Combined Simulations: HLA Connected Simulations and Environment
Telespazio VEGA Deutschland, Olaf Herper and Marcus Zücker
8th Future Military Pilot Training, Berlin
Who we are

- Telespazio Vega – German Aerospace Company as part of Leonardo and Thales
- Located in Darmstadt, Hesse
- ~ 450 Employees
Expertise in Training Systems

Training Solutions

- Pilot Trainings
  - Cougar / Super Puma (Swiss Air Force)
  - EC635 (Swiss Air Force)
  - CH53GA (German Army)
  - CH53 GS/GE (German Army)

- Maintenance Trainings
  - NH90 (Norway, Netherland, France and Australia)
    - 4 Navy Variants and 2 Army Variants
Existing Training Equipment

- **CH 53 Mockup for Pilot training**
  - 2 in daily use in Holzdorf
  - 2 in daily use in Laupheim

- **Virtual Battlespace (VBS) for tactical infantry and logistic training**
  - Used at the Air Mobility Command in Celle
Cockpit Procedure Trainer CH-53 - Mockup
Cockpit Procedure Trainer CH-53 – Desktop version

Mobile CPT:
- Laptop
- Desktop PC
Virtual Battlespace

- Scenario Training
- Tactical Training
- Group procedure Training

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Distributed System
Combined Training Scenarios

- Examle for virtual training:
  - Board and disembark
  - Load- and unload cargo
  - Take-off and Landing
  - Forward Air MedEvac
  - Procedure for swarm flights
  - Gunner training

- **Main emphasis:** Combine training with pilots and ground forces
Training benefits

- Training and practice
  - Cooperation of pilots and ground forces
  - Together in a simulation network
  - With fully-synthetic training tools

- Authentic operating of the helicopter
- Realistic approach of the ground forces
- Cooperation of all forces
- In a common training environment
System Architecture - Overview

Virtual Environment:
• Provides models and entities in a simulated world
• Implements and tracks interactions between entities
• Provides interactive 3D-World
• Provides interface to Communication Layer

Communication Layer:
• Provides communication bus and services for all connected parties
• Provides model guide and structure for implementation
• Supports distributed participants

Simulator Interface:
• Collects data from all connected simulations
• Statevector (Pos., Vel., Equipment Configuration...)
• Distributes data from environment (entities in vicinity, threats...)
• Provides interface to Communication Layer

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System Architecture – Basic Layout

VBS3 IG  CIGI  VBS3 Gateway  HLA LVC

Pitch RTI
RPR 2.0 FOM  HLA CRC

Gateway  HLA

Client I/O

CH53GA

Simple Data
(R/P/Y, H/C config)

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System Architecture – Virtual Environment

Selected solution:
Virtual Battlespace
Bohemia Interactive Simulations

• 3D Environment
• Existing models and entities with interactions
• Capability to connect to external interfaces (HLA, Dis)
• Handover of entity control to external inputs
• Already in use and established
System Architecture – Communication Layer

HLA – Communication:
- „High-Level Architecture“ designed for communication within distributed simulations.
- **Federation of Federates** communicating via a Runtime-Infrastructure (RTI) using a **Federation Object Model (FOM)**
  - FOM: predefined by SISO-STD-001
  - VBS providing a CRC on their HLA-Interface, LRC have to be implemented on each participating simulation.
- Selected Solution: Pitch pRTI from Pitch Technologies
System Architecture – Simulator Interface

Sim-Interface:
- Data-Channels: CIGI and HLA
- Published Data:
  - StateVector (Pos., Vel., Orientation)
  - Entity State (Lights, Ramp, Ldg, Dmg...)
  - Communications (Radio)
- Received Data:
  - Visual Feedback (Height, other Entities)
  - Awareness (Other Entities for Sensors, Map...)
  - Communications (Radio)
System Architecture – Combined Simulation Overview

VBS3 IG

Roll, Pitch, Yaw
Collision, DTED

VBS3 IG

Gateway

CH53GA

GWClient

VBS3 Main Host w GW

VBS Client

Sim

proprietary

Telespazio VEGA Deutschland
Find us at the Leonardo Spa booth in **Hall 3 - 204**

THANK **YOU** FOR YOUR ATTENTION