Objectives

- Contribute key capability towards goals of ITAP, which is the “ilities” Tradespace and Affordability Program (RT46/113/137)
- Provide model-based affordability analysis for tradespaces that include diverse complex “ilities”

Overall Approach

- Leverage and extend several current bodies of work (BWI):
  - BW1: Trade study capabilities (FACT/ERS/Cortex)
  - BW2: Patterns for model interoperability (MIM)
  - BW3: Cost modeling capabilities (COSYSMO ...)
  - BW4: Implementation enablers (MBSE/SysML ...)
- Incorporate other “ilities” via BW3-like modeling in future phases

Approach (Oct 2013 - Dec 2015)

- Implement cost modeling concepts as SysML building blocks
  - Based on SoS/COSYSMO systems engineering cost (effort) modeling work by Lane, Valerdi, Boehm, et al.
  - Provides generic, reusable knowledge capture
- Apply SysML building blocks to system-of-systems (SoS) case studies
- Characterize broader applications for affordability trade studies

Accomplishments & Observations

- Created cost modeling building blocks in SysML
- Successfully validated via two healthcare SoS case studies:
  - Base complexity (Case 1) and increased complexity (Case 2)
- Characterized integration approach and application usages:
  - By other tools: FACT/ERS/Cortex, ...
  - With other capabilities: risk analysis, schedule analysis, ...
  - In normal system models: idealization algorithms for sizing/costing factors
- Via user-friendly interfaces: OpenMBEE for model-based wikis
- Benefits:
  - Enables better knowledge capture (e.g., includes units): — More modular, reusable, precise, maintainable, complete, ...
  - Acausal; better verification & validation vs. spreadsheets; ...
  - Enables swapping in/out alternative subsystem designs
  - Provides patterns that are easy-to-apply with many systems/SoS
- Provides key step for affordability trade studies with diverse “ilities”

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