

DCN 4893  
Executive Correspondence



# EW Capability At NAVAIR Weapons Division China Lake



# OUTLINE

- **Purpose of Today's Briefing**
- **EW Terms of Reference**
- **Comparison of NAVAIR WD Point Mugu and China Lake EW Capabilities**
- **China Lake Programs / Activities Examples**
- **Summary**

# Expected Takeaways

- **NAWC Weapons Division understands and strongly supports the BRAC process goals:**
  - **Recommendations that facilitate transformation**
  - **Recommendations that deliver efficiencies**
- **The recommendations you are reviewing are the result of NAWC input and DoN / DoD analysis**
- **Your analysis will validate whether**
  - **The risks are reasonable**
  - **Transformation is achieved**
  - **Return on investment and efficiencies is substantiated**

# What is Electronic Warfare (EW)?

## *BRAC 05 definition*

- Electronic Warfare (EW) encompasses the **capability to disrupt or degrade an enemy's defenses** throughout the areas and times – and **across the entire electronic, infrared(IR), and visual spectrums** – required to **permit the deployment and employment of U.S. and allied combat systems**. Electronic Warfare **includes** capabilities for **deceiving, disrupting, or destroying enemy** surveillance, command and controls (C<sup>2</sup>), and weapons systems/sensors (e.g., early warning, acquisition and targeting functions) associated with the enemy's integrated air/area defense network. **EW also includes the critical capabilities of recognizing attempts by hostile systems to attack or engage U.S. or friendly forces**, automatically initiating the appropriate counter-measures or defensive response, and protecting friendly systems through redundancy and hardening.

# EW Terms of Reference

- **ESM – Electronic Support Measures – search for, intercept, identify, and locate sources of radiated EMR (ELINT, COMINT et cetera) for EW threat recognition. ESM provides data ultimately used to develop ECM, ECCM, avoidance, targeting, mission planning, and other tactical deployment options**
- **ECM – Electronic Countermeasures – involving actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum**
- **ECCM – Electronic Counter-countermeasures – involving actions taken to ensure friendly, effective use of EMR despite the enemy's use of electronic warfare**
- **EA – Electronic Attack – involving the use of electromagnetic or directed energy to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability**

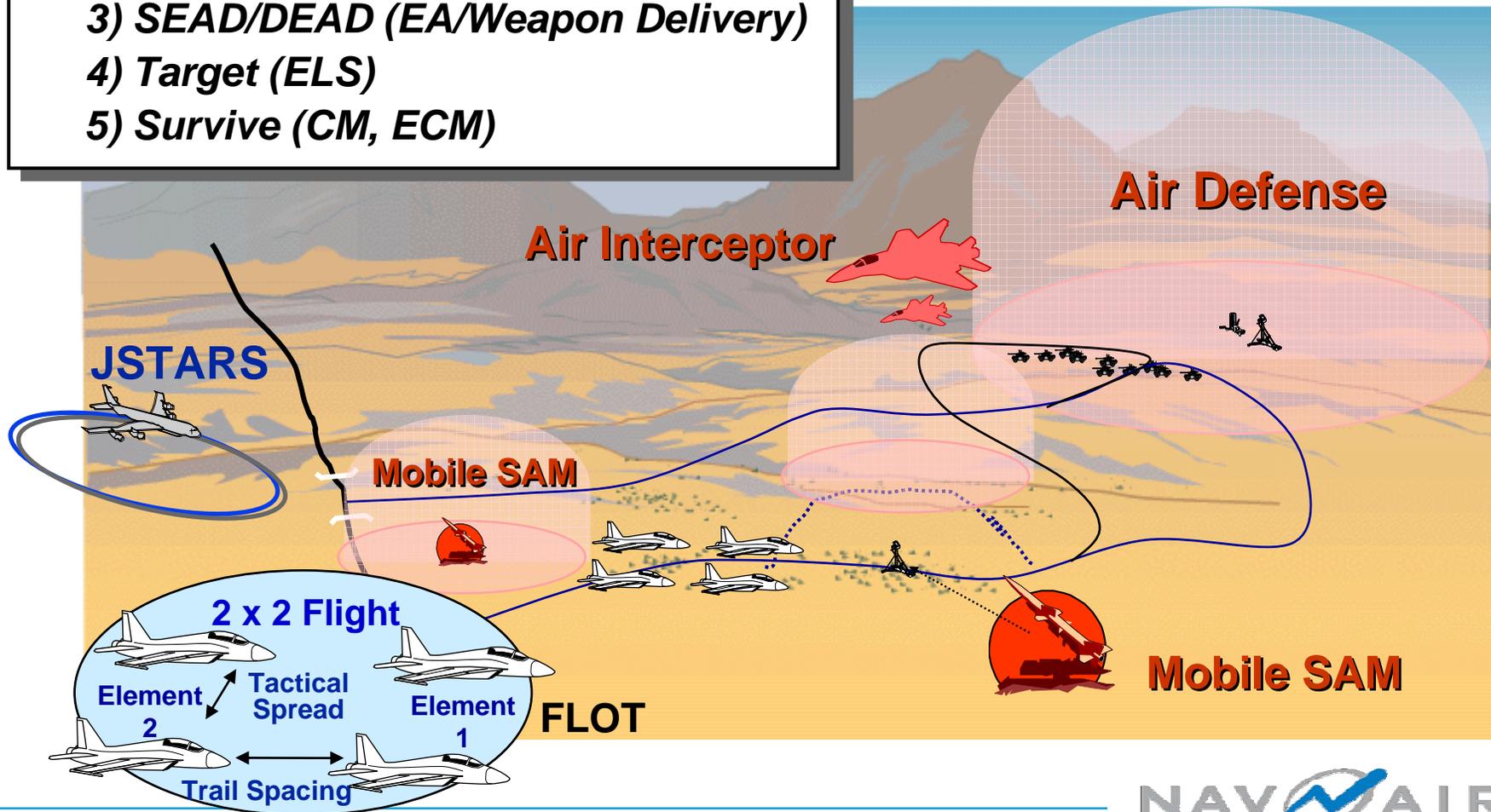
Extracted from The History of US Electronic Warfare, Alfred Price



# Specific Mission Example

## EW Tactical Events:

- 1) *ESM (detect)*
- 2) *Avoid (reroute)*
- 3) *SEAD/DEAD (EA/Weapon Delivery)*
- 4) *Target (ELS)*
- 5) *Survive (CM, ECM)*



# EW Mission Support at NAVAIR

## Point Mugu, CA

- EW for Tactical Aircraft (Rotary & Fixed Wing)
    - Radar Warning Receivers
    - Missile Warning Systems
    - Jammers
    - Dispensers / Expendables
    - Turn-Key Reprogramming Labs / FMS support
  - EW Suite / Systems Integration
  - EW Data Base Management (EWDS/TIRMS)
  - USMC Tactical Electronic Reconnaissance Processing & Evaluation System
  - Airborne Electronic Attack - ICAP 2, ICAP3
  - Jammer Techniques Optimization (JATO)
  - EW Mission Planning
    - JMPS (Joint Mission Planning System)
    - TEAMS (Tactical EA-6B Mission Support)
  - High Fidelity EW Simulation Development & Support
    - Open / Closed-loop Systems and Capabilities
  - EW Support Equipment (SE)
    - EW Test Program Set (TPS) Software Development and Fleet Support
    - EW SE Development and Fleet Support
    - Systems Supportability Analysis Services
- OFFPs, UDFs,  
Fleet, &  
Joint Service  
Support

Not duplicated at China Lake

## Naval Air Warfare Center, Weapons Division Sensors, Electronics and Electronic Warfare

		Sensors, Electronics	Electronic Warfare		
<b>China Lake</b>	<b>China Lake</b>	<b>Development Systems Integration Test and Evaluation In-Service Engineering Life Cycle Support</b>  <b>(333)</b>	<b>EW Systems Integration (inc FMS) EW Test and Evaluation (ECR, JR, AJ GPS, Mongoose etc) FME, Electronic Attack, ...</b>  <b>(318)</b>	<b>12</b>	<b>China Lake</b>
<b>Point Mugu</b>	<b>Point Mugu</b>	-	<b>EW Development EW In-Service Engineering EW Life Cycle Support</b>  <b>(369)</b>		<b>Point Mugu</b>

# EW Mission Support at NAVAIR

## China Lake, CA

- China Lake complements Point Mugu EW expertise in the following areas
  - EW Intel analysis and database management
    - HARM, RWR, and non-EA-6B Jammers
  - Next Generation EW Platform Integration
    - EA-18, JSF, UAV/UCAV...
  - Foreign Materials Evaluation – IADS, Weapons
  - ELINT/COMINT Sensor Systems Development
  - TACAIR Radar Warning Systems Expertise
  - Electronic Attack
    - Directed Energy
      - *Destruction* – HPM and Tactical Laser Research and Advanced Development
      - *Disruption* – Multi-mode RADAR
  - Core EW Facilities
  - EW Systems Development and Operational Test and Evaluation

## EW Intelligence Analysis Process To Support TACAIR EW & HARM Reprogramming

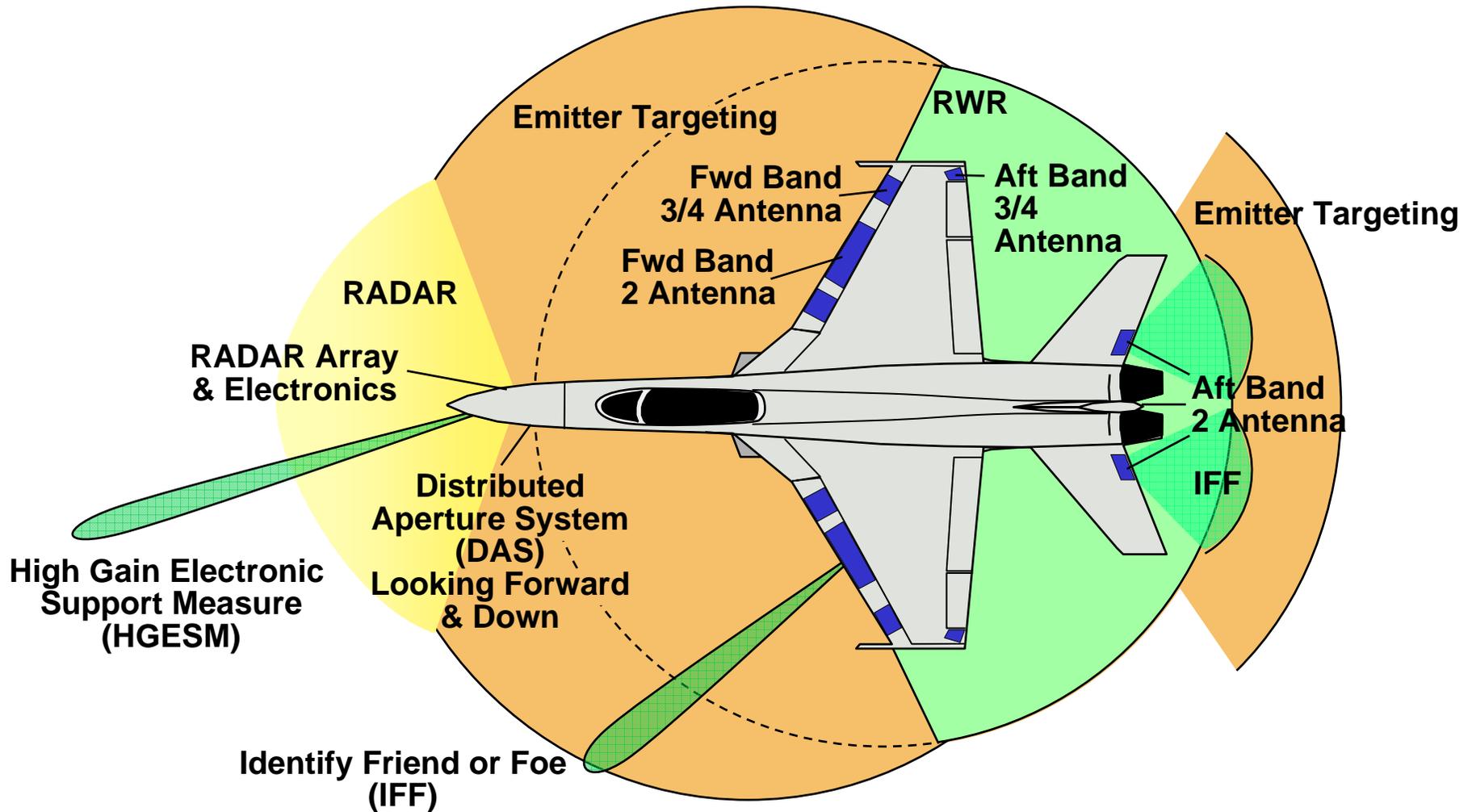
- **Inputs – Fleet requests, OAG, TACAIR EW Technical Review Board, ARM Steering Committee, Order of Battle data, new emerging threats**
- **Threats list – EW Suite FRD lists, HARM Geo-tailored Emitter lists**
- **Multiple data sources – EWIR DB, FME, other intelligence sources**
- **Emitter Data for Naval Analysis (EDNA) Database-**  
*a relational Database where data is a parametric assessment of the threat emitter, provided to each system for sensor engineering*

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# Typical Next Generation EW Platform



**Sensor Suite Coverage Supports SA and Targeting**

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# Foreign Materials Evaluation

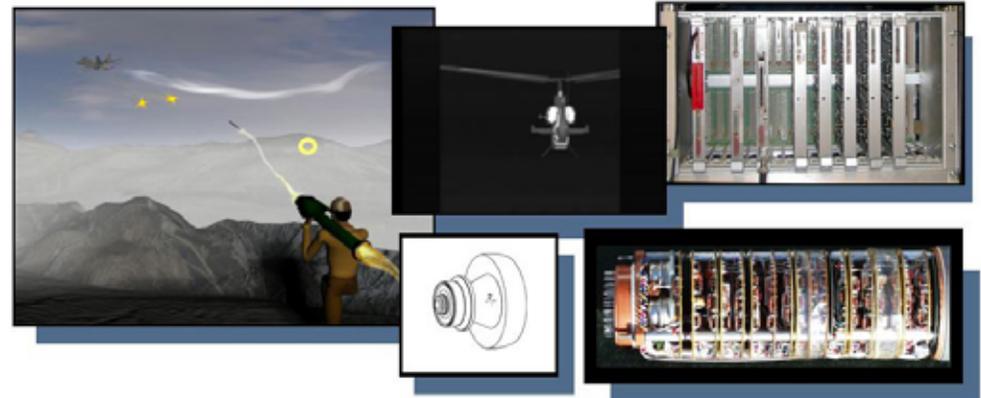
## Electro-optics / Infrared Evaluation Office: Characterizing the Threats



## Seeker Repair Lab: Repair the Threats



## Threat Missile Simulation: Threat Missile in Flight



## Seeker Test Van/Infrared Signature Measurements: Threats in the Field



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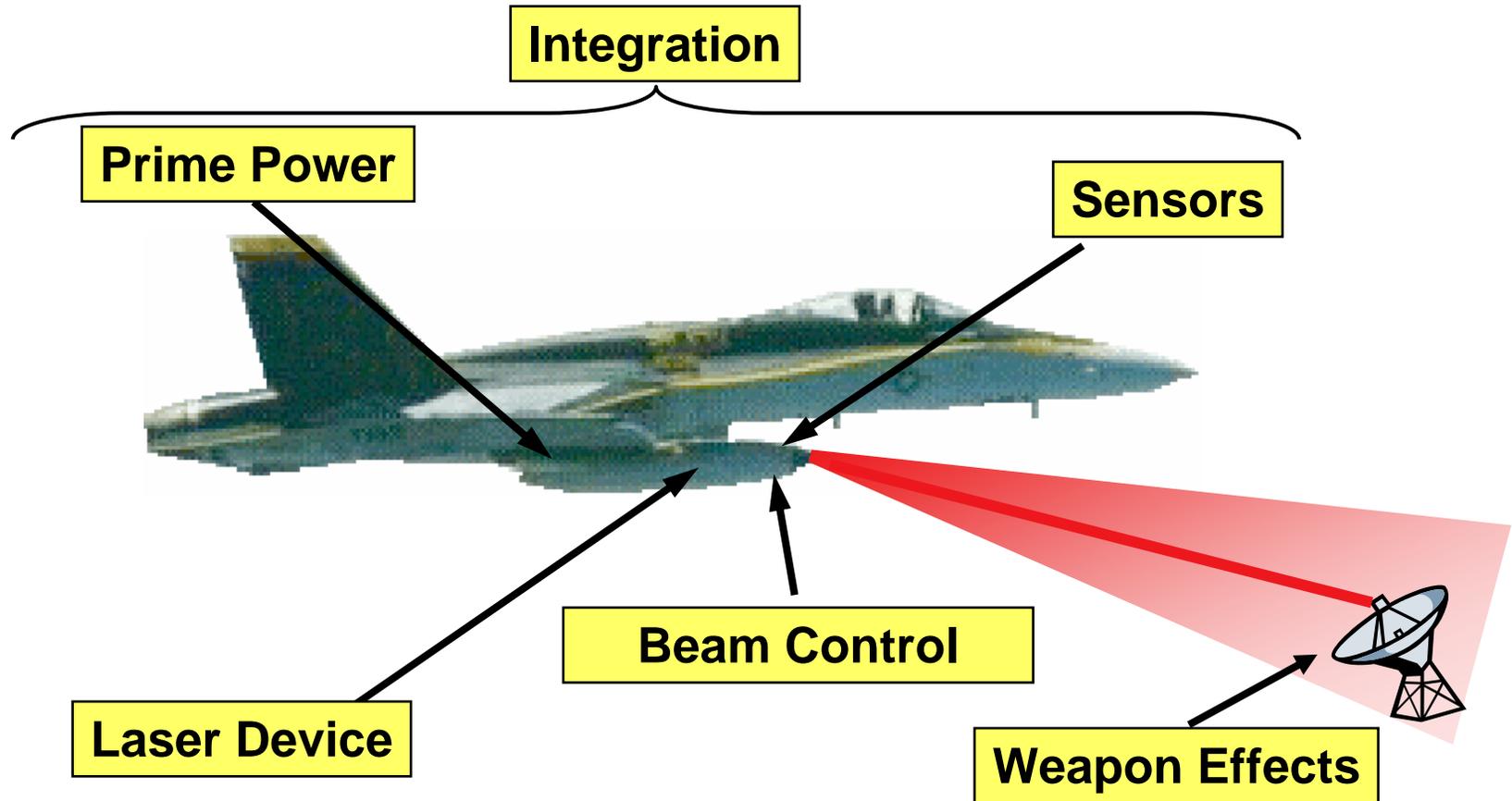
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# NAVAL AVIATION DE HEL\* S&T INVESTMENT AREAS

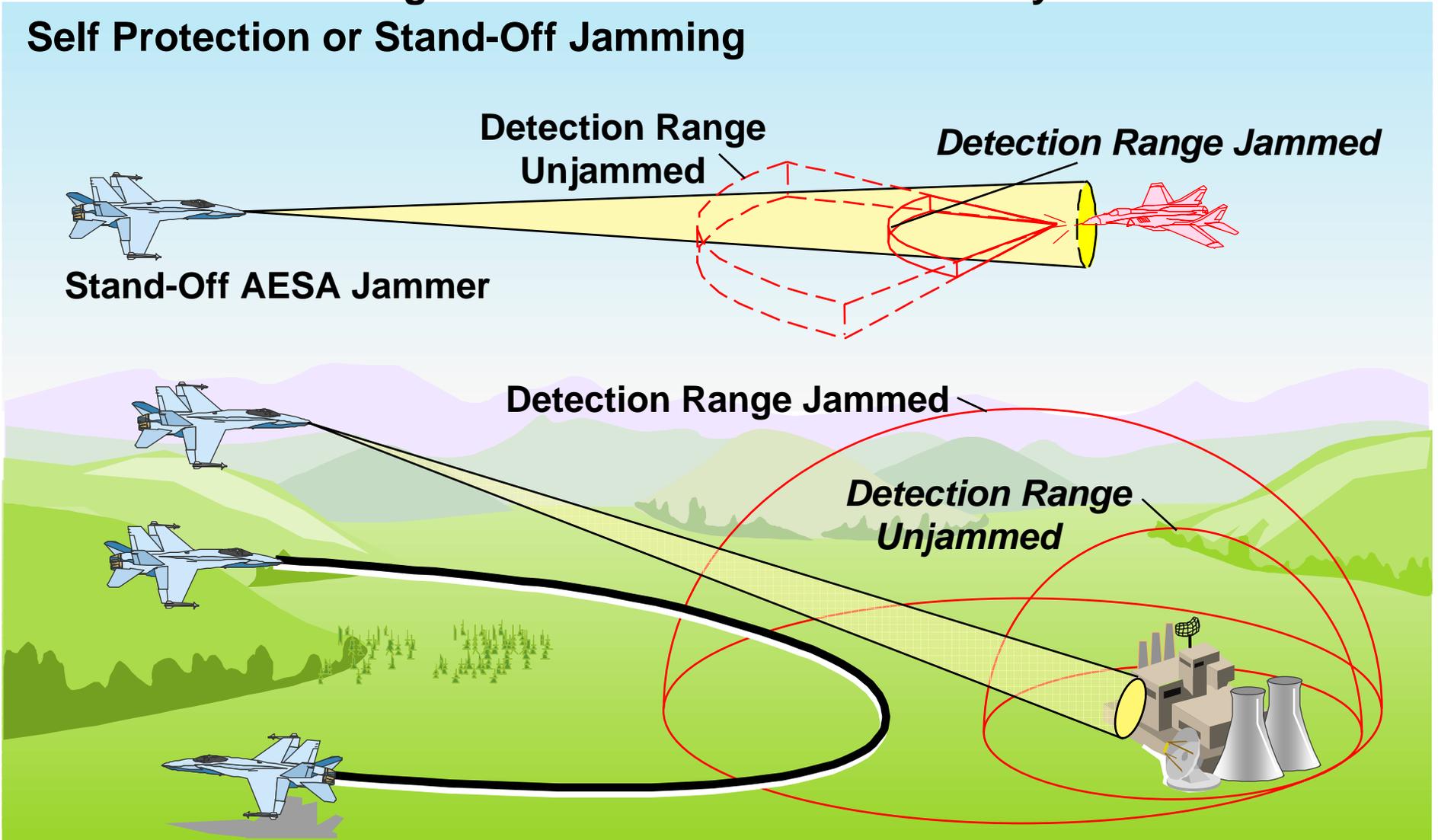


**100 KW+ laser weapon that can be integrated into a flyable platform  
in less than 10 years**

# Electronic Attack –

utilizing advanced multi-mode sensor systems

## Self Protection or Stand-Off Jamming



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# NAWCWD EW FACILITIES COMPLEMENTARITY

## • PT MUGU

- Electronic Combat Simulation & Evaluation Laboratory (ECSEL): System UDF/OFP Development
- Iron Crow: Support Equipment Development & TPS
- EA-6B ICAP II BLK 89: Development and Integration
- EA-6B ICAP III: Development and Integration
- EA-18G AEA: Development and Integration
- Tactical Electronic Reconnaissance Evaluation System (TERPES): Mission Planning & Processing
- Electronic Warfare Database Support (EWDS): Threat Intelligence Support
- Jamming Technique Optimization (JATO): Technique Development

## • CHINA LAKE

- Electronic Warfare Integration Laboratory (EWIL): Flight Test Support & Data Analysis
- Electronic Combat Range (ECR): Open Air Range

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# EW Systems Developmental / Operational Test And Evaluation Facility

- **Provide decision-quality test data for development and/or modernization of aircraft EW suite systems**
- **Provide additional support services:**
  - **Combat tactics development and training (TOPGUN)**
  - **Hardware-in-the-loop testing**
  - **Missile flight testing**
  - **Special operations training**
  - **Satellite-based systems and UAV test and training**
  - **NASA JPL and Foreign Military tests**
- **Key functions:**
  - **Acquire / develop air defense threats, range instrumentation, and support facilities**
  - **Operate and maintain the range**

# EW Systems Developmental / Operational Test And Evaluation Facility



SA-2E FAN SONG



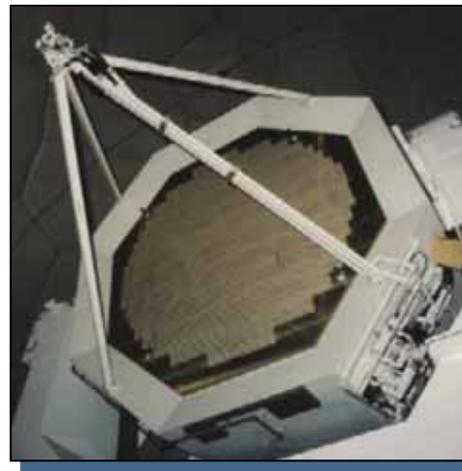
SA-3  
LOW BLOW



SA-8 LAND ROLL



EURO ROLAND II



SA-N-6/SA-10  
TOP DOME / FLAP LID



SPOON REST B

# Summary of NAVAIR WD China Lake Other EW Functionality

- F/A-18 ASL – EW sub-system integration
- Echleron Valley –
  - Anti-JAM GPS Evaluation/Development
  - High level (optical and RF) directed energy RDT&E
- Foreign Materials Evaluation
- ELINT / COMINT systems DT&E
- Counter-measure dispense systems DT&E
- EW Threat Analysis and Characterization
- Advanced Systems Development

# Summary

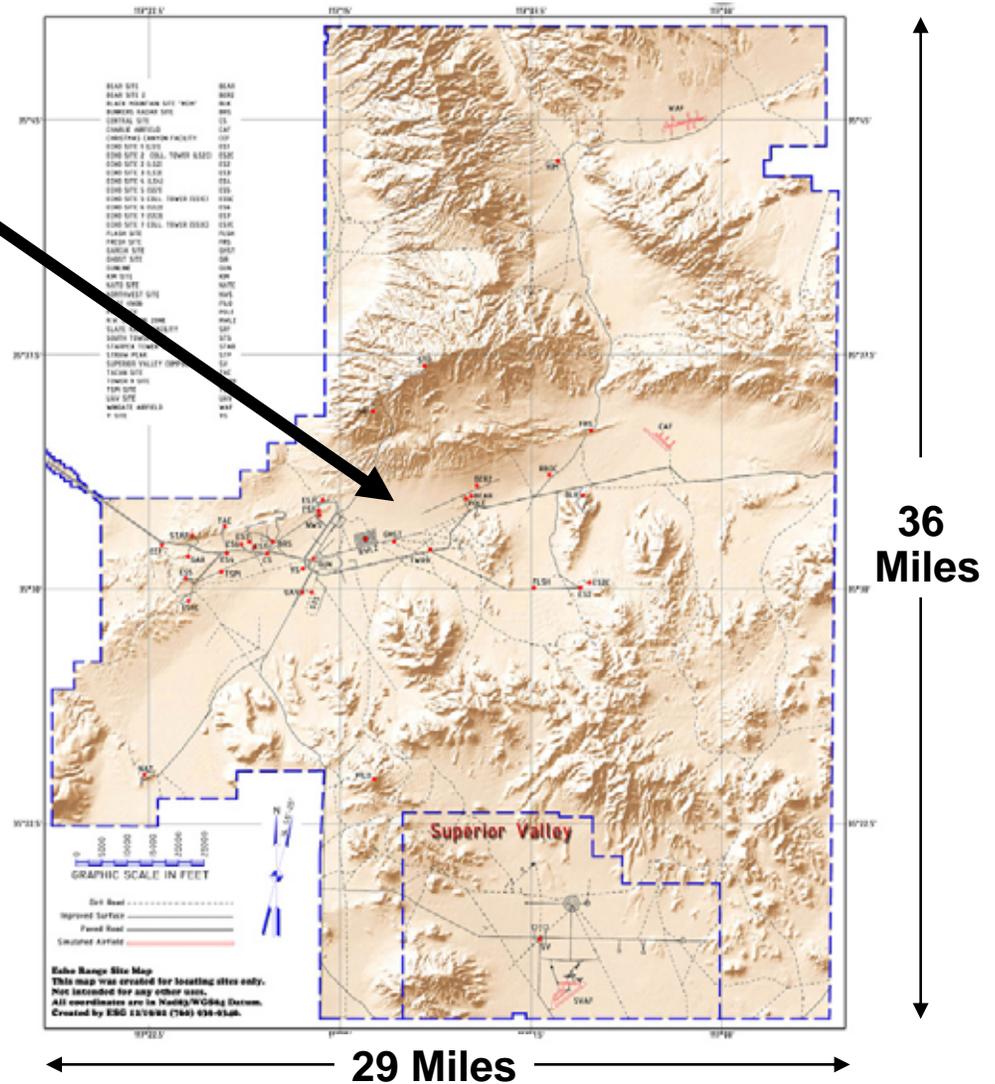
- **NAVAIR WD Point Mugu and China Lake possess unique, complementary, and interdependent EW domain knowledge**
  - *This is ‘by design;’ our organization is highly integrated*

# Backup Slides

# EW Systems Developmental / Operational Test And Evaluation Facility

## Echo Range

- Electronic Combat Range (ECR) (1990 to Present)
- China Lake South Range
- R-2524 Airspace
- Randsburg Wash
- Mojave B Range
- Electronic Warfare Threat Environment Simulation (EWTES) (1976 to 1990)



# Sensors, Electronics and Electronic Warfare BRAC 2005 DOD Military Value

