ANNEX
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER
AND
XWING, INC.
UNDER SPACE ACT UMBRELLA AGREEMENT NO. 37306 / SAA2-403718
(ANNEX NUMBER ONE)

ARTICLE 1. PURPOSE

This Annex One to the Nonreimbursable Space Act Umbrella Agreement SAA2-403718 (the "Umbrella Agreement") between Xwing, Inc. ("Xwing" or "Partner") and NASA Ames Research Center ("NASA or "NASA ARC") shall be for the purpose of enabling a collaborative activity between NASA System-Wide Safety (SWS) researchers and Xwing. Under this Annex, both Parties will be able to share critical safety flight and ground operations data and algorithms, evaluate safety arguments and safety management systems for increasingly-autonomous emerging aviation operations, and evaluate the risks of emerging Advanced Air Mobility operations. NASA SWS will provide information and open-source tools for the evaluation of algorithms and operational data, safety case analysis and assessment, safety management systems, and risk analysis and prognostics. Xwing will provide access to flight and ground operations data obtained from their operations in the National Airspace System (NAS), representative algorithms, and subject matter expertise on the design and execution of the systems.

This collaborative effort will also include frequent interaction between subject matter experts at NASA and Xwing to adjust best practices as necessary to develop an effective and robust demonstration of design safety assurance and safety management systems for increasingly-autonomous aerospace systems.

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

Each capitalized term used in this Annex, but not defined herein, shall have the meaning ascribed to it in the Umbrella Agreement.

ARTICLE 2. RESPONSIBILITIES

A. NASA ARC will use reasonable efforts to:

Year One:

1. Identify risks and hazards and evaluate safety arguments related to vision-based landing, in particular for runway detection and identification.

2. Review Xwing's concepts of operation and planned operational procedures as delivered and provide recommendations for safety monitoring, assessment, and mitigations as described in the NASA Aeronautics Research Mission Directorate (ARMD) Strategic Implementation Plan (SIP) Thrust 5.

Year Two:

1. Expand on knowledge gained during Year One toward vision-based landing, in particular by evaluating techniques and assurance processes related to aircraft localization and GPS augmentation.
2. Identify and evaluate techniques for the assurance of algorithms for centerline tracking during take-off roll, rollout after landing, and during taxiing.
3. Identify and evaluate techniques for object detection using cameras and LIDARs during ground operations of an aircraft.

Year Three:

1. Expand on knowledge gained during Year One and Year Two toward camera and LIDAR based object detection during ground taxiing.
2. Provide subject-matter expertise and access to NASA-released safety services, functions, and capabilities (SFCs) for in-time operational safety management systems.

B. Partner will use reasonable efforts to:

Year One:

1. Provide concept of operations and planned operational procedures for each planned flight and/or test as managed by Xwing.
2. Provide data (Regular Electro-Optical camera, Long Wave InfraRed camera, LIDAR) and relevant algorithms (that use a combination of neural networks and traditional methods) from these flights.

Years Two & Three:

1. Provide updated flight and operational data, algorithms, and safety assurance evidence from relevant flights and testing.
2. Provide subject matter expertise related to Xwing's algorithms, operations, and certification approaches.

ARTICLE 3. SCHEDULE AND MILESTONES

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

Milestone	Estimated Completion Date
Identify risks and hazards and evaluate safety arguments related to vision-based landing, in particular for runway detection and identification (NASA)	1 to 12 months after Effective Date
Provide concept of operations and planned operational procedures for each planned flight and/or test as managed by Xwing as well as provide data (Regular Electro-Optical camera, Long Wave InfraRed camera, LIDAR) and relevant algorithms (that use a combination of neural networks and traditional methods) from these flights (Partner)	1 to12 months after Effective Date
Review Xwing's concepts of operation and planned operational procedures as delivered and provide recommendations for safety monitoring, assessment, and mitigations (NASA)	1 to 12 months after Effective Date
Expand on knowledge gained during Year One toward vision-based landing, in particular by evaluating techniques and assurance processes related to aircraft localization and GPS augmentation (NASA)	12 to 24 months after Effective Date
Identify and evaluate techniques for the assurance of algorithms for centerline tracking during take-off roll, rollout after landing, and during taxiing as well as object detection using cameras and LIDARs during ground operations of an aircraft (NASA)	12 to 24 months after Effective Date
Provide updated flight and operational data, algorithms, and safety assurance evidence from relevant flights and testing (Partner)	12 to 36 months after Effective Date
Expand on knowledge gained during Year One and Year Two toward camera and LIDAR based object detection during ground taxiing (NASA)	12 to 36 months after Effective Date
Provide subject matter expertise related to Xwing's algorithms, operations, and certification approaches (Partner)	12 to 36 months after Effective Date
Provide subject-matter expertise and access to NASA-released safety SFCs for in-time operational safety management systems (NASA)	12 to 36 months after Effective Date

ARTICLE 4. FINANCIAL OBLIGATIONS

There will be no transfer of funds between the Parties under this Agreement and each Party will fund its own participation. All activities under or pursuant to this Agreement

are subject to the availability of funds, and no provision of this Agreement shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, (31 U.S.C. § 1341).

ARTICLE 5. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

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

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

1. Background Data:

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

2. Third Party Proprietary Data:

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

3. Controlled Government Data:

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

4. The following software and related Data will be provided to Partner under a separate Software Usage Agreement:

None.

ARTICLE 6. TERM OF ANNEX

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

ARTICLE 7. RIGHT TO TERMINATE

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

ARTICLE 8. POINTS OF CONTACT

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

Management Points of Contact

NASA Ames Research Center
Matt Holtrust
Agreement Manager
Mail Stop: 223-3, Room 100
Moffett Field, CA 94035
Phone: 650-604-4069
matthew.j.holtrust@nasa.gov

Xwing, Inc
Name: Jesse Kallman
Title: VP of Commercialization
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San Francisco, CA 94102-4480
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Technical Points of Contact

NASA Ames Research Center
Misty Davies
Senior Scientist
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misty.d.davies@nasa.gov

Xwing, Inc
Name: Maxime Gariel
Title: CTO
292 Ivy Street, Ste. A
San Francisco, CA 94102-4480
Phone: 415-375-3366
Email: maxime@xwing.com

ARTICLE 9. MODIFICATIONS

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

ARTICLE 10. SIGNATORY AUTHORITY

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

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AMES RESEARCH CENTER

BY: HUY TRAN Digitally signed by HUY TRAN Date: 2022.09.27 17:17:03 -07'00'

Huy K. Tran
Director of Aeronautics

DATE:

XWING, INC.

DocuSigned by: Jesse Kallman 333CCD661B9745D...

BY:

Name: Jesse Kallman
Title: V.P. Commercialization & Strategy

DATE: 9/21/2022