08/28/03
Falcon 4.0/SP3 Training Mission Report #03

Objective:

Today we will have four main objectives for our flight as we start to ramp up on the complexity of our training missions.

1. Navigation & Timing
2. Auto-pilot
3. Terrain Following Radar
4. Stores management (selective jettison only)

Planning/preflight:

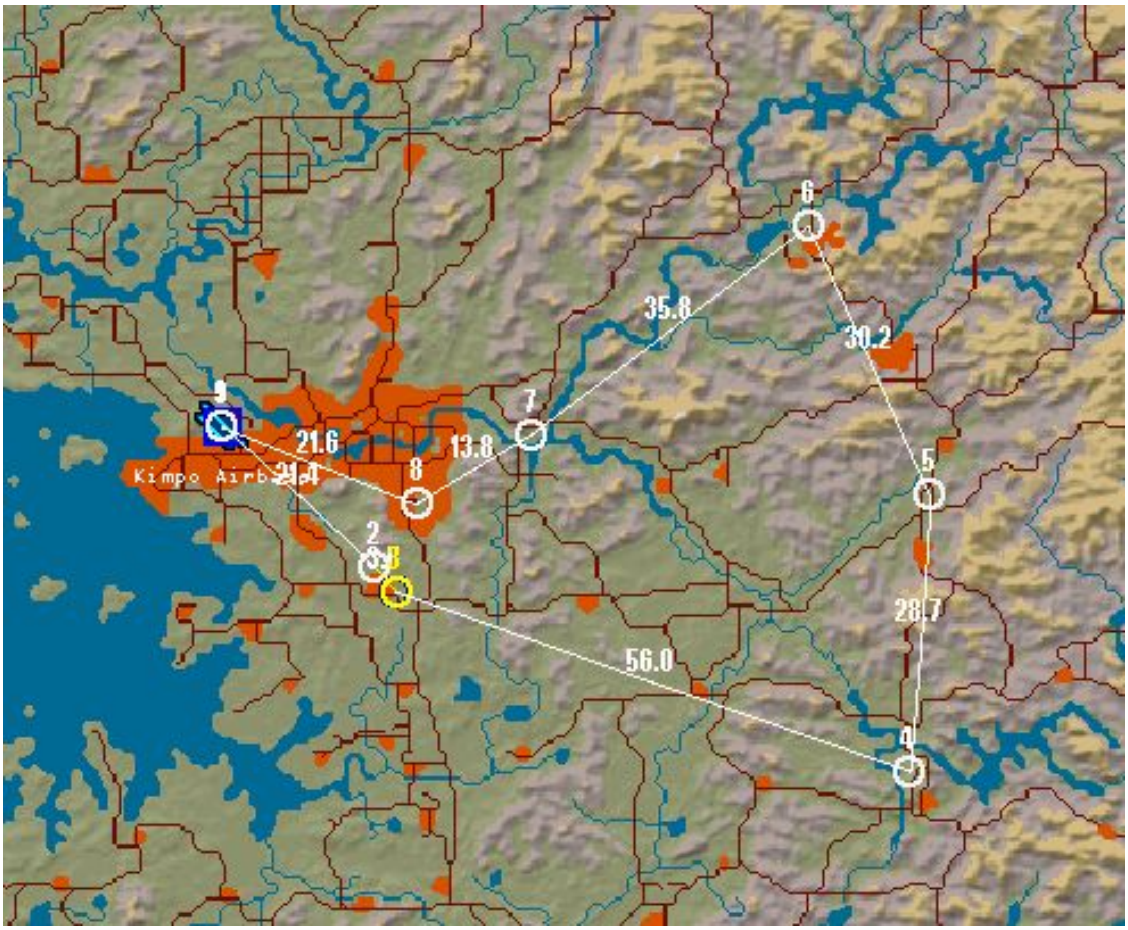
Our flight today will be departing Kimpo airfield for a timed navigation exercise that will demonstrate how the F-16 can fly a profile and make a strike with pinpoint accuracy and timing. As stated before it is critical to arrive over the target area as close to the planned time as possible due to many factors. Obviously if you are early or late during your run-in to the target area you can alternatively slow down or speed up to adjust your arrival over the target to coincide with your briefed arrival time. The F-16 has an exceptional means of showing the pilot how to accomplish this, freeing the pilots mind from having to do mental math and instead allowing him (or her) to fly and fight the aircraft.

At some point during the navigation exercise we will also employ the autopilot.

Furthermore we will engage the Terrain Following Radar (TFR) for a high speed, low altitude leg or two.

After completing the navigation/timing course we will head out over the ocean to demonstrate the Selective Jettison system for safely getting rid of unwanted ordnance.

The navigation/timing route:



The mission briefing with the steer-points and navigation data displayed. This information is mirrored on your knee-board within the cockpit:

BRIEFING

MISSION:
YOUR TASK: Training (Diverted)

PACKAGE ELEMENTS:
Cowboy1 (Training) 1 F-16CG

STEERPOINTS:

#	Desc	Time	Dist	Head	IAS	Alt	Comments
1	Takeoff	09:00:43	--	--	--	5.0M	Takeoff
2	--	09:03:22	21.4	133	480	0.5A	--
3	--	09:03:51	3.5	141	400	5.0M	--
4	--	09:11:12	56.0	109	400	10.0M	--
5	--	09:15:29	28.7	4	400	0.5A	--
6	--	09:19:57	30.2	336	400	1.0A	--
7	--	09:24:21	35.8	233	400	15.0M	--
8	--	09:26:24	13.8	239	400	0.5A	--
9	Land	09:31:26	21.6	292	250	2.0A	Land

ORDNANCE:
Cowboy11: 2Lt. Beach
500 x 20mm M61
6 x Mk-82

WEATHER:
Wind: 244 deg @ 6 kts.
Temp: 16 deg C.
Clouds: Clear
Con Layer: 30,000 ft MSL base

EMERGENCY PROCEDURES:
No alternate landing strip is currently available.

Good Luck!

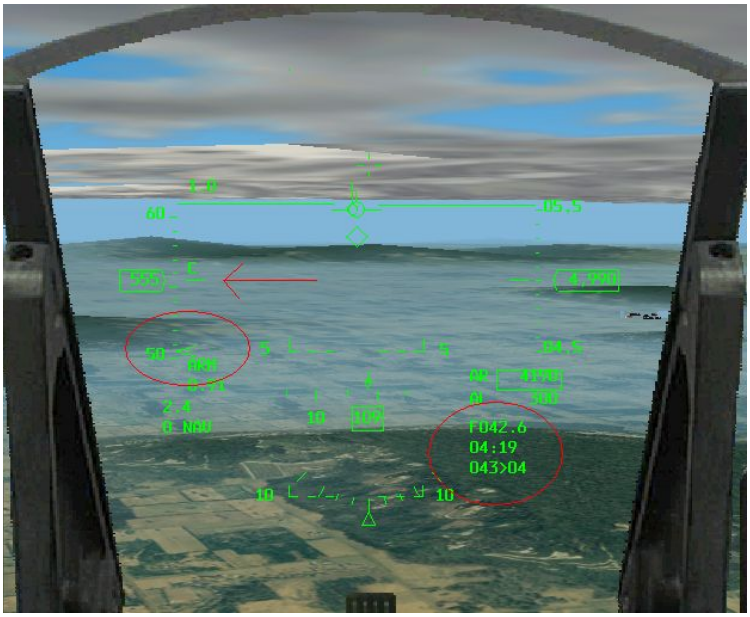
Our training load for today are 6 Mk-82 500 lb. bombs mounted under each wing on Miscellaneous Armament Unit (MAU) / Triple Ejector Racks (TER):

Debrief:

After taking off we head out on our navigation/timing exercise. Here we are setting up the autopilot so that we can do a bit of busy work in the cockpit without having to worry about tending to the aircraft (as much). The autopilot configuration panel is on the left side panel just above the landing gear indicator lights:

There are two switches, one controls pitch commands the other roll commands. In this case I've selected the pitch switch to "ALT HOLD" to maintain my current altitude and the roll switch to "STRG SEL" which will couple the roll commands to the course waypoints.

Now with the aircraft safely engaged on autopilot all I have to do is start looking at speed control to arrive at my navigation points on time. As we look through the HUD we can see a small carat on the left side near the speed tape. This carat is showing me what speed I need to currently fly to arrive at my next waypoint exactly on time. If I fly slower than that carat speed it will gradually increase, meaning that I will have to fly progressively faster in order to "catch up" to where I need to be. If I fly faster than the carat speed, it will drop to a lower value, indicating that I am going to be early unless I slow down. In this case I'm doing 555 knots and the carat is below the reference line (the red arrow is pointing at that) meaning I need to slow down (to approximately 505 knots or so) to be back on track to reach my next waypoint at the designated time:



In the bottom right of that last HUD picture you can see my navigation data displayed. It is showing me 42.6 nm from my next turn point, 4 minutes and 19 seconds, and the 043>04 simply means I'm 43 miles from waypoint 4.

With nobody shooting at you, the navigation exercise is a lot of fun:

Now you can see I'm approaching waypoint 4 (1 second to go and 0 miles):

I turn the aircraft manually over the waypoint by temporarily disconnecting the autopilot using the CTRL-3 key. This is similar to Touch Control Steering (TCS) in the Citation I fly, you simply hold down the button on the yoke, make a manual adjustment, then release the button and the previously selected autopilot mode resumes (sort of like hitting “coast” on your cruise control):

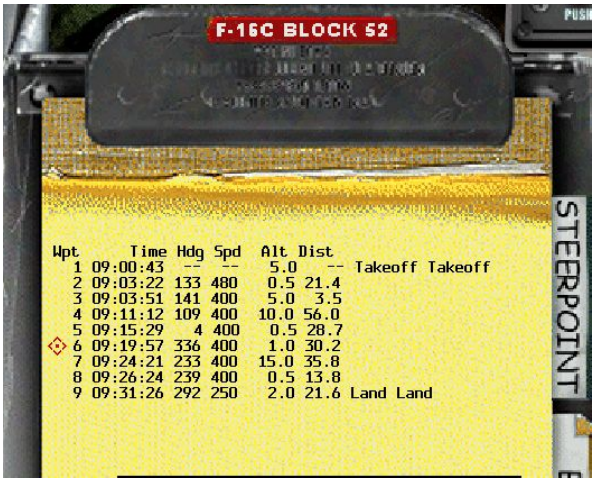
Now we are headed for waypoint 5, which is 18.4 miles distant and my speed carat is centered meaning I should arrive over it exactly on time:

When I hit the first waypoint that I had the autopilot engaged to follow the waypoint did not cycle automatically to the next one, so the airplane crossed the waypoint and entered a gentle turn back toward the waypoint we had just crossed. Flipping through the SP3 manual I found what I was looking for on page 50. You have to go to the Steerpoint Page on the DED (you can get to that by hitting the big number 4 on the ICP) and sequence from MANUAL to AUTO. This will cause the waypoints to automatically change to the next one once the aircraft is within 2 miles of the waypoint. This is nice to engage because the autopilot will lead the turns slightly and take you smoothly through all the waypoints without any pilot input.

Here the autopilot is now tracking the automatically cycling waypoints and smoothly turning me toward the next one:

Our next waypoint is waypoint #6, 24.8 miles away. The carat is centered on the speed tape indicating I will reach waypoint #6 right on time and this can be verified by the data in the DED (lower right corner) which is showing an ETA at the next waypoint of 09:19:57:

We can compare that value to our preflight data on our kneeboard to confirm that we are on time by looking at waypoint #6 and verifying that we planned to be there at 09:19:57:



With the timing and navigation exercise working out well we'll move on to the next phase of the training flight and engage the Terrain Following Radar. The TFR in Jane's F-15 was always a high point and I'm anxious to see how well Falcon 4 does on this feature.

Pulling up the TFR page on the left MFD I select "NORM" mode, 300 feet for the altitude, and a "MED" ride (alters how abrupt the control movements are). Hitting the ON button on the MFD engages the TFR with those selected settings and my F-16 noses over toward the ground:

Down on the deck the TFR scans out ahead of the aircraft and gently adjust the flight altitude accordingly. I am really amazed at how well this is simulated.

A refinery flashes by the right side of the aircraft:

In this next screen you can see on the right MFD that while I was down low enjoying the ride I bypassed my next waypoint. Apparently in TFR mode the aircraft no longer automatically follows the navigation data automatically. You must manually adjust the heading you desire to fly in TFR mode:

Holding down the CTRL-3 key I temporarily disconnect the autopilot and manually re-align with the next waypoint, but since I've flown a bit off course I have to engage the burner to catch up to the speed carat so that I don't arrive late at my next waypoint:

A few things to keep in mine about flying with TFR. The obvious advantage to flying in TFR mode is that you are far less visible to the enemy. Their SAM and AAA sites will have less time to track and engage you and you will also tend to be lost in the ground clutter when enemy aircraft are searching for you. Flying low has distinct disadvantages though that must be weighed against the benefits.

First and foremost is flying high speed / low altitudes is extremely demanding on the pilot. Controlled flight into terrain is one of the most common causes of accidents and at 300 feet and 500 knots there is just no margin for error. During the first Gulf War General Horner realized early on that low altitude bombing was the single greatest threat to his airmen. As such, he made the unpopular decision of restricting bombing mostly to medium altitudes keeping his pilots from running into the ground, and out of smaller caliber weapons range.

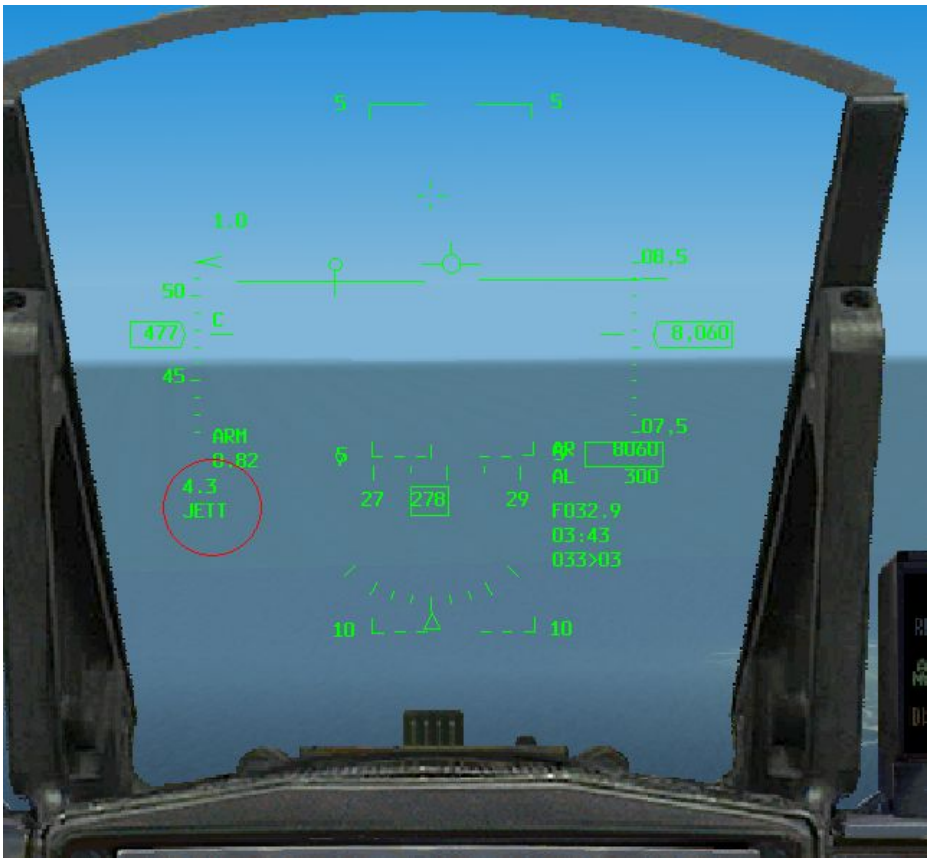
The second thing to consider is that you are a prime candidate for “the golden BB” at such low altitudes. Every farmer and infantryman with a rifle is within range though hopefully you will be well past them before they have time to react. I’ve heard that Falcon 4 suffers from some sort of “Magic AK-47”; we shall see.

Lastly, although the list could go on and on (bird strikes, limited A2G radar range..etc..), you must remember that your fuel consumption at low altitude will be markedly higher. Keep this in mind when choosing what kind of profile to fly. Getting to the target safely after a stunningly successful low altitude ingress is pointless if you run out of gas on the egress!

After completing the navigation/timing course I climb up to 10,000 feet and point my nose out over the Yellow Sea:

Pulling up the Stores Management Page (SMS) on the left MFD I go into the Selective Jettison mode and highlight the left side stores (bombs, TER and MLU all go together):

The HUD mirrors the fact that I'm in the Selective Jettison page by displaying JETT in the HUD:



Simply pressing the pickle button on my HOTAS releases the selected stores:

A few more button presses and I've released the right wing stores as well letting them fall harmlessly into the ocean:

Whenever you rid your aircraft of stores you are essentially changing the G-limit envelope that you can now safely pull. Since we had stores on our aircraft our configuration switch was set in the CAT III position (I don't exactly know what CAT I and CAT III imply) and now that the computer senses we no longer have stores it will give us a master caution and an associated specific systems warning light indicating that we need to set that switch to something else:

After punching out the master caution light (simply by clicking on it) I select the CAT switch to I and the STORES warning light goes out and we are back to a normal panel:

Thoroughly exhausted from all the page flipping I head back to Kimpo:

The ordnance people met the aircraft to ready it for the next flight:

Conclusions:

Wow. What can I say. The avionics and systems in F4/SP3 are simply stunning. And we aren't even scratching the surface yet guys. To all the people that I've seen complaining that the old Digital Integration/Spectrum Holobyte Tornado has never met a worthy successor I submit to you that F4/SP3 might be every button pushing geeks Holy Grail.

I don't know how this whole mission report reads (boring?), but I have to tell you, flying this mission was FUN. Of course I was itching to blow up that refinery I passed <g> but flipping through the SP3 manual and having that tiny (ok..very tiny) light bulb go off over my head reminded me of the old days of simming where you flew with the manual in your lap and every flip of the switch was a new discovery. If the combat in this sim is a tenth as good as the avionics modeling we will have a winner.

BTW – Comments on this format mission report are welcome. This is the first time I've used HUD / panel images that were cropped and added circles and arrows to show switch and HUD symbology. I was hoping to give this process a bit of an 'educational' feel too it. Yea or nay?

BeachAV8R