The Leader in Autonomous Aviation

Parker Vascik, Product Manager

2024 NETC AAM Regional Plan

For more about Xwing, visit us at www.xwing.com

1) Technology company developing autonomous flight

- FAA STC project for uncrewed Cessna Caravan
- Industry thought leadership in ML and AI
- Collaboration with FAA Chief Scientist on certification approach

2) Part 135 cargo-feeder airline:

- 34 aircraft serving UPS
- two Part 145 maintenance stations

OPERATING AUTONOMOUSLY SINCE 2021

| **270+** autonomous flights | **560+** flight hours | **525+** auto-landings | **50,000+** miles flown | **11** airports with automated missions |

PAID OPERATIONS FOR:
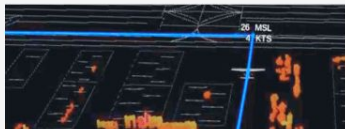
AGILE FLAG AIR COMBAT COMMAND · FEDERAL AVIATION ADMINISTRATION · NASA

Xwing's tech stack makes **any** aircraft autonomous through all stages of flight operations

Mission management system
Decision making engine

Detect and avoid
Hazard avoidance in air/on ground

Precision navigation
Landing without ground infrastructure

Communication
Secure and redundant

Mission Control Center
Ground-based flight supervision

Year	Event
2023	Xwing enters FAA certification program for uncrewed autonomous system
2022	Dual-use SBIR projects begin
2021	Joint development partnership with Textron
2021	Completes first fully autonomous gate-to-gate flight
2020	Start of UPS Partnership, piloted commercial cargo operations begin
2019	Xwing acquires first aircraft: Cessna Grand Caravan 208B
2018	Xwing and Bell partner to complete NASA UAS demo
2016	Xwing founded

Keeping humans involved to supervise and monitor

From the Mission Control Center, remote supervisors:

- Communicate with air traffic control and other aircraft

- Approve/modify the aircraft's proposed flight plan

- Allow the aircraft to progress through critical phases of flight

- Will have ability to supervise many aircraft at once

Keyboard   Mouse   Headset

Xwing leads the industry in developing certifiable autonomy technology

Relieve Pilot Shortage
One-to-many ops (like air traffic control), faster training, more diverse workforce, flexible schedule

Lower Operational Costs
Removes dominant cost factor

Increases network flexibility; increase asset utilization

Improve Safety & Security
Removes common pilot errors; decisions made 50 times per second

"Fly the Battery"
Increase vehicle range; increase battery and cycle life

OUR SHORT TERM GOALS :
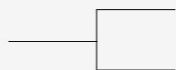
Certifying our autonomy stack with the FAA for commercial use

Advancing DoD deployment to fulfill military needs

- First AI Machine Learning Certification Project for a type certified UAS

- First PSCP to provide full certification map for Associated Elements and Uncrewed Aircraft

U0-CRT-00118	Xwing Uncrewed Aircraft Concept of Operations
U0-CRT-00114	Aircraft Functional Hazard Assessment for the Xwing Uncrewed Aircraft Modification on the Textron C208B Grand Caravan
U0-CRT-00117	Xwing Approach to Ground-Based AE: In support of ACO discussions and UAS PSCP submission
U0-CRT-00119	Autoflight System (AFS) Overview
U0-CRT-00120	Vehicle Management System (VMS) Overview
U0-CRT-00121	Mission Management System (MMS) Overview
U0-CRT-00122	Hazard Avoidance System (HAS) Overview
U0-CRT-00123	Onboard Communication System (OnCS) Overview
U0-CRT-00124	Command and Communication Associated Element Overview

PSCP for Xwing UA Modification on Textron Model 208B	Page 1 of 108
Revision: - Release Date: 03/13/23	Document No. U0-CRT-00115

XWING

Project Specific Certification Plan
for the Xwing Uncrewed Aircraft Modification
on the Textron Model 208B

FAA Project No: TBD

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Name	Title/Role	Signature	Date
Arthur Dubois	Sr. Director of Engineering/ Author	*Arthur Dubois* Arthur Dubois (Mar 13, 2023 07:43 PDT)	3/13/23
Anna Dietrich	Regulatory Lead/ Checker	Anna Dietrich (Mar 13, 2023 07:45 PDT)	3/13/23
Frances Louie	Director of Certification/ Approver	Frances Louie (Mar 13, 2023 07:48 PDT)	3/13/23

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- Xwing is **not avoiding compliance** for any current regulations.

- Using proven reliable **Type Certificated aircraft**

- All initial operations are **IFR within an existing Part 135** air carrier

- Xwing has **mapped all current regulations** to parts of our Unmanned Aircraft System

- Certification approach is to **"shrink the change"** in other words limit as much as possible the regulations that will require an alternative means of compliance through an FAA Part 11 exemption

- Xwing is **mitigating all major and above hazards at the aircraft level** and departing only with an IFR "clearance" to destination to limit the safety concerns of loss link

Cargo and Defense are first, leading the way for broader adoption of autonomy

The Cessna Caravan is our first application

Fastest way to FAA Certification
Modifying an existing, well-known aircraft is the best way to derisk certification

Lowest risk for regulatory approval
Working within the existing rules and minimizing alternate means of compliance

An FAA certified autonomous aircraft requires an FAA certified airline to operate it
Xwing owns and operates a cargo feeder airline in the UPS network

Proven product-market fit
There is a high demand in both cargo industry and DoD

"It was the quality of the technology, pragmatic approach to compliance, and commitment to safety that drew me to Xwing."

**Earl Lawrence**
Chief Compliance and Quality Officer
Former FAA Executive Director
Aircraft Certification

Demonstrated Capability.

- "The first Air Force autonomous logistics mission"
- Multiple mission-relevant cargo deliveries
- 2,835 autonomous flight miles over several days
- Both military bases and civilian airports
- Night ops, sloped runways, congested airspace
- Autoland at 6 airports including 5 new
  - 3 of the new airports had no infrastructure, no prior survey, no preparation.

Agile Flag '24 | Jan. 26 – Feb.1, 2024
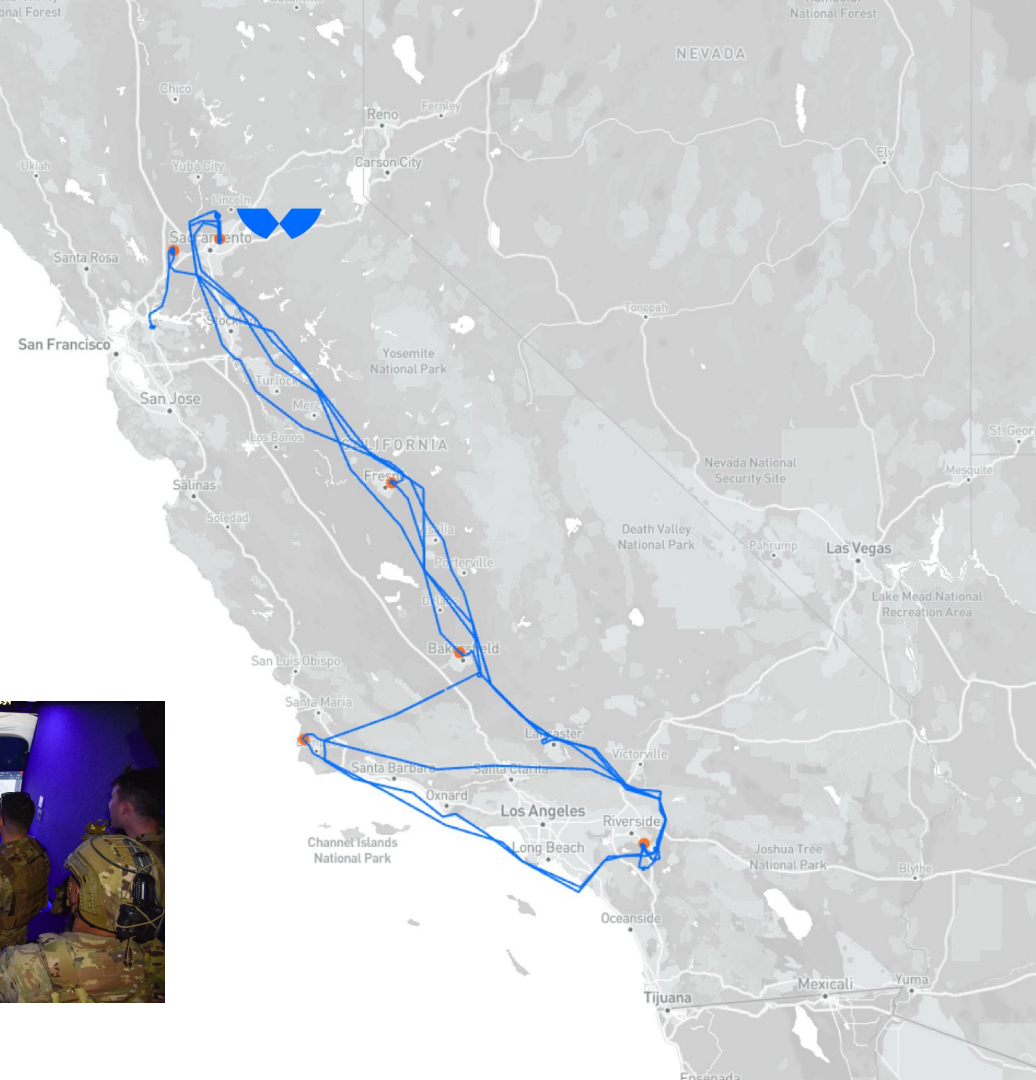
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Questions?

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