Tri-service Convergence:

Sensors Open Systems Architecture (SOSA)

Embedded Tech Trends

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Dr. Ilya Lipkin (AFLCMC)

Summary

- **SOSA standard is real**
  - Consortium stood up
  - All three services actively engaged
  - Technology demonstrated in flight
  - First draft approved
- **Industry application has begun**
  - Numerous acquisition programs lining up to use
  - Participation in SOSA includes a broad range of industry and end user participation
  - SOSA requirements are finding their way into DoD RFIs and RFPs
- **All are invited to participate**

Outline

- **Background**
  - Vision and scope
  - What is a sensor system

- **SOSA organization overview**
  - Standing working groups and their purpose
  - Bridging and ad hoc sub-committees

- **Current SOSA status**
  - Stand up of an Open Group consortium and what does it mean

SOSA VISION/GOALS

Vision- Business/acquisition practices and a technical environment for sensors and C4ISR payloads that foster *innovation*, industry *engagement*, *competition*, and allow for *rapid fielding* of cost-effective capabilities and platform mission reconfiguration while *minimizing logistical* requirements

| *Open*:	*Standardized*:	*Harmonized*:	*Aligned*:	*Cost Effective*:	*Adaptable*:
Vendor- and platform-agnostic open modular reference architecture and business model	Software, hardware, and electrical-mechanical module interface standards	Leverage existing and emerging open standards such as: FACE, OMS, SPIES, CMOSS, VICTORY, VITA	Consistent with DoD acquisition policy guidance	Affordable C4ISR systems including lifecycle costs	Rapidly responsive to changing user requirements

- SOSA End Product

  A set of **technical and business reference architectures**, IP **business case,**

  an acquisition strategy document, and a tailorable request for proposal (RFP) technical package

SOSA Vision
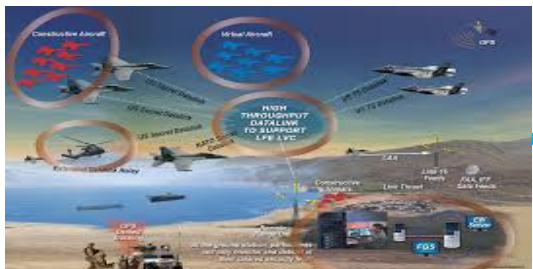
1. Current Mission Met Through Point Solutions and Workarounds

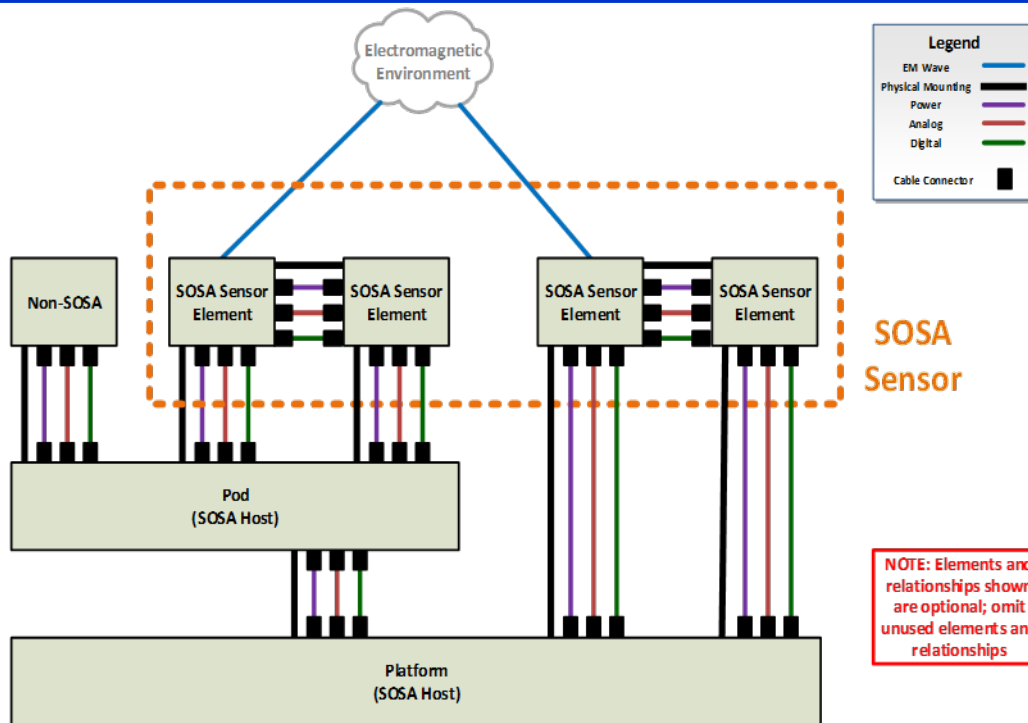2. Decomposition into Common Functional Components

3. Recomposition Of Common Components into Reusable Capability Packages

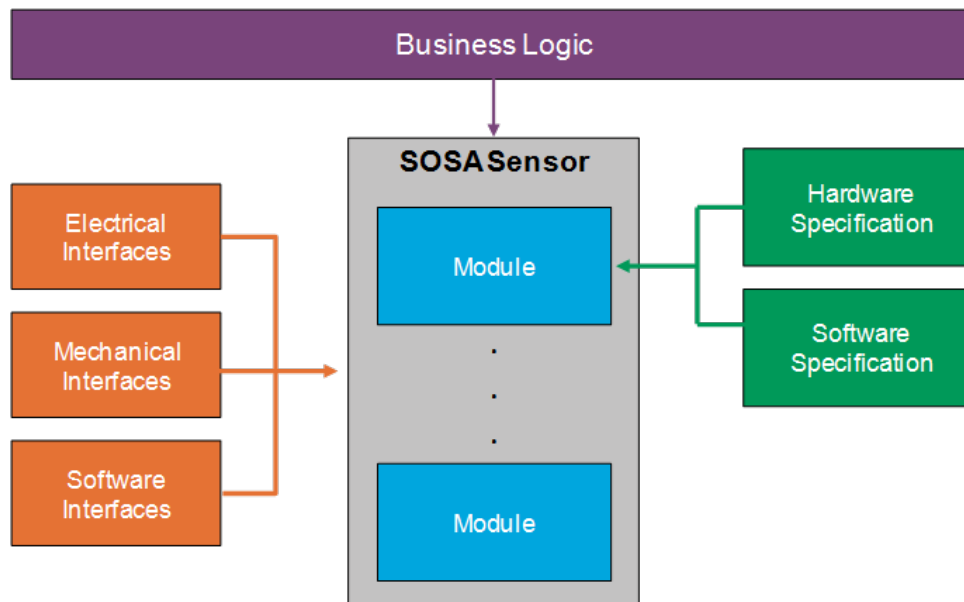4. Affordable Mission Effectiveness Through Systematic Reuse
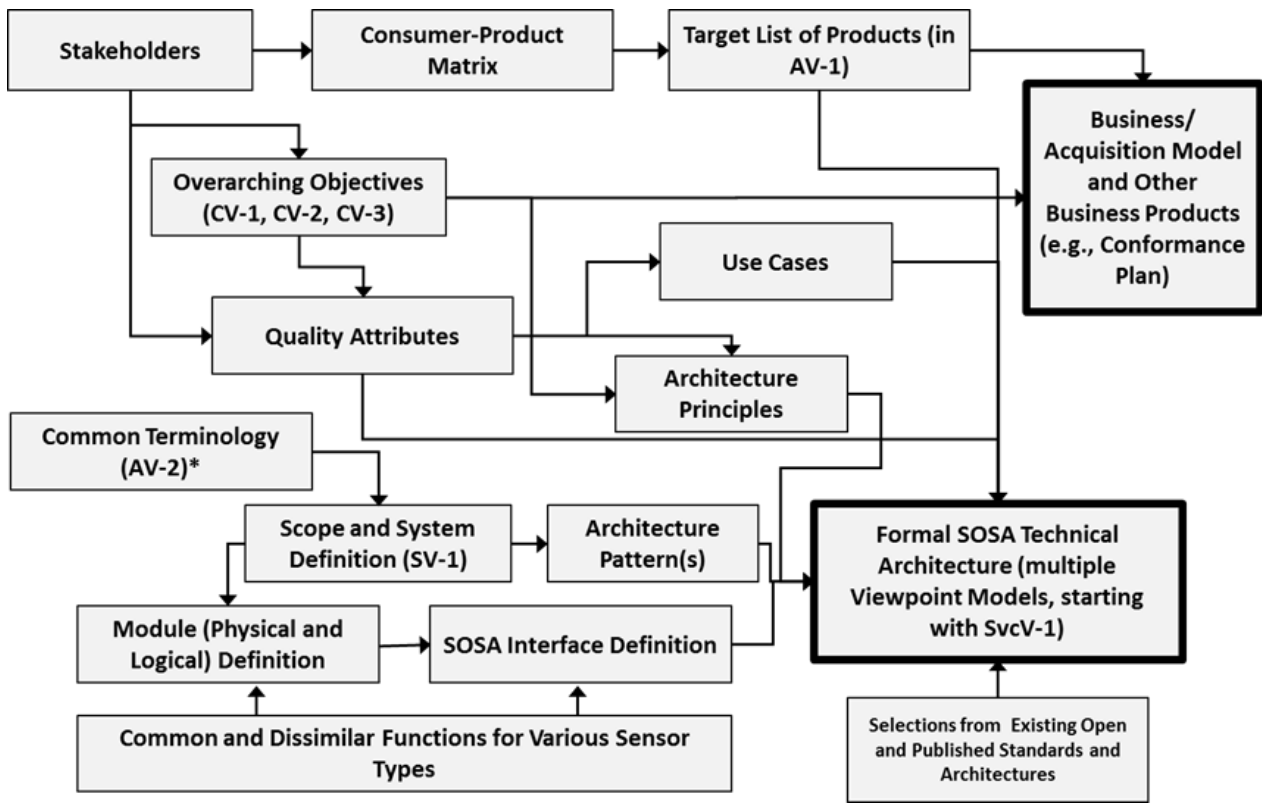
What Constitutes a SOSA Sensor?

The Facets that Comprise a SOSA Module

- **SOSA specifications are based on convergence of domains of knowledge for: business logic (market and government-driven forces), and technical (software, hardware, and electrical/mechanical interfaces).**

Architectural Development Method

SOSA Approach

The SOSA initiative Will

- Address the challenges of affordable capability evolution for today's military community.
  - Part of the SOSA approach is to develop an Open Systems Architecture (OSA), captured in the SOSA Technical Standard that addresses software, hardware, and payload modules, and interfaces.

This OSA

- Is designed to promote portability and create product families across the sensor, Radar, SIGINT, EW, Electro Optical/Infra-Red (EO/IR), and Communications community.

The SOSA Technical Standard

- Is intended to promote the development of reusable sensor components applicable to a broad class of sensors and host platforms.

SOSA Approach

Another aspect of the SOSA approach is

- To develop an Open Business Model that addresses the needs of the acquisition community and ensures a strong industrial base.

It includes

- Business processes to adapt the procurement to a MOSA reality, protect industry intellectual property, and incentivize industry to invest in broadly applicable technologies that can be applied to a wide variety of sensors.

SOSA Approach

The SOSA approach allows "capabilities"

- To be developed as components that are exposed to other components through well-defined ("key") interfaces.

It also provides

- For the reuse of capabilities across different environments.

The SOSA Technical Standard

- Does not guarantee compliance with any safety certification standard, but instead provides all the necessary capabilities to achieve that in the implementation phase by the vendors.
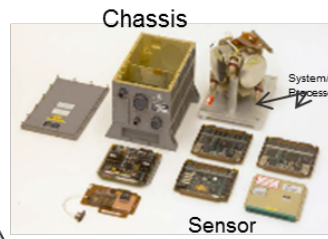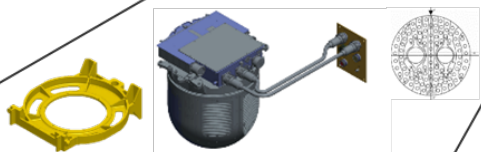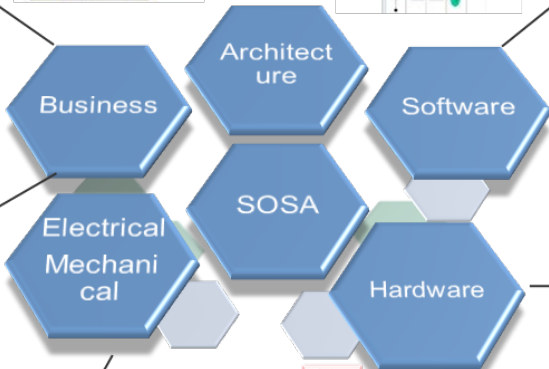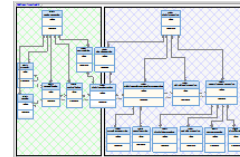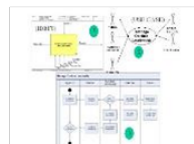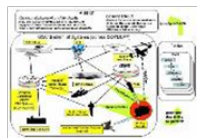
SOSA Organization

Data Rights
IP
Contracting Guide

SOW
CDRL
DID
Section L, M Support

Marketing
Outreach
Business Development
Open Acquisition Guide

Business

Architecture

Software

SOSA

Electrical
Mechanical

Hardware

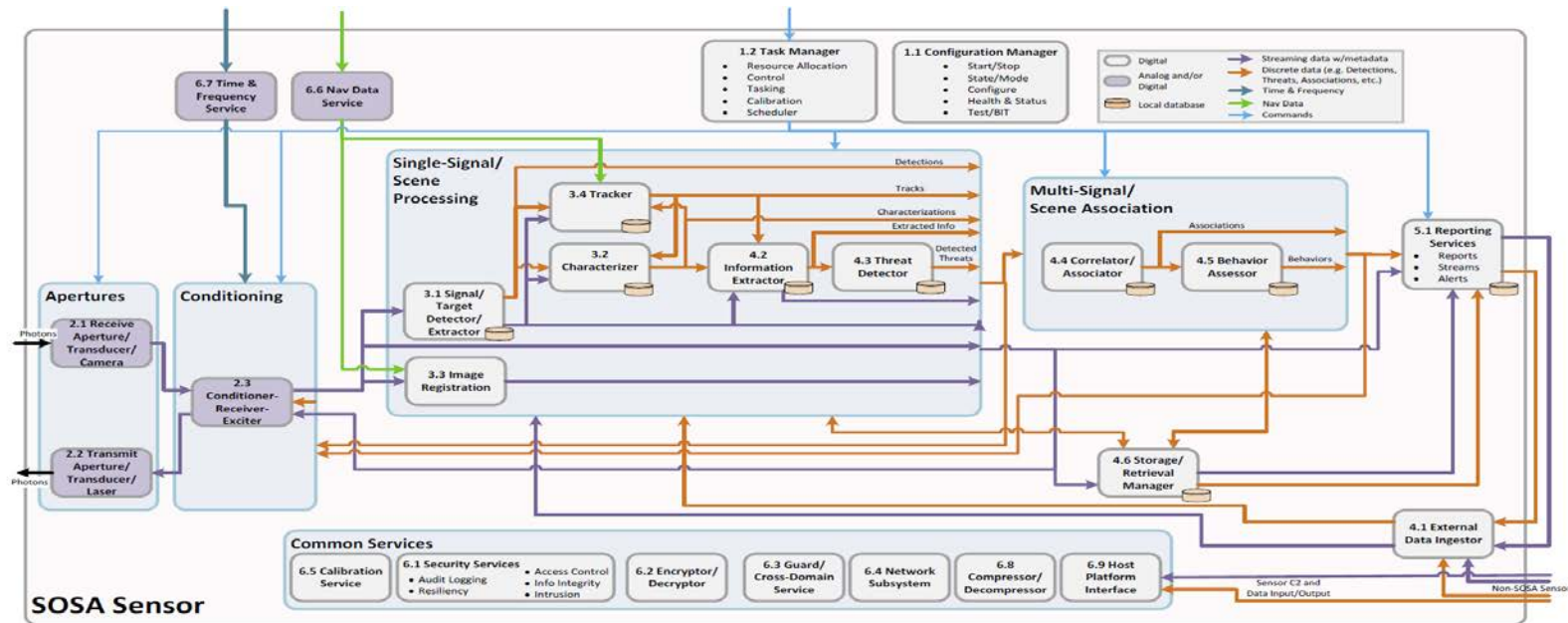Chassis

System/Mission
Processor
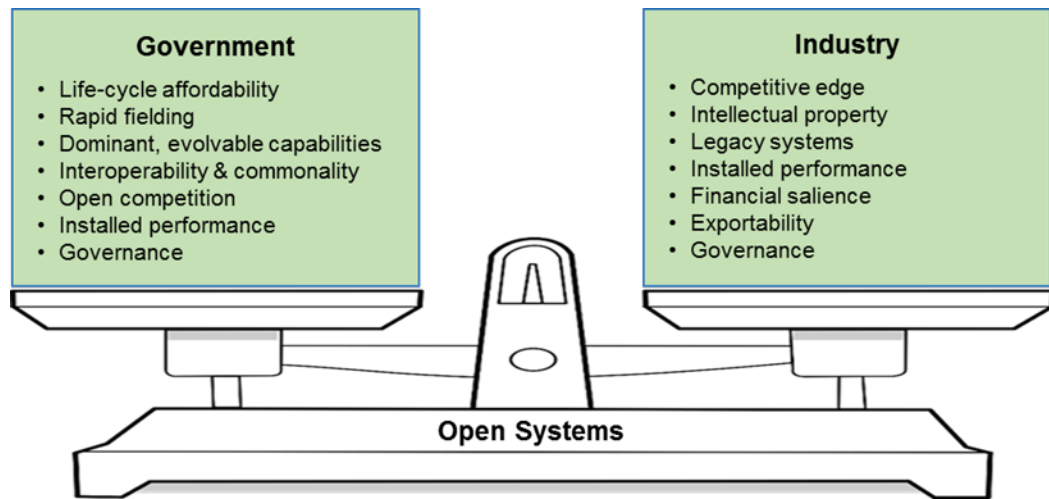
Sensor
Electronics

SOSA Architecture

- **SOSA Targeting Single/Multi-INT Architecture**

Each Module is Designed to be Competitively Procurable and Translatable to Selected OSA's

SOSA Business Initiative and Model

Government
- Life-cycle affordability
- Rapid fielding
- Dominant, evolvable capabilities
- Interoperability & commonality
- Open competition
- Installed performance
- Governance

Industry
- Competitive edge
- Intellectual property
- Legacy systems
- Installed performance
- Financial salience
- Exportability
- Governance

Open Systems

- **Supporting development of Open Business Model for C4ISR**
  - Developing with Industry/Government Collaboration Draft SOW, CDRLs, Section L/M sample language for procuring organizations
  - Open Systems Architecture (OSA) sample guide for the Industry partners
- **Conformance / Compliance Policies**
- **Developing Marketing, Intellectual Property (IP) and Collaboration Strategies with OSA**

SOSA Software View
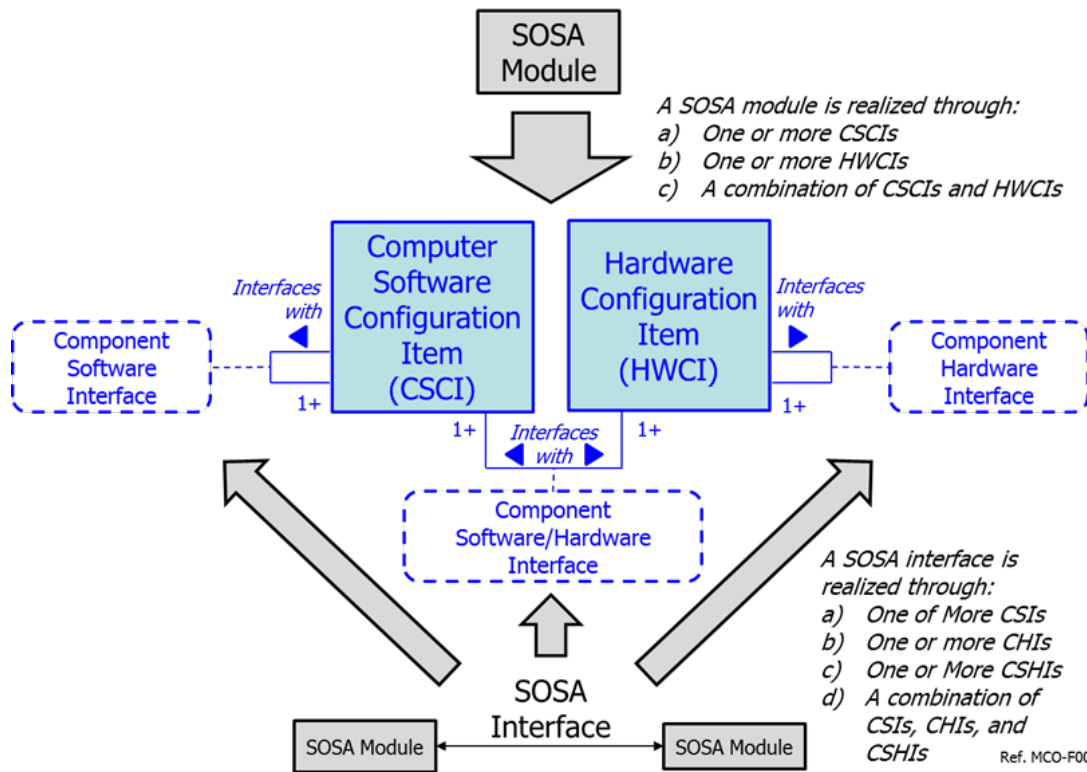
The SOSA module interfaces (bottom of figure)

- Are realized as Component Software Interfaces, Component Hardware Interfaces, or Component Software/Hardware Components.

The Software/Hardware Component Interface

- Represents a low-level tie such as interrupts from the hardware and/or the shared register/memory.

The Component Hardware Interface

- Represents the low-level analog/electrical interface between Hardware Components, effectively the Physical Layer in the Open System Interconnect Reference Model (OSIRM).

SOSA Module

A SOSA module is realized through:
a) One or more CSCIs
b) One or more HWCIs
c) A combination of CSCIs and HWCIs

Computer Software Configuration Item (CSCI)

Hardware Configuration Item (HWCI)

Component Software Interface

Component Hardware Interface

Interfaces with

1+   1+   1+   1+

Component Software/Hardware Interface

SOSA Interface

SOSA Module ◄──────► SOSA Module

A SOSA interface is realized through:
a) One of More CSIs
b) One or more CHIs
c) One or More CSHIs
d) A combination of CSIs, CHIs, and CSHIs

Ref. MCO-F0003ab

SOSA Hardware & Electrical Mechanical OSA
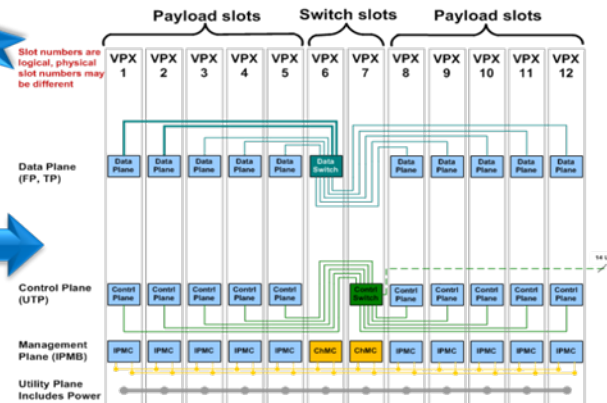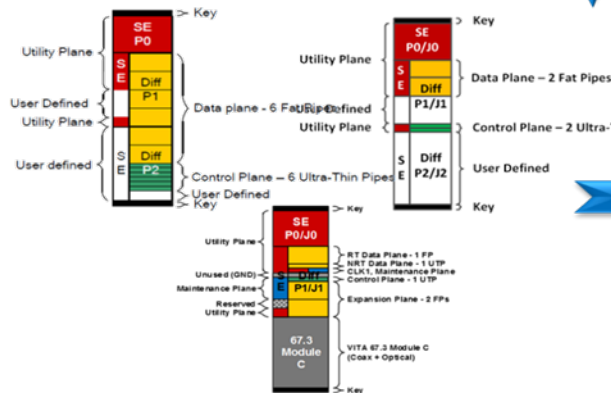
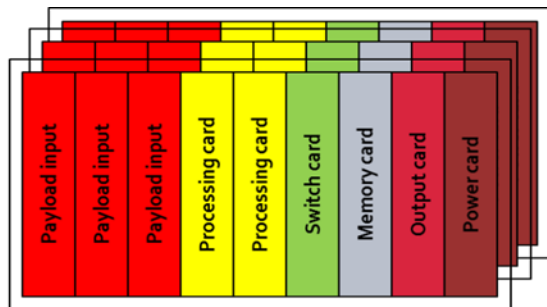**The SOSA Electrical/Mechanical standard**

- Will describe sensor pin outs for Class I and Class II sensors only.

Class III and Class IV sensors

- Do not have the physical space available to accommodate all signals outlined in the standard.

Future implementations of the standard

- Could include a limited subset of the standard that applies to Class III and IV sensors.

Enables Reuse of Sensors/Cards/Capabilities across programs and services

Current Status and Path Forward

- **First Industry Day – June 2015**
- **Formation of a consortium**
  - Formed working group under FACE consortium – November 2015
  - Independent Open Group Consortium stood up – November 2017
- **Snap shots/ DRAFT standard**
  - First draft November 2017, released January 2018
  - Next draft planned September 2018
- **Demonstrations**
  - Executed successful SPOC demo – July 2017
  - Next demo in planning – targeting early fall 2018