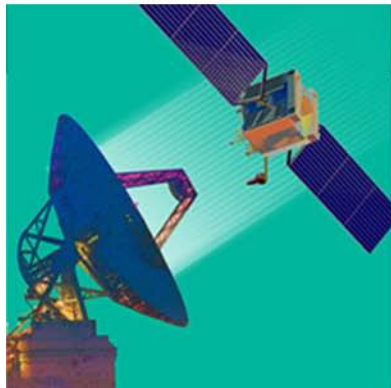


# Working Group Outbrief

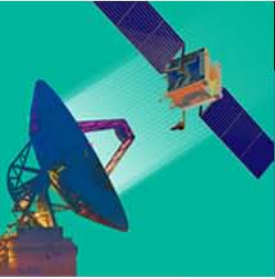
## Ground System Architectures Workshop



Session 11E

Architecture-Centric Evolution  
Working Group 2009

*Maryann Hutchison, The Aerospace Corporation*



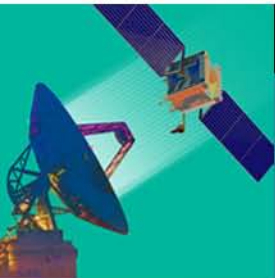
## Session Goals

- **Topic**
  - SOA (Service Oriented Architecture) based approaches for architecting satellite ground systems in a net-centric environment – Where we are today
- **Presentations & panel discussion**
  - Focus on sharing experiences in determining when (and if) a SOA-based architecture applies and experiences and lessons learned in developing or prototyping a SOA-based architecture.
- **Panel questions related to topic areas**
  - Software Architecture Considerations and Tradeoffs
  - Successes, Challenges, and Lessons Learned in Applying SOA
  - Implementation Considerations
  - Systems Interoperability
  - Standards and Core Services
  - Future Predictions



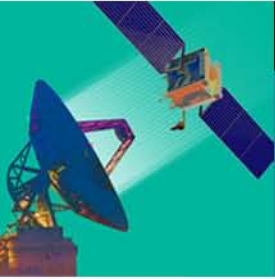
## Presenters/Panelists

- **Acquisition and Oversight Perspective**
  - Michael Kramer, Aerospace
  - Major Steve Paine, USAF
  - John Arcos, Eltefat Shokri, Aerospace
- **Development Perspective**
  - Magdi Carlton, NASA JPL
  - Morris Brill, Northrop Grumman
- **Research Perspective**
  - Scott Tilley, SEI/CMI
  - Richard Taylor (UCI), Nenad Medvidovic (USC), Eric Dashofy (Aerospace)



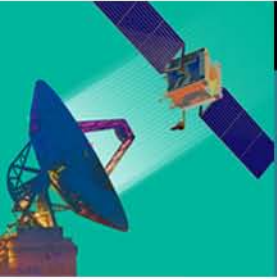
## Key Points

- **Definition of Service-Oriented Architecture**
  - Terminology overload: SOA is all things or “Are we drinking Kool-Aid?”
    - SOA cannot be purchased
    - Requires change of culture/paradigm;
  - Misconceptions on SOAs
    - Net-centric == SOA
    - Legacy applications can be easily integrated into SOA
      - consider using SMaRT for legacy migration
  - SOA is not a technology....it is a paradigm
    - How do you standardize a paradigm?



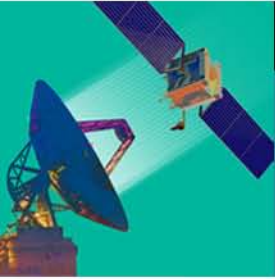
## Key Points

- **Experiences- Lessons Learned**
  - Need to align business operations and goals - 75% fail on 1<sup>st</sup> try
    - Cost of aligning business logic with IT
  - Agility in SOA framework is more important than immediate ROI
    - Reuse drives the long-term business case
    - Industry ROI is typically not seen for the first 2-5 years
  - Start small, fail small, build when you succeed!!
  - Tension between architectural purity and user needs
    - Selection and development of services should be driven by user-centric scenarios
- **Current Status and Appropriateness of Standards**
  - Reference architecture helpful in capturing diverse SOA viewpoints
  - Reference model captures core concepts and relationships to understand essence of SOA
  - Evolving SOA standards
  - Proliferation of competing standards and standards groups



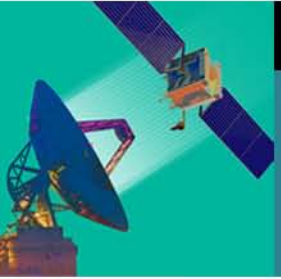
## Key Points

- **Implementation Considerations – Development**
  - Applied to: mission control, data management, S/C analysis, environmental information systems
    - Successful applications were those best suited to a SOA approach
  - Service ownership decentralization and independent evolution entail loss of control
    - Who pays?
    - Who's responsible?
    - New contract-business incentives evolving
  - Don't forget
    - Security
    - Training
    - Licensing dependencies
  - Legacy System challenges:
    - Architectural mismatches
    - Operational mismatches,
    - Tool availability
    - Separation of Concerns
  - CMU-SEI SMaRT available to analyze viability of legacy component migration
  - Service granularity



## Key Points

- **Where are we going – Research**
  - Consider WWW view
    - RESTful service architectural style vs SOAP-based Web services
      - exposing info via URLs vs methods
  - Semantics of service definition is a challenge
    - How to model and describe services?
    - QoS contract guarantees
  - Trends in SOA
    - Major Concerns:
      - From hiding Heterogeneity to Standards-based Interoperability to Integration
    - Performance
      - Like a local application to Some Real-Time to Predictable to Predictable +



## Conclusions

- Despite existence of an industry standard reference model (OASIS) on SOA, there is significant disagreement on what SOA is
- Decentralization means loss of control
  - Trust is a requisite component
- Successful SOA projects in progress
  - User-centric view
  - Importance of training
  - Essential to understand and align business operations and goals for achievable expectations