JTLS IUC – Calian/SimFront/VCCI Introductions

19th March 2024

JTLS-GO International Users Conference

Monterey, CA

Calian/SimFront

- Mr Dan Turcotte
- Mr Jason Bone

Contact details: Mr Dan Turcotte; d.turcotte@simfront.com Mr Jason Bone: jason.bone@calian.ca

Defence Capabilities Overview

CALIAN

Calian - Four Business Units

Advanced Technologies | Health | **Learning** | IT and Cyber Security

Learning – Training Delivery & Technology Solutions

Individual Training

Delivering individual virtual training experiences for multiple occupational specialties to prepare for the mission.

We deliver individual training across Canada from introductory to advanced.

Collective Training

Developing, designing, delivering, and analyzing collective training for the Canadian Army Simulation Centre and for NATO.

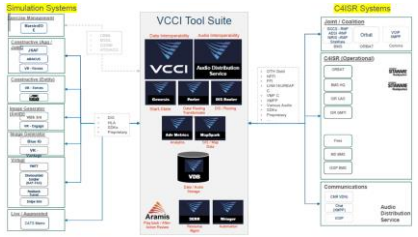
We integrate multi-national actors, measure performance, and provide detailed summaries of areas for improvement.

Leadership Training

Preparing leaders in organizations deploying to high-risk environments.

This means awareness of the environment, the threat, potential scenarios, and the implications for leading in that context.

Systems Integration for Synthetic Environments



Integration of C4ISR systems into simulation systems for combined and joint training

Integrating existing tools into synthetic environments provides highly realistic, customized solutions to meet any training need.

Enterprise Exercise Control Systems

CALIAN Maestro EDE™

CALIAN Response Ready™

chatbook Chatdeck Chatter

Sustaining proprietary training solutions to allow exercise controllers to plan, develop, and deliver training within a single platform.

All events and injects are tied to training objectives, enabling rich data collection for evaluating performance and effectiveness.

AR, VR, and MR Training Solutions

Using augmented, virtual and mixed reality we deliver a highly realistic training experience.

Our solutions provide an immersive visual experience with voice-recognition systems to provide an interactive experience

Calian in NATO

SME Support to Exercises

NATO 360 Scenario Development
EXCON SME Support to Exercises
TOPFAS
LOGFAS
Wargame Development
CAX Operators

Geospatial Services
EXCON SME Support to Exercises
Scenario Support
STEADFAST PINNACLE / PYRAMID

NATO WDA Future OPFOR Study
Wargame Innovation Project

MARCOM Battle Staff Training
Key Leader Training

SME Support to Exercises

Scenario Development for the Fuhrungsakademie
SME Support to Exercises
E3D
LOGFAS

ORION Scenario, E3D, SME Support, RRC FRA
E3D, GYC

Eurocorps
Scenario Development
SME Support to Exercises
E3D
LOGFAS

JFC Brunssum
Battle Staff Training
Key Leader Training
Functional SME Trg

NSHQ / NSOS
Senior Mentors
Instructors
EXCON SME Support

SHAPE
Battle Staff Training
Key Leader Training
Support to DM/C2 Concept Development
Future Nuclear Ex Program
CBRN SME Support

JFC Naples
Battle Staff Training
Key Leader Training
JLSG Training

SimFront
A Calian Company

Calian Learning Technologies

Systems Integration & Interoperability by Design

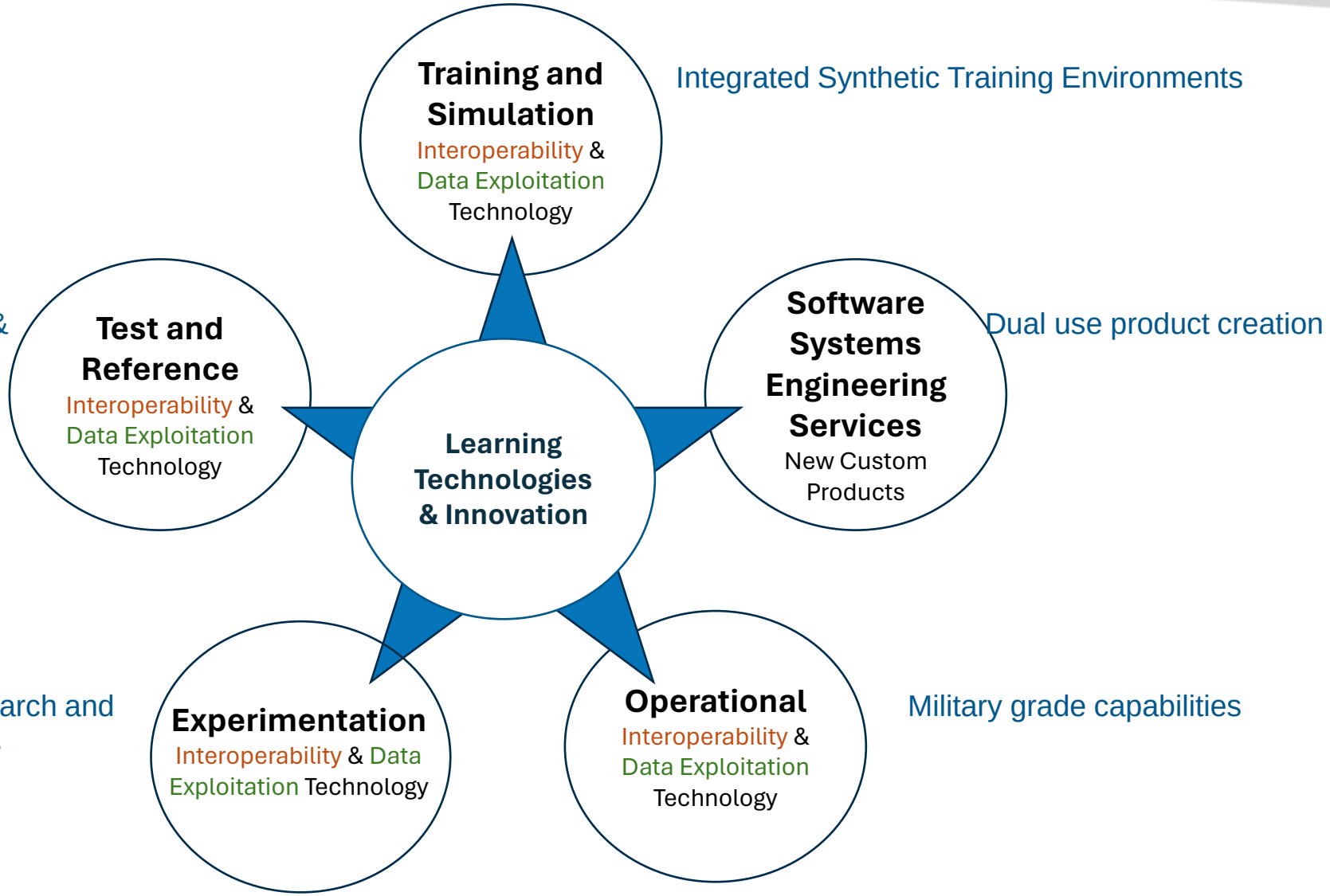
"We do interoperability because
we want to, not because we have to."

2024

Calian Learning Technology – Business Areas

VCCI Tool Suite + CALIAN. | Maestro EDE™

- VCCI
- Audio Distribution Service
- MapSpark
- Aramis
- Midas
- Genesis
- Wringer



Overview

- Systems Interoperability for Complex Synthetic Training Environments
  - **Interoperability by design. The VCCI ecosystem** and how it will provide nations and partners with new ways of integrating JTLS-GO with their synthetic environment capabilities.
  - **Interoperability for C2 Systems. The ADS ecosystem** – Providing Commanders and Headquarters with Information advantage accelerating Command Decision-making cycles. ADS also provides insight for consideration to bring Coalition Communications, or Communications for Coalitions, in training environments.

- **What this means for JTLS-GO environments** – Unpacking the initial integrations, expected outcomes, and the capability development road map.

- Concluding remarks

Integration and Interoperability by Design

An unbound Architecture, and why it makes everything possible

The System Interoperability & Integration Problem Space

Assumption: Physical issues aside (plugs, connectors, electrical, etc.) the most severe interoperability and integration challenges remain at the data and communication levels.

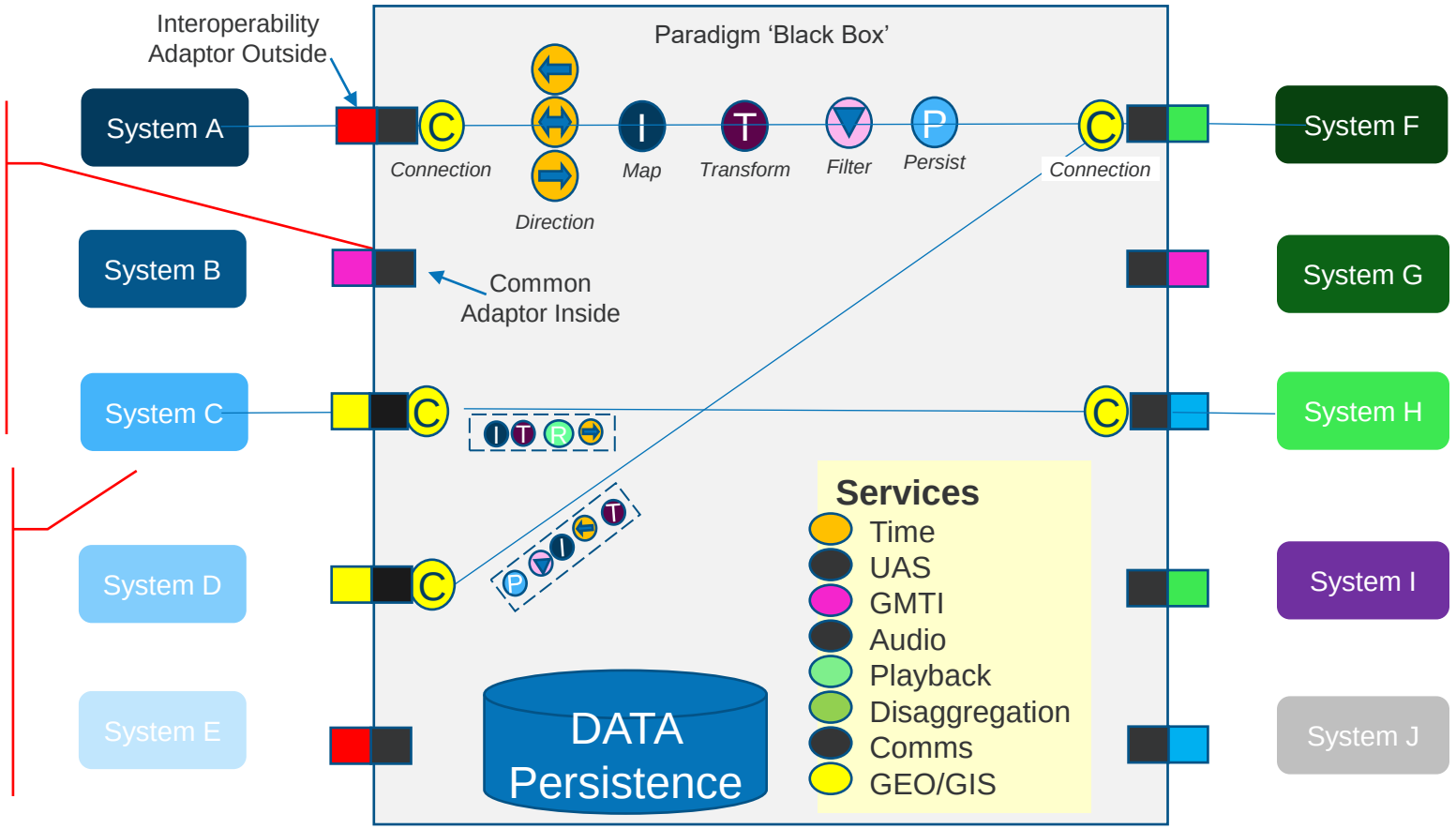
1. **Interoperability** – Systems talk the same language natively. Rarely possible or achieved at scale.
    - It is “possible” for a single OEM to control the data and communications within the OEM’s internal product line.
    - In Complex System of Systems environments, rarely can OEMs know about, or rely on, the other OEM implementations.
2. **Integration** (1) – Systems talk different languages but can talk via a standard.
    - In Complex System of Systems environments, the published standard rarely cover all use cases and functional requirements. Therefore, many OEMs deviate from the standard in some way or form.
    - It is still possible to achieve significant product and systems integration leveraging standards.
3. **Integration** (2) – Systems talk a mix of Open and Proprietary standards (exposed with SDKs, or not)
    - SDKs offer both the possibility of addressing OEM deviations to standards, but also achieve rich integration that run deeper into OEM products resulting in significant value-added features and functionality for the end-user.

The System Agnostic Interoperability Framework – Paradigm ©

1. System Agnostic

Adaptors & Standards
- Mil Stds
- NATO Stds
- SISO IEEE Stds
- Commercial, or
- *SDKs*
- *Proprietary*

Systems
- C2 Systems
- ISR
- Simulation
- Audio
- AI
- AAR
- Data Analytics



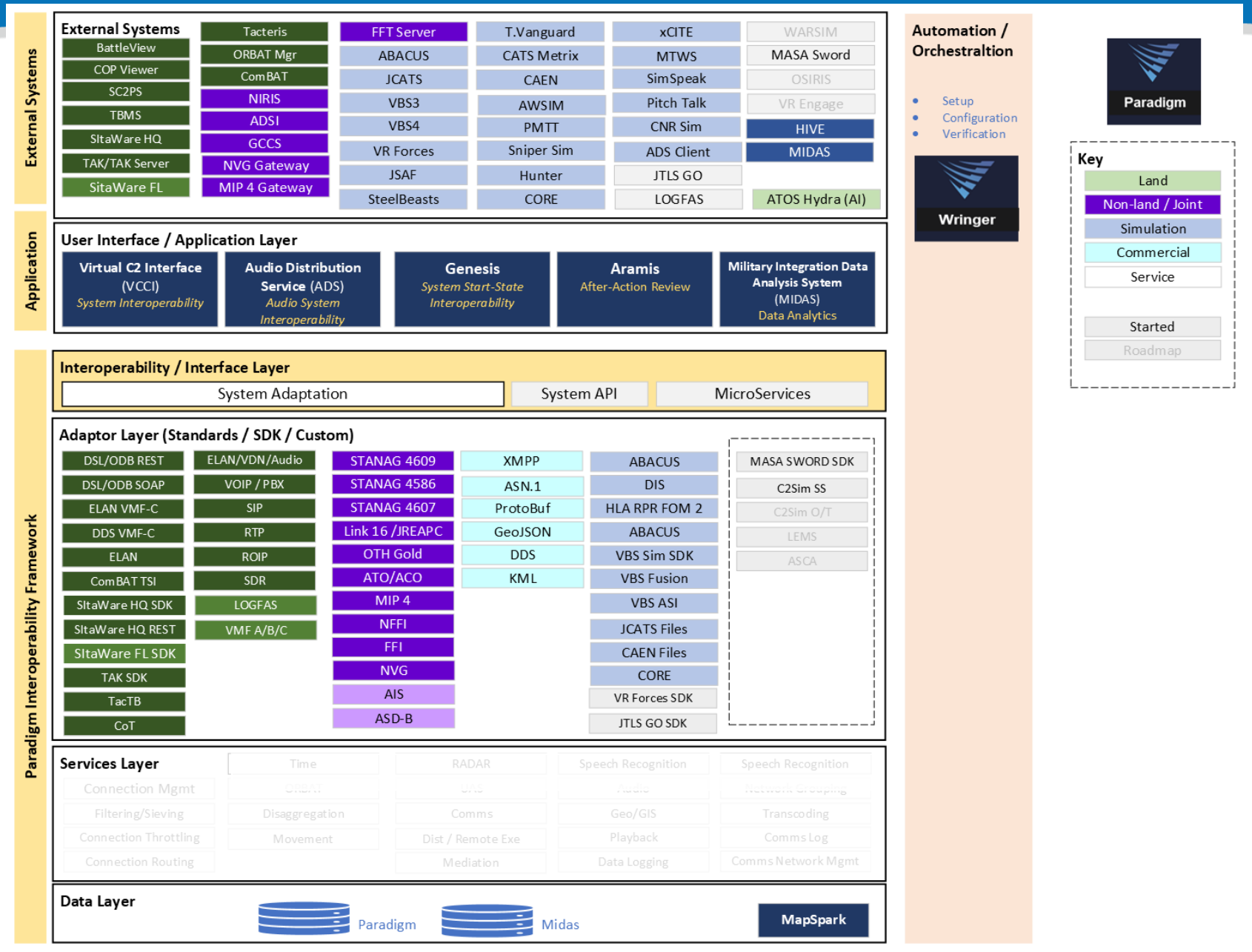
Features

- Solves N^2 connection issue
- Granular Control per Connection
- Common Services
- Backward/Forward Compatibility
- Agile, Extendable, Scalable, Reusable, Adaptors

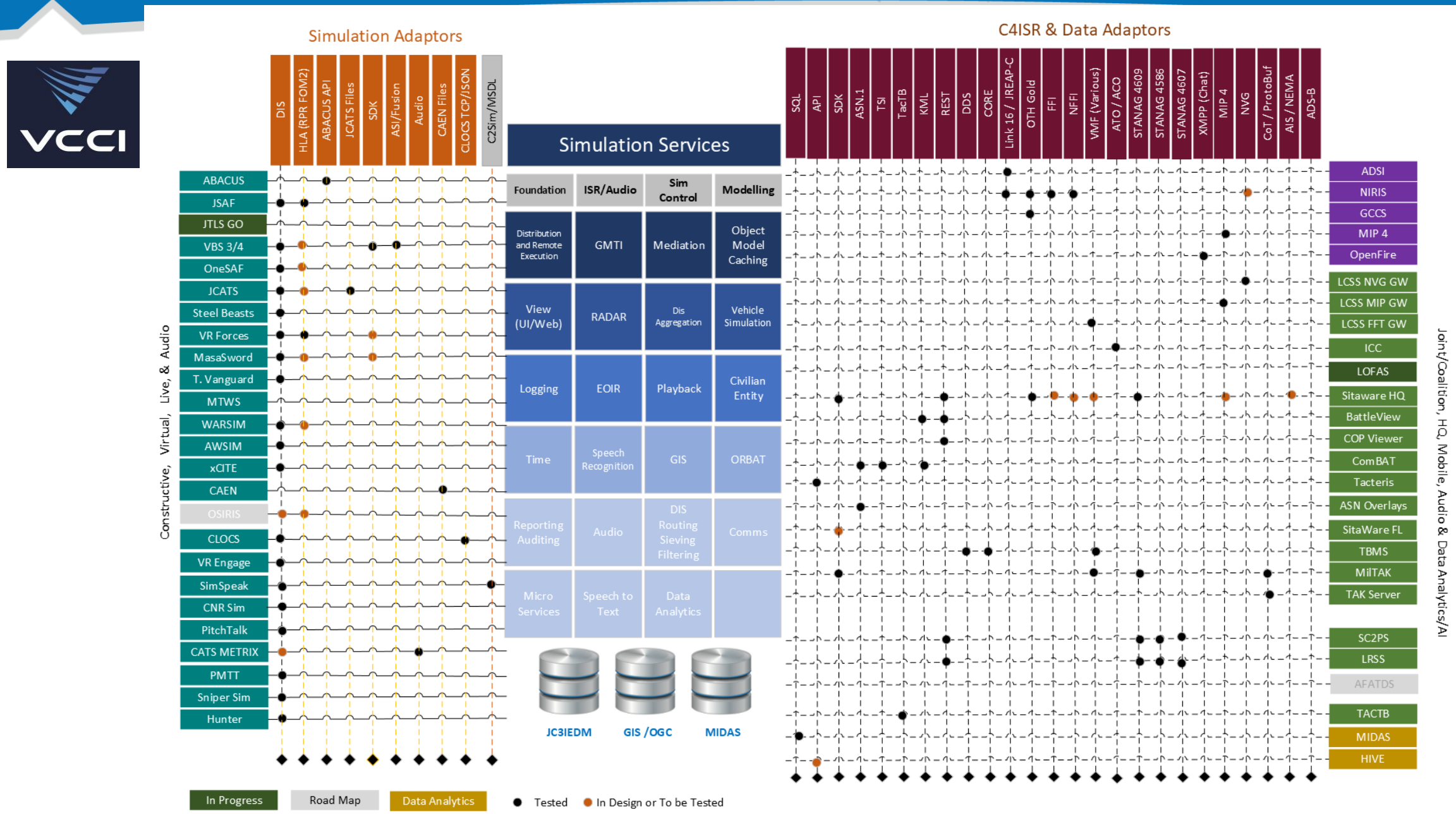
Paradigm Architecture – The laydown

Features

- System Agnostic
- Horizontal and Vertical Integration across Interoperability Products



Virtual Command and Control Interface (VCCI) – Available interfaces



Canadian Army: Complex Integrated Synthetic Environments for Training – a sample

Synthetic Environment(s)

CAST (CASC)

- Simulation Aggregate
- Simulation Entity
- Simulation Image Gen
- Simulation Radio

VTS

- HQ C2 Systems
- HQ ISR Systems
- Tactical Comms

Tactical (DSCs)

- Simulation Entity
- Simulation Image Gen
- Simulation Radio

VTS

- HQ C2 Systems
- HQ ISR Systems
- Tactical Comms

LIVE / EXCON

- CATS Metrix™
- Simulation LVC
- Simulation Radio

Audio Distribution Service

- Tactical Comms

Interoperability (VTS)

Start-State

Genesis

Core interoperability

VCCI

Audio Distribution Service

AAR & Data Analytics

Aramis

Midas

GIS & Map

MapSpark

Orchestration & IVV

Wringer

C4ISR Operational Environment

Joint / Coalition

Interoperability
- C4ISR Systems
- Simulation Systems
- Data Collection

NATO OTAN

ABCANZ

Interoperability
- Radio
- VOIP
- Chat
- File Share
- Intercom (road map)

- HQ C2 Systems
- HQ ISR Systems

Headquarters

Audio Distribution Service

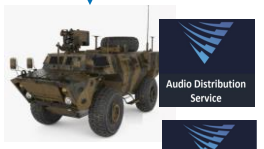
MapSpark

- HQ C2 Systems
- HQ ISR Systems
- Tactical Comms

Mobile / Dismounted

Audio Distribution Service

MapSpark



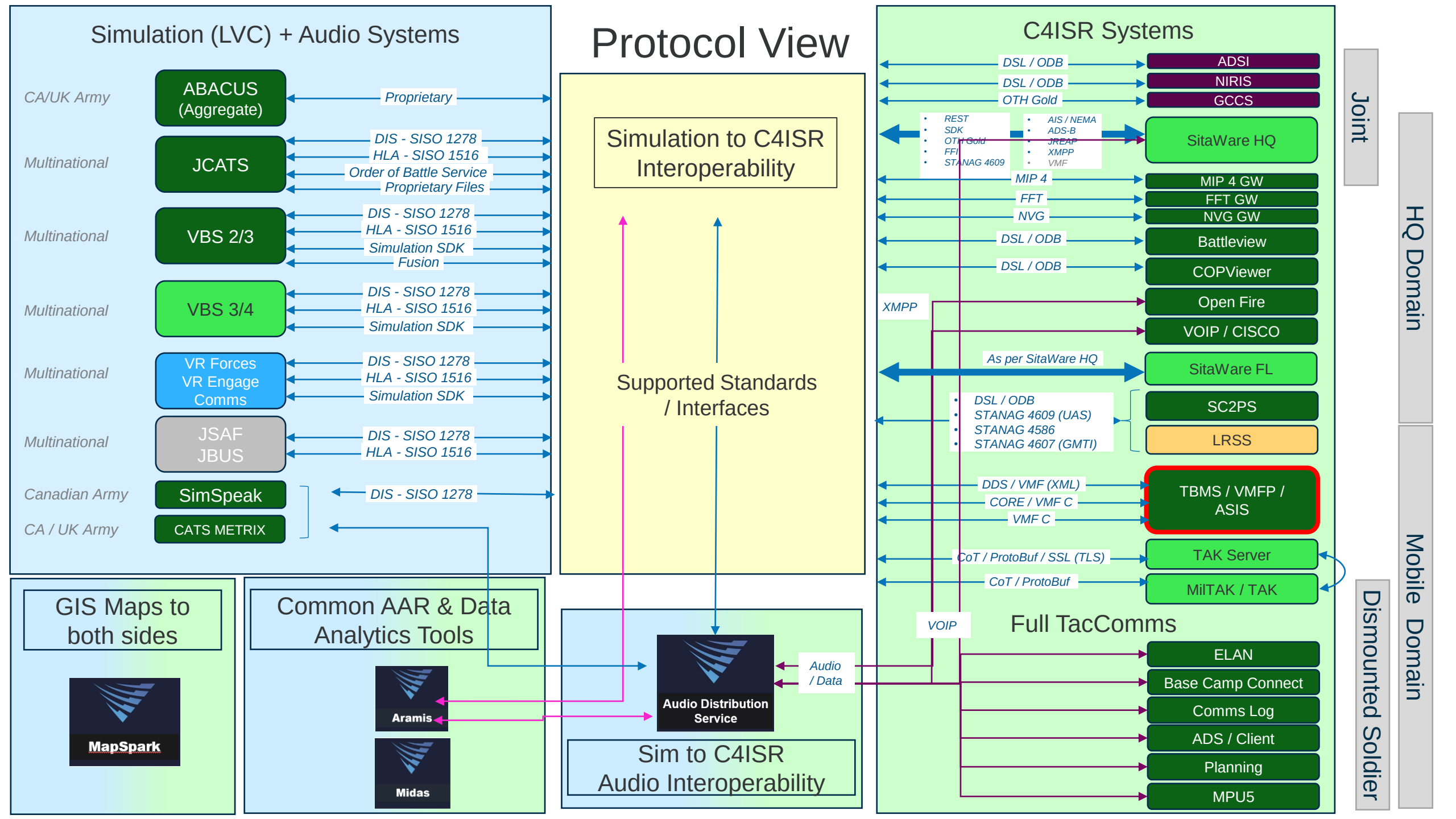
Audio Distribution Service

MapSpark

Audio Distribution Service

MapSpark

- HQ C2 Systems
- HQ ISR Systems
- Tactical Comms


Protocol View
Simulation (LVC) + Audio Systems
CA/UK Army
ABACUS (Aggregate)
Proprietary
Multinational
JCATS
DIS - SISO 1278
HLA - SISO 1516
Order of Battle Service
Proprietary Files
Multinational
VBS 2/3
DIS - SISO 1278
HLA - SISO 1516
Simulation SDK
Fusion
Multinational
VBS 3/4
DIS - SISO 1278
HLA - SISO 1516
Simulation SDK
Multinational
VR Forces
VR Engage
Comms
DIS - SISO 1278
HLA - SISO 1516
Simulation SDK
Multinational
JSAF
JBUS
DIS - SISO 1278
HLA - SISO 1516
Canadian Army
SimSpeak
DIS - SISO 1278
CA / UK Army
CATS METRIX
Simulation to C4ISR Interoperability
Supported Standards / Interfaces
C4ISR Systems
DSL / ODB
ADSI
DSL / ODB
NIRIS
OTH Gold
GCCS
REST
SDK
OTH Gold
FFI
STANAG 4609
AIS / NEMA
ADS-B
JREAP
XMPP
VMF
SitaWare HQ
MIP 4
MIP 4 GW
FFT
FFT GW
NVG
NVG GW
DSL / ODB
Battleview
DSL / ODB
COPViewer
XMPP
Open Fire
VOIP / CISCO
As per SitaWare HQ
SitaWare FL
DSL / ODB
STANAG 4609 (UAS)
STANAG 4586
STANAG 4607 (GMTI)
SC2PS
LRSS
DDS / VMF (XML)
CORE / VMF C
VMF C
TBMS / VMFP / ASIS
CoT / ProtoBuf / SSL (TLS)
TAK Server
CoT / ProtoBuf
MilTAK / TAK
VOIP
Full TacComms
ELAN
Base Camp Connect
Comms Log
ADS / Client
Planning
MPU5
Joint
HQ Domain
Mobile Domain
Dismounted Soldier
GIS Maps to both sides
MapSpark
Common AAR & Data Analytics Tools
Aramis
Midas
Audio / Data
Audio Distribution Service
Sim to C4ISR Audio Interoperability

Integrated Environment Example

ABACUS or VR Forces – Constructive Aggregate Sims

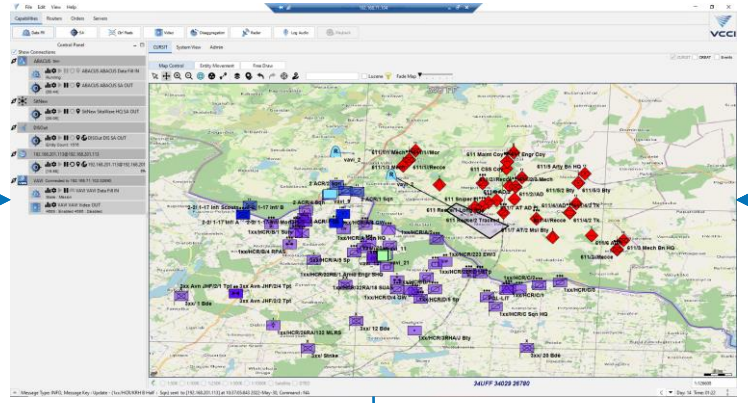
- Sim Data

JCATS or other Entity Sims

- Disaggregation
- FMV

VBS 4 – Entity Sim / Image Generator

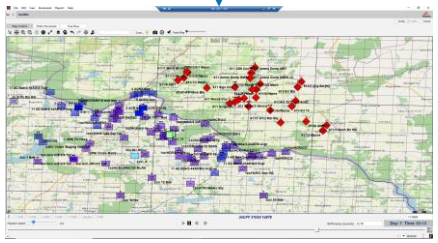
VCCI – System Interoperability



- ORBAT
- Sim
- C4ISR
- STANAG 4609

- Sim Data
- C4ISR Data

Aramis - AAR

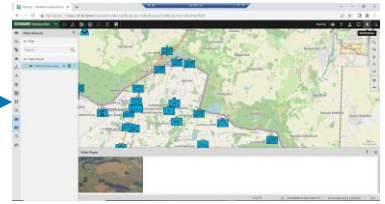


Geo/GIS Data

MapSpark

SitaWare HQ

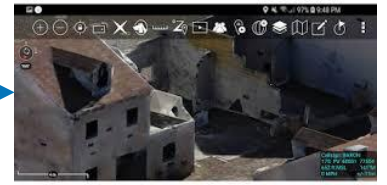
SitaWare HQ UAS/STANAG 4609



Sitaware HQ UAS/STANAG 4609

WinTAK

WinTAK UAS/STANAG 4609



How things look like in VCCI

Connected & Managed Systems

ABACUS (Aggregate)

VBS (Entity / FMV)

TAK (STANAG 4609)

SitaWare HQ (STANAG 4609 UAS)

VR Forces

TAK (COP)

ComBAT (COP)

SitaWare HQ (COP)

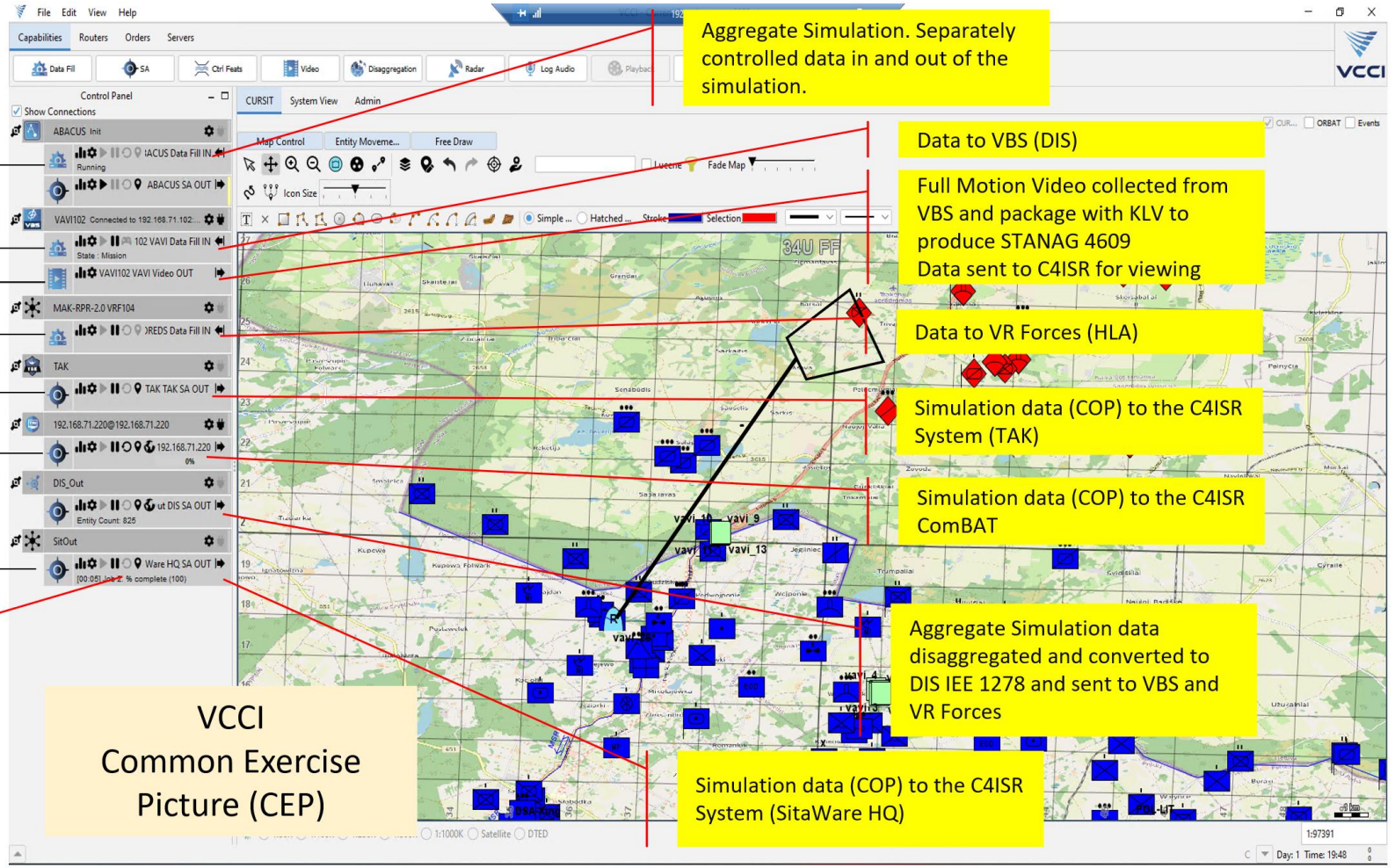
System Data Management by VCCI:
- Direction
- Filtering (Geo, entity, time, etc..)
- Data rate and flow control

System Type

C4ISR

Simulation

Virtual Command and Control Interface



Aggregate Simulation. Separately controlled data in and out of the simulation.

Data to VBS (DIS)

Full Motion Video collected from VBS and package with KLV to produce STANAG 4609
Data sent to C4ISR for viewing

Data to VR Forces (HLA)

Simulation data (COP) to the C4ISR System (TAK)

Simulation data (COP) to the C4ISR ComBAT

Aggregate Simulation data disaggregated and converted to DIS IEE 1278 and sent to VBS and VR Forces

Simulation data (COP) to the C4ISR System (SitaWare HQ)

VCCI
Common Exercise Picture (CEP)

Interoperability solutions for C2 audio systems (combat net radio)

Providing Tactical Commanders and Headquarters with Information Advantage accelerating Command Decision-making cycles

Audio Distribution Service – 50 000 Feet View

- ADS is …

Software running on Windows 10 or Windows Server 2019:

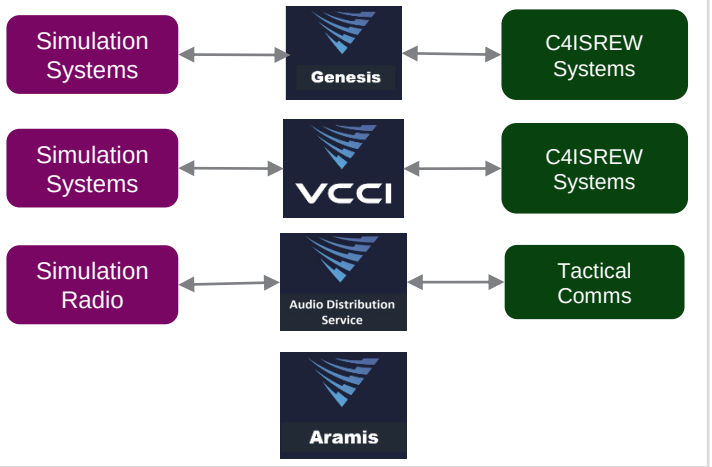
- Contains a server component and a client component;

Server Component:

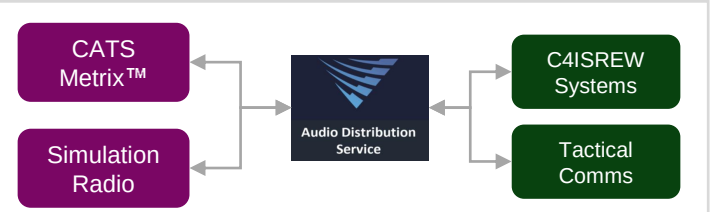
- **Integrates all tactical communication voice systems** (e.g. CNR, MPU-5, VoIP) used by the CA into a single voice service that is provided/distributed to multiple clients over IP bearers:
  - Specifically designed to work Half-Duplex(HD) to match tactical voice procedure;
  - Uses low-rate IP codecs and multicast to make transmission as efficient and robust as possible over broadcast bearers
  - Mesh architecture
  - Has Systems Management Capabilities; imports comms plans, etc.
- **Can create internal Nets as needed** (e.g. Staff Intercom)
- With the voice nets being concentrated into a single service, advanced functions are then added:
  - Voice Net Grouping (1 to many) (also referred to as **'Bridging'**);
  - **Voice Recording and Playback;**
  - **Automated Speech-to-Text;**
  - **Integrated File Transfer capability;**
  - **Integrated Text Chat (XMPP-based)** to provide a single application for voice and text and 'Listen to This' capability that hooks into Voice Playback;
  - The above integrated into a **Comms Log** with standard tags (e.g. Action Taken) to automate the Comms Log function, saving staff at Bde from manually transcribing (3 x 8-hour shift = 9-16 staff)
- Also **includes DHCP Server, IP Router (OSPF/RIP), XMPP Server (if needed)**; and
- **Can handle > 100 simultaneous voice nets simultaneously**

Interoperability Deployment Context - Canadian Army: Operational environments and Training

Synthetic Environment(s)



CAST and Other



LIVE / EXCON

Audio Distribution Service

General Capabilities/Features

1. TacComms Audio Interface & Interoperability
   - IP-Based Networks
   - IP-Based Combat Net Radio-RTP, ROIP (Harris, MPU5, Base Camp Connect, etc)
   - IP-Based SatComms
   - VOIP/PBX/SIP Radio
2. HQ Communications
   - TacComms +
   - VOIP based systems
   - XMPP based systems
   - File Transfers
3. Simulation Radio Interface & Interoperability
   - Seamless integration between Sim and C2
   - DIS, HLA simulated radios supported.
4. Audio Recording & Playback
   - Per Channel /Net
   - Audio Recordings (LVC) for AAR
5. Comms Log Application
   - Automated (Speech to Text)
   - Multilingual

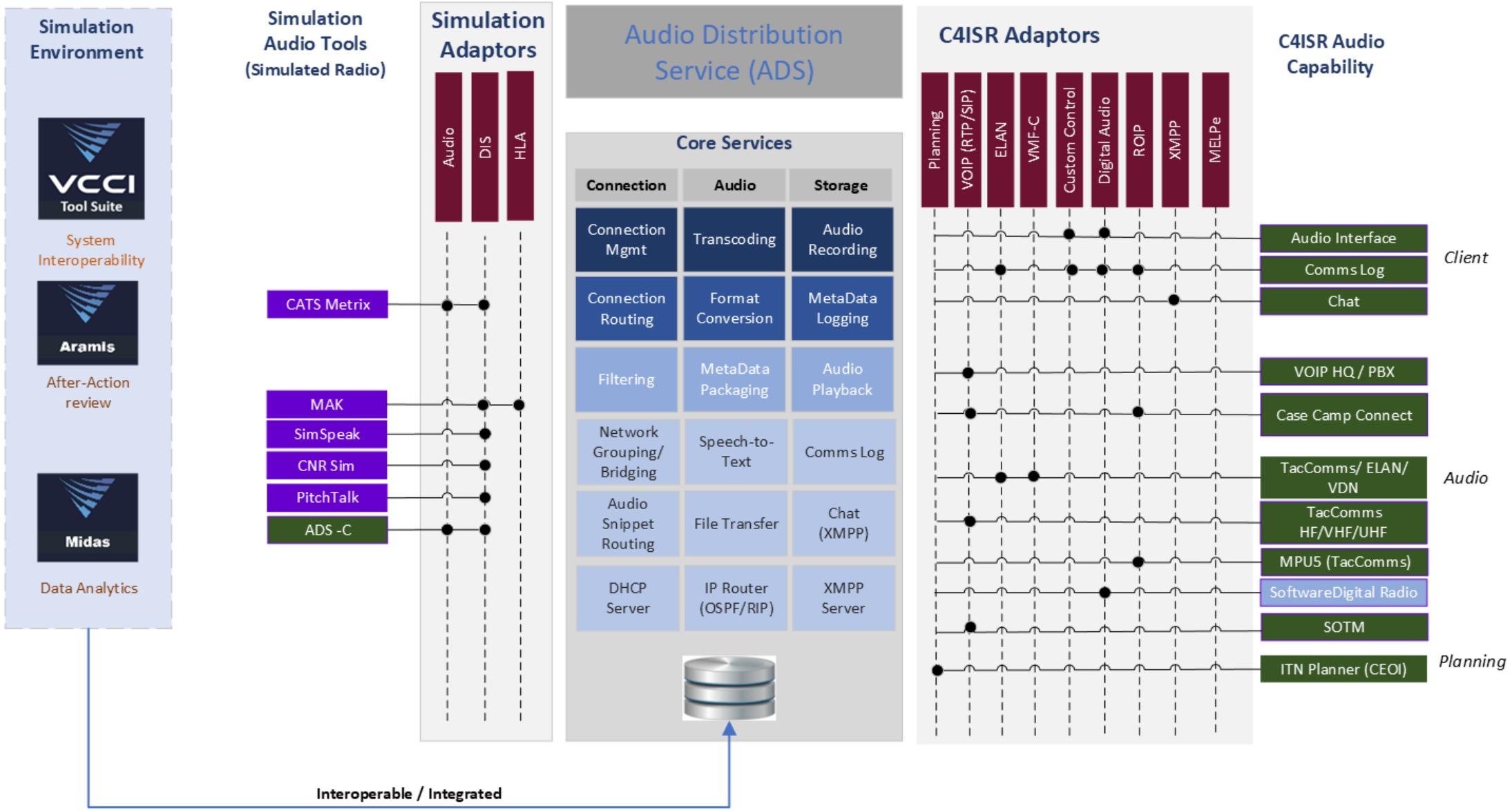
Operational Environments

Headquarters Domain

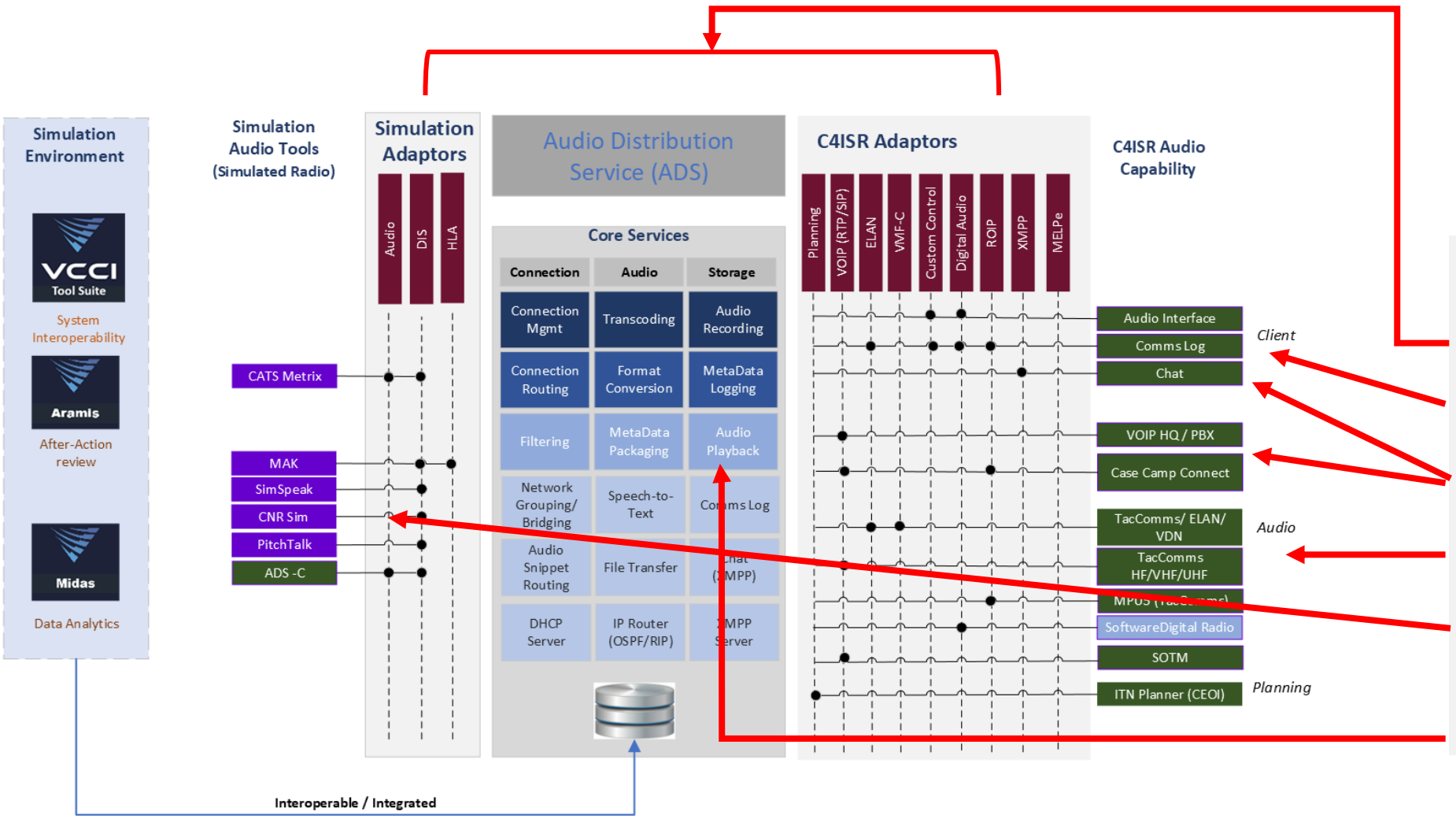
Mobile Domain

ADS – A BYOCD "Bring-your-own-communication-device"

Audio Distribution Service (ADS) – Growing list of interfaces



Audio Distribution Service (ADS) – Available interfaces

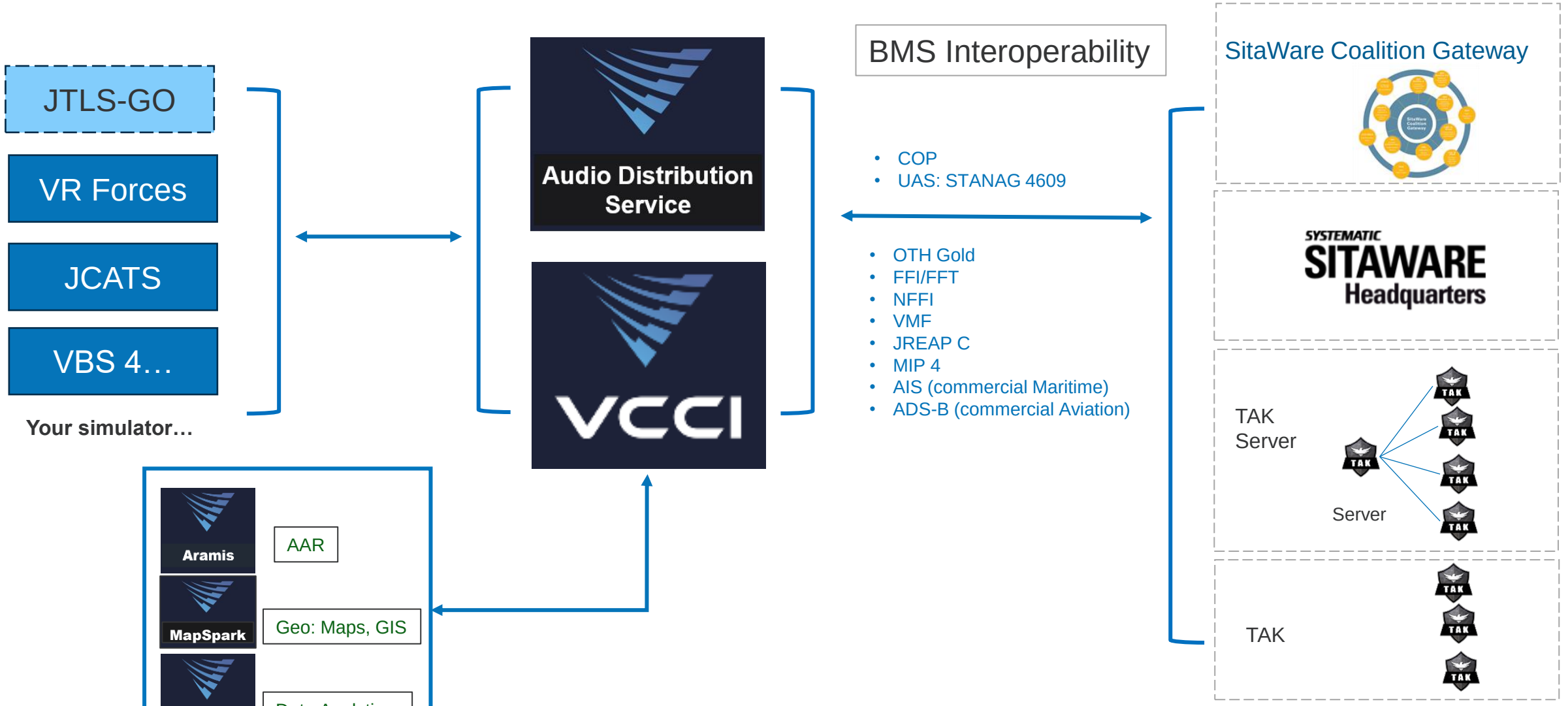


General Capabilities/Features

1. Interoperability
2. Comms Log Application
3. XMPP & HQ Communications
4. TacComms Audio Interface
5. Simulation Radio Interface & Interoperability

5. Audio Recording & Playback

VCCI and ADS: Rinse and Repeat Interoperability



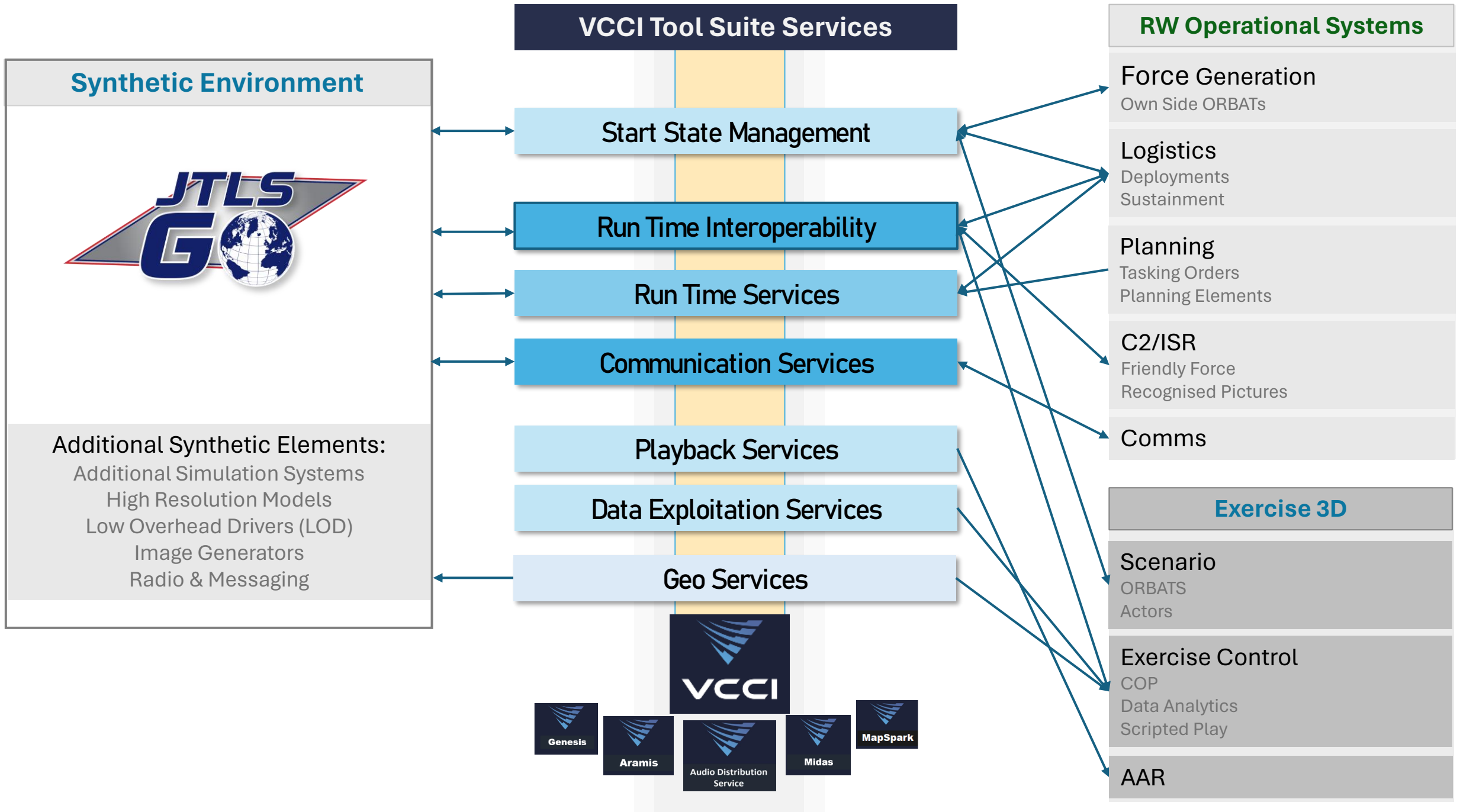
VCCI – JTLS-GO Integration

JTLS GO ⟷ VCCI

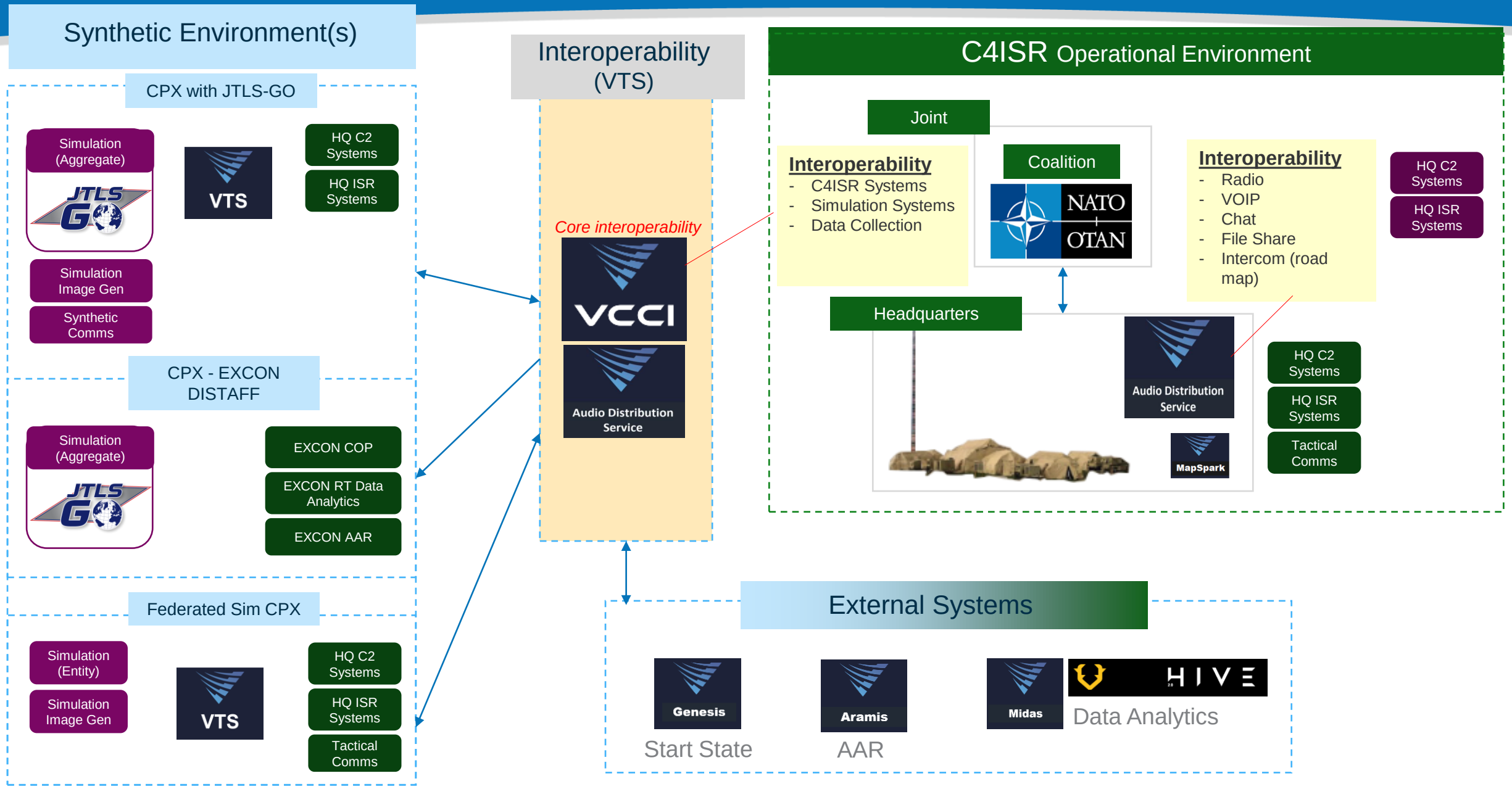
Why

How

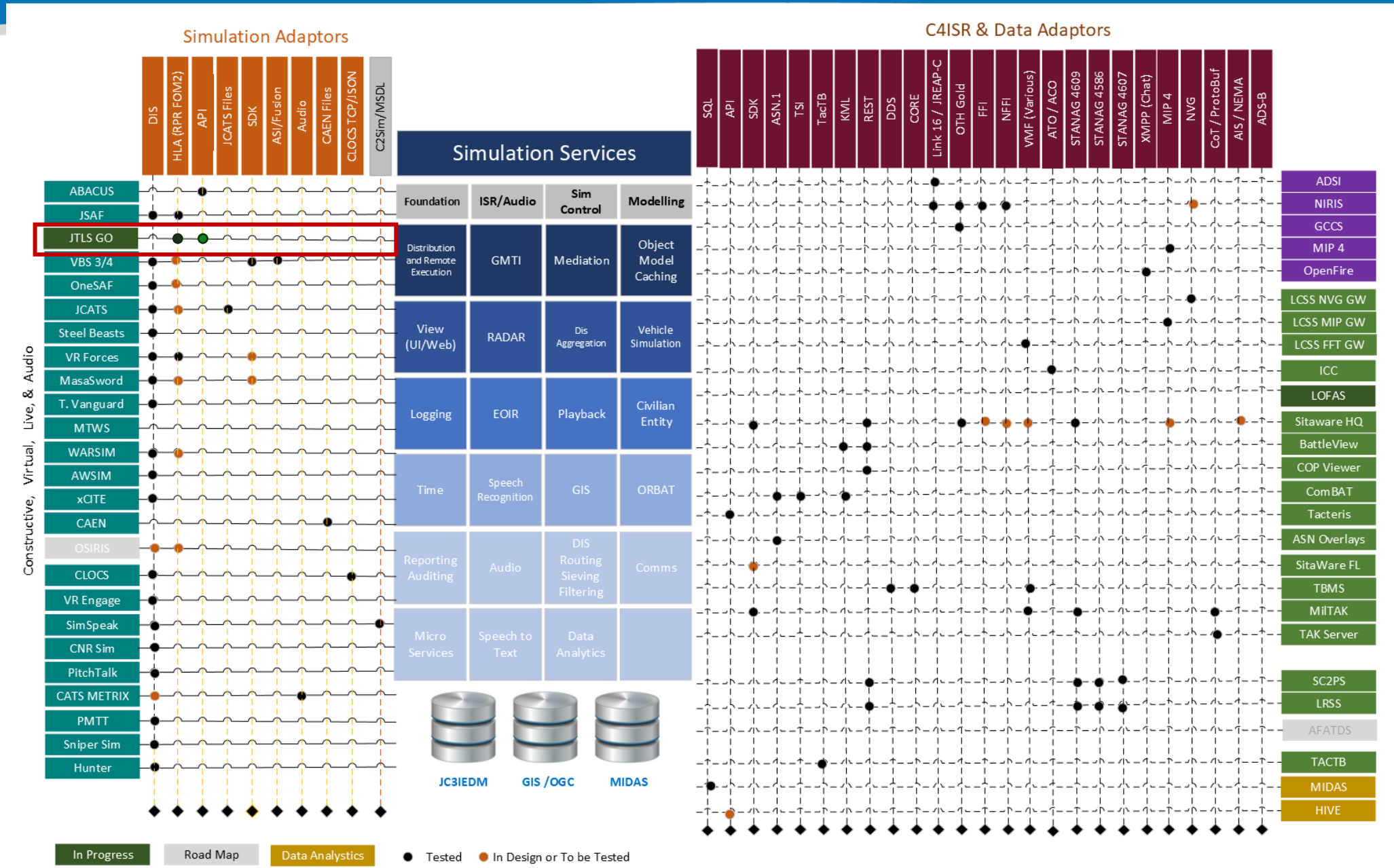
When


Synthetic Environment
JTLS GO
Additional Synthetic Elements:
Additional Simulation Systems
High Resolution Models
Low Overhead Drivers (LOD)
Image Generators
Radio & Messaging
VCCI Tool Suite Services
Start State Management
Run Time Interoperability
Run Time Services
Communication Services
Playback Services
Data Exploitation Services
Geo Services
VCCI
Genesis
Aramis
Audio Distribution Service
Midas
MapSpark
RW Operational Systems
Force Generation
Own Side ORBATs
Logistics
Deployments
Sustainment
Planning
Tasking Orders
Planning Elements
C2/ISR
Friendly Force
Recognised Pictures
Comms
Exercise 3D
Scenario
ORBATS
Actors
Exercise Control
COP
Data Analytics
Scripted Play
AAR

Complex Integrated Synthetic Environments for Training



Virtual Command and Control Interface (VCCI) – JTLS-GO Interfaces



Roadmap VCCI– JTLS-GO Integration – Phase 1

Phase 1 - Initial Interoperability (Proof of Concept)

Base capability for JTLS-GO interoperability and leverage all of VCCIs existing C2 adaptors that support outbound data flows for a “SIM to C2” type workflow.

Timeline: Development work is currently underway. Estimated Phase 1 completion September ’24.

Trials and demos to be set with VCCI, JTLS-GO and Sitaware HQ

- VCCI Ingest
  - JTLS-GO ORBAT (Units and Equipment)
    - JTLS-GO DDS Database
    - Entity Mapping
  - Dynamic Run-Time entity state information
    - JTLS-GO API (JODA Client)

OUTCOME: JTLS-GO will be able to align and automatically stimulate or feed SitaWare HQ

Roadmap – Phase 1

Synthetic Environment

JTLS GO

Additional Synthetic Elements:
- Additional Simulation Systems
- High Resolution Models
- Low Overhead Drivers (LOD)
- Image Generators
- Radio & Messaging

VCCI Tool Suite Services

- Start State Management
- Run Time Interoperability
- Run Time Services
- Communication Services
- Playback Services
- Data Exploitation Services
- Geo Services

VCCI

Genesis | Aramis | Audio Distribution Service | Midas | MapSpark

RW Operational Systems

Force Generation
Own Side ORBATs

Logistics
Deployments
Sustainment

Planning
Tasking Orders
Planning Elements

C2/ISR
Friendly Force
Recognised Pictures

Comms

Exercise 3D

Scenario
ORBATS
Actors

Exercise Control
COP
Data Analytics
Scripted Play

AAR

Fully Implemented - As defined
Partial implementation
Partial functionality enabled

Roadmap VCCI – JTLS-GO Integration – Follow on Phases

Follow on Phases – Iterative growth Options

Subject to JTLS-GO JODA client restrictions:

- Tactical Graphics
  - Bi-directional
- Two-Way ORBAT Transfer
  - ORBAT creation and alignment into JTLS-GO (Genesis)
- Tasks and Orders
  - Construct tasks and orders in JTLS-GO where order set is defined by external source
- Situational Awareness (SA) OUT
  - Feed SA information into JTLS-GO

OUTCOME: Expanded Interoperability; bi-directional workflows, more capabilities integrated (Sim and C4ISR)

Roadmap – Phase 2+

Synthetic Environment

JTLS GO

Additional Synthetic Elements:
- Additional Simulation Systems
- High Resolution Models
- Low Overhead Drivers (LOD)
- Image Generators
- Radio & Messaging

VCCI Tool Suite Services

- Start State Management
- Run Time Interoperability
- Run Time Services
- Communication Services
- Playback Services
- Data Exploitation Services
- Geo Services

VCCI

Genesis | Aramis | Audio Distribution Service | Midas | MapSpark

RW Operational Systems

Force Generation
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Exercise 3D

Scenario
ORBATS
Actors

Exercise Control
COP
Data Analytics
Scripted Play

AAR

Fully Implemented - As defined
Non-Roadmap dependant

Further considerations

VCCI as a 'Next Generation' enabler

- Complex synthetic environment - multiple sims with single common external interface
- Promotes collaboration across information stakeholders
- Promotes distribution across networks/domains

VCCI's modular deployment approach

- Helps with the management of ITAR/export controlled release

Conclusions

- **We do Systems Interoperability by design because we want to, not because we have to.**
  - VCCI will provide immediate benefit to any partner, or nation, requiring progressively deeper interaction with a JTLS-GO training environment.

  - Our JTLS-GO adaptor will be available this year, likely early Fall. Prototypes will be available for demonstrations shortly, likely at the next CAX2 Forum.

- **ADS can bring deeper communications to training environments; at every possible level.**
  - There is an opportunity for every nation, and partner, to reconsider how they blend operational communication systems with their training environments, not to mention how they might wish to transform their operational communications environment as well.

- **Regarding JTLS-GO > We are extremely pleased to be coming in to help, we are committed, and we look forward to helping NATO Nations further extend their training environments.**

Questions / Discussion