

WHAT'S A SIMMER TO DO. YOU FINALLY, THROUGH EXTREME HASSLE, SWEAT, AND HEAD-ACHE EVENTUALLY GET YOUR BRAND NEW SIMULATION UP AND RUNNING ON YOUR ABOUT GETTING AIRBORNE AND WANT TO START DOO-HICKEYS ARE NOT EVEN OPERATING. WHAT YOU SEE ON YOUR MONITOR IS NOT WHAT IS EXPERIENCING THE INFAMOUS AND DREADED "COLD AND DARK COCKPIT PRE-START" PROBLEM.

What's a simmer to do. You finally, through extreme hassle, sweat, and head-ache eventually get your brand new simulation up and running on your about getting airborne and want to start doo-hickeys are not even operating. What you see on your monitor is not what is experiencing the infamous and dreaded

monitor. You are excited flying right away ... *BUT WAIT!* Everything is somehow screwed up and some of the little displays and is going on. Your enclosed instruction manual must be talking about some other sim, because what is depicted in the simplified diagrams. WHAAAAAT! I am going to suggest that you may be "COLD and DARK cockpit pre-start" problem.

HISTORY LESSON

In the beginning of flight simming, there were games like ZAXXON and SPACE INVADERS. These were puny attempts to replicate a three dimensional flight domain while offering some rudimentary and crude control choices to the operator (UP or DOWN). And we absolutely L-O-V-E-D them. I cannot even count the many hours I spent (wasted) as an otherwise conscientious adult pounding and hammering on a keyboard attempting to accomplish some obscure and meaningless task (like saving the world!). Things rapidly changed and the first early "true" flight sims that evolved were an incredible and vast leap forward. MSFS 2002 and USAF and CFS were a visual feast. Fascinating and addictive and beautiful to look at. ... and our love for the genre grew exponentially. We were even developing a "second life" where we never aged and our beloved games just kept improving. Life was good.

With the introduction of "Reality based Simulation" there was a decided shift towards the complex. An "early" example was Aerowinx PS-1. It was a DOS based 747-400 program created by a genius name Hardy Heinlin from Germany. It represented a dramatic improvement in technical precision available for the home PC. Then just a few eye-blinks ago, great strides were made in the pursuit of realistic flight simulation with the introduction of such marvelous sims as the LevelD 767 and PMDG 747-400. Today, new computer platforms with MSFX, DirectX-10, Vista, G88 vid-cards and other technical improvements, are allowing the developers to reach greater and greater levels of exactness and preciseness where the real airplanes are concerned. It is very challenging for the sim developers to decide exactly where to bridge the gap and create a product that serves the demanding needs of simmers as well as reflect the fidelity of the original airplane. The technical limits simply no longer exist.

One of the areas where this realism v. simulation is becoming a problem is in the "cold-dark" cockpit start scenario. Up until recently, while there was a "cold-dark" scenario available, the airplanes were designed to be at the end of the runway with engines running. For the Boeing fleet, this is a logical choice for the flight simmer. The recent introduction of some incredible Airbus simulations, however, has created a great deal of misunderstanding and problems. Mostly the problem revolves around the Airbus idiosyncrasy of not allowing the access to the weight change page (INIT-B) page of the MCDU (onboard computer) after the second engine has been started. The little known fact is that, just like the real airplane, Airbus pilots can access and change the weights using the FUEL PRED (fuel prediction) page of the MCDU.

Screen shot of the Wilco A320PIC over Paris, France.

The early flight games were not so much concerned with "absolute realism" as they were the perception of reality. By that I mean that the missile control suite and the MFDs on FALCON 4.0, were not truly representative of reality, but were getting pretty close. Radar and missile warning systems could replicate pretty much what a pilot might experience in a given situation. They were fun to fly and very forgiving. And here is the point of this article ... the sim developers went along with the subterfuge and were complicit in the deception. They did things and built in "cheats" for the sim-aviators that did those tasks that were simply too repetitious or complex for their target customers to understand or complete.



Screenshot of PMDG 747-400 on letdown into Narita, Japan.



Because of the recency of its release and the fact that it is somewhat more complex than the Boeing set-up situation, I have elected to use the Wilco Series 1 Airbus A320 as my demonstration airplane. This is not a review of this excellent product, but does serve to be representative of the latest sim program releases. The Cold-Dark start requirements are basically similar for "ALL" jet airplanes.

Screenshot of Level D 767-300ER over Honolulu, Hawaii

DU

... SO WHAT DO I DO???

While sitting at the breakfast table, scribbling some notes about the Cold-Dark situation, I came to the conclusion that all of the new glass-jets have some basic similarities; however, there are some very important dis-similarities also ... and it is these things that give simmers nightmares. I am using the term "glass jets" to describe airplanes that have LCD powered displays and operate using a Flight Management Computer. These would include most of the Boeing and Airbus airliners that are being sold today. To further beat this description to death, while I don't include old school MD-11s, Boeing 727s, etc in this mix, much of what is said does apply to them. Enuff of that. Let's begin our discussion with a general overview of the situation.

LET'S WORK THE PROBLEM BACKWARDS

Let's work the problem backwards. Our ultimate goal is to have the engines running and supplying electrical power and pneumatic air for the needs of our operation. In order to get the engines started, we will have to have THREE THINGS: **ELECTRICAL POWER, PNEUMATIC AIR, AND FUEL.** In order to get those, we will have to have the APU running. The APU is an on-board jet engine with enough power to supply all the electrical and pneumatic air needs for the airplane ... this includes galleys, air conditioning, radios, etc ... and stuff needed for engine starting. This APU is a gas hog and so it is generally not allowed to operate unless it is needed. Many simmers overlook the fact that this unit can run you out of gas if it is allowed to operate without supervision. A side note here: On the airlines, they can provide pneumatic air from an on-site external device creatively called by the pilots an "Air" cart. The air-cart is usually nothing more than an over-grown leaf blower on a little wagon run by a putt-putt gasoline motor, but at really big airports, they actually have a truck mounted unit (much better) that is capable of providing enough air pressure to run the airplane air conditioning packs.

In order to start the APU, however, we must have some decent electrical power available. The airplanes are designed to use the **AIRPLANE BATTERY** for this function ... however, after lengthy periods of disuse, the batteries will "go dead" and an external power source will be required. Without flogging a dead horse too much, let me say that "lengthy periods of disuse" may be as short as overnight ... if certain power drain items are not shut off. There exist two separate shut-down venues, one is the normal post-flight check-list that allows some small drain items to remain operating ... and then there is the "SHUT DOWN" check-list which produces a stone-cold-dead airplane with everything

shut down. Normally, this is NOT the situation referred to as a "Cold-Dark" cockpit ... in simming, we would be looking at a post-flight airplane situation when we refer to a cold-dark cockpit.

This leads me to the discussion regarding the Flight Management Computer and the Inertial Reference System. Normally, *ANYTIME* there is power to the airplane, the FMC (Boeing) or FMGC (Airbus) is powered. This does not mean that the ADIRU or IRS or IRU (Inertial Navigation system) is powered. The FMC doesn't know where it is ... and doesn't really care. It has some functions that are non-navigational to tend to.

In order for the ADIRU to ALIGN, it must be selected to NAV (three separate switches), a PRESENT POSITION supplied, and not be disturbed for 10 minutes. Now, as simmers, we don't worry about a food truck slamming into the airplane and jarring the IRU, but "on the line" those first 10 minutes can be critical.

If you are flying an F-18 on a moving ship, the situation is different, but Boeing and Airbus airliners both require a 10 minute undisturbed warm-up period. In the sims of today, the developers realized what an impatient bunch we Flight Sim Aviators are ... so they have included a place to artificially adjust the IRU/ADIRU align time to a lesser or non-existent time period. I use about 1 minute just to remind me that the situation exists ... many simmers just shut off the alignment cycle.

On Airbus airplanes I am familiar with, entering the weights is usually done on the INIT-B page of the MCDU. However, after the second engine has been started, the INIT-B page is no longer accessible and weight changes and entries must be made on the FUEL PRED page.

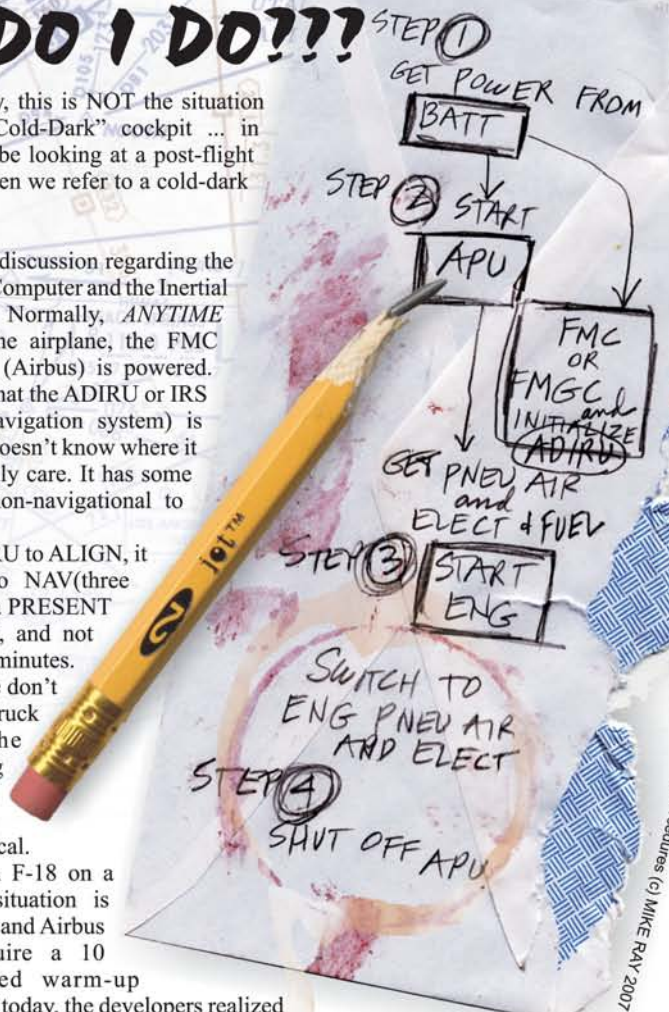
So, to re-cap the situation in the proper order: BATTERY switch on, fuel switches on, start APU, APU bleed on, start ENGINES, APU off, align ADIRUs. Pretty simple, really. Some simmers will use different sequences, but the end result is the same.

Here are some last minute thoughts. The "real" airplane APU and engines are advertised to start on gravity feed only ... but airliner SOP (Standard Operating Procedure) will have us turning on the fuel pumps for an engine start. A good idea is to consider whether you want to draw down your BATTERY running the fuel pumps for the APU start. I have it both ways in the text, and a sharp reader can pick up the difference.

Regarding inputting the present position: The Boeing POS INIT is not covered in the text, since it is pretty intuitive. You simply enter the four digit ICAO designator for the departure airport. I have chosen to describe the slightly more complex Airbus procedure.

IT IS NOT SUGGESTED PROCEDURE TO ENTER THE PRESENT POSITION LAT/LONG IN THE ADIRU PANEL!!!

It will work, but is used for irregular situations only. More precise initializations can be achieved using the gate or parking position on the airport, if available. The more difficult Airbus scenario is fully described in this presentation, so don't let that confuse you.



What to do with a ... a COLD and DARK AIRBUS COCKPIT

If, after pushing the "FLY NOW" button on your MSFS 2004 or MSFX set-up page, your cockpit display sorta looks like this; then the airplane is not connected to an electrical power source and you may have a cold, dark cockpit.

**AIRPLANE SYSTEMS ARE EITHER NOT POWERED ELECTRICALLY,
OR you need to turn up the intensity of the display illumination.**

The monitor screens may look black. This means that the airplane is unpowered .. and usually we can assume that neither the **APU**, **EXTERNAL** power, nor the **ENGINE GENERATORS** are supplying electrical energy. If you have elected to conduct a "COLD and DARK" start for your flight sim scenario, this is what you might see. In order to continue, we need to have a plan. I am going to propose the following steps:

- START APU
- ADIRUs to NAV
- LOAD MCDU PRESENT POSITION and ALIGN
- START ENGINES
- COMPLETE AFTER-START ITEMS
- FINISH LOADING of MCDU

Even though an **EXTERNAL POWER** source may be available, I suggest using the **APU**. This will facilitate the engine start procedure.

ADIRU stands for Air Data Inertial Reference System. For Boeing guys, this is the same thing as an **IRU** or **IRS**.

STEP 1: Select **INIT** page.
STEP 2: Enter **DEPT/DEST** in **LS1R**.
STEP 3: Select **ALIGN IRS** ➔.



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NOTE:
If you choose to start the engines at this point, you will have to remember that in order to enter the weights, you will have to use the **FUEL PRED** page instead of the **INIT B** page. Access to the **INIT B** page is denied after the start of the second engine. In the "real world" airlines teach to complete the **MCDU BEFORE** starting engines.

HOW TO START the APU (Auxiliary Power Unit).
... and get ready for engine start.

STEP 1: Select **APU** synoptic to monitor **APU** start. Use the **ECAM** selector panel **APU** button or the **QWERTY** command for lower **ECAM** display on your particular sim.

STEP 2: Select **BOTH BAT** switches **ON** and check for voltage.

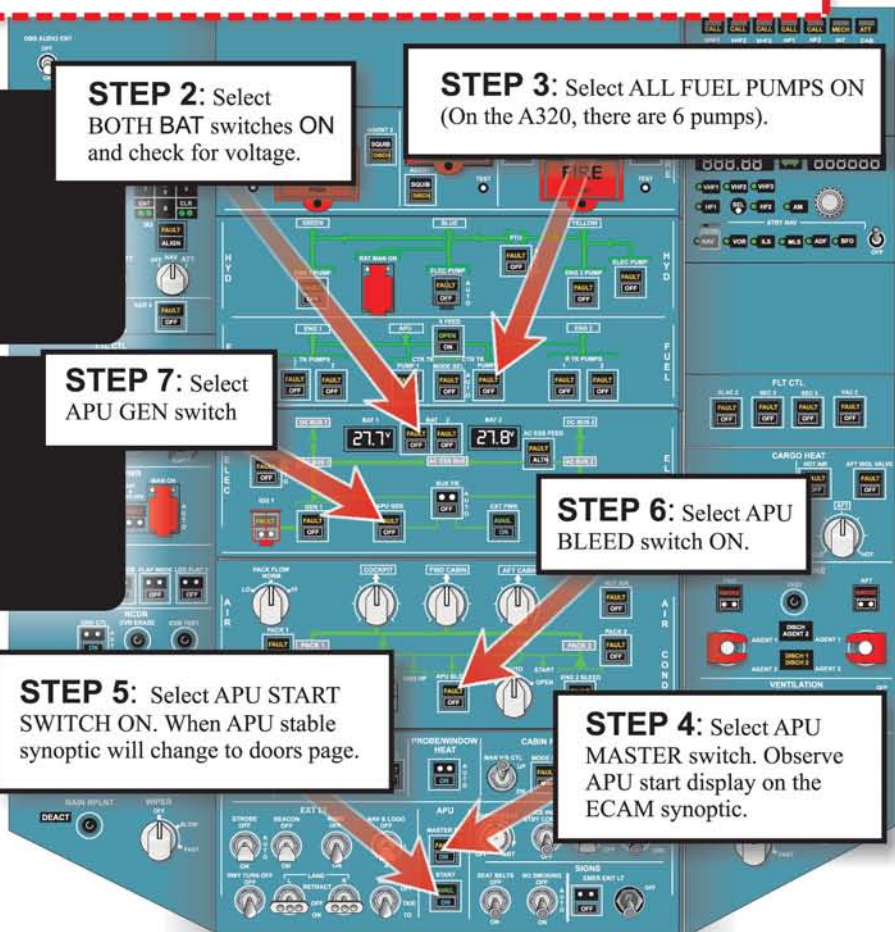
STEP 3: Select **ALL FUEL PUMPS ON** (On the A320, there are 6 pumps).

STEP 7: Select **APU GEN** switch

STEP 5: Select **APU START SWITCH ON**. When **APU** stable synoptic will change to doors page.

STEP 6: Select **APU BLEED** switch **ON**.

STEP 4: Select **APU MASTER** switch. Observe **APU** start display on the **ECAM** synoptic.



On the Wilco A320 sim, the qwerty commands are **SHIFT-8**, and **SHIFT-9**. I suggest that you open **BOTH** upper and lower **ECAM** synoptics and get them displayed at this time in order to monitor your progress... when mine were displayed, they were stacked on top of each other. I had to "mouse" them apart and move them to a part of the monitor where they didn't interfere with the next steps. They were both blank and black on my display.

IF YOU SEE THIS DISPLAY ...

SYSTEM IS ELECTRICALLY POWERED

BUT

ADIRUs NOT ALIGNED

Your cockpit display units might look something like this. Now don't get all picky on me here, each airplane is "slightly" different, and you add to that the fact that each sim developer may get things a little different. It is those "ORANGE Xs" that I want you to see. Those mean that the ADIRUs are not supplying information ... yet. They must be aligned first.

HOW TO ALIGN THE ADIRUs

STEP 8: I suggest that you select the STS (Status) position to monitor the alignment process.

STEP 11: LS1R. Place DEPT/DEST in the FROM/TO boxes.

STEP 12: LS3R. ALIGN IRS →

STEP 10: Type DEPT/DEST in the MCDU. e.g.; LPPG/EGLL. The FMGC will recognize that as a PRESENT POSITION. (Wilco uses the SHIFT-5 key to display MCDU)

WARNING:
When I first turned on my MCDU, it was BLACK. It took me a few moments to turn up the intensity of the display unit to get the image to display properly.

STEP 9: All three ADIRU selectors to NAV.

Mine were already in the NAV position. On a true COLD-DARK situation, they would have been OFF.

There is a **10 MINUTE WARM-UP** for the ADIRUs. Some sims, such as Wilco have an adjustable time scale to over-ride that requirement.

LOADING the WEIGHTS on the INIT B page

If engines are running, your sim may not allow to access the INIT B page by selecting the "NEXT PAGE" on the MCDU keypad. That is the way the real airplane works.

NOTE:

If you have engines running, then depending on which sim you are using, you may not be able to open the INIT B page. You can, however, use the FUEL PRED page to check your weights or make changes. This is a questionable area because some simulations will allow access and some will not. The "real airplane" will NOT allow access to the INIT B Page with the engines running.

Start with the upper right hand entry.



Fill in the Aircraft **ZFW** (Zero Fuel Weight). This is the weight of the empty aircraft plus the weight of the payload. **It DOES NOT include the weight of the fuel!**

Once you have placed the ZFW in the ZFW boxes, the display automatically changes to display boxes labeled "BLOCK Fuel." This is the request for the "Block Fuel" which we have also copied from the "Fuel and Payload" page.

If you didn't remember to copy it down, go back to the MSFX menu by pressing "ALT" key on the QWERTY keyboard, from the toolbar that appears at the top of your monitor display select ... etc.

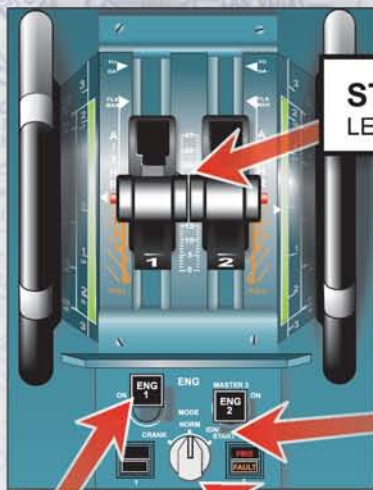
WHERE DO WE GET THIS INFORMATION?

We get this weight from the "FUEL and PAYLOAD" menu on the MSFX when we set it up. If you forgot to write it down, press "ALT" on the QWERTY keyboard and the MSFX toolbar will appear at the top of the display. Select AIRCRAFT - FUEL and PAYLOAD. This will give you a view of the aircraft weights.

"Empty weight" plus "Payload" equals "ZFW."

You have the option to start engines or complete the **MCDU** set-up at this point. The only problem is that if you start engines first, you will have to enter the weights on the **FUEL PRED** page. *You do not have to shut down the engines to change the weights.* For some strange and unknown reason, the Airbus airplanes I am familiar with deny access to the **INIT-B** page after the start of the second engine. The solution is simple, however, you simply use the **FUEL PRED** page to make the changes.

HOW TO START THE ENGINES

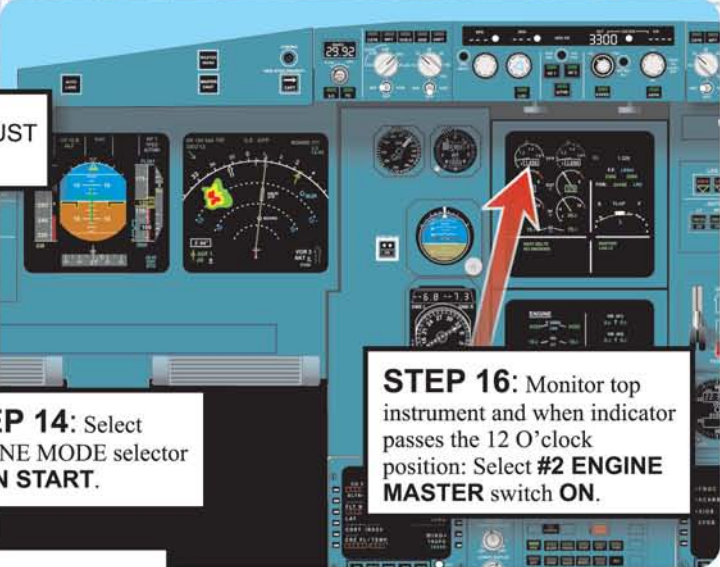


STEP 13: THRUST LEVERS to IDLE.

STEP 14: Select ENGINE MODE selector to **IGN START**.

STEP 15: Select **#1 ENGINE MASTER** switch to **ON**.

STEP 17: After engine parameters stabilize; Reset **ENGINE MODE** selector to **NORM**.

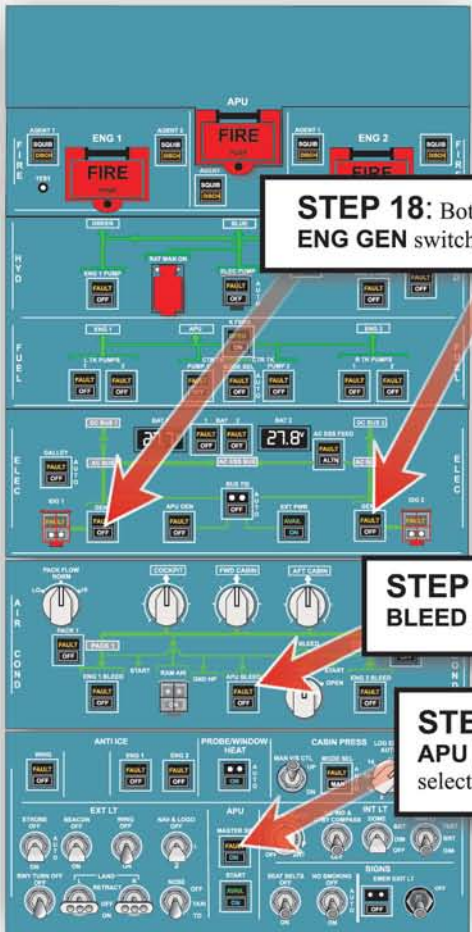


STEP 16: Monitor top instrument and when indicator passes the 12 O'clock position: Select **#2 ENGINE MASTER** switch **ON**.

Though the engine start on most newer airplanes, both Boeing and Airbus, is automated, I would like to point out, that the engine start procedures used on the airlines are much more complicated than the one we have presented here. It is unlikely that you could simply jump into a cockpit and crank

AFTER START CLEAN-UP

up and go flying predicated on your flight simulation experience ... but that is not to say that it is a reasonable facimile. I am one of those guys that feels there is the potential for real airline training value using the MSFX and third party add-on airplane simulations, and the situation is getting closer to becoming reality with every new simulation.



STEP 18: Both **ENG GEN** switches **ON**.

STEP 19: **APU BLEED ... OFF**

STEP 20: **APU MASTER** selector ... **OFF**.

Now, a word regarding procedures and sims. The efforts of the developers is almost obsessive when it comes to replicating the reality with such fabulous fidelity as they do. And as we continue to receive new entries into the flight simulation arena for our pleasure, we must keep in mind that simming is suppose to be fun and entertaining. It is NOT real life. Similarly, the procedures are sometimes truncated and occasionally grotesquely altered to accommodate the flight simulation audience. There is little or no evidence to support the conclusion that simply because you can "fly" a sim that you are a qualified airline pilot. It just doesn't happen like that. I DO NOT want any of my readers to think or imagine that they can attempt to use a commercial airliner to do harm or commit a criminal act predicated on the material that I have provided.

Soon, there will be new computer simulations and utilities hitting the market. They will come in all manner of complexity varying from simple game "missions" such as the MSFX default airplanes up to "EXPERT" choices such as the Wilco sim. We will have newly developed airplanes from PMDG, PSS, AirSimmers, XP Reality, Captain Sim, and others whom we haven't even heard from yet. Most of these are going to be absolutely gorgeous eye-candy and marvelous replications of the intricacies of the real airplanes. It is a fabulous summer to be a simmer. Buy them and support the developers, keep the marketplace commercially alive. These products that we simmers take for granted will simply disappear ... unless we support them by purchasing them, using them, and referring them to our friends. It is OUR SIM WORLD ... and we can make it better by supporting those developers and marketers that keep us supplied with all these new and exciting products. Simmers are extremely well educated and knowledgeable buyers, and their intellectual curiosity has a very positive driving affect on the potential new product stream. Thanks to all you in the sim-community, we have some really terrific flight simulations to enjoy.

Catch ya' next time, until then ... Happy Simming.

Captain Mike Ray