ANNEX NO. 01
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
AND
TEXAS A&M ENGINEERING EXPERIMENT STATION
FOR
ROBOTICS AND RELATED TECHNOLOGIES
UNDER
SPACE ACT UMBRELLA AGREEMENT NO. SAA-EA-23-35888

ARTICLE 1. PURPOSE

The purpose of this Annex is for the National Aeronautics and Space Administration's Johnson Space Center (NASA JSC) to provide design expertise to Texas A&M Engineering Experiment Station (TEES) to support TEES's development of a robotic actuator designed to perform in a space environment. For the purpose of this Annex, a space actuator is defined as a single degree-of-freedom device including motor, motor controller, firmware, bearings, speed reduction, sensors, actuator housing structure, and cabling.

NASA JSC will provide design expertise and technical guidance to TEES, including observation and real-time consultation during TEES's initial testing activities at TEES facilities, as the actuator is being assembled by TEES and integrated with TEES facility test equipment. NASA JSC will also perform testing of the assembled actuator at JSC facilities. NASA JSC will provide hands-on training to TEES personnel related to NASA actuator testing processes and procedures, to be conducted onsite at JSC. NASA JSC possesses unique expertise in the area of robotic technologies with applications to human spaceflight missions. JSC will leverage the pre-existing designs for NASA's Volatiles Investigating Polar Exploration Rover (VIPER) and Valkyrie humanoid robot and concurrent efforts, and will make NASA JSC experts who have worked on those projects available for consultation to TEES.

As NASA plans for future deep-space robotic missions and the robotic servicing of remote human engineered equipment and facilities, a variety of unique technologies related to robotics are being developed. The objective of this Annex is to expand access to these robot technologies in academia and U.S. industry to foster innovation around common advanced hardware and software platforms relevant to both space and terrestrial applications. This, in turn, will benefit both NASA mission priorities and the nation's broader technical objectives concerning robotics. The technology readiness level of systems required for autonomous lunar surface operations will be advanced, and the community of developers investigating remote manipulation and the supervisory control paradigms needed for successful semi-autonomous remote operations both in space and on earth will be expanded.

This effort furthers NASA's performance of its statutory functions as expressed in the National Aeronautics and Space Act, and by expanding technology transfer and the use of partnerships to address critical space and terrestrial challenges, it supports Strategic Objective 3.1 of NASA's

2022 Strategic Plan (Innovate and advance transformational space technologies).

The legal authority for this Annex, consistent with the Umbrella Agreement, is in accordance with the Space Act, Other Transactions Authority (OTA), 51 U.S.C. § 20113(e).

ARTICLE 2. RESPONSIBILITIES

NASA will use reasonable efforts to:

1. Consult with TEES on robotics lab design and infrastructure requirements necessary to support the development and testing of TEES space robotic actuators and related technologies.

2. Provide design expertise to support TEES's development of a space robotic actuator.

3. Provide observation and real-time consultation during TEES's initial testing activities at the TEES facilities.

4. Conduct testing of the assembled TEES space robotic actuator at NASA JSC facilities.

5. Provide hands-on training to TEES personnel related to NASA actuator testing processes and procedures, to be conducted onsite at JSC.

6. Advise TEES regarding the formulation of post-integration research and test plans concerning the TEES space robotic actuator and related technology development activities.

7. Participate in follow-on discussions with NASA JSC after NASA's onsite testing of the TEES space robotic actuator has been completed, regarding the formulation of future research and test plans related to potential applications of the actuator.

8. Document, publish, or present status, technical findings, and results as mutually agreed.

9. Participate in, attend, and support agreed-upon technical conferences, workshops, and meetings (both domestic and international) that are of relevance to the project's robotics development, suitable for the dissemination of project progress, or of mutual interest to NASA and TEES in support of Annex objectives.

10. Travel to TEES labs, as required to observe TEES's initial testing activities and provide real-time consultation to TEES during the testing.

11. Provide information technology (IT) for use by visiting TEES personnel, per JSC policy, including access to NASA's large file sharing system and access to the NASA JSC WiFi guest network.

TEES will use reasonable efforts to:

1. Obtain guidance and expertise from NASA JSC regarding robotics lab design and infrastructure requirements necessary to support the development and testing of space robotic actuators and related technologies.

2. Obtain guidance and expertise from NASA JSC regarding the design, building and testing of a space robotic actuator.

3. Provide relevant associated equipment to NASA JSC to support robotics research leveraging the TEES space robotic actuator.

4. Observe NASA's testing of the TEES space robotic actuator onsite at JSC.

5. Participate in follow-on discussions with NASA JSC after NASA's onsite testing of the TEES space robotic actuator has been completed, regarding the formulation of future research and test plans related to potential applications of the actuator.

6. Document, publish, or present status, technical findings, and results as mutually agreed.

7. Participate in, attend, and support agreed-upon technical conferences, workshops, and meetings (both domestic and international) that are of relevance to the project's robotics development, suitable for the dissemination of project progress, or of mutual interest to NASA and TEES in support of Annex objectives.

8. Travel to NASA JSC labs, as required for observation of NASA onsite testing and to receive expertise, consultation, and training from NASA personnel.

ARTICLE 3. SCHEDULE AND MILESTONES

The planned major milestones for the activities for this Annex defined in the "Responsibilities" Article are as follows:

Technical interchange meetings to assess project plans	Effective Date (ED) + 1 month, and periodically thereafter as required
Space robotic actuator requirements review	ED + 7 months
Completion of NASA testing activities for space robotic actuator	ED + 20 months

ARTICLE 4. FINANCIAL OBLIGATIONS

A. TEES agrees to reimburse NASA an estimated cost of $400,000.00 for NASA to carry out its

responsibilities under this Annex.

Subject to the availability of funds, TEES agrees to pay NASA JSC $100,000.00 prior to the initiation of work under this Annex, and the remainder of the funds according to the following payment schedule:

ED + 10 months: $100,000.00
ED + 13 months: $100,000.00
ED + 16 months: $100,000.00

TEES shall mark each payment with NASA Johnson Space Center and Annex No. 01.

B. Upon request, NASA will provide TEES a summary of costs incurred to date. NASA will not provide services or incur costs beyond the current funding. Although NASA has made a good faith effort to accurately estimate its costs, it is understood that NASA provides no assurance that the proposed effort under this Annex will be accomplished for the estimated amount. Should the effort cost more than the estimate, TEES will be advised by NASA as soon as possible. TEES shall pay all costs incurred and have the option of canceling the remaining effort, or providing additional funding in order to continue the proposed effort under the revised estimate. Should this Annex be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA shall account for any unspent funds within one year after completion of all effort under this Annex, and promptly thereafter, at TEES's option return any unspent funds to TEES or apply any such unspent funds to other activities under the Umbrella Agreement. Return of unspent funds will be processed via Electronic Funds Transfer (EFT) in accordance with 31 C.F.R. Part 208 and, upon request by NASA, TEES agrees to complete the Automated Clearing House (ACH) Vendor/Miscellaneous Payment Enrollment Form (SF 3881).

ARTICLE 5. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

A. Data produced under this Annex which is subject to paragraph C. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement will be protected for the period of one year.

B. Under paragraph H. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement, Disclosing Party provides the following Data to Receiving Party. The lists below may not be comprehensive, are subject to change, and do not supersede any restrictive notice on the Data provided.

1. Background Data:
The Disclosing Party's Background Data, if any, will be identified in a separate technical document.

2. Third Party Proprietary Data:
The Disclosing Party's Third Party Proprietary Data, if any, will be identified in a separate technical document.

3. Controlled Government Data:
The Disclosing Party's Controlled Government Data, if any, will be identified in a separate technical document.

4. The following software and related Data will be provided to TEES under a separate Software

Usage Agreement: None

ARTICLE 6. TERM OF ANNEX

This Annex becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect until the completion of all obligations of both Parties hereto, or two years from the Effective Date, whichever comes first, unless such term exceeds the duration of the Umbrella Agreement. The term of this Annex shall not exceed the term of the Umbrella Agreement. The Annex automatically expires upon the expiration of the Umbrella Agreement.

ARTICLE 7. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Annex by providing thirty (30) calendar days written notice to the other Party.

ARTICLE 8. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Annex.

Management Points of Contact

NASA Lyndon B. Johnson Space Center
Steven E. Fredrickson
Division Chief, JSC Software, Robotics, and Simulation
Mail Stop: ER
2101 NASA Parkway
Houston, Texas 77058
Phone: 281-483-1457
steven.e.fredrickson@nasa.gov

Texas A&M Engineering Experiment Station
Marcie Avery
Director, TEES Contracting
1111 RELLIS Parkway
Bryan, TX 77807
Phone: 979-317-3810
mavery@tamu.edu

Technical Points of Contact

NASA Lyndon B. Johnson Space Center
Jonathan Rogers
Chief, Robotic Systems Technology Branch
Mail Suite: ER4
2101 NASA Parkway
Houston, Texas 77058
Phone: 281-483-3716
jonathan.m.rogers@nasa.gov

Texas A&M Engineering Experiment Station
Dr. Robert O. Ambrose
TEES Director for Space and Robotics Initiatives
1111 RELLIS Parkway
Suite 5226
Bryan, TX 77840
Phone: 979-845-0991
rambrose@tamu.edu

ARTICLE 9. MODIFICATIONS

Any modification to this Annex shall be executed, in writing, and signed by an authorized representative of NASA and TEES. Modification of an Annex does not modify the terms of the Umbrella Agreement.

ARTICLE 10. LIABILITY AND RISK OF LOSS

For the responsibilities and activities conducted under this Annex, and any claims arising thereunder, the following sentence shall be added to the end of Paragraph C, Article 8 (titled "Liability and Risk of Loss") of the Umbrella Agreement:

TEES's liability for such repair and restoration shall not exceed $5,000.00.

ARTICLE 11. SIGNATORY AUTHORITY

The signatories to this Annex covenant and warrant that they have authority to execute this Annex. By signing below, the undersigned agrees to the above terms and conditions.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER	TEXAS A&M ENGINEERING EXPERIMENT STATION
BY: GERALD LEBEAU Digitally signed by GERALD LEBEAU Date: 2023.04.26 23:12:28 -05'00'	BY:
Julie Kramer White	John E. Hurtado, Ph.D.
Director of Engineering	Interim Director
DATE:	DATE: 04/13/2023