

## Working Group Outbrief

# Ground System Architectures Workshop

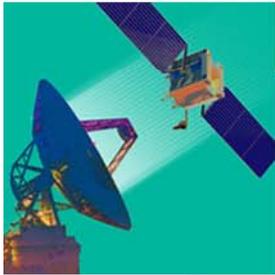


Session 12A

Beyond “Shall Statements”:  
Modernizing Requirements  
Engineering

*Leyna Cotran, Lockheed Martin Space Systems and University of California, Irvine; **Eric Dashofy**, The Aerospace Corporation*

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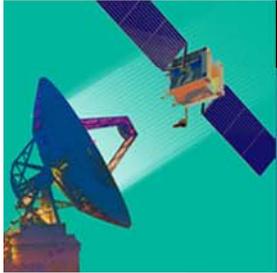


## Session 12A

### Session Goals

- Assemble stakeholders from the customer, contractor, oversight, and academic perspectives to discuss open issues and advances in requirements engineering
  - Are there techniques we can use to move beyond ‘shall’ statements for expressing and capturing requirements?
  - Should we continue to emphasize the “what vs. how” distinction in requirements?
  - How can we explore different, more flexible approaches to requirements engineering within the constraints of contracting models?

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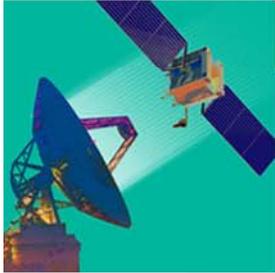


## Session 12A

### Presenters/Panelists

- Professor Richard Taylor, UC Irvine
  - Define requirements as changes to existing architectures
- Emil White, Lockheed Martin
  - Involve verification and validation stakeholders as early as possible
- Dale Robinson, Raytheon
  - Minimize the number of requirements to maximize flexibility
- Dr. Ban Al-Ani, UC Irvine
  - Techniques from the social sciences can inspire new forms of requirements capture
- Jorge Seidel, Aerospace Corporation
  - Why do we make requirements for 10 year programs when we admit we cannot predict technological change in 10 years?
- Andrea Richards, Raytheon
  - Without information about intent and margin, subcontractors can't implement reqts

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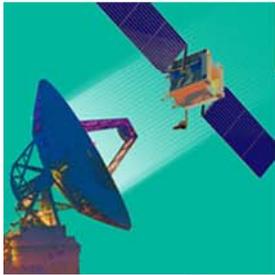


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### Key Points

- “The requirements” aren’t – stakeholders use requirements for different purposes
  - Context outside the requirements themselves is required for many stakeholder groups (CONOPS in particular)
  - Do we need the equivalent of styles and views?
- Spending more to engage a wide variety of stakeholders early can substantially reduce defects later
- It is possible to do successful agile development inside existing contracting models (less so in hardware)
  - You can change requirements after SRR, but with costs and only up to a point: testing is too late
- Different contracting models (e.g., “point systems”) could be interesting, but the implications are hard to understand.

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## Session 12A

## Conclusions

- We can move beyond ‘shall’ statements, but we cannot move away from them: some stakeholders need them (or the equivalent)
  - Model-driven approaches may provide the impetus
- Still a wide gap between market-driven and contract-driven models
  - Focus on the user is the bridge: the further you get away from the user, the more likely problems are
  - Avoid too much unmitigated user involvement, though
- The key to agility is broad buy-in from many stakeholders
- Reuse of requirements must become more acceptable and better than “copy-paste”
- Conceptualize systems with democracy, keep them on track with pharaohs