

Developing Project Managers at NASA by Edward J. Hoffman

Professional development has always been a major concern at NASA, but until recently there has been no systematic process for the development, growth and improvement of the Agency's people working on projects. This article summarizes the NASA Project Management Development Process and highlights supporting processes to improve employees' project management skills and career development planning.

Ten years ago NASA established the Program Project Management Initiative (PPMI) to provide project management development in advance of need. Over the years, PPMI has met the needs of thousands of NASA employees. In recent years greater emphasis has been placed

on having a more systematic, agency-wide process for the development of people in projects.

In order to establish a systematic process which would best represent NASA and meet the demands of our workforce, a study was conducted to determine the components of an effective development process. The researchers interviewed over 150 people from five NASA Centers at various stages of their careers. The central finding of this study was the need for a NASA project management development process that would be voluntary, nonbureaucratic, open to many, and involve a minimum of paperwork.

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We appreciate the good response to our inaugural newsletter, dealing with the "fuzzy front end" of the innovation process. This issue is devoted to project management, which was the subject of our June Conference and July Roundtable and is becoming recognized as an important source of competitive advantage.

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Director

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In August 1993 the results of the full-scale Career Development Research Study were published. The study, titled *Career Development for Project Management*, led to NASA senior management's recommendation to establish and institutionalize the Project Management Development Process. The PMDP, formally established in 1995, has received a great deal of interest from other government agencies and industry, as well as international organizations.

While communicating the PMDP and receiving ideas for implementation, General Spence Armstrong, Associate Administrator for Human Resources and Education, and I visited every NASA Center. What we found was a great depth of concern for fairness and equity in the development of program and project managers. The predominant concerns were that NASA management would openly support and communicate such a process for NASA employees, and that the PMDP not result in a system which forced Center managers to hire project managers who have only gained "checklist" qualification. It should be neither a barrier nor a guarantee of promotion, but rather a wide-open, professional enhancement opportunity.

In January 1995 a group of NASA project managers and human resources management professionals met with staff at Kennedy Space Center to plan the launch of PMDP. This group refined and expanded the developmental experience and training recommendations described within the two PMDP handbooks. (Both the participant and supervisors PMDP handbooks are available through local training offices, as well as through the NASA web site: <http://www.hq.nasa.gov/office/HR-Education/training/ppmi.htm>.)

Note that PMDP is a process, not a program or product, and it is open to senior managers as well as to new hires and mid-career NASA employees. The development process is ongoing. It is also important to keep in mind that PMDP is not a training process; rather, it is a development process for enhancing critical competencies associated with the work of people in projects. With this direction, PMDP encourages gaining competency through appropriate and specific work assignments which are supplemented by well-timed training and development rotations and assignments.

PMDP Guidelines

To support the PMDP, a participant handbook and a supervisor handbook were created. Both guidebooks begin with a description of the Project Management Development Process, including the three main goals of strengthening "the consistent application of suc-

cessful project management practices" across all of NASA, providing "clear information" about professional development opportunities in the Agency, and identifying "work experiences, training and developmental assignments" which enable people in projects to enhance their competencies and support career development goals. The PMDP is not a selection process that limits future selection, nor is it a guarantee of future promotion. It is intended to support the enhancement of professional capabilities and growth.

PMDP is a tool to assist the NASA employee in career development planning. Its starting point and framework is the employee's Individual Development Plan, a projection of the applicant's career objectives along with the on-the-job work requirements to be supplemented by training and work assignments. The IDP is worked out in conjunction with a supervisor and, if desired, a mentor who will guide the employee through the PMDP. An IDP can be a Center-specific process, the NASA process or an approach the individual and immediate supervisor support.

The mentor and/or supervisor will ordinarily begin the process by asking the applicant to fill out a Record of Accomplishment (RoA), which will help each of them to determine where the employee is in terms of professional development. The RoA is a simple form, not unlike a resume or curriculum vitae, listing relevant education, work experience, training courses and other accomplished development opportunities. There is a sample RoA page within the participant handbook. It is the development of this RoA or listing of work and educational experiences that provides the individual and the supervisor with the information necessary to discuss an appropriate initial level of entry into the PMDP. More important than the initial level, however, is the fact that the RoA forces a person to take the time to document specifically the past experiences which establish a skill mark and visually supports the person in planning for future goals.

During the initial planning process the supervisor should provide honest feedback about the employee's accomplishments, skills and areas of growth. In addition, a mentor may be extremely useful for providing guidance of expertise which the supervisor might not have. It is important to keep in mind that the intent of this process is not to ascend to the highest level possible; the objective is to document the experiences gained to date honestly and clarify individual competencies, areas for growth and specific steps for enhancing competency. The PMDP should open up a window of needs and concurrent opportunities for gaining competencies.

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Both the RoA and the IDP are simply professional development tools. Completion of the forms is not an end in itself nor a contract for advancement. Emphasis should always be on the development process, not merely filling out forms and getting them signed. (In fact, the intent is that after the initial establishment of an RoA and a IDP, documentation and maintenance become simple.)

To assist the employee in building the Individual Development Plan, the PPMI has created the *IDP Advisor*, a 34-page handbook with locator that provides specific examples of potential work experiences and training recommendations for each of the four levels. The *IDP Advisor* is intended as a catalyst of potential activities, not a prescription. It will also be periodically updated to reflect management changes and offer new ideas.

Management Development Process

At the heart of PMDP are the core competencies for each of the four levels. Within each level are knowledge, skills and competencies clustered within the following eight general factors:

- organizational knowledge
- technical knowledge
- technical management
- project life cycle and program control
- contract acquisition
- individual and team development
- Agency, business and international relations
- risk management and safety

Hands-on technical expertise is emphasized in Level one, while broad leadership competencies are emphasized increasingly up through Level Four.

Typically, Level One is considered entry level after one to three years of basic discipline development and work experience. It focuses on hands-on engineering tasks. One critical component is understanding NASA guidance on the management of projects as documented in the soon to be released NPD 7120.4 (and concurrent handbook). Also considered critical to job performance in terms of organizational knowledge is some kind of understanding of and experience with the NASA Project Life Cycle. The supervisor and/or mentor may specify the observation of at least one program review per phase locally, plus several observations of project life cycle reviews with the Center director or directorate.

In the technical area, hands-on hardware/software operations are deemed critical, along with configuration management systems and procedures, plus quality assurance. Over a period of three or four years, the entry-level candi-

date is expected to develop thorough technical knowledge in his or her discipline, and participate in both operations analysis and research activities.

Three core training experiences are required for Level One candidates, each related to a corresponding work requirement. The Program Control Overview course relates to Project Life Cycle development activities, while Systems Engineering and Task Management enrich the technical program flow as well as cost and scheduling work requirements. Several other courses are encouraged, depending upon the candidate's work schedule and experiences. The fundamental idea is to make theory and practice mutually beneficial. As the one informs the other, the candidate in Level One obtains a broad foundation of knowledge and experience necessary for systematic career development.

Level Two candidates, on the other hand, typically find themselves gaining valuable experience as technical experts or as leaders on small subsystems or instrumentation projects. Their required courses are Project Management and Program Control Overview. At this point the candidate should be designing, developing, testing and reviewing hardware/software at the test bed and system level. He or she may serve as the leader of a cross-functional team, and lead team meetings.

Their knowledge of issues in interagency and international relations can be enhanced through work assignments, task teams and possible rotations. The candidates should by now be writing reports, requirements and Statements of Work (SOWs) for a subsystem. At this level they are encouraged to enhance their managerial skills because they will be assuming more managerial duties, with their communication and interpersonal skills becoming more important.

Level Three reflects a systems manager perspective. A candidate is expected to manage a systems-level project, including contractors and NASA team members. The individual manager is usually responsible for contract management, developing and monitoring master schedules, maintaining budget control, preparing a Program Operating Plan (POP) and managing the overall system life cycle. The project manager at this level is seen as an Agency resource and may be asked to serve on NASA-wide boards.

The Advanced Project Management course must be completed before completing Level Three. Courses

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in management and Performance Measurement Systems are encouraged, along with the Project Management Shared Experiences Program offered every other year.

The PMSEP is also encouraged for participants in Level Four, along with the Senior Executive Program. Work or developmental experiences require knowledge for NASA's political environment and strategic planning, as on Level Three.

At Level Four people are expected to interface with all project implementation organizations internal to NASA (Mission Assurance, Engineering, Operations, Acquisition) and external organizations (industry, academia, international partners, and U.S. governing bodies). They are expected to manage and be held accountable for the entire program or project which they are leading.

In terms of individual and team development activities, Level Four people should become adept in managing people (including recruitment, human resource development, coaching, mentoring and personnel evaluation) and teamwork (including team selection, motivation, rewards, empowerment and conflict resolution). They will be known for their decision making skills, creative problem solving and troubleshooting experiences. Working across Agency, Center and international lines, they learn to deal with other cultures and handle external factors which act on any project.

Of course, not everyone who chooses to enter the PMDP process will want to move through all four levels. Our NASA history and past practices show many talented, successful scientists and engineers have found their niche, working on technical tasks, managing small projects or balancing laboratory work and management.

Others will choose to progress through the ranks and up the four levels of accomplishment. They will enter the PMDP, meet with their mentor and/or supervisor regularly, plan their training and professional development activities, discuss their IDP and document their progress in their RoA, and make adjustments to the IDP at least annually, until the career objectives are fully achieved.

Moving from one level of achievement to the next higher one involves a minimum of paperwork and procedure. First of all, a candidate's supervisor has the authority to recommend individual placement up to Level Two. To begin Level Three, however, the supervisor will have to submit a completed IDP or RoA from

Level Two to the Installation PMC Panel for review and approval. Level Four entry requires the same procedure, plus concurrence from the Center Director and the Agency-level PMC. In each case, the Center's human resource organization will receive a copy of the revised IDP and completed RoA. Upon completion of each level the individual will receive an Agency certificate of recognition.

The primary responsibility for professional development rests with the applicant. We tried to keep the PMDP process as self-directed and self-monitored as possible, with plenty of assistance from mentors, supervisors and the PPMI. We have developed PMDP handbooks for the supervisor/mentor as well as the participant, and we ask that the applicants themselves who choose their mentors, if any, complete and process the documentation such as their own IDP and RoA, and that they schedule all meetings with mentor and/or supervisor for guidance and feedback.

The Installation Panels at the third and fourth levels set policy for the Center's PMDP to ensure fair and consistent treatment for all participants. They also approve "graduation" to the next level of accomplishment.

Likewise, the Program Management Council sets policy Agencywide for the PMDP and approves entry into Level Four. Our Headquarters PPMI Office coordinates the Agencywide project management training program in support of the PMDP and continues to periodically evaluate the PMDP as it relates to the quality of project management within NASA. With all this attention at various levels of NASA management, constant revision, upgrading and improvement of the PMDP process is expected as conditions change and as the needs of the Agency evolve. With the increasing emphasis around the world on core competencies for project managers, the PMDP provides unlimited opportunities for NASA project managers to plan and manage their own futures.

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Please forward all comments and suggestions regarding this newsletter to
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