**.

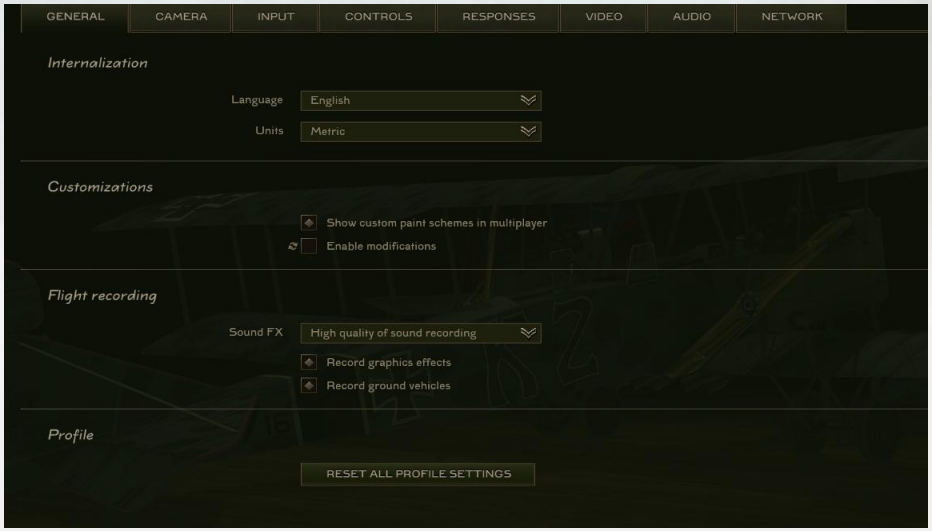


Figure 5.1.1

- The **Internalization** section allows you to set the language in which Rise of Flight is displayed. Choose the language you wish to use from the **Language** drop-down list. You can also set in this section the measurement system in which the simple gauge icons and bombsight controls are displayed. These options can be found in the **Units** drop-down list and are as follows:

  - **Metric**: displays airspeed in kilometers per hour and altitude in meters.

  - **Imperial**: displays airspeed in miles per hour and altitude in feet.

  - **By plane**: displays altitude and airspeed according to the instrumentation installed in each particular aircraft.

  Note: you cannot adjust these settings while you are flying a mission.

- The **Customizations** section allows you to enable or disable the display of custom aircraft skins for other players in multiplayer game play. Click the **Show paint schemes in multiplayer** check box if you wish to see these custom skins. If this check box is cleared, only the default skin for each aircraft type will be displayed for the aircraft of other players. This setting has no effect on the skin of your own aircraft.

  You can also enable third-party modifications in this section. To enable or disable third-party modifications, click the **Enable modifications** check box. In order for this setting to take effect, you will first need to exit and restart the game. Please see section 3.3 for more information on third-party modifications.

  Note: you cannot adjust these settings while you are flying a mission.

- The **Flight recording** section allows you to set various parameters for recording in-flight game play. The **Sound FX** drop-down list gives you three options for the quality of the sound recording: **No sound recording**, **Medium quality of sound recording**, and **High quality of sound recording**. To enable the recording of special effects (such as tracers, flames, and explosions), click on the **Record graphics effects** check box. To include the movement of ground vehicles in your recordings, click on the **Record ground vehicles** check box.

  Note: you cannot adjust these settings while you are flying a mission.

- The **Profile** section allows you to reset all the settings in the **General** section to their default values. To do this, click on the **Reset All Profile Settings** button. A dialog box will open, asking you to confirm your decision.

Once you have completed making any changes to the **General** tab, be sure to click on the **Apply** button at the bottom of the screen to apply your changes. If you wish to undo any changes you have made to this screen, click on the **Reset** button. A dialog box will open, asking you to confirm your decision. To reset all of the settings on this screen to their default values, click on the **Defaults** button. A dialog box will open, asking you to confirm your

decision.

Note: if you attempt to click on another tab in the Options section without first applying your changes, a dialog box will open, asking you to either apply or discard your changes or to cancel your changes and remain on the currently selected tab.

- The **Camera** tab is divided into two sections, **Camera** and **Cockpit camera**.



Figure 5.1.2

- The **Camera** section (Figure 5.1.2) allows you to choose the type of camera you wish to use when following an aircraft in external view mode. Enabling the **Cinematic camera effect** option simulates the effect of a non-stabilized camera. That is, the camera will move horizontally and vertically, thus simulating it being attached to an aircraft that is being buffeted around. Keep this check box cleared if you want your external camera view to remain stable.

- The **Cockpit Camera** section allows you to adjust various in-cockpit camera settings. Please see section 3.5 for more information on adjusting these settings.

Once you have completed making any changes to the **Camera** tab, be sure to click on the **Apply** button at the bottom of the screen to apply your changes. If you wish to undo any changes you have made to this screen, click on the **Reset** button. A dialog box will open, asking you to confirm your decision. To reset all of the settings on this screen to their default values, click on the **Defaults** button. A dialog box will open, asking you to confirm your decision.

Note: if you attempt to click on another tab in the Options section without first applying your changes, a dialog box will open, asking you to either apply or discard your changes or to cancel your changes and remain on the currently selected tab.

- The **Input** tab (Figure 5.1.3) is divided into two sections, **Mouse** and **Force Feedback**.



Figure 5.1.3

- The **Mouse** section allows you to adjust various settings for your mouse. The **Sensitivity and Acceleration** settings control the speed of your mouse for both in-cockpit and the various external camera views. Click and drag the sliders to the right to increase these values and to the left to decrease them. To invert your cockpit camera's Y axis (the camera's upward and downward movement) when using your mouse, click on the **Invert Y Axis** check box.

  Note: this setting does not affect external camera views.

- The **Force Feedback** section allows you to adjust your joystick's force feedback options (provided your joystick is a force feedback model). Click and drag the sliders to the right to increase these values and to the left to decrease them.

  To enable or disable force feedback for your controller, click on the **Enable Force Feedback** button. In order for this setting to take effect, you will first need to exit and restart the game.

Once you have completed making any changes to the **Input** tab, be sure to click on the **Apply** button at the bottom of the screen to apply your changes. If you wish to undo any changes you have made to this screen, click on the **Reset** button. A dialog box will open, asking you to confirm your decision. To reset all of the settings on this screen to their default values, click on the **Defaults** button. A dialog box will open, asking you to confirm your decision.

Note: if you attempt to click on another tab in the Options section without first applying your changes, a dialog box will open, asking you to either apply or discard your changes or to cancel your changes and remain on the currently selected tab.

- The **Controls** tab (Figure 5.1.4) allows you to customize your keyboard and flight controller axis inputs for your currently selected pilot profile and save them to a specific

configuration file. The files you save on this tab can then be accessed and modified at any time in the game. These configuration files are stored in the **\Rise of Flight\data\input** folder, with the filename extension of **.actions**.



Figure 5.1.4

Note: the default configuration file for the Controls tab is named input.actions. It is NOT recommended that players save any changes to this file, since it will be overwritten if a game update includes a new version of this file. In such a case, any changes the player has made to this file will be permanently lost.

To change the keystroke or axis input for a particular command, please perform the following steps:

1. Select the file you wish to alter by first clicking on the **Import Assignment Preset file** button at the upper right-hand corner of the screen (it is part of the **Import / Export Assignments** set of buttons). In the dialog box that opens, left-click on the file you wish to modify and then click on the **Load** button. This dialog box also allows you to remove any unwanted configuration files.

2. Choose the type of command you wish to alter from the **Category** column, and then left-click on the specific command you wish to alter under the **Game Action** column heading.

   Note: some commands cannot be altered from their default setup; in such cases a gray padlock icon will be displayed in the right-hand column.

3. Since each command can have up to three inputs, choose the specific input you want to change by left-clicking on the command's appropriate column (1, 2, or 3) under the **Buttons and Axis Assignments** heading. A dialog box will open up which says "**Push device button or move axis to assign.**" Press the button or move the controller axis (e.g., throttle lever, joystick handle, etc.) you wish to assign. The key-press or axis assignment you have entered will then be displayed on the screen.

4. Click on the **Apply** button to assign the input to the game. Otherwise, click on the **Retry** button to apply another input, or select **Cancel** to exit the dialog box completely.

   Note: if you have assigned an input to a command that has already been assigned to another command, a gray icon depicting two squares will be displayed next to the input you have entered.

5. Once you have completed your changes, click on the **Apply** button at the bottom of the screen to save your changes (remember: "apply before you fly"). If you wish to re-name or export your configuration file, first click on the **Export and Save Assignment Preset as a new file** button at the upper right-hand corner of the screen (it is part of the **Import / Export Assignments** set of buttons). In the dialog box that opens, left-click on the filename you wish to use, or enter a new filename and then click on the **Save** button. This dialog box also allows you to remove any unwanted configuration files.

   - If you want to revert to the game's default input commands, click on the **Defaults** button at the bottom of the screen. A dialog box will open, asking you to confirm your decision.

   - If you want to revert to the last saved version of the configuration file you are currently editing (and thus undoing any changes made to it), click on the **Reset** button at the bottom of the screen. A dialog box will open, asking you to confirm your decision.

   - If you want to export your configuration file to an HTML file, click on the **Export and Save Assignment Preset as a new file as an HTML reference document** button at the upper right-hand corner of the screen (it is part of the **Import / Export Assignments** set of buttons). You will be asked to name the file, which will be saved in the **\Rise of Flight\data** folder.

- The **Responses** tab (Figure 5.1.5) allows you to adjust the response curves for your game controllers. Each analogue aspect of your controllers (referred to as an "Axis") can be adjusted to your preference. As with the **Controls** tab, you can access this screen at any time in the game. These configuration files are stored in the **\Rise of Flight\data\input** folder, with the filename extension of **.responses**.

  In addition, you can create one response file for all aircraft in the game, or you can create a unique response file for a particular aircraft. If you choose the latter option, the

aircraft's response file will be automatically loaded by the game when you start a mission.



Figure 5.1.5

Note: the default configuration file for the Responses tab is named input.responses. It is NOT recommended that players save any changes to this file, since it will be overwritten if a game update includes a new version of this file. In such a case, any changes the player has made to this file will be permanently lost.

The following axis assignments can be adjusted on this screen:

- **Pitch:** this refers to the upward and downward movement of your aircraft's nose, which is controlled by the aircraft's elevators.

- **Roll:** this refers to the movement of your wings to the left and to the right, which is controlled by the aircraft's ailerons.

- **Yaw:** this refers to the lateral movement of your aircraft's nose to the left and to the right, which is controlled by the aircraft's rudder.

- **Throttle:** this refers to the way you increase or reduce power to your aircraft's engine. You can assign a separate throttle axis for individual engines on multi-engine aircraft.

  Note: the Airco D.H.2 and the Fokker E.III have no form of throttle control. With these planes you control the engine's power with the blip switch and by adjusting the mixture.

- **Altitude Throttle:** certain German aircraft are fitted with an additional throttle that allows for increased engine power at higher altitudes. This axis refers to the control of that throttle. There are currently two aircraft fitted with an altitude throttle: the Fokker D.VIIF and the Pfalz D.XII.

- **Radiator:** aircraft fitted with an inline, liquid-cooled engine have a radiator lever, which helps to control the temperature of the engine. As with the throttle axis, you can assign a separate radiator axis for individual engines on multi-engine aircraft.

  Note: although they are fitted with an inline engine, the Albatros D.II, DFW C.V, R.E.8, and the 150-horspower SPAD S.VII have no form of radiator control.

- **Mixture:** the mixture axis allows you to control the ratio of the fuel-air mixture. As your altitude increases, you will need to increase the amount of air in the mixture, which is more commonly known as "leaning" the mixture. Conversely, at lower altitudes, you will need to increase the amount of fuel in the mixture, which is referred to as making the mixture more "rich." You can assign a separate mixture axis for individual engines on multi-engine aircraft.

  Note: certain aircraft have a pre-set mixture setting, and thus mixture cannot be adjusted on these planes. This includes all German aircraft powered by an inline engine and some Allied aircraft fitted with an inline engine.

- **Stabilizer trim:** the stabilizer trim axis allows you to adjust the pitch of your horizontal stabilizer, which affects how much elevator input is needed to keep the aircraft in level flight. Adjusting stabilizer trim will either make your aircraft pitch downwards ("nose heavy") or pitch upwards ("tail heavy"). The following aircraft are currently fitted with stabilizer trim controls: Airco D.H.4, Bristol F.2B, R.A.F. R.E.8, R.A.F. S.E.5a, and the Sopwith Triplane.

  Note: although the Airco D.H.2 was also fitted with a stabilizer trim control system, it is not simulated in Rise of Flight, since – in contrast to the above-listed planes – it utilized a spring-loaded adjustment mechanism.

To change the response curve for a particular axis assignment, please perform the following steps:

1. Select the file you wish to alter by first clicking on the **Import Curve Preset File** button at the upper right-hand corner of the screen (it is part of the **Import / Export Curves** set of buttons). In the dialog box that opens, left-click on the file you wish to modify and then click on the **Load** button. This dialog box also allows you to remove any unwanted configuration files.

2. Choose the plane to which you want to apply your changes from the **Plane** column. The **All planes** option will apply your changes to all aircraft, while any other choice in the list will apply your changes only to that particular aircraft.

   Note: in order to create a response curve for a particular aircraft, you must disable the

Use "All Planes" response for this plane *setting.*

3. Choose the axis assignment you wish to modify from the **Current axis** drop-down list.

   Note: axis assignments can be changed only on the ***Controls*** *tab.*

4. By default, you will notice a line on the graph that starts in the lower left-hand corner and ends in the top right-hand corner, along which are three points. This line is your controller's response curve. To modify the line on this graph, note the following points:

   - Drag one of the three points to the position to which you wish to move it. If you want to make a part of the axis response less sensitive, make the line "flatter" (more close to being horizontal). Conversely, if you want to make a portion of the axis more responsive, make the line "steeper" (more close to being vertical).

   - If you need more points than the default three provided, left-click at the point on the line where you wish to add a new point; likewise, if you wish to remove a point, double-click on the point you wish to remove.

     Note: the ***Symmetry*** *option mirrors any changes you make to one half of the line to the other half of the line. Thus, when you have this option enabled, you can only add and remove points on only one half of the line.*

   - To create an s-curve for your axis assignment, click on the **S-Curve** button. To change the line back to its default value, click on the **Linear** button.

   - To simultaneously shift all the points on the line up or down, click on the up arrow button or the down arrow button under the **Shift curve** heading.

   - Enable the **Invert** setting if you wish to reverse the line's response setting.

   - Enable the **Smooth** setting if you want to create a response curve with smooth transitions at each point on the line.

   - Enable the **Lock Y** setting if you only want to move points on the line vertically.

   - If you wish to add a "dead zone" to your response curve (which will eliminate any response from the controller in the zone), click and drag one of the sliders at either the top or the bottom of the graph. As you adjust these sliders, the shaded area on the graph will show the size of the dead zone.

   Note: when the ***Symmetry*** *option is enabled, the only dead zone slider that can be adjusted is the one at the top of the graph.*

5. As you make changes to a response curve, you can see the effects of your changes on both the graph and on the **Current axis output** display. To do so, simply manipulate the controller whose axis you are modifying (e.g., move your throttle controller back and forth).

6. Once you have completed your changes, click on the **Apply** button at the bottom of the screen to save your changes (remember: "apply before you fly"). If you wish to re-name or export your configuration file, first click on the **Export and Save Curve values as a new Preset File** button at the upper right-hand corner of the screen (it is part of the **Import / Export Curves** set of buttons). In the dialog box that opens, left-click on the filename you wish to use, or enter a new filename and then click on the **Save** button. This dialog box also allows you to remove any unwanted configuration files.

   - If you want to revert to the game's default response curve for a particular axis assignment, click on the **Defaults** button at the bottom of the screen. A dialog box will open, asking you to confirm your decision.

   - If you want to undo all changes you have made to a response curve, click on the **Reset** button at the bottom of the screen. A dialog box will open, asking you to confirm your decision.

- The **Video** tab (Figure 5.1.6) allows you to make various adjustments to Rise of Flight's video settings. In order for some of these settings & changes to take effect, you will first need to exit and restart the game. Please see section 3.2 for more information on adjusting these settings.

Note: you cannot adjust certain settings here while you are flying a mission.

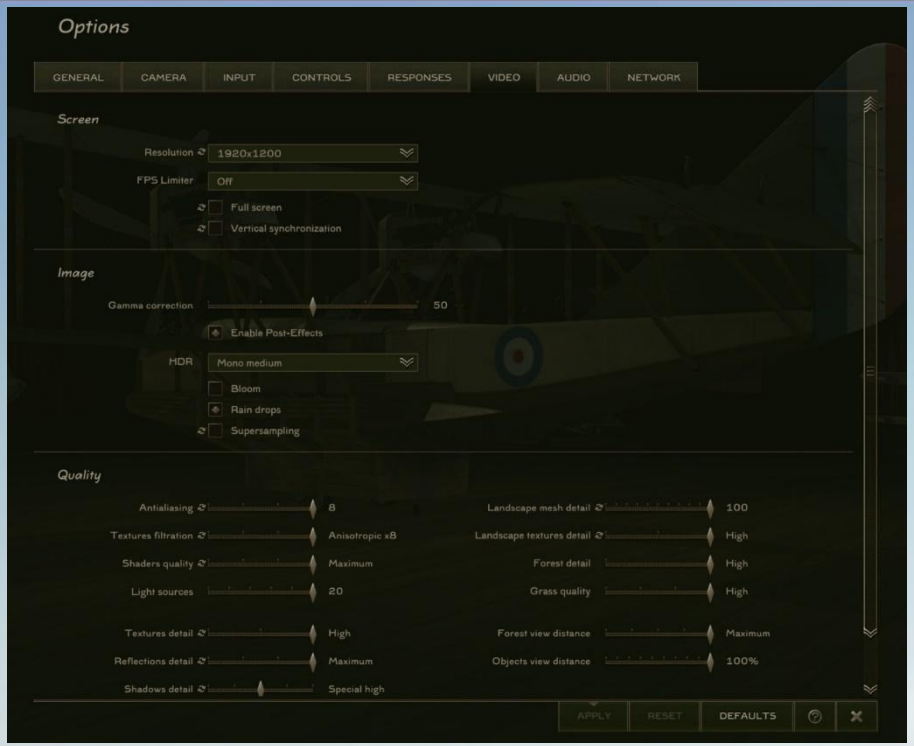


Figure 5.1.6

Once you have completed making any changes to the **Video** tab, be sure to click on the **Apply** button at the bottom of the screen to apply your changes. If you wish to undo any changes you have made to this screen, click on the **Reset** button. A dialog box will open, asking you to confirm your decision. To reset all of the settings on this screen to their default values, click on the **Defaults** button. A dialog box will open, asking you to confirm your decision.

Note: if you attempt to click on another tab in the Options section without first applying your changes, a dialog box will open, asking you to either apply or discard your changes or to cancel your changes and remain on the currently selected tab.

- The **Audio** tab (Figure 5.1.7) allows you to make various adjustments to Rise of Flight's audio settings. In order for some of these settings & changes to take effect, you will first need to exit and restart the game. Please see section 3.4 for more information on adjusting these settings.

Note: you cannot adjust certain settings here while you are flying a mission.



Figure 5.1.7

Once you have completed making any changes to the **Audio** tab, be sure to click on the **Apply** button at the bottom of the screen to apply your changes. If you wish to undo any changes you have made to this screen, click on the **Reset** button. A dialog box will open, asking you to confirm your decision. To reset all of the settings on this screen to their default values, click on the **Defaults** button. A dialog box will open, asking you to confirm your decision.

Note: if you attempt to click on another tab in the Options section without first applying your changes, a dialog box will open, asking you to either apply or discard your changes or to cancel your changes and remain on the currently selected tab.

- The **Network** tab (Figure 5.1.8) allows you to make various adjustments to Rise of Flight's network settings for multiplayer game play. Please see section 3.6 for more information on adjusting these settings.

Note: you cannot adjust these settings while you are flying a mission.

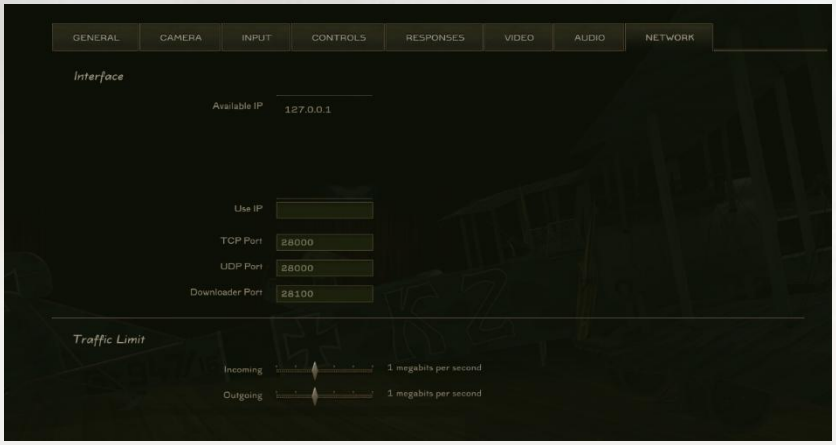


Figure 5.1.8

Once you have completed making any changes to the **Network** tab, be sure to click on the **Apply** button at the bottom of the screen to apply your changes. If you wish to undo any changes you have made to this screen, click on the **Reset** button. A dialog box will

open, asking you to confirm your decision. To reset all of the settings on this screen to their default values, click on the **Defaults** button. A dialog box will open, asking you to confirm your decision.

Note: if you attempt to click on another tab in the Options section without first applying your changes, a dialog box will open, asking you to either apply or discard your changes or to cancel your changes and remain on the currently selected tab.

5.2 DIFFICULTY SETTINGS

Before you begin a mission in Rise of Flight, you can enable or disable a number of settings (Figure 5.2) that affect the complexity and difficulty of the game. You can choose these options individually, or you can select one of the four presets from the drop-down list (Arcade, Novice, Veteran, or Ace). If you choose to not use one of the four presets, your difficulty setting will be listed as "Custom." In either case, your changes will be saved automatically.

To access the difficulty settings display, click on the **Settings** button before loading a mission.



Figure 5.2.1

The screen is divided into three sections: **Gameplay**, **Simplifications**, and **Pilot Help**.



Figure 5.2.2

Note: the score you receive for completing a mission depends on the complexity of the difficulty settings you have chosen. Choosing a simpler lower difficulty level leads to a slower increase in rank and will deprive you of many awards in the Campaign and the Career modes of game play.

- **Gameplay Settings:**
  - **Friendly icons:** enables blue-colored icons for friendly planes and ground objects.
  - **Enemy icons:** enables red-colored icons for enemy planes and ground objects.
  - **Navigation icons:** enables colored markers and symbols that point the way to various waypoints and mission objectives.
  - **Far object icons on map:** marks all ground objects of the mission on the in-flight map, regardless of how far you are from them.
  - **Aiming help:** enables onscreen aids that help the player aim their machine guns properly.
  - **Padlock:** enables the ability to visually "lock on" to an enemy aircraft and to follow its movements automatically.
  - **Simple gauges:** enables the display of icons which display the aircraft's fuel level, course, altitude, airspeed, RPM (including maximum safe RPM), radiator & mixture settings, engine temperature (including maximum and minimum safe operating limits), and time of day.

- **Subtitles:** enables the display of in-mission textual information related to mission objectives.

- **Simplifications:**

  - **Simplified physics:** reduces the intensity and complexity of the physical forces acting on your aircraft is reduced, thus making flying easier.

  - **No wind:** disables the effects of wind and turbulence.

  - **No misfire:** eliminates the possibility of your machine guns or cannons misfiring.

  - **Safety collisions:** eliminates the possibility of damage resulting from colliding with other objects or surfaces.

  - **Invulnerability against weapons:** eliminates the possibility of damage resulting from enemy fire, including the pilot.

  - **Unlimited fuel:** enables an unlimited supply of fuel.

  - **Unlimited ammo:** enables an unlimited supply of ammunition.

  - **No engine overflow:** eliminates the disruption of fuel flow to the engine resulting from negative-g aerobatic maneuvers.

  - **Warmed up engine:** automatically warms up your engine to the optimal temperature at the start of the mission.

- **Pilot Help:**

  - **Easy piloting:** enables an automatic pilot-assistance system, thus making flying much easier.

  - **Autorudder:** enables automatic support for the yaw axis. This option is recommended if your controller does not have a sufficient number of axes to support yaw movement.

  - **Cruise control:** enables automatic control of the throttle in order to achieve the optimum flight speed. This option also takes into account the aircraft's rate of climb or descent.

  - **Autopilot:** enables artificial intelligence (AI) for the player's pilot. This option allows the AI to fly the mission according to the defined objectives (including dogfighting with the enemy), without any input from the player.

  - **Automatic RPM limiter:** enables automatic limiting of engine speed, which will prevent the engine from breaking down. This option takes into account the angle and speed of your dives in order to prevent damage to the engine.

  - **Automatic mixture:** enables automatic control of the engine's fuel-air mixture.

  - **Automatic radiator:** enables automatic control of your radiator in order to prevent engine failures resulting from overcooling or overheating. This option applies only to engines equipped with radiators.

  - **Automatic engine start:** enables the automatic start-up of the engine.

5.3 CUSTOMIZING YOUR AIRCRAFT

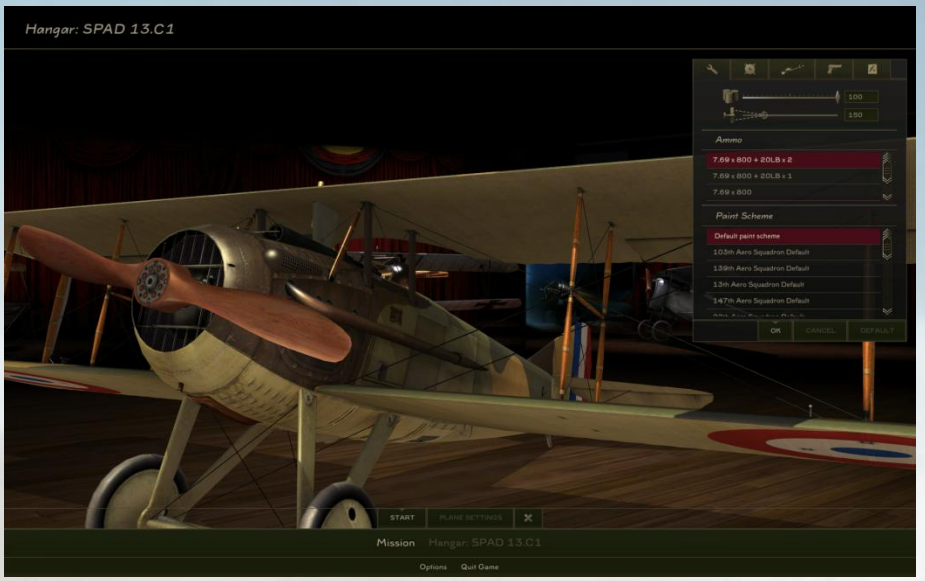


Figure 5.3.1

Rise of Flight allows you to customize your aircraft before you begin playing a mission. These customizations include your aircraft's paint scheme, ammunition loadout, machine gun convergence, fuel level, weapon modifications, and cockpit field modifications. To customize your aircraft, click on the **Hangar** link at the bottom of the Mission Briefing screen. In the upper right-hand corner you will see a window divided into five tabs: **Plane Settings**, **Field Modifications**, **Weapon Modifications, Pilot Stuff**, and **Plane Description** (Figure 5.3.1).

Note: if you need to rotate the view of the 3D aircraft model while on the Hangar screen, either scroll your mouse wheel up & down or click and drag your mouse cursor horizontally.

- The **Plane Settings** tab allows you to adjust your fuel level, machine gun convergence, ammunition loadout, and paint scheme.

  - To adjust your fuel level, either drag the slider left & right or enter in a number (from 1-100) in the box to the right of the slider. This number represents the percentage of

fuel carried by your aircraft. The default value for this setting is 100 percent.

- To adjust your machine gun convergence, either drag the slider left & right or enter in a number (from 50-500) in the box to the right of the slider. This number represents the range in meters where the fire from your machine guns will "converge" (or meet). The default value for this setting is 150 meters.

- To change your ammunition loadout, click on one of the options from the list in the **Ammo** section; your currently selected choice will be highlighted in red. Certain loadouts, such as those that include externally carried bombs, can be seen on the 3D aircraft model when chosen.

- To change your aircraft's paint scheme, click on one from the list in the **Paint Scheme** section; your currently selected choice will be highlighted in red. A thumbnail preview of the paint scheme will be displayed when you hold your mouse cursor over a particular entry in the list.

  Note: you can download additional paint schemes in the form of skin packs from http://riseofflight.com/en/community/usefulmaterials. Once you have downloaded a skin pack, double-click on the file and follow the on-screen instructions to properly install the skins.

  *In addition, download and install the "Skins *.jpg to *.dds thumbnails conversion pack" from the link above to ensure the preview images for paint schemes display properly.*

- To revert to the default settings for your aircraft, either click on the **Default** or **Cancel** button. Clicking on the latter button will close customization window; to re-open it, click on the **Plane Settings** button at the bottom of the screen.

- To apply your changes, click on the **Start** button to begin the mission, click on the **OK** button to close the customization window, or click on the **Mission** button to return to the Mission Briefing screen.

- The **Field Modifications** tab (Figure 5.3.2) allows you to customize your aircraft with a variety of field modifications, including gun sights, cockpit instruments, and cockpit lights.



Figure 5.3.2

*Note: field modifications must be purchased at the Rise of Flight Store page before they will appear in your copy of the game. The only exceptions to this are those for the Albatros D.Va and the SPAD S.XIII, which are included in the game free of charge. After purchasing a field modification, you must re-login at least once in Online Mode to activate your purchase (if you are running the game at the same time you make a purchase, you must exit and re-start the game). To access the Field Mods webpage, navigate your web browser to http://riseofflight.com/en/store/fieldmods or click on the **Buy Gauges** button on the **Field Modifications** tab.*

- To view the description of a particular field mod, hold your mouse cursor over the textual description of the device. A screen will pop up, showing a larger picture of the device, along with some brief historical information.

- To add a field mod to your aircraft, click on the check box at the right-hand side of the list. Certain mods, such as gun sights, engine thermometers, and wing-mounted

airspeed gauges, will be displayed on the aircraft's external 3D model.

- To add all available field mods to your aircraft, click on the **Select all gauges** check box.

  Note: only one gun sight modification can be chosen if more than one type is available for your aircraft.

- To remove all field mods from your aircraft, clear the **Select all gauges** check box.

- To apply your changes, click on the **Start** button to begin the mission, click on the **OK** button to close the customization window, or click on the **Mission** button to return to the Mission Briefing screen.

- The **Weapon Modifications** tab (Figure 5.3.3) allows you to customize your aircraft with a variety of weapon modifications, including extra machine guns, cannons, high-caliber machine guns for balloon-busting, and rockets.

  *Note: weapon modifications must be purchased at the Rise of Flight Store page before they will appear in your copy of the game. The only exceptions to this are those for the Albatros D.Va and the SPAD S.XIII, which are included in the game free of charge. After purchasing a weapon modification, you must re-login at least once in Online Mode to activate your purchase (if you are running the game at the same time you make a purchase, you must exit and re-start the game). To access the Weapon Mods webpage, navigate your web browser to http://riseofflight.com/en/store/weaponmods or click on the **Buy Modifications** button on the **Weapon Modifications** tab.*

  - To view the description of a particular weapon mod, hold your mouse cursor over the textual description of the device. A screen will pop up, showing a larger picture of the device, along with some brief historical information.

  - To add a weapon mod to your aircraft, click on the check box at the right-hand side of the list. Enabled weapon mods will be displayed on the aircraft's external 3D model.

  - To add all available weapon mods to your aircraft, click on the **Select All Items** check box.

    Note: only one weapon modification can be chosen if more than one variant is available for your aircraft.

  - To remove all weapon mods from your aircraft, clear the **Select All Items** check box.



Figure 5.3.3

- The **Pilot Stuff** tab (Figure 5.3.4) allows you to customize your aircraft and pilot with a variety of items, including scarves, streamers, and pistols.

  *Note: these items must be purchased at the Rise of Flight Store page as part of the Personal Package before they will appear in your copy of the game. The only exceptions to this are the white scarf and the blue streamer, which are included free of charge. After purchasing this content, you must re-login at least once in Online Mode to activate your purchase (if you are running the game at the same time you make a purchase, you must exit and re-start the game). To access the Personal Package webpage, navigate your web browser to http://riseofflight.com/en/store/personalization/personalpack or click on the **Buy Stuff** button on the **Pilot Stuff tab**.*

  - To view the description of a particular item, hold your mouse cursor the textual description of the object. A screen will pop up, showing a larger picture of the item and a brief description of it.

- To add an item to your aircraft or pilot, click on the check box at the right-hand side of the list. To enable all available items, click on the **Select All Items** check box.

  Note: only one scarf, one streamer, and one pistol can be chosen at a time.

- To remove all items, clear the **Select All Items** check box.

- To apply your changes, click on the **Start** button to begin the mission, click on the **OK** button to close the customization window, or click on the **Mission** button to return to the Mission Briefing screen.

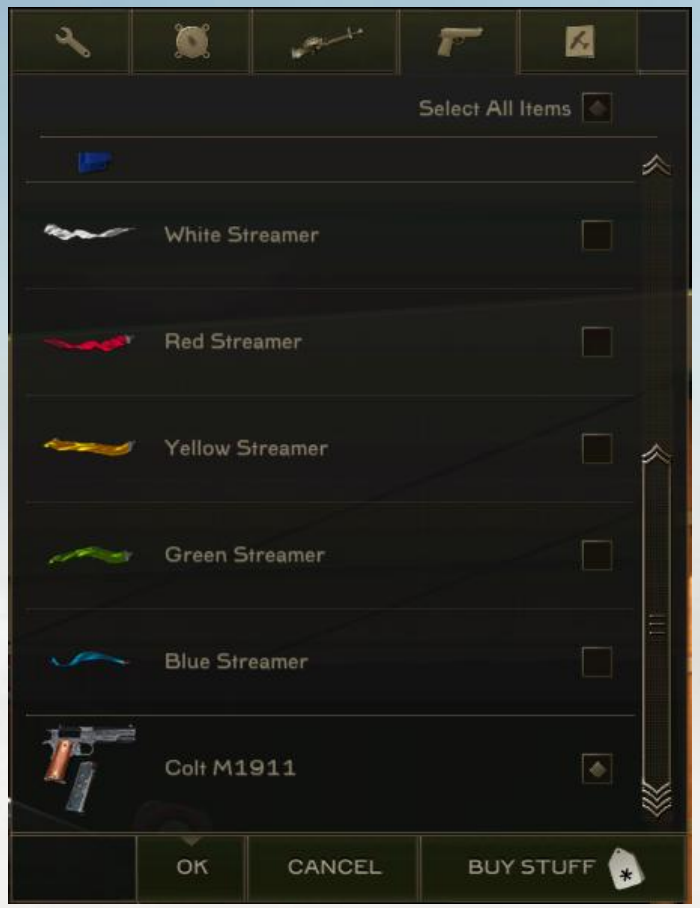


Figure 5.3.4

- The **Plane Description** tab (Figure 5.3.5) shows historical information about your aircraft, including a brief history of the aircraft's development and combat service, armament, performance information, and references used by the Rise of Flight development team to model the aircraft.

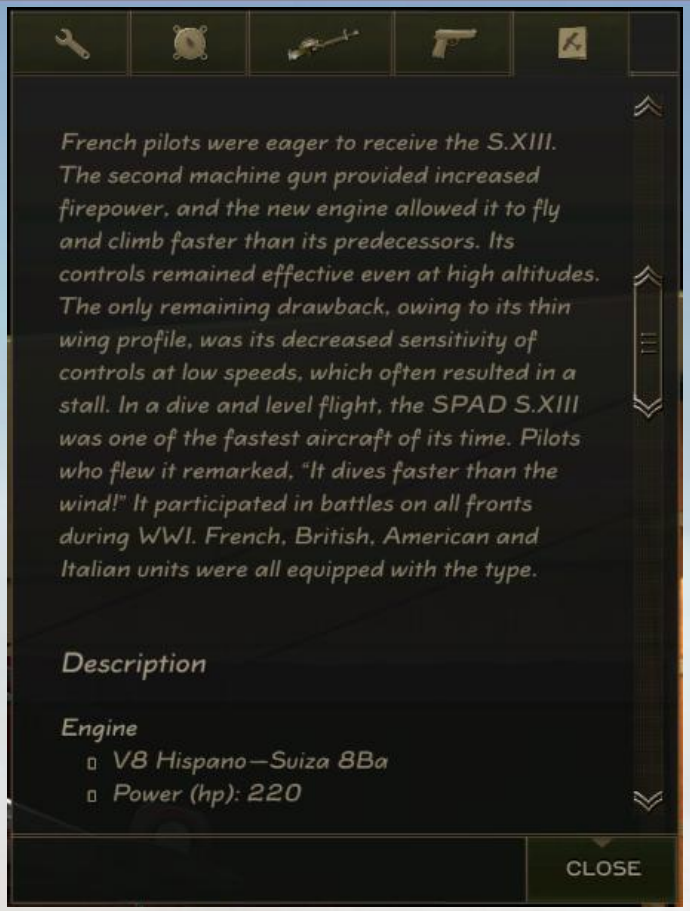


Figure 5.3.5



6.0 BASIC AIRCRAFT AND SYSTEMS MANAGEMENT

6.1 ENGINE AND COCKPIT CONTROLS

At more complex difficulty levels, you will need to manually manage your aircraft's engine in order to get the best performance out of it. Keep these points in mind in order to keep your engine running properly:

- **Engine startup/shutdown:** to start up or shut down your aircraft's engine, press the **E** key (**Engines Start/Stop**).

  Note: be sure you have set your engine's fuel mixture to full rich, or the engine will fail to start. In addition, the propeller will sometimes need to make more than one revolution before the engine will start. As long as your fuel mixture setting is correct, you need to press the E key only once to start your engine.

  Note: certain aircraft have a pre-set mixture setting, and thus mixture cannot be adjusted on these planes. This includes all German aircraft powered by an inline engine and some Allied aircraft fitted with an inline engine. For these planes you thus do not need to adjust the fuel mixture prior to starting the engine.

- **Throttle control**: to control your engine's power with your keyboard, press the **–** key to decrease power and the **=** key to increase power. If you have an analogue throttle on your controller, you can control the engine's power with the **Engines control: throttle** axis assignment.

  Note: the Airco D.H.2 and the Fokker E.III have no form of throttle control. With these planes you control the engine's power with the blip switch and by adjusting the mixture.

  Note: certain German aircraft are fitted with the Mercedes D.IIIaü engine, which is optimized for high-altitude performance. This engine works in a similar manner to the altitude throttle (see below), except that you do not have a separate altitude throttle with this type of engine. Planes fitted with this style of engine will have the forward portion of their throttle quadrant marked in red. This red marking signifies the amount of throttle needed to engage the high-altitude features of the engine. You can run your engine with this power setting (thus gaining some horsepower) for some time below 1500 meters before the engine will fail. Above 1500 meters, the engine can be safely run with this power setting for an indefinite period of time.

- **Blip switch:** aircraft fitted with a rotary engine have a blip switch, which temporarily cuts ignition to the engine in order to control the engine's RPM. "Blipping" your engine is handy when you want to lose altitude quickly, such as on approach to landing and when you want to prevent your engine RPM from getting too high, which can cause the engine to blow out. In addition, the blip switch is your only form of engine control in the Fokker E.III and the Airco DH.2, since these aircraft are not fitted with a throttle.

  To use the blip switch, press the **Left Shift** + **E** key combination (**EngineBlipSwitch**). Ignition to the engine will be interrupted as long as you hold down this switch. Be careful to not let your engine's RPM get too low while holding down the blip switch, or your engine may shut down.

- **Radiator control:** on aircraft fitted with an inline engine, you will need to manually open and close the radiator shutters in order to maintain a safe operating temperature (which is between 50 and 80 degrees Celsius). Letting your engine run too hot or too cold for extended periods can cause engine failure. To control the radiator shutters on your aircraft's engines with your keyboard, press the **Right Ctrl + –** key combination to close the radiator shutters and the **Right Ctrl + =** key combination to open the radiator shutters. You can also control the radiator shutters with the **Engines control: radiator** axis assignment.

  Note: although they fitted with an inline engine, the Albatros D.II, DFW C.V, R.E.8, and the 150-horsepower SPAD S.VII have no form of radiator control.

- **Mixture control:** in order for your engine to produce maximum power, you must set the mixture to the proper setting. At lower altitudes, the air is denser, so you will want to maintain a "rich" mixture. As you gain altitude, the air becomes thinner, so you will need to increase the amount of air in the mixture by "leaning" the mixture. If the needle on your tachometer is unstable (or "wobbling"), your mixture is too rich. If you notice your engine RPM starting to drop, your mixture is too lean. In addition, you will need to set your engine's mixture to full rich in order to it to start.

  To adjust the fuel mixture with your keyboard, press the **Right Shift + –** key combination to lean the mixture and the **Right Shift + =** key combination to enrich the mixture. You can also control the mixture setting with the **Engines control: mixture** axis assignment.

  Note: certain aircraft have a pre-set mixture setting, and thus mixture cannot be adjusted on these planes. This includes all German aircraft powered by an inline engine and some Allied aircraft fitted with an inline engine.

- **Altitude throttle:** the Fokker D.VIIF and Pfalz D.XII have an additional throttle that allows their BMW engine to give more power at higher altitudes. To avoid damaging

your engine, this throttle should not be used below 2000 meters altitude. Above 2000 meters, the throttle can be safely opened to 1/3 of its max output; above 3000 meters, it can be opened to 2/3 of its max output, and it can be opened all the way above 4000 meters.

To adjust the altitude throttle with your keyboard, press the **Right Alt + -** key combination to close the throttle and the **Right Alt + =** key combination to open the throttle. You can also control the altitude throttle with the **Engines control: Altitude throttle** axis assignment.

Note: using the altitude throttle beyond its safety limits can cause damage to your aircraft's engine. Operating the altitude throttle in this manner is recommended only in emergencies and for very short periods of time.

- **Stabilizer trim:** on certain aircraft, the pitch of the horizontal stabilizer can be adjusted, which affects how much elevator input is needed to keep the aircraft in level flight. Stabilizer trim will either make your plane pitch downwards ("nose heavy") or pitch upwards ("tail heavy"). The following aircraft are currently fitted with stabilizer trim controls: Airco D.H.4, Bristol F.2B, R.A.F. R.E.8, R.A.F. S.E.5a, and the Sopwith Triplane.

  To adjust your aircraft's stabilizer trim, press the **Right Ctrl + Up Arrow** key combination to make your aircraft more nose heavy, and press the **Right Ctrl + Down Arrow** key combination to make the aircraft more tail heavy. You can also control the amount of stabilizer trim with the **Plane control: stabilizer** axis assignment.

  Note: although the Airco D.H.2 was also fitted with a stabilizer trim control system, it is not simulated in Rise of Flight, since – in contrast to the above-listed planes – it utilized a spring-loaded adjustment mechanism.

- **Lighting:** if your aircraft is fitted with a cockpit lamp, you can turn it on and off with the **L** key (**Cockpit light on/off**).

  Note: if your engine takes damage due to enemy fire, your flight goggles will likely become covered in oil. When this happens, you can clear your goggles of the oil by looking away from your aircraft's engine (that is, to the left or to the right) or by shutting off the engine. Be aware that your engine will have sustained serious damage in such a situation, so you should attempt to immediately disengage from combat and find a safe place to land.

6.2 MULTI-CREW AIRCRAFT

Rise of Flight features a number of multi-crew aircraft of different types, including fighters, observation & reconnaissance planes, and heavy bombers. Each of these aircraft has at least one gunner/observer position, and some have two engines. Because of this, keep in mind these features when flying a multi-crew airplane.

- **Engine and Cockpit Controls:**

  - **Engine selection**: if flying a multi-engine aircraft, certain keyboard commands and axis assignments will control both engines simultaneously. If you wish to control only one engine at a time, press either the **1** key (**Engine 1 control on/off**) or the **2** key (**Engine 2 control on/off**) to control engine 1 and engine 2, respectively. To take control of both engines at the same time, press the **0** key (**Common engines control on/off**).

  - **Engine startup/shutdown**: to start up the engines in a multi-engine aircraft, you can choose to start both engines at the same time or start them individually. To start both engines simultaneously, press the **E** key (**Engines Start/Stop**). Likewise, the **Right Ctrl + 1** (**Engine 1 Start/Stop**) and **Right Ctrl +2** (**Engine 2 Start/Stop**) key combinations will start engines 1 and 2, respectively. These commands can also be used to shut down the engines.

  - **Throttle control**: to simultaneously control the power to both engines with your keyboard, press the **–** key to decrease power and the **=** key to increase power. If you have an analogue throttle on your controller, you can control both engines with the **Engines control: throttle** axis assignment, or you can assign each engine to its own axis with the **Engine 1 control: throttle** and the **Engine 2 control: throttle** axis assignments.

  - **Radiator control:** to simultaneously control the radiator shutters on both engines with your keyboard, press the **Right Ctrl + –** key combination to close the radiator shutters and the **Right Ctrl + =** key combination to open the radiator shutters. You can also control both sets of radiator shutters with the **Engines control: radiator** axis assignment or you can assign each set of radiator shutters to its own axis with the **Engine 1 control: radiator** and the **Engine 2 control: radiator** axis assignments.

    Note: although they are fitted with an inline engine, the DFW C.V and the R.E.8 have no form of radiator control.

  - **Mixture control:** to simultaneously adjust the fuel mixture on both engines with your keyboard, press the **Right Shift + –** key combination to lean the mixture and the **Right Shift + =** key combination to enrich the mixture. You can also control both engine mixture settings with the **Engines control: mixture** axis assignment or you can assign each mixture lever to its own axis with the **Engine 1 control: mixture** and the **Engine 2 control: mixture** axis assignments.

    Note: certain aircraft have a pre-set mixture setting, and thus mixture cannot be adjusted on these planes. Multi-crew aircraft affected by this feature include the DFW C.V., Gotha G.V, Breguet 14 B.2, and the R.E.8.

  - **Lighting:** in addition to the standard cockpit lighting, the Handley Page O/400 comes with a set of navigation lights. Press the **Right Ctrl + L** key combination (**Navigation lights on/off**) to toggle this lighting on and off.

- **Crew & Gunner Controls:**

- To cycle through the crew positions on a multi-crew plane, press the **Left Ctrl + C** key combination (**Toggle combat post**). Note that unless you have enabled autopilot, you will still be in control of the aircraft when you move to a gunner position. To level out the aircraft in such a case, press the **Left Shift + A** key combination (**Level Autopilot**).

- To take control of a turret-mounted gun, press the **T** key (**Turret: take/leave control**). This allows you to move the gun laterally & vertically with your mouse and to fire the gun with either the keyboard's spacebar or the left-hand button on your mouse (**Turret MG fire**).

- To aim a turret-mounted machine gun with the gun sights, press the **Left Shift + T** key combination (**Turret: nestle to the gunsight**).

  *Note: this command does not enable you to take control of the gun. You will still need to perform the **Turret: take/leave control** command to take control of the gun.*

- To clear a jam/misfire on a turret-mounted machine gun, press either the **R** key or the middle button on your mouse (**Turret MG recharge**).

- To move a machine gun from one mounting to another, press the **Left Shift + C** key combination (**Switch firing point**).

  Note: this command can only be applied to the upper-rear machine gun on the Handley Page O/400 and the hatch-mounted machine gun on the Felixstowe F.2A.

6.3 BASIC WEAPONS MANAGEMENT

The main weapons you can employ in Rise of Flight include machine guns, cannons, bombs, and rockets. Additional weapons include flare guns and pistols. Employment of these weapons is described below.

- **Machine guns / cannons:**

  - You must cock your machine guns or cannons before you can fire them. To do this, press the **R** key (**All guns recharge / rearm**) to cock all your guns one at a time.

    Note: if you have any overwing guns mounted to your plane, the guns will be automatically pulled down and then pushed back up (if necessary) when carrying out this command.

    Note: many aircraft in Rise of Flight feature machine guns that fire through the arc of the aircraft's propeller. In order for these types of machine guns to fire, your aircraft's propeller must be spinning, as the propeller shaft is connected to the machine gun synchronization gear fitted to your aircraft. This synchronization gear is what allows your machine guns to fire without the rounds striking your aircraft's propeller blades.

  - To fire all of your plane's guns, press and hold the **spacebar (All guns fire**) on your keyboard.

  - To fire only your forward-facing guns, press and hold the **Right Alt + Space** key combination (**Forward-facing guns fire**). This command only fires guns which are currently aligned to converge with your gunsight. This means that any upper-wing mounted guns which are tilted to fire upwards (see below) will not fire with this command. In addition, the Lewis machine gun weapon mod as mounted on the Albatros D.III, the Albatros D.Va, and the R.E.8, and the Becker automatic cannon weapon mod as mounted on the two versions of the Albatros D.II will not fire at all with this command, as they are not fitted to converge with each plane's respective gunsight.

  - To fire only your nose-mounted guns, press and hold the **Left Alt + Space** key combination (**Nose guns fire**). This command only fires the guns fitted to the nose of your aircraft.

  - To fire only your overwing-mounted guns, press and hold the **comma** key (**Overwing guns fire**). This command fires all guns mounted to the upper wing of your aircraft, regardless of the angle at which they are tilted.

  - To fire only your wing-mounted guns, press and hold the **period** key (**Wing-guns fire**). This command fires the two Lewis machine guns mounted on the lower wings of the Sopwith Dolphin.

    *Note: the lower-wing Dolphin machine guns are an optional weapon mod that must be purchased at the Rise of Flight Store page before they will appear in your copy of the game. After purchasing this item, you must re-login at least once in Online Mode to activate your purchase (if you are running the game at the same time you make a purchase, you must exit and re-start the game). To access the Weapon Mods webpage, navigate your web browser to http://riseofflight.com/en/store/weaponmods. Alternatively, you can click on the **Buy Modifications** button on the **Weapon Modifications** tab, which can be accessed from the **Hangar** screen. Please see section 5.3 for more information on weapon mods.*

    Note: firing your guns for prolonged periods will cause their accuracy and muzzle velocity to progressively degrade, so fire your guns only in short bursts.

  - Any gun that is mounted to the upper wing of your aircraft can be moved up and down in order to change the angle at which it fires. This angle will vary, but typically it is about a 45-degree upward angle. To do this, press the **Left Alt + R** key combination (**Elevate / Depress guns**).

  - To reload an overwing-mounted machine gun or cannon, press the **R** key (**All guns recharge / rearm**). If more than one gun needs to be reloaded, each gun will automatically be reloaded one at a time.

    *Note: if your overwing guns need to be reloaded, you do not need to use the **Elevate / Depress guns** command before using the **All guns recharge / rearm** command. In such cases the animation of the gun being pulled down and subsequently pushed back up will play automatically.*

- If you have enabled misfires in the game's difficulty options, your guns will periodically fail to fire. To clear a misfired gun, press the **R** key (**All guns recharge / rearm**). If more than one gun has misfired, each gun will automatically be cleared one at a time.

  *Note: you do not need to use the **Elevate / Depress guns** command before using the **All guns recharge / rearm** command when clearing a misfire on an overwing gun. With some aircraft the gun will not be pulled down before the recharging animation plays. This simulates the ability of pilots to reach up and pull the charging handle without needing to get up out of their seat. Aircraft currently simulated in this manner include the Albatros D.III, the Albatros D.Va, the Nieuport 11, the Nieuport 17, the S.E.5a, and the Sopwith Dolphin.*

- **Bombs:**

  - To drop one bomb, press the **B** key (**Drop a bomb / launch rockets**). To drop a pair of bombs, press the **Left Shift + B** key combination (**Drop two bombs / launch rockets**). To drop all your bombs in a single salvo, press the **Left Ctrl + B** key combination (**Drop all bombs / launch rockets**).

- **Rockets:**

  - The Le Prieur rockets modeled in Rise of Flight can be only launched all at once in a salvo. Any of the above-mentioned keys for dropping bombs will also fire off your rockets.

  *Note: rockets are an optional weapon mod that must be purchased at the Rise of Flight Store page before they will appear in your copy of the game. After purchasing this item, you must re-login at least once in Online Mode to activate your purchase (if you are running the game at the same time you make a purchase, you must exit and re-start the game). To access the Weapon Mods webpage, navigate your web browser to http://riseofflight.com/en/store/weaponmods. Alternatively, you can click on the **Buy Modifications** button on the **Weapon Modifications** tab, which can be accessed from the **Hangar** screen. Please see section 5.3 for more information on weapon mods.*

- **Flares:**



Figure 6.3.1

  - While flares (Figure 6.3.1) are primarily meant to be used for signaling, they can also be used to wound pilots and aircrew (including you!). To fire a flare, first choose your flare color from the following choices: red (**Left Control +1**), green (**Left Control + 2**), yellow (**Left Control + 3**), or white (**Left Control + 4**). Then, point the flare gun in the direction you wish to fire it (with either your mouse or head-tracking device) and click either your left mouse button or the **Left Control + Space** key combination (**Shoot personal weapon / flare pistol**). If you wish, you can enable an on-screen aiming cursor by clicking your right mouse button and choosing the **Aiming Help** option at the top of the screen (this option can also be enabled with the **Left Windows + A** key combination). The flare gun will automatically reload after you fire a shot (provided you have flare cartridges remaining).

    When you are finished firing the flare gun, press the **Left Control + ~** key combination (**Remove personal weapon / flare pistol**) to "return" it to its holster.

    Note: you cannot use the flare gun while occupying a gun turret position on a multi-crew plane.

- **Pistols:**



Figure 6.3.2

*Note: pistols must be purchased at the Rise of Flight Store page as part of the Personal Package before they will appear in your copy of the game. After purchasing this item, you must re-login at least once in Online Mode to activate your purchase (if you are running the game at the same time you make a purchase, you must exit and re-start the game). To access the Personal Package webpage, navigate your web browser to http://riseofflight.com/en/store/personalization/personalpack. Alternatively, you can click on the **Buy Stuff** button on the **Pilot Stuff** tab, which can be accessed from the **Hangar** screen.*

- To be able to use a pistol (Figure 6.3.2) while flying a mission, be sure you have enabled it from the **Pilot Stuff** tab on the **Hangar** screen before you start your mission. To fire the pistol, first press the **Left Control + 5** key combination (**Personal weapon)**. Then, point the pistol in the direction you wish to fire it (with either your mouse or head-tracking device) and click either your left mouse button or the **Left Control + Space** key combination (**Shoot personal weapon / flare pistol**). If you wish, you can enable an on-screen aiming cursor by clicking your right mouse button and choosing the **Aiming Help** option at the top of the screen (this option can also be enabled with the **Left Windows + A** key combination). The pistol will automatically reload once you have fired off the entire magazine (provided you have spare magazines remaining.

  When you are finished firing the pistol, press the **Left Control + ~** key combination (**Remove personal weapon / flare pistol**) to "return" it to its holster.

  Note: you cannot use the pistol while occupying a gun turret position on a multi-crew plane.

6.4 BOMBSIGHT USAGE

Rise of Flight features a number of aircraft that are equipped with an optical bombsight, allowing you to bomb ground targets from high altitudes. Each bombsight is modeled according to its real-world counterpart. As such, the features and controls described below (Figures 6.4.1 and 6.4.2) will not necessarily be found on every aircraft equipped with a bombsight.

Note: placing your mouse cursor over a particular control will cause a tooltip to pop up, explaining in brief detail what type of function the control has.

- **Bombsight controls:**

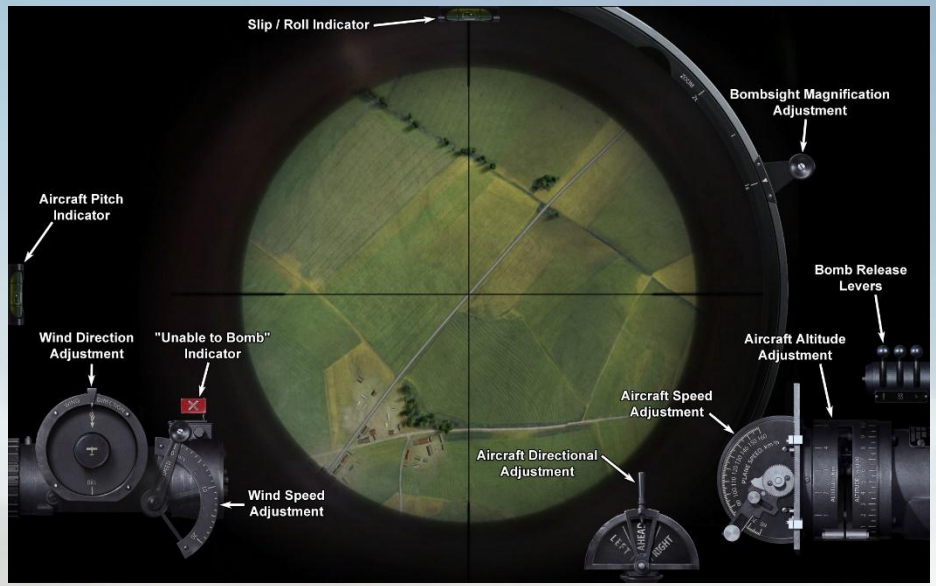


Figure 6.4.1

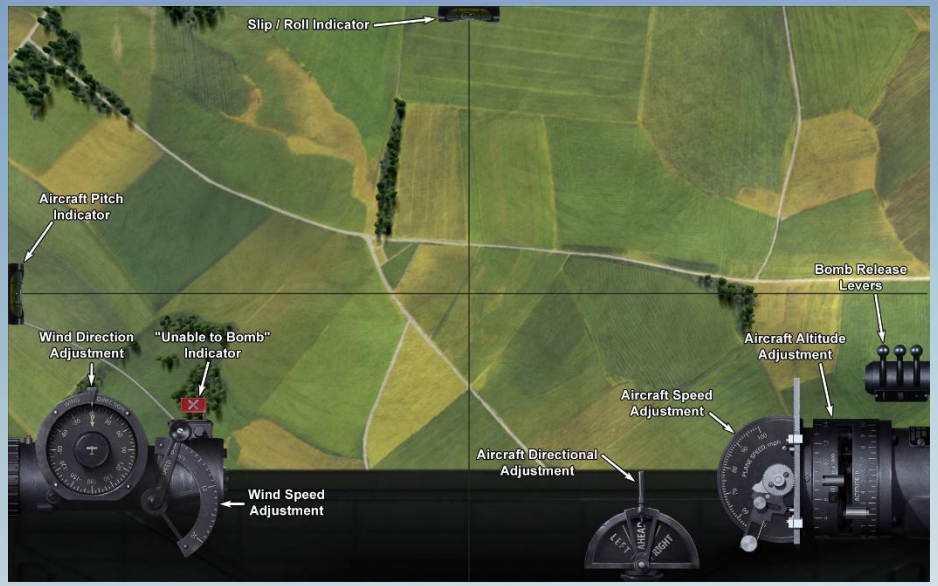


Figure 6.4.2

- **Slip / Roll and Aircraft Pitch indicators:** these bubble indicators show whether the aircraft is flying a straight and level course. In particular, the sideslip indicator notes whether the aircraft is yawing in a particular direction, while the acceleration indicator notes whether the aircraft's nose is pitched upward or downward.

- **Wind direction and wind speed:** these dials are set to indicate the speed and direction from which the wind is blowing, in relation to your aircraft's course. Wind direction is indicated in degrees and wind speed in meters per second.

- **"Unable to Bomb" indicator:** this red flag will pop up just above the wind speed dial or the altitude indicator when your bombsight cannot be operated properly. Factors that can cause this warning to pop up include the following: no bombs onboard the aircraft; aircraft is not flying a stable course; or when the altitude entered into the bombsight is outside the sight's operating parameters.

- **Aircraft directional adjustment:** this control allows you alter your aircraft's course by making shallow turns to the left and to the right. This control can also be inputted with the **Left Shift + Z** (**Level Autopilot: left turn**) and the **Left Shift + X** (**Level Autopilot: right turn**) key combinations.

- **Aircraft speed:** this dial is used to set the aircraft's Indicated Air Speed, which is displayed in either kilometers per hour or miles per hour. The measurement system displayed is dependent on your **Customizations** setting, which can be found on the **Options** page.

- **Aircraft altitude:** these dials are used to set your altitude above the target (**not** altitude above sea level), and it is displayed in either meters or feet. As with the airspeed dial, the measurement system displayed is dependent on your **Customizations** setting. The left-hand dial uses the thousands scale, while the right-hand dial uses the hundreds scale.

- **Bombsight magnification:** this lever adjusts your field of view through the lens of the bombsight. It can be set anywhere between 1x zoom (no magnification) to 2x zoom (double magnification).

  Note: this feature is only available on German aircraft.

- **Bomb release levers:** as the name implies, these levers will release your aircraft's bombs. From left to right, the levers correspond to the **Drop a bomb**, **Drop two bombs**, and the **Drop all bombs** commands

- **Executing a bombing run:**

While the bombsight controls in Rise of Flight vary depending on the aircraft to which they are fitted, the following procedures will help you hit your target:

1. To access the bombsight, press the **V** key (**Bombsight**). This will cause the Level Autopilot feature to be automatically engaged (as long as your aircraft is flying a reasonably stable course). In the Breguet 14 B.2, you will also need to open the doors covering the bombsight with the **Right Control + N** key combination (**Bomb bay door toggle**).

2. If applicable, adjust the wind direction and wind speed dials. To input wind direction, subtract the direction from which the wind is blowing from your aircraft's course. For example, if your aircraft's course is 350 degrees and the wind is blowing from 270 degrees, the wind is blowing 80 degrees from the left. Thus, you would rotate the dial 80 degrees to the left (counter clockwise).

   Note: in some aircraft, the only two options for entering the wind speed are 0 and 180 degrees.

3. Input your aircraft's Indicated Air Speed with the airspeed dial. Note that in the Breguet 14.B2, the airspeed indictor in the cockpit shows True Air Speed calculated at 2000 meters and 4000 meters. Thus, the airspeed you enter into the bombsight should be about 10% lower than the airspeed indicated by the cockpit instrument. For example, 10% of 155 km/h is about 15 km/h. Thus, the airspeed you would enter into the bombsight is 140 km/h.

   Note: in some aircraft, there are a limited number of airspeed values that can be entered into the bombsight.

4. Input your aircraft's altitude with the two altitude dials. Note that this altitude is your height above the target and not your height above sea level (as indicated by your altimeter). For example, if you are flying at 2000 meters and your target is 100 meters above sea level, the altitude you would enter into the bombsight is 1900 meters. If

you are flying a mission in career mode, the target's altitude above sea level will be noted in the mission briefing.

Note: in some aircraft, there are a limited number of altitude values that can be entered into the bombsight.

5. Adjust your aircraft's course as necessary with the steering handle (or with the **Level Autopilot: left turn** and **Level Autopilot: Right turn** commands). If you use the steering handle for this procedure, you do not need to hold down your mouse button once you have initiated a turn.

6. When the target passes under the crosshairs of the bombsight, release your bombs with the bomb release levers. From left to right, the levers correspond to the **Drop a bomb**, **Drop two bombs**, and the **Drop all bombs** commands. The bombs can also be dropped with the corresponding keyboard commands (see section 6.3 for more information). Once you have dropped all of your bombs, the bombsight warning flag above the wind speed dial will pop up.

   Note: if you are not playing as the flight leader in a single-player mission, it is recommended you wait until the flight leader drops his bombs before dropping your bombs. Otherwise, the flight leader and any other AI-controlled pilots may not drop their bombs on the target.

7. To exit the bombsight view, press the **V** key (**Bombsight**).



7.0 ARTILLERY SPOTTING AND RECONNAISSANCE

7.1 ARTILLERY SPOTTING MISSIONS

Artillery spotting is a special type of mission in Rise of Flight, where you as the player direct artillery fire onto enemy ground targets. Currently, you can fly artillery-spotting missions with the DFW C.V, Breguet 14.B2, Bristol F.2B, and the R.E.8. In order to successfully carry out an artillery-spotting sortie, please note the following steps:

1. Before starting the mission, choose a "Radio" loadout for your aircraft from the Hangar screen.

2. Once you are over the target zone, you will notice an artillery gun icon (Figure 7.1.1) appear in the upper left-hand corner of the screen. If you have subtitles enabled, you will also receive a message that the artillery battery is ready to receive your firing instructions.

   Note: if you fly outside the target zone, the artillery gun icon will disappear.



Figure 7.1.1

3. On your map, locate the firing grid (Figure 7.1.2) that corresponds to the target zone. This grid is a series of interconnected boxes, with a group of letters appearing on one side and a group of numbers on another side.

4. After you have visually identified the target, estimate in which grid location the target is located. This location will be a letter followed by a number (for example, D-5).

5. Click your right mouse button to enable your mouse cursor, and then click on the artillery gun icon. This will bring up a special map that reproduces the firing grid on your regular map. It helps to have the level autopilot enabled while carrying out this step and the following step.

6. Place your mouse cursor on the grid location you want the artillery battery to target, and click your left mouse button. The location you have selected will be marked by an X, and a message will show on the screen (if you have subtitles enabled) indicating your firing instructions to the artillery battery.



Figure 7.1.2

7. Watch the target area to see where the artillery rounds are landing. If the target is not being hit, note in which direction the rounds are missing and send a new grid location message to the artillery battery.

8. Once the target has been destroyed by the artillery battery, you will receive an on-screen message that your mission has been completed (if you have subtitles enabled). If you complete another artillery spotting mission in another firing grid, you will receive credit for completing a secondary mission objective.

7.2 RECONNAISSANCE MISSIONS

Rise of Flight features two types of reconnaissance missions: visual reconnaissance and photoreconnaissance. Visual recon missions involve identifying a particular enemy target, while photo recon missions involve photographing an enemy target. To successfully carry out each type of mission, please note the following steps:

- **Visual reconnaissance:**

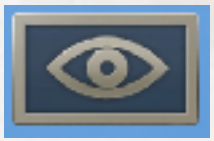


Figure 7.2.1

1. Once you are over the target zone, you will notice an "eyeball" icon (Figure 7.2.1) appear in the upper left-hand corner of the screen.

   Note: if you fly outside the target zone, this icon will disappear.

2. On your map, locate the box that identifies the zone to be reconnoitered. This box will have a large letter inside of it.

3. After you have visually identified the target, note what type of target it is (for example, a balloon or an artillery battery). Your target will typically be located near the middle of the target zone.

4. Click your right mouse button to enable your mouse cursor, and then click on the "eyeball" icon in the upper left-hand corner. This will bring up a display from which you will identify the location and type of target. It helps to have the level autopilot enabled while performing this step and the following two steps.

5. From the left-hand column, click on the letter that corresponds to the target zone you identified in step 2. The letter you choose will be circled.

6. From the right-hand column, click on the type of target that corresponds to the one you have identified in the target zone. Your choice will be circled.

   Note: if you choose the wrong letter for the target zone or the wrong target type, you will need to exit the target zone and re-enter it in order to correct your mistakes. Once you exit the target zone, you should ensure you are at least 5 kilometers away from it before you attempt to re-enter the target zone.

7. Once you have correctly located and identified the target, you will receive an on-screen message that your mission has been completed (if you have subtitles enabled).

   If you successfully identify a target in another target zone, you will receive credit for completing a secondary mission objective.

- **Photo reconnaissance:**

1. Before starting the mission, choose a "Photo" loadout for your aircraft from the Hangar screen.

2. Once you are over the target zone, you will notice a camera icon (Figure 7.2.2) appear in the upper left-hand corner of the screen.

   Note: if you fly outside the target zone, this icon will disappear.

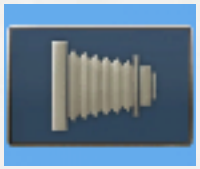


Figure 7.2.2

3. Click your right mouse button to enable your mouse cursor, and then click on the camera icon. This will bring up a two-dimensional camera (Figure 7.2.3) with which you will take pictures of the target. It helps to have level autopilot enabled while carrying out this step and the following step.

Note: at this point, be sure you are flying at the correct altitude and in the general direction indicated for the photo reconnaissance waypoint, both of which will be noted on your map. Otherwise, the camera will be crossed out with a large red X, and you will thus not be able to take any pictures.



Figure 7.2.3

4. Click repeatedly on the center of the camera lens while over the target.
5. Once you have taken the required number of pictures, you will receive an on-screen message that your mission has been completed (if you have subtitles enabled).



8.0 IN-FLIGHT OPTIONS

Rise of Flight features a number of options you can quickly access while flying a mission. Each of these is described below and in the following section on communications. To access these options, first click your right mouse button and then left-click on one of the following choices:

8.1 IN-FLIGHT MAP

- To toggle the display your in-flight map (Figure 8.1.1), press the **M** key (**Flight map**) or click the map icon on the upper left-hand corner of the screen (figure 8.1). The **Left Windows + M** key combination will also toggle the map's display. By default, the map will be displayed in the lower right-hand corner of the screen.



Figure 8.1



Figure 8.1.1

To enlarge the map, double-click on the map; double-click it again to return it to its original size.



Figure 8.1.2

- To reposition the map, place your mouse cursor over one of the borders of the map. While holding down your left mouse button, drag your mouse cursor to reposition the map.

- To manually resize the map, place your mouse cursor over the lower right-hand corner of the map. While holding down your left mouse button, drag your mouse cursor to resize the map.

- To zoom in and zoom out the map's display, scroll your mouse wheel up and down.

- To view a different portion of the map, place your mouse cursor over the map. While holding down your left mouse button, drag the mouse cursor to the location of the map you wish to view.

- To make the map more transparent, press the **Page Down** key. Conversely, to make it more opaque, press the **Page Up** key. By default, the map is entirely opaque.

  Note: regardless of your difficulty settings, your aircraft's position on the map will be marked by a blue icon when you are on the ground.

8.2 BRIEFING

To toggle the mission briefing display, press the **Left Windows + B** key combination or click on the icon (Figure 8.2) at the upper left-hand corner of the screen. The briefing page displays important information about your mission, including the mission's objective, weather conditions, and pilots assigned to the mission. You can resize and reposition this display in the same manner as the in-flight map.



Figure 8.2

8.3 2D GAUGES

- To toggle the display of the game's two-dimensional cockpit gauges, press the **Left Windows + G** key combination (**Simple gauges**) or click on the icon (Figure 8.3) at the upper left-hand corner of the screen.

- The number and type of gauges displayed is dependent on whether you have the **Simple gauges** difficulty setting enabled. If you have this setting enabled, you will see gauges indicating the aircraft's fuel level, course, altitude, airspeed, RPM (including maximum safe RPM), radiator & mixture settings, engine temperature (including maximum and minimum safe operating limits), and time of day. With the **Simple gauges** setting disabled, the only gauges you will see are those indicating the aircraft's course, radiator settings, mixture settings, throttle settings, and the time of day.

  *Note: the measurement system in which the simple gauges are displayed is dependent upon your **Internalization** setting on the **Options > General** tab.*



Figure 8.3

- If you are flying a multi-engine aircraft, a separate gauge for each engine's throttle, mixture, and radiator settings will be displayed. In addition, each gauge has a number above the radiator display, which notes the number of the engine (in increasing order from left to right). If you have taken control of a particular engine, the number will be highlighted in green. See section 6.2 for more information on multi-engine management.

- To reposition a gauge, right-click your mouse to enable the mouse cursor, and click and drag the gauge while holding down your left mouse button. Double-click the gauge to return it to its default position.

8.4. AIMING HELP

The Aiming Help option toggles the display of a special aiming sight in two circumstances: (1) when you have taken control of a turret-mounted machine gun but are not aiming down the weapon's sights or (2) when you are using the flare gun or a pistol. To toggle this setting, either click on the icon (Figure 8.4) at the upper left-hand corner of the screen or press the **Left Windows + A** key combination.



Figure 8.4

8.5 PLAYERS LIST

To display your current statistics while flying a single-player mission, press the **Left Windows + Tab** key combination or click on the icon (figure 8.5) at the upper left-hand corner of the screen. If you are playing a career mode mission, the statistics for any computer-controlled aircraft in your flight will also be displayed. Please see section 15.2 for detailed information about the statistics screen.



Figure 8.5

8.6 OPTIONS

This option, which can also be accessed via the **Options** link on the main game screen, allows you to access and adjust the game's settings. To enable this option, press the **Left Windows + S** key combination or click the icon (figure 8.6) at the upper left-hand corner of the screen. Please see section 5.1 for detailed information about this page's settings.



Figure 8.6

8.7 HIDE HUD

This option clears the screen of all buttons and icons, including those icons identifying enemy and friendly aircraft and any time compression icons (such as the Pause icon). To re-enable the HUD, either click on the icon at the upper left-hand corner of the screen (figure 8.7) or press the **Left Windows + H** key combination.



Figure 8.7



9.0 COMMUNICATIONS

9.1 IN-FLIGHT COMMUNICATION

Rise of Flight has three sets of orders by which you can communicate with other aircraft and with gunners aboard your plane: pilot gestures, flight leader commands, and gunner commands. While pilot gestures are for communication between human players, flight leader commands are for ordering computer-controlled pilots when you are in charge of the formation. Gunner commands are for ordering any computer-controlled gunners on board your aircraft only. Each type of command is discussed below.

Note: all of the below commands can be carried out by first right-clicking your mouse and then pressing the respective number on your keyboard that is associated with each command. Alternatively, you can first right-click your mouse and then left-click on the command of your choice. In addition – as discussed below – each command also has an associated key combination.

- **Pilot gestures:** to access the list of available gestures, click your right mouse button and either press the **1** button on your keyboard or left-click on the "hand" icon (Figure 9.1).



Figure 9.1

- **Ok:** (Figure 9.1.1) notifies your flight you are "ready to go," "ready to take off," etc. This gesture can also be performed by pressing the **Left Shift + 5** key combination (**Gesture: OK!**)



Figure 9.1.1

- **Forward:** (Figure 9.1.2) orders your flight to attack an enemy target. This gesture can also be performed by pressing the **Left Shift + 6** key combination (**Gesture: attack!**).



Figure 9.1.2

- **Stop:** (Figure 9.1.3) orders your flight to cease their current actions. This gesture can also be performed by pressing the **Left Shift + 1** key combination (**Gesture: hand up**).



Figure 9.1.3

- **To the left:** (Figure 9.1.4) orders your flight to shift their formation to the left of your aircraft. This gesture can also be performed by pressing the **Left Shift + 2** key combination (**Gesture: form left**).



Figure 9.1.4

- **To the right:** (Figure 9.1.5) orders your flight to shift their formation to the right of your aircraft. This gesture can also be performed by pressing the **Left Shift + 3** key combination (**Gesture: form right**).



Figure 9.1.5

- **To the left and right:** (Figure 9.1.6) orders your flight to take up a "V" formation behind your aircraft. This gesture can also be performed by pressing the **Left Shift + 4** key combination (**Gesture: V-formation**).



Figure 9.1.6

- **Flight leader commands:** to access the list of available commands, click your right mouse button. The commands you can give to computer-controlled pilots are divided into four sections: Commands, Attack, Patrol, and Formation. Each section can be accessed by left-clicking on the appropriate icon or by pressing the 2-5 keys, respectively.

  Note: in order for computer-controlled pilots to carry out your orders, they must be within close visual range of your aircraft. The maximum range at which the computer will respond to your commands is dependent upon the computer pilot's skill level.

  - **Commands Section:** (Figure 9.1.7)



Figure 9.1.7

  - **Hold formation and cover me:** (Figure 9.1.8) orders your flight to remain in formation and provide protection against enemy aircraft. Your pilots will fly slightly above your position and automatically attack any enemy aircraft that threaten your formation. This command can also be performed by pressing the **Left Alt +5** key combination (**Command: hold formation**).

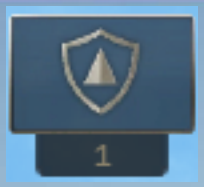


Figure 9.1.8

- **Do like me:** (Figure 9.1.9) orders your flight to mimic your actions. This can be as simple as remaining in formation with your aircraft or attacking an enemy target. This command can also be performed by pressing the **Left Alt +4** key combination (**Command: do like me**).



Figure 9.1.9

- **Follow our mission:** (Figure 9.1.10) orders your flight to cease their current actions if they are not in accordance with the mission's objectives (for example, stopping an attack on an enemy target that is not part of the mission's orders and returning to formation). This command can also be performed by pressing the **Left Alt + 3** key combination (**Command: follow our mission**).

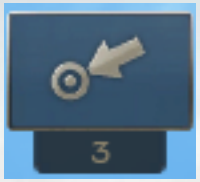


Figure 9.1.10

- **Accept the leadership:** (Figure 9.1.11) transfers command of your flight to the #2 pilot in the group (or the highest-numbered pilot in the formation still flying). Once this command is given, you cannot regain control of the flight. This command can also be performed by pressing the **Left Alt + 9** key combination (**Command: accept the leadership**).

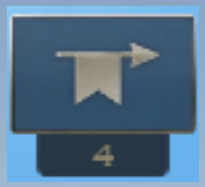


Figure 9.1.11

- **Return to base:** (Figure 9.1.12) orders your flight to return to your home airfield. This command can also be performed by pressing the **Left Alt + 0** key combination (**Command: return to base**).



Figure 9.1.12

- **Attack Section:** (Figure 9.1.13)



Figure 9.1.13

- **Attack air:** (Figure 9.1.14) orders your flight to attack any nearby airborne targets. This command can also be performed by pressing the **Left Alt + 1** key combination (**Command: attack nearest air**).



Figure 9.1.14

- **Attack ground:** (Figure 9.1.15) orders your flight to attack any nearby ground targets. This command can also be performed by pressing the **Left Alt + 2** key combination (**Command: attack nearest ground**).

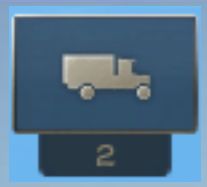
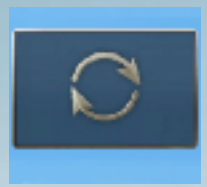


Figure 9.1.15

- **Patrol Section:** (Figure 9.1.16)


Figure 9.1.16

- **Patrol air:** (Figure 9.1.17) orders your flight to loiter in the area and to be on the lookout for enemy aircraft. Your flight will focus its attention on attacking any enemy aircraft it has spotted after issuing this command. This command can also be performed by pressing the **Left Alt + 7** key combination (**Command: patrol for air**).



Figure 9.1.17

- **Patrol ground:** (Figure 9.1.18) orders your flight to loiter in the area and to be on the lookout for enemy ground targets. Your flight will focus its attention on attacking any enemy ground targets it has spotted after issuing this command. This command can also be performed by pressing the **Left Alt + 8** key combination (**Command: patrol for ground**).



Figure 9.1.18

- **Patrol air and ground:** (Figure 9.1.19) orders your flight to loiter in the area and to be on the lookout for both enemy aircraft and ground targets. Your flight will focus its attention on attacking any enemy aircraft and/or ground targets it has spotted after issuing this command. This command can also be performed by pressing the **Left Alt + 6** key combination (**Command: patrol the area**).



Figure 9.1.19

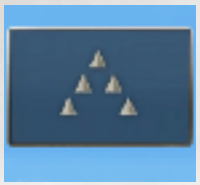
- **Hold position:** (Figure 9.1.20) orders your flight to loiter in the area. This command can also be performed by pressing the **Left Ctrl + 5** key combination (**Command: hold position**).



Figure 9.1.20

- **Formation Section:**

- **V-formation:** (Figure 9.1.21) orders your flight to form into a "V" behind your aircraft. This is the default formation for the game. This command can also be performed by pressing the **Left Ctrl + 4** key combination (**Command: formation V**).


Figure 9.1.21

- **Column:** (Figure 9.1.22) orders your flight to form into a column behind your aircraft. This command can also be performed by pressing the **Left Ctrl + 1** key combination (**Command: formation column**).

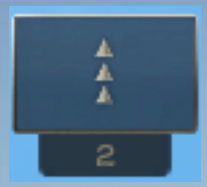


Figure 9.1.22

- **Left edge:** (Figure 9.1.23) orders your flight to shift to the left of your aircraft in a "half-V" formation. This command can also be performed by pressing the **Left Ctrl + 2** key combination (**Command: formation left edge**).

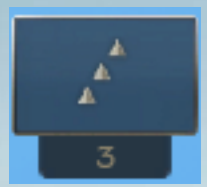


Figure 9.1.23

- **Right edge:** (Figure 9.1.24) orders your flight to shift to the right of your aircraft in a "half-V" formation. This command can also be performed by pressing the **Left Ctrl + 3** key combination (**Command: formation right edge**).



Figure 9.1.24

*Note: your currently ordered formation will be displayed by the **Formation** icon.*

- **Gunner commands:** to access the list of available commands, right-click your mouse button and either press the **6** button on your keyboard or left-click on the gunner icon (Figure 9.1.25).



Figure 9.1.25

- **Fire at will:** (Figure 9.1.26): orders your gunner(s) to fire at any enemy aircraft in the vicinity. This command is linked to the attack distance commands discussed below. This command can also be performed by pressing the **Right Alt + 1** key combination (**Gunners: Fire at will**).



Figure 9.1.26

Note: this is the default firing command for your gunner(s) when beginning a mission.

- **Return fire:** (Figure 9.1.27) orders your gunner(s) to only fire at enemy aircraft that are making an attack run on your aircraft. This command is linked to the attack distance commands discussed below. This command can also be performed by pressing the **Right Alt + 2** key combination (**Gunners: Return fire**).



Figure 9.1.27

- **Cease fire:** (Figure 9.1.28) orders your gunner(s) to cease firing all weapons. This command can also be performed by pressing the **Right Alt + 3** key combination (**Gunners: Cease fire**).



Figure 9.1.28

- **Cease heavy weapons fire:** (Figure 9.1.29) orders your gunner(s) to cease firing all weapons larger than a machine gun (i.e., cannons and recoilless guns). This command can also be performed by pressing the **Right Alt + 4** key combination (**Gunners: Cease heavy weapons fire**).



Figure 9.1.29

- **Attack balloons:** (Figure 9.1.30) orders your gunner(s) to attack any enemy balloons encountered, in addition to enemy aircraft. This command can also be performed by pressing the **Right Alt + 5** key combination (**Gunners: Attack balloons**).



Figure 9.1.30

- **Attack ground targets:** (Figure 9.1.31) orders your gunner(s) to attack any enemy ground targets encountered, in addition to enemy aircraft. This command can also be performed by pressing the **Right Alt + 6** key combination (**Gunners: Attack ground targets**).



Figure 9.1.31

- **Short attack distance:** (Figure 9.1.32) orders your gunner(s) to commence firing at enemy aircraft at a closer range than the normal attack distance. Enemy aircraft outside the short attack distance range will not be engaged by your gunner(s). This command can also be performed by pressing the **Right Alt + 7** key combination (**Gunners: Short attack distance**).



Figure 9.1.32

- **Normal attack distance:** (Figure 9.1.33) orders your gunner(s) to commence firing at enemy aircraft at the normal attack range as programmed into the game. Enemy aircraft farther than this distance will not be engaged by your gunner(s). This command can also be performed by pressing the **Right Alt + 8** key combination (**Gunners: Normal attack distance**).



Figure 9.1.33

Note: this is the default attack distance for your gunner(s) when you begin a mission.

- **Long attack distance:** (Figure 9.1.34) orders your gunner(s) to commence firing at enemy aircraft at the maximum distance possible. This command can also be performed by pressing the **Right Alt + 9** key combination (**Gunners: Long attack distance**).



Figure 9.1.34



10.0 COCKPIT CAMERA ADJUSTMENT

Rise of Flight offers a number of options for modifying the in-cockpit camera system for each individual aircraft. These options involve adjusting your zoom level, adjusting your default head position, and setting up customized snap views.

Note: you can adjust the in-cockpit camera settings for both the pilot's position and for any gun turrets fitted to your aircraft. Each gun turret has its own separate camera settings for each type of gun that can be fitted to the turret (including guns that differ only in their ammunition loadout).

- **Zoom level adjustment:**

  - To zoom in your cockpit view, press the **numpad +** key (**Head: zoom in**). To zoom out your view, press the **numpad –** key (**Head: zoom out**). To return to the default, un-zoomed view, press the **numpad *** key (**Head: reset zoom**).

  - **Adjusting the default head position:**

    1. Ensure that any head tracking software (such as TrackIR) is disabled.
    2. Make sure you cockpit view is centered by pressing the **numpad 5 key** (**Head: snap center**).
    3. Adjust your camera view to the left and to the right with the **Delete** (**Head: move left**) and the **End** keys (**Head: move right**), respectively.
    4. Adjust your camera view forward and backward with the **Insert** (**Head: move forward**) and the **Home** keys (**Head: move backward**), respectively.
    5. Adjust your camera view up and down with the **Page Up** (**Head: move up**) and the **Page Down** keys (**Head: move down**), respectively.
    6. Once you are satisfied with your changes, press the **F10** key (**Head: save snap**). If at any time before this step you want to revert to the default head position, press the **numpad 5** key.

- **Creating a snap view:**

  Creating a custom snap view is especially handy when you want to quickly shift your camera view to a specific position, such as a gun sight. To create a custom snap view, please note the following steps:

  1. Ensure any head tracking software is disabled and that your camera mode is set to Snap View by pressing the **F9** key (**Head: snap mode**). You can confirm your camera mode is in snap view mode by pressing and releasing any of the numpad keys from 0-9 (excluding the numpad 5 key) or the numpad decimal key.
  2. Press and hold any of the numpad keys listed in step 1.
  3. While still holding down the numpad key, adjust your camera view as described in steps 3-5 in the "adjusting the default head position" section.
  4. Once you are satisfied with your changes, press the **F10** key.
  5. To switch to the custom snap view you have created, press the key you chose for the custom snap view in step 2. In addition, you can map this custom snap view to a button on a game controller. To do this, please refer to section 5.1. All of the snap view commands can be found in the **Pilot head control** section of the **Controls** screen.

*Note: you can back up your custom snap views and edit them with a text editor by navigating to the **\Rise of Flight\data\LuaScripts\snapviews** folder.*



11.0 FLIGHT RECORDER AND PLAYBACK SYSTEM

Rise of Flight allows you to record your missions to a track file and then view the track in a specialized in-game display. To record and view a mission, please note the following steps:

- **Recording a track file:**

  - Before you begin recording a mission, you can set a number of parameters in the **Game** section of the **Options** screen. Please refer to section 5.1 to view a description of these options.

  - You can set the name of the track file before you begin a mission. To do so, enter the name in the **Flight record** text box. If you do not wish to create a name at this time, one will be created automatically once you finish recording the mission.

  - To being recording a mission, press the **Left Ctrl + R** key combination (**Flight record**). You will notice a camera icon appear in the upper right-hand portion of the screen. Press this key combination again to finish recording. A new track file will be generated

each time you begin recording in-game footage.

- **Viewing a track file:**

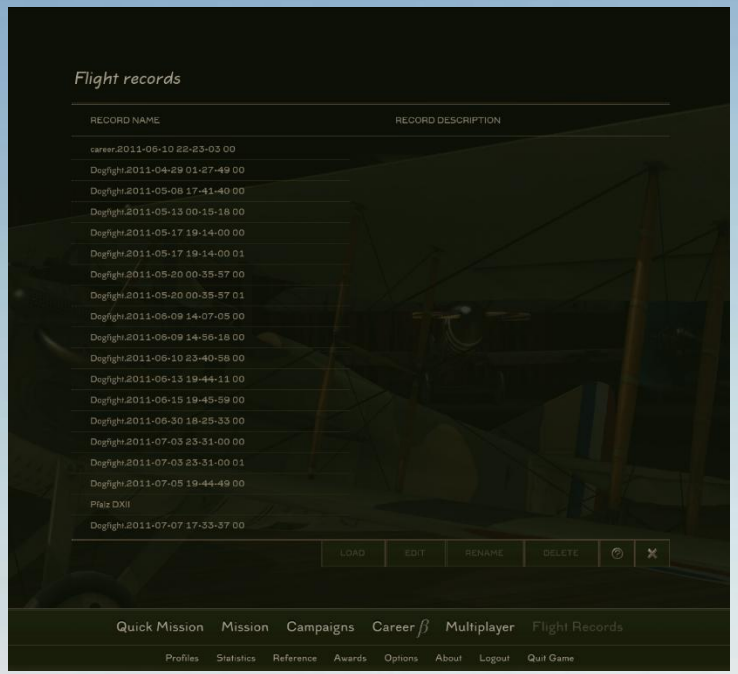


Figure 11.0.1

- To access your tracks, click on the **Flight Records** link at the bottom of the main game screen. This will load the main flight records screen (Figure 11.0.1), from which you can load, edit, rename, and delete your track files.

- To view a track file without making any edits to it, click on the **Load** button.
- Once the track loads, you will need to un-pause the game in order to view your footage. If you wish to change the camera position while viewing the track, please note the camera options available in the "Editing a track file" section below.

- To begin playing the track, press the **Play** icon at the lower left-hand corner of the screen. You can also use this icon to pause the footage at any time. The track will play exactly as it was recorded and saved.

- If you wish to jump to a particular point of time in the track file, left-click and drag the marker that is located below the time display at the bottom of the screen.

- If you wish to view your track without the playback interface at the bottom of the screen, click your right mouse button and left-click on the **Flight Record Scale** icon at the upper left-hand corner of the screen. To restore the interface, either click the icon again or move your mouse cursor to the bottom edge of the screen.

- To finish watching a track and to return to the main flight records screen, press the **Esc** key and choose the **Finish Playback** option.

- **Editing a track file:**



Figure 11.0.2

- Click on the **Edit** button from the main flight records screen.

- Once the track loads (Figure 11.0.2), you can edit the track's camera positions and the speed at which the track plays. These options are described below.

  - **F1** (**Camera: player cockpit**): takes you to the in-cockpit view of your plane.

  - **F2** (**Cam.ext.free: my plane**): takes you to an external view of your plane.

  - **F3** (**Camera: flyby**): takes you to an external flyby view of your plane.

  - **F4** (**Camera: combat camera**): takes you to a fixed external view above and behind your plane.

  - **F5** (**Cam.ext.free: ground**): takes you to an external view of the nearest ground object. Pressing this key repeatedly will cycle through all nearby ground objects. There are two related camera views for this option: the **Left Shift + F5** key combination (**Cam.ext.free: friendly ground**) will lock on only to friendly ground objects, while the **Left Ctrl + F5** key combination (**Cam.ext.free: enemy ground**) will lock on only to enemy ground objects.

  - **F6** (**Cam: ext. free, bombs**): takes you to an external view of the nearest bomb that has been dropped. This camera view will follow the bomb all the way to the ground

until it explodes. There are two related camera views for this option: the **Left Shift + F6** key combination (**Camera: ext.free, friendly bombs**) will lock on only to friendly bombs, while the **Left Ctrl + F6** key combination (**Camera: ext.free, enemy bombs**) will lock on only to enemy bombs.

- **F11:** (**Camera: free**): takes you to an external which does not follow any particular aircraft or ground object. From this point you can manipulate the camera view with your mouse or the following keys:
- To move the camera forward and backward, press the **W** and **S** keys (**Cam.free: move fwd/bwd**), respectively.
- To move the camera to the left and to the right, press the **A** and **D** keys (**Cam.free: move left/right**), respectively.
- To move the camera up and down, press the **R** and **F** keys (**Cam.free: move up/down**), respectively.
- **Left Shift + F2** (**Cam.ext.free: friendly air**): takes you an external view of the nearest friendly aircraft (including balloons). Pressing this key combination continually will cycle through all nearby friendly aircraft.
- **Left Ctrl + F2** (**Cam.ext.free: enemy air**): takes you to an external view of the nearest enemy aircraft (including balloons). Pressing this key combination repeatedly will cycle through all nearby enemy aircraft.
- To accelerate the speed at which the mission plays, press the **right bracket** key. To decelerate the speed at which a mission plays, press the **left bracket** key.

- Once you have completed your edits, you will be prompted to by the game to save your changes. If you do not wish to save your changes, press the **Cancel** button. Your changes will be visible the next time you load the track with the **Load** button.

Note: you can share and back up your tracks by navigating to the ***\Rise of Flight\data\Tracks*** *folder. A complete track file is composed of two main parts: a file with the .trk file extension and a corresponding folder with the same name. You will need both parts in order to properly view, save, and share tracks.*



12.0 QUICK MISSION GAMEPLAY

Rise of Flight's quick mission builder allows you to create single-player missions on the fly with up to 30 aircraft and a variety of ground targets. You do not need to be logged into the game via Online Mode in order to play a quick mission. To set up and play a quick mission, first click on the **Quick Mission** link at the bottom of the main game screen and follow the instructions below.



Figure 12.0

12.1 MAP SELECTION (Figure 12.0)

The first thing you want to do when creating a quick mission is to choose the map on which you want to play the mission. Choose your map from the drop-down menu at the upper right-hand corner of the screen. Rise of Flight offers you a number of choices when selecting your map:

- **Western Front:** this is the full-size map that comes with the game, which depicts the front lines in Northeastern France as of 1918. This map comes in three season variations: summer, autumn, and winter.

- **Verdun:** this is a scaled-down version of the Western Front map, which depicts the front lines in and around the city of Verdun. This map comes in three seasonal variations: summer, autumn, and winter.

- **Lake:** this is a fictional map, which features a lake in the middle of the terrain. This map comes with three seasonal variations: summer, autumn, and winter.

12.2 MISSION TYPE SELECTION

You can fly three different types of quick missions: Duel, Skirmish, and Survive. To choose your mission type, click one of the icons on the map. This icon marks where you will start the mission and what type of mission you want to fly. Each of the three mission types is discussed below.

- **Duel:** in this mode, you will face off against one enemy aircraft. When setting up this type of mission, you have the following options:

  - **Friendly aircraft type:** the aircraft you will fly is listed on the left-hand side of the screen and is displayed on a blue background as "My Plane." To choose your aircraft, click on the arrow to the right to the aircraft's name. A menu will pop up, allowing you to choose which aircraft you want to fly. You can also choose to allow the game to choose a random fighter for you.

    Note: any aircraft you have not purchased will be dimmed and marked by price tag icon on this menu. If you wish to purchase an aircraft at this time, click on the price tag icon. This action will automatically take you to the Rise of Flight Store web page for the aircraft you want to purchase. You will need to exit the game and log back in to the game in Online Mode at least once in order to see your new aircraft.

  - **Friendly aircraft parameters:** to adjust your weapon loadout, fuel level and aircraft's skin, click on the wrench icon below your aircraft's name. A menu will pop up, allowing you to make your changes. Once you are satisfied with your changes, click anywhere outside the menu to exit this display.

    Note: adjusting the parameters in this section will adjust the parameters for all computer-controlled aircraft in the flight, in addition to your own aircraft. You can also adjust your own aircraft's parameters on the Hangar screen once you have loaded the mission.

  - **Enemy aircraft type:** the aircraft you will fly against is listed on the right-hand side of the screen and is displayed on a red background as "Enemy Plane." When choosing the enemy's aircraft, you can choose a specific aircraft type or allow the game to choose one at random. To choose the enemy's aircraft, click the arrow to the right of the aircraft's name. A menu will pop up, allowing you to make your selection.

    Note: you can choose any enemy aircraft from this menu, regardless of whether you have purchased the aircraft in order to fly it.

  - **Enemy aircraft skill level:** to adjust the enemy aircraft's skill level, click the **Select AI** icon below the aircraft's name. You can choose a particular skill level or allow the game to choose one at random.

  - **Enemy aircraft parameters:** to adjust the enemy aircraft's loadout, fuel level and skin, click the wrench icon below the aircraft's name. A menu will pop up, allowing you to make your changes. Once you are satisfied with your changes, click anywhere outside the menu to exit this display.

  - **Tactical situation:** you can choose from a number of tactical situations in which you will find yourself and the enemy at the start of the mission. To choose a particular setup, click the banner at the upper-center portion of the screen or use your mouse wheel to scroll through the available choices. In all cases, your aircraft is denoted by a blue aircraft icon, while the enemy is denoted by a red aircraft icon. Each tactical scenario is described below.

    Note: these options also apply to Skirmish and Survive missions.

    - **Face to Face:** in this scenario, you and the enemy aircraft will begin the mission flying directly towards each other on parallel courses.

    - **Pursuit:** in this scenario, you will begin the mission pursuing the enemy aircraft from his tail position (also known as his "six o'clock").

    - **Escape:** in this scenario, you will begin the mission with the enemy aircraft pursuing you from your six o'clock position.

    - **Aside:** in this scenario, you and the enemy aircraft will begin the mission flying side-by-side on opposite & parallel courses.

    - **Scramble:** in this scenario, you will begin the mission on the ground at your airbase, while the enemy aircraft will already be airborne.

  - **Starting altitude and distance:** in each type of tactical situation, you can set the starting altitude for both you and the enemy, and you can set the distance that will separate each side at the start of the mission. To adjust these settings, click and drag the appropriate slider with your left mouse button, or place your mouse cursor over the slider and scroll your mouse wheel up and down.

    Note: each of these settings is calibrated in meters. For instance, if you set your starting altitude to 1.5, this means you will start the mission flying at 1500 meters.

- **Skirmish:** in this mode, you and up to 15 friendly aircraft can do battle with up to 15 enemy aircraft. In this type of mission, you have the following options:

  - **Aircraft type and number:** the aircraft you and any friendly computer-controlled pilots will fly is listed and displayed on a blue background on the left-hand side of the screen, while the enemy's aircraft settings are displayed on a red background on the right-hand side of the screen. The formation of which you will be a part is marked as "My Flight" and a star icon.

  - To choose the number of aircraft for a particular flight, click the arrow to the left of the aircraft's name. You can choose anywhere from 0-5 aircraft or allow the game to choose a random number.

  - Once you have chosen the number of aircraft for a particular flight, choose the type of aircraft for the flight by clicking the arrow to the right of the aircraft's name. A menu will pop up, allowing you to choose a particular aircraft, or you can allow the game to choose a random plane.

    Note: for Flight B and Flight C aircraft on your side, you can choose any aircraft, regardless of whether you have purchased the aircraft in order to fly it. This also applies to all enemy flights.

    - **Aircraft skill level:** to adjust the skill level for a particular flight, click the **Select AI** icon to the right of the aircraft's name. You can choose a particular skill level or allow the game to choose one at random.

    - **Aircraft formation:** to adjust the formation for a particular flight, click the **Formation** icon, which is located to the right of the **Select AI** icon. You can choose a particular aircraft formation or allow the game to choose one at random. Your position in the formation is marked by the "triangle 1" icon.

    - **Aircraft parameters:** to adjust the weapon loadout and skin for all aircraft of a particular flight, click on the wrench icon, which is located to the right of the **Formation** icon. A menu will pop up, allowing you to make your changes. Once you are satisfied with your changes, click anywhere outside the menu to exit this display.

      Note: you can also adjust your own aircraft's parameters on the Hangar screen once you have loaded the mission. Any changes you make on the Hangar screen will not affect the other aircraft in your flight.

    - **Tactical situation:** your tactical situation options are the same as those you can set for Duel and Skirmish missions.

- **Survive:** in this mode, you will face off against successive waves of enemy aircraft. This mode is similar to Duel mode, except that in Survive mode a new enemy aircraft will be spawned once you have shot down the currently active enemy aircraft. In this type of mission, you have the following options:

  - **Friendly aircraft type:** the aircraft you will fly is listed on the left-hand side of the screen and is displayed on a blue background as "My Plane." To choose your aircraft, click on the arrow to the right to the aircraft's name. A menu will pop up, allowing you to choose which aircraft you want to fly. You can also choose to allow the game to choose a random fighter for you.

    Note: any aircraft you have not purchased will be dimmed and marked by price tag icon on this menu. If you wish to purchase an aircraft at this time, click on the price tag icon. This action will automatically take you to the Rise of Flight Store web page for the aircraft you want to purchase. You will need to exit the game and log back in to the game in Online Mode at least once in order to see your new aircraft.

  - **Friendly aircraft parameters:** to adjust your weapon loadout and aircraft's skin, click on the wrench icon below your aircraft's name. A menu will pop up, allowing you to make your changes. Once you are satisfied with your changes, click anywhere outside the menu to exit this display.

    Note: you can also adjust your aircraft's parameters on the Hangar screen once you have loaded the mission.

  - **Enemy aircraft type:** the aircraft you will fly against is listed on the right-hand side of the screen and is displayed on a red background as "Enemy Plane." When choosing the enemy's aircraft, you can choose a specific aircraft type or allow the game to choose one at random. To choose the enemy's aircraft, click the arrow to the right of the aircraft's name. A menu will pop up, allowing you to make your selection.

    Note: you can choose any enemy aircraft from this menu, regardless of whether you have purchased the aircraft in order to fly it.

  - **Enemy aircraft skill level:** to adjust the enemy aircraft's skill level, click the **Select AI** icon below the aircraft's name. You can choose a particular skill level or allow the game to choose one at random.

  - **Enemy aircraft parameters:** to adjust the enemy aircraft's loadout and skin, click the wrench icon below the aircraft's name. A menu will pop up, allowing you to make your changes. Once you are satisfied with your changes, click anywhere outside the menu to exit this display.

  - **Number of enemy waves:** to choose how many waves of enemy aircraft you will face, click on the arrow above the enemy aircraft's name. You can choose any number from 1-5 or allow the game to choose a number at random.

  - **Tactical situation:** your tactical situation options are the same as those you can set for Duel and Skirmish missions.

12.3 TIME AND WEATHER CONDITIONS

You can set the time of day and the weather conditions when setting up a quick mission. These parameters are depicted by five circles near the bottom of the screen. You can adjust these parameters three different ways: (1) point your mouse cursor at a particular point along the circle's edge and click your left mouse button, (2) left-click and drag your mouse cursor around the circle's edge, or (3) scroll your mouse wheel up and down. Each of these parameters is described below.

- **Time:** sets the time of the mission, in 15-minute increments. Daylight missions will be noted by a sun icon, while nighttime missions will be noted by a moon icon.
- **Clouds:** sets the altitude at which clouds will be spawned. This value can be set from 1000-5000 meters, in one-hundred meter increments.
- **Wind:** sets the speed of the wind. This value can be set from 0-5 meters per second.
- **Turbulence:** sets the speed and intensity of the wind's turbulence as it buffets your aircraft. This value can be set from 0-3 meters per second.
- **Weather:** sets the level of cloud cover and precipitation. There are four values for this setting: Clear, Average, Heavy, and Overcast. On the Overcast setting, you will see rainfall on the summer and autumn maps and snowfall on the winter maps.

12.4 GROUND TARGETS

Ground targets are defined as secondary objectives for you and any other friendly aircraft in Quick Mission mode. To enable the appearance of a particular type of ground target, click the check box for any of the eight pre-defined ground target types at the lower right-hand corner of the screen.

12.5 MISSION RECORDING

If you plan on recording your quick mission session and want to define a name for your track file at this time, left-click on the text box at the lower left-hand corner of the screen, which is labeled as "Flight record." Once you have set the file's name, click anywhere outside the text box to save your changes. Please see section 11.0 for more information on recording and editing track files.

12.6 DIFFICULTY SETTINGS

To set the difficulty settings for your mission, click on the **Settings** button at the lower right-hand corner of the screen. Please see section 5.2 for detailed information on each difficulty setting.

12.7 MISSION GENERATION

Once you are satisfied with the setup of your mission, click on the **Start Mission** button to generate the mission. Once the mission is generated, you can adjust your aircraft's parameters from the Hangar screen (see section 5.3 for more info), view the mission briefing, and view your in-flight map. When you are ready, click on the **Start** button to begin the mission. You can restart the mission at any time and keep your mission settings intact by pressing the **Esc** key and choosing the **Restart Mission** option. To finish your mission (and view your mission statistics) and return to the main Quick Mission setup screen, press the **Esc** key and choose the **Finish Flight** option.



13.0 SINGLE MISSION GAMEPLAY

In Single Mission mode, you can play a variety of pre-made single-player missions with aircraft you have purchased. All single missions in Rise of Flight are stored in the **\Rise of Flight\data\missions** folder. You can create subfolders for single missions in this directory, which will be recognized by the game on the main Single Mission screen. You do not need to be logged into the game via Online Mode in order to play a single mission. To play a single mission, click on the **Mission** link at the bottom of the main game screen and follow the steps below.

13.1 MISSION SELECTION

When you click on the **Mission** link, you will be presented with the main single mission selection screen (Figure 13.1). By default, you will see two folders on this screen: **Fly Now** and **Scenarios**. Each of these types of missions is described below.

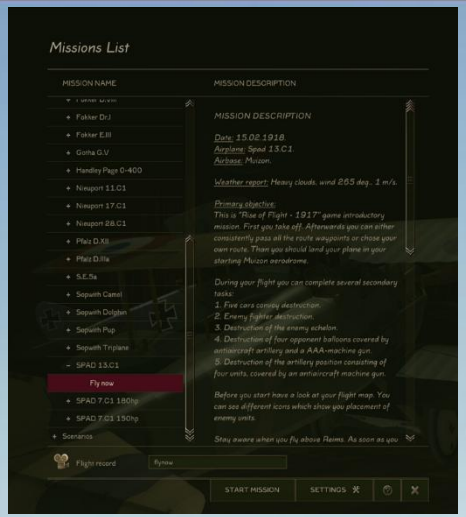


Figure 13.1

- **Fly Now:** in this type of mission, you can attempt to complete a variety of mission objectives which are common to all aircraft. You can simply fly a pre-set flight path, do battle with randomly-generated enemy aircraft, or attack a variety of ground targets. To load a particular Fly Now mission, please note the following steps:

  - Left-click on the **Fly Now** folder and then left-click on the name of the aircraft you wish to fly. This will show the Fly Now mission below the name of the aircraft you have chosen.

  - Left-click on the mission name to view the mission's description in the right-hand column. You can also view this description on the briefing screen once the mission has been loaded.

  - To close the main **Fly Now** folder or any of the aircraft subfolders, left-click on the name of the folder.

- **Scenarios:** in scenario missions, you can fly a mission that is tailored to each specific aircraft (for example, high-altitude bombing missions with twin-engine bombers and artillery spotting missions with two-seaters). To load a particular Scenario mission, please note the following steps:

  - Left-click on the **Scenarios** folder and then left-click on the name of the aircraft you wish to fly. This will show the available missions below the name of the aircraft you have chosen.

  - Left-click on the name of a mission to view the mission's description in the right-hand column. You can also view this description on the briefing screen once the mission has been loaded.

  - To close the main **Scenarios** folder or any of the aircraft subfolders, left-click on the name of the folder.

13.2 MISSION RECORDING

If you plan on recording your single mission session and want to define a name for your track file at this time, left-click on the text box near the bottom of the screen, which is labeled as "Flight record." Once you have set the file's name, click anywhere outside the text box to save your changes. Please see section 11.0 for more information on recording and editing track files.

13.3 DIFFICULTY SETTINGS

To set the difficulty settings for your mission, click on the **Settings** button near the bottom of the screen. Please see section 5.2 for detailed information on each difficulty setting.

13.4 STARTING THE MISSION

When you are ready to load your mission, click on the **Start Mission** button near the bottom of the screen. Once the mission has been loaded, you can adjust your aircraft's parameters from the Hangar screen (see section 5.3 for more info), view the mission briefing, and view your in-flight map. When you are ready, click on the **Start** button to begin the mission. You can restart the mission at any time by pressing the **Esc** key and choosing the **Restart Mission** option. To finish your mission (and view your mission statistics) and return to the main Single Mission selection screen, press the **Esc** key and choose the **Finish Flight** option.



14.0 CAMPAIGN MODE GAMEPLAY

Campaign mode allows you to play a sequential series of missions based upon a particular theme. In this mode of gameplay, you must complete the primary objective of your current mission before you are allowed to advance to the next mission. The campaigns currently available also feature unique awards that are not available in any other form of gameplay.

You do not need to be logged into the game via Online Mode in order to play a campaign mission. To play a campaign mission, click on the **Campaigns** link at the bottom of the main game screen and follow the steps below.

14.1 CAMPAIGN SELECTION

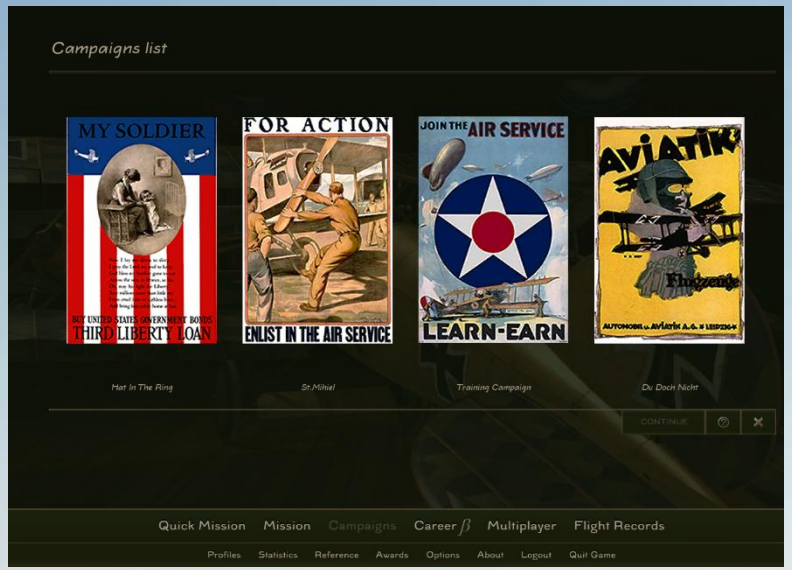


Figure 14.1

When you click on the **Campaigns** link, you will be presented with the main campaign selection screen (Figure 14.1). From this screen you can choose to start a new campaign or resume a campaign already in progress. Left-click on the campaign you wish to play and click on the **Continue** button. Each of the currently available campaigns is described below.

*Note: if a campaign is currently not accessible, you can click on the **Overview** button to preview what types of missions and aircraft it features. Once you have clicked on this button, you can then purchase the campaign by clicking on the **Buy** button at the bottom of the screen, which will automatically take you to the Rise of Flight Store webpage.*

- **Training Campaign:** this campaign is designed to familiarize you with the various gameplay features you will find in Rise of Flight. Featuring cut scenes narrated by a digital Eddie Rickenbacker, you will learn about the basics of flight, how to attack balloons and ground targets, and how to dogfight against enemy aircraft, all while flying the SPAD S.XIII. In all, there are six missions in this campaign.

- **Du Doch Nicht:** this campaign, in which you will fly the Fokker D.VII, features ten historical missions based upon the experiences of the German ace Ernst Udet.

- **Hat In The Ring:** this campaign, in which you will fly the Nieuport 28.C1 and the SPAD S.XIII, features sixteen historical missions based upon the exploits of the 94th Aero Squadron of the United States Army Air Service.

- **St. Mihiel:** this campaign, in which you will fly the Nieuport 28.C1 and the SPAD S.XIII for the United States and the Fokker D.VII for Germany, features thirty-six historical missions based upon the September 1918 Battle of Saint-Mihiel.

  *Note: this campaign must be purchased from the Rise of Flight Store in order to be able to access it. After purchasing this campaign, you must re-login at least once in Online Mode to activate your purchase (if you are running the game at the same time you make a purchase, you must exit and re-start the game). To access the St. Mihiel campaign webpage, navigate your web browser to http://riseofflight.com/en/store/campaigns/stmihielcamp or click on the **Buy** button on the main campaign selection screen*

14.2 CAMPAIGN MISSION SELECTION

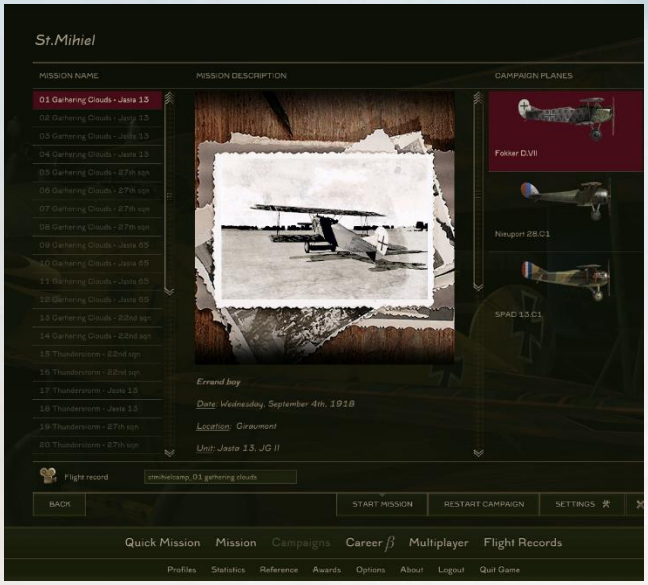


Figure 14.2

Once you have chosen your campaign and clicked on the **Continue** button, you will be taken to the campaign's mission selection screen (Figure 14.2). On this screen you can see your current progress in the campaign. In addition, all aircraft you will fly in the campaign are noted in the right-hand column under the **Campaign Planes** heading. By default, the game will automatically select the current mission you need to complete. All currently inaccessible missions in the campaign will be grayed out. Clicking on the name of a mission will load the mission's description in the center column, and the type of aircraft in which you will fly will be highlighted in red in the right-hand column. The mission's description can also be viewed on the briefing screen once you have loaded the mission.

14.3 MISSION RECORDING

If you plan on recording your campaign mission session and want to define a name for your track file at this time, left-click on the text box near the bottom of the screen, which is labeled as "Flight record." Once you have set the file's name, click anywhere outside the text box to save your changes. Please see section 11.0 for more information on recording and editing track files.

14.4 DIFFICULTY SETTINGS

To set the difficulty settings for your mission, click on the **Settings** button near the bottom of the screen. Please see section 5.2 for detailed information on each difficulty setting.

Note: it is recommended that you enable the Subtitles difficulty option for campaign missions, as you will often receive on-screen messages about the status of your mission objectives with this option enabled.

14.5 STARTING THE MISSION

When you are ready to load your mission, click on the **Start Mission** button near the bottom of the screen. Once the mission has been loaded, you can adjust your aircraft's parameters from the Hangar screen (see section 5.3 for more info), view the mission briefing, and view your in-flight map. When you are ready, click on the **Start** button to begin the mission. You can restart the mission at any time by pressing the **Esc** key and choosing the **Restart Mission** option.

14.6 CAMPAIGN PROGRESSION

Once you have successfully completed your mission's primary objective (and your aircraft is located in friendly territory), press the **Esc** key and choose the **Finish Flight** option, which will take you to the mission statistics screen. Press the **Proceed** button to return to the campaign's mission selection screen, or press the **X** button to return to the main game screen.

14.7 RESTARTING A CAMPAIGN

If you wish to restart a particular campaign, click on the **Restart Campaign** button on the campaign's mission selection screen. This option permanently erases any progress you have made in your chosen campaign, so be certain this is what you want to do.



15.0 CAREER MODE GAMEPLAY

Career mode is a form of single-player gameplay where you join a historical squadron and fly over the Western Front in the time period from September 1916-November 1918. As you rise through the ranks, you can earn medals and ultimately be promoted to take command of your squadron. The computer-controlled pilots of your squadron will also accumulate flight time and victories, and you can encounter historical enemy aces. You must be logged in to the game via Online Mode in order to play career missions. To access the career mode, click on the **Career** link at the bottom of the main game screen and follow the instructions below.

15.1 CAREER CREATION

When you click on the **Career** link, you will be presented with the main career selection screen (Figure 15.1.1). From this screen you can choose to start a new career, resume a career already in progress, or delete a previously-created career. You can have up to 5 created careers at any one time for your currently-selected pilot profile. To create a new career, click on the **Create New** button.



Figure 15.1.1

*Note: for careers in which your pilot has been killed, captured, or successfully made it to the war's end, you can view your statistics by clicking on the **View** button. Pilots meeting one of these three criteria will be noted by a special icon over their avatar.*

- **Choosing a starting date:**

  Once you have clicked on the **Create New** button, you will be presented with the "Create Career – Date and Squadron" screen. If you wish to not create a new career at this time, click on the **Back** button. Otherwise, please note the following steps.

  - The first thing you need to do when creating a new career is to choose a starting date, beginning with the month. Left-click on the month in which you wish to start. The month and corresponding year you have chosen will be noted by the horizontal slider. This slider can be moved by scrolling your mouse wheel up and down or by left-clicking on the slider and (while holding the mouse button down) dragging it left and right.

  - Once you have chosen a month, you need to choose the particular day on which you wish to start. To scroll through the list of days, place your mouse cursor over the horizontal list of days at the top of the screen and scroll your mouse wheel up and down. Alternatively, you can left-click and drag your mouse cursor left and right. The day you have chosen, along with the corresponding month and year will be highlighted in red.

- **Choosing a squadron:**

  Once you have selected your starting month and day, you need to select a squadron from the map (Figure 15.1.2). The squadrons available are based on the date you have chosen to start your career. To aid in your selection of a squadron, you have the option of using two filters, which are discussed below.

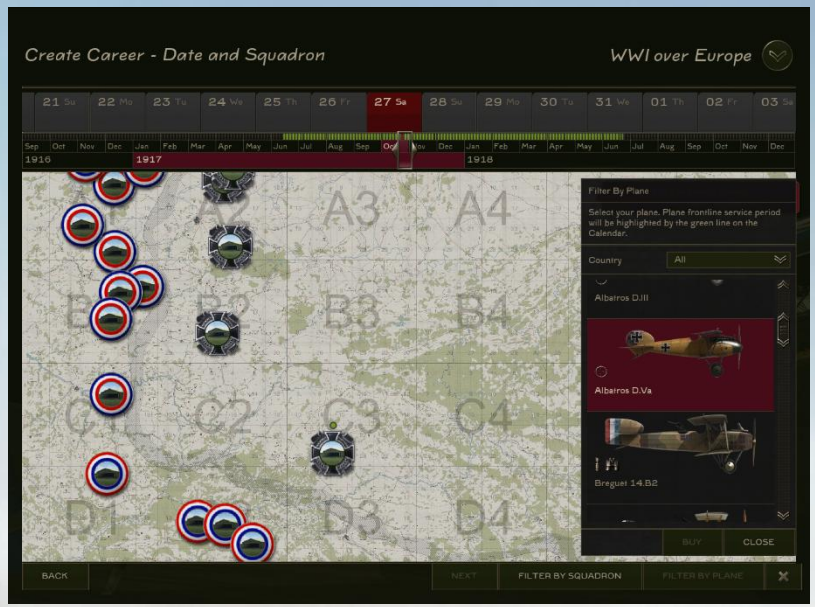


Figure 15.1.2

- **Filter by Squadron:** this filter allows you to see when a particular squadron is available for joining. Clicking on this button brings up a menu listing all available squadrons. To only see the squadrons for a particular nation, click the on the drop-down list and choose a nation. Clicking on a squadron will create a blue horizontal line between the day and month section of the screen; this notes when a squadron is available for joining. Once you have clicked on a date within this timeline, the squadron will be noted on the map by a small blue circle. To clear the filter from the screen, click on the squadron's name again.

- **Filter by Plane:** this filter allows you to see when a particular plane is available to fly. Clicking on this button brings up a menu listing all available aircraft. To only see the aircraft produced by a particular nation, click on the drop-down list and choose an aircraft. Clicking on a plane will create a yellow horizontal line between the day and month section of the screen; this notes when a plane is available to fly. Once you have clicked on a date within this timeline, the squadrons that are equipped with your selected plane will be noted on the map by a small yellow circle. To clear the filter from the screen, click on the plane's name again.

*Note: any aircraft you have not purchased will be dimmed on this menu. If you wish to purchase an aircraft at this time, click on the **Buy** button. This action will automatically take you to the Rise of Flight Store web page for the aircraft you want to purchase. You will need to exit the game and log back in to the game in Online Mode at least once in order to see your new aircraft.*

To choose a particular squadron on the map, first left-click on the squadron's icon. Placing your mouse cursor over the squadron's name will enable a thumbnail showing with which aircraft the squadron is equipped, as well as the squadron's primary mission. The crosshair icon denotes a fighter squadron; the binoculars icon denotes a recon/artillery spotting squadron; and the bomb icon denotes a bomber squadron. Left-click on the squadron's name to complete the squadron selection process. Your chosen squadron, along with its logo, will be marked by a vertical tab on the map.

- **Creating your pilot persona:**

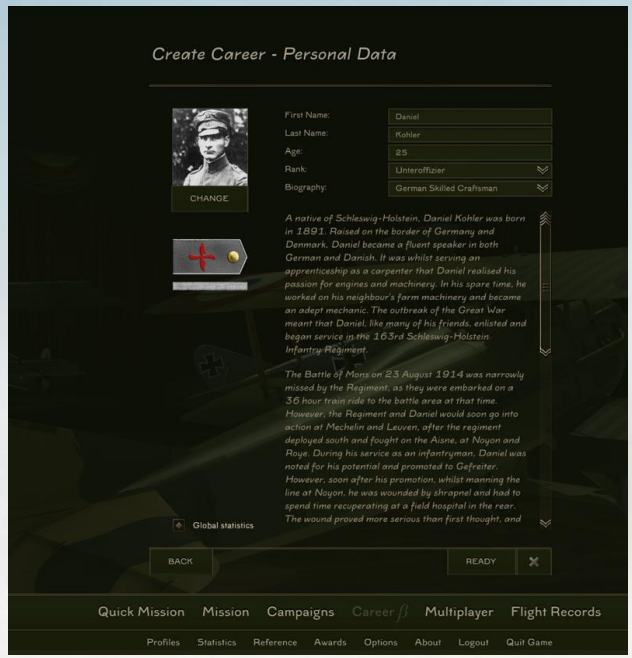


Figure 15.1.3

Once you have selected a starting date and squadron, click on the **Next** button. You will be taken to the "Create Career – Personal Data" screen (Figure 15.1.3). On this page, you can set the particulars of your pilot's background. If you wish to return to the "Create Career – Date and Squadron" screen, click on the **Back** button. Otherwise, please note the following steps.

- **Pilot name:** to alter your pilot's name, left-click on the **First Name** and **Last Name** text boxes and enter the changes you wish to make. Your changes will be automatically updated in your pilot's biography. To save your changes, left-click anywhere outside the two text boxes.

- **Pilot age:** to change your pilot's age, left-click on the **Age** text box and enter a two-digit value. Your changes will be automatically updated in your pilot's biography. To save your changes, left-click anywhere outside the text box.

- **Pilot rank:** to choose your starting rank, click on the **Rank** drop-down list and left-click on your choice. If you wish to start your career as the commander of your squadron, choose the rank at the bottom of the list. Your choice will be automatically updated in your pilot's biography.

  Note: the list of available ranks depends on your progress in previous careers. In other words, you cannot start a career with a rank level you have not achieved in a previous career. Once you have achieved a particular rank level, that level is available for all nationalities.

- **Pilot biography:** to change your pilot's biography, click on the **Biography** drop-down list and left-click on your choice.

- **Pilot avatar:** to change your pilot's avatar, click on the **Change** button above your pilot's rank insignia. This will bring up a menu (Figure 15.1.4) from which you can choose either a historical or custom avatar. Left-click on the avatar of your choice and click on the **OK** button to return to the pilot persona screen.



Figure 15.1.4

Note: to create a custom avatar, first create a new folder called "avatars" (without quotes) in the ***\Rise of Flight\data\swf*** *directory. Place your image (a 256x256 DDS file) in this new folder. You do not need to exit the game in order to add a custom avatar.*

- **Global pilot statistics:** if you wish to make your pilot and squadron statistics available for other players to see, click the **Global statistics** check box. If you do not wish to share this data, clear the check box.

Once you are satisfied with your choices, click on the **Ready** button to finish creating your new career. You will be returned to the main career selection screen, from which you can now select your pilot persona and begin flying career missions.

15.2 CAREER MANAGEMENT

To resume a career, first click on the **Career** link at the bottom of the main game screen. You will be presented with the main career selection screen, from which you can choose a career you wish to resume. Click on the career you wish to resume, and press the **Continue** button. If this is the first time you have resumed a particular career, you will be presented with a welcome message. When you are ready, click on the **OK** button to exit the screen and continue to the main career management screen.

When you resume a career in subsequent sessions, the first screen you will be presented with is the "A New Day" screen (Figure 15.2.1). This screen is a summary of your squadron's information and displays the following information: date, time of day, squadron's location, weather conditions, and the squadron commanding officer. If applicable, you will also see screens noting the delivery of new aircraft, the arrival of new pilots, the delivery of a new newspaper, or the appointment of a new squadron commander. When you are ready, click on the **OK** button to exit each screen and to continue to the main career management screen.

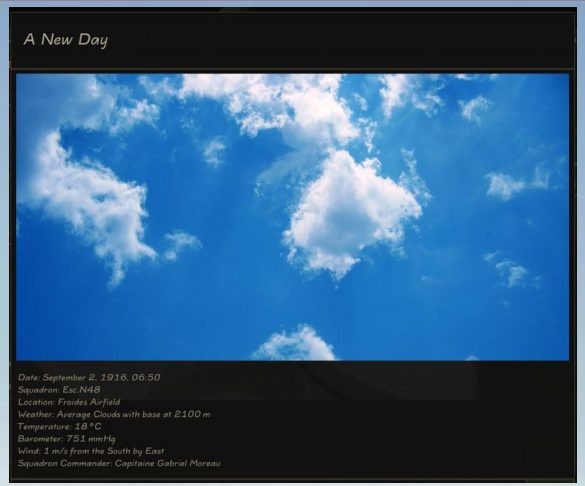


Figure 15.2.1

Note: the exception to the above is when the weather is to poor to fly on a particular day. In such cases you will simply be notified of when weather conditions are too poor to permit operations.

The main career management screen is divided into 6 sections: **Squadron Room**, **Personal Room**, **World News, Headquarters**, **Missions**, and **Reports**. Each of these sections is described below.

- **Squadron Room:**



Figure 15.2.2

When you resume a career, the first career management section you will see is the Squadron Room page (Figure 15.2.2). This page details all the information related to your squadron and is divided into five sections: **History**, **Description**, **Squadron Personnel**, **Other Players' Achievements**, and **Planes**.

- **History:** this section describes the historical background of your squadron, including the unit's history in both WWI and later conflicts. Part of this text may be hidden when you load this page. To view this section in its entirety, left-click anywhere on the text. To partially hide the text again, left-click anywhere on the text. To completely hide this section, left-click on the minus sign to left of the **History** label, which will change the symbol to a plus sign. Left-click on the sign again to display the section.

- **Description:** this section lists your squadron's current airfield and commanding officer. Left-click on the minus sign to the left of the **Description** label to completely hide this section (which will change the symbol to a plus sign), and left-click on the sign again to display the section.

- **Squadron Personnel:** this section lists all pilots currently on your squadron's roster, along with their corresponding statistics. Your pilot's name is highlighted in gray. In addition, the statistics of any pilots formerly assigned to the squadron will be noted at the bottom of the list as "Ex-members." The squadron's commander will be marked by a pennant icon, and any pilots currently hospitalized will be noted by a cross icon. To sort a particular statistical column in ascending order, left click on the column's icon. Left-click on the minus sign to the left of the **Squadron Personnel** label to completely hide this section (which will change the symbol to a plus sign), and left-click on the sign again to display the section. Each of the statistical columns is described below.

- **Planes destroyed:** all enemy aircraft destroyed by the pilot will be listed here.

- **Balloons destroyed:** all enemy balloons destroyed by the pilot will be listed here.

- **Vehicles destroyed:** all vehicles, locomotives, railcars, and guns destroyed by the pilot will be listed here.

- **Facilities destroyed:** a "facility" in Rise of Flight refers to a collection of buildings, such as a railway station or supply dump. In order to be credited with destroying a facility, you must destroy at least 50% of the target's buildings.

- **Total / successful sorties:** these two columns refer to how many sorties the pilot has flown and how many of those sorties have been successfully completed.

- **Score:** a pilot's score is calculated as the sum of all successful sorties plus targets destroyed. For instance, if a pilot has destroyed 8 aircraft and completed 7 sorties, his score would be 15.

- **Flight time:** this column lists the pilot's total flight time, which uses the hours : minutes : seconds format.

  - **Other Players' Achievements:** this section shows how the cumulative achievements of your squadron stack up against other players' careers with the same squadron. Your squadron's statistics are highlighted in gray. Any careers no longer active will be struck through with a horizontal line. The statistical columns shown are the same as those in the Squadron Personnel section. Left-click on the minus sign to the left of the **Other Players' Achievements** label to completely hide this section (which will change the symbol to a plus sign), and left-click on the sign again to display the section.

    *Note: you need to have enabled **Global statistics** when you created your pilot persona in order to see your squadron on this list. See section 15.1 for more information.*

  - **Planes:** this section shows the current number and type(s) of aircraft assigned to your squadron. In addition, any aircraft currently out of service will be denoted by a wrench icon and how many days it will be before they are available again. To view detailed information about a particular aircraft type, double-click on the image of the aircraft. Left-click on the minus sign to the left of the **Planes** label to completely hide this section (which will change the symbol to a plus sign), and left-click on the

sign again to display the section.

- **Personal Room:**



Figure 15.2.3

The Personal Room page (Figure 15.2.3) lists the details of your pilot persona, including victories and awards earned. It is divided into five sections: **Biography**, **Diary**, **Personal victories, Global statistics**, and **Awards**.

- **Biography:** this section shows the biography of your pilot, along with your current rank, avatar, and nationality. Part of you pilot's biography may be hidden when you load this page. To view the full text of the biography, left-click anywhere on the text. To partially hide the text again, left-click anywhere on the text. To completely hide this section, left-click on the minus sign to left of the **Biography** label, which will change the symbol to a plus sign. Left-click on the sign again to display the section.

- **Diary:** this section lists the dates on which your pilot has been awarded a medal, wounded in action, promoted in new rank, or assigned as the commander of the squadron. To completely hide this section, left-click on the minus sign to left of the **Diary** label, which will change the symbol to a plus sign. Left-click on the sign again to display the section.

- **Personal victories:** this section chronologically lists the enemy aircraft you have shot down, including the date of the victory, the type of plane you were flying, the type of aircraft shot down, and the enemy pilot's name, rank, and squadron. Below this section is a summary of your victories divided into four sections as follows: enemy countries, types of enemy planes shot down, enemy pilot ranks (whether their rank was higher, lower, or the same as your rank), and planes in which you have scored your victories. To completely hide this section, left-click on the minus sign to left of the **Personal victories** label, which will change the symbol to a plus sign. Left-click on the sign again to display the section.

- **Global statistics:** this section shows how the achievements of your pilot stack up against other the pilots of other players. Your pilot's statistics are highlighted in gray. Any pilots no longer active will have their name and statistics struck through with a horizontal line. Any currently-wounded pilots will be noted by a cross icon, while any squadron commanders will have a pennant icon next to their name. The statistical columns shown are the same as those shown on the Squadron Room page. Left-click on the minus sign to the left of the **Global statistics** label to completely hide this section (which will change the symbol to a plus sign), and left-click on the sign again to display the section.

  *Note: you need to have enabled **Global statistics** when you created your pilot persona in order to see your pilot's name on this list. See section 15.1 for more information.*

- **Awards:** this section displays the awards you have earned in your career. Double-click on an award to view detailed information about it, including the date it was awarded to you and its historical background. When you are finished, click on the **OK** button to return to the Personal Room screen. Left-click on the minus sign to the left of the **Awards** label to completely hide this section (which will change the symbol to a plus sign), and left-click on the sign again to display the section.

- **World News:**



Figure 15.2.4

The World News page (Figure 15.2.4) is a virtual newspaper relating events and stories about the Great War. This newspaper automatically updates every two (historical) weeks, at which time you will be notified via a popup message screen about new mail being delivered to your squadron. Each issue has an updated list

(according to the date of the newspaper's publication) of the top 30 fighter pilot aces of the war. You will see your pilot's name on this list if you have enough success in your career.

- **Headquarters:**

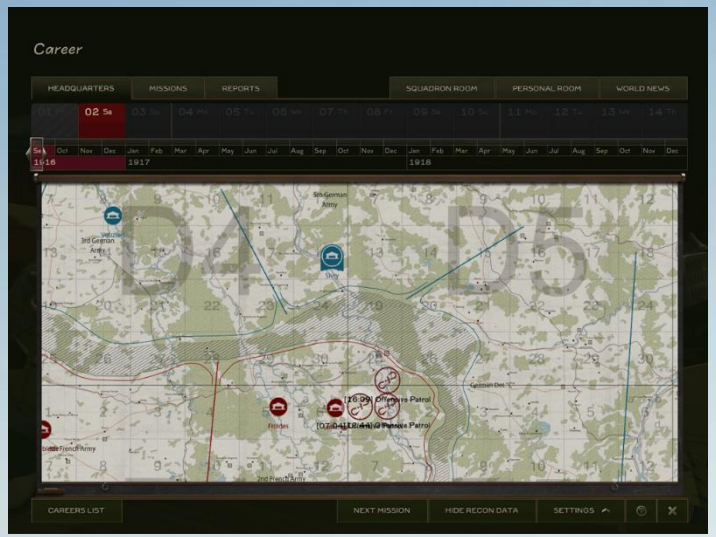


Figure 15.2.5

The Headquarters page (Figure 15.2.5) shows the map of the Western Front. From here you can perform a number of tasks, each of which is described below.

- To view the overall strategic situation at the front, click on the **Show Recon Data** button. This function shows the location of each side's armies, their respective zones of control, and any offensives currently in progress. Placing your mouse cursor over the name of an army will show its commander's name.

  Note: this feature consumes a large of amount of computer resources, so it is not recommended you keep this function enabled longer than you need to view the data it shows.

- This page shows the location of all squadrons currently assigned to the front. Friendly squadrons are shown with a blue hangar icon, while enemy squadrons are shown with a red hangar icon. Your squadron's icon is surrounded by a dark-blue ribbon. To see what type of aircraft are currently assigned to a squadron, left-click on its icon and place your cursor over the name of the unit. The name and a picture of each aircraft type assigned to the unit will then be displayed.

- To transfer to a different squadron, first locate an icon that is surrounded by a light-blue ribbon and left-click on it. Squadrons to which you can transfer will be marked by a gray airfield icon next to its name. Left-click on the squadron's name to bring up its "Squadron Info" page (Figure 15.2.6, this is essentially a scaled-down version of the Squadron Room page). Click on the **Join This Squadron** button, at which point you will be prompted to confirm your choice. Click on the **Proceed** button to complete your transfer request.

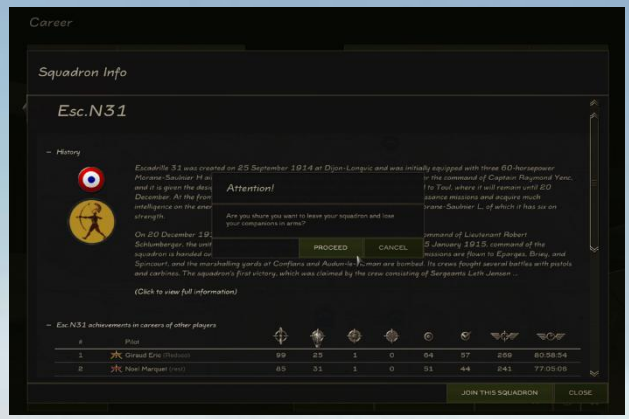


Figure 15.2.6

- This page also shows your squadron's assigned missions for the day, which are marked by an icon along with the start time and type of assignment. Left-click on the mission's icon to see the mission's waypoints. Each waypoint shows the flight's assigned altitude, airspeed, formation type, and form of behavior displayed by computer-controlled pilots (offensive, defensive, or passive). Each type of behavior is described below.

- **Offensive:** computer-controlled pilots will attack any enemy aircraft in the vicinity, regardless of whether they are attacking your flight.

- **Defensive:** computer-controlled pilots will only attack enemy aircraft which are either attacking your flight or are in close proximity to your flight.

- **Passive:** computer-controlled pilots will not break formation to attack enemy aircraft but will instead attempt to reach the next waypoint at all costs.

  Note: you can edit these waypoints if you are the squadron's commander. See section 15.4 for more details.

- **Missions:**



Figure 15.2.7

The Missions page (Figure 15.2.7) lists all of the missions assigned to your squadron for the day, along with the current in-game time of day, squadron location, weather conditions, and the squadron's commander. Left-click on the plus sign to the left of the mission's start time to view the mission's details (which will change the symbol to a minus sign), and click on the sign again to hide the mission's details. In addition, you can view the mission's flight plan on the **Headquarters** page by clicking on the arrow icon (labeled as "Show on the map") to the left of the mission's name.

Note: you can view the assigned missions from previous days by left-clicking on a date at the top of the screen.

Each assigned mission section has the following components: start time, mission type, mission status, assigned pilots, and assigned aircraft. If you are assigned to a mission, your name will be highlighted in gray. The mission's flight leader will be denoted by a vertical ribbon icon, while the squadron commander will be denoted by a pennant icon. Once the mission has been flown, its status will be updated from "Pending" to either "Completed" or "Failed."

Note: you can edit the details of assigned missions if you are the squadron's commander. See section 15.4 for more details.

- **Reports:**



Figure 15.2.8

As your squadron completes its missions, a report for each mission will be displayed on the Reports page (Figure 15.2.8). Left-click on the plus sign to the left of the mission's name to view the mission's details (which will change the symbol to a minus sign), and click on the sign again to hide the mission's details). In addition, you can view the mission's flight plan on the **Headquarters** page by clicking on the arrow icon (labeled as "Show on the map") to the left of the mission's name.

Note: you can view reports from previous days by left-clicking on a date at the top of the screen.

Each mission report has the following components: start time, mission type, mission status, mission duration, assigned pilots, assigned aircraft, and targets destroyed. If you were assigned to a mission, your name will be highlighted in gray. The mission's flight leader will be denoted by a vertical ribbon icon, while the squadron commander will be denoted by a pennant icon. Pilots killed in action or captured by the enemy will have their name and statistics struck through with a horizontal line. In addition, any pilots killed, captured, or wounded in action will be listed immediately below in the **Losses** section.

The Reports page also has two subsections at the bottom of the page: **All events** and (if applicable) **New airplanes**. The first section notes any significant events that have occurred in the squadron during the day, such as new pilots being assigned to the unit, the awarding of medals, pilots who have been lost (due to being killed, captured or wounded), and the assignment of a new squadron commander. The latter section shows when new aircraft have been delivered to your unit. Each section's details can be expanded by clicking on the plus sign next to the section's label (which will change the symbol to a minus sign) and hidden by clicking on the sign again.

15.3 CAREER PROGRESSION

Career missions come in two general formats: missions flown only by your fellow pilots, and missions to which you are assigned. If you are not assigned to the upcoming mission, you will notice a button at the bottom of the screen labeled as **Next Mission.** In such a case, simply click on the button and wait for the game to simulate the mission and generate its results. Once the mission has been generated, you can view the mission's report on the **Reports** page.

If you are assigned to the upcoming mission, you will notice a button at the bottom of the screen labeled as **Begin Mission.** Once you have set your difficulty settings, click on the **Begin Mission** button to being loading the mission. Once the mission has been loaded, you can adjust your aircraft's parameters from the Hangar screen (see section 5.3 for more info), view the mission briefing, and view your in-flight map. When you are ready, click on the **Start** button to begin the mission. You can restart the mission at any time by pressing the **Esc** key and choosing the **Restart Mission** option.

Note: most squadrons in Rise of Flight's career mode have custom aircraft skins associated with them. To see these skins in career mode, navigate to http://riseofflight.com/en/community/usefulmaterials and download all of Community Historical skin packs and the latest version of the Official Skin Pack. Once you have downloaded these files, double-click on each one and follow the on-screen instructions to properly install the skins.

To complete a career mission, press the **Esc** key and choose the **Finish Flight** option, which will take you to the mission statistics screen (Figure 15.3). If you wish to see the flight path of your mission, along with the location and time of any aircraft or ground targets destroyed during the mission, click on the **Results** link at the bottom of the page. Friendly aircraft shot down will be marked by a blue aircraft icon, while enemy aircraft shot down will be marked by a red aircraft icon. Place your mouse cursor over the icon to view information about the aircraft's destruction (including the victorious pilot, time of victory, and altitude at which the victory was scored).

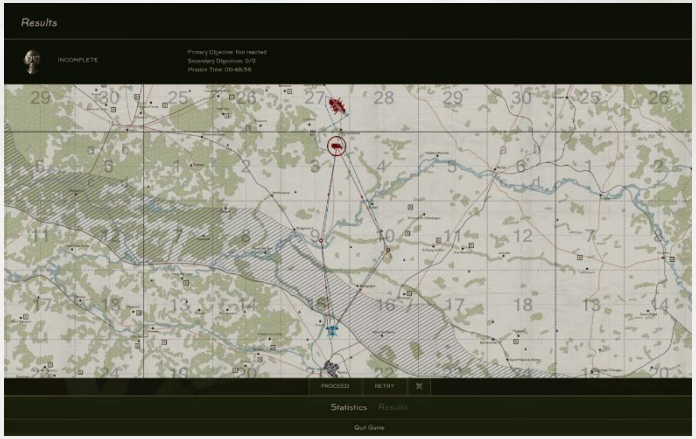


Figure 15.3

In order for your mission statistics to count and to proceed to the next career mission, you must click on the **Proceed** icon on the mission statistics screen. Clicking on this button will return you to the **Reports** page.

*Note: you cannot undo the results of a mission once you have confirmed your decision to proceed. If you are killed or captured at the end of a mission and you click on the **Proceed** button, your career will be over.*

If you shoot down 3 friendly aircraft during the course of your career, your pilot will be executed by firing squad.

Once all the day's missions have been flown, you will see a button at the bottom of the screen labeled as **Next Day**. Click on this button to advance your career to the next day and to receive a new set of missions. If the next day's weather is too poor to fly missions, you will be notified via a special message screen, and the game's historical calendar will automatically advance to the next day of good weather. All days skipped due to bad weather will be denoted by a weather icon on the calendar at the top of the screen.

15.4 COMMANDING A SQUADRON

Commanding a squadron in career mode allows you to adjust the details for your squadron's assigned missions, and you can assign yourself to a lone patrol mission. Each of these functions is described below.

- **Adjusting pilot and aircraft details:**

  To edit the pilots and aircraft assigned to a mission, navigate to the **Missions** page and click on the plus sign for the mission you wish to edit. On this page you can edit the pilots assigned to a mission, the assigned aircraft type(s), and the fuel and ammunition loadout for each assigned aircraft.

  - **Editing pilot assignments:**



Figure 15.4.1

To add a pilot to a mission (including yourself), left-click on the "Add pilot" drop-down list (Figure 15.4.1) and left-click on the pilot you wish to add to the mission. Your name will be highlighted in gray and marked by a pennant icon. To remove a pilot from a mission, click on the X icon. To change a pilot's position in the flight's formation, click on the up arrow icon and on the down arrow icon. To assign a pilot to lead a mission, click on the vertical ribbon icon.

Note: you cannot change the pilot assigned to a Lone Patrol.

- **Editing aircraft assignments:**



Figure 15.4.2

If your squadron is equipped with more than one type of aircraft, you can change what type of aircraft a pilot will fly on a mission. Left-click on the arrow to the right of the aircraft's name and choose the type of aircraft you wish to assign (Figure 15.4.2).

The total number of aircraft available will be displayed when you choose an aircraft type to assign.

- **Editing fuel and ammunition:**



Figure 15.4.3

To change an aircraft's fuel and ammunition loadout, left-click on the wrench icon. This will bring up a menu (Figure 15.4.3) from which you can set the aircraft's fuel level and armament carried (including cameras and radios).

- **Adjusting mission waypoints:**

To adjust the waypoints for a mission, click on the mission's icon on the **Headquarters** page (or click on the arrow icon next to the mission's name on the **Missions** page, which will take you to the **Headquarters** page). For each waypoint you can adjust its location on the map and edit its details. You can also remove waypoints entirely.

- **Moving a waypoint:** to move a waypoint, left-click and drag its marker to a new location on the map.

- **Editing a waypoint:** to edit a waypoint, first left-click on its marker (Figure 15.4.4). You will be given the choice to edit the waypoint's altitude (in meters), airspeed (in kilometers per hour), formation type, and assigned behavior (for computer-controlled pilots). To change a waypoint's altitude or airspeed, left-click on the text box and enter in a new value or left-click and drag the slider to the right of the text box (alternatively, you can place your mouse cursor over the slider and scroll your mouse wheel up and down). To change the formation type or behavior, left-click on the appropriate drop-down list and left-click on your selection. For a description of each behavior type, see the **Headquarters** subsection in section 15.2. Once you have finished making your changes, left-click anywhere outside the waypoint editor interface.



Figure 15.4.4

- **Adding and removing waypoints:** to change the number of waypoints, first left-click on the waypoint marker that is located on top of the mission's icon. At the bottom of the list you will see a drop-down list labeled "Waypoints." From this list you can choose the number of waypoints for the mission. The "D" option resets the number of waypoints to the default setting for the mission. Once you have finished making your changes, left-click anywhere outside the waypoint editor interface.

  Note: you cannot adjust the waypoints for Protection Patrol missions, since these missions are dependent on the flight path of the aircraft you are assigned to escort.

- **Scheduling a lone patrol:**

To schedule a lone patrol, your squadron must complete its first two assigned missions of the day. Once this has occurred, you will see the **Schedule Lone Patrol** button at the bottom of the screen (Figure 15.4.5). Your patrol time will be automatically scheduled before any missions that still have a status of "Pending." Click on the button to schedule your patrol, and click on the **Proceed** button to confirm your decision. Once your mission shows up on the **Missions** page, you can edit the mission's aircraft and waypoint details.

Note: you cannot cancel a lone patrol mission once it has been placed on the squadron's schedule.



Figure 15.4.5



16.0 MULTIPLAYER

Rise of Flight features a number of gameplay modes in which you can fly with and against other human pilots. As you accumulate flight time and success in multiplayer, you can earn a number of awards unique to this mode of gameplay. You must be logged in to the game via Online Mode in order to play multiplayer missions. To access multiplayer mode, click on the **Multiplayer** link at the bottom of the main game screen and follow the instructions below.

16.1 JOINING A MULTIPLAYER MISSION

- **Joining a server:**

When you click on the **Multiplayer** link, you will be presented with the main multiplayer server list (Figure 16.1.1). On this page you can see detailed information for every active server, including the server's name and connection status, difficulty settings, the number of players currently on the server, and the current mission and mission type being played. You can obtain more information about an icon for a particular server by placing your mouse cursor over the icon in question. A legend explaining the various icons on this screen is located below the main server list. Each of the types of missions you can play on a multiplayer server is described below.



Figure 16.1.1

- **Capture the flag (CTF):** in this mode, two or more teams vie for control for certain sectors of the map. Each sector is marked by a flag that displays the team's emblem.

Teams attempt to control these sectors by capturing and then controlling the territory by maintaining air superiority.

- **Team death match (TDM):** in this mode, teams fight over the course of several rounds for victory in the match. The number of rounds and points needed for victory are set the server's administrator. Points in this mode of play are given for destroying enemy aircraft and ground targets. The team with the higher number of points at the end of the match is declared the winner.

- **Cooperative (Co-op):** the goal of this mode of gameplay is to fly as a team and accomplish the mission's objective, which is defined by the server's administrator. In this mode, you can fly against human or computer-controlled opponents. Unlike in the other two types of multiplayer gameplay, you cannot re-spawn once you have been shot down.

To update the connection status for all servers on the main server list, click on the **Update Pings** button at the bottom of the screen. Clicking on this button will cause it to be grayed out until the connection update status is complete.

If you wish to record your multiplayer session, left-click on the text box labeled as "Flight record" at the bottom of the screen. Once you have set the file's name, click anywhere outside the text box to save your changes. Please see section 11.0 for more information on recording and editing track files.

When you are ready, left-click on the server's name you wish to join, which will then be highlighted in red, and then click on the **Enter** button. If the server requires a password, you will be required to enter it at this time in order to successfully join the server and load the currently-selected mission.

- **Pre-mission options:**

  Once the mission has loaded, you will be presented with the **Game Map** screen (Figure 16.1.2). Besides choosing your aircraft, you can perform a variety of functions from this screen, each of which is described below.

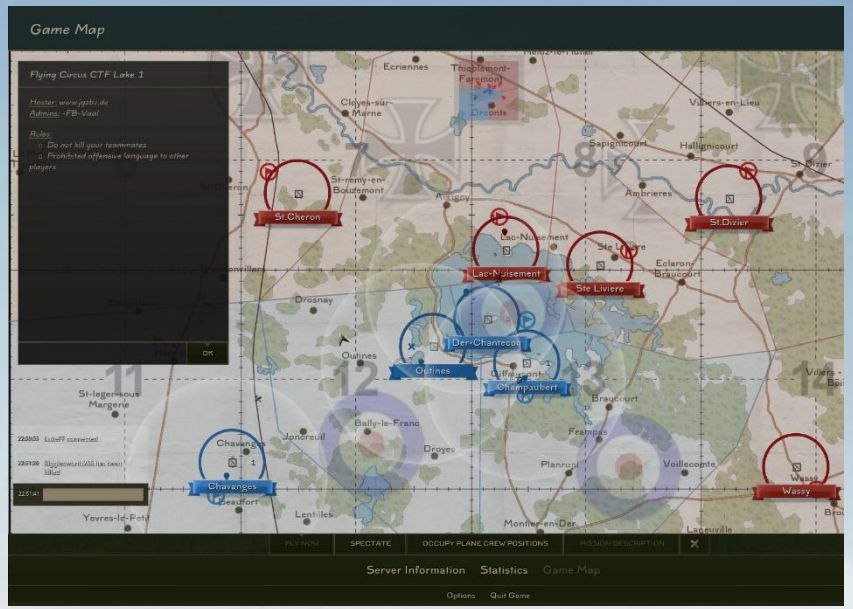


Figure 16.1.2

- **Text chat:** to send a text message to all other players on the server, left-click on the text box at the lower left-hand corner of the screen and press the **Enter** key (**Send chat messages to all**). Once you have joined a particular team, you can also send messages to your team only by pressing the **Right Ctrl + Enter** key combination (**Send chat messages to friendly**).

- **Server information:** (Figure 16.1.3) to view the details of the server, click on the **Server Information** link at the bottom of the screen.



Figure 16.1.3

- **Current statistics:** (Figure 16.1.4) to see the statistics for each team and each player currently on the server, click on the **Statistics** link at the bottom of the screen. To sort a particular statistical column in ascending order, left-click on the column's icon. Each column's description can be seen by placing your mouse cursor over the column's icon.



Figure 16.1.4

- **Banning or kicking a player:** to attempt to remove a player from the server, left-click on the player's name on the **Statistics** screen, and then left-click on either the **Ban** or **Kick** icon at the far right-hand portion of the screen. Kicking a player simply removes the player from the server, while banning a player not only kicks them from the server but also prevents them from re-joining the server for a particular amount of time (this time can be seen on the **Server Information** screen). For a ban or kick vote to be successful, a particular number of votes must be cast, which is set by the server's administrator.

- **Spectating:** if you do not wish to fly a multiplayer mission but simply want to view the mission's action, click on the **Spectate** button.

- **Choosing your aircraft and beginning the mission:**

In multiplayer missions, you can either fly as the pilot of your own aircraft or as a gunner in a multi-crew aircraft. You can fly as a gunner in any available multi-crew aircraft, even if you have not purchased that particular plane.

- **Flying as a pilot:** to pilot your own aircraft, first left-click on a valid airbase name on the map. Allied airbase names are highlighted in blue, while Central airbase names

are highlighted in red. On the **Select Plane** screen, left-click on the type of aircraft you wish to fly. Once you have chosen your aircraft and made any adjustments to it on the Hangar screen, click on the **Fly Now** button to enter the mission.

- **Flying as a gunner:** to fly as a gunner, click on the **Occupy Plane Crew** positions button, which will open up a new screen (Figure 16.1.5). Left-click on the name of the plane in which you want to fly, and then left-click on one of the available gunner positions depicted on the aircraft's 3D model. Available gunner positions will be marked in green, while unavailable positions will be marked in red. Once you have chosen a position, click on the **Occupy Position** button, which will take you directly into the mission. If you wish to then leave a gunner position, press the **Esc** key and choose the **Exit Crew Position** option.



Figure 16.1.5

16.2 IN-FLIGHT OPTIONS

- **Communication:**

In addition to the in-flight options described in sections 8.0 and 9.0, you can also send text messages to other players while flying a multiplayer mission. To send a message, first right-click anywhere on the screen and then left-click on the text box at the lower left-hand corner of the screen to enter your message. To send a message to all players on the server, press the **Enter** key (**Send chat messages to all**). To send a message to your team only, press the **Right Ctrl + Enter** key combination (**Send chat messages to friendly**).

To toggle the display of sent chat messages, first right-click anywhere on the screen and then press the **C** key (**Show chat window**). The chat message window also displays system messages, including aerial victories and when a player has joined or left the server.

- **Player Information:**

To view the current players on the server and their statistics, first right-click anywhere on the screen and press the Tab key. This screen (Figure 16.2) displays the same information as that shown on the **Statistics** screen.



Figure 16.2

16.3 MISSION COMPLETION

To complete a multiplayer mission, press the **Esc** key and choose the **Finish Flight** option. Note that on some servers your plane must be on the ground before you can choose this option. Choosing the **Finish Flight** option ensures that your kill streak statistics are counted correctly. If you terminate a mission without choosing the **Finish Flight** option while over enemy territory, your pilot status will show as Captured.

16.4 CREATING A SERVER



Figure 16.4

To create a new multiplayer server, first click on the **Create New Server** button at the bottom of the main multiplayer server list. You will then be taken to the **New Server** screen (Figure 16.4), from which you can set the server's parameters. These parameters are described below:

- **Server type:** the first step in creating a server is to decide what type of missions you want your server to run. The **Dogfight** section allows you to set up CTF and TDM missions, while the **Cooperative** section allows you to set up Co-op missions. Only one type (either Dogfight or Cooperative) can be chosen.

- **Main server settings:**

  - **Server name:** sets the name of the server that will be displayed on main server list.

  - **Password:** to limit access to the server, enter a password here. Otherwise, leave this box blank.

  - **Server Description:** the detailed description of the server.

  - **Max clients:** sets the maximum number of clients that can simultaneously be connected to the server. This number should reflect the capabilities of the server and the quality of its Internet connection.

  - **Max ping:** sets the maximum permissible connection delay possessed by each client (in milliseconds).

  - **Ban time:** sets the time that a banned player is prevented from rejoining a server. The first box shows the number of minutes, and the second box shows the number of seconds.

  - **Accessible from Internet:** allows clients to connect to the server via an Internet connection. Clearing this check box only allows players to see the server if they are on your local area network (LAN).

  - **Global Statistics:** enables player statistics to be sent to the Rise of Flight master server for inclusion on the leader boards.

  - **Spectator mode available:** allows clients to view a multiplayer mission in progress without flying as a pilot or gunner. This setting also allows for the use of external cameras.

  - **Kill notifications:** allows system messages in the chat window about the actions of other players. These include messages about a player's aerial victories and when a player has been killed.

  - **Return friendly fire:** if this box is checked, a player who has shot at and hit a friendly aircraft or ground object will receive damage to their aircraft in return.

  - **Lock skins:** prohibits clients from using custom skins. If enabled, only default aircraft skins will be available.

  - **Lock loadouts:** prohibits clients from modifying their aircraft's loadout. Loadouts are set by the server's administrator.

  - **Lock fuel:** prohibits clients from modifying their aircraft's starting fuel level. Fuel levels are set by the server's administrator.

- **Team death match mission settings:**

  - **Rounds per mission:** sets the number of rounds in the mission.

  - **Points per round:** sets the number of points that must be scored for a team to win the round.

- **Capture the flag mission settings:**

  - **Flags capturing quorum:** sets the minimum number of players needed for a team to attempt a flag capture. If this number is not met, the flags will not react to the presence of a team's players in the flag's capture zone.

- **Cooperative mission settings:**

  - **Mission lobby timeout:** sets the time delay (in minutes and seconds) between when all players have clicked on the **Ready** button and the start of the mission.

- **Common server settings:**

  - **Coalition change penalty:** sets the time penalty (in minutes and seconds) imposed when a client changes teams.

  - **Reflight penalty:** sets the minimum amount of time (in minutes and seconds) a client must wait between flights.

  - **Finish flight timeout:** sets the amount of time (in minutes and seconds) that will elapse before a client's aircraft will de-spawn once the **Finish Flight** option has been chosen.

  - **Mission End timeout:** sets the time (in minutes and seconds) before the server restarts once all missions in the rotation have been played.

  - **Debriefing timeout:** sets the amount of time (in minutes and seconds) that will elapse before mission statistics will be displayed at the conclusion of a mission.

  - **Deaths until penalty:** sets the number of deaths in battle after which the **Death penalty** rule will be applied.

  - **Death penalty:** sets the time penalty (in minutes and seconds) that a client must wait before being able to take off again once the **Deaths until penalty** threshold has been reached.

  - **Idle players kick timeout:** sets the time (in minutes and seconds), at which players will be automatically dropped from the server due to inaction.

  - **Mission pool:** allows you to choose which missions will be played on the server. To add a mission to the pool, first left-click on its name and then left-click on the pair of arrows pointing to the right. To remove a mission, first left-click on its name and then left-click on the pair of arrows pointing to the left, or left-click on the X icon.

    To move a mission up or down in the rotation, first left-click on the mission's name and then left-click on the upward and downward-pointing arrows.

  - **Mission repeats until change:** sets the number of times a mission will repeat before the next mission in the pool is loaded.

  - **Random rotation:** enables missions in the pool to be chosen by the server in a random order.

  - **Difficulty settings:** click on the **Settings** button to set the difficulty settings for your server. See section 5.2 for a detailed description of these options.

Once you have set the above settings, click on the **Start Server** button to activate your server.

16.5 CREATING A DEDICATED SERVER

In order to run a dedicated server you need to install the RoF software, create a separate account, configure the server settings and finally select missions for the server to host and run. Below, each step is described in detail.

1. Download and install Rise of Flight

Login on the machine that you will be using as dedicated server. Go to the Rise of Flight main website and click on the "free to play" banner. Follow the instructions to download the software and install it up to the step where you update to the latest version using RoF Launcher.

Because a dedicated server does not need to have a 3d graphics card you'll probably have to stop here, as you will not be able to actually start the RoF program, which is the next step.

Also please note that there is no need to download / install any of the skin packs as these are not used by the server program.

2. Create a new account

A separate account is needed for the server, because you can't login twice with the same account at the same time. The account you use for the server may be any account as long as it is active, so the easiest way is to create a new demo/ free2play account.

Start your normal copy of RoF and complete the steps of the "free to play" webpage: Click on "Register Demo or Activate Retail Copy" from the main screen in-game to register a User Account. Activate the demo account with the special Free2Play Key Code.

You need to login online at least once to be able to use the account for the dedicated server. Simply start your game and instead of using your normal credentials, use the free2play account details. You can also change the profile name in the game. The new account can now be used for the dedicated server.

3. Edit your startup.config

This file contains the general RoF settings and is located in the <RoF install folder>\data. The values in here are normally set using the RoF Launcher, but for the server you should change them manually. Below you will see an example config file. Just follow the comments after // (don't add these comments to your config file!) to customize your dedicated server.

```
[KEY = account] // You may need this later for custom stats
        login = ""
        password = ""
[END]

[KEY = camera] // Not used by dedicated server
        shake = 1
[END]
```

```
[KEY = graphics] // Not used by dedicated server
        filter = 0
        forest_distance = 0
        forest_quality = 0
        fps_limit = 0
        full_height = 1024
        full_width = 1280
        fullscreen = 0
        gamma_b = 1.00000
        gamma_g = 1.00000
        gamma_r = 1.00000
        grass_quality = 0
        land_textures = 2
        landscape_mesh_quality = 0.00000
        multisampling = 0
        post_bloom_enable = 0
        post_dof_enable = 0
        post_drops_enable = 0
        post_effects_enable = 1
        post_hdr = 0
        reflection = 0
        shaders = 2
        shadows_quality = 0
        texmipdown = 0
        vsync = 0
        win_height = 1024
        win_width = 1280
[END]

[KEY = input] // Not used by dedicated server
        input_map = "input.map"
[END]

[KEY = interface] // Not used by dedicated server
        language = "eng"
        showcompas = 1
        showicons = 1
        withdebug = 0
[END]

[KEY = iservice] // Leave as is
        proxy_name                                                      =
        "fokker.neoqb.com:443;albatros.neoqb.com;breguet.neoqb.com"
        register_url = "http://riseofflight.com/Registration.aspx"
        server_debug = ""
        try_ping = 0
        try_web_port = 1
        use_proxy = 0
[END]

[KEY = network] // Insert IP address, connection speed and port numbers
        client_download_traflimit = 1000
        client_ip = "<your IP address here>"
        client_upload_traflimit = 1000
        downloader_port = 28100 ** Leave as is
        server_download_traflimit = 100000
        server_upload_traflimit = 100000
        tcp_port = 28000 // Leave as is
        udp_port = 28000 // Leave as is
[END]

[KEY = sound] // Not used by dedicated server
        count = 32
        interface = 1
        quality = 1
        volume = 0.68000
[END]

[KEY = system] // Option to turn on logs. Leave as is for now
        debug_info = 0
        gamelog = 1 // this creates a text file with mission events
        keep_binary_log = 0
        mission_text_log = 0
        modes = 0
        skin_dir = "graphics\Skins\"
[END]
```

- Tip: The IP address of the server will usually be shown in the title bar of your remote desktop window.

- Tip: Be sure to be on the safe side with the connection speed settings. See here: http://en.wiki.riseofflight.com/index.php?title=Network_Settings

- Tip: Use default port numbers if you have one server running, only use different port numbers for the other servers.

- Tip: Before you update RoF, make sure to backup this file as a new update might overwrite these settings with default values.

4. Edit your ...dedicated_server.sds files

Before you can run your dedicated server it needs to know which mission(s) to host and what the server rules are. This is controlled by the .sds files. The default filenames are: dedicated_config_dogfight.sds and dedicated_config_coop.sds, but you may use a different name. They are also located in <RoF install folder>\data.

The multiplayer mission themselves reside in either: <RoF install folder>\data\multiplayer\Cooperative or \Dogfight folder. Each mission consists of several files:

- 1 mission file <mission name>.mission This is the mission file in text format.
- 1 msbin file <mission name>.msbin This is the mission file in binary format for quicker download.
- 1 list file <mission name>.list This file contains references to all files that need to be downloaded by the client plus a checksum to verify the version.
- 5 description files <mission name>.eng/.fra/.ger/.rus/.spa These files contain the mission description, subtitles and Icon texts up to 5 languages.

To configure your mission rotation: Open the .sds file in Notepad or any other text editor. Below is an example from an operational server. You may copy these values, just make sure you at least change the following values: login, password, ServerDesc and file="Dogfight\<your mission>" under [rotation]. The comments after // will inform you of the function of each setting.

```
login = "<email address for server account>" //Account email
password = "<your password>" //Account password

mode=1 //0 Coop, 1 Dogfight mode
ServerName="<Your server Name>" //Server name, which will be displayed in server list
victoryCount=1 //Number of wins per mission needed to achieve victory
ranked=1 //1 Server statistics will be counted in global statistics, 0 will not be counted
spectator=0 //1 Allow spectators to use all views, 0 Spectators able to use only static cameras in mission
protection="" //Game server password, make empty ("") if password is not required
maxClients=60 //Number of clients allowed to be simultaneously on the server
maxClientPing=1 //Maximum allowed ping from client to server in milliseconds, 1 no ping limitation (default)
LobbyTimer=30000 //Planes list timeout when all players have reported READY status, in milliseconds
ExternalIP=1 //1 Server will be visible from internet, 0 will be visible only from LAN
ShutdownLoads=1 //1 Unlimited missions rotation, 1 and more missions rotation limit, after this limit server will be closed
killNotification=1 //1 'Player Killed' and 'Player A Shot Down Player B' chat notifications ON, 0 kill and shot down chat notifications OFF
friendlyFireReturn=0//1 Shooter will receive a damage if he will hit to a friendly plane, 0 function off
finishMissionIfLanded=1 //1 Finish Mission function will be available only for landed player, 0 it will be available for players in flight too
penaltyDeaths=0 //Quantity of consequent player deaths which cause Death. Penalty Timeout, 0 Death Penalties OFF
penaltyTimeout=0 //Death Penalty Timeout size, in seconds
respawnTimeout=15 //Timeout between Player's spawns
coalitionChangeTimeout=5 //Coalition Change Penalty Timeout size, in seconds
finishMissionTimeout=5 //Timeout between pressing Finish Mission button and actual mission finishing, in seconds
missionEndTimeout=60//Timeout after victory conditions achieved (no round remained or all flags captured) and before mission ending
idleKickTimeout=5000//Timeout between moment when player starts to stand still on the ground and moment when he will be kicked, 1 function off
lockPayloads=0 //1 Lock payload settings as defined in mission editor (this will switch off weapons mods!), 0 Payload selection unlocked
lockFuelLoads=1 //1 Lock fuel settings as defined in mission editor, 0 no lock
lockSkins=0 //1 Lock player's ability to change skin in Hangar screen, only predefined skin is available, 0 Skin selection unlocked
tdmPointsPerRound=5000 //Team Deathmatch points amount which should be achieved by coalition to win the round, 0 no coalition points counting
tdmRoundsPerMission=1 //Team Deathmatch rounds quantity for one mission, 0 no rounds limitation
ctfQuorum=0 //Quorum of alive players (pilots) in two most plenty coalitions to unlock flags rising/lowering
banTimeout=900 //Ban time setting, in seconds.

serverDesc="Welcome to my server."
serverDesc="Enjoy your stay"
serverDesc="Please visit our website"
serverDesc="Play fair, no vulching allowed." //Server Description

[rotation]
        random=false //true – Random order of missions rotation (only works once in rotation), false Missions rotation order in accord with rotation list
        delay=5000 //Timeout for displaying mission results and statistics after mission end, in milliseconds
        file="Dogfight\TDM_5x5_Verdun_summer" //this is the mission list, add as many lines with as many missions as you want in your rotation
        file="Dogfight\TDM_5x5_Lake_summer"
[end]

//Mission settings, true option on, false option off

friendlyIcons=false //Allow friendly objects icons in 3D and on the map
enemyIcons=false //Allow enemy objects icons in 3D and on the map
navigationIcons=false //Allow navigation icons in 3D and on the map
unlimitedMapIcons=false //No range limit for objects icons on the map
aimingHelp=false //Show aiming helpers for gunnery and bombing
padlock=false //Allow to use padlock
simpleDevices=false //Allow to use simple gauges
subtitles=true //Show subtitles
easyFlight=false //Easy piloting
autoCoordination=false //Autorudder
```

autoThrottle=false //Cruise control
autoPilot=false //Allow to use autopilot
autoThrottleLimit=false //Automatic RPM limiter
autoMix=false //Automatic mixture control
autoRadiator=false //Automatic radiator control
autoStart=false //Automatic engine start procedure
noMoment=false //Simplified physics
noWind=false //No wind
noMisfire=false //No missfire
noBreak=false //Safety collisions
invulnerability=false //Invulnerability for weapons
unlimitFuel=false //Unlimited fuel
unlimitAmmo=false //Unlimited ammo
engineNoStop=false //No engine overflow while negative gload
hotEngine=true //No need to warm up engine

5. Firewall settings

Add firewall rules for the upload and download ports you configured in startup.cfg. By default: TCP:28000 and 28100, UDP: 28000.

6. Start your server

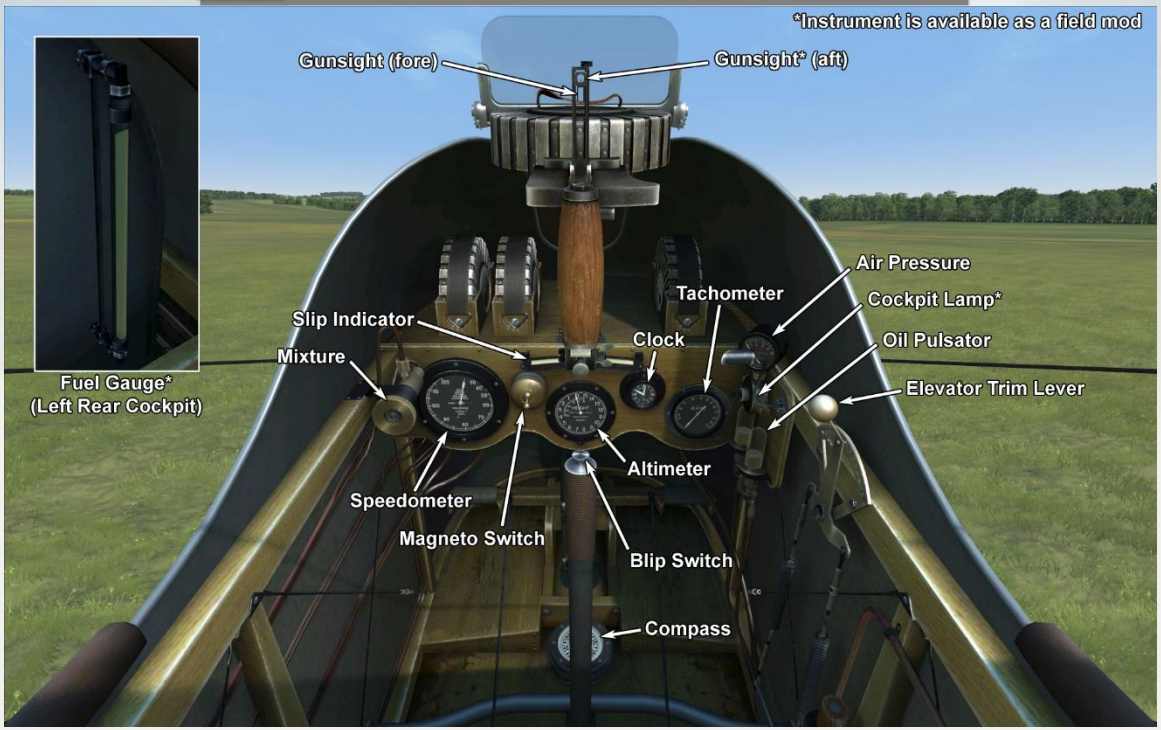
The server program Dserver.exe can be found in <RoF install folder>\bin_game\release\. Simply double click to start. Click “open” and select the proper .sds file. There should be no errors after Dserver loads the mission and you get the "mission loaded successfully" message.

To change mission rotation files, you can click “open” again and select another .sds file. There is also a button to skip a mission in the list.

APPENDIX A – AIRCRAFT

A.1 ENTENTE SINGLE-CREW AIRCRAFT





Airco D.H.2

The Airco D.H.2 was a single-seat fighter and the second project of designer Sir Geoffrey de Havilland. With this design, he capitalized on the development of the 'pusher' propeller concept, where the propeller is situated behind the pilot. This design eliminated the need for a synchronized machine gun, which was introduced only at the end of 1916. The prototype of the D.H.2 made its first flight in July 1915. In February 1916, No. 24 Squadron of the Royal Flying Corps became the first unit to be equipped with the type, when it began active service in France.

The Lewis machine gun was mounted in a nacelle and was initially difficult to aim. The movable gun mount forced the pilot to simultaneously control the aircraft and aim the machine gun by hand, which made combat even more difficult. Later on, pilots began to lock the gun down in a fixed position pointing forward. As a result, pilots could aim the weapon by maneuvering the aircraft, which was found to be more effective than attempting to aim the machine gun manually during combat.

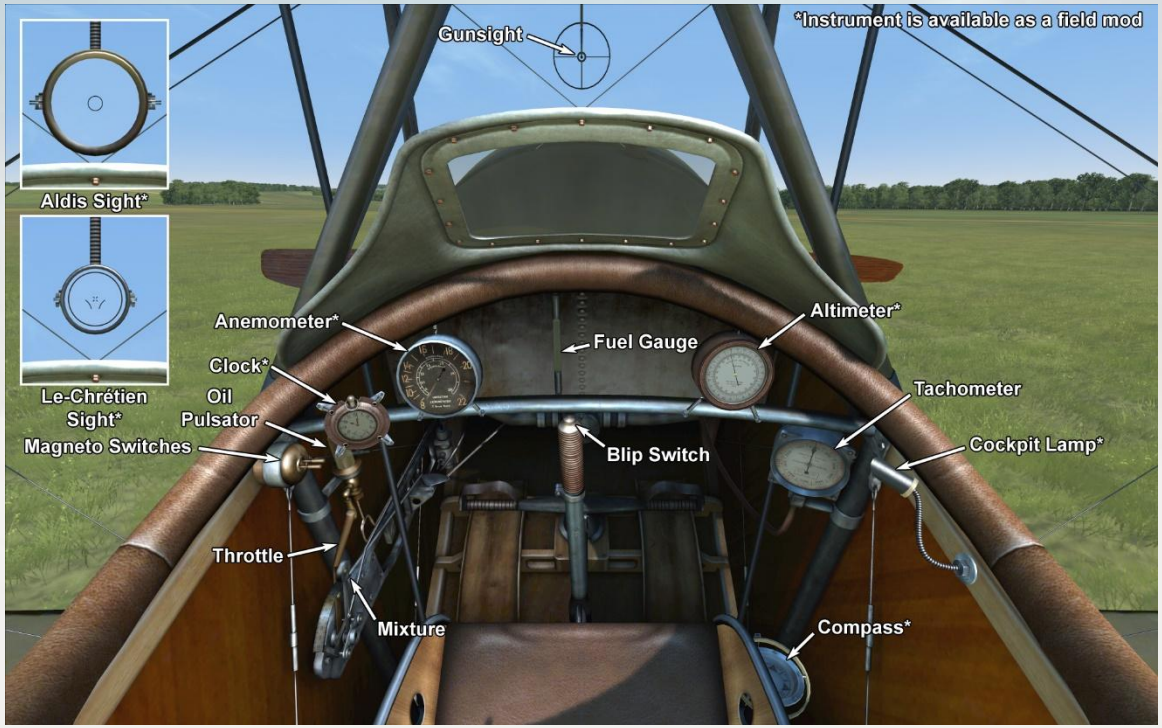
The D.H.2 was often criticized for the complex procedures needed to master the aircraft and the quick reactions demanded by the controls. Even so, all of this made for an outstanding fighter in the hands of experienced pilots. With the introduction of the D.H.2, the RFC gained air superiority over the formerly feared - but now rapidly outdated - Fokker monoplanes, especially during the first Battle of the Somme. The Allied air forces' resulting domination lasted until the autumn of 1916, at which time the German Albatros D.I and D.II fighters were introduced.

By the end of 1916, the Airco D.H.2 was being withdrawn from combat service. Almost all remaining aircraft had been transferred to training squadrons by the middle of 1917, where they remained in service until the beginning of 1918. Several aircraft remained in service until the end of 1917, in Palestine and on the Macedonian front. Not a single unit survived the end of WWI.

Crew: 1
Engine: 1 x Gnome Monosoupape rotary, 100 horsepower
Height: 2921 mm
Length: 7683 mm
Wingspan: 8610 mm
Wing Surface: 21.5 square meters
Empty Weight: 454 kg
Takeoff Weight: 653 kg
Fuel Capacity: 118 liters
Oil Capacity: 18.5 liters
Climb Rate: 7 minutes to 1000 m; 15 minutes, 22 seconds to 2000 m; 28 minutes, 23 seconds to 3000 m; 45 minutes to 4000 m
Maximum Speed: 130 km/h at sea level; 125 km/h at 1000 m; 118 km/h at 2000 m; 110 km/h at 3000 m; 97 km/h at 4000 m
Service Ceiling: 4500 m
Endurance: 3 hours, 15 minutes (combat); 3 hours, 15 minutes (cruise)
Armament: 1 x .303 in Lewis machine gun, 4 drums with 97 rounds each

A.1 ENTENTE SINGLE-CREW AIRCRAFT





Nieuport 11.C1

The Nieuport 11 'Bebe' ('Baby') was a further development of the concepts proposed by Gustav Delage, who was the designer of the Nieuport 10. In general, the Bebe was designed as a single-seat sesquiplane fighter. Its lower wing consisted of one spar and had a much narrower chord than the upper wing, and it was fastened to the upper wing with Vee-shaped interplane struts. A drawback of this design was the weakly built construction of the lower wing, thus making it prone to twisting and bending when under high G loads. Similar problems were common to other sesquiplanes, including the whole family of Nieuports from the '10' to the '23,' the Albatros D.III and D.V, etc.

The first Nieuport 11s arrived at the French front in January 1916. The Bebe quickly became a formidable adversary for the monoplane Fokker Eindecker, surpassing it in almost every way. In addition to ailerons, elevators were now attached to a conventional tail plane with a vertical stabilizer and a deflecting rudder. These upgrades greatly improved maneuverability and precise control of the aircraft, compared with older types equipped with wing warping and balanced 'Morane' type elevators.

The emergence of the Nieuport 11 at the front finally put an end to the devastating superiority of the Fokker monoplanes, which for a time had become known as the 'Fokker Scourge.' During the Battle of Verdun in February 1916, Nieuport 11s inflicted heavy damage on the enemy's air forces, which forced the German High Command to review the tactics of combat aircraft. Many famous aces of WWI (including Georges Guynemer) had their first major successes flying the Bebe.

Some Nieuport 11s were equipped with special rails mounted on the wing struts in order to fire Le Prieur rockets at enemy airships and observation balloons. The Bebe remained in active military service until the summer of 1917, by which time aircraft that were more modern had replaced the Nieuport 11. Some planes were transferred to flying schools for operation as training aircraft. Famous in its time, the performance characteristics of this aircraft led to its wide popularity. The Nieuport 11 was in service with many countries, including Belgium, Russia, and Great Britain. Several hundred aircraft of this type were also built under license in Italy and Russia.

Crew: 1
Engine: 1 x Le Rhone 9C rotary, 80 horsepower
Height: 2400 mm
Length: 5640 mm
Wingspan: 7520 mm
Wing Surface: 13.30 square meters
Empty Weight: 320 kg
Takeoff Weight: 480 kg
Fuel Capacity: 91 liters
Oil Capacity: 15 liters
Climb Rate: 4 minutes, 20 seconds to 1000 m; 9 minutes, 10 seconds to 2000 m; 15 minutes, 25 seconds to 3000m; 23 minutes, 40 seconds to 4000 m
Maximum Speed: 165 km/h at sea level; 158 km/h at 1000 m; 151 km/h at 2000 m; 144 km/h at 3000 m; 136 km/h at 4000 m
Service Ceiling: 5000 m
Endurance: 2 hours (combat); 3 hours (cruise)
Armament: 1 x .303 in Lewis machine gun, 4 drums with 97 rounds each
Weapon Mod Armament: 2 x .303 in overwing Lewis machine guns, 6 drums with 97 rounds each; 8 x Le Prieur rockets

A.1 ENTENTE SINGLE-CREW AIRCRAFT

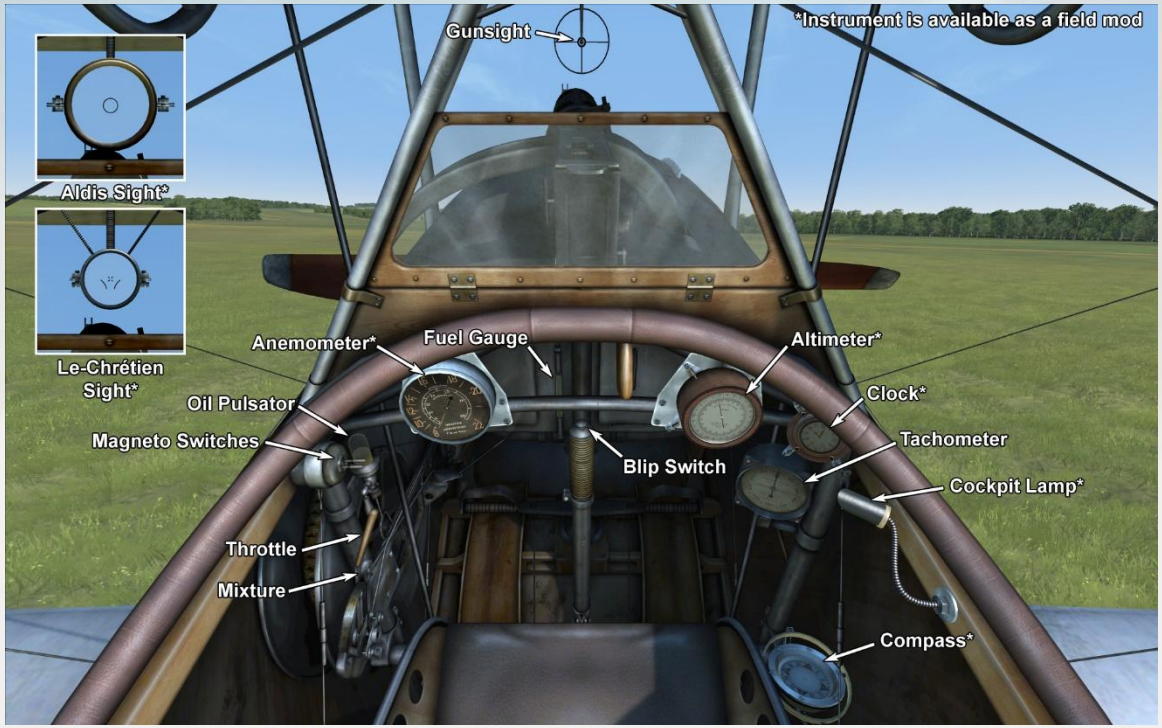


Nieuport 17.C1

The Nieuport 17 was intended to be a further development of the Nieuport 11 fighter. In comparison to its predecessor, it had a larger wingspan and surface area. In addition, a more powerful engine was fitted, which led to modifications of its engine cowling. Furthermore, it was fitted with a Vickers machine gun that was mounted in front of the cockpit and metal aileron control wires. The lower wing continued to carry one spar and the top one two spars, the so-called "one-and-a-half wings" design. The plane was initially manufactured in several French factories, but licenses were soon purchased by other countries: Great Britain, Russia, Italy, Finland, and Japan. In all, 7200 planes were built with the Le Rhone engine.

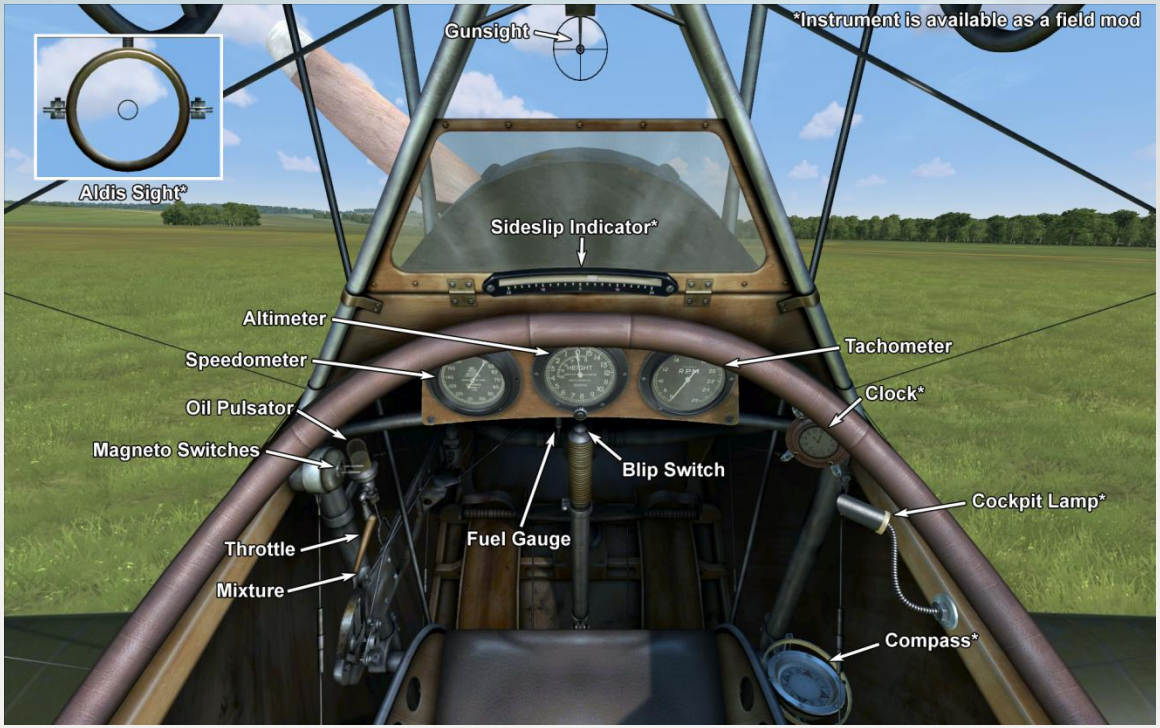
The first mention of its combat appearance is in May 1916, with its equipping of the French N57 squadron. It was used for engaging balloons, bombers and fighters. Pilots noted its good climb speed and visibility and its excellent maneuverability. The introduction of the Vickers machine gun was met with ambiguity. Some pilots removed and replaced it with a Lewis machine gun mounted on the upper wing. Others, however, used both machine guns simultaneously, although this somewhat decreased maneuverability.

The plane's powerful engine and high diving speed exposed the main drawback of the "one-and-a-half wings" design – a weak lower wing due to only one spar. There are two known occasions when pilots made successful landings after losing their lower wings.



Crew: 1
Engine: 1 x Le Rhone 9J rotary, 110 horsepower
Height: 2400 mm
Length: 5800 mm
Wingspan: 8160 mm
Wing Surface: 14.75 square meters
Empty Weight: 375 kg
Takeoff Weight: 560 kg
Fuel Capacity: 78 liters
Oil Capacity: 20 liters
Climb Rate: 3 minutes, 6 seconds to 1000 m; 6 minutes, 43 seconds to 2000 m; 11 minutes, 34 seconds to 3000 m; 19 minutes, 23 seconds to 4000 m; 48 minutes to 5000 m
Maximum Speed: 156 km/h at sea level; 152 km/h at 1000 m; 145 km/h at 2000 m; 136 km/h at 3000 m; 125 km/h at 4000 m; 115 km/h at 5000 m
Service Ceiling: 5300 m
Endurance: 1 hour, 50 minutes (combat); 2 hours, 40 minutes (cruise)
Armament: 1 x .303 in Vickers machine gun, 400 rounds
Weapon Mod Armament: 1 x .303 in overwing Lewis machine gun, 3 drums with 97 rounds each; 2 x .303 in overwing Lewis machine guns, 6 drums with 97 rounds each; 8 x Le Prieur rockets





Nieuport 17.C1 (Great Britain)

The Nieuport 17 was intended to be a further development of the Nieuport 11 fighter. In comparison to its predecessor, it had a larger wingspan and surface area. In addition, a more powerful engine was fitted, which led to modifications of its engine cowling. Furthermore, it was fitted with a Vickers machine gun that was mounted in front of the cockpit and metal aileron control wires. The lower wing continued to carry one spar and the top one two spars, the so-called “one-and-a-half wings” design. The plane was initially manufactured in several French factories, but licenses were soon purchased by other countries: Great Britain, Russia, Italy, Finland, and Japan. In all, 7200 planes were built with the Le Rhone engine.

The first mention of its combat appearance is in May 1916, with its equipping of the French N57 squadron. It was used for engaging balloons, bombers and fighters. Pilots noted its good climb speed and visibility and its excellent maneuverability. The introduction of the Vickers machine gun was met with ambiguity. Some pilots removed and replaced it with a Lewis machine gun mounted on the upper wing. Others, however, used both machine guns simultaneously, although this somewhat decreased maneuverability. In British service, the standard policy was to replace the Vickers machine gun with a Lewis machine gun mounted on the upper wing. A variety of British instruments were also usually fitted to Nieuport 17s in service with Royal Flying Corps and Royal Naval Air Service squadrons.

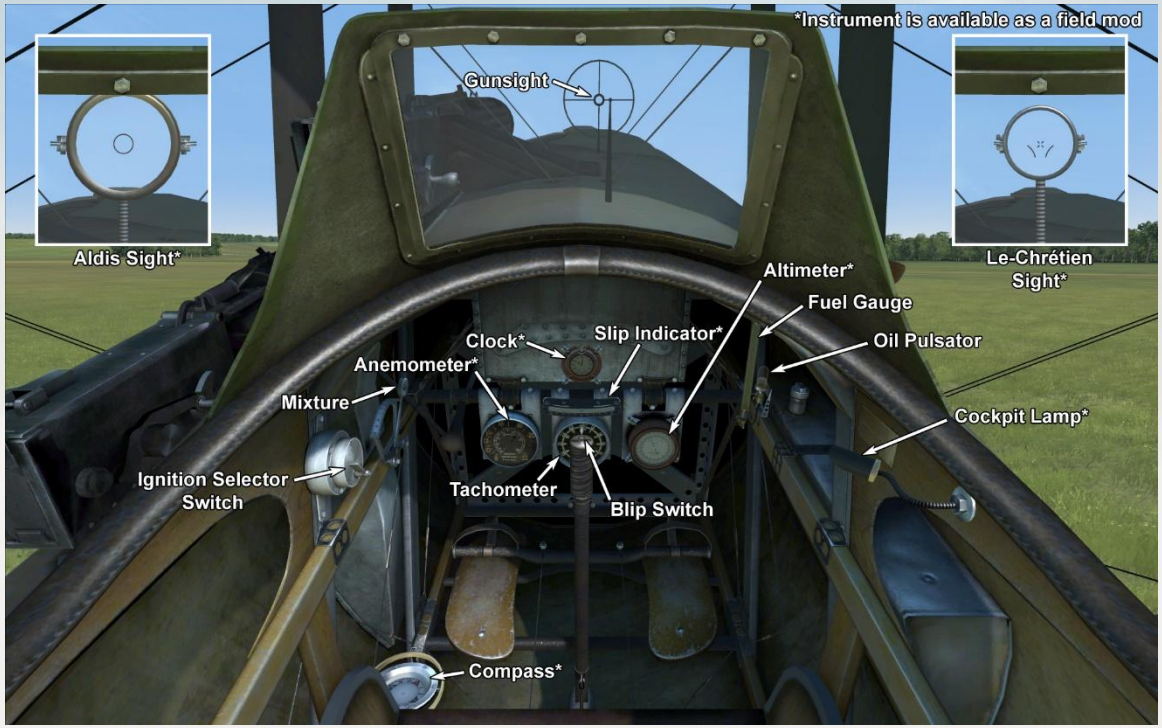
The plane’s powerful engine and high diving speed exposed the main drawback of the “one-and-a-half wings” design – a weak lower wing due to only one spar. There are two known occasions when pilots made successful landings after losing their lower wings.

Crew: 1
Engine: 1 x Le Rhone 9J rotary, 110 horsepower
Height: 2400 mm
Length: 5800 mm
Wingspan: 8160 mm
Wing Surface: 14.75 square meters
Empty Weight: 369 kg
Takeoff Weight: 558 kg
Fuel Capacity: 78 liters
Oil Capacity: 20 liters
Climb Rate: 3 minutes, 7 seconds to 1000 m; 6 minutes, 46 seconds to 2000 m; 11 minutes, 42 seconds to 3000 m; 19 minutes, 45 seconds to 4000 m; 53 minutes, 32 seconds to 5000 m
Maximum Speed: 163 km/h at sea level; 154 km/h at 1000 m; 143 km/h at 2000 m; 130 km/h at 3000 m; 115 km/h at 4000 m; 93 km/h at 5000 m
Service Ceiling: 5300 m
Endurance: 1 hour, 50 minutes (combat); 2 hours, 40 minutes (cruise)
Armament: 1 x .303 in Lewis machine gun, 3 drums with 97 rounds each
Weapon Mod Armament: 2 x .303 in overwing Lewis machine guns, 6 drums with 97 rounds each; 8 x Le Prieur rockets



Nieuport 28.C1

The next evolution in the line of fighters made by Nieuport S.A.d E. (Societe Anonyme des Etablissements) Company was the Nieuport 28. Its designers knew that their previous designs were now obsolete and did not allow for better flight characteristics. Therefore, it was decided to use structural features of the SPAD XIII in the design of the new fighter. Some of these features are as follows: larger surface area of the lower wing (a second spar was fitted to it, thus making it a true biplane); a second machine gun was placed left of the centerline behind the engine; and ailerons were fitted to the lower wing instead of the top wing. Its first trial flight occurred on June 5, 1917. Unfortunately, the new fighter could not exceed the flight characteristics of the already-employed SPAD XIII. As a result, French pilots refused to fly it. In all, 208 fighters of this type were built, after which the Nieuport S.A.d E. Company switched to manufacturing of the SPAD XIII.

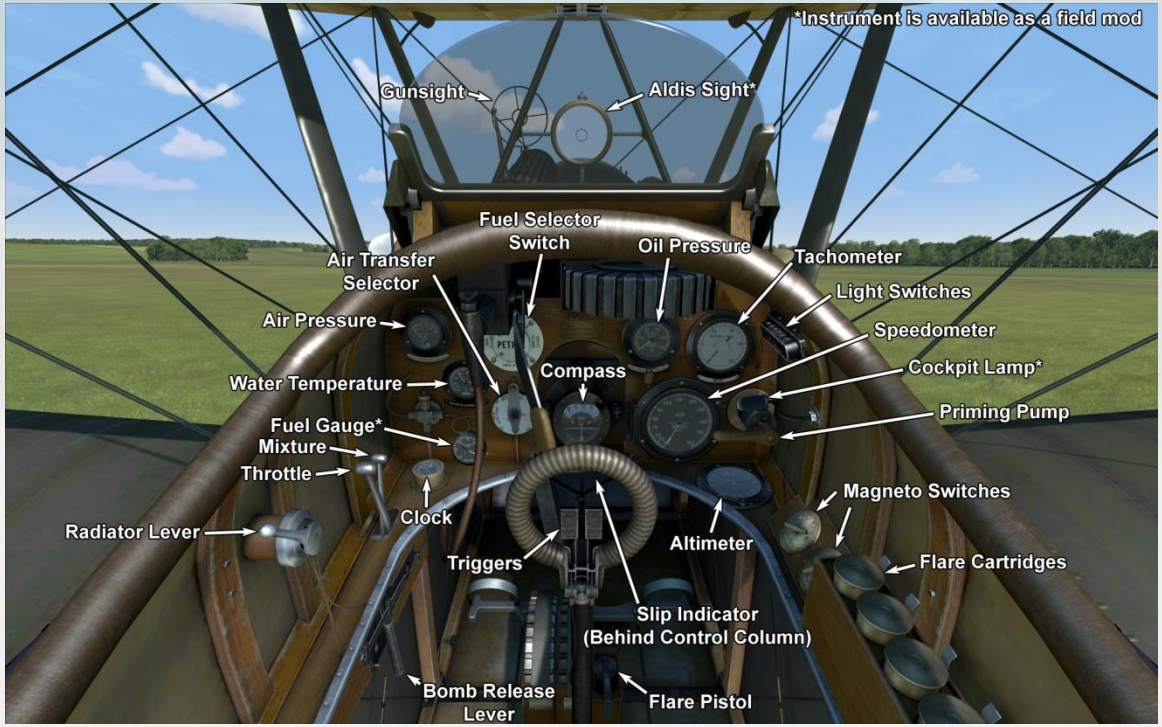


The Nieuport 28 entered service with American squadrons in February 1918. Due to an insufficient supply of Vickers machine guns, combat use of the fighter did not begin until the following month. It was primarily used for engaging enemy fighters and balloons but rarely for bomber escort or recon missions behind enemy lines. Pilots noted it good climb speed, maneuverability, and the sensitivity of its controls. In the course of its combat service, it was found that the plane tended to lose its top wing covering in prolonged dives. Several convincing episodes were described when pilots managed to successfully land even with such damage.

Crew: 1
Engine: 1 x Gnome 9N rotary, 160 horsepower
Height: 2500 mm
Length: 6400 mm
Wingspan: 8160 mm
Wing Surface: 20 square meters
Empty Weight: 436 kg
Takeoff Weight: 698 kg
Fuel Capacity: 125 liters
Oil Capacity: 25 liters
Climb Rate: 2 minutes, 43 seconds to 1000 m; 5 minutes, 43 seconds to 2000 m; 9 minutes, 30 seconds to 3000 m; 14 minutes, 49 seconds to 4000 m; 23 minutes, 20 seconds to 5000 m
Maximum Speed: 203 km/h at sea level; 190 km/ h at 1000 m; 177 km/h at 2000 m; 165 km/h at 3000 m; 150 km/h at 4000 m; 136 km/h at 5000 m
Service Ceiling: 5800 m
Endurance: 1 hour, 10 minutes (combat); 1 hour 10 minutes (cruise)
Armament: 2 x .303 in Vickers machine guns, 250 rounds per gun
Weapon Mod Armament: 2 x 11.43 mm Vickers “balloon” guns, 150 rounds per gun

A.1 ENTENTE SINGLE-CREW AIRCRAFT





R.A.F. S.E.5a

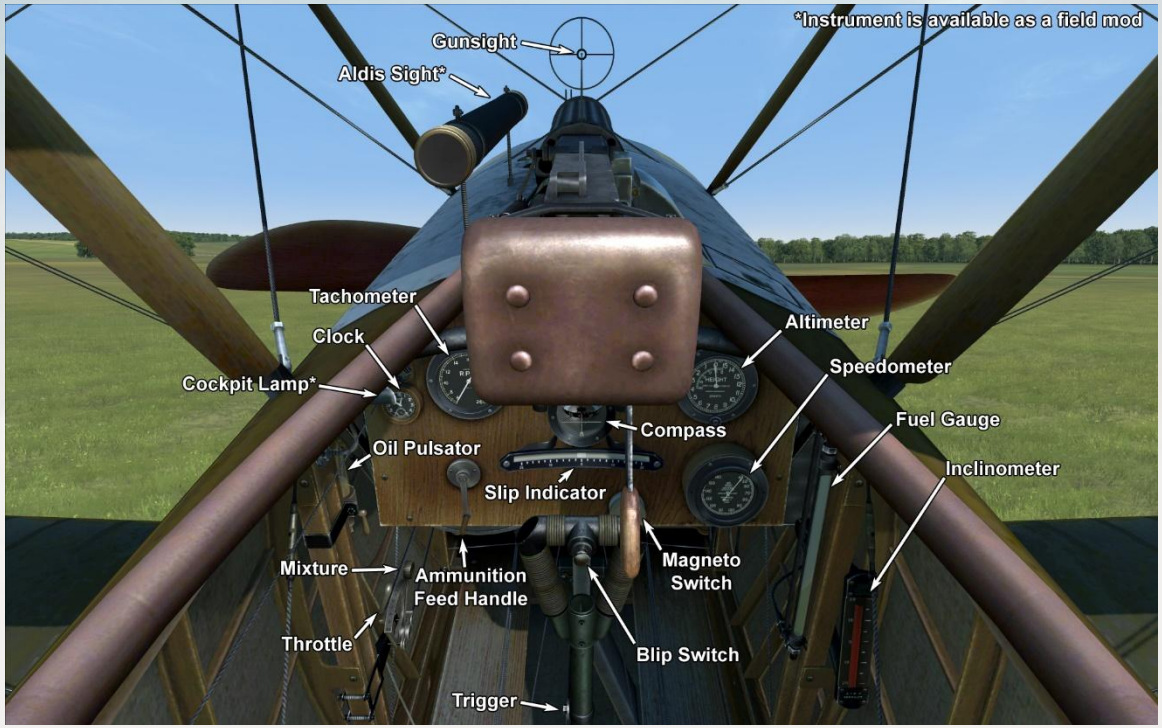
The S.E.5a (single-seat fighter, Scout Experimental 5a) was designed by the British company known as R.A.F. (Royal Aircraft Factory). The goal was to build a fighter around the 200hp Hispano-Suiza engine, which would enable it to be fast and have a high climbing speed. To achieve this goal, engineers had to settle on a compromise. By making the wing profile thin, they simultaneously increased its surface area. This design featured ailerons in both the upper and lower wings. In all, 5269 planes were built by the end of the war.

The plane's first trial flight was performed in January 1917, and it first went into action in June 1917 with the British No. 56 Squadron RFC. It was used to engage enemy fighters and balloons and to escort bombers; only rarely was it used to engage ground targets near the front lines. In evaluating the aircraft, pilots mentioned its structural durability, sufficient maneuverability, stability in dives and when firing machine guns, fine handling, and good sensitivity of controls at low speeds. When landing at high speed, the plane could not touch down due to its high wing lift. It is notable that most of the top British aces flew this type of plane. It was even given a nickname - "ace-maker."

During the aircraft's service, the poor reliability of the Hispano-Suiza engine became apparent; as a result, the plane was also fitted with the more reliable Wolseley Viper engine (license-built by the British Hispano-Suiza factories). The landing gear structure had to be redesigned after frequent reports were made of it breaking upon landing. This involved changing its shape (metal welded tubes were replaced by a wooden frame). The aircraft was deployed to the Western Front and also to Macedonia, Mesopotamia and Palestine.

Crew: 1
Engine: 1 x Wolseley Viper inline, 200 horsepower
Height: 2743 mm
Length: 6300 mm
Wingspan: 8000 mm
Wing Surface: 23.7 square meters
Empty Weight: 635 kg
Takeoff Weight: 886 kg
Fuel Capacity: 148 liters
Oil Capacity: 16 liters
Climb Rate: 2 minutes, 55 seconds to 1000 m; 6 minutes, 1 second to 2000 m; 9 minutes, 38 seconds to 3000 m; 15 minutes, 3 seconds to 4000 m; 22 minutes, 46 seconds to 5000 m
Maximum Speed: 218 km/h at sea level; 210 km/h at 1000 m; 198 km/h at 2000 m; 183 km/h at 3000 m; 165 km/h at 4000 m; 151 km/h at 5000 m
Service Ceiling: 6500 m
Endurance: 1 hour, 50 minutes (combat); 3 hours, 50 minutes (cruise)
Armament: 1 x .303 in Vickers machine gun, 400 rounds and 1 x .303 in Lewis machine gun, 4 drums with 97 rounds each; up to 80 lbs of bombs





Sopwith Pup

The Sopwith Pup was a single seat fighter designed by the talented engineer Herbert Smith of the Sopwith Aviation Company. The first prototype flew in February 1916, whereby its good flying characteristics and maneuverability quickly won it favor from its pilots. After a number of improvements, in was transferred to operational service in March 1916 with the Royal Naval Air Service (RNAS). The aircraft was officially called the "Sopwith Scout," but soon its nickname became the "Pup" due to its similarity with to the 1½ Strutter (but with smaller proportions). The "Pup" nickname was never officially recognized, but it started the tradition of naming all later Sopwith aircraft after a bird or an animal.

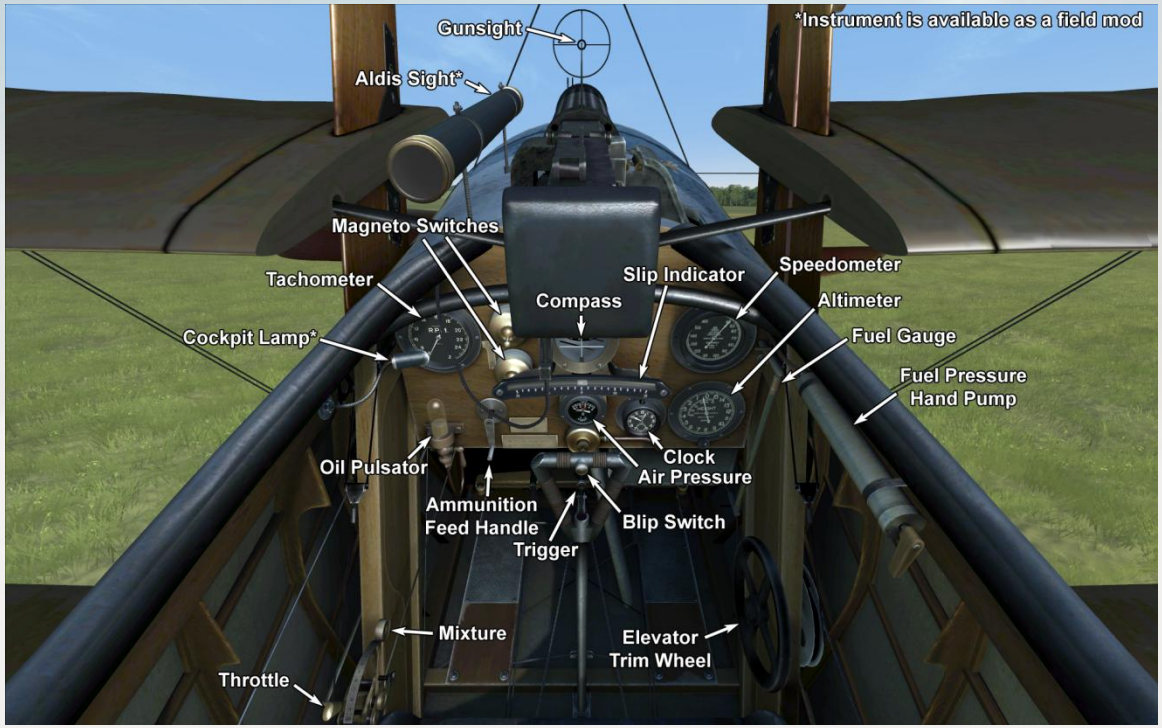
The first examples of the Sopwith Pup were transferred to the front in October 1916. Its good flight characteristics allowed it to compete successfully against enemy opposition. Over 20 victories were attributed to No. 8 (Naval) Squadron during the Battle of the Somme, who was equipped with the Pup. Manfred von Richthofen, after encountered the Pup in combat, noted "We saw at once that the enemy aeroplane was superior to ours."

The excellent blend of the Pup's light weight and its considerably large wing surface allowed British pilots to outperform the enemy in a dogfight. British ace James McCudden remarked, "the Sopwith [Pup] would turn twice to an Albatros's once…it was a remarkably fine machine for general all-round flying. It was so extremely light and well-surfaced that after a little practice one could almost land it on a tennis court." It was due to this latter feature that the Pup became the first aircraft to land aboard a moving ship - the HMS Furious - on 2 August 1917.

The combat life of the Pup was short. Its opposition had received new aircraft superior to the Pup in many ways by the spring of 1917. One by one, the aircraft were transferred from the front to flying schools, where it was used in the training role for some time. Altogether, 1770 Pups were manufactured.

Crew: 1
Engine: 1 x Le Rhone 9C rotary, 80 horsepower
Height: 2870 mm
Length: 5890 mm
Wingspan: 8080 mm
Wing Surface: 23.6 square meters
Empty Weight: 356 kg
Takeoff Weight: 556 kg
Fuel Capacity: 82 liters
Oil Capacity: 21 liters
Climb Rate: 3 minutes, 40 seconds to 1000 m; 7 minutes, 50 seconds to 2000 m; 13 minutes, 8 seconds to 3000 m; 20 minutes, 54 seconds to 4000 m
Maximum Speed: 176 km/h at sea level; 166 km/h at 1000 m; 156 km/h at 2000 m; 146 km/h at 3000 m; 132 km/h at 4000 m
Service Ceiling: 5500 m
Endurance: 2 hours, 30 minutes (combat); 3 hours, 30 minutes (cruise)
Armament: 1 x .303 in Vickers machine gun
Weapon Mod Armament: 8 x Le Prieur Rockets





Sopwith Triplane

Sopwith engineer Herbert Smith, in designing the Triplane, elected to rectify the lack of maneuverability and visibility in previous aircraft designs with the well-known triplane scheme. The three narrow-chord wings provided an increase in air speed and improved the field of view from the cockpit. Furthermore, the three wings provided an outstanding climb rate and allowed for the compact placement of pilot, fuel tanks, armament, and engine.

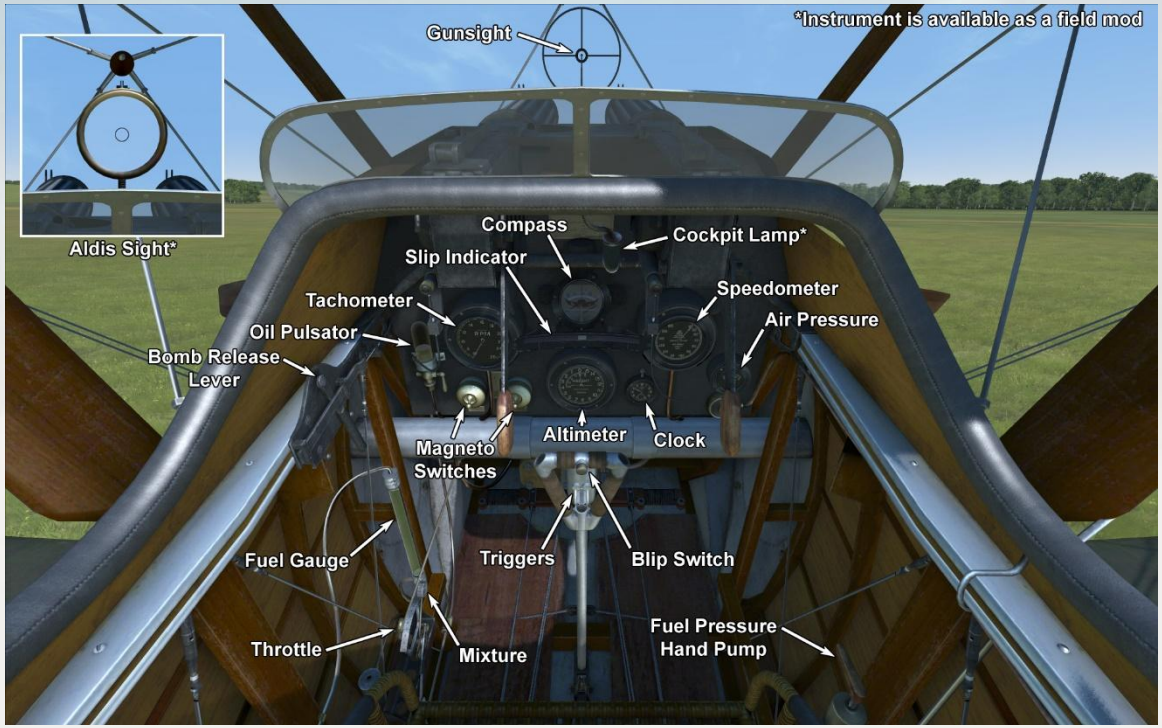
The first flight test was performed on May 26, 1916. In addition to Sopwith, aircraft were also manufactured by Clayton & Shuttleworth Ltd. and Lincoln Oakley Ltd. However, a contract with France was soon agreed to that would supply British squadrons with SPAD VII fighters, thus ending the demand for Triplanes. About 180 Sopwith Triplanes in all were manufactured.

The first field tests were conducted by No. 1 (Naval) Squadron in June 1916, which were followed by minor design improvements. Full rearmament of RNAS squadrons was completed by the end of 1916. Until the middle of 1917, Triplanes were armed with only one Vickers machine gun. British pilots noted that the Germans preferred to avoid combat and turned away when spotting the unique image of Sopwith Triplane. The Triplane was successfully employed against balloons and fighters, in addition to the escort role.

Pilots reported that the plane exhibited an outstanding climb rate, high speed and fair maneuverability. They noted that the controls were light and effective, and the rudder was well-balanced. During the summer of 1917, No. 10 (Naval) Squadron's "Black Flight" claimed 87 German aircraft destroyed for the loss of just one Triplane. The Triplane was also employed by the French Navy, and in 1917 one was transferred to Russia for evaluation. The Sopwith Triplane was deployed to the Western Front and to Macedonia.

Crew: 1
Engine: 1 x Clerget 9B rotary, 130 horsepower
Height: 3200 mm
Length: 5730 mm
Wingspan: 8070 mm
Wing Surface: 21.46 square meters
Empty Weight: 500 kg
Takeoff Weight: 699 kg
Fuel Capacity: 87 liters
Oil Capacity: 18 liters
Climb Rate: 3 minutes, 16 seconds to 1000 m; 6 minutes, 54 seconds to 2000 m; 11 minutes, 29 seconds to 3000 m; 17 minutes, 30 seconds to 4000 m; 26 minutes, 39 seconds to 5000 m
Maximum Speed: 185 km/h at sea level; 175 km/h at 1000 m; 164 km/h at 2000 m; 153 km/h at 3000 m; 141 km/h at 4000 m
Service Ceiling: 6300 m
Endurance: 1 hour, 40 minutes (combat): 2 hours, 50 minutes (cruise)
Armament: 1 x .303 in Vickers machine gun, 500 rounds
Weapon Mod Armament: 2 x .303 in Vickers machine guns, 500 rounds per gun





Sopwith Camel

The Sopwith Camel's construction was based on that of its predecessor, the Sopwith Pup. Sopwith's chief designer Herbert Smith decided to somewhat alter the Pup's design, since a new larger and heavier engine would have to be mounted. Some changes were made to the landing gear struts, the spacing of the wings and stabilizer were increased, and the fuselage acquired an extension to the cockpit's trailing edge, which looked rather like a camel's hump. That 'hump' is what gave the plane its name - the Sopwith Camel.

A remarkable detail of the plane's construction was its compactness: the pilot's seat, fuel tanks, machine guns and engine were all installed very close together.

In parallel with the work of the main Sopwith factory, the plane was also assembled by a number of other companies such as Ruston Proctor Co, Portholme Aerodrome Ltd, Boulton & Paul Ltd, British Caudron Co. Ltd, Clayton & Shuttleworth Ltd, Hooper & Co. Ltd and others. In total, about 5490 Camels were built.

The Camel's first flight trials were performed by the British No. 60 squadron in March of 1917, which were followed by a series of minor improvements to the plane's construction. Production aircraft were first delivered to fighter squadrons in May of 1917. It was primarily used for destroying enemy aircraft and balloons, while from time to time it was also engaged in ground attack operations. English journalists referred to this plane as a "small and agile beast."

Camel pilots mentioned the plane's well-balanced flight controls, the good upward view, and the high cruising speed. Due to the aircraft's unique balance, the plane could almost instantly change its heading, which made the Camel a dangerous opponent. The typical combat scenario for the Camel pilot was a dogfight at low and medium altitudes, where the Camel had the advantage in steep turns. Veterans were known to say, "Once you become a Camel pilot, you will fly it forever." In addition to equipping British units, this plane was also piloted by four American squadrons of the U.S. Air Service and by some Belgian pilots.

Crew: 1
Engine: 1 x Clerget 9B rotary, 130 horsepower
Height: 2590 mm
Length: 5490 mm
Wingspan: 8530 mm
Wing Surface: 21.46 square meters
Empty Weight: 431 kg
Takeoff Weight: 700 kg
Fuel Capacity: 168 liters
Oil Capacity: 20 liters
Climb Rate: 3 minutes, 7 seconds to 1000 m; 6 minutes, 35 seconds to 2000 m; 11 minutes, 5 seconds to 3000 m; 17 minutes, 39 seconds to 4000 m; 27 minutes, 56 seconds to 5000 m
Maximum Speed: 190 km/h at sea level; 178 km/h at 1000 m; 166 km/h at 2000 m; 154 km/h at 3000 m; 142 km/h at 4000 m; 128 km/h at 5000 m
Service Ceiling: 6000 m
Endurance: 2 hours, 30 minutes (combat); 5 hours (cruise)
Armament: 2 x .303 in Vickers machine guns, 500 rounds per gun; up to 80 lbs of bombs
Weapon Mod Armament: upper wing cutout

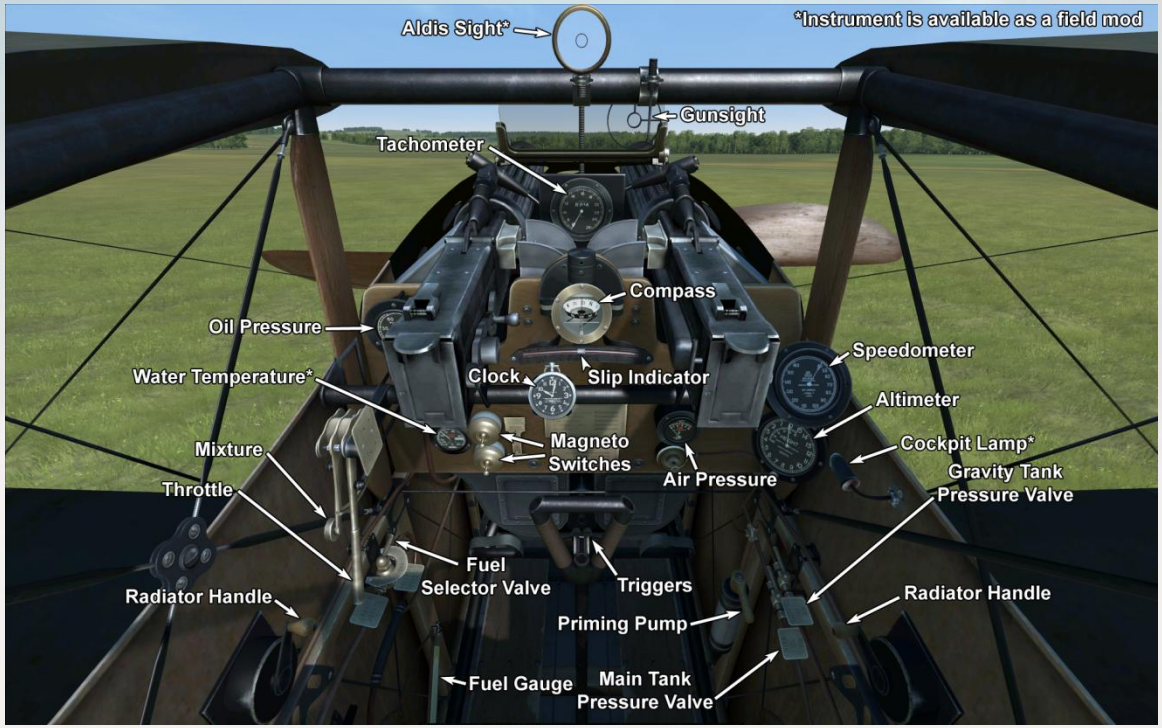


Sopwith Dolphin

The Sopwith Dolphin was designed by the Sopwith Aviation Company in Britain. In designing the aircraft, the flaws of the Sopwith Camel were taken into account. These included bad forward and upward visibility and difficulties of handling a rotary-powered plane. In response to the latter issue, the engineers elected to fit the new aircraft with an inline engine. The design featured a compact arrangement of the cockpit, fuel tanks, machine guns and engine. This resulted in the pilot's head being level with the hatch on the upper wing. The radiators were moved to the sides of the fuselage and behind the cockpit. The first trial flights were made in May 1917. In addition to the Sopwith Aviation Company, several other companies manufactured the aircraft: Darracq, Hooper, and SACA. By the end of the war, 1532 planes of the type had been built.

Operational evaluation of the Dolphin began with the British No. 56 Squadron on June 13, 1917. Several design improvements would follow. In January 1918, No. 19 Squadron became the first operational unit to receive production examples of the Dolphin. The type was employed against enemy fighters and balloons, especially at high altitudes, where it was superior to the Sopwith Camel. It was also used to bomb and strafe ground targets.

Dolphin pilots noted the plane's good balance of controls, perfect visibility upward and forward, but the downward visibility was obscured by the lower wings and the engine cowling. The plane was a formidable opponent, as it possessed the maneuverability of the Sopwith Camel and a speed and climb rate equal to that of the S.E.5a. Pilots often complained about the cockpit crumpling and its tendency to nose over on harsh landings. For a short period, French and American pilots flew these aircraft. It was deployed to the Western Front.



Crew: 1
Engine: 1 x Hispano-Suiza 8Ba inline, 200 horsepower
Height: 2600 mm
Length: 6700 mm
Wingspan: 10000 mm
Wing Surface: 24.5 square meters
Empty Weight: 436 kg
Takeoff Weight: 893 kg
Fuel Capacity: 123 liters
Oil Capacity: 18 liters
Climb Rate: 3 minutes, 16 seconds to 1000 m; 6 minutes, 37 seconds to 2000 m; 10 minutes, 48 seconds to 3000 m; 16 minutes, 8 seconds to 4000 m; 23 minutes, 25 seconds to 5000 m
Maximum Speed: 200 km/h at sea level; 189 km/h at 1000 m; 178 km/h at 2000 m; 167 km/h at 3000 m; 156 km/h at 4000 m; 144 km/h at 5000 m
Service Ceiling: 6500 m
Endurance: 1 hour, 40 minutes (combat); 3 hours, 20 minutes (cruise)
Armament: 2 x .303 in Vickers machine guns, 500 rounds per gun; up to 80 lbs of bombs
Weapon Mod Armament: 2 x .303 in cockpit-mounted Lewis machine guns, 4 drums with 97 rounds each; 2 x .303 in lower wing-mounted Lewis machine guns, 2 drums with 97 rounds each

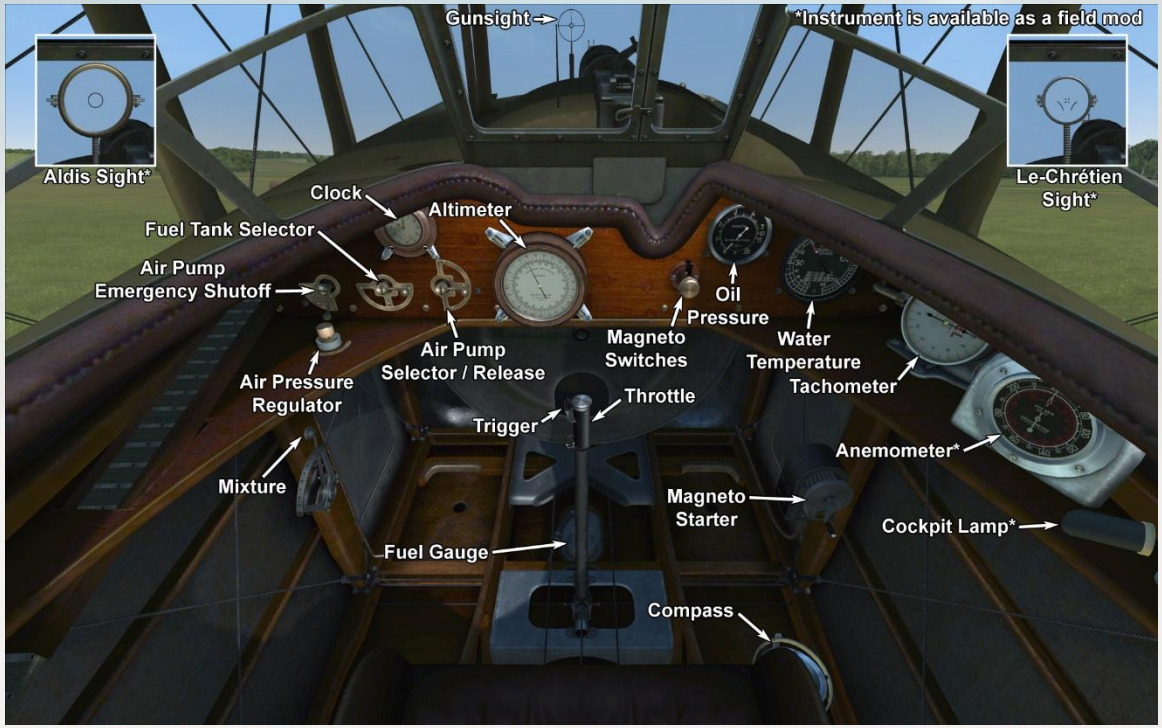
A.1 ENTENTE SINGLE-CREW AIRCRAFT



SPAD 7.C1 (150 hp)

The SPAD S.VII was a single-seat fighter developed by Louis Bechereau of the Societe Pour L'Aviation et ses Derives in early 1916. Much of the design of the aircraft was drawn from SPAD's development of the rotary-powered SPAD Type A. The initial engine to equip the SPAD S.VII, the 150-horsepower Hispano-Suiza 8A, was originally developed by Swiss engineer Marc Birkigt in February 1915.

The prototype aircraft, which was called the SPAD V, was flown for the first time in April 1916. This plane initially had a large conical spinner with a central opening, which was blended with a circular radiator and cowling. Although the spinner was eventually discarded, the circular radiator and cowling would remain defining features of the type. Flight testing showed the aircraft possessed an excellent maximum speed and climb rate. In addition, the airframe's sound construction endowed the plane with a diving performance superior to that of the lightly built Nieuports, which were known to shed their lower wings in steep dives. With these promising characteristics in mind, the aircraft was ordered into production as the SPAD S.VII on 10 May 1916.



Initial delivery of the SPAD S.VII was slow due to difficulties with the production of radiators. Production gradually increased as contracts were given to other French manufacturers (Gremont, Janoir, Kellner, de Marcay, Regy, Societe d'Etudes Aeronautiques, and Sommer). The aircraft was also produced in Russia by Duks and by the Bleriot & Spad Aircraft Works in Great Britain. In early 1917, the 180-horsepower Hispano-Suiza 8Ab began to be fitted to the aircraft, and by April 1917, all newly produced planes were equipped with it. In all, approximately 3,500 SPAD S.VIIs of all types were built.

Crew: 1
Engine: 1 x Hispano-Suiza 8Aa inline, 150 horsepower
Height: 3200 mm
Length: 6080 mm
Wingspan: 7822 mm
Wing Surface: 17.85 square meters
Empty Weight: 500 kg
Takeoff Weight: 705 kg
Fuel Capacity: 105 liters
Oil Capacity: 11 liters
Climb Rate: 3 minutes, 8 seconds to 1000 m; 6 minutes, 43 seconds to 2000 m; 11 minutes, 26 seconds to 3000 m; 18 minutes, 22 seconds to 4000 m
Maximum Speed: 193 km/h at sea level; 181 km/h at 1000 m; 169 km/h at 2000 m; 156 km/h at 3000 m; 141 km/h at 4000 m
Service Ceiling: 5486 m
Endurance: 2 hours, 30 minutes
Armament: 1 x .303 in Vickers machine gun, 500 rounds
Weapon Mod Armament: 1 x .303 in overwing Lewis machine gun, 3 drums with 97 rounds each; 6 x Le Prieur rockets

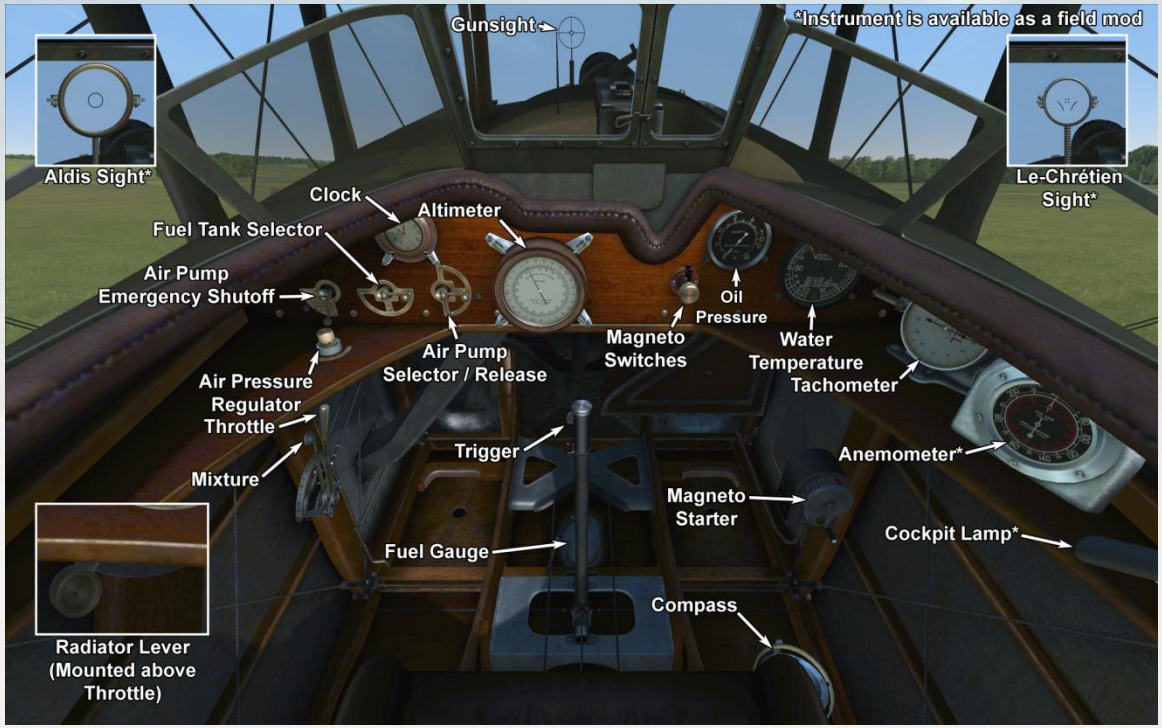
A.1 ENTENTE SINGLE-CREW AIRCRAFT



SPAD 7.C1 (180 hp)

The SPAD S.VII was a single-seat fighter developed by Louis Bechereau of the Societe Pour L'Aviation et ses Derives in early 1916. Much of the design of the aircraft was drawn from SPAD's development of the rotary-powered SPAD Type A. The initial engine to equip the SPAD S.VII, the 150-horsepower Hispano-Suiza 8A, was originally developed by Swiss engineer Marc Birkigt in February 1915.

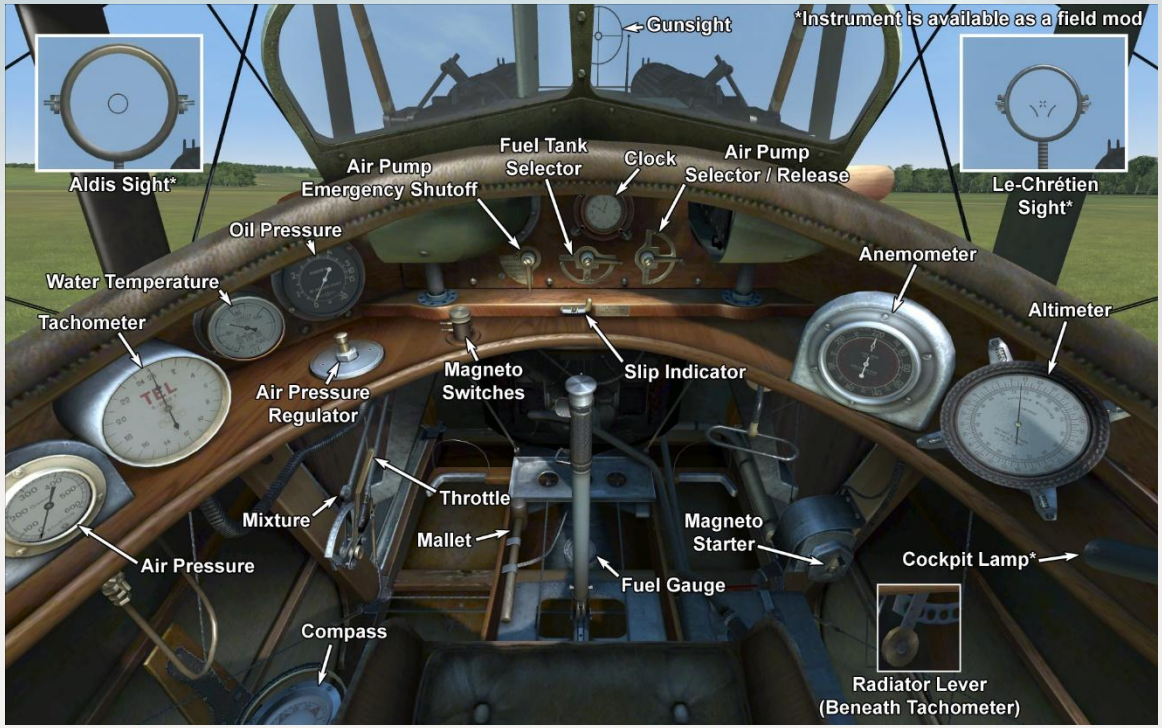
The prototype aircraft, which was called the SPAD V, was flown for the first time in April 1916. This plane initially had a large conical spinner with a central opening, which was blended with a circular radiator and cowling. Although the spinner was eventually discarded, the circular radiator and cowling would remain defining features of the type. Flight testing showed the aircraft possessed an excellent maximum speed and climb rate. In addition, the airframe's sound construction endowed the plane with a diving performance superior to that of the lightly built Nieuports, which were known to shed their lower wings in steep dives. With these promising characteristics in mind, the aircraft was ordered into production as the SPAD S.VII on 10 May 1916.



Initial delivery of the SPAD S.VII was slow due to difficulties with the production of radiators. Production gradually increased as contracts were given to other French manufacturers (Gremont, Janoir, Kellner, de Marcay, Regy, Societe d'Etudes Aeronautiques, and Sommer). The aircraft was also produced in Russia by Duks and by the Bleriot & Spad Aircraft Works in Great Britain. In early 1917, the 180-horsepower Hispano-Suiza 8Ab began to be fitted to the aircraft, and by April 1917, all newly produced planes were equipped with it. In all, approximately 3,500 SPAD S.VIIs of all types were built.

Crew: 1
Engine: 1 x Hispano-Suiza 8Ab inline, 180 horsepower
Height: 3200 mm
Length: 6080 mm
Wingspan: 7822 mm
Wing Surface: 17.85 square meters
Empty Weight: 500 kg
Takeoff Weight: 705 kg
Fuel Capacity: 105 liters
Oil Capacity: 11 liters
Climb Rate: 2 minutes, 16 seconds to 1000 m; 4 minutes 48 seconds to 2000 m; 8 minutes, 1 second to 3000 m; 12 minutes 28 seconds to 4000 m
Maximum Speed: 219 km/h at sea level; 206 km/h at 1000 m; 191 km/h at 2000 m; 177 km/h at 3000 m; 162 km/h at 4000 m; 187 km/h at 5000 m
Service Ceiling: 6553 m
Endurance: 1 hour, 30 minutes
Armament: 1 x .303 in Vickers machine gun, 350 rounds
Weapon Mod Armament: 1 x .303 in overwing Lewis machine gun, 3 drums with 97 rounds each; 6 x Le Prieur rockets





SPAD 13.C1

The SPAD S.XIII was designed as an improved version of the SPAD S.VII. While appearing externally similar to its predecessor, it was in fact a completely new design. A second machine gun and more a powerful engine were fitted. In addition, an auxiliary fuel tank was placed in the central section of the upper wing. The main fuel tank had outlines of the lower fuselage section. To the left and behind the cockpit was an installation for a reconnaissance camera or a bomb load. The aircraft's first flight was made on the 4th of April 1917. The plane was manufactured by Bleriot, Levasseur, Bernard, Kellner, Safca, Borel, and Nieuport. In all, 8472 planes of the type were built.

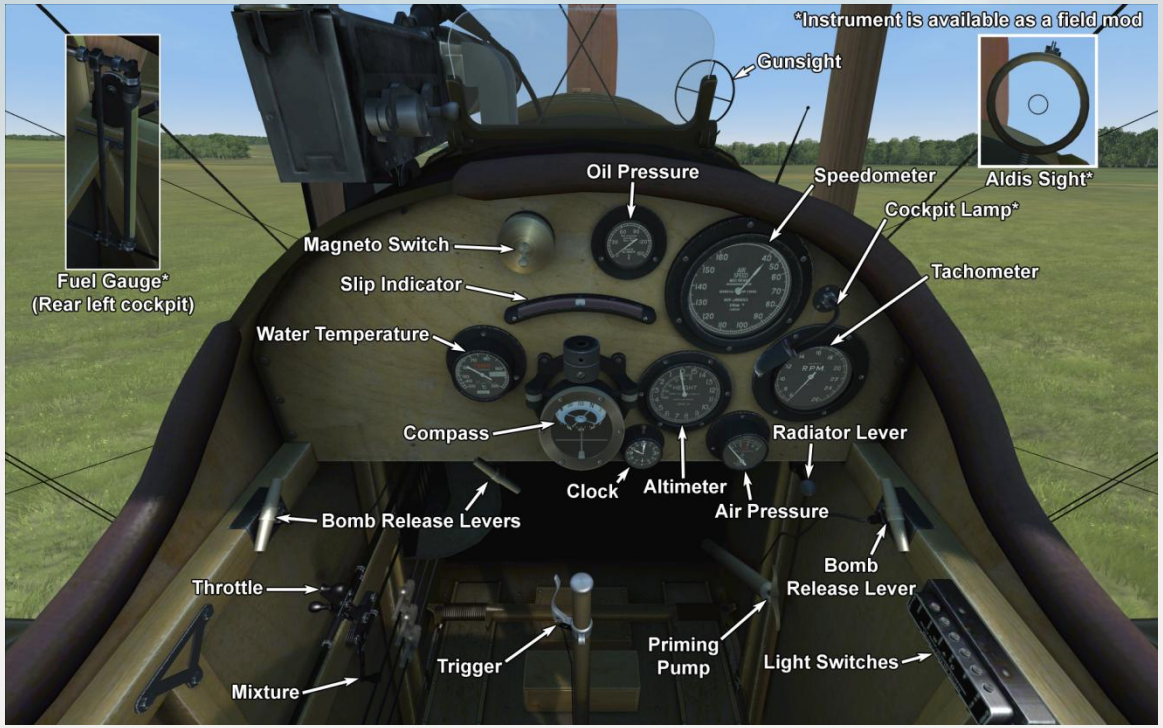
The S.XIII first appeared at the front in late summer-early fall 1917, being initially supplied to French fighter squadrons. It was mainly used for engaging enemy planes, escorting bombers, aerial mapping, and recon; rarely was it used for the bombing of ground targets near the front lines.

French pilots were eager to receive the S.XIII. The second machine gun provided increased firepower, and the new engine allowed it to fly and climb faster than its predecessors. Its controls remained effective even at high altitudes. The only remaining drawback, owing to its thin wing profile, was its decreased sensitivity of controls at low speeds, which often resulted in a stall. In a dive and level flight, the SPAD S.XIII was one of the fastest aircraft of its time. Pilots who flew it remarked, "It dives faster than the wind!" It participated in battles on all fronts during WWI. French, British, American and Italian units were all equipped with the type.

Crew: 1
Engine: 1 x Hispano-Suiza 8Ba inline, 220 horsepower
Height: 2600 mm
Length: 6250 mm
Wingspan: 8080 mm
Wing Surface: 20.2 square meters
Empty Weight: 565 kg
Takeoff Weight: 820 kg
Fuel Capacity: 113.5 liters
Oil Capacity: 17 liters
Climb Rate: 2 minutes, 38 seconds to 1000 m; 5 minutes, 28 seconds to 2000 m; 8 minutes, 57 seconds to 3000 m; 13 minutes, 24 seconds to 4000 m; 19 minutes 30 seconds to 5000 m
Maximum Speed: 220 km/h at sea level; 208 km/h at 1000 m; 195 km/h at 2000 m; 181 km/h at 3000 m; 167 km/h at 4000 m; 153 km/h at 5000 m
Service Ceiling: 6800 m
Endurance: 1 hour, 30 minutes (combat); 3 hours (cruise)
Armament: 2 x .303 in Vickers machine guns, 400 rounds per gun; up to 40 lbs of bombs; installation for photo reconnaissance camera
Weapon Mod Armament: 2 x 11.43 mm Vickers "balloon" guns, 200 rounds per gun

A.2 ENTENTE MULTI-CREW AIRCRAFT





See next page for Airco D.H.4 gunner and bombsight positions

Airco D.H.4

The D.H.4 was designed by Geoffrey de Havilland to be a two-seat light bomber powered by the Beardmore-Halford-Pullinger (B.H.P.) engine. The first prototype flew in August 1916, but the B.H.P. engine proved to be weak and required a major redesign. Thus, the D.H.4 was modified in order to be equipped with the Rolls Royce Eagle engine. The first order for 50 planes powered by the Eagle III engine (250 hp) was placed at the end of 1916.

Essentially an all-wooden construction tractor biplane, the only "flaw" noted by its crews was the fuel tank placed between the pilot's and the observer's cockpits. This caused communication problems between the two crew members.

The airplane's armament consisted of one forward-firing Vickers synchronized machine gun and one or two Lewis guns on a Scarff ring mount in the observer's position. It could carry up to 460 pounds of bombs on external wing racks and under the fuselage.

Due to shortages of Rolls Royce engines, production aircraft were also fitted with the B.H.P. (230 hp), the RAF3A (200 hp), the Siddeley Puma (230 hp) and the 260 hp Fiat engines. However, D.H.4s fitted with these alternative engines could not match the performance of Rolls Royce-powered machines.

The first D.H.4s in frontline service were supplied to No.55 Squadron in March 1917, thus making it the first RFC squadron to be fully equipped with the type. By the end of 1917 a total of 6 RFC squadrons were equipped with D.H.4s. It was also used by RNAS squadrons for naval operations, including recon and anti-submarine patrols.

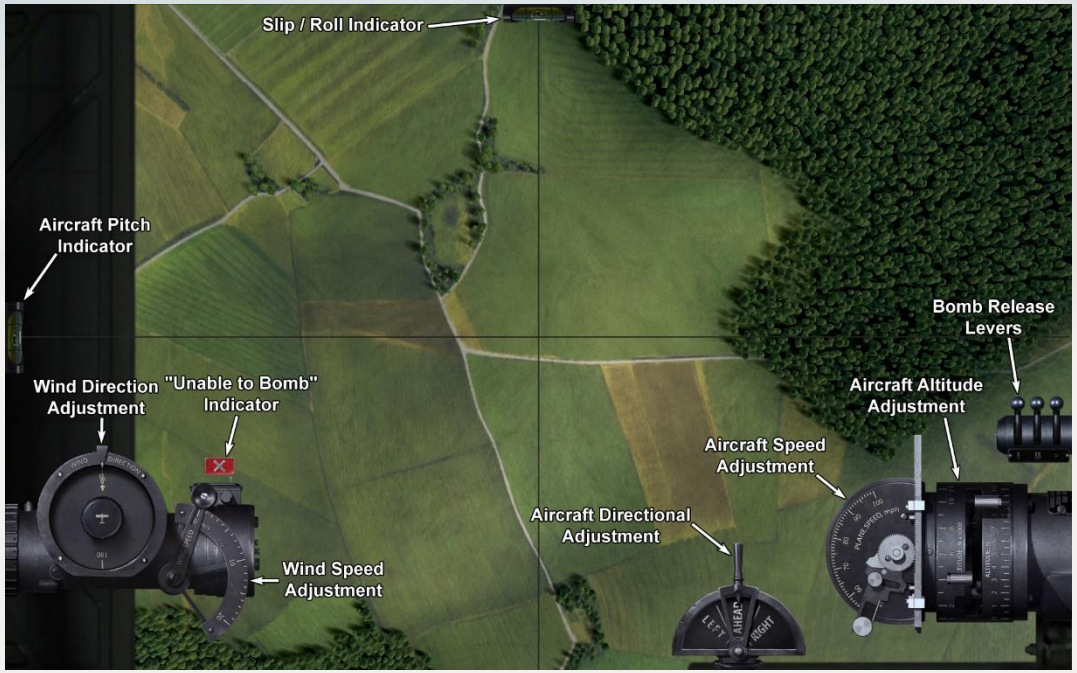
Pleasant to fly and easy to operate, the D.H.4 was also highly regarded by its crews for its speed and maneuverability. Due to its capabilities the type was often employed without fighter cover, owing to its high speed and good altitude performance.

Mostly used as a light daytime bomber, the D.H.4 could also carry radio equipment for artillery observation duties and photo recon equipment for photo reconnaissance missions.

A.2 ENTENTE MULTI-CREW AIRCRAFT

Airco D.H.4 gunner and bombsight positions



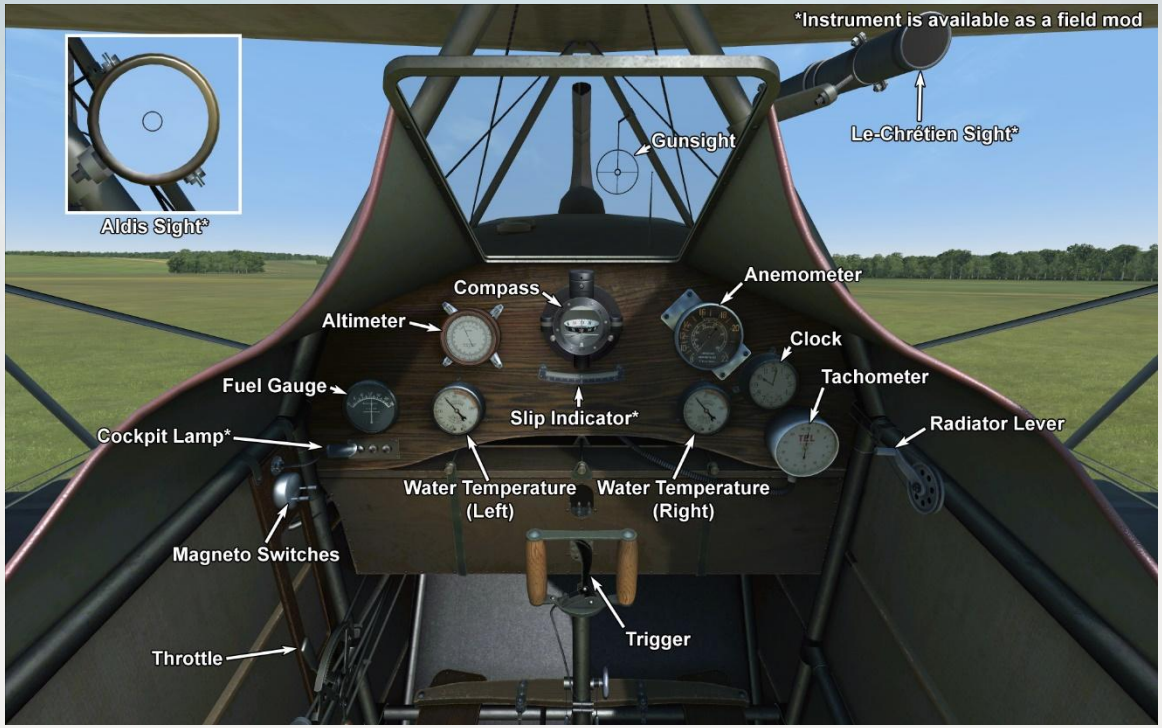


Airco D.H.4 (continued)

D.H.4 production was undertaken by Airco, F.W. Berwick and Company, Glendower Aircraft Company, Palladium Autocars, Vulcan Motor and Engineering, and the Westland Aircraft Works in the UK. A total of 1,449 aircraft had been built in the UK for the RFC and the RNAS by the end of the war.

Crew: 2
Engine: 1 x Rolls Royce Eagle VII inline, 275 horsepower (325 horsepower at 1800 RPM)
Height: 3100 mm
Length: 9200 mm
Wingspan: 12916 mm
Wing Surface: 40 square meters
Empty Weight: 1088 kg
Takeoff Weight: 1588 kg
Fuel Capacity: 249 liters
Oil Capacity: 27.3 liters
Climb Rate: 3 minutes, 23 seconds to 1000 m; 7 minutes, 7 seconds to 2000 m; 11 minutes, 47 seconds to 3000 m; 17 minutes, 52 seconds to 4000 m; 27 minutes to 5000 m
Maximum Speed: 200 km/h at seal level; 189 km/h at 1000 m; 178 km/h at 2000 m; 166 km/h at 3000 m; 154 km/h at 4000 m; 140 km/h at 5000 m
Service Ceiling: 6800 m
Endurance: 3 hours
Armament: 1 x forward-firing .303 in Vickers machine gun, 500 rounds; and 1 x .303 in Lewis machine gun in rear-facing turret, 7 drums with 97 rounds each; up to 460 lbs of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 2 x forward-firing .303 in Vickers machine guns, 500 rounds per gun; 2 x .303 in overwing Lewis machine guns, 2 drums with 97 rounds each; 2 x .303 in Lewis machine guns in rear-facing turret, 8 drums with 97 rounds each





See next page for Breguet 14.B2 gunner and bombsight positions

Breguet 14.B2

The Breguet 14 was a French two-seater aircraft designed by the Breguet Aviation firm. The prototype made its first flight in April 1917. To ensure exceptional durability, the airframe structure was composed of duralumin and steel sections. Several companies manufactured this plane, including Michelin, Bellanger, Renault, Farman, Schmitt, and Darracq. During the war, production aircraft were fitted with a variety of engine types. Renault engines were the first to be installed and were subsequently followed by Fiat models and, in later months, Liberty engines. These reliable and powerful engines made the Breguet 14 the fastest two-seat bomber of WWI.

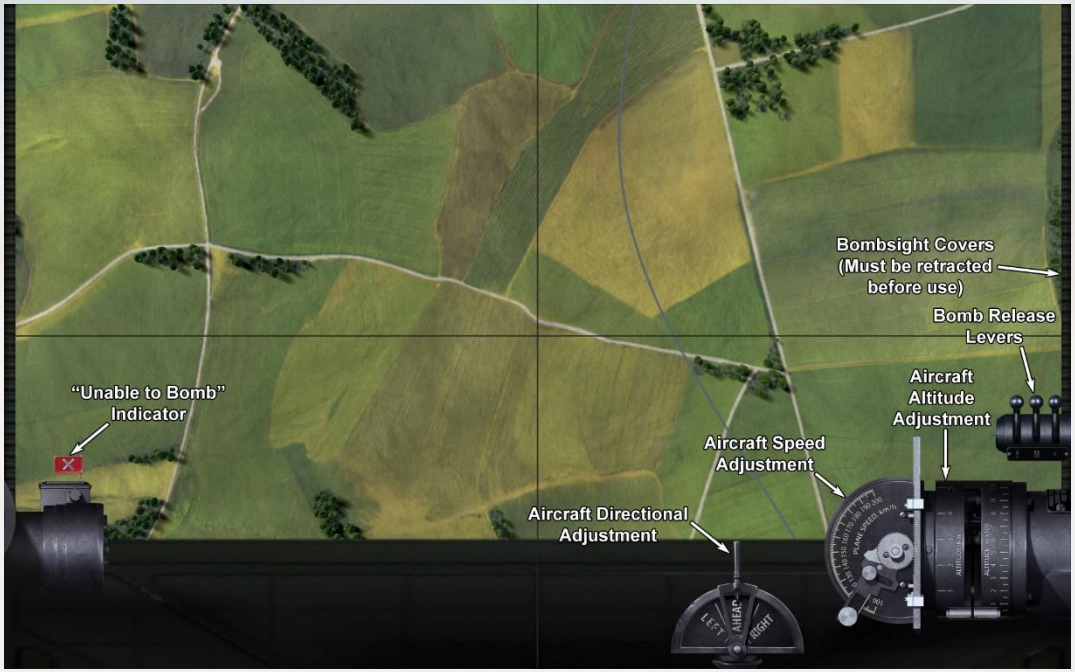
The first series of planes entered service with the French Army Corps in May 1917, where it eventually replaced the Sopwith 1½ Strutter. The Breguet 14 was faster, had a higher climb speed, could carry a higher bomb load and possessed a more durable structure. In April 1918, 225 aircraft of this type were in service with 1 American and 50 French squadrons.

The French Army employed it in a variety of ways, including bombing, aerial supply, artillery spotting, aerial mapping of the front lines, recon, and dropping of propaganda leaflets. Its main bombing targets were railway junctions, German frontline fortifications, and targets in the immediate battle area. Pilots noted its speed and ability to take punishment from enemy fire. The Breguet 14 participated in battles on the Western, Eastern and Italian fronts.

A.2 ENTENTE MULTI-CREW AIRCRAFT

Breguet 14.B2 gunner and bombsight positions

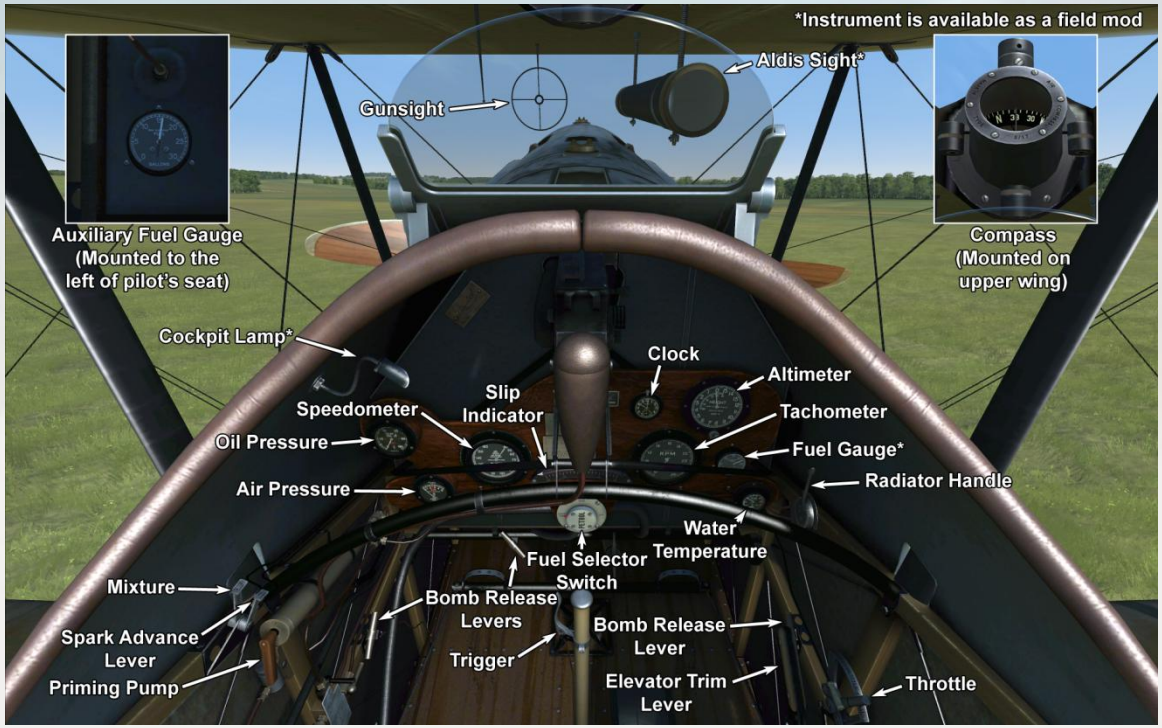




Breguet 14.B2 (continued)

Crew: 2
Engine: 1 x Renault Fcx inline, 300 horsepower
Height: 3300 mm
Length: 8870 mm
Wingspan: 13284 mm
Wing Surface: 52 square meters
Empty Weight: 1076 kg
Takeoff Weight: 1538.2 kg (without bomb load); 1794.2 kg (256 kg bomb load); 1858.2 kg (320 kg bomb load)
Fuel Capacity: 250 liters
Oil Capacity: 35 liters
Climb Rate (without bomb load): 3 minutes, 21 seconds to 1000 m; 7 minutes, 8 seconds to 2000 m; 11 minutes, 58 seconds to 3000 m; 18 minutes, 33 seconds to 4000 m; 28 minutes, 38 seconds to 5000 m
Climb Rate (with 256 kg bomb load): 4 minutes, 8 seconds to 1000 m; 9 minutes, 13 seconds to 2000 m; 16 minutes, 8 seconds to 3000 m; 26 minutes, 51 seconds to 4000 m; 49 minutes, 45 seconds to 5000 m
Maximum Speed: 182 km/h (without bomb load)
Endurance: 2 hours, 30 minutes
Armament: 1 x forward-firing .303 in Vickers machine gun, 500 rounds and 2 x .303 in Lewis machine guns in rear-facing turret, 8 drums with 97 rounds each; up to 320 kg of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 1 x .303 in overwing Lewis machine gun, 5 drums with 97 rounds each





See next page for Bristol F.2B gunner and bombsight positions

Bristol F.2B (Falcon II)

Intended to replace the old B.E. two-seater reconnaissance aircraft, design of the Bristol F.2 started in March of 1916. To this end, the new type was to be supplied with dual controls and wireless and camera equipment. The F2 was also designed to be capable of carrying out fighter patrols, and so it was armed with a fixed Vickers gun firing through the cowling and a rear turret with one or two Lewis guns.

The first prototype Bristol F.2A flew in September of 1916, equipped with a Rolls Royce Mk.1 engine. After successfully completing its trials, the type was ordered into production. The first combat unit in France to receive F.2As was No. 48 Squadron, which had begun receiving the type by March 8, 1917.

The first offensive patrol with the F.2A was flown on April 5, 1917, but it proved to be a disastrous debut for the type. The patrol consisted of six F.2As and was led by Captain I.V. Leefe-Robinson, V.C. The flight was attacked over Douai by five Albatros D.IIIs led by Manfred von Richthofen, who shot down two of the Bristols for his thirty-fifth and thirty-sixth victories. Two other Bristols, one of them flown by Leefe-Robinson himself, were accounted for by Richthofen's pilots. This failure was due mainly to outdated tactics employed by the Bristol pilots - as they flew in close formation and relied only upon defensive maneuvers. However, as pilots gained combat experience, the F.2 proved to be a superior combat machine when used as a fighter plane.

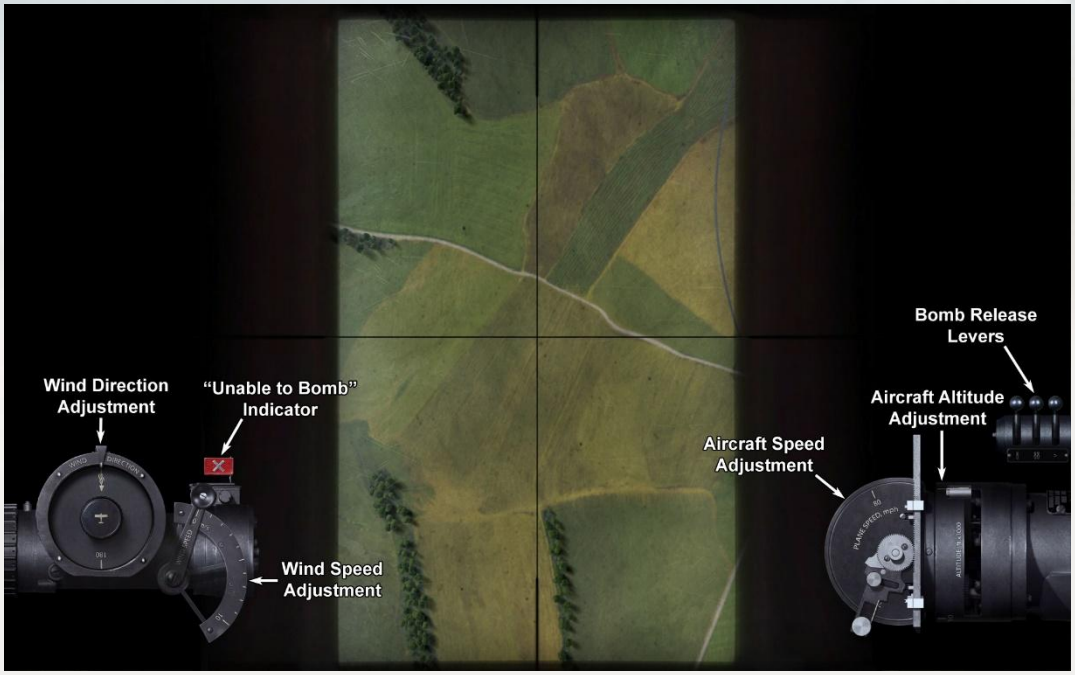
Some changes were subsequently made to the F.2's airframe, and it was also fitted with new Falcon II and Falcon III engines, whereupon it was re-designated as the Bristol F.2B. Along with improved tactics, these modifications enabled the F.2B to become one of the best - if not the best – two-seater fighters of World War I. Due to a shortage of the Rolls Royce engines, a wide variety of other engines was installed, such as the 300-horsepower Hispano-Suiza, RAF 4a, Sunbeam Arab and Liberty engines.

Fast, with a good climb rate, rugged, and very fast in dives, and flown by aggressive and experienced pilots, F.2Bs soon became feared by enemy opponents. German pilots typically chose to

A.2 ENTENTE MULTI-CREW AIRCRAFT

Bristol F.2B (Falcon II) gunner and bombsight positions





Bristol F.2B (Falcon II) (continued)

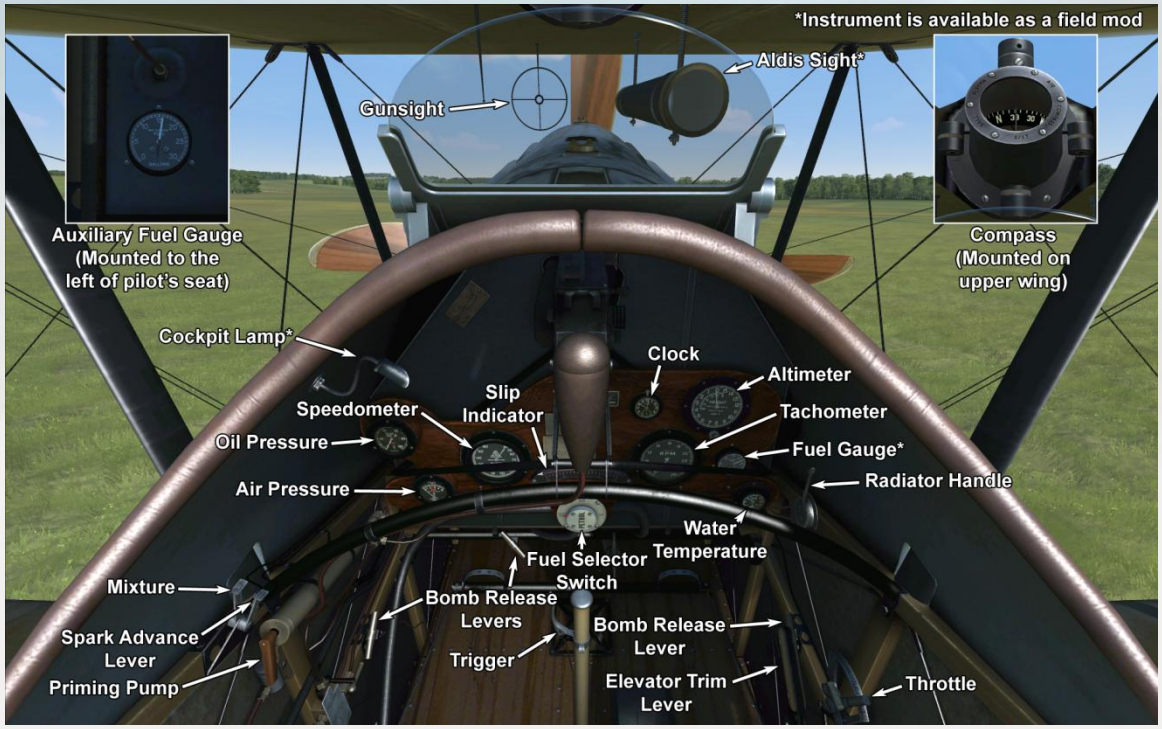
evade Bristols if they did not have superior numbers. The most successful Bristol ace that flew F.2Bs as a pilot, Andrew Edward McKeever from No.11 Squadron, scored an impressive 31 kills flying Bristols. However, his record was overshadowed by that of the highest scoring observer ace of the war, Charles George Gass, who scored 39 kills while flying as a Bristol gunner.

While excelling as a fighter, the F.2 was also capable of being a good ground attack airplane. It could carry up to 450 lbs. of bombs on external racks. Some of the Bristols were also equipped with a Negative Lens bombsight.

A total of 3,101 Bristol Fighters of all types had been produced by the end of 1918. Owing to its success in wartime, Bristol Fighters continued to be employed by the RAF into the 1920s.

Crew: 2
Engine: 1 x Rolls Royce Falcon II inline, 255 horsepower
Height: 2970 mm
Length: 7874 mm
Wingspan: 11986 mm
Wing Surface: 37.7 square meters
Empty Weight: 885 kg
Takeoff Weight: 1262 kg (without bomb load); 1465 kg (with 448 lb bomb load); 1371 kg (with 240 lb bomb load)
Fuel Capacity: 170.5 liters
Oil Capacity: 15.2 liters
Climb Rate (without bomb load): 3 minutes, 25 seconds to 1000 m; 7 minutes, 40 seconds to 2000 m; 13 minutes, 5 seconds to 3000 m; 20 minutes, 40 seconds to 4000 m; 33 minutes, 35 seconds to 5000 m
Maximum Speed (without bomb load): 198 km/h at sea level; 183 km/h at 1000 m; 167 km/h at 2000 m; 148 km/h at 3000 m; 135 km/h at 4000 m; 118 km/h at 5000 m
Service Ceiling: 6100 m
Endurance: 3 hours
Armament: 1 x forward-firing .303 in Vickers machine gun, 973 rounds; and 2 x .303 in Lewis machine guns in rear-facing turret, 8 drums with 97 rounds each; up to 450 lbs of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 2 x .303 in overwing Lewis machine guns, 6 drums with 97 rounds each; 1 x .303 in Lewis machine gun in rear-facing turret, 7 drums with 97 rounds each





See next page for Bristol F.2B gunner and bombsight positions

Bristol F.2B (Falcon III)

Intended to replace the old B.E. two-seater reconnaissance aircraft, design of the Bristol F.2 started in March of 1916. To this end, the new type was to be supplied with dual controls and wireless and camera equipment. The F2 was also designed to be capable of carrying out fighter patrols, and so it was armed with a fixed Vickers gun firing through the cowling and a rear turret with one or two Lewis guns.

The first prototype Bristol F.2A flew in September of 1916, equipped with a Rolls Royce Mk.1 engine. After successfully completing its trials, the type was ordered into production. The first combat unit in France to receive F.2As was No. 48 Squadron, which had begun receiving the type by March 8, 1917.

The first offensive patrol with the F.2A was flown on April 5, 1917, but it proved to be a disastrous debut for the type. The patrol consisted of six F.2As and was led by Captain I.V. Leefe-Robinson, V.C. The flight was attacked over Douai by five Albatros D.IIIs led by Manfred von Richthofen, who shot down two of the Bristols for his thirty-fifth and thirty-sixth victories. Two other Bristols, one of them flown by Leefe-Robinson himself, were accounted for by Richthofen's pilots. This failure was due mainly to outdated tactics employed by the Bristol pilots - as they flew in close formation and relied only upon defensive maneuvers. However, as pilots gained combat experience, the F.2 proved to be a superior combat machine when used as a fighter plane.

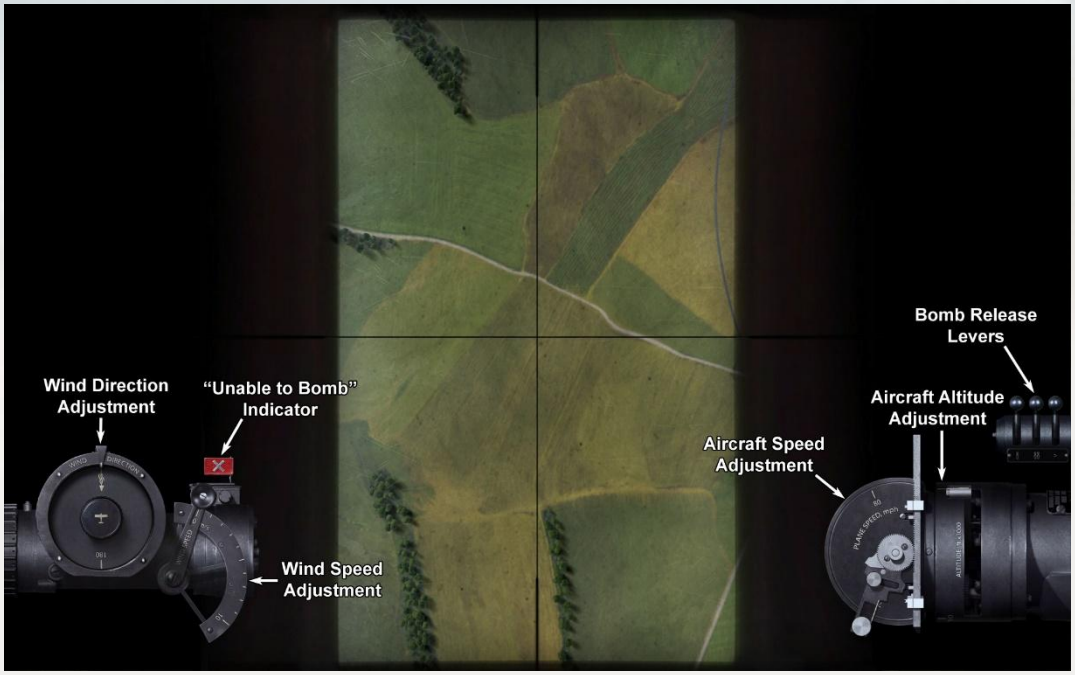
Some changes were subsequently made to the F.2's airframe, and it was also fitted with new Falcon II and Falcon III engines, whereupon it was re-designated as the Bristol F.2B. Along with improved tactics, these modifications enabled the F.2B to become one of the best - if not the best – two-seater fighters of World War I. Due to a shortage of the Rolls Royce engines, a wide variety of other engines was installed, such as the 300-horsepower Hispano-Suiza, RAF 4a, Sunbeam Arab and Liberty engines.

Fast, with a good climb rate, rugged, and very fast in dives, and flown by aggressive and experienced pilots, F.2Bs soon became feared by enemy opponents. German pilots typically chose to

A.2 ENTENTE MULTI-CREW AIRCRAFT

Bristol F.2B (Falcon III) gunner and bombsight positions





Bristol F.2B (Falcon III) (continued)

evade Bristols if they did not have superior numbers. The most successful Bristol ace that flew F.2Bs as a pilot, Andrew Edward McKeever from No.11 Squadron, scored an impressive 31 kills flying Bristols. However, his record was overshadowed by that of the highest scoring observer ace of the war, Charles George Gass, who scored 39 kills while flying as a Bristol gunner.

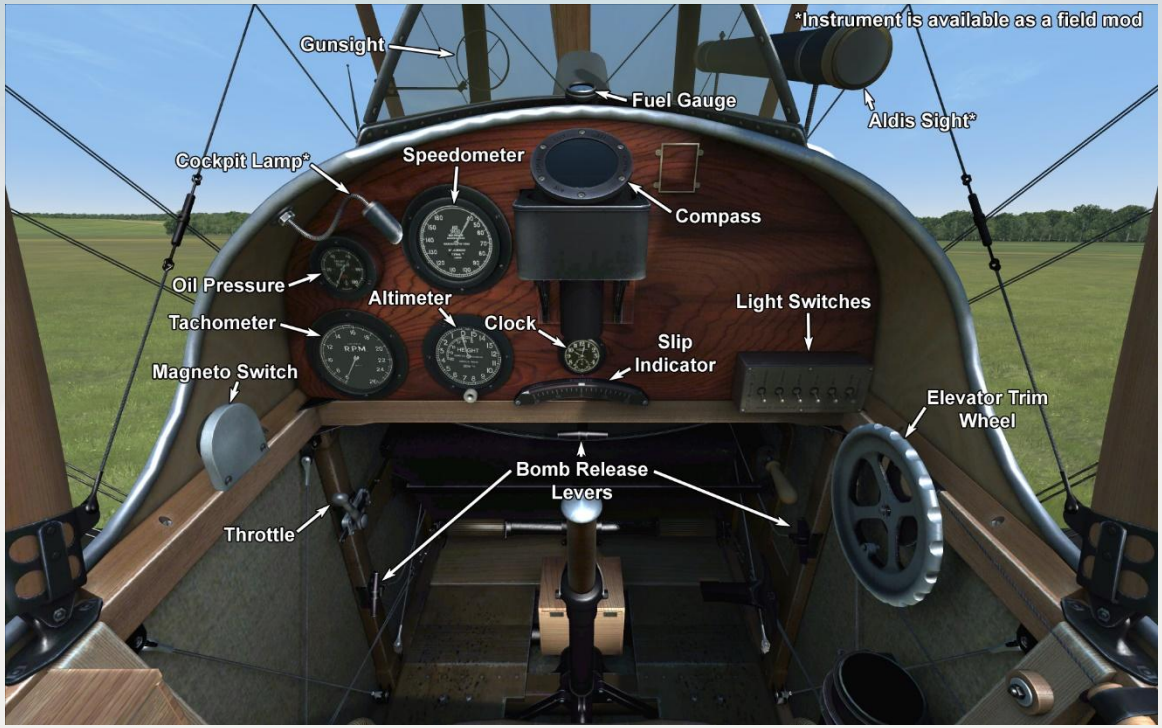
While excelling as a fighter, the F.2 was also capable of being a good ground attack airplane. It could carry up to 450 lbs. of bombs on external racks. Some of the Bristols were also equipped with a Negative Lens bombsight.

A total of 3,101 Bristol Fighters of all types had been produced by the end of 1918. Owing to its success in wartime, Bristol Fighters continued to be employed by the RAF into the 1920s.

Crew: 2
Engine: 1 x Rolls Royce Falcon III inline, 285 horsepower
Height: 2970 mm
Length: 7874 mm
Wingspan: 11986 mm
Wing Surface: 37.7 square meters
Empty Weight: 885 kg
Takeoff Weight: 1262 kg (without bomb load); 1465 kg (with 448 lb bomb load); 1371 kg (with 240 lb bomb load)
Fuel Capacity: 170.5 liters
Oil Capacity: 15.2 liters
Climb Rate (without bomb load): 3 minutes to 1000 m; 6 minutes, 35 seconds to 2000 m; 11 minutes, 5 seconds to 3000 m; 17 minutes to 4000 m; 25 minutes, 40 seconds to 5000 m
Maximum Speed (without bomb load): 205 km/h at sea level; 190 km/h at 1000 m; 174 km/h at 2000 m; 156 km/h at 3000 m; 142 km/h at 4000 m; 127 km/h at 5000 m
Service Ceiling: 6100 m
Endurance: 3 hours
Armament: 1 x forward-firing .303 in Vickers machine gun, 973 rounds; and 2 x .303 in Lewis machine guns in rear-facing turret, 8 drums with 97 rounds each; up to 450 lbs of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 2 x .303 in overwing Lewis machine guns, 6 drums with 97 rounds each; 1 x .303 in Lewis machine gun in rear-facing turret, 7 drums with 97 rounds each

A.2 ENTENTE MULTI-CREW AIRCRAFT





See next page for R.E.8 gunner and bombsight positions

R.A.F. R.E.8

The R.E.8 was designed as a replacement for the obsolete B.E.2. Armament consisted of one synchronized machine gun facing forward and a rear gunner position aft of the pilot. This was a departure from the B.E.2 design which had the gunner in front of the pilot. This had caused some awkward and dangerous firing positions, especially to the rear.

The R.E.8 was equipped with the V-12 RAF 4a air-cooled engine. The aircraft was designed to carry a radio and photographic equipment for recon and artillery spotting duty. It could also carry a small bomb load on underwing racks, making it a very versatile aircraft for its time. The first versions of this aircraft began to arrive at the front in late 1916, but it did not arouse much enthusiasm among its pilots. The aircraft was difficult to fly and it was not very forgiving. Piloting mistakes could lead to a deadly tailspin. The first front-line squadron to receive the R.E.8 – 52 Squadron - reverted back to the old, but combat-proven B.E.2. Eventually the R.E.8 did see extensive combat, but its debut was not very encouraging. One famous combat from April 13, 1917, saw six R.E.8s, which were on a recon mission over the front line, attacked by six Albatroses led by Manfred von Richthofen. In a fleeting, lopsided battle, all six R.E.8s were shot down with no losses to the Germans.

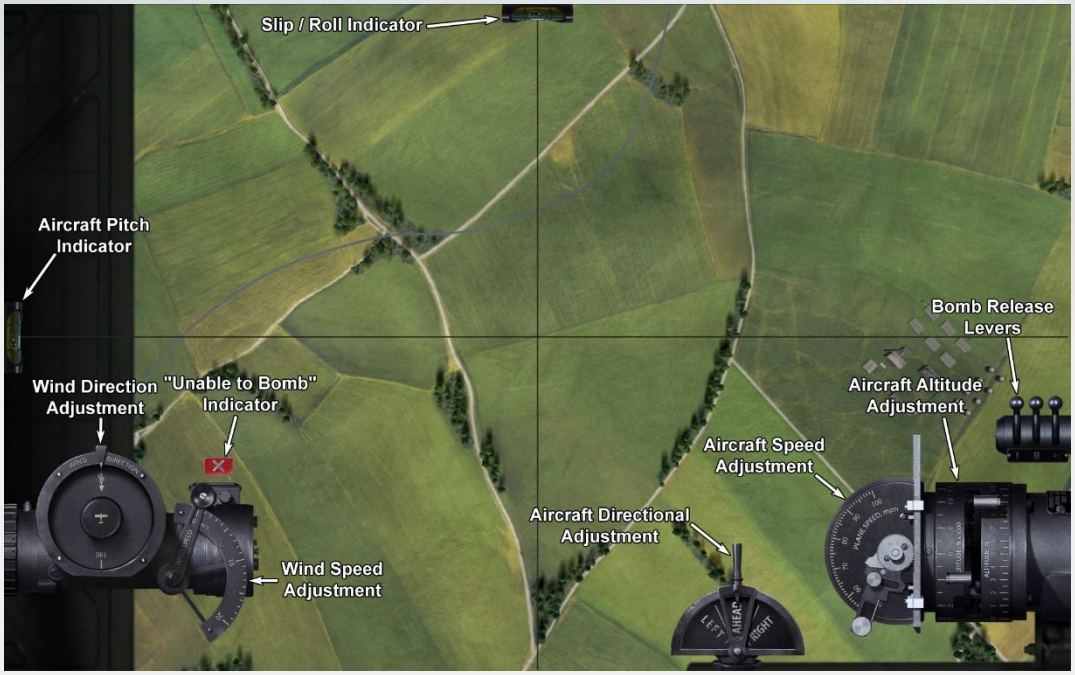
Nevertheless, the troops urgently needed a new plane and after modifications of the tail assembly and elimination of many small defects, the R.E.8 entered into mass production at several plants and became the most popular two-seat aircraft fielded by the British during the First World War. No fewer than 4,077 planes were built after introduction, and it was one of the most common aircraft in the skies over the Western Front. It was used as an artillery spotter and reconnaissance platform, as well as a bomber.

The military designation of “R.E.8” shared a familiar ring with the name of a famous entertainer of the day called Harry Tate, so the aircraft became known affectionately as the “Harry Tate” by its aircrews. The R.E.8, when under the direction of experienced flight crews, performed well in combat and remained in service until the end of the war. 16 squadrons of Royal Air Force flew the R.E.8 on the Western Front. Several other squadrons in other theaters of combat operations also used the R.E.8.

A.2 ENTENTE MULTI-CREW AIRCRAFT

R.E.8 gunner and bombsight positions



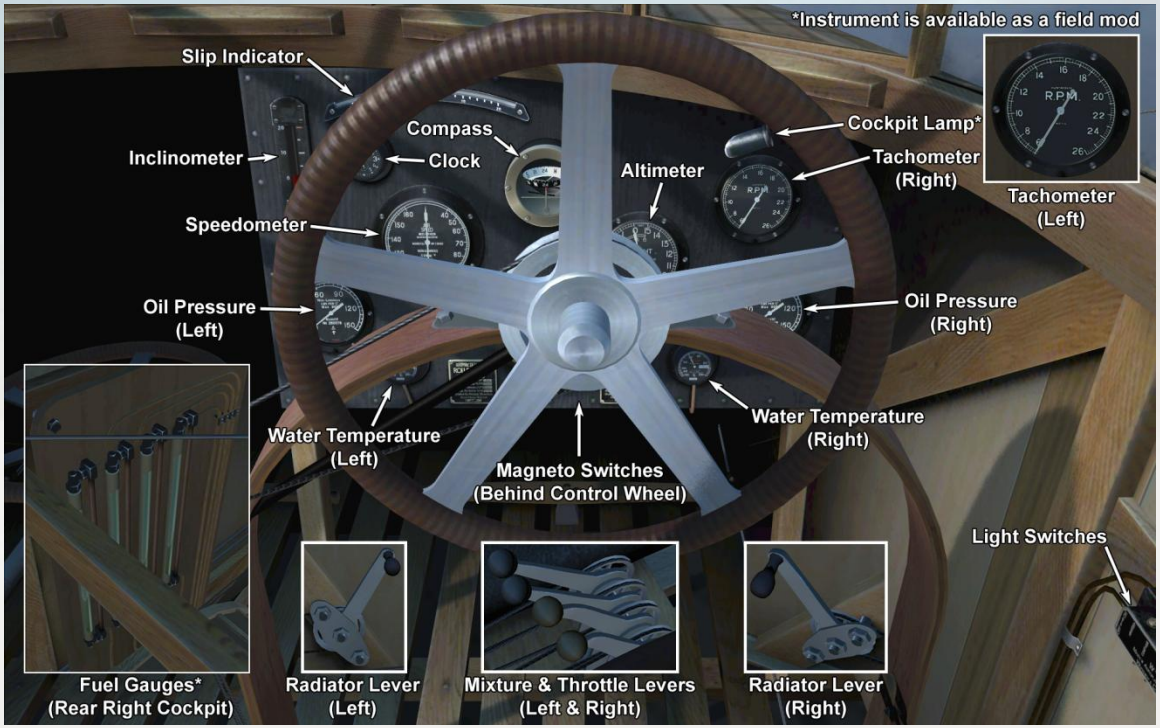


R.E.8 (continued)

Crew: 2
Engine: 1 x RAF 4a inline, 150 horsepower
Height: 3470 mm
Length: 8500 mm
Wingspan: 12980 mm
Wing Surface: 35.07 square meters
Empty Weight: 717 kg
Takeoff Weight: 1215 kg
Fuel Capacity: 181 liters
Oil Capacity: 13.2 liters
Maximum Speed: 166 km/h at sea level
Service Ceiling: 6800 m
Endurance: 4 hours, 30 minutes
Armament: 1 x forward-firing .303 in Vickers machine gun, 500 rounds; and 1 x .303 in Lewis machine gun in rear-facing turret, 8 drums with 97 rounds each; up to 224 lbs of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 1 x .303 in overwing Lewis machine gun, 3 drums with 97 rounds each; 2 x .303 in Lewis machine guns in rear-facing turret, 8 drums with 97 rounds each

A.2 ENTENTE MULTI-CREW AIRCRAFT





See next page for Felixstowe F.2A gunner and bombsight positions

Felixstowe F.2A

The Felixstowe F.2 was a 1917 British flying boat class designed and developed by Lieutenant Commander John Cyril Porte of the Royal Navy at the Seaplane Experimental Station, Felixstowe during the First World War. The F.2 was an adaptation of a larger version of Porte's superior Felixstowe F.1 hull design married with the larger Curtiss H.12 flying boat. The Felixstowe hull had superior water-contacting attributes and became a key feature in subsequent seaplane designs.

The F.2 was given an impressive defensive armament, which usually consisted of one or two Lewis machine guns on a Scarff ring in the nose turret, one or two Lewis guns (also on a Scarff ring) in the dorsal turret, and two Lewis guns on side hatches. An optional single Lewis machine gun could also be fitted to the windscreen frame of the pilot's cockpit. Two 230-lb bombs could be fitted to wing racks on the lower wings.

The F.2A was widely used as a patrol aircraft over the North Sea until the end of the war, in a patrol zone referred to as the "spider web." Its excellent performance and maneuverability made it an effective and popular aircraft with its crews. It often found itself fighting against enemy patrol and fighter seaplanes, in addition to hunting U-boats and Zeppelins.

Crew: 4-6, depending on weapon loadout
Engine: 2 x Eagle VIII inline, 360 horsepower
Height: 5340 mm
Length: 14100 mm
Wingspan: 29150 mm
Wing Surface: 105.3 square meters
Empty Weight: 3424 kg
Takeoff Weight: 5049 kg
Climb Rate: 7 minutes, 31 seconds to 1000 m; 17 minutes, 51 seconds to 2000 m; 37 minutes, 28 seconds to 3000 m
Maximum Speed: 156 km/h at sea level; 146 km/h at 1000 m; 139 km/h at 2000 m; 130 km/h at 3000 m; 120 km/h at 4000 m
Service Ceiling: 3550 m
Endurance: 6 hours

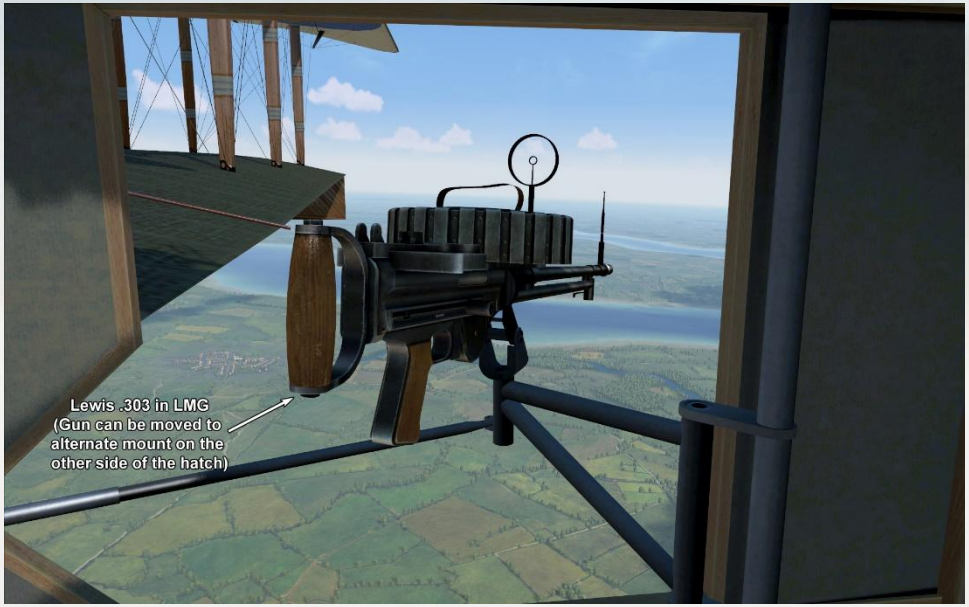
Armament: 2 x .303 in Lewis machine guns in nose turret, 8 drums with 97 rounds each; 1 x .303 in Lewis machine gun in dorsal turret, 7 drums with 97 rounds each; 1 x .303 in Lewis machine gun in hatch positions, 9 drums with 97 rounds each (two firing positions); 460 lbs of bombs; installation for photoreconnaissance camera
Weapon Mod Armament: 1 x cockpit-mounted .303 in Lewis machine gun, 4 drums with 97 rounds each; 1 x 57 mm Davis recoilless gun in nose turret, 17 rounds; 2 x .303 in Lewis machine guns in dorsal turret, 8 drums with 97 rounds each; 2 x Lewis machine guns in upper-wing turret, 8 drums with 97 rounds each

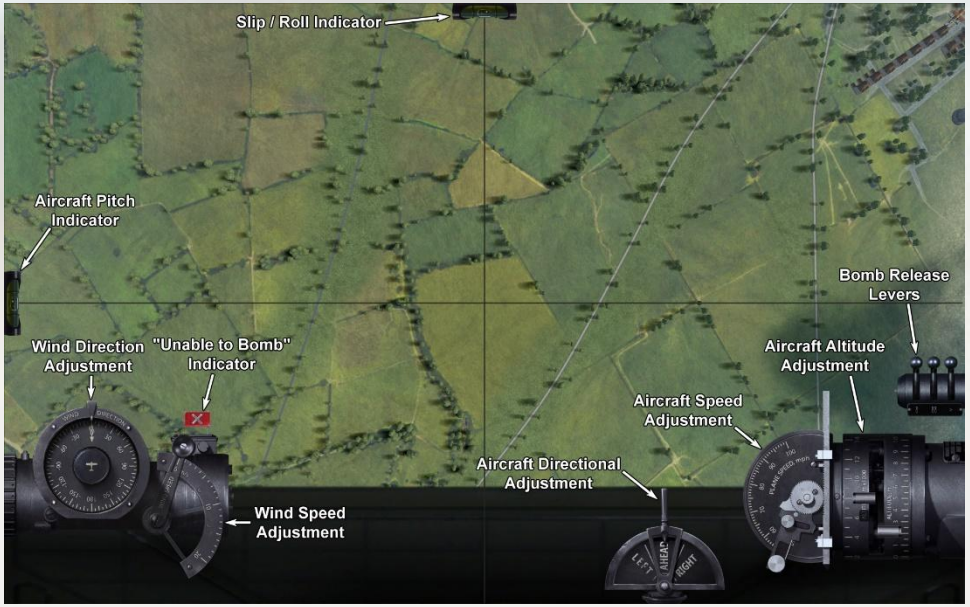
A.2 ENTENTE MULTI-CREW AIRCRAFT

Felixstowe F.2A gunner and bombsight positions









A.2 ENTENTE MULTI-CREW AIRCRAFT

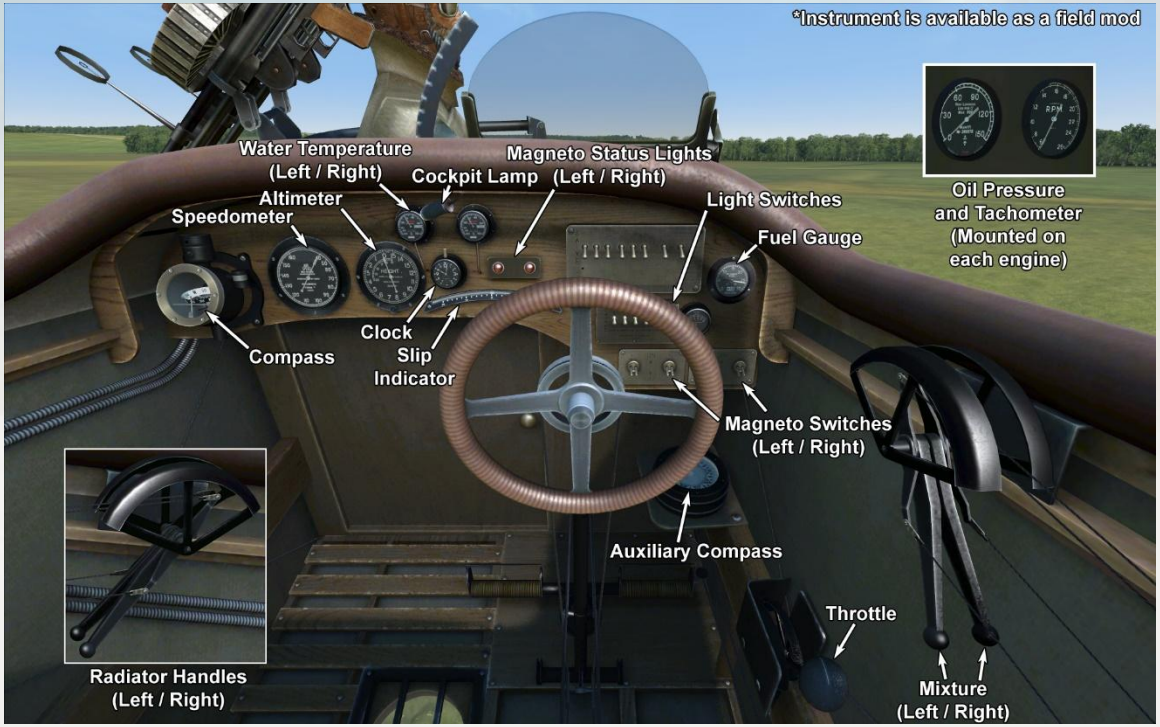


Handley Page O/400

The O/400 was the next step in improving upon the HP O/100 design. Two fuel tanks were moved from the engine nacelles into the fuselage, and a medium-size fuel tank was mounted above these two tanks in the upper section of the fuselage. Hollow spars were mounted in the wings; the undercarriage was fitted with towing lugs; and radiator shutters were now fitted at the factory. The engines were now covered with armor plating. The differential thrust of the two engines was compensated by the central tail fin. The fitting of the new Eagle VIII engines made it possible to increase the maximum bomb load. Besides Handley Page, this bomber was also manufactured by the Royal Aircraft Factory, Boulton and Paul, Metropolitan Carriage Wagon, and Birmingham Carriage Co. By the end of the war, 554 planes had been built in England.

The first mention of this plane in frontline use is dated mid-1918. These planes were used to bomb railway stations, supply depots, factories and ports at night. Pilots mentioned that the plane handled nicely and was easy to handle on takeoff; however, they noted that the controls were a little stiff and felt slightly delayed.

Planes of this type participated in combat on the Western and Palestinian fronts.

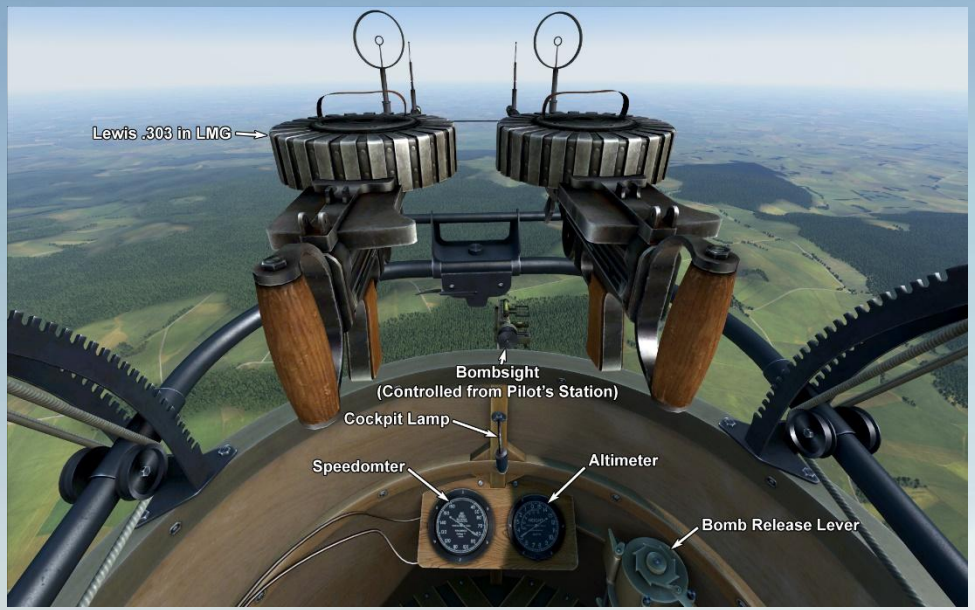


Crew: 4
Engine: 2 x Eagle VIII inline, 360 horsepower
Height: 6700 mm
Length: 18930 mm
Wingspan: 30480 mm
Wing Surface: 153.1 square meters
Empty Weight: 3774 kg
Takeoff Weight: 5265 kg (without bomb load); 6078 kg (with 1792 lb bomb load)
Fuel Capacity: 1291 liters
Oil Capacity: 136 liters
Climb Rate (without bomb load): 7 minutes, 42 seconds to 1000 m; 18 minutes, 54 seconds to 2000 m; 43 minutes, 14 seconds to 3000 m
Maximum Speed (without bomb load): 156 km/h at sea level; 146 km/h at 1000 m; 135 km/h at 2000 m; 121 km/h at 3000 m
Endurance: 8 hours at 1000 m (with bombs); 9 hours, 26 minutes at 1000 m; (without bombs)
Armament: 2 x .303 in Lewis machine guns in forward-facing turret, 12 drums with 97 rounds each; 1 x .303 in Lewis machine gun in upper rear-facing turret, 7 drums with 97 rounds each (two firing positions); and 1 x .303 in Lewis machine gun in lower rear-facing turret, 7 drums with 97 rounds each; up to 250 lbs of bombs
Weapon Mod Armament: 1 x 57 mm Davis recoilless gun in nose turret, 17 rounds; 2 x .303 in Lewis machine guns in dorsal turret, 14 drums with 97 rounds each

See next page for Handley Page 0/400 gunner and bombsight positions

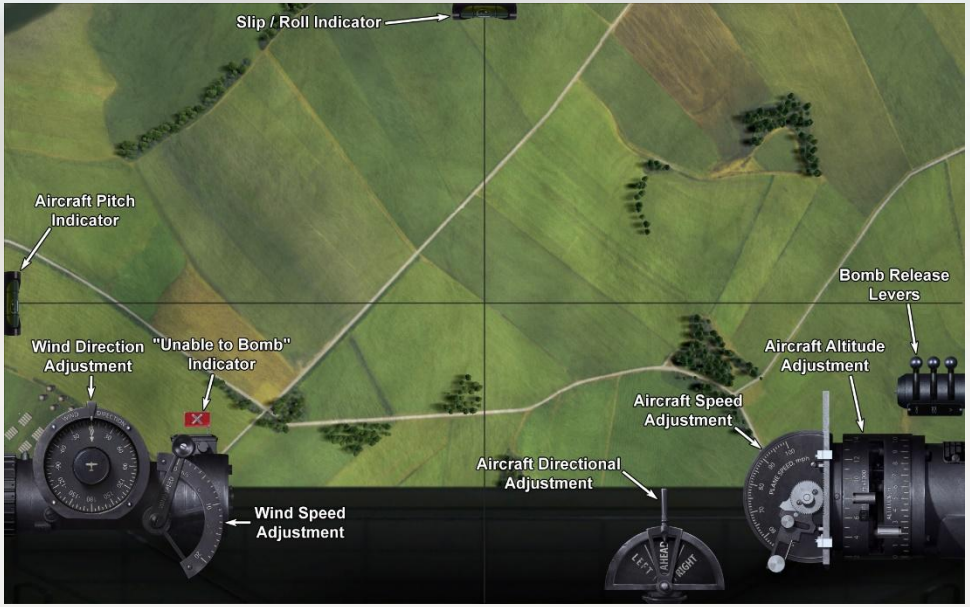
A.2 ENTENTE MULTI-CREW AIRCRAFT

Handley Page 0/400 gunner and bombsight positions



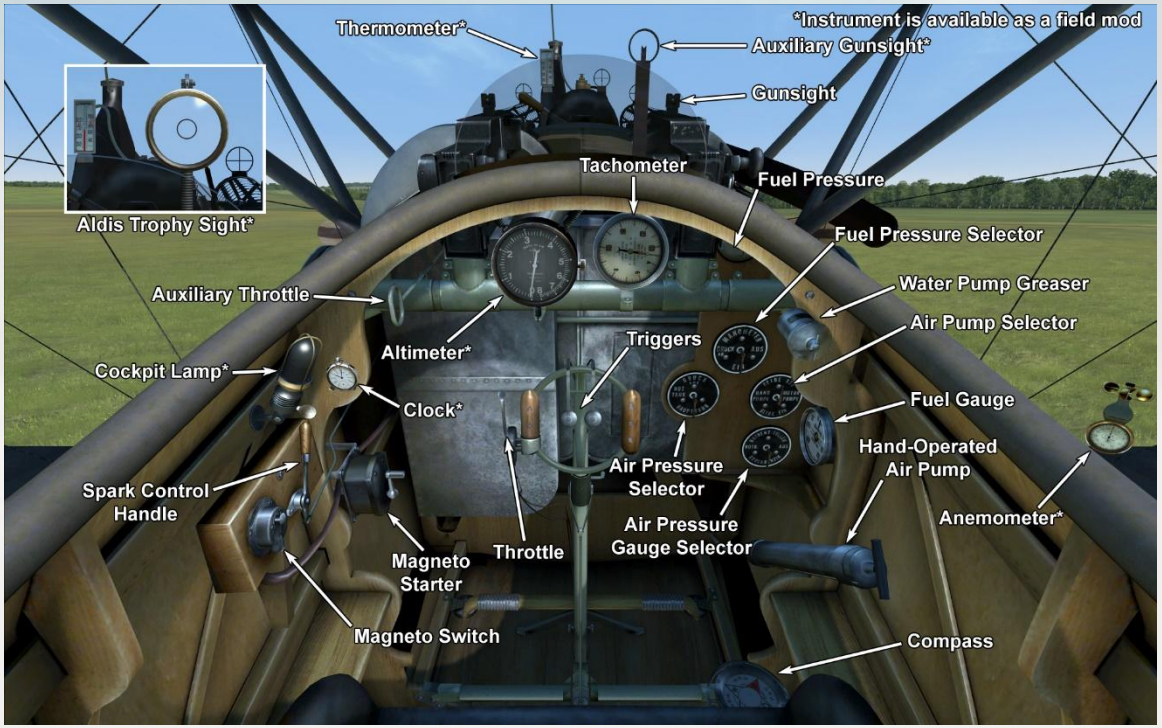






A.3 GERMAN SINGLE-CREW AIRCRAFT





Albatros D.II

First in the pantheon of the legendary Albatros fighter planes, the D.II became a symbol and icon of the fighter plane in the Great War. Under the guidance of engineer Robert Thelen, the plane incorporated new features in design and development. While retaining the clean aerodynamic shape of the D.I model's fuselage, new central N-shaped struts were added to the wings. The upper wing was moved closer to the fuselage, and early models of the aircraft were fitted with Windhoff box-type radiators on both sides of the fuselage.

The Albatros Werke, Ostdeutsche Albatros Werke, and Luft-Verkehrs-Gesellschaft mbH factories manufactured the aircraft. In all, 768 Albatros D.IIs were produced.

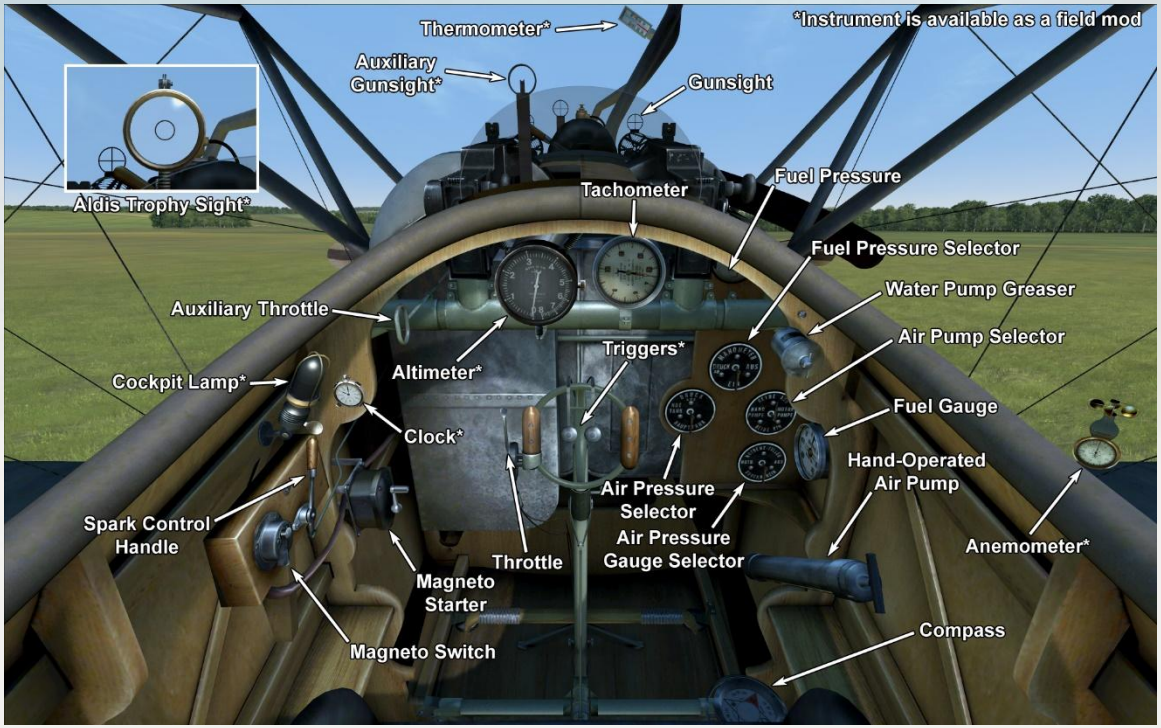
In August 1916, the first detachment of Albatros D.I and D.II fighters arrived at the front. Starting with these two models of aircraft, two Spandau machine guns became standard equipment for all German fighters. In the hands of experienced pilots, who were already battle hardened and experienced in aerobatics, the D.II made for huge gains in air superiority. The rapid mass production of Albatros fighter planes allowed Germany to maintain air superiority all the way through April 1917. "Bloody April" has become synonymous with the great losses of British aircraft in 1917.

The Albatros D.II was also employed against balloons and for providing cover for twin-seat bombers and scouts. Its pilots noted the good power of the twin machine guns, good forward and upward visibility, responsive handling, high speed and impressive rate of climb. Albatros D.IIs were deployed to the Western Front.

Crew: 1
Engine: 1 x Mercedes D.III inline, 160 horsepower
Height: 2640 mm
Length: 7400 mm
Wingspan: 8500 mm
Wing Surface: 24.9 square meters
Empty Weight: 673 kg
Takeoff Weight: 898 kg
Fuel Capacity: 85 liters
Oil Capacity: 10 liters
Climb Rate: 4 minutes, 27 seconds to 1000 m; 9 minutes, 26 seconds to 2000 m; 16 minutes, 10 seconds to 3000 m; 30 minutes to 4000 m
Maximum Speed: 164 km/h at sea level; 156 km/h at 1000 m; 148 km/h at 2000 m; 139 km/h at 3000 m; 129 km/h at 4000 m
Service Ceiling: 5000 m
Endurance: 1 hour, 20 minutes (combat); 2 hours, 50 minutes (cruise)
Armament: 2 x 7.92 mm LMG 08/15 machine guns, 500 rounds per gun
Weapon Mod Armament: 1 x 20 mm overwing Becker cannon, 4 magazines with 15 rounds each

A.3 GERMAN SINGLE-CREW AIRCRAFT





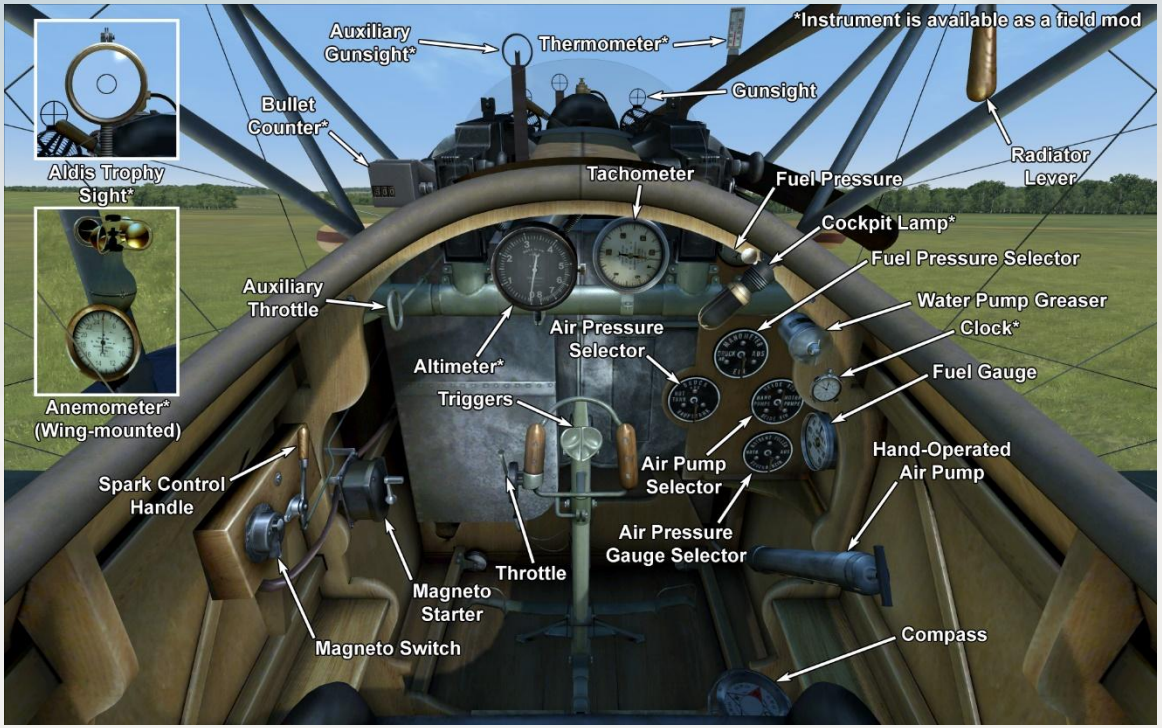
Albatros D.II (Late)

Once the Albatros D.II was deployed to the front, it was found that the Windhoff box-type radiators repeatedly failed in combat. To rectify this problem, the designers of the Albatros D.II replaced them with a Teves & Braun model, which were mounted on the central upper wing.

Crew: 1
Engine: 1 x Mercedes D.III inline, 160 horsepower
Height: 2640 mm
Length: 7400 mm
Wingspan: 8500 mm
Wing Surface: 24.9 square meters
Empty Weight: 673 kg
Takeoff Weight: 898 kg
Fuel Capacity: 85 liters
Oil Capacity: 10 liters
Climb Rate: 4 minutes, 27 seconds to 1000 m; 9 minutes, 26 seconds to 2000 m; 16 minutes, 10 seconds to 3000 m; 30 minutes to 4000 m
Maximum Speed: 164 km/h at sea level; 156 km/h at 1000 m; 148 km/h at 2000 m; 139 km/h at 3000 m; 129 km/h at 4000 m
Service Ceiling: 5000 m
Endurance: 1 hour, 20 minutes (combat); 2 hours, 50 minutes (cruise)
Armament: 2 x 7.92 mm LMG 08/15 machine guns, 500 rounds per gun
Weapon Mod Armament: 1 x 20 mm overwing Becker cannon, 4 magazines with 15 rounds each

A.3 GERMAN SINGLE-CREW AIRCRAFT





Albatros D.III

Having investigated the construction of captured Nieuport fighter aircraft, German engineers designed the lower wing of their new plane to be narrower and shorter than the upper one. The wing tips were swept in an effort to eliminate wing vibration. Among other remarkable design solutions, the following can be mentioned: the aileron control rods were drawn through the lower wing, the radiator was moved from the side of the fuselage to the middle of the upper wing, and the wings were now supported by V-shaped struts. Weight reduction was one of the primary tasks for this particular aircraft. The plane was manufactured by Albatros Werke and Ostdeutsche Albatros Werke. In all, 1346 Albatros D.IIIs were built.

Test flights began in late August or early September 1916, and in December 1916, the plane was first delivered to fighter squadrons. Several months of combat action revealed that the plane had a tendency to lose its lower wing in a steep dive or in a sharp turn. Water from the radiator, which was fitted on the upper wing, would spill onto the machine guns, thus making firing impossible. The radiator was relocated to the right side of the pilot in order to correct this problem. From June 1917, engineers began using Daimler's new cellular radiator, which helped to solve problems with the engine overheating.

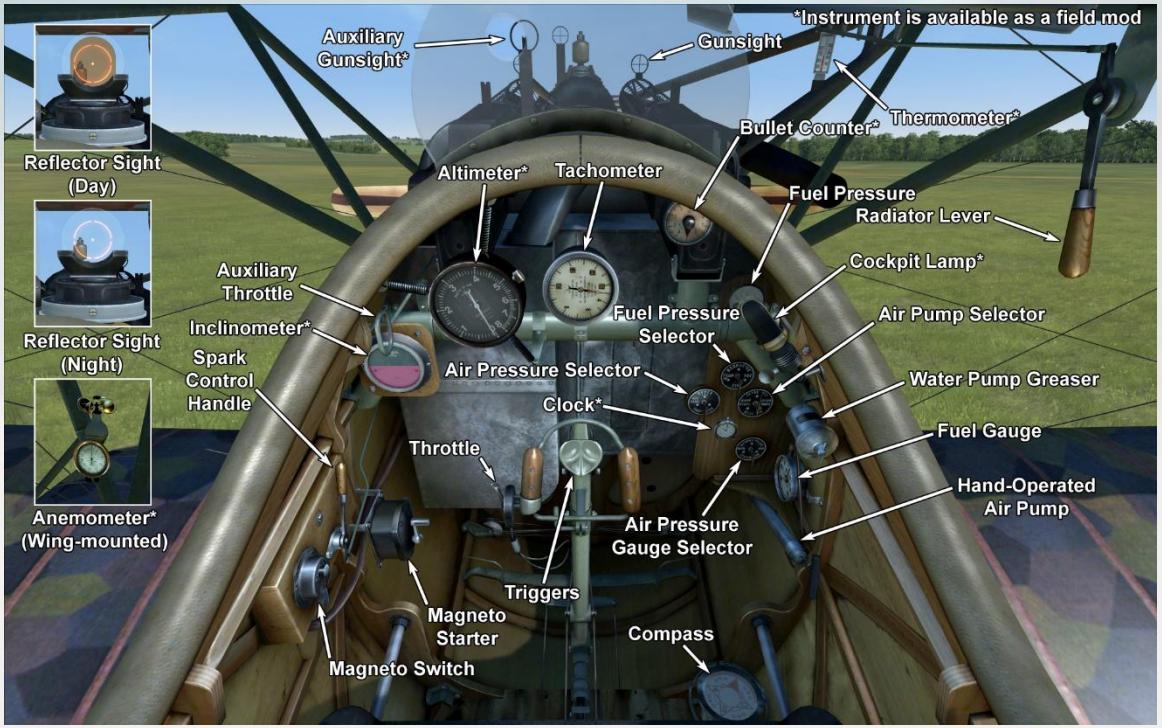
The high production rate of the Albatros D.III resulted in numerical superiority for German aviation in April 1917.

The Albatros D.III was employed against both enemy balloons and aircraft. It was also commonly used as an escort for bombers and scout planes. Pilots noted the excellent view from the cockpit, good controllability, and high speed and climb rate. The flight characteristics of the plane improved once the new Mercedes D.IIIa engine was mounted, which allowed the plane to remain in frontline service through the autumn of 1918. The fighter was deployed to the Western Front and to the Palestinian Front.

Crew: 1
Engine: 1 x Mercedes D.IIIa inline, 180 horsepower
Height: 2900 mm
Wing Surface: 20.54 square meters
Empty Weight: 660 kg
Takeoff Weight: 885 kg
Fuel Capacity: 110 liters
Oil Capacity: 8 liters
Climb Rate: 3 minutes, 57 seconds to 1000 m; 8 minutes, 14 seconds to 2000 m; 13 minutes, 37 seconds to 3000 m; 20 minutes, 52 seconds to 4000 m; 32 minutes, 13 seconds to 5000 m
Maximum Speed: 170 km/h at sea level; 163 km/h at 1000 m; 155 km/h at 2000 m; 146 km/h at 3000 m; 137 km/h at 4000 m; 126 km/h at 5000 m
Service Ceiling: 5800 m
Endurance: 1 hour, 30 minutes (combat); 3 hours, 10 minutes (cruise)
Armament: 2 x 7.92 mm lMG 08/15 machine guns, 500 rounds per gun
Weapon Mod Armament: 1 x .303 in overwing trophy Lewis machine gun, 4 drums with 97 rounds each

A.3 GERMAN SINGLE-CREW AIRCRAFT





Albatros D.Va

The engineers of Albatros Werke faced the task of building a fast and maneuverable fighter plane. The older Albatros D.III had a lower wing defect that led to failure of the wing in a steep dive. Having been unable to find out the reason of these failures, the engineers moved the aileron control wires from lower wing to the top wing.

Test flights were carried out in the spring of 1917. Externally, the Albatros D.V differed from earlier Albatros models as follows: it had a larger tail fin surface; the top wing was lowered closer to the fuselage; the radiator was set to starboard of the centerline, and the fuselage was more rounded.

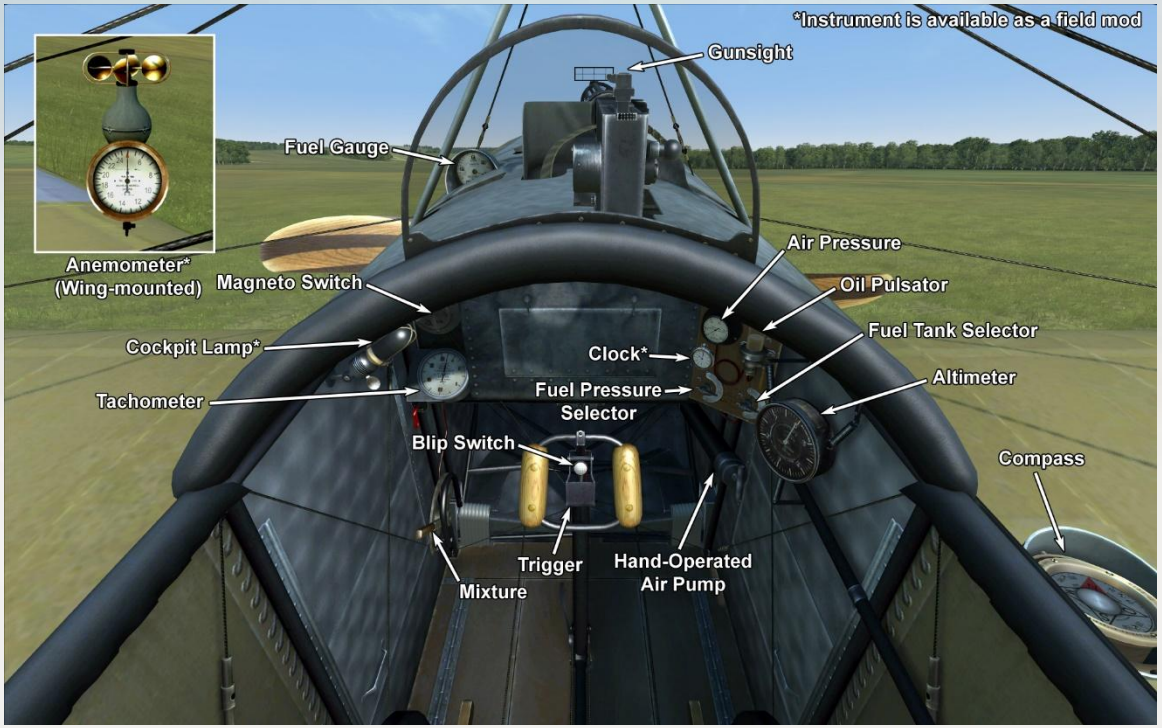
Fighter squadrons began receiving the Albatros D.V in May 1917. Several months of combat experience showed that the lower wing problem had not been solved. In response, the engineers moved the aileron control wires back to the lower wing and strengthened the attachment point of the V-shaped strut to the lower spar with an additional strut. In addition, the more powerful Mercedes D.IIIa engine was installed. With these changes, the plane became the Albatros D.Va.

The plane was manufactured at Albatros Werke and Ostdeutsche Albatros Werke. There were a total of 1650 Albatros D.V and D.Va aircraft built. Both models were deployed to the Western Front and the Palestinian Front.

Albatros D.Va pilots noted the type's great visibility, handling, sufficient speed and rate of climb. The new engine improved the aircraft's high altitude flight characteristics. However, pilots placed no confidence in the new low wing attachment, and so they refused to perform steep dives in combat. Despite this, veteran pilots continued to increase their combat scores, and employing large numbers of the aircraft on sorties became more frequent.

Crew: 1
Engine: 1 x Mercedes D.IIIa inline, 180 horsepower
Height: 2900 mm
Length: 7330 mm
Wingspan: 9050 mm
Wing Surface: 21.2 square meters
Empty Weight: 680 kg
Takeoff Weight: 915 kg
Fuel Capacity: 103 liters
Oil Capacity: 9 liters
Climb Rate: 4 minutes, 13 seconds to 1000 m; 8 minutes, 46 seconds to 2000 m; 14 minutes, 32 seconds to 3000 m; 22 minutes, 30 seconds to 4000 m; 35 minutes, 55 seconds to 5000 m
Maximum Speed: 170 km/h at sea level; 163 km/h at 1000 m; 154 km/h at 2000 m; 145 km/h at 3000 m; 135 km/h at 4000 m; 124 km/h at 5000 m
Service Ceiling: 5600 m
Endurance: 1 hour, 30 minutes (combat); 3 hours, 10 minutes (cruise)
Armament: 2 x 7.92 mm lMG 08/15 machine guns, 500 rounds per gun
Weapon Mod Armament: 1 x .303 in overwing trophy Lewis machine gun, 4 drums with 97 rounds each





Fokker E.III

The Fokker E.III Eindecker was a single-seat monoplane fighter. The aircraft was designed by Anthony Fokker at the beginning of 1915. Roll control was implemented by physically deforming the whole surface of the wings ('wing-warping'). This type of control was typical for all early aircraft. Later on, the unreliable and ineffective wing-warping function was replaced by ailerons, or 'control surfaces.'

The Fokker E.III was equipped with synchronizer gearing, a revolutionary innovation that changed the face of air combat. With synchronizer gear implemented, it was now possible to fire a machine gun through a rotating propeller without damaging it. Bullets would only be fired once the propeller blade had cleared the front of the machine gun's muzzle and during the gap left as each blade in turn moved around the spinner. This device drastically improved the performance of the aircraft in its role as a fighter. Synchronizer gear ('interrupter gear') was invented after the capture of Roland Garros' Morane-Saulnier type L. This aircraft was equipped with metal deflector wedges attached to the propeller blades. This legacy design allowed for firing through the spinning blades, but deflectors greatly impeded the efficiency of the propeller, damaging it in many cases. Anthony Fokker chose an alternative approach to this problem by creating a geared assembly connecting the shaft of the engine to the trigger of the machine gun. Bullets could then only be fired during the time that the propeller blades were not in front of the machine gun's muzzle. Equipped with the new synchronizer gear, German aircraft ruled the skies until the beginning of 1916. This period was known as the 'Fokker Scourge,' during which time Allied aviators regarded their poorly armed aircraft as 'Fokker Fodder'.

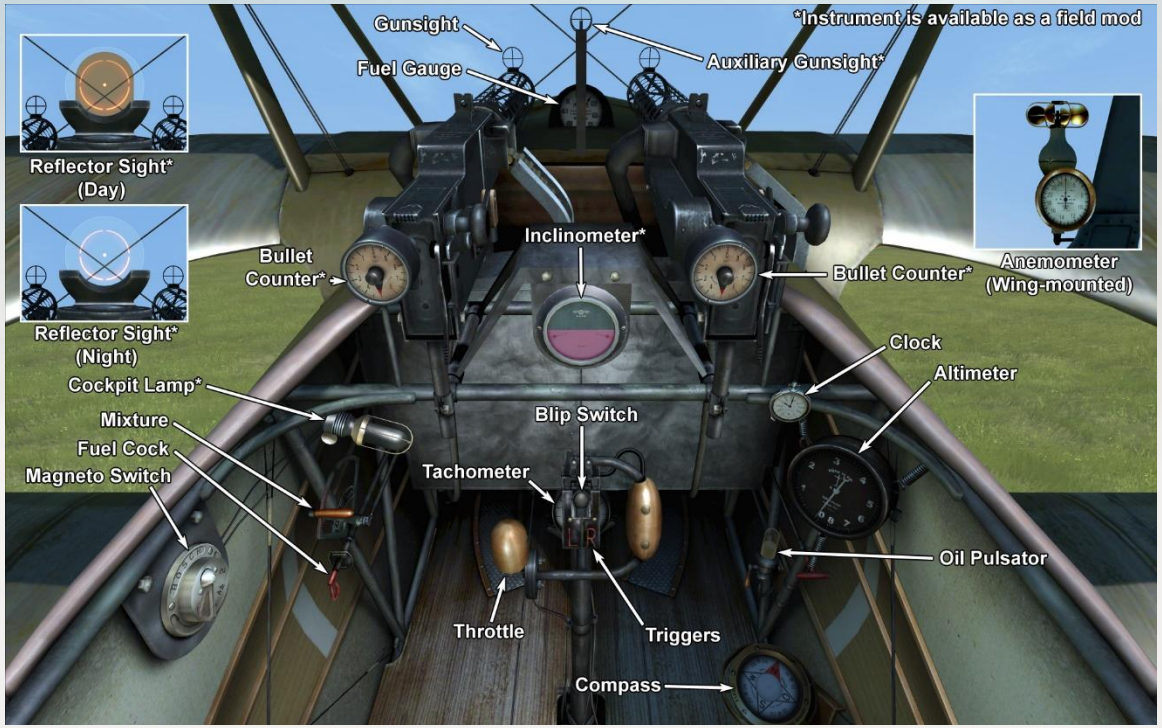
The first official Eindecker victory was achieved by Leutnant Wintgens on 1 July 1915 when he shot down a French Morane-Saulnier 'parasol' monoplane. The two most famous Eindecker pilots were Oswald Boelcke (19 of his 40 victories were achieved flying the Eindecker) and Max Immelmann (with 15 victories flying the Eindecker).

The 'Fokker Scourge' and the total domination enjoyed by the Fokker E.III ended at the beginning of 1916 with the introduction of the DH-2 and the Nieuport 11 into frontline service.

In all, 270 Fokker E.III planes were built. Some aircraft were transferred to other countries, including the Ottoman Empire, Austria-Hungary, and Bulgaria.

Crew: 1
Engine: 1 x Oberursel U.I rotary, 100 horsepower
Height: 2290mm
Length: 7160 mm
Wingspan: 10000 mm
Wing Surface: 15.99 square meters
Empty Weight: 417 kg
Takeoff Weight: 641 kg
Fuel Capacity: 120 liters
Oil Capacity: 25 liters
Climb Rate: 6 minutes, 28 seconds to 1000 m; 14 minutes, 35 seconds to 2000 m; 28 minutes, 45 seconds to 3000 m
Maximum Speed: 142 km/h at sea level, 133 km/h at 1000 m; 123 km/h at 2000 m; 113 km/h at 3000 m; 97 km/h at 4000 m
Service Ceiling: 4000 m
Endurance: 3 hours (combat); 3 hours (cruise)
Armament: 1 x 7.92 mm IMG 08 machine gun, 500 rounds





Fokker Dr.I

In the spring of 1917, during a visit to Jasta 11, Anthony Fokker inspected the construction of a captured British fighter, the Sopwith Triplane. Manfred von Richthofen related to Fokker the details of his dogfight with this new aeroplane. It was only due to his great experience that the Red Baron managed to avoid defeat.

The prototype of the F.I (the name at the time of the Dr.I) triplane was made ready by August 1917. Some remarkable details of its construction were as follows: a steel tube fuselage frame, as well as metal frames for the stabilizer and tail fin; an absence of bracing trusses; and the placement of the ailerons on the upper wing. The plane was more compact and robust than the British Sopwith Triplane. In total, 320 Dr.I triplanes were built.

On 23 September 1917, Werner Voss shot down two British fighters while piloting an experimental version of the plane. Soon afterwards, he was attacked by six SE5s of the Royal Flying Corps. Each British plane was damaged in the course of this dramatic and historic fight, which forced two of their number to retire from the battle. It was only because he was outnumbered that the ace Voss unfortunately lost his life.

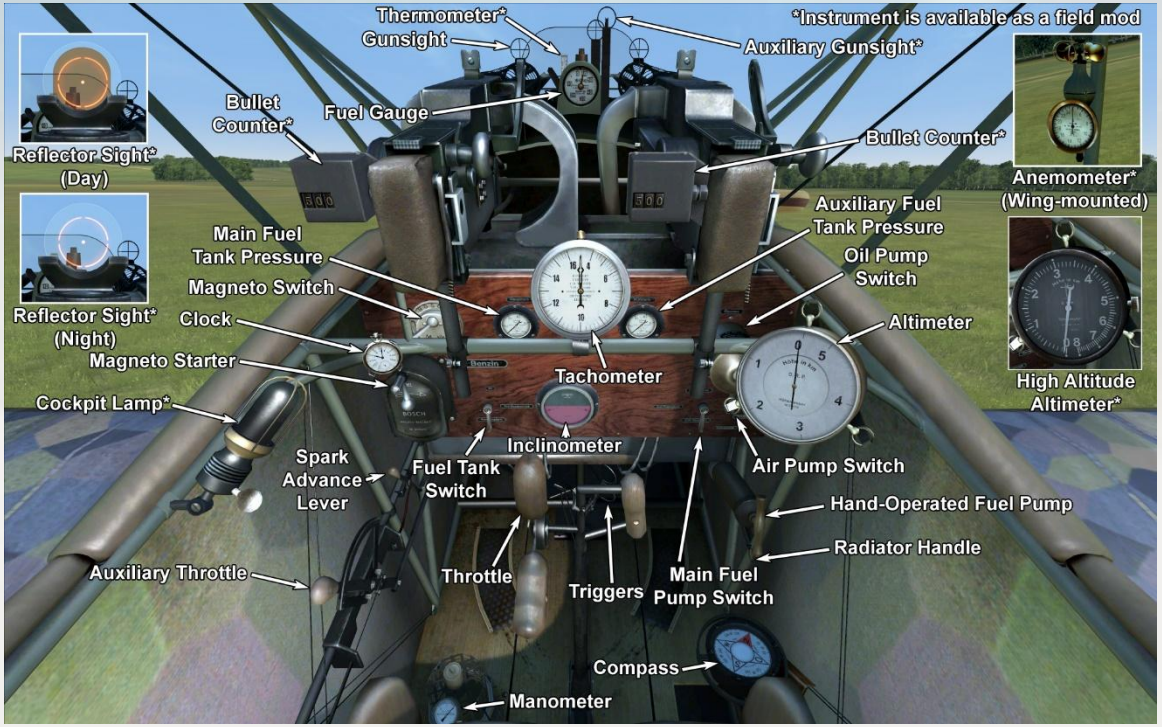
By October 1917, the first production Fokker Dr.I planes were being delivered to fighter squadrons. It was a superb fighter, but it was rarely used to cover two-seater recon planes. Dr.I pilots reported an excellent rate of climb and maneuverability and a good view from the cockpit. Pilots reported, "You need only a light touch to swing this plane around!" Thanks to these features, the triplane pilot could decide whether to disengage from an attacking enemy or to attack an enemy plane. It could engage on even terms the king of the dogfight, the British Sopwith Camel, with a good chance of victory.

RFC pilots were especially apprehensive of situations where the Fokker Dr.I and the Albatros D.Va were flying together in combat formation. The Fokkers would initiate the dogfight and the Albatros pilots would shoot down enemy planes attempting to disengage and leave the battle.

By the spring of 1918, the plane was obsolete. Only the most outstanding German aces, masterfully piloting the plane and sharpshooting their enemies, continued to fly the triplane in combat.

Crew: 1
Engine: 1 x Oberursel UR II rotary, 110 horsepower
Height: 2950 mm
Length: 5770 mm
Wingspan: 7190 mm
Wing Surface: 18.66 mm
Empty Weight: 388 mm
Takeoff Weight: 571 mm
Fuel Capacity: 72 liters
Oil Capacity: 20 liters
Climb Rate: 2 minutes, 56 seconds to 1000 m; 5 minutes, 58 seconds to 2000 m; 9 minutes, 30 seconds to 3000 m; 13 minutes, 57 seconds to 4000 m; 20 minutes, 10 seconds to 5000 m
Maximum Speed: 178 km/h at sea level; 170 km/h at 1000 m; 161 km/h at 2000m; 151 km/h at 3000 m; 141 km/h at 4000 m; 129 km/h at 5000 m
Service Ceiling: 5500 m
Endurance: 1 hour, 40 minutes (combat); 2 hours, 30 minutes (cruise)
Armament: 2 x 7.92 mm lMG 08 machine guns, 500 rounds per gun





Fokker D.VII

The Fokker D.VII was designed by Reinhold Platz of the Fokker-Flugzeugwerke. His task was to create a fighter capable of beating the French SPAD XIII and British S.E.5a fighters. Some notable design features of the type included a metal airframe structure, a thick-sectioned wing, and a lack of bracing wires.

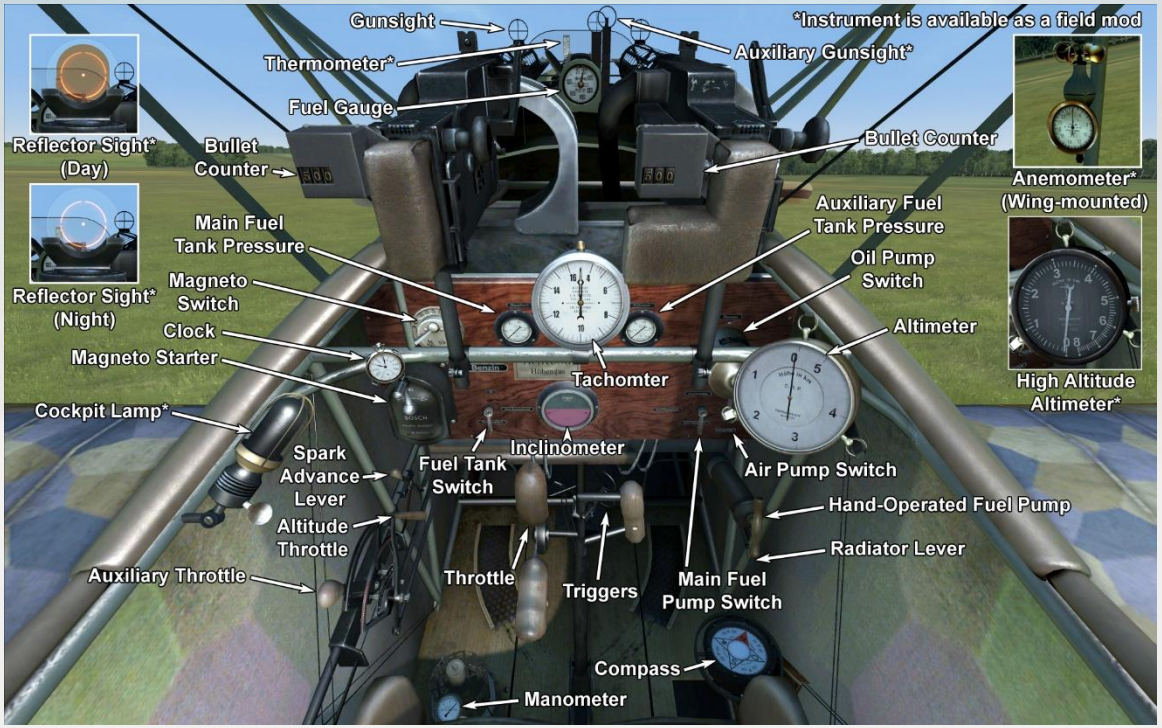
A competition among various new fighters took place in Adlershof from January 21st to February 12th, 1918, during the course of which the D.VII prototype proved to be the fastest, most durable, and the best-climbing aircraft. Manfred von Richthofen, a close friend of Anthony Fokker, also evaluated the prototype and noted some minor flaws. In particular, he noted the aircraft exhibited instability in a long dive, which was later corrected. The success of the design led to it being produced at a number of factories, including Fokker Flugzeugwerke, Albatros Werke, and the Ostdeutsche Albatros Werke. The Fokker D.VII would become one of the best - if not ultimately the best - fighter by the end of the war. In total, 2029 planes were produced and sent to front by the end of 1918.

The first production aircraft reached the frontline airfields of Bavarian squadrons in April 1918. The Fokker D.VII was used to escort bombers, engage enemy fighters, and attack balloons; it was rarely used for strafing enemy supply columns in the immediate battle area and for recon. During its initial service, it became clear that the water-cooled radiator did not cool the engine sufficiently. The problem was fixed by modifying the radiator facing, engine cowling, and by increasing the airflow through the cylinders.

D.VII pilots noted the type's good climb speed, excellent cockpit visibility, stability in maneuvers, and good handling at low speeds. Pilots excitedly exclaimed, "The plane is like hanging on its propeller!" All of these attributes helped pilots in carrying out offensive and defensive missions. German squadrons equipped with this type were the main opponents of Allied aviation until the war's end.

Crew: 1
Engine: 1 x Mercedes D.IIIa inline, 180 horsepower
Height: 2950 mm
Length: 6950 mm
Wingspan: 8700 mm
Wing Surface: 20.4 square meters
Empty Weight: 700 kg
Takeoff Weight: 909 kg
Fuel Capacity: 91 liters
Oil Capacity: 11 liters
Climb Rate: 3 minutes, 38 seconds to 1000 m; 7 minutes, 40 seconds to 2000 m; 12 minutes, 53 seconds to 3000 m; 20 minutes, 19 seconds to 4000 m; 33 minutes, 50 seconds to 5000 m
Maximum Speed: 190 km/h at sea level; 180 km/h at 1000 m; 168 km/h at 2000 m; 156 km/h at 3000 m; 142 km/h at 4000 m; 125 km/h at 5000 m
Service Ceiling: 5600 m
Endurance: 1 hour, 10 minutes (combat); 2 hours, 50 minutes (cruise)
Armament: 2 x 7.92 mm lMG 08 machine guns, 500 rounds per gun





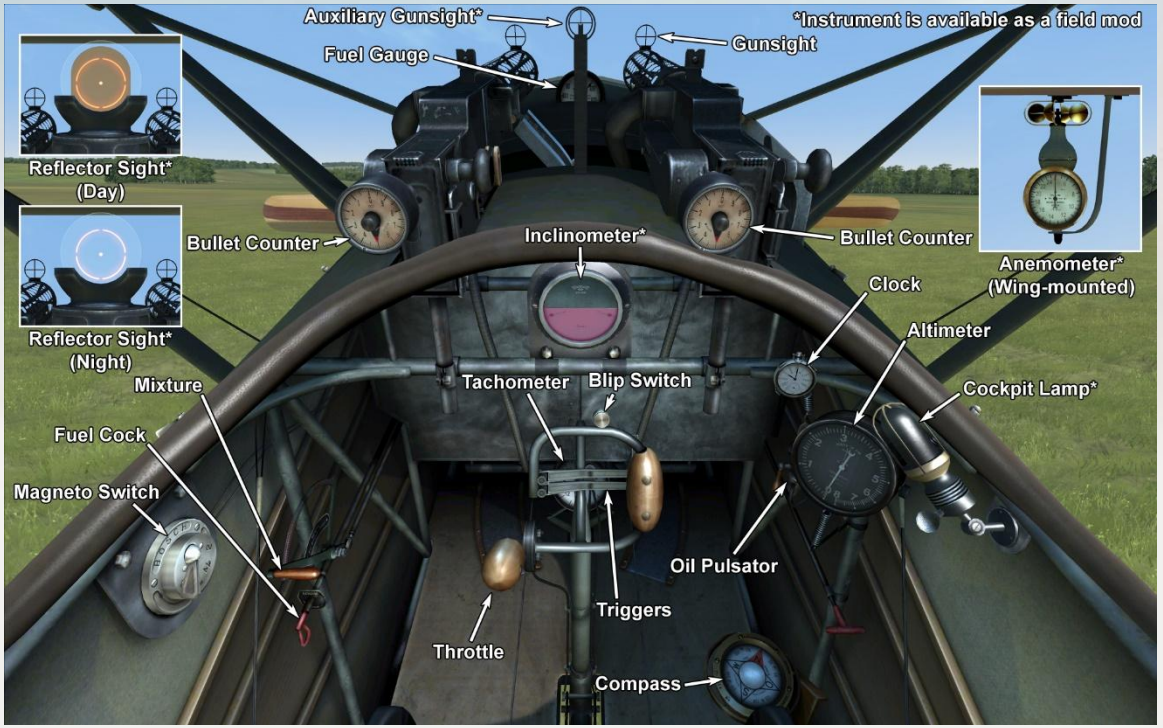
Fokker D.VIIF

While the Fokker D.VII was generally equipped with the Mercedes D.IIIa engine, a new BMW engine type with the D.VIIF designation was also fitted to the type. This new high compression BMW engine with high altitude control gave the D.VII much better performance. Its climb rate was almost twice that as the Mercedes-equipped version, and when flown at maximum throttle the engine was capable of generating almost 250 horsepower at ground level for a short time. With a nominal rating of 230 horsepower and a newly designed carburetor, this engine very much improved the aircraft's high altitude performance and pushed the aircraft's performance to a new level. However, there was a persistent shortage of BMW engines, and as a result, only every third or fourth aircraft had this type of engine installed.

The D.VIIF was mainly supplied to the best and most proven frontline squadrons. As a result, the best German pilots were now able to outclass the latest Allied aircraft types in a plane superior to those of the Allies in almost every important aspect.

Crew: 1
Engine: 1 x BMW IIIa inline, 232 horsepower
Height: 2950 mm
Length: 6950 mm
Wingspan: 8700 mm
Wing Surface: 20.4 square meters
Empty Weight: 669.5 kg
Takeoff Weight: 904 kg
Fuel Capacity: 95 liters
Oil Capacity: 20.7 liters
Climb Rate: 2 minutes, 52 seconds to 1000 m; 5 minutes, 24 seconds to 2000 m; 8 minutes, 41 seconds to 3000 m; 11 minutes, 54 seconds to 4000 m; 15 minutes, 33 seconds to 5000 m
Maximum Speed: 194 km/h at sea level; 195 km/h at 1000 m; 192 km/h at 2000 m; 183 km/h at 3000 m; 173 km/h at 4000 m; 167 km/h at 5000 m
Service Ceiling: ~9000 m
Endurance: 1 hour, 42 minutes (combat); 4 hours, 26 minutes (cruise)
Armament: 2 x 7.92 mm lMG 08 machine guns, 500 rounds per gun





Fokker D.VIII

This aircraft was specifically designed by Fokker for the Second Fighter Competition, which was convened between May 27 and June 21, 1918 at Adlershof, the German aircraft test center. Constructed as a monoplane fighter, it was mainly based on previous designs by Reinhold Platz. Its design was based on a tube-welded fuselage and wings covered with plywood throughout their span. The wing, which had a thick profile, was situated level with the pilot's line of sight, which reduced upward visibility. During the Second Fighter Competition, the E.V showed good performance and offered good all-round visibility. It also has a good climb rate and good maneuverability, with some test pilots even preferring it to the Fokker D.VIIF. Thereafter, a contract was placed to produce 400 planes for the army, which were all powered by the Oberursel UR II.

The E.V/D.VIII was produced at the Fokker-Flugzeugwerke, with 285 aircraft having been produced by war's end.

On 7 August 1918, the aircraft went into frontline service with Jasta 6 and Jasta 19, but unfortunately on the 16th and then again, on the 19th, E.V pilots were killed following catastrophic wing failures. All E.Vs were temporarily grounded for a crash investigation; this investigation ended in October. Wing failures were found to be due to poor production quality and poor-quality materials used during wing construction. With the aircraft's wings built to the original quality specification and with its new wing having increased strength and quality, it earned its new designation– the Fokker D.VIII. Visually there was no difference between the E.V and the D.VIII, and some earlier produced E.Vs were re-designated as D.VIIIs after the wings were replaced.

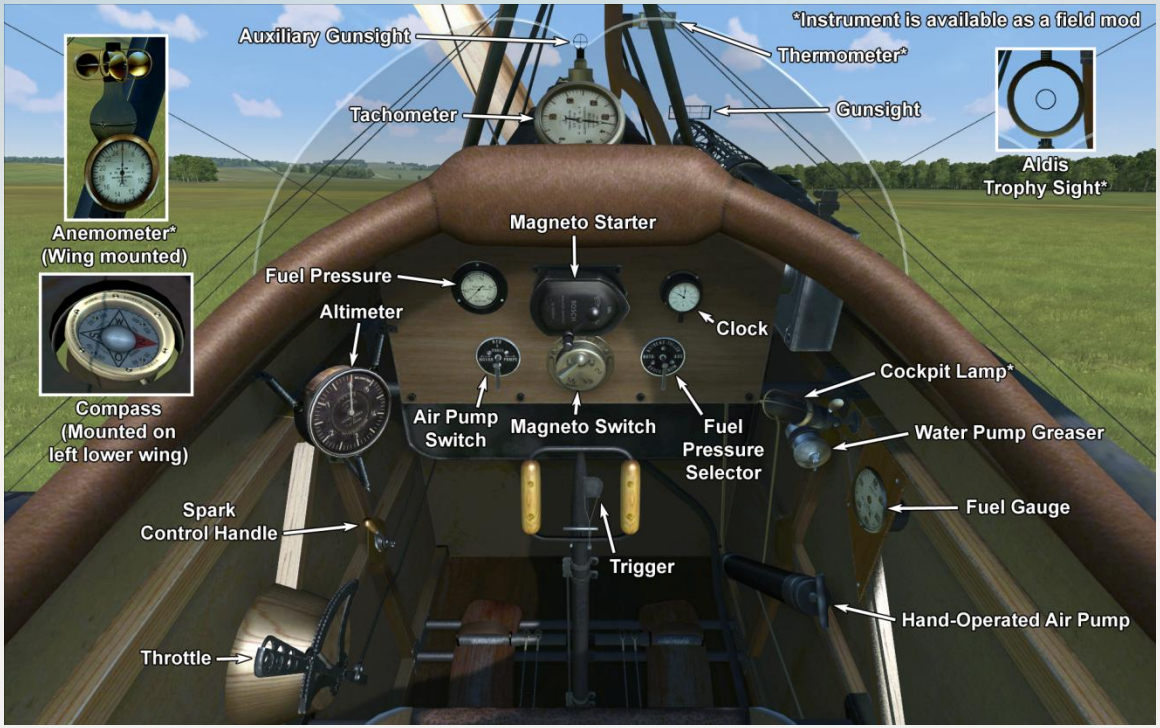
Pilots' impressions about the aircraft were as follows: its climb performance and all-round cockpit view was excellent, and it was both easy to fly and responsive to the controls. Some pilots preferred it to the Fokker D.VII as it was more maneuverable. It had a tendency to drop the right wing on landing and to ground loop in the same direction. It also got its nickname - the "Flying Razor" - from its characteristic monoplane construction.

After the Fokker E.V/D.VIII entered service on the Western Front, official records show a victory by Emil Rolf on August 17th, while other service details say little more about the aircraft.

Crew: 1
Engine: 1 x Oberursel UR II rotary, 110 horsepower
Height: 2820 mm
Length: 5865 mm
Wingspan: 8340 mm
Wing Surface: 10.7 square meters
Empty Weight: 360 kg
Takeoff Weight: 562 kg
Fuel Capacity: 69 liters
Oil Capacity: 20 liters
Climb Rate: 2 minutes, 42 seconds to 1000 m; 5 minutes, 47 seconds to 2000 m; 9 minutes, 25 seconds to 3000 m; 14 minutes, 2 seconds to 4000 m; 20 minutes, 20 seconds to 5000 m
Maximum Speed: 185 km/h at sea level; 177 km/h at 1000 m; 167 km/h at 2000 m; 158 km/h at 3000 m; 148 km/h at 4000 m; 136 km/h at 5000 m
Service Ceiling: 6500 m
Endurance: 1 hour, 30 minutes (combat); 2 hours, 20 minutes (cruise)
Armament: 2 x 7.92 mm lMG 08 machine guns, 500 rounds per gun

A.3 GERMAN SINGLE-CREW AIRCRAFT





Halberstadt D.II

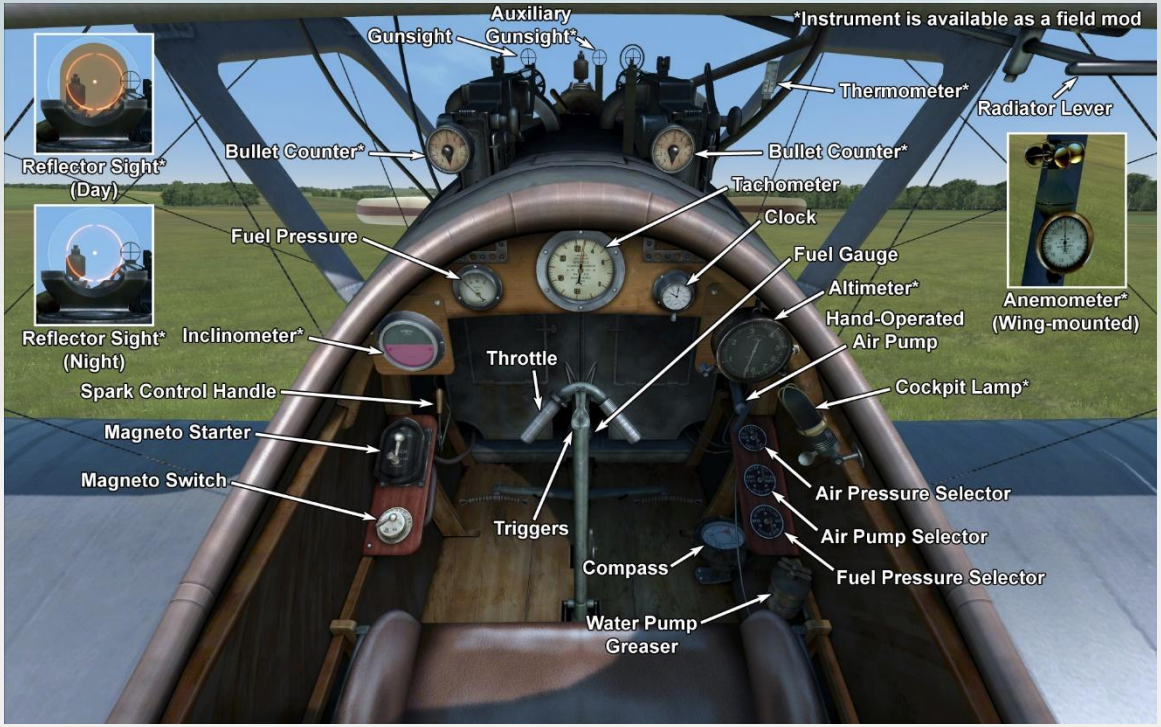
The first Halberstadt D.I prototype - designed with the 100 hp Mercedes D.I engine - flew in the late autumn of 1915. It was later fitted with the 120 hp Mercedes D.II engine, and in this form the type went into production as the D.II. The plane was intended to supplement the Fokker D-type biplanes, which at the time were replacing the obsolescent Fokker E-series monoplanes. The first machines were delivered to frontline units in June 1916.

Most pilots were impressed by the type's better performance (particularly its climb and speed) against the older Fokker monoplanes. It also had very quick, easy, and responsive controls which gave it good maneuverability in hands of experienced pilots.

By the end of 1916 the Halberstadt D.II had become obsolescent, and so it was largely withdrawn from the Western Front or relegated to quieter sectors. However, while on combat operations they gave a good account of themselves and were certainly respected by their Allied adversaries. The number of Halberstadt D.IIs built was 96 production aircraft powered by the Mercedes D.II engine.

Crew: 1
Engine: 1 x Mercedes D.II inline, 120 horsepower
Height: 2660 mm
Length: 7300 mm
Wingspan: 8800 mm
Wing Surface: 23.6 square meters
Empty Weight: 519 kg
Takeoff Weight: 728 kg
Fuel Capacity: 96 liters
Oil Capacity: 18 liters
Climb Rate: 4 minutes to 1000 m; 8 minutes, 50 seconds to 2000 m; 15 minutes to 3000 m; 23 minutes, 25 seconds to 4000 m; 37 minutes, 35 seconds to 5000 m
Maximum Speed: 145 km/h at sea level; 138 km/h at 1000 m; 131 km/h at 2000 m; 124 km/h at 3000 m; 115 km/h at 4000 m; 105 km/h at 5000 m
Service Ceiling: 5950 m
Endurance: 2 hours, 34 minutes
Armament: 1 x 7.92 mm lMG 08/15 machine gun, 500 rounds





Pfalz D.IIIa

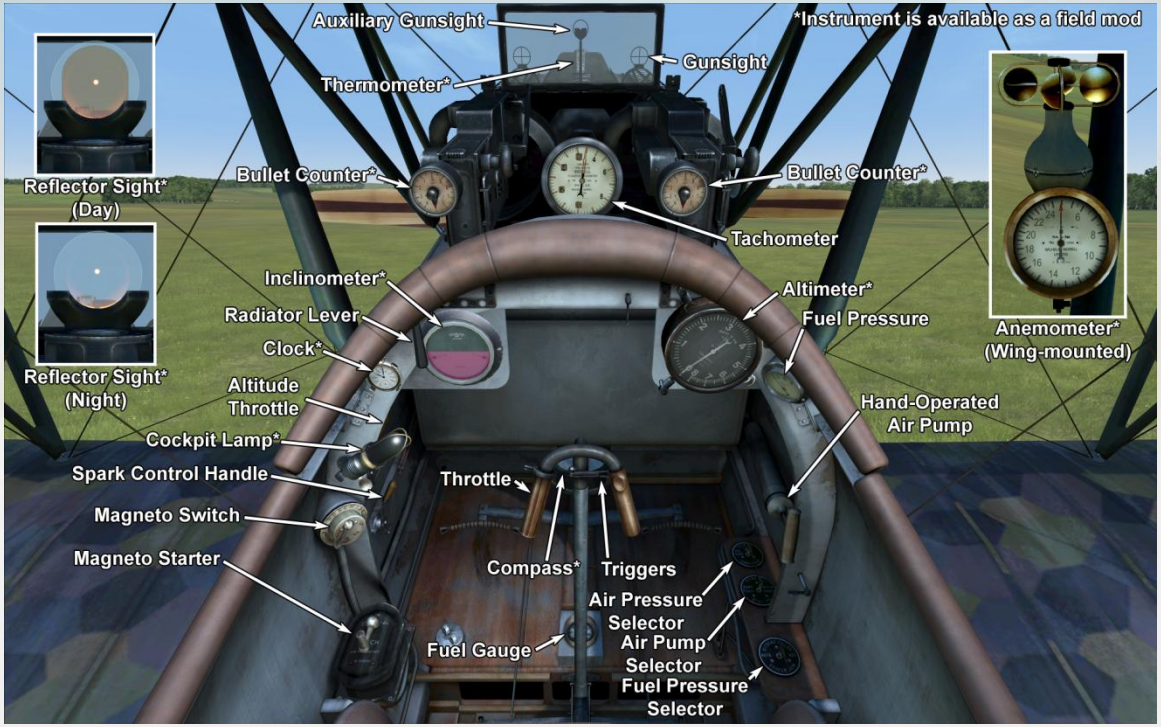
The Pfalz D.III was designed by Pfalz Flugzeugwerke. German engineers were impressed by the famous French Nieuport fighters, which were designed with “one-and-a-half” wings. As such, Pfalz’s design was based on the achievements of French engineers. The first trial flight was carried out in May 1917. The plane’s design featured machine guns mounted on the sides of the engine and aileron control wires situated in the lower wing. Half a year later, the Pfalz D.IIIa was introduced. It featured a more powerful engine, a larger tail fin, a modified shape of the lower wing and machine guns mounted at the pilot's line of sight. In all, 1010 Pfalz D.III and Pfalz D.IIIa aircraft were built.

In June 1917, the first Pfalz D.IIIs entered service with combat squadrons. The plane was used for bomber escort and for engaging enemy fighters and balloons. Pilots noted its exceptional cockpit visibility, good maneuverability, and stability when firing the machine guns; speed and climb rate were described as good. Some pilots claimed that its control sensitivity was even better than that of the Albatros D.V. Its structural durability permitted steep dives in combat and successful forced landings. English and French pilots claimed that one could shoot it down only when seriously wounding or killing the pilot. Its flight characteristics improved slightly when the Mercedes D.IIIa engine was fitted. The plane was deployed to the Western Front and to the Turkish Fronts.

Crew: 1
Engine: 1 x Mercedes D.IIIa inline, 180 horsepower
Height: 2670 mm
Length: 6950 mm
Wingspan: 9400 mm
Wing Surface: 22.09 square meters
Empty Weight: 725 kg
Takeoff Weight: 905 kg
Fuel Capacity: 94 liters
Oil Capacity: 20 liters
Climb Rate: 3 minutes, 50 seconds to 1000 m; 7 minutes, 55 seconds to 2000 m; 12 minutes, 51 seconds to 3000 m; 19 minutes, 19 seconds to 4000 m; 28 minutes, 38 seconds to 5000 m
Maximum Speed: 168 km/h at sea level; 160 km/h at 1000 m; 152 km/h at 2000 m; 144 km/h at 3000 m; 134 km/h at 4000 m; 134 km/h at 5000 m
Service Ceiling: 6000 m
Endurance: 1 hour, 10 minutes (combat); 2 hours, 50 minutes (cruise)
Armament: 2 x 7.92 mm lMG 08 machine guns, 500 rounds per gun

A.3 GERMAN SINGLE-CREW AIRCRAFT





Pfalz D.XII

In designing the next modification of the Pfalz fighter aircraft, the company's engineers decided to use a thin-sectioned wing similar to that found on the SPAD VII. Such a wing satisfied the needs of combat tactics used by German pilots: diving, firing at the enemy, then climbing back to altitude. The design also featured equal surface areas of both the upper and the lower wings. In addition, aircraft was fitted with a nose radiator similar to the Fokker D.VII and was the first fighter fitted with a tube radiator (which subsequently was redesigned due to cooling issues). In all, 800 planes of the type were built.

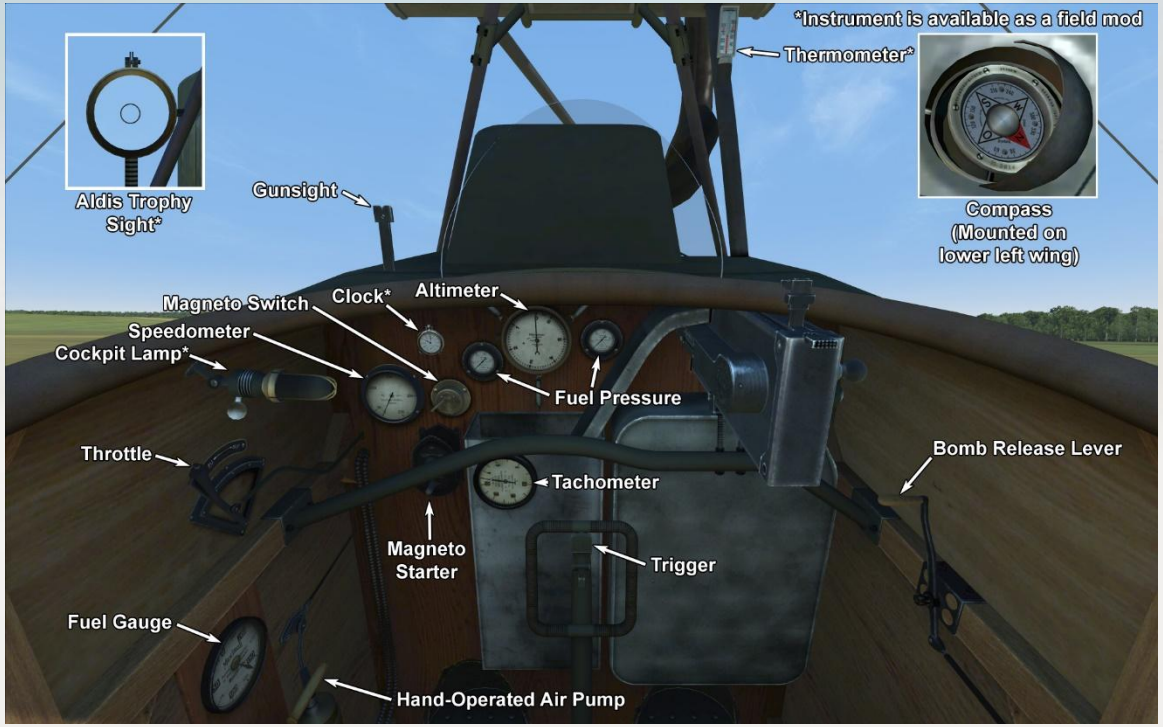
The aircraft's first flight was made near the end of February 1918 at Adlershof. During the second fighter competition in June 1918 at Adlershof, the plane (fitted with a BMW IIIa engine) came in second in the climb speed challenge – 5 km in 17.6 minutes! After that, it was sent to the front for combat testing. One pilot noted good cockpit visibility, especially vertically down, and in a dive, it was faster than the Fokker D.VII. However, it was less maneuverable and its controls were heavier than the Fokker D.VII. On June 30 1918, the plane entered service with combat squadrons. It was often used in combination with the Fokker D.VII, usually operating at a lower altitude than the better-climbing Fokker D.VII. It was mostly assigned to rookie pilots and supporting squadrons.

Among its flaws was a tendency to stall during an Immelman maneuver. In such a case, it would come out of the stall after losing 1500 m altitude. In a horizontal turn, the altitude loss was 150 m. After reaching 3 km altitude, its climb rate decreased. It is assumed that these characteristics belonged to planes fitted with the Mercedes D.IIIa engine, as the Fokker Company had the priority for BMW IIIa engines. Due to its high landing speed and weak landing gear, which was new to most pilots, the landing gear often broke on landing (later models had strengthened and shorter landing gear to compensate for this). The plane was deployed to the Western Front.

Crew: 1
Engine: 1 x BMW IIIa inline, 232 horsepower
Height: 2700 mm
Length: 6350 mm
Wingspan: 9000 mm
Wing Surface: 21.7 square meters
Empty Weight: 753 kg
Takeoff Weight: 921 kg
Fuel Capacity: 84 liters
Oil Capacity: 18.5 liters
Climb Rate: 3 minutes, 45 seconds to 1000 m; 7 minutes, 26 seconds to 2000 m; 11 minutes, 16 seconds to 3000 m; 15 minutes, 24 seconds to 4000 m; 20 minutes, 2 seconds to 5000 m
Maximum Speed: 197 km/h at sea level; 198 km/h at 1000 m; 195 km/h at 2000 m; 185 km/h at 3000 m; 174 km/h at 4000 m; 163 km/h at 5000 m
Service Ceiling: 8850 m
Endurance: 1 hour, 32 minutes (combat); 4 hours (cruise)
Armament: 2 x 7.92 mm lMG 08 machine guns, 500 rounds per gun

A.4 GERMAN MULTI-CREW AIRCRAFT





See next page for DFW C.V gunner and bombsight positions

DFW C.V

The DFW C.V was a two-seater biplane plane designed and produced at the Deutsche Flugzeug Werke near Leipzig. In designing the aircraft, DFW's designers aimed to create a light but durable airframe. Its structural features included a metal-covered strut in the tail section, a metal cowl protecting the engine, two hollow spars in the wings, and floating ribs. The radiator was mounted above the engine.

The aircraft's first flight occurred on July 11, 1916. After its official trials were completed, the aircraft was sent to the front line where it received perfect reviews. At this point, mass production commenced at other factories, including Aviatik, LVG, and Halberstadt. By the end of the war, 3955 planes of the type had been produced. The C.V became the most numerous German aircraft in its class in WWI.

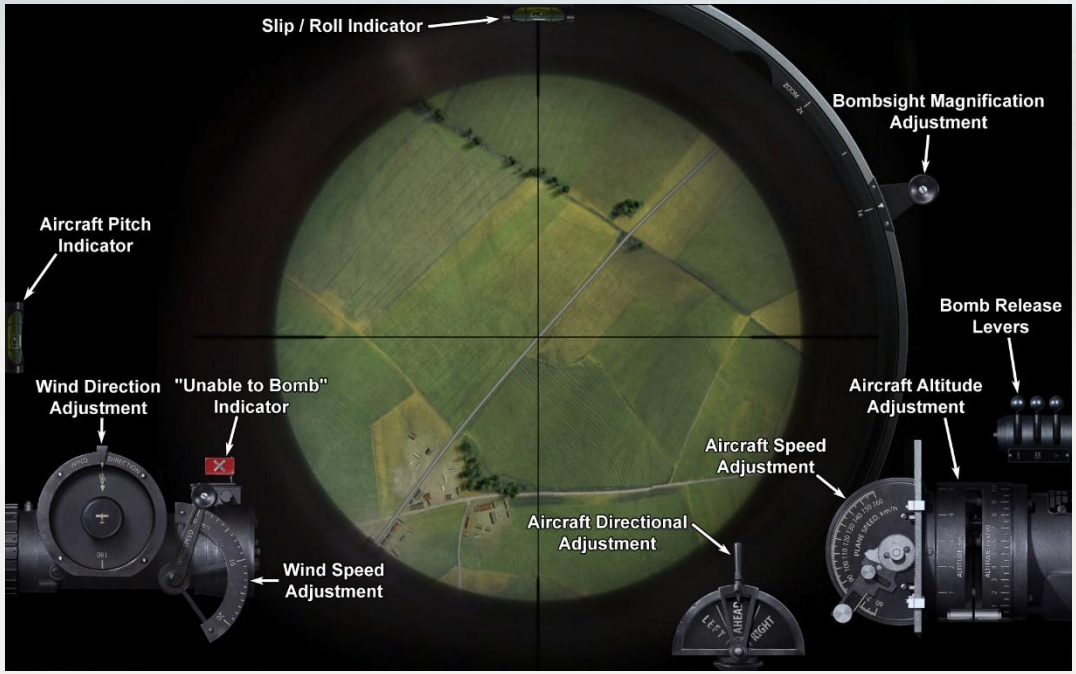
The DFW C.V entered service in October 1916, initially being sent to special Luftstreitkräfte regiments. Schutzstaffeln began receiving the aircraft in March 1917. The plane was mainly used for bomber escort, artillery spotting, recon, aerial photo reconnaissance and as a personal aircraft in fighter squadrons.

Among its advantages, pilots noted the aircraft's ease of controls and of landing, high climb speed, and good visibility for the observer/gunner. Some frontline reports mentioned equal maneuverability to that of the Bristol F.2B Fighter, easy field maintenance, and very good structural durability.

A.4 GERMAN MULTI-CREW AIRCRAFT

DFW C.V gunner and bombsight positions

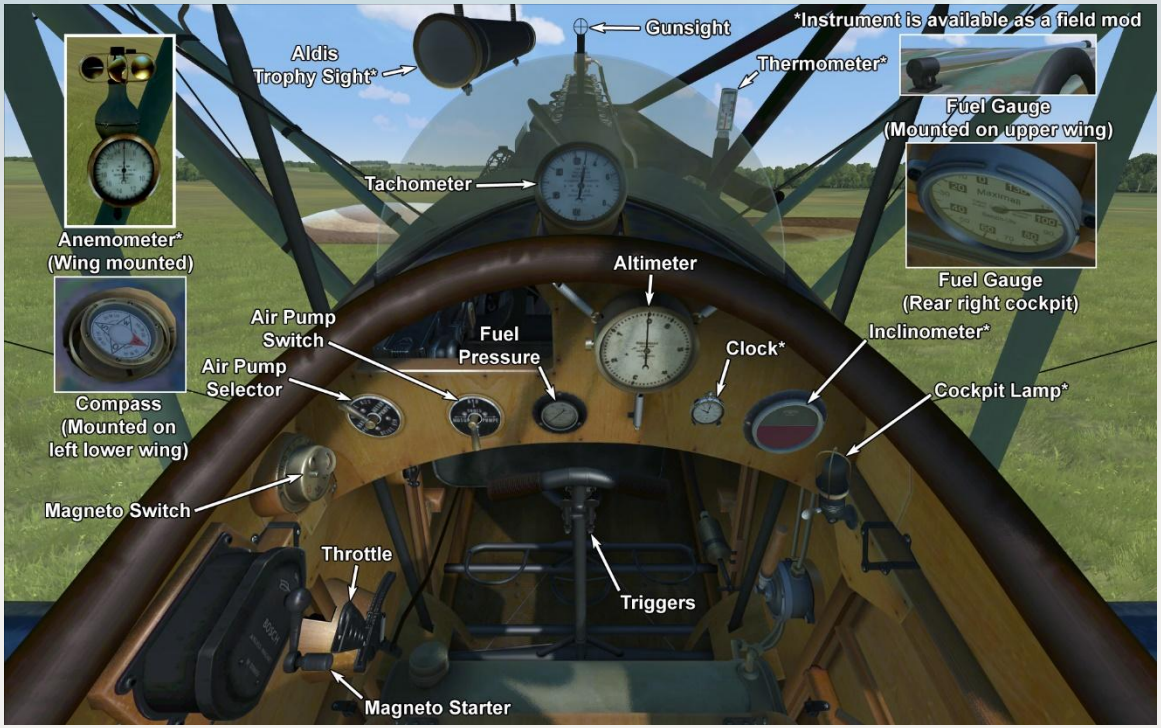




DFW C.V (continued)

Crew: 2
Engine: 1 x Benz Bz.IV inline, 200 horsepower
Height: 3140 mm
Length: 5890 mm
Wingspan: 13270 mm
Wing Surface: 35.5 square meters
Empty Weight: 990 kg
Takeoff Weight: 1477 kg
Fuel Capacity: 162.5 liters
Oil Capacity: 30 liters
Climb Rate: 4 minutes to 1000 m; 7 minutes to 2000 m; 15 minutes to 3000 m; 25 minutes to 4000 m; 40 minutes to 5000 m
Maximum Speed: 155 km/h
Endurance: 3 hours, 30 minutes
Armament: 1 x forward-firing 7.92 mm lMG 08/15 machine gun, 500 rounds; and 1 x 7.92 mm lMG 14/17 machine gun in rear-facing turret, 4 drums with 250 rounds each; up to 200 kg of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 2 x 7.92 mm LMG 14/17 machine guns in rear-facing turret, 8 drums with 250 rounds each; 1 x 20 mm Becker cannon in rear-facing turret, 4 magazines with 15 rounds each





See next page for Halberstadt CL.II gunner and bombsight positions

Halberstadt CL.II (180 hp)

The Halberstadt CL.II design was a response to Idflieg's (Inspectorate of Aviation Troops) specification issued in August 1916 for new "light C-type" with a 160-180 horsepower engine.

The ability to protect heavier observation aircraft from enemy fighter attacks was the purpose behind the design of the CL.II two-seat escort fighter. Ideflieg ordered three Halberstadt CL.II prototypes in November 1916, all powered by the Mercedes D.III engine. The first of these aircraft was ready in April 1917, and after a few design changes to the wing, the type underwent its final tests at Aldershof from 2-7 May 1917.

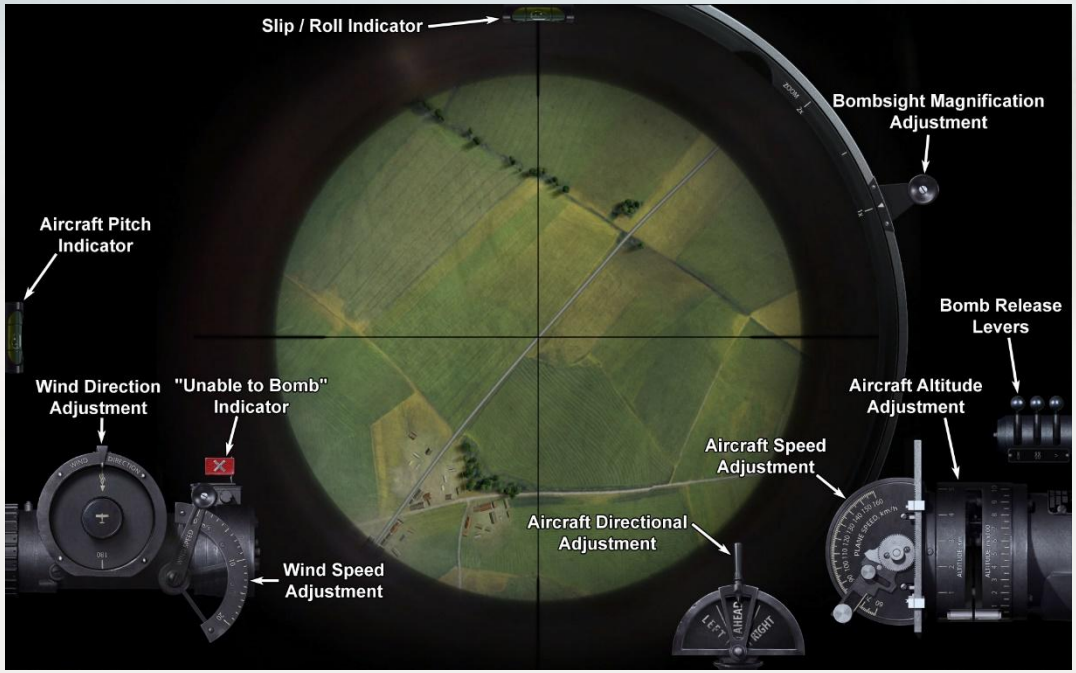
Deliveries of the CL.II to frontline units began in August 1917, with the type being supplied mainly to Schutzstaffeln (protection flights), and Schlachtstaffeln (ground attack flights). Its climb and maneuverability were excellent, and its performance was regarded by its crews as being very close to such single-engine fighters as the Albatros D.III and the D.V. While the type was able to carry photo and radio equipment, it was primarily used as an escort fighter and also as a ground attack aircraft. Owing to its good maneuverability and its ability to rapidly change its altitude it was able to avoid enemy ground fire and to successfully attack enemy ground troops and other frontline installations.

Due to its good performance, its ability to defend itself against enemy fighters, and being comfortable to fly, the CL.II was preferred by pilots over all other types and remained in service throughout the remainder of the war. It served alongside newer airplane types.

A.4 GERMAN MULTI-CREW AIRCRAFT

Halberstadt CL.II gunner and bombsight positions



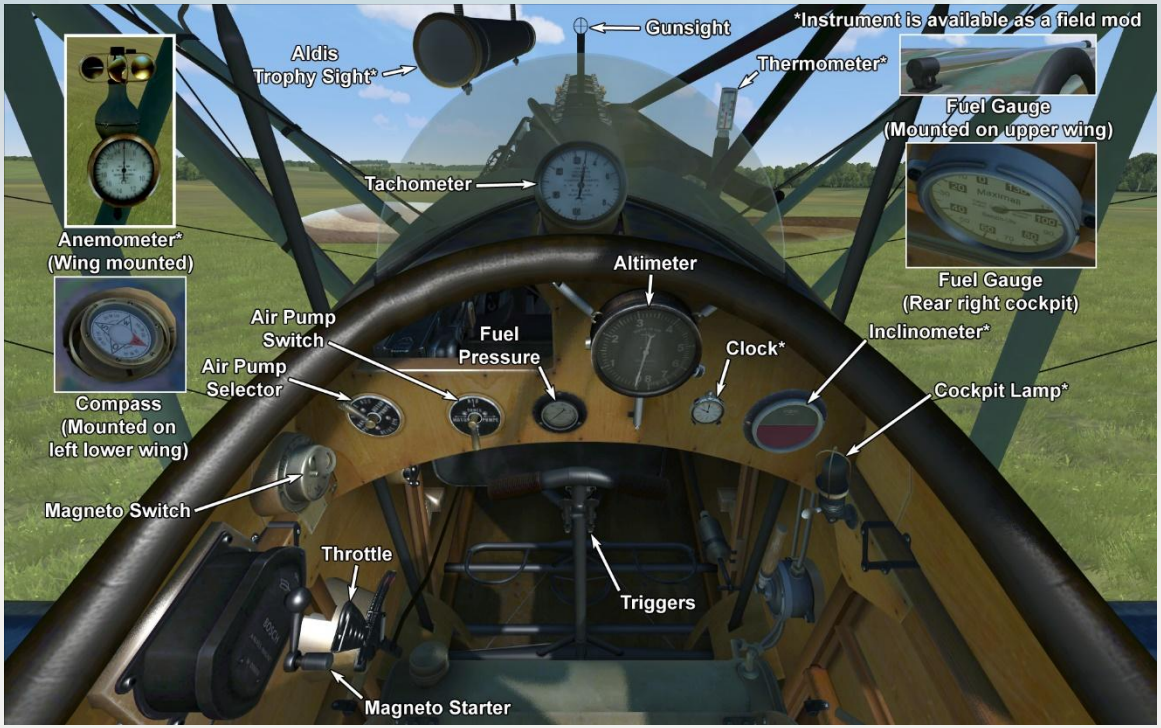


Halberstadt CL.II (180 hp) (continued)

It is not exactly known how many CL.IIs were built. Ideflieg placed six separate production orders with Halberstadter Flugzeugwerke for a total of 900 aircraft, and approximately 300 aircraft were ordered from Bayerische Flugzeug Werke AG in two separate orders. Thus, total production was about 1200 aircraft.

Crew: 2
Engine: 1 x Mercedes D.IIIa inline, 180 horsepower
Height: 2750 mm
Length: 7300 mm
Wingspan: 10770 mm
Wing Surface: 27.5 square meters
Empty Weight: 735 kg
Takeoff Weight: 1145.2 kg
Fuel Capacity: 154.6 liters
Oil Capacity: 28 liters
Climb Rate: 5 minutes, 42 seconds to 1000 m; 12 minutes, 52 seconds to 2000 m; 23 minutes, 20 seconds to 3000 m; 42 minutes, 40 seconds to 4000 m
Maximum Speed: 165 km/h at sea level; 156 km/h at 1000 m; 145 km/h at 2000 m; 135 km/h at 3000 m; 123 km/h at 4000 m
Service Ceiling: 5350 m
Endurance: 3 hours
Armament: 1 x forward-firing 7.92 mm lMG 08/15 machine gun, 500 rounds; and 1 x 7.92 mm lMG 14/17 machine gun in rear-facing turret, 3 drums with 250 rounds each; up to 150 kg of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 2 x forward-firing 7.92 mm lMG 08/15 machine guns, 500 rounds per gun; 2 x 7.92 mm lMG 14/17 machine guns in rear-facing turret, 6 drums with 250 rounds each; 1 x 20 mm Becker cannon in rear-facing turret, 4 magazines with 15 rounds each





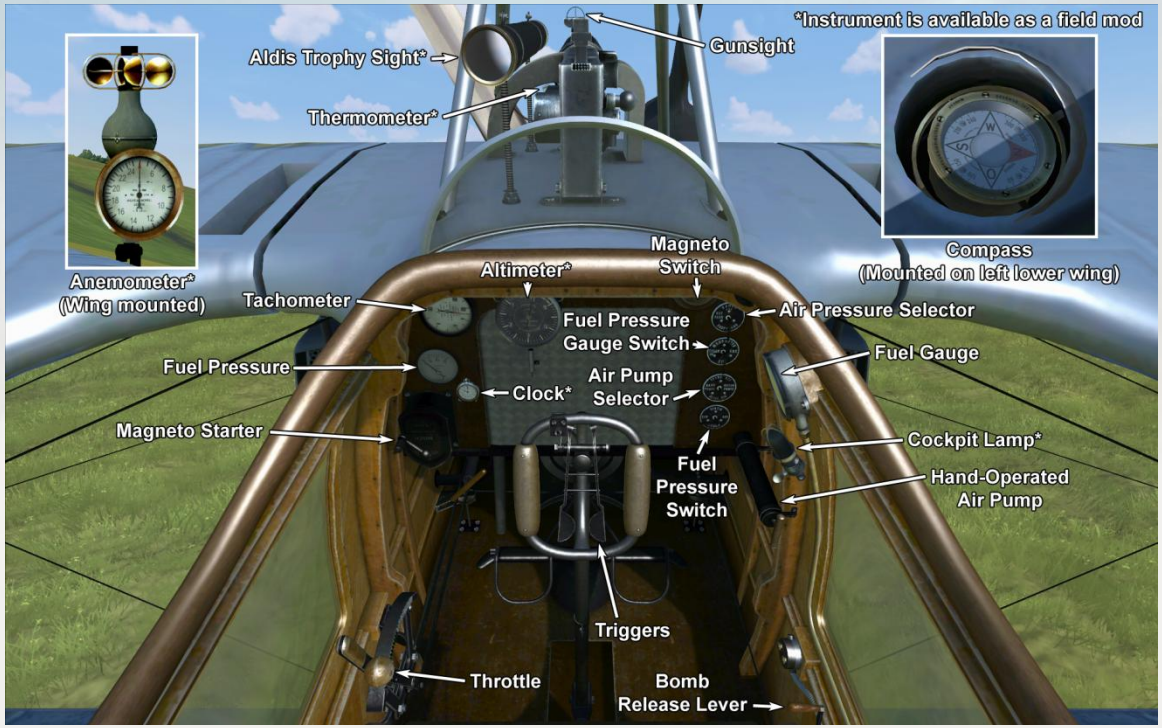
See prior page for Halberstadt CL.II gunner and bombsight positions

Halberstadt CL.II (200 hp)

In the course of the CL.II's development, the aircraft was fitted with the 200-horsepower Mercedes D.IIIaü engine, which gave improved performance at higher altitudes. CL.IIs fitted with this type of engine can be recognized by the installation of a horizontal air pump. However, older Mercedes engines were also upgraded to D.IIIaü standards, and in such cases they retained their vertical air pump.

Crew: 2
Engine: 1 x Mercedes D.IIIaü inline, 200 horsepower
Height: 2750 mm
Length: 7300 mm
Wingspan: 10770 mm
Wing Surface: 27.5 square meters
Empty Weight: 735 kg
Takeoff Weight: 1145.2 kg
Fuel Capacity: 154.6 liters
Oil Capacity: 28 liters
Climb Rate: 4 minutes, 27 seconds to 1000 m; 9 minutes, 44 seconds to 2000 m; 16 minutes, 49 seconds to 3000 m; 27 minutes, 31 seconds to 4000 m
Maximum Speed: 174 km/h at sea level; 165 km/h at 1000 m; 155 km/h at 2000 m; 144 km/h at 3000 m; 132 km/h at 4000 m
Service Ceiling: 6150 m
Endurance: 3 hours
Armament: 1 x forward-firing 7.92 mm lMG 08/15 machine gun, 500 rounds; and 1 x 7.92 mm lMG 14/17 machine gun in rear-facing turret, 3 drums with 250 rounds each; up to 150 kg of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 2 x forward-firing 7.92 mm lMG 08/15 machine guns, 500 rounds per gun; 2 x 7.92 mm lMG 14/17 machine guns in rear-facing turret, 6 drums with 250 rounds each; 1 x 20 mm Becker cannon in rear-facing turret, 4 magazines with 15 rounds each





See next page for Roland C.IIa gunner and bombsight positions

Roland C.IIa

One of the most original trends of thought in aircraft design during 1915 was seen in Luft-Fahrzeug-Gesellschaft's (LFG) Roland C.II, which was designed by Dipl. Ing. Tantzen. Tantzen, who had recently joined LFG as a design engineer, ambitiously presented a drastically cleaned-up airframe, eliminating as much as possible the "built-in" drag of the interplane, center section strut arrangement and its attendant bracing. The streamlined design of the fuselage and the aircraft's thin wings endowed the machine with great performance for its time. When it began to equip frontline units, the C.II was one of the fastest airplanes at the front and was able to outrun any enemy fighter plane. The upper wings were placed at the top edge of the fuselage, which gave the pilot a great forward and upward view. However, due to its wide oval fuselage and low pilot seat position it was a very unforgiving airplane on landing - some pilots claimed there were very few C.II pilots who hadn't crashed the type on landing.

With time, some modifications were made to the C.II. These included the addition of a forward-firing machine gun for the pilot, changes to the internal wing structure, and moving the aileron controls into the upper wing. This last change introduced push-pull control rods, which replaced the cable-actuated aileron controls fitted through the lower wings on early production machines. In addition, the trailing edge wing wire was replaced with a wooden stringer. As a result of these changes, the plane was now classified as the C.IIa.

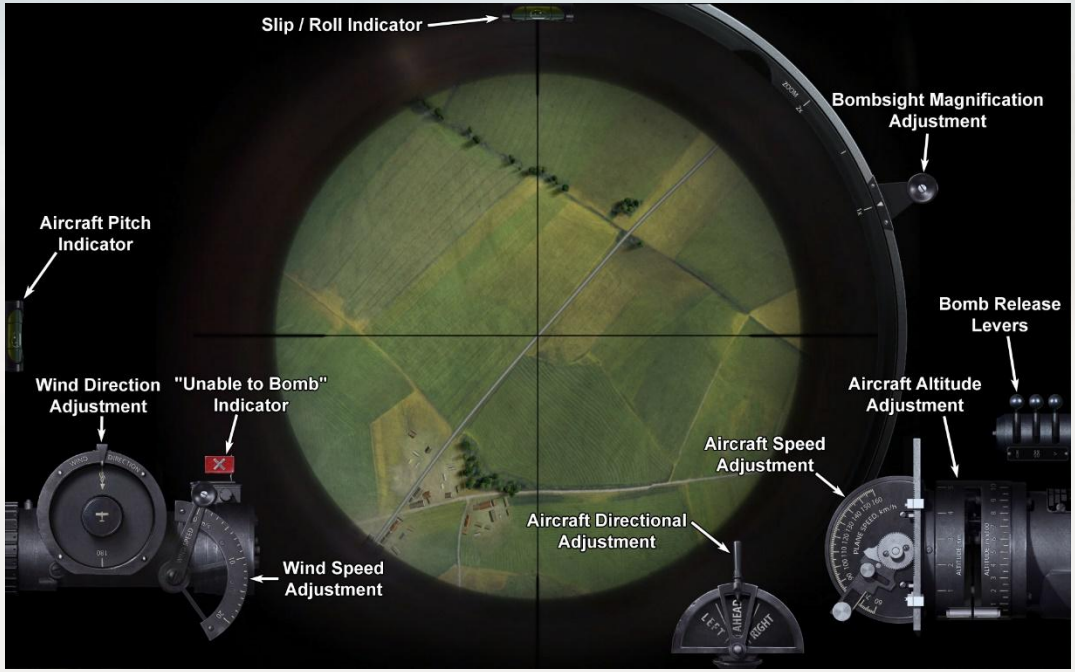
The (probably apocryphal) story is told that when officials attended the flight trials of the C.II one member was heard to remark, "Truly this machine is a whale!" The type thus certainly became unofficially known as the Walfisch. The first prototype - powered by the Mercedes D.III engine – flew on 25-26 October 1915. Mass production began on 23 December, when the first production order for 50 machines was placed.

C.IIs began to equip the Flieger Abteilung units for reconnaissance and also for escort duties by the beginning of 1916. The reconnaissance machines were typically armed with only a Parabellum machine gun for the observer. A radio transmitter also formed part of the observer's equipment. A forward-firing Spandau machine gun was later added to the armament, and some later machines were able to carry bombs on an external rack under the fuselage. Mainly because of its relatively high speed, C.IIs were often used as strategic

A.4 GERMAN MULTI-CREW AIRCRAFT

Roland C.IIa gunner and bombsight positions





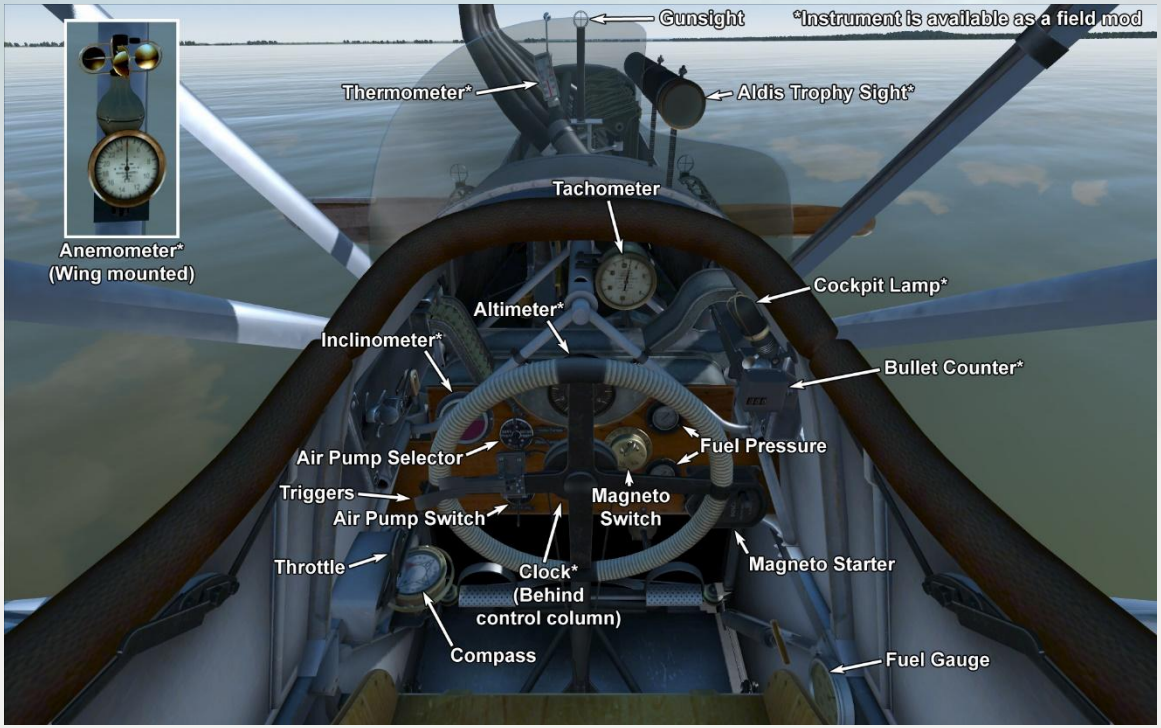
Roland C.IIa (continued)

reconnaissance airplanes, flying missions deep into enemy territory. When the Allies introduced faster fighter planes, Rolands were employed in the close support and recon role. By June 1917 the type had been withdrawn from frontline units and transferred to training schools.

The Roland C.II was built by LFG Roland and Linke-Hofmann (under a license agreement). Assuming all production orders were fulfilled, LFG Roland built 139 C.II machines, and 168 C.IIa machines were built by both manufacturers.

Crew: 2
Engine: 1 x Mercedes D.III inline, 162 horsepower
Height: 2860 mm
Length: 7720 mm
Wingspan: 10300 mm
Wing Surface: 29 square meters
Empty Weight: 714 kg
Takeoff Weight: 1226 kg
Fuel Capacity: 259 liters
Oil Capacity: 35 liters
Climb Rate: 6 minutes, 9 seconds to 1000 m; 14 minutes, 44 seconds to 2000 m; 28 minutes, 45 seconds to 3000 m
Maximum Speed: 165 km/h at sea level; 157 km/h at 1000 m; 149 km/h at 2000 m; 140 km/h at 3000 m; 121 km/h at 4000 m
Service Ceiling: 5250 m
Endurance: 5 hours, 14 minutes
Armament: 1 x forward-firing 7.92 mm lMG 08/15 machine gun, 500 rounds; and 1 x 7.92 mm lMG 14 machine gun in rear-facing turret, 4 drums with 250 rounds each; up to 50 kg of bombs; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 2 x 7.92 mm lMG 14/17 machine guns in rear-facing turret, 8 drums with 250 rounds each; 1 x 20 mm Becker cannon in rear-facing turret, 4 magazines with 15 rounds each





See next page for Hansa-Brandenburg W.12 gunner position

Hansa-Brandenburg W.12

The Brandenburg W12 was designed in response to a request for a seaplane with defensive armament installed, as existing single-seat fighters, such as the Albatros W.4 and others, were defenseless against attacks from behind. The plane also featured a specially-constructed fuselage with an inverted tailfin and rudder, which provided an excellent field of fire for the rear turret. The W12's good weight and overall size gave the plane good speed and maneuverability

The first prototype of the W12 flew in January 1917 at Warnemünde. Its designer - Ernst Heinkel - later became widely known as a builder of his own company's designs. He would later become famous mainly for the WWII aircraft he designed.

The W12 was essentially powered by either the Mercedes D.III engine - with a leading-edge radiator – or the Benz Bz.III, which was fitted with a car-type radiator at the far end of the nose. The plane's armament consisted of two fixed forward-firing 7.92mm LMG 08 machine guns and one 7.92mm Parabellum machine gun on a ring mount in the tail position behind the pilot.

The first W12s entered frontline service in significant numbers during September 1917. Its first operational success came on 11 December 1917, with the downing of the British coastal airship C27 by three W12s, which were led by Oblt d.R.Friedrich Christiansen. For this action he was awarded the Pour le Merite.

The W12 was mostly used for maritime patrols, for searching for enemy submarines and convoys, and for hunting enemy seaplanes.

A.4 GERMAN MULTI-CREW AIRCRAFT

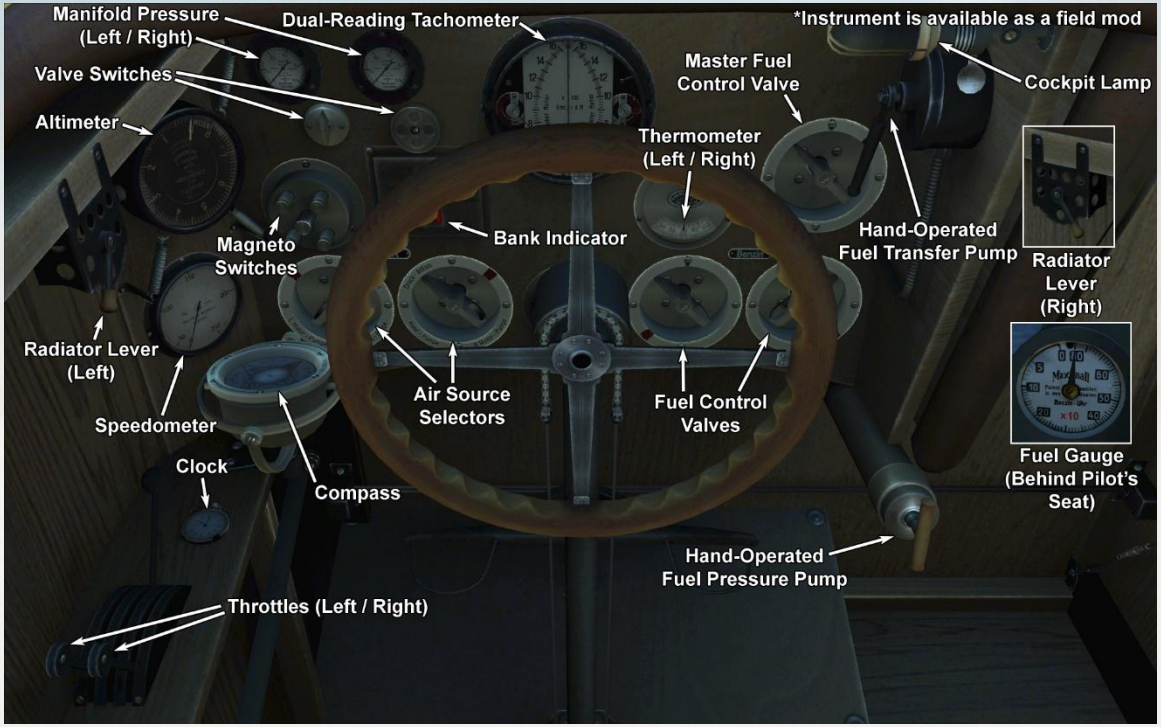
Hansa-Brandenburg W.12 gunner position



Hansa-Brandenburg W.12 (continued)

Crew: 2
Engine: 1 x Benz III inline, 160 horsepower
Height: 3300 mm
Length: 9600 mm
Wingspan: 11200 mm
Wing Surface: 35.3 square meters
Empty Weight: 1056 kg
Takeoff Weight: 1550 kg
Climb Rate: 11 minutes, 24 seconds to 1000 m; 29 minutes, 49 seconds to 2000 m
Maximum Speed: 153 km/h at sea level; 143 km/h at 1000 m; 132 km/h at 2000 m; 120 km/h at 3000 m
Service Ceiling: 3850 m
Endurance: 3 hours, 30 minutes
Armament: 2 x forward-firing 7.92 mm lMG 08 machine guns, 500 rounds per gun; and 1 x 7.92 mm lMG 14/17 machine gun in rear-facing turret, 5 drums with 250 rounds each; installations for photoreconnaissance camera and wireless radio
Weapon Mod Armament: 2 x 7.92 mm lMG 14/17 machine guns in rear-facing turret, 6 drums with 250 rounds each; 1 x 20 mm Becker cannon in rear-facing turret, 4 magazines with 15 rounds each





See next page for Gotha G.V gunner and bombsight positions

Gotha G.V

The Gotha G.V was a subsequent development of the Gotha G.IV. Combat experience showed that the close proximity of the fuel tanks to the engines could lead to disastrous results. As a result, the fuel tanks were moved to the fuselage. A shortage of quality materials led to an increased weight of the airframe. The lower part of the fuselage retained the gun tunnel for firing rearward and downward. To improve stability while taxiing on the ground, the undercarriage legs were shortened, which required the engine nacelles to be repositioned above the lower wing. This latter modification is the most important external feature distinguishing the V series from previous models. Orders were placed in October 1916 for the production of 100 aircraft. In August 1917, first Gotha G.V left the factory. The plane was manufactured by Gothaer Waggonfabrik A.G. In all, 205 planes of the V series were built.

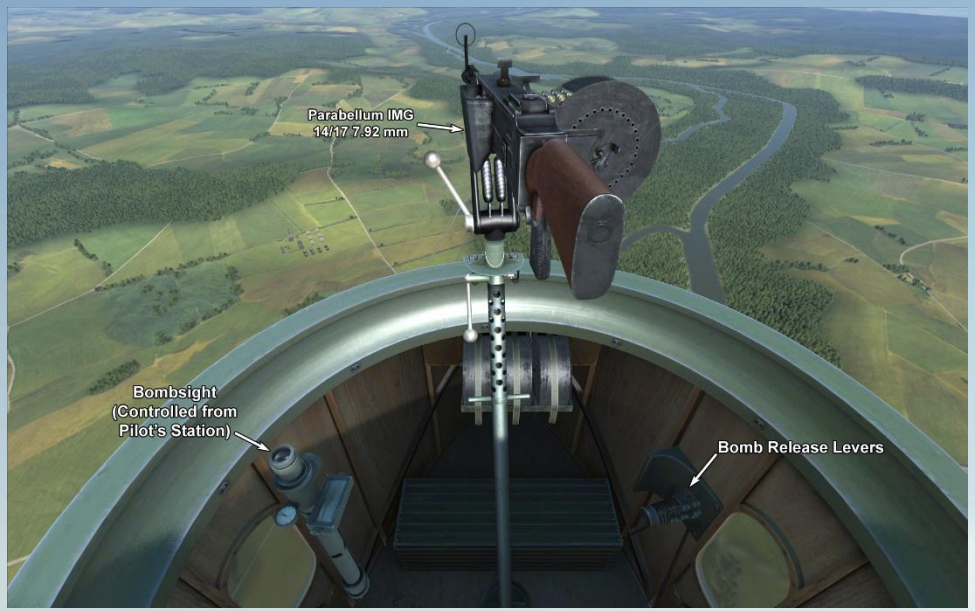
The G.V was used to bomb strategically important ground targets and cities such as London. By war's end, the plane was being employed as a night bomber.

With a maximum bomb load, the plane was stable in flight, but on returning to base, it exhibited minimum stability and an unpleasant heaviness of the tail fin. To overcome these flaws, the tail gunner would sit close to the pilot; later on, the wings were simply moved rearwards by 20 cm. Upon landing, the plane had a tendency to yaw until it made full contact with ground. In February 1918, additional gears were fitted that were meant to make landings safer and to avoid nosing over. The aircraft took part in battles over the Western Front.

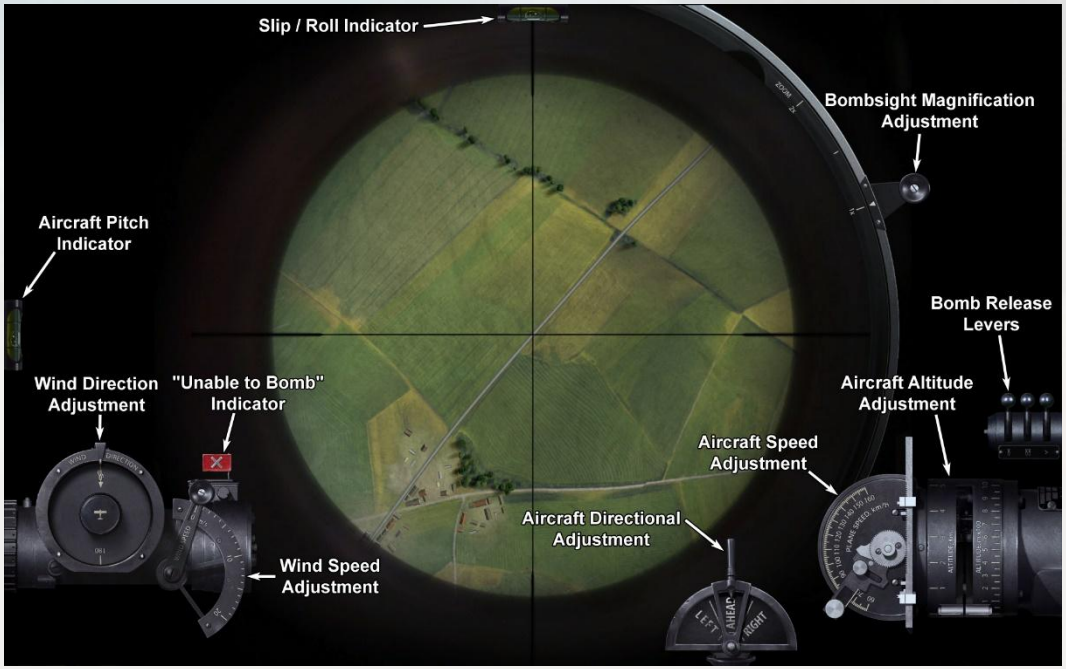
Crew: 3
Engine: 2 x Mercedes D.IVa inline, 260 horsepower
Height: 4300 mm
Length: 12400 mm
Wingspan: 23700 mm
Empty Weight: 2739.8 kg
Takeoff Weight: 3745.4 kg (without bomb load); 4095 kg (with 350 kg bomb load)
Climb Rate (without bomb load): 6 minutes to 1000 m; 12 minutes, 38 seconds to 2000 m; 20 minutes, 46 seconds to 3000 m; 32 minutes, 7 seconds to 4000 m; 53 minutes, 37 seconds to 5000 m
Climb Rate (with 350 kg bomb load): 7 minutes, 35 seconds to 1000 m; 16 minutes, 20 seconds to 2000 m; 27 minutes, 51 seconds to 3000 m; 47 minutes, 35 seconds to 4000 m
Maximum Speed (without bomb load): 137.6 km/h at sea level; 132.7 km/h at 1000 m; 126.7 km/h at 2000 m; 121.7 km/h at 3000 m; 113.9 km/h at 4000 m; 102.6 km/h at 5000 m
Service Ceiling: 6850 m (without bomb load); 4650 m (with 350 kg bomb load)
Endurance: 5 hours (with bombs); 7 hours (without bombs)
Armament: 1 x 7.92 mm lMG 14/17 machine gun in forward-facing turret, 4 drums with 250 rounds each; and 1 x 7.92 mm lMG 14/17 machine gun in rear-facing turret, 4 drums with 250 rounds each; up to 700 kg of bombs
Weapon Mod Armament: 2 x 7.92 mm LMG 14/17 machine guns in forward-facing turret, 8 drums with 250 rounds each; 2 x 7.92 mm lMG 14/17 machine guns in rear-facing turret, 8 drums with 250 rounds each; 1 x 20 mm Becker cannon in forward-facing turret, 4 magazines with 15 rounds each; 1 x 20 mm Becker cannon in rear-facing turret, 4 magazines with 15 rounds each

A.4 GERMAN MULTI-CREW AIRCRAFT

Gotha G.V gunner and bombsight positions







APPENDIX B – NATIONAL AWARDS

B.1 AWARDS OF FRANCE

Croix de Guerre

The Croix de Guerre (Cross of War) was established on 2 April 1915. Those who were awarded the War Cross were mentioned in dispatches at least once; the number of such records represented on the award's ribbon points to the courage of its owner. The bronze star is the lowest degree, while the silver palm is the highest.

The Croix de Guerre can be awarded to both French citizens and allies of France.



Order of the Legion of Honor

The Order of the Legion of Honor was founded as a social institution that consolidated the patriotism of honorable civilians and soldiers and those who have contributed to the prosperity of France. By slightly modifying the rules for making these awards, Napoleon Bonaparte founded the order in 1802, basing the award on that of the Roman legions. The insignias of the Order of the Legion of Honor have been modified numerous times. Since 1915 the Order has been awarded for combat prowess as the 'War Cross with Palm Leaves.' During the Great War around 55000 people were awarded with the order, 20000 of whom were not French citizens.

The Order of the Legion of Honor was the highest award for bravery to be awarded by France during World War One and remains to this day the country's highest award. The order is awarded for 'Courage in combat or noteworthy military or civil conduct that contributed to the prosperity of France through science, art, politics and more.' The order includes five grades as follows (in descending order): Grand Cross, Grand Officer, Commander, Officer, and Knight.



WWI Victory Medal

Established on 20 July 1922, the WWI Victory Medal (*Médaille Interalliée 1914–1918*) was a commemorative award given to French combatants for participating in the battles of the First World War. It was awarded to all soldiers who served three months (not necessarily consecutive), between 2 August 1914 and 11 November 1918 in the war zone. It was also awarded to civilian nurses, aliens (civilian or military) who served directly under French command, Marshals and generals who had a command for at least three months, and prisoners of war from the Alsace and Lorraine region.



B.2 AWARDS OF GREAT BRITAIN

Air Force Cross

The Air Force Cross was granted during WWI to warrant officers and officers of the RAF and the Commonwealth for “an act or acts of valour, courage or devotion to duty whilst flying, though not in active operations against the enemy.”

The award was established on 3 July 1918 along with Distinguished Flying Cross. It was to be awarded for tasks not involving direct contact with enemy forces. During WWI approximately 679 pilots and Royal Air Force personnel were awarded the medal, and another two individuals were awarded the medal twice.



Distinguished Service Cross

The Distinguished Service Cross (DSC) was granted during WWI to warrant officers and officers of the Royal Navy for “gallantry during active operations against the enemy.”

The award was originally created in 1901 as the Conspicuous Service Cross and was originally intended for warrant and junior officers ineligible for the DSO. It was renamed the Distinguished Service Cross in October 1914, with eligibility being extended to all naval officers (commissioned and warrant) below the rank of Lieutenant Commander, including Royal Naval Air Service pilots. During WWI, Royal Navy pilots and personnel were awarded the medal 305 times; 39 aviators were awarded the medal twice, and 7 aviators were awarded it three times.



Distinguished Flying Cross

The Distinguished Flying Cross (DFC) was awarded during WWI to warrant officers and officers of the RAF and other Commonwealth states for “an act or acts of valour, courage or devotion to duty whilst flying in active operations against the enemy.”

The award was established on 3 June 1918, shortly after the formation of the Royal Air Force. Approximately 1100 DFCs were awarded during WWI, with a further 70 first bars and 3 second bars also awarded.



Military Cross

The Military Cross was awarded to warrant officers and officers of the rank of Captain or lower for courage and valor displayed in combat, but not sufficient for being awarded with the Victoria Cross or Distinguished Service Order.

The decoration was originally created on 28 December 1914 and revised on 26 August 1916. Until the introduction of the DFC, many pilots were awarded the Military Cross in recognition of their aerial achievements. British and Commonwealth officers were the main recipients of the award, but there were foreigners who also received it. During WWI, aviators were awarded the Military Cross 1122 times; 113 of them received the award a second time, and 10 of them were awarded it three times. In addition, a further 4 officers received the medal four times. The first among this latter group was Royal Field Artillery officer F.V. Walllington; he received the third bar to his Military Cross on 10 July 1918 (published 13 September 1918). The previous three awardings of the medal were granted while he was a 2nd Lieutenant.



Distinguished Service Order

The Distinguished Service Order (DSO) was instituted on 6 September 1886 by Queen Victoria. It is typically awarded to officers holding the rank of Major or higher, but the honor has sometimes been awarded to especially valorous junior officers.

After 1 January 1917, commanders in the field were instructed to recommend this award only for those serving under fire. This was because that between 1914 and 1916 it was awarded under circumstances which could not be regarded as under fire (often to staff officers, which caused resentment among front-line officers). The Order could be awarded multiple times - in such cases a bar representing multiple awards was attached to the ribbon. 304 pilots were awarded the DSO during WWI, of whom 27 were awarded it twice, and a further 2 pilots were awarded it three times. A number of pilots who were not citizens of Great Britain or the Commonwealth were awarded the DSO; these men were Willy Omer Francois Jean Coppens de Houthulst of Belgium, Rene Paul Fonck of France, Alexander Alexandrovich Kazakov of Russia, and Clive Wilson Warman of the United States.



Victoria Cross

The Victoria Cross (VC), Great Britain's highest military decoration, was introduced in 1856 to recognize acts of valor during the Crimean War of 1853-1856. The first VC awarding ceremony was held in June 1857. Since the introduction of the award, the medal has been awarded to only 1356 individual recipients. During WWI, nineteen airmen received this medal. The VC was also awarded to fourteen individuals who were neither British nor citizens of the Commonwealth: 5 Americans, 3 Danes, 2 Germans, 1 Swiss, 1 Belgian, 1 Swede, and 1 Ukrainian. In modern times the medal can be awarded to the service personnel of any institution regardless of gender, although no woman has officially received the famous medal. However, a gold replica of the VC was presented by the officers of 104th Bengal Lancers to Mrs. Webber Harris, the wife of the regimental commander, "For her indomitable pluck" during an epidemic of cholera in India in 1895.

Throughout the award's history, only three persons have been awarded the Victoria Cross twice: Arthur Martin-Leake - a British surgeon captain (1902 & 1914); Noel Godfrey Chavasse - a British medical doctor who died of his wounds (1916 & 1917); and Charles Upham – a New Zealand infantryman (1941 & 1942).



WWI Victory Medal

Established on 1 September 1919, the Victory Medal was a campaign medal awarded to British military personnel who served during WWI. The medal was never awarded singly – it was issued to all those who had received the 1914 Star or the 1914-15 Star and to most of those who were awarded the British War Medal. To qualify for the award, one had to be mobilized in any service and have entered a theater of war between 5 August 1914 and 11 November 1918. Women qualified for the medal for service in nursing homes and other auxiliary forces.

The Victory Medal was also awarded to members of the British Naval Mission to Russia during 1919 - 1920 and for mine clearance in the North Sea between 11 November 1918 and 30 November 1919.



B.3 AWARDS OF THE UNITED STATES

Distinguished Service Cross

The Distinguished Service Cross is awarded for “extreme gallantry and risk of life in actual combat with an armed enemy force, but not meeting the criteria for the Medal of Honor.” The award was established by President Woodrow Wilson on 2 January 1918. General Pershing, Commander-in-Chief of the Expeditionary Forces in France, had recommended that recognition other than the Medal of Honor be authorized for the American armed forces for service rendered, in like manner, to that awarded by the European armies. The medal was enacted into law by an Act of Congress on 9 July 1918. During WWI, approximately 1900 recipients were awarded the medal.



Medal of Honor

The Medal of Honor is awarded for “gallantry and intrepidity at the risk of his life above and beyond the call of duty while engaged in an action against any enemy of the United States; while engaged in military operations involving conflict with an opposing foreign force; or while serving with friendly foreign forces engaged in an armed conflict against an opposing armed force in which the United States is not a belligerent party.” The award was established by President Abraham Lincoln on 21 December 1861 as the Navy Medal of Valor, which was an early variant of the Medal of Honor. At first the medal was awarded only to enlisted personnel. Army officers were not eligible to receive the award until 1891, and naval officers first became eligible in 1915. During WWI pilots were eligible to receive the Army version of the medal, as the Air Force Version was not established until 6 July 1960. During WWI, there were less than 100 Army personnel who received the award, including 4 pilots (three posthumously).

To be eligible for the award, recipients must be serving in the US armed forces but not necessarily have US citizenship. However, there have been exceptions to this policy: it was granted to 8 civilians, including the only woman - Mary Edwards Walker for participating in the First Battle of Bull Run in 1861; pilot Charles Lindberg for flying across the Atlantic; and “Buffalo Bill” Cody for his exploration of the Wild West. In 1916, a special commission of the US Army rescinded some awards (including the above-mentioned civilian examples). Some awards were restored just recently, such as that of Buffalo Bill’s in 1989. Since the beginning of World War II, the medal has been awarded for extreme bravery beyond the call of duty while engaged in action against an enemy. Arising from these criteria, approximately 60% of the medals earned during and after World War II have been awarded posthumously.



WWI Victory Medal

Established in 1919, the World War I Victory Medal was awarded to any member of the U.S. military who had served in the armed forces between the following dates and in the following locations: 6 April 1917 - 11 November 1918 for any military service; 12 November 1918 - 5 August 1919 for service in European Russia; or 23 November - 1 April 1920 for service with the American Expeditionary Force Siberia. The award was officially known as the “Victory Medal” until 1947, when it adopted its current name in response to the “Victory Ribbon” being renamed the World War II Victory Medal.

The award was authorized with a large variety of devices to denote participation in battles and campaigns. The Silver Citation Star was authorized to be worn on the ribbon of the Victory Medal for any member of the U.S. Army who had been cited for gallantry in action between 1917 and 1920. This device was redesigned and renamed the Silver Star in 1932. Holders of the Silver Citation Star could have the device upgraded to the Silver Star upon request. Likewise, the Navy Commendation Star was authorized for any person who had been commended by the Secretary of the Navy for performance of duty during WWI. Although it was identical in appearance to the Silver Citation Star (and could also be worn on the ribbon of the Victory Medal), the Navy Commendation Star could not be upgraded to the Silver Star.



B.4 AWARDS OF GERMANY

Pilot's Badge

Although the Pilot's Badge mostly speaks of affiliation, it was not granted to pilots automatically after graduation from flying schools. During WWI, it was usually awarded after a pilot's first combat mission. However, there were pilots who flew several combat missions before receiving their Pilot's Badge. Besides the Imperial (Prussian) Pilot's Badge, there also were badges for observer, gunner, and Zeppelin pilot. The Kingdom of Bavaria also issued its own version of the Pilot's Badge.



Wound Badge

The Wound Badge was established on 3 March 1918 by King Wilhelm II and had three grades: Black, Silver and Gold. The Wound Badge in Black was awarded for less than three wounds; the Wound Badge in Silver was awarded for three or more wounds; and the Wound Badge in Gold was awarded for wounds that permanently injured or disfigured the recipient. Julius Buckler was probably the only German aviator to receive the Wound Badge in Gold. Leaving for the front at a young age, he was severely wounded in the infantry and transferred to the German Air Service. Having received 4 more injuries during 1917, after a long recovery in the hospital he was sent to Jasta 17, where he was wounded again on 6 May 1918. Incredibly, Leutnant Buckler lived until 1960.



Iron Cross

The Iron Cross is probably the most famous of all German decorations. It was established by King Frederick William III of Prussia and first awarded on 10 March 1813. The Iron Cross was normally only a military decoration, although there were instances of it being awarded to civilians for performing military functions. For example, the civilian pilot Hanna Reitsch was awarded the Iron Cross 1st Class for her bravery as a test pilot during World War II. The Iron Cross was initially established with two grades, but from 1881 to the end of WWII, there were three grades of the Iron Cross: Iron Cross 2nd Class, Iron Cross 1st Class, and the Grand Cross of the Iron Cross. The Grand Cross was intended for senior generals of the German Army. An even higher decoration, the Star of the Grand Cross of the Iron Cross, was awarded only twice, to Field Marshal Gebhard von Blucher in 1813 and to Field Marshal Paul von Hindenburg in 1918. During WWI, the Grand Cross was awarded 5 times; the Iron Cross 1st Class was awarded 218,000 times; and the Iron Cross 2nd Class was awarded over 5 million times.

When speaking of the Iron Cross, one cannot avoid the topic of another decoration - the “Kulm Cross.” In 1813, a battle took place between Napoleon and the Allied armies, including those of Russia. After the battle, Graf Ostermann-Tolstoy was awarded the Grand Cross of the Iron Cross. General Yermolov received the Red Eagle 1st Class from the King of Prussia, and all servicemen of the Russian Guard regiments were recommended to receive the Iron Cross. However, since the number of servicemen in these regiments was approximately 12,000 soldiers and officers, and at that moment, only 11,000 Prussians had been awarded the Iron Cross, discontent began to grow in the Prussian military. As a result, King Frederick William III awarded the surviving 7,131 guardsmen with the Kulm Cross, which differed from the Iron Cross only by the lack of date and the King's monogram.



Knight's Cross with Swords of the Royal House Order of Hohenzollern

The Knight's Cross with Swords of this Order was typically granted to officers who already had been awarded the Iron Cross 1st Class. This award was therefore an intermediate one between the Iron Cross 1st Class and the highest military Order of Prussia - the Orden Pour le Merite - for Prussian officers of lower ranks. The House Order of Hohenzollern was granted approximately 8300 times during WWI.



Knight's Cross of the Military Order of Max Joseph

The Military Order of Max Joseph was the highest purely military order of the Kingdom of Bavaria. It was founded on 1 January 1806 by Maximilian I Joseph of Bavaria, the first king of Bavaria. The order came in three classes: Grand Cross, Commander's Cross, and Knight's Cross. According to the king's statute, the class of award was to match the rank of the recipient; for example, the Grand Cross could be awarded to officers holding the rank of General or higher. Bavarian recipients who were not already members of the nobility were also granted personal nobility and the right to add "Ritter von" ("Knight of") to their title. Non-Bavarians could also receive the Military Order of Max Joseph but were not conferred a title of nobility. For this reason Erich Ludendorff's surname did not become "Ritter von Ludendorff," although he was awarded the Grand Cross in 1916. During WWI, this Order was granted the following number of times: Grand Cross: 5; Commander's Cross: 14; and Knight's Cross: 253. These numbers include non-Bavarian recipients.



Knight's Cross of the Military Order of St. Henry

The Military Order of St. Henry was established on 7 October 1736 by August III, King of Poland and Elector of Saxony. It was the highest Saxon order bestowed upon members of the German Air Service. The award was revised a number of times and came in four classes: Grand Cross, Commander's Cross 1st Class, Commander's Cross 2nd Class (or sometimes just Commander), and Knight's Cross. The only pilot of WWI to be awarded with the Commander's Cross 2nd Class was Max Immelman, although more than 100 pilots and observers/gunners were awarded the Knight's Cross version of this award.





Orden Pour le Mérite

During World War I, Prussia's highest military award - the Orden Pour le Mérite (Order of Merit) - was awarded to officers for repeated and continual gallantry in action. It was never awarded posthumously. In reality, WWI pilots received it for achieving a certain number of shot-down enemy aircraft and balloons - the number changed throughout the war.

The order was reinstituted from an earlier award by Prussian King Friedrich II in 1740 as an award for military and civil merit. In 1810 King Friedrich Wilhelm III decreed the award could only be granted for military merit and bravery in the face of the enemy. Later, in memory of his deceased wife, he added an additional distinction, a spray of gilt oak leaves attached above the cross. After the Prussian victory over Napoleon and the invasion of Paris in 1814 it was granted to 1662 persons, of which 1470 were Russian servicemen. In 1842 a “civilian” version was re-established - for achievements in science and art, and in 1844 a crown was added to the award, which was granted to Order recipients for honorable service over the course of 50 years.

Of all the officers in the German army and navy during WWI, the most frequent recipients were those serving in the army (533). Aviators received the award 80 times, and naval officers were awarded it 49 times. Of those aviators, 76 held the rank of Captain or below. The first to receive the award were pilots who had shot down 8 enemy planes, namely Oswald Boelcke and Max Immelmann (on 12 January 1916). Among foreigners granted with the Order of Merit were citizens of the Austro-Hungarian Empire, (14 persons), Bulgaria (4 persons) and Turkey (2 persons). Altogether during WWI the order was awarded 687 times. Following the end of WWI, the Orden Pour le Mérite was never again awarded for military service, although the civil class of the order can still be awarded for achievements in the arts and sciences.



Order of the Red Eagle

The Order of the Red Eagle was awarded to military personnel and civilians for courage in combat, excellence in military leadership, long and faithful service to the Kingdom of Prussia, or other great achievements.

This was a very rare award during WWI. The only two persons to be awarded the 3rd Class with Crown and Swords version of the order during the war were Rittmeister Manfred Albrecht von Richthofen and Oberstleutnant Maercker, the latter of whom received the award after the war on 16 November 1918. Altogether, the 3rd Class with Crown and Swords version of the order was awarded only 10 times from 1894 - 1918. The order had six classes and many additions - crown, oak leaves, swords, bow, service record medallion, and badge of the Order of St. John of Malta. There was also a set of special versions, the Stars 1st - 4th Class, for non-Christians. The traditional ribbon of the order was white with two orange stripes, but combat awards were frequently conferred with a black-and-white ribbon, similar to that of the Iron Cross.



Hindenburg Cross

The Cross of Honor, also known as the Honor Cross or, popularly, the Hindenburg Cross, was a commemorative medal inaugurated on 13 July 1934 by Reichspräsident Paul von Hindenburg for those soldiers of Imperial Germany who fought in World War I. The award came in three versions: the Honor Cross for Combatants (for soldiers who fought on the front); the Honor Cross for War Participants (for non-combatant soldiers; and the Honor Cross for Next-of-Kin (for the next of kin of fallen soldiers). Austrian veterans were eligible for the award after the annexation of Austria in 1938. In all, 6,250,000 medals were awarded to combatants, 1,200,000 medals were awarded to non-combatants, and 720,000 medals were awarded to next-of-kin. A variation of the award with an anchor in the center - which was known as the Naval Cross - was awarded to veterans of the Imperial German Navy.



B.5 AWARDS OF BELGIUM

Medaille du Volontaire Combattant (Volunteer Medal)

The Medaille du Volontaire Combattant was awarded to Belgians and some foreigners who voluntarily enlisted for service during the Great War. Most Belgian pilots in WWI were volunteers and had to pay for their flying lessons out of their own pocket.



Croix de Guerre

The World War I Croix de Guerre was established by royal decree on October 25, 1915 as an award for bravery or other military virtue on the battlefield. It was only awarded to individuals. The Croix de Guerre was not only awarded for bravery but also for three years or more of service on the front line or for good conduct on the battlefield. It was also awarded to volunteers older than 40 or younger than 16 after a minimum of 18 months of service, to escaped prisoners of war rejoining the armed forces, and to military personnel who were placed on inactive duty because of injury. Bronze, silver and gold Palms and Lion ribbon emblems were awarded for various categories of Mention in Dispatches. The award is similar in fashion to the French Croix de Guerre and was a common award given to Belgian combat pilots in WWI.



Military Decoration for Gallantry (Second Class)

The Military Decoration for Exceptional Service or Acts of Courage or Devotion was awarded to military personnel of any rank for gallantry or devotion to duty; it is also referred to as an 'Article 4' award by the Belgian forces. It is also awarded in two classes denoted by the addition of an inverted gilt chevron for the award first class in addition to the Palm for second class.



Military Decoration for Gallantry (First Class)

The Military Decoration for Exceptional Service or Acts of Courage or Devotion was awarded to military personnel of any rank for gallantry or devotion to duty; it is also referred to as an 'Article 4' award by the Belgian forces. It is also awarded in two classes denoted by the addition of an inverted gilt Chevron for the award first class in addition to the Palm for second class.



Order of Leopold II

The Order of Leopold II is an order of Belgium and is named in honor of King Léopold II. The decoration was established on August 24, 1900 by Leopold II as king of the Congo Free State and was in 1908, upon Congo being handed over to Belgium, incorporated into the Belgian awards system. The order is awarded for meritorious service to the Sovereign of Belgium, and as a token of his personal goodwill. It can be awarded to both Belgians and foreigners. Several Belgian pilots were awarded this medal during WWI.



Order of the Crown Medal

The Order of the Crown is an Order of the Kingdom of Belgium established on October 15, 1897 by King Leopold II in his capacity as ruler of the Congo Free State. The order was first intended to recognize heroic deeds and distinguished service achieved for service in the Congo Free State - many of which acts soon became highly controversial. In 1908, the Order of the Crown was made a national decoration of Belgium, junior to the Order of Leopold.

The Order may also be bestowed to foreign nationals and is frequently awarded to military and diplomatic personnel of other countries stationed in (or providing support to) Belgium.



Order of Leopold

The Order of Leopold is one of the three Belgian national honorary orders of knighthood. It is the highest order of Belgium and is named in honor of King Leopold I. It consists of a military, a maritime and a civilian division. The maritime division is only awarded to personnel of the merchant navy, and the military division to military personnel. The decoration was established on July 11, 1832 and was awarded for extreme bravery in combat or for meritorious service of immense benefit to the Belgian nation. The Order of Leopold is awarded by Royal Decree. A few talented Belgian fighter pilots did receive this award during WWI for their performance in aerial combat.



WWI Victory Medal

Created July 17, 1919 and awarded to all those who served between the August 1, 1914 and November 11, 1918. The award features a “rainbow” ribbon signifying the multi-national victory of the Entente forces.



APPENDIX C – GROUND OBJECTS FOR VISUAL RECONNAISSANCE



AAA position



Field camp



Supply dump / factory



Field gun



AAA position



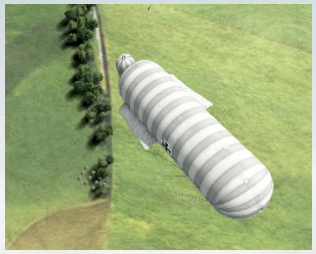
Howitzers



Supply train



Machine gun



Balloon position



HQ camp



Trucks and cars



Passenger train



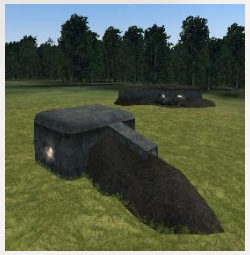
Barge



Fuel dump



Tanks



Pill box

APPENDIX D – CONTROLS, PERFORMANCE AND SPIN RECOVERY

Entente

Plane	Max RPM	Max Temp. (C)	Engine Controls	Endurance (Minutes)	Max Dive Speed kph (IAS)	Max Dive Speed mph (IAS)	Max Corner Speed kph (IAS)	Max Corner Speed mph (IAS)	Max Level Speed (kph)	Max Level Speed (mph)	Turn Rating	Roll Rating	BnZ Rating	Worst Enemies	Left Spin Recovery	Right Spin Recovery
Airco D.H.2	1400	n/a	No Throttle Mixture, Blip	195	230	*143*	200	*124*	130	*81*	2	5	1	All except Fokker E.III	Automatic recovery.	Opposite rudder, stick flat into spin direction (left). Blip engine. Common ROF method also works but is slower.
Breguet 14.B2	1800	80	Radiator	150	295	*183*	250	*155*	180	*112*	5	6	7	Pfalz D.XII, Fokker D.VIII, Fokker DVIIf	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*
Bristol F2B F.II	2500	93	Mixture, Radiator	180	350	*217*	250	*155*	198	*123*	7	9	9	Pfalz D.XII, Fokker D.VIII, Fokker DVIIf	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	Automatic recovery.
Bristol F2B F.III	2500	93	Mixture, Radiator	180	350	*217*	250	*155*	205	*127*	8	10	10	Pfalz D.XII, Fokker D.VIII, Fokker DVIIf	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	Automatic recovery.
Handley Page O/400	2000	93	Mixture, Radiator	480	275	*171*	190	*118*	156	*97*	0	0	0	Pfalz D.XII, Fokker D.VIII, Fokker DVIIf	Automatic recovery.	Automatic recovery.
Nieuport 11.C1	1400	n/a	Mixture, Blip	120	215	*134*	215	*134*	167	*104*	6	10	3	Anything 1918	Automatic recovery.	Automatic recovery.
Nieuport 17.C1	1500	n/a	Mixture, Blip	110	250	*155*	205	*127*	165	*103*	7	7	4	Fokker Dr.1, Pfalz D.III, Fokker D.VIIf	Automatic recovery.	Automatic recovery.
Nieuport 28.C1	1500	n/a	Mixture, Blip	70	340	*211*	270	*168*	203	*126*	1	6	7	Fokker D.VIII, Fokker DVIIf, Fokker Dr.1	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	Automatic recovery.
S.E.5a	2300	93	Mixture, Radiator	110	380	*236*	235	*146*	218	*135*	5	8	8	Fokker D.VIII, Fokker DVIIf, Fokker Dr.1	Stick BACK and into the spin, then hold with opposite rudder.	Stick BACK and into the spin, then hold with opposite rudder.
R.E.8	2000	80	None	255	295	*183*	205	*127*	171.4	*107*	4	4	4	Anything 1918	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	Stick FORWARD and into the spin, then hold with opposite rudder. ENGINE OFF.
Sopwith Pup	1500	n/a	Mixture, Blip	150	270	*168*	190	*118*	176	*109*	10	7	3	Fokker Dr.1	Stick BACK and into the spin, then hold with opposite rudder.	Common: Stick FORWARD and into the spin, then hold with opposite rudder.
Sopwith Triplane	1550	n/a	Mixture, Blip	100	280	*174*	225	*140*	185	*115*	8	7	5	Fokker Dr.1, Pfalz D.III, Fokker D.VIIf	*Stick BACK and into the spin, then hold with opposite rudder.*	Automatic recovery.
Sopwith Camel	1550	n/a	Mixture, Blip	150	300	*186*	215	*134*	190	*118*	9	6	6	Fokker Dr.1	*Stick BACK and into the spin, then hold with opposite rudder.*	Common: Stick FORWARD and into the spin, then hold with opposite rudder. Throttle down.
Sopwith Dolphin	2200	93	Mixture, Radiator	100	330	*205*	222	*138*	200	*124*	6	5	8	Pfalz D3a, Fokker DVIIf, Fokker Dr.1	*Stick BACK and into the spin, then hold with opposite rudder.*	Stick BACK and into the spin, then hold with opposite rudder.
Spad V.II 150HP	2000	80	Mixture	150	360	*224*	260	*162*	193	*120*	5	5	7	Pfalz D3a, Fokker D.VIII, Fokker DVIIf, Fokker Dr.1	Stick FORWARD and into the spin, then hold with opposite rudder. ENGINE OFF.	Stick FORWARD and into the spin, then hold with opposite rudder. ENGINE OFF.
Spad V.II 180HP	2250	80	Mixture, Radiator	90	380	*236*	260	*162*	219	*136*	5	5	9	Fokker D.VIII, Fokker DVIIf, Fokker Dr.1	*Stick FORWARD and into the spin, then hold with opposite rudder. ENGINE OFF.*	Stick FORWARD and into the spin, then hold with opposite rudder. ENGINE OFF.
Spad 13	2200	80	Mixture, Radiator	90	380	*236*	270	*168*	220	*137*	4	8	10	Fokker D.VIII, Fokker DVIIf, Fokker Dr.1	Automatic recovery.	Common: Stick FORWARD and into the spin, then hold with opposite rudder. Throttle down.

Central Powers

Plane	Max RPM	Max Temp. (C)	Engine Controls	Endurance (Minutes)	Max Dive Speed kph (IAS)	Max Dive Speed mph (IAS)	Max Corner Speed kph (IAS)	Max Corner Speed mph (IAS)	Max Level Speed (kph)	Max Level Speed (mph)	Turn Rating	Roll Rating	BnZ Rating	Worst Enemies	Left Spin Recovery	Right Spin Recovery
Albatros D.II	1700	88	Radiator	80	300	*186*	215	*134*	164	*102*	7	9	2	Sopwiths, SE5a, Spad 13	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*
Albatros D.III	1700	88	Radiator	90	290	*180*	220	*137*	170	*106*	6	8	3	Sopwiths, SE5a, Spad 13	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*
Albatros D.Va	1700	88	Radiator	90	290	*180*	230	*143*	170	*106*	6	7	4	Sopwiths, SE5a, Spad 13	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*
DFW C.V	1600	88	None	230	260	*162*	225	*140*	155	*96*	5	5	3	Nieuport 28, Sopwith Dolphin, SE5a, Spad 13, Bristol F2B	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*
Fokker E.III	1400	n/a	No Throttle Mixture,	180	250	*155*	190	*118*	142	*88*	3	3	2	All except D.H.2	Stick flat into the spin direction (left) only. Engine on.	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*
Fokker Dr.1	1500	n/a	Mixture, Blip	100	270	*168*	205	*127*	178	*111*	9	10	5	Sopwith Pup, Camel	Automatic recovery.	Automatic recovery.
Fokker D.VII	1700	90	Radiator	70	325	*202*	240	*149*	190	*118*	7	6	5	Sopwiths, SE5a, Spad 13	Automatic recovery.	Automatic recovery.
Fokker D.VIIF	1700	88	Radiator, Alt-throttle	102	335	*208*	240	*149*	194	*121*	7	6	10	Sopwith Camel	Automatic recovery.	Automatic recovery.
Fokker D.VIII	1500	n/a	Mixture, Blip	90	325	*202*	240	*149*	185	*115*	6	5	8	Sopwiths	Automatic recovery.	Automatic recovery.
Gotha G.V	1600	90	Radiator	300	240	*149*	200	*124*	137	*85*	0	0	0	Nieuport 28, Sopwith Dolphin, SE5a, Spad 13, Bristol F2B	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*
Pfalz D.IIIa	1700	90	Radiator	70	280	*174*	250	*155*	168	*104*	8	7	4	Sopwith Pup, Camel	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*	*Common: Stick FORWARD and into the spin, then hold with opposite rudder.*
Pfalz D.XII	1700	88	Radiator, Alt-throttle	92	315	*196*	270	*168*	197	*122*	1	6	8	Sopwiths, SE5a, Spad 7	Stick FORWARD and into the spin, then hold with opposite rudder. ENGINE OFF.	Automatic recovery.

NOTES:

1. Endurance is "Combat" endurance, i.e. Under full power taken from the store.
2. Max Dive Speed is the speed when airframe damage starts.
3. Max Corner Speed is the speed which full up elevator can be pulled to full deflection without wings falling off.
4. Turn/Roll rating is out of 10, 1 being the worst, 10 being the best.
5. BnZ rating is based upon all BnZ qualities such as speed, dive, roll rate, and number of machine guns.
6. Common ROF spin recovery in blue text. Non-standard is in red text.
7. Any spin recovery that doesn't mention engine can be done with engine off, on, even full power.
8. All spin recoveries were tested at 100% fuel, and full bomb and ammunition loadout.

SOURCES:

1. Thanks to piecost for dive speed, and corner speed data and testing (http://riseofflight.com/Forum/viewtopic.php?f=49&t=23711)
2. ROF Store page provides the standard data.
3. Spin recoveries are from Taipan's testing.
4. Max RPM comes from simple gauges.

For any errors or omissions contact O_Taipan on the RiseOfFlight.com forums.

APPENDIX E – RISE OF FLIGHT GAME ICONS

Map Icons: Mission


attack enemy recon flight


attack enemy bombers flight


attack enemy fighter patrol flight


support friendlies in dogflight


attack enemy duel opponent


attack enemy transport column


attack enemy armoured column


attack enemy tank platoon


attack enemy AAA position


attack enemy artillery position


attack enemy observation baloon


attack enemy buildings


cover friendly recon flight


cover friendly bombers flight


recon for enemy positions


cover friendly transport column


cover friendly armoured column


cover friendly tank platoon


cover friendly AAA position


cover friendly artillery position


cover friendly observation baloon


cover friendly buildings

Map Icons: Object


unknown aircraft


friendly aircraft


enemy aircraft


unknown balloon


friendly balloon


enemy balloon


unknown ground units


friendly ground units


enemy ground units

Map Icons: Route


action point


waypoint


airfield

HUD Icons: Object

unknown aircraft

friendly aircraft

enemy aircraft


unknown balloon


friendly balloon


enemy balloon


unknown ground units


friendly ground units


enemy ground units


enemy leader

Required Action Icons


attack zone


secondary attack zone


primary attack zone


object to cover


secondary object to cover


primary object to cover


current target


current secondary target


current primary target

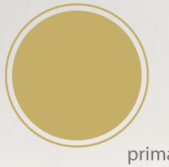

landing point


current waypoint

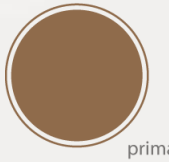

current secondary waypoint


current primary waypoint

Map Icons: Objectives


primary objective accomplished


secondary objective accomplished


primary objective failed


secondary objectivefailed

APPENDIX F – RANK INSIGNIA

Germany:

Unteroffizier	Vizefeldwebel	Feldwebel	Leutnant	Oberleutnant	Hauptmann
					

United States:

Corporal	Sergeant	2nd Lieutenant	1st Lieutenant	Captain	Major
					

Great Britain:

Sergeant	Flight Sergeant	2nd Lieutenant	Lieutenant	Captain	Major
					

France:

Caporal	Sergent	Adjutant	Sous Lieutenant	Lieutenant	Capitaine
					

Belgium:

Sergent	1er Sergent	Adjutant	Sous Lieutenant	Lieutenant	Captaine
					

APPENDIX G – FIELD MODS & WEAPON MODS

One of the defining aspects of World War I aviation was the extent to which pilots, engineers and mechanics in the field would customize their aircraft. Many aircraft were shipped from the factory to the field with a minimum array of instrumentation or weapons. Depending on the resources available, a squadron could customize and enhance a number of features of their aircraft. This included items such as altimeters, engine temperature gauges, airspeed indicators, gunsights and weapons. At times even captured equipment, such as the Aldis gunsight, would be taken off downed enemy aircraft and put back into use. This section illustrates the various field mods and weapon mods which can be fitted to each aircraft. Some field mods greatly improve your ability to manage the performance of your aircraft or your navigation efforts. Many weapon mods can give you increased firepower, but they can also come with a noticeable performance hit once installed. Choose your field mods and weapon mods wisely! Their added weight and drag is modeled. All field mods and weapon mods can be purchased at the Rise of Flight Store: http://riseofflight.com/en/store/fieldmods / http://riseofflight.com/en/store/weaponmods.

AIRCO D.H.2



Field Mods



Lewis Rear Gunsight



Fuel Gauge



Cockpit Light

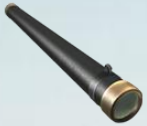
Weapon Mods

There are no weapon mods currently available for the D.H.2

Sopwith Pup



Field Mods



Aldis Gunsight



Cockpit Light

Weapon Mods



Le Prieur Rockets (AP)



Le Prieur Rockets (HE)

Sopwith Triplane



Field Mods



Aldis Gunsight



Cockpit Light

Weapon Mods



2 x Vickers Machine Guns

Sopwith Camel



Field Mods



Aldis Gunsight



Cockpit LIght

Weapon Mods



Upper Wing Cutout

R.A.F. S.E.5a



Field Mods



Aldis Gunsight



Fuel Gauge



Cockpit Light

Weapon Mods

There are no weapon mods currently available for the S.E.5a

Sopwith Dolphin



Field Mods



Aldis Gunsight



Engine Temp Gauge



Cockpit Light

Weapon Mods



2 x Lewis Machine Guns (Cockpit)



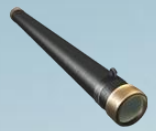
2 x Lewis Machine Guns (Lower Wings)

Nieuport 11.C1



Field Mods


Le-Chretien Gunsight


Aldis Gunsight


Anemometer


Altimeter


Compass


Clock


Cockpit Light

Weapon Mods


2 x Lewis Machine Guns (Upper Wing)



Le Prieur Rockets (AP)



Le Prieur Rockets (HE)

Nieuport 17.C1



Field Mods


Le-Chretien Gunsight


Aldis Gunsight


Anemometer


Altimeter


Compass


Clock


Cockpit Light

Weapon Mods


1 x Lewis Machine Gun (Upper Wing)


2 x Lewis Machine Guns (Upper Wing)



Le Prieur Rockets (AP)



Le Prieur Rockets (HE)

SPAD 7.C1 (150 hp & 180 hp)



Field Mods


Anemometer


Le-Chretien Gunsight


Aldis Gunsight


Cockpit Light

Weapon Mods


1 x Lewis Machine Gun (Upper Wing)



Le Prieur Rockets (AP)



Le Prieur Rockets (HE)

SPAD 13.C1



Field Mods



Le-Chretien Gunsight



Aldis Gunsight



Cockpit Light

Weapon Mods



2 x Balloon Guns

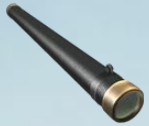
Nieuport 28.C1



Field Mods



Le-Chretien Gunsight



Aldis Gunsight



Anemometer



Altimeter



Compass



Clock



Sideslip Indicator



Cockpit Light

Weapon Mods



2 x Balloon Guns

R.A.F. R.E.8



Field Mods



Aldis Gunsight



Cockpit Light

Weapon Mods



1 x Lewis Machine Gun (Upper Wing)



2 x Lewis Machine Guns (Turret)

Airco D.H.4



Field Mods



Aldis Gunsight



Fuel Gauge



Cockpit Light

Weapon Mods



2 x Vickers Machine Guns



2 x Lewis Machine Guns (Upper Wing)



2 x Lewis Machine Guns (Turret)

Bristol F.2B (Falcon II & Falcon III)



Field Mods



Aldis Gunsight



Fuel Gauge



Cockpit Light

Weapon Mods



2 x Lewis Machine Guns (Upper Wing)



1 x Lewis Machine Gun (Turret)

Breguet 14.B2



Field Mods



Le-Chretien Gunsight



Aldis Gunsight



Sideslip Indicator



Cockpit Light

Weapon Mods



1 x Lewis Machine Gun (Upper Wing)

Handley Page O/400



Field Mods



Fuel Gauge

Weapon Mods



57mm Davis Gun (Nose Turret)



2 x Lewis Machine Guns (Dorsal Turret)

Felixstowe F.2A



Field Mods



Fuel Gauge



Cockpit Light

Weapon Mods



57mm Davis Gun (Nose Turret)



1 x Lewis Machine Gun (Cockpit)



2 x Lewis Machine Guns (Dorsal Turret)



2 x Lewis Machine Guns (Upper Wing Turret)

Nieuport 17.C1 GBR



Field Mods



Le-Chretien Gunsight



Aldis Gunsight



Anemometer



Altimeter



Compass



Clock



Cockpit Light

Weapon Mods



1 x Lewis Machine Gun (Upper Wing)



2 x Lewis Machine Guns (Upper Wing)



Le Prieur Rockets (AP)



Le Prieur Rockets (HE)

R.A.F. F.E.2b



Field Mods

Weapon Mods

Sopwith Strutter 1 1/2



Field Mods

Weapon Mods

Hanriot HD-1



Field Mods

Weapon Mods

Fokker E.III



Field Mods


Anemometer


Clock


Cockpit Light

Weapon Mods

There are no weapon mods currently available for the E.III

Albatros D.II (Early & Late)



Field Mods


Aldis Trophy Gunsight


Iron Sights


Anemometer


Altimeter


Clock


Engine Temp Gauge


Cockpit Light

Weapon Mods


1 x Becker Autocannon
(Upper Wing)

Albatros D.III



Field Mods


Aldis Trophy Gunsight


Iron Sights


Anemometer


Altimeter


Clock


Engine Temp Gauge


Bullet Counter


Cockpit Light

Weapon Mods


1 x Lewis Machine Gun
(Upper Wing)

Albatros D.Va



Field Mods


Collimator Sight (Day)


Collimator Sight (Night)


Iron Sights


Anemometer


Altimeter


Clock


Inclinometer


Engine Temp Gauge


Bullet Counter


Cockpit Light

Weapon Mods


1x Lewis Machine Gun (Upper Wing)

Fokker Dr.I



Field Mods


Collimator Sight (Day)


Collimator Sight (Night)


Iron Sights


Inclinometer


Bullet Counter


Cockpit Light

Weapon Mods

There are no weapon mods currently available for the Dr.I

Pfalz D.IIIa



Field Mods


Collimator Sight (Day)


Collimator Sight (Night)


Iron Sights


Anemometer


Altimeter


Inclinometer


Engine Temp Gauge


Bullet Counter


Cockpit Light

Weapon Mods

There are no weapon mods currently available for the D.IIIa

Pfalz D.XII



Field Mods


Collimator Sight (Day)


Collimator Sight (Night)


Anemometer


Altimeter


Compass


Inclinometer


Clock


Engine Temp Gauge


Bullet Counter


Cockpit Light

Weapon Mods

There are no weapon mods currently available for the D.XII

Fokker D.VII



Field Mods


Collimator Sight (Day)


Collimator Sight (Night)


Iron Sights


Anemometer


High Altimeter


Engine Temp Gauge


Bullet Counter


Cockpit Light

Weapon Mods

There are no weapon mods currently available for the D.VII

Fokker D.VIIF



Field Mods


Collimator Sight (Day)


Collimator Sight (Night)


Iron Sights


Anemometer


HIgh Altimeter


Engine Temp Gauge


Cockpit Light

Weapon Mods

There are no weapon mods currently available for the D.VIIF

Fokker D.VIII



Field Mods


Collimator Sight (Day)


Collimator Sight (Night)


Iron Sights


Anemometer


Inclinometer


Cockpit Light

Weapon Mods

There are no weapon mods currently available for the D.VIII

DFW C.V.



Field Mods


Aldis Trophy Gunsight


Engine Temp Gauge


Clock


Cockpit Light

Weapon Mods


2 x Parabellum Machine Guns (Rear Turret)



1 x Becker Autocannon (Rear Turret)

Halberstadt CL.II (180 hp & 200 hp)



Field Mods


Aldis Trophy Gunsight


Anemometer


Inclinometer


Engine Temp Gauge


Clock


Cockpit Light

Weapon Mods

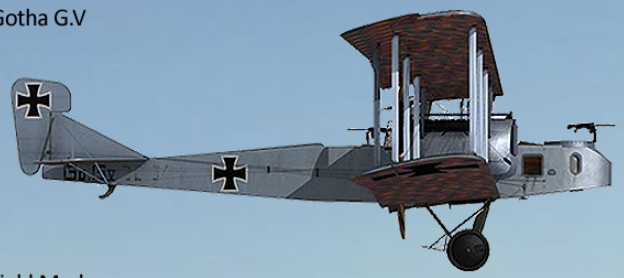

2 x Spandau Machine Guns


2 x Parabellum Machine Guns (Rear Turret)



1 x Becker Autocannon (Rear Turret)

Gotha G.V



Field Mods



Fuel Gauge

Weapon Mods



2 x Parabellum Machine Guns (Nose & Rear Turrets)



1 x Becker Autocannon (Nose & Tail Turrets)

Hansa-Brandenburg W.12



Field Mods



Aldis Trophy Gunsight



Anemometer



Altimeter



Bullet Counter



Inclinometer



Engine Temperature Gauge



Clock



Cockpit Light

Weapon Mods



2 x Parabellum Machine Guns (Rear Turret)



1 x Becker Autocannon (Rear Turret)

Roland C.IIa



Field Mods



Aldis Trophy Gunsight



Anemometer



Altimeter



Engine Temperature Gauge



Clock



Cockpit Light

Weapon Mods



2 x Parabellum Machine Guns (Rear Turret)

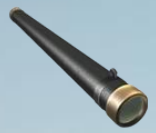


1 x Becker Autocannon (Rear Turret)

Halberstadt D.II



Field Mods



Aldis Trophy Gunsight



Anemometer



Engine Temperature Gauge



Cockpit Light

Weapon Mods

There are no weapon mods currently available for the D.II.

Field Mods

Weapon Mods

Field Mods

Weapon Mods

Credits

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This User Manual is dedicated to all in the Rise of Flight community. Thank you for your support. We hope you find this manual useful. Future revisions and additions will follow.



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