

Galaxy Evolution Explorer Postcards from a PM

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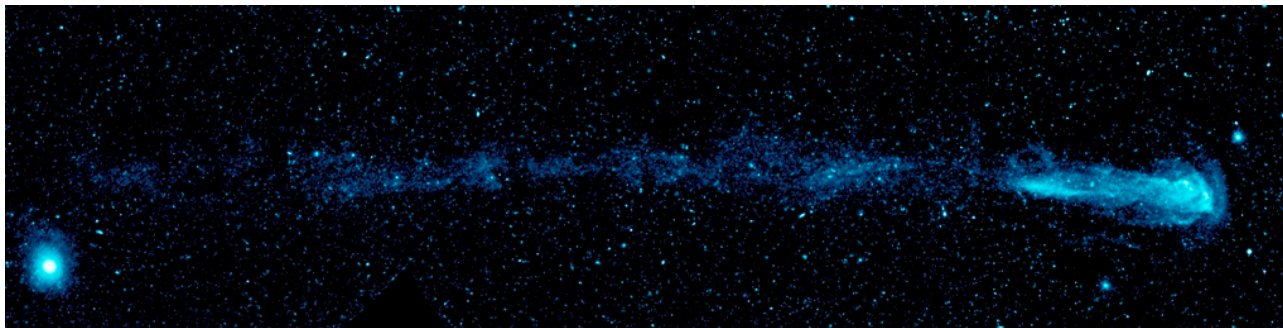
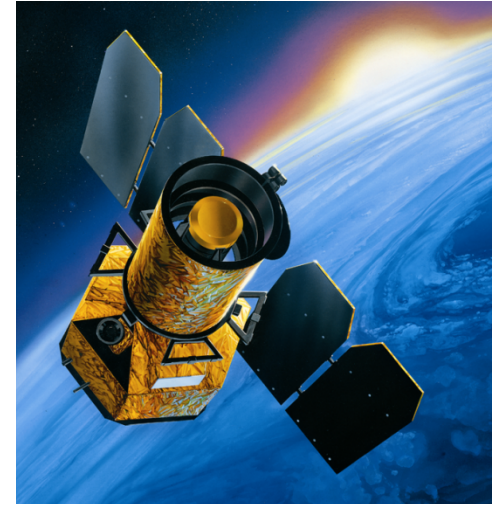


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Small Missions Can Produce Remarkable Science

- Galaxy Evolution Explorer is a space telescope that performed the first wide-area ultraviolet imaging and spectroscopic surveys of the heavens
- Primary mission: map the history of star formation over 80% of the age of the Universe
- Developed in 4 years for \$72M (sans rocket)
- Launched 28 Mar 2003 on a 28 month mission
- Flew largest detectors of their kind





Small Missions Present Special Challenges and Opportunities

- Small \neq Easy
 - *Difficulty = Challenge/Resources*
 - *Requires vigilance to remain focused and avoid requirements creep*
- Small does mean there is no place to hide
 - *Reserves smaller in absolute terms*
 - *More susceptible to forces beyond Project's control*
 - *Demand A-Team players (remove low performers quickly)*
 - *Staff with broadband individuals; use specialists as needed*
 - *Premium on proactive problem solving*
- Small offers some advantages
 - *PM is closer to technical work*
 - *PM has better visibility across the whole activity*
 - *Can more easily fly under the bureaucratic radar*



Postcards from a PM

- Five things to get right during formulation
 1. *Organization*
 - ◆ Strong individuals & institutions with clear authority and accountability
 - ◆ PI/PM relationship must be strong and trusting
 - ◆ Project Systems Engineer must be broadband and understand science req.
 2. *Work Breakdown Structure (WBS)*
 - ◆ Product oriented with clear deliverables and responsibility assignments
 3. *Requirements*
 - ◆ Be realistic, keeping requirements focused, achievable, and verifiable
 - ◆ Need ample performance margins and useful descopes
 4. *Schedule*
 - ◆ Protect key deliverables with ample funded schedule reserve (FSR)
 - ◆ Understand key dependencies and critical path
 5. *Budget*
 - ◆ Have ample cost reserves (separate from FSR)
 - ◆ Profile conservatively (especially with reserves)



Postcards from a PM

- Five things to get right during implementation
 1. *Management Controls*
 - ◆ Have good metrics to show performance against plan
 - ◆ Manage to life cycle cost and recommend descopes to PI if needed
 2. *Risk Management*
 - ◆ Sweep for risks across the team but triage them to manageable size
 3. *Systems Engineering*
 - ◆ Always have a baseline and resist make-better changes
 - ◆ Verify by test if possible and be sure test data is thoroughly reviewed
 4. *Communication and Reviews*
 - ◆ Keep team and stakeholders informed
 - ◆ Record agreements and decisions in writing
 - ◆ Reward those who identify mistakes; celebrate successes
 - ◆ Emphasize penetrating peer-to-peer reviews; avoid PowerPoint parades
 5. *Safety & Mission Assurance (SMA)*
 - ◆ Find cost effective ways to meet the intent of SMA requirements



Postcards from a PM

- Things to keep in mind:
 - *Some members of the science team are good engineers; use them!*
 - *Scaling existing technology is often riskier than it appears*
 - *Inheritance and reuse are usually exaggerated*
 - *Descopes are often invoked too late*
 - *“Every box needs a mother, or it becomes one”*
 - *Risk acceptance of stakeholders diminishes monotonically over time*
 - *It’s difficult to buy down risk after the fact*
 - *If performance can’t be verified by test it should be verified by more than one analytical approach; beware of test-like-you-fly exceptions*
 - *Ensure that subsystem Cogs and scientists review test data*
 - *Get to the root cause of anomalies*
 - *Pay attention to validation as well as verification*
 - *Make decisions in a timely manner*
 - *When in doubt take the path of least regret*