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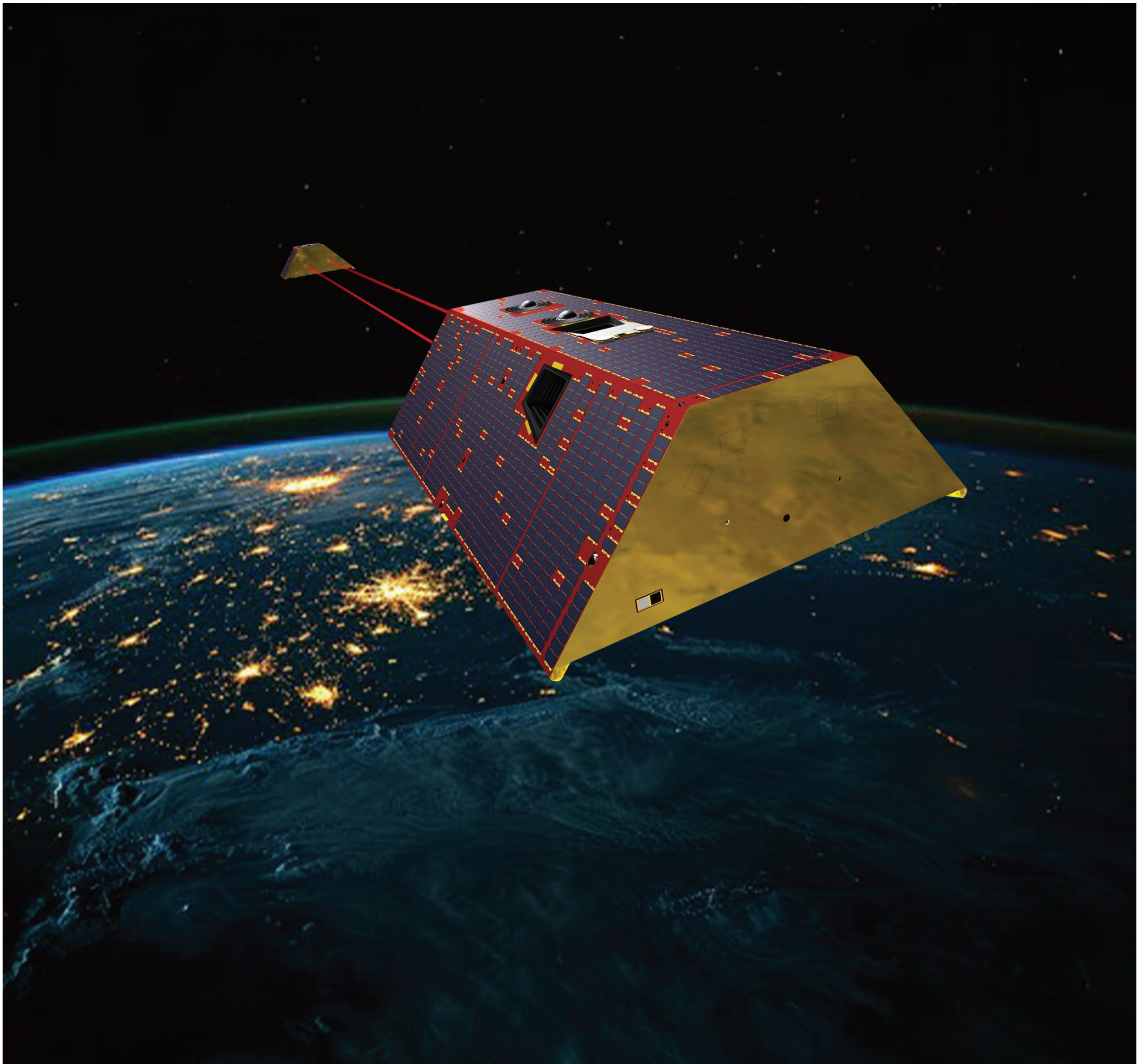
NASA's Management of the Gravity Recovery and Climate Experiment-Continuity (GRACE-C) Mission



September 23, 2026

IG-26-012

Office of Inspector General

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RESULTS IN BRIEF

NASA's Management of the Gravity Recovery and Climate Experiment-Continuity (GRACE-C) Mission

September 23, 2026 IG-26-012 (A-25-06-00-SARD)

WHY WE PERFORMED THIS AUDIT

Gravity Recovery and Climate Experiment-Continuity (GRACE-C) is the third in a series of Science Mission Directorate missions that use two satellites to monitor month-to-month changes of Earth's gravity field, enabling researchers to track water movement and surface mass changes across the planet and monitor variations in ice sheets, glaciers, underground water storage, soil moisture, and sea levels. Continuation of the Gravity Recovery and Climate Experiment (GRACE) series missions—each of which has been managed by the Jet Propulsion Laboratory (JPL)—was recommended in both the 2007 and 2017 National Academies of Sciences, Engineering, and Medicine's Earth science decadal surveys. Changes in the distribution of Earth's mass, continuously tracked by the GRACE missions since 2002, is one of the key measurements used for the establishment of records to understand shifting groundwater, ice sheets, and plate tectonics around the world on longer time scales. These measurements are also used for immediate applications, including providing insights into where global groundwater resources may be shrinking or growing, where dry soils are contributing to drought, and where saturated soils increase the chance of flooding.

The original GRACE mission operated from 2002 through 2017. Subsequently, the Gravity Recovery and Climate Experiment Follow-On (GRACE-FO) mission began operations in 2018. NASA plans to continue to operate GRACE-FO until GRACE-C commences operations to avoid data gaps. As the third mission in the series, GRACE-C's mission objectives include extending the foundational measurements of global, month-to-month gravity and mass variations, including changes in the mass of ice sheets and glaciers, the amount of water in large lakes and rivers, near-surface and underground water storage, and changes in sea level, ocean heat content, and ocean currents.

In this audit, we examined whether NASA was effectively managing the GRACE-C project relative to controlling costs, meeting milestones, and achieving technical objectives. Specifically, we assessed whether the project (1) was performed in accordance with cost and schedule plans, (2) had an effective risk management process in place, and (3) effectively managed open technical challenges and international partnership agreements. We performed work at the Jet Propulsion Laboratory where we interviewed project management personnel. We also interviewed NASA Headquarters' Science Mission Directorate and Earth Science Division personnel and coordinated with them for access to and garner input from international partners.

WHAT WE FOUND

As of May 2026, the GRACE-C project remained on track to launch before July 2029 and continues to operate within the cost and schedule baselines NASA committed to Congress and the Office of Management and Budget—the Agency Baseline Commitment—in May 2024. However, the project has already used a significant portion of its project-managed budget reserves (referred to as unallocated future expenses, or UFE) and has identified liens and risks that will further reduce the remaining project-managed UFE. This less than desirable reserve posture is due to both internal project management decisions and external factors largely out of management's control. Internally, to mitigate the impact of various issues on the project schedule, such as instrument development problems, quality issues, and Eaton fire disruptions at JPL, GRACE-C project management allocated project-managed UFE to address the increased costs. External factors affecting cost reserve posture include increased JPL indirect costs charged to GRACE-C and an unfavorable foreign exchange rate.

An indirect cost rate is a tool for determining the proportion of indirect costs each program and project should bear. It is the ratio of the indirect costs to a direct cost base. Due to funding uncertainty primarily regarding NASA's Mars Sample Return mission, JPL has undergone multiple reorganizations and workforce reductions since 2024. These changes contributed to retroactive JPL indirect cost rate adjustments in fiscal year 2025, which increased the GRACE-C project's cost by approximately $4.6 million because of the reduced allocation base. Going forward, the project estimates an additional $13.3 million in impact from increases to the JPL indirect cost rate. Also, JPL utilized firm-fixed-price contracts payable in euros with its European partners, for which an exchange rate of up to $1.10 per euro was budgeted. However, since the project was baselined, rates have trended higher, and as of July 2026, the rate was $1.14 per euro. Consequently, project management has estimated $8 million in additional cost to cover the exchange-rate deficit.

In February 2026, an independent assessment performed by JPL's Integrated Program Evaluation Group considered past performance, increased JPL indirect cost rates, and the foreign exchange rate and found the project will deplete its project-managed UFE and exceed the management agreement life-cycle cost estimate—the amount over which the GRACE-C project manager has management control—by $9.3 million. Our calculations closely align with this independent assessment. In June 2026, the Integrated Program Evaluation Group revised its estimate based in part on the delivery of some components to show the project would exceed the management agreement by $300,000, an amount we did not independently verify. GRACE-C managers stated the estimate will continue to be recalculated. Accordingly, in our opinion, although the project is currently being managed within Agency Baseline Commitment cost and schedule baselines, there is lower than typical project-managed UFE, which is already estimated to be exceeded. This concern, along with ongoing technical issues and NASA's historical experience, will result in cost and schedule pressure on the project that the Science Mission Directorate will need to actively monitor, manage, and mitigate.

We also noted opportunities for NASA and JPL to improve its international partner agreements and project-level documents. The working relationship between NASA, JPL, and the international partners is managed under a set of formal documents executed by NASA's Office of International and Interagency Relations and the relevant parties. Requirements were included in these documents for formal actions to be taken or for information to be exchanged during GRACE-C's development. However, we identified instances where these requirements were not always met as written. In some instances, alternative approaches or actions were used by the project to meet what they understood to be the intent of these requirements, but the agreements and related documents do not include allowances for the use of alternatives. Although we did not identify a direct effect on GRACE-C development, which we attribute to the long-standing relationship between the parties over the entirety of GRACE missions, not consistently following agreed-upon, formal processes and procedures increases the risk that the intent of established controls is not met, thereby increasing the potential for negative consequences to a project achieving its objectives.

What We Recommended

To better ensure GRACE-C can meet its cost and schedule commitments and is operationally successful, we recommended the Associate Administrator for Science Mission Directorate routinely assess the project's risk posture to determine the appropriateness and timing of allocating Science Mission Directorate-managed UFE to reduce cost and schedule pressures. We also believe NASA can improve international partner agreements and project-level documents and recommended that the Associate Administrator for International and Interagency Relations in coordination with the Associate Administrator for Science Mission Directorate review international partner agreement language in management and project documents for applicability of requirements and include options for alternative approaches if appropriate.

We provided a draft of this report to NASA management who concurred and partially concurred, respectively, with our recommendations and described planned actions to address them. We consider management's comments responsive; therefore, the recommendations are resolved and will be closed upon further discussion with SMD officials and verification of the proposed corrective actions.

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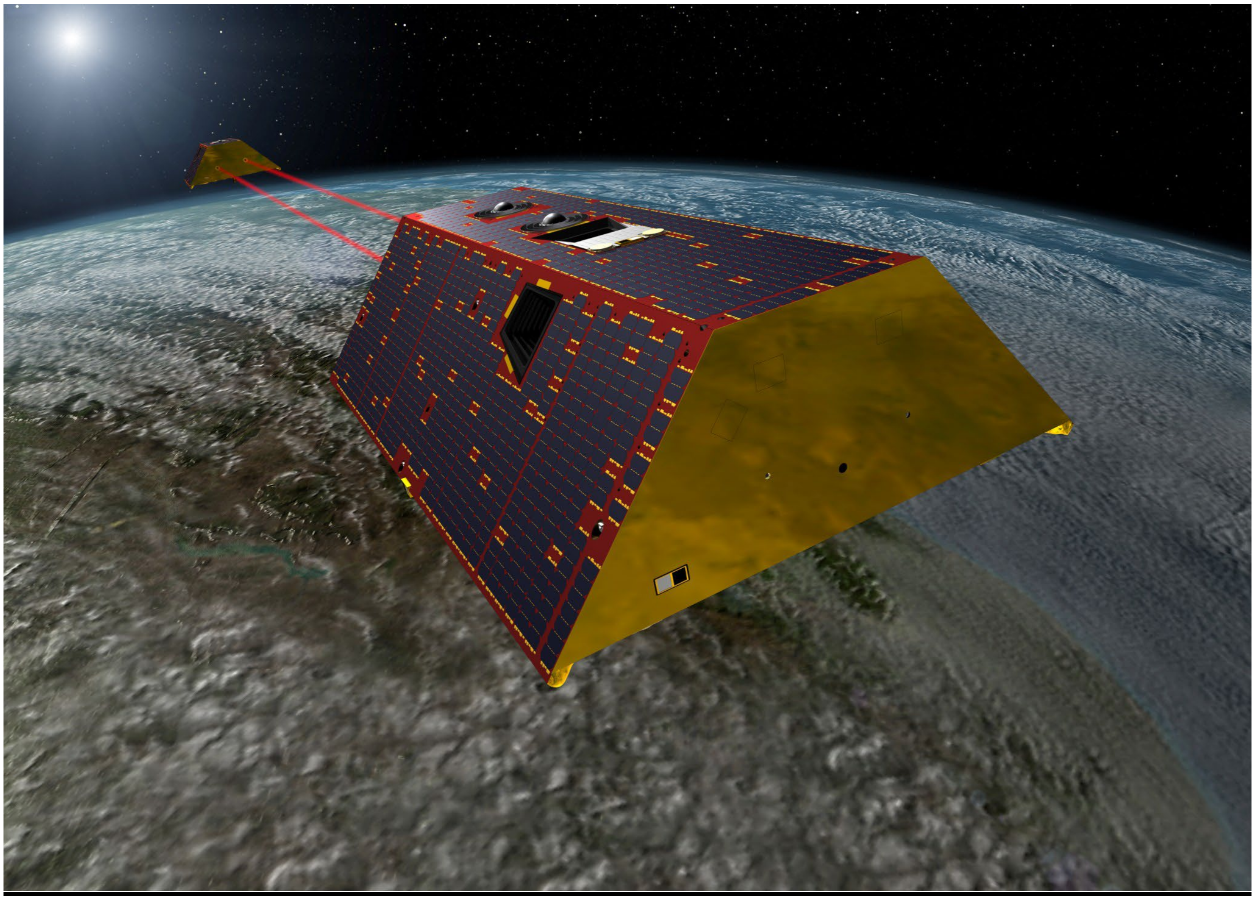
Acronyms

ABC	Agency Baseline Commitment
CPI	cost performance index
CPP	Cooperative Project Plan
DLR	Deutsches Zentrum für Luft- und Raumfahrt (German Aerospace Center)
EVM	Earned Value Management
GRACE	Gravity Recovery and Climate Experiment
GRACE-C	Gravity Recovery and Climate Experiment-Continuity
GRACE-FO	Gravity Recovery and Climate Experiment Follow-On
IA	Implementing Arrangement
JPL	Jet Propulsion Laboratory
KDP	Key Decision Point
LRI	laser ranging interferometer
MA	Management Agreement
NRC	National Research Council
SMA	Safety and Mission Assurance
SMAR	Safety and Mission Assurance Requirements
SPI	schedule performance index
UFE	unallocated future expenses

INTRODUCTION

Gravity Recovery and Climate Experiment-Continuity (GRACE-C) is the third in a series of missions that use two satellites to monitor month-to-month changes of Earth's gravity field, enabling researchers to track water movement and surface mass changes across the planet and monitor variations in ice sheets, glaciers, underground water storage, soil moisture, and sea levels.[1] This data provides an integrated global view of changes in Earth's water cycle and water resources—measurements that have important applications for everyday life, such as drought assessment and forecasting, water-use planning for agriculture, and understanding the drivers of sea level rise. See Figure 1 for an artist's impression of the GRACE-C satellites orbiting Earth.

Figure 1: Artist's Impression of the GRACE-C Satellites Orbiting Earth



Source: NASA.

[1] Changes in the gravity field are related to change or transportation of mass on Earth, which can provide information on ocean circulation, glacial melt, droughts, and geodynamics—the science of accurately measuring and understanding the Earth's rotation and gravity field.

GRACE-C is an Earth sciences mission in NASA's Science Mission Directorate. The project is a partnership between NASA and the German Aerospace Center (DLR) with a life-cycle cost estimate of $658 million and a launch readiness date of July 2029.[2] GRACE-C's twin satellites will launch on board a SpaceX Falcon 9 launch vehicle and establish a polar orbit at an altitude of approximately 500 kilometers (311 miles) above the Earth's surface.[3]

In this audit, we determined whether NASA is effectively managing the GRACE-C project relative to controlling costs, meeting milestones, and achieving technical objectives. Specifically, we assessed whether the project (1) was performed in accordance with cost and schedule plans, (2) had an effective risk management process in place, and (3) effectively managed open technical challenges and international partnership agreements. See Appendix A for details of the audit's scope and methodology.

Background

Science Mission Objectives

Continuation of the Gravity Recovery and Climate Experiment (GRACE) series missions was recommended in both the 2007 and 2017 National Academies of Sciences, Engineering, and Medicine's Earth science decadal surveys.[4] The National Academies noted that scientific understanding of global change requires long-term, reliable measurements of the key physical variables that define the variability and shifts in state of the Earth system.[5] Changes in the distribution of Earth's mass, continuously tracked by the GRACE missions since 2002, is one of the key measurements used for the establishment of records to understand Earth system behavior—shifting groundwater, ice sheets, and plate tectonics around the world—on longer time scales. These measurements are also used for immediate applications, including providing insights into where global groundwater resources may be shrinking or growing, where dry soils are contributing to drought, and where saturated soils increase the chance of flooding.

The original GRACE mission operated from 2002 through 2017. Subsequently, the Gravity Recovery and Climate Experiment Follow-On (GRACE-FO) mission began operations in 2018. NASA plans to continue to operate GRACE-FO until GRACE-C commences operations to avoid data gaps. As the third mission in the series, GRACE-C's mission objectives include extending the foundational measurements of global,

[2] DLR refers to Deutsches Zentrum für Luft- und Raumfahrt, the official name of the German Aerospace Center. The $658 million life-cycle cost estimate does not include DLR costs.

[3] Polar orbits are at or near 90-degree inclination to Earth's equator and typically enable the satellite to traverse one or both the North and South Poles.

[4] National Research Council (NRC) of the National Academies, 2007 to 2017, *Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond* (2007), and National Academies, 2017 to 2027, *Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space* (2018). The NRC was the research arm of the National Academy of Sciences, and in 2015, the institution became the National Academies of Sciences, Engineering, and Medicine. The National Academies are private, nonprofit institutions that provide expert advice to help shape sound policies, inform public opinion, and advance the areas of science, engineering, and medicine.

[5] The Earth system is made up of multiple subsystems that interact with one another and are studied globally by NASA's system of interdisciplinary missions. These subsystems are (1) the atmosphere, a thin layer composed of a mixture of gases and particles suspended in the air that surround Earth, including carbon dioxide and water; (2) the hydrosphere, which includes the liquid ocean, inland water bodies, and groundwater; (3) the cryosphere, a subset of the hydrosphere that consists of frozen water; (4) the geosphere, which includes the solid Earth—the core, mantle, crust, and soil layers; and (5) the biosphere, which includes all of Earth's organisms, such as humans and matter that has not yet decomposed.

month-to-month gravity and mass variations, including changes in the mass of ice sheets and glaciers, the amount of water in large lakes and rivers, near-surface and underground water storage, and changes in sea level, ocean heat content, and ocean currents.

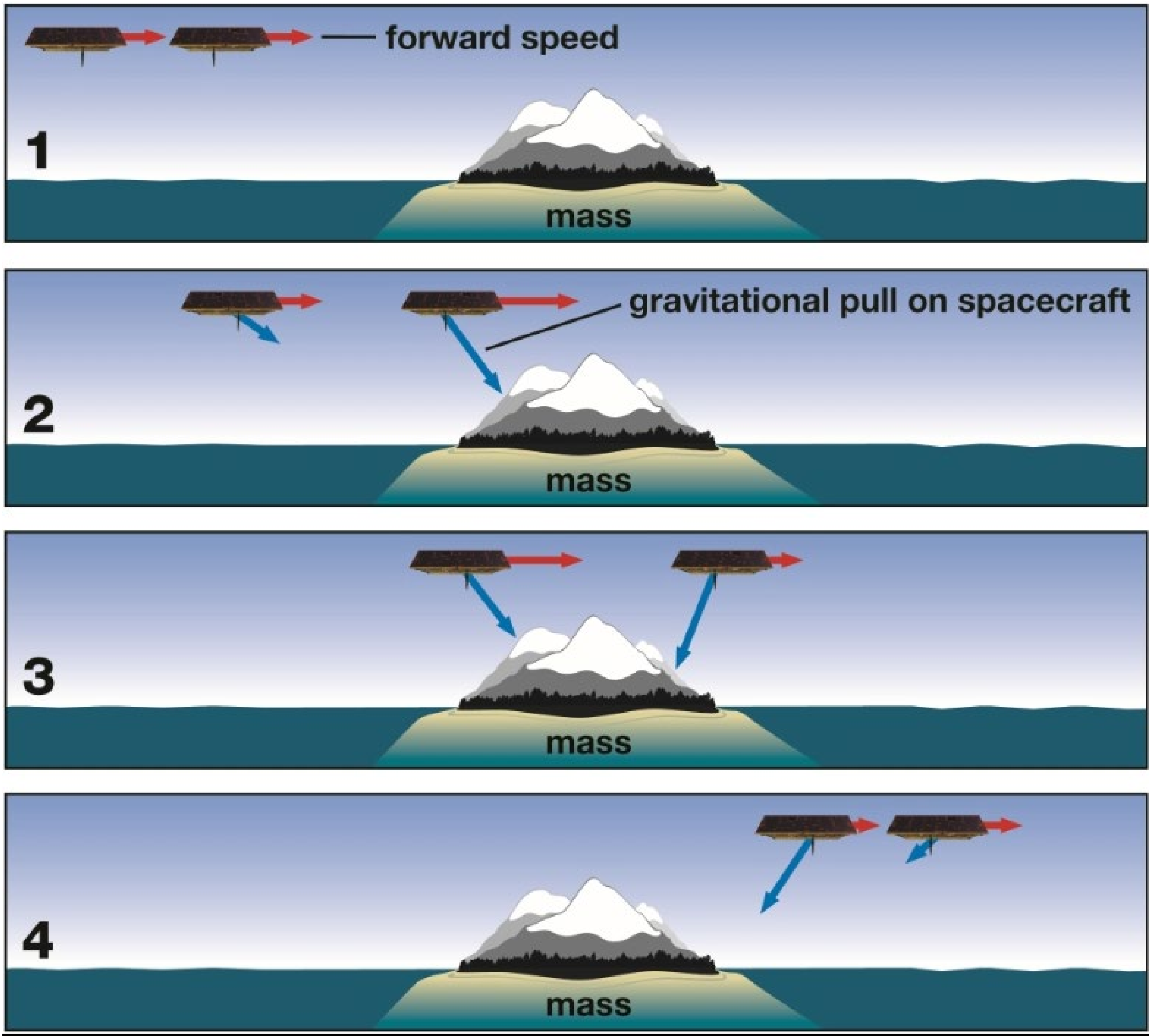
The primary difference between each iterative mission is the method and precision with which the distance between the two satellites is measured, improving on the missions' ability to measure changes in gravity's effect on the satellites. GRACE measured this distance with the precision of one micron, 70 times smaller than the width of a human hair. GRACE-FO included an experimental laser that improved the precision by 20 to 30 times. GRACE-C will incorporate GRACE-FO's demonstrated laser technology as its primary instrument.

Mission Architecture

GRACE-C's mission architecture consists of a pair of satellites in low Earth polar orbits. The mission will achieve its science and applications objectives by making accurate measurements of the change in distance between the centers of mass of the twin satellites, as well as by precisely measuring the non-gravitational forces acting on the satellites and tracking their orientation and position. These satellites will follow each other at an altitude of approximately 500 kilometers (311 miles) and a distance of about 220 kilometers (137 miles) from each other.

The centerpiece of the GRACE-C mission is the precise measurement of very small distance variations between the satellites as they orbit Earth. Objects with a heavier mass have more gravity, while objects with a lighter mass have less gravity, both of which impact the distance of the satellites from each other as they pass over these objects. When the satellites pass over areas of Earth with heavier mass, such as mountain ranges, the distance between the satellites increases because the higher gravity causes the first satellite to accelerate. When the satellites fly over lighter mass areas, such as oceans and lakes, the opposite happens and the distance between the two satellites decreases because the lower gravity causes the first satellite to decelerate. Figure 2 illustrates how the distance changes between the satellites as they fly over water, ice, and land.

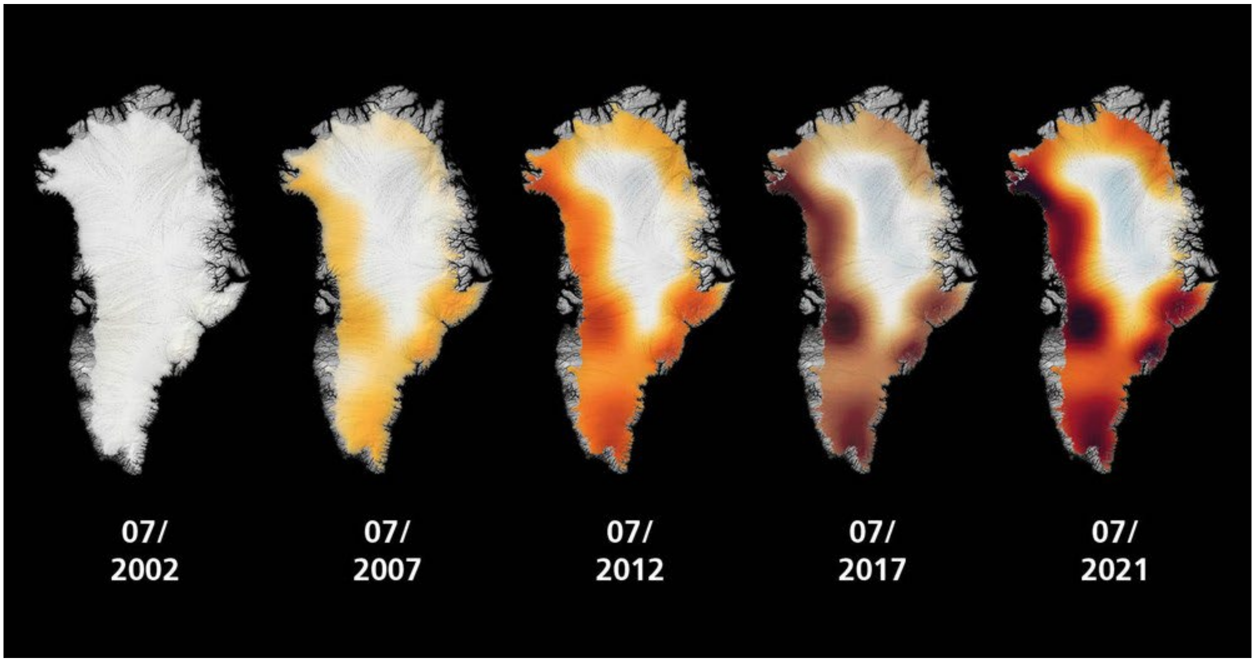
Figure 2: How GRACE-C Measures Gravity



Source: NASA.

These variations in the satellites distance from each other are processed to create a monthly map of Earth's gravity field. By comparing these maps over time, scientists can calculate changes in mass that affect ice sheets and glaciers, the amount of water in large lakes and rivers, near-surface and underground water storage, and changes in sea level, ocean heat content, and ocean currents. Applications to benefit society can then be derived from this data. Underground water that would otherwise be difficult to measure allows farmers and policymakers to manage water scarcity and food security, while data quantifying ice mass loss and its contribution to sea level rise allows coastal planners to better protect infrastructure and prepare for future environmental shifts. For example, the GRACE mission and its successor GRACE-FO have observed changes in Earth's gravitational field for over two decades, including measurements of ice sheets and global sea levels. Using this data, scientists determined that Greenland's ice sheet has lost around 5.7 trillion tons of ice between 2002 and 2026, contributing around 1.5 centimeters to global sea level rise. Figure 3 depicts the ice loss in Greenland from 2002 to 2021.

Figure 3: Greenland's Ice Loss from 2002 through 2021



Source: NASA.

Note: Ice loss relative to the 2002 water equivalent—yellow represents 1 meter of loss, orange is 2 meters, brown is 3 meters, dark red is 4 meters, and black is 5 meters.

Key Instruments

To gather GRACE-C's measurements and data, each satellite carries Global Navigation Satellite System receivers, attitude determination sensors, a laser ranging interferometer (LRI), Super Star Three-axis Accelerometer for Research accelerometers, and laser retroreflectors:

- The Global Navigation Satellite System receivers are used to determine the position of the satellites in space.
- The attitude determination sensors track the satellites' orientation in space, which is critical for spacecraft operations and science data processing.
- The LRI measures changes in the distance between the two satellites with extreme precision (a factor of more than 20 to 30 times more accurate than microwave systems, the primary measuring systems used in prior GRACE missions).
- The Super Star Three-axis Accelerometer for Research accelerometers are located at the center of mass of each satellite to measure non-gravitational forces, such as atmospheric drag, acting on them.
- The laser retroreflectors are used for precise orbit determination from ground-based laser tracking.

Project Organization

NASA is responsible for GRACE-C and is providing project management, systems engineering and mission design, safety and mission assurance, delivery of the integrated LRI, the accelerometers, the two satellites, instrument integration and on-orbit operations, science and applications data processing, and delivery of calibrated and validated science and applications data products to a NASA archive for public distribution and long-term preservation. NASA's Jet Propulsion Laboratory (JPL) is managing the development and execution of the GRACE-C project for NASA and will procure the two satellites from Airbus Defence and Space (Airbus), the company that built the satellites for the GRACE and GRACE-FO missions.[6] Development and construction of the LRI system will be led by JPL.

DLR is responsible for providing optics subsystems for the LRI, mission operations and telemetry, tracking and command, the ground data system, laser retroreflectors for ground-to-satellite ranging, and the launch vehicle and launch services. GRACE-C has a launch readiness date of July 2029 from Vandenberg Space Force Base in California aboard a SpaceX Falcon 9 launch vehicle, with primary mission operations expected to last at least 5 years—the same designed primary mission length as the previous GRACE missions.

The German Space Operations Center, which is part of DLR, will be responsible for the day-to-day operations and control of the GRACE-C satellites. They will manage the flight control and mission operations from their facilities in Oberpfaffenhofen, Germany.

NASA Life-Cycle Management Process

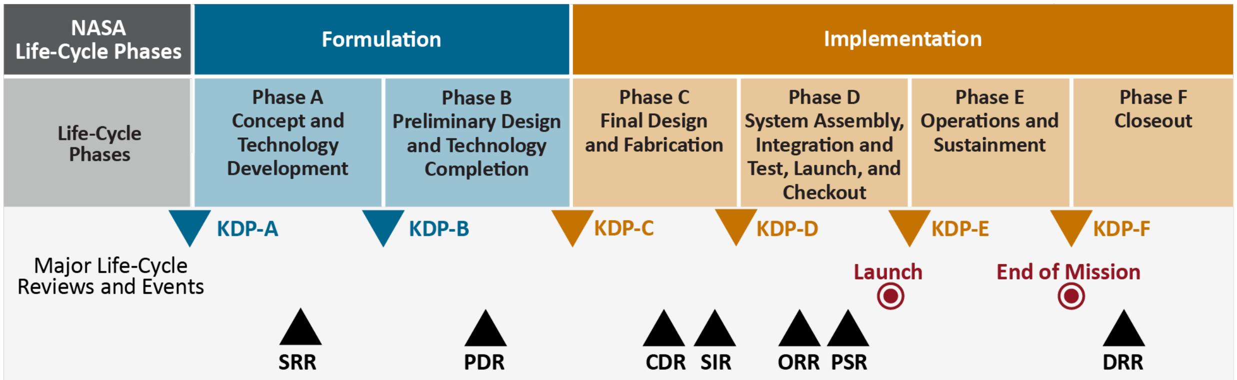
One of the fundamental concepts used within NASA for the management of major systems, like GRACE-C, is the program and project life cycle. NASA divides the life cycle of its programs and projects into two major phases—Formulation and Implementation—that are further divided into Phases A through F. Formulation consists of Phases A and B, and Implementation is Phases C through F. Periodic reviews, such as the Preliminary Design Review and Critical Design Review, assess the maturity of the design and determine whether the program or project is ready to proceed to the next phase. This structure also allows managers to assess the progress of their programs and projects at Key Decision Points (KDP) throughout the process (see Figure 4). Specifically, KDPs are the events at which the Decision Authority determines the readiness of a program or project to progress to the next phase of the life cycle and are defined so they provide natural points for "go" or "no-go" decisions.[7] At KDP-C, before proceeding to Phase C and Implementation, the Management Agreement (MA) and Agency Baseline Commitment (ABC) are established.[8]

6 NASA has a contract with the California Institute of Technology, a private nonprofit research university, to operate JPL in Pasadena, California, as a federally funded research and development center. JPL also managed the development of the GRACE and GRACE-FO missions.

7 The Decision Authority is the individual authorized by the Agency to make important decisions on programs and projects under their authority. The Decision Authority for GRACE-C is the Science Mission Directorate Associate Administrator.

8 KDP-C includes a final assessment of the preliminary design, a determination of whether the program or project is sufficiently mature, and the establishment of cost and schedule baselines. The MA defines the cost, schedule, and technical parameters and authorities over which the program or project manager has management control. The ABC establishes and documents an integrated set of project requirements, cost, schedule, and technical content that forms the basis for NASA's commitment to the Office of Management and Budget and Congress.

Figure 4: NASA Project Life-Cycle Phases, Key Decision Points, and Reviews



A **Key Decision Point (KDP)** is an event where NASA determines whether a program or project is ready to move to the next phase of its life cycle and establishes content, cost, and schedule commitments for that phase.

System Requirements Review (SRR) evaluates whether the functional and performance requirements for the system meet the needs of the program or project and represent achievable capabilities.

Preliminary Design Review (PDR) evaluates completeness and consistency of the planning, technical, cost, and schedule baselines developed during Formulation.

Critical Design Review (CDR) evaluates the program or project design to meet mission requirements with appropriate margins and acceptable risk.

System Integration Review (SIR) evaluates whether the program or project is ready for integration and test, can be completed with available resources, and is ready for Phase D.

Operational Readiness Review (ORR) evaluates the readiness of the project to operate the flight system and associated ground systems in compliance with defined project requirements and constraints during the operations and sustainment phase of the project life cycle.

Pre-Ship Review (PSR) ensures the completeness of any item of hardware or software before it is released to another facility for integration with a larger system or the spacecraft.

Disposal Readiness Review (DRR) evaluates the readiness of the program or project and system for a disposal event, such as deorbiting.

Source: NASA Office of Inspector General representation of information from NASA Procedural Requirements 7120.5F, *NASA Space Flight Program and Project Management Requirements w/Change 4* (August 3, 2021).

Earned Value Management

Earned Value Management (EVM) is a project management tool that NASA uses to measure a project's performance by comparing the estimated value of a completed task at a specific point in time in the project's schedule with the actual cost. The concept of earned value is fundamental to understanding how EVM works. The value of a task is how much project personnel initially estimated the task would cost to complete, with the project "earning" that value when it completes the task. In other words, earned value is the estimated cost of the actual work completed. EVM produces two key metrics—cost and schedule performance index ratios—to inform managers and decision-makers about the project's performance.

Cost Performance

Cost performance is measured by comparing a project's estimated cost to complete a task (the earned value) with the actual cost of the task. The result of this comparison is a ratio, calculated as the cost performance index (CPI), that provides managers and decision-makers with a simple indicator of how efficiently a project is completing its tasks from a cost perspective. When the actual cost of a task equals what was estimated, the ratio is one. When a completed task costs less than estimated, the ratio is greater than one and indicates the project is completing tasks below budget (a positive condition). When a completed task costs more than estimated, the ratio is less than one and indicates the project is exceeding its planned budget (a negative condition).

Schedule Performance

Schedule performance is measured by comparing how much work a project has completed at a specific point in time to the work or tasks it had planned to complete by that point. The result of this comparison is a ratio, calculated as the schedule performance index (SPI). Comparable to cost performance, a ratio greater than one indicates the project is accomplishing more work than planned at that point in time (a positive condition), while a ratio less than one indicates the project is completing less work than planned at that point in time (a negative condition).

Cost of the GRACE-Series Missions

The initial GRACE mission was selected under the Earth System Science Pathfinder Program, which was designed to provide an innovative approach to Earth science research. A competitively selected mission led by a Principal Investigator from a university, they and their team were responsible for the success of the mission, primarily including the development of the flight hardware with minimal direct oversight from NASA. GRACE-FO and GRACE-C were both executed as directed missions with lower risk tolerance and requirements for greater accuracy chosen for programmatic reasons. According to GRACE-C project officials, increased spacecraft design robustness and oversight requirements, along with inflation, contributed to the greater life-cycle cost estimates for each of the GRACE missions, from $97 million in 2002 for GRACE, to $432 million for GRACE-FO in 2018, and to $658 million for GRACE-C in 2029.

As of May 2026, GRACE-C had spent $341.6 million, or 51.9 percent, of its $658 million ABC life-cycle cost estimate. The remaining $316.4 million includes $234 million for Phase D work and $82.4 million for Phases E and F. The MA life-cycle cost estimate is $628 million, of which $82.5 million is reserved for unanticipated costs, also referred to as project-managed unallocated future expenses (project-managed UFE). In addition to the project-managed UFE, the Science Mission Directorate also retains control of some UFE at the Headquarters level.

GRACE-C Is on Track to Meet Cost and Schedule Estimates But Is Facing Cost Pressure

In May 2024, GRACE-C passed its Preliminary Design Review and was approved to enter Phase C—final design and fabrication—with an ABC of $658 million and a launch readiness date of July 2029. More than 2 years later, these cost and schedule baselines have remained unchanged since their establishment. As of May 2026, the GRACE-C project remained on track to launch before July 2029 and continued to operate within the ABC cost and schedule baselines. The GRACE-C project proceeded to Phase D—system assembly, integration and test, launch, and checkout—in December 2025, and cost, schedule, and programmatic metrics remain within planned margins. However, the project has already used a significant portion of its project-managed UFE and has identified liens and risks that will further reduce the remaining project-managed UFE.[9] As a result, a February 2026 independent cost estimate by JPL's Integrated Program Evaluation Group indicated the project would overrun its $628 million MA amount by $9.3 million.[10] In June 2026, the group revised its estimate to show the project would exceed the MA amount by $300,000.[11]

Current Project Status

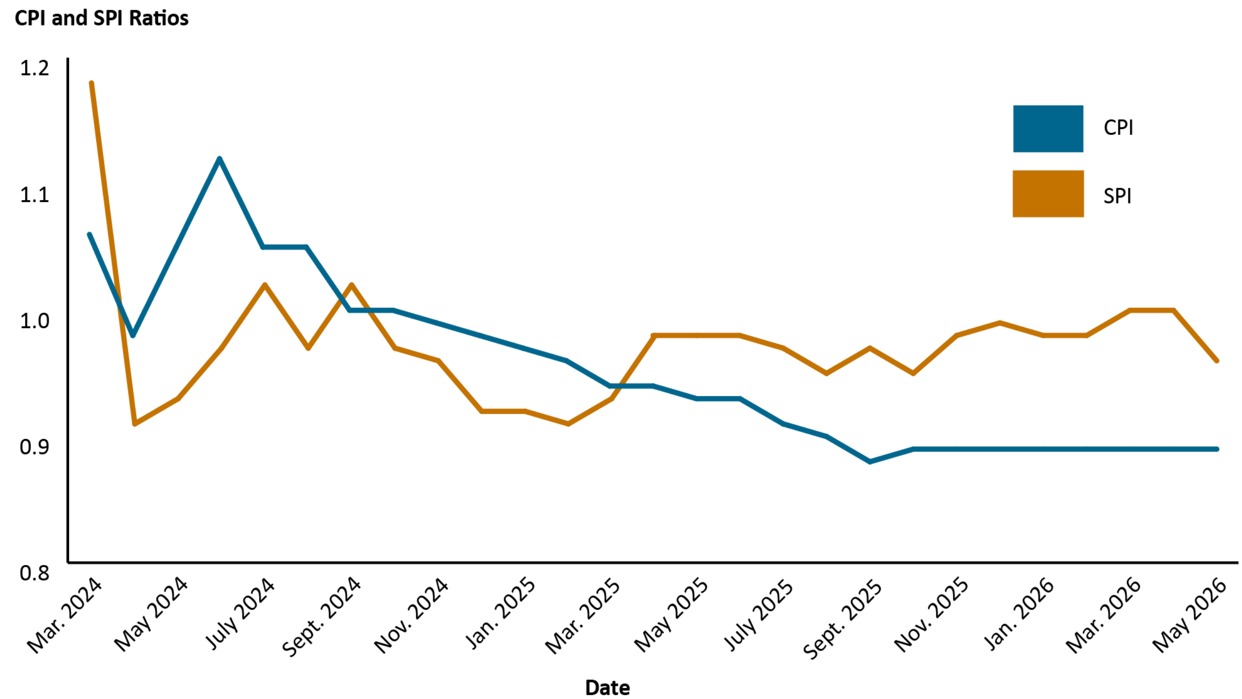
The GRACE-C project employs an EVM System to monitor cost and schedule performance, which began reporting earned value performance metrics in May 2024. Those metrics show the project's cost performance has decreased over time. The project's CPI trended downward from June 2024 through September 2025, and since that time, has remained at 0.89 as of May 2026. The decreased cost performance is the result of allocating funds to mitigate risks and maintain the project's schedule due to various external and technical issues (detailed in the following section). The project's schedule performance, on the other hand, has generally maintained its planned schedule. As of May 2026, the project's SPI was 0.96 and has been at or above 0.95 since April 2025. Overall, CPI metrics indicate persistent cost pressure while SPI metrics indicate stable schedule execution. Figure 5 shows the changes in CPI and SPI metrics over time.

[9] Liens are items and events that are currently negatively impacting the project or have a very high likelihood of occurring. Risks (or threats) are like liens in that they have a potential negative impact on the reserve position of the project, but with less likelihood of occurrence or the requirement for immediate resolution.

[10] GRACE-C project management provided the Office of Inspector General this independent cost estimate in February 2026, based on December 2025 data. This estimate closely aligned with a calculation we performed independently.

[11] After concluding our fieldwork and drafting this report, we received this reassessed estimate to completion in June 2026 based on April 2026 data. However, we did not perform an independent analysis on this updated data. GRACE-C managers said that the estimate will continue to be recalculated during project development.

Figure 5: CPI and SPI Performance (as of May 2026)



Source: NASA Office of Inspector General representation of Agency data.

Project-Managed UFE Used to Date

JPL's flight project practices guidelines recommend project-managed UFE—the funds reserved for unanticipated costs—be at 25 percent of the project's estimate at completion at KDP-C.[12] The GRACE-C MA baseline, however, set project-managed UFE at 15 percent for firm-fixed-price contracts, including those used with the European subcontractors (discussed later in this section), and 25 percent for all other Phase A to D costs, totaling $82.5 million of the $628 million MA amount.[13] Project management justified its lower reserve rates because of the mission's high use of heritage technologies—previously flown space flight components. This approach was agreed to by Science Mission Directorate leadership.

[12] *JPL Flight Project Practices, Rev. 15* (July 18, 2023). Estimate at completion is a value (expressed in dollars or hours) developed to represent a realistic projection of the final cost of a task (or group of tasks) when completed. It is the sum of direct and indirect costs to date, plus the estimate of costs for all authorized remaining work.

[13] A firm-fixed-price contract provides a set price that does not change even if the contractor's costs increase during performance.

As of May 2026, the project had already used $50.5 million, or 61.2 percent, of the $82.5 million project-managed UFE total. To mitigate the impact of various issues on the project schedule, such as LRI development problems, quality issues, and Eaton fire disruptions at JPL, GRACE-C project management allocated project-managed UFE to address the increased costs.[14] As a result, mitigation efforts have consumed project-managed UFE and impacted the overall project's estimated costs to complete development.[15]

Specifically, the GRACE-C project has relied on project-managed UFE, spending $35.3 million as of May 2026, to maintain scheduled delivery dates for JPL's portion of LRI development. Within the GRACE-C integrated master schedule, the primary critical path begins with the development of LRI-1 and LRI-2; shipment of the LRI components to Airbus in Germany, the subcontractor responsible for developing and delivering the two satellites; full integration and testing of GRACE-C's instruments, systems, and components; shipment to the launch site; and finally launch.[16] JPL's portion of the LRI had manufacturing problems with its subsystems' components, including the Laser Ranging Processor, which will among other things, control laser frequency, and the Scale Factor Unit, which will measure the frequency of the laser beams between the two satellites. Delays caused by these issues were absorbed using internal instrument schedule slack, supplemented by additional workforce mitigation efforts like adding workforce at JPL.[17]

JPL has shipped its LRI components to DLR's prime contractor in Germany for joint LRI integration and testing prior to delivery to Airbus. However, DLR-contributed LRI subsystems—the Optical Bench System and Triple Mirror Assembly—are behind schedule. As of May 2026, the Optical Bench System, which routes, receives, and directs the optical laser beams, was about 4 weeks late due to parts and manufacturing issues, and the Triple Mirror Assembly, which routes the laser beam, also incurred an additional 4-week delay due to alignment and calibration issues. JPL is working with Airbus to manage the integration and testing schedules. Although sufficient schedule margin remains to complete Phase D, the cumulative schedule pressure increases risks to the LRI integration and testing timeline.

Project-Managed UFE Allocated to Liens and Risks

As of May 2026, of the remaining $32 million in project-managed UFE, $6.1 million has already been allocated to liens and $12.3 million to risks. Consequently, only $13.6 million in unallocated project-managed UFE is available through Phase D. This represents 7 percent of remaining costs through Phase D, which is below JPL guidelines and the rates agreed to at KDP-C. The preponderance of the liens and risks are due to the cost impact of increased JPL indirect cost rates and foreign exchange rate fluctuations as noted below.

[14] The Eaton fire just to the east of JPL began on January 7, 2025, and was not contained until January 31, 2025. Its proximity to the Laboratory and effects on staff living in the area resulted in JPL shutting down for 14 days.

[15] According to NASA officials, rather than giving funds for potential foreign exchange rate cost risk to the project up front, NASA has documented the exchange rate assumptions in its decision memorandums, allowing the exchange rate risk to be addressed in the future if that risk is realized when the payments are made.

[16] An integrated master schedule constitutes the framework for time phasing and coordinating all program and project efforts into a master plan to ensure that objectives are accomplished within approved commitments. The critical path identifies the longest sequence (or path) of tasks throughout the entire schedule to completion. A delay of a task on that critical path will impact the completion date of the project or consume any available schedule margin.

[17] Slack refers to the amount of time a task can be delayed without affecting the project's overall completion date or subsequent milestones and without using the overall project's schedule margin.

Increased JPL Indirect Cost Rates

An indirect cost rate is a tool for determining the proportion of indirect costs each program and project should bear. It is the ratio of the indirect costs to a direct cost base. The direct cost base is the accumulated direct costs, usually (a) total direct salaries and wages with or without fringe benefits or (b) total direct costs exclusive of any extraordinary or distorting expenditures used to distribute indirect costs to individual federal awards.[18]

Due to funding uncertainty primarily regarding NASA's Mars Sample Return mission, JPL has undergone multiple reorganizations and workforce reductions since 2024.[19] These changes contributed to retroactive JPL indirect cost rate adjustments in fiscal year 2025, which increased the GRACE-C project's cost by approximately $4.6 million because of the reduced allocation base. Going forward, the project estimates an additional $13.3 million in impact from increases to the JPL indirect cost rate. The impact of the JPL rate increase has been included in the project's lien list and will be incorporated into the project's cost estimate. Further rate increases would place additional pressure on project-managed UFE and further deteriorate the project's reserve posture.

Unfavorable Foreign Exchange Rate

The dollar-to-euro exchange rate has shifted significantly since the project's MA baseline was set at KDP-C in May 2024, when $1.08 per euro was used. Rates fluctuated between $1.02 and $1.12 from 2023 to 2025, rising to $1.20 in January 2026. NASA Headquarters and JPL budgeted for an exchange rate of up to $1.10 per euro. As of July 2026, the rate was $1.14 per euro.

JPL utilized a firm-fixed-price contract with Airbus in Germany valued at €150.5 million and payable in euros. Additional subcontracts payable in euros include LRI laser development with Tesat-Spacecom in Germany for €5.9 million and accelerometer development with ONERA in France for €5.1 million. Because of significant volatility in the dollar-to-euro exchange rates since GRACE-C began development in May 2024, the budgeted cost allowance for exchange rate variance has been exceeded. As a result, the project has estimated $8 million in additional cost to cover the exchange-rate deficit. As of May 2026, approximately $60.6 million in remaining contract value must still be funded and paid in euros.

[18] Direct costs can be specifically identified with an output, such as a program, project, or mission. This includes (a) salaries and other benefits for employees who work directly on the output; (b) materials and supplies used in the work; (c) costs associated with office space, equipment, facilities, and utilities used to produce the output; (d) costs of goods or services received from other entities; and (e) other costs, like travel, related to the production of the output. Indirect costs, on the other hand, are for resources that are not specifically identifiable with one output. This includes costs of general and administrative services, general research and technical support, employee health and recreation facilities, and operating and maintenance costs.

[19] The Mars Sample Return Program is a partnership between NASA, under the Science Mission Directorate, and the European Space Agency to return Martian geological samples to Earth for scientific study by late 2033. The program's life-cycle cost estimate had grown from between $3.4 billion to $4.9 billion in December 2020 to between $5.9 billion to $6.2 billion in September 2022 to $8 billion to $11 billion in September 2023. In 2025, NASA released its fiscal year 2026 budget request that proposed canceling the mission.

Cost and Schedule Pressures Moving Forward

Uncertainty in the JPL indirect cost rate and foreign exchange rate can further erode the GRACE-C project's reserve posture and will continue to impose pressure on the project. GRACE-C has retained all schedule margin, 163 days in total, including 53 days for LRI delivery to spacecraft assembly, test, and launch operations. However, to maintain this schedule posture, project managers chose to expend additional resources (UFE) to complete the same scheduled tasks at a higher cost, essentially sacrificing funding to maintain schedule. In February 2026, an independent assessment performed by JPL's Integrated Program Evaluation Group considered past performance, increased JPL indirect cost rates, and the foreign exchange rate and found the project will deplete its project-managed UFE and require $637.3 million to complete the project, exceeding the MA life-cycle cost estimate by $9.3 million. Our calculations closely align with this independent assessment. In June 2026, the Integrated Program Evaluation Group revised its estimate based in part on the delivery of some components to show the project would exceed the MA by $300,000; however, we did not independently verify this calculation.

As noted in NASA's 2025 Lunar Trailblazer Anomaly Review Board Report, ongoing cost pressure can negatively impact the risk management process of a project.[20] Moreover, in 2010, the National Research Council (NRC) conducted a study examining the primary causes of cost growth in Earth and space science missions.[21] The study found that most cost increases occur after the Critical Design Review, when the project's design is evaluated to include appropriate margins and acceptable risk. The NRC concluded that, unlike mass or power growth—where changes are typically visible earlier—cost growth is often not recognized until after the Critical Design Review.

The NRC further observed that the highest percentage of schedule growth occurs during Phase D, after the start of system integration and testing. This trend is consistent across Earth science, heliophysics, astrophysics, and planetary missions. JPL flight project practices reflect these findings by recommending projects have a 20 percent cost reserve (project-managed UFE) at the start of instrument and payload integration and testing on the remaining costs to complete development—GRACE-C began this phase substantially below this amount. The NRC's study and JPL criteria highlight the importance of maintaining adequate reserves to address risks that typically materialize during later life-cycle phases. Accordingly, in our opinion, although the project is currently being managed within ABC cost and schedule baselines, there is lower than typical project-managed UFE, which is already estimated to be exceeded. This concern, along with ongoing technical issues and NASA's historical experience, will result in cost and schedule pressure on the project that the Science Mission Directorate will need to actively monitor, manage, and mitigate.

[20] The $72 million Lunar Trailblazer mission aimed to map the distribution of the different forms of water that exist on the surface of the Moon. In February 2025, NASA launched the spacecraft; however, it was lost the next day. NASA established an independent Anomaly Review Board to understand the issues that led to the post-launch anomaly and identify lessons learned from this mission that could be crucial for enabling the success of future projects. The spacecraft was lost due to what the board determined was the solar panels were inadvertently programmed to look away from the Sun. The board also stated that the risk management process was overwhelmed during development due to cost and schedule pressure, leading to an over-acceptance of risks versus mitigation.

[21] NRC of the National Academies, *Controlling Cost Growth of NASA Earth and Space Science Missions* (2010).

Opportunities Exist to Improve NASA's International Partner Agreements and Project-Level Documents

The working relationship between NASA, JPL, and DLR for GRACE-C is managed under a set of formal documents executed by NASA's Office of International and Interagency Relations and the relevant parties, including a Framework Agreement and an Implementing Arrangement (IA).[22] Separately, the project produces multiple documents for the management of its work and relationship with DLR, such as the Cooperative Project Plan (CPP).[23] Requirements were included in both the IA and CPP, as well as other project-level documents, for formal actions to be taken or for information to be exchanged between the parties during GRACE-C's development.

However, we identified instances where these requirements were not always met as written. In some instances, alternative approaches or actions were used by the project to meet what they understood to be the intent of these requirements, but the agreements and related documents do not include allowances for the use of alternatives unless issues arise between the parties.[24] Not consistently following agreed-upon, formal processes and procedures increases the risk that the intent of controls established within those processes is not met, thereby increasing the potential for negative consequences to a project achieving its objectives.

We noted exceptions to the requirements in the following areas:

Safety and Mission Assurance (SMA).[25] The GRACE-C project's Safety and Mission Assurance Requirements (SMAR) document, incorporating language included in JPL's SMAR template, calls for international partners to submit a mission assurance implementation plan for approval by the project's

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[22] The Framework Agreement, signed by NASA and DLR in 2010 and extended in 2020, sets forth the obligations, terms, and conditions for cooperation between the parties in the exploration and use of outer space. The IA between NASA and DLR sets forth their respective responsibilities and the terms and conditions under which they expect to cooperate on the GRACE-C mission.

[23] The CPP between JPL and DLR defines the management methods, relationships, and responsibilities of the entities responsible for the successful development and operation of the GRACE-C mission. The CPP is the vehicle for implementing the roles and responsibilities defined in the IA and includes details related to the implementation of the articles of the IA.

[24] Framework Agreement, Article 14, Section 2 states: "In the event issues arise regarding the interpretation or implementation of this Agreement, the Program Managers identified in the relevant Implementing Arrangement shall consult promptly to seek resolution of the issues. Any dispute on which the Program Managers are unable to reach agreement shall be referred to the appropriate senior-level officials for joint resolution." The Framework Agreement anticipates some latitude in how projects meet partnership requirements in the event of "issues," but not whether these and other related requirements should be met.

[25] The objective of the SMA effort is to enhance the likelihood of mission success through the implementation of SMA processes on the project. These include design, development, review, and verification of practices and procedures intended to ensure that the delivered spacecraft system, instruments, and payloads meet performance requirements and function for their intended lifetimes. Application of the SMA processes assist in the identification, assessment, and mitigation of risks to the project.

Mission Assurance Manager.[26] Although an implementation plan was submitted, it was not comprehensively reviewed and approved after it was received. The project's interpretation of the intent of the SMAR requirement was to ensure the project Mission Assurance Manager was aware of DLR's SMA processes and practices and agreed with the approach, which would be evaluated on a case-by-case basis. The project reviewed partner documents and activities as needed and is currently amending the SMAR to clarify the intent by removing the word "approval" from the implementation plan requirement.

Risk Management. The JPL-DLR CPP requires a specific monthly meeting between the two parties where risks are shared and discussed.[27] There were several instances in a 12-month period we reviewed where these meetings were not held each month. During these months other meetings between GRACE-C project and partner management as well as key project milestone meetings were held, and the project believes that the combination of these exchanges was sufficient to meet the intent of this requirement. Additionally, records of the risk coordination discussions were only made and retained locally by the individual meeting participants. By contrast, GRACE-C's project-level Risk Management Board discussions are formally documented and shared with all members following each meeting.[28]

We did not identify any negative impacts on GRACE-C's development as a consequence of these exceptions. We believe this is due to the high use of heritage technologies involved in this project and the positive nature of the relationships between NASA, JPL, and DLR and their subcontractors and related parties stemming from collaborations on previous GRACE missions. However, a different project facing a different set of conditions and relationship concerns—for example, a flagship project confronting new and novel engineering challenges or more significant resource constraints with a new partner—may need different requirements included in these documents to ensure development challenges are properly and timely addressed.

As internal controls, requirements contained in agreement terms and project documents are intended to provide reasonable assurance that the parties achieve their desired results effectively and efficiently. We believe that any requirement included in agreements and project documents executed by the relevant parties should be met and, where appropriate, allow for alternative options or approaches to meet the intent if certain conditions exist. In each instance, there should be formal documentation that the requirement was met, and if it was not met, there should be documentation explaining why. Ideally, this process would include a verification step to confirm that requirements are being met.

[26] GRACE-Continuity Safety and Mission Assurance Requirements, Section 3.1.2 states: "International partners and JPL primary subcontractors shall submit an SMA implementation plan or plans for approval by the Project [Mission Assurance Manager] and JPL discipline specialists, which describes process and practices to be used to meet the intent of the applicable requirements specified herein."

[27] GRACE-Continuity Project Cooperative Project Plan, Section 4.4.2 states: "Once a month, a DLR-JPL Risk Coordination Meeting (RCM) will be held. During this meeting, risks from DLR responsibility areas (LRI-D, MOS, LV) will be shared, and the latest risks from JPL's Significant Risk List (SRL) will be discussed, plus any LRI-U risks not on the SRL. The DLR-originating risks, once shared, will be absorbed into the JPL risk management board (RMB) meeting (typically a week later), and any updates to the SRL made during the RMB (plus any non-SRL LRI-U risks) will be fed back to DLR at the next DLR-JPL RCM."

[28] The GRACE-C Risk Management Board is a team that provides oversight for risk management throughout the project life cycle, reviews risk assessments, identifies trade studies for effective mitigations, and recommends dispositions of the risks to the project manager. The board provides the authority to disposition risks and implement actions.

Additionally, reliable, useful, and timely information is required for the effective management of government resources. Documentation of actions taken to comply with agreement requirements exists for the benefit of the overall project and its stakeholders, rather than the current incumbent of any particular project role. We believe that the conduct and results of any project activity required by partnership agreements should be documented and retained as part of the project's records for future reference. Without this documentation, project management as well as any future or successor personnel may not have appropriate insight into the actions taken, decisions that were made, and the information used to arrive at those decisions.

CONCLUSION

Benefitting from mostly heritage technology, well established partner and subcontractor relationships, and an experienced workforce, the GRACE-C project is performing within the ABC cost estimate and development schedule and is achieving its technical objectives. However, external factors, such as JPL indirect cost rate changes and unfavorable foreign exchange rates, along with management decisions to buy down schedule risks, have added cost pressure that could increase risk and exceed the MA life-cycle cost estimate. Additionally, we noted opportunities for NASA and JPL to improve its partnership management process. Specifically, requirements in the IA and CPP were not completed or executed as required to ensure an effective partnership management process.

Recommendations, Management's Response, and Our Evaluation

To better ensure GRACE-C can meet its cost and schedule commitments and is operationally successful, we recommended the Associate Administrator for Science Mission Directorate:

1. Routinely assess the project's risk posture to determine the appropriateness and timing of allocating Science Mission Directorate-managed UFE to reduce cost and schedule pressures.

To improve NASA's international partner agreements and project-level documents, we recommended the Associate Administrator for International and Interagency Relations in coordination with the Associate Administrator for Science Mission Directorate:

2. Review international partner agreement language in management and project documents for applicability of requirements and include options for alternative approaches if appropriate.

We provided a draft of this report to NASA management who concurred and partially concurred, respectively, with our recommendations and described planned actions to address them. We consider management's comments responsive; therefore, the recommendations are resolved and will be closed upon further discussion with SMD officials and verification of the proposed corrective actions.

Management's comments are reproduced in Appendix B. Technical comments provided by management and revisions to address them have been incorporated as appropriate.

Major contributors to this report include Ray Tolomeo, Science and Aeronautics Research Audits Director; Gerardo Saucedo, Assistant Director; Jiang Yun Lu; Bryan McGloin; Karlo Torres; Adhana Davis; and Lauren Suls.

If you have questions or wish to comment on the quality or usefulness of this report, contact Laurence Hawkins, Audit Operations and Quality Assurance Director, at 202-358-1543 or laurence.b.hawkins@nasa.gov.

Digitally signed by Robert Steinau
Date: 2026.09.22 13:00:00 -04'00'

Robert H. Steinau
NASA OIG Senior Official

APPENDIX A: SCOPE AND METHODOLOGY

While we performed this audit from August 2025 through August 2026, it was suspended during the government shutdown that occurred from October 1 to November 12, 2025. The audit was performed in accordance with generally accepted government auditing standards, which require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

In this audit, we examined NASA's management of the GRACE-C mission. Specifically, we assessed whether NASA is effectively managing the GRACE-C mission relative to achieving technical objectives, meeting milestones, and controlling costs. The audit was primarily conducted at NASA Headquarters and JPL.

To assess the effectiveness of NASA's management of the GRACE-C mission, we interviewed NASA Headquarters and JPL project officials, including the program executive, project manager, business manager, lead engineer, risk manager, mission assurance manager, and procurement manager. We also researched websites, reviewed and analyzed documents, inquired with relevant personnel, and analyzed the risks related to NASA's processes for cost, schedule, lessons learned, technical issues, risk management, procurement and acquisitions, international partnerships, and workforce.

Finally, we reviewed federal and NASA criteria, policies, procedures, and supporting documentation; prior audit reports; external reviews; and other documents relevant to the GRACE missions. The documents we reviewed included:

- White House, *National Space Policy of the United States of America* (December 9, 2020)
- NASA, *Fiscal Year 2026 Budget Technical Supplement* (June 9, 2025)
- NASA, *Fiscal Year 2025 Full Budget Request (Congressional Justification)* (April 15, 2024)
- NASA Procedural Requirements 8705.4B, *Risk Classification for NASA Payloads* (November 1, 2024)
- NASA Procedural Requirements 8000.4C, *Agency Risk Management Procedural Requirements* (April 19, 2022)
- NASA Procedural Requirements 7120.5F, *NASA Space Flight Program and Project Management Requirements w/Change 4* (August 3, 2021)
- National Academies, *Thriving on Our Changing Planet: A Midterm Assessment of Progress Toward Implementation of the Decadal Survey* (2024)
- National Academies, *Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space* (2018)
- National Academies, *Continuity of NASA Earth Observations from Space: A Value Framework* (2015)

- NRC, *Controlling Cost Growth of NASA Earth and Space Science Missions* (2010)
- NRC, *Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond* (2007)

Assessment of Data Reliability

Project performance audits include various sources of information for cost, schedule, procurement, and risk management. This information includes numeric and text data. The projects use several agency-level and project specific systems to manage and report this data. The GRACE-C project performance data used by the audit team is generally available data provided as part of standard reports that are widely disseminated by the GRACE-C project team. We did not request any data transfers or perform any data pulls. We determined that the data from BOBJ-SAP and the Empower EVM system were sufficiently reliable for the purpose of reviewing cost and schedule data for points of analysis and discussion.

Review of Internal Controls

We assessed internal controls associated with how NASA is managing the GRACE-C mission relative to controlling costs, meeting milestones, and achieving technical objectives. We identified that the project is facing cost pressure due to external factors and buy down of schedule risks. We also identified that opportunities exist for improvement in the partnership management process. Control weaknesses are identified and discussed in this report. Our recommendations, if implemented, will improve those identified weaknesses.

Prior Coverage

During the last 10 years, the NASA Office of Inspector General and Government Accountability Office have issued four reports of significant relevance to the subject of this report. Reports can be accessed at https://oig.nasa.gov/audits/ and https://www.gao.gov, respectively.

NASA Office of Inspector General

NASA's Earth Science Mission Portfolio (IG-17-003, November 2, 2016)

Government Accountability Office

NASA: Assessments of Major Projects (GAO-25-107591, July 1, 2025)

NASA: Assessments of Major Projects (GAO-18-280SP, May 1, 2018)

NASA: Assessments of Major Projects (GAO-16-309SP, March 30, 2016)

Appendix B: Management's Comments

National Aeronautics and Space Administration

Mary W. Jackson NASA Headquarters
Washington, DC 20546-0001

September 15, 2026

Reply to Attn of: Science Mission Directorate

TO: Deputy Assistant Inspector General for Audits

FROM: Deputy Associate Administrator for Science Mission Directorate
Associate Administrator for International and Interagency Relations

SUBJECT: Agency Response to OIG Draft Report, "NASA's Management of the Gravity Recovery and Climate Experiment-Continuity (GRACE-C) Mission" (A-25-06-00-SARD)

The National Aeronautics and Space Administration (NASA) appreciates the opportunity to review and comment on the Office of Inspector General (OIG) draft report entitled, "NASA's Management of the Gravity Recovery and Climate Experiment-Continuity (GRACE-C) Mission" (A-25-06-00-SARD), dated August 7, 2026.

In this report, the OIG found that GRACE-C is on track to meet cost and schedule estimates but is facing cost and schedule pressures. The OIG also found that opportunities exist to improve NASA's international partner agreement management process.

The OIG makes two recommendations, one addressed to the Associate Administrator (AA) for Science Mission Directorate (SMD) and one addressed to the AA for International and Interagency Relations, in coordination with the AA for SMD.

Specifically, OIG recommends the AA for SMD:

Recommendation 1: Routinely assess the project's risk posture to determine the appropriateness and timing of allocating Directorate-managed unallocated future expenses (UFE) to reduce cost and schedule pressures.

> **Management's Response:** NASA concurs with this recommendation. The GRACE-C mission is subject to NASA Procedural Requirements (NPR) 7120.5F, NASA Space Flight Program and Project Management Requirements, and managed in alignment with NPR 8705.4B, Risk Classification for NASA Payloads. In accordance with these policies, SMD routinely assesses risk posture, and management decisions for release of Directorate-managed UFE to projects are approved by the SMD AA with input from the Project, Program and Division. For example, the date of the last formal assessment for consideration of release of Directorate-managed UFE to GRACE-C was December 9, 2025, conducted as part of Key Decision Point D. NASA also assesses the risk posture for UFE in monthly reports and quarterly management reviews. At the most recent quarterly management review on August 5, 2026, the project presented lessened concerns on UFE projections compared to the

audit period. NASA considers this recommendation implemented, and will continue to both monitor relevant factors that could impact GRACE-C and work to maintain sufficient UFE in accordance with its confirmed baselines and commitments. If additional Project funds are requested in future years, NASA will follow its standard process to assess the necessity and propriety of releasing Mission Directorate-held UFE.

Estimated Completion Date: August 5, 2026.

In addition, OIG recommends that the AA for International and Interagency Relations, in coordination with the AA for the SMD:

Recommendation 2: Review international partner agreement language in management and project documents for applicability of requirements and include options for alternative approach options if appropriate.

Management's Response: NASA partially concurs with this recommendation. The Office of International and Interagency Relations (OIIR) will coordinate with SMD to review applicable language in the management and documentation section(s) of international agreements. Where appropriate, when agreements are developed or updated, OIIR and SMD will adjust international agreement language to specify that alternative approaches are allowed to meet the intent of requirements.

Estimated Completion Date: January 29, 2027.

We have reviewed the draft report for information that should not be publicly released. As a result of this review, we have not identified any information that should not be publicly released.

Once again, thank you for the opportunity to review and comment on the subject draft report. If you have any questions or require additional information regarding this response, please contact Luc Riesbeck at luc.h.riesbeck@nasa.gov or (202) 957-9022.

Sincerely,

Dr. Mark Clampin
Deputy Associate Administrator for
Science Mission Directorate

Kathleen Karika
Associate Administrator for
International and Interagency Relations

cc:
Director, NASA Office of JPL Management and Oversight/Dr. Pulkkinen (Acting)

APPENDIX C: REPORT DISTRIBUTION

National Aeronautics and Space Administration

Administrator
Deputy Administrator
Associate Administrator
Chief of Staff
Associate Administrator for Science Mission Directorate
Associate Administrator for International and Interagency Relations
Acting Chief Program Management Officer
Director, Earth Science Division
Director, Jet Propulsion Laboratory
Acting Director, NASA Office of JPL Management and Oversight

Non-NASA Organizations and Individuals

Office of Management and Budget
    Deputy Associate Director, Energy, Science, and Water Division

Government Accountability Office
    Director, Contracting and National Security Acquisitions

Airbus Defence and Space

ONERA

Tesat-Spacecom

Congressional Committees and Subcommittees, Chair and Ranking Member

Senate Committee on Appropriations
    Subcommittee on Commerce, Justice, Science, and Related Agencies

Senate Committee on Commerce, Science, and Transportation
    Subcommittee on Aviation, Space, and Innovation
    Subcommittee on Science, Manufacturing, and Competitiveness

Senate Committee on Homeland Security and Governmental Affairs

House Committee on Appropriations
    Subcommittee on Commerce, Justice, Science, and Related Agencies

House Committee on Oversight and Government Reform
    Subcommittee on Government Operations

House Committee on Science, Space, and Technology
Subcommittee on Investigations and Oversight
Subcommittee on Research and Technology
Subcommittee on Space and Aeronautics

(Assignment No. A-25-06-00-SARD)