

TESTING NEXT GENERATION EW SYSTEMS AGAINST A MODERN IADS

ENGILITY



Darin Nielsen

darin.nielsen@engilitycorp.com



Test Instrumentation
May 12-14, 2015 Las Vegas, Nevada

GET CONNECTED to LEARN, SHARE, AND ADVANCE.





TESTING AGAINST A MODERN INTEGRATED AIR DEFENSE SYSTEM

- Testing of the next generation electronic warfare systems against emerging threat systems is going to be a challenge. The Next Generation Jammer (NGJ) system, the Joint Strike Fighter (JSF), and other programs need to be verified against modern Integrated Air Defense Systems (IADS).
 - Live ranges have limited assets and capabilities especially when trying to simulate a “mission level” environment and have traditionally operated with a single system against a single threat scenario.
 - Engility Corporation supports both live range testing and the electronic warfare labs for both the Navy and the Air Force, and is supporting both range and laboratory upgrades to live, virtual and constructive (LVC) systems.



AIRBORNE ELECTRONIC ATTACK SYSTEMS REQUIRING MISSION LEVEL TEST AND EVALUATION



AGM-88E
Advanced Anti-Radiation
Guided Missile (AARGM)



EA-18G Growler



AN/ALQ-214 Integrated Defensive
Electronic Countermeasures (IDECM)



EA-6B Prowler



F-22 Raptor



AN/ALQ-99 Tactical Jamming System



EC-130H Compass Call



Miniature Air Launched Decoy (MALD)
and Miniature Air Launched
Decoy Jammer (MALD-J)



Next Generation Jammer (NGJ)



AN/ALQ-184 Electronic Attack Pod



Joint Strike Fighter F-35ABC



AN/ALQ-131 Self Protection Jammer Pod

Source: GAO 12-175 29 Mar 2012, AIRBORNE ELECTRONIC ATTACK Achieving Mission Objectives Depends on Overcoming Acquisition Challenges



NEXT GENERATION JAMMER (NGJ)

- **NGJ is a new jamming asset that will need to be tested and evaluated both for it's initial release and every update to the software and libraries**
 - **Awarded to Raytheon 2013**
 - **Active Electronically Steered Array (AESA)**
 - **Replace the ALQ-99 on the EA-18G Growler**
 - **Operational in 2021 timeframe**
 - **Provide both stand-off and stand-in jamming capabilities**



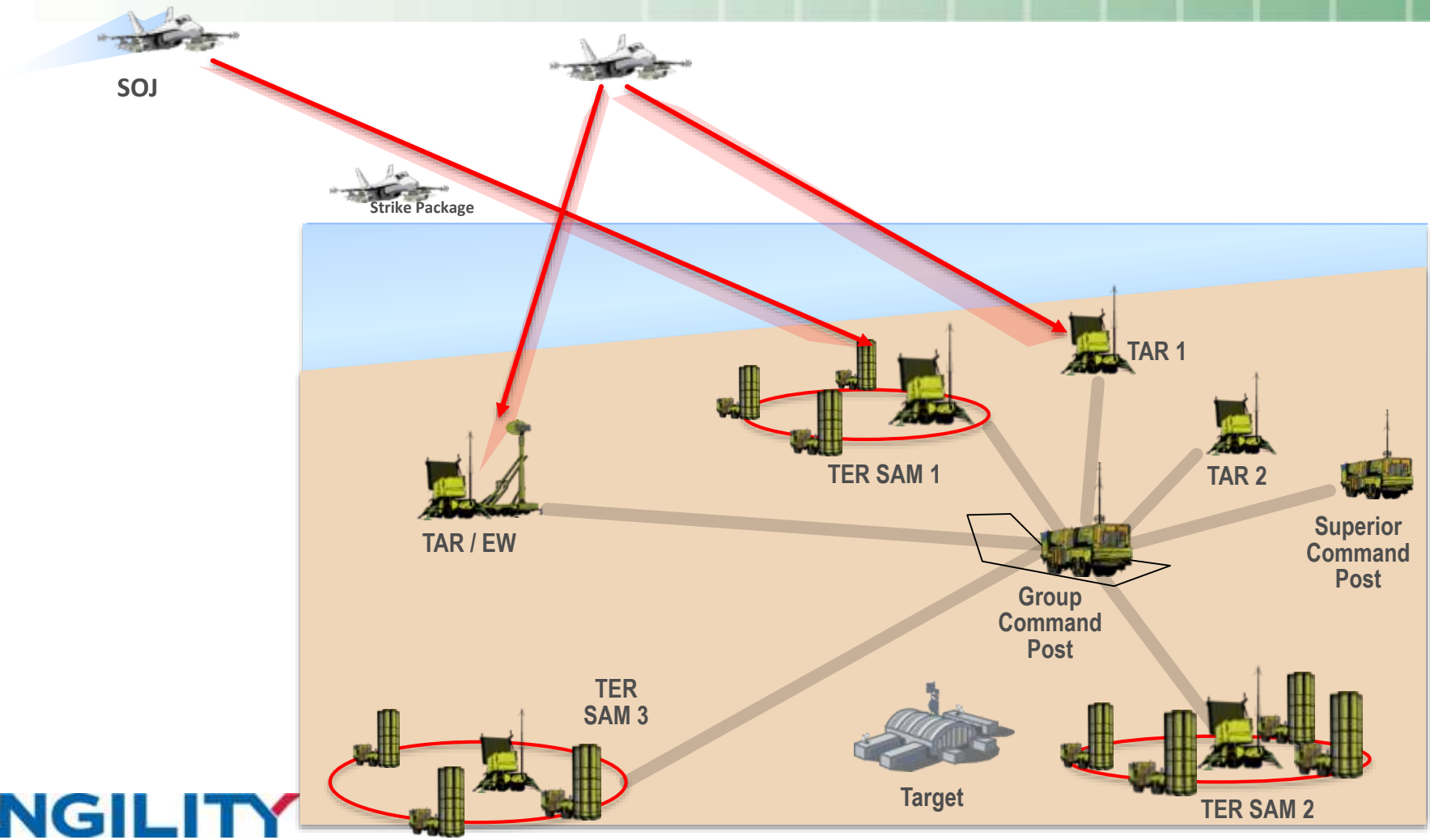


TESTING NEXT GEN ELECTRONIC WARFARE SYSTEMS

- **We cannot duplicate all possible threat IADS configurations and threat density at our ranges**
- **Testing will require a combination of Live, Virtual and Constructive entities to provide a mission level test bed**
- **A test event may include Hardware in the Loop (HWIL) from DOD labs, Live data from multiple ranges, and Simulations from one or more sites**

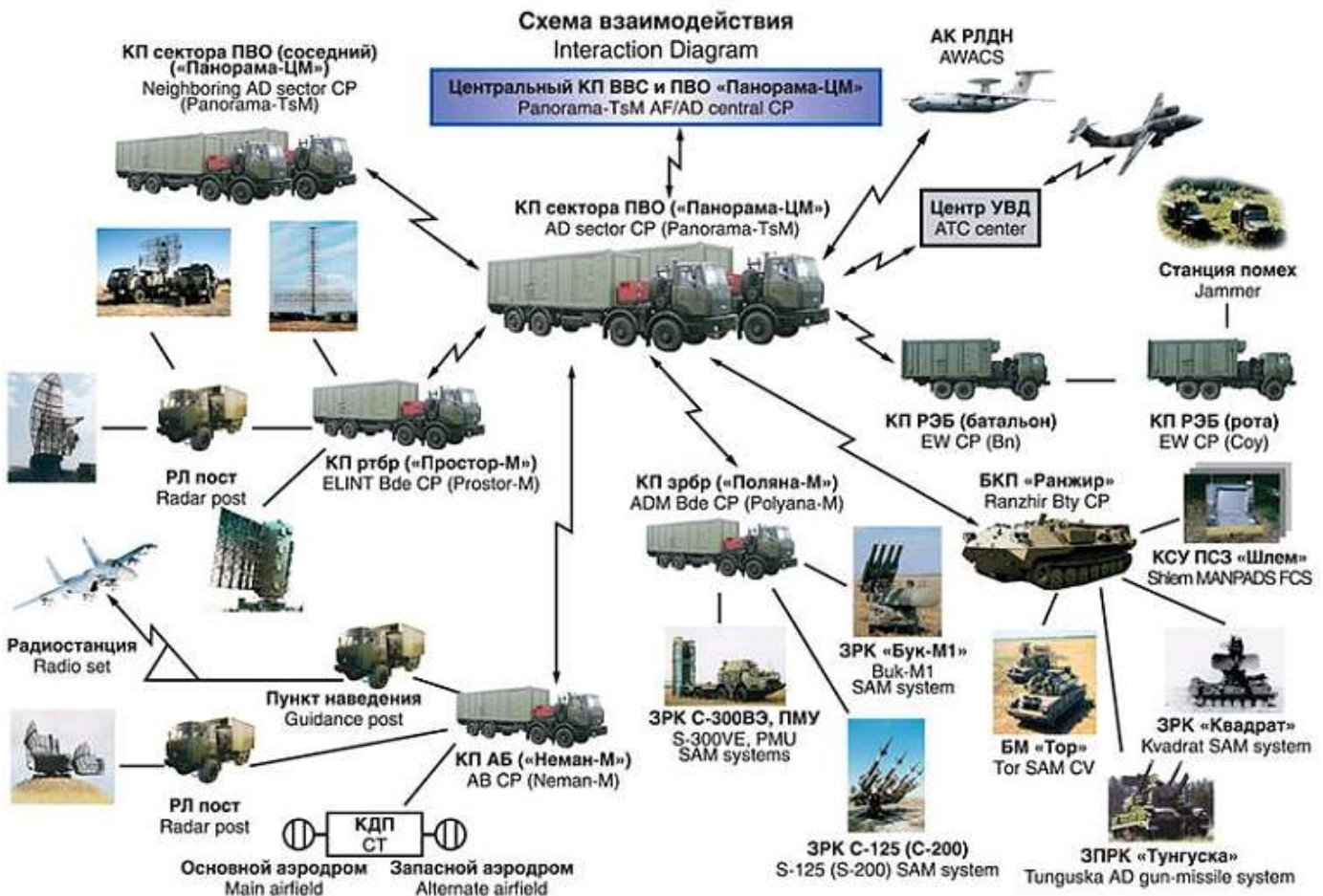


CONCEPTUAL IADS SCENARIO





OLD PICTURE OF A RUSSIAN IADS WITH COMMAND POSTS





COMMAND POST

- A Modern IADS Command Post will take in track data for various radars and other sources
- Tracks must be Correlated, Threats must be evaluated, Priorities must be set by automation and by the operators
- Decide who to engage, when and with what





POSSIBLE LVC SCENARIO

- A possible Live, Virtual Constructive test scenario could include a live EA-18G with a set of NGJ midband pods in a stand off jamming configuration.
- Another aircraft or UAV protected entity flying against a live threat on a range
- The live range threat could be connected to a local or remote simulated group and superior command post





POSSIBLE LVC SCENARIO

- A second HWIL EA-18G at Point Mugu could also be “flying” against a target tracker/SAM in the same geographic air-space and simulated track data could be sent to the Command Post Simulation in parallel with the live exercise
- Communication between the Live, Virtual and Constructive entities could be over the JMETC or I/O range networks using TENA, HLA or DIS protocols



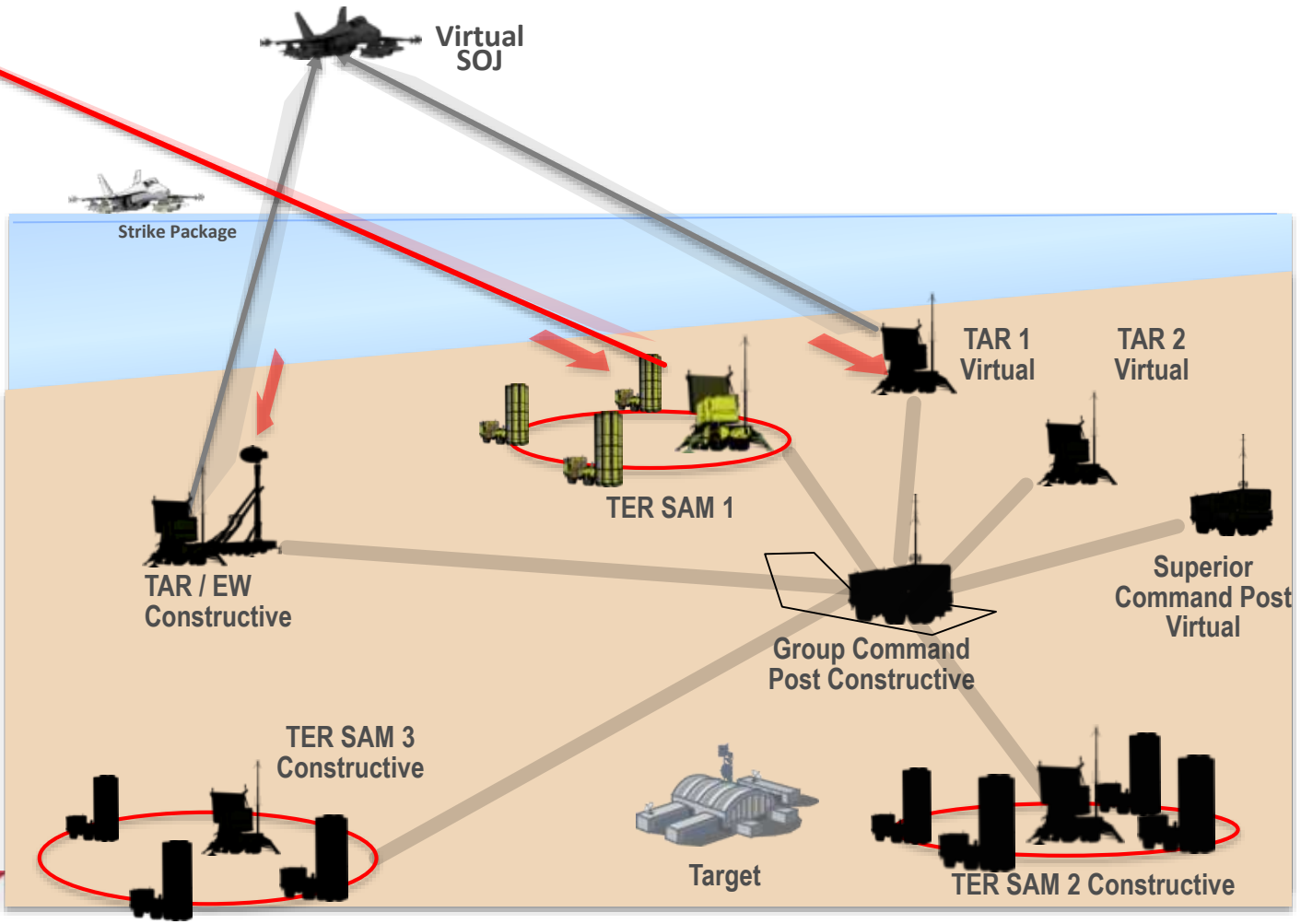


TESTING NEXT GEN ELECTRONIC WARFARE SYSTEMS



Possible scenario with real, HWIL and simulated IADS sites and Jamming

The data flow to the command post the same format whether it is a Live, Virtual or Constructive source

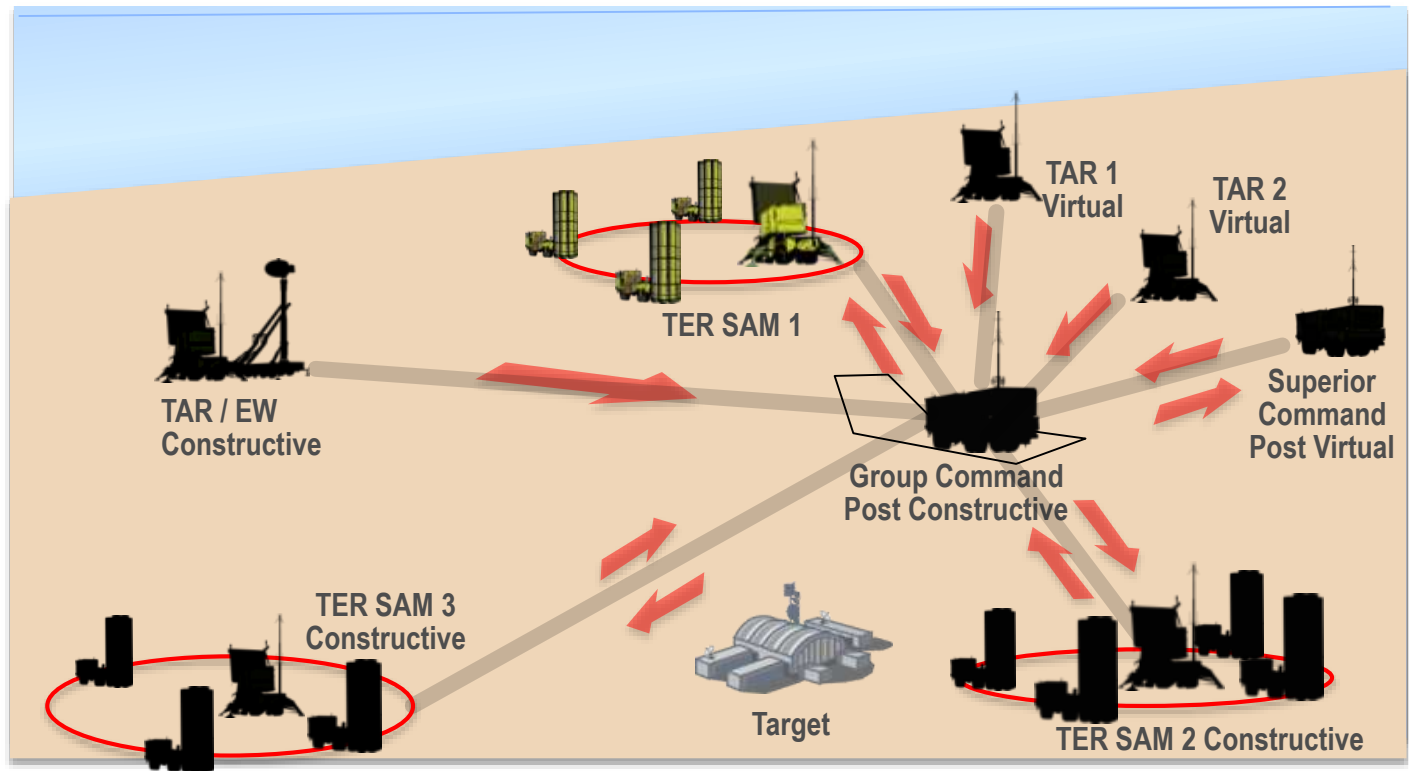




TESTING NEXT GEN ELECTRONIC WARFARE SYSTEMS

Data Flow and in every direction can be analyzed

Effectiveness testing can be performed with many scenarios by replaying the live data and modifying the simulated parameters

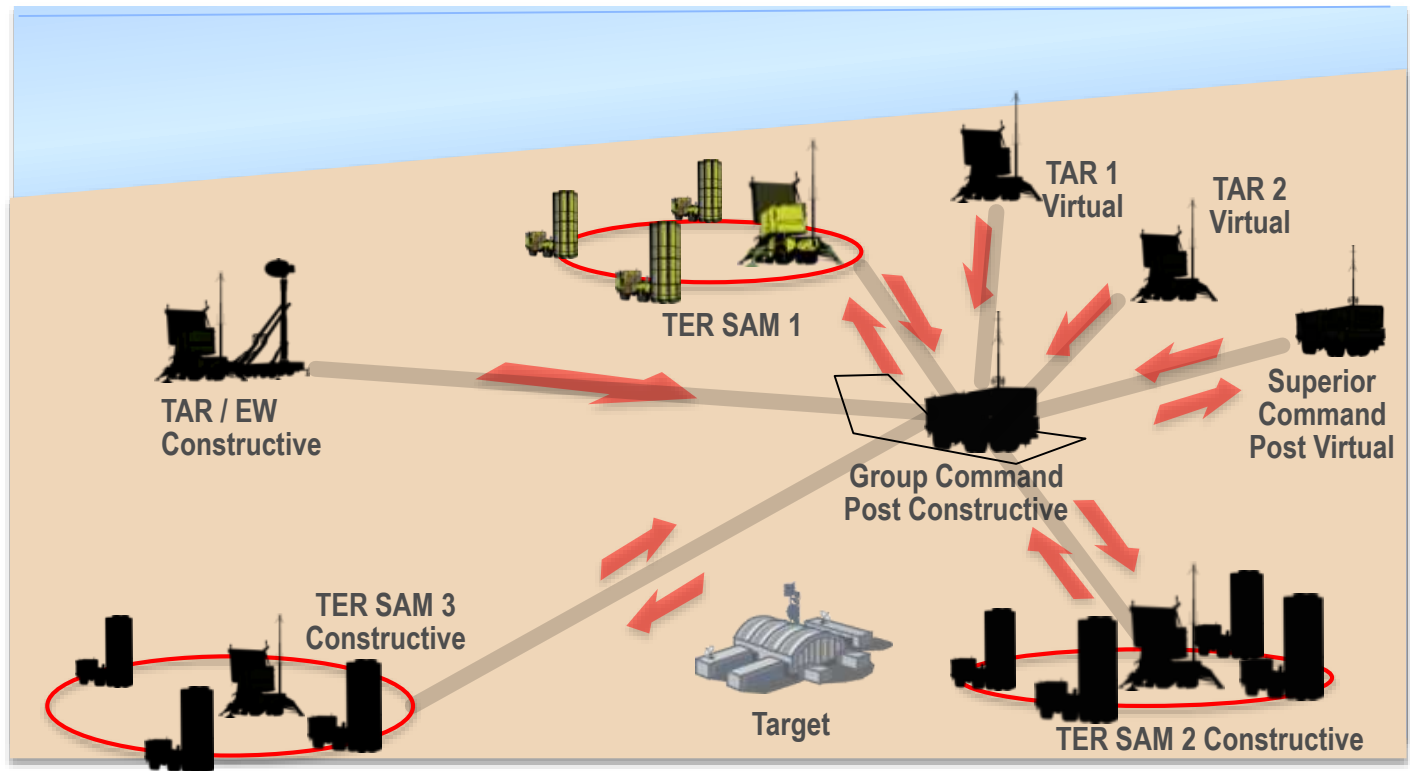




TESTING NEXT GEN ELECTRONIC WARFARE SYSTEMS

Data Flow and in every direction can be analyzed

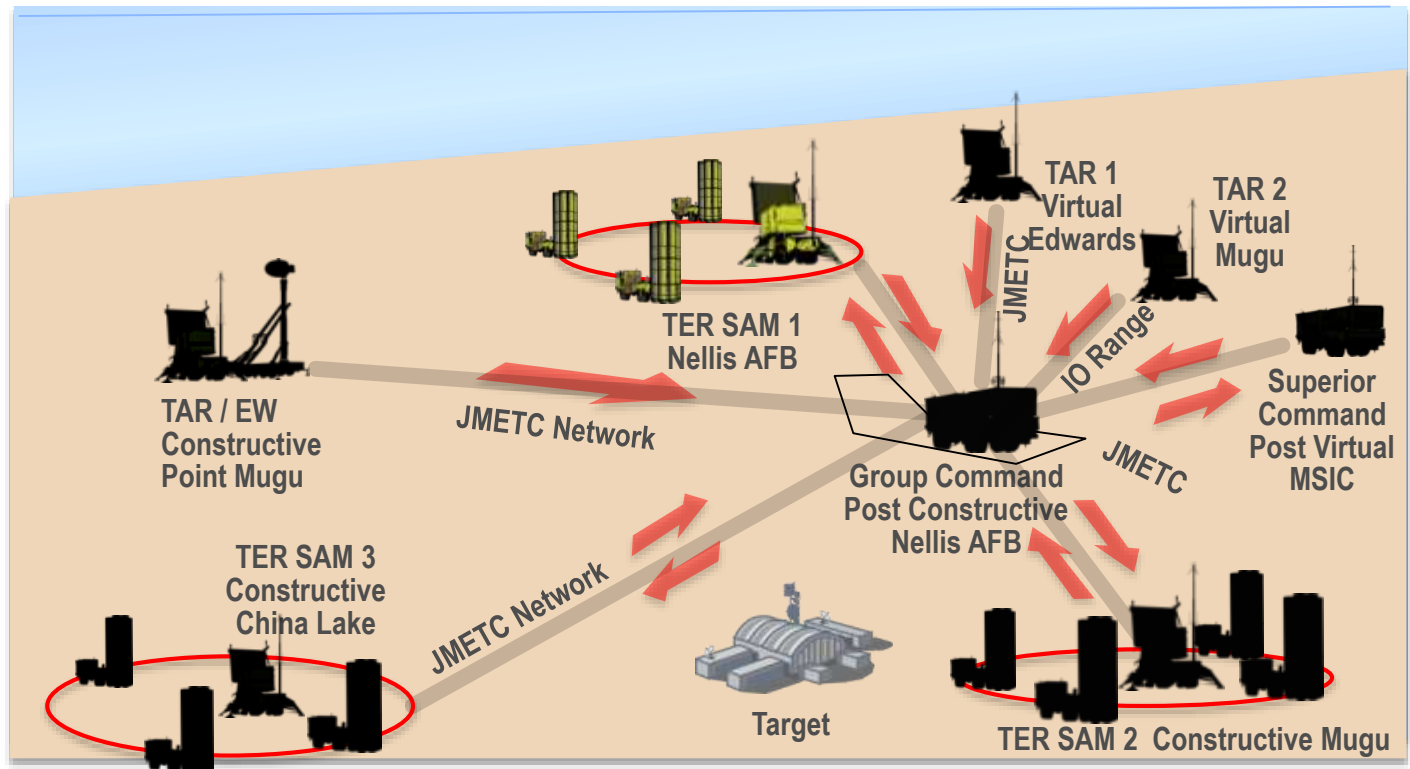
Effectiveness testing can be performed with many scenarios by replaying the live data and modifying the simulated parameters





TESTING NEXT GEN ELECTRONIC WARFARE SYSTEMS

Various Models, Simulations and hardware in the loop can reside in different DOD locations and communicate over secure networks, such as JMETC, to build the Live, Virtual Constructive IADS Test Environment





VERIFICATION, VALIDATION AND ACCREDITATION OF THE TEST SCENARIO

- The V&V process will have to be followed for each entity in the test scenario
- Can be a long and difficult process depending on the accrediting agency
- Probably need to work with the intelligence communities and use their models where possible for constructive systems
- Need to utilize live test data as much as possible to verify and validate the HWIL and simulated systems



TESTING NEXT GENERATION EW SYSTEMS AGAINST A MODERN IADS

- Questions?