INTRODUCTION

MAAM-SIM is a division of the Mid Atlantic Air Museum. Located at Carl A. Spaatz Regional Airport, Reading, Pennsylvania, MAAM is a non-profit educational organization. The MAAM-SIM team members, Bill Rambow, Jan Visser, Fred Banting, Rob Young, Bill Womack, and Howard Sodja, are all volunteers who have donated their time, talent and toil to further the goals and support the aircraft restoration projects of the museum. All proceeds from the sale of MAAM-SIM products directly benefit the museum and its
restoration projects, such as "The Engine Replacement Fund", which has purchased engines for the Martin 4-0-4 and the B-25J "Briefing Time", as well as "The Widow's Web", the project restoring what will be the only flying P-61 Black Widow in the world. At the time of this release, the team, also known as "The R4D Team", has raised over $200,000 for MAAM. Our eventual goal with the release of this new DC-3 / R4D package is to purchase two new engines for MAAM's R4D #50819 and get her back in the air, where she belongs. On behalf of MAAM and the team, thank you very much for supporting us in this effort.

It is the intent of the MAAM-SIM team to produce yet more FS add-on packages, modeled exclusively on aircraft in the MAAM collection. We produce our "extreme photo-realistic" aircraft and panels by working from digital photographs and digital sound recordings to provide the best possible representation of the real aircraft. This means the airplane must be a finished, flying example of its type, so that is why you won't be seeing the P-41 for a while from us, much as we would love to do it. But there are a number of other great aircraft, beautifully restored, in the MAAM collection to provide us with grist for the development mill for some time to come. Sorry, we can't do your "Connie" or your "Marauder", unless of course you would care to donate one to the museum!

On behalf of MAAM President Russ Strine and the staff and volunteers of the Mid Atlantic Air Museum, we would like to invite you to visit our facility in Reading. See the museum website for hours and directions. We would also like to invite you to become one of us, by joining MAAM. You can learn all about us and about membership at www.maam.org.

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**Manual Conventions**

Several IMPORTANT notices and NOTES are printed in red and their font enlarged.

Helpful TIPS are printed in green.

Dynamic LINKS are royal blue and underlined. The headings in the Table of Contents are all dynamic bookmark links that will take you directly to that section of the manual. Throughout this manual you will encounter many more such bookmark links to guide you to referenced items elsewhere in the document. Links are all underlined. After using a link, you may click on the Back button or use the key command Alt + Left Arrow to return to your previous position in the manual.

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This FS aircraft package has been designed to duplicate, in appearance, sound, and performance, the R4D-6 #50819, owned and operated by the Mid Atlantic Air Museum. Our version is equipped as she is operated today, so you will find she has the necessary modern radios and the associated instruments that allow her to be flown in today's ATC environment. The DC-3's and C-47's share her panel, with a couple exceptions which will be addressed later on and in the separate documents that came with this CD, "X47.doc", "DDayC47.doc", "C-47_AT_9.doc", and "bpb_fs9.txt".
SYSTEM REQUIREMENTS

To use this add-on airplane and panel you must have at least the following:

A PC capable of running Flight Simulator with acceptable frame rates. A lot has been said about the relative frame rate performance of Flight Simulator. Suffice it to say, frame rate acceptability is in the eye of the beholder. The R4D / DC-3 package is a complicated aircraft with numerous panels and a virtual cockpit, as well as a full sound suite that will make demands on your system. To accommodate computers of lesser capability, different complexity levels of the aircraft are included and will be discussed later in the manual.

Microsoft Flight Simulator "Century of Flight" or FS2002, either the Standard or Professional version, properly installed. Refer to the Flight Simulator documents and package for its system requirements and installation procedure.

It is recommended that you start with a clean system, especially if yours is mid-range or lower computer. Consider shutting down other programs running in the background, as these will take up system resources that Flight Simulator can use to run more smoothly. This is especially true of graphics intensive programs that may tax your video card and rob FS of resources it needs to perform at its best. A reboot of your system before an FS session is always a good idea.

Another thing that can affect the performance of your system is whether or not your anti-virus scan program is running (and you must have one in the crazed on-line environment). I cannot speak for others, but I have found that the Norton Anti-Virus may cause delays in response to inputs, like mouse clicking, for instance. When you are not on-line, and especially when running FS, you may wish to disable Auto-Protect by right clicking on the Norton icon in the task bar (bottom right of Windows). Just be sure to enable it again when you are downloading, or especially handling e-mails! You may find the same behavior with other anti-virus programs.

MANUAL  This folder contains the html version of the User's Manual (this document) along with all of its illustration and video files. To read the manual, click on the file '_manual.htm'. Your browser will automatically be invoked and the manual will be displayed. NOTE: Moving the file to a location without the other files in the folder will cause the graphics to not be displayed. The HTML manual is not intended for printing and contains dynamic links which will make your navigation through the document more convenient. The links can not be reproduced in other formats. The imbedded instructional videos can be run separately by opening the manual folder and clicking on the desired wmv file. You may run this manual on your browser concurrently with Flight Simulator, for easy reference.

A PDF version of this manual, suitable for printing, will be available from www.maam.org and your favorite flightsim website after July 4, 2004.

PTM  This folder contains a complete, scanned copy of the 96 page PILOT TRAINING MANUAL FOR C-47. This is a fascinating historical document in its own right, but it serves another purpose for users of the R4D. Because this simulation add-on has been designed to be as faithful to the original aircraft as possible, we have deferred to this manual for much of the operational information which otherwise might be required here. In most cases, where operational details differ between the real aircraft and the FS version, we have tried to set those out in the various sections of this User's Manual. But in most cases, you won't go far wrong if you "fly it by the book".

AIRCRAFT PACKAGES

The CD contains separate, self-installing R4D / DC-3 aircraft packages for FS2002 and FS2004. These are installed by the included installation routine and each contains the complete aircraft, including panels, gauges, sound suite, and start-up flights. See Installation, below.

There are several different aircraft models in this package. The flagship is the museum's own Douglas R4D-6 of the U.S. Naval Air Transport Service (NATS), tail number 50819...
Here's our girl on the ramp at MAAM, in her bare-metal guise. The scenery is MAAM-SIMS KROG/MAAM freeware (krdg_fs9.zip), included in this package.

...and here she is in her present-day silver paint at dusk.
The R4D is a 28-seat Admiral’s transport with starboard side air-stairs.

MAAM’s R4D-6 is equipped with unusual 1350 HP P&W 1830-94 engines fitted with the distinctive, long “desert filter” scoops.

The CD also includes two other complete, civilian DC-3 aircraft packages.
The United Air Lines Mainliner "City of San Francisco" is a 21 passenger model with a starboard side air-stair.
The British European Airways "Sir Eric Geddes"

...is a RMA freighter with port-side double doors.
Cargo can be loaded and unloaded with a stroke of the / key.

Obviously, these are not just "repaints" of the R4D model. Besides the structural differences in the aircraft, including their unique virtual cabins, the two civilian ships are powered by typical P&W 1830-92 engines of 1200 hp each and come with their own flight model and appropriate MAP and RPM gauges, speed and power placards, as well as reference pages and checklists. All three aircraft, however, share the R4D's cockpit and instrument panels, with the exception of the aforementioned features. A number of other liveries, based upon these three models, are planned or in the works and will be released as free add-ons. If you have a favorite DC-3, and particularly if you can provide photographs from which Jan can work, we might even be able to add it to your hangar.

MAAM-SIM encourages freeware repaints of the MAAM R4D and DC-3's by other artists. The only condition is that only the modified texture files from our package be distributed and that certain conditions be met. See the Legal Notice section for further details.

ADDED AIRCRAFT ENHANCEMENTS IN THIS EDITION OF THE CD INCLUDE THE XC-47C AMPHIBIAN AND D-DAY C-47 / DAKOTA PACKAGES. Please read the separate instructions for these aircraft on this CD. These are "DDayC47.doc" and "XC47.doc".

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INSTALLATION OF AIRCRAFT PACKAGES

Double-click on the self-installing archive for either FS2002 or FS2004. You may change the path - where the files are installed - during the install routine, but we recommend you stick with default installations, as it will save you work and confusion in the future. However, if your FS installation is not a default installation (C:\Program Files\Microsoft Games\Flight Simulator 9 for FS2004, or C:\Program Files\Microsoft Games\FS2002 for FS2002) YOU MUST change the path to match yours. The installation program will automatically install all the files to the correct folders and locations. Simply follow the on-screen instructions. All three aircraft, the MAAM-SIM R4D-6, the MAAM-SIM DC-3 - Passenger, and the MAAM-SIM DC-3 - Cargo, will be installed. NOTE: You must have the R4D in your Aircraft folder in order for the two DC-3’s to work, since their sound folders are aliased to that of the R4D. Similarly, you must have the Passenger DC-3 in the folder to have the Cargo DC-3, since they share the same panel.

RESOLUTION

These aircraft and their panels, because of the great level of detail and realistic scale of the gauges, are best suited for higher resolutions. The panels were designed for a minimum of 1024 x 768, but look even better at 1280x1024. If you are experiencing trouble making out the small letters and numbers, give a higher resolution a try. Just go into Windows Control Panel/Display/Settings to select a higher resolution, then adjust the FS menu settings for Options/Settings/Display. You may be surprised at how much that helps the old eye strain.

AIRCRAFT COMPLEXITY OPTIONS

Because not all computer systems were created equal, and because what one user considers an acceptable frame rate and performance may not please others, we have decided to offer two different complexity levels in the R4D / DC-3 package. Since the biggest controllable factor on frame-rate hit in this aircraft lies with the Virtual Cockpit, or VC, along with the associated panels, gauges, and textures, these options feature different levels of VC inclusion.

Upon installation, you will find the R4D and MAAM DC-3’s in the Select Aircraft menu as shown in the three pictures that follow:

The basic aircraft has a full 3-D Virtual Cockpit and Virtual Cabin. All of the variations marked Medium have a virtual cockpit, but no virtual cabin.

In addition, the Medium complexity models contain an option to remove the 3-D Yokes, for those wishing an unobstructed view of the panels and controls. See the Virtual Cockpit section of this manual for instructions to accomplish this.

OTHER METHODS OF IMPROVING YOUR FRAME RATE

As an alternative to stepping down to a less complete VC, or to supplement the frame rate performance even further, there are a number of other things you can do. Just about all of them involve compromise and sacrifice of one sort or another. The following suggestions are presented primarily for the benefit of inexperienced FS users, since most old hands at the game have learned most or all of them from experience. This is by no means an exhaustive list, and what works on one system very well, may yield little or no improvement on another, due to differences in the hardware and software on a given computer. You should experiment with different settings and options. Sometimes, things that you would never dream are a factor in affecting performance and frame rate can produce a significant improvement.

OPTIONS / SETTINGS / DISPLAY MENU Most of the things you can do within Flight Simulator to improve performance are located right here. Moving sliders to lower settings and un-checking some boxes may improve your performance. If you take a look at Flight Simulator Help under 'Setting Scenery Options' you’ll find that about everything that may affect performance. The same goes for 'Setting Aircraft Display Options' and 'Setting Hardware Options’. You should read these Help sections and experiment for yourself to find a combination of settings with which you are satisfied. One of these under the Aircraft Display Options you may want to consider is turning down the Virtual Cockpit Gauge Quality from High to Low. Take a look at the comparison below...

DIFFERENT VIEWS You will achieve the highest frame rates in Tower view, but unless you are a radio-controlled model aircraft flyer, you might find flying from this view a bit awkward! The next highest frame rates are in Spot view, followed by the 2D panels, and the VC will give the biggest frame rate hit, as you might expect.
USE WINDOWED, RATHER THAN FULL-SCREEN MODE  Doing this may give you the most dramatic increase in frame rate. That is because certain features of your video card may only work in full-screen mode. The improvement in FR and the deterioration of the display are going to depend on your particular video card. You may be able to accomplish the same thing by adjusting the display sliders and check boxes, like anti-aliasing, for instance. But I prefer to leave my display options high, and then take advantage of the performance boost afforded by windowed operation when needed, such as when I'm in an area of dense AI aircraft traffic, scenery, or clouds. It's a simple matter to hit Alt + Enter and reap the FR benefits without even interrupting my flight to mess with sliders and check boxes. When I want to go back to the high quality display, I just tap Alt + Enter again, and I'm back in full-screen mode.

HARDWARE UPGRADES  This is last on the list of options because we are talking about MONEY. The cheapest effective upgrade is probably a boost in RAM. But the most bang for the buck is probably a better video card. Don't take manufacturer's claims at face value - rumor has it they might be trying to sell you something! The best 3-D card for gaming in general might not be the best for Flight Simulator. I suggest you read or ask questions on the AVSIM Online PC / MAC Hardware for Simulations Forum, and read user reviews, if you can find them, before spending a lot of money on hardware. The good news is, improvement in performance is not always proportional to the amount of money spent. Well, it's good news if you don't learn it the hard way! $$$$$!!!

REALISM, DISPLAY, AND SOUND SETTINGS

FS2004 and FS2002  This manual covers both the FS2004 and FS2002 R4D / DC-3 packages. If you are still flying the older platform, you may find that some of the greater capabilities and features of the "Century of Flight" outlined here may convince you it's time to upgrade. This add-on was primarily designed for FS2004, then backward engineered for FS2002 because there are still so many fans of the R4D still using the old sim. But frankly, the aircraft are at their best in FS2004. Our Flight Dynamicist, Rob Young, has this to say, "First of all, no one should expect trim settings to be remotely the same. FS2002 handles power, air density, altitude versus density and lastly lift in very different ways compared to FS2004. So trim is going to be different. Therefore please do not fly in FS2002 and compare trim etc with what it was in FS2004, or vice versa. Just fly and refer to the placard targets.

Since this aircraft simulation has been designed to be as true to the real aircraft in every respect as possible, we recommend you fly it in a realistic manner. The Flight Simulator Aircraft / Realism menu bars should be set, in our opinion, like this...

FS 2002

![Realism Settings](image)

FS 2004
However, whether you go full bore toward realistic settings on all the sliders and boxes, or not, there are a couple of IMPORTANT aspects of the realism settings:

IMPORTANT! For both FS2002 and 2004, the flight model GENERAL REALISM SLIDER MUST BE SET AT MAXIMUM. That's the top slider in the realism menu shown above. Many of the flight model's design parameters will not work as set if this slider is even one fraction of a centimeter less than maximum. FS implements max realism at precisely max slider travel. Any less than this and the flight model realism jumps back to "easy".

IMPORTANT! Likewise, P-Factor is bugged in FS2002 but is fine in FS2004. Our flight dynamics maestro, Rob Young writes, "The R4D and the DC3, like our B-25, and the ideals we have for their performance, almost all set us up for the worst possible influence of the bugged FS2002 p-factor. In detail, the p-factor reacts worse to the following:

1. Powerful engines, especially twin piston props (and we have a VERY powerful couple of engines, especially at full thrust).
2. The fact that we want a rudder which correctly responds to asymmetrical thrust (almost all other aircraft have too powerful a rudder).
3. Almost no other prop aircraft for FS2002 can side slip. In fact no other aircraft I've ever tried, apart from my own, can side slip. I've had to cut the slip down a bit to stop the p-factor excesses in FS2002, but you can still get a good 25 degrees slip if you ever wanted it (which is nevertheless not a recommended manoeuvre in these aircraft)."

So, unless you like taking off-runway excursions when you pull the nose up, we strongly recommend you just turn off the P-factor slider in FS2002, because it is either ON full if the p-factor slider is anywhere right of zero in the aircraft realism menu. Thus if you set the slider even one quarter of the way from the left, FS2002 still interprets this as on FULL. There is actually no increment in p-factor in FS2002.

In FS2004, P-factor is fully adjustable within the realism menu. Therefore, in FS2004, we recommend setting the p-factor slider between one third and halfway if you want to fly with this effect on. Please note that the rudder (if you use the preferred tail wheel lock and free castoring differential braking option), will not correct p-factor drift until 20 knots or so airspeed has been established on the take off run.

IMPORTANT! In order to properly see the Virtual Cabin light effects, make sure the Options / Settings / Display / Hardware menu's slider for Hardware-rendered lights is set all the way to the right, to 8. The other settings shown below depend on your video card and personal preferences to obtain acceptable performance.
SOUND SETTINGS  We recommend your Flight Simulator /Options/Settings/Sound menu sliders be set something like this...

The engines are at half-scale, while the cockpit sounds are set to maximum to allow you to hear some of the more subtle sounds, like the ground roll rattle. The Environment is all the way up, but if you don’t like your thunder and rain loud, tone this one down. The Navigation setting is turned down to prevent the radio Morse identifiers from blasting your eardrums out. Lessons / Flights setting is up to you, but the ATC is at the top end so you can hear transmissions over the roar of the engines.

CONTROL DEVICES

The type of control device(s) you use can and will affect your enjoyment of this aircraft model. The real plane has a yoke and rudder pedals, obviously, but many flight sim pilots have and prefer joysticks. So did I, for years, until I got my first yoke! For the last few years I have had a yoke and pedals with toe brakes on my primary computer, and a twist-stick with Force Feedback on the secondary, so I have flown the DC-3 extensively with both. I find the aircraft much easier and more realistic to control with the yoke and pedals. But a lot depends on your particular brand and type of control device and how it is set up and calibrated. It is all a matter of personal choice.

We strongly recommend, however, that you obtain and use a rudder control device, either pedals or a twist type joystick. Flying the DC-3 with auto-coordinated rudder is not only unrealistic, it will also rob you of much of the pleasure of controlling the aircraft as it was meant to be controlled. In fact, this model is designed to be steered on the ground by use of differential braking and power, just like the real thing. If you do not have a set of pedals with toe brakes, you may accomplish this by using the F11 and F12 keys, or you may choose to use the optional "Easy Steering" rudder steering model option.

We also recommend you use a mouse equipped with a scroll-wheel. You can adjust many controls by placing the cursor on the desired mouse control point (hotspot) and moving the wheel. This is especially useful for controlling the Sperry Autopilot. See the section on the Sperry for further details.

IMPORTANT  There are known and serious issues on joysticks which provide mechanical trim sliders. The reason is that most trim sliders do not work within a required range. FS provides the flight model tweaker, with many ways in which to adjust the range of trim, but this is dependant on EITHER operating trim through keyboard presses or trimming by assigning it to a joystick button which is held down for smooth trim updates,
NOT a slider. We encourage you to deploy trim by repeat buttons, NOT sliders, or by pressing the standard keys for FS. If you find that you are not seeing “BT” achieve the correct behavior and numbers in takeoff, it may well be a problem with trim sliders.

The R4D / DC-3 aircraft has been designed for optimized trim with the repeat function (Options / Controls / Assignments menu) set HALFWAY. In our experience, setting the repeat function to MAX results in too-quick trim changes.

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START-UP FLIGHTS

A number of flights, or situations, as we old-time FSers tend to call them, have been installed in the Flight Simulator Flights menu under the category "MAAM R4D DC-3". All of these are engines-off, "cold cockpit" situations, and there is one for each airplane in the package. *(NOTE: FS sets the master ignition switch to on and the mag levers to Both when an aircraft is loaded. Nothing we could do about it.)

MAAM-SIM NATS R4D-6 START-UP FLIGHT

This is an engines-off situation with the bare-metal version of the R4D parked in front of the MAAM hangar at Reading. Of course, you can switch aircraft once you have loaded the flight and all the parameters will transfer to the new plane. The realistic MAAM hangar and complex is part of the freeware MAAM/Reading Scenery for FS2004, by MAAM-SIM’s Bill Womack, included in this package.

Here’s what you see in the default scenery in FS2002...

Here’s what you see in the default FS2004 - enough said!

There are also start-up flights for the BEA Freighter, “Sir Eric Geddes” at Gatwick....
MAAM-SIM BEA DC-3 START-UP FLIGHT

...and UAL Mainliner "City of San Francisco" at KSFO.

You may create your own start-up flights by starting from one of these, then moving the aircraft by using the World/Airports menu, change the weather, time of day, radio frequencies, and so on.

SCENERY

FS 2004 Included in the package, for those who do not already have it, is MAAM-SIM's freeware KRDG/MAAM scenery, for FS2004 only. It features fully detailed scenery of the Reading Regional Airport (KRDG), including the grounds of the Mid Atlantic Air Museum. All objects were constructed in Gmax and feature photo-realistic textures that bring them very close in appearance with their real-world counterparts. Other scenery features include radio frequency-controlled hangar door animations, realistic AI GA and Commercial traffic and even the inclusion of an important local VFR landmark...
Throughout this manual you will see other screenshots of the DC-3's at our completely rebuilt Reading. To install the FS2004 scenery, open the Scenery folder on the CD and follow the instructions in the FS9scenery.txt you will find there. Tip: This Freeware Scenery can also be downloaded from all the major flight sim websites - file name "KRDG-FS9.zip".

MAAM's new sign as it was in September, 2003 with the "MAAM-SIM Mobile HQ" in the background. - FS9, only

North side of KRDG, with the entire MAAM complex, Reading Flight Academy, and FBO.
FS2002 During development, Bill Womack made some demo files for FS2002 of the early stages of the MAAM scenery. We have included this, as well. At least you can see the MAAM compound, including the hangar, museum office, storage building, T-hangar, as well as the WW 2 Weekend French Village, wooden control tower, and vintage Gulf filling station. To install it, open the Scenery Folder on the CD, read "FS8scenery.txt and follow the instructions. NOTE: This was only a preliminary development stage for the scenery and the exclude file will eliminate the MS default KRDG airport buildings. So you have to make your choice. You can always delete the MAAM scenery, or just inactivate it in the scenery menu, and get them back, if you like.

INSTRUMENT PANELS

This section of the manual deals primarily with the 2-D panels and sub-panels, or pop-ups. Although the Virtual Cockpit and Cabin will be dealt with in another section, both the 2-D and 3-D panels share the same instruments and controls, to a large extent.

MOUSE CONTROL POINTS  Most controls on the R4D's various panels and pop-ups can be operated by using your mouse. Move your cursor to a control until the "pointing hand" cursor appears. This indicates that you are in the mouse click or hotspot area of the control.

IMPORTANT: All mouse activated, rotating controls on the gauges of the R4D panel, except those on the Sperry Autopilot, are controlled by using both the Left and Right mouse buttons. The right button will rotate the knob or lever clockwise, and the left mouse button will rotate it counter-clockwise. Placing the cursor on
the desired control and clicking the desired mouse button will move the control one increment per click in that direction. Holding the mouse button down will spin or move the control in a continuous motion.

The Omni Bearing Indicator (OBI) above serves as an example of a gauge with right and left mouse button control. Place your mouse cursor anywhere in the orange highlighted area. When you are in the “hot spot” your cursor will become a pointing hand, as shown. Clicking the right mouse button will move the OBI’s bearing ring in the direction of the yellow arrow one degree per click. Clicking the left mouse button will move the ring in the direction of the red arrow. Holding down either button will spin the ring at the rate of about ten degrees per second in the appropriate direction.

SCROLL-WHEEL MOUSE In FS2004, you may also use the wheel of a scroll-wheel-equipped mouse, to operate these controls. Simply place the cursor over the hotspot and rotate the mouse wheel. Once you have tried this, you’ll really appreciate this feature. In fact, using a mouse wheel will get around an otherwise annoying bug with the Sperry. See the Known Issues section of the manual for more details.

Instruments with rotating controls using the right and left mouse button capability, or the mouse-wheel, include:

- Clock - mouse points. (See Clock Diagram)
- DME 1 - control knob and bearing knob
- VOR OBI 1 and 2 - bearing control knob
- ADF - bearing control knob
- Attitude Indicator - caging knob and vertical adjustment knob
- Directional Gyro - adjustment knob
- Fuel Quantity Gauge - fuel tank indicator knob
- DME 2 - omni selector knob and knots / TTS knob
- Radio Stack - all knobs on Nav, Com, ADF, and Transponder sets
- Radio Control Box - Xmit 1/ Xmit 2 knob
- Ignition - left and right magneto levers
- Cowl Flap Controls - right and left cowl flap levers
- Fuel Selector Controls - right and left engine levers
- Aileron and Rudder Trim Controls - trim cranks
- A mouse scroll-wheel will also operate the Throttle, Prop, and Mixture knobs.

All other mouse-able switches and controls on the R4D panels are operated by using the left mouse button only. These left-click controls are operated in several ways. The Full Quadrant Console offers examples of each (see Full Quadrant Diagram). The Tail Wheel Lock Lever offers an example of a “toggle” mouse action. Clicking the left mouse button will move the lever, and clicking it again moves it back to its original position. The Elevator Trim Wheel uses two hotspots to move the wheel up and down. The Prop, Throttle, and Mixture Control Levers feature drag-able hotspots, where holding down the left mouse button allows you to move, or “drag” the knobs to any desired position in its travel.

2-D PANELS AND POP-UP DIAGRAMS

The panel and gauge diagrams which follow will show most of these mouse hotspots, but many are designed to be intuitive and will quickly become second nature.

The primary panel, visible when any of the MAAM DC-3’s is loaded into Flight Simulator, is the Pilot’s Panel. It can be called up from the Copilot's Panel by clicking on the AC icon. The keyboard command to toggle the panel on and off is: Shift + 1. If you use the key command to call up the panel, you will need to turn off the active panel by using its key command. For example, when calling up the pilot's panel from the copilot's panel, hit the Shift + 3 key to turn off the copilot panel, either before, or after using Shift + 1.
By mouse clicking on the CP icon, you are switched to the Copilot's Panel and seat. The keyboard command to toggle the panel on and off is: Shift + 3
You can access an enlarged, or IFR, panel by clicking on the magnifier icon on the pilot's panel. Icons are located at the same place on both the regular and enlarged panels so that you can quickly check the large panel, then return to the normal panel with a couple mouse clicks. The keyboard command to toggle the panel on and off is: Shift + 2

You will find this panel useful to make the gauges easier to read precisely, adjust the barometric pressure in the altimeter, and a number of other tasks. Of course, you can fly "under the hood" for practice IFR work by using this and the copilot's IFR panel.
Here is the enlarged, IFR, Copilot's panel. Like its counterpart on the other side of the cockpit, it is invoked with the magnifier icon and has a corresponding return icon in the lower, outboard corner. The keyboard command to toggle the panel on and off is: Shift + 4. Tip: When flying from the pilot's seat, hit Shift +4 to quickly check the state of the fuel quantity, landing gear indicator lights or copilot's DME. Hitting the key combo a second time takes you back to your primary panel.

Enlarged (IFR) Copilot's Panel

Mouse icon is located at the same coordinates on normal copilot's panel

Key command: Shift +4

All mouse points identical to normal copilot's panel
Called up by the OEP icon on both the Pilot's Panel and Copilot's Panel, or by using the key command Shift + 5, this pop-up can be used by itself, or in conjunction with the Full Quadrant pop-up, as shown above.

Users of the previous versions of the R4D will find the new OEP is very different from the one they are used to. That is because the old one was very much a jury rigged affair to make room for a "modern" autopilot and an arrangement of the starting and light switches visible on the main panel. The decision to go with a pop-up sub-panel for the OEP and the elimination of the phony AP allowed a much more realistic rendition of the R4D's real overhead panel. Many, or most of the switches and controls are either self-explanatory or will be familiar from other aircraft in FS. The following diagram shows the mouse points on the OEP, except those for the radio stack, which has its own diagram.
Engine starting will be covered in its own manual section, but note that the three toggle switches, PRIME, START, and VIB are the only self-centering switches in this panel. All the others, with the exception of the two MAGNETO LEVERS, are simple toggle switches. There is, of course, one more mouse point not highlighted above - the icon to call up the Radio Control Box.

The R4D’s OEP can be divided into four areas, laid out in horizontal bands. From top to bottom, we’ll call these the Light Switch area, the Radio Stack, the Switch Bank, and the Ignition.

**LIGHT SWITCH AREA**

A pair of working toggle switches with indicator lights controls the Inverters (not supported by FS). Next is a pair of rheostat knobs for the instrument lights. The RED is non-functional, but the WHITE toggles the 2-D AND 3-D panels’ GAUGE LIGHTS.

On the right is the row of Light Switches, marked:
- **NAC** - Nacelle Lights (not implemented)
- **CABIN** operates the VC passenger cabin light effect. (SEE NOTE BELOW)
- **LANDING LEFT** and **RIGHT** which operate as a gang
- **BEACON** that operates the rotating beacons on the belly and tail fin
- **NAV** which operates the wingtip and tail-cone navigation lights

**NOTE:** In order for the cabin and cockpit lights to operate properly, you must set the Options/Settings/Display/Hardware/Hardware Rendered Lights slider all the way to the right, to 8. Also, if the cabin lights are On (O key or Cabin Light switch) before engine start, the start-up exhaust flame effect will not appear. Cockpit, Nav, Beacons and Landing Lights may be on and will not cause this conflict.

**TIP:** Flying with your Navigation Lights on during daylight hours, which you should do anyway to comply with FAA regulations and safe flying practices, will improve the clarity and brightness of the Virtual Cockpit panels while not altering the appearance of the 2-D panels.

**RADIO STACK**
The radio stack consists of, from left to right, COM 1, NAV 1, ADF, TRANSPONDER, NAV 2, and COM 2 radios. The next diagram shows the mouse control points for the different units in the stack. The headset icon in the center brings up the Radio Control Box pop-up.

The radios are controlled by a pair of Radio Control Boxes located on each cockpit side wall. One of these can be called up as a pop-up within a pop-up by clicking on the headphone icon in the center of the radio stack.

The active controls on the RCB are:
The MICROPHONE SELECTOR knob can be moved between the XMIT 1 and XMIT 2 positions by left or right clicking. When a com radio is selected for transmission, the corresponding AUDIO SWITCH will be moved to the ON position automatically. The other Com radio can be toggled ON and OFF so that you may choose to hear both radios, or only the one on which you have chosen to transmit. The NAV 1, NAV 2, ADF and DME AUDIO SWITCHES toggle the audible Morse identifier which can be heard when a station is tuned and in range. The MARKER BEACON SWITCH toggles the audible tones of the OMI when you cross over a marker beacon.

SWITCH BANK

The BATTERY switch works only in the Off and On position. The Battery switch must be on to start the engines, and once they are running, either the battery switch, or at least one of the GENERATOR switches must be on for the electrics to work. The other working controls are: ANTIICER, PITOT HEAT, PRIME, START, VIBRATOR, FUEL PUMPS, BLOWERS, RADIO MASTER, and CALL SWITCHES. All others are moving, dummy switches for functions not supported by FS. Engine starting will be covered in an instructional video, later in this manual.

IGNITION
The IGNITION unit consists of a MASTER SWITCH in the center that is toggled by left-clicking on it, and the two MAGNETO LEVERS, which are rotated by left and right-clicking to rotate in the desired direction. The ignition is flanked by the FEATHERING KNOBS, which are also toggled by left-clicking on them. For Engine Starting instructions, see the Aircraft Operation section of this manual.

As only the top of the control quadrant console can be seen in the main Pilot's Panel window, we have provided a pop-up to give access to the whole quadrant, activated by the quadrant icon on the Pilot's Panel, or by using Shift +6. Enlarged RPM and MAP gauges are provided above the quadrant to facilitate power adjustment while using the pop-up.
The Full Quadrant Console Pop-Up contains a number of controls that are not accessible from the partial quadrant that is visible in both the Pilot's and Copilot's panels. Only the Prop Pitch, Throttle, and Mixture Control Levers are adjustable in the partial quadrant. Like the other pop-ups, this window can be sized and dragged to suit your own preferences, although it was designed for and will look best in its default position. It may also be undocked by selecting that option from the drop-down menu you will see if you right click on it. The next diagram shows the various mouse control hot spots, each shaded in a different color. Note: the enlarged RPM and MAP gauges have been left out of this pop-up diagram and the next for clarity.
This diagram shows the various mouse points on the FQC. Beginning at the top left, let's go clockwise around the unit. Operation of the controls will be covered later in the Full Quadrant Console section of this manual.

**LEFT AND RIGHT FUEL TANK SELECTORS** Right and left-clicking anywhere in these zones will rotate the levers.

**ELEVATOR TRIM WHEEL** Individual hotspots move the wheel in either direction. The wheel can be adjusted by the mouse points on the trim wheel on both the normal and full quadrant, or by using the FS key commands number pad 7 and 1. *FS2004 Tip: A mouse wheel works very well to control trim.*

**PROP PITCH CONTROL LEVERS, THROTTLE LEVERS, and MIXTURE CONTROL LEVERS** Knobs can be dragged individually, or in pairs by placing the cursor between a pair.

**CARBURETOR HEAT LEVERS** Knobs are toggled from Hot, at the bottom, and Cold, at the top.

**RUDDER TRIM CRANK** and **AILERON TRIM CRANK** Right or left-click in the shaded area to rotate the crank in the desired direction.

**TAIL WHEEL LOCK LEVER** Left-click in the shaded area to toggle between Locked (left and forward) an Unlocked (right and rearward).

**PARKING BRAKE KNOB** Left-click to toggle between Brakes Set (in, or forward) and Brakes Released (out, or rearward)

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The ATC icon or standard FS key command ` (accent) can be used to bring up the ATC window. The window can be sized and dragged to your preferred position the first time you use it and thereafter it will remain in this configuration for the rest of your session.

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You can use the checklist icon or the standard FS keyboard command, F10, to display the Kneeboard. Subsequent clicks or keystrokes will toggle through the various pages on the kneeboard:

**KEY COMMANDS** - a list of the standard, or default, FS key commands.
REFERENCE - Contains detailed aircraft specifications, performance data and limits, and power settings for all phases of flight, to supplement the checklists. You will also find a printable, MS Word, version of the reference pages in the Flight Simulator/Aircraft/Douglas R4D/Documents folder. There are different Reference Pages with different data for the P&W 1830-94 engined R4D-6 and the two 1830-92 powered DC-3's. TIP: Reference pages may be printed by opening the R4D and DC-3 aircraft folders, clicking on the R4D_ref.htm or DC3_ref.htm, then printing from your browser menu.

CHECKLISTS - The very detailed checklists have been compiled from several vintage DC-3 manuals. The FS2004 version, only, has an interactive checklist. No, we are not discriminating against FS2002. The older sim uses plain text files for the reference pages and checklists, while FS2004 uses html. There are both Normal and Emergency Operation checklists that can (and should) be used to operate the aircraft simulation realistically.

FS2004 Checklist features include:

When you first load the R4D or DC-3 checklist from the kneeboard, you will be asked to choose between a basic, Standard Checklist and a more detailed, Tutorial Checklist. Once you've made your choice, it will automatically load the next time you bring it up. You can switch between list types at any time thereafter by clicking the little link at the very top left of each checklist. NOTE: The choice to be remembered, you must have your Windows Security set to allow cookies from local web pages.
MULTIPLE STYLE OPTION  By clicking either font style 1 or font style 2 buttons, you can choose either a period-looking type-written checklist, or a larger print version, if you find the small print hard to read.

SMART CHECKS  The list can be opened, some items checked, and then closed again. The next time you open the list the checked items will remain checked unless you uncheck them by clicking them again. At the end of the flight you can clear all checked items by clicking the "clear all checked items and bookmarks" button at the top.

BOOKMARKS  If you work through part of the checklist, say the takeoff section, before you put away the list, click the little green bookmark icon next to the next section and the list will automatically jump to this section the next time you launch it. The bookmarks are cleared by clicking the same button at the top that you use for clearing all checkmarks.

PRINTING OPTION  The right-most button at the top allows for printing the list from within the sim, so you can have a paper copy for your non-virtual kneeboard.
FS2002, because it uses plain text checklists and reference pages can not support all these bells and whistles. However, we have provided two versions of the checklist, as we did for FS2004. By default, the more detailed, tutorial version is installed. If you want to substitute the Standard, no frills checklist, here is how you go about it:

1. Using Windows Explorer or My Computer, open the MAAM-SIM R4D-6 (or DC-3) folder in the FS2002\Aircraft directory.
2. Double-click on aircraft.cfg. This will open the file in Notepad.
3. On the seventh line you will find an entry reading: kb_checklists=DC-3_checkride
4. Change the last word from checkride to checklist so it reads: kb_checklists=DC-3_checklist
5. Repeat the edit for each different aircraft model in the file.
6. Click on the X box to close Notepad.
7. Click Yes, to save the changes.
8. If FS2002 is running, reload the aircraft to see the new checklist in your kneeboard.

There are MS Word versions of the FS2002 Checklists, suitable for printing, located in the R4D and DC-3 aircraft folders

These controls, which are located on the deck between the pilots' seats and on the longitudinal wall behind the copilot's position, can be called up on a single pop-up with the flap and gear icon or the Shift + 8 keys.
RETRACTING THE LANDING GEAR

GEAR DOWN AND LOCKED

CLICK ON LATCH, LEVER SPRINGS TO HALF-UP POSITION

CLICK ON LOCK LEVER TO PULL TO FULL-UP POSITION

CLICK ON GEAR ACTUATING LEVER TO RETRACT GEAR

ACTUATING LEVER RETURNS TO NEUTRAL POSITION AFTER GEAR RETRACTS

EXTENDING THE LANDING GEAR

GEAR UP

CLICK ON GEAR ACTUATING LEVER TO EXTEND GEAR

ACTUATING LEVER RETURNS TO NEUTRAL POSITION WHEN GEAR IS DOWN

CLICK ON LATCH TO PUSH DOWN LOCKING LEVER AND SECURE IT

GEAR DOWN AND LOCKED
This pop-up displays two items found side-by-side on the copilot's cockpit wall. These are the paired Landing Gear Pressure Gauge and Hydraulic System Pressure Gauge, and the Left and Right Cowl Flap Control Levers. It may be called up using the Cowl Flap icon or the key command Shift + 7. For operation, see the Cowl Flaps Video in the Operation section of this manual.
The FS20004 or FS2002 standard GPS may be called up with the icon or Shift + 9. Like other windows, you may drag and size the GPS as you wish and it will remain in that configuration during your FS session. We decided to make the GPS available in our R4D because a hand-held GPS is actually used by her MAAM pilots, on occasion. Note: There is no key command for the GPS, since we have used the default FS Shift + 3 for another panel. Call up the GPS by clicking on the GPS icon or the Views / Instrument Panels / GPS drop-down menu.

If you need instruction on the use of this instrument you will find it in the Flight Simulator Help, Index section. There is an extensive tutorial for the new GPS in FS2004.

The FS20004 Map, shown above, or the FS2002 map window can be accessed with the compass rose icon or key command Alt + w + m, which activates the World / Map drop-down menu. Unlike the other windows and pop-ups, this one will interrupt your FS session as long as it is visible. This is standard FS stuff, so you are on your own with this one.

AIRSPEED AND POWER PLACARDS The Airspeed Reference Placard on the pilot's panel, and the Power Reference Placard on the copilot's side, are enlargeable. Clicking anywhere on the cards will bring up a readable version, the same size as in the Enlarged Pilot's and Copilot's Panels. These should be used for quick reference to proper speeds and power settings for various phases of flight and the certified speed limits. Clicking on the enlarged placard reduces it to normal size. NOTE: There are different placards for the R4D-6 and the two DC-3's, as they have different engines and other specifications. See the Kneeboard Reference Pages for detailed information on both models. To fly these aircraft in the most realistic manner, you should adhere to the data on the placards and reference pages.
Pilot's Panel with Airspeed Reference Placard enlarged.

ACTUAL SIZE OF THE PLACARDS AS SEEN IN THE ENLARGED (IFR) PANELS AND THE POP-UPS

Following is an explanation of the abbreviations used.

Official FAR Definitions of V Speed Abbreviations Used in the R4D Airspeed Card

VMC Critical control speed with the critical engine inoperative.

V1 Maximum speed in takeoff at which the pilot must take the first action to stop within accelerate-stop distance. (also) Minimum speed in takeoff following failure of the critical engine at VEF, at which pilot can continue takeoff and achieve required height above takeoff surface within takeoff distance.

V2 Takeoff safety speed.

VR Rotation speed.

VX Speed for best angle of climb.

VXSE Speed for best angle of climb - single engine.

VY Speed for best rate of climb.

VYSE Speed for best rate of climb - single engine.

VB Design speed for maximum gust intensity.

VA Design maneuvering speed.

VLE Maximum landing gear extension speed.

VFE Maximum flap extended speed.

VSO Stall speed or minimum steady flight speed in landing configuration.

VS1 Stall speed clean.

VREF 1.3 x VSO

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PANEL AND POP-UP ACTIVATION BY MENU
INSTRUMENT PANEL DROP-DOWN MENU  Besides the mouse icons and key commands, all of the R4D panels and pop-ups can be accessed using the FS drop-down menu. When in full-screen mode, the menu bar at the top of the screen is hidden, but can be brought up by hitting the Alt key (FS SOP). Then selecting View, Instrument Panel, and the desired panel or pop-up, you can activate it with your mouse.

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MOVING, RE-SIZING, AND UNDOCKING POP-UPS  Each of the R4D pop-up panels will appear at a default location, as shown in the preceding graphics, determined by settings in the panel configuration file and have, in some respects, been designed for those locations. However, each can be moved and re-sized to suit your own taste and preferences by dragging them and their edges with your mouse. For example, the Overhead Electrical Panel (OEP) and the Full Quadrant pop-ups were designed to be used together during engine start-up, as shown in the first graphic below.

But if you prefer to keep a view out the windscreen and use the OEP with the standard, partial quadrant, you can drag the OEP down to the position shown in the second picture, top right. Just place your cursor on any part of the OEP, other than a mouse hotspot for any of the switches, and hold down the left mouse button to drag it into the new position.

If you have aging eyeballs, like mine, or a small monitor, or just want the biggest possible OEP, drag the bottom and right edges of the OEP window a shown in the third screen-shot.

Or, perhaps you have the eyes of an eagle and a monitor that would double as a big-screen in a sports bar. You might choose to uncover all the gauges, except the Sperry by down-sizing and placing the OEP as shown in the final shot.

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FOUR OEP SIZE AND POSITION OPTIONS

DEFAULT OEP AND FULL QUADRANT LOCATIONS

OEP DRAGGED DOWN FOR USE WITH PARTIAL QUADRANT

OEP ENLARGED TO MAXIMUM SIZE

OEP REDUCED AND DRAGGED TO UNCOVER FLIGHT GAUGES
There are nearly infinite number of size and position combinations, and you can do the same thing with the other pop-ups. However, there are a few things to keep in mind, if you do not choose to use the default set-up. First, any changes you make will only hold true during your current FS session with the aircraft. Restarting FS, or even changing aircraft and coming back to the R4D will cause all pop-ups to revert to their default positions and sizes. Conversely, toggling the altered pop-up off and on will not make it revert to its original configuration. Finally, changes you make that work just fine on the pilot’s panel may not look or work so well when you call them up on the copilot’s panel...

The default Copilot’s OEP position works very well in that the partial quad is accessible, as are all of the primary flight instruments and engine gauges. But the second arrangement, which was intended to allow use of the partial quad on the pilot’s side, has lost the quad, along with nearly all the instruments.

SAVING YOUR POP-UP PREFERENCES You can actually make your preferences in pop-up positions your permanent default positions by editing the panel.cfg. However, it is not within the scope of this manual to teach you to be panel designers, so I'll refer you to the SDK from MS, for that. However, there is a FS technique that will allow you to do it just as well, for all practical purposes, without editing any text files. The positions and sizes of pop-ups are one of the parameters in a saved flight. So, all you have to do is size and place all the pop-ups to suit yourself, then save the flight, making it your start-up flight for the R4D. As long as you use this modified flight to start your session with the R4D, even if you move it to another location using the map or airport menus, your pop-up configuration will override the default locations as laid out in the panel.cfg.

UNDOCKING POP-UPS For users of multi-monitor setups, we have designated all of the pop-ups as un-dockable Windows. Right clicking on any of the pop-ups, outside of any hotspots, will bring up a drop-down menu from which you may select to check the Undock item. The pop-up will become a separate window. Repeating the procedure will uncheck and re-dock the pop-up.

VISIBILITY IN THE 2-D PANEL The DC-3, like most other tail draggers in FS, has a shortcoming when taxiing, as well as during takeoff and landing rollout, not encountered in tricycle geared planes—namely, a lack of runway visibility. You simply can not see the pavement ahead in normal cockpit view. Only sky fills the windshield.

There are several techniques to cope with this shortcoming, aside from the obvious solution of using the VC for takeoff.
Some pilots choose to open a second window, using the Virtual Cockpit or Spot Plane view while taxiing. This method carries one penalty, though: it cuts into the frame rate. Depending on your system and your display options setup, this may or may not be acceptable. Or it may be bearable while taxiing, but totally out of the question when taking off.

Personally, I prefer to “adjust my seat position” by hitting Shift + Enter to pan down the view, or raise the seat, if you will, until the runway is in sight. Hitting Space Bar takes you back to a normal view angle. During the takeoff roll, as the tail comes up, quickly hit the Space Bar to normalize the view, and continue the takeoff.

**2-D COCKPIT VIEWS** Usually you must choose between a virtual cockpit and 2-D, out-the-window, views. But we have figured out how to give you both. So there are six photo-real views.
You probably thought it was not possible to get a straight-to-the-rear view from a DC-3. But, when you pull the hat switch to the rear, or use the number-pad 2, you will be treated to this view from the R4D’s astrodome. That’s the horseshoe antenna blocking your view of the vertical stab, but it’s a nice view all the same. If you are a fanatic for details, and don’t want to have this view in your civil DC-3’s, just delete the bitmap from your DC-3 panel folder, but I chose to leave it in because of the utility of it.

SELECTING VIEWS - When the 2-D Panel is active, the views are selected by using the hat-switch on your yoke or stick, or with the number keypad (number lock on). The only peculiarity is that, although the cabin view is controlled by the forward position of the hat switch, the key command is Ctrl + 8 with the number lock OFF. This is because the nose view is programmed as the “Look ahead/up” command.

LOCKING VIEWS ‘ON’ - Views are active only as long as the switch or key is held down, and then return to the forward main panel view. But you can choose to lock a given view ON. While you hold the hat switch or key down to activate the desired view, hit the Number Lock key, and then release the switch or key. The view will remain active until another view is selected. Again, the cabin view is a bit different. When it is selected by key, it will remain on by itself, without hitting the Number Lock. Hitting another view will turn it off.
FRAME RATES IN 2-D VIEWS - You may notice a reduction in frame rate when looking out the side windows. This is because the engines, wings, and props, which are actually part of the so-called VC, are visible. Users of the "Medium" complexity version of the plane will not have this hit, but then they won't have the engines and wings out there, either!

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VIRTUAL COCKPIT AND CABIN

The MAAM-SIM R4D and DC-3's are each equipped with a 3-D "Virtual Cockpit", or VC. We have expanded that abbreviation to represent "Virtual Cabin", since our VC encompasses the entire cockpit, baggage and radio compartments, and passenger cabin. Sorry, we did not include the lavatory in the tail. You'll just have to hold it. ;-)
1. Using Windows Explorer or My Computer, open the MAAM-SIM R4D-6 (or DC-3) folder in the FS Aircraft directory.
2. Open the model.m folder
3. Double-click on Model.cfg. This will open the file in Notepad.
4. Edit the entry by adding -Y to the end so that it reads:

   [models]
normal=r4d_medium-Y

5. Click on the X box to close Notepad.
6. Click Yes, to save the changes.

   NOTE: If you remove the yoke with FS running, you MUST restart the program before the change will take place.

CONTROL ANIMATIONS The VC flight deck includes a number of animations that mirror the controls in the 2D panels, as well those of your yoke or other control devices. Animations include the yoke; rudder pedals; throttle, prop and mixture levers on the quadrant; the gear lever and ball, wing flap lever, and cowl flap levers.

MOUSE CONTROL IN THE VC The VC uses the same photo-real gauges as the 2D panels, but only certain mouse controls will work in the 3-D panel. These include the entire Sperry Autopilot, DG adjustment knob, Altimeter adjustment knob, DME's, VOR's, ADF, Fuel Quantity Gauge, and Flap Indicator hotspots. Most mouse-able gauge controls can be controlled with keyboard commands, though, and of course some of them may already be controlled by your yoke or stick. Some control devices have programmable buttons that you can set up for these functions, in case you fall in love with the VC and never want to leave.

LOOKING AROUND THE VC The best way to look around, up, and down in VC view is by using a hat switch on your yoke or stick. If you don't have a hat switch, you'll have to use the key commands. See your kneeboard, or the Options /Controls / Assignments menu of Flight Simulator...

By default, when you first select VC view, using the S key, you will be placed in the pilot's seat.

MOVING AROUND THE VC To move about the VC, use the keyboard commands you will find listed on the first page of your kneeboard, or in the Options / Controls / Assignments menu of Flight Simulator. You may wish to experiment with different magnification levels to obtain the exact view you want. Do so by clicking the mouse anywhere in the panel, then adjust magnification with the + and - keys. For fine adjustment, use Shift with the + and - keys. To return to the pilot's seat - the starting position when you first load the aircraft, press the Space Bar. (See Point of View, below)

POINT OF VIEW As is true with every other Flight Simulator aircraft equipped with a VC, the eye-point, or point of view moves about the aircraft's internal model in response to your key commands. When you move to a different part of the aircraft model, then manipulate your hat switch to look around, up, and down, you will naturally see everything from your new point of view.

ANOTHER WAY OF MOVING AND LOOKING AROUND We recommend you try a very nice freeware utility called "ActiveCamera 2002 and 2004" by Serge Baye, Guillaume Darier, and Andy Newman, of Anticyclone. This add-on program for FS enables keyboard control of movement around the VC using the number pad, which is much easier and more intuitive than the default key combinations. The program also allows you to move in the same way outside of the plane, which makes a real walk-around inspection possible. Use of the ActiveCamera program allows you to move anywhere inside the aircraft, well beyond the normal limitations posed by the visual model. For instance, you can move around to see what it's like flying from the passenger's point of view, or just take some dramatic screenshots...
from inside the cabin.

Then there's the spectacular fly-by capability and the "head latency" feature that gives you a real sense of movement during attitude changes in VC mode. Give it a shot. We think you'll like it. MAAM-SIM is not affiliated with Anticyclone - we're just fans of them and their utility.

AIRCRAFT ANIMATIONS AND SPECIAL EFFECTS

The R4D features a number of external model animations, including all control surfaces, wing flaps, and landing gear, as you probably expect. These are all operated in the normal fashion, with standard FS key commands and the mouse activated controls on the 2-D panels and pop-ups, as previously discussed. In addition to these, there are several others that require a bit of explanation.

COWL FLAPS  The cowl flaps can be opened and closed through a dozen stages increments by using the following key commands: OPEN - Cntrl/Shift-V and CLOSE - Ctrl/Shift-C. More realistically, you can operate the cowl flaps using the Cowl Flap Levers.
CABIN DOORS  The passenger, cargo, and baggage doors of the three models are operated by two different key commands, as shown below...
When the main door, not the baggage or cargo extension door, is open, the red DOOR WARNING LIGHT will be illuminated on the copilot's panel.

NOTE: For the baggage/cargo door operation key command, be sure to release the Shift and E keys before hitting the 2 key, otherwise you will invoke the enlarged pilot's panel. If you want to open both doors together, hit Shift+ E, release them and then hit 1 and 2.

EFFECTS  Jan Rosenberg has created a number of remarkable custom special effects for the R4D and DC-3. We'll let you discover them yourself, Easter Eggs, if you will, with one exception. This one must be initiated by a key command, namely the "i" key, which is the FS default smoke command.

ENGINE OIL DRIPS ON THE RAMP

This command will cause engine oil to drip on the ground from the engines when they are not running. The drips fall one by one, and the patterns are different for each engine. This effect only works in FS2004, as is true with some of the others. As can be seen in the shot above, the relative darkness of the pavement makes a big difference in how visible the effect will appear. The drip lasts for 15 to 19 seconds and the spots on the tarmac will last for three minutes. (Don't we wish we had this "vanishing oil" at MAAM?) Press the "i" key twice for additional drips. The effect has a built-in time limit, so the "i" key is pressed once to start it. After the time limit expires (20 seconds), pressing "i" twice starts the next initiation.

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OPERATION

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We have provided several sources of information on the operation of the R4D and DC-3. Aside from text and illustrations in this USER'S MANUAL, and the CHECKLISTS and REFERENCE PAGES, previously discussed you should also use these included items:

PILOT TRAINING MANUAL FOR THE C-47, a scanned, 96 page illustrated manual published by the Office of the Assistant Chief of Air Staff, Training, USAAF during World War II. This will be found in its own folder on the CD called PTM. Open the folder and click on the c47ptm.pdf document to read it.

R4D AIRCRAFT OPERATION INSTRUCTIONAL VIDEOS Following are a series of instructional videos shot aboard the R4D with MAAM President Russ Strine, the pilot of the real #50819. Russ is an ex-Embry Riddle flight instructor, so explanation comes easily to him, and by watching the referenced videos and reading the sections below you can benefit from his store of knowledge about the DC-3. The videos follow a normal flight sequence, from Engine Start to Shut-Down. Russ discusses and demonstrates the actual flight procedures he uses on the MAAM R4D with its P&W 1830-94 engines. If you are flying one of the -92 powered DC-3's, refer to the Airspeed and Power placards on the panel for the correct numbers, where they differ from the R4D.
Below the videos, where appropriate, additional instructions that apply to the Flight Simulator aircraft are laid out. Some of these notes are **IMPORTANT**, as they point out differences in FS procedures because of the limitations of the sim, from the actual procedure.

When the video from which these clips are derived was made, in February, 2004, our Douglas was still in need of a couple new engines, so Russ talks us through everything, but we hope to hear the new mills cough to life soon, if we can sell enough CD's. :-)

To run a video, simply pass your mouse cursor over it. It will stop automatically when finished, or you can stop it by right clicking, then selecting STOP from the drop-down menu. Just be careful that your cursor is clear of the video box when you use the menu, or it will start again. All videos are Windows Movie Video (wmv) files.

If you wonder why I have spread the movie boxes out this way, it's because while a video is running, if you were to move your mouse over another video you will have multiple flight instructors yakking in your ear! Spacing them out this way makes sure there are not two videos showing in the browser at the same time.

To run the videos outside of this manual and your browser, go to the Manual folder in your C:\R4D Files folder, locate the video file you wish to play, and click on it. This will start your default viewing program, usually Windows Media Player, and the video will begin. You can adjust the viewing size in your player, but the videos were made the size you see below to keep the file size down. Even so, several are over 30 MB. Enlarging them will cause the picture quality to deteriorate quite a bit. Now you know why this is the biggest user's manual you ever heard of!

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**ENGINE STARTING PROCEDURE VIDEO**

IMPORTANT! You must set Mixture to Full Rich in order to start the engines. This is a deviation from the procedure Russ explains because of the way MS FS models the fuel system. You will notice when you use the auto-start key command, Ctrl + E, that the mixture levers are advanced before the engine starts. Perhaps in the next iteration of FS they will make working fuel primers so that we can do it by the book. Also in FS, the fuel-pressure sensors are incorrectly placed after the carburetor-mixture controls, and not in the fuel lines before the carburetors. So, if you do not have the mixture levers advanced when you turn on the fuel pumps, you will not see fuel pressure registering on the gauges.

Because you have only one "finger", the mouse, to use, unlike Russ, you can not hold or operate more than one switch at a time. So we have made switches self-center after an appropriate period. This does mean that you can't dawdle before performing the next step, or the start-up may fail. But once you have learned the procedure, you should have no trouble starting the engines just like Russ does (except for that Mixture business, above!)

**TIP: Hold down the VIB switch until the engine catches.**

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**ENGINE RUN-UP VIDEO**

The capability to lock the tail wheel is in FS2004, only. See the Full Quadrant Diagram for the location and operation of the Tail Wheel Lock Knob.

The Propeller Feather Check in FS will yield about a 400 RPM drop when you test it at 1700 RPM.

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Under constant anti-icer use the alcohol level will drop from full to empty in a bit less than 5 hours. The alcohol level is only adjusted when fuel is added to the main tanks so if you reduce the fuel load from the menu the alcohol level does not change.

In the FS model, the Cowl Flap Trail position is an intermediate position between Open and Closed.

Here's a review of how it's done on our sim:

1. Bring up the Full Quadrant Pop-up. Center the Elevator Trim Wheel and the Rudder and Aileron Cranks, and lock the Tail Wheel.

2. Gradually advance the throttles until a Manifold Pressure of 52 inches is reached. Quoting the PTM: "Advance your throttles evenly and steadily until you reach takeoff power. This forward movement of the throttles should take a full five seconds."

3. Apply gentle, increasing right rudder to counteract torque and keep the plane tracking along the runway centerline.

4. As soon as the Airspeed Indicator becomes active, apply gentle forward yoke until the tail lifts.

5. When nose comes down through the horizon, ease the forward pressure off the yoke.

6. Hold the plane level and accelerate. At 85 KIAS (VR), ease back on the yoke and allow the plane to fly itself off the runway.
7. Once airborne, ease the right rudder you have been holding so you avoid turning or skidding.

8. When you have achieved a positive rate of climb, as indicated on the Altimeter and Vertical Speed Indicator, raise the landing gear.

9. Keep the climb angle quite flat until 105 knots, which is VY -- Speed for Best Rate of Climb. Make the first power reduction to a Manifold Pressure (MAP) of 41 inches, then adjust the angle of climb to maintain VY.

10. At 500 feet AGL, reduce to climb power—throttles to 35.5" MAP, and Props to 2400 RPM.

That’s it—ten easy steps to becoming safely airborne in the Goon. In actual operation, you will find some of these nice neat steps running together and overlapping. It will take a little practice to get used to the routine and develop your skills so that the whole evolution goes smoothly every time. You will find it easier to keep the plane from wandering back and forth across the centerline if you advance the throttles slowly, especially the first part of the acceleration. This will allow you to counteract the engine torque with the rudder pedals without the over-control that leads to a serpentine takeoff run. Use the projection on top of the windshield wiper, where the arm joins the blade, (see below) as a guide to help you stay centered, and easy does it on those pedals—keep it light as a feather.

Pay attention to mixture control as you climb to higher altitudes. You will need to reduce the richness of the mixture at higher altitudes to maintain power.
NOTE: Do not be misled by those "FINAL" numbers on the POWER placard. This does not refer to a long final, such as an ILS approach, or even a longer than usual final on a pattern approach. You should maintain the IN RANGE power setting of 25" MAP and 2050 RPM all the way down until landing is assured, adjusting as needed to maintain the proper final approach speed of 85 KIAS. You should reduce throttles to 20" MAP over the fence, and not before, otherwise you will find the nose coming up as the airspeed drops off.

Also, do not extend full flaps until you turn final. Those huge boards create a tremendous amount of drag at full extension. Use them when you need them, and not before.

Summarizing Captain Strine's technique in a normal pattern approach:
1/4 flaps at the IN RANGE check, about five miles out.
1/2 flaps upon turning base leg.
3/4 flaps nearing the end of base, before turning final.
Full flaps after rolling out on final approach.
LANDING VIDEO

AFTER-LANDING CHECK VIDEO

TAXI AND GROUND-HANDLING VIDEO
GROUND-STEERING The DC-3 has a full-castoring tail wheel. This means that the wheel is able to swivel freely through 360 degrees and is not connected to any steering mechanism, nor is it connected to the rudder. In FS2004, for the first time, we are able to model this behavior. The result is that our DC-3 can be steered just as the real one is, by application of differential braking and differential throttle. Rudder effectiveness does not kick in until the aircraft is moving at some speed. Any user with a twist-stick or pedals can achieve this in coordination with a mouse on the throttle controls (or keys, but this is more difficult). That said, some older pedals do not have toe-braking and thus the keys must be used in this instance; but ALL twist sticks can use differential braking. Users with non-twist sticks must use keys.

In FS2004, throttles can be adjusted separately by dragging the levers with your mouse, or by using the Ctrl + E +1 or 2 engine key commands, or if you are fortunate enough to have one, by using a double-throttle quadrant. Differential braking is most realistically accomplished with toe-brake equipped pedals, but can also be done very well on a twist-stick type joystick by rotating the stick in the desired direction and then engaging the brake (trigger) button. Alternatively, the left and right brakes can be applied with the F11 and F12 keys, respectively.

On the takeoff and landing roll, or when taxiing along a straight path, you should lock the tail wheel, which lessens the tendency to overcorrect by using too much brake or throttle on one side. Once you have attained sufficient forward speed, producing enough air flow past the rudder, you will find that you can steer on the roll with the rudder alone. Just as with the real Douglas, it takes practice to master the techniques. So, what do you do if you don’t have toe-brake equipped pedals, or a twist-stick, let alone a pricey, multiple-engine quadrant, and just detest those tedious key combinations? Read on...

EASY STEERING OPTION INSTRUCTIONS for FS2004. We have provided an alternate aircraft.cfg file called "aircraft.cfgES" that simply makes the tail wheel steerable. By installing this option the aircraft can be steered on the ground with no use of differential engines or brakes, although you can still use them, if you wish. This is unrealistic, but makes the aircraft user-friendly for those who like things this way, as she behaves as an aircraft would with nosewheel steering i.e. Cessna. To install this option, follow these instructions:

1. Using Windows Explorer or My Computer, open your FS2004/Aircraft/MAAM-SIM R4D-6 folder.
2. Right-click on the aircraft.cfg file and select rename. Name it aircraft.cfgbak and click yes to confirm that you want to rename it.
3. Follow the same procedure with aircraft.cfgES, renaming it aircraft.cfg.
5. Repeat all of the above for both the MAAM-SIM DC-3 - Passenger and Cargo aircraft, using the aircraft.cfgES you find in their own folders.

This will allow you to steer the aircraft easily using pedal movement or twist-stick movement i.e. by rudder, even at slow speed. Differential engine control and differential braking will still be functional. If you want to re-install the realistic steering, just reverse the process.

FS2002 does not model either the locking tail-wheel or its free-castoring ability, so you have no choice to make. The DC-3 will steer just as any other aircraft in FS2002, in that it is effectively steered by the rudder.

If you want to re-install the realistic steering, just reverse the process.

SPERRY AUTOPILOT OPERATION
DEVELOPMENT HISTORY  Shortly after the original R4D panel was uploaded I received a very complimentary e-mail from Arne Bartels, the designer of the original Sperry Autopilot gauge used in virtually every FS DC-3 panel, and many other aircraft. When I did my second panel for the R4D, Arne offered to do a new version of the venerable autopilot to exactly match the one aboard R4D #508819. I jumped at the offer and made a special trip back to Reading to get the close-up digital photos I would need to produce the graphics for Arne. In short order, he had programmed the new gauge which has some terrific new features and which is now familiar to thousands who use the R4D and its many repaints, as well as a number of other panels, since we offered it as freeware for developers to use. Now, in this latest version, I have redone the graphics yet again, since the quality of my camera has improved quite a bit from v1 of the R4D panel.

HOW THE SPERRY CONTROLS FLIGHT  The Mark III is very different in operation from modern autopilots that hold set altitudes, headings, rates of climb and descent, and so on. The Sperry tends to control ATTITUDES, namely BANK, and PITCH angles. I say tends to control, because what the Sperry is really controlling are the angles held by the elevators and ailerons. So it really isn't accurate to claim it will hold attitudes, since these can be affected by changes in aerodynamic forces. For instance, as every pilot knows, wind will affect the angle of bank for a given aileron angle as the aircraft turns through the direction of the wind. Even Trixie, your slightly overweight stewardess, bringing you a cup of java from the aft galley will cause a change in pitch trim, even though you have the Sperry set to hold a specific elevator angle. The YAW axis is handled differently. The Sperry will hold a gyro compass heading (by use of the rudder alone). So, to summarize, the Sperry does not hold a set altitude, nor a rate of climb or descent, as the modern AP does, but it will hold a given gyro-compass heading.

OPERATING THE MARK III  The Sperry takes a bit of practice to master. But once familiar with its capabilities and quirks, many FS pilots love it. It’s part of the old time charm as the modern AP does, but it will hold a given gyro-compass heading.

There are three gauges and a number of control knobs and wheels which make up the U.S. Navy Mark III Automatic Pilot mounted in the panel of R4D #508819. The first gauge is the Heading Indicator (HI), on the left side of the unit, which has two moving scales or cards. The upper one is controlled by the first of three control knobs at the top of the AP. The knob is marked RUD. The lower card is the AP's Directional Gyro (DG), adjusted by clicking on the left and right of the caging and adjustment knob just below it. Note: This knob will also adjust the main DG’s on both panels. Pressing the D key will calibrate all three DG’s with the magnetic heading of the aircraft. If you have set up your options to include gyro drift, you should periodically calibrate your DG’s by hitting the D key. When turned On (see later section on master switch), lining up these two cards will cause the Sperry AP to hold the present heading using the rudder.

IMPORTANT: There is a bug in FS2004 that causes its DG and the main DG to adjust only in 10-degree increments when the Sperry is switched ON. When it is OFF, the card will adjust in one-degree increments. There is no known fix for this problem, however, as a work-around, using the wheel on a wheel mouse will allow single-degree adjustment.

The center gauge is the Artificial Horizon (AH). There are two fixed alignment index marks and corresponding moveable pointers, called follow-up indexes. The pair at the top are set by the center control knob, marked AIL. When the marks are aligned, and the unit is On, the ailerons will hold the present roll attitude. Moving the follow-up index to the right of the alignment index will cause the ailerons to hold a banked attitude in that direction. The pair of marks on the right side of the AH are controlled by the right hand knob marked ELE and are used to maintain a set pitch attitude, using the elevators.

The third gauge is the Vacuum Gauge and registers the suction of the instrument vacuum system required to operate the gyro's. The correct reading should be between 3.75 and 5 hg, shown by the heavy white arc on the gauge.

Below and to the right of the artificial horizon is the autopilot’s Master ON/OFF Knob. Note that ON is on the left, a counter-clockwise twist. It’s a rather atypical arrangement these days, so it will take some getting used to. Mouse click on the desired side to move the white pointer. This knob can also be operated remotely by the key command Z.

ADJUSTING CONTROL FORCE SENSITIVITY  The three SPEED VALVE control wheels at the bottom edge of the unit are used to vary the sensitivity of the Sperry's hydraulic controls. Since it was designed specifically for this plane and panel, Arne has made the center setting of the Mark III’s wheels normal for the R4D. Just click on the center of a wheel to set it to normal. When loading the R4D into FS, the wheels will be centered by default. Each wheel controls one axis and is situated below the corresponding gauge and control knob. Rotating the wheels toward a higher number, by clicking repeatedly on their right sides make the controls more sensitive, while clicking on the left makes them less so. You may hold the mouse button down for continuous movement.

Don’t be thrown by that arrow and the “sensitivity increase” label in relation to the mouse points. Think of the mouse points as where you would initially place your finger to rotate the wheel in the desired direction. Practice using the wheels in conjunction with the “RUD”, “AIL”, and “ELE” knobs to fine tune your control. Anyone can set digital readouts and push lighted buttons on a modern AP – but it takes a virtuoso to master the Sperry’s wheels and knobs to make the Douglas do your bidding!

Arne also provided a copy of the relevant pages from a vintage manual sent to him by Danny Hecht. It was taken from a C-54 manual of the same wartime vintage as the one included with this product, the USAAF C-47 Pilots’ Training Manual. The C-54 manual pages dealing with the autopilot are included in this archive, courtesy of Danny Hecht. Read these four, very interesting pages to learn how to operate the Sperry Mark III Autopilot the way in an authentic manner:
The C-54 has one of two types of automatic pilot: the Sperry A-3 or the Jack & Heintz A-3A. These are identical with the exception of their speed controls. The knobs which control the hydraulic speed control valves of the A-3 autopilot are on the control pedestal. The A-3A employs airspeed valves, regulated by discs on the bottom of the gyro control mounting unit on the instrument panel.

The autopilot permits gyroscopic action to operate the surface controls of the airplane and keep it on a set course. The gyroscopic units operate from the instrument vacuum system, on a suction of 4.2" Hg. Hydraulic oil pressure
to operate the servo actuating units is created by an engine-driven oil pump on No. 2 engine. Operating pressure is 123 psi, + or - 3 psi. The servo units act on the surface controls to correct the course or attitude of the airplane.

The speed valves in the A3 autopilot control the sensitivity of the autopilot by regulating the return flow of oil from the units to the hydraulic reservoir. Turning a knob clockwise closes the valve and produces slower control. Counter-clockwise opens the valve and produces faster action. The speed valves in the A3A autopilot control sensitivity by governing the airflow through the gyro units.
Operation of the Autopilot

1. Trim airplane to fly hands-off.

2. Check vacuum for 3.75" to 5" Hg.

3. Check servos for OFF.

4. Turn oil pressure valve ON, and check autopilot oil pressure gage for 125 psi, ± or —5 psi.

5. Check to see that the autopilot horizon is unaged and erect.

6. Set and unage directional gyro controls.

7. Turn upper rudder knob on directional gyro unit, and align upper card with lower card.

8. Turn aileron knob until its follow-up index matches the zero point on the banking scale at the top of the autopilot artificial horizon.

9. Turn elevator knob until follow-up index matches the elevator alignment index at the side of the artificial horizon.

CAUTION:

Don't align follow-up index with horizon bar.
Of the two types of autopilots discussed in the C-54 manual, the one used in the R4D #819 is of the Jack & Heintz A-3A pattern.

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FUEL AND PAYLOAD MANAGEMENT

You will find that proper fuel and payload (FS2004) management is critical when flying these aircraft.
Each aircraft has its own, default load-out which you may alter by using this menu. The default loads reflect the different seat arrangements of the R4D and the passenger DC-3, as well as the cargo stations of the freighter. You need to balance fuel and payloads to stay within the Maximum Gross Weight for your aircraft. See the Kneeboard Reference Pages for detailed weight information.

It is not realistic to expect that you can carry both a full load of passengers or cargo and a full fuel load. Howard Sodja, our MAAM-SIM researcher, historian, and producer of the reference pages and, along with Bill Womack, the checklists, has this to say on the subject, "In my four-years as a ground service agent (ramp tramp), I never saw a DC-3 fueled so that all four tanks were full. Before each flight, the pilot or copilot would check the fuel with a dip-stick, and then tell us how many gallons to put in each tank. The auxiliary tanks were mostly empty in the DC-3s I serviced. The flight crew plan for a landing with only enough fuel for the required alternate airport reserve. This is because unneeded fuel adds to operating expenses (more fuel consumption for a flight to carry the unneeded fuel), limits the gross weight capacity (most heavy aircraft cannot carry max fuel and max payload), increases fire danger in an accident, and causes poorer takeoff and climb performance."

FS2004 does not give you the option of controlling your payload, but you will still need to properly manage your fuel.

IMPORTANT! There are several oddities, issues, and bugs in the MSFS fuel system that you should be aware of:

The quantity of fuel in your tanks in FS2004 is a function of what was in the tanks in the saved flight from which you started your FS session and any changes you made on the previous aircraft before you loaded one of ours. Because different aircraft have different numbers and arrangements of tanks, you can get unexpected, and potentially bothersome results, if you don't take care. The best way to avoid this is to always start your MAAM-SIM DC-3 session with one of the included Start-Up Flights, or another that you have saved with your desired fuel load aboard.

FS2002 does not save the fuel state as part of the saved flights, so always check your fuel before you takeoff, which you should of course do anyway. But unlike in FS2204, you can not assume the same fuel will be in there that you had when you saved the flight.
FS2004 - In order to make the selectors work, they had to be named according to FS's conventions, rather than the actual DC-3 tank nomenclature. So, you will find both the Auxiliary tanks labeled as “center” in the FS2004 Aircraft/Fuel and Payload menu. You will have to remember that the Left Aux tank will be called Center and the Right Aux Tank will be Center 2 in the menu. Both the Fuel Quantity Gauge and Fuel Tank Selectors on the panel are properly labeled and work realistically. Here’s what it looks like...

FS2002, on the other hand, would not accept this work-around. Fuel will always be fed from both Aux tanks first, then both Mains, regardless of how the selectors are set. If you set the selectors to Main, the Aux tank will empty and then the Main will feed automatically. However, if you select the Aux tanks, they will empty and the engines will stop when they are dry.

FS2004 and FS2002 - When you resize the screen, from full-screen to windowed or vice versa, the fuel selectors will revert to their default position, which is each engine reading from its respective main tank. Below is a shot of the selectors with the levers in the default position with the Left Engine on the Left Main tank, and the Right Engine feeding from the Right Main tank.

So, if your selectors are in any other position, when you change screen modes, be ready to switch them back to the desired tanks. Minimizing, oddly enough, does not cause this problem.

Above is a better look at the face of the selector with the lever removed by digital magic. ;-) (This is what you must do when you create digital, photo-real gauges, by the way.) The left and right selector are identical, NOT mirrors of each other. So that accounts for the asymmetrical look of the default setting in the previous picture. Just remember to rotate the levers outboard to select the correct auxiliary tank for an engine.

While we are talking about the fuel system, let’s take a look at the interesting, four-tank Fuel Quantity Gauge...
When you turn the knob on ours you will hear the distinctive “clunk” sound of the real instrument. That robust noise and the “jumping” of the faces (pointed out by two beta testers as an obvious flaw in my graphics!) are really exact representations of the real thing. There are four different gauge faces that rotate into position in front of the glass when the knob is turned to the desired tank. The gauge was created from four successive photos on my tripod mounted digital camera, so that “jumping about” effect is just what you see when turning the knob on the real thing. Adding to the effect is the fact that the Main and Aux tanks have different, non-linear scales. Take a look at the relative distance between the E and 20 gallon marks and the 190 and F marks in the shots above. Although there is only a 1% difference in size between a main and aux tank, the tank shapes are quite different, which accounts for the different scales you see.

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FLIGHT MODEL NOTES  by Rob Young

As far as the MAAM-SIM team is aware, there are no examples of an FS9 DC3 or R4D which manage to take off, climb, cruise and then land with total accuracy. The DC3 has awesome challenges for the flight modeler. The principle challenge is that at recommended settings we have to make the aircraft climb at only 500 fps with quite a lot of power and then cruise at a reasonable speed on a relatively low power setting. As that was not enough, we also have to make it descend with gear down (and later flaps) without the speed running away, even at power settings which are only a little less than cruise. And as if THAT wasn’t enough, we need to make this aircraft capable of sustaining level flight, and even a tiny bit of climb capability, in the event of an engine failure, fully loaded!

All this adds up to a veritable nightmare for the flight modeler, and if I knew all this when we started on the project I might well have thrown in the towel. Several months later, the MAAM DC3 and R4D for FS2004 are quite close to the goals set, but I cannot claim total accuracy. FS9 just won’t let us keep that climb down to 500 fps at recommended settings AND let us have any viable one engined performance. But we got pretty close.

Thus, everything is a compromise. Beyond this cliché, you’ll find that climb was at least contained to just a little over 500 fps at 2400 rpm with 35 inches or so, and this slight over-performance enabled us to not only achieve pretty accurate cruise speeds (150 knots or more TAS) but also accommodated (with care) the possibility of getting safely round the pattern and landing without scars on one-engine, something which the default FS9 DC3 cannot do so well.

The default DC3 also climbs nearer 700 fps at equivalent power settings so we were pleased we got that down to a more realistic rate.

Although the DC3 has a de-rated engine compared with R4D (1200 hp and Max power of 48 inches Manifold Pressure), in practice only the take off run sees a significant difference, with climb almost matching and the cruise showing a couple of knots or so slower. Since on long runways the R4D Manifold Pressure is rarely set to full blast anyway, you will in practice see little difference in overall performance between the two types. In other words the extra power of the R4D, with a max permitted MAP of some 52 inches, only really shows in this upper range of the throttle limits.

If you get a chance to see the excellent videos accompanying this package by MAAM’s president, Russ Strine, you will have a very good introduction to managing the MAAM R4D and DC3 in all aspects of flight. As with all aircraft, the placard recommendations, and Russ’s technique, are not cast in absolute stone. There may be small variations according to temperature, wind, turbulence and loading.

We loaded both aircraft by default so that you will see max gross achieved with only 50% of fuel. This is because with a full compliment of passengers and cargo, 50% fuel capacity is plenty for an "average" flight. If you want to go a long way, then you’ll have to reduce the load-out. Please do so by keeping the balance within limits which means not throwing out passengers all from the front, or the back, of the aircraft.

Apart from getting as close as we could to the published specifications, our big priority was in general handling. I worked long hours getting the basic control harmony as smooth as possible. This should translate into graceful pitch and roll handling, which I made less “fussy” and wallowing than the default DC3.

You will see that, with the FS9 versions only, you have the option of easy steering on the ground, with the rudder linked to tail wheel steering, or by default a free castoring tail wheel which responds only to differential braking. This can be mastered with practice very quickly. However, with a locked tail wheel on take off you will need to use rudder to correct the optional p-factor drift to the left, and this rudder becomes effective only at 20 knots or so.

Our detailed manual gives you pretty good detail regarding all stages of flight, but I’d like to emphasise here the need to get approaches and landing pretty squarely in line with the recommended settings. The best way to get your approach and landing drama free is to set 25 inches of power and 2000 rpm. To slow down, level off and at 145 knots or less you can drop the gear. From this point until the landing you need hardly touch the throttles again. Descend at 500 fps and little by little add a notch of flap. This will raise the nose and you will need to trim down a little or contain the rise with a little forward pressure. Once equilibrium is established keep descending at 500 fps. Try to resist adding flap notches too soon. Full flaps shouldn’t be deployed until you are on short finals. After this you should see 85 knots (still at 500 fps descent). When nearing the fence you can throttle back to 20 inches and let the speed bleed off a little.

You will find that although the R4D is restricted to 52 inches of Manifold Pressure, fire-walking the throttles will result in more than this, so it is essential to monitor power and not be too brutal at take off time. Similarly the DC3 should not exceed 48 inches.

A note about the FS2002 versions of these MAAM aircraft:- FS2002 handles nearly all stages of flight differently from FS2004, and there will be some obvious, some subtle, differences between the two. In particular you should not expect trim to be the same, and we reckon the FS2004 versions are a lot more satisfying (and accurate) to fly.

I must record my thanks to my MAAM colleagues on the design team, all of whom are not only extremely talented but manage also to be a friendly, intelligent, cultured and humorous bunch. As with the BT25 (Briefing time), this project has been a great pleasure. My thanks also to our tireless Beta test team, who occasionally gave me a hard time, but all for the good of getting the MAAM DC3 and R4D to behave in a way which we hope will give you many hours of piloting pleasure.

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KNOWN ISSUES

The following are known issues which have been noted during development and testing for which there are presently no fixes. Some issues below are as a result of the peculiarities of FS programming and never will have a fix. But, if solutions are found, and it is considered worthwhile, free patches will be available and can be downloaded from www.maam.org. These issues may or may not be experienced on your system.

1. FS2Sound.dll  False error warning on load-up. After installation of the DC-3 / R4D in FS2004, you may see a warning when you load the program saying this:
We have chosen to use the most recent full release version of FSSound.dll, by Daniel Steiner, which is v1.5.0.2, rather than the newer beta v1.6 beta which we have tried. Although the flag is eliminated by this beta, we have received reports that this beta causes problems with some other third-party panels. We do not want to interfere with other products by overwriting the older, proven, but outdated module with this newer beta. If you do not run other panels using FSSound.dll and would like to have the beta file, you can get it here: ftp://fssound.hn.org/FSSound/v1.6/FSSoundt160beta1.zip (at the time of this writing in November, 2003.)

If you do not want to cope with this flag and having to click on Yes each time FS9 starts, there is a way to get rid of it. Ian Pearson has written instructions and these can be found in the Aircraft/R4D Documents folder in "fs9cfgtweak.txt"

2. SPERRY AUTOPILOT DG ADJUSTMENT There is a bug in the FS2004 installation that causes the Sperry's DG and the main DG to adjust only in 10-degree increments when the Sperry is switched ON. When it is OFF, the card will adjust in one-degree increments. There is no known fix for this problem, however, as a workaround, using the wheel on a scroll-wheel mouse will allow single degree adjustment.

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**TECHNICAL SUPPORT**

If you are having problems, we will be happy to help you. But please keep in mind that answering technical e-mails, as much as we like to hear from you, can be very time consuming and takes us away from our development work. So we would ask you do a few things first:

1. If yours is a general MS Flight Simulator related issue, please see Flight Simulator Help for information. We would also recommend the MS Flight Simulator General Discussion Forum at AVSIM Online as a good source of help on general FS questions. There, you will often find a wealth of expertise ready and willing to answer your questions.

2. Please read this manual in its entirety to be sure your question has not already been addressed. If MAAM had a dollar for every time we have answered questions already covered in print, we would have our Black Widow flying!

3. If yours is an operational question about the DC-3, please refer to the genuine DC-3 manual and instructional videos included on the CD. There is also a lot more technical and operational information to be had on the other vintage manuals available on the supplementary Multi-Media CD.

4. If you need help related to the operation and use of this R4D / DC-3 package, there is a MAAM-SIM Support Forum at AVSIM Online. There you will be able to find answers from other users of the package, one of the BTBT (Briefing Time Beta Team) members, or one of the developers.

4. Once you have exhausted these ready resources, you can contact us by e-mail. We need some specific information in order to help you. In your message, please tell us the following:
   
   A. Your Windows operating system. Do you have Windows XP Home or Professional, 2000, ME, 98SE?
   B. Your system’s hardware specifications. Go into detail about your processor, RAM, video card, sound card, etc. Many issues are hardware related.
   C. Exactly what problem you are encountering. “It won’t work,” doesn’t tell us enough to help you. Our crystal balls are in-op! Be specific and thorough.
   D. What steps you have taken to try to correct the problem. Go into detail and tell us what changes, if any, you have noted. We would rather read a long e-mail which gives us all the information we need, than a brief one that requires us to solicit more detail from you before we can help. Contact us at maam-sim@maam.org. Your inquiry will be directed to the team member best able to assist you.

   BILL RAMBOW   JAN VISSER   FRED BANTING   ROB YOUNG   BILL WOMACK   HOWARD SODJA   MARK BEAUMONT

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**CREDITS**

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Francois Dumas not only served on the BTBT, but also donated an FTP site the team used for transferring thousands of MB’s of files over the course of the project. Through the good auspices of Francois, we also had a private forum for the “MAAM Skunk Works Beta Team” at simflight.com, which greatly facilitated the testing process, for which Francois Dumas not only served on the BTBT, but also donated an FTP site the team used for transferring thousands of MB’s of files over the course of the project. Through the good auspices of Francois, we also had a private forum for the “MAAM Skunk Works Beta Team” at simflight.com, which greatly facilitated the testing process, for which we want to thank its Executive Director, Miguel Blaufuks.

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Thanks for reading to the end! ;-) 

Bill Rambow
June 6, 2006

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