



THE IMPORTANCE OF PEOPLE IN ONE-OF-A-KIND FLIGHT PROJECTS

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AGENDA



- **Background**
 - Mars Program 1993-1999
 - JPL Mgmt. Philosophy and Practices
- **A Tale of Two Projects**
 - Mars Pathfinder
 - Mars Surveyor '98
- **Closing Thoughts**



BACKGROUND



- **Mars Program 1993-1999**

- Started as modestly funded (\$150 M/yr) effort to send orbiter/lander pairs to Mars at each launch opportunity (26 mo. Intervals)
- Emphasis on low-cost missions using “Faster-Better-Cheaper” philosophy for project development
- Examples
 - Mars Global Surveyor (1996 launch)
 - Mars Pathfinder (1996 launch)
 - Mars Surveyor ‘98 (1998/99 launches)
 - Mars Climate Orbiter
 - Mars Polar Lander

- **JPL Mgmt. Philosophy and Practices**

- During this period (1993-1999) onset of “Process-Based Management” approach with desire for broad application
 - Flight projects
 - Institutional functions



A TALE OF TWO PROJECTS



- **Mars Pathfinder**

- \$196 M Development Budget
 - \$171 M Lander
 - \$25 M Sojourner Rover
- 1992-1996 (Phase A/B/C/D)
- JPL In-House Implementation
 - “Subsystem mode”
 - Core project team collocated
 - Project team granted large degree of autonomy (“Skunkworks”)
- Single Project with “Cradle-to-Grave Responsibility”
 - Formulation
 - Full-scale development
 - Mission operations
 - High personnel continuity throughout life cycle
- Science Team Collocated with Project during Pre-Launch System Testing and Mission Operations



A TALE OF TWO PROJECTS (cont'd)



- **Mars Surveyor '98**

- \$190 M Development Budget
- Single Project developed two different missions/spacecraft
 - Mars Climate Orbiter
 - Mars Polar Lander
- 1994-1999 (Phase A/B/C/D)
- “Out-of-House” Implementation
 - Small (10-12 FTE) JPL Project Office
 - Single system contract for both spacecraft
 - Single contract for integrated lander science payload
- Multiple Organizations Involved Through Project Life Cycle
 - Shared effort between MS'98 and multi-mission ground system and operations project for ground system and handover to mission operations
 - Varying degrees of personnel continuity
- All science teams located remotely for both pre-launch training and all post-launch mission operations



A TALE OF TWO PROJECTS (cont'd)



- **Similarities**

- Each project heavily influenced by temperament and personality of individuals in key positions
- Fast-paced, demanding, stressful environment due to relatively small size of development teams
- Cost and schedule constraints STRONG drivers on both technical and programmatic decision-making processes that developed

- **Differences**

- Collocation vs. Decentralized teams resulted in substantial differences in speed and dynamics of decision making
- Pathfinder team became very cohesive with strong “esprit de corps” - heavy reliance on personal communication for success
- MS '98 developed strong cohesiveness in selected pockets, but political relationships between different organizations more like Balkans at times
- Generally more emphasis on regimented processes in MS '98 - very difficult when participants had little direct interaction



CLOSING THOUGHTS



- **Don't Lose Sight of Fact that Flight Projects are Accomplished by Good People Who are Dedicated and Work Hard**
 - True regardless of process(es) or mgmt. approach
 - For hard to quantify tasks, good processes tend to be by-product of getting right people, not other way around
 - Overemphasis on process and methodology (important though they are...) can be demoralizing to people
- **Interpersonal and Organization Relationships Matter**
 - Perhaps better to fit job to be done to people/organizations, rather than trying to force people/organizations to fit job
 - Compare/contrast MPF and MS'98 experiences
- **Differences between Success and Failure can be Very Small**
 - I wonder what would happen if MPF went through same failure review process as MS '98...
- **I Don't Have All the Answers!**