How Can Systems Engineering Help Improve Program Development and Execution in Times of Tight Budgets?

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Looking through the lens of a Chief Engineer
- Program and Business

A lot of time spent fighting fires
- Program schedule and technical difficulties
- Test Failures

In my experience, the vast majority of fires are started by inadequate front-end systems engineering
Integration of a Radar into a System-of-Systems

- Problem: Attempt to develop Interface Specifications without having created a CONOPS and true functional allocation – “Just modify the existing ICD”
- Outcome:
  - ICD and IRS took an interminable series of meetings to develop, delaying software development and testing – “Hmm, what might we use this field for?”
  - Desired functionality lacking – “What do you mean I can’t drop a track?”

Integration of Existing Components into a Weapon System

- Problem: Integrate the components without end-to-end analysis capability to support architectural trades and functional allocations – “Already been done for all the components”
- Outcome:
  - System performance lacking – “Less than the sum of the parts”
  - Test preparation capability inadequate – “You assumed what?”
Now More Than Ever

Why this keeps happening
- Hard to quantify the benefit of avoiding future problems, rework, etc.
- Leveraging existing systems makes it easy to assume away the need
- In a cost constrained environment, SE can be a tempting target for perceived cost reduction

Why it can’t happen any more
- Programs can’t afford delays, rework and overruns due to inadequate or incomplete systems engineering
- The DoD can’t afford to buy systems that are not all they can be
- The Warfighter can’t afford the risk of system failures