

**SPACE**

**Memorandum of Understanding  
Between the  
UNITED STATES OF AMERICA  
and GERMANY**

Signed at Washington and Potsdam  
January 31 and February 10, 2014

Entered into force February 10, 2014



NOTE BY THE DEPARTMENT OF STATE

Pursuant to Public Law 89—497, approved July 8, 1966  
(80 Stat. 271; 1 U.S.C. 113)—

“ . . .the Treaties and Other International Acts Series issued under the authority of the Secretary of State shall be competent evidence . . . of the treaties, international agreements other than treaties, and proclamations by the President of such treaties and international agreements other than treaties, as the case may be, therein contained, in all the courts of law and equity and of maritime jurisdiction, and in all the tribunals and public offices of the United States, and of the several States, without any further proof or authentication thereof.”

**MEMORANDUM OF UNDERSTANDING**  
**BETWEEN THE**  
**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
**OF THE UNITED STATES OF AMERICA**  
**AND THE**  
**GERMAN RESEARCH CENTRE FOR GEOSCIENCES**  
**OF THE FEDERAL REPUBLIC OF GERMANY**  
**FOR COOPERATION ON**  
**THE GRAVITY RECOVERY AND CLIMATE EXPERIMENT FOLLOW-ON MISSION**

## **TABLE OF CONTENTS**

### **Preamble**

<b>Article 1</b>	<b>Purpose of Cooperation</b>
<b>Article 2</b>	<b>Definitions</b>
<b>Article 3</b>	<b>NASA Responsibilities</b>
<b>Article 4</b>	<b>GFZ Responsibilities</b>
<b>Article 5</b>	<b>Science Teams</b>
<b>Article 6</b>	<b>Joint Steering Group</b>
<b>Article 7</b>	<b>Cooperative Project Plan</b>
<b>Article 8</b>	<b>Rights Resulting in, and Distribution of, Scientific Data</b>
<b>Article 9</b>	<b>Points of Contact</b>
<b>Article 10</b>	<b>Financial Arrangements</b>
<b>Article 11</b>	<b>Schedule and Milestones</b>
<b>Article 12</b>	<b>Priority-of-Use</b>
<b>Article 13</b>	<b>Liability and Risk of Loss</b>
<b>Article 14</b>	<b>Registration of Space Objects</b>
<b>Article 15</b>	<b>Mission Extensions and End-of-Mission Operations</b>
<b>Article 16</b>	<b>Transfer of Goods and Technical Data</b>
<b>Article 17</b>	<b>Intellectual Property Rights</b>
<b>Article 18</b>	<b>Release of Results and Publication Information</b>
<b>Article 19</b>	<b>Exchange of Personnel and Access to Facilities</b>
<b>Article 20</b>	<b>Customs Clearance and Movement of Goods</b>
<b>Article 21</b>	<b>Ownership of Equipment</b>
<b>Article 22</b>	<b>Consultation and Dispute Resolution</b>
<b>Article 23</b>	<b>Investigations of Mishaps</b>
<b>Article 24</b>	<b>Amendments</b>
<b>Article 25</b>	<b>Entry into Force, Duration, and Termination</b>

## **Preamble**

The National Aeronautics and Space Administration of the United States of America (hereinafter referred to as "NASA") and the German Research Centre for Geosciences (hereinafter referred to as "GFZ") of the Federal Republic of Germany, hereinafter collectively referred to as the "Parties";

Recognizing the successful cooperation between the United States and Germany on the joint Gravity Recovery and Climate Experiment (GRACE) mission;

Desiring to engage in scientific, instrumentation, and data exchanges and related activities associated with a joint Gravity Recovery and Climate Experiment Follow-On (GRACE-FO) mission; and

Considering their mutual interest in understanding the planet Earth;

HAVE AGREED as follows:

## **Article 1 Purpose of Cooperation**

1. The purpose of this Memorandum of Understanding (MOU) is to set forth the respective responsibilities of the Parties and the terms and conditions under which they will cooperate on the GRACE-FO mission.
2. GRACE-FO is a continuation of the science initiated by the United States-German GRACE mission that was launched in 2002. The primary objective of GRACE-FO is to acquire critical data for tracking water movement on and beneath the Earth's surface and understanding changes in ice sheets and global sea levels. Its data will enhance studies of ocean currents and changes in the structure of solid Earth. GRACE-FO will do this by continuing the extremely high-resolution global data record of the Earth's gravity field and how it changes over time. These gravity fields assist in the study of global climatic issues by improving our understanding, among other things, of surface and deep ocean currents, lithospheric and mantle density variations, aquifer depletion, and polar ice sheet mass variations. As with the GRACE mission, GRACE-FO will acquire the gravity field data using two Earth polar-orbiting spacecraft identically equipped and flying in a loosely controlled tandem formation. As these two spacecraft orbit the Earth, variations in the Earth's gravity field will cause the distance between the two GRACE-FO spacecraft to change. The microwave link between the two GRACE-FO spacecraft will measure these changes at the micron level. These measurements will then be used to determine the Earth's gravity field every month. Launch is planned for August 2017 on a GFZ-provided Launch Vehicle.
3. In addition to extending the record of gravity field observations from GRACE, GRACE-FO will also continue the GRACE Radio Occultation measurements to provide globally distributed temperature and humidity profiles to international weather services on a best efforts basis.

4. A secondary objective of GRACE-FO is to demonstrate spacecraft-to-spacecraft laser ranging interferometry technology that can support future gravity missions. Like the microwave system for the primary science measurements, the Laser Ranging Interferometer (LRI) will consist of transmit and receive elements on each of the two GRACE-FO spacecraft. However, as a secondary technology demonstration, accommodation and operation of the LRI are dependent on the necessary technologies being sufficiently developed and matured within the project constraints such that the LRI will not adversely affect the primary science objectives of the mission.

5. The GRACE-FO mission is expected to operate for five (5) years after launch. Based on both the value of the observations and the longevity previously experienced by the GRACE mission, an extended GRACE-FO mission is likely and the Parties will plan for that possibility, although extended mission commitments are not a part of this MOU.

## **Article 2**

### **Definitions**

As used in this MOU, the following terms have the specified meanings:

1. "Data Products" are those resulting from processing of the spacecraft and Instrument data and any necessary supporting Housekeeping Data and/or ancillary engineering data and are referred to in this document as Level-1 and higher Data Products. Full and complete Data Product level definitions are found in the Cooperative Project Plan (see Article 7).
2. "End-of-Mission" includes end-of-life activities complying with the Parties' de-orbit requirements as referenced in Article 15 (Mission Extensions and End-of-Mission Operations) and described in the End of Mission Plan.
3. "Flight Segment" consists of the two GRACE-FO spacecraft, the science and technology demonstration instrumentation, and the instrumentation to calibrate the spacecraft-to-spacecraft tracking measurements.
4. "GRACE-FO spacecraft" consist of the two spacecraft buses and their Instruments.
5. "Instruments" means the two accelerometers, the Microwave Instrument (MWI), and the Laser Ranging Interferometer (LRI). The LRI will be flown as a technology demonstration.
6. "Mission Operations System" means the hardware, software, and ancillary equipment required to command and operate the spacecraft and collect Housekeeping and Instrument science data.
7. "Near Earth Network (NEN)" means NASA's world-wide network of ground-based antennas that provide comprehensive communications services to space assets.
8. "Related Entity":
  - a. For the purpose of this MOU means:

- i. A contractor or subcontractor of a Party at any tier;
- ii. A grantee or any other cooperating entity or investigator of a Party at any tier; or
- iii. A contractor or subcontractor of a grantee or any other cooperating entity or investigator of a Party at any tier.

b. In Article 13 (Liability and Risk of Loss) of this MOU, it also means:

- i. A user or customer of a Party at any tier; or
- ii. A contractor or subcontractor, including suppliers of any kind, of a user or customer of a Party at any tier.

c. In Article 13 (Liability and Risk of Loss) and Article 16 (Transfer of Goods and Technical Data) of this MOU, it may also include another State or an agency or institution of another State, where such State, agency, or institution is an entity described above or is otherwise involved in the activities undertaken pursuant to this MOU.

9. "Telemetry" is downlinked data comprised of:

- a. "Housekeeping Data" are those engineering measurements of spacecraft and Instrument performance and health for the two GRACE-FO spacecraft; and,
- b. "Instrument Data" are those resulting from operation of the Instruments in the Instrument-specific formats, and are referred to as Level-0 data.

### **Article 3 NASA Responsibilities**

For GRACE-FO, NASA will provide the two GRACE-FO spacecraft and the Instruments needed to collect the primary science data, including the MWI and accelerometers. It will also provide the electronics and laser components for the LRI should technical maturity be achieved and other circumstances permit. In addition, NASA will provide ground networks of GPS stations and laser ranging stations for spacecraft navigation and participate in science and science data processing.

To implement this cooperative project, NASA will use reasonable efforts to carry out the following specific responsibilities:

- 1. Provide and lead the overall project management for the GRACE-FO mission;
- 2. Lead the overall design, development, integration, and qualification of the Flight Segment;
- 3. Support GFZ as necessary to assure compatibility of the Flight Segment with the Launch Vehicle and the Mission Operations System to achieve the primary and secondary scientific and technology demonstration objectives of the mission;

4. Design, develop, integrate, and qualify for space flight the two GRACE-FO spacecraft;
5. Design, develop, integrate, and qualify the MWI for space flight;
6. Design, develop, integrate, and qualify for space flight the electronic and laser components of the LRI and support GFZ in the design, development, integration and qualification for space flight of the optical components of the LRI;
7. Deliver the GRACE-FO Flight Segment to the launch site for launch;
8. Assure compatibility of the mission's Flight Segment with the Launch Vehicle and the Mission Operations System;
9. If feasible, provide available NEN assets for Telemetry, Tracking and Command (TT&C) support of the two GRACE-FO spacecraft during the Launch and Early Orbit Phase (LEOP) of the mission, including initial acquisition support, and contingency TT&C support of the two GRACE-FO spacecraft for the duration of the mission;
10. Provide a Mission Manager who, working closely with the Project Office, Science Team, and Mission Operations teams, will manage the mission plan, operations timeline, and response to contingencies;
11. Extend and develop as necessary for the GRACE-FO mission the science data system which was implemented to support GRACE;
12. Promptly inform the GFZ Project Manager identified in Article 9 (Points of Contact) of any technical or programmatic problems which may affect overall GRACE-FO project and/or LRI schedules, cost, or performance;
13. Lead development of the Cooperative Project Plan as detailed in Article 7 (Cooperative Project Plan); and,
14. Establish jointly with GFZ the GRACE-FO End-of-Mission Plan.

#### **Article 4** **GFZ Responsibilities**

GFZ will support development of the two GRACE-FO spacecraft, develop the optical components for the LRI, should technical maturity be achieved and other circumstances permit, and provide the single Launch Vehicle and all launch services. It will also provide GRACE-FO Mission Operations and Telecommand Systems, ground networks of GPS stations and a Potsdam Laser



Tracking Station, a Laser Retro Reflector for each of the two GRACE-FO spacecraft, and participate in science and science data processing.

To implement this cooperative project, GFZ will use reasonable efforts to carry out the following specific responsibilities:

1. Provide and lead the project management for the German contributions to GRACE-FO;
2. Support NASA as necessary in the design, development, integration, and qualification for space flight of the Flight Segment;
3. Support NASA as necessary to assure compatibility of the Flight Segment with the Launch Vehicle and Mission Operations System to achieve the primary and secondary scientific and technology demonstration objectives of the mission;
4. Design, develop, integrate, and qualify for space flight the optical components of the LRI and support NASA in the design, development, integration and qualification for space flight of the electronic components of the LRI;
5. Provide a Laser Retro-Reflector for each of the two GRACE-FO spacecraft;
6. Provide dedicated launch services to deliver two GRACE-FO spacecraft to a near-polar orbit;
7. Provide NASA with specifications of the Launch Vehicle environmental conditions, launch processing requirements, safety requirements, and appropriate mechanical and electrical interfaces for use in the design of the two GRACE-FO spacecraft;
8. Provide required technical information to enable NASA to assess the feasibility of providing available assets for TT&C support of the two GRACE-FO spacecraft during the LEOP of the mission, including initial acquisition support, and for contingency TT&C support of the two GRACE-FO spacecraft for the duration of the mission;
9. Develop and provide the mission operations and telecommand systems for the GRACE-FO mission and operate the mission from launch until completion of the mission;
10. Maintain and operate a ground network of tracking stations which are required for the GRACE-FO mission;
11. Produce and archive the Level-0 Data Products from the two GRACE-FO spacecraft and make these products available to NASA within 24 hours of acquisition from the two GRACE-FO spacecraft;

12. Extend and develop as necessary for the GRACE-FO mission the science data system that was implemented to support GRACE;
13. Promptly inform the NASA Project Manager identified in Article 9 (Points of Contact) of any technical or programmatic problems that may affect the overall GRACE-FO project and/or LRI schedules, cost, or performance;
14. Support development of the Cooperative Project Plan as detailed in Article 7 (Cooperative Project Plan);
15. Establish jointly with NASA the GRACE-FO End-of-Mission Plan;
16. Arrange with the launch provider and/or governmental authorities that NASA-provided items will: (a) receive prompt customs entry at the port-of-entry, and, (b) will not be uncrated or removed from their shipping containers prior to arrival at the launch processing site, and then only by NASA and/or its contractors; and,
17. Arrange for the right of NASA and/or NASA contractors: (a) to house the Flight Segment and ground support equipment in a secure payload processing facility while at the launch site, (b) to accompany and be physically present with the Flight Segment and ground support equipment during pre-launch and launch activities at the launch site, and, (c) to enjoy such other rights as may be agreed in the Cooperative Project Plan.

## **Article 5 Science Teams**

1. NASA will form a U.S. GRACE/GRACE-FO Science Team. This science team will be competitively selected by NASA from the science community.
2. GFZ will select members of the European Science Team who each will be responsible for acquiring their own funding.
3. The NASA and European Science Teams will compose the Joint GRACE-FO Science Team which will meet at least once every twelve (12) months and otherwise, upon agreement of the Parties.

## **Article 6 Joint Steering Group**

1. The Parties will establish a Joint Steering Group (JSG) to provide oversight for the mission. The JSG will comprise two senior-level representatives from each Party, designated by the Parties in writing.

2. The JSG will be convened at least once every twelve (12) months and otherwise, upon agreement of the Parties. The Parties' Program/Project Managers, Program or Mission Scientists, Project Scientists and others of their Project or Program staff, as agreed by the Parties, will support these meetings.
3. The JSG will review program/project status, resolve conflicts, and provide institutional resources to ensure timely delivery of mission elements and efficient operations. The JSG will be co-chaired by the Parties during mission development and operations of the two GRACE-FO spacecraft. Decision-making by the JSG will be made by consensus.
4. Changes made to the mission by one Party that may impact the other Party in terms of cost, mission performance, schedule, risk, and end of life of the mission will require the approval of the JSG.

## **Article 7**

### **Cooperative Project Plan**

The Cooperative Project Plan will be the vehicle for coordinating implementation of this cooperative project and will include, *inter alia*, the following elements.

1. NASA is the lead agency for the GRACE-FO mission and is responsible for all contributions of the U.S. to the GRACE-FO Mission.
2. GFZ is responsible for all German contributions to the GRACE-FO mission.
3. The NASA Project Manager (see paragraph 6a of this Article) is responsible to NASA for the overall mission, and the GFZ Project Manager is responsible for implementation of all German mission contributions.
4. If it becomes necessary to change either Project Manager, the Parties will consult prior to appointment of a new Project Manager.
5. The Parties will consult prior to undertaking any activities involving participation by third parties. It is understood that individual scientific investigators are not considered third parties for the purposes of this type of consultation.
6. The Cooperative Project Plan will provide for the following:
  - a. Establishment by NASA of a GRACE-FO Project Office located at the Jet Propulsion Laboratory to provide NASA project planning and management. This Project Office will be responsible for executing the responsibilities identified in this MOU for NASA.

- b. Establishment of a GFZ GRACE-FO Project Office that will provide the management of all German-provided elements of the GRACE-FO mission. This office will be responsible for executing the responsibilities identified in this MOU for GFZ.
  - c. Establishment of the Parties' Project Office roles and responsibilities including, but not limited to, establishing and maintaining a protocol and chain of authority for making decisions relevant to key milestones over the life of the GRACE-FO mission.
  - d. Delivery schedules, formal reviews, and other management procedures.
  - e. All relevant technical information that is needed for effective cooperation.
  - f. All necessary launch site requirements, such as facilities, services, and security.
  - g. Rules for communications between organizations. Direct interactions among various contractors are required and all such interactions will be coordinated by the appropriate contracting technical offices designated by the Parties' Project Managers. Technical direction to any contractor must flow down the contracting chain from the respective prime contractors and be consistent with Article 16 (Transfer of Goods and Technical Data).
  - h. Full and complete Data Product level definitions.
7. In case of any conflict between the Cooperative Project Plan and this MOU, the MOU will prevail.

## **Article 8**

### **Rights Resulting in, and Distribution of, Scientific Data**

The Parties will have access to, and use of, all data generated under this MOU. Following a post-launch check-out period, the scientific data generated under this MOU will be made available for public access as soon as such data become available and in accordance with the terms laid out in the Mission Science Plan. There will be no period of exclusive access to these data. All data will be archived in the Physical Oceanography Distributed Active Archive of the NASA-managed Earth Observing System Data and Information System and in a similar system at GFZ in Germany as soon as such data become available.

## **Article 9**

### **Points of Contact**

For programmatic or scientific questions, the appropriate points of contact are shown below.

The NASA Headquarters Points of Contact are:

Programmatic

Mr. David Jarrett  
Program Executive  
Earth Science Division  
Science Mission Directorate  
NASA Headquarters  
300 E St., SW  
Washington, DC 20546  
United States of America  
Telephone: +1-202-358-1705  
Facsimile: +1-202-358-3098  
E-mail: David.B.Jarrett@nasa.gov

Scientific

Dr. John Labrecque  
Program Scientist  
Earth Science Division  
Science Mission Directorate  
NASA Headquarters  
300 E St., SW  
Washington, DC 20546  
United States of America  
Telephone: +1-202-358-1373  
E-mail: John.Labrecque@nasa.gov

The GFZ Point-of-Contact is:

Prof. Dr. Frank Flechtner  
Project Manager  
Section "Global Geomonitoring and Gravity Field"  
Department 1 "Geodesy and Remote Sensing"  
GFZ German Research Centre for Geosciences  
c/o DLR Oberpfaffenhofen  
D-82234 Wessling  
Telephone: +49-8153-28-1297  
Facsimile: +49-8153-28-1735  
E-Mail: frank.flechtner@gfz-potsdam.de

Any change in a Party's respective contact information will be communicated in writing to the other Party.

**Article 10**  
**Financial Arrangements**

1. Each Party will bear the costs of discharging its respective obligations under this MOU, including travel and subsistence of personnel and transportation of all equipment and other items for which it is responsible.
2. The Parties' obligations under this MOU are subject to the availability of appropriated funds and each Party's respective funding procedures. Should either Party encounter budgetary problems that may affect the activities to be carried out under this MOU, the Party encountering the problems will notify and consult with the other Party as soon as possible.

## **Article 11**

### **Schedule and Milestones**

The schedule and milestones contained in the Cooperative Project Plan are estimated based upon the Parties' current understanding of the projected availability of their goods, services, facilities, or equipment. In the event that either Party's projected availability changes, the other Party will be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly.

## **Article 12**

### **Priority-of-Use**

The Parties agree that the furnishing Party's usage of its own goods, services, facilities, or equipment will have priority over the usage planned in this MOU. Should a conflict arise, the furnishing Party, in its sole discretion, will determine whether to exercise its priority. Should a schedule conflict arise with other users, the furnishing Party, in its sole discretion, will determine priority as between the users.

## **Article 13**

### **Liability and Risk of Loss**

1. The Parties agree that the objective of this Article is to establish a cross-waiver of liability in the interest of encouraging participation in the exploration, exploitation, and use of outer space. The Parties intend that the cross-waiver of liability be broadly construed to achieve this objective.

2. For purposes of this MOU:

a. The term "Damage" means:

- i. Bodily injury to, or other impairment of health of, or death of, any person;
- ii. Damage to, loss of, or loss of use of any property;
- iii. Loss of revenue or profits; or
- iv. Other direct, indirect, or consequential damage.

b. The term "Launch Vehicle" means an object, or any part thereof, intended for launch, launched from Earth, or returning to Earth which carries Payloads, persons, or both.

c. The term "Payload" means all property to be flown or used on or in a Launch Vehicle.

d. The term "Protected Space Operations" means all activities, including Launch Vehicle or Transfer Vehicle activities and Payload activities on Earth, in outer space, or in transit between Earth and outer space, in implementation of this MOU. Protected Space Operations begins at the signature of this MOU and ends when all activities done in implementation of this MOU are completed. It includes, but is not limited to:

i. Research, design, development, test, manufacture, assembly, integration, operation, or use of Launch Vehicles or Transfer Vehicles, Payloads, or Instruments, as well as related support equipment and facilities and services; and

ii. All activities related to ground support, test, training, simulation, or guidance and control equipment and related facilities or services.

“Protected Space Operations” excludes activities on Earth that are conducted on return from space to develop further a Payload’s product or process for use other than for the activities within the scope of this MOU.

e. The term “Transfer Vehicle” means any vehicle that operates in space and transfers Payloads or persons or both between two different space objects, between two different locations on the same space object, or between a space object and the surface of a celestial body. A Transfer Vehicle also includes a vehicle that departs from and returns to the same location on a space object.

### 3. Cross-waiver of liability:

a. Each Party agrees to a cross-waiver of liability pursuant to which each Party waives all claims against any of the entities or persons listed in paragraphs 3(a)(i) through 3(a)(iv) of this Article based on Damage arising out of Protected Space Operations. This cross-waiver will apply only if the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations. The cross-waiver will apply to any claims for Damage, whatever the legal basis for such claims, against:

- i. The other Party;
- ii. A Party to another NASA agreement that includes flight on the same Launch Vehicle;
- iii. A Related Entity of any entity identified in paragraphs 3(a)(i) or 3(a)(ii) of this Article; or
- iv. The employees of any of the entities identified in paragraphs 3(a)(i) through 3(a)(iii) of this Article.

b. In addition, each Party will extend the cross-waiver of liability, as set forth in paragraph 3(a) of this Article, to its own Related Entities by requiring them, by contract or otherwise, to:

- i. Waive all claims against the entities or persons identified in paragraphs 3(a)(i) through 3(a)(iv) of this Article; and



- ii. Require that their Related Entities waive all claims against the entities or persons identified in paragraphs 3(a)(i) through 3(a)(iv) of this Article.
- c. For avoidance of doubt, this cross-waiver of liability includes a cross-waiver of claims arising from the *Convention on International Liability for Damage Caused by Space Objects*, done on March 29, 1972 (hereinafter the “Liability Convention”), where the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations.
- d. Notwithstanding the other provisions of this Article, this cross-waiver of liability will not be applicable to:
  - i. Claims between a Party and its own Related Entity or between its own Related Entities;
  - ii. Claims made by a natural person, his/her estate, survivors, or subrogees (except when a subrogee is a Party to this MOU or is otherwise bound by the terms of this cross-waiver) for bodily injury to, or other impairment of health of, or death of, such person;
  - iii. Claims for Damage caused by willful misconduct;
  - iv. Intellectual property claims;
  - v. Claims for Damage resulting from a failure of a Party to extend the cross-waiver of liability to its Related Entities, pursuant to paragraph 3(b) of this Article; or
  - vi. Claims by a Party arising out of or relating to the other Party’s failure to perform its obligations under this MOU.
- e. Nothing in this Article will be construed to create the basis for a claim or suit where none would otherwise exist.
- f. In the event of third-party claims which may arise out of, *inter alia*, the Liability Convention, the Parties will consult promptly on any potential liability, on any apportionment of such liability, and on the defense of such claim.

#### **Article 14**

##### **Registration of Space Objects**

GFZ will request that its government register the two GRACE-FO spacecraft as space objects in accordance with the Convention on the Registration of Objects Launched into Outer Space, done on November 12, 1974 (the Registration Convention).

#### **Article 15**

##### **Mission Extensions and End-of-Mission Operations**

1. GRACE-FO will operate for a nominal period of five years. Extensions and End-of-Mission decisions will be made jointly following coordination of GFZ and NASA internal Mission extension review processes. The two GRACE-FO spacecraft will be operated by GFZ throughout the nominal mission period of five years, including the decommissioning phase, passivation, and



End-of-Mission maneuvers as defined in the End of Mission Plan. GFZ will command and control the GRACE-FO spacecraft and Instruments.

2. Any mission termination, i.e., End-of-Mission, decisions will nominally be made jointly following coordination of GFZ and NASA internal mission review processes. A reserve of GRACE-FO spacecraft expendables for End-of-Mission operations has been established. Residual expendables, above that required to support End-of-Mission operations, can be used to support extended operations should the Parties decide to support such an extension. GFZ will lead and be responsible for the End-of-Mission operations consistent with the GRACE-FO End-of Mission Plan and German laws and technical regulations.

## **Article 16**

### **Transfer of Goods and Technical Data**

The Parties are obligated to transfer only those technical data (including software) and goods necessary to fulfill their respective responsibilities under this MOU, in accordance with the following provisions, notwithstanding any other provisions of this MOU:

1. All activities under this MOU will be carried out in accordance with the Parties' national laws and regulations, including those laws and regulations pertaining to export control.
2. The transfer of technical data for the purpose of discharging the Parties' responsibilities with regard to interface, integration, and safety will normally be made without restriction, except as required by paragraph 1 of this Article.
3. All transfers of goods and proprietary or export-controlled technical data are subject to the following provisions.
  - a. In the event a Party or its Related Entity finds it necessary to transfer such goods or data, for which protection is to be maintained, such goods will be specifically identified and such data will be marked.
  - b. The identification for such goods and the marking on such data will indicate that the goods and data will be used by the receiving Party and its Related Entities only for the purposes of fulfilling the receiving Party's or Related Entities' responsibilities under this MOU, and that such goods and data will not be disclosed or retransferred to any other entity without the prior written permission of the furnishing Party.
  - c. The receiving Party and its Related Entities will abide by the terms of the notice and protect any such goods and data from unauthorized use and disclosure.
  - d. The Parties to this MOU will cause their Related Entities to be bound by the provisions of this Article through contractual mechanisms or equivalent measures.

4. All goods exchanged in the performance of this MOU will be used by the receiving Party or Related Entity exclusively for the purposes of the MOU. Upon completion of the activities under this MOU, the receiving Party or Related Entity will return or otherwise dispose of all goods and marked proprietary or export-controlled technical data provided under this MOU, as directed by the furnishing Party or Related Entity.

## **Article 17**

### **Intellectual Property Rights**

1. Nothing in this MOU will be construed as granting, either expressly or by implication, to the other Party any rights to, or interest in, any inventions or works of a Party or its Related Entities made prior to the entry into force of, or outside the scope of, this MOU, including any patents (or similar forms of protection in any country) corresponding to such inventions or any copyrights corresponding to such works.

2. Any rights to, or interest in, any invention or work made in the performance of this MOU solely by one Party or any of its Related Entities, including any patents (or similar forms of protection in any country) corresponding to such invention or any copyright corresponding to such work, will be owned by such Party or Related Entity. Allocation of rights to, or interest in, such invention or work between such Party and its Related Entities will be determined by applicable laws, rules, regulations, and contractual obligations.

3. It is not anticipated that there will be any joint inventions made in the performance of this MOU. Nevertheless, in the event that an invention is jointly made by the Parties in the performance of this MOU, the Parties will, in good faith, consult and agree within 30 calendar days as to:

- a. The allocation of rights to, or interest in, such joint invention, including any patents (or similar forms of protection in any country) corresponding to such joint invention;
- b. The responsibilities, costs, and actions to be taken to establish and maintain patents (or similar forms of protection in any country) for each such joint invention; and
- c. The terms and conditions of any license or other rights to be exchanged between the Parties or granted by one Party to the other Party.

4. For any jointly authored work by the Parties, should the Parties decide to register the copyright in such work, they will, in good faith, consult and agree as to the responsibilities, costs, and actions to be taken to register copyrights and maintain copyright protection (in any country).

5. Subject to the provisions of Article 16 (Transfer of Goods and Technical Data) and Article 18 (Release of Results and Public Information), each Party will have an irrevocable royalty-free right to reproduce, prepare derivative works, distribute, and present publicly, and authorize others to do so on its behalf, any copyrighted work resulting from activities undertaken in the performance of this MOU for its own purposes, regardless of whether the work was created solely by, or on behalf of, the other Party or jointly with the other Party.

**Article 18**  
**Release of Results and Public Information**

1. The Parties retain the right to release public information regarding their own activities under this MOU. The Parties will coordinate with each other in advance concerning releasing to the public information that relates to the other Party's responsibilities or performance under this MOU.
2. The Parties will make the results available to the general scientific community, as appropriate and agreed between the Parties, in a timely manner.
3. The Parties acknowledge that the following data or information does not constitute public information and that such data or information will not be included in any publication or presentation by a Party under this Article without the other Party's prior written permission:
  - a. Data furnished by the other Party in accordance with Article 16 (Transfer of Goods and Technical Data) which is identified as export-controlled or proprietary; or
  - b. Information about an invention of the other Party before an application for a patent (or similar form of protection in any country) corresponding to such invention has been filed covering the same, or a decision not to file has been made.

**Article 19**  
**Exchange of Personnel and Access to Facilities**

1. To facilitate implementation of the activities conducted under this MOU, the Parties may support the exchange of a limited number of personnel (including contractors and subcontractors) from each Party, at an appropriate time and under conditions mutually agreed between the Parties.
2. Access by the Parties to each other's facilities or property, or to each other's Information Technology (IT) systems or applications, is contingent upon compliance with each other's respective security and safety policies and guidelines including, but not limited to, standards on badging, credentials, and facility and IT system application/access. Access to a launch services provider's facilities or property, or to such a provider's Information Technology (IT) systems or applications, will be provided through the launch services contract.

**Article 20**  
**Customs Clearance and Movement of Goods**

1. In accordance with its laws and regulations, each Party will facilitate free customs clearance and waiver of all applicable customs duties and taxes for goods necessary for the implementation of this MOU. In the event that any customs duties or taxes of any kind are nonetheless levied on such equipment and related goods, such customs duties or taxes will be borne by the Party of the country levying such customs duties or taxes. In the event that any customs duties, taxes, or fees of any kind are levied by a third Party as the result of any launch services contracts, such customs duties, taxes, or fees will be the responsibility of GFZ.

2. In accordance with its laws and regulations, each Party will also facilitate the movement of goods into and out of its territory as necessary to comply with this MOU. In accordance with applicable contractual arrangements, each Party will also facilitate the movement of goods into and out of any third party's territory, and GFZ will be responsible for movement within any third party's territory.

#### **Article 21**

##### **Ownership of Equipment**

Unless otherwise agreed in writing, each Party will retain ownership of all equipment, including the goods, hardware, software, and associated technical data, it provides to the other Party under the terms of this MOU, without prejudice to any individual rights of ownership of the Parties' respective Related Entities. To the extent feasible and recognizing that equipment sent into space or integrated into the other Party's equipment cannot be returned, each Party agrees to return the other Party's equipment in its possession at the conclusion of activities under this MOU.

#### **Article 22**

##### **Consultation and Dispute Resolution**

The Parties agree to consult promptly with each other on all issues involving interpretation, implementation, or performance of the MOU. Such issues will first be referred to the points of contact identified in Article 9 (Points of Contact). If they are unable to come to agreement, then the dispute will be referred to the JSG described in Article 6 (Joint Steering Group). Any dispute which cannot be resolved at this level will be referred to the NASA Administrator and to the GFZ Executive Board, or their designees.

#### **Article 23**

##### **Investigations of Mishaps**

In the case of a close call, mishap or mission failure, the Parties agree to provide assistance to each other in the conduct of any investigation, bearing in mind, in particular, the provisions of Article 16 (Transfer of Goods and Technical Data). In the case of activities which might result in the death of or serious injury to persons, or substantial loss of or Damage to property as a result of activities under this MOU, the Parties agree to establish a process for investigating each such mishap.

#### **Article 24**

##### **Amendments**

This MOU may be amended at any time by written agreement of the Parties.

**Article 25**  
**Entry Into Force, Duration, and Termination**

This MOU will enter into force upon signature by the Parties. It shall remain in force for five years after launch, or until March 31, 2022, whichever occurs first. Either Party may terminate this MOU at any time by giving the other Party at least six (6) months' written notice of its intent to terminate. In the event of termination, the terminating Party will endeavor to minimize any negative impact of such termination on the other Party. Termination or expiration of this MOU will not affect a Party's continuing obligations under Article 13 (Liability and Risk of Loss), Article 16 (Transfer of Goods and Technical Data), Article 17 (Intellectual Property Rights), and Article 18 (Release of Results and Public Information), unless otherwise agreed by the Parties.

Done in two originals, in the English language.

FOR THE UNITED STATES NATIONAL  
AERONAUTICS AND SPACE  
ADMINISTRATION



Charles Bolden  
Administrator

Date: 1/31/2014

Place: Washington, DC

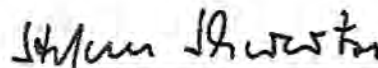
FOR THE GERMAN RESEARCH  
CENTRE FOR GEOSCIENCES



Reinhard Hüttl  
Scientific Executive Director and Chairman  
of the Executive Board

Date: Feb. 10, 2014

Place: Potsdam



Stefan Schwartz  
Administrative Executive Director

Date: Feb. 10, 2014

Place: Potsdam

