VSI/GVA Data Model

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• Publish & Subscribe communication
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**Subsystem Communication**

- Need for subsystems to communicate with one another
  - GPS & Inertial Navigation System
  - Inertial Navigation System to Weapon System
  - Crewstation to Automotive
- The complete Vetronic system is greater than the sum of the subsystems!
Multiple Subsystem Communication

Data Producers need to know where Consumers live

Disadvantage
Tight coupling between producers & consumers
Publish & Subscribe Communication

- Data Producers do not need to know where Consumers live
- Data Consumers do not need to know where Producers live

- Efficient Communication
- Loosely Coupled
- Asynchronous

Data Producers

Middleware

Data Consumers

VSI
Vehicle Systems Integration
Publish & Subscribe Communication

Publish

Subscribe

Middleware Network

Application Program

Application Program

Application Program

Application Program

VSI
Vehicle Systems Integration

QinetiQ

QinetiQ

THALES

Raytheon

BAE SYSTEMS

MINISTRY OF DEFENCE

VRC
Vitech Research Centre
Abstracted Subsystem Communication

- Middleware abstracts the applications from the communication mechanism
- Application program need only provide an interface to the middleware
Communication

- Requires a common language understood by all participants
- A minimum vocabulary recognised by all participants
Data Model – common subsystem vocabulary

• DDS Middleware will establish an Information backbone
  – Basis for ‘plug & play’ subsystems.
• A ‘comprehensive’ Data Model must be defined for all subsystems
• A vehicle profile is applied to the Data Model to extract only interfaces required for that vehicle.
• The Data Model then generates the interface code for each subsystem
Land Data Model

- Land Data Model development is funded as part of the current VSI research package
  - QinetiQ led with contributions from: BAE Systems, Thales, General Dynamics (UK), Ultra Electronics, Selex Galileo, Lockheed Martin (Insy), VRC (University of Sussex).

- VSI & GVA Data Models are the same!
  - GVA model is a baselined version of the VSI Data Model
  - GVA implements a subset of the full VSI functionality
Model Structure

- Model segmented into functional areas
- Behaviour independent
- Documentation included
  - UML diagrams e.g. class & sequence diagrams
- Interface Design Language
  - generating the interface code
LPPV Data Model Instantiation

- Subset of the full VSI Data Model
- Implement only the interfaces required for the subsystems fitted
Ownership of the Data Model

- Essential that it is owned by MOD!

- Essential for MOD to be able to give the model to whomever it wants.

- Essential for MOD to stop suppliers changing things in a way that is only in the supplier’s interest

- International Research Collaboration – potential for MOD to standardise with France, Germany etc.
Video integration and interoperability

- Multiple sensor types (SD, HD, steerable etc) displays and video formats (compression etc)
- Interaction between individual company elements demonstrated

Uses Video Standard Def Stan 00-82

- 10 Gigabit Ethernet infrastructure

DDS Middleware and VSI data

- QinetiQ & Selex only
VSI Briefing Day QinetiQ demonstration

QinetiQ Sources

QinetiQ Monitors

Thales Monitors

Thales RTOS Source

00-82 domain

Video Manager/Gateway

Monitor

DDS domain

VTID Source
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