

Summary of Sensor Standards Harmonization Technical Meeting

Report of the Technical Working Group

Huntsville, Alabama
US Space and Rocket Center
March 7, 2006

Purpose

- Develop a further collective technical understanding of the various sensor standards programs being advanced by SDO's
 - Discuss the more detailed technical aspects of sensor standards efforts
 - Reach an improved understanding of how these standards work together to address Community of Interest (COI) needs
 - Identify major issues needing resolution by sponsors of standards development programs
 - Identify opportunities to accelerate collaborative development of a coherent sensor standards framework
- Results be summarized for discussion with program sponsors at a follow-on Sensor Standards Harmonization Working Group meeting at NIST on March 14, 2006.

Attending

- Over 40 participants representing staff and members of several key standards consortia working to advance open standards for sensors and sensor networks

- IEEE TC 9
- OASIS
- OGC

3eti	Smart Sensor Systems
ESensors	European Space Agency
ESRI	Ionic Software
Michael Baker	Intergraph
Image Matters	Natural Resources Canada
Sandia Labs	Oak Ridge National Labs
Northrop Grumman	Lockheed Martin Corporation
IGN (France)	IRIS Corporation
L-3 Communications	University of Muenster (Germany)
US NIST	PCI Geomatics
US NGA	SAIC
Seicorp	CapWIN
Environment Canada	Texas A&M University
Warning Systems	University of Alabama Huntsville

Program Summary

- In-depth discussions of sensor standards programs:
 - IEEE 1451
 - OASIS CAP 1.1, EDXL-DE
 - OGC Web Services, OGC Sensor Web Enablement
- Presentation of case studies and demonstrations of standards frameworks in action
- Discussion / identification of issues, opportunities, and potential next steps for consideration by all involved

All documentation available at the NIST website:

<http://ieee1451.nist.gov/membersonly/March%207%202006%20Tech%20Meeting/>

For login - userid: 1451mem , password: 1451member

Harmonization Issues and Opportunities

- Participants identified a range of opportunities and issues worthy of further discussion and collaboration
- Immediate action needed to leverage opportunity for convergence of presently independent standards work
- Longer-term action recommended to assure that we collectively address significant related issues
 - Security
 - Architecture guidance for service interruption / denial of service
 - Coordinated outreach to increase awareness and encourage market uptake of “best practice” sensor standards frameworks

Harmonization Discussion Items

Short-Term

- Better understand and leverage IEEE, OASIS, and OGC sensor standards work to meet different user needs
- Clear vs. protected payload content (security issues).
 - Sensitive payload elements/blocks/modules (e.g., sensor location information) must be encrypted separately from the rest of message payload in many cases
 - Many COI's are “hot” for encryption, but most may not have this requirement
 - What parts of this need are implementation-specific and what parts must be addressed by the standard?
 - If it is a part of the standard, what is optional and what is mandatory?
- Design-space considerations for “XML-izing” TEDS (e.g., support for SensorML / TransducerML mappings)
 - Similar issue with “what gets done where” e.g., correction using TEDS data
 - Develop and maintain mappings between TEDS & SensorML, TML etc

Harmonization Discussion Items

Short-Term

- Post before processing, data storage/warehousing and replication considerations (e.g., continuity/reliability/quality of service)
- Alerting, notification, publish/subscribe models, messaging and interface issues
 - Need to consider the role of SOA alerting/messaging in an execution context
 - Replication strategies for redundancy (architecture level guidance?)
 - Validation of standards to support replication strategies
 - Further work to see how payloads work within certain protocols, and how they “fit” with COI scenarios
 - Use of common definitions / value lists regardless of service / protocol used
- Traceability of sensor messaging initiation and services
 - For instance, CAP links to pedigree / lineage (e.g., via SensorML or other metadata) for source cross-references, citations, processing chain (e.g., where is message from and who authorizes it)

Harmonization Discussion Items

Short-Term

- Control (tasking) of actuators (commands, groups)
 - What are the COI policies and procedures (use cases) that drive these requirements?
 - How do we handle requests in terms of locking, prioritization of tasking etc?
 - EDXL-RM is an OASIS starting point for this issue. The OGC SPS is a service for planning / tasking sensors. Opportunities for SPS to use EDXL-RM? More work needed for fine-grained control.
- Compare and contrast similarities and differences between key standards of IEEE, OASIS, OGC
 - IEEE's Sensor Observation Service (part of a proposed Sensor Web Services wrap around IEEE 1451.0) and OGC's Sensor Observation Service
 - OASIS's EDXL-DE messaging and OGC's Sensor Alert Service

Harmonization Discussion Items Short-Term

- Time referencing
 - Required in many scenarios
 - Use of IEEE 1588 for clock / timestamp referencing
- Need for data transformations for legacy or other heterogeneous sensor systems and standards
 - For effective / efficient encapsulation of legacy systems / sensors
 - Expression of semantics with dictionaries, taxonomies, ontologies
 - Transformations of both semantics and syntax needed
- Need to reach out to other players for inclusion in this collaborative process
 - OMA, IETF from the LBS perspective
 - ISA
 - IEEE 1512, HIFLD, ,ZIGBEE, Wireless HART, Others?

Harmonization Discussion Items Longer-Term

- Expressing this work as part of architecture frameworks (DoDAF, FEA, RM-ODP, etc.)
 - Huge outreach issue / opportunity for various COI's
 - Key to provide focused guidance for build out
- Distribution policies, assertions, and management
 - In the context of security, authentication, etc.
- Overall outreach with industry and Communities of Interest (COI) / Use

Parting Thoughts

- This meeting was highly productive, set the stage for further collaboration. Some logical next steps:
 - Formalize a forum to work together to accelerate sensor standards development, testing, validation, and market implementation
 - Work SDO policies (Alliances, MOU's etc.) to improve access to sensor standards documentation and subject matter experts for improved coordination
 - Joint testbeds and pilots driven by COI use cases.
 - Inform COI sponsors of what we have found, and see their support to help drive this convergence
 - Inform and gain support of major Sensor Standards sponsors
 - Identify and employ common use cases for use to drive collaboration, testing, validation, and convergence
 - Enable access to sensors and sensor networks to address these use cases
 - Overall facilitation of milestones, life-cycle management to support various COI's

For March 14 Meeting at NIST

- Opportunity to inform COI sponsors of our initial findings, and options for near-term collaboration
- Recommend expanding this meeting to include representatives / sponsors from as many COIs as possible (Homeland security, Defense & Intelligence, Environment, Insurance, Transportation, Engineering, Construction, etc.).
- Standards needs of COIs will differ greatly; however, a “**core framework**” of sensor-related standards can help meet varied requirements