

CVW-14 INITIAL TRAINING

Week 2: NAV & AAR





OVERVIEW



- Welcome back!
- In Week 2, we will discuss:
 - **NAVIGATION 101** – Where are you? Where do you want to go? When do you want to get there? What if you no longer want to go there? Why is Knuckles asking me so many questions? How do I get him to shut up?
 - **DEPARTURE PROCEDURES** – How do you launch from an airfield without colliding with another group of assholes in the same airspace?
 - **AIR TO AIR REFUELING** – What happens when a KC-135 and an F/A-18 love each other very, very much?
- This will be a busy one. Let's get started!



THE HSI



- Navigation is primarily done through the **HSI** (Horizontal Situation Indicator) page.
 - Top-down view displaying items such as:
 - *Heading*
 - *Flight Plan*
 - *Navigation Aids*
 - *TACAN*
 - *Waypoints*
 - The HSI can be placed on any screen, but you'll only get moving-map underlays on the AMPCD





WAYPOINTS

- A **waypoint** is just a coordinate
 - There are several different formats:
 - Lat/Long
 - DDM – Degrees Minutes Seconds i.e. N 44° 13' 27.55"
 - DDM – Degrees Decimal Minutes i.e. N 44° 15.3585'
 - MGRS i.e. 11S PA 9535 69784
- Heading, distance and time to Steerpoint is available on the HUD and HSI
- Waypoints can be edited via the **HSI Data Page**



HSI DATA PAGE



- The **DATA** page edits waypoints
 - This can be done at any time, either in the air or on the ground
- Can add a WP, but not name it
 - Use both the HSI page and UFC
- Scroll through all WPs using arrows on Right OSBs
- Can set a Desired Time On Target (**DTOT**) for any one waypoint
- DATA page is also where you will set the **Bullseye** WP using AA WPT button



ADDING A WAYPOINT

- Let's say you want to add a new WP between existing WPs 4 & 5
- Decide what number you want to use
 - In this case we'll say "11"
- Go to the Data page on the HSI
- Box SEQUFC and you'll see a variety of options on the UFC
 - Click "INS"
 - Type the number of the waypoint BEFORE THE ONE YOU WANT TO ENTER, in this case Waypoint 4, then hit enter
 - Now type the NUMBER OF THE WP YOU WANT TO ADD and click enter
 - You'll see your new waypoint populated in the list
- Use the arrows to scroll up to your new waypoint, then click UFC and enter the coordinates



DTOT



- DTOT stands for *Desired Time On Target* – a specific time at which you want to arrive at a specific point.
 - The jet will then give you a required ground speed in order to hit the target at the selected time
 - To make this even more fun, you can also plug in a desired groundspeed, but let's not worry about that tonight
- "But how do I input this in the jet?"
 - Great question, glad you asked...



Where am I, Where are you, Where's the gas station?



DTOT



Procedure for setting up DTOT is as follows:

- 1) Select DATA
- 2) Select SEQUFC (Sequence UFC)
- 3) Box TGT, Option 2
- 4) Enter the number for the target WP
- 5) Box TOT, Option 3
- 6) Enter 6-digit **ZULU Time**
 - I. Format: HH:MM:SS
- 7) Return to the HSI
 - I. Box SEQ1 & AUTO
 - II. Verify required Ground Speed – does the number make sense???



DTOT



- The HUD will also give you an indication of whether you're fast or slow
 - The “^” caret will move left for slow, right for fast





TACAN



- **TACAN**, is a navigation system used by military aircraft.
 - It provides the user with *bearing* and *distance (DME)* to a ground, air or ship-borne station.
- TACAN emitters are used on the ground in fixed positions, on aircraft to facilitate distance or bearing, and aboard Navy carriers.



TACAN SETUP (UFC)

1. Power on
2. Set Channel (1-67)
3. Set mode
 - T/R
 - RCV
 - A/A
4. Set Band X/Y



Where am I, Where are you, Where's the gas station?



TACAN HUD



- Arrow on the HUD represents desired track
- Course Deviation Indicator (CDI) dots indicate course error of 4° and 8°



Where am I, Where are you, Where's the gas station?



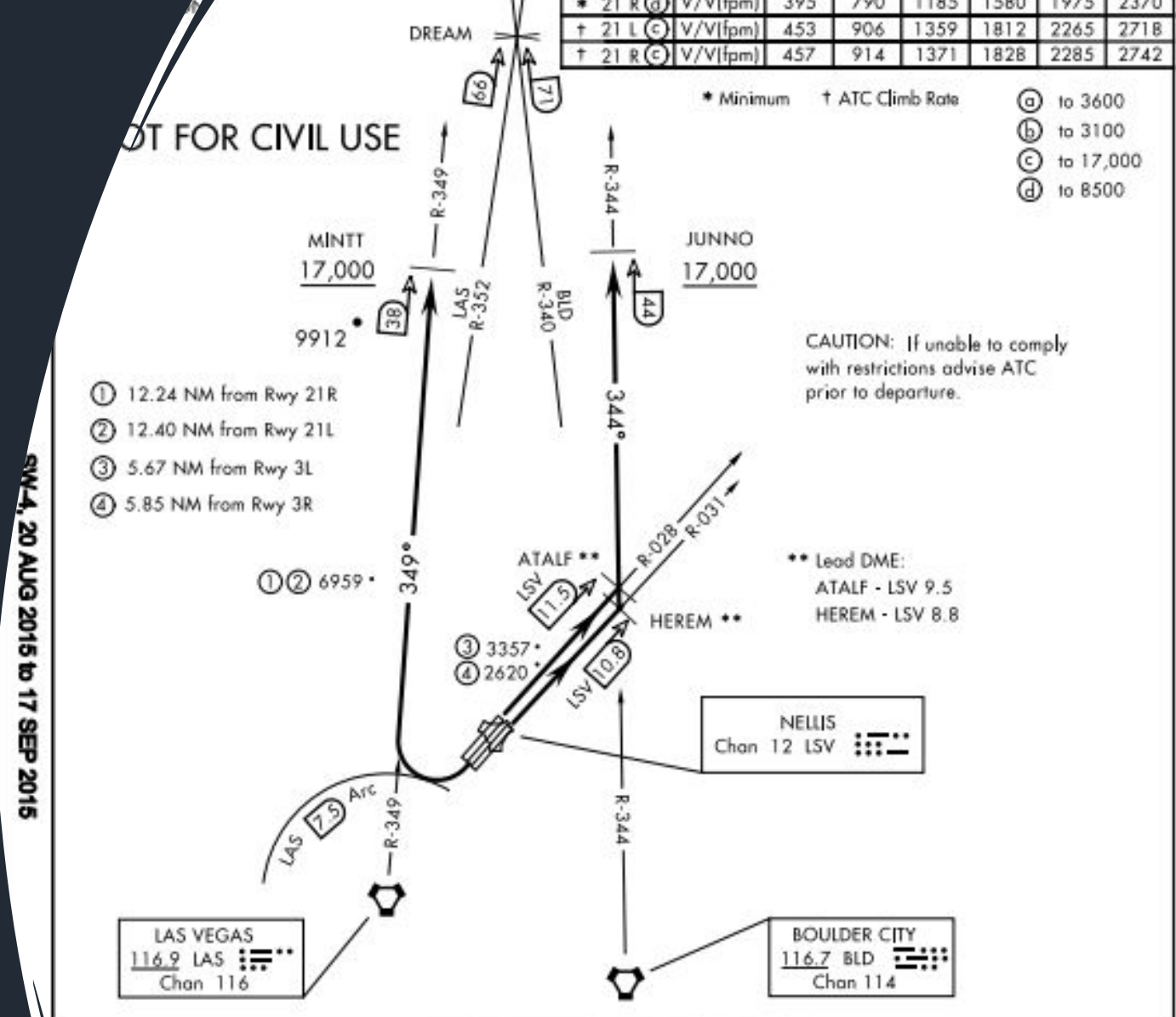
BULLSEYE

- **Bullseye** is a pre-defined point used as a reference for radio calls indicating a position.
 - For example, if someone says they have a radar contact at "bullseye 050/30 miles", the radar contact is 30 miles away from the bullseye point at a heading of 050 (roughly northeast).
- Why use Bullseye?
 - It's a lot quicker than BRAA calls – everybody can reference it!
 - The bad guys don't know where B/E is, so they can't figure out what you're talking about even if they listen in on your comms!
- To set up Bullseye, use the [HSI data page](#)
 - B/E is the last waypoint by default (59)
 - Select this WP, then box **A/A WPT**

TOPIC 2.2 – DEPARTURE PROCEDURES

"How do I follow a VFR Departure Procedure?"

"What is the point of following a VFR Departure Procedure?"



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RWY 3L: Fly runway heading to intercept the LSV TACAN R-028 then direct ATALF, intercept the BLD VORTAC R-344 then direct JUNNO, cross JUNNO at or above 17,000, then via assigned route.

TAKE-OFF RWY 3R: Fly runway heading to intercept the LSV TACAN R-031 then direct HEREM, intercept the BLD VORTAC R-344 then direct JUNNO, cross JUNNO at or above 17,000, then via assigned route.



VFR DEPARTURES

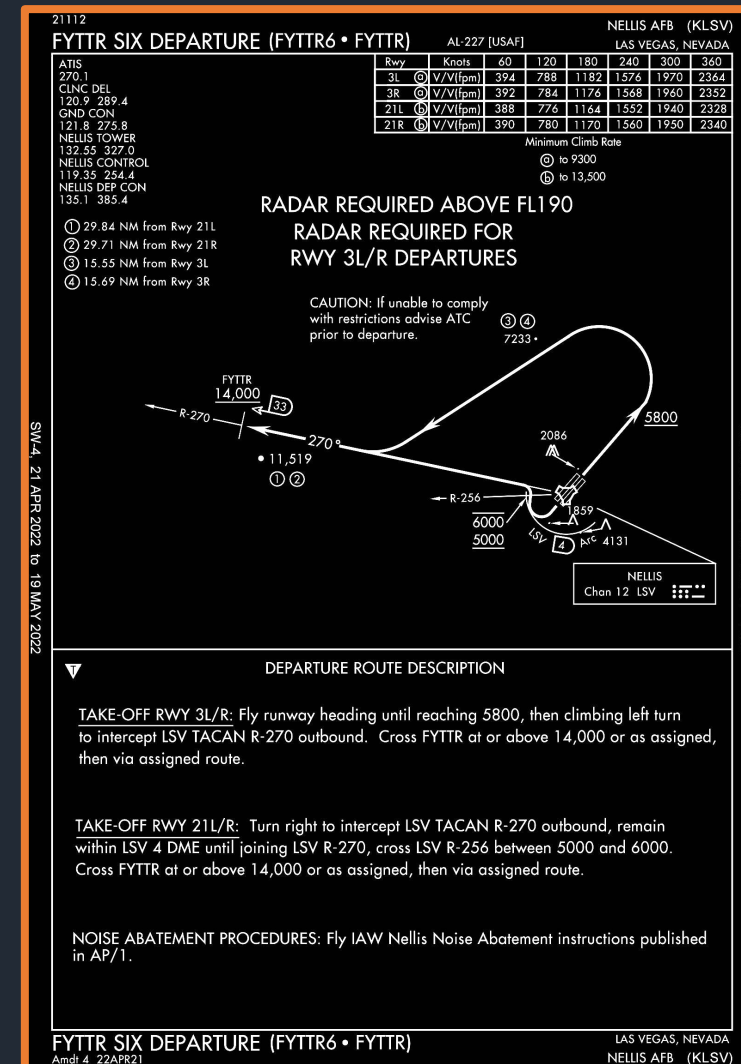


• *Departure/Approach Procedures*

- Formal Procedures are given in chart (plate)
- *Must fly as depicted*

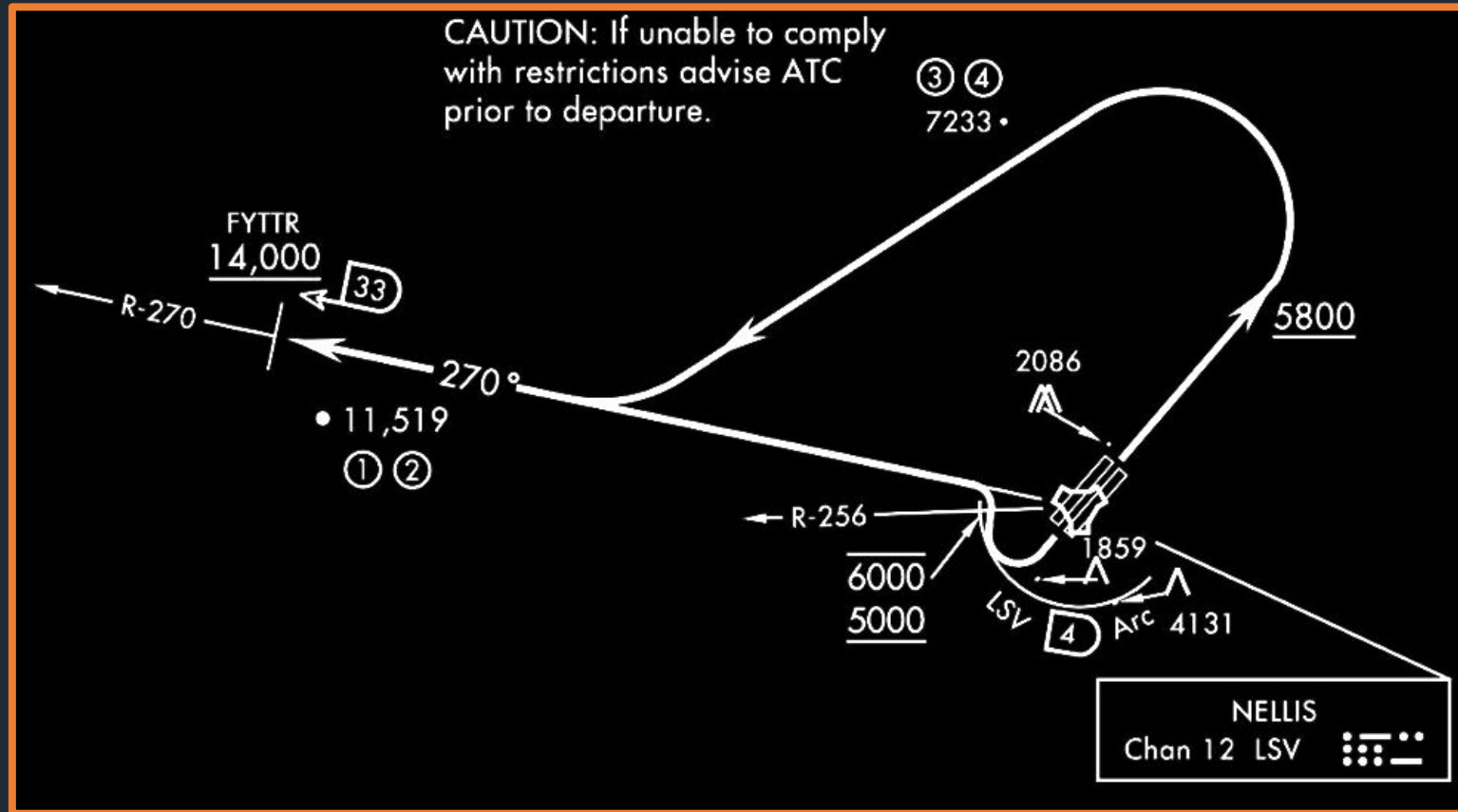
• Departure Plate contains:

1. General Information
2. Entry/Exit Points
3. Altitudes
 - I. Bars above or below signify limits
4. Specific Instructions/Hazards
5. Visual reference





HOW DO WE READ THIS?



This is the FYTTR-6 Departure from Nellis.

Let's break it down a little bit!

Where am I, Where are you, Where's the gas station?



FYTTR-6 DEPARTURE



TAKE-OFF RWY 3L/3R: Fly runway heading until reaching 5800, then climbing left turn to intercept LSV TACAN R-270 outbound. Cross FYTTR at or above 14,000 or as assigned, then via assigned route.

Huh...?



FYTTR-6 DEPARTURE



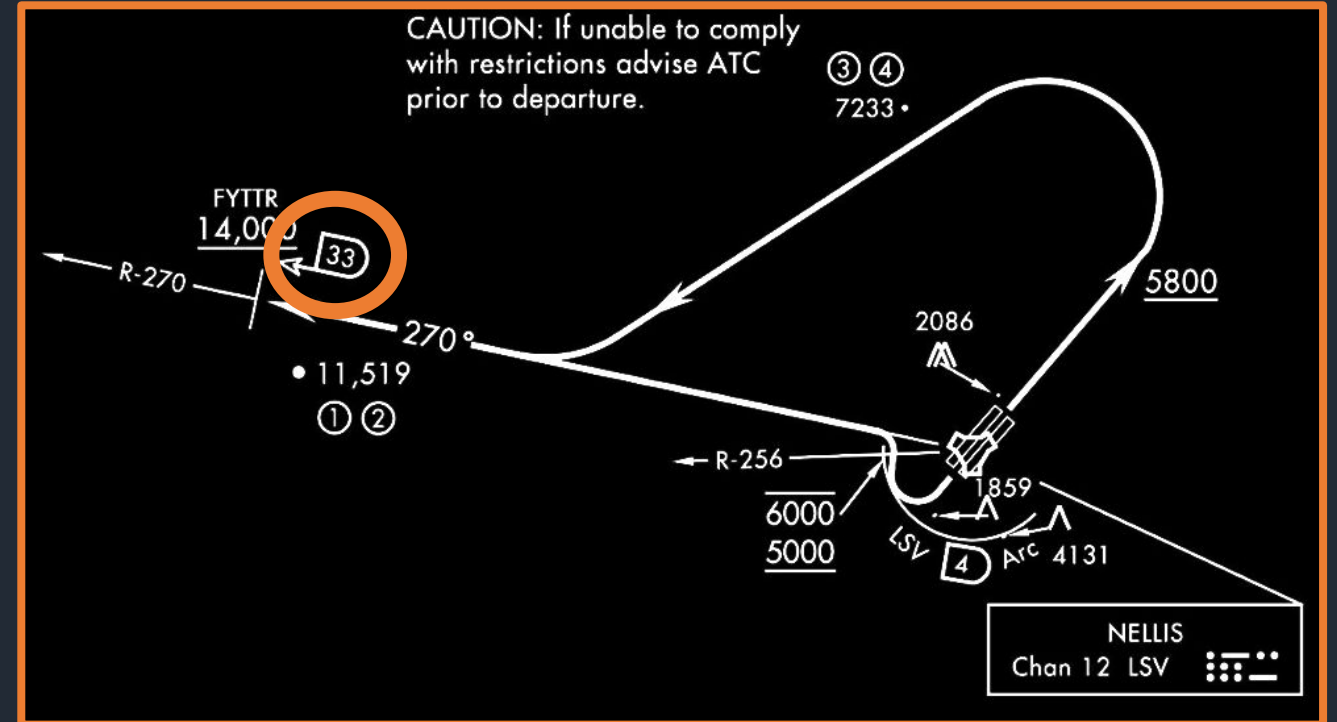
- To start, set your TACAN to Nellis! (12X)
 - Box TACAN on the HSI
 - Use the Course Select knob and set it to 270 (That's the "LSV TACAN R-270 outbound" part of the instructions!)
- When you take off, climb until 5800 MSL
 - Once you reach this, keep climbing and start a left turn
- Keep an eye on the course line on the HSI – the idea is that you'll make a right turn and roll out on that bearing so you're flying 270 from Nellis!



FYTTR-6 DEPARTURE



- By the time you reach FYTTR, you need to be at or above 14,000
- How do you know where FYTTR is?
- **33 DME from Nellis!**



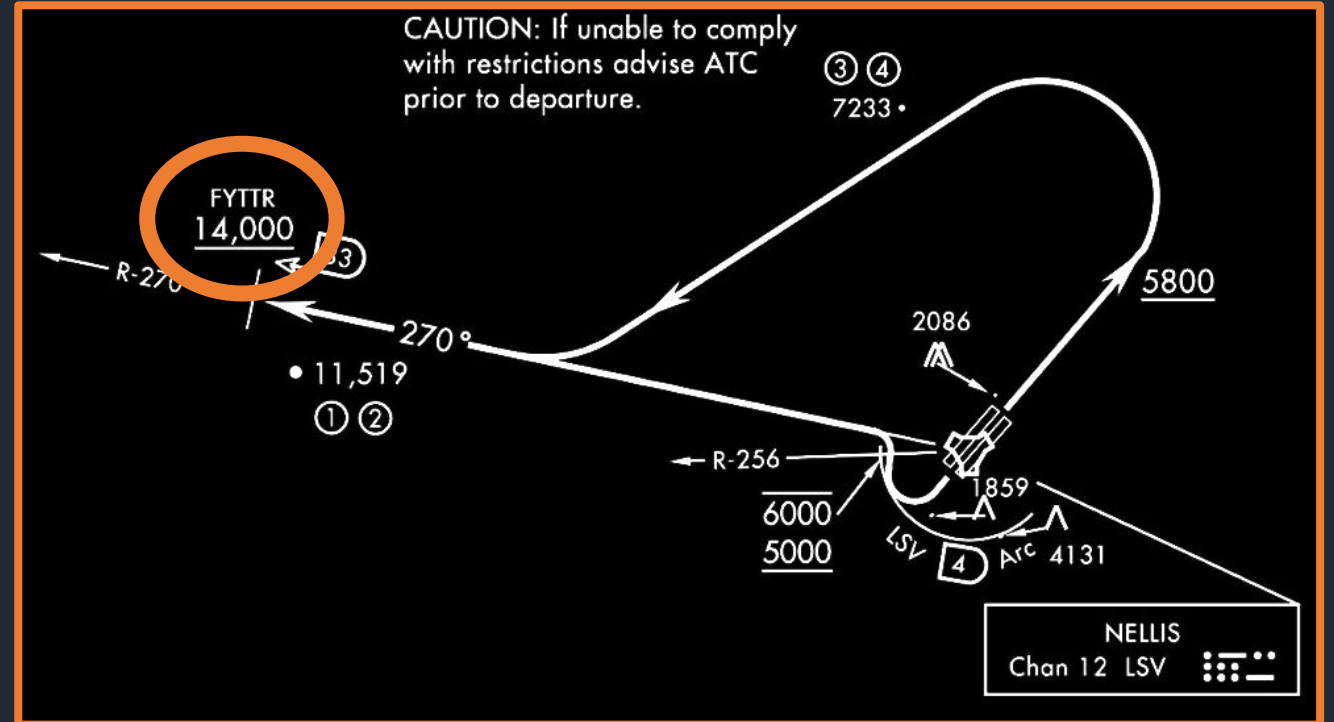
Where am I, Where are you, Where's the gas station?



FYTTR-6 DEPARTURE



- How do you know you need to be at or above 14,000 by FYTTR?
 - *There's a little bar there under 14,000!*
- If there was a bar ABOVE 14,000, what would that tell us?





WHY DO WE DO THIS?

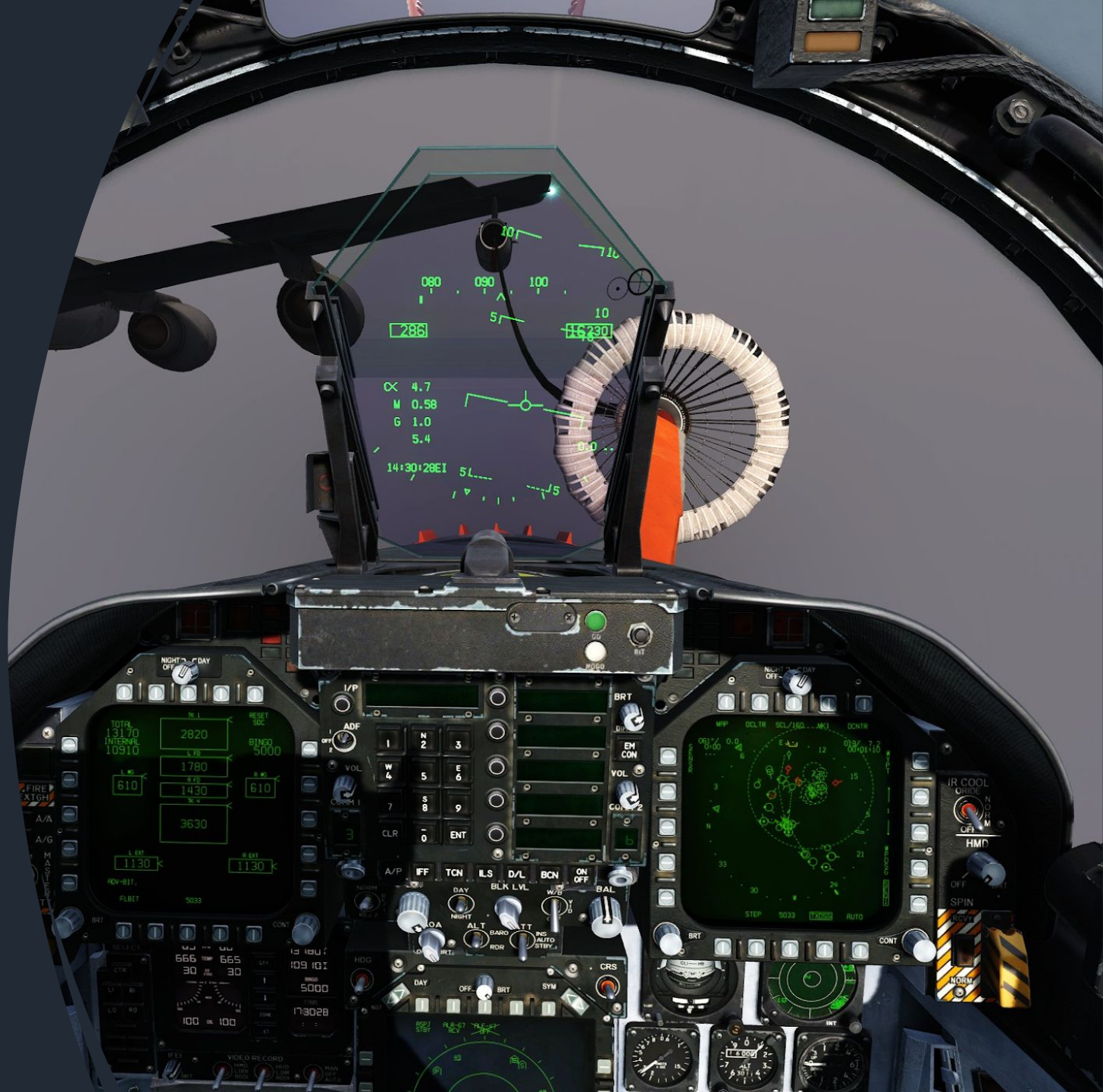
- For the most part, departure plates like this aren't something we're going to use once we leave the NTTR and go off on cruise.
- However, there *are* specific departure procedures that we follow for Case-I and Case-III departures out on the boat.
 - It's good practice to learn to read one of these and it teaches you how to fly by the numbers, so we're gonna make you do it!
 - Please also note that these exist for recoveries as well!

TOPIC 2.3 – AIR-TO-AIR REFUELING

"What are the procedures for safe operation around the tanker?"

"How do you plug (and stay plugged) with the tanker?"

"How did MACE get that callsign?"





AIR-TO-AIR REFUELING

- The Hornet has fairly short legs. As a result many missions we fly will require *air-to-air refueling*, or *AAR*.
- ***This is one of the most difficult things to learn in DCS. Difficulties include (but are not limited to)...***
 - Flying Precise Formation
 - Wake Turbulence
 - Pilot Induced Oscillation (PIO)
 - Especially in the vertical
 - Depth Perception (~~VR USERS OF THE WORLD UNITE~~)
- AAR takes a LOT of practice. You'll probably suck at first. That's okay!
 - For this reason it's going to be a part of pretty much every training sortie we fly. We'll go up, hit the tanker, then go do whatever else we're gonna do.
 - You'll have plenty of opportunities to git gud.



FLIGHT PERFORMANCE ADVISORY SYSTEM (FPAS)



- The **FPAS** page is your best friend when it comes to maximizing range & endurance
- FPAS will show you:
 - Current Range
 - Current Endurance
 - Best Speed/Angles to max either of these numbers
- HOME WP will be Nellis for today
 - Unused WP(58) to disable
- NOTE: The FPAS can only calculate info below M0.9!





AIR-TO-AIR REFUELING



There are several different types of tankers you might encounter in the Hornet, including...



US NAVY S-3B Tanker

Carrier On Board (COB) tanker
Typically used near the boat



US NAVY KC-130 Tanker

Forward A2A tanker
Supports operations further from the boat
Commonly used for Helicopters
ED plz gib Super Hornet Buddy Tanker
Where am I, Where are you, Where's the gas station?



USAF KC-135 MPRS

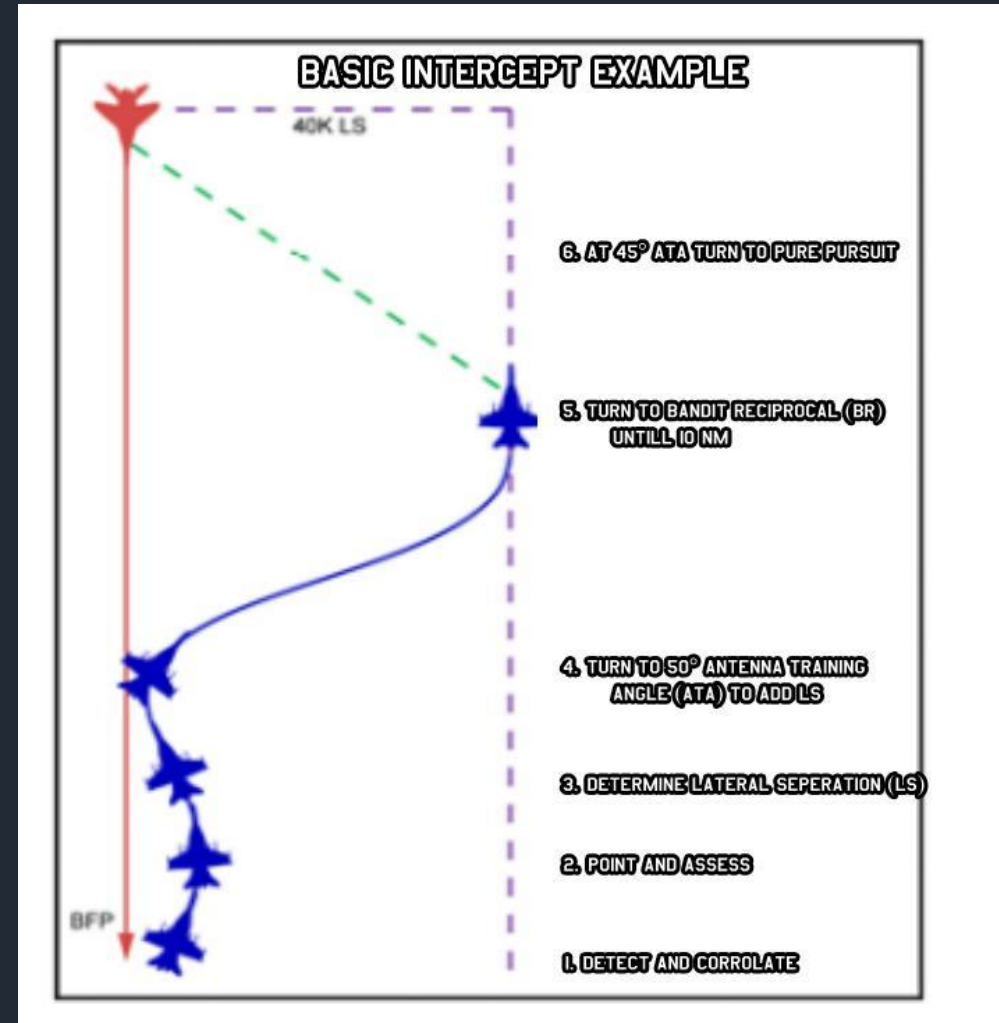
Air Force A2A tanker with pod
Supports Joint USAF-USN operations



GETTING TO THE TANKER



- Obviously the first step to tanking is finding the tanker.
 - Use TACAN to find the tanker – A/A mode!
 - When directed by FL, switch to tanker freq, then call the tanker to *request rejoin.*
 - Rather than flying straight at it, you'll want to fly a proper *intercept* to rejoin on the tanker without it taking twenty years – for this week just follow your flight leads.
- As you approach the tanker, put your radar to standby and verify that your master arm is off!
 - "Nose cold, switches safe."

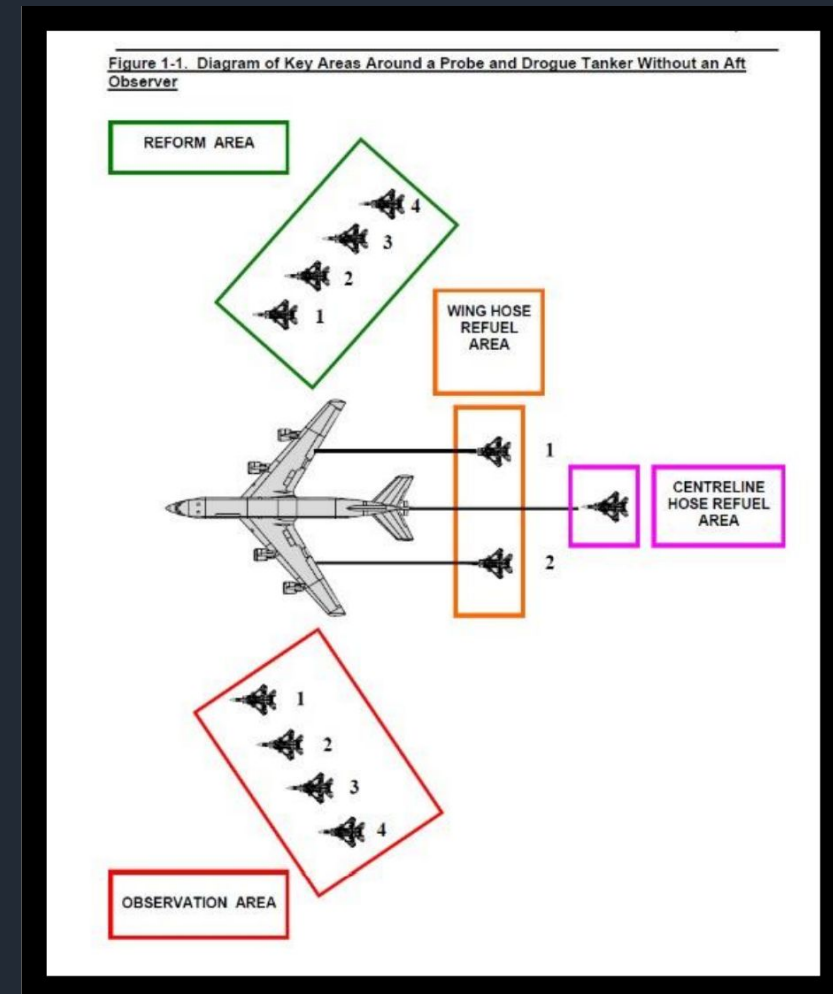




AROUND THE TANKER



- To ensure deconfliction, we've got 3 ***control areas*** around tanker
 - ***Observation Area***
 - ***Refuel Area***
 - ***Reform Area***
- In observation area, Echelon Left
- In reform area, Echelon Right
- Flight members are sent to refuel one at a time by lead.
 - Flight order or fuel state
- The first aircraft to reach reform area ***leads reform formation***





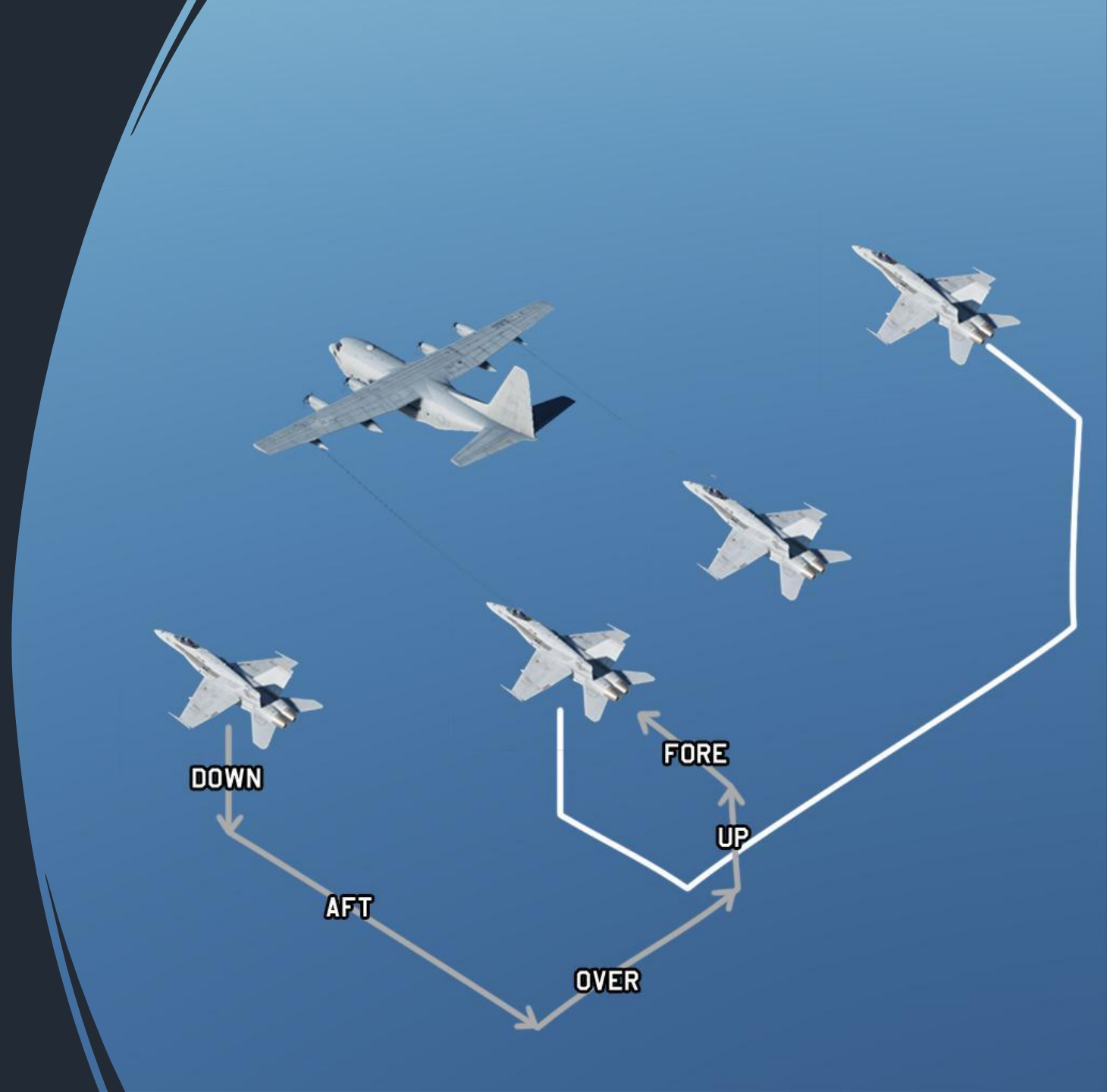
PORT OBSERVATION



Where am I, Where are you, Where's the gas station?

TRANSITIONS

- To operate safely around the tanker, there's a very specific flow to transition between areas
- Order Of Operations:
 - Down
 - Aft
 - Over
 - Up
 - Fore
 - Drill this into your head!!!
- Make sure you shoulder check before you move, just in case...





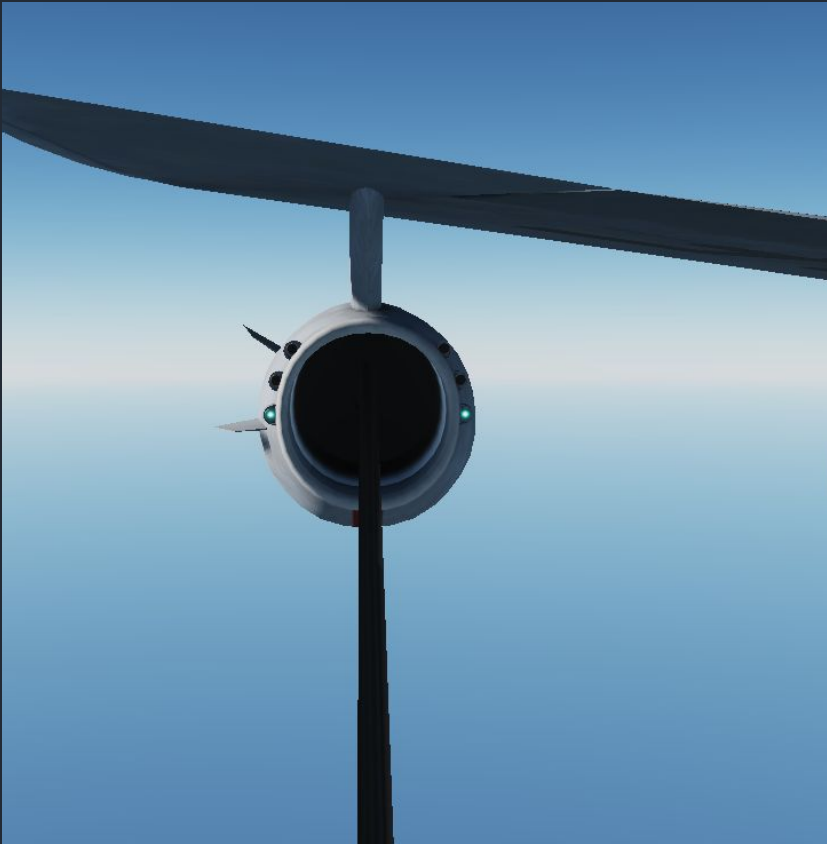
PUT THE THING IN THE THING



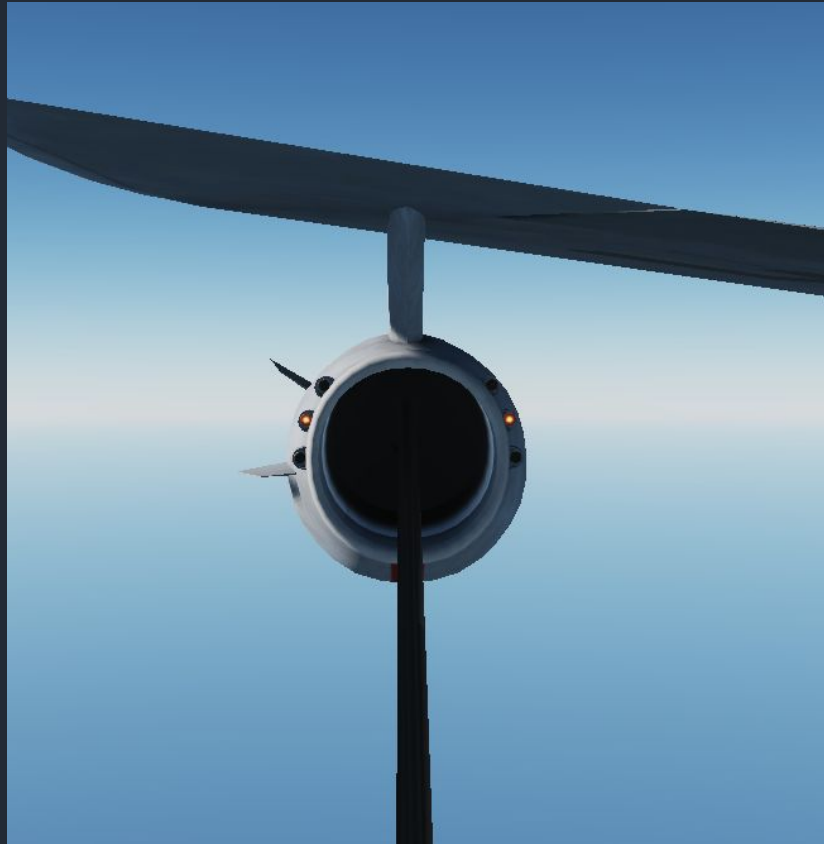
- Once in position in the refueling area, call "***Ready Precontact***"
 - You will probably hear "return precontact!" at least once. Get closer.
 - Resist the urge to go guns on the tanker.
 - You will hear a "cleared contact" in response when you're in position.
- Approach the basket ***veeeeery slowly***.
 - The Hornet's engines take a while to spool. Minor corrections.
- ***Watch the pod instead of the basket.***
 - This feels counter-intuitive, but it works.
- Once you're plugged and receiving, you'll hear "***You're taking fuel.***"



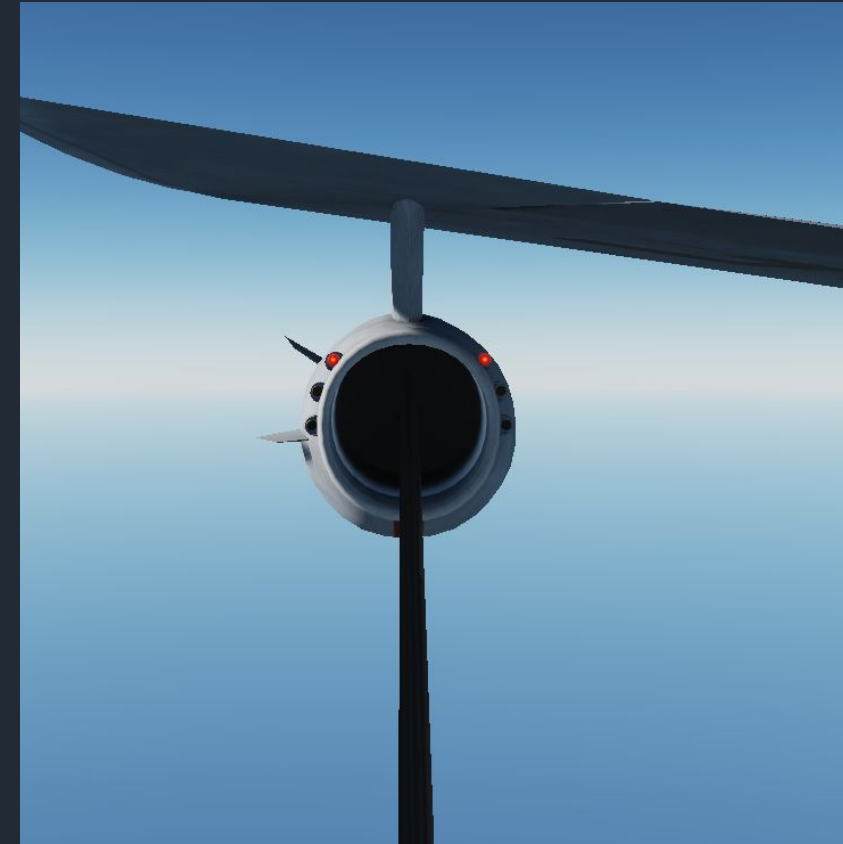
ON THE BASKET



SOLID: Good position, steady
Flashing: Drifting too far aft



SOLID: Too close, steady
Flashing: Too close, drifting closer



SOLID: Very close, breakaway warning
Flashing: BRAKEAWAY

Where am I, Where are you, Where's the gas station?



ON THE BASKET

- Once you've plugged, watch the tanker.
 - Pick a reference point on the tanker itself and hold it steady.
 - Again, minor corrections are the key here.
 - Some people like turning on attitude hold autopilot for this. YMMV.
 - Figure out an airspeed at which you're not drifting forward or aft, and shoot to hold that at all times.
 - Remember that if you add power, you'll climb. If you cut it, you'll descend.
 - Some guys like a little nose down trim so you're constantly applying back stick pressure to stay on the basket; YMMV.
 - The tanker *is going to turn.* Remain calm.



WHAT QUESTIONS DO WE HAVE?



Hey that's cheating!

Thanks for stopping at Kwik Trip, we'll see you next time