Beyond “Shall Statements”: Modernizing Requirements Engineering

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Ground System Architectures Workshop

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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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
• “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.
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.