SNAP: MONA’s Foundation at SMC

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SNAP Motivation

Objective 1: Reduce to practice a MONA approach for a hosted payload adapter
Objective 2: Demonstrate with multiple payload and multiple spacecraft interfaces
SNAP Background

• Rapid, Low-Cost Development
  – Leveraged past work done by AFRL, ORS, DAPRA, NASA, ODNI
    • Planning phase enabled socialization before creation
  – Tasked Space Dynamics Laboratory who had relationships and expertise with previous open architecture efforts

• SNAP’s Building Blocks
  – Software built on AFRL-sponsored standards
  – SNAP unit based on BAE F6TP Breadboard
  – ORS’ MSV engineering model spacecraft used for demo
Adapting to MONA

The “Secret Sauce” is the Modular Open Network Architecture (MONA)

**Software “Driver”**
- Translates protocols
- Routes commands
- Routes data
- Abstracts functions
- Unique details pushed to boundary

**Any Payload**

**Any Spacecraft**

**Common Interface**

**Payload Unique Common SNAP Translator**

**Spacecraft Unique Common SNAP Translator**
Custom interfaces can be supported:
- Design and build an interface module for a custom interface (new electronic board)
- Create a “driver” to talk to the interface module (same scope on new software driver)
SNAP Architecture Reduces Cost & Time

What We Have

- 80% software reuse / 100% re-test
  - Reused w/mod
  - Reused w/mod
  - Reused w/mod
  - Reused w/mod
  - Reused w/mod

Higher Cost
Adapting to new hardware

What We Want

- 80% software reuse / 20% re-test
  - New
  - Reused
  - Reused
  - Reused
  - Reused

SNAP Services

Lower Cost
SNAP uses packet encapsulation to **minimize change propagation**.
Packet encapsulation enables modularity in network communication.
Packet formats can change, other formats stay the same.
This is the “N” in MONA.
Transportation Uses a Similar Modular System
Setting the Foundation

- SNAP’s “ripple” effect
  1) enables government program managers to leverage prior knowledge
  2) creates atmosphere for collaboration, competition, and cost reduction
  3) provides starting point to influence future space acquisitions

• SNAP’s Future Direction
  • Demo’s success indicates interest from industry attendees at MONA/SNAP Industry Workshop
    ▪ All SNAP material accessible to attendees
    ▪ Government/Industry collaboration to initiate standards development
  • Develop plans to address issues related to cyber security/information assurance in a MONA atmosphere