



***NPS / MOVES Open House  
24 May 2022***

**Tactical Training Group Pacific  
LVC Enabled Training and FTC Overview  
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**Overall Classification of this brief is:**

**UNCLASSIFIED**

# Agenda

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- How do we establish an LVC architecture and use this technology in support of the Fleet Training Continuum?
- NCTE Overview
  - NCTE defined
  - Navy Enterprise Tactical Training Network (NETTN)
- Fleet Synthetic Training Overview
  - FST
  - C3F Facilities and Capabilities
- Live, Virtual, Constructive (LVC)
  - Resourcing
  - FST at Sea
- Improvement Initiatives

# General LVC Description

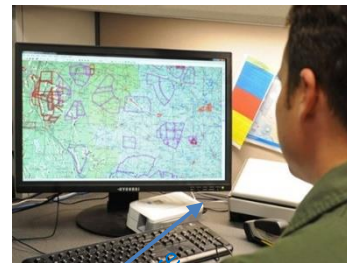


- **Live:** Real operators training on real equipment (ships and aircraft)



Units share tactical picture

- **Virtual:** Real operators training on simulated equipment (high fidelity simulators)



COP/TDL/CEC/Voice/Chat



- **Constructive:** Computer generated forces, **RED** or **BLUE** (role played from a distributed training node)



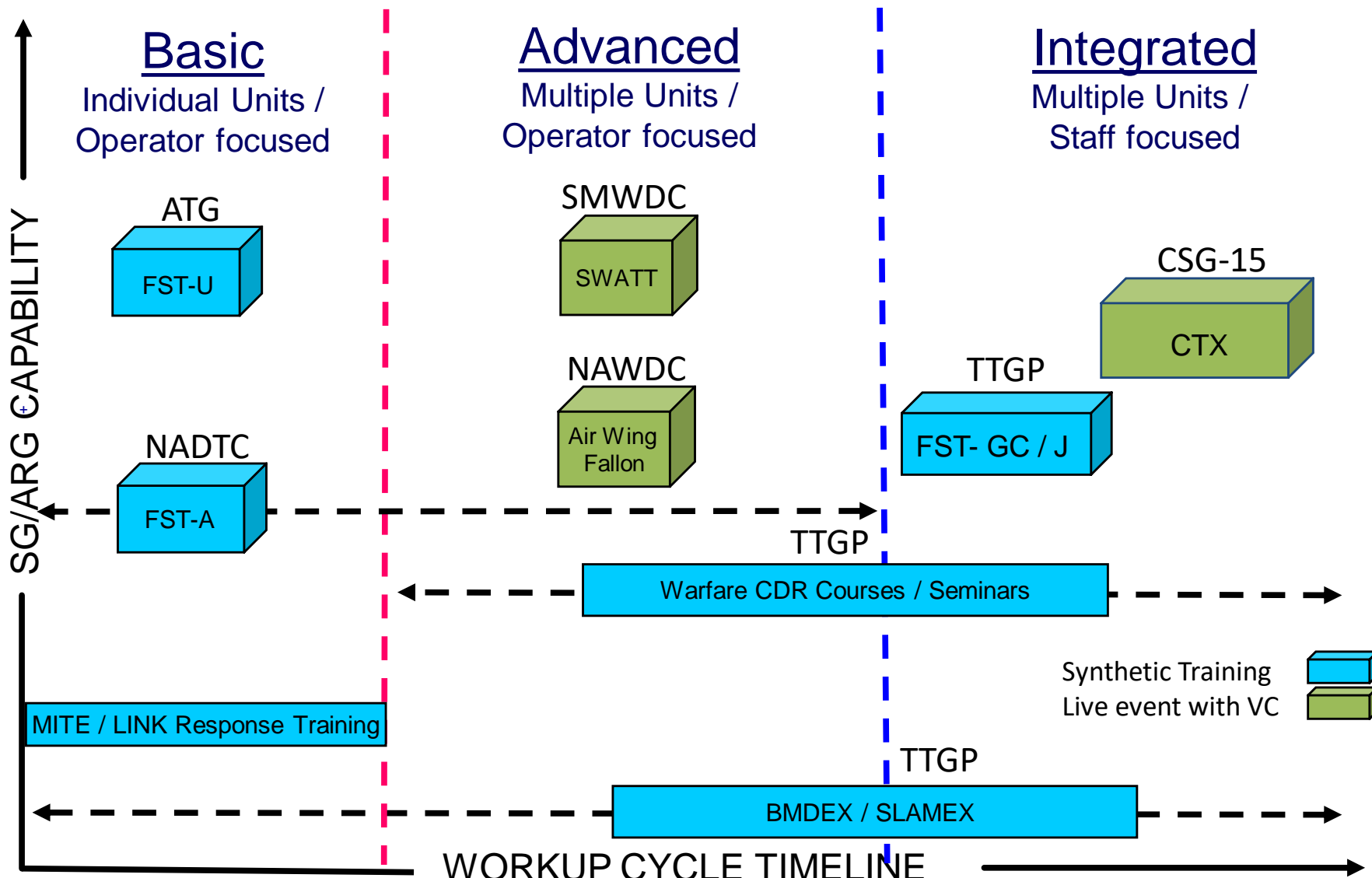
Scenario from JSAF pushed to Live and Virtual Players from the LVC Distributed Control Centers via NCTE

Training Architecture

Training Architecture

**Network Geographically Separated Players, Realistic Threat Density Profiles**

# F RTP Distributed Training





# NCTE Overview

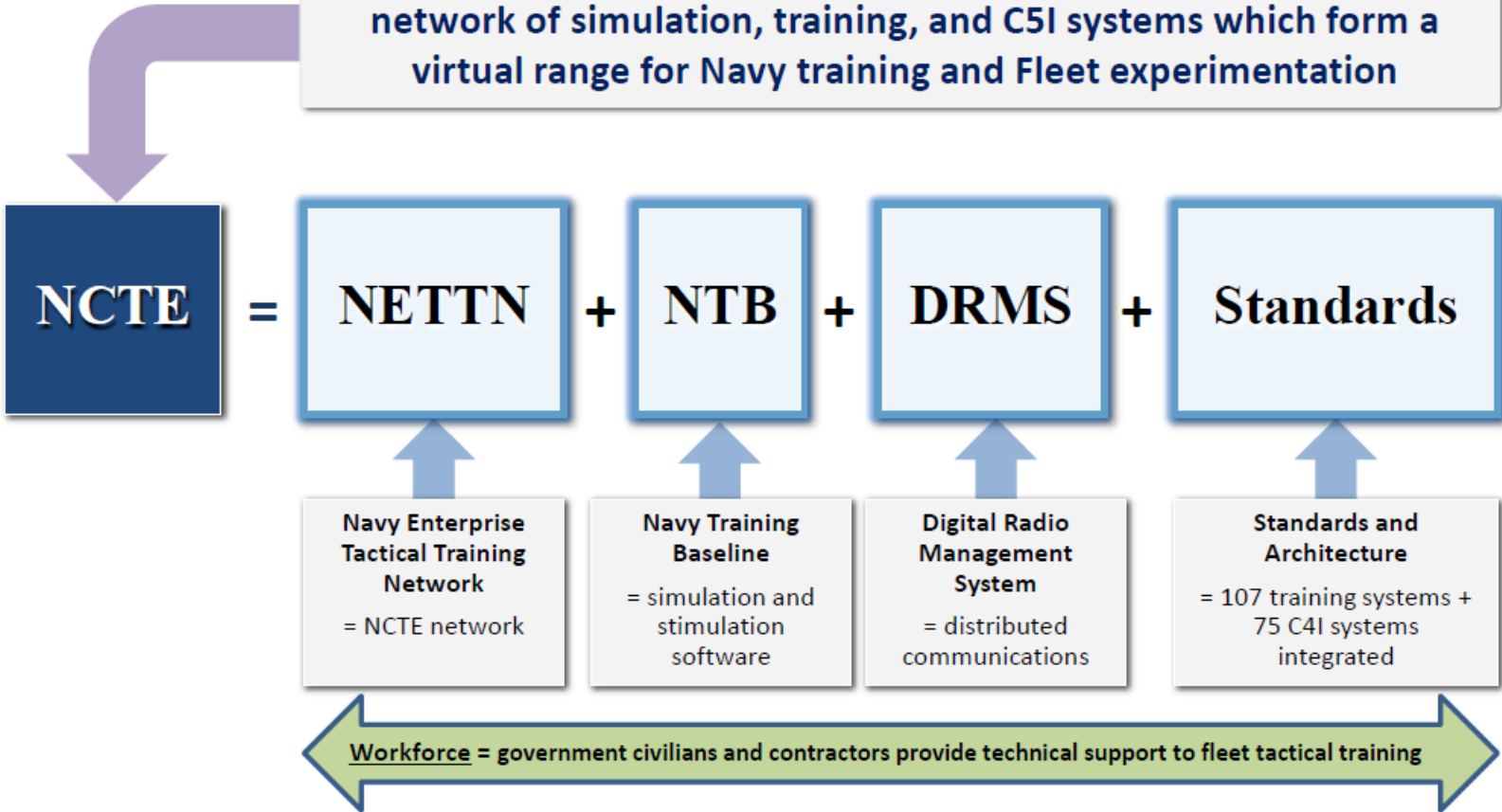
- NCTE - Navy program and platform to support FST
  - Combines shore-based and ship-embedded simulation and stimulation systems into a single, distributed simulation enterprise
  - Provides the voice and data communication systems and infrastructure required to support Fleet training
- Enables Navy warfighting readiness by providing a tailored, realistic environment networked to Fleet/Joint/Coalition FST exercises and other distributed training events
- NSWCC Corona - NCTE PM (Engineering)
- TACTRAGRUPAC - CPF's NCTE EA (Training)

**NCTE is the backbone for Distributed Training**

# NCTE is more than a network

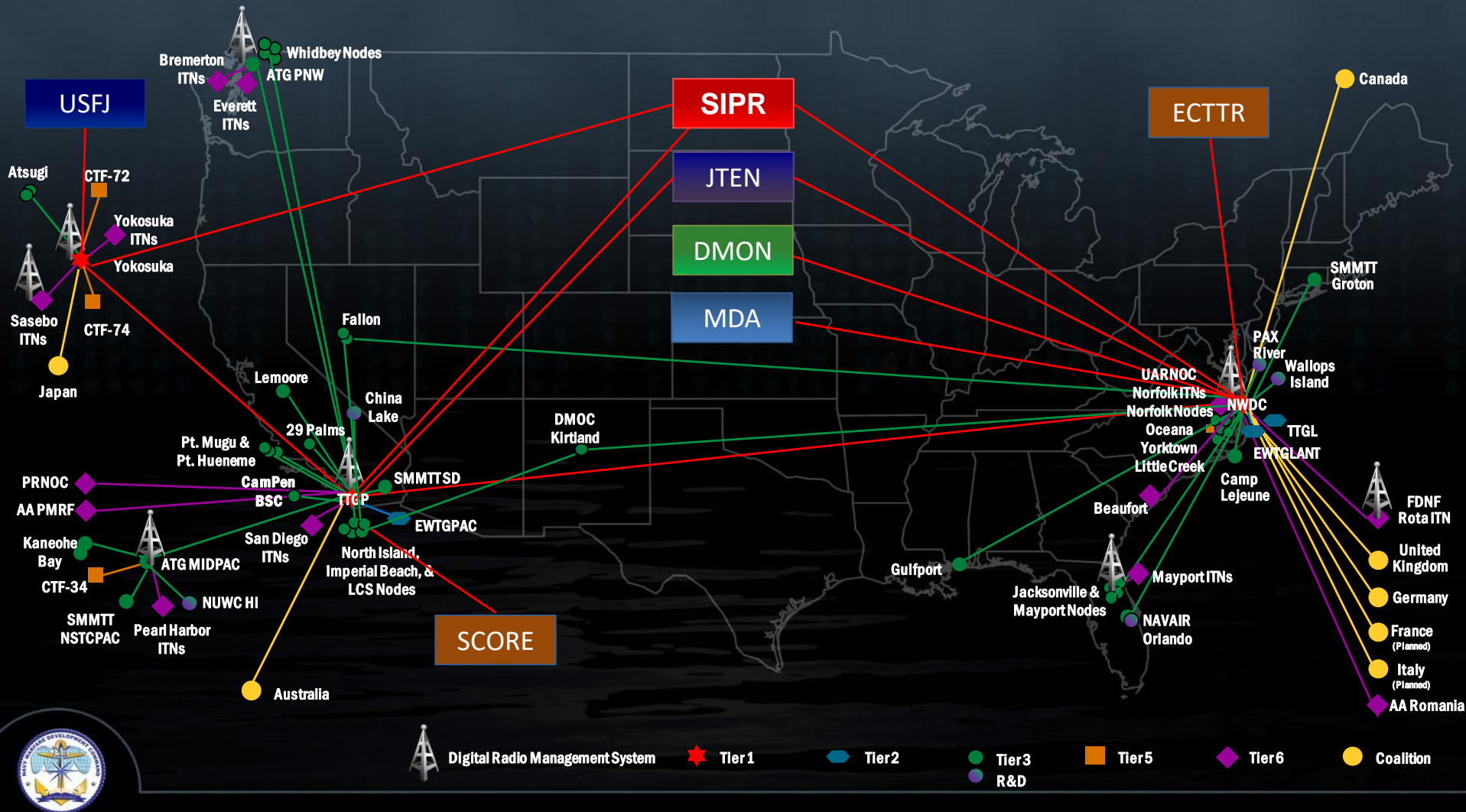


The Navy Continuous Training Environment (NCTE) is an integrated network of simulation, training, and C5I systems which form a virtual range for Navy training and Fleet experimentation



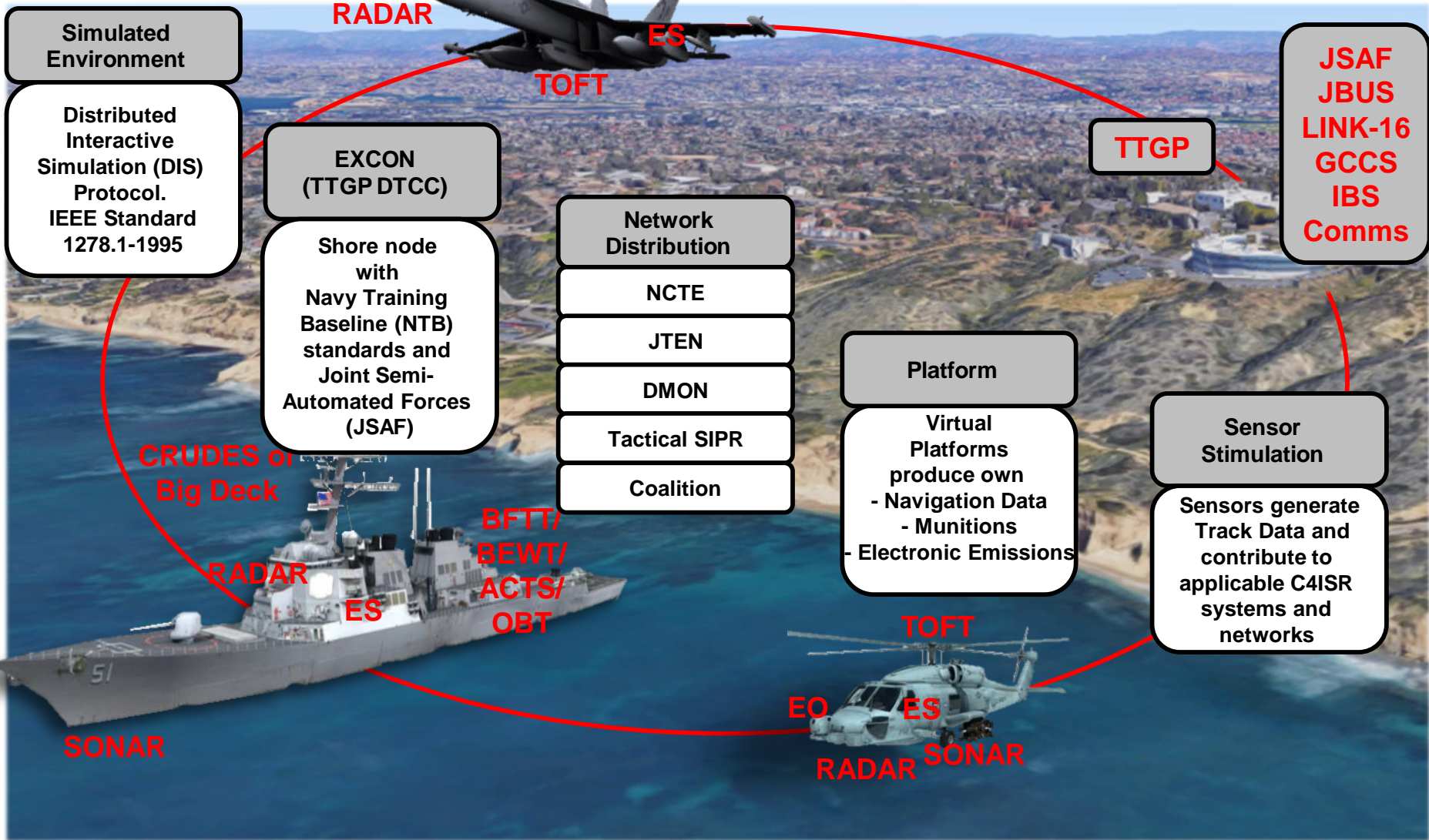


# Navy Enterprise Tactical Training Network (NETTN)



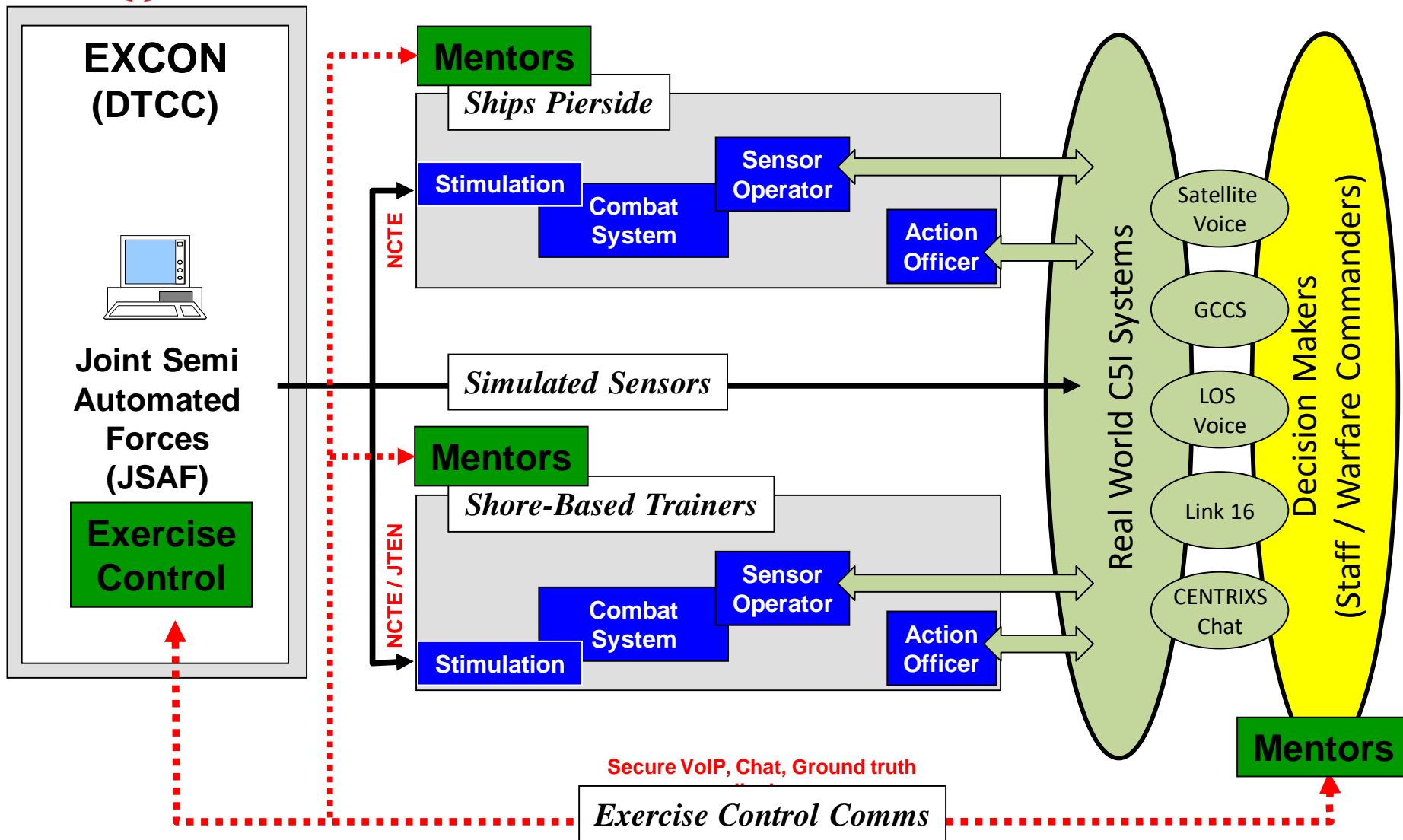


# Fleet Synthetic Training-101





# FST Technical Implementation



NCTE, JTEN, SIPR, CENTRIXS

# Resilient Shield (example)



## Yokosuka

- CTF-70
- 94<sup>th</sup> AAMDC
- USS Lassen
- JS Kongo
- JS Teruzuki
- JMSDF P-3
- JASDF Fighters
- C7F
- USS Chancellorsville
- USS Shiloh
- USS Curtis Wilbur
- USS Benfold

## Schriever AFB

- MDIOC
- MDST
- 100<sup>th</sup> MD BN
- 49<sup>th</sup> MD BDE

## Peterson AFB

- NORTHCOM

## San Diego

- TTGP
- THAAD EADSIM

## Kasuga

- 2 ADMG

## Yokota

- 5 AF ADLE
- JTF BMD

**USFJ  
RED Core**

**SIPR**

**NCTE**

**CNET**

**NCTE**

## Hickam AFB

- 613<sup>th</sup> AOC

## Damneck

- NSWCCo

## Pearl Harbor

- CPF Data Fusion Cell

## Wahiawa

- EHF Terminal

## TDL

- GWM
- TDACS
- CDLMS
- C2P
- LMMT
- ADSI
- JTIDS
- USQ-125
- EHF MTJ
- UTJ (SHF or pier)

## COTP

- GCCS-M
- C2PC
- AFATDS
- JADOCs
- TBMCS
- NCFS
- ASAS
- JTT

## Comms

- DRMS
- UHF LOS
- UHF SAT Comms
- EHF Comms
- DIS Voice
- VOIP
- SIPR Chat
- CENTRIXS Chat

## Networks

- NCTE, NOFORN
- NCTE, REL JPN
- SIPR
- CENTRIXS J
- MDA CNET
- USFJ RED CORE

Exercises BMD Architecture Beyond that possible in a Lab only setting

Often IDs un-tested Systems Integration issues

Realistic Threat Track numbers and kinematics



- Naval Aviation Distributed Training Center (NADTC) - Pacific
- NADTC West (Pt. Loma) - IOC SEP 2015
  - Maritime Focused
    - CPF/USFF-funded
  - Atsugi, K-Bay, NASNI, Pt. Mugu, Whidbey, Norfolk, Jacksonville, Mayport
    - MH-60R/S, E-2C/D, P-8
  - 183 events FY22, so far
- NADTC East (Oceana) – IOC ~2017
  - Strike Focused
    - PMA-205 funded
  - Iwakuni, Lemoore, Whidbey, Oceana, Norfolk
    - F/A-18C, F/A-18E/F, EA-18G, F-35C



# LVC Realities

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- Training/Tactical Mode at Sea configuration differences
  - Combat System Operating System Standards (CSOSS)
    - ie. Flight ops restricted to Case I, no RF or SINS alignment, etc.
- Limitations
  - Limited LOS comms / TDL with shore nodes
  - No stimulation for live aviation
  - CEC does not recognize synthetic targets
- Training quality varies by baseline capabilities
  - SSDS
    - Some radars can display fused live and synthetic inputs
    - CV-TSC not connected to GCCS or aircraft when in Training Mode
  - AEGIS
    - Radar stimulation for SPY-1 only (no SPS-67 or SPQ-9)
    - Dual tracks due to inability to fuse live and synthetic tracks



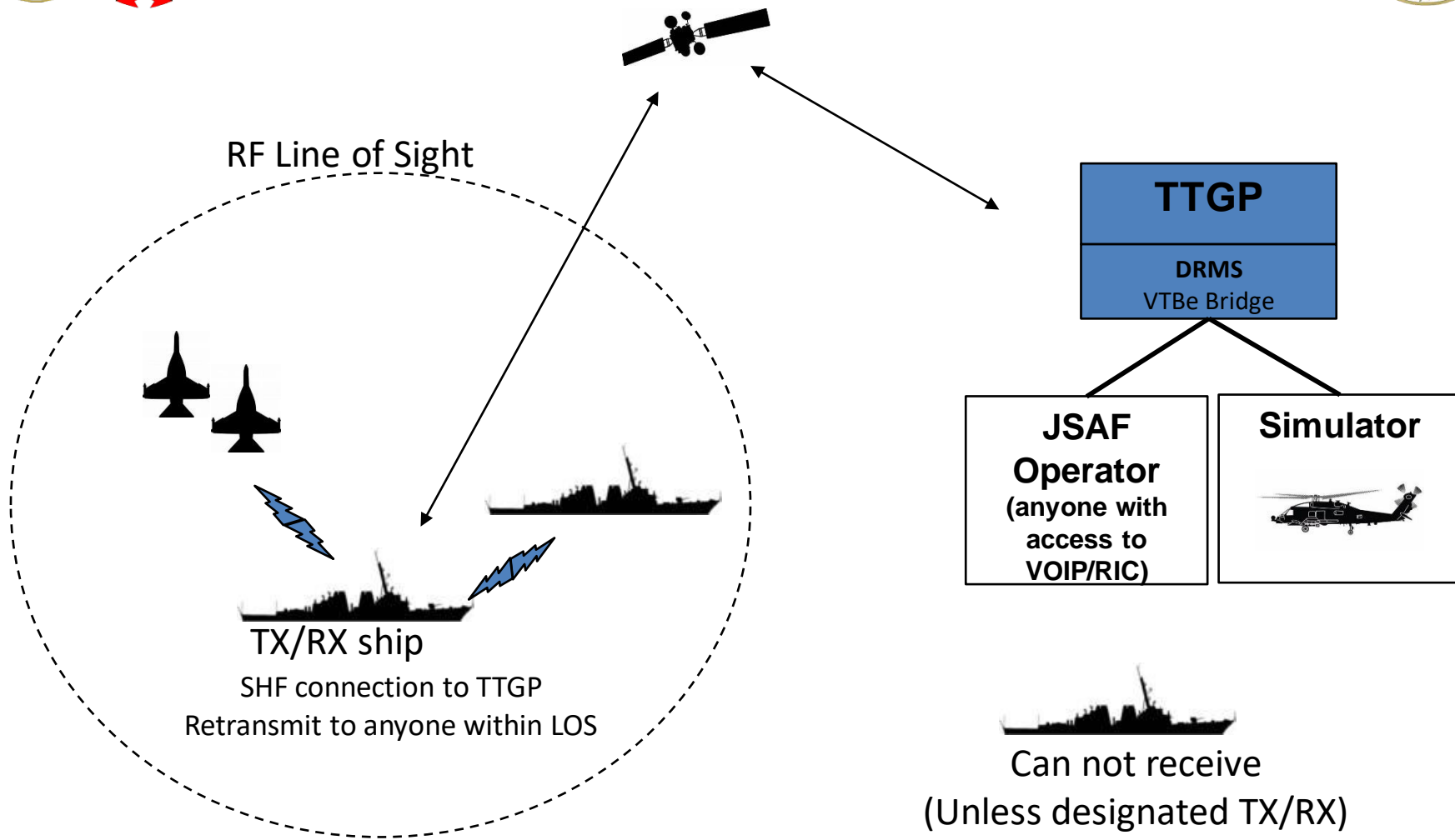
# VTBe Overview

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- VTBe allows LDTCC and Shore Simulators access to Strike Group UHF LOS RF comms via shipboard equipment (not capable on HF, SHF, or EHF)
  - Transparent to watchstanders
  - Not transparent to ship's comms personnel
- One ship is designated as the TX/RX for a circuit to allow TTGP access via VTBe
- VTBe functioned well during FST-GC/J (all ships)
  - Normal RF LOS issues
  - Normal shipboard equipment issues
    - Constant key, No TX, No RX, Crypto, etc.
  - Lack of understanding new architecture
- LDTCC will access EHF/UHF SATCOM ckts via DRMS
  - TTGP must be included on SAR (Satellite Access Request)



# Simple Architecture



**Never place two TX/RX ships on the same circuit within LOS of each other**

# LITL Overview

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- LITL Ground Station, located in LDTCC, converts scenario M&S into Link-16 messages
  - Produces AESA radar contacts and RWR indications
- FA-18 E/F and EA-18G only (No E-2/MH-60)
  - H12 (or higher OFP)
  - AESA radar
  - Requires unique JMPS file
  - Specific Link-16 Network (built by CSG-15 JICO)
- Operations within range of MIDS antenna
  - Nominally 120nm
- JSAF and NGTS Federation
  - Simultaneous and identical presentation to ships and aircraft
  - Up to 16 live aircraft and unlimited constructive entities
  - Real time or scripted maneuvers with recording capability



# ONR Support to fleet LVC



- **Naval Simulation Center Pacific (NSCPAC)**
  - Center of gravity for FST Research, Development, Testing, & Evaluation (RDT&E) and Fleet Warfighting Training Capability (FWTC) improvement
- **Replicate the ability to run FST-like events in RDT&E environment**
  - Enables incremental development from concept through operational capability while maintaining Information Assurance posture.
- **Develop and test prototype systems, experimental concepts, and future technologies**
  - FAC/FIAC SCAT Sim
  - ANTS2 Navigation Sim
  - RADAR Degradation Sim- DRFM
  - Comms Degradation Sim- Jamming & realistic LOS loss
  - GPS Degradation Sim- GPS/ AIS deception and spoofing
  - TLAM Sim
  - Environmental Modeling & Builder METOC tool integration
  - NCTEndo
  - Training Sonobouy- LVC sonobouy



**Naval Simulation Testing Center Pacific - Discovering, Developing & Demonstrating Training Solutions for the Warfighter**



# Improvements

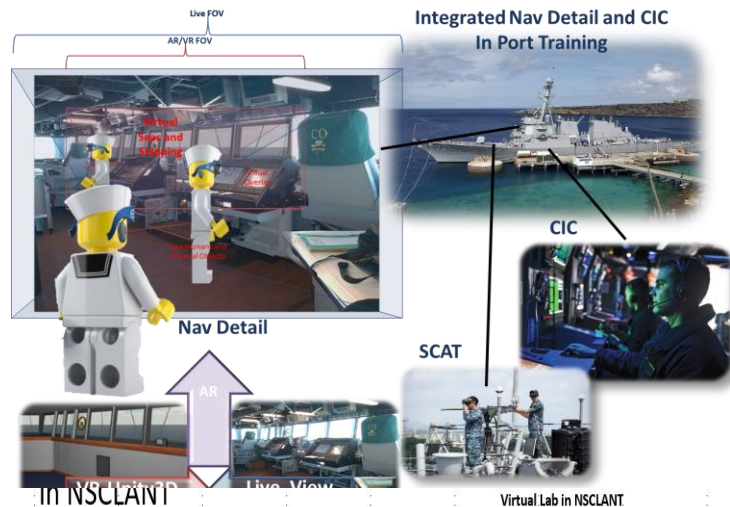
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- Enablers to achieve LVC Vision
  - NCTE architecture improvements
    - Fusing live and synthetic ranges
    - Networks and Cross Domain Solutions to enable IW stimulation
  - ONR Training Technology Initiatives
    - NCTEndo
      - Scenario on demand
      - Gaming technology
    - ASW Federated Sonobuoy
    - Augmented Reality FAC-FIAC
    - Complex Jamming
    - Distributed Open Ocean Mission Rehearsal (DOOMR)

# NSCPAC S&T Success

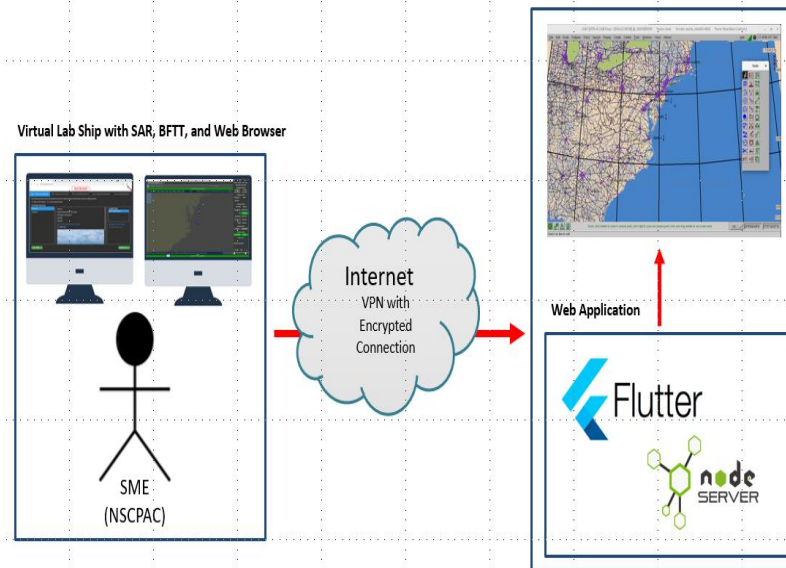
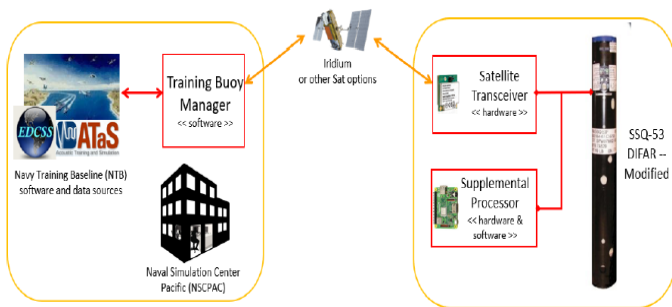


- ANTS2-FAC/FIAC
  - Integration of AR into shipboard spaces w/ shipboard embedded training systems
- NCTEndo
  - On demand LVC training; ships join from a game lobby just like Call of Duty
- Training Sonobuoy
  - Integrate “additive” sensor in water w/ LVC training architecture for ships and capable aircraft



## Training Sonobuoy Concept

Modify the SSQ-53G Directional Frequency Analysis and Recording (DIFAR) sonobuoy to receive V-C inputs from the shore-based training enterprise, and inject into live sensor feed





# Ender's Game



- TTGP was tapped by CSG-15 to increase CSG Commander and Warfare Commanders' knowledge of SAP capabilities and their application through a new FRTP event to invoke high volume learning in a HEFT environment. Through resident wargaming knowledge, TTGP leadership facilitated a highly successful tabletop exercise and Socratic seminar for CSG-11 Commander and Warfare Commanders. This will serve as the benchmark for pre-deployment, fully informed rehearsal.



Fully informed tabletop exercise in a HEFT environment



# Improvements

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- Requirements:
  - Create and facilitate new FRTP event in 6 months for CCSG-9
  - Learning Objectives: decision making and consequence management
- Participants:
  - CCSG-9 CDR, WCs, N2, N3, N9, Romeo, TTGP facilitators, CPF N7A, Space Cadre, and C3F SAP Manager
- Game Play and Mechanics:
  - 2 Sessions
    - A round: 24 hours planning, WC time, CUB, Red reaction, adjudication
  - Game board
    - Hexes, Blue/Red pucks, overlays
  - Efficiency Tools
    - Smart book (METOC, ROE, fuel/ordnance), Syndicate action cards, printed OPORDs, overhead projector, white boards, placards

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# Tactical Training Group Pacific



## QUESTIONS?

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# Tactical Training Group Pacific



*Backup*

# Definitions

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- Advanced Combat Direction System - ACDS
  - Is a centralized, automated C2 system, collecting and correlating combat information. It upgrades the NTDS for carriers and large-deck amphibious ships. Real people operating real equipment in the real environment (e.g. aircraft flying, ships underway). Live participants are expected to get training value.
- NATO Sea Sparrow - NSS
- Rolling Airframe Missile - RAM
  - is a small, lightweight, infrared homing surface-to-air missile
- Digital Radio Management System – DRMS
  - UHF LOS radio



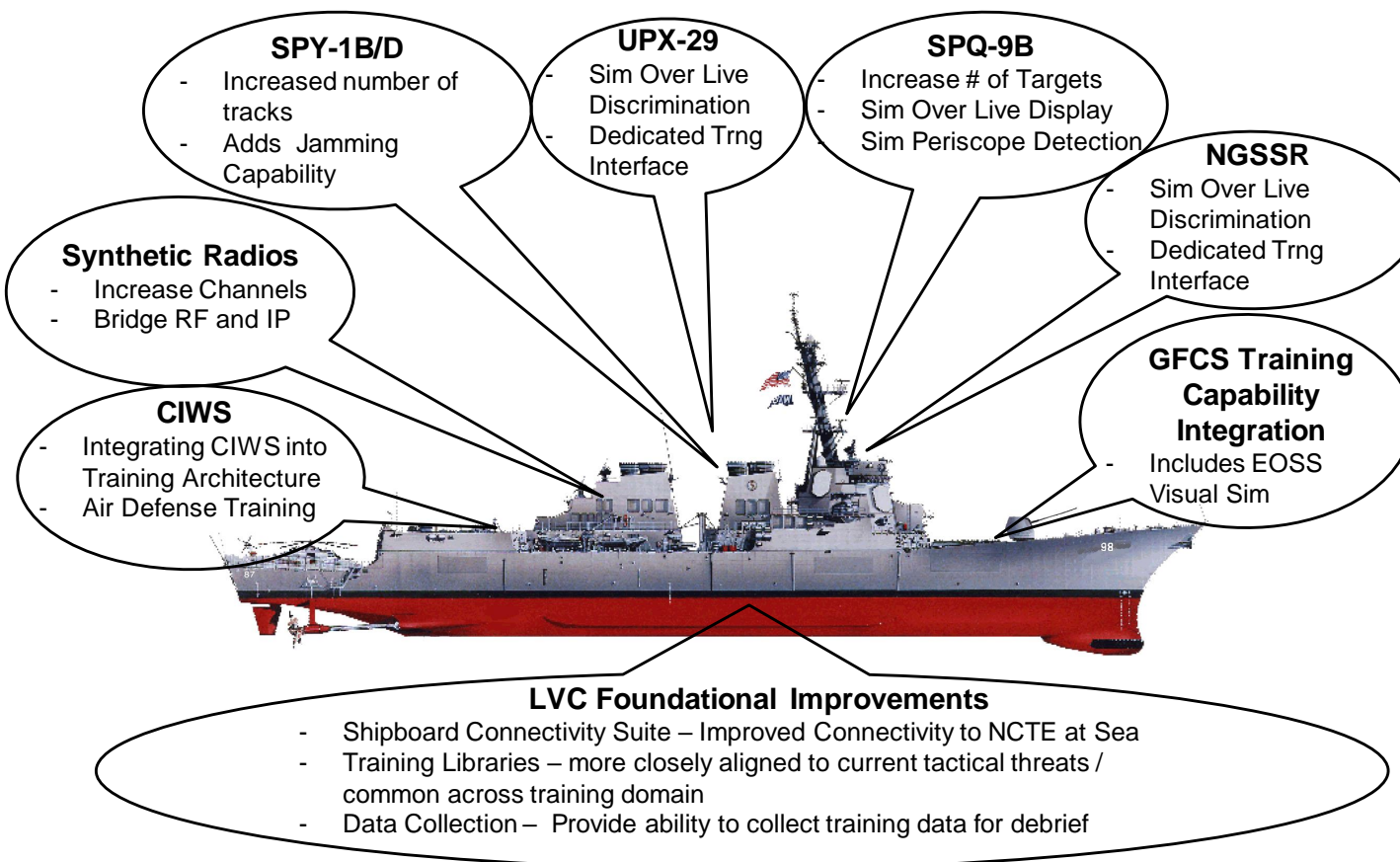
# History



- 2003-05 - Multiple Battle Group Inport Exercise (MBGIE) conducted
  - Predecessor to FST
- 2006-07 – Navy-wide Fleet Synthetic Training instruction signed and implemented as part of Carrier Strike Group training
- 2008 - BMD ships began conducting BMD FST at Sea (BFAS)
- 2013 – USFF/CPF signed LVC Training Capability Requirement
- 2015 – Fleet Training Integration Panel (FTIP) initiated Fleet Training Wholeness (FTW) attempting to identify way to train to the high end fight
  - Pursue budget items to improve training (\$4B) – provided some gains
- 2016 – USFF/CPF signed LVC Concept of Employment
- 2016 - present – CSG-4 and 15 incorporating LVC within underway training events for Carrier Strike Groups and Amphibious Ready Groups

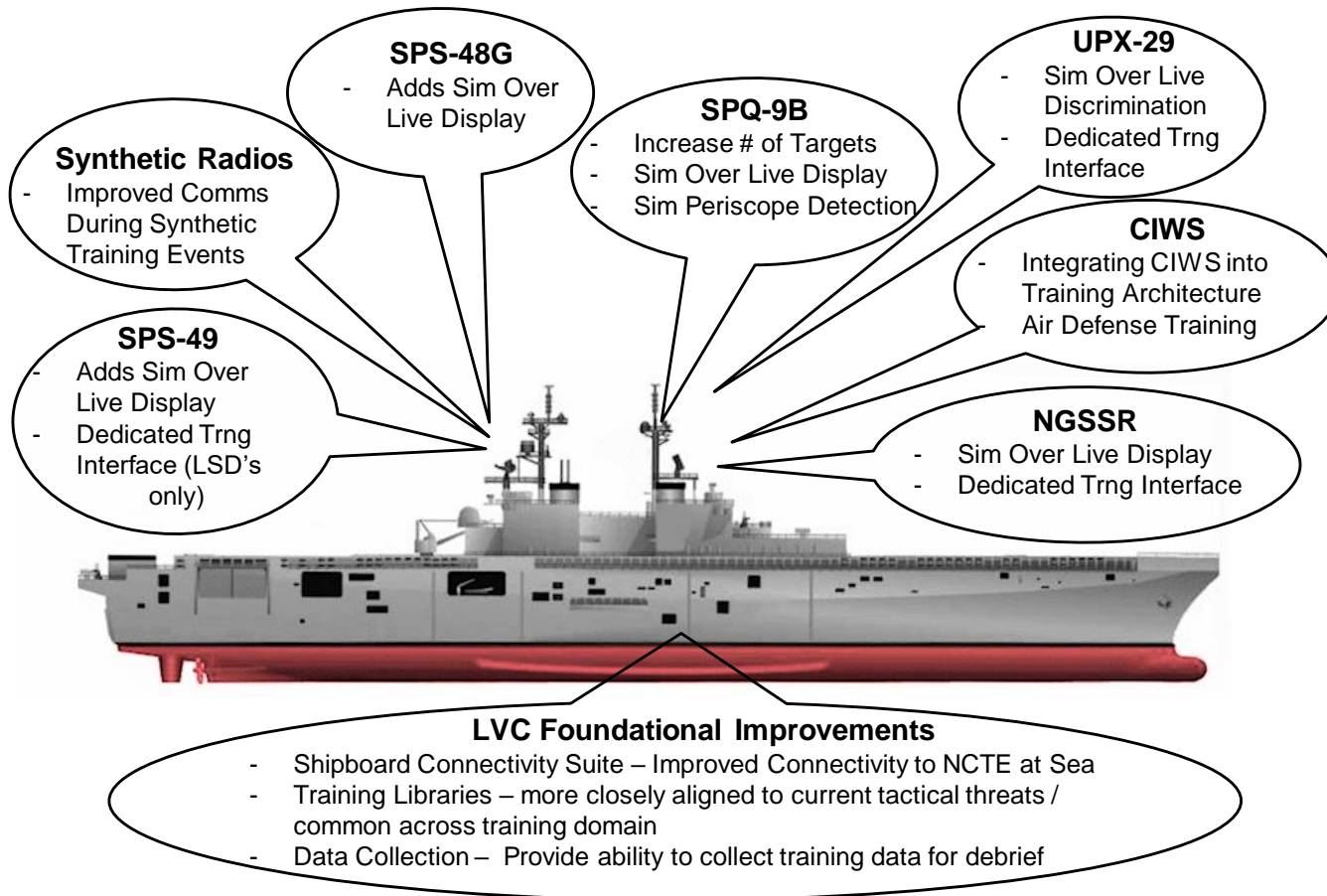
It took 10 years to fully implement FST, it will take just as long to implement LVC

# AEGIS LVC Improvements





# SSDS LVC Improvements

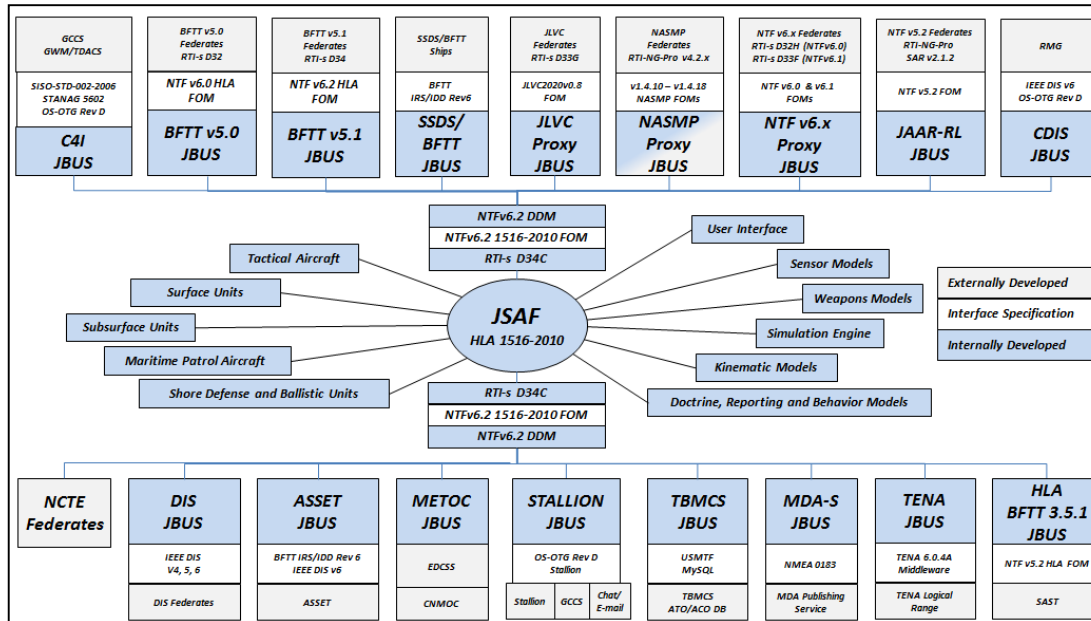




# NCTE Unique Components



- NETTN - Navy Enterprise Tactical Training Network
- NTB – Navy Training Baseline
  - Joint Semi-Automated Forces (JSAF)
  - Joint Simulation Bus (JBUS)
- DRMS - Digital Radio Management System



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