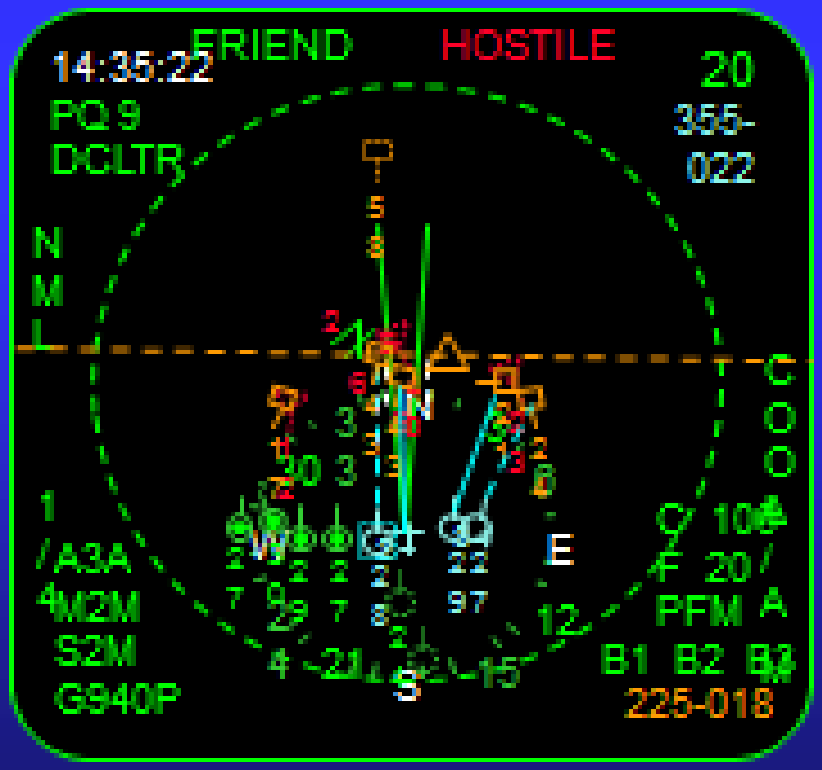
142ND Fighter Wing Midair Collision Avoidance Program

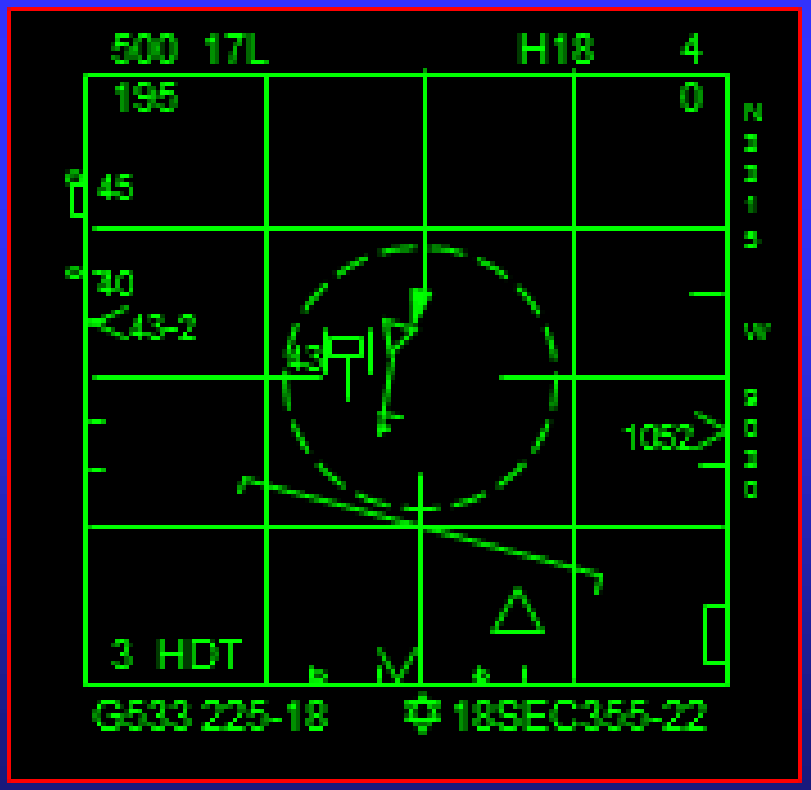
OBJECTIVES

- Mid Air Collision realities
- 142Fighter Wing - 123rd Fighter Squadron Mission
- F15 Local Operations
- Transient Aircraft Operations
- Night Operations
- TFR Operations
- MACA Tips

Some Reality

- F15 Pilot Mission is to find Aircraft and sanitize the airspace
  - Basic Priorities Formation / Sensors / Comm
    - (Aviate / Navigate / Communicate)






SL
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Midairs

- Despite all training, rules, experience
  - 24% of F-15 mishaps are midair collisions

Why we are here

- Midair Collision avoidance is every Pilots responsibility
- Even with our training specific to midair collision avoidance mishaps still occur
- Priority may not be General Aviation Aircraft
- ***Closure rates in excess of visual pick-up***

142nd Fighter wing – 123 Fighter Squadron

- 21 F- 15 C/D model Aircraft
- 3 F-15s dedicated solely to Alert Mission
- Approximately 30 Pilots
- 1000 Trained Military Professionals
- Located on the south runway of Portland International Airport
- All Working to Protect the United States and Specifically the Pacific Northwest

123rd Fighter Squadron Mission

- Air Defense of the Pacific Northwest
- Domination of the Air Superiority Arena
- Federal Augmentation in support of National Security Objectives
- Response to State and Local Contingencies
- Pro-active Involvement in Activities that add value to the People and Communities which we Serve

Why F-15s Fly in the Local Area

- Support Homeland Defense
- Support Contingency Ops (Combat) around the world
- Train for Combat so that others don’t have to

F-15

- Single Seat Air Superiority Fighter
- All Weather with Day -Night Capability
- Unprecedented Maneuverability
- State of the art avionics and weapons

WEAPONS

- The F-15 Can Carry 8 Missiles
  - Typically 6 AIM-120 – Advanced Radar Missile
  - Typically 2 AIM-9X – Advanced Heat seeking Missile
  - 20mm Gun – 940 rounds or 10seconds

F-15

- 64,000lb Fighter when loaded with 24,000lbs fuel and 8 missiles
- 43 foot wingspan
- 2 Pratt and Whitney F100-PW-220 Turbofan engines with afterburner
- Each producing 23,500 lbs thrust
- Max speed 1875mph (mach2.5)
- 50,000 ft/min initial climb rate
- Service ceiling of 65,000ft

F15 Local Area Operations

- Typical Launch
- Formations
- Departure
- Arrival routes
- Local MOAs
- Low Level Routes
- Airfields

Typical F15 Takeoff Times

- Alert Fighter can launch anytime with 5 minute response to threat
- Typical training sortie is 1 - 1.5 hour long
- Training flights Monday – Friday with 0845 and 1245 takeoffs
- Saturday and Sunday flying 1 weekend a month
- Night flying periodically on weekdays after civil twilight ends

Training Configurations

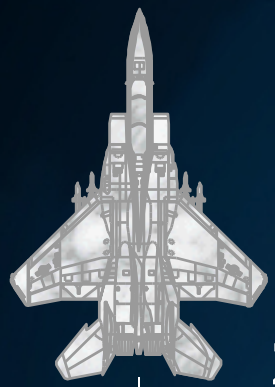
- Air to Air Combat training only
- Typically launch 6-8 aircraft at a time for training
  - Basic Fighter Maneuvers - 1 v 1 dogfight
  - Air Combat Maneuvers - 2 v 1 dogfight
  - Tactical Intercepts – as 2v4, 4v4 long range
  - Air Combat Training – Dissimilar aircraft training can be an 8v8 to 12v16 in local airspace

Typical F-15 Formations

2 Ship Line Abreast

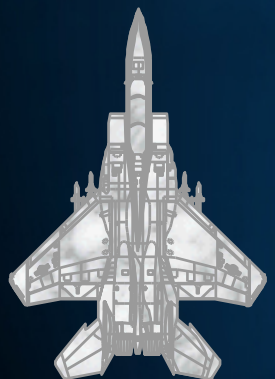
4 Ship Wall

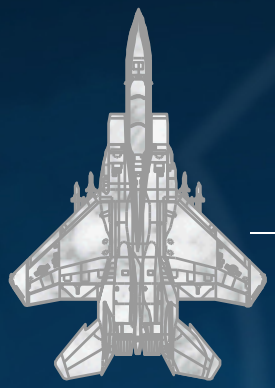
Typical F-15 Formations



2 Ship Lead Trail

1-2 nm

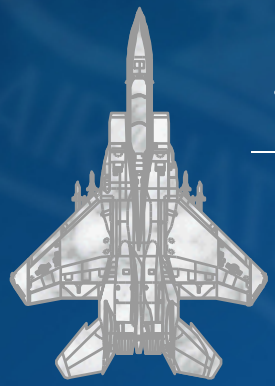




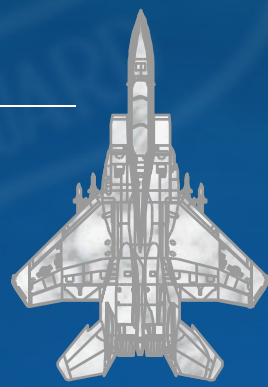
.5-1.5 nm

1-2 nm

4 Ship Offset Container



.5-1.5 nm

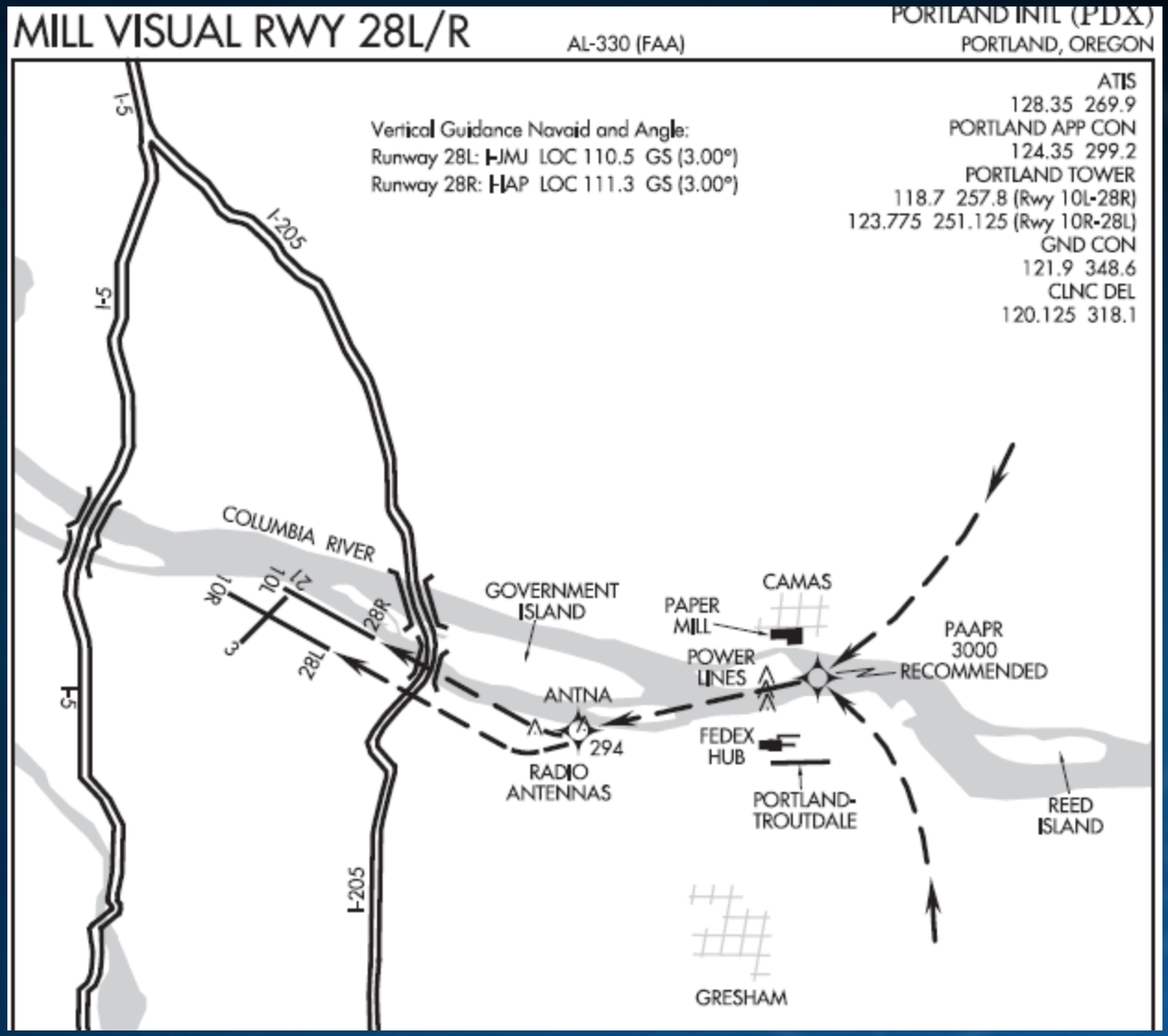


Portland 1 Departure

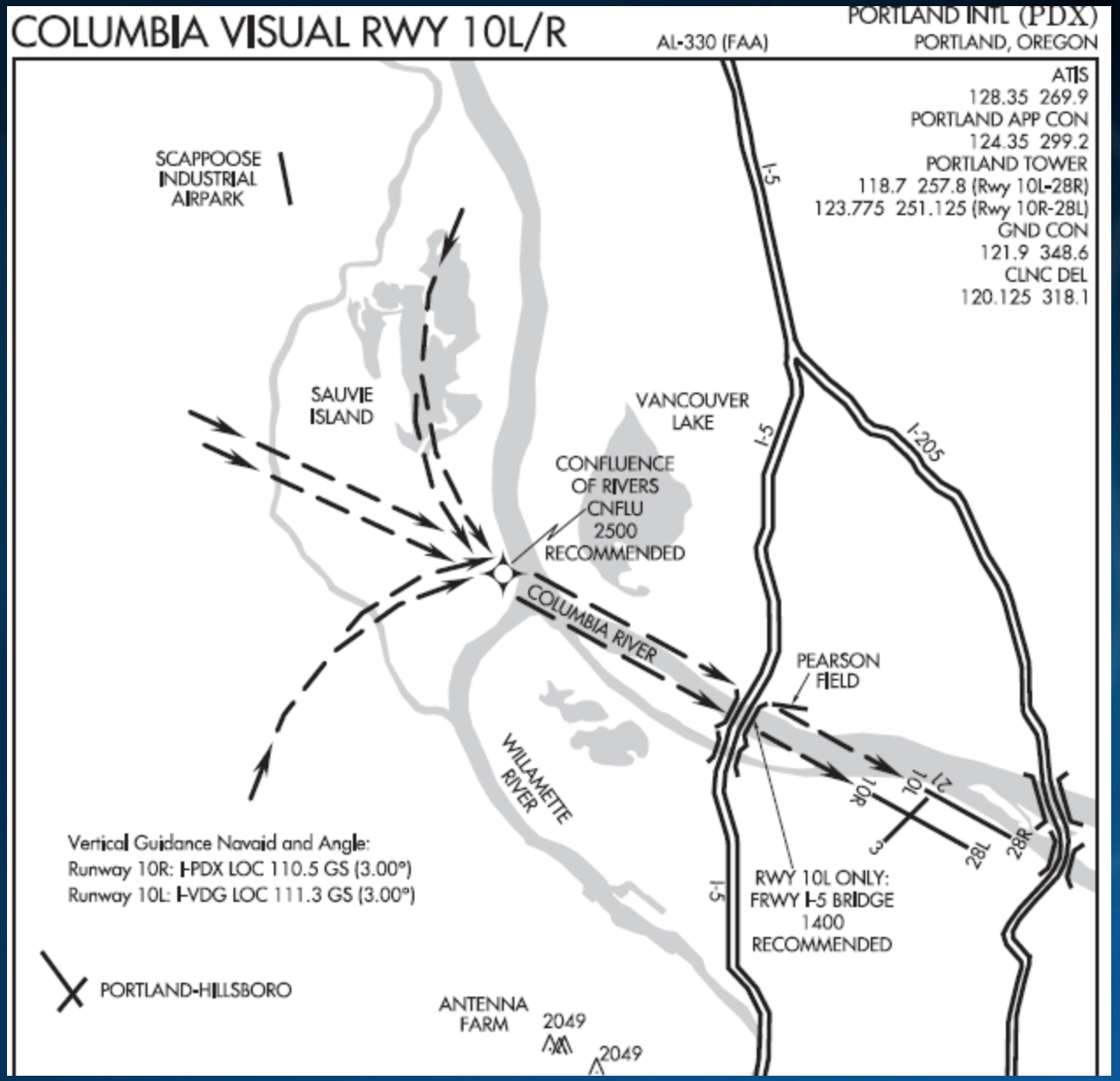
Arrival Routes

- Mill or Columbia Visual
- Radar Vectors to Instrument Final
- STARs
  - ELKES RECOVERY – Unpublished setup for F-15 usage
  - HELNS 5
  - MOXEE 6

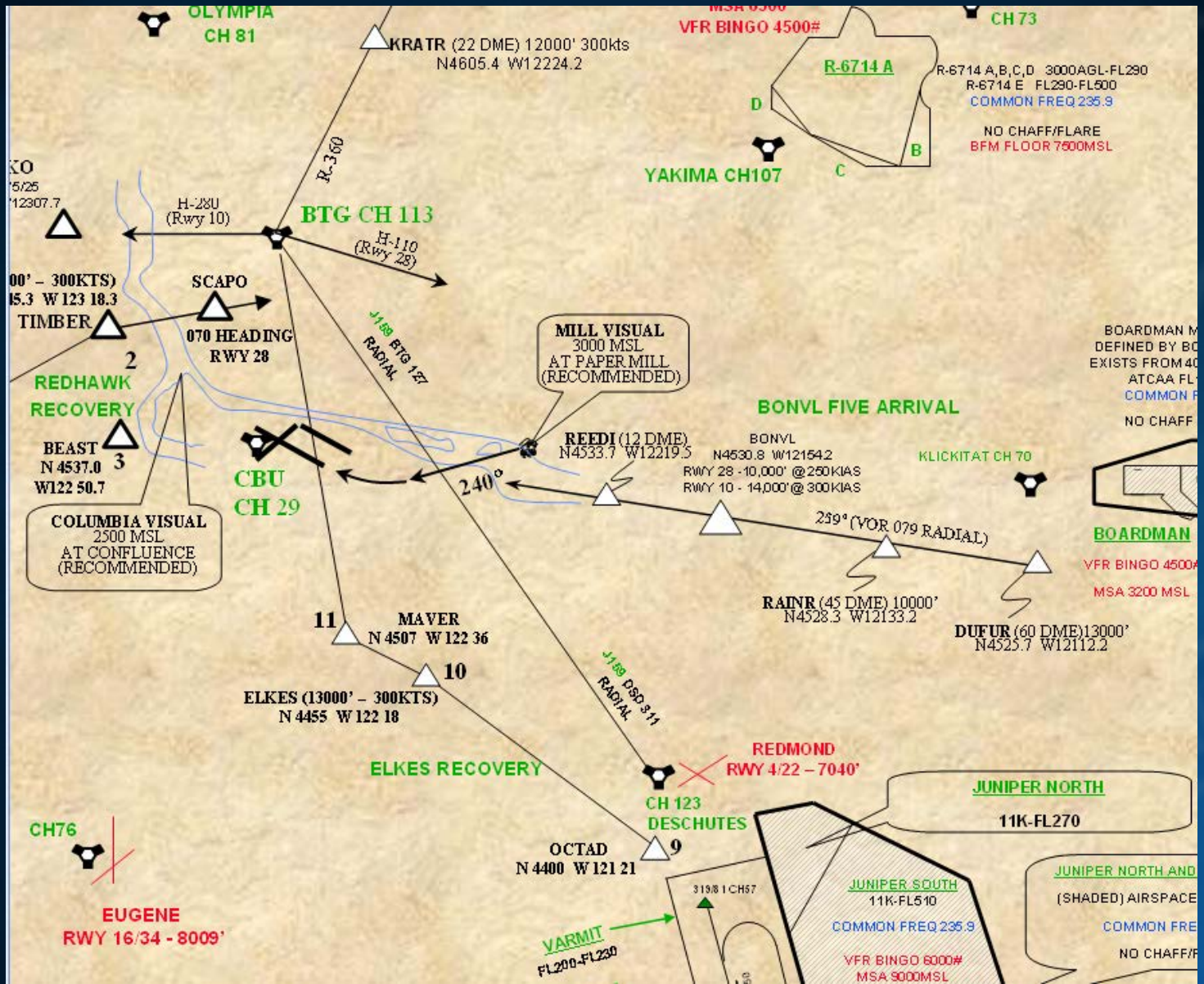
Mill Visual


MILL VISUAL RWY 28L/R
AL-330 (FAA)
PORTLAND INTL (PDX)
PORTLAND, OREGON
Vertical Guidance Navaid and Angle:
Runway 28L: HJMJ LOC 110.5 GS (3.00°)
Runway 28R: HAP LOC 111.3 GS (3.00°)
ATIS
128.35 269.9
PORTLAND APP CON
124.35 299.2
PORTLAND TOWER
118.7 257.8 (Rwy 10L-28R)
123.775 251.125 (Rwy 10R-28L)
GND CON
121.9 348.6
CLNC DEL
120.125 318.1
I-5
I-205
COLUMBIA RIVER
10R
10L
28R
28L
GOVERNMENT ISLAND
CAMAS
PAPER MILL
POWER LINES
PAAPR 3000 RECOMMENDED
ANTNA
294
RADIO ANTENNAS
FEDEX HUB
PORTLAND-TROUTDALE
REED ISLAND
GRESHAM

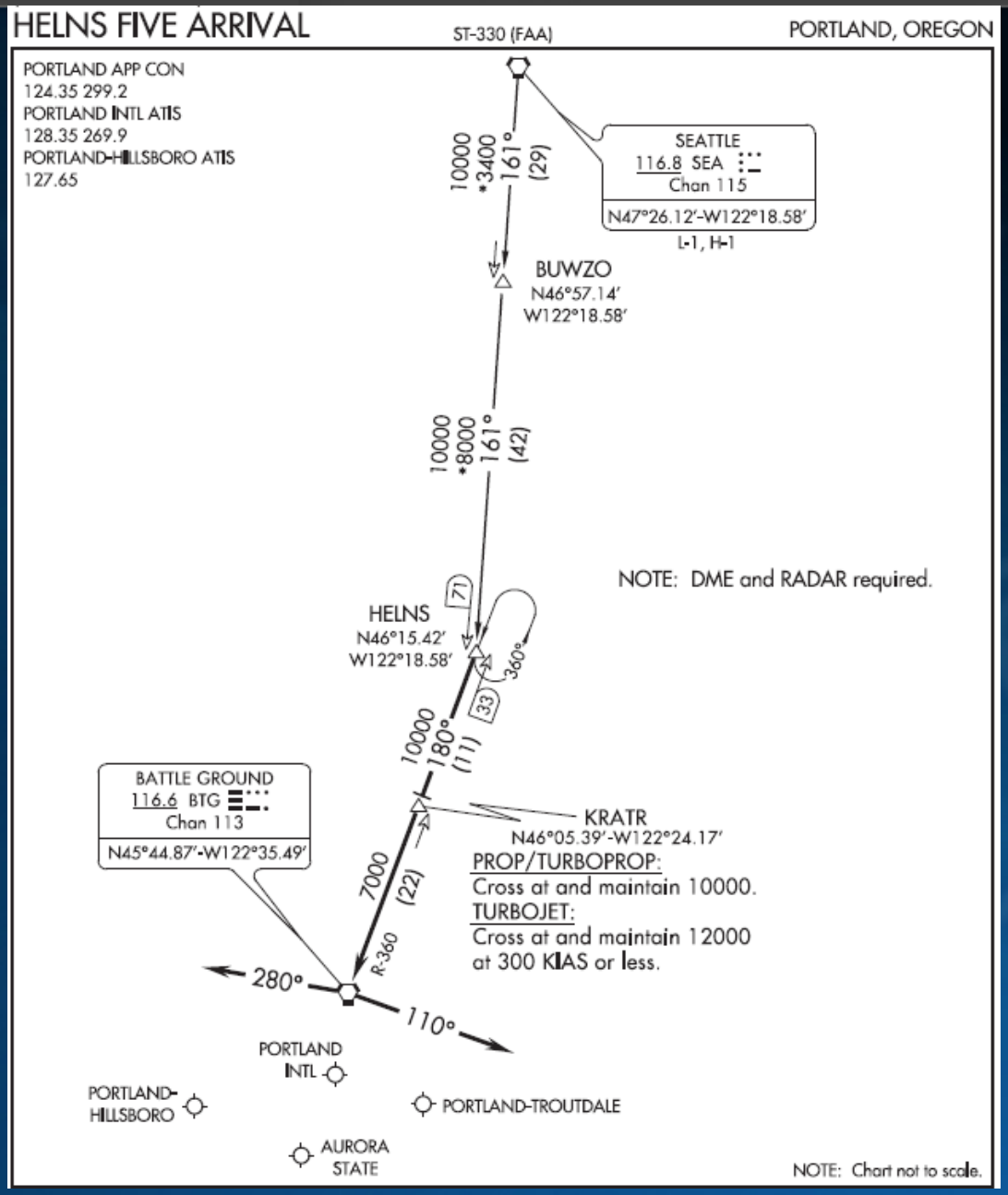
Columbia Visual



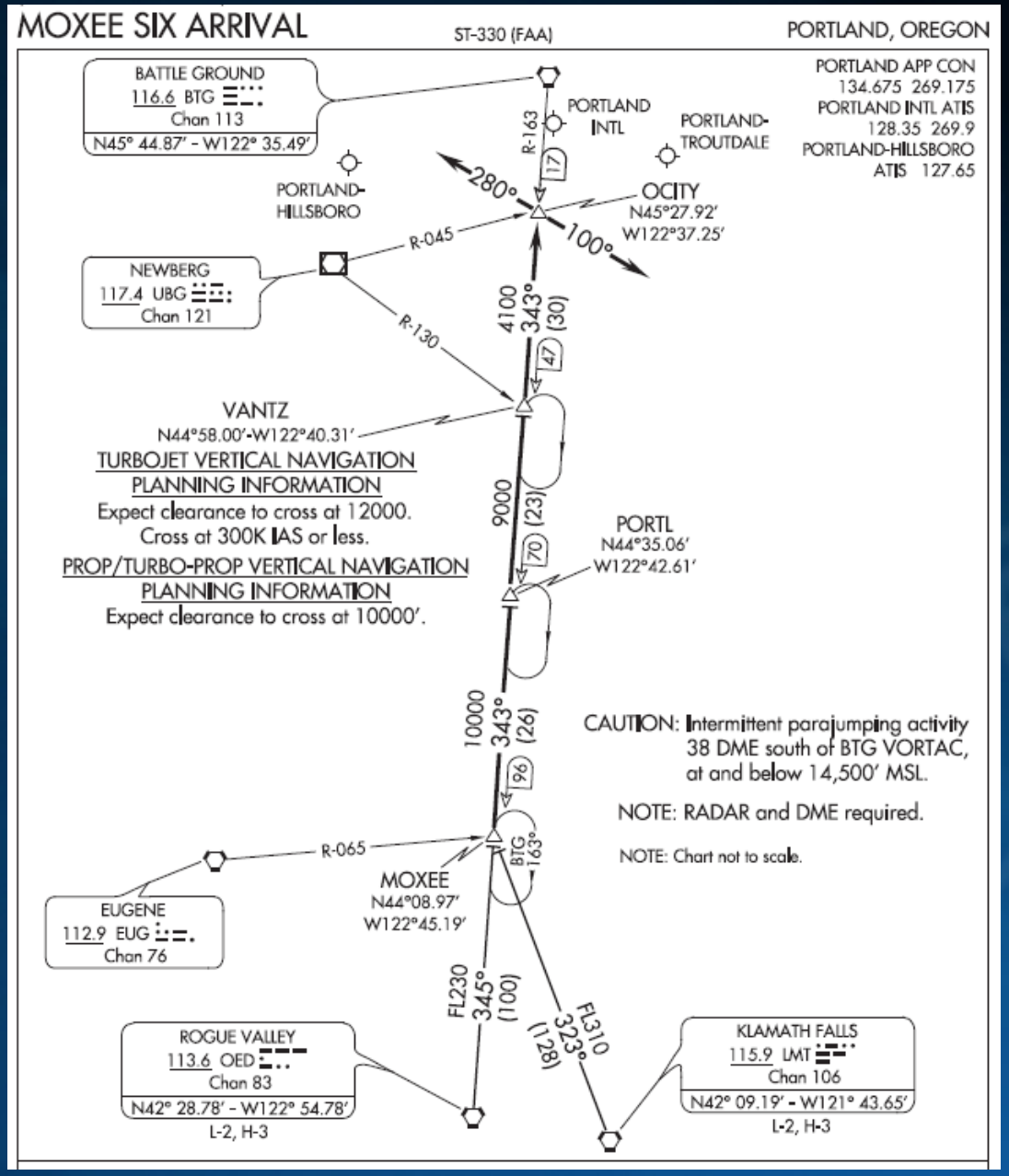
Elkes Recovery



HELNS FIVE


HELNS FIVE ARRIVAL
ST-330 (FAA)
PORTLAND, OREGON
PORTLAND APP CON
124.35 299.2
PORTLAND INTL ATIS
128.35 269.9
PORTLAND-HILLSBORO ATIS
127.65
10000
*3400
161°
(29)
SEATTLE
116.8 SEA
Chan 115
N47°26.12'-W122°18.58'
L-1, H-1
BUWZO
N46°57.14'
W122°18.58'
10000
*8000
161°
(42)
NOTE: DME and RADAR required.
71
HELNS
N46°15.42'
W122°18.58'
360°
33
10000
180°
(11)
BATTLE GROUND
116.6 BTG
Chan 113
N45°44.87'-W122°35.49'
KRATR
N46°05.39'-W122°24.17'
PROP/TURBOPROP:
Cross at and maintain 10000.
TURBOJET:
Cross at and maintain 12000
at 300 KIAS or less.
7000
(22)
R-360
280°
110°
PORTLAND INTL
PORTLAND-HILLSBORO
PORTLAND-TROUTDALE
AURORA STATE
NOTE: Chart not to scale.

MOXEE 6


MOXEE SIX ARRIVAL
ST-330 (FAA)
PORTLAND, OREGON
PORTLAND APP CON
134.675 269.175
PORTLAND INTL ATIS
128.35 269.9
PORTLAND-HILLSBORO
ATIS 127.65
BATTLE GROUND
116.6 BTG
Chan 113
N45° 44.87' - W122° 35.49'
PORTLAND INTL
PORTLAND-TROUTDALE
PORTLAND-HILLSBORO
R-163
17
280°
100°
OCITY
N45°27.92'
W122°37.25'
R-045
NEWBERG
117.4 UBG
Chan 121
R-130
4100
343°
(30)
47
VANTZ
N44°58.00'-W122°40.31'
TURBOJET VERTICAL NAVIGATION
PLANNING INFORMATION
Expect clearance to cross at 12000.
Cross at 300K IAS or less.
PROP/TURBO-PROP VERTICAL NAVIGATION
PLANNING INFORMATION
Expect clearance to cross at 10000'.
9000
(23)
70
PORTL
N44°35.06'
W122°42.61'
10000
343°
(26)
96
CAUTION: Intermittent parajumping activity
38 DME south of BTG VORTAC,
at and below 14,500' MSL.
NOTE: RADAR and DME required.
NOTE: Chart not to scale.
R-065
BTG
163°
MOXEE
N44°08.97'
W122°45.19'
EUGENE
112.9 EUG
Chan 76
FL230
345°
(100)
FL310
323°
(128)
ROGUE VALLEY
113.6 OED
Chan 83
N42° 28.78' - W122° 54.78'
L-2, H-3
KLAMATH FALLS
115.9 LMT
Chan 106
N42° 09.19' - W121° 43.65'
L-2, H-3

Pacific Northwest Training Airspace

- Be sure to check NOTAMS for scheduled airspace activity
- Expect activity in Juniper-Hart all day during weekdays
- Expect Activity in W570 weekdays at 0900 and again at 1300 based on takeoff times at PDX

MOA

- MOAs consist of airspace of defined vertical and lateral limits established for the purpose of separating certain military training activities from other air traffic.
- Activities conducted in MOAs include but are not limited to : Air Combat Tactics, Tactical Air Intercepts, Aerobatics, Formation training, and Low Altitude Maneuvering

Restricted Area

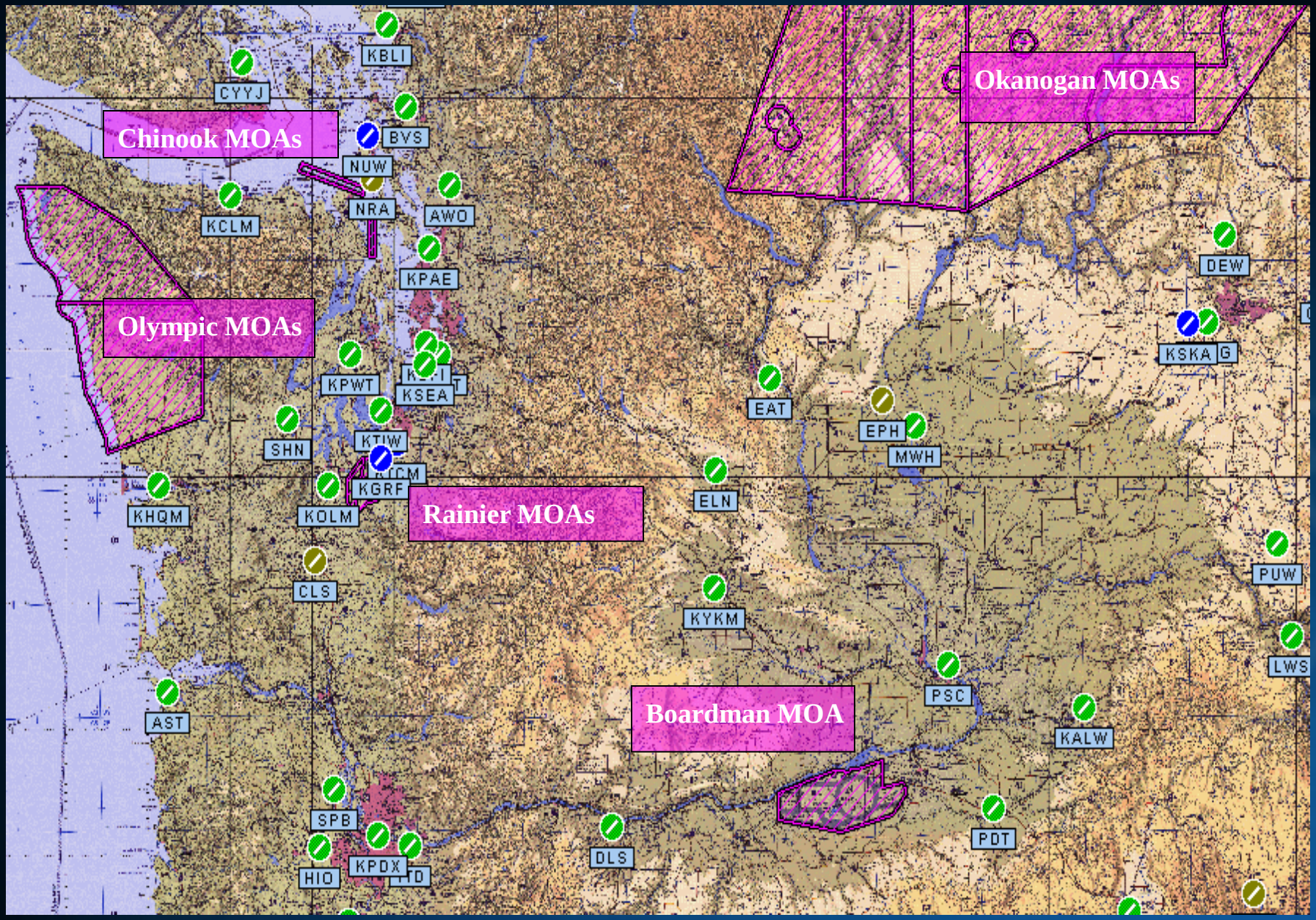
- Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants
- Restricted areas denote the existence of unusual often invisible hazards to aircraft such as artillery firing, aerial gunnery or guided missiles

Warning Area

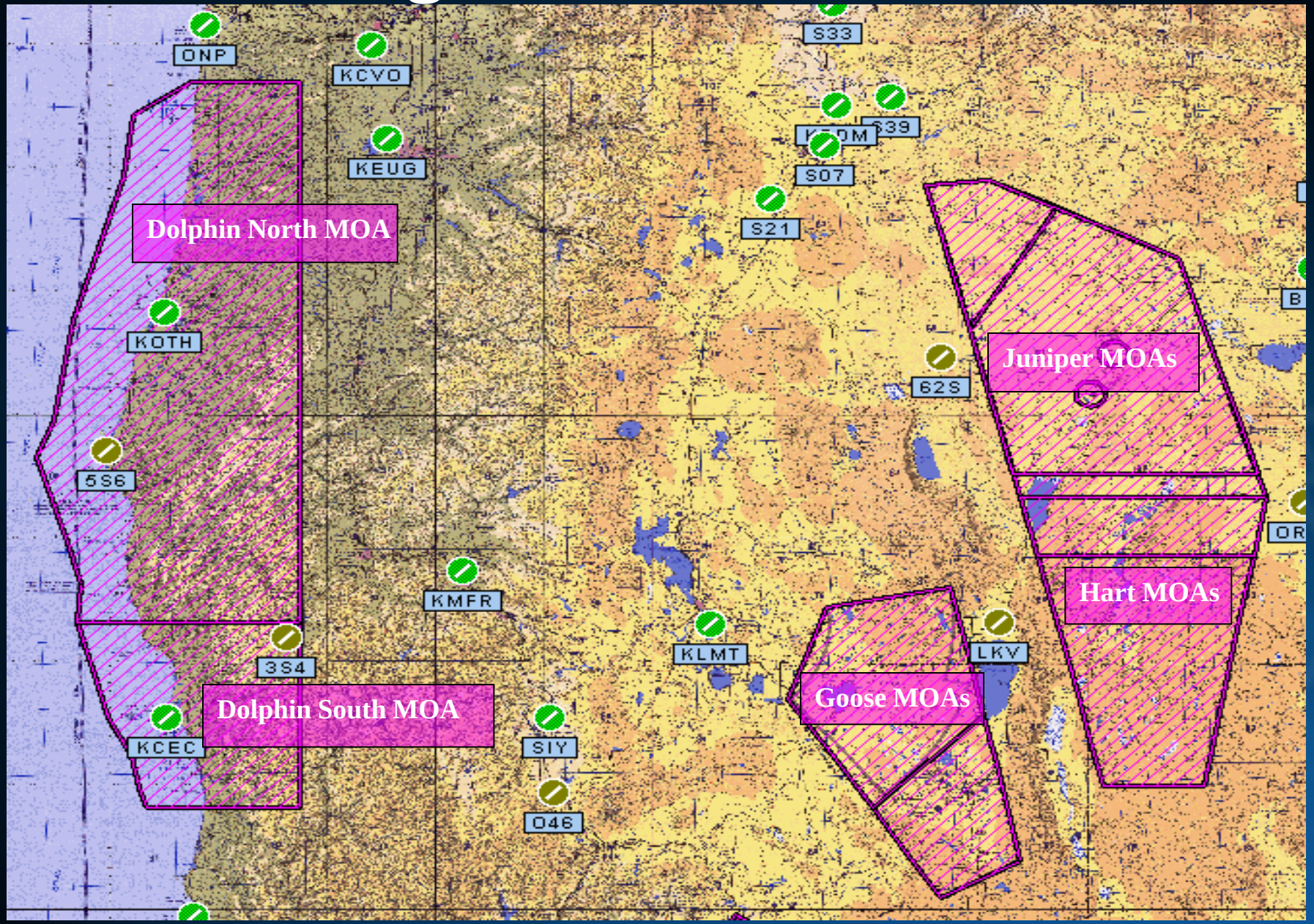
- A warning area is airspace of defined dimensions, (extending from 3 NM outward from the coast of the United States), designated to contain activity that may be hazardous to nonparticipating aircraft.

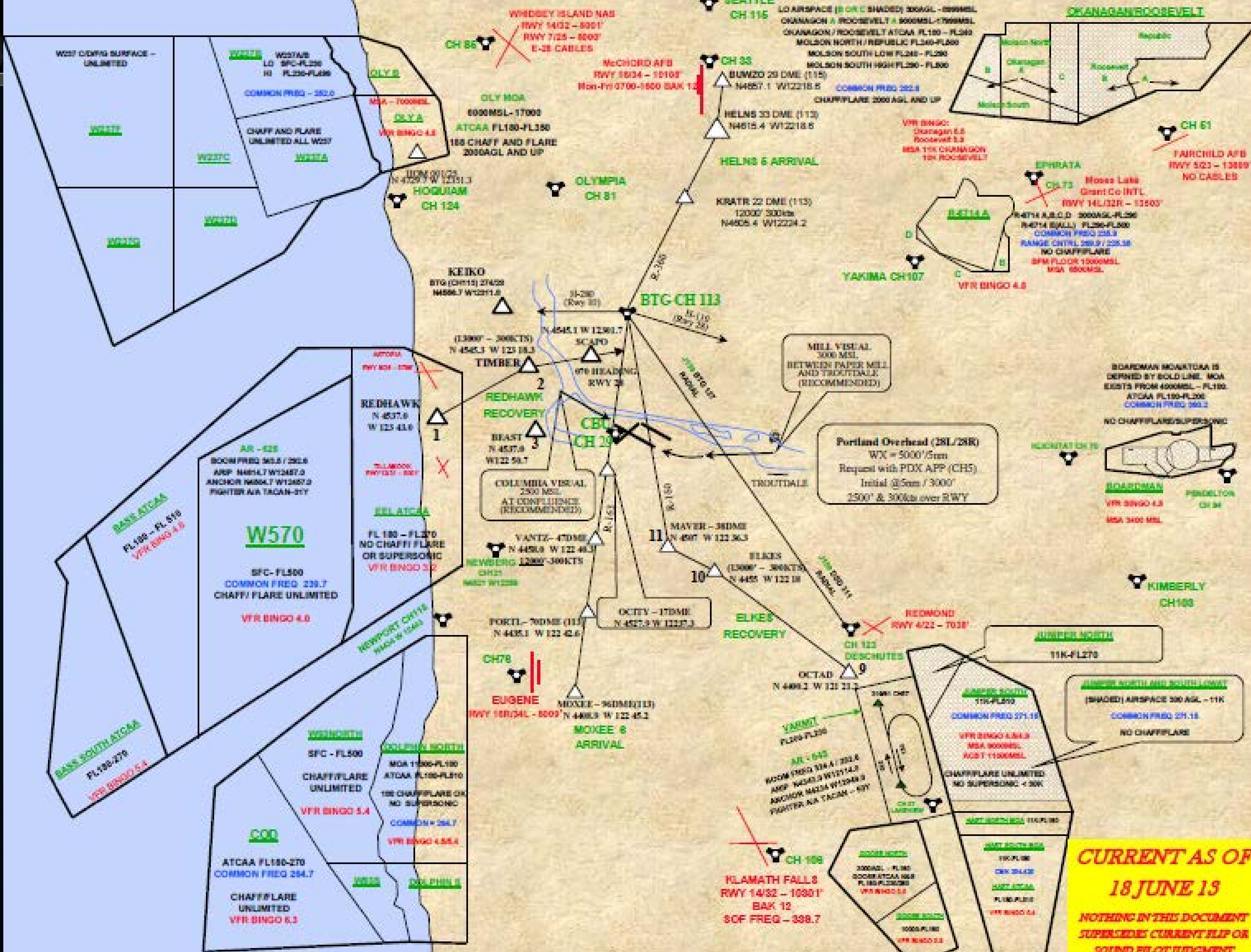
- The purpose of a warning area is to warn nonparticipating pilots of the potential danger from activities being conducted. A warning area may be located over domestic waters, international waters, or both.

Washington Local MOAs



Oregon Local MOAs





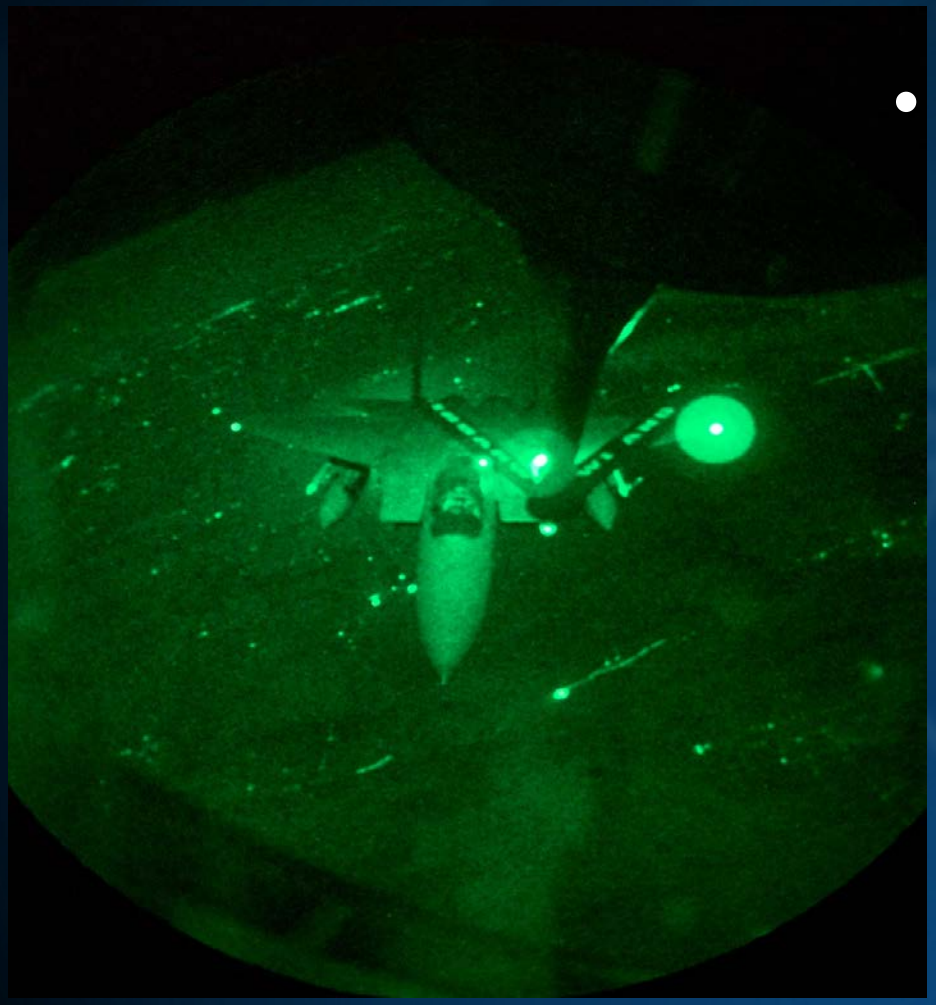
WHIDBEY ISLAND NAS
E-28 CABLES
CH 86
McCHORD AFB
CH 38
OLY MOA
6000MSL- 17000
ATCAA FL180-FL350
180 CHAFF AND FLARE
2000AGL AND UP
OLY B
OLY A
W237
W237C
W237A
W237D
W237G
COMMON FREQ - 252.0
CHAFF AND FLARE UNLIMITED ALL W237
HOQUIAM
CH 124
OLYMPIA
CH 81
HELNS 33 DME (113)
HELNS 5 ARRIVAL
KRATR 22 DME (113)
12000' 300kts
N4605.4 W12224.2
CHAFF/FLARE 2000 AGL AND UP
OKANAGAN/ROOSEVELT
Republic
Molson South
CH 51
FAIRCHILD AFB
NO CABLES
EPHRATA
Moses Lake
Grant Co INTL
R-6714 A
NO CHAFF/FLARE
YAKIMA CH107
VFR BINGO 4.8
KEIKO
BTG CH 113
TIMBER
REDHAWK
REDHAWK RECOVERY
BEAST
CBL CH 29
SCAPO
070 HEADING RWY 28
MILL VISUAL
3000 MSL
BETWEEN PAPER MILL AND TROUTDALE
(RECOMMENDED)
Portland Overhead (28L/28R)
WX = 5000'/5nm
Request with PDX APP (CH5)
Initial @5nm / 3000'
2500' & 300kts over RWY
TROUTDALE
COLUMBIA VISUAL
2500 MSL
AT CONFLUENCE
(RECOMMENDED)
BOARDMAN
PENDELTON CH 94
NO CHAFF/FLARE/SUPERSONIC
AR - 620
W570
SFC- FL500
COMMON FREQ 239.7
CHAFF/ FLARE UNLIMITED
VFR BINGO 4.0
EEL ATCAA
FL 180 – FL270
NO CHAFF/ FLARE
OR SUPERSONIC
VFR BINGO 3.2
BASS ATCAA
BASS SOUTH ATCAA
VANTZ– 47DME
NEWBERG
MAVER – 38DME
ELKES
OCTTY – 17DME
PORTL– 70DME (113)
ELKES RECOVERY
KIMBERLY
CH108
REDMOND
CH 123
DESCHUTES
OCTAD
JUNIPER NORTH
11K-FL270
CH76
EUGENE
MOXEE – 96DME(113)
MOXEE 6
ARRIVAL
W93NORTH
SFC - FL500
CHAFF/FLARE UNLIMITED
VFR BINGO 5.4
DOLPHIN NORTH
COD
ATCAA FL180-270
COMMON FREQ 284.7
CHAFF/FLARE UNLIMITED
VFR BINGO 6.3
DOLPHIN S
AR - 643
CHAFF/FLARE UNLIMITED
NO CHAFF/FLARE
CH 109
KLAMATH FALLS
RWY 14/32 – 10301'
BAK 12
SOF FREQ – 338.7
CURRENT AS OF
18 JUNE 13
NOTHING IN THIS DOCUMENT SUPERSEDES CURRENT FLIP OR SOUND PILOT JUDGMENT

Airfields the F-15 utilizes

- Portland
- Klamath Falls
- Eugene – Practice approaches and Overheads
- Redmond – Practice approaches and Overheads
- McChord AFB – Practice Approaches and Overheads
- Yakima Washington – Practice Approaches and overheads
- Navy Whidbey Island – Practice Approaches and approaches

Other Aircraft Training In the Northwest

F 15 Night Operations

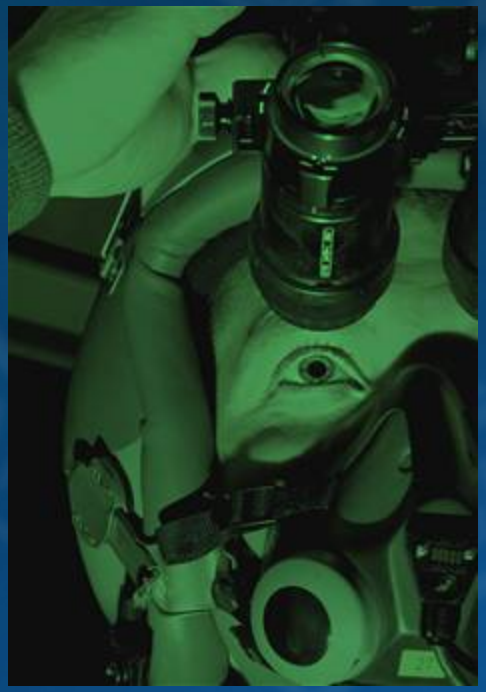


- 123rd Pilots are cleared to conduct complete lights out operations in the W570 and Juniper/Hart MOA

Military Aircraft Operating Lights Out

- Regulatory docket no FAA-2001-10191
- To train lights out aircraft must be under military radar control
- MOAs will be NOTAMed 48 hour prior
- When Military control is not available aircraft will be operating with “Reduced” lighting (Anti-Collision lights out)
- Night vision Goggles will normally be worn by military pilots operating in and around special use airspace at night

- Pilots flying with NVG have only a 40° field of view with no depth perception
- F-15s train to fight at night the same as day. Expect aggressive vertical maneuvers and direction changes



TFR Operations

- Oregon F-15s are regularly tasked to enforce Temporary Flight Restriction zones.

- Always check local NOTAM and advisories to determine if a TFR exists.

TFR Operations

- Expect TFRs during the Political season and when the President is in the Pacific Northwest
- All Pilots are Responsible for Identifying and avoiding TFRs. Ignorance is no excuse.
- Always Monitor guard Frequencies of UHF 243.0 and VHF 121.5

IF You See this In a TFR you may be close to experiencing real Aircraft structural problems

- IF Intercepted by Portland F-15s immediate compliance is mandatory otherwise further more aggressive engagement may ensue
- First expect the F-15 to attempt contact on guard frequency

ICAO Standards

- Know the standard NORDO signals with following highlights:
  - F15 Rocking wings Flashing Lights then slow level turn to left or right = You have been intercepted follow me.
  - Normal Response = Rocking wings flashing NAV lights meaning understand and comply.
  - Expect the F15 to point you in the desired direction then extend away from you and return to left side of your aircraft. This will occur until you either leave the TFR or escorted to an airfield. Realize the F-15 minimum airspeed is such that several passes will be required and do not attempt to follow him around the race track he is creating.

ICAO Standards

- Abrupt F-15 Breakaway from You with a climbing 90° or greater turn without crossing Your flight path = You may Proceed
- Normal Response = Rocking of wings meaning understood and comply

ICAO Standards

- F-15 Lowering Landing gear showing steady landing light and over-flight of an active runway = Land at this airport
- Normal Response = Lowering landing gear showing steady landing lights following F-15 and landing when considered safe.
- Keep in mind that the F-15 may approach you with gear extended during a normal intercept. This can be done in attempt to match your airspeed versus directing a landing. Use your SA on airfield suitability or location to determine intent of F-15.

MACA TIPS

MACA TIPS

- Most collision occur under VFR lower than 5000ft and within 5nm of an airport
- Practice Your Scan every time you fly
- Know your blind spots and adjust accordingly in your scan
- Military aircraft colliding with General Aviation rates are low Yet 80% of reported military near misses are with General Aviation

Know How to Clear

- Divide your Field of view up into segments
- Focus outside on a distant object or Cloud then begin scan
- Move in ordered pattern across field of view and refocus eyes every 6-10 seconds on distant object
- IF given traffic point out and unable to gain Tally refocus eyes check again and then check opposite side in-case of controller error
- ***If Traffic is not moving on your windscreen you are on a collision course***

Mission Plan Potential Conflicts

- This is the general purpose of Today's brief we are here to expose you to our operations in the local area so you can plan accordingly

- Know high density areas and MOAs or Low level training routes

- Be where you are supposed to be and be on altitude

Use All Available Radar Services

- Excellent Idea to use VFR flight following when available
- Set proper transponder codes and verify function

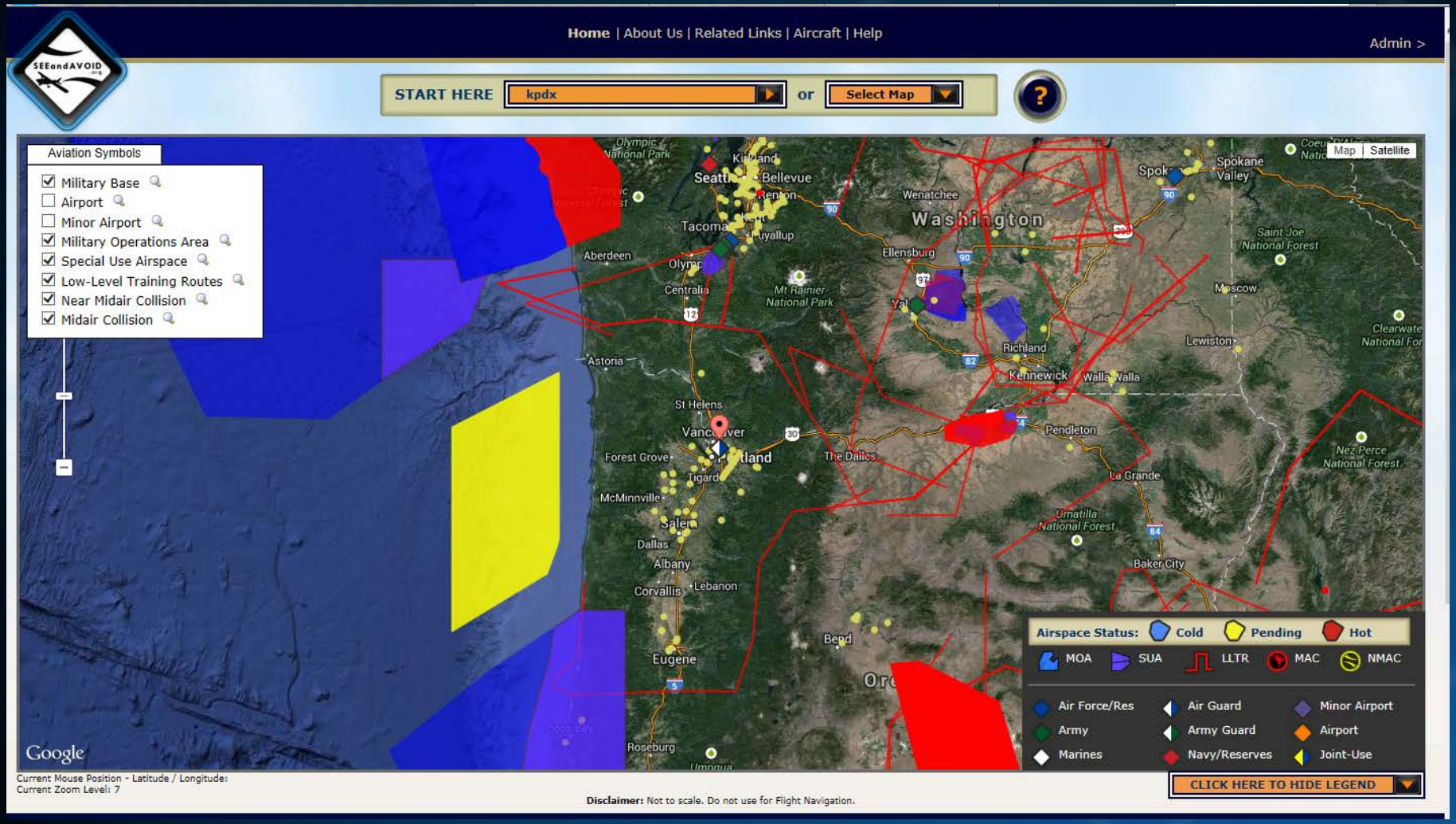
Prioritize Cockpit Duties and Stay Alert

- Back to mission planning on the ground to limit re-study in the air
- Minimize Head down time and do not obstruct outside field of view
- Maintain aircraft control and clearing are primary responsibility
- Avoid complacency

See and Avoid

- Critical for all pilots
- Controllers are not required to provide separation for VFR aircraft
- There is no guarantee that everyone is following the rules and is where they are supposed to be

See and Avoid .org

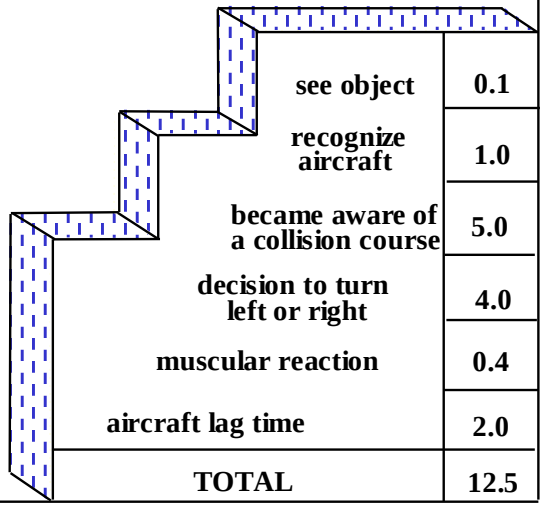


REACTION CHART

Critical Seconds

Move away from the F-15 illustration about 3 feet. The F-15 silhouette represents the aircraft as it would appear from the distance indicated on that page. The time required to cover these distances is given in seconds for the combined speeds of 360 and 600 mph.

The shaded blocks in the lower left corner of the page mark the danger area, based on the reaction times on the lower right of this page.

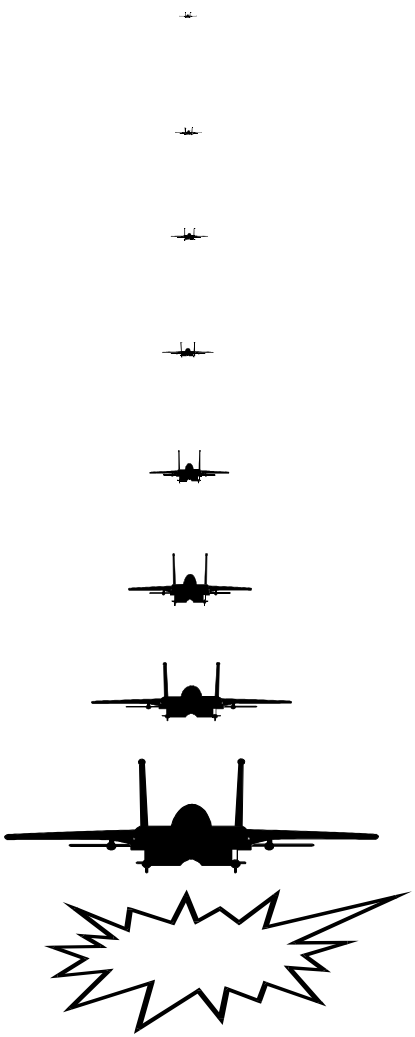


see object	0.1
recognize aircraft	1.0
became aware of a collision course	5.0
decision to turn left or right	4.0
muscular reaction	0.4
aircraft lag time	2.0
TOTAL	12.5

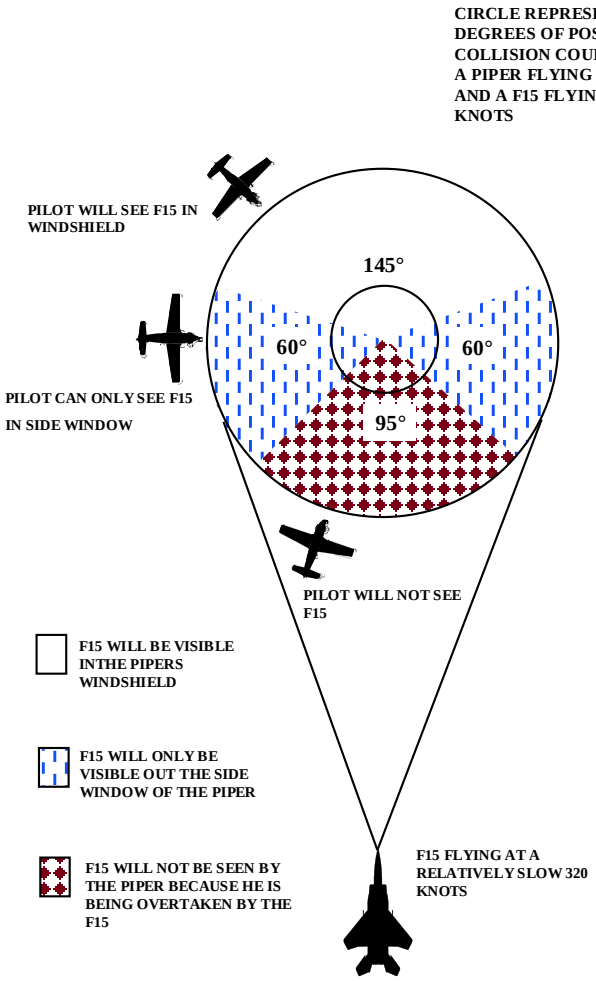
Closure Rate

DISTANCE- SPEED- TIME

SPEED →	600 MPH	360 MPH
DISTANCE	SECONDS	
10 Miles	60	100
6 Miles	36	60
5 Miles	30	50
4 Miles	24	40
3 Miles	18	30
2 Miles	12	20
1 Mile	06	10
1/2 Mile	03	05
0 Mile	0	0



GEOMETRY OF A COLLISION COURSE



What We Do

- When we know there is “Stranger Traffic”
  - Set A floor above your altitude
  - Set a bubble around your location
  - Knock of training until your clear

What you can do

1. Familiarize yourself with your aircrafts blind spots and ensure all windows are clean and not obstructed.
2. Study your entire route and your destination, to include local traffic patterns, airspace, and operating areas before your flight.
3. Brief everyone traveling with you on proper scanning procedures and how to report aircraft.
4. Obey all flight rules and maintain your altitude and assigned route.

What you can do

5. Avoid crowded airspace, directly crossing over a VOR, and cross airports at a safe altitude or fly around them.
6. Use your radio to help gain situational awareness on arriving and departing civilian traffic.
7. Complete checklist early to stay ahead of the aircraft. This will allow you more time to properly scan for other aircraft.

As you can see depending on the altitude and weather conditions the F-15 can be difficult to identify

Aircraft Separation

- VFR Flight Through a MOA is Legal but Very Risky ...day or Night
- Expect Closure Speeds in Excess of 1000 Kts!
- Whenever Possible, Try to Avoid Flights Through a MOA
- If Flight Through MOA is Unavoidable, Attempt to Fly Near the Airspace Boundaries (Vertical and Lateral)

RECAP

- We are here Today as further exposure to your surroundings and potential for mishaps
- Desire is for all to utilize the airspace to enjoy flying while doing so safely
- Extra attention to this detail will pay huge dividends

QUESTIONS?