ADVANCED TRAINING CAPABILITIES DIVISION

DELIVERING THE SKILL TO KILL

Simulator Common Architecture and Requirements (SCARS)

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Agenda

- Background
- Overview
- Simulator Common Architecture Requirements and Standards (SCARS) Key Components
- Three Phased Approach
- SCARS Standards
- SCARS Applications
- What Industry Can Do for SCARS

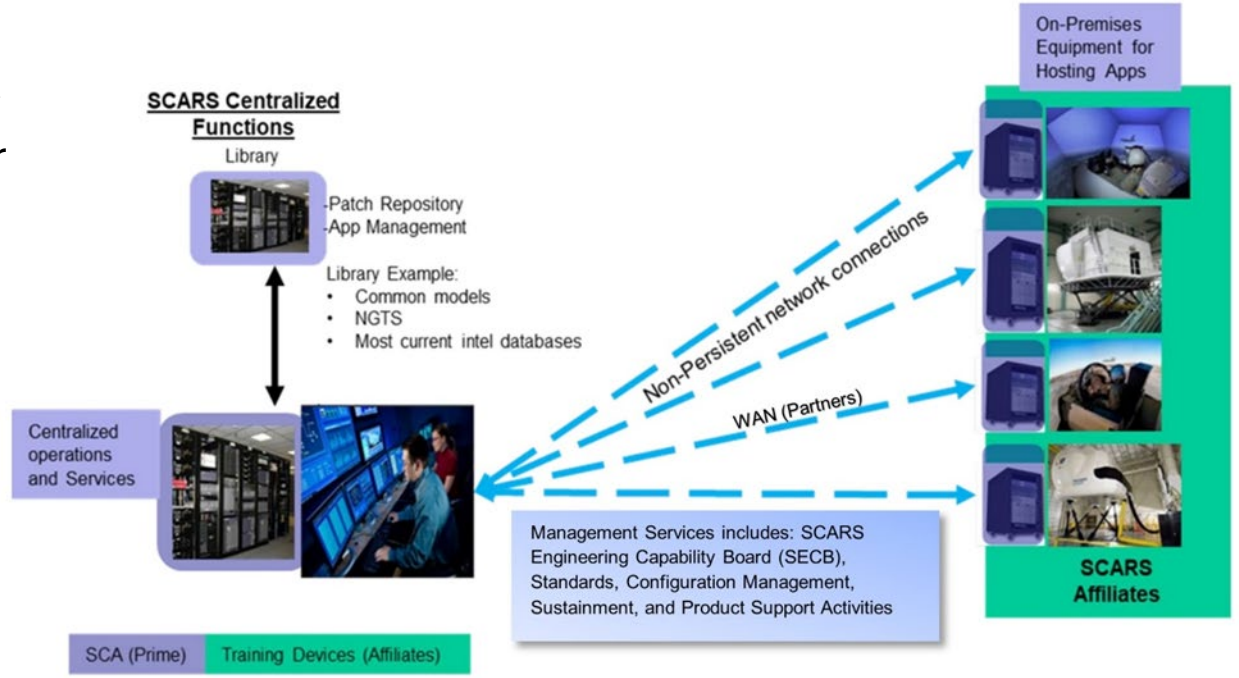
Background – USAF OTI Problem Statement

- Large base of training devices with disparate configurations – very limited reuse
  - Over 2400 training devices (50+ platforms) supporting 9 MAJCOMs
  - Uniqueness of devices requires costly unique development, production and support
- Cyber threats are continuous, evolving, & increasing in frequency and severity
  - AF Training Systems must comply with DoD Risk Management Framework (RMF)
  - Implementing RMF is costly to sustain (scans) and implement changes (patches)
- Demand on training systems is increasing – higher fidelity and greater interoperability
  - Training effectiveness is limited by the lack of standards and common architectures within the training device

New Approaches are Necessary to Efficiently Move Forward and Support the Warfighter

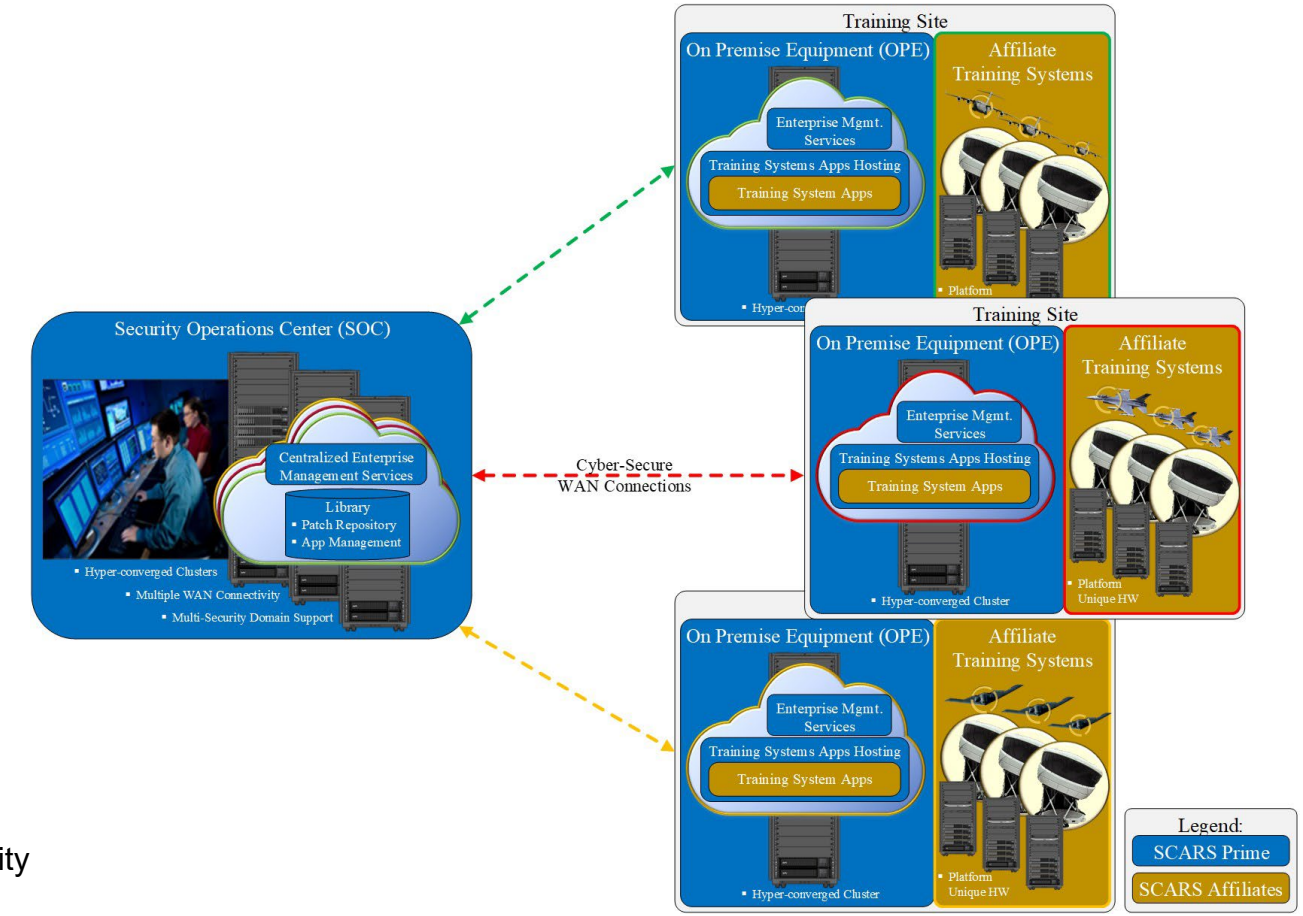
Overview

- Program Sponsor: HAF/A35
- Supported MAJCOMs: ACC, AFGSC, AFRC, AFSOC, AMC, PACAF, USAFE
- Purpose: SCARS is a sustainment initiative to incrementally establish a Modular Open Systems Approach (MOSA) for Air Force simulators that leverages applications, supports efficient and rapid updates to capabilities, evolves with cybersecurity threats and controls, and minimizes life cycle costs.
- Acquisition pathway: Sustainment Initiative
- Prime vendor: CAE USA
- Contract attributes: IDIQ
  - 5-yr base ordering period (2020-2025) + 5 1-yr options (2025-2030)

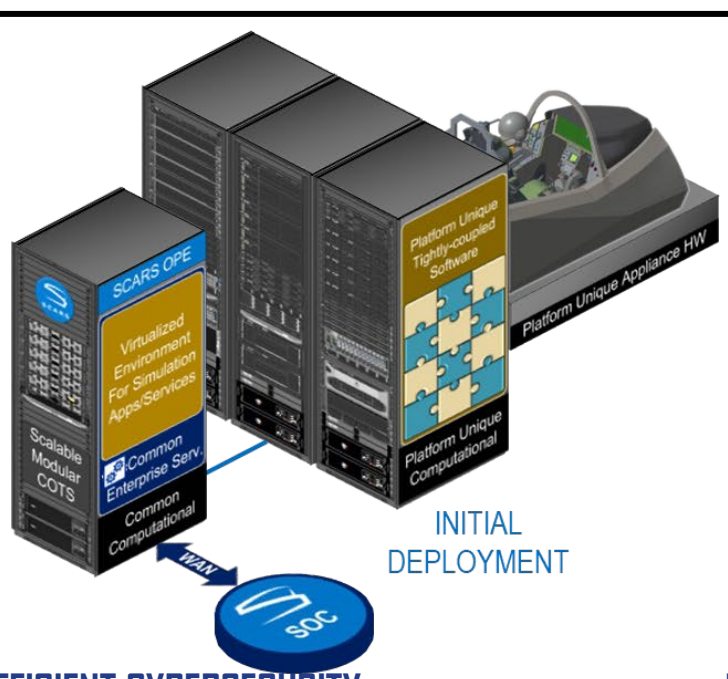


SCARS Key Components

- Security Operations Center (SOC)
  - Remote management of OPE and SCARS WAN
  - Dashboard for central management and enterprise view
  - SCARS Help Desk
  - SCARS Library
- Wide Area Network (WAN)
  - Utilizing existing partner networks, if available
  - SCARS WAN
- On-Premise Equipment (OPE)
  - Local cloud for hosting simulation applications
  - Scalable
  - Common security controls
  - Works with any WAN
- Training Systems with approved ATOs
  - No ATO, no SCARS
  - Must implement SCARS Basic OPE Integration and Common Security
- SCARS Standards
  - Key to establishing common architecture



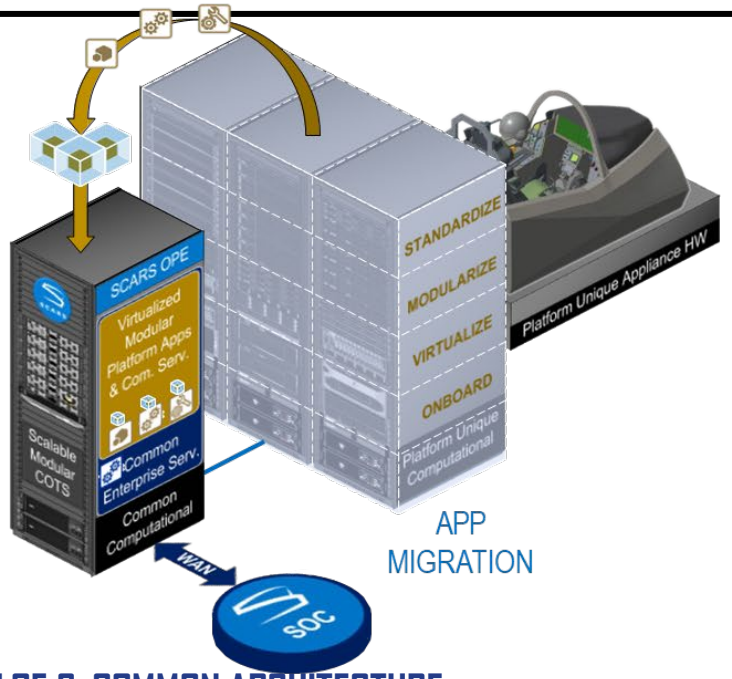
Three Lines of Effort



LOE 1: EFFICIENT CYBERSECURITY

- Provide centralized cyber-maintenance for vulnerability scans, patches, anti-virus, & enterprise-wide RMF controls
- Common Cyber Tools
- Centralized Scanning/Patching of trainer devices

WARFIGHTER BENEFIT: *Significantly reduced trainings system down time for maintenance and faster ATOs*



LOE 2: COMMON ARCHITECTURE

- Majority of functionality for training systems moved to a common infrastructure
- New technologies support a complete migration to cloud/virtual computing
- Common modeling and interfaces
- Virtualize software that is not hardware dependent

WARFIGHTER BENEFIT: *Reliability improved, minimized maintenance, and reduced cost of functional improvements*

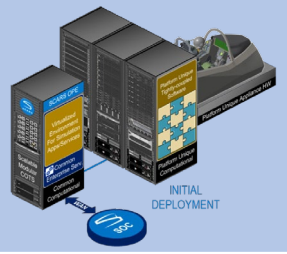
LOE 3: STANDARD APPLICATIONS

- Training systems embrace common applications
- Common infrastructure for application hosting
- Only software that can't be virtualized is trainer specific
- Extensive Common Models

WARFIGHTER BENEFIT: *Application re-use across platforms and consistent performance enhances "fair fight"*

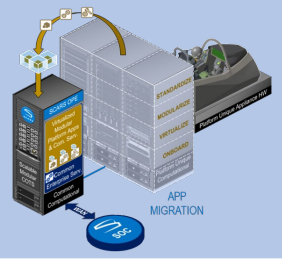
Lines of Effort

LoE 1: EFFICIENT CYBERSECURITY



	FY25	FY26 Q1	FY26 Q2	FY26 Q3	FY26 Q4	FY27	FY28
KC-135	▲						△
C-5	▲		△				
F-22						△	△
F-16				△	△		

LoE 2: COMMON ARCHITECTURE



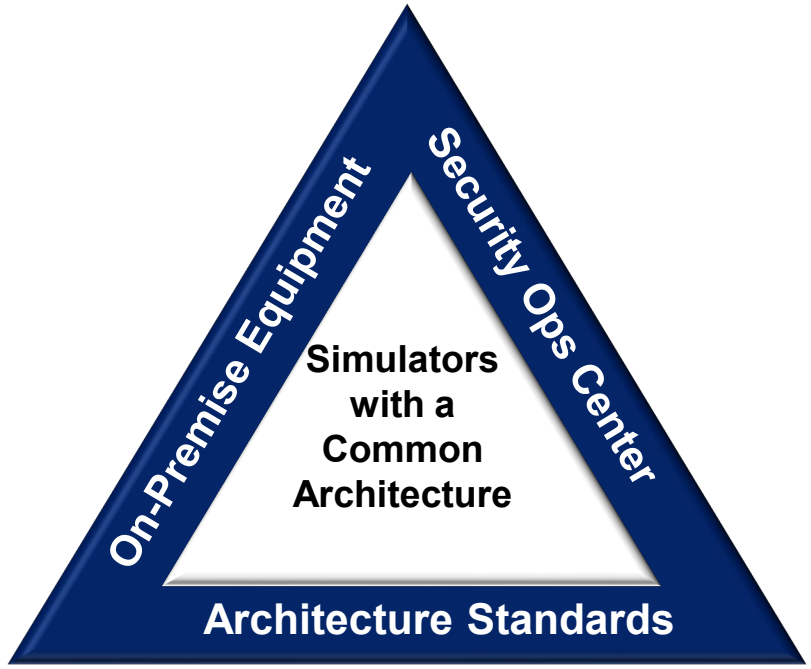
	FY25	FY26 Q1	FY26 Q2	FY26 Q3	FY26 Q4	FY27	FY28
F-16 MTC Virtual				△	△		
F-16 CUT Virtual						△	△

LoE 3: STANDARD APPS & DATA

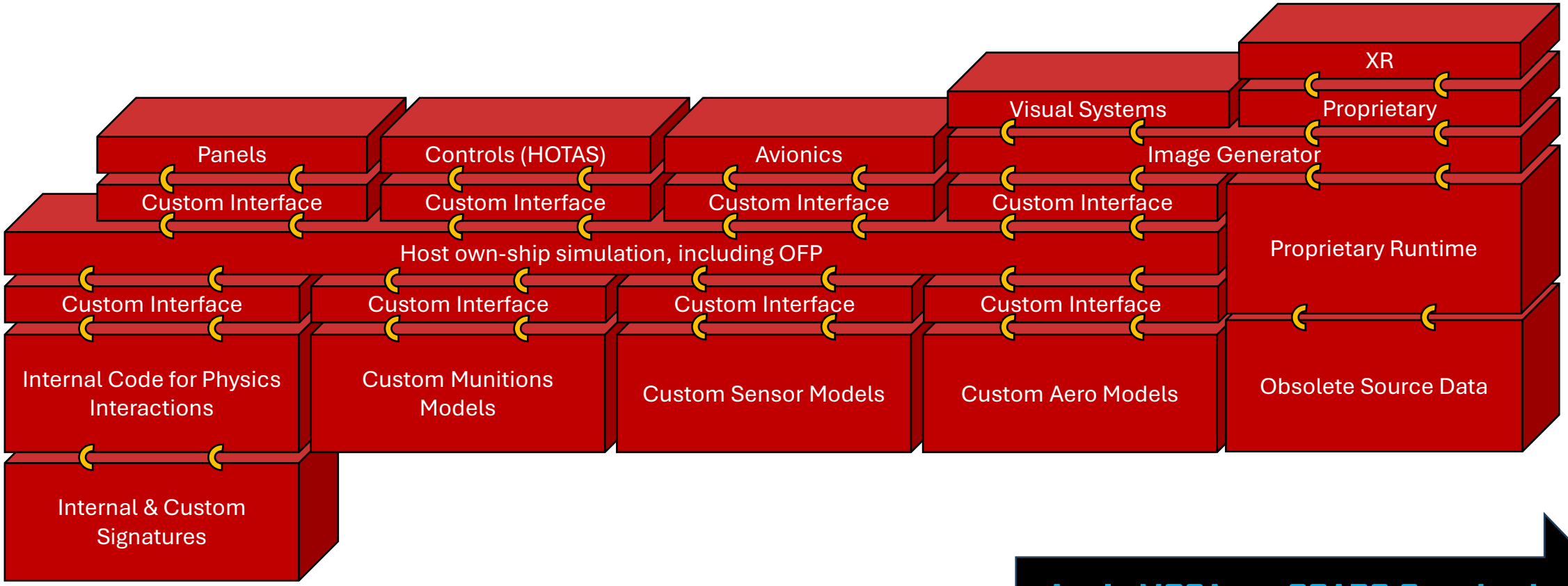
	FY25	FY26 Q1	FY26 Q2	FY26 Q3	FY26 Q4	FY27	FY28
GDR: CONUS & Priority AORs		△			△		
GDR: Worldwide coverage			△				△
Mission Planning App in Library		△	△				
Iron Bank in Library		△			△		

SCARS Standards

- SCARS develops standards for training simulator architecture focused on internal interfaces and architectures
- Standards informed by Requirements and Objectives, and governed through SCARS Engineering Capabilities Board
- Standards published annually – SCARS provides funds to training system programs for standards implementation
- Once implemented and verified through testing, training system is connected to SOC

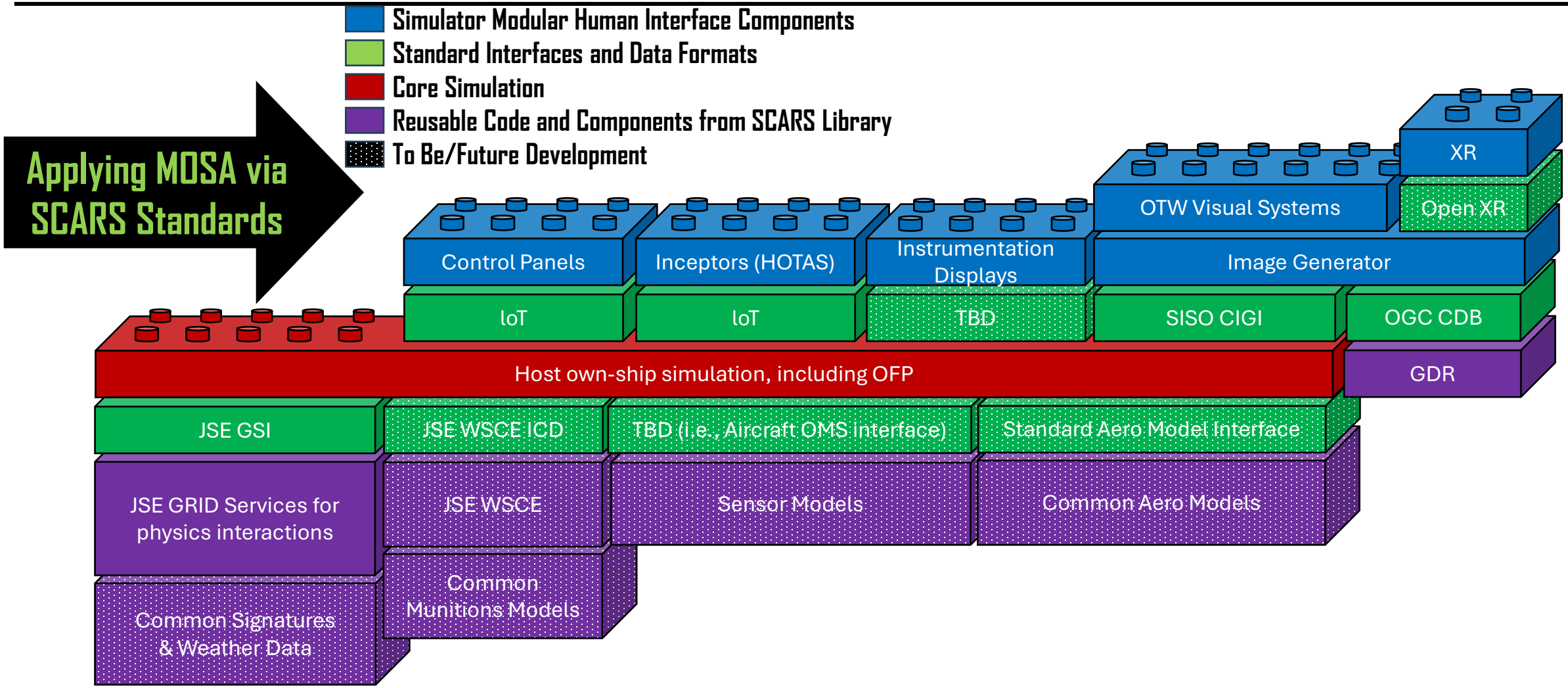


Before Implementation of SCARS Standards



Apply MOSA via SCARS Standards

Conceptual Example with SCARS Standards



MOSA allows for competition and reusable components/data, driving lower long-term sustainment costs.

Examples of Industry Standards Embraced by SCARS

- Open Geospatial Consortium (OGC) Common Database (CDB)
  - Mandated as interchange format with various minimum specifications
- Simulation Interoperability Standards Organization (SISO) Common Image Generator Interface (CIGI) SISO-STD-013
  - Mandated as interface between simulations and image generators
- Internet of Things (IoT)
  - Mandated for interfaces between simulations and aircrew control systems
- ARINC-610C
  - Mandates specific common simulator functions when using aircraft parts in simulators
- Object Management Group (OMG) System Modeling Language (SysML)
  - Mandated for Model Based Systems Engineering

SCARS Standards

- Basic On-premise Equipment Integration Standard
  - ICD for Integrating training systems with SCARS OPE
- Common Security Controls Standard
  - ICD for training systems to benefit from SCARS-provided cybersecurity controls
- Certification Process Standard
  - Process to test training systems for compliance with SCARS standards
- Application Certification Standard
  - Processed to certify and field training system software with SCARS OPE
- Data Standard
  - ICD of standard data formats for training systems
  - Includes MBSE Modeling Guide and Geospatial Data Specification
- DevSecOps Standard
  - Process for using SCARS-provided DevSecOps pipelines for training system software sustainment
- Architecture Standard
  - ICD for MOSA-compliant modular subsystems and interfaces for training systems

SCARS Standards, cont.

- Some standards are available to the public, and others are limited distribution.
- Standards are required for integration with SCARS infrastructure.
- Standards are applied to USAF training systems which are tested for compliance with applicable verification criteria.
- The USAF is not providing a service to certify products as compliant with SCARS Standards.
- To request standards, send email to
  - aflcmc.wns.scarsstandards@us.af.mil

SCARS Simulator Standards

FY26:

- Open XR - Mandate a standard software interface for integrating extended reality devices with training simulators
- Open Mission System and Universal Command and Control Interfaces - Reinforce the need for training systems to comply with OMS and UCI GRAs, if in use by the aircraft system
- Debrief system minimum capabilities – If training systems are acquiring a debrief system, this standard will provide the minimum requirement the debrief system must meet
- Standard Weapons Server (WSCE) – Mandating WSCE application for munition modeling
- Standard Mission Planning Tool (TaskView) – Mandating application as a mission planning tool

FY27+:

- Mandatory requirements in Geospatial Data Specification (FY27)
- Best Practices for VMs and Containers (FY26 or FY27)
- Standard Data Structure for propulsion (engine) (FY27)
- Standard Data Structure for Aerodynamics (still in development under B-2 contract) (FY28)
- Standard Data Structure for Ground Dynamics (still in development under B-2 contract) (FY28)
- Other topics driven by upcoming requirements from HAF/A35

SCARS Common Applications – Sim Library

Software	Purpose	Standard/Common	Target
Iron Bank content (multiple apps)	Reusable container code	Common	FY26
Performance Evaluation Tracking System (PETS)	Debrief Metrics	Common	FY26
LVC Network Control Suite (LNCS)	Debrief Replay	Common	FY26
TASKVIEW	Test Mission Scenarios	Standard	FY26
Global Reusable Interface Domain (GRID)	Authoritative adjudication of kinetic and electronic interactions	Standard	FY26
Next Generation Threat System (NGTS)	Constructive Simulation (air, land, sea entities)	Common	FY26
ARC-210 Gen 6 Radio Model	Radio model	Standard	FY26
Weapons Server Common Environment (WSCE)	Munition Simulation	Standard	FY26
JBUS (and specific plug-ins relevant to AF training)	DMO Gateway	Common	FY26
GSI Test Harness	Test tool for GSI interface	Standard	FY26
SCARS Standards Compliance Tool (SCT)	Test tool for SCARS Standards	Standard	FY26
Analysis and Reporting Tool (ART)	Post-Event Analysis	Common	FY27
Service Control Executive (SCE)	Sim startup	Common	FY27
Battlespace Environment Audio Video Event Recorder (BEAVER)	Debrief Replay	Common	FY27
Digital Integrated Air Defense System (DIADS)	Constructive Simulation for IADS	Common	FY27
Targeting Pods Simulation	Common targeting pod simulation	Standard	FY28
TBD	Automated ATO Documentation	Common	FY28+
TBD	Debrief software compliant with SCARS Standards	Standard	
TBD	Reusable aero models	Common	
TBD	(Awaiting requirements from HAF/A35…)		

What Industry Can Do for SCARS

- Apply modular architectures for hardware and software
- Apply standard interfaces for hardware and software
- Support standard data formats
- Avoid proprietary interfaces
- Recommend industry or defacto or emerging standards/trends to Government
- Share innovative products, solutions, technologies, and ideas with the Innovation Cell
- Apply Internet of Things (IoT) for control systems
- Apply software containers where appropriate
- Licensing methods that do not require connection to Internet or hardware keys/dongles
- OEM product support must include patches/updates in response to identification of cybersecurity vulnerabilities
- Innovate!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