Architecting for the Future: Some Lessons Learned

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Outline

- Background
- Motivation
- GSO Architecture
- Architecture Realities
  - Operating, enhancing, and maintaining legacy systems
  - Acquiring new systems
- Summary

GSO Responsibility - Mission Ground Systems

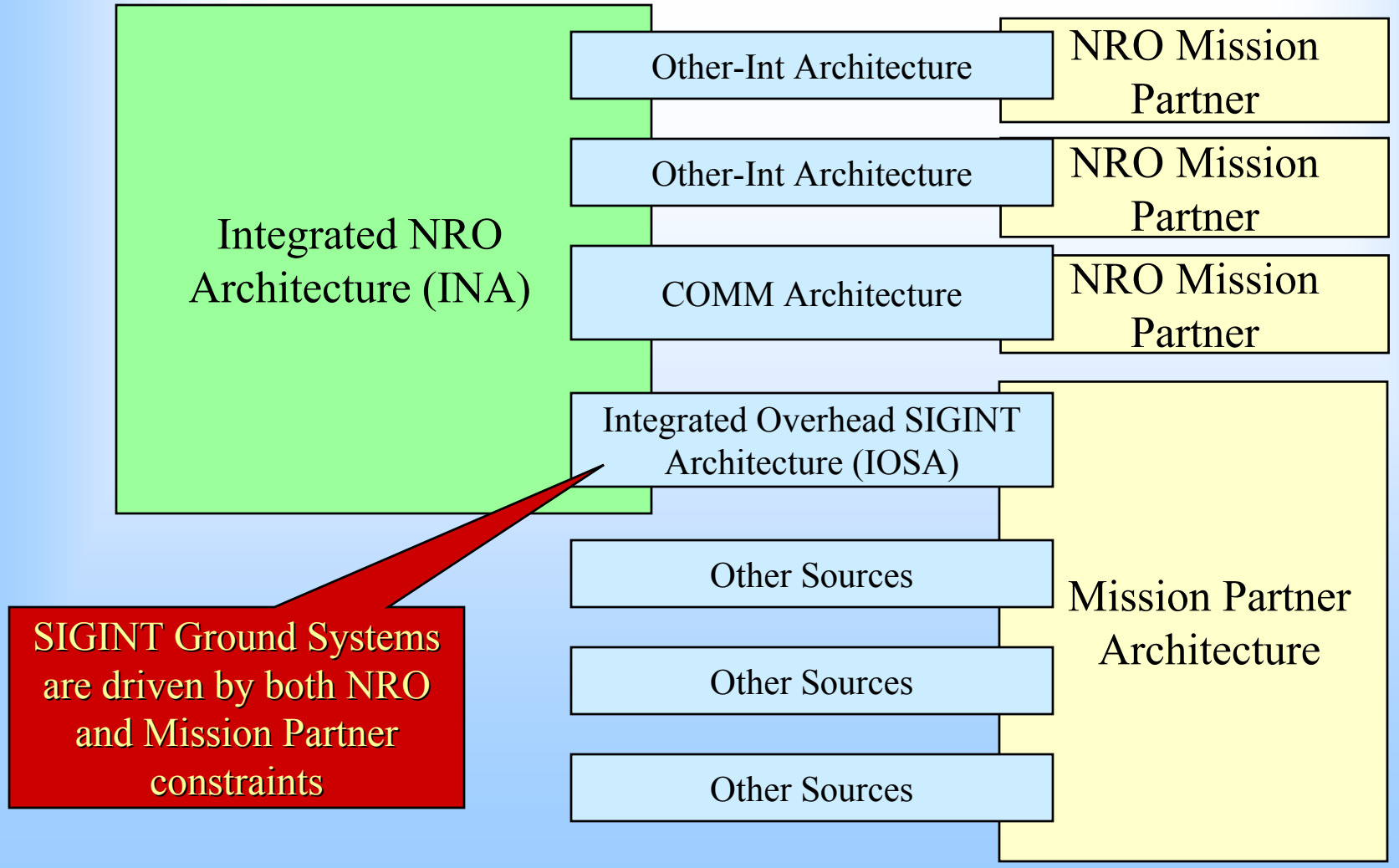
- Multiple Legacy Ground Elements for:
  - Planning
  - Flying
  - Distributing
  - Processing
- Developed and Maintained by Multiple SPOs
- GSO Responsible for Infrastructure and End-to-end Optimization
- Bottom Line: Roles, Responsibilities, Interface Boundaries are extremely complex

Challenges

- **Recent Successes Have Raised User Expectations**
  - Support to military operations
  - Data where and when users need it
  - Interoperability with non-NRO systems
  - Fusion of multiple sensor inputs
- **Increasing World Threats Demand:**
  - Quicker turnaround on system enhancements
  - Quicker turnaround on tasking requests
- **The Magic is On The Ground**
  - Only on the Ground Can NRO Respond to Expectations and Demands
  - With a strong ground architecture, we can respond faster than new sensor platforms can be designed and deployed

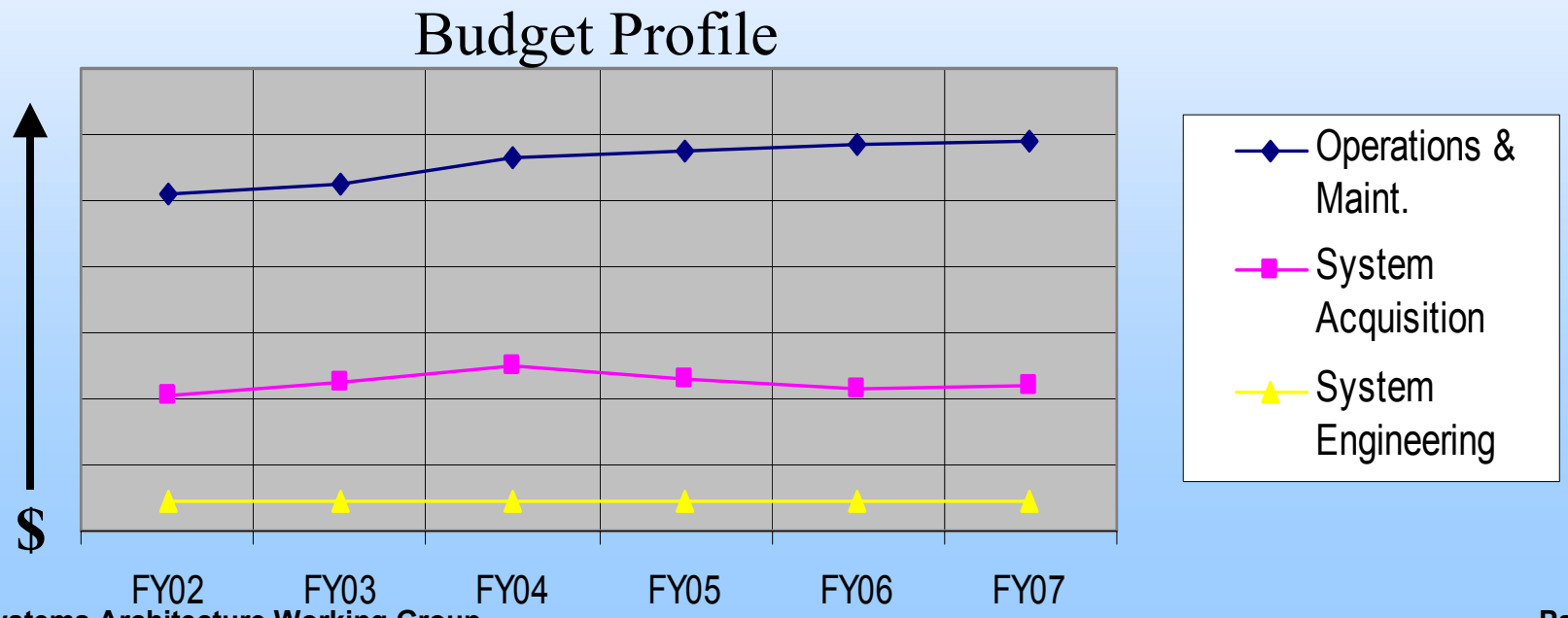
More Challenges…we have lot's of touch points

NROs Architecture Must Fit into Collaborative Environment with Mission Partners



Some More Challenges

- Declining resources on orbit
- Minimal synergy in stovepipe architectures
- Federal acquisition policies/laws not aligned with modern developmental strategies
- Long budget planning timeline
- Aging ground systems *dominated* by O&M costs



GSO Architecture
Goals / Objectives / Attributes

What we Did

Goals
- SIGINT value
- Overhead relevance

Objectives
- Increase overhead SIGINT value
  - Improve customer satisfaction with delivered data products
  - Provide unexpected capabilities
  - Decrease time to implement change
  - Maintain / increase coverage of program requirements
- Improve manageability of programs
- Improve coordination/integration with intel community
- Reduce life cycle costs
- Improve defensibility of programs
- Improve system reliability, availability, maintainability, & survivability

Attributes
- Improved access to data and tools
- Rapid insertion of capabilities
- Location independence for operators
- Responsive mission planning/execution with reduced complexity
- Isolation of impact of changes
- Elimination of single points of failures
- Exhaustive processing
- Consistency with external databases
- Shared algorithms/non-redundant processing
- Intrinsic security throughout

GRA role in GSO

New Starts

A

B

C

D

B

A

New Starts

C

B

New Starts

A

D

B

New Starts

GRA

ENDZONE

Architecting Realities

- **Leadership Commitment is Paramount to Success**
- **Architecture Team Leadership Requires and Enormous Amount of Energy, Focus and Emotion**
- **Architecting in an Acquisition Organization vice Architecting in an Architecture Organization**
  - **Impacting current acquisitions is very difficult**
  - **Current Commitments On the Books**
  - **Risk and Uncertainty Unproven**
  - **Funding Outside Near Term Window**
- **How the Architecture Team Works with People Will Make or Break it's Success and Longevity**
  - **Organizational Ownership is Critical**

Summary

- The Architecture is Never Done
- The Architecture will Never Be Acquired as Initially Defined
- Use the Architecture as a Tool
  - Disentangle Objectives and Keep Them Straight
  - Understand Purposes of Separate Products
  - Point of Departure for Discussion and Analysis