National Defense Industrial Association

War-Winning Capabilities…On Time, On Cost

Common Range Integrated Instrumentation System (CRIIS)

NDIA
NATIONAL DEFENSE INDUSTRIAL ASSOCIATION
HL
45th Annual Targets
UAVs and Range Division
Symposium

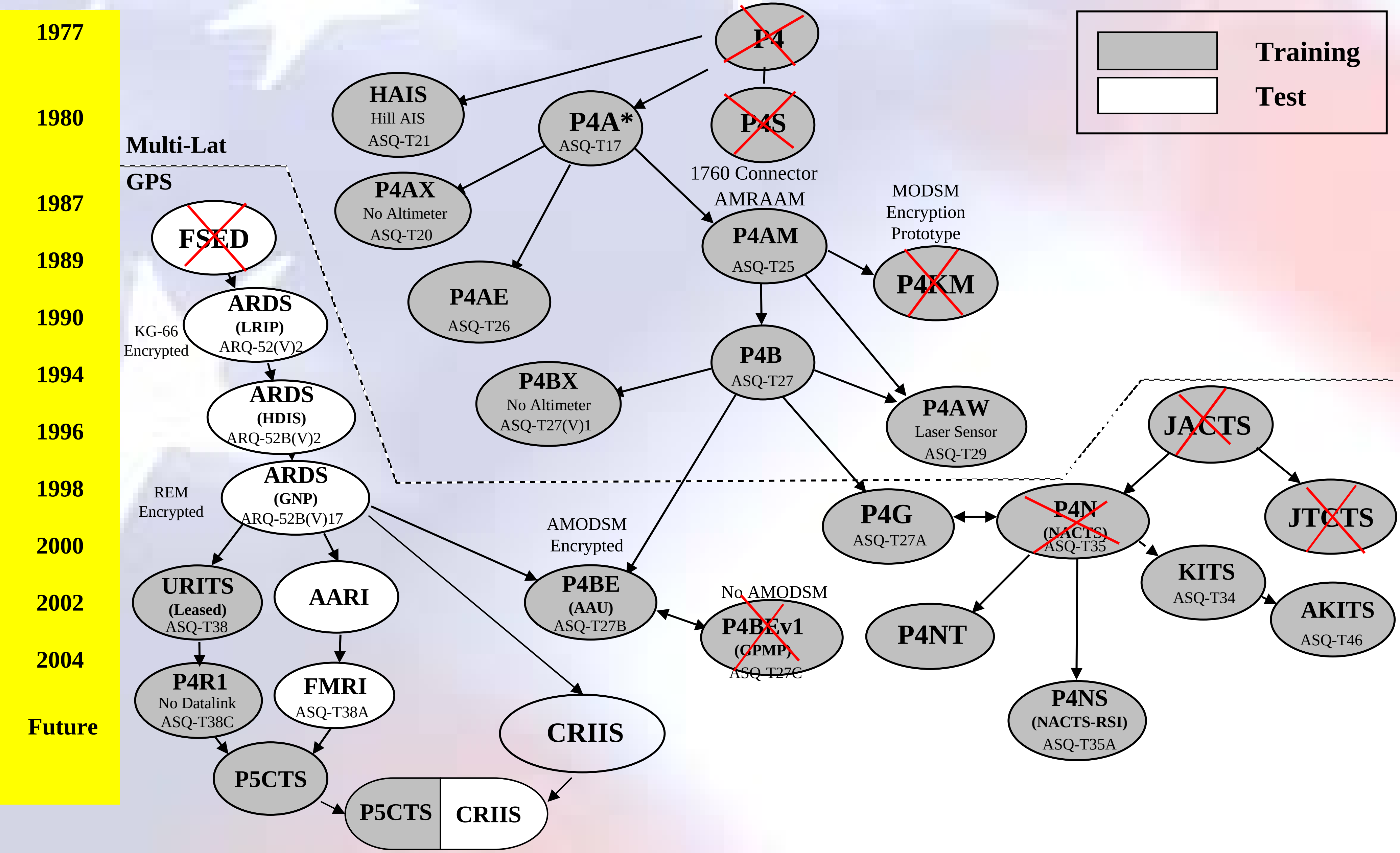
Mr. Mike Sorial
CRIIS Program Manager
850-883-3601
mike.sorial@eglin.af.mil

Distribution Statement A:

Approved for public release.
Distribution unlimited.

AAC/PA # 10-19-07-609

Evolution of Test and Training Instrumentation



▨ Training
☐ Test

1977
1980
1987
1989
1990
1994
1996
1998
2000
2002
2004
Future

Multi-Lat

GPS

~~**P4**~~

~~**P4S**~~

HAIS
Hill AIS
ASQ-T21

P4A*
ASQ-T17

P4AX
No Altimeter
ASQ-T20

P4AE
ASQ-T26

1760 Connector
AMRAAM

P4AM
ASQ-T25

MODSM
Encryption
Prototype

~~**P4XM**~~

P4B
ASQ-T27

P4BX
No Altimeter
ASQ-T27(V)1

P4AW
Laser Sensor
ASQ-T29

~~**FSED**~~

ARDS
(LRIP)
ARQ-52(V)2

KG-66
Encrypted

ARDS
(HDIS)
ARQ-52B(V)2

ARDS
(GNP)
ARQ-52B(V)17

REM
Encrypted

~~**JACTS**~~

~~**JTCTS**~~

P4G
ASQ-T27A

~~**P4N**~~
~~**(NACTS)**~~
ASQ-T35

KITS
ASQ-T34

AKITS
ASQ-T46

P4NT

P4NS
(NACTS-RSI)
ASQ-T35A

AMODSM
Encrypted

P4BE
(AAU)
ASQ-T27B

No AMODSM

~~**P4BEv1**~~
~~**(GPMP)**~~
~~ASQ-T27C~~

URITS
(Leased)
ASQ-T38

AARI

P4R1
No Datalink
ASQ-T38C

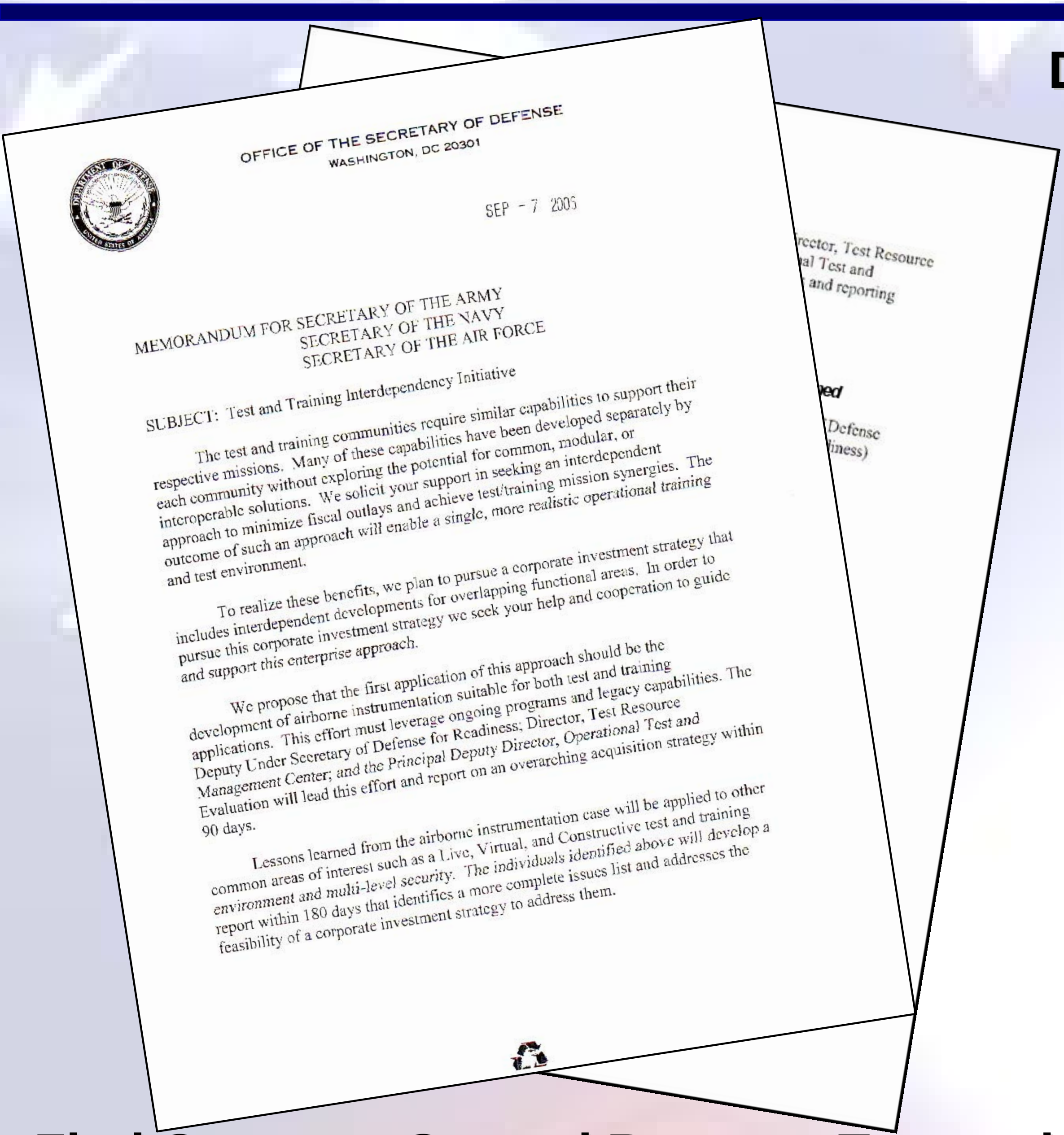
FMRI
ASQ-T38A

CRIIS

P5CTS

P5CTS **CRIIS**

Memos, Memos Everywhere



OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, DC 20301

SEP - 7 2006

MEMORANDUM FOR SECRETARY OF THE ARMY
SECRETARY OF THE NAVY
SECRETARY OF THE AIR FORCE

SUBJECT: Test and Training Interdependency Initiative

The test and training communities require similar capabilities to support their respective missions. Many of these capabilities have been developed separately by each community without exploring the potential for common, modular, or interoperable solutions. We solicit your support in seeking an interdependent approach to minimize fiscal outlays and achieve test/training mission synergies. The outcome of such an approach will enable a single, more realistic operational training and test environment.

To realize these benefits, we plan to pursue a corporate investment strategy that includes interdependent developments for overlapping functional areas. In order to pursue this corporate investment strategy we seek your help and cooperation to guide and support this enterprise approach.

We propose that the first application of this approach should be the development of airborne instrumentation suitable for both test and training applications. This effort must leverage ongoing programs and legacy capabilities. The Deputy Under Secretary of Defense for Readiness; Director, Test Resource Management Center; and the Principal Deputy Director, Operational Test and Evaluation will lead this effort and report on an overarching acquisition strategy within 90 days.

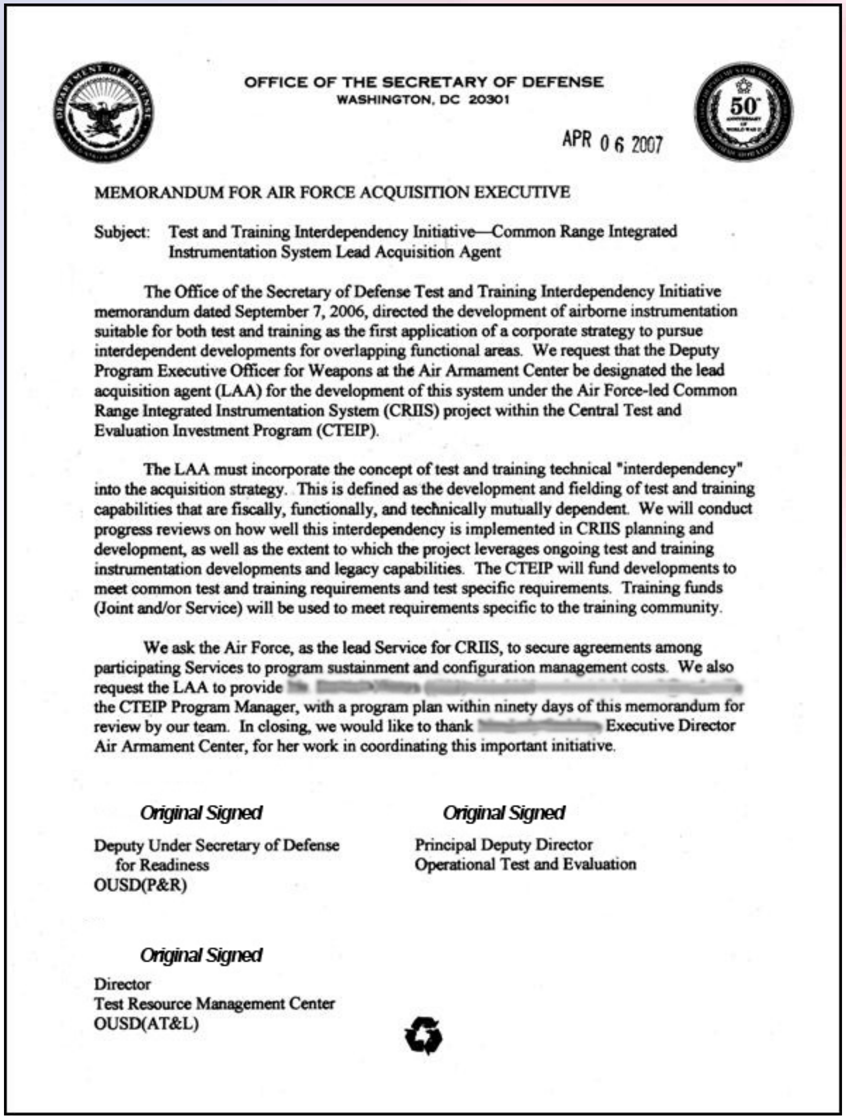
Lessons learned from the airborne instrumentation case will be applied to other common areas of interest such as a Live, Virtual, and Constructive test and training environment and multi-level security. The individuals identified above will develop a report within 180 days that identifies a more complete issues list and addresses the feasibility of a corporate investment strategy to address them.

rector, Test Resource
al Test and
and reporting

ned

Defense
iness)

Direction To Proceed with CRIIS



OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, DC 20301

APR 06 2007

MEMORANDUM FOR AIR FORCE ACQUISITION EXECUTIVE

Subject: Test and Training Interdependency Initiative—Common Range Integrated Instrumentation System Lead Acquisition Agent

The Office of the Secretary of Defense Test and Training Interdependency Initiative memorandum dated September 7, 2006, directed the development of airborne instrumentation suitable for both test and training as the first application of a corporate strategy to pursue interdependent developments for overlapping functional areas. We request that the Deputy Program Executive Officer for Weapons at the Air Armament Center be designated the lead acquisition agent (LAA) for the development of this system under the Air Force-led Common Range Integrated Instrumentation System (CRIIS) project within the Central Test and Evaluation Investment Program (CTEIP).

The LAA must incorporate the concept of test and training technical "interdependency" into the acquisition strategy. This is defined as the development and fielding of test and training capabilities that are fiscally, functionally, and technically mutually dependent. We will conduct progress reviews on how well this interdependency is implemented in CRIIS planning and development, as well as the extent to which the project leverages ongoing test and training instrumentation developments and legacy capabilities. The CTEIP will fund developments to meet common test and training requirements and test specific requirements. Training funds (Joint and/or Service) will be used to meet requirements specific to the training community.

We ask the Air Force, as the lead Service for CRIIS, to secure agreements among participating Services to program sustainment and configuration management costs. We also request the LAA to provide [redacted] the CTEIP Program Manager, with a program plan within ninety days of this memorandum for review by our team. In closing, we would like to thank [redacted] Executive Director Air Armament Center, for her work in coordinating this important initiative.

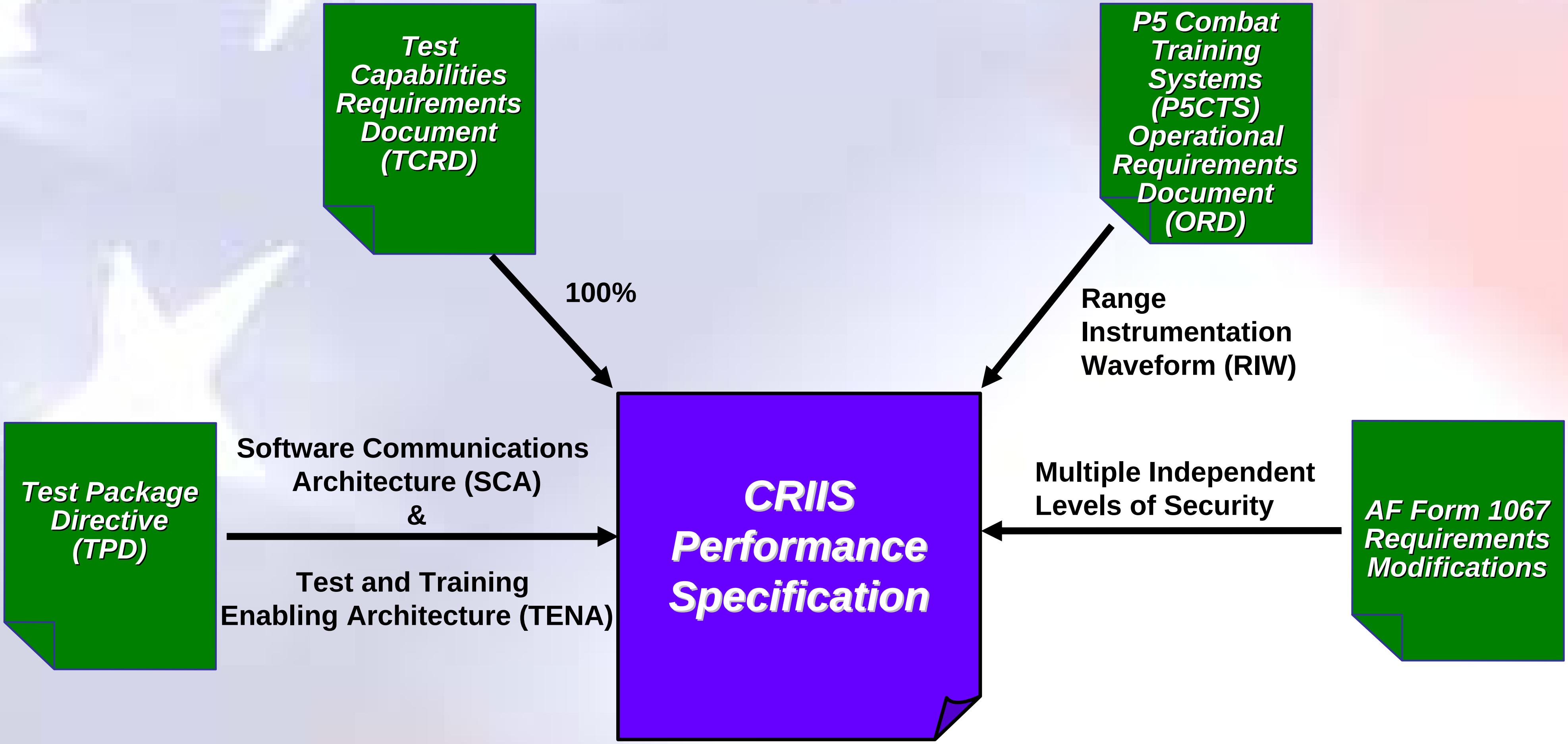
Original Signed
Deputy Under Secretary of Defense
for Readiness
OUSD(P&R)

Original Signed
Principal Deputy Director
Operational Test and Evaluation

Original Signed
Director
Test Resource Management Center
OUSD(AT&L)

Find Common Ground Between Test and Training Instrumentation

Requirements Relationships



Test Capabilities Requirements Document (TCRD)

100%

P5 Combat Training Systems (P5CTS) Operational Requirements Document (ORD)

Range Instrumentation Waveform (RIW)

Test Package Directive (TPD)

Software Communications Architecture (SCA)
&
Test and Training Enabling Architecture (TENA)

CRIIS Performance Specification

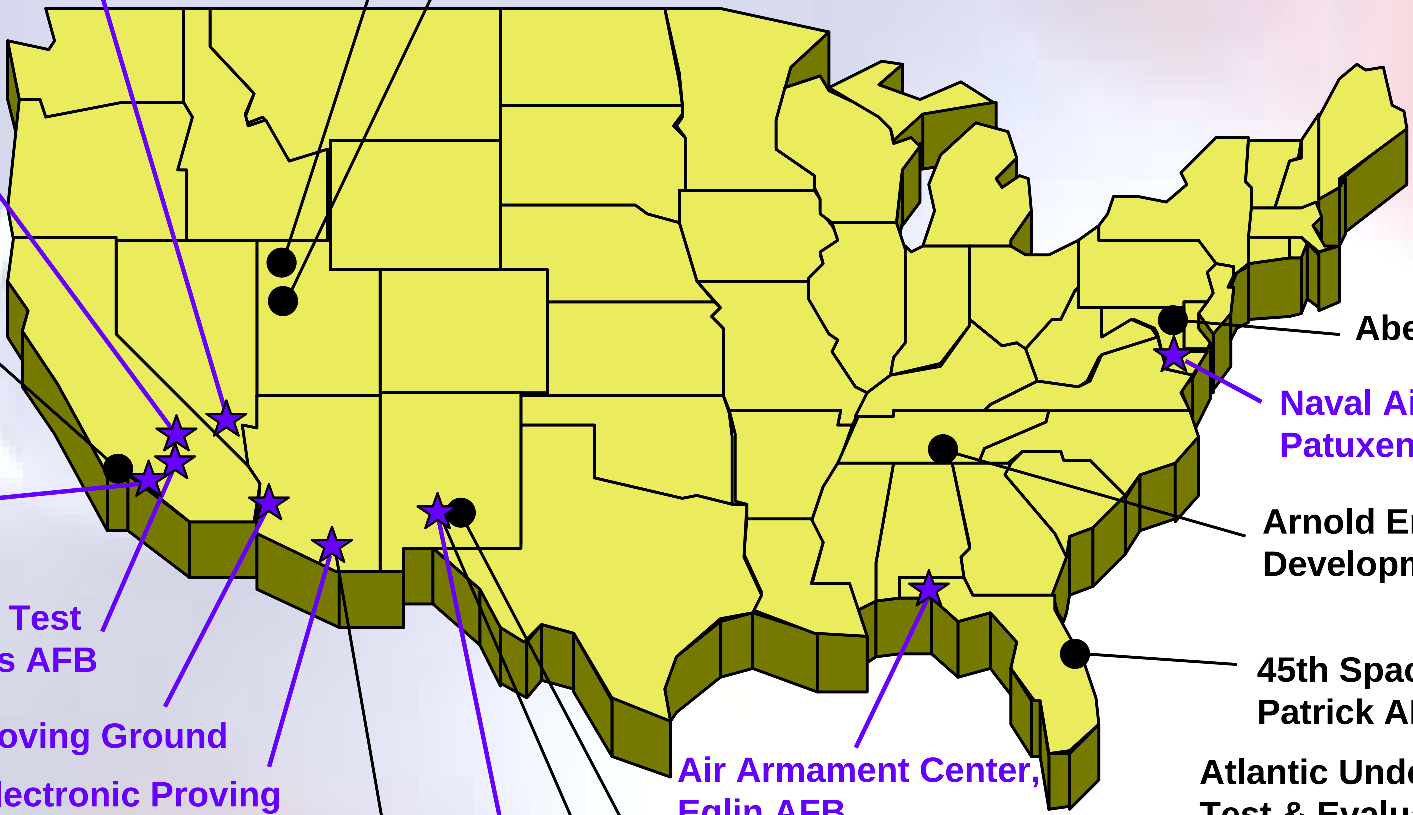
Multiple Independent Levels of Security

AF Form 1067 Requirements Modifications

Managed by Requirements Control Working Group

Major Range and Test Facility Base (MRTFB) and Initial Beddown Location

★ - Purple Text Denotes Beddown Locations



Air Force Air Warfare Center, Nellis AFB

Utah Test & Training Range

Dugway Proving Ground

Naval Air Warfare Center, China Lake

30th Space Wing, Vandenberg AFB

Naval Air Warfare Center, Point Mugu

Air Force Flight Test Center, Edwards AFB

Yuma Proving Ground

Electronic Proving Ground, Ft. Huachuca

Joint Interoperability Test Command

Kwajalein Missile Range

White Sands Missile Range

High Energy Laser System Test Facility

46th Test Group, Holloman AFB

Air Armament Center, Eglin AFB

Aberdeen Test Center

Naval Air Warfare Center-Patuxent River

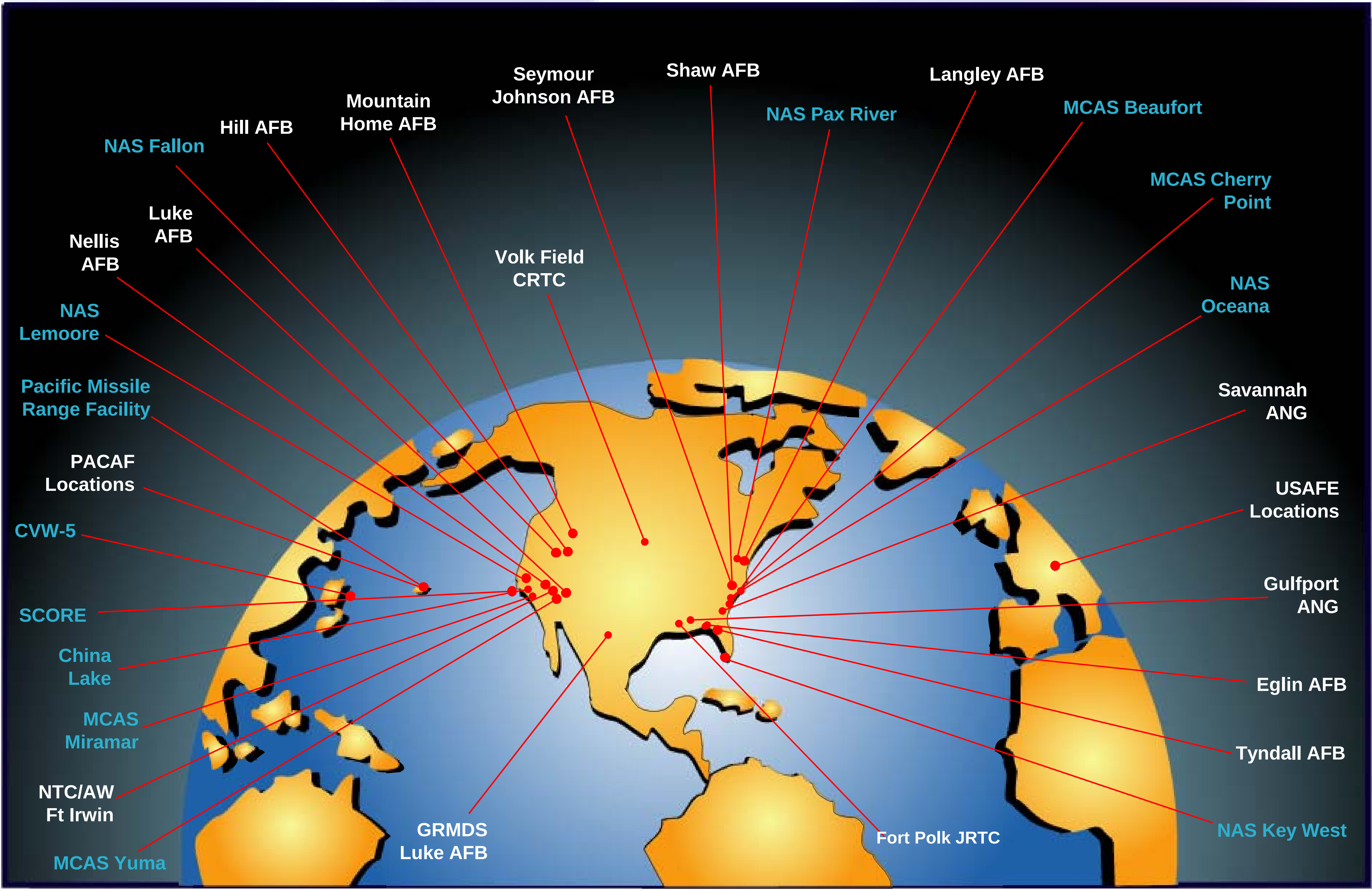
Arnold Engineering Development Center

45th Space Wing, Patrick AFB

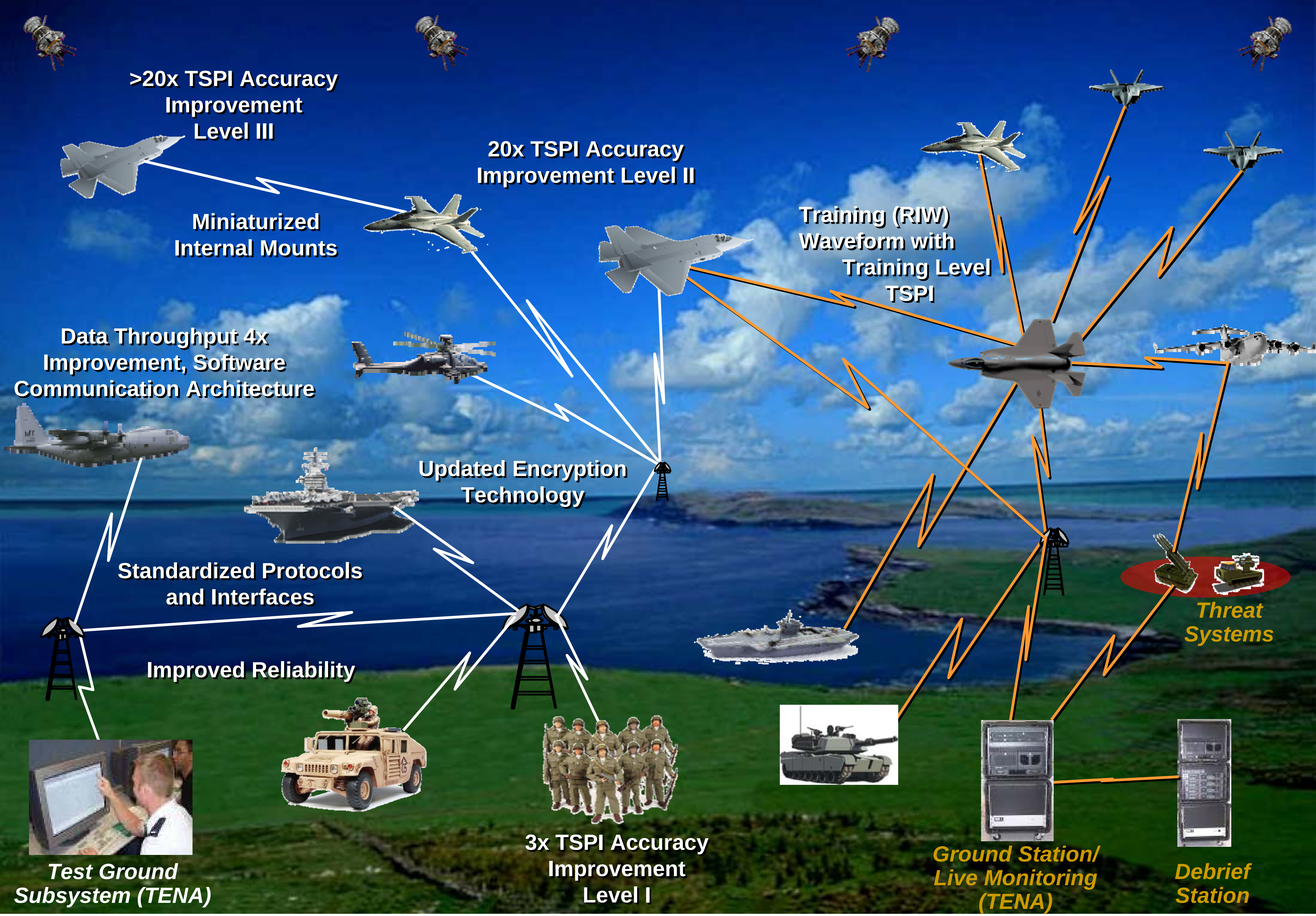
Atlantic Undersea Test & Evaluation Center

Atlantic Fleet Weapons Training Facility

Where We Train Today


Seymour Johnson AFB
Shaw AFB
Langley AFB
Mountain Home AFB
NAS Pax River
MCAS Beaufort
Hill AFB
NAS Fallon
MCAS Cherry Point
Luke AFB
Nellis AFB
Volk Field CRTC
NAS Oceana
NAS Lemoore
Pacific Missile Range Facility
Savannah ANG
PACAF Locations
USAFE Locations
CVW-5
Gulfport ANG
SCORE
China Lake
Eglin AFB
MCAS Miramar
Tyndall AFB
NTC/AW Ft Irwin
GRMDS Luke AFB
Fort Polk JRTC
NAS Key West
MCAS Yuma

Common Range Integrated Instrumentation System



>20x TSPI Accuracy Improvement Level III

20x TSPI Accuracy Improvement Level II

Miniaturized Internal Mounts

Training (RIW) Waveform with Training Level TSPI

Data Throughput 4x Improvement, Software Communication Architecture

Updated Encryption Technology

Standardized Protocols and Interfaces

Threat Systems

Improved Reliability

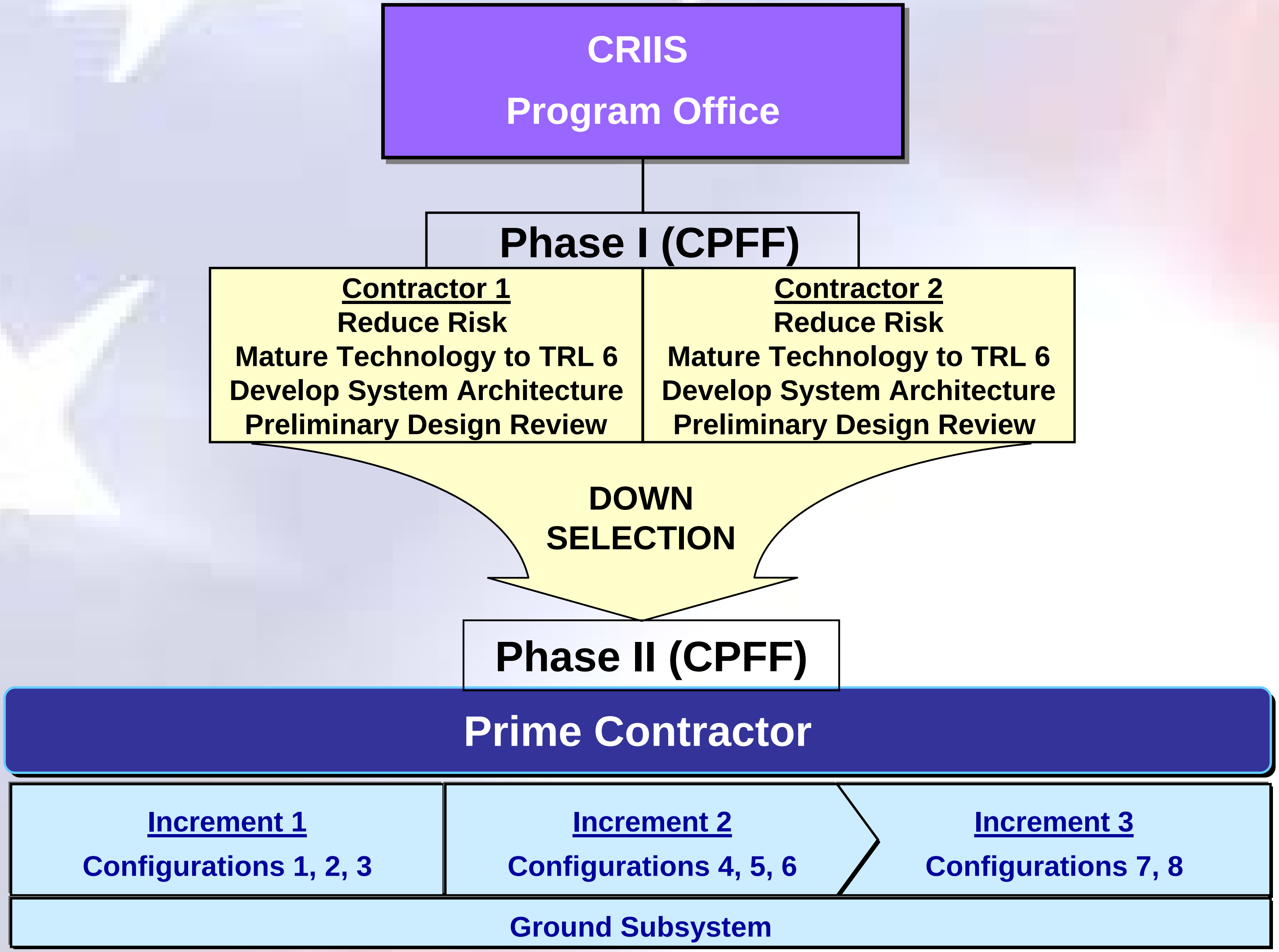
Test Ground Subsystem (TENA)

3x TSPI Accuracy Improvement Level I

Ground Station/ Live Monitoring (TENA)

Debrief Station

Program Acquisition Approach



CRIIS

Program Office

Phase I (CPFF)

Contractor 1
Reduce Risk
Mature Technology to TRL 6
Develop System Architecture
Preliminary Design Review

Contractor 2
Reduce Risk
Mature Technology to TRL 6
Develop System Architecture
Preliminary Design Review

DOWN SELECTION

Phase II (CPFF)

Prime Contractor

Increment 1
Configurations 1, 2, 3

Increment 2
Configurations 4, 5, 6

Increment 3
Configurations 7, 8

Ground Subsystem

CRIIS Increments & Configurations

Training and Test

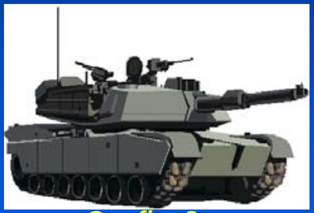
INCREMENT 1

Configurations 1, 2, 3

Config. 1
Dismounted Soldier

Level IA TSPI

Short Range DL

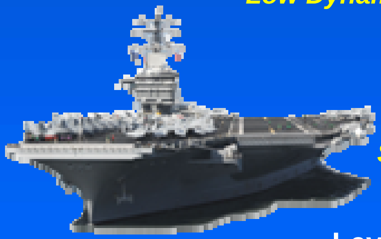


Config. 2
Low Dynamic Vehicles

Level IB TSPI

Mid Range DL

Encryption



Config. 3
Ship-to-Shore

Level IB TSPI

Extended Range DL

INCREMENT 2

Configurations 4, 5, 6

Level II TSPI

High Throughput DL

Encryption

SN 003
SN 003

Config. 4 Pod

Config. 5 Moderate Accuracy
Multi-Package Internal Mount

Config. 6 Moderate Accuracy
Single Package Internal Mount

RIW/Training Hooks

INCREMENT 3

Configurations 7, 8

Config. 7 High Accuracy
Multiple-Package Internal Mount

Level III TSPI

High Throughput DL

Encryption

Config. 8 High Accuracy
Single Package Internal Mount

Ground Subsystem (GS)

Architecture Approach

TSPI Building Blocks

- Level I A
- Level I B
- Level II
- Level III

Absolute Mode

DATALINK Building Blocks

- Short Range
- Mid Range
- Extended Range
- High Throughput

OTHER Building Blocks

- Encryption Device
- Recorders
- Participant Interface Controller
- Other Training Hooks (RTKN, Weapon Sims)

RIW

Common Framework

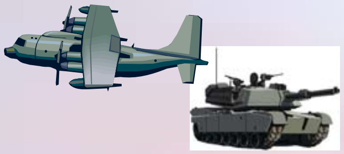
- Mechanical Interface
- Electrical Interface
- Data Formats & Protocols

Dismounted Soldier
Configuration #1

COMMON FRAMEWORK
- Level I A
- Short Range
- Recorders
- Participant Interface Controller

Low-Dynamic Vehicle
Configuration #2

COMMON FRAMEWORK
- Level I B
- Mid Range
- Encryption Device
- Recorders
- Participant Interface Controller



Ship-to-Shore
Configuration #3

COMMON FRAMEWORK
- Level I B
- Extended Range
- Recorders
- Participant Interface Controller

Moderate Accuracy
Configuration #4: POD
Configuration #5: 2-box IM
Configuration #6: 1-box IM

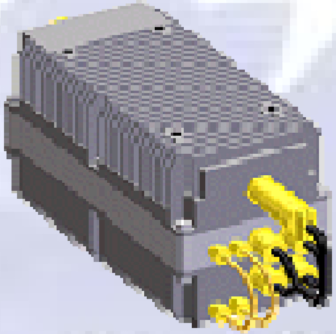
COMMON FRAMEWORK
- Level II (Absolute Mode)
- High Throughput (RIW)
- Encryption Device (RIW)
- Recorders
- Participant Interface Controller (RIW)
- Other Training Hooks (RTKN, Weapon Sims)

High Accuracy
Configuration #7: 2-box IM
Configuration #8: 1-box IM

COMMON FRAMEWORK
- Level III
- High Throughput
- Encryption Device
- Recorders
- Participant Interface Controller

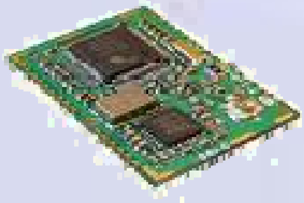
Ground Subsystem

Key Technologies



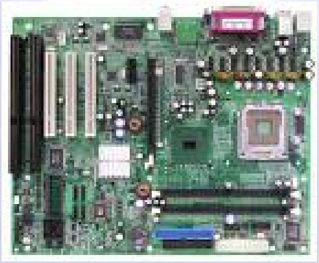
Datalink

Antenna



GPS Receiver Module

Recording Device



Participant Interface Unit

Inertial Measurement Unit

Encryption Device

Antenna

Ground Subsystem

Key Working Groups

Test & Training Enabling Architecture (TENA)

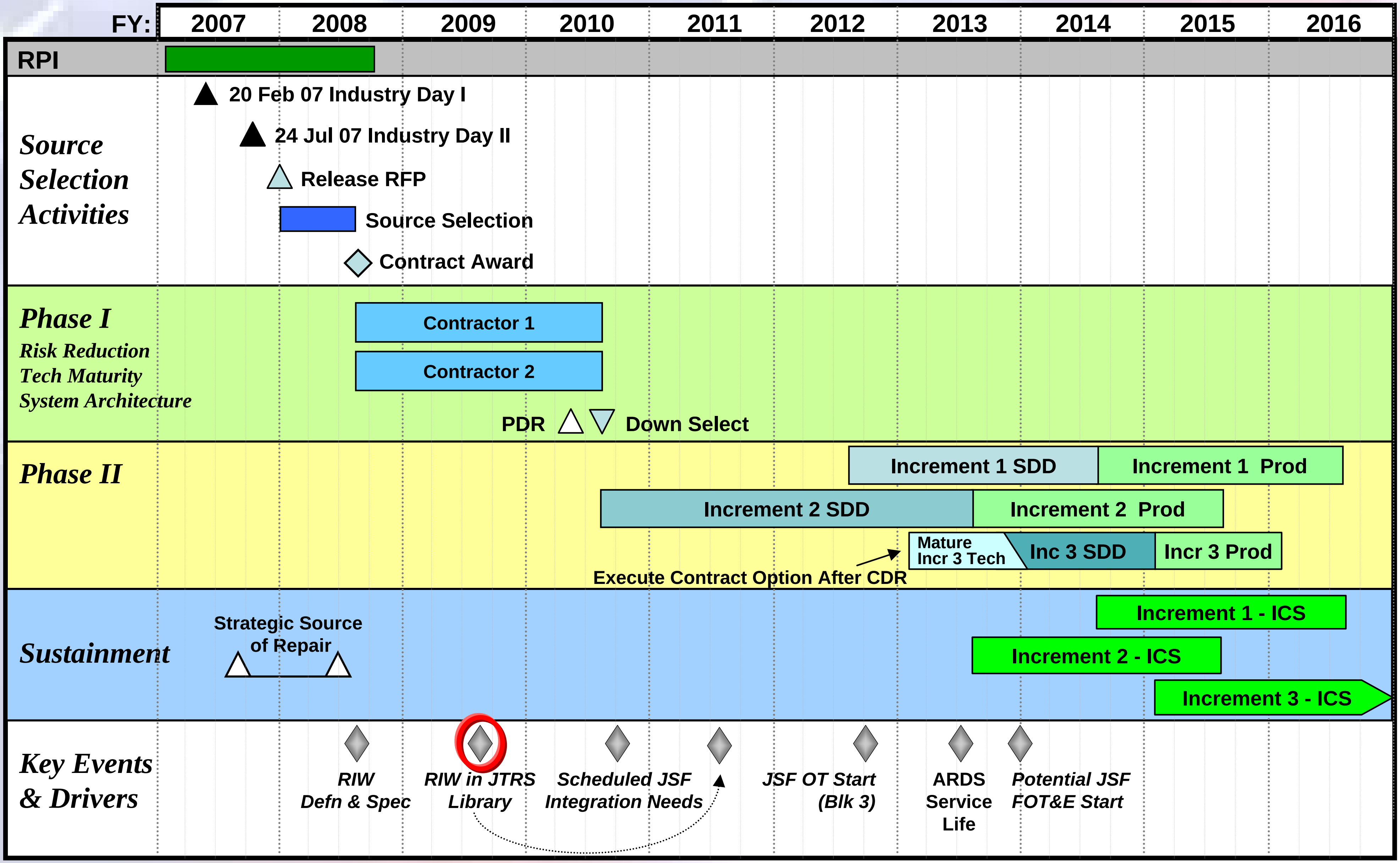
Integrated Test Team

System Security

Joint Tactical Radio System (JTRS)

Frequency Allocation

CRIIS Program Schedule



FY: 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

RPI

Source Selection Activities

- 20 Feb 07 Industry Day I
- 24 Jul 07 Industry Day II
- Release RFP
- Source Selection
- Contract Award

Phase I
Risk Reduction
Tech Maturity
System Architecture

- Contractor 1
- Contractor 2
- PDR
- Down Select

Phase II

- Increment 1 SDD
- Increment 1 Prod
- Increment 2 SDD
- Increment 2 Prod
- Mature Incr 3 Tech
- Inc 3 SDD
- Incr 3 Prod
- Execute Contract Option After CDR

Sustainment

- Strategic Source of Repair
- Increment 1 - ICS
- Increment 2 - ICS
- Increment 3 - ICS

Key Events & Drivers

- *RIW Defn & Spec*
- *RIW in JTRS Library*
- *Scheduled JSF Integration Needs*
- *JSF OT Start (Blk 3)*
- ARDS Service Life
- *Potential JSF FOT&E Start*

Test & Training Approach

Phase II

INCREMENT 2

Configurations 4, 5, 6

Level II TSPI

High Throughput DL

Encryption

SN 003
SN 003

Config. 4 Pod

Config. 5 Moderate Accuracy
Multi-Package Internal Mount

Config. 6 Moderate Accuracy
Single Package Internal Mount

MILS

Basic CRIIS System

+

"The Hooks"

Participant Interface Controller (PIC) Delta

DLT RIW Capable

PORT RIW

TSPI

Training Debrief

Enables Testing (OT/FDE/TDE) in a Training Environment
"Interoperability"

Summary

- **Maturing Technology Readiness**
- **Lowering Integration Risks**
- **Maximizing Open Architecture for Future Growth**
- **Interoperability with Training Achieved Through Datalink**