Information Sharing
(OMG/C4I DTF)

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Presented by: M. Abramson, ASMG, President
Co-chair C4I DTF

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The CRO shared information environment envisioned by the SOPES initiative is categorized by services and/or capabilities supporting:

- A broad cross-section of crisis response organizations, including:
  - First Responders (e.g., Police, Fire Department and Emergency Medical Personnel);
  - Government Agencies (Federal, Provincial/State, and Municipal);
  - Non-Government Organizations (NGOs);
  - Private Volunteer Organizations (PVOs);
  - Para-military and security agencies; and
  - Military (Land, maritime, air, and space).

- A shared representative operational picture across organizations, agencies and communities of interest (e.g., Situational Awareness (SA) in support of a Common Operational Picture (COP), resource support, Urban Search and Rescue, Health and Medical Services, and transportation, and finance.
Objectives for SOPES

- Information Exchange Data Model (IEDM)
- Information Exchange Mechanism (IEM)
- Information Exchange Policy Management
- Logging and Auditing for Information Exchange Environments;
Promoting Interoperability through the JC3IEDM

Other Government Departments (OGDs)

Private Volunteer Organizations (PVOs)

Non-Government Organizations (NGOs)

Non-MIP Nations

Non-MIP CoIs

Other Levels of Government

Reach back to National Domain
Describing a Community of Interest (CoI)

User Semantics
User Exchange Syntax

Community of Interest Exchange Agreements
Community of Interest Semantics
Community of Interest Exchange Syntax
Community of Interest Exchange Protocols

Community of Interest Semantic Build Plans:
- Navigation Plans
- Semantic Guards
- Domain Filters

Community of Interest Taxonomy:
- Domain Business Rules
- Domain Values
- Domain Attributes
- Tags and Labels
Community of Interest Data Structures

DATA IN USE
User Application
Network Exchange
DATA IN TRANSIT

The Message (XML, PDU, ...)
SOPES IEDM Objectives

- Reusable Architectural Component for Crisis Management Interoperability
  - Common Transactional Ontology

- Alignment to OMS’s Information Exchange Framework (IEF)

- Alignment to Formal Architecture Frameworks
  - DODAF
  - MODAF
  - DNDAF
  - NAF
  - ZACKMAN
  - SABSA

- Provide an extensible modelling paradigm for transactional ontologies

- UML Profile that supports the needs of Stakeholders, Analysts and Engineers

- Alignment to Model Driven Architecture

- Multiple Platform Specific Models
  - XML (XSD provided in Annex 6)
  - Serialized Objects (Used for Testing)
  - Code Classes (C++, JAVA, …)
  - OWL RDF
Elements of Interoperability

- **Communities of Interest**

  - **Described in:**
    - Legislation
    - International Agreements
    - Policy/Doctrine
    - Memoranda of Understanding
    - Strategic Partnership Agreements
    - Operating Procedures

  - **Designed as:**
    - Contracts (Agreement to share information)
    - Semantics (Agreed meaning of the shared information)
    - Business Rules (Business rules for constructing semantics from data elements/stores)
    - Ontology (Allowable domains for data elements)
    - Guards and Filters (Selective removal of data from a semantic)
    - Runtime Parameters/Properties
Alignment to IEF

SOPES IEDM Specification

Transferred to IEF Initiative

Operational Log

User Application

Policy Based Data Service

API

Data Distribution Service

Security Services (e.g., Firewall and Encryption)

Security Audit Application

Scenario Analysis

Operator

Information Manager

Policy Management Service

Architecture Metadata

Executable Policies (Rules)

Transformation Rules

Meta-data Transformations

1. Project
   - 1) Information Contracts
   - 2) Semantics
   - 3) Business Rules
   - 4) Privacy, Confidentiality, Security Policies
   - 5) Information Resource Dictionary
   - 6) Static Data Model

Network

XML, PDU, AdatP-3, ...

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Alignment to IEF

Information Exchange Framework

- Policies / Rules
  - IA
    - Confidentiality
    - Integrity
    - Availability
    - Provenience
    - Non-repudiation
    - Accountability / Traceability
  - Logs
    - Aggregation / Filters
    - QoS
    - Discovery
    - Deconfliction
    - Correlation

- Mechanisms
  - Distribution
  - Transliteration
    - Semantic
    - Syntactic
    - Vocabulary
    - Reconciliation

- Domain Specific Data Models
  - SOPES IEDM
    - Healthcare
    - Space
    - Finance
  - MIP JC3IEDM
    - C3 Taxonomy & Business Rules (TBM)
    - NGO TBM
    - Sustainment TBM
    - CRM & EM (TBM)
    - GooB TBM

Technology Exists
- Non-MARS RFP
- Active MARS RFP
- Pending RFP

White paper being developed by MARS
Alignment with DODAF

Operational View (OV2)

Node 1

Need Line

Node 2

Application

Data Distribution Services

Information Exchange Policy

MDA

Data Store

Business-Object View

Relational Data View

Logical > Physical Data Definitions OV7 / SV11

Data Transactions

Information Construction

Wrapper Entities

SOM Data

SOM Message

SOM Domain

SOM Entity

SOM Association

Semantics Agreements

Business Object

Information Construction

Data Transactions

Message Construction

Information Exchange Policy

Information Sharing Agreement

Semantic

Domain Filter(s)

Filtered Semantic

Filtered Semantic

Graphical Representation of OV 3

Onological Commitment

Community of Interest

Information (Ontology) View

More than a Graphical SV6

Defines / includes:

1. Business-Object / Message Construction rules;
2. Taxonomy;
3. Domains & Business Rules

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Domain Metamodel Provide to UPDM Effort

- Needline
  - need
  - contract
- InformationSharingAgreement
  - contract
  - owner
- CommunityofInterest
  - Owner
  - GuardSpecification
- InformationContract
- SemanticGuard
  - DataAggregateSafeguard
- Semantic
  - Identifier
- Transactional
  - Identifier
- LogicalDataModel
- Wrapper
- LogicalDataModel
- PhysicalCharacteristics
- LogicalCharacteristics
- MappingSource
- TargetLogicalModel
- AllowableTransactionSpecification
- LogicalDataModel
- PhysicalDataModel
- PhysicalTableDefinition
- SV-11::DataElement
- OV-7::InformationElement
- PhysicalModel
- ProblemDomain
- OperationalRule
- ConstructionPlan
- DomainFilter
- InformationSecurityDMM
- OV-7::InformationElement
- SV-11::DataElement
Statistics

- 16 Transactional Packages
- 184 Defined Transactions
- 271 Wrappers and Corresponding JC3IEDM Entities
- ~2500 pages
- 10 Annexes

Transactional Packages

1. Action (45)
2. Capability (2)
3. Context (12)
4. ControlFeature (5)
5. Facility (21)
6. GeographicFeature (5)
7. Holding (2)
8. Location (22)
9. Materiel (8)
10. MeteorologicalFeature (2)
11. ObjectItem (12)
12. ObjectType (6)
13. Organisation (20)
14. Person (7)
15. Plans & Orders (13)
16. Report (2)
SOPES Packages

Action:

- Action_Effect Action_Effect_Type
- Action_Objective_Item_Marking
- Action_Objective_Item_Target_Personnel_Protection
- Action_Resource_Employment_Aircraft
- Action_Resource_Employment_Electronic_Warfare
- Action_Resource_Employment_Maritime
- Action_Resource_Employment_Reconnaissance
- Action_Resource_Item
- Action_Resource_Type
- ActionEvent_CBRN
- ActionEvent_ChemicalBiological
- ActionEvent_Nuclear
- ActionEvent_NuclearWeapon
- ActionEvent_Radioactive
- ActionEvent_Radiological
- Candidate_Target_Detail_Item
- Candidate_Target_Detail_Type
- Action_Context Action_Context_Status
- Action_Effect_Item
- Action_Functional_Assoc Action_Location
- Action_Objective Action_Objective_Item
- Action_Objective_Task
- Action_Objective_Type
- Action_Reference_Assoc
- Action_Required_Capability
- Action_Resource
- Action_Resource_Employment
- Action_Temporal_Assoc
- ActionEvent_Composite
- ActionEvent_Detail
- ActionEvent_Status
- ActionTask_Composite
- ActionTask_ROE ActionTask_Status
- Candidate_Target_Detail
- Candidate_Target_Detail_Assoc
- Candidate_Target_Detail_Authorisation
- Candidate_Target_List
- Candidate_Target_List_Assoc
- Candidate_Target_List_Authorisation
- Request_Answer
Capability::

- Capability_Composite
- Capability_Reference_Assoc

Context::

- Context_Element_Reporting_Data_Item
- Context_Assessment
- Context_Context_Assoc_Status
- Context_Element
- Context_Element_Status
- Context_Object_Item_Assoc_Status
- Context_Reporting_Data_Assoc
- Context_Specification
- Operational_Information_Group_Organisation_Assoc
- Operational_Information_Group_Organisation_Assoc_Status
- Operational_Information_Group_Plan_Order_Content
- Reference_Assoc

ControlFeature::

- ControlFeature_Item
- ControlFeature_Item_Type
- ControlFeature_Position
- ControlFeature_Status
- ControlFeature_Type
SOPES Packages

**Facility::**
- Facility_Item Facility::Facility_Item_Type
- Facility_Position Facility::Facility_Status
- Facility_Type
- Medical_Facility_Status_Composite
- MFS_Casualty_Bed_Occupancy
- MFS_Pending_Casualty_Evacuation
- MFS_Pending_Surgery
- MFSI_Casualty_Group
- MFSI_Casualty_Type
- MFSI_Evacuation Facility::Military_Obstacle
- Minefield_Maritime_Casualty_Estimate
- Minefield_Maritime_Sustained_Threat_Measure_Of_Effectiveness
- Network_Facility_Capacity
- Network_Facility_Frequency
- Network_Facility_Item
- Network_Facility_Service
- Network_Facility_Service_Status
- Runway_Approach_Direction_Assoc

**GeographicFeature::**
- GeographicFeature_Item
- GeographicFeature_Item_Type
- GeographicFeature_Position
- GeographicFeature_Status
- GeographicFeature_Type

**Holding::**
- Holding
- Holding_Transfer
SOPES Packages

Location::
- Cartesian_Point Location::Cone_Volume
- Geographic_Point
- Relative_Coordinate_System
- Relative_Point Location::Sphere_Volume
- Surface_Volume Location::Absolute_Point
- CorridorArea_Surface Location::Ellipse_Surface
- FanArea_Surface
- Geometric_Volume_Item Location::Line_Item
- LinePoint_Item Location::Location_Composite
- OrbitArea_Surface Location::Point_Item
- Point_Reference Location::PolyarcArea_Surface
- PolygonArea_Surface Location::Surface_Item
- TrackArea_Surface

MeteorologicalFeature::
- MeteorologicalFeature_Position
- MeteorologicalFeature_Item

ObjectItem::
- Object_Item_Address
- Object_Item_Affiliation
- Object_Item_Assoc
- Object_Item_Assoc_Status
- Object_Item_Capability
- Object_Item_Group_Account
- Object_Item_Group_Account_Detail
- Object_Item_Hostility_Status
- Object_Item_Object_Type_Establishment
- Object_Item_Reference_Assoc
- Object_Item_Type
- Object_Reference

Materiel::
- Consumable_Materiel_Type
- Equipment_Type Materiel::Materiel_Item
- Materiel_Item_Type
- Materiel_Position Materiel::Materiel_Status
- Materiel_Type Materiel::Vessel_Type
SOPES Packages

**ObjectType::**
- Object_Type
- Object_Type_Establishment
- Object_Type_Establishment_Detail
- Object_Type_Affiliation
- Object_Type_Capability_Norm
- Object_Type_Reference_Assoc

**Organisation::**
- Executive_Military_Organisation_Type
- Government_Organisation_Type
- Military_Post_Type
- Task_Formation_Type
- Unit_Type
- Unit_Type_Recursive
- Military_Organisation_Type
- Organisation_Action_Assoc
- Organisation_ActionTask_ROE
- Organisation_Item
- Organisation_Item_Type
- Organisation_Materiel_Type_Assoc
- Organisation_PlanOrderByAssoc
- Organisation_PlanOrderByAssoc_Status
- Organisation_Position
- Organisation_Reference_Assoc
- Organisation_Status
- Organisation_Structure
- Organisation_Structure_Detail
- Organisation_Type
Person::
- Person_Identification_Document
- Person_Item
- Person_Item_Type
- Person_Language_Skill
- Person_Position
- Person_Status
- Person_Type

Plans & Orders::
- Plan_Order_Component_Header_Content
- Order_Item
- Order_Status
- Plan_Item
- Plan_Order_Assoc
- Plan_Order_Component
- Plan_Order_Component_Content
- Plan_Order_Component_Content_Reference
- Plan_Order_Component_Structure
- Plan_Order_Distribution
- Plan_Order_Distribution_Acknowledgement
- Plan_Order_Header_Content
- Plan_Status

Report::
- Absolute_Reporting_Data
- Relative_Reporting_Data
Transactional Exemplar
- Building on current practices
- Providing for the future
- Targets interoperability
- Highlights Information Security Policy as part of formal architectures
- Enables the specification of Security Safeguards as part of formal architectures
• Highlights security elements and filtering requirements as part of formal architectures
• Captures Transformation Requirements as part of Formal Architectures
Selective Construction

Class 0
- Attribute 1
- Attribute 2
- Attribute 3
- Attribute 4
- Attribute 5
- TransformData()

Class 1
- Attribute 1
- Attribute 2
- Attribute 3

Class 2
- Attribute 1
- Attribute 2

Class 5
- Attribute 1
- Attribute 2
- Attribute 3

<Transactional>

<Wrapper>
Compare Data Service SQL Inserts
Vs. MIP provided Inserts for each Test
- All inserts present
- All elements present and correct
- Not additional elements or incorrect elements
- No additional inserts

Execute MIP Check Script
Multiple PSMs

- SOPES Meta Model
- Domain Model Processor
- XMI Processor
- MIP Metadata Repository (CWM/MOF)
- MIP Semantic Model
- Transactional Model
- Persistence Model
- Business Object XSD
- OCL construction Plans
- SQL DDL
- Persistence XSD
- OWL/RDF ...
- SOPES v2 or MIP Blk4 ?
Schedule

- **Final Revised Submission – June 2008**
  - Released to OMG Community
  - Released to MIP Community
  - Released to DoD Sponsor

- **Vote-to-vote – June 2008**

- **Updates based on Community Comments**

- **Taskforce Vote – September 2008**
Questions?

Comments?

Mike Abramson
President, Advanced Systems Management Group Ltd
Co-chair OMG C4I Domain Task Force
Office: (613)567-7097 x222
Cell: (613) 794-1382
Email: abramson@asmg-ltd.com
Updates to Revised Submission
- c4i/08-05-xx (ASMG SOPES IEDM Annex 5 - revised submission)