

Objective:

Close air combat radar mode – specifically Dogfight Mode.
M61A1 cannon.

Planning/preflight:

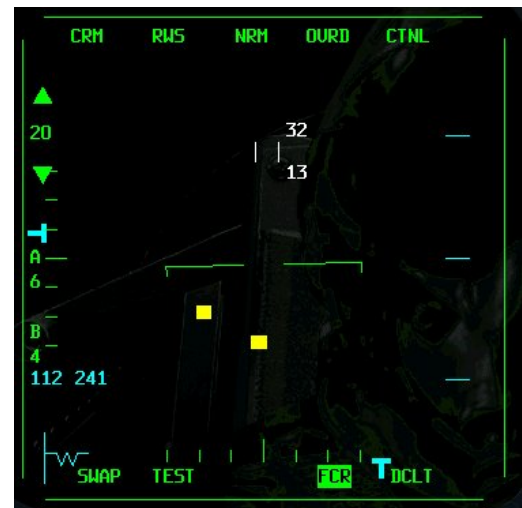
Thus far we've looked at most of the medium and long range sensors employed by the F-16: Range While Scan (RWS), Track While Scan (TWS), and Long Range Scan (LRS). Today we will concentrate on a specific "special radar mode" known as "Dogfight Mode". Dogfight Mode quickly puts the radar in Air Combat Mode (ACM) and brings up BOTH the M61A1 20mm cannon gun-site AND the AIM-9 HUD mode TOGETHER! This is an excellent combination because you have both of your "knife fight" weapons armed and displayed simultaneously, allowing for greater flexibility and instantaneous weapons employment. We will fly out to the missile range once again where we have a scheduled intercept with some Marine aviators (read: targets) that are also training.

Debrief:

With 6 AIM-9Ps and no external fuel we are in "high-maneuverability" mode!



At the appointed time the Marines show up (I'm surprised too!); contact at 37 miles.



At eight miles we can see they are flying in combat spread.



Coming up on the merge my radar bug shows the lead at 19,000 feet.



Tally ho! We'll take em' down the left side and pull hard into them.



Of course, doing so puts the outside and trailing wingman on my six. Another rookie mistake:



I plain outrun and out-turn the wingman though as I still have a lot of energy after the merge:



Going into the vertical, trying to remember the advice about not getting into a turning engagement with a smaller, low-wing loading aircraft such as the A-4 (thanks Hans) I zoom up, roll and come down on the bandits from above:



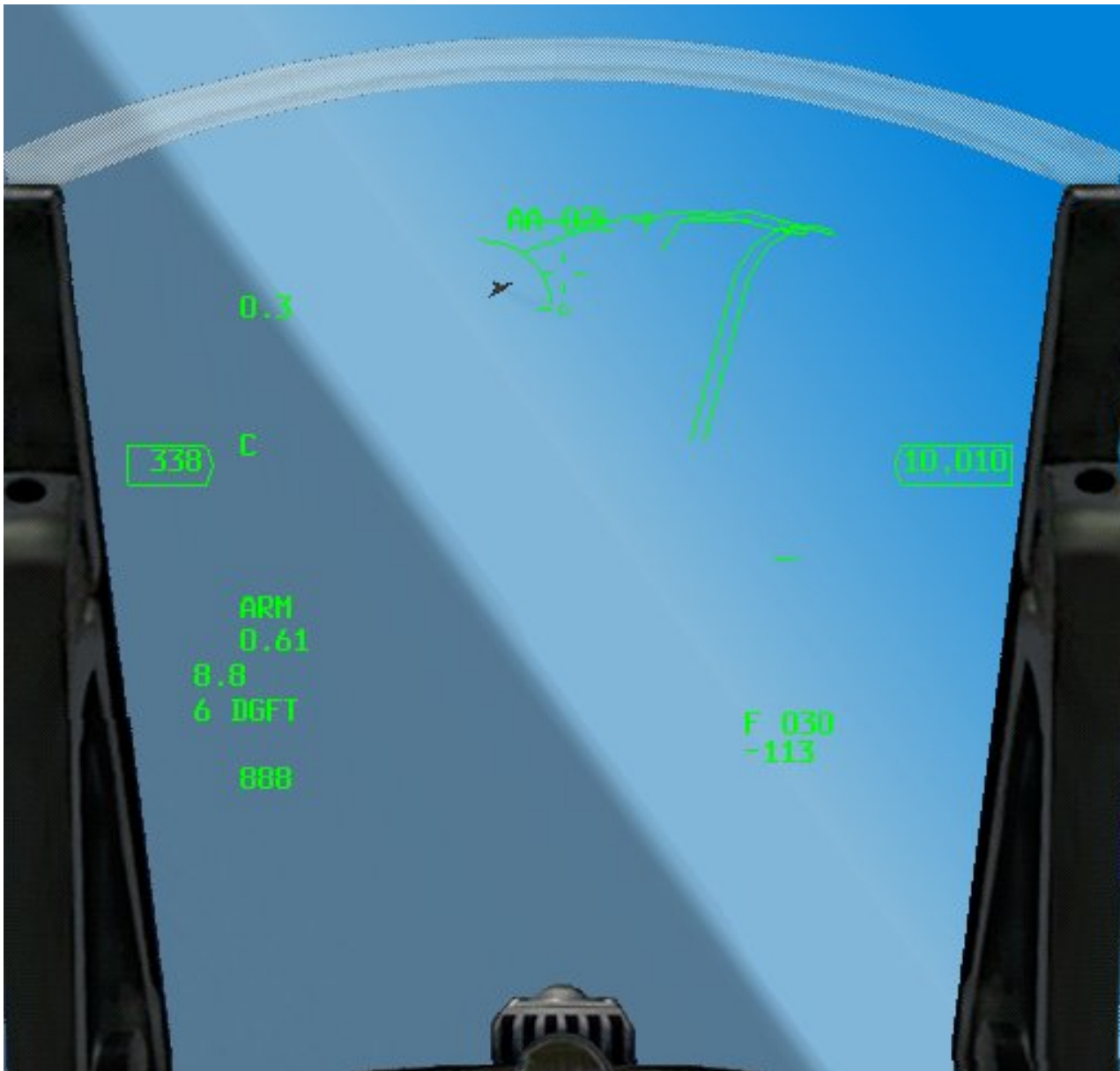
As I come down I hit the "D" key (forgot which switch on the HOTAS did that!) which brings up the Dogfight Mode (DM from here on out). The manual does not specifically state which ACM sub-mode is brought up upon selection of DM although the "default" ACM mode is the 30x20 sub-mode. This means that the radar will scan out to 10 miles in front of your aircraft in a scan pattern roughly equivalent to the HUD field of view (Chapter 22, page 22 of F4 manual) and lock up any aircraft within that volume. As you can see on the right MFD, selection of the DM automatically arms both the cannon and the AIM-9 (if carried).



The M61A1 20mm cannon fires 6000 rounds per minute, holds 510 rounds and will give approximately 5 seconds of shooting. Upon selection of DM the Enhanced Envelope Gun Sight (EEGS) or "funnel" will show up on the HUD indicating the approximate path of the bullets should you fire at that moment. The bullets should proceed down the center of the funnel. As such, ideally you want to place your target in the center of the funnel prior to firing. The funnel represents the minimum (600 feet) and maximum (3000 feet) range of the cannon. The funnel width is pre-set to the typical fighter width of 35 feet. F4/SP3 brings to you the additional ability to use the ICP to manually adjust the gun-funnel width to the appropriate aircraft type. Thus, if you know you are going to be engaging a larger wing-span aircraft (ie: MiG-25 / 46 ft. wing-span) you can manually set the proper funnel width. I seriously doubt my gunnery will ever be good enough that this would be a factor.

In addition to the EEGS the DM places a simple version of the Short Range Missile (SRM) HUD mode on the HUD at the same time. One curious thing I noticed is that initial selection of DM puts the radar in stand-by, thus a "NO-RAD" indication appears in the HUD. This is something I don't understand and I manually turned the radar back on by taking it out of stand-by using the left radar MFD push-button. Any guidance on this would be appreciated.

The simplified SRM symbology on the HUD consists of a round reticule with tick marks at all four corners, which I believe are marks representing 12, 9, 6, and 3-thousand foot distance marks as they work their way around counter-clockwise. Thus in the following HUD shot the target is approximately 3000 feet in front of us:



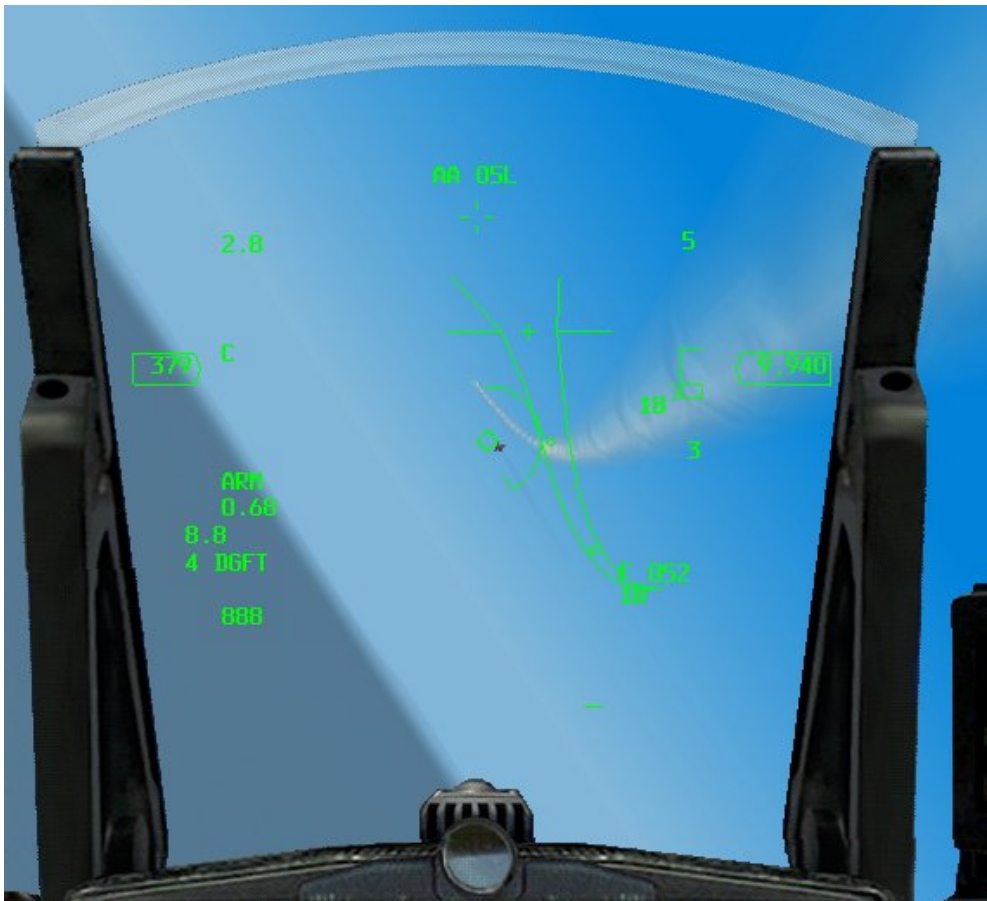
The A-4 breaking left:



My first Sidewinder apparently was not locked on correctly and goes dumb immediately after launch:



My second fares a bit better and tracks well on the target:



The second missile looks like a hit, but our friend in the A-4 keeps on trucking so I launch missile #3:



Definitely a hit, but that A-4 just won't succumb!



Missile #4 tracks wide for a miss:



Missile #5 appears to hit but I can't tell. With one last missile I'm getting frustrated with these AIM-9Ps. The A-4 has slowed and has some trailing edge flaps out and I'm tending toward over-shooting now:



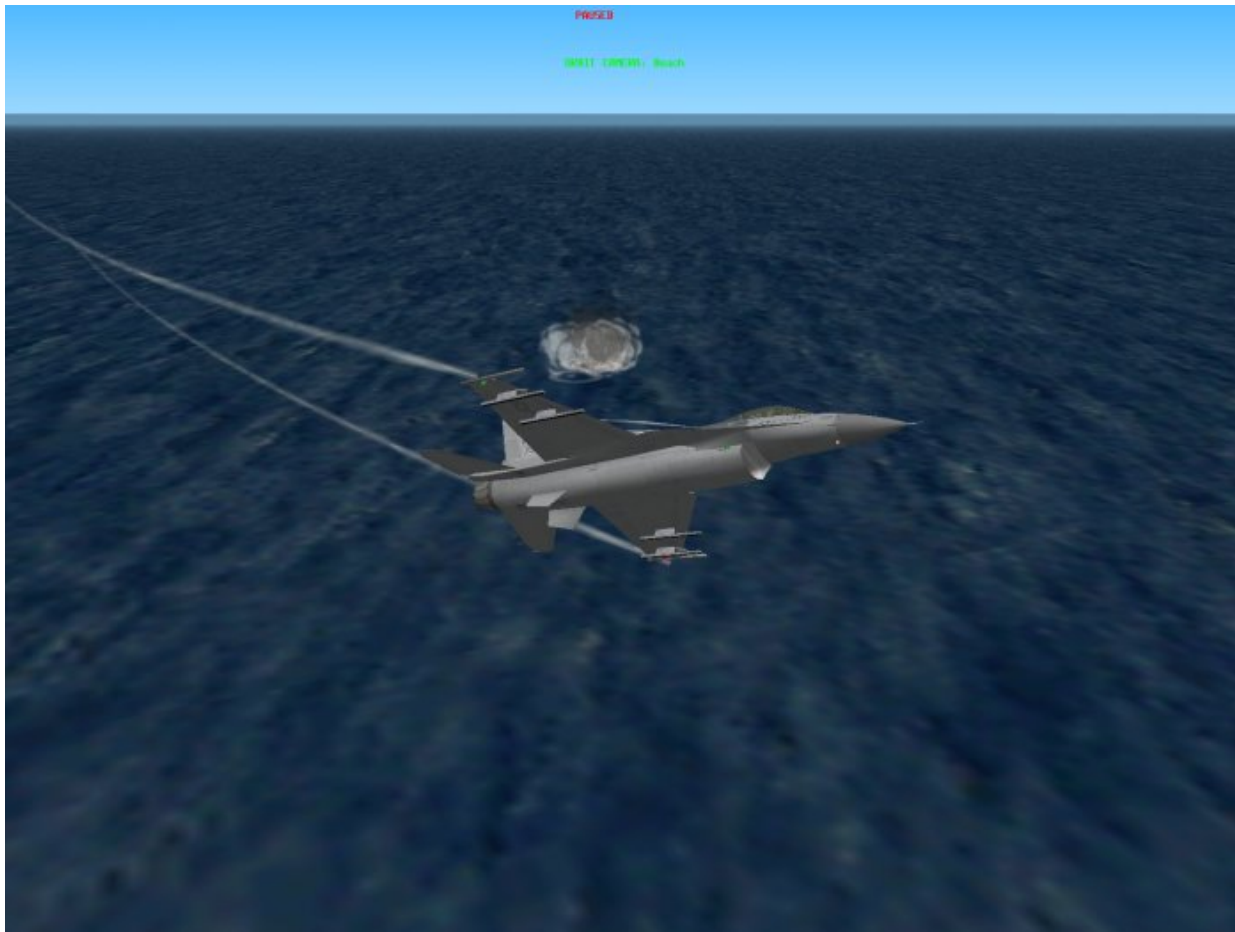
Breaking away so as not to blunder in front of the A-4, who is now only doing about 200 knots, I climb away, and re-engage with my last missile which appears to hit (3 hits, 3 misses if you are keeping score):



The A-4 rolls over as I come down on him but I can't tell if he's out of control or just flying evasively:



I follow him down and get the break-away X across the HUD and almost follow the A-4 into the water!

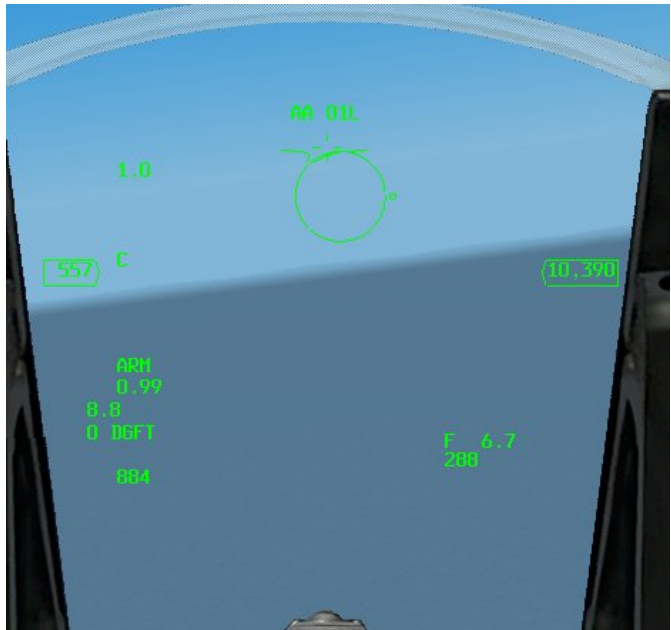




Pulling away from the water I climb back up to hunt down the other A-4. I find him at about 15 miles using my RWS mode.



Glancing at the fuel gauge I'm mindful that I'm not carrying external tanks on this mission.



Inside of 10 miles I go to DM and the radar locks on the A-4.

Why these guys are flying around with their flaps down is beyond me, but they are making it hard for me to stay behind them!



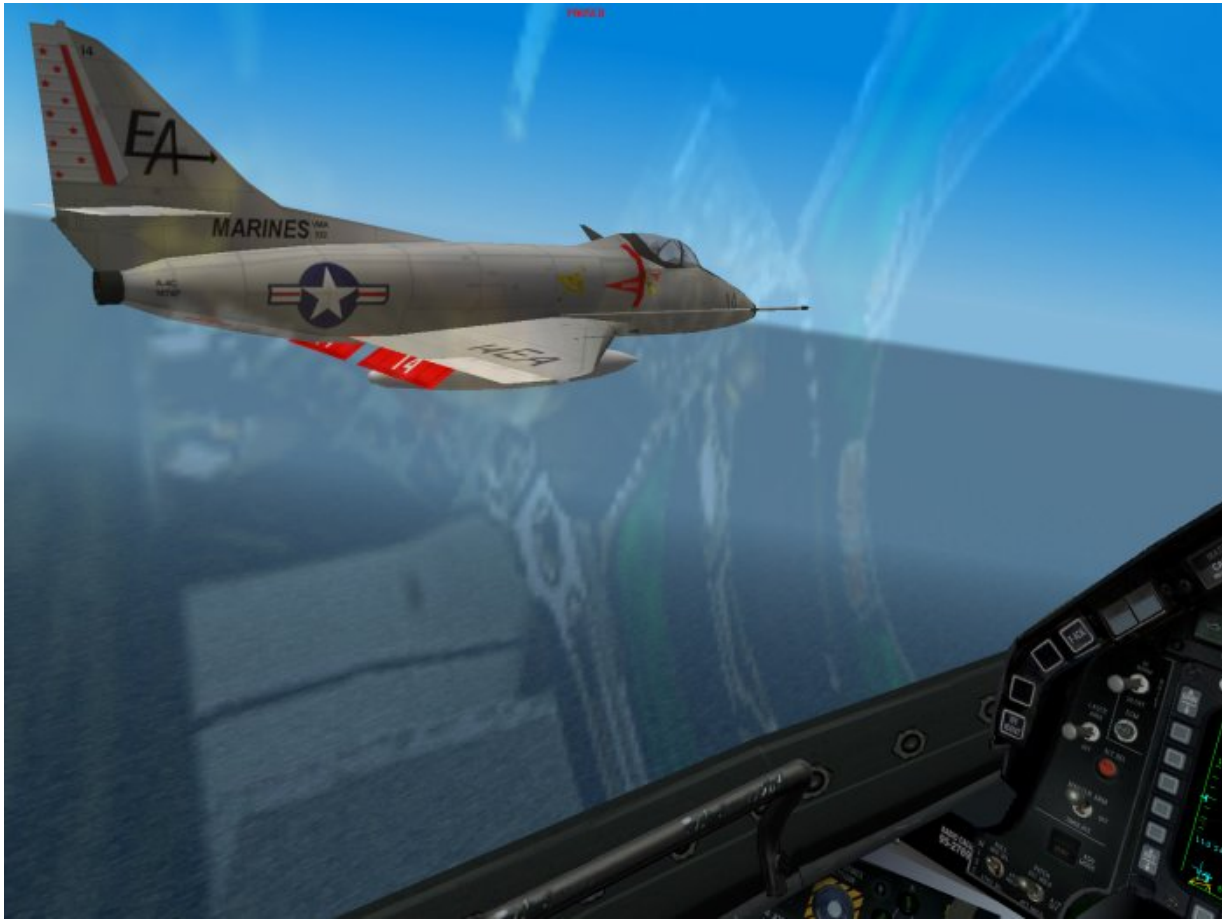
I sloppily fire my gun at the A-4, get a couple hits but stupidly run out of ammunition before I can finish him off:



With no gun rounds remaining and no missiles left, all I can do is hurl insults at the guy:



I pull up on his right wing, snap him a salute and head for home:



I land and pull to a stop satisfied that every frustrating training flight reveals a new piece of knowledge.



Conclusions:

The Dogfight Mode is a super effective mode of quickly locking up a target during the heat of the battle. I still have not found a reason behind the radar being put in stand-by upon initial selection however. The AIM-9P has been a disappointing performer for me. I don't know if I'm firing it out of its envelope or if it is really just that bad. All of my shots have been rear-aspect, as is required of the -9P (unlike the -9M) but they just don't kill targets with a single shot (at least rarely).

FLIGHT STATISTICS:			
Callsign	Status	Ordnance Fired	Results
Slng11	Functional	23 x 20mm M61	17 misses, 6 hits (26%)
		6 x AIM-9P	3 misses, 3 hits (50%)

The cannon is a real killer. It doesn't take many hits to down an aircraft although restraint is the key when using this weapon as the rounds deplete quickly for the over-zealous trigger-man.

BeachAV8R