

# 167<sup>th</sup> VAR Defensive Maneuvering



## Tutorial on Defensive Maneuvering Against A/A Missiles

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# Terms and Definitions:

- **3-9 Line:** An imaginary line from an aircrafts 3 O'clock to it's 9 O'clock.
- **Beaming:** Positioning your aircraft so the enemy aircraft is at your 8-10 o'clock or 2-4 o'clock
- **Jink:** High-G defensive turn
- **SA:** Situational Awareness

**NOTE:** The term RWR/RWS will be used interchangeably since they are used in a similar manner in DCS.

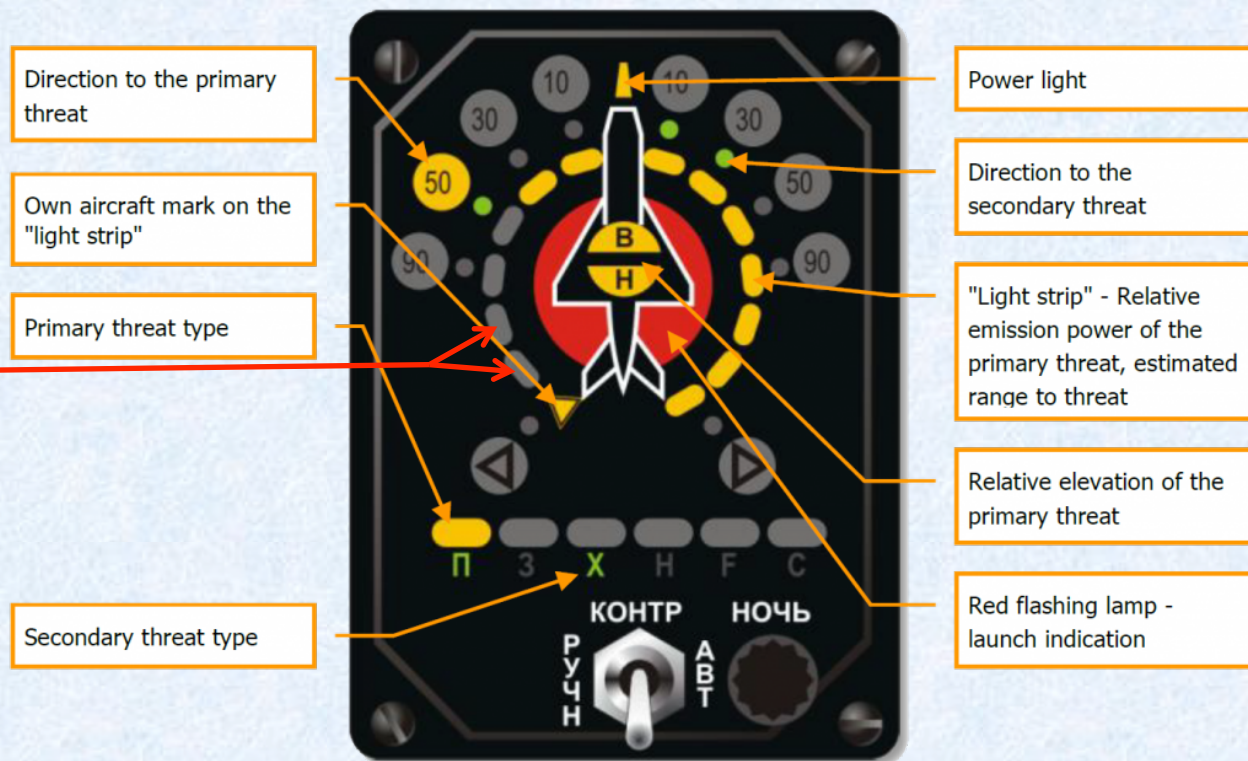


# Understanding Your RWR:

## Russian Radar Warning System (RWS)

- Use “light strip” to help estimate range on Active Radar launched missile (ex: Aim-120)

- When light strip is mostly lite except for the last 2 strips, missile is extremely close and you need to *Jink* with chaffs
- Use light strip to determine if you are out running the missile (ex: Drag Defense)



# Understanding Your RWR:

## American Tactical Warfare Warning System (TEWS)

- Active Radar missiles will be shown with “M” designation and the location will be displayed, while Semi-Active Radar missiles will only show missile launch detected but the location will be unknown. Because of this, Semi-Active Radar missiles are more dangerous for both Russian and American aircrafts.



- It is more difficult judge missile range with the TEWS since it does not show signal strength and judging distance on the display is more challenging.
- Note:** Currently there are only Aim-120s and R-77 that are Active Radar, so keep that in mind when deciding which defensive tactic to employ
- For additional info on icon identifiers see Pg.81-82 in your DCS F-15C Manual

# Understanding Your RWR:

## American TEWS Symbolology



Airborne radar. All radars of this type are indicated by the ^ mark, which appears over the aircraft type symbols. Ground-based and ship-based radar symbols designations are described in the table below



Upper semi-circle– denotes a new threat. Such a mark appears over the newest by time of detection.



«Diamond» – the primary threat mark. This of mark denotes the most dangerous threat. It is positioned very close to your aircraft or the launching enemy.



Flashing circle indicates that a missile launch has been detected.



Flashing circle with a «diamond» around an «M» symbol – ARH missile activity (R-77, AIM-120C, AIM-54C, MICA-AR). Active missile are always the primary threat.



# Understanding Your RWR:

- Both American and Russian RWRs have “blind spots” above and below the aircraft. So if you’re in a turning and the RWR Warning stops, this doesn’t mean that the missile is no longer tracking, you’re in your RWR’s blind spot! **KEEP MANEUVERING!**



# Situation Setup:

- All these techniques are assuming you are in a head-to-head intercept with the enemy aircraft (some of these techniques can be used against SAM)





# Drag Defense: Difficulty=Easy

- **Purpose:** Outrun the missile's intercept capability
- **Best Used:** Medium/Long Range Launches (Aim-120: >15mi/24km)(R-77: >12mi/20km)
- **Technique:** Once a missile launch is detected, turn 180° away from missile and dive down to low altitude at high speed “dragging” the missiles with you (you can climb once you know the missile is at low altitude to bleed off additional speed and maneuverability)
- Use RWR to determine if Chaff are necessary (if extremely close), however if no RWR warning, use Flares (IR missile)
- [Drag Defense Video:](https://www.youtube.com/watch?v=gDV5ZnloAsc&index=1&list=PL-rNisMp5bxFu95q8IMBU0CfKBBRVZg3V)
  - <https://www.youtube.com/watch?v=gDV5ZnloAsc&index=1&list=PL-rNisMp5bxFu95q8IMBU0CfKBBRVZg3V>

# Formation Flanking: Difficulty=Easy

- **Purpose:** Allows Lead to press the attack/go defensive while 2<sup>nd</sup> element flanks enemy or vice versa
- **Best Used:** With a formation of 2 or more
- **Technique:** Prior to lock, send 2<sup>nd</sup> element flanking left/right and Lead presses forward to draw them in. Once they have committed, flank in the opposite direction of your element. Once engaged, draw the enemy aircraft into a position that will allow your element to get off a 6 O'clock shot on the enemy aircraft.
- **Formation Flanking Video:**
  - <https://www.youtube.com/watch?v=yTqfFGsybMM&list=PL-rNisMp5bxFu95q8IMBU0CfKBBRVZg3V&index=6>

# Defensive Barrel Roll:

## Difficulty=Moderate

- **Purpose:** Out maneuver the inbound missile with a barrel roll
- **Best Used:** Close-Extremely Close range (IR missiles) with countermeasures for missiles at your 12 o'clock or 6 o'clock
- **Technique:** Once launch is detected (visually or RWR), release countermeasures and begin a High-G barrel roll. Keep an eye on your airspeed!
  - Timing is crucial for this technique, especially at Extremely Close range. So practice!
  - If you employ this tactic at Extremely Close range, make very tight turns but limit your rolls to <2 complete rolls because it will bleed off your speed quick!
- [Defensive Barrel Roll Video:](https://www.youtube.com/watch?v=YuTuTUrqyoM)
  - <https://www.youtube.com/watch?v=YuTuTUrqyoM>



# Terrain Masking: Difficulty=Moderate

- **Purpose:** Obstruct line-of-sight of missile's seekerhead with an object (ex: mountain)
- **Best Used:** In mountainous terrain
- **Technique:** Once missile launch detected, dive down and fly low, preferably into a deep mountain valley with a ridgeline that is perpendicular to the missile's flight path
  - Keep SA on the last known position of enemy aircraft since you will lose sight of them and they are probably trying to flank you
  - Trying to keep an eye on the missile, enemy aircraft, and the terrain ahead at low altitude makes this maneuver difficult
- [Terrain Masking Video:](https://www.youtube.com/watch?v=tkzc07TlgIQ&index=3&list=PL-rNisMp5bxFu95q8IMBU0CfKBBRVZg3V)
  - <https://www.youtube.com/watch?v=tkzc07TlgIQ&index=3&list=PL-rNisMp5bxFu95q8IMBU0CfKBBRVZg3V>

# Defensive Notching: Difficulty=Hard

- **Purpose:** Mask your aircraft into the radar's ground clutter making tracking difficult
- **Best Used:** When missile is above your aircraft
- **Technique:** Before enemy missile is launched, beam the enemy aircraft (8-10 o'clock/2-4 o'clock) and head to lower altitude. Once launched, keep the missile at your 3-9 line and keep it there until missile lock is lost
  - You may need to keep a slight turn in towards the missile as the missile turns with you
  - If the missile has not lost lock before 2mi/3km, Jink toward the missile and release countermeasures
  - Reason: doppler radar has a hard time tracking objects that are perpendicular to it's scan and the ground clutter will aid in masking the aircraft
- **Defensive Notching Video:**
  - <https://www.youtube.com/watch?v=gDV5ZnloAsc&index=1&list=PL-rNisMp5bxFu95q8IMBU0CfKBbRVZg3V>

# Beaming: Difficulty=Hard

- **Purpose:** Force the missile to continuously maneuver in order to hold a lead pursuit on you. This will drain energy from the missile.
- **Best Used:** Medium/Long Range Launches (Aim-120: >15mi/24km)(R-77: >12mi/20km)
- **Technique:** Before enemy missile is launched, beam the enemy aircraft (8-10 o'clock/2-4 o'clock). Once launched, put the missile at your 3-9 line and KEEP IT THERE! Once the missile is 2mi/3km (you can use your RWR as well), Jink into the missile while releasing Chaff and Flares
  - When you turn into the missile, \*consider\* taking an offensive missile shot at the enemy aircraft putting them on the defensive
- Beaming Video:
  - <https://www.youtube.com/watch?v=n2KsngsfRLA&list=PL-rNisMp5bxFu95q8IMBU0CfKBBRVZg3V&index=4>



# Defensive Press: Difficulty=Hard

- **Purpose:** Minimize time spent evading missiles and allow you back into your formation with your flight
- **Best Used:** Against a single enemy aircraft
- **Technique:** Once you are locked on by an enemy aircraft, \*consider\* breaking formation and beaming the enemy aircraft. Once launched at, try and fire your missile (even if you know it will miss) forcing them on the defensive BEFORE you go defensive. Break hard to lower altitude while releasing Chaff and try and get another quick shot off on the enemy aircraft forcing them to stay defensive. If they are still a threat, try to close the range in order to increase hit probability.
- **Defensive Press Video:**
  - <https://www.youtube.com/watch?v=KpAi1gK8jkU&index=5&list=PL-rNisMp5bxFu95q8IMBU0CfKBBRVZg3V>

# Additional Tips:

- Always keep an eye out for smoke trails from enemy missiles because they will only be visible for a few sec. Once the motor run out, spotting the missile is nearly impossible (use your RWR if possible)
- You may not receive a RWR warning if an IR missiles is launched at you, so keep your head on a swivel and always check your six!
- Increased air density = Increased air friction = Decreased missile's range
- USE YOUR RWR!!! It will tell you a lot about the current situation and the status of an inbound radar missiles

# Additional Tips Continued:

- SPEED IS LIFE! Make sure you are turning at the optimum cornering speed of your aircraft!
- Altitude is Life Insurance! So \*consider\* regaining lost altitude after evading a missile
- See if you can fire off a shot or two during a defensive maneuver to force them on the defensive
- If you are at low altitude and it's been over 8 seconds from launch, you can pull up to higher altitude with confidence since the missile will, more than likely, be unable to



# Additional Tips Continued:

- Pay attention to the RWR Warning sounds. It will tell you which countermeasure to use. If you hear a launch warning with a continuous lock use your Chaff and save your Flares, you'll probably need them later.
- These are BASIC techniques, be adaptive to your situation and utilize multiple techniques if needed
- Practice with Labels On first then TURN THEM OFF!!! You need to learn to preform these techniques based on your instruments and your ability to read the situation

# Acknowledgements:

- Most of the techniques and information are from pickinthatbanjo and Flame on YouTube.



<https://www.youtube.com/user/pickinthatbanjo>



[https://www.youtube.com/channel/UCEQaJCaksXhs8V\\_q5Cu6TSQ](https://www.youtube.com/channel/UCEQaJCaksXhs8V_q5Cu6TSQ)



# PRACTICE!!!!





# Don't Be THAT GUY...



**Be THIS GUY!**



**I'VE GOT THIS SHIT**