Army, Laboratory, Industry, University: Modeling Stakeholder Needs

Where It All Starts and Could Abruptly End

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Agenda

• Steve and Kent’s Background
• Our Thesis
• Experiential Lessons Learned Applied to Teaching MBSE
• Our Investigative Process
• An Exercise for You
• Lessons Learned from the Process
• Takeaway
# Steve and Kent’s Background

## Steve Sutton
- Degrees in EE; Registered PE; INCOSE ESEP
- 45 yrs SE for information systems for intelligence and military applications – conceptual design and analysis
- Director of SE Program at UMD/ISR – taught intro to MBSE

## Kent de Jong
- Degrees in EE; Degree in Business; INCOSE CSEP
- 25 years SE for weapons systems, software systems, security systems, robotics & business systems - conceptual design & analysis through implementation & production
- Instructor at UMD/ISR teaching introduction to MBSE
Our Thesis

• Problem understanding not fully known before launching into functional design and developing values for performance

  (Ready → Fire → Aim → Fire → Aim)

• Program/project risk increases and eventually failure or delay occurs

• Get the problem statement “right” and the remainder of the work has a solid foundation

Our experience led to this thesis and the lessons learned we emphasize with our students
Lessons from Experience Applied to Teaching MBSE

- Ensure we have a clear, precise understanding of problem, its constraints, and stakeholders
- Express problem in terms and language of the stakeholder
- Keep the solution space wide open unless no alternative
- Precisely define textual language and terms
- Ensure unknowns addressed, resolved before proceeding to next stage in design
- Identify, assess consequences before changing course
- Include stakeholder in the process

Heuristic: Mistakes made on the first day constrain and haunt you for the remainder of the program
MB Language & Approaches Help Apply Lessons

• Model artifacts help understand the boundaries of the problem
• Model artifacts help with understanding the problem from stakeholder’s viewpoint
• Modeling language forces a more precise, if not perfect, expression of the problem – textual explanation clarifies the model
• Learn the language while addressing a problem
• Teach stakeholders to learn how to understand the models
• Use modeling language to take “notes” and from the notes build models that come under CM
• Use models to assess proposed changes
A System Engineering Method

Today’s focus: Using elicitation and models to understand and define a stakeholder(s) problem
Define the Problem

- Characterize Stakeholders
- Identify Sources of Distress
- Organize Known Information
- Define Problem Scope
Organize Known Information
Define Problem Scope
Exercise: The Automated Dog Walker

• Please review the problem statement provided
  • Customer owns dog
  • Customer wants a robot to walk the dog

• What questions would you ask of the customer?
Lessons Learned from the Process

• Defining a Problem is REALLY HARD
• Some uncertainty always
• Iteration is very helpful
• Models, diagrams help organize information
• Whatever we define, we need to validate
Takeaway

• Get the problem statement right and the rest of the program/project goes smoother
• Do try this at work or at home