



National
Aeronautics and
Space
Administration

NASA Grant and Cooperative Agreement

CFDA No.: 43.002 Aeronautics

CHOOSE ONE:

- COOPERATIVE AGREEMENT
 GRANT

CHOOSE ONE: EDUCATION FACILITIES RESEARCH TRAINING

NASA Grant and Cooperative Agreement Web Site: <http://prod.nais.nasa.gov/pub/pub_library/srba/index.html>

1. FEDERAL AWARD IDENTIFICATION NO. 80AFRC19M0005	2. SUPPLEMENT NUMBER	3. PERIOD OF PERFORMANCE 01/31/2019 - 08/31/2020
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4. RECIPIENT NAME/ADDRESS (No., Street, City/County, State, Zip) US GOV GA AERONAUTICAL UAV S, INC. 14200 KIRKHAM WAY POWAY CA 92064-7103	5. AWARDING ORGANIZATION
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6. EMPLOYER IDENTIFICATION NO. (EIN)	7. UNIQUE ENTITY IDENTIFIER 824684229
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8. PRINCIPAL INVESTIGATOR/STUDENT/ORGANIZATION'S PROJECT OR PROGRAM MGS. (Name, Email & Phone)
PI: MELISSA CAUDILLO-HUERTA EMAIL: MELISSA.CAUDILLO@GA-ASI.COM PH# 858-312-4367

9. PROPOSAL NO., TITLE, AND PROJECT DESCRIPTION
18-SIO-0004 Systems Integration and Operationalization Development and Demonstration

10A.	AMOUNT OF AWARD	10B.	FUNDS OBLIGATED
PREVIOUS	\$0.00	PREVIOUS	\$0.00
THIS ACTION	\$1,984,346.00	THIS ACTION	\$1,984,346.00
TOTAL	\$1,984,346.00	TOTAL	\$1,984,346.00

11. NASA ACCOUNTING AND APPROPRIATION DATA See Continuation Sheet If Applicable	12. PR NUMBER 4200678865
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13. NASA POINTS OF CONTACT

REQUIRING CENTER:

	NAME	MAIL STOP	TELEPHONE	E-MAIL ADDRESS
TECHNICAL OFFICER	KURT A. SWIERINGA	152	757.864.9789	KURT.A.SWIERINGA@NASA.GOV
NEGOTIATOR	LISA A. JACKSON	4811/140	661.276.2154	LISA.A.JACKSON@NASA.GOV
ADMINISTRATOR	ROSALIA TOBERMAN	703/S311	661.276.3931	ROSALIA.TOBERMAN@NASA.GOV
PAYMENTS	NASA SHARED SERVICE CENTER	B111	877.677.2123	NSSC-ACCOUNTSPAYABLE@NASA.GOV

14. THIS AWARD IS MADE UNDER THE AUTHORITY OF 51 U.S.C. 20113(e) AND IS SUBJECT TO ALL APPLICABLE LAWS AND REGULATIONS OF THE UNITED STATES IN EFFECT ON THE DATE OF THIS AWARD, INCLUDING, BUT NOT LIMITED TO

14 CFR PART 1274. 2 CFR 1800.

15. APPLICABLE STATEMENT(S), IF CHECKED: <input type="checkbox"/> NO CHANGE IS MADE TO EXISTING TERMS AND CONDITIONS <input type="checkbox"/> R&D TERMS AND CONDITIONS AND NASA AGENCY-SPECIFIC REQUIREMENTS APPLY TO THIS GRANT	16. APPLICABLE ENCLOSURE(S), IF CHECKED: <input checked="" type="checkbox"/> TERMS AND CONDITIONS <input checked="" type="checkbox"/> SPECIAL CONDITIONS <input checked="" type="checkbox"/> REQUIRED PUBLICATIONS AND REPORTS
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National
Aeronautics and
Space
Administration

NASA Grant and Cooperative Agreement

CFDA No.: 43.002 Aeronautics

CHOOSE ONE:

- COOPERATIVE AGREEMENT
 GRANT

**THE UNITED STATES OF AMERICA
NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION**

Recipient

- A recipient indicates acceptance of an award and its associated terms and conditions by drawing or requesting funds from the designated NASA payment system or office.
- Recipient is required to sign this document and return 1 copies.

NAME OF GRANT OFFICER

Lisa A. Jackson

NAME AND TITLE OF AUTHORIZED REPRESENTATIVE
(Type or print)

Chris Ray

Digitally signed by Chris Ray
DN: dc=com, dc=ga, ou=Accounts, ou=Employee,
cn=Chris Ray, email=Chris.RayJr@ga-asi.com
Date: 2019.01.31 13:04:33 -08'00'

SIGNATURE

DATE

01/31/2019

SIGNATURE

DATE



NASA Grant and Cooperative Agreement

ITEM NO. (A)	ITEM OR SERVICE (Include Specifications and Special Instructions) (B)	QUANTITY (C)	UNIT (D)	ESTIMATED COST	
				UNIT PRICE (E)	AMOUNT (F)
	Systems Integration and Operationalization Development and Demonstration				
0001	CLIN 1 Obligated Amount \$952,751.00 Purchase Requisition: 4200678865 Fund: AERX22018D Appropriation: 8018/190126 Amount: \$952,751.00				\$952,751.00
0002	KICK OFF MEETING Obligated Amount \$51,697.00 Purchase Requisition: 4200678865 Fund: AERX22018D Appropriation: 8018/190126 Amount: \$51,697.00				\$51,697.00
0003	BASELINE MISSION CONOPS Obligated Amount \$173,312.00 Purchase Requisition: 4200678865 Fund: AERX22018D Appropriation: 8018/190126 Amount: \$173,312.00				\$173,312.00
0004	BASELINE RISK ASSESSMENT Obligated Amount \$148,604.00 Purchase Requisition: 4200678865 Fund: AERX22018D Appropriation: 8018/190126 Amount: \$148,604.00				\$148,604.00
0005	PROJECT SPECIFIC CERTIFICATION Obligated Amount \$255,570.00 Purchase Requisition: 4200678865 Fund: AERX22018D Appropriation: 8018/190126 Amount: \$255,570.00				\$255,570.00
0006	FLIGHT DEMONSTRATION PLAN Obligated Amount \$31,533.00 Purchase Requisition: 4200678865 Fund: AERX22018D Appropriation: 8018/190126 Amount: \$31,533.00				\$31,533.00



NASA Grant and Cooperative Agreement

ITEM NO. (A)	ITEM OR SERVICE (Include Specifications and Special Instructions) (B)	QUANTITY (C)	UNIT (D)	ESTIMATED COST	
				UNIT PRICE (E)	AMOUNT (F)
0007	SIO DEMONSTRATION Obligated Amount \$352,861.00 Purchase Requisition: 4200678865 Fund: AERX22018D Appropriation: 8018/190126 Amount: \$352,861.00				\$352,861.00
0008	FINAL PROGRAM WRAP UP Obligated Amount \$18,018.00 Purchase Requisition: 4200678865 Fund: AERX22018D Appropriation: 8018/190126 Amount: \$18,018.00				\$18,018.00

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TERMS AND CONDITIONS
§1274.910 AUTHORITY (JUL 2002)

§1274.911 PATENT RIGHTS (JUL 2002)

§1274.912 PATENT RIGHTS—RETENTION BY THE RECIPIENT (LARGE BUSINESS)
(JUL 2002)

(a) Definitions. (1) Administrator, as used in this clause, means the Administrator of the National Aeronautics and Space Administration (NASA) or duly authorized representative.

(2) Invention, as used in this clause, means any invention or discovery which is or may be patentable or otherwise protectable under title 35 of the U.S.C.

(3) Made, as used in relation to any invention, means the conception or first actual reduction to practice such invention.

(4) Nonprofit organization, as used in this clause, means a domestic university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under section 501(a) of the Internal Revenue Code (26 U.S.C. 501(a)), or any domestic nonprofit scientific or educational organization qualified under a State nonprofit organization statute.

(5) Practical application, as used in this clause, means to manufacture, in the case of a composition or product; to practice, in the case of a process or method; or to operate, in case of a machine or system; and, in each, case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.

(6) Reportable item, as used in this clause, means any invention, discovery, improvement, or innovation of the Recipient, whether or not the same is or may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of any work under this contract or in the performance of any work that is reimbursable under any clause in this contract providing for reimbursement of costs incurred prior to the effective date of this contract.

(7) Small business firm, as used in this clause, means a domestic small business concern as defined at 15 U.S.C. 632 and implementing regulations of the Administrator of the Small Business Administration. (For the purpose of this definition, the size standard contained in 13 CFR 121.901 through 121.911 will be used.)

(8) Subject invention, as used in this clause, means any reportable item which is or may be patentable or otherwise protectable under Title 35 of the United States Code, or any novel variety of plant that is or may be protectable under the Plant Variety Protection Act (7 U.S.C. 2321, et seq).

(9) Manufactured substantially in the United States means the product must have over 50 percent of its components manufactured in the United States. This requirement is met if the cost to the Recipient of the components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all components required to make the product. (In making this determination only the product and its components shall be considered.) The cost of each component includes transportation costs to the place of incorporation into the product and any applicable duty (whether or not a duty-free entry certificate is issued). Components of foreign origin of the same class or kind for which determinations have been made in accordance with Federal Acquisition

Regulation 25.102(a)(3) and (4) are treated as domestic. Scrap generated, collected, and prepared for processing in the United States is considered domestic.

(b) Allocation of principal rights—(1) Presumption of title. (i) Any reportable item that the Administrator considers to be a subject invention shall be presumed to have been made in the manner specified in paragraph (A) or (B) of section 20135(b)(1) of the National Aeronautics and Space Act (51 U.S.C. Chapter 201) (hereinafter called “the Act”), and the above presumption shall be conclusive unless at the time of reporting the reportable item the Recipient submits to the Agreement Officer a written statement, containing supporting details, demonstrating that the reportable item was not made in the manner specified in paragraph (A) or (B) of section 20135(b)(1) of the Act.

(ii) Regardless of whether title to a given subject invention would otherwise be subject to an advance waiver or is the subject of a petition for waiver, the Recipient may nevertheless file the statement described in paragraph (b)(1)(i) of this section. The Administrator will review the information furnished by the Recipient in any such statement and any other available information relating to the circumstances surrounding the making of the subject invention and will notify the Recipient whether the Administrator has determined that the subject invention was made in the manner specified in paragraph (A) or (B) of section 20135(b)(1) of the Act.

(2) Property rights in subject inventions. Each subject invention for which the presumption of paragraph (b)(1)(i) of this section is conclusive or for which there has been a determination that it was made in the manner specified in paragraph (A) or (B) of section 20135(b)(1) of the Act shall be the exclusive property of the United States as represented by NASA unless the Administrator waives all or any part of the rights of the United States, as provided in paragraph (b)(3) of this section.

(3) Waiver of rights. (i) Section 20135(g) of the Act provides for the promulgation of regulations by which the Administrator may waive the rights of the United States with respect to any invention or class of inventions made or that may be made under conditions specified in paragraph (A) or (B) of section 20135(b)(1) of the Act. The promulgated NASA Patent Waiver Regulations, 14 CFR part 1245, subpart 1, have adopted the Presidential memorandum on Government Patent Policy of February 18, 1983, as a guide in acting on petitions (requests) for such waiver of rights.

(ii) As provided in 14 CFR part 1245, subpart 1, Recipients may petition, either prior to execution of the Agreement or within 30 days after execution of the Agreement, for advance waiver of rights to any or all of the inventions that may be made under an Agreement. If such a petition is not submitted, or if after submission it is denied, the Recipient (or an employee inventor of the Recipient) may petition for waiver of rights to an identified subject invention within eight months of first disclosure of invention in accordance with paragraph (e)(2) of this section or within such longer period as may be authorized in accordance with 14 CFR 1245.105. Further procedures are provided in the REQUESTS FOR WAIVER OF RIGHTS—LARGE BUSINESS provision.

(c) Minimum rights reserved by the Government. (1) With respect to each Recipient subject invention for which a waiver of rights is applicable in accordance with 14 CFR part 1245, subpart 1, the Government reserves—

(i) An irrevocable, royalty-free license for the practice of such invention throughout the world by or on behalf of the United States or any foreign government in accordance with any treaty or agreement with the United States; and

(ii) Such other rights as stated in 14 CFR 1245.107.

(2) Nothing contained in this paragraph shall be considered to grant to the Government any rights with respect to any invention other than a subject invention.

(d) Minimum rights to the Recipient. (1) The Recipient is hereby granted a revocable, nonexclusive, royalty-free license in each patent application filed in any country on a Recipient subject invention and any resulting patent in which the Government acquires title, unless the Recipient fails to disclose the subject invention within the times specified in paragraph (e)(2) of this section. The Recipient's license extends to its domestic subsidiaries and affiliates, if any, within the corporate structure of which the Recipient is a party and includes the right to grant sublicenses of the same scope to the extent the Recipient was legally obligated to do so at the time the contract was awarded. The license is transferable only with the approval of the Administrator except when transferred to the successor of that part of the Recipient's business to which the invention pertains.

(2) The Recipient's domestic license may be revoked or modified by the Administrator to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with 14 CFR part 1245, subpart 3, Licensing of NASA Inventions. This license will not be revoked in that field of use or the geographical areas in which the Recipient has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of the Administrator to the extent the Recipient, its licensees, or its domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.

(3) Before revocation or modification of the license, the Recipient will be provided a written notice of the Administrator's intention to revoke or modify the license, and the Recipient will be allowed 30 days (or such other time as may be authorized by the Administrator for good cause shown by the Recipient) after the notice to show cause why the license should not be revoked or modified. The Recipient has the right to appeal, in accordance with 14 CFR 1245.112, any decision concerning the revocation or modification of its license.

(e) Invention identification, disclosures, and reports. (1) The Recipient shall establish and maintain active and effective procedures to assure that reportable items are promptly identified and disclosed to Recipient personnel responsible for the administration of this clause within six months of conception and/or first actual reduction to practice, whichever occurs first in the performance of work under this contract. These procedures shall include the maintenance of laboratory notebooks or equivalent records and other records as are reasonably necessary to document the conception and/or the first actual reduction to practice of the reportable items, and records that show that the procedures for identifying and disclosing reportable items are followed. Upon request, the Recipient shall furnish the Agreement Officer a description of such procedures for evaluation and for determination as to their effectiveness.

(2) The Recipient will disclose each reportable item to the Agreement Officer within two months after the inventor discloses it in writing to Recipient personnel responsible for the administration of this clause or, if earlier, within six months after the Recipient becomes aware that a reportable item has been made, but in any event for subject inventions before any on sale, public use, or publication of such invention known to the Recipient. The disclosure to the agency shall be in the form of a written report and shall identify the Agreement under which the reportable item was made and the inventor(s) or innovator(s). It shall be sufficiently complete in technical detail to convey a clear understanding, to the extent known at the time of the disclosure, of the nature, purpose, operation, and physical, chemical, biological, or electrical characteristics of the

reportable item. The disclosure shall also identify any publication, on sale, or public use of any subject invention and whether a manuscript describing such invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the agency, the Recipient will promptly notify the agency of the acceptance of any manuscript describing a subject invention for publication or of any on sale or public use planned by the Recipient for such invention.

(3) The Recipient shall furnish the Agreement Officer the following:

(i) Interim reports every 12 months (or such longer period as may be specified by the Agreement Officer) from the date of the Agreement, listing reportable items during that period, and certifying that all reportable items have been disclosed (or that there are no such inventions) and that the procedures required by paragraph (e)(1) of this section have been followed.

(ii) A final report, within three months after completion of the work, listing all reportable items or certifying that there were no such reportable items, and listing all subcontracts at any tier containing a patent rights clause or certifying that there were no such subcontracts.

(4) The Recipient agrees, upon written request of the Agreement Officer, to furnish additional technical and other information available to the Recipient as is necessary for the preparation of a patent application on a subject invention and for the prosecution of the patent application, and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions.

(5) The Recipient agrees, subject to 48 CFR (FAR) 27.302(j), that the Government may duplicate and disclose subject invention disclosures and all other reports and papers furnished or required to be furnished pursuant to this clause.

(f) Examination of records relating to inventions. (1) The Agreement Officer or any authorized representative shall, pursuant to the Retention and Examination of Records provision of this cooperative agreement, have the right to examine any books (including laboratory notebooks), records, and documents of the Recipient relating to the conception or first actual reduction to practice of inventions in the same field of technology as the work under this contract to determine whether—

(i) Any such inventions are subject inventions;

(ii) The Recipient has established and maintained the procedures required by paragraph (e)(1) of this section; and

(iii) The Recipient and its inventors have complied with the procedures.

(2) If the Agreement Officer learns of an unreported Recipient invention that the Agreement Officer believes may be a subject inventions, the Recipient may be required to disclose the invention to the agency for a determination of ownership rights.

(3) Any examination of records under this paragraph will be subject to appropriate conditions to protect the confidentiality of the information involved.

(g) Subcontracts. (1) Unless otherwise authorized or directed by the Agreement Officer, the Recipient shall—

(i) Include this Clause Patent Rights—Retention by the Recipient—(Large Business) (suitably modified to identify the parties) in any subcontract hereunder (regardless of tier) with other than a small business firm or nonprofit organization for the performance of experimental, developmental, or research work; and

(ii) Include the clause Patent Right—Retention by the Recipient—(Small Business) (suitably modified to identify the parties) in any subcontract hereunder (regardless of tier) with a small

business firm or nonprofit organization for the performance of experimental, developmental, or research work.

(2) In the event of a refusal by a prospective subcontractor to accept such a clause the Recipient—

(i) Shall promptly submit a written notice to the Agreement Officer setting forth the subcontractor's reasons for such refusal and other pertinent information that may expedite disposition of the matter; and

(ii) Shall not proceed with such subcontract without the written authorization of the Agreement Officer.

(3) The Recipient shall promptly notify the Agreement Officer in writing upon the award of any subcontract at any tier containing a patent rights clause by identifying the subcontractor, the applicable patent rights clause, the work to be performed under the subcontract, and the dates of award and estimated completion. Upon request of the Agreement Officer, the Recipient shall furnish a copy of such subcontract, and, no more frequently than annually, a listing of the subcontracts that have been awarded.

(4) The subcontractor will retain all rights provided for the Recipient in the clause of paragraph (g)(1)(i) or (1)(ii) of this section, whichever is included in the subcontract, and the Recipient will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.

(5) Notwithstanding paragraph (g)(4) of this section, and in recognition of the contractor's substantial contribution of funds, facilities and/or equipment to the work performed under this cooperative agreement, the Recipient is authorized, subject to the rights of NASA set forth elsewhere in this clause, to:

(i) Acquire by negotiation and mutual agreement rights to a subcontractor's subject inventions as the Recipient may deem necessary to obtaining and maintaining of such private support; and

(ii) Request, in the event of inability to reach agreement pursuant to paragraph (g)(5)(i) of this section, that NASA invoke exceptional circumstances as necessary pursuant to 37 CFR 401.3(a)(2) if the prospective subcontractor is a small business firm or organization, or for all other organizations, request that such rights for the Recipient be included as an additional reservation in a waiver granted pursuant to 14 CFR part 1245, subpart 1. Any such requests to NASA should be prepared in consideration of the following guidance and submitted to the contract officer.

(A) Exceptional circumstances. A request that NASA make an “exceptional circumstances” determination pursuant to 37 CFR 401.3(a)(2) must state the scope of rights sought by the Recipient pursuant to such determination; identify the proposed subcontractor and the work to be performed under the subcontract; and state the need for the determination.

(B) Waiver petition. The subcontractor should be advised that unless it requests a waiver of title pursuant to the NASA Patent Waiver Regulations (14 CFR part 1245, subpart 1), NASA will acquire title to the subject invention (51 U.S.C. 20135). If a waiver is not requested or granted, the Recipient may request a license from NASA (see licensing of NASA inventions, 14 CFR part 1245, subpart 3). A subcontractor requesting a waiver must follow the procedures set forth in the attached clause REQUESTS FOR WAIVER OF RIGHTS—LARGE BUSINESS.

(h) Preference for United States manufacture. The Recipient agrees that any products embodying subject inventions or produced through the use of subject inventions shall be manufactured substantially in the United States. However, in individual cases, the requirement to manufacture substantially in the United States may be waived by the Assistant Administrator for Procurement

(Code HS) with the concurrence of the Associate General Counsel for Intellectual Property upon a showing by the Recipient that under the circumstances domestic manufacture is not commercially feasible.

(i) March-in rights. The Recipient agrees that, with respect to any subject invention in which it has acquired title, NASA has the right in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of the agency to require the Recipient, an assignee or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the Subcontractor, assignee, or exclusive licensee refuses such a request NASA has the right to grant such a license itself if the Federal agency determines that—

(1) Such action is necessary because the Recipient or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use;

(2) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Recipient, assignee, or their licensees;

(3) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the Recipient, assignee, or licensees; or

(4) Such action is necessary because the agreement required by paragraph (i) of this clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.

[End of provision]

§1274.914 REQUESTS FOR WAIVER OF RIGHTS—LARGE BUSINESS (JUL 2002)

§1274.915 RESTRICTIONS ON SALE OR TRANSFER OF TECHNOLOGY TO FOREIGN FIRMS OR INSTITUTIONS (JUL 2002)

§1274.916 LIABILITY AND RISK OF LOSS (JUL 2002)

§1274.917 ADDITIONAL FUNDS (JUL 2002)

§1274.919 COST PRINCIPLES AND ACCOUNTING STANDARDS (JUL 2002)

§1274.920 RESPONSIBILITIES OF THE NASA TECHNICAL OFFICER (JUL 2002)

§1274.921 PUBLICATIONS AND REPORTS: NON-PROPRIETARY RESEARCH RESULTS (JUL 2002)

(a) NASA encourages the widest practicable dissemination of research results at all times during the course of the investigation consistent with the other terms of this agreement.

(b) All information disseminated as a result of the cooperative agreement shall contain a statement which acknowledges NASA's support and identifies the cooperative agreement by number.

(c) Prior approval by the NASA Technical Officer is required only where the Recipient requests that the results of the research be published in a NASA scientific or technical publication. Two copies of each draft publication shall accompany the approval request.

(d) Reports shall contain full bibliographic references, abstracts of publications and lists of all other media in which the research was discussed. The Recipient shall submit the following technical reports:

(1) A progress report for every year of the [cooperative agreement](#) (except the final year). Each report is due 60 [days](#) before the anniversary date of the [cooperative agreement](#) and shall describe research accomplished during the report period.

(2) A summary of research is due by 90 days after the expiration date of the cooperative agreement, regardless of whether or not support is continued under another cooperative agreement. This report is intended to summarize the entire research accomplished during the duration of the cooperative agreement.

(e) Progress reports and summaries of research shall display the following on the first page:

(1) Title of the cooperative agreement.

(2) Type of report.

(3) Period covered by the report.

(4) Name and address of the Recipient's organization.

(5) Cooperative agreement number.

(f) An original and two copies, one of which shall be of suitable quality to permit micro-reproduction, shall be sent as follows:

(1) Original--Agreement Officer.

(2) Copy--Technical Officer

(3) Micro-reproducible copy--NASA Center for Aerospace Information (CASI), Parkway Center, Attn: Document Processing Section, 7121 Standard Drive, Hanover, MD 21076.

[End of provision]

§1274.922 SUSPENSION OR TERMINATION (JUL 2002)

§1274.923 EQUIPMENT AND OTHER PROPERTY (FEB 2004)

§1274.924 CIVIL RIGHTS (JUL 2002)

§1274.925 SUBCONTRACTS (JUL 2002)

(a) Recipients are not authorized to issue grants or cooperative agreements.

(b) NASA Agreement Officer consent is required for subcontracts over \$150,000 and/or subcontracts for critical systems, subsystems, components, or services under this Cooperative Agreement.

(c) If not submitted by the Recipient and accepted by NASA in the original proposal. The Recipient shall provide the following information to the Agreement Officer:

(1) A copy of the proposed subcontract.

(2) Basis for subcontractor selection.

(3) Justification for lack of competition when competitive bids or offers are not obtained.

(4) Basis for award cost or award price.

(d) The Recipient shall utilize small business, veteran-owned small business, service-disabled veteran-owned small business, historically underutilized small business, small disadvantaged business, women-owned business concerns, Historically Black Colleges and Universities, and minority educational institutions as subcontractors to the maximum extent practicable.

(e) All entities that are involved in performing the research and development effort that is the purpose of the cooperative agreement shall be part of the Recipient's consortium and not subcontractors.

[End of provision]

§1274.926 CLEAN AIR-WATER POLLUTION CONTROL ACTS (JUL 2002)

§1274.927 DEBARMENT AND SUSPENSION AND DRUG-FREE WORKPLACE (SEP 2014)

§1274.928 FOREIGN NATIONAL EMPLOYEE INVESTIGATIVE REQUIREMENTS (JUL 2002)

§1274.929 RESTRICTIONS ON LOBBYING (JUL 2002)

§1274.930 TRAVEL AND TRANSPORTATION (JUL 2002)

§1274.931 ELECTRONIC FUNDS TRANSFER PAYMENT METHODS (JUL 2002)

§1274.932 RETENTION AND EXAMINATION OF RECORDS (JUL 2002)

RESTRICTIONS ON FUNDING ACTIVITIES WITH CHINA

(a) NASA is restricted from using appropriated funds to enter into or fund any grant or cooperative agreement of any kind to participate, collaborate, or coordinate bilaterally with China or any Chinese-owned company, at the prime recipient level or at any subrecipient level, whether the bilateral involvement is funded or performed under a no-exchange of funds arrangement.

(b) Definition: "China or Chinese-owned Company" means the People's Republic of China, any company owned by the People's Republic of China, or any company incorporated under the laws of the People's Republic of China.

(c) The restrictions in the Acts do not apply to commercial items of supply needed to perform a grant or cooperative agreement.

(d) Subaward - The recipient shall include the substance of this provision in all subawards made hereunder.

[End of Term and Condition]

LIMITED RELEASE OF RECIPIENT CONFIDENTIAL BUSINESS INFORMATION

- (a) NASA may find it necessary to release information submitted by this award to individuals not employed by NASA. Business information that would ordinarily be entitled to confidential treatment may be included in the information released to these individuals. Accordingly, by this award, the Recipient hereby consents to a limited release of its confidential business information (CBI).
- (b) Possible circumstances where NASA may release the Recipient's CBI include, but are not limited to, the following:
- (1) To other Agency (non-NASA) contractors and subcontractors tasked with assisting NASA in handling and processing information and documents in the evaluation, the award or the administration of Agency grants/cooperative agreements, such as providing post award audit support and specialized technical support to NASA's technical evaluation panels;
 - (2) To NASA contractors and subcontractors engaged in information systems analysis, development, operation and maintenance, including performing data processing and management functions for the Agency.
- (c) Except where otherwise provided by law, NASA will permit the limited release of CBI under subparagraphs (1) or (2) only pursuant to non-disclosure agreements signed by the assisting contractor or subcontractor, and their individual employees who may require access to the CBI to perform the assisting contract.
- (d) NASA's responsibilities under the Freedom of Information act are not affected by this award term.
- (e) The Recipient agrees to include this term, including this paragraph (e), in all subcontracts/subawards at all levels awarded pursuant to this award that requires the furnishing of confidential business information by the subcontractor/subrecipient.

[End of Term and Condition]

PERSONAL IDENTITY VERIFICATION OF RECIPIENT PERSONNEL (DEC 2014)

- (a) The Recipient shall comply with agency personal identity verification procedures identified in the contract that implement Homeland Security Presidential Directive-12 (HSPD-12), Office of Management and Budget (OMB) guidance M-05-24 and Federal Information Processing Standards Publication (FIPS PUB) Number 201.
- (b) The Recipient shall account for all forms of Government-provided identification issued to the Recipient employees in connection with performance under this contract. The Recipient shall return such identification to the issuing agency at the earliest of any of the following, unless otherwise determined by the Government:
- (1) When no longer needed for grant performance.

- (2) Upon completion of the Recipient's employee's employment.
- (3) Upon grant completion or termination.
- (c) The Grant Officer may delay final payment under a grant if the Recipient fails to comply with these requirements.
- (d) The Recipient shall insert the substance of this clause, including this paragraph (d), in all subcontracts or subagreements when their employees are required to have routine physical access to a Federally controlled facility and/or routine access to a Federally-controlled information system. It shall be the responsibility of the Recipient to return such identification to the issuing agency in accordance with the terms set forth in paragraph (b) of this section, unless otherwise approved in writing by the Grant Officer.

[End of Term and Condition]

RESTRICTIONS ON THE USE OF THE NASA SEAL, INSIGNIA, LOGOTYPE, PROGRAM IDENTIFIERS, OR FLAGS (DEC 2014)

- (a) In accordance with 14 CFR Part 1221, the NASA Seal, NASA Insignia, NASA Logotype, NASA Program Identifiers, and the NASA Flags are protected and shall be used exclusively to represent NASA, its programs, projects, functions, activities, or elements.
- (b) The use of these devices by recipients shall be governed by the requirements and restrictions set forth at 14 CFR §§ 1221.109-113. Requests for use of these devices by recipients shall be subject to the prior written approval of the NASA Grant Officer in conjunction with the NASA Headquarters, Office of Communications.
- (c) The use of these devices by recipients for any purpose other than as authorized by NASA regulations shall be prohibited. Their misuse shall be subject to the penalties authorized by statute, as set forth in 14 CFR §1221.115 and shall be reported as provided in 14 CFR §1221.116.

[End of Term and Condition]

§1274.902 PURPOSE (JUL 2002)

The purpose of this cooperative agreement is to conduct a shared resource project that will lead to progress toward commercial UAS operations in the National Airspace System. This cooperative agreement will advance the technology developments and research which have been performed on the integration of detect and avoid (DAA) and command and control (C2) systems and facilitate progress toward generating artifacts for type certification. The specific objective is to integrate UAS technologies required for a commercial mission, conduct a flight demonstration in the National Airspace System, and make progress toward type certification and operational approval required for routine commercial UAS operations. This work will culminate

in a UAS flight demonstration in the National Airspace System with integrated detect and avoid (DAA) and command and control (C2) systems, progress toward UAS type certification, and publicly available documentation of lessons learned from the type certification efforts to benefit the UAS community.

§1274.903 RESPONSIBILITIES (JUL 2002)

- (a) This Cooperative Agreement will include substantial NASA participation during performance of the effort. NASA and the Recipient agree to the following Responsibilities, a statement of cooperative interactions to occur during the performance of this effort. NASA and the Recipient shall exert all reasonable efforts to fulfill the responsibilities stated below.
- (b) NASA Responsibilities. The following NASA responsibilities are hereby set forth effective upon the start date, which unless stated otherwise, shall be the execution date of this bilateral Cooperative Agreement. The end date stated below, may be changed by a written bilateral modification:

<u>Responsibilities</u>	<u>Start Date</u>	<u>End Date</u>
Provide \$1,984,346 in funding	Award Date	08/31/2020
Provide \$2,157,000 in-kind Contribution		

In-Kind Contribution

0.67 work year equivalent for DAA consultation and support in both FY2019 and FY2020

0.5 work year equivalent for C2 consultation and support in both FY2019 and FY2020

0.67 work year equivalent for airworthiness consultation and support in both FY2019 and FY2020

0.83 work year equivalent in both FY2019 and FY2020 for certification consultation and support, for generating broadly applicable certification documentation, and for the creation of any other certification products.

0.5 work year equivalent for Live Virtual Constructive (LVC) test environment support in FY2019 and FY2020 (note that additional resources will be required for new LVC connections).

0.33 work year equivalent in both FY2019 and FY2020 for management of the Cooperative Agreement(s).

See “Special Conditions Section” for additional NASA’s Responsibilities

- (c) Recipient Responsibilities. The Recipient shall be responsible for particular aspects of project performance as set forth in the technical proposal dated 06/20/2018. The following responsibilities are hereby set forth effective upon the start date, which unless stated otherwise, shall be the execution date of this bilateral Cooperative Agreement. The end date stated below, may be changed by a written bilateral modification:

<u>Responsibilities</u>	<u>Start Date</u>	<u>End Date</u>
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Provide \$11,951,081 worth of labor Award Date 08/31/2020

See “Special Conditions Section” for additional Recipient’s Responsibilities

- (d) Since NASA contractors may obtain certain intellectual property rights arising from work for NASA in support of this agreement, NASA will inform Recipient whenever NASA intends to use NASA contractors to perform technical engineering services in support of this agreement.
- (e) Unless the Cooperative Agreement is terminated by the parties, end date can only be changed by execution of a bilateral modification.

[End of provision]

§1274.904 RESOURCE SHARING REQUIREMENTS (JUL 2002)

Where NASA and other Government agencies are involved in the cooperative agreement, “NASA” shall also mean “Federal Government”.

- (a) NASA and the Recipient will share in providing the resources necessary to perform the agreement. NASA funding and non-cash contributions (personnel, equipment, facilities, etc.) and the dollar value of the Recipient's cash and/or non-cash contribution will be on an 26% (NASA) – 74% (Recipient) basis. Criteria and procedures for the allowability and allocability of cash and non-cash contributions shall be governed by FAR Parts 30 and 31, and NFS Parts 1830 and 1831.
- (b) The funding and non-cash contributions by both parties are represented by the following dollar amounts:
 - Government Share: \$4,141,346
 - Recipient Share: \$11,951,081
 - Total Amount: \$16,092,427
- (c) The Recipient's share shall not be charged to the Government under this Agreement or under any other contract, grant, or cooperative agreement, except to the extent that the Recipient's contribution may be allowable IR&D costs pursuant to FAR 31.205-18(e).

[End of provision]

§1274.905 RIGHTS IN DATA (JUL 2002)

- (a) Definitions.

“Data,” means recorded information, regardless of form, the media on which it may be recorded, or the method of recording. The term includes, but is not limited to, data of a scientific or technical nature, computer software and documentation thereof, and data comprising commercial and financial information.

(b) Data categories.

(1)General. Data exchanged between NASA and Recipient under this cooperative agreement will be exchanged without restriction as to its disclosure, use or duplication except as otherwise provided below in this provision.

(2) Background Data. In the event it is necessary for Recipient to furnish NASA with Data which existed prior to, or produced outside of, this cooperative agreement, and such Data embodies trade secrets or comprises commercial or financial information which is privileged or confidential, Recipient will make said Data available for NASA review at a Recipient site only.

(3) Data first produced by Recipient. In the event Data first produced by Recipient in carrying out Recipient's responsibilities under this cooperative agreement is furnished to NASA, and Recipient considers such Data to embody trade secrets or to comprise commercial or financial information which is privileged or confidential, Recipient will make said Data available for NASA review at a Recipient site only. All other Data produced and furnished to NASA by Recipient under this cooperative agreement will be exchanged without restriction as to its disclosure, use or duplication.

(4)Data first produced by NASA. As to data first produced by NASA in carrying out NASA's responsibilities under this cooperative agreement and which Data would embody trade secrets or would comprise commercial or financial information that is privileged or confidential if it had been obtained from the Recipient, will be marked with an appropriate legend and maintained in confidence for an agreed to period of up to five years after development of the information, with the express understanding that during the aforesaid period such Data may be disclosed and used (under suitable protective conditions) by or on behalf of the Government for Government purposes only, and thereafter for any purpose whatsoever without restriction on disclosure and use. Recipient agrees not to disclose such Data to any third party without NASA's written approval until the aforementioned restricted period expires. Use of this data under a separate cooperative agreement or contract issued to a party other than the Recipient for the purpose of continuing the project in the event this cooperative agreement is terminated by either party shall constitute a government purpose.

(5)Copyright.

(i) In the event Data is exchanged with a notice indicating the Data is protected under copyright as a published copyrighted work, or are deposited for registration as a published work in the U.S. Copyright Office, the following paid-up licenses shall apply:

(A) If it is indicated on the Data that the Data existed prior to, or was produced outside of, this agreement, the receiving party and others acting on its behalf, may reproduce, distribute, and prepare derivative works for the purpose of carrying out the receiving party's responsibilities under this cooperative agreement; and

(B) If the furnished Data does not contain the indication of paragraph (b)(5)(i)(A) of this section, it will be assumed that the Data was first produced under this agreement, and the receiving party

and others acting on its behalf, shall be granted a paid up, nonexclusive, irrevocable, world-wide license for all such Data to reproduce, distribute copies to the public, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the receiving party. For Data that is computer software, the right to distribute shall be limited to potential users in the United States.

(ii) When claim is made to copyright, the Recipient shall affix the applicable copyright notice of 17 U.S.C. 401 or 402 and acknowledgment of Government sponsorship to the data when and if the data are delivered to the Government.

(6) Oral and visual information. If information which the Recipient considers to embody trade secrets or to comprise commercial or financial information which is privileged or confidential is disclosed orally or visually to NASA, such information must be reduced to tangible, recorded form (i.e., converted into Data as defined herein), identified and marked with a suitable notice or legend, and furnished to NASA within 10 days after such oral or visual disclosure, or NASA shall have no duty to limit or restrict, and shall not incur any liability for, any disclosure and use of such information.

(7) Disclaimer of liability. Notwithstanding the above, NASA shall not be restricted in, nor incur any liability for, the disclosure and use of:

(i) Data not identified with a suitable notice or legend as set in paragraph (b)(2) of this section; nor

(ii) Information contained in any Data for which disclosure and use is restricted under paragraphs (b)(2) or (3) of this section, if such information is or becomes generally known without breach of the above, is known to or is generated by NASA independently of carrying out responsibilities under this agreement, is rightfully received from a third party without restriction, or is included in data which Participant has, or is required to furnish to the U.S. Government without restriction on disclosure and use.

(c) Marking of data. Any Data delivered under this cooperative agreement, by NASA or the Recipient, shall be marked with a suitable notice or legend indicating the data was generated under this cooperative agreement.

(d) Lower tier agreements. The Recipient shall include this provision, suitably modified to identify the parties, in all subcontracts or lower tier agreements, regardless of tier, for experimental, developmental, or research work.

[End of provision]

§1274.906 DESIGNATION OF NEW TECHNOLOGY REPRESENTATIVE AND PATENT REPRESENTATIVE (JUL 2002)

(a) For purposes of administration of the clause of this cooperative agreement entitled “PATENT RIGHTS—RETENTION BY THE CONTRACTOR (LARGE BUSINESS)” or “PATENT

RIGHTS—RETENTION BY THE CONTRACTOR (SMALL BUSINESS)” the following named representatives are hereby designated by the Agreement Officer to administer such clause:

Title	Office code/Representative	Address	email
New Technology	570/ Earl Adams	NASA Armstrong Flight Research Center P. O. Box 273 Edwards, CA 93523-0273	Earl.S.Adams@nasa.gov
Patent	RA000/ Mark Homer	Patent Counsel Office 4800 Oak Grove Drive Pasadena, CA 91109	Mark.W.Homer@nasa.gov

- (b) Reports of reportable items, and disclosure of subject inventions, interim reports, final reports, utilization reports, and other reports required by the clause, as well as any correspondence with respect to such matters, should be directed to the New Technology Representative unless transmitted in response to correspondence or request from the Patent Representative. Inquiries or requests regarding disposition of rights, election of rights, or related matters should be directed to the Patent Representative. This clause shall be included in any subcontract hereunder requiring “PATENT RIGHTS—RETENTION BY THE CONTRACTOR (LARGE BUSINESS)” clause or “PATENT RIGHTS—RETENTION BY THE CONTRACTOR (SMALL BUSINESS)” clause, unless otherwise authorized or directed by the Agreement Officer. The respective responsibilities and authorities of the above-named representatives are set forth in NFS 1827.305-370.

[End of provision]

§1274.907 DISPUTES (JUL 2002)

- (a) In the event that a disagreement arises, representatives of the parties shall enter into discussions in good faith and in a timely and cooperative manner to seek resolution. If these discussions do not result in a satisfactory solution, the aggrieved party may seek a decision from the Dispute Resolution Official under paragraph (b) of this provision. This request must be presented no more than (3) three months after the events giving rise to the disagreement have occurred.
- (b) The aggrieved party may submit a written request for a decision to the Center Ombudsman, who is designated as the Dispute Resolution Official. The written request shall include a statement of the relevant facts, a discussion of the unresolved issues, and a specification of the clarification, relief, or remedy sought. A copy of this written request and all accompanying materials must be provided to the other party at the same time. The other party shall submit a written position on the matters in dispute within thirty (30) calendar days after receiving this

notification that a decision has been requested. The Dispute Resolution Official shall conduct a review of the matters in dispute and render a decision in writing within thirty (30) calendar days of receipt of such written position.

[End of provision]

§1274.908 MILESTONE PAYMENTS (JUL 2002)

(a) By submission of the first invoice, the Recipient is certifying that it has an established accounting system which complies with generally accepted accounting principles, with the requirements of this agreement, and that appropriate arrangements have been made for receiving, distributing, and accounting for Federal funds received under this agreement.

(b) Payments will be made upon the following milestones:

CLINS	Date	Milestones	Price	Deliverable
1	Feb-19	Monthly Reports/Core (average \$50,144.79 per month)	\$ 952,751.00	2
2	Feb-19	Kickoff Meeting	\$ 51,697.00	1
3	Mar-19	Baseline Mission CONOPS	\$ 173,312.00	3
4	Jun-19	Baseline Risk-based Assessment Document	\$ 148,604.00	4
6	Dec-19	Project Specific Certification Plan	\$ 255,570.00	7
7	May-20	Flight Demonstration Plan	\$ 31,533.00	5
10	Jul-20	SIO Demonstration	\$ 352,861.00	Demo
11	Aug-20	Final Program Wrap-Up	\$ 18,018.00	11

\$ 1,984,346.00

*There are no payments associated with Milestones 5, 9-10 and 12. Milestone 6 UAS Operations Manual has been deleted.

(c) Upon submission by the recipient of invoices in accordance with the provisions of the agreement and upon certification by NASA of completion of the payable milestone, the Agreement Officer shall authorize payment. Payment shall be made within 30 calendar days after receipt of proper invoice. Payment shall be considered as being made on the date of electronic funds transfer. A proper invoice must include the following:

(i) Name and address of the recipient.

(ii) Invoice date (The Recipient is encouraged to date invoices as close as possible to the date of the mailing or transmission).

(iii) Cooperative agreement number.

(iv) Description, milestone, and extended price of efforts/tasks performed.

- (v) Payment terms.
 - (vi) Name and address of Recipient official to whom payment is to be sent. (Must be the same as that in the cooperative agreement or in a proper notice of assignment).
 - (vii) Name (where practicable), title, phone number, and mailing address of the person to be notified in the event of a defective invoice.
 - (viii) Any other information or documentation required by the cooperative agreement.
 - (ix) Taxpayer identification number (TIN).
 - (x) While not required, the recipient is strongly encouraged to assign an identification number to each invoice.
- (d) A payment milestone may be successfully completed in advance of the date appearing in paragraph (b) of this section. However, payment shall not be made prior to that date without the written consent of the Agreement Officer.
- (e) The recipient is not entitled to partial payment for partial completion of a payment milestone.
- (f) Unless approved by the Agreement Officer, all preceding payment milestones must be completed before payment can be made for the next payment milestone.
- (g) (i) If the Recipient is authorized to submit invoices directly to the NASA paying office, the original invoice should be submitted to:

Name: NASA Shared Services Center
Mail Stop: B1111
Telephone: 8776772123
E-Mail Address: NSSC-AccountsPayable@nasa.gov

- (ii) If the Recipient is not authorized to submit invoices directly to the NASA paying office, the original invoice should be submitted to the Agreement Officer for certification.
- (iii) Copies of the recipient's invoice should be submitted to the following offices:
 - (A) Copy 1—NASA Agreement Officer.
 - (B) Copy 2—Auditor.
 - (C) Copy 3—Contract administration office.
 - (D) Copy 4—Project management office.
 - (E) Copy 5—Other recipients as designated by the Agreement Officer.

[End of provision]

§1274.909 TERM OF AGREEMENTS (JUL 2002)

- (a) The agreement commences on the effective date indicated on the attached cover sheet and continues until the expiration date indicated on the attached cover sheet unless terminated by either party. If all resources are expended prior to the expiration date of the agreement, the parties have no obligation to continue performance and may elect to cease at that point. The parties may extend the expiration date if additional time is required to complete the milestones at no increase in Government resources. Requests for approval for no-cost extensions must be forwarded to the NASA Agreement Officer no later than ten days prior to the expiration of the award to be considered.
- (b) Provisions of this Agreement, which, by their express terms or by necessary implication, apply for periods of time other than that specified as the agreement term, shall be given effect, notwithstanding expiration of the term of the agreement.

[End of provision]

§1274.933 SUMMARY OF RECIPIENT REPORTING RESPONSIBILITIES (JUL 2002)

This cooperative agreement requires the recipient to submit a number of reports. These reporting requirements are summarized below. In the event of a conflict between this provision and other provisions of the cooperative agreement requiring reporting, the other provisions take precedence.

Report	Frequency	Reference
Report of Joint NASA/Recipient Inventions	As required	1274.911 Patent Rights (Paragraph (b)(4))
Interim Report of Reportable Items	Every 12 months	1274.912 Patent Rights—Retention by the Recipient (Large Business) (Paragraph (e)(3)(i))
Final Report of Reportable Items	3 months after completion	1274.912 Patent Rights—Retention by the Recipient (Large Business) (Paragraph (e)(3)(ii))
Disclosure of Subject Inventions	Within 2 months after inventor discloses it to Recipient	1274.912 Patent Rights Retention by the Recipient (Large Business) (Paragraph (e)(2)) or 1274.913 Patent Rights—Retention by the Recipient (Small Business)

		(Paragraph (c)(1))
Election of Title to a Subject Invention	1 year after disclosure of the subject invention if a statutory bar exists, otherwise within 2 years	1274.913 Patent Rights—Retention by the Recipient (Small Business) (Paragraph (c)(2))
Listing of Subject Inventions Every	Every 12 months from the date of the agreement	1274.913 Patent Rights—Retention by the Recipient (Small Business) (Paragraph (f)(5)(i))
Subject Inventions Final Report	Prior to close-out of the agreement	1274.913 Retention by the Recipient (Small Business) (Paragraph (f)(5)(ii))
Notification of Decision to Forego Patent Protection	30 days before expiration of the response period	1274.913 Patent Rights—Retention by the Recipient (Small Business) (Paragraph (f)(3))
Notification of a Subcontract Award	Promptly upon award of a subcontract	1274.912 Patent Rights—Retention by the Recipient (Large Business)(Paragraph (g)(3)) or 1274.913 Patent Rights—Retention by the Recipient (Small Business) (Paragraph (g)(3))
Utilization of Subject Invention	Annually	1274.913 Patent Rights—Retention by the Recipient (Small Business) (Paragraph (h))
Notice of Proposed Transfer of Technology	Prior to transferring technology to foreign firm or institution	1274.915 Restrictions on Sale or Transfer of Technology to Foreign Firms or Institutions (Paragraph (b))
Progress Report	60 days prior to the anniversary date of the agreement (except final year)	1274.921 Publications and Reports: Non-Proprietary Research Results (Paragraph (d)(1))
Summary of Research	90 days after completion of agreement	1274.921 Publications and Reports: Non-Proprietary Research Results (Paragraph (d)(2))
NASA Form 1018 Property in the Custody of Contractors	Annually by October 15	1274.923 Equipment and Other Property (Paragraph (f))
NASA Form 1018 Property in the Custody of Contractors	60 days after expiration date of agreement	1274.923 Equipment and Other Property (Paragraph (f))

[End of provision]

§1274.934 SAFETY (JUL 2002)

NASA's safety priority is to protect: (1) The public, (2) astronauts and pilots, (3) the NASA workforce (including contractor employees working on NASA contracts), and (4) high-value equipment and property.

- (a) The Recipient shall act responsibly in matters of safety and shall take all reasonable safety measures in performing under this cooperative agreement. The recipient shall comply with all applicable federal, state, and local laws relating to safety. The Recipient shall maintain a record of, and will notify the NASA Agreement Officer immediately (within one workday) of any accident involving death, disabling injury or substantial loss of property. The Recipient will immediately (within one workday) advise NASA of hazards that come to its attention as a result of the work performed.
- (b) Where the work under this cooperative agreement involves flight hardware, the hazardous aspects, if any, of such hardware will be identified, in writing, by the Recipient. Compliance with this provision by subcontractors shall be the responsibility of the Recipient.

[End of provision]

§1274.936 BREACH OF SAFETY OR SECURITY (JUL 2002)

Safety is the freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment. Safety is essential to NASA and is a material part of this contract. NASA's safety priority is to protect: The public; astronauts and pilots; the NASA workforce (including contractor employees working on NASA contracts); and high-value equipment and property. A major breach of safety by the Recipient entitles the Government to remedies (pending corrective measures by the Recipient) which includes, suspension or termination of the Cooperative Agreement, require removal or change of Recipient's personnel from performing under the Agreement. A major breach of safety must be related directly to the work on the Agreement. A major breach of safety is an act or omission of the Recipient that consists of an accident, incident, or exposure resulting in a fatality or mission failure; or in damage to equipment or property equal to or greater than \$1 million; or in any "willful" or "repeat" violation cited by the Occupational Safety and Health Administration (OSHA) or by a state agency operating under an OSHA approved plan.

- (a) Security is the condition of safeguarding against espionage, sabotage, crime (including computer crime), or attack. A major breach of security by the Recipient entitles the Government to remedies (pending corrective measures by the Recipient) which includes, suspension or termination of the Cooperative Agreement, require removal or change of Recipient's personnel from performing under the Cooperative Agreement. A major breach of security may occur on or off Government installations, but must be related directly to the

work on the Cooperative Agreement. A major breach of security may arise from any of the following: compromise of classified information; illegal technology transfer; workplace violence resulting in criminal conviction; sabotage; compromise or denial of information technology services; damage or loss greater than \$250,000 to the Government; or theft.

- (b) In the event of a major breach of safety or security, the Recipient shall report the breach to the Agreement Officer. If directed by the Agreement Officer, the Recipient shall conduct its own investigation and report the results to the Government. The Recipient shall cooperate with the Government investigation, if conducted.

[End of provision]

§1274.937 SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES (JUL 2002)

- (a) The Recipient shall be responsible for Information Technology security for all systems connected to a NASA network or operated by the Recipient for NASA, regardless of location. This provision is applicable to all or any part of the cooperative agreement that includes information technology resources or services in which the Recipient must have physical or electronic access to NASA's sensitive information contained in unclassified systems that directly support the mission of the Agency. This includes information technology, hardware, software, and the management, operation, maintenance, programming, and system administration of computer systems, networks, and telecommunications systems. Examples of tasks that require security provisions include:
- (1) Computer control of spacecraft, satellites, or aircraft or their payloads;
 - (2) Acquisition, transmission or analysis of data owned by NASA with significant replacement cost should the Recipient's copy be corrupted; and
 - (3) Access to NASA networks or computers at a level beyond that granted the general public, e.g. bypassing a firewall.
- (b) The Recipient shall provide, implement, and maintain an IT Security Plan. This plan shall describe the processes and procedures that will be followed to ensure appropriate security of IT resources that are developed, processed, or used under this cooperative agreement. The plan shall describe those parts of the cooperative agreement to which this provision applies. The Recipient's IT Security Plan shall be compliant with Federal laws that include, but are not limited to, the Computer Security Act of 1987 (40 U.S.C. 1441 et seq.) and the Government Information Security Reform Act of 2000. The plan shall meet IT security requirements in accordance with Federal and NASA policies and procedures that include, but are not limited to:
- (1) OMB Circular A-130, Management of Federal Information Resources, Appendix III, Security of Federal Automated Information Resources;

- (2) NASA Procedures and Guidelines (NPG) 2810.1, Security of Information Technology;
and
- (3) Chapter 3 of NPG 1620.1, NASA Security Procedures and Guidelines.
- (c) Within days after cooperative agreement award, the Recipient shall submit for NASA approval an IT Security Plan. This plan must be consistent with and further detail the approach contained in the Recipient's proposal that resulted in the award of this cooperative agreement and in compliance with the requirements stated in this provision. The plan, as approved by the Agreement Officer, shall be incorporated into the cooperative agreement as a compliance document.
- (d)(1) Recipient personnel requiring privileged access or limited privileged access to systems operated by the Recipient for NASA or interconnected to a NASA network shall be screened at an appropriate level in accordance with NPG 2810.1, Section 4.5; NPG 1620.1, Chapter 3; and paragraph (d)(2) of this provision. Those Recipient personnel with non-privileged access do not require personnel screening. NASA shall provide screening using standard personnel screening National Agency Check (NAC) forms listed in paragraph (d)(3) of this provision, unless Recipient screening in accordance with paragraph (d)(4) is approved. The Recipient shall submit the required forms to the NASA Center Chief of Security (CCS) within fourteen (14) days after cooperative agreement award or assignment of an individual to a position requiring screening. The forms may be obtained from the CCS. At the option of the government, interim access may be granted pending completion of the NAC.
- (2) Guidance for selecting the appropriate level of screening is based on the risk of adverse impact to NASA missions. NASA defines three levels of risk for which screening is required (IT-1 has the highest level of risk):
- (i) IT-1—Individuals having privileged access or limited privileged access to systems whose misuse can cause very serious adverse impact to NASA missions. These systems include, for example, those that can transmit commands directly modifying the behavior of spacecraft, satellites or aircraft.
- (ii) IT-2—Individuals having privileged access or limited privileged access to systems whose misuse can cause serious adverse impact to NASA missions. These systems include, for example, those that can transmit commands directly modifying the behavior of payloads on spacecraft, satellites or aircraft; and those that contain the primary copy of “level 1” data whose cost to replace exceeds one million dollars.
- (iii) IT-3—Individuals having privileged access or limited privileged access to systems whose misuse can cause significant adverse impact to NASA missions. These systems include, for example, those that interconnect with a NASA network in a way that exceeds access by the general public, such as bypassing firewalls; and systems operated by the Recipient for NASA whose function or data has substantial cost to replace, even if these systems are not interconnected with a NASA network.

- (3) Screening for individuals shall employ forms appropriate for the level of risk as follows:
- (i) IT-1: Fingerprint Card (FC) 258 and Standard Form (SF) 85P, Questionnaire for Public Trust Positions;
 - (ii) IT-2: FC 258 and SF 85, Questionnaire for Non-Sensitive Positions; and
 - (iii) IT-3: NASA Form 531, Name Check, and FC 258.
- (4) The Agreement Officer may allow the Recipient to conduct its own screening of individuals requiring privileged access or limited privileged access provided the Recipient can demonstrate that the procedures used by the Recipient are equivalent to NASA's personnel screening procedures. As used here, equivalent includes a check for criminal history, as would be conducted by NASA, and completion of a questionnaire covering the same information as would be required by NASA.
- (5) Screening of Recipient personnel may be waived by the Agreement Officer for those individuals who have proof of—
- (i) Current or recent national security clearances (within last three years);
 - (ii) Screening conducted by NASA within last three years; or
 - (iii) Screening conducted by the Recipient, within last three years, that is equivalent to the NASA personnel screening procedures as approved by the Agreement Officer under paragraph (d)(4) of this provision.
- (e) The Recipient shall ensure that its employees, in performance of the cooperative agreement, receive annual IT security training in NASA IT Security policies, procedures, computer ethics, and best practices in accordance with NPG 2810.1, Section 4.3 requirements. The Recipient may use web-based training available from NASA to meet this requirement.
- (f) The Recipient shall afford NASA, including the Office of Inspector General, access to the Recipient's, subcontractors' or subawardees' facilities, installations, operations, documentation, databases and personnel used in performance of the cooperative agreement. Access shall be provided to the extent required to carry out a program of IT inspection, investigation and audit to safeguard against threats and hazards to the integrity, availability and confidentiality of NASA data or to the function of computer systems operated on behalf of NASA, and to preserve evidence of computer crime.
- (g) The Recipient shall incorporate the substance of this clause in all subcontracts or subagreements that meet the conditions in paragraph (a) of this provision.

[End of provision]

During the term of this agreement and in the interest of achieving program objectives, the parties may agree to changes that affect the responsibility statements, milestones, or other provisions of this agreement. Any changes to this agreement will be accomplished by a written bilateral modification.

[End of provision]

§1274.939 APPLICATION OF FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS (JUL 2002)

- (a) Federal Laws and Regulations. This Cooperative Agreement shall be governed by the Federal Laws, regulations, policies, and related administrative practices applicable to this Cooperative Agreement on the date the Agreement is executed. The Recipient understands that such Federal laws, regulations, policies, and related administrative practices may be modified from time to time. The Recipient agrees to consider modifying this Agreement to be governed by those later modified Federal laws, regulations, policies, and related administrative practices that directly affect performance of the Project.
- (b) State or Territorial Law and Local Law. Except to the extent that a Federal statute or regulation preempts State or territorial law, nothing in the Cooperative Agreement shall require the Recipient to observe or enforce compliance with any provision thereof, perform any other act, or do any other thing in contravention of any applicable State or territorial law; however, if any of the provisions of the Cooperative Agreement violate any applicable State or territorial law, or if compliance with the provisions of the Agreement would require the Recipient to violate any applicable State or territorial law, the Recipient agrees to notify the Government (NASA) immediately in writing in order that the Government and the Recipient may make appropriate arrangements to proceed with the Project as soon as possible.
- (c) Changed Conditions of Performance (Including Litigation). The Recipient agrees to notify the Government (NASA) immediately of any change in State or local law, conditions, or any other event that may significantly affect its ability to perform the Project in accordance with the terms of this Cooperative Agreement. In addition, the Recipient agrees to notify the Government (NASA) immediately of any decision pertaining to the Recipient's conduct of litigation that may affect the Government's interests in the Project or the Government's administration or enforcement of applicable Federal laws or regulations. Before the Recipient may name the Government as a party to litigation for any reason, the Recipient agrees to inform the Government; this proviso applies to any type of litigation whatsoever, in any forum.
- (d) No Government Obligations to Third Parties. Absent the Government's express written consent, and notwithstanding any concurrence by the Government in or approval of the award of any Agreement of the Recipient (third party contract) or subcontract of the Recipient (third party subcontract) or the solicitation thereof, the Government shall not be subject to any obligations or liabilities to third party contractors or third party subcontractors or any other person(s).

[End of provision]

§1274.940 CHANGES IN RECIPIENT'S MEMBERSHIP (JUL 2002)

The Recipient shall notify the cognizant Agreement Officer within seven (7) days of any change in the corporate membership (ownership) structure of the Recipient, including the addition or withdrawal of any of the Recipient's affiliated members (e.g., Consortium Member). If NASA reasonably determines that any change in the corporate membership (ownership) of Recipient will conflict with NASA's objectives for the Systems Integration and Operationalization (SIO) Project or any statutory or regulatory restriction applicable to the agency, NASA may terminate this Agreement after giving the Agreement Recipient at least ninety (90) days prior written notice of such perceived conflict and a reasonable opportunity to cure such conflict.

[End of provision]

§1274.942 EXPORT LICENSES (JUL 2002)

- (a) The Recipient shall comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR parts 730 through 799, in the performance of this Cooperative Agreement. In the absence of available license exemptions/exceptions, the Recipient shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of hardware, technical data, and software, or for the provision of technical assistance.
- (b) The Recipient shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of this Cooperative Agreement, including instances where the work is to be performed on-site at AFRC, where the foreign person will have access to export-controlled technical data or software.
- (c) The Recipient shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.
- (d) The Recipient shall be responsible for ensuring that the requirements of this provision apply to its subcontractors.
- (e) The Recipient may request, in writing, that the Agreement Officer authorize it to export ITAR-controlled technical data (including software) pursuant to the exemption at 22 CFR 125.4(b)(3). The Agreement Officer or designated representative may authorize or direct the use of the exemption where the data does not disclose details of the design, development, production, or manufacture of any defense article.

[End of provision]

§1274.943 INVESTIGATION OF RESEARCH MISCONDUCT (MAY 2005)

Recipients of this cooperative agreement are subject to the requirements of 14 CFR part 1275, "Investigation of Research Misconduct."

[End of provision]

§ 1274.944 AWARD TERM AND CONDITION FOR RECIPIENT INTEGRITY AND PERFORMANCE MATTERS.

(a) *Reporting of matters related to recipient integrity and performance -*

(1) *General reporting requirement.*

(i) If the total value of your currently active grants, cooperative agreements, and procurement contracts from all Federal awarding agencies exceeds \$10,000,000 for any period during the period of performance of this Federal award, then you as the recipient during that period of time must maintain the currency of information reported in FAPIIS about civil, criminal, or administrative proceedings described in paragraph (a)(2) of this section. This is a statutory requirement under section 872 of Public Law 110-417, as amended (41 U.S.C. 2313).

(ii) As required by section 3010 of Public Law 111-212, all information posted in FAPIIS on or after April 15, 2011, except past performance reviews required for Federal procurement contracts, will be publicly available.

(2) *Proceedings about which you must report.* Submit the information required about each proceeding that -

(i) Is in connection with the award or performance of a grant, cooperative agreement, or procurement contract from the Federal Government;

(ii) Reached its final disposition during the most recent five-year period; and

(iii) Is one of the following:

(A) A criminal proceeding that resulted in a conviction, as defined in paragraph (a)(5)(ii) of this section.

(B) A civil proceeding that resulted in a finding of fault and liability and payment of a monetary fine, penalty, reimbursement, restitution, or damages of \$5,000 or more.

(C) An administrative proceeding, as defined in paragraph (a)(5)(i) of this award term and condition, that resulted in a finding of fault and liability and your payment of either a monetary fine or penalty of \$5,000 or more or reimbursement, restitution, or damages in excess of \$100,000.

(D) Any other criminal, civil, or administrative proceeding if -

(1) It could have led to an outcome described in paragraph (a)(2)(iii)(A), (B), or (C) of this section;

(2) It had a different disposition arrived at by consent or compromise with an acknowledgment of fault on your part; and

(3) The requirement in this award term and condition to disclose information about the proceeding does not conflict with applicable laws and regulations.

(3)*Reporting procedures.* Enter in the SAM Entity Management area the information that SAM requires about each proceeding described in paragraph (a)(4) of this section. You do not need to submit the information a second time under assistance awards that you received if you already provided the information through SAM, because you were required to do so under Federal procurement contracts that you were awarded.

(4)*Reporting frequency.* During any period of time when you are subject to the requirement in paragraph (a)(1) of this section, you must report proceedings information through SAM for the most recent five year period, either to report new information about any proceeding(s) that you have not reported previously or affirm that there is no new information to report. Recipients that have Federal contract, grant, and cooperative agreement awards with a cumulative total value greater than \$10,000,000 must disclose semiannually any information about the criminal, civil, and administrative proceedings.

(5)*Definitions.* For purposes of this section:

(i) Administrative proceeding means a non-judicial process that is adjudicatory in nature in order to make a determination of fault or liability (*e.g.*, Securities and Exchange Commission Administrative proceedings, Civilian Board of Contract Appeals proceedings, and Armed Services Board of Contract Appeals proceedings). This includes proceedings at the Federal and State level but only in connection with performance of a Federal contract or grant. It does not include audits, site visits, corrective plans, or inspection of deliverables.

(ii) Conviction, for purposes of this award term and condition, means a judgment or conviction of a criminal offense by any court of competent jurisdiction, whether entered upon a verdict or a plea, and includes a conviction entered upon a plea of *nolo contendere*.

(6) Total value of currently active grants, cooperative agreements, and procurement contracts includes -

(i) Only the Federal share of the funding under any Federal award with a recipient cost share or match; and

(ii) The value of all expected funding increments under a Federal award and options, even if not yet exercised.

(b) [Reserved]

[End of provision]

Special Conditions

1.0 Project Responsibilities

In order to accomplish the objectives of SIO, the Industry Partner will develop and integrate a Detect and Avoid (DAA) system, Control and Non-Payload Communication (CNPC) radio, and Navigation system, onto a MQ-9B SkyGuardian aircraft (UBC97000-10) and GCS (CGCS). NASA expects this agreement to provide progress toward the following objectives:

- A ConOps with high commercialization potential;
- Integration of systems and technologies necessary to support the end-to-end ConOps;
- Generation of safety and airworthiness data, identification of operational requirements and restrictions, and obtaining approval to operate in the NAS;
- A flight demonstration in FY2020 that emulates the proposed ConOps; and
- Industry Partner progress toward obtaining a certification for the UAS.

NASA will complement the industry efforts by providing expertise in many of the areas necessary to support the Fiscal Year (FY) 2020 demonstration and to progress toward commercialization. A key objective of the SIO demonstration will be to leverage integrated DAA, Command and Control (C2), and state-of-the-art UAS vehicle technologies with a pathway toward certification. The NASA UAS-NAS project has several years' experience in research to support the development of standards for DAA and C2, extensive airworthiness experience, and flight test experience. NASA will use this experience to provide consultation that is expected to help the Industry Partner determine test data and artifacts needed to support airworthiness and regulatory compliance of their UAS. NASA will compile the necessary information to develop documentation of the SIO certification process that will be made available to the public as a guide for similar vehicles attempting to achieve certification and operational approval. Note that NASA consultation support will be limited to what can be achieved using the following NASA resources:

- 0.67 work year equivalent for DAA consultation and support in both FY2019 and FY2020
- 0.5 work year equivalent for C2 consultation and support in both FY2019 and FY2020
- 0.67 work year equivalent for airworthiness consultation and support in both FY2019 and FY2020
- 0.83 work year equivalent in both FY2019 and FY2020 for certification consultation, generating publicly available certification documentation, and for the creation of any other certification products.
- 0.5 work year equivalent for Live Virtual Constructive (LVC) test environment support in FY2019 and FY2020.
- 0.33 work year equivalent in both FY2019 and FY2020 for management of the Cooperative Agreement.

2.0 General Responsibilities

2.1 General NASA Responsibilities

- NASA will attend any critical reviews of the Industry Partner's UAS technologies or operations. These reviews could include:
 - Design Reviews: System Requirements Review (SRR), Preliminary Design Review (PDR), and Critical Design Review (CDR)
 - Operational Readiness Reviews
 - Technology Reviews
- NASA will provide results of related in-house NASA sponsored research to maximize synergy between simulation results and the development of airworthiness requirements for the Industry Partner-supplied UAS.
- NASA will provide any technical reports and conference papers produced as part of this Cooperative Agreement for the Industry Partner to review in order to avoid the release of Industry Partner's proprietary information.
- NASA will coordinate with the FAA to ensure that they are aware of the Industry Partner's work toward certification.
- NASA will provide consultation on the Industry Partner's DAA and C2 certification efforts.
- NASA will schedule and host a semi-annual project review at a NASA Aeronautics Research Center or another location negotiated with the Industry Partner. The semi-annual project review is expected to include presentations from the Industry Partner. It is understood that the Industry Partner will not share any of its proprietary information at any such review.
- NASA will lead regular Working Group meetings. The planned working groups and meeting frequency are negotiable, but the following are expected;
 - SIO flight demonstration,
 - DAA,
 - C2, and
 - Certification.
- NASA will share research results and data collected as part of this effort with Industry Partner in accordance with Export Administration Regulations (EAR) and International Traffic in Arms Regulations (ITAR) and NASA's Export Control Program (ECP).
- NASA will work with the Industry Partner on any public relations and media outreach in connection with this Cooperative Agreement.

2.2 General Industry Partner Responsibilities

- The Industry Partner shall provide one SkyGuardian UAS with technologies required to support an end-to-end mission.
- The Industry Partner shall perform appropriate reviews of its UAS technologies or operations. These reviews could include:
 - Design Reviews: System Requirements Review (SRR), Preliminary Design Review (PDR), and Critical Design Review (CDR)

- Technology Reviews

The Industry Partner's process and format are expected to be used as long as it constitutes a rigorous systems engineering approach

- The Industry Partner shall be responsible for any system development, integration, and verification and validation required of its SkyGuardian UAS. The Industry Partner shall be responsible for collecting artifacts necessary to obtain airworthiness approval.
- The Industry Partner shall be responsible for making progress toward certification.
- The Industry Partner shall review technical reports and conference papers produced by NASA as part of this Cooperative Agreement to ensure that there is no accidental dissemination of proprietary information. The Industry Partners' review shall be completed within 20 calendar days of receiving the document from NASA.
- The Industry Partner shall support regular Working Group meetings at its facilities in Poway, CA. The planned working groups and meeting frequency are negotiable, but the following are expected:
 - Operations and airworthiness,
 - DAA,
 - C2, and
 - Certification.
- The Industry Partner shall lead a kick-off meeting and provide monthly status reports. See deliverables 1 and 2 in section 9.0 for additional details.
- The Industry Partner shall support SIO Demonstration planning and flight demonstration coordination, including flight schedules, airspace, and control.
- Any SIO-related public relations and media outreach shall be jointly approved by the Industry Partner and NASA.
- The Industry Partner shall provide NASA with any proposed use of NASA emblems/devices (i.e., NASA Seal, NASA Insignia, NASA Logotype, NASA Program Identifiers, and the NASA Flag) for review and approval.
- If connecting to NASA assets or networks, external information systems shall follow a security assessment and accreditation process that meets NASA Policy Regulation (NPR) 2810.1A, Security of Information Technology, and is consistent with National Institute of Standards and Technology (NIST) Special Publication (SP) 800-37 Guide for Applying the Risk Management Framework to Federal Information Systems: A Security Life Cycle Approach and shall be reported to Federal governing bodies for Federal Information Security Modernization Act (FISMA) purposes. NASA is responsible for ensuring that Federal and NASA requirements are met, for ensuring that NASA information is adequately protected, and for reporting information security metrics related to the external systems to federal governing bodies.
- The Industry Partner shall provide, to the extent approved in advance by Industry Partner, reasonable access and ITAR-appropriate content to media and

the public during the demonstration to showcase the DAA and C2 technologies through a distributed connection infrastructure, with the understanding that granting such access does not obligate the Industry Partner in any way to compromise its intellectual property and other proprietary information. Requesting and coordinating the resources for a connection to NASA's LVC test environment is one way to accomplish this goal.

- Due to cyber security concerns, the Industry Partner shall not use any UAS, equipment, or components equipment manufactured by DJI within this activity.

2.3 Force Majeure

Neither party shall be liable for any delay or failure to carry out or make continuously available its obligations under this Cooperative Agreement if such delay or failure is due to any cause beyond such party's control, including without limitation restrictions of law or regulations, labor disputes, acts of God, unusually severe weather, acts of terrorism or war, telecommunications, network or power failures or interruptions, or mechanical or electronic breakdowns.

3.0 Concept of Operations (ConOps)

3.1 ConOps - NASA Responsibilities

- NASA will review the *Mission ConOps* document (deliverable 3) provided by the Industry Partner and provide any applicable comments or recommendations.
- NASA will work with the Industry Partner to coordinate with RTCA SC-228 to ensure that they are aware of relevant DAA and C2 aspects of the ConOps.
- NASA will work with the Industry Partner and FAA to ensure that the FAA has a comprehensive understanding of the Industry Partner's proposed ConOps to facilitate policy creation and to identify any barriers to a FY2020 demonstration.

3.2 ConOps - Industry Partner Responsibilities

- The Industry Partner shall develop and provide a *Mission ConOps* document (deliverable 3). See section 9.0 for additional details.
- The Industry Partner should coordinate with RTCA SC-228 to present any relevant DAA and C2 aspects of the ConOps.

4.0 National Airspace System (NAS) Safety and Certification

4.1 NAS Safety and Certification - NASA Responsibilities

- NASA will provide comments and recommendations on the *Risk-based Safety Assessment* document developed by the Industry Partner.
- NASA will provide consultation on the development of a certification basis and the definition of necessary data requirements for certification, with the understanding that under the scope of the contract there is no expectation that certification be achieved by the end of the period of performance.
- NASA will leverage the Industry Partner's certification efforts to develop

broadly applicable documentation related to the certification process to help other members of industry considering similar commercial operations. NASA will provide the generic documentation of the certification process for the Industry Partner to review in order to ensure that proprietary information is protected.

- NASA will lead SIO Certification working group teleconference meetings.
- NASA will coordinate with the FAA through the NASA/FAA research transition team.

4.2 NAS Safety and Certification - Industry Partner Responsibilities

- The Industry Partner shall work toward the development and submission of a certification application to the FAA. The timeframe of the SIO activity may not be adequate to achieve a certification; however, NASA is interested in motivated industry partners that expect to make significant progress.
- The Industry Partner shall develop and provide a *Risk-based Safety Assessment* document that includes a safety assessment that includes hazards and mitigations. See deliverable 4 in section 9.0 for additional details.
- The Industry Partner shall develop and provide a *Project Specific Certification Plan*. See deliverable 6 in section 9.0 for additional details.
- The Industry Partner shall provide data and documentation necessary to support a certification basis available to NASA. See deliverable 7 in section 9.0 for additional details.
- The Industry Partner shall provide regular updates on obtaining certification for their UAS through the SIO Certification working group meetings.

5.0 Detect and Avoid (DAA) Technologies

5.1 DAA - NASA Responsibilities

- NASA will advise on the DAA MOPS requirements and test cases to support the Industry Partner's efforts toward certification.
- NASA will provide existing DAA test cases from previous research activities.
- NASA will review and comment on the Industry Partner's DAA airworthiness and FAA certification plan.
- NASA will lead SIO DAA working group meetings.
- NASA will provide applicable NASA modeling and simulation results from currently planned research activities.

5.2 DAA - Industry Partner Responsibilities

- The Industry Partner shall provide a DAA system that has a pathway toward certification. A pathway toward certification can be shown using one of the options below.
 - Option 1: A DAA system that is consistent with either draft or final versions of the SC-228 MOPS (source: SC-228 Working Group 1

- workspace).
- Option 2: A DAA system that leverages standards outside of RTCA SC-228.
 - Option 3: Individualized approval of a DAA system through the FAA’s certification process.
 - If the Industry Partner’s DAA solution is designed to comply with the RTCA SC-228 Phase 2 MOPS that are currently under development, they should support the development of those MOPS by participating in RTCA SC-228 DAA technical meetings.
 - The Industry Partner shall perform necessary technology development, characterization, and testing to ensure the DAA system meets all airworthiness requirements for the SIO flight demonstration. This requirement is expected to include a combination of simulation and flight test scenarios.

DAA System Information	Description of Example Content
DAA system performance	System latency for the following steps: intruder detection, track processing, downlink, alerting and guidance processing, uplink of conflict resolution maneuver, and execution of the conflict resolution maneuver by the flight management system.
Sensor/surveillance suites	The description shall include the types of sensor(s), update rates, surveillance field of regard and range (minimum and maximum), minimum intruder size, outputs, environmental/airspace limitations, latencies, installation requirements, and detection accuracy.
Track Processing	The description shall include the track processor ICD (outputs), maximum number of tracked intruders, declaration range, filtering, and data association.
Associated architectures	Diagrams shall include DAA external system representations.
Alerting and guidance	The description shall include alerting and guidance algorithms, including definition of hazard zones, alerting thresholds, and/or maneuver guidance outputs (e.g., bands, regions, single maneuver, etc.)
Displays for DAA	The description shall include the visual and auditory display for DAA alerting and guidance, and other display and control features that support those technologies. Description of any human factors evaluations or analyses of these displays shall also be included.

Exhibit 1: DAA system information

6.0 Command and Control (C2)

6.1 C2 - NASA Responsibilities

- NASA will provide information from subject matter experts regarding the development, verification, and validation of CNPC radios that supported the creation of the RTCA SC-228 C2 standards (DO-362 UAS Terrestrial MOPS). This includes the following information from existing documents:
 - Lab and flight test article and equipment configurations
 - Flight test patterns, tracking, and data gathering
 - Flight operational environments
 - C2 radio interface to aircraft avionics
 - C2 radio interface to C2 Ground Stations
 - C2 Ground Station networking
 - Interface to Ground Control Station
 - Verification and validation methodologies
 - NASA modeling & simulation data and results
- NASA will advise on the C2 MOPS requirements and test cases to support the Industry Partner's efforts toward certification.
- NASA will review and comment on the Industry Partner's C2 system certification, and demonstration plan.
- NASA will provide information on the development of C2 test cases.
- NASA will provide information on data-link security requirements.
- NASA will lead SIO C2 working group meetings.
- If required and as expertise allows, NASA will provide information on spectrum outside the scope of RTCA SC-228 Terrestrial MOPS including satellite communication, Long-Term Evolution (LTE), mesh networks, and other forms of C2.
- If required, NASA will provide information on spectrum authorizations.
- When available, NASA will share results of an Urban Air Mobility study that identifies example C2 concept of operations scenarios, assumptions, constraints, limitations, C2 seed requirements, policies, standards, and a candidate C2 system concept solution(s) for urban air mobility operations.

6.2 C2 - Industry Partner Responsibilities (C2)

- The Industry Partner shall provide a C2 system for the demonstration that has a pathway toward certification. A pathway toward certification can be shown using one of the options below.
 - Option 1: A C2 system that is consistent with either draft or final versions of the SC-228 MOPS (source: SC-228 Working Group 2 workspace).
 - Option 2: A C2 system that leverages standards outside of RTCA SC-228.
 - Option 3: Individualized approval of a C2 system through the FAA's

certification process.

- The Industry Partner shall develop and implement security protocols for the link consistent with National Institute of Standards and Technology, Federal Information Processing Standards. If other security standards will be used, they must be documented and coordinated with NASA.
- The Industry Partner shall identify industry standard radio requirements for the UAS. These requirements should include priorities for essential C2 communications for each phase of flight and the identification of redundant, primary, or secondary back-up C2 implementations as necessary. Industry Partner is not creating a standard.
- The Industry Partner shall perform necessary technology development, characterization, and testing to ensure the C2 system is sufficient for the SIO flight demonstration. The data collected and shared with NASA shall include C2 performance information such as latency and both the duration and frequency of outages. Outages include loss, disruption, or impairment of RF links and/or data traffic.

C2 System Information	Description
Radio system characteristics	<ul style="list-style-type: none"> • The size, weight, and power (SWaP) requirements for the UAS C2 radio system. • Power and cooling requirements for the C2 radio system.
Antenna systems	<ul style="list-style-type: none"> • Description of the antenna systems necessary to implement the proposed C2 system(s) (i.e. directional, steerable, etc.) including critical limiting performance parameters and any technology development required to miniaturize and implement the system.
C2 radio performance	<ul style="list-style-type: none"> • Modulation, coding, channelization, transmitter power, receiver sensitivity, radio frequency, bandwidth, throughput, and data rates.
C2 Ground system performance	<ul style="list-style-type: none"> • Capacity, expected line of sight (LOS) coverage, networking, synchronization, handovers, modulation, coding, channelization, transmitter power, receiver sensitivity, radio frequency, bandwidth, throughput, and data rates.
Latency	<ul style="list-style-type: none"> • Expected forward latencies of the proposed C2 communications path from C2 ground station radio input to the UAS C2 radio output. • Expected return latencies of the system's C2 communications path from the UAS C2 radio input to the ground station C2 radio output.
Scalability	<ul style="list-style-type: none"> • The scalability of the C2 demonstration system with respect to spectrum usage. Specifically, if the system will leverage spectrum outside the DO-362 designated C-Band, spectrum owned by industries that are primarily outside of the aviation industry, or the use of unlicensed spectrum. • The scalability of the C2 demonstration system with respect to the proposed use case. Specifically, if the system will be tailored to one manufacturer or one particular set of use cases.
Security	<ul style="list-style-type: none"> • Implementation and logistics for personnel and equipment physical safety/security. • C2 network cybersecurity.

Exhibit 2: C2 system information

7.0 UAS Technologies and Integration

- The Industry Partner shall provide a UAS capable of demonstrating integrated DAA and C2 technologies in the NAS and leverage vehicle technologies that enable an end-to-end mission, with minimal operational restrictions.
- The Industry Partner shall perform necessary technology development, characterization, and testing to ensure that all UAS systems meet NASA's airworthiness process.

8.0 SIO Demonstration and Airworthiness

Flight activity resulting from this Cooperative Agreement is for the purpose of developing a required set of artifacts and documentation deliverables explained in Section 9.0. For the purposes of this Cooperative Agreement, SIO demonstration flights are defined as the flights associated with the final demonstration(s) that will occur at the end of the SIO activity, and do not include any flights for product development or testing leading up to the SIO demonstration.

8.1 SIO Demonstration and Airworthiness – NASA Responsibilities

- NASA shall monitor the Industry Partner’s airworthiness process leading up to SIO demonstration flights.
- NASA shall inform Industry Partner and Test Site of all relevant applicable NASA airworthiness policies.
- NASA shall attend certain reviews with appropriate subject matter experts and provide non-binding recommendations and SIO demonstration and airworthiness advice as appropriate.
- NASA shall retain the right to call a halt to SIO demonstration flight activities due to either safety considerations or a determination that necessary permissions have not been received.
- NASA shall jointly craft a draft mishap press release with the Industry Partner prior to the start of flight activities.
- NASA shall support Mishap Investigations.
- NASA shall provide lessons learned from previous NASA activities and recommendations for the Industry Partner to consider as they create and submit any COA applications needed for the SIO demonstration.

8.2 SIO Demonstration and Airworthiness – Industry Partner Responsibilities

- The Industry Partner shall obtain all FAA permissions required to perform the SIO flight demonstration. These permissions are expected to include an experimental airworthiness certificate from the FAA, any COAs required for the SIO demonstration, and any spectrum approvals required for the SIO demonstration.
- The Industry Partner shall provide NASA with proof of all permissions for the SIO flight demonstration by a date agreed to by both NASA and the Industry Partner. The permissions may include waivers, deviations, exemptions, experimental certifications, licenses, COAs, and spectrum approvals that are related to the use the UAS and any systems that support the UAS.
- The Industry Partner shall provide the necessary artifacts and analysis necessary to meet NASA’s airworthiness process.
- The Industry Partner shall invite NASA to key meetings with the FAA and any key airworthiness and safety reviews.

- The Industry Partner shall jointly craft a draft mishap press release with NASA prior to the start of flight activities.

The Industry Partner shall lead Mishap Investigations with NASA participation.

9.0 Documentation

The SIO activity is expected to include information exchange between Industry Partner and NASA. This section describes requirements for the documents that NASA expects from the Industry Partner in order to facilitate the exchange of information and support airworthiness approval. Several of the documents listed below are expected to align with standard systems engineering documents and/or documents required for airworthiness approval for the SIO flight demonstration and certification.

One goal of the SIO activity is to use information provided by the Industry Partners to create publicly available documentation that describes lessons learned from the certification process. In order to accomplish that goal, the Industry Partner shall provide a version of each deliverable that is unrestricted and may be publicly released. Additionally, the Industry Partner shall make all deliverable content that contains proprietary information available for review and comment at an Industry Partner site. For the purposes of this agreement, unrestricted information shall include information related to the concept of operations, safety assessment, and certification artifacts. Proprietary information may include, among other things, detailed engineering drawings, schematics, source code, software interfaces, and detailed software/system requirements.

Deliverable 1: The Industry Partner shall support a joint NASA/Industry Partner *Kick-off Meeting* that includes the following elements:

- Objectives and scope of SIO (NASA)
- SIO schedule (NASA)
- Project plan and schedule (Industry Partner)
- Requirements review and discussion (Industry Partner)
- Project risks (Industry Partner)
- Data management plan, including how any restricted information will be marked (Industry Partner)
- Coordination plan and procedures, including defining working group meetings, management meetings, and a change review board (Industry Partner)

The kick-off meeting materials prepared by the Industry Partner shall be provided to NASA and NASA will provide the kick-off meeting materials it prepares to the Industry Partner.

Deliverable 2: The Industry Partner shall develop and deliver monthly status reports. The monthly status reports shall include:

- Project status,

- Schedule update,
- Applicable financial information (planned versus actual monthly expenditures of funds directly applicable to this contract) exclusive of the Industry Partner's internal research and development (IRAD) expenditures, and
- Project risks.

Deliverable 3: The Industry Partner shall develop and deliver a *Mission ConOps* document. The document shall include:

- The ConOps for the end state of the commercializable mission
- The ConOps for the FY2020 SIO demonstration
- Operating environment(s)
- Procedures, including the following elements:
 - Roles and responsibilities
 - Interactions between the pilot in command and air traffic control
 - Interactions between the pilot in command and the UAS
 - Any other applicable roles and responsibilities
 - Lost-link procedures
 - Contingency procedures for other off-nominal events, such as an incapacitated ground control station, loss of propulsion, etc.
 - Control of multiple UAS from a single ground control station, if applicable
 - Handoffs between different ground control stations and pilots in command, if applicable
 - Any other procedures applicable to either the end state ConOps or the FY2020 demonstration ConOps
- The use of the DAA, and C2as integrated into the Industry Partner's SkyGuardian UAS.
- Any applicable operational restrictions or regulations to be waived
- Minimum equipment list
- UAS characteristics, including the size and weight of the UAS

Deliverable 4: The Industry Partner shall develop and deliver a *Risk-based Safety Assessment* document that includes a safety assessment, hazards, and mitigations. The safety assessment shall consider the operational environments described in the *Mission ConOps* document for both the end state ConOps and the FY2020 demonstration ConOps. The proposed mitigations can either be procedural or technological. Attachment 3 is an example of a Risk-based Safety Assessment produced by NASA. Additionally, the Society of Automotive Engineers (SAE) ARP4754, *Guidelines for Development of Civil Aircraft and Systems*, and ARP4761, *Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment*, can be used as guides when preparing the *Risk-based Safety Assessment* document. The risks and mitigations described in this document are expected to be used to support NASA's airworthiness process, obtaining

approval for the FY2020 demonstration in the NAS (e.g., a No Chase COA), and certification.

Deliverable 5: The Industry Partner shall develop and deliver a *Flight Demonstration Plan* and all supporting documentation necessary to meet the agreed upon airworthiness process.

Deliverable 6: The Industry Partner shall deliver a *Project Specific Certification Plan* that contains all elements described in Attachment 7. The *Project Specific Certification Plan* is expected to be the same as the plan that the Industry Partner should submit to the FAA.

Deliverable 7: In addition to the *Project Specific Certification Plan*, the Industry Partner shall provide NASA with any issue papers, special certificates, and any other certification artifacts produced under this agreement. NASA will review and comment on these certification artifacts to assist the Industry Partner in the certification efforts. NASA will also use these certification artifacts as when developing publicly available certification documentation.

Deliverable 8: The Industry Partner shall develop a *System Design Document*. The document will include:

- A high-level description of the C2 system design,
- A high-level description of the DAA system design,
- A description of the infrastructure requirements to support implementation of the C2 and DAA systems, and
- A description of the integration of DAA and C2, including a description of the components that are implemented in the ground control station and onboard the aircraft, and the communications link(s) used to transmit DAA information.

Deliverable 9: The Industry Partner shall develop and deliver a *System Test/Acceptance Plan* that includes the following elements:

- A description of the test requirements for all relevant UAS subsystems including, but not limited to, DAA and C2. The test requirements shall include:
 - Test cases and the test methodology (e.g., unit tests, simulation, flight test)
 - Evaluation criteria for all test cases
- A description of any integration tests, ground tests, or flight tests used to collect airworthiness and certification data
 - Test cases and the test methodology (e.g. simulation, ground test, flight test)
 - Evaluation criteria for all test cases

Deliverable 10: NASA plans to lead a collaborative effort to create a *Final Report* that summarizes the SIO activity and demonstrations. This report will include information from the Industry Partner, NASA and other industry partners participating in the SIO. To support the creation of this final report, the Industry Partner shall provide sections summarizing its contributions to SIO, including:

- Summary of work performed under SIO in support of the demonstration;
- Summary of any relevant data collected and analyzed;
- Certification progress and future certification plans;
- Any certification issues or lessons learned; and
- Future commercialization plans.

The precise scope of the *Final Report* will be determined collaboratively, but it is expected to be a 10 to 15 page conference paper with approximately 3 to 4 pages of content per each participating industry partner.

Deliverable 11: The Industry Partner shall provide graphics for NASA to use in publicly available publications and media articles/materials. These graphics may include photographs of Industry Partner's UAS and graphics depicting its ConOps for NASA to use in publicly available publications and media articles.