

# **Engineering Project Management, GS- 0801-14**

## **AST- Engineering Project Management, NCC: 770-10**

**Position Number:** GS05H39

**Introductory Statement:** This Deputy Project Manager-Technical is within the Flight Programs and Projects Directorate (FPPD), Code 400. Multiple Deputy Project Manager-Technical position exists within the Directorate, each performing the following duties.

As the Deputy Project Manager-Technical for an FPPD Project, the incumbent is responsible for assisting the Project Manager with the planning, organizing, directing of technical and programmatic aspects of the project, and spanning diverse disciplines, which are necessary for the successful implementation in a Flight Program.

### **Engineering Project Management for NASA 60%**

Manages significant elements or phases of complex projects with three or more subsystems, services, capabilities, or products that support major NASA functions, programs, or projects. Originates and develops new tools, methods, techniques, or systems that contribute to a larger program or project.

Overcomes difficult and complex technical, project management, and organizational problems. Plans, guides, coordinates, and manages the work of subordinate, secondary, and matrixed resources engaged in accomplishing the missions and functions of the organization. Performs periodic review and analysis to assess achievement of major goals. Provides engineering analysis for special projects, future projects, and in advance planning of new systems and capabilities of all applicable NASA programs and areas of concern and responsibility. Participates in preliminary and critical design reviews and determines, develops, and defends requirements.

### **Technical Resources Management Work 10%**

Manages resources and/or resource allocations, requirements definition, integration, and review for broad projects and programs with national impact. Advises and consults with all levels of management, headquarters personnel, and other federal agencies, on technical and resource requirements in the design or construction of facilities, systems, or equipment. Resolves problems, integrating difficult and complex factors to negotiate changes and requirements. Develops policy. Establishes review processes and control systems.

Conducts technical reviews, performs programmatic analysis and assessments, and modifies resource allocations as required. Technical decisions and determinations are accepted as authoritative.

Establishes and maintains liaison with program managers and other project offices to ensure proper distribution of resources and adequate funding. Coordinates budget development and local authority funding actions for projects or programs. Conducts budget presentations.

**Advises on, Conducts, and Monitors Technical Managerial Functions 10%**

Serves as a senior technical contact for engineering projects/requirements. Keeps senior management informed on progress; proposed project, grant or contract modifications; resource analyses; analysis of proposals; and assessment of contract modifications. Consults, and advises management on operational and planning issues. Establishes budget and resource requirements.

Serves as expert representative on committees, panels, and working groups. Conducts comprehensive project and/or program reviews. Serves as technical liaison within the center/program and with other NASA centers and external agencies. Provides expert technical advice and direction to project and program managers, grant personnel, and contractor professionals

Work complexities require versatility and innovation, the implementation of short cuts or compromises that are considered risky, or the development of alternate solutions to reduce time and costs.

**Aerospace and Aeronautical Flight Systems Analysis and Development 10%**

Directs a broad range of inter-disciplinary development and design activities. Makes recommendations and implements actions involving highly complex technical problems, including those that apply to experimental or unconventional integrated systems such as aerospace and aeronautical flight applications. Analyzes, tests, evaluates, validates and certifies flight hardware, software and system capabilities based on design and operational and safety requirements. Defines unknown conditions, resolves critical design problems, or develops new design theories. Directs critical design projects and integrates unique systems, customer products, and project and/or program elements to satisfy vehicle design and operational requirements.

Performs as a program/project level expert in integrating requirements necessary for development and operations of flight vehicle systems and/or payloads. This includes mission integration, cargo integration, and related flight production scheduling activities in accordance with flight requirements, payload commitments, and operational constraints. Represents the Program/Project Office with internal and external NASA communities. Leads technical analyses of assigned systems and/or payload requirements. Recommends cost and scheduling strategies; policies and procedures; and operational schedules.

Serves as a recognized expert responsible for providing technical and management support for flight systems in accordance with Program or Project-level requirements. Manages design, development, integration, test, evaluation, operation, and maintenance of flight vehicle and/or payload hardware, software, and associated systems.

Determines when major development should be stopped or major alterations made due to changes in programs. Plans and establishes overall outline for design and development of proposed technology, equipment, or systems. Publishes technical data and develops scientifically based standards for engineering application. Serves as liaison between research, design, and operations. Projects affect the work of other experts and the development of major parts of projects.

**Performs Contractor Oversight 10%**

Initiates contact and provides expert technical advice and direction to contractor professionals. Serves as a senior technical contact. Keeps the Contracting Officer informed on progress, proposed contract modifications, validity of claims, analysis of proposals, and assessment of contract time extensions.

Work complexities require the development of alternate solutions to reduce time and costs, versatility and innovation, and short cuts or compromises that are considered risky. Resolves unusual demands caused by extraordinary urgency, safety, or economic restraints in areas such as life science or measurement and instrumentation systems. Contributes to the accomplishment of agency program objectives, such as challenging agency standards for implementation of project/program management systems, operations, and controls.

**OTHER SIGNIFICANT FACTS:**

In order to qualify for this position, incumbent must possess a bachelor's degree appropriate to the position.

Performs other duties as assigned.

**Factor 1- 8 Knowledge Required by the Position**

The position requires a mastery of the concepts and principles of general engineering to resolve novel or obscure problems; extend and modify techniques; develop new approaches that guide other engineers who solve a variety of technical problems; and/or apply new, innovative, or experimental general engineering theories, developments, or practices to problems or studies not susceptible to treatment by acceptable methods.

#### **Factor 2- 5 Supervisory Controls**

The supervisor provides guidance solely in the form of general legislative, mission, or policy directions and resource constraints. The engineer typically initiates new projects or activities independently and keeps the supervisor informed of progress in planning, coordinating, and implementing the work and resolving conflicts. Recommendations and decisions of the engineer are accepted as technically sound even though final approval may depend on formal action by high-level management. The engineer has the highest degree of independence in seeking optimum technical or policy solutions to problems in the light of current engineering developments. Completed work is broadly reviewed for adherence to mission or legislative direction and for assurance that broad policy or program objectives are fulfilled.

#### **Factor 3- 5 Guidelines**

Guidelines are basic legislation and/or broadly stated agency regulations and policy statements. At this level the engineer is a recognized technical authority in the interpretation of such broad guidelines, and must exercise considerable judgment and ingenuity in interpreting and adapting guides that exist; in developing new and improved hypotheses, concepts, or approaches not previously tested or reported; and/or in developing new policies that have the potential to take the organization (and the affected public) in new directions. The ideas, methods and procedures developed are on the cutting edge of technology and often serve as precedents for other scientists, engineers, or policy-makers within or outside the agency.

#### **Factor 4- 5 Complexity**

Assignments are of such breadth, diversity, and intensity that they involve many varied and complex features, and typically contain a combination of complex features that involve serious or difficult to resolve conflicts between engineering and management requirements. The work requires originating innovative scientific/engineering techniques, establishing criteria and standards applicable to wide range of engineering problems and conditions, or developing new scientific concepts or approaches that advance the state-of-the-science.

#### **Factor 5- 5 Scope and Effect**

The work includes the resolution of a broad range of critical or highly unusual engineering problems, development of innovative approaches or guides, or the determination of the effectiveness and validity of proposed or current policies and programs. The engineer serves as an expert advisor and consultant to officials and managers within or outside the agency on a broad range of engineering activities and broad policy issues.

**Factor 6- 3 Personal Contacts**

Personal contacts include a wide range of professional and administrative personnel throughout the agency, at other federal agencies, in state and local government, private industry, academia, consumer advocacy groups, and in some cases the media and elected officials.

**Factor 7- 4 Purpose of Contacts**

The purpose of contacts is to justify, defend, negotiate, or settle controversial and far-reaching matters through active participation in conferences, meetings or presentations. The persons contacted typically have diverse viewpoints, goals, or objectives, requiring the engineer to achieve a common understanding of the problem and a satisfactory solution by convincing others, arriving at a compromise, or developing suitable alternatives.

**Factor 8- 1 Physical Demands**

The work is primarily sedentary except for requisite field surveys and site inspections. Inspections may involve a considerable amount of physical activity including walking, climbing, bending, and stooping.

**Factor 9- 1 Work Environment**

Work is usually performed in an office setting, although there may be exposure to conditions in buildings or other structures under construction, renovation, or restoration.

## **Engineering Project Management, GS- 0801-15**

### **AST- Engineering Project Management, NCC: 770-10**

**Position Number:** GS05H40

**Introductory Statement:** This Deputy Project Manager-Technical is within the Flight Programs and Projects Directorate (FPPD), Code 400. Multiple Deputy Project Manager-Technical position exists within the Directorate, each performing the following duties.

As the Deputy Project Manager-Technical for an FPPD Project, the incumbent is responsible for assisting the Project Manager with the planning, organizing, directing of technical and programmatic aspects of the project, and spanning diverse disciplines, which are necessary for the successful implementation in a Flight Program.

### **Engineering Project Management for NASA 60%**

Manages overall development efforts for a significant and complex NASA program or a set of complex projects with multiple interfaces and extensive scope and variety. Makes substantial and continuing contributions to long-range project planning and to the formulation, modification, and determination of overall objectives. Serves as an authoritative source of information for decisions and guidance concerning changes in program objectives relating to the management of the total project effort. Sets the organizational climate for the overall effort, establishing strategic direction and political approaches. Evaluates and develops policy. Plans, develops, and negotiates budget and resource allocations.

Supports mission requirements and initiates design and modification efforts as necessary. Coordinates with other offices within the project to establish content, cost, schedule of products, deliverables, and services. Formulates and negotiates agreements and plans for institutional support of project activities. Monitors and controls program or project development efforts and resource utilization. Applies innovation and originality to solve difficult and complex technical, project management, and organizational problems in an area of rapidly changing technology linked to an ever-changing economic environment.

### **Technical Resources Management Work 10%**

Directs and manages budget and resource planning activities for a NASA engineering program of national or international scope and impact. Serves as an expert consultant on the most challenging technical problems in field of specialty. Maintains close contact with headquarters, field centers, commercial industry representatives, and international partners to integrate resource planning elements in the areas of advanced technology and engineering application.

Analyzes and plans long-range resource requirements, scheduling, budgeting, and program allocations. Develops long-range program planning and control systems. Reviews and assesses long-range mission planning of projects to anticipate impacts on resources. Integrates program schedule requirements and resource directives. Establishes policy and advises on policy development.

Represents Center at inter-agency meetings, and chairs and participates in boards, panels, and committees. Charters working groups and committees to coordinate resources management.

### **Advises on, Conducts, and Monitors Technical Managerial Functions 10%**

Provides authoritative technical decisions, advice, and consultation on variables and unknowns affecting planning, integration, coordination, and critical management problems with respect to safety, costs, and economics. Analyzes, coordinates, and

integrates a number of complex program elements into programs that represent a Center-wide/program position. Serves as expert technical management consultant and advisor to subordinate activities in areas such as technology development and commercialization activities at a NASA center. Initiates investigations and risk-management studies to find solutions to critical problems in areas such as resources analysis, technical management systems, technical engineering operations management, or configurations management.

Develops, analyzes, and evaluates long-range plans for a Branch, Center, or program. Develops and implements policies. Oversees the development of trend analysis, process analyses, control policies, and requirements for a Center, or program. Directs surveillance and audit activities. Consults on the development of technical resources and business management systems. Monitors the design and development of advanced technology for a NASA center. Initiates and facilitates technology transfer activities. Serves as the Center, program, and NASA representative. Incumbent has a far-reaching effect on the management of work and programs for extensive NASA engineering activities.

#### **Aerospace and Aeronautical Flight Systems Analysis and Development 10%**

Serves as a recognized engineering expert, technical authority, and technical advisor/consultant to agency management, other government agencies, and the aerospace industry on flight systems.

Directs and/or manages engineering and integration efforts for projects and/or programs involving space and aeronautical flight systems, vehicles, and/or payloads, including design and operational requirements definition, hardware and/or software development, testing, verification, safety, integration, certification and operations. Manages cost, schedule, and technical aspects including risk management of the project/program. Manages multi-disciplinary teams in the design, development, integration, test, evaluation, operation, and long-term maintenance of flight vehicle and/or payload hardware, software, and associated systems.

Oversees and directs the development and design of large, new, and unusually complex aerospace and aeronautical flight technology, equipment, or systems that impact major programs and result in major advancement in the state-of-the-art of broad technologies.

Develops or directs the development of innovative and/or novel concepts, processes, and techniques. Monitors program, project, or study progress.

Evaluates in-house and contractor proposals for flight systems and provides technical management and direction of contracts.

Serves as a decision-maker on various panels, conferences, working groups, and technical committees.

**Performs Contractor Oversight 10%**

Integrates and coordinates the efforts of agency personnel with those of contractors in research, development, and engineering. Incumbent has a far-reaching effect on the work and programs of extensive engineering activities.

Provides authoritative technical decisions, advice, and consultation to contractors on variables and unknowns affecting planning, coordination, and critical problems with respect to safety, costs, and economics. Serves as an expert consultant and advisor to subordinate activities in areas such as life science or measurement and instrumentation systems. Audits contractor performance and communicates functional direction, policy information, and quality and safety controls. Initiates investigations and studies to prove or disprove contractor's design criteria and to find solutions to critical problems in design, construction, production, or operation. Establishes validity criteria of studies to guide contract personnel specializing in various facets of the problems. Contributes to the accomplishment of agency program objectives, such as planning and implementing precedent-setting national standards for project/program management systems, operations, and controls.

**OTHER SIGNIFICANT FACTS:**

In order to qualify for this position, incumbent must possess a bachelor's degree appropriate to the position.

Performs other duties as assigned.

**Factor 1- 9 KNOWLEDGE REQUIRED BY POSITION**

1. A B.S degree in an appropriate field of engineering, physical science, computer science, or mathematics is required to apply the professional theories, practices, principles, and techniques of aerospace technology to plan, develop, and implement the flight design, fabrication, integration, and test.

2. Knowledge of space flight project management, including but not limited to, HST planning and evaluation, crew safety, system integration, neutral buoyancy laboratory

simulations, mission operations, reliability and quality assurance.

3. Working knowledge of on-orbit spacecraft servicing, including but not limited to HST.

4. Working knowledge of spacecraft design and mission analysis.

5. Knowledge of STS interfaces, crew activities, and safety requirements.

6. Knowledge of emerging space flight technologies.

7. A broad technical knowledge of the tasks, concepts, and techniques of spacecraft and science instrument fabrication; integration and test to direct the design, development, integration, test, and launch of the spacecraft.

8. Knowledge of the duties and responsibilities of a technical officer on large contracts with a major aerospace company; knowledge of cost control techniques such as performance measurement systems; knowledge of procurement regulations; skill in analyzing financial data to understand the cost status of the contract and budget for changes.

9. Knowledge of proposal evaluation techniques; skill in estimating manpower needs to accomplish tasks; technical knowledge in all spacecraft systems and subsystem; knowledge of techniques and skill in negotiating to evaluate proposed contract changes and negotiate such changes.

10. Knowledge of planning and scheduling techniques and systems such as PERT, Gantt, Office 2; skill in evaluating a schedule for realism to plan and evaluating the contractor's plan for developing and launching the spacecraft on schedule.

11. Skill in directing large diverse groups of companies and people such as the spacecraft mission contractor, support contractors, and GSFC engineers. Skill in resolving conflicts, delegating tasks, and assigning responsibility to coordinate the work of all the groups contributing to the development of the spacecraft. Skill in managing many different problems simultaneously.

12. Ability to work with discipline managers and independently provides the direction to technical experts as they perform their duties in support of the spacecraft development, integration, test, launch, and operations.

13. Skill in communicating orally and in writing to provide briefings, status reviews, resource requirements to Office and to higher management.

14. Ability to lead the effort of a group of professional engineers.

### **Factor 2- 5 SUPERVISORY CONTROLS**

The Deputy Project Manager receives direction from the Project Manager in terms of broadly defined mission objectives, budgetary allocations, and a general schedule.

Assignments are primarily self-conceived and initiated and the incumbent may alter approaches and concepts as the program progresses. The incumbent's decisions and judgments have a far-reaching effect on the success of the mission and are accepted as authoritative within and outside of the Agency.

Work is viewed in terms of meeting policy and programmatic objectives. Supervision is of an administrative nature.

### **Factor 3- 5 GUIDELINES**

The Deputy Project Manager receives guidelines in the form of mission objectives and NASA's policies, and specific guidelines relating to budgetary and schedule restraints.

The incumbent interprets the broad objectives and as a recognized authority in the area of spacecraft development is free to use his/her own judgment to formulate specific requirements and to develop detailed cost, schedule, and technical plans. His/her product is a budgetary allocation by fiscal year, including a contractor performance measurement system; a set of plans for the day-to-day activities; a set of integration, test, and launch procedures; and a set of post-launch operational plans and procedures.

#### **Factor 4- 6 COMPLEXITY**

The Deputy Project Manager must plan and organize information that is received from multiple sources. Decisions are made on cost, schedule, and technical risk. Schedule/risk trades are made across interfaces between science instruments, mission contractor, and support contractors. He/she must resolve technical and management difference of opinion between experienced industrial and government managers. This requires an in-depth understanding of the technical factors involved, the management methods for costing and manpower allocation, program objectives, and policies.

#### **Factor 5- 6 SCOPE AND EFFECT**

The purpose of this position is to provide a source of technical expertise in the design, development, integration, test, and operation of the spacecraft. The incumbent directs and coordinates several diverse disciplines during the design, development, and integration phases of this effort. By providing expert advice, counsel, guidance and direction to key NASA officials, managers, and engineers (both within and outside the Center), and the incumbent influences the policies of NASA, other government agencies, and foreign participants. Results of this activity have a direct and long-term effect on NASA's ability to achieve mission objectives, which impact a large user community on both a national and international level and expand our knowledge of the earth as a system.

#### **Factor 6- 4 PERSONAL CONTACTS**

The Deputy Project Manager has daily personal contact with the members of the Project Staff as well as discipline support personnel from the various GSFC codes that are part of the program. He/she will also have daily contact with the senior managers and technical staff at the industrial contractor's plant. He/she will have frequent contact with Division Chiefs and Branch Heads at GSFC and various senior technical and management personnel at other NASA Centers. The Deputy Project Manager will have contact with the senior management at GSFC (Directors of), with Division Managers of NASA Headquarters, and with senior scientists and managers from U.S. and European institutes on an as needed basis. The contacts occur in a variety of settings and context requiring an in-depth understanding of technical and managerial factors, which impact the successful accomplishment of the mission.

#### **Factor 7- 4 PURPOSE OF CONTACTS**

Purpose of the contacts is to provide leadership, management, technical direction, and guidance in planning and implementing the mission systems and to justify, negotiate, and settle matters involving significant or controversial technical and programmatic issues. These issues are usually varying and potentially have a large impact; requiring

the incumbent to achieve satisfactory results relative to objectives of the efforts of contractors, other government and foreign agencies, good working relationships with national and international participants through consultation, advice, mutual discussion and conferences to identify areas of common development and to monitor common progress. Coordinates requirements and resolves conflicting, technical views arising from Joint Working Groups involving other U.S. government agencies and foreign participants. Supports international meetings--both management and technical in nature.

**Factor 8- 1 PHYSICAL DEMANDS**

Typical engineering and management work is required. This includes working at a desk, attendance at meetings and conferences at GSFC, NASA Headquarters, etc. Significant domestic travel is required. No special physical demands are required.

**Factor 9- 1 WORK ENVIRONMENT**

During the implementation phase, the normal work environment involves normal safety precautions typical of such places as offices, meeting rooms, and laboratories. During the integration, test, and launch phases, work involves longer hours at moderate risk, which requires special safety precautions.