Psyche
Mission Roles and Responsibilities

National Aeronautics and Space Administration

Communication and Public Outreach

Director of Communications: The Director of Communications is responsible for setting the overall communications and outreach goals and strategy.

Lead Communications Specialist: The Lead Communications Specialist manages the oversight of all communications activities and serves as a point-of-contact for media and public relations representatives and NASA HQ Office of Communications. The Lead Communications Specialist also leads the Communications Team meetings.

Public Engagement Representative: The Public Engagement Representative is responsible for day-to-day coordination of NASA's outreach activity in support of the mission. This includes the creation of outreach products such as exhibits, models, print and online materials and supports the official Psyche social media accounts.

Media Relations Representative: The Media Relations Representative is responsible for day-to-day coordination of NASA's media support for the mission. This includes coordination of the development of all news products such as media releases and related visual products, and is the main point of contact for responding to media inquiries.

Artist: An Artist collaborates with the Project to develop the official mission artistic renditions and conceptual pieces.

Website Designer: A Website designer designs, develops and maintains the mission website according to the needs of the Project.

Social Media Manager: The NASA Social Media Manager (SMM) oversees social media marketing campaigns and day-to-day activities. The NASA SMM can work on multiple missions. Responsible for the official oversight of all NASA digital media platforms and ensures proper online presence protocol is followed by the various account holders.

Flight System

Flight System Roles

Flight System Manager: The Flight System Manager is responsible for the day-to-day technical and programmatic direction of the flight system development. The Flight System includes the SSL-provided Solar Electric Propulsion (SEP) Chassis, and several JPL-provided subsystems. The overall Flight System development also includes the system-level integration and test of the science instruments and the flight terminal for the Deep Space Optical Communications (DSOC) technology demonstration, all of which are delivered to system integration and test by the Payload Manager. The Flight System Manager is directly accountable to the Project Manager for performance commitments, including the overall cost and schedule of the flight system.

Deputy Flight System Manager: The Deputy Flight System Manager works directly with the Flight System Manager, is "second in command" for the day-to-day technical and programmatic direction of the flight system development.

Solar Electric Propulsion Chassis Contract Technical Manager: Solar Electric Propulsion Chassis Contract Technical Manager serves as JPL's technical lead for the subcontracted work at SSL, to develop and deliver the Solar Electric Propulsion (SEP) Chassis to JPL, for further integration and test with the rest of the flight system. Also responsible for SSL's role in flight system integration and test at JPL.

Subcontract Data Requirements List Administrator: The Subcontract Data Requirements List (SDRL) Administrator coordinates the review, approval, and distribution of Subcontractor-provided technical information, regarding the products and services that are supplied by a Subcontractor. The list of the technical information products are known as the SDRL. For instance, the SDRL Administrator for the Solar Electric Propulsion (SEP) Chassis contract would coordinate the review, approval, and distribution of technical information about the SEP Chassis from SSL. This technical information may include requirements, implementation plans, design documentation, drawings, analyses, test results, etc.

Flight System Systems Engineer: The Flight System Systems Engineer (FSSE) coordinates the overall systems engineering effort for the flight system, including the development of flight system requirements, the decomposition of those requirements to the subsystems, the coordination of flight system trade studies and other design decisions, and the development of verification and validation plans across the various flight system work elements. Works on behalf of the Flight System Manager to ensure the overall technical integrity of the flight system.

Flight System Support Engineer: The Flight System Support Engineer assists the Flight System Systems Engineer (FSSE) with the coordination of a specific subset of the flight system systems engineering effort. Some support engineers have domains that align cleanly with subsystems (example: ensuring the integrity of the requirements and "Verification and Validation" plans affecting the telecom subsystem), while other support engineers handle the coordination of various cross-cutting systems engineering processes (example: the tracking of key technical performance metrics).

Spacecraft Chief Engineer: The Spacecraft Chief Engineer provides senior technical expertise in support of the Flight System Systems Engineer (FSSE), primarily in the resolution of spacecraft-level trade studies and technical problems. Duties include making architectural recommendations, providing technical consulting and review, and leading in-depth studies or tiger teams pertaining to key spacecraft-level performance issues and/or risks.

Subsystem Roles

Product Delivery Manager: The Product Delivery Manager (PDM) is responsible for the planning, implementation and successful delivery of a defined set of products and/or services within the project, known as a project element. Some project elements align cleanly with subsystems (e.g. the telecom subsystem), other project elements capture cross-cutting technical domains (e.g. contamination control) that span multiple subsystems. PDMs focus primarily on programmatic responsibilities - the cost plans, schedule, staff, equipment, etc. required to successfully deliver the products and services. PDMs deliver to System Managers, so for instance, the Flight System PDMs deliver to the Flight System Manager.

Product Delivery Lead: The Product Delivery Lead (PDL) assists a particular Product Delivery Manager (PDM) with the planning, implementation and successful delivery of a specific subset of the products and/or services within a project element. PDLs typically work on behalf of the PDMs, handling very specific types of products - e.g. the Avionics PDM may have several PDLs, covering the flight electronics, flight software, testbed simulation equipment, etc.

Cognizant Engineer: A Cognizant Engineer is responsible for the overall technical integrity of a specific work element or portion of a work element, working on behalf of a Product Delivery Manager (PDM).

Design Engineer: A Design Engineer is responsible for the detailed design of a specific hardware or software product, in response to performance requirements, environmental requirements, reliability requirements, and other product assurance requirements.

Analyst: An Analyst is responsible for analyzing the performance and/ or reliability of a function, a subsystem, or a component. Analysts often need to develop and/or integrate various models, and then correlate those models to appropriate test results, as those results become available. Tests and analyses are two key pillars of the pre-launch verification efforts that occur at multiple levels of integration, in order to prove that the flight system can and will satisfy its mission requirements.

Test Engineer: A Test Engineer is responsible for the testing of hardware or software products. This may include some "standalone" testing that is performed on the product prior to its delivery to the next level of integration, and may also include some testing that is performed after the product has been fully integrated into a larger system.

Subsystems

Command & Data Handling: The Command & Data Handling (C&DH) subsystem receives ground commands from the telecom subsystem, performs validation and decoding of the commands, and distributes the commands to the appropriate spacecraft subsystems and components. The C&DH also receives housekeeping telemetry and science data from the other spacecraft subsystems and components, and packages the data for storage on a data recorder or for real-time transmission to the ground via the telecom subsystem. Other functions of the C&DH include the transfer of information between various subsystems onboard the spacecraft, including the maintenance and distribution of the spacecraft clock.

Flight Software: The Flight Software (FSW) runs inside the Command & Data Handling (C&DH), executing a variety of high-level applications (example: performing the Guidance, Navigation & Control (GN&C) calculations that allow the spacecraft to know where the Earth is located). The FSW also executes some very low-level housekeeping functions (e.g. scrubbing the onboard memory for radiation-induced bit errors).

Avionics: In JPL-managed missions such as Psyche, the term "Avionics" is used to describe a large development effort that spans the Command & Data Handling (C&DH), the Flight Software (FSW), and all of the Simulation and Support Equipment (SSE) that is needed to properly test the full functionality that is ultimately embedded in the C&DH and FSW. The "Avionics" Product Delivery Manager (PDM) has overall responsibility for the development and delivery of the SSE, the C&DH, and the FSW, including the FSW that controls various other subsystems. But the "Avionics" PDM is not responsible for the delivery and performance of other flight equipment in other subsystems such as Electrical Power Subsystem (EPS), Telecom, and Guidance, Navigation, & Control (GN&C).

Structure: The structure subsystem must be engineered to withstand the launch loads imparted by the launch vehicle, and must provide sufficiently stable points of attachment for all the equipment in other subsystems. The structure subsystem determines the overall configuration of all the flight system equipment, ensuring adequate separation of sensitive instrumentation, and ensuring adequate fields of view for both engineering sensors and science instruments.

Thermal Control: Spacecraft must be engineered to withstand transit through Earth's atmosphere and the space environment. They must operate in a vacuum with temperatures potentially ranging across hundreds of degrees Celsius. Material requirements are such that either high melting temperature, low density materials such as beryllium and reinforced carbon–carbon or (possibly due to the lower thickness requirements despite its high density) tungsten or ablative carbon–carbon composites are used. Thermal control subsystems make use of both passive elements (example: materials with specific radiative properties) and active elements (examples: electrical heaters and louvers) to keep equipment temperatures within specified operating ranges.

Propulsion Subsystem: Psyche's propulsion subsystem is used primarily to change the spacecraft velocity, but it can also be used to turn the spacecraft, stabilize its attitude, or unload momentum from the reaction wheels. Like most propulsion subsystems, Psyche's propulsion components include fuel, tankage, valves, pipes, and thrusters. Psyche uses high-efficiency Hall thrusters for the velocity changes, often thrusting for long time periods at very low thrust levels. A set of low-efficiency cold gas thrusters can be used for applications where higher thrust levels are needed.

Guidance, Navigation, & Control: Guidance, Navigation, & Control (GN&C) is responsible for the development and delivery of sensors, actuators, and algorithms that control the spacecraft's orientation and position in space. Guidance refers to the calculation of future commands that will steer the spacecraft towards where it is desired to be. Navigation refers to the processing of either optical or radio frequency measurements (e.g. doppler) in order to determine a spacecraft's orbital elements or position. Control refers to the tactical, real-time commanding of rotational or translational actuators (e.g. reaction wheels, thrusters) that cause the spacecraft to alter its orientation or flight path, in order to move the spacecraft from where it was (as determined by Navigation), to where it needs to be (as determined by Guidance). GN&C algorithms are typically developed by specialists on the GN&C team, and are then embedded into the real-time onboard Flight Software (FSW) by the FSW team.

Electrical Power Subsystem: The electrical power subsystem (EPS) provides power generation, regulation, and distribution to the various spacecraft subsystems. The Psyche EPS generates power using large solar arrays, and is also capable of storing and later recovering energy from a battery, to ride through solar eclipses and other transient periods where the solar arrays are unable to generate power. The Psyche EPS also provides a variety of power switching services, which allow other flight equipment to be turned on and off as necessary in order to conserve power.

Telecommunications Subsystem "Telecom": The Psyche telecommunications subsystem (commonly referred to as "telecom") uses X-band radio frequencies to communicate with the Deep Space Network (DSN) on Earth. Uplink refers to communications from the Earth to the spacecraft, and downlink refers to communications from the spacecraft to the Earth. Psyche uses different uplink and downlink frequencies to enable concurrent uplink and downlink communications, during those times when it is in contact with the DSN. Psyche's High Gain Antenna (HGA) supports downlink data rates of ~ 150 kbps. During spacecraft emergencies and other activities when the HGA cannot be pointed directly at Earth, a set of Low Gain Antennas can be used to support lower downlink data rates, rates as low as 40 bps. Note: DSOC is a separately provided optical communications package that is being flown as a technology demonstration, and is operated completely independent from the Psyche telecom subsystem.

Fault Management: Fault management refers to a set of onboard functions that detect, isolate, and correct malfunctions of the flight system. This allows the flight system to "ride out" an anomaly, continuing the mission timeline if possible, or halting the stored sequence, going to "safe mode", and awaiting further diagnosis and instructions from the ground. Fault Management functions include maintaining and examining error logs, accepting and acting on error detection notifications, tracing and identifying faults, carrying out sequences of diagnostics tests, correcting faults, reporting error conditions, and localizing and tracing faults by examining and manipulating database information that cause the spacecraft to alter its orientation or flight path, in order to move the spacecraft from where it was (as determined by Navigation), to where it needs to be (as determined by Guidance). Guidance, Navigation & Control (GN&C) algorithms are typically developed by specialists on the GN&C team, and are then embedded into the real-time onboard Flight Software (FSW) by the FSW team.

Harness Subsystem: The harness subsystem, also known as the wire harness or the cabling, is the network of wires that carries power and data signals among the various elements of the flight system. Cables are designed and built in a variety of segments, where each segment is bound together by straps, cable ties, cable lacing, sleeves, electrical tape, etc. Various cables are then routed between various power and data connectors, and are then anchored to the structure at appropriate tie down points within specified operating ranges.

Ground Data System

Ground Data System Manager: The Ground Data System (GDS) Manager manages and provides leadership, schedule and cost control for the development of the GDS. Works with other project functions to make sure the GDS supports operations and is consistent with the mission and spacecraft design.

Ground Data System (GDS) System Engineer: The Ground Data System (GDS) System Engineer is responsible for the design, architecture, and implementation of the GDS to meet the GDS requirements.

Software Developer: A Software Developer designs, codes, tests, and delivers software per the Ground Data System (GDS) and Mission Operations Systems (MOS) requirements and the Project software management plan.

Science Data Center Manager: The Science Data Center (SDC) Manager oversees the design and implementation of the SDC architecture to meet mission requirements and support Psyche Mission Operations Systems (MOS) during the mission.

Science Data Center Systems Engineer: The Science Data Center (SDC) Systems Engineer works with the SDC Manager to design and implement SDC architecture to support the Psyche Mission Operations Systems (MOS) during the mission.

NASA Headquarters Leadership

Mission Program Executive: The Mission Program Executive (PE) provides technical oversight of programmatic activities and ensures the project is initiated and executed according to approved processes. Acts as the primary interface between project management and Science Mission Directorate leadership to provide analysis of the project's ability to meet its commitments.

Mission Program Scientist: The Mission Program Scientist (PS) is the senior NASA scientist responsible for ensuring the science content of the mission and serves as the liaison between the science team and Science Mission Directorate leadership.

Launch Vehicle

Launch Vehicle Mission Manager: The Launch Vehicle Mission Manager is the Project Manager and primary Launch Services Program interface for the NASA Spacecraft Programs/Projects and to the launch services contractor. Has overall mission management responsibilities for technical, contract deliverables, resources and schedule.

Launch Vehicle Integration Engineer: The Launch Vehicle Integration Engineer is the technical lead for the launch vehicle mission specific integration including mission unique requirements definition, development and verification.

Launch Vehicle Launch Site Integration Manager: The Launch Vehicle Launch Site Integration Manager is the interface for launch site processing of the spacecraft, responsible for advance planning for launch site processing, capturing and implementing spacecraft processing requirements, and acting as the spacecraft's consultant and advocate at the launch site.

Launch Vehicle Program Integration Manager: The Launch Vehicle Program Integration Manager provides launch vehicle program and business management for the launch services contract, including specialized support in procurement and resource management.in procurement and resource management.

Mission Assurance

Mission Assurance Manager: The Mission Assurance Manager leads and manages the overall Safety & Mission Assurance (SMA) effort for the Project. Oversees the SMA disciplines (Safety, Parts, Quality Assurance, Reliability, Environmental Requirements). Member of the Project Leadership Team and the Risk Management Board. Acts as the SMA Technical Authority.

Safety Engineer: The Safety Engineer creates directorate Systems Safety Programs that comply with management requirements to identify, assess, and manage system safety risks.

Environmental Requirements Engineer: The Environmental Requirements Engineer generates and verifies top level Environmental Requirements for the Project. Examples include: Random Vibration, Acoustic, Pyroshock, Thermal, Radiation, EMC, Magnetics and Micro- Meteoroid, etc.

Magnetic Control Lead: The Magnetic Control Lead leads the effort to ensure that the spacecraft generated magnetic fields do not disrupt the operation of the magnetometer instrument.

Reliability Engineer: The Reliability Engineer provides reliability (circuit and mechanism) design and analysis support to project elements at JPL and at partners/subcontractors (as applicable) to identify and manage asset reliability risks that could adversely affect project operations.

Electrical, Electronic and Electromechanical Parts Procurement: Electrical, Electronic and Electromechanical (EEE) Parts Procurement deals with the supply chain operations and logistics of Electronic and Electromechanical supplies/services.

Electrical, Electronic and Electromechanical Parts Engineering: Electrical, Electronic and Electromechanical (EEE) Parts Engineering provides parts engineering support to ensure EEE parts will meet mission requirements. Includes parts requirements and testing, radiation effects, and failure analysis.

Hardware Quality Assurance Engineer: The Hardware Quality Assurance (HQA) Engineer provides JPL on-site and itinerant HQA support and/or oversight to partner's/subcontractor's Quality Assurance (QA) effort to ensure that proper HQA processes are selected and used for flight hardware.

Software Quality Assurance: Software Quality Assurance (SQA) generates and oversees the implementation of the project SQA plan.

Mission Design

Mission Design Manager: The Mission Design Manager leads the team of Mission Designer, Mission Planner, Navigation Engineer, and Optical Navigation Engineers to complete their responsibilities within the given timeline and budget.

Mission Designer: The Mission Designer is responsible for setting the course of the spacecraft traveling to the target. Calculating the launch vehicle's target, designing optimal trajectory to the asteroid Psyche, and finding the right orbits around the asteroid for the science team, are part of their responsibilities.

Mission Planner: The Mission Planner develop the flight activity plan (what happens in space) and conducts project-level trade studies related to those flight activities.

Navigation Engineer: The Navigation Engineer is responsible for finding where the spacecraft has been, is, and will be. This process is called the statistical orbit determination and they use, typically, Doppler and ranging observations from NASA's Deep Space Network antennas in the process.

Optical Navigation Engineer: The Optical Navigation Engineer's role is similar to Navigation Engineer. However, they use different type of data called optical images in their process. Using pictures taken from different angles, they can find the spacecraft position from triangulation. find the spacecraft position from triangulation.

Mission System

Mission System Manager: The Mission System Manager ensures that the people, processes and ground software come together to successfully operate the spacecraft that the Flight System has built, delivering to the ground the data the Project Science Team has planned.

Mission Operations Systems Engineer: The Mission Operations Systems Engineer (MOSE) is responsible for systems engineering leadership for all ground system elements supporting flight project mission operations including the development operations concepts and architectures, leading MS-level trade studies, and leading the effort to define and document Mission Operations Systems (MOS) requirements and flowing those requirements down to lower teams/subsystems.

Science Systems Engineer: The Science Systems Engineer works between the Project Science team and external Co-Is and the Mission System and Payload System to ensure that Mission and Payload systems are implemented in accordance with the science goals and needs.

Spacecraft Operations Systems Engineer: The Spacecraft Operations Systems Engineer plans, develops, and executes spacecraft operations for flight projects. This engineer assists the Flight System Team (hardware developers) with operational issues prior to launch and then participates in the leadership of operating the spacecraft post-launch.

Deep Space Network Mission Interface Manager: The Mission Interface Manager (MIM) is responsible for defining and coordinating the Deep Space Network (DSN) support and agreements.

Planning & Execution Systems Engineer: The Planning and Execution Systems Engineer provides the system engineering for the software and procedures used to plan, schedule, sequence and execute the activities that accomplish JPL's space exploration missions.

Payload

Payload Manager: The Payload Manager is the person directly in charge of monitoring the timeline completion of the "payload" or the physical things that the rocket will carry.

Payload Lead System Engineer: The Payload Lead System Engineer (PLSE) is the technical lead for the Payload System. This role focuses on both the performance of the individual instruments as well as their accommodation on the spacecraft. The PLSE leads the team of Instrument Engineers focused on payload accommodation and monitors the technical progress of each of the instrument teams.

JPL Instrument Engineers: The Instrument Engineers are the system engineers directly responsible for the accommodation of individual instruments on the spacecraft. They spend their time working with both the Spacecraft team and one of the instrument teams to ensure that the mechanical, thermal, electrical and software interfaces are well-defined and enable the instrument to achieve its science or technology objectives. This role is distinct from instrument engineers with the "Instrument teams" proper.

Instrument Project Manager(s): The Instrument Project Manager is responsible for the technical scope, cost, schedule and delivery of an individual instrument within the Payload System.

Instrument System Engineer - Lead: The Instrument System Engineer, sometimes referred to as the Instrument Lead Engineer, is responsible for the design, build, test and technical performance of an individual instrument. This person serves as the technical leader for the team building an instrument.

Instrument Electrical/Electronic Engineer(s): The Instrument Electrical engineer is responsible for the design, build and test of the instrument electronics. This typically includes power distribution, command and data handling and signal processing within the instrument.

Instrument Test Engineers: Instrument Test Engineers execute tests of the instrument to make sure that it meets requirements and the performance of the instrument will allow it to meet its scientific or technical objectives during the mission.

Instrument Technicians (of various types as required): Instrument Technicians typically have the hands-on job of building and assembling the instrument. They work in teams and often have very specialized skills appropriate to the type of instrument they build and assemble.

Instrument Support Equipment Engineers (as required): Instrument Support Equipment Engineers build electronics and mechanical or thermal equipment used to assemble and test the instrument.

Field Programmable Gate Array/Firmware Engineer (if/as required): The Field Programmable Gate Array (FPGA)/Firmware Engineer develops the firmware that runs inside any FPGAs within the instrument. This firmware is often responsible for controlling electronic signals within the instrument and communicating with the spacecraft computer.

Instrument Mechanical Engineer(s): The Instrument Mechanical Engineer designs the mechanical structure of the instrument such that it can survive the intense loads (sometimes called "g-force") that come with a launch into space. The mechanical structure of an instrument must support the specialized sensors an electronics, and oftentimes maintain tight tolerances with very detailed structural designs.

Instrument Scheduler: The Instrument Scheduler assists the Instrument Project Manager by tracking the many, many individual steps that must be achieved in building an instrument and delivering it in time for launch. This can often mean thousands of individual tasks, all coordinated together to achieve success.

Instrument Resource Analyst: The Instrument Resource Analyst assists the Instrument Project Manager by tracking the cost and budget of the instrument development work. This can include interactions with subcontractors and the overall project team.

Instrument Information Management / Configuration Management: The Instrument Information Management / Configuration Management (IM/CM) engineer helps the entire instrument team keep track of their design, build and test data. As the work proceeds rapidly and often changes quickly, this is important for making sure the entire team is using the most recent data and ensuring that data is archived properly for later use.

Instrument Thermal Engineer(s): The Instrument Thermal Engineer is responsible for the thermal design the instrument such that it can survive the harsh environment of space. This often includes designing heaters, coolers, and radiators to achieve very tight temperature requirements in the cold vacuum of space.

Instrument Software Engineer: The Instrument Software Engineer designs and builds the software that runs on the processor within the instrument. This software is typically responsible for gathering and processing the science data, and sending that science data to the spacecraft computer for downlink to Earth. The instrument software is often very complex and controls the sensitive detectors that gathers the key science data for the mission. For instruments with internal software (e.g. the Gamma Ray and Neutron Spectrometer).

Instrument Quality Assurance Manager: The Instrument Quality Assurance (QA) Manager is responsible for the practices and procedures the Instrument Team uses to build and test the instrument. These processes and procedures have been honed over many years and many missions to ensure success in the harsh environments of launch and flight through space. The QA Manager oversees the work of many specialists in a variety of disciplines including environmental testing, reliability analysis and safety.

Instrument Quality Assurance Specialists: The Instrument Quality Assurance (QA) Specialists are experts in a particular area of quality assurance. This can range across a wide variety of disciplines including environmental testing, reliability analysis, software quality, electronic parts assessment and selection, and hardware assembly.

Planetary Mission Program Office

Mission Manager: The Mission Manager functions as the Program Manager's day-to-day point of contact and oversight for the project (Phases A-F), performing technical and programmatic management functions on behalf of the Program Manager, ensuring the Program Manager maintains an awareness of the project status and that the programmatic needs of the assigned projects are being adequately addressed.

Program Manager: The Program Manager (PM) has responsibility for planning and implementation of the program consistent with top-level policies, strategies, requirements, and funding established by NASA HQ.

Deputy Program Manager: The Deputy Program Manager is delegated to act on behalf of the Program Manager.

Business Manager: The Business Manager supports the Program Manager and Mission Managers in managing the Program Office resources, as well as, management of the Program Analysts assigned to the different missions.

Program Analyst: The Program Analyst supports the Program Office by managing the Program implementation budgets, maintaining the Project Budget Reports (PBRs) with Projects, developing Planning, Programming, Budgeting, and Execution (PPBE) packages, tracking Program and Project budgets, and tracking Program and Project Liens and Threats.

Program Chief Engineer: The Program Chief Engineer (CE) is the Engineering Technical Authority (ETA) for the program. The Program CE, in partnership with the Program Manager, ensures an atmosphere of technical "checks and balances" within the program and projects.

Program Deputy Chief Engineer: The Program Deputy Chief Engineer is delegated to act on behalf of the Program Chief Engineer.

Program Safety & Mission Assurance Lead: The Program Safety & Mission Assurance (SMA) Lead has overall responsibility for assuring that appropriate specifications and standards have been integrated and adopted by the program, and ensures an atmosphere of technical "checks and balances" is maintained.

Management Support Assistant: The Management Support Assistant (MSA) provides support to the Program Office personnel by processing travel requests, maintaining office correspondence, coordinating team meetings, maintaining the office calendar, escorting visitors, and stocking office supplies.

Project Management (JPL)

Project Manager: The Project Manager is the primary leader for a project, with specific Programmatic, Personnel, Discipline and Technical, and Institutional responsibilities. The Project Manager is responsible and accountable for all aspects of mission success.

Deputy Project Manager: The Deputy Project Manager provides senior level project management support and coordination to the Project Manager.

Project Staff Assistant: The Project Staff Assistant provides administrative support and coordination to the Project Manager and the project team.

Project Business Manager: The Project Business Manager (PBM) leads the Business team and provides comprehensive cost, schedule, and performance analyses (including earned value), and supports the project team with interpretation and utilization of all business related information and analyses.

Project Resource Analysts: A Project Resource Analyst (PRA) is the focal point for financial resources management and performance analysis, with specific programmatic and institutional responsibilities.

Project Schedule Analysts: A Project Schedule Analyst (PSA) is the primary leader for schedule resources management and performance analysis, with specific programmatic and institutional responsibilities.

Task Plan Contract Administrator: The Task Plan Contract Administrator coordinates the project "Task Plan," which is the equivalent of the JPL project's cost and schedule contract with NASA.

JPL Subcontract Managers: The Subcontracts Manager (SCM) is responsible for the business relationship that exists between JPL and the subcontractor. The SCM is the only role authorized by Caltech to commit JPL financially and contractually in acquiring products and services, and this authority cannot be delegated. SCMs are responsible for the actions that transform purchase requests into subcontracts, as well as actions that promote satisfactory subcontracts performance and completion.

Launch Approval Engineer: The Launch Approval Engineer (LAE) is responsible for providing and obtaining project certification of technical spacecraft and mission description information, design analyses and trade studies required for supporting preparation of National Environmental Policy Act (NEPA) documents, launch vehicle data books, safety analyses, risk communication products, and other launch approval engineering related documents.

Project System Engineering

Project System Engineer: The Project System Engineer is responsible for the technical integrity of the entire project. This includes developing the project architecture, requirements and interfaces, and controlling/analyzing the technical design and managing/ controlling risk.

Deputy Project System Engineer: The Deputy Project System Engineer works hand in hand with the Project System Engineer to ensure the entire Project is successfully designed, analyzed, built, tested and launched.

Project System Engineering (Support): Project System Engineers (Support) work with the Project System Engineer (PSE) to accomplish the tasks listed above.

Project Software Systems Engineer: The Project Software Systems Engineer is responsible for ensuring the proper development and testing of all software on the project (on the spacecraft, in the instruments, and in the ground system).

End to End Information Systems Engineer: The End to End Information Systems (EEIS) Engineer ensures that proper design, build and testing of all data pathways between the ground, spacecraft and instruments (including getting the science data to the end users).

Information & Configuration Management Engineer: The Information and Configuration Management (IMCM) Engineer is responsible for organizing the Integration and Test (I&T) architecture and data organization, retrieval, and archiving to support the project.

Planetary Protection Engineer: The Planetary Protection engineer ensures that the Project meets all NASA planetary protection requirements related to avoiding organic and biologic contamination of other bodies in the solar system.

Contamination Control Engineer: The Contamination Control Engineer is responsible ensuring the Project takes the necessary steps (requirements development, processes during development, etc.) to protect instruments and other hardware from potentially damaging contamination during development and in flight.

Launch Systems Engineer: The Launch Systems Engineer is the primary interface between the Project and the Launch Services provider. Their responsibility includes ensuring the Project has all of the information necessary to ensure the flight system is compatible with the launch vehicle (including the launch dynamics environment).

Project Verification and Validation Engineer: The Project Verification and Validation (V&V) Engineer is responsible for ensuring that the design meets the requirements and also meets the intent of the requirements. They ensure that a plan is developed and executed to analysis, test and otherwise prove out the design.

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Project System Integration & Test

Assembly, Test, and Launch Operations Manager: The Assembly, Test, and Launch Operations (ATLO) Manager is responsible for managing the team that assembles and tests the flight system, and prepares it for launch. This includes, planning, testbed testing, mechanical and electrical assembly and integration, functional testing, environmental and reliability testing, and launch operations at the launch site.

Deputy Assembly, Test, and Launch Operations Manager: The Deputy Assembly, Test, and Launch Operations (ATLO) Manager supports the ATLO manager.

Lead Test Conductor: The Assembly, Test, and Launch Operations (ATLO) Test Conductor (TC) is responsible for leading each test activity. The TC is responsible for coordination with subsystem operators, facility support personnel, the Lead Mechanical Engineer, the Quality Assurance (QA) representative, and the Safety/Security representative to ensure that support and oversight, if required, is provided for the testing activity.

Lead Mechanical Engineer: The Lead Mechanical Engineer has the responsibility for system assembly, integration and handling operations involving delivered flight hardware and mechanical support equipment during Assembly, Test, and Launch Operations (ATLO). The mechanical lead conducts all aspects of the mechanical operation from pretest briefing through completion of the operation. This individual is directly responsible for the safety of the flight hardware.

Mechanical Engineering Support: A team of engineers that support the day-to-day floor activities and allow the Lead Mechanical Engineer to focus on external considerations or plan for upcoming activities. The Mechanical Team supports the Electrical Test Team and the Propulsion Team. All persons handling flight hardware are trained and certified for the type of operation they are participating in.

Mechanical Technicians: The team of Mechanical Technicians performs the majority of the flight hardware handling and assembly activities. The technicians are required to be certified for handling and assembling flight hardware and acquire certification by attending Quality Assurance (QA) sponsored training classes. Most flight technicians have extensive hardware experience and often are knowledgeable on the proper and safe handling of flight equipment.

Electrical Engineering Support: Electrical Engineering Support perform the orderly process of connecting each subsystem to the others to build essential functionality, demonstrate interface compatibility, verify subsystem performance while operating with other subsystems and systems, and the early detection of any inter-subsystem interference problems. A fundamental consideration in the implementation of system integration is to detect interface errors before any damage can propagate.

Electrical Technicians: The Electrical Test Team operates the spacecraft and performs all the necessary electrical and performance verifications.

Science

Principal Investigator: The mission Principal Investigator (PI) is responsible for overall Psyche mission success, and for the scientific integrity and execution of the mission within committed cost and schedule. The PI oversees the team organization, arbitrates science priorities and progress, and oversees the delivery of mission data sets to the Planetary Data System (PDS). The PI is the ultimate decisional authority on the Psyche team. The PI is responsible for ensuring that all mission participants are able to exercise the rights and execute the responsibilities laid out by their role's definition or by the Team Guidelines, and also that no additional responsibilities are assigned that interfere with their existing rights or responsibilities. The PI is accountable to NASA for the Project's technical, cost, and schedule performance.The PI on Psyche leads the science team, oversees Communications and Public Outreach, and delivers the Psyche science products. She delegates the responsibility for implementation of the Project to the Project Manager at the Jet Propulsion Laboratory.

Deputy Principal Investigator: The Deputy Principal Investigator (DPI) assists the Principal Investigator (PI) where needed in managing relationships among the many elements of the project and the science investigators. The DPI can take on decisional authority for the PI when so directed.

Project Scientist: The Project Scientist is a Co-Investigator who is embedded in the day-to-day activities and decision-making of the project. The Project Scientist reports directly to the Principal Investigator (PI) and works closely with the Project Manager. The Project Scientist supports the PI by maintaining cognizance of all aspects of the mission in interactions with the Project Manager and the project team as well as maintaining cognizance of science experiments, science planning and operations, and data acquisition, reduction, and analysis in interactions with the science team.

Co-Investigators: Co-Investigators (Co-Is) are responsible for specific scientific tasks pertinent to answering the science objectives of the mission, or for operating instruments and analyzing their data. Co-Is receive direct support from NASA for their role on the mission and are responsible to the Principal Investigator (PI) for the execution of their assigned roles. Co-Is are directly responsible for the data acquisition or data analysis required to satisfy one or more of the Level-2 science requirements. The Co-Is of the Psyche science team are active participants in all aspects of mission implementation. These positions come with many privileges and responsibilities, including adhering to these Team Guidelines. Co-Is are responsible for funding Team Affiliates with mission funds and for ensuring that their sponsored Affiliates and Collaborators adhere to the Team Guidelines.

Instrument Leads: Instrument Leads are science team members responsible for delivery of the instruments to integration with the spacecraft, and for the operation of the instruments while in flight, and for delivery of their data.

Science Team Collaborators: The Collaborators of the Psyche science team are team members who work in support of team activities through the sponsorship of a Co-Investigator (Co-I) or the Principal Investigator (PI) or Deputy Principal Investigator (DPI). Each collaborator must be specifically associated by name and under the management of an individual Co-I who is responsible for ensuring that they adhere to these guidelines. Collaborators are typically people who work closely with a Co-I and provide important support that enhances the science return from Psyche. Collaborators may either be specifically named on selected proposals or as-yet unnamed postdocs and technical staff working with team members. Collaborators are brought into the science team for specific periods of time for technical support or to perform research of interest to the mission team.

SSL Solar Electric Propulsion (SEP) Chassis*

SEP Chassis Program Manager: The SEP Chassis Program Manager is the person in overall charge of the planning and execution the Psyche project at SSL.

SEP Chassis Technical Director: The SEP Chassis Technical Director provides senior level technical guidance for the Psyche project at SSL. Additional responsibilities include membership on the project Risk Board and Magnetic Control Review Board.

SEP Chassis Systems Engineering Manager: The SEP Chassis Systems Engineering Manager conducts and coordinates analysis, design, testing, and documentation of Solar Electric Propulsion (SEP) Chassis subsystems in accordance with the SSL's systems engineering process.

SEP Chassis Contracts Manager: The SEP Chassis Contracts Manager manages the SSL subcontract with JPL, supporting negotiations of contract modifications and executing the mods through the SSL Contract Authorization process.

SEP Chassis Finance Manager: The SEP Chassis Finance Manager is a professional individual who is involved in the financial management of the project, working with the Program Manager to establish internal work agreements with SSL functional organizations, tracking earned value and supporting costing activities in response to contract modifications or requests for proposal (RFP)s.

SEP Chassis Launch Vehicle Mission Manager: The SEP Chassis Launch Vehicle Mission Manager is responsible for supporting JPL and the Launch Service Provider in defining and maintaining the launch vehicle interface and associated documentation. Additional responsibilities include launch base planning and execution.

SEP Chassis Resources Program Manager: The SEP Chassis Resources Program Manager (RPM) is responsible for developing and maintaining the Solar Electric Propulsion (SEP) Chassis schedule, providing weekly SSL-internal updates and monthly schedule inputs into the Psyche Project Integrated Master Schedule (IMS).

SEP Chassis Product Assurance Manager: The SEP Chassis Product Assurance Manager is the Mission Assurance lead, responsible for ensuring the safety and reliability of the Solar Electric Propulsion (SEP) Chassis.

SEP Chassis Mechanical Subsystem Engineer(s): The SEP Chassis Mechanical Subsystem Engineer is responsible for the overall design, analysis, manufacturing and test of the Mechanical Subsystem. Works closely with the Systems Engineering Manager.

SEP Chassis Power Subsystem Engineer(s): The SEP Chassis Power Subsystem Engineer is responsible for the overall design, analysis, manufacturing and test of the Power Subsystem. Works closely with the Systems Engineering Manager.

SEP Chassis Propulsion Subsystem Engineer(s): The SEP Chassis Propulsion Subsystem Engineer is responsible for the overall design, analysis, manufacturing and test of the Propulsion Subsystem. Works closely with the Systems Engineering Manager.

SEP Chassis Thermal Subsystem Engineer(s): The SEP Chassis Thermal Subsystem Engineer is responsible for the overall design analysis manufacturing and test of the Thermal Subsystem. Works closely with the Systems Engineering Manager.

SEP Chassis Configuration Engineer: The SEP Chassis Configuration Engineer is responsible for the physical location of all units of the Flight System, maintaining the spacecraft model.

SEP Chassis Electrical Systems Engineer(s): The SEP Chassis Electrical Systems Engineer is responsible for the overall design, analysis, manufacturing and test of the Data Handling Subsystem. Works closely with the Systems Engineering Manager

* SSL is an aerospace company. The Psyche spacecraft's solar electric propulsion (SEP) chassis will be built by SSL.