

**AMENDMENT NO. 1 TO**  
**NONREIMBURSABLE SPACE ACT AGREEMENT**  
**BETWEEN**  
**THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
**AND ATK SPACE SYSTEMS INC.**  
**FOR COMMERCIAL SPACE CAPABILITIES COLLABORATION**

PURPOSE OF AMENDMENT AND AGENCY COMMITMENT

The purpose of this Amendment No. 1 to Space Act Agreement No. SAA-QA-14-18881 between the National Aeronautics and Space Administration (“NASA”) and ATK SPACE SYSTEMS INC. (“Partner”), effective December 18, 2014 (the “Agreement”), is to (1) reflect the change in name of the Partner and update points of contact and Partner signatory, (2) adjust milestones to reflect the Partner’s revised program content and schedule, (3) clarify NASA furnishing of information and services, and (4) extend the period of performance under the Agreement.

Now therefore, in consideration of the mutual undertakings in this Amendment, the Agreement is amended in accordance with Article 21 of the Agreement as follows:

In accordance with Article 22 of the Agreement, the parties hereby consent through this Amendment to assignment of the Agreement by ATK Space Systems Inc. to Orbital Sciences Corporation. Throughout the Agreement, “ATK” shall be replaced with “Orbital ATK”.

**I. Amendment to Title of Agreement.**

In the title of the agreement, “ATK SPACE SYSTEMS INC.” shall be replaced by “ORBITAL SCIENCES CORPORATION.”

**II. Amendment to ARTICLE 1. AUTHORITY AND PARTIES**

This article shall be replaced with the following in its entirety:

In accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113), this Agreement is entered into by the National Aeronautics and Space Administration (hereinafter referred to as "NASA") and Orbital Sciences Corporation, located at 45101 Warp Drive, Dulles, VA 20166 (hereinafter referred to as “Partner” or “Orbital ATK”). NASA and Partner may be individually referred to as a “Party” and collectively referred to as the

“Parties”. Space Logistics LLC as may be referenced herein is a wholly owned subsidiary of Orbital ATK.

### **III. Amendment to ARTICLE 2. PURPOSE**

- A. The sentence “The scope of the activity and alignment with NASA’s strategy for human space exploration is as described in the Executive Summary in Appendix 1.” shall be deleted and replaced with the following:

“The Parties are working in collaboration to perform certain tasks, including tasks identified in Appendix 2 and additional work identified in this Agreement. Partner’s activity, as identified in Article 4 is related to this Agreement but is not a Partner responsibility under this Agreement, except where described elsewhere in this Agreement. This collaboration is aligned with NASA’s strategy for human space exploration as described in the Executive Summary in Appendix 1.”

- B. The sentence “Access to additional Government resources such as facilities, services, and technologies may be considered on a cost reimbursable basis and may require the negotiation of a separate Reimbursable Space Act Agreement with the appropriate NASA center or facility providing the requested resources.” shall be deleted entirely.

### **IV. Amendment to ARTICLE 3. RESPONSIBILITIES**

- A. Article 3.A.2 is deleted entirely and replaced with:

Provide access to requested NASA technical data, lessons learned, expertise support, services, facilities, and NASA-developed technologies, on a non-interference basis as resources permit. NASA furnished services, facilities, and technologies that may be provided are identified in Appendix 2.

- B. The following modification is made to Article 3.A.5:

“Within” is deleted and replaced with “If requested by Orbital ATK, and within”.

- C. Article 3.B is deleted entirely and replaced with:

Partner will use reasonable efforts to:

1. Provide NASA with data regarding its progress towards the milestones identified in Article 4.
2. Conduct a quarterly meeting with NASA regarding the past quarter’s milestones, demonstrating that the success criteria have been met, and discuss upcoming activities.
3. Fulfill its obligations in Appendix 2.

**V. Amendment to ARTICLE 4. SCHEDULE AND MILESTONES**

Article 4 shall be replaced in its entirety with the following:

The Milestones below are intended to provide a measure of Partner’s overall progress, but are not a Partner responsibility under this Agreement, except where described elsewhere in this Agreement:

Milestone	Title	Description and Success Criteria	Planned Achievement Date
M1	Term Sheets Signed for MEV-1 through 4	Space Logistics LLC signs term sheets with customers for space logistics services with Mission Extension Vehicle (MEV)-1 through MEV-4	██████████
M2	Financing Secured for MEV-1	Space Logistics LLC secures sufficient financing to execute MEV-1	██████████
M3	Authorization To Proceed (ATP) for MEV-1	Space Logistics LLC awards Orbital ATK with contract to build MEV-1	██████████
M4	SRR for MEV-1	Orbital ATK holds Systems Requirements Review (SRR) for MEV-1 (Orbital ATK Internal Standard)	██████████
M5	PDR for MEV-1	Orbital ATK holds Preliminary Design Review (PDR) for MEV-1 (Orbital ATK Internal Standard)	██████████
M6	ATP for MEV-2	Space Logistics LLC awards Orbital ATK with contract to build MEV-2	██████████
M7	CDR for MEV-1	Orbital ATK holds Critical Design Review (CDR) for MEV-1 (Orbital ATK Internal Standard)	██████████
M8	Ground operator interface requirements	Orbital ATK completes Rendezvous and Proximity Operations (RPO) ground operator interface requirements for MEV space logistics services (Orbital ATK Internal Document)	██████████

M9	Ground Demonstration of MEV robotics	Ground demonstration of MEV robotics including completed assembly of a separation ring (or hard point) grabber prototype (Orbital ATK Robotics RPO Laboratory demonstration)	
M10	Ground system prototype	Orbital ATK completes ground operator interface prototype for testing and validation for remote operation	
M11	Launch	Successfully launch MEV-1	
M12	1 <sup>st</sup> Docking	MEV-1 docking in Geosynchronous Earth Orbit (GEO) with a communications satellite	
M13	GEO Operations	Successfully complete 1st month of MEV-1 docked operations to extend life of a satellite	

**VI. Amendment to ARTICLE 9. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS**

- A. Article 9.A.6 is deleted and replaced with “RESERVED.”
- B. The following modification is made to Article 9.A.10:  
The word “under” is deleted and replaced with “for restricted data as described in”.
- C. The following modification is made to Article 9.B:  
In the second sentence “The” is deleted and replaced with “Such”.
- D. The following modification is made to Article 9.C:  
In the first sentence, after the words “five (5) years after its development,” add “unless specified otherwise in Appendix 2.”
- E. The following modification is made to Article 9.H.3:
  - a. In subparagraph a., “ViviSat” shall be replaced with “Space Logistics LLC.”
  - b. In subparagraph c., “None” shall be replaced with “As marked.”
  - c. In subparagraph d., “(to be confirmed)” shall be deleted.

**VII. Amendment to ARTICLE 10. INTELLECTUAL PROPERTY RIGHTS - INVENTION AND PATENT RIGHTS**

Article 10 shall be replaced in its entirety with the following:

A. General

- 1. NASA has determined that 51 U.S.C. § 20135(b) does not apply to this Agreement. Therefore, title to inventions made (conceived or first actually reduced to practice) under

this Agreement remain with the respective inventing party(ies). No invention or patent rights are exchanged or granted under this Agreement, except as provided herein.

2. “Related Entity” as used in this Invention and Patent Rights Article means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or Partner assigned, tasked, or contracted with to perform activities under this Agreement.

3. The invention and patent rights herein apply to employees and Related Entities of Partner. Partner shall ensure that its employees and Related Entity employees know about and are bound by the obligations under this Article.

#### B. NASA Inventions

NASA will use reasonable efforts to report inventions made under this Agreement by its employees. Upon request, NASA will use reasonable efforts to grant Partner, under 37 C.F.R. Part 404, a negotiated license to any NASA invention made under this Agreement. This license is subject to paragraph E.1. of this Article.

#### C. NASA Related Entity Inventions

NASA will use reasonable efforts to report inventions made under this Agreement by its Related Entity employees, or jointly between NASA and Related Entity employees, where NASA has the right to acquire title. Upon request, NASA will use reasonable efforts to grant Partner, under 37 C.F.R. Part 404, a negotiated license to any of these inventions where NASA has acquired title. This license is subject to paragraph E.2. of this Article.

#### D. Joint Inventions With Partner

The Parties will use reasonable efforts to report, and cooperate in obtaining patent protection on, inventions made jointly between NASA employees, Partner employees, and employees of either Party’s Related Entities. Upon timely request, NASA may, at its sole discretion and subject to paragraph E. of this Article:

1. refrain from exercising its undivided interest inconsistently with Partner’s commercial business; or
2. use reasonable efforts to grant Partner, under 37 C.F.R. Part 404, an exclusive or partially exclusive negotiated license.

#### E. Rights to be Reserved in Partner’s License

Any license granted Partner under paragraphs B., C., or D. of this Article is subject to the following:

1. For inventions made solely or jointly by NASA employees, NASA reserves the irrevocable, royalty-free right of the U.S. Government to practice the invention or have it practiced on behalf of the United States or on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.
2. For inventions made solely or jointly by employees of a NASA Related Entity, NASA reserves the rights in 1. above, and a revocable, nonexclusive, royalty-free license retained by the Related Entity under 14 C.F.R. § 1245.108 or 37 C.F.R. § 401.14 (e).

F. Protection of Reported Inventions

For inventions reported under this Article, the Receiving Party shall withhold all invention reports or disclosures from public access for a reasonable time (1 year unless otherwise agreed or unless restricted longer herein) to facilitate establishment of patent rights.

G. Patent Filing Responsibilities and Costs

1. The invention and patent rights herein apply to any patent application or patents covering an invention made under this Agreement. Each Party is responsible for its own costs of obtaining and maintaining patents covering sole inventions of its employees. The Parties may agree otherwise, upon the reporting of any invention (sole or joint) or in any license granted.
2. Partner shall include the following in patent applications for an invention made jointly between NASA employees, its Related Entity employees and Partner employees:

The invention described herein may be manufactured and used by or for the U.S. Government for U.S. Government purposes without the payment of royalties thereon or therefor.

**VIII. Amendment to ARTICLE 16. TERM OF AGREEMENT**

Article 16 is deleted entirely and replaced with:

This Agreement becomes effective upon the date of the last signature below (“Effective Date”) and shall remain in effect until December 31, 2019.

**IX. Amendment to ARTICLE 18. CONTINUING OBLIGATIONS**

The word “clauses” shall be inserted after the word “related.”

**X. Amendment to ARTICLE 19. POINTS OF CONTACT**

The points of contact in Article 19 are deleted entirely and replaced with:

<p><b><u>NASA</u></b> Philip R. McAlister Director, Commercial Spaceflight Development Division, NASA Headquarters philip.mcalister@nasa.gov Telephone: 202-358-0712 300 E Street, SW Washington, DC 20546</p>	<p><b><u>Orbital ATK</u></b> David Kang Advanced Programs [REDACTED] Telephone: [REDACTED] Cell: [REDACTED] 45101 Warp Drive Dulles, VA 20166</p>
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**XI. Addition of New ARTICLE 25. NASA FURNISHED INFORMATION AND SERVICES**

The following shall be added to the Agreement as new Article 25:

**ARTICLE 25. NASA FURNISHED INFORMATION AND SERVICES**

A. NASA may, at its sole discretion and on terms to be negotiated between the Parties, provide Partner additional NASA services, technical expertise, or Government Property. Access to NASA-developed technologies may require a separate license agreement. Access to NASA software may require a separate software usage agreement. NASA equipment used at Partner facilities will be in accordance with a separate NF-893 Loan Agreement. Additional NASA services, technical expertise, or Government Property may be provided on a non-reimbursable basis. Specific services and Government Property will be identified in Appendix 2 to this Agreement. Partner shall remain solely responsible for completion of its milestones under this Agreement regardless of the availability or use of such optional NASA services, technical expertise, or Government Property.

B. There is no Government Furnished Property or Services furnished under this Agreement except for those that may be provided in Article 25.A. However, Partner has the ability to enter into separate reimbursable Space Act agreements with NASA Centers to use NASA resources in performance of this Agreement. The terms and conditions of other Space Act agreements will govern the use of NASA resources not being provided under this Agreement.

## **XII. Amendment to APPENDIX 1 – EXECUTIVE SUMMARY**

Appendix 1 – Executive Summary shall be replaced in its entirety with the following:

**Capabilities planned by the company:** Space Logistics LLC, a wholly owned subsidiary of Orbital ATK, is pursuing the emerging industry in **space logistics** and **space transportation** and plans to provide cost effective service to both Government and commercial space customers.

Space Logistics LLC is the leading U.S.-based space logistics services company. Initially, we seek to change the nature of the satellite business by providing commercial on-orbit satellite services.

Orbital ATK has more than five years of direct planning, investment and preparation to build, launch, and profitably operate a satellite Mission Extension Vehicle (MEV) fleet.

Orbital ATK, as the Space Logistics LLC mission prime, has proven capability to design, develop, integrate, launch and operate complex satellite systems in developing the MEV and its operations. Collaboration with Orbital ATK provides NASA the benefits of an existing, experienced partner in promoting a U.S. commercial space industry upon which Government and commercial space industries can depend for future science, exploration, national security and commercial missions.

**Purpose of the proposed partnership:** With the Space Logistics LLC space logistics and hosted payload business case matured, Orbital ATK prepares to leverage NASA expertise for core technologies relevant to market expansions.

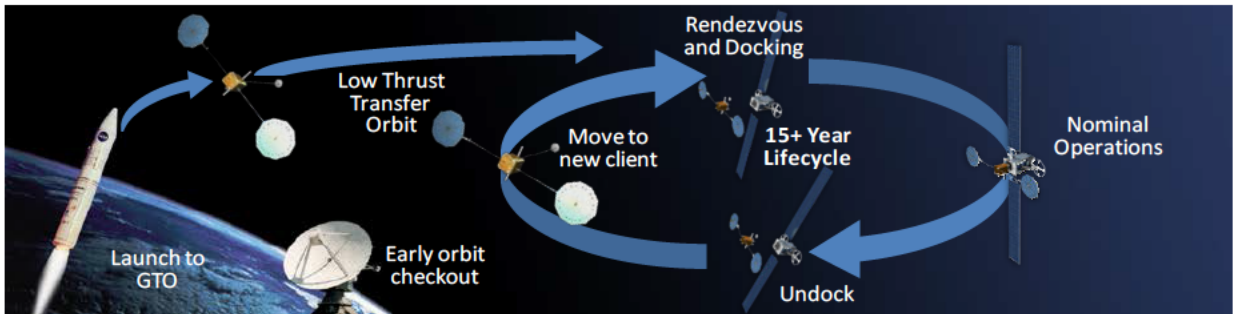
An Orbital ATK Space Act Agreement (SAA) under CCSC will support near-term development of space logistics services. Previously, to address **space transportation** services, ATK entered into SAA with NASA GRC for adapting MEVs with high power solar electric propulsion. The same propulsion system is currently baselined for the NASA Asteroid Retrieval Mission. Orbital ATK looks forward to working with NASA to develop commercially provided integrated space capabilities.

**Relevance to NASA:** Space Logistics LLC pricing model is **fixed price payment on delivery of service**. With current economic realities, the key goals expressed in NASA's 2014 Strategic Plan and NASA's Voyages report benefit through relegating routine and mature services and capability maintenance to commercial firms. With planned launches starting in late **2018**, these capabilities are available well within the five-year CCSC objective.

NASA's 2014 Strategic Plan, Strategic Goal 1, Objective 1.1 and NASA's Voyages report clearly identified transporting cargo beyond LEO and in-space propulsion. With the integration of high power solar electric propulsion, the commercial MEV Fleet can be a part of meeting the NASA Strategic Plan of evolving commercial "**access to space**" to providing commercial transport service for "**access through space**". NASA benefits from commercial firm fixed price assurance to deliver cargo beyond low Earth orbit supporting NASA's Strategic Plan to extend and sustain human activities across the solar system. MEV will be launched in late 2018. With expected regular launch cycles, new capabilities can be readily integrated to expand the commercial market space and meet the five-year CCSC objective.



**Business and technical approach, including why NASA should have confidence in the company's ability to complete the proposed capabilities:** As the key confidence litmus test, Space Logistics LLC's business and technical approaches close with commercial customers. Three MEVs are already under signed term sheets with communication satellite owner/operators. Currently, Space Logistics LLC received a full financing commitment from Orbital ATK for development and launch of an MEV.



**Figure-1: MEV Mission Overview**

The initial target market for Space Logistics LLC MEVs are GEO communication satellites that are functional, yet approaching their end of life due to a lack of propellant and/or related propulsive/attitude control systems failures. The initial MEV mission as depicted in Figure 1 begins with the launch of MEV into Geosynchronous Transfer Orbit (GTO). The baseline configuration is to stacked launch on a single launch vehicle. As a commercial entity, Space Logistics LLC covers all launch and on-orbit insurance for the MEV missions. Space Logistics LLC proposes not just a single mission but a fleet of satellites dedicated to creation of a new U.S. industry in space logistics.

**XIII. Addition of APPENDIX 2 – NASA FURNISHED SERVICES, FACILITIES, AND TECHNOLOGIES**

The following Appendix 2 shall be added after Appendix 1:

Appendix 2 – NASA Furnished Services, Facilities, and Technologies

In accordance with Article 9 Intellectual Property Rights – Data Rights, any Data First Produced by NASA under this Agreement which does not have a period of time specified in this Appendix 2 will be protected for a period of five (5) years after its development. All other time periods specified herein for the protection of data also commence after its development.

<b><u>NASA Furnished Services, Facilities, and Technologies</u></b>	<b><u>Corresponding Partner Obligations</u></b>	<b><u>Data Rights</u></b>
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<b><u>NASA Furnished Services, Facilities, and Technologies</u></b>	<b><u>Corresponding Partner Obligations</u></b>	<b><u>Data Rights</u></b>

**XIV. Renumbering of ARTICLE 25. SIGNATORY AUTHORITY**

Article 25 shall be renumbered to Article 26.

**APPROVALS**

The signatories to this Amendment covenant and warrant that they have authority to execute this Amendment No. 1 and agree to the above terms and conditions.

NATIONAL AERONAUTICS AND  
SPACE ADMINISTRATION

ORBITAL SCIENCES  
CORPORATION



BY: \_\_\_\_\_

BY: \_\_\_\_\_

Philip R. McAlister  
Director, Commercial Spaceflight  
Development Division

Steven A. Mumma  
Senior Director, Contracts  
Space System Group

Date: February 27, 2017

Date: February 27, 2017