

Delivering Air Superiority in Contested Environments

Suppression of Near-Peer Enemy Air Defences

Future SEAD Developments

Geoff Tithecott, Capability Manager RF countermeasures

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Background





S-400 Deployment.



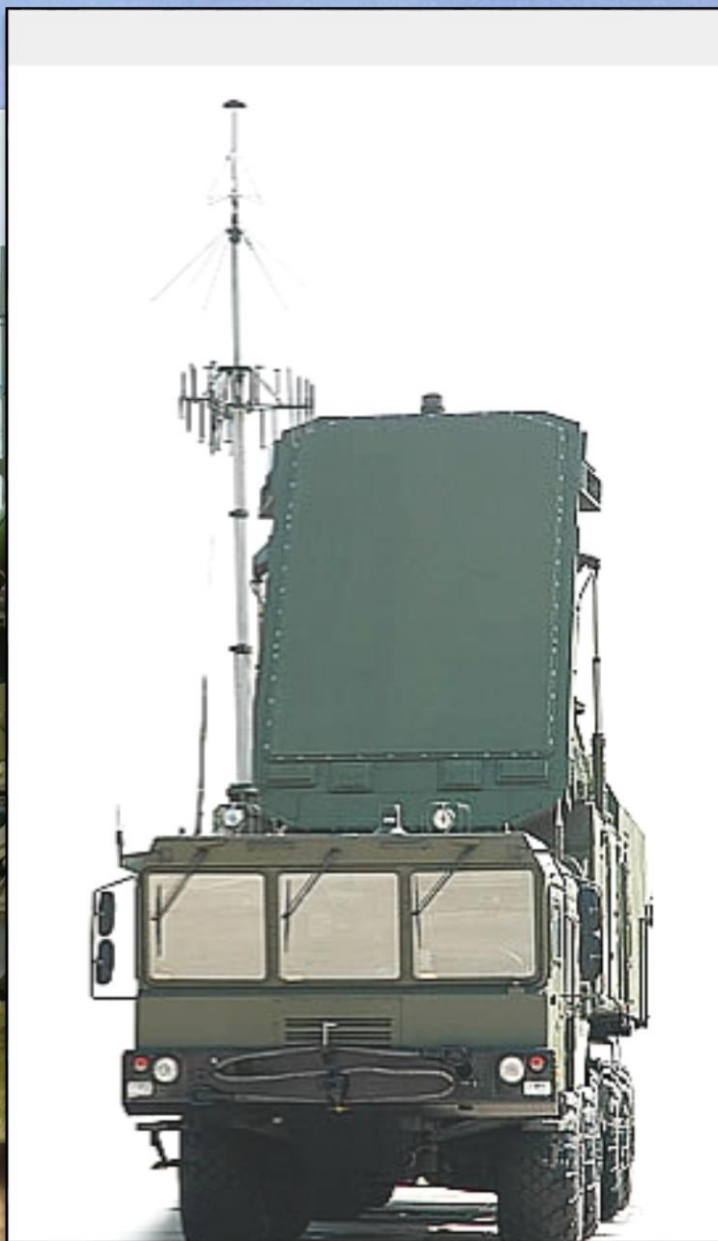
IADS - Sensors

- Surveillance
- VHF
- Airborne
- Passive



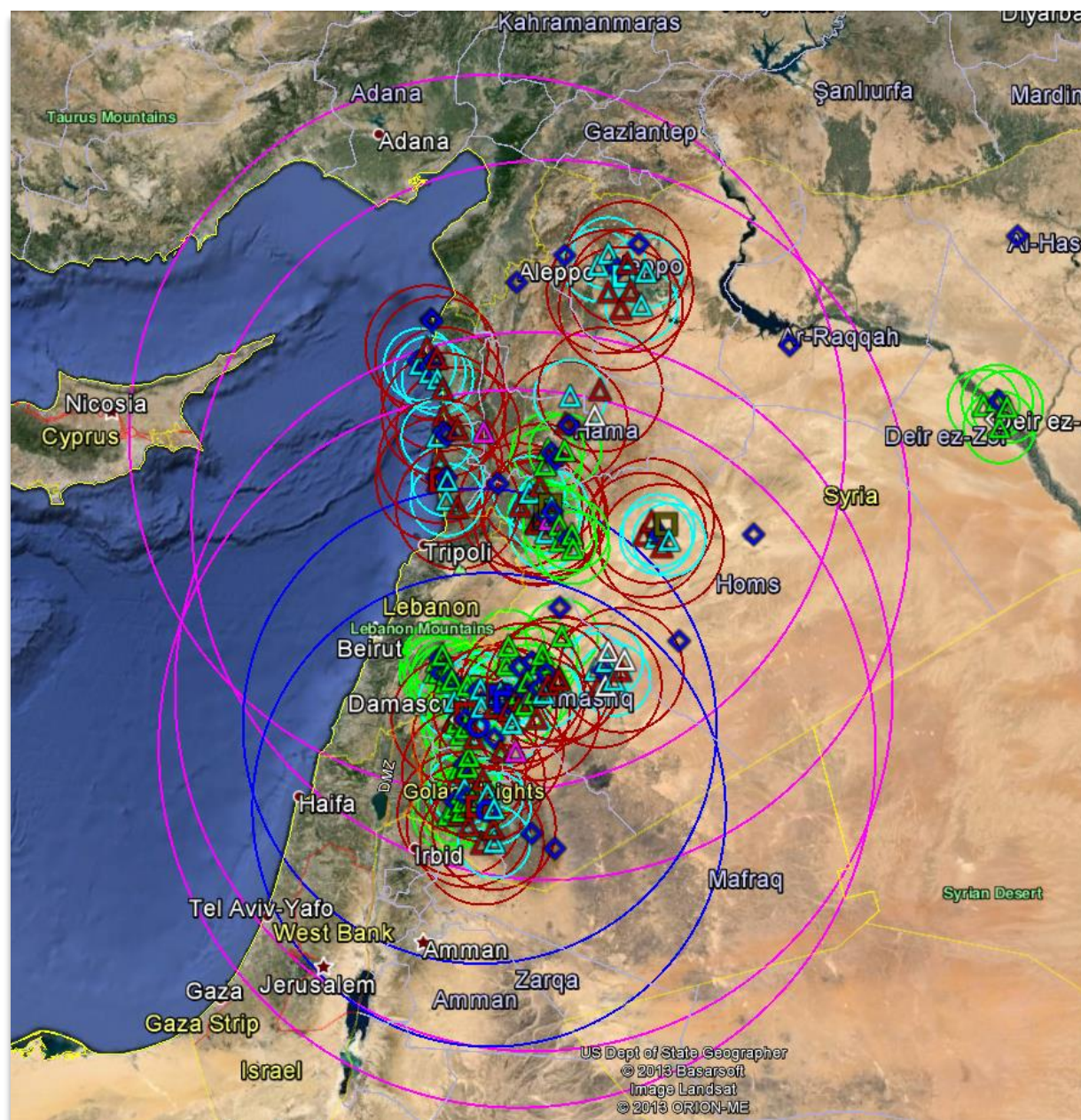
IADS - Effectors

- SAM
 - Short
 - Medium
 - long
- Missiles
 - Active RF
 - Passive RF
 - IR



IADS - Integration

- Diverse
- Layered
- Networked
- Highly Mobile

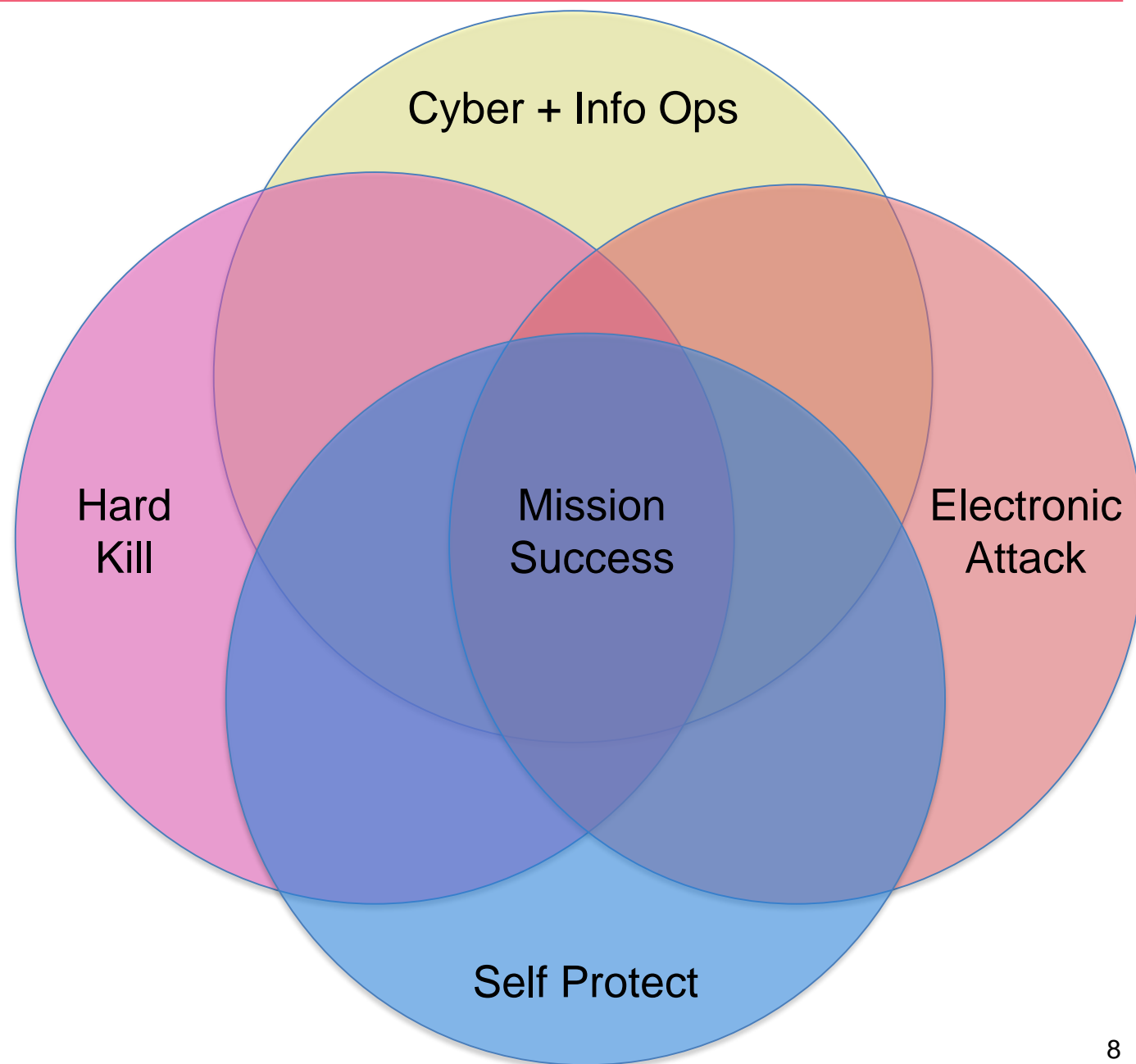




Features and Doctrine for a future SEAD Capability

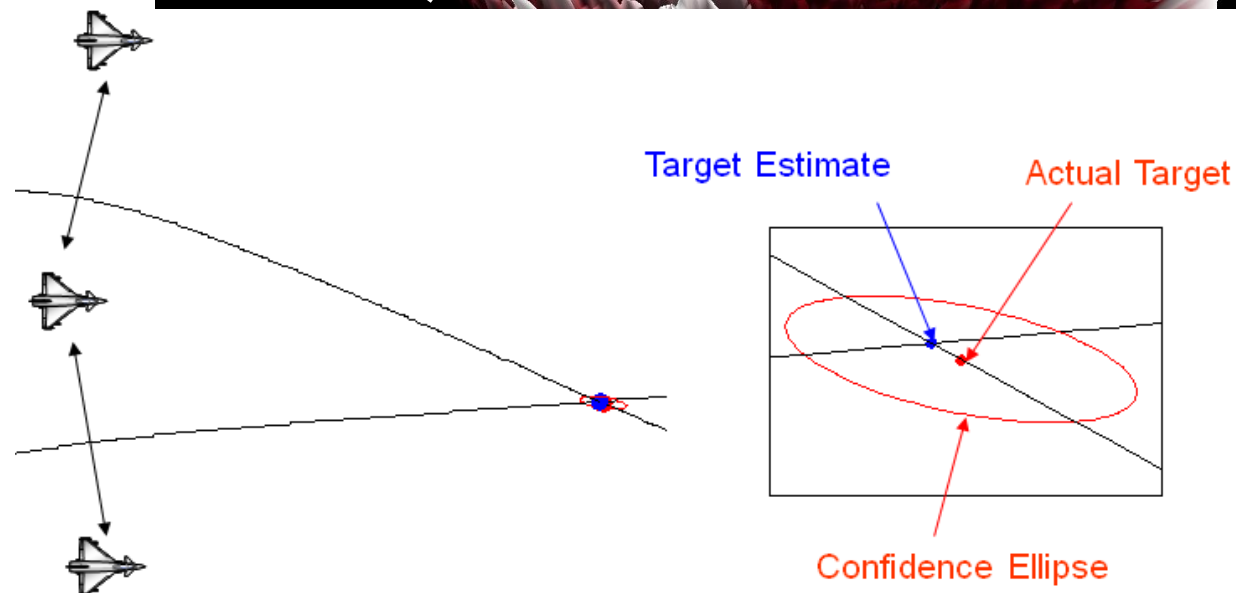
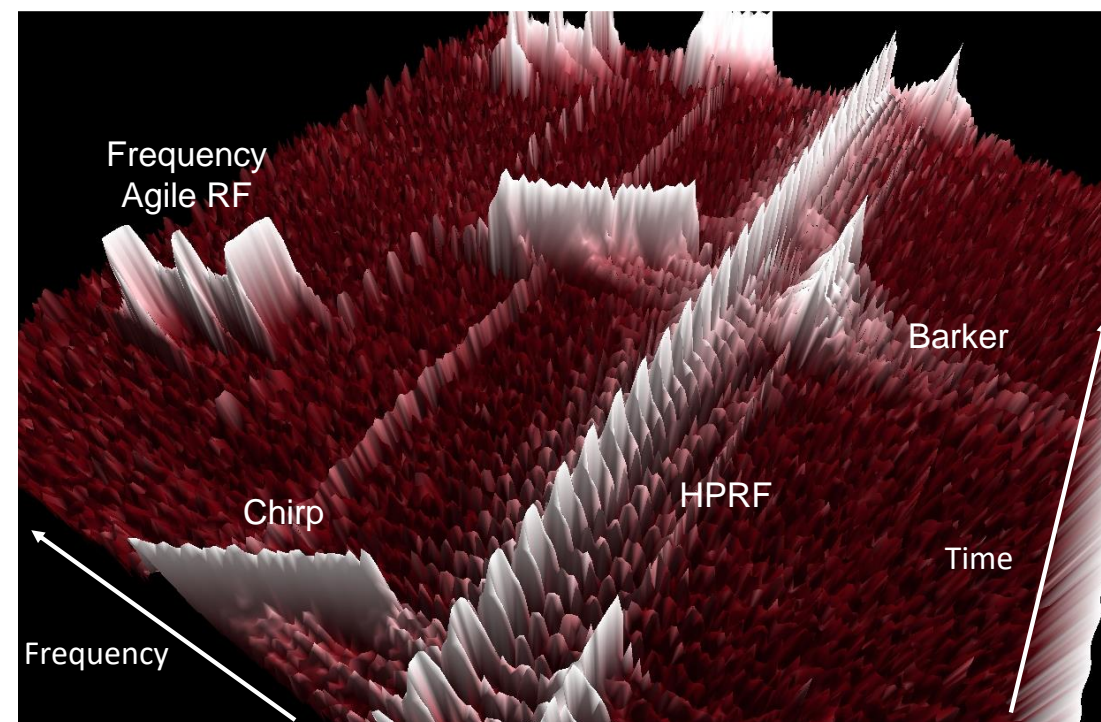
System of Systems Approach

- Layered
- Multiple assets
- Diverse capabilities
- Mix of persistent and expendable
- Co-ordinated



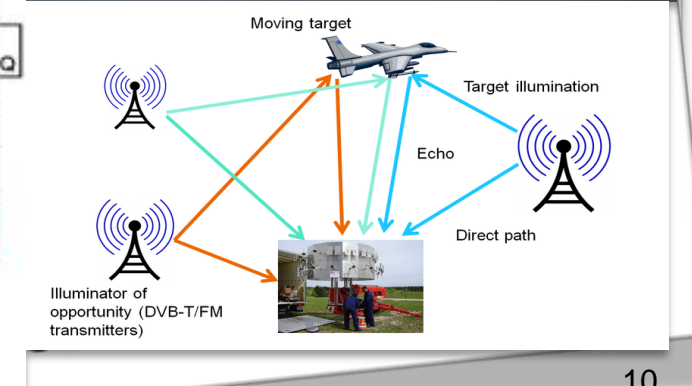
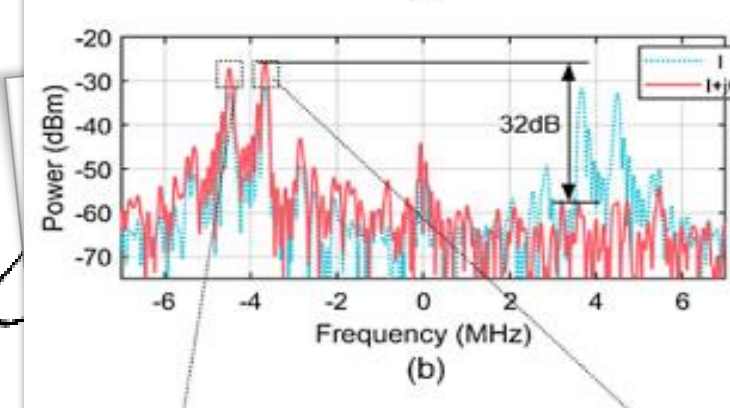
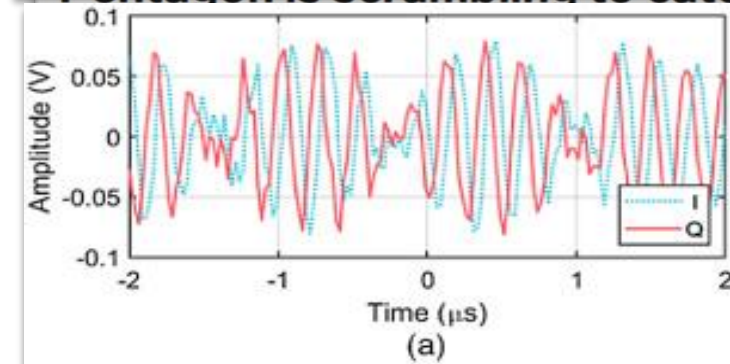
Sensors - Find, Fix, Identify

- Detection
 - CEME – Commercial use and intentional interferers
 - Wideband – technology allows increasing use of spectrum
- Geolocation
 - Passive
 - Multi-platform
- Recognition
 - Waveform types
 - Adaptive waveforms
 - Specific Emitters



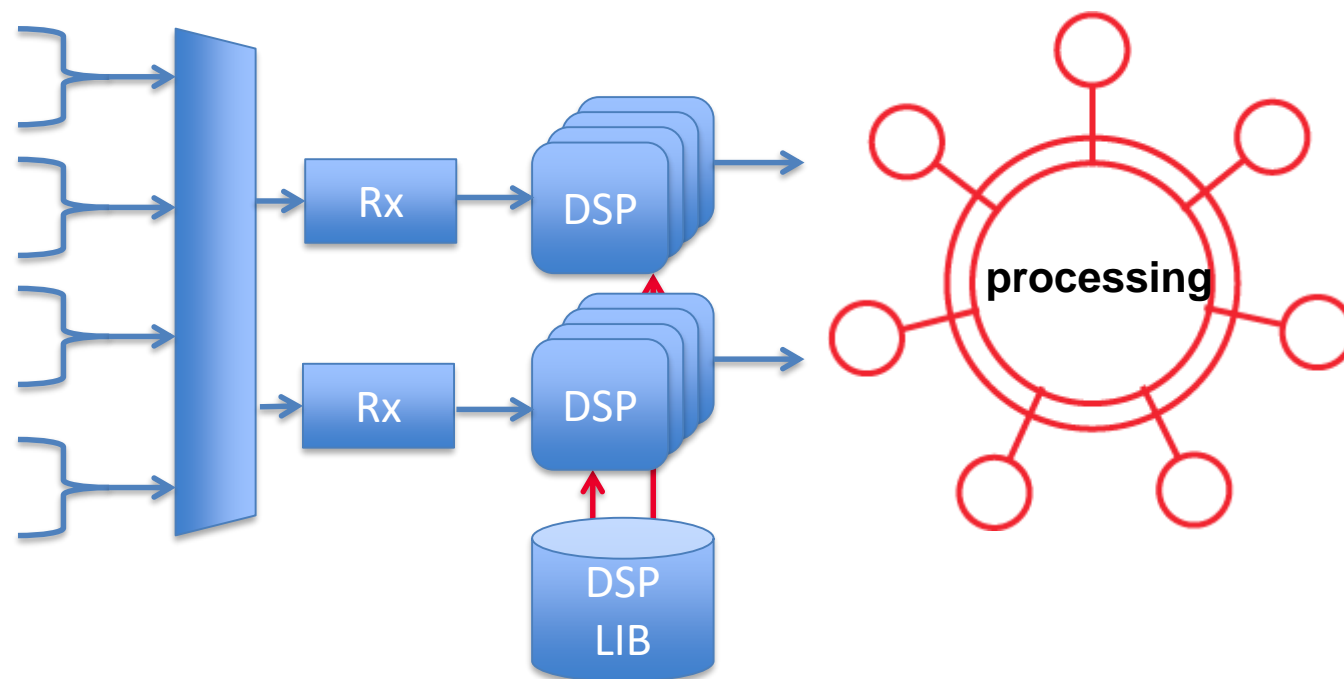
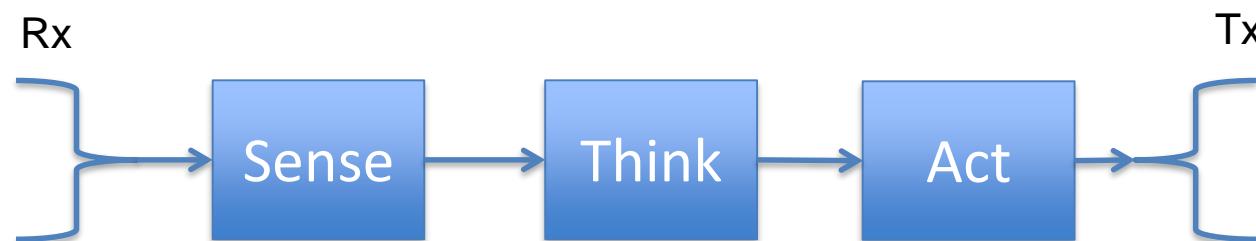
Effectors

- EA/ED roles
 - SOJ
 - Escort
 - SIJ
 - Self protect
- Communications
 - Cyber effects
- Countermeasure Capabili
 - Multi platform
 - Wider bandwidths
 - Adaptive
 - Complex waveforms
 - Passive systems
 - Measuring effects



Processing flexibility

- Adaptive / Cognitive EW
 - Machine learning
 - Pattern of life
- Architecture Agility
 - Reallocation of hardware
 - Re-configurable firmware
 - Distributed processing
- Algorithmic updates
 - Algorithmic mission data loads
 - Tools to rapidly analyse and update data and algorithms



Data Management

- Real Time
 - Networks
 - Fusion
 - Data Quality
 - Recording
- Integrated Mission Support
 - Planning
 - Mission data preparation
 - Test and evaluation
 - Post mission analysis





Equipment

Stand Off - Electronic Attack

- Advances in microwave electronics and AESA technology.
 - Higher power transmitters
 - Higher gain antennas
 - Wider bandwidth
 - Advanced techniques
 - Multi tasking



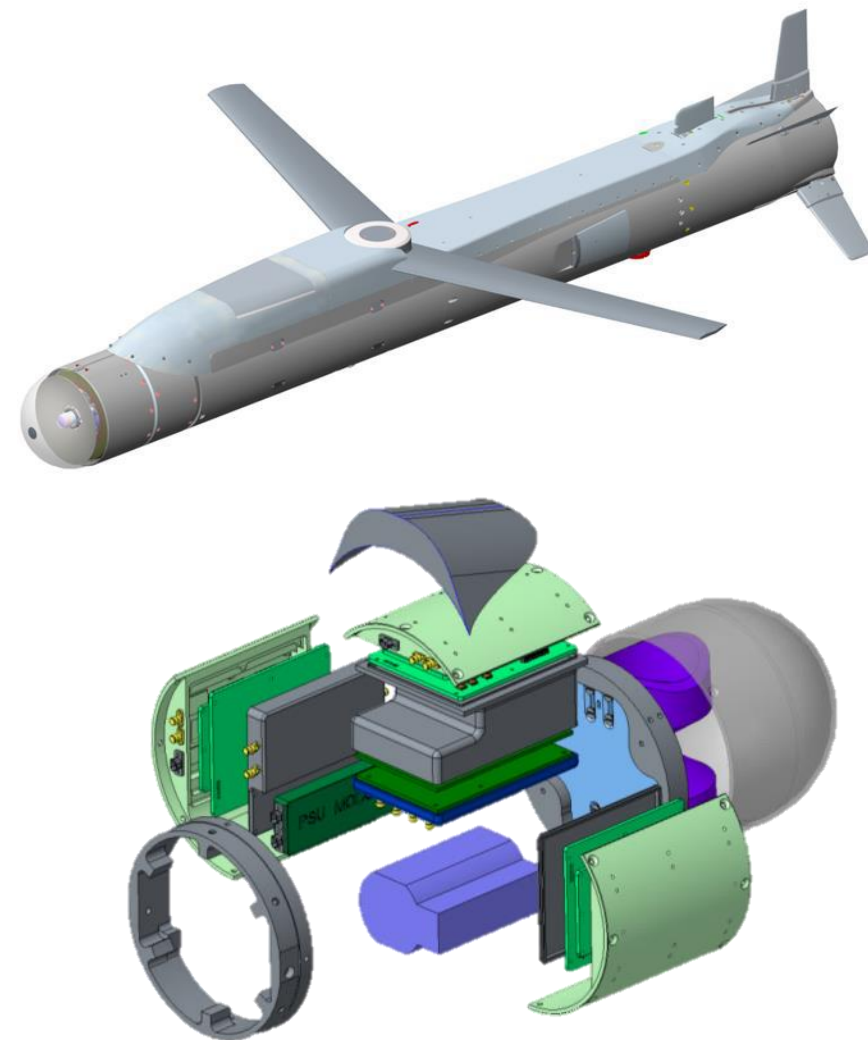


Stand in Jamming – SPEAR EW

MBDA
MISSILE SYSTEMS

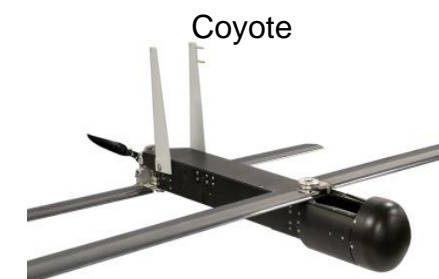
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- Development of SPEAR Weapon
 - Retains outer mold line and mass properties
 - Seeker and warhead removed
 - Replaced by additional fuel and EW payload
- SEAD force multiplier
- Provides SIJ and air launched decoy capability deep inside MEZ
- EW Payload
 - Development of Leonardo BriteCloud technology
 - Extremely wideband operation
 - Handles multiple simultaneous threats



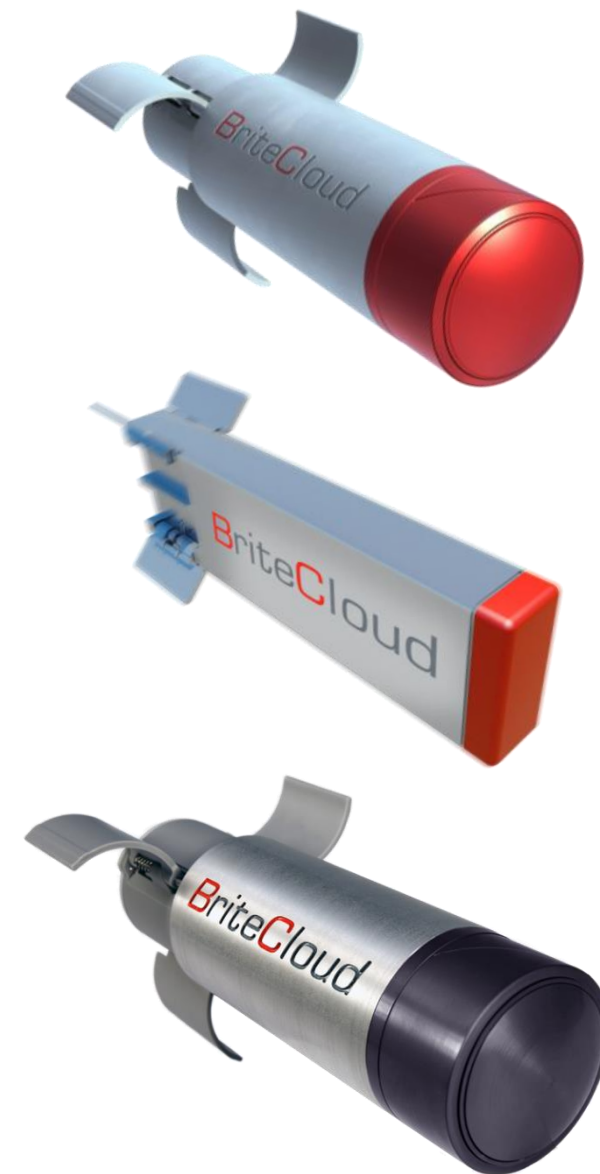
Stand in Jamming - Drones

- Similar EW technology can be used in small drones
- They have reduced range and/or speed
- Potentially large numbers can produce an operational benefit if a viable method of deployment exists.
- Loyal Wingman Concepts.



Self Protect – Expendable Active Decoys

- Off-Board DRFM Jammer
- Rapid Response
- Increased miss distance vs. TRD and on-board ECM
- Overcomes Chaff 'discrimination'
- Mission reprogrammable enabling optimisation against emerging threats
- Very low integration costs
- No platform modification required
- No Sustainment / maintenance costs





Self Protect – PRAETORIAN LTE

New architecture: Designed to provide capability growth through to the OSD

- Early digitisation (in Wing Tip Pods)
- High speed, wide bandwidth, fast data processing to centralised Av Bay processing capabilities
- Secure high speed, wide bandwidth dedicated (off-boarding) EW datalink
- Frequency band extensions
- Algorithmic mission data
- Enhanced DF / Geolocation
- MFA type ECM coverage 360 ° (Az); Steerable in Az & El
- Hybrid Missile Approach Warner



Conclusions

- SEAD is a complex and increasingly important task where many individual elements need to be combined to produce an overall effect.
- SEAD involves more than just Airborne EA
- Solution is dependent on existing capability, force mix and operational need.
- **Points to Note**
 - Solutions must be interoperable with existing equipment.
 - Self protection should not be forgotten. Pop up threats and unanticipated events happen.
- **A range of solutions will be needed.**
 - This makes it difficult to robustly counter.
 - However a common core is desirable to help affordability

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