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Project Scientist Role

Some background

NASA's organization of space science projects creates an intrinsic tension between science and engineering:

The Project must build, send and operate equipment in space,

And at the same time, the Project must meet science objectives and maximize science return.

The Project Manager is responsible for budget and schedule and reports to a Program Executive at Headquarters, so NASA has placed space scientists under the discipline of engineers.

But NASA also designated a Project Scientist to advise the Project Manager on matters of general scientific significance.

Furthermore, the principal investigators (PIs) form the nucleus of a Science Working Group or PSG where project-wide science issues are raised and resolved.

By granting the Project Scientist the right to raise issues important to the PIs directly at Headquarters, NASA has reminded engineers that in science projects they must serve as well as manage the PIs.

Project Science Group

- chaired by the Project Scientist.
- includes Principal Investigators, Team Leaders and the Program Scientist, as co-chair, as members.
- establishes science and measurement strategies and coordinates cross-instrument and cross-discipline data analyses

NASA Headquarters View of Job

The Project Scientist

- provides scientific leadership
- assures that the mission meets or exceeds the science requirements.
- is an integral member of the project management team.

NASA Headquarters View of Job

The PS roles and responsibilities entail exercising responsibility, authority, and management in the following four areas:

1. Leadership: Provide scientific guidance and oversight of all elements of the project implementation, from the beginning of formulation to the end of science operations. Support development of science requirements, goals and objectives. Support definition of Level-1 specifications.
2. Planning: Takes lead in identifying scientific options for the PI (and PM for larger projects) in all matters regarding science, science policy, and science-engineering trades required to achieve the mission objectives within the schedule and resources available. Participate in project meetings/reviews and be responsible for confirming that scientific requirements will or will not be met.
3. Implementation: Oversee the implementation of the science observation program of the mission. Review and approve plans for calibration, operations, and data analysis.
4. Approval: Review and recommend approval of, and proposed modifications to, the science, and technical requirements. Provide recommendations on mission success criteria. Approve budgets and make decisions regarding expenditure of resources.

The Generic Center Project Scientist

The Project Scientist-

- is the lead science representative to NASA Headquarters
- is the the primary representative to the science community
- develops, articulates, and defends the science requirements, goals, and objectives
- assures that the system design and development are consistent with the science requirements and objectives

Project Scientist

- provides advice and guidance to the Project Manager.
- reviews and approves the Science Mission Operations requirements, and the science instrument performance requirements
- has overall responsibility for ensuring that science findings are made available to the media

Project Scientist

- develops the science utilization policies and attests to the acceptability of the end-to-end system level scientific performance
- is a recognized authority in space science and publishes in refereed, scientific journals
- coordinates publication of the science results from the mission
- coordinates and approves press releases and briefings

Project Scientist

- maximizes the science return of the mission within the schedule and resources available
- chairs the Project Science Group (PSG), with the Program Scientist as co-chair
- adjudicate conflicts among scientists and mediates between scientists and project management
- establishes clear policies for data rights and release
- approves the Project Data Management Plan

Rules for PS

1. You have a white collar job on the Project. Find a blue collar job and do that also.
2. Encourage your PM to always hire extremely talented people whether he has a spot for them or not.
3. Take time to personally show new people the ropes.
4. Make certain that the experiment teams interact early and often.

Rules for PS

5. Recognize the built in tension between the science and engineering
6. Set quarterly PSG meetings a year in advance and resist changing the date later.
7. Fight for the PI's interests, but pick your battles carefully.
8. Work with the Headquarters Program Scientist and keep her informed and involved in day-to day matters.

Rules for PS

9. Make sure all science requirements are clear and complete; you may get exactly what you ask for.
10. Refuse to go away and just let the engineers design systems to meet the science requirements. Track the development closely.
11. But avoid inserting creeping requirements.
12. Interact with the PM and Headquarters in establishing Level 1 requirements.

Rules for PS

13. Work to assure that there are viable plans for data validation and archiving and that delivery schedules are met.
14. Get involved in setting up special sessions to get the science out to the community.
15. Frequently brief the Project personnel (and contractors) on the science findings.
16. Get out to the tracking stations before launch to explain what the mission is about.
17. And I repeat - enable the teams to interact and discuss science.

An Important Document

NASA
Procedural
Requirements NPR 7120.5D
Effective Date: March 06, 2007
Expiration Date: March 06, 2012

COMPLIANCE IS MANDATORY

Subject: NASA Space Flight Program and Project Management Requirements

(Not much mention of science.)

NASA Administrator Dan Goldin, back in the days of faster, better, cheaper, came to JPL and told us that we should not always expect to achieve 100%. I don't recall any successful NASA planetary mission that has not achieved 200% or more. It is not possible to design a mission with confidence that it will achieve the level 1 requirements and not exceed those requirements.