Cost Estimating without a Point Design

Kelli McCoy Jet Propulsion Lab NASA Cost Symposium - August 12, 2014

Timeframe of Interest



 Most cost models are mass-driven with ancillary cost inputs like power, pointing, etc

+Early in a design, it is often too early to reasonably bound these parameters

Should an estimator wait patiently until a mission design has the maturity required to use traditional cost models?



The Effect

 In this scenario, a mission gets into an inefficient serial loop attempting to optimize design given a cost constraint





Potential Solution (CML 1)

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Input fed

to CML 2

 JPL has begun creating an adaptable and integrated set of cost/design tools, based on concept <u>maturity level</u>, using <u>all</u> cost & design data available

Q: How does a mission fall into family with other missions? A: Use Cluster Analysis to understand analogous family of missions and a range of potential cost

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CML 2: Feasibility #instruments on element Phase E duration Payload complexity/cost Power Source Mission Risk Class Prop System Type Primary Telecom Band CD S? Radiation Dose (krad)

Input

Mission Category Target Body Flight Element Type Data Type Q: Is this mission feasible within cost/design constraint?

A: Building off Cluster Analysis, use PCA & Bayesian methods to understand cost and uncertainty

 After initial feasibility is determined, integrated models can perform real-time design/cost trades until an optimal point design is achieved

Potential Solution (CML 4-5)

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Yes! Technical Tools Multidisciplinary • Dry Parameter teams Mass DB Computer • Costing models Multiple Tools • simulation tools NICM Data repositories • PCEC . . . **PRICE** Dry Mass Do we mean the same thing?

Balanced Design and Cost Assessment

Summary

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- At completion, we will have a set of dynamic models for early formulation where...
 - design and cost are integrated models, enabling a cost-effective design at inception
 - inputs are tailored for concept maturity, such that we don't need to wait for a point design to bound mission cost
 - + all available data is used in an appropriate manner