

What is Team X?

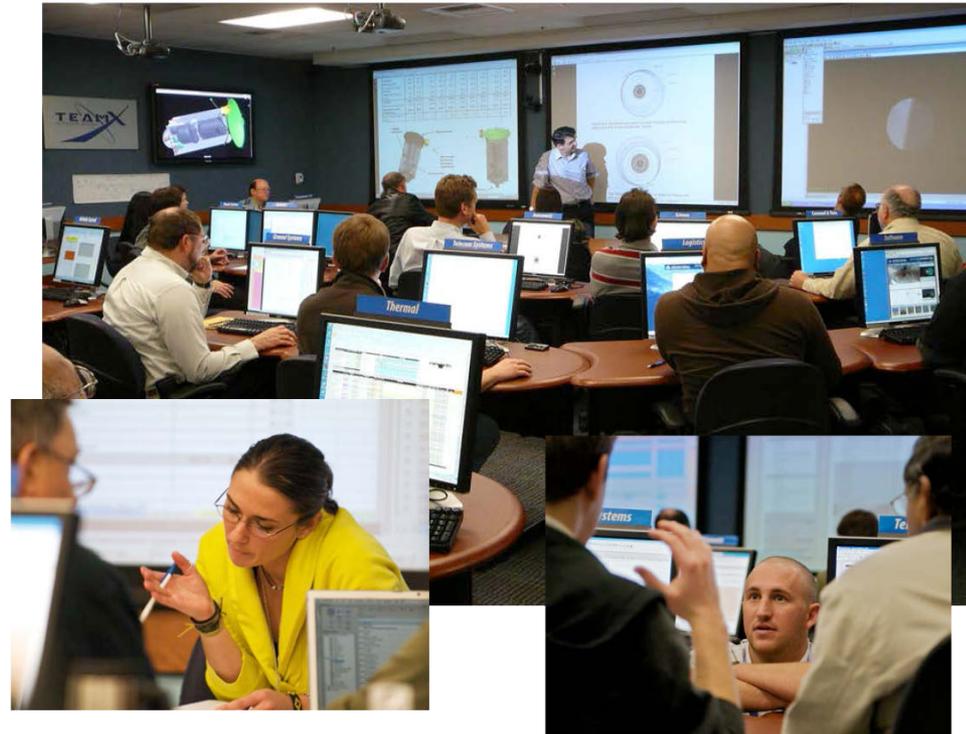
TEAM

Jet Propulsion Laboratory

X

Keith Warfield
June 27, 2012

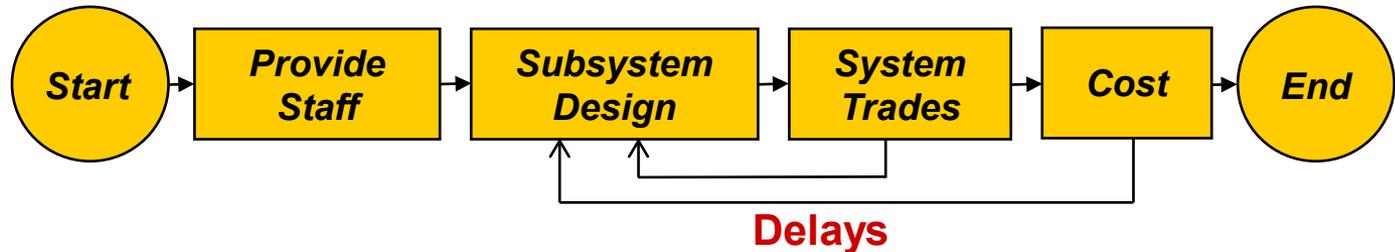
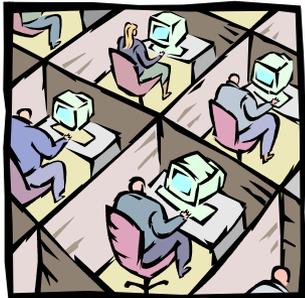
Team X is a concurrent engineering team for rapid design and analysis of space mission concepts



- ✦ Developed in 1995 by JPL to reduce study time and cost
- ✦ More than 1100 studies completed
- ✦ Institutionally endorsed
- ✦ Emulated by many institutions

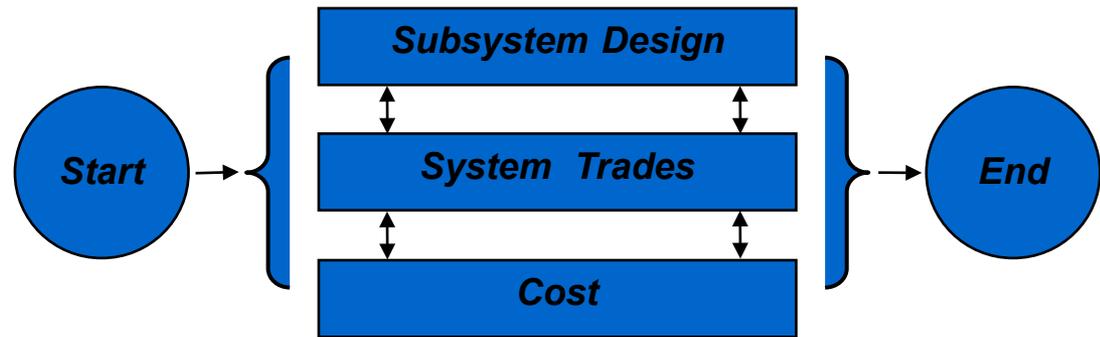
Team X profiled in *Time* magazine, October 2005

✦ Traditional Method – Serial



✦ Concurrent Engineering – Parallel

- Diverse specialists working in real time, in the same place, with shared data, to yield an integrated design



✦ People

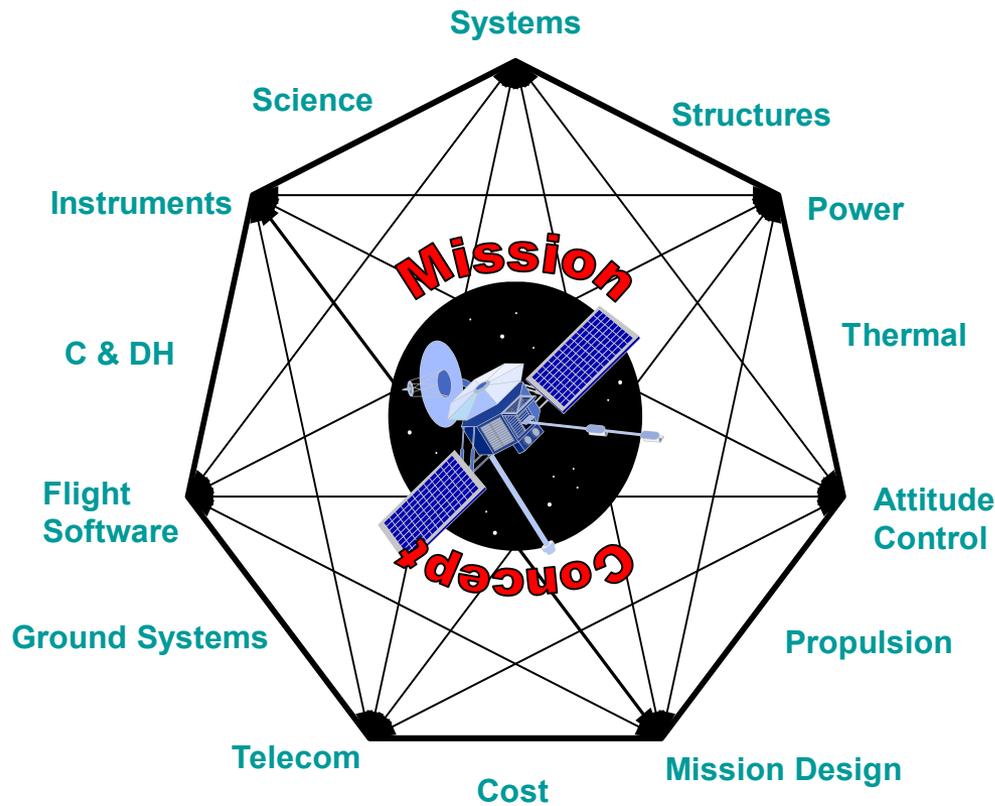
- About 20 regular “chairs” – each with a lead and at least 2 backups
- Each represents major subsystems of the spacecraft design
- Represent the “doing” orgs
- Usually working on current flight projects too
- Additional experts are added as needed

✦ Tools

- Each chair has subsystem sizing tools in Excel and exchange data with a common database through custom VB code
- Tools are endorsed by the “doing” orgs and selected by the chair leads
- Some tools currently in use: STK, Institutional Costs Models, Zemax, @RISK, Mathcad, SolidWorks, Unigraphics, and JPL proprietary trajectory and EDL tools

✦ Process

- Structured process is the framework for the study
 - ◆ Products – Team has a set of standard products, but will generate custom products when requested
 - ◆ Pre-work – non-concurrent work is started in advance of the study
 - ◆ Sessions – 3 hours each. Number and schedule vary depending on the study and products required
 - ◆ Post Study – Work is completed after sessions. SEs and Study Lead responsible for report completion.



Concept Design

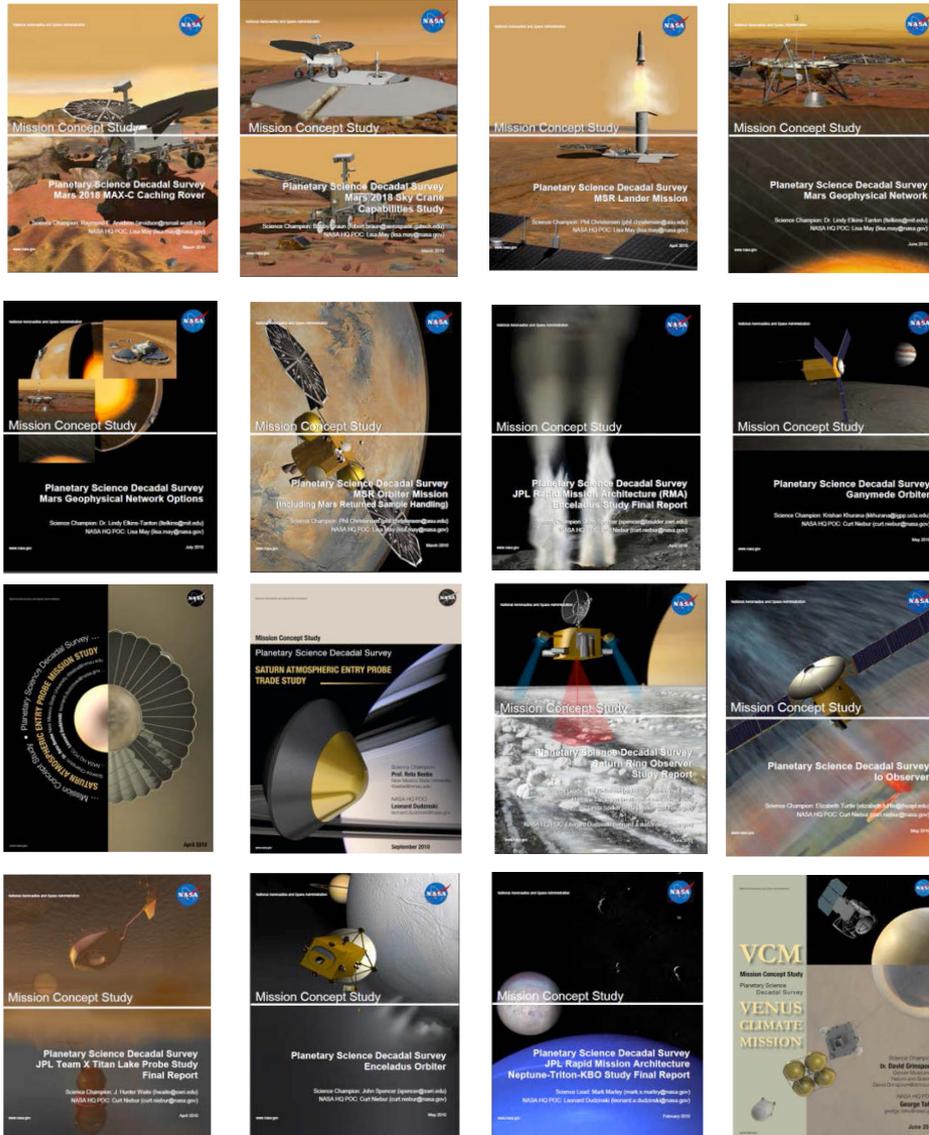
- Design and size a full space mission, platform or instrument
- Products: study report including mass, power and cost estimates
- Optional Products: configuration images; trajectory visualization; risk reports
- Schedule: 6-7 weeks

Institutional Cost Estimate

- Estimate the cost of a full space mission design concept
- Products: study report including cost estimate and its underlying assumptions
- Schedule: 3-4 weeks

Red Team Review

- Identify the strengths/weaknesses in an existing space mission or instrument design
- Products: report w/ technical and cost strengths, weaknesses, opportunities & threats
- Schedule: 1-2 weeks



✦ **Team X supported 16 architecture and mission concepts for Planetary Science Decadal Survey**

✦ **Team X supported 14 instrument and mission concepts for ASTRO 2010 Decadal Survey**