



**DUBAI WORLD CONGRESS**

***SELF-DRIVING  
TRANSPORT***



**J. SCOTT DRENNAN  
VP – INNOVATION**

# Innovation

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*Innovation = Creative Ideation + Disciplined Execution*

Incremental and Generational

or

Radical

*Smartly and fearlessly depart from past practices and principles in pursuit of novel and coveted technologies, vehicle configurations and missions.*

# STRATEGIC TECHNOLOGIES

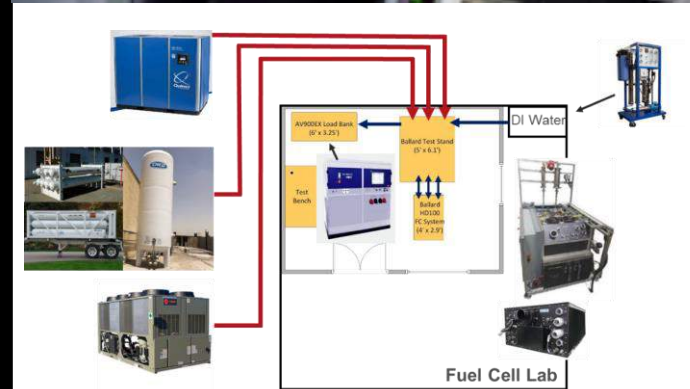
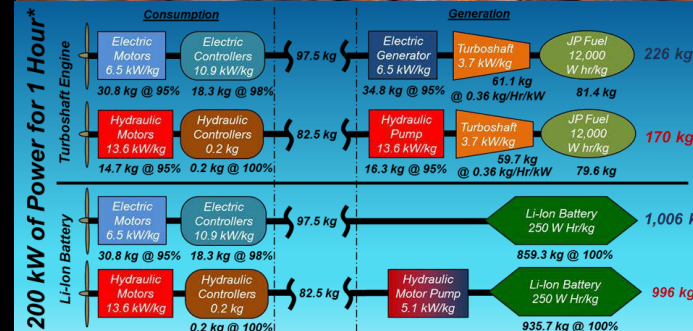
## High-Speed, Long-Range VTOL

### Advanced Flight Controls

### Autonomy

### Alternate Propulsion

### Generic Test Cells





# STRATEGIC ENABLERS

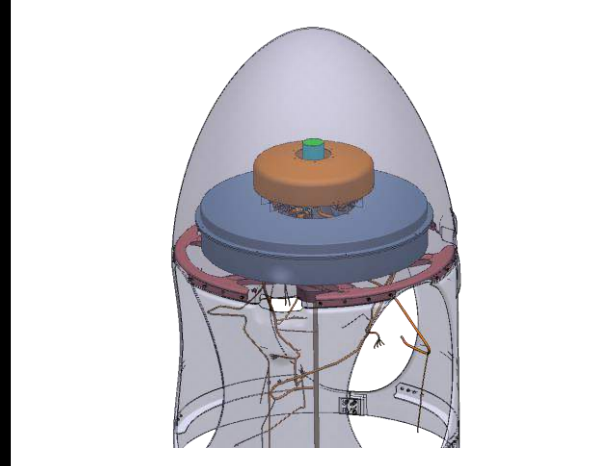
Unmanned Aerial Systems

Sensors, Big Data & AI

Energy Management

Advanced Manufacturing

Rapid Prototyping & Demo



# Intelligent Vehicle Introduction

## Purpose

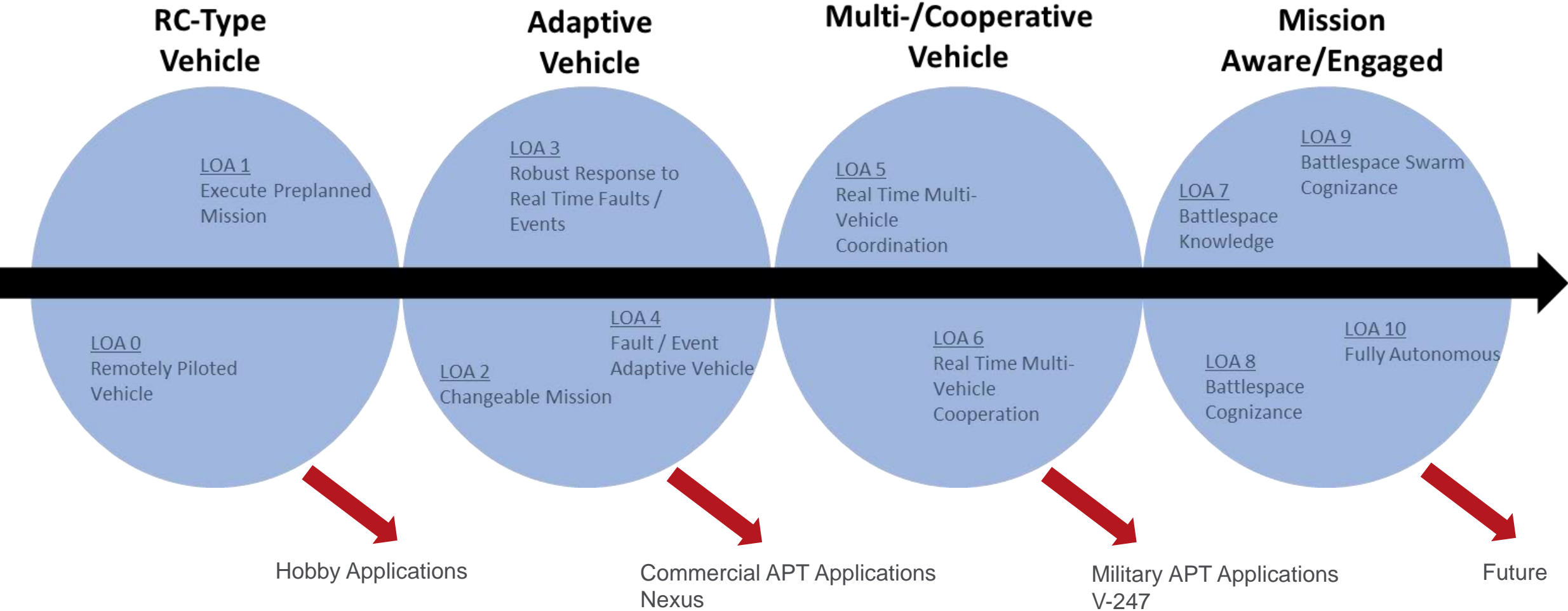
Position Bell as the technology leader for intelligent vertical lift solutions in both manned and unmanned applications.

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## Technology Thrust Areas

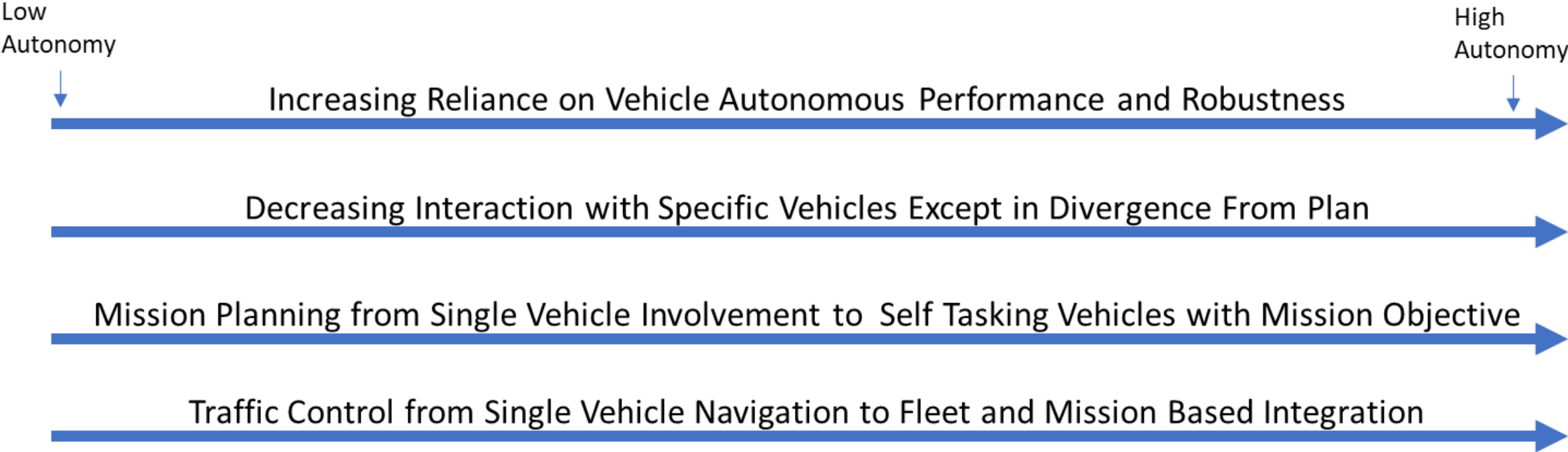
- **Autonomy**  
Robust and adaptive vehicles characterized by on-board and cooperative decision making
- **Cybersecurity**  
Physically and electronically secure vehicles and operation
- **Artificial Intelligence / Machine Learning**  
Automated decision making based on training and learning to augment human involvement
- **Human-Machine Collaboration**  
Collaborative and cooperative teaming that enhances mission capability and human effectiveness

# Autonomy, AI and Humans

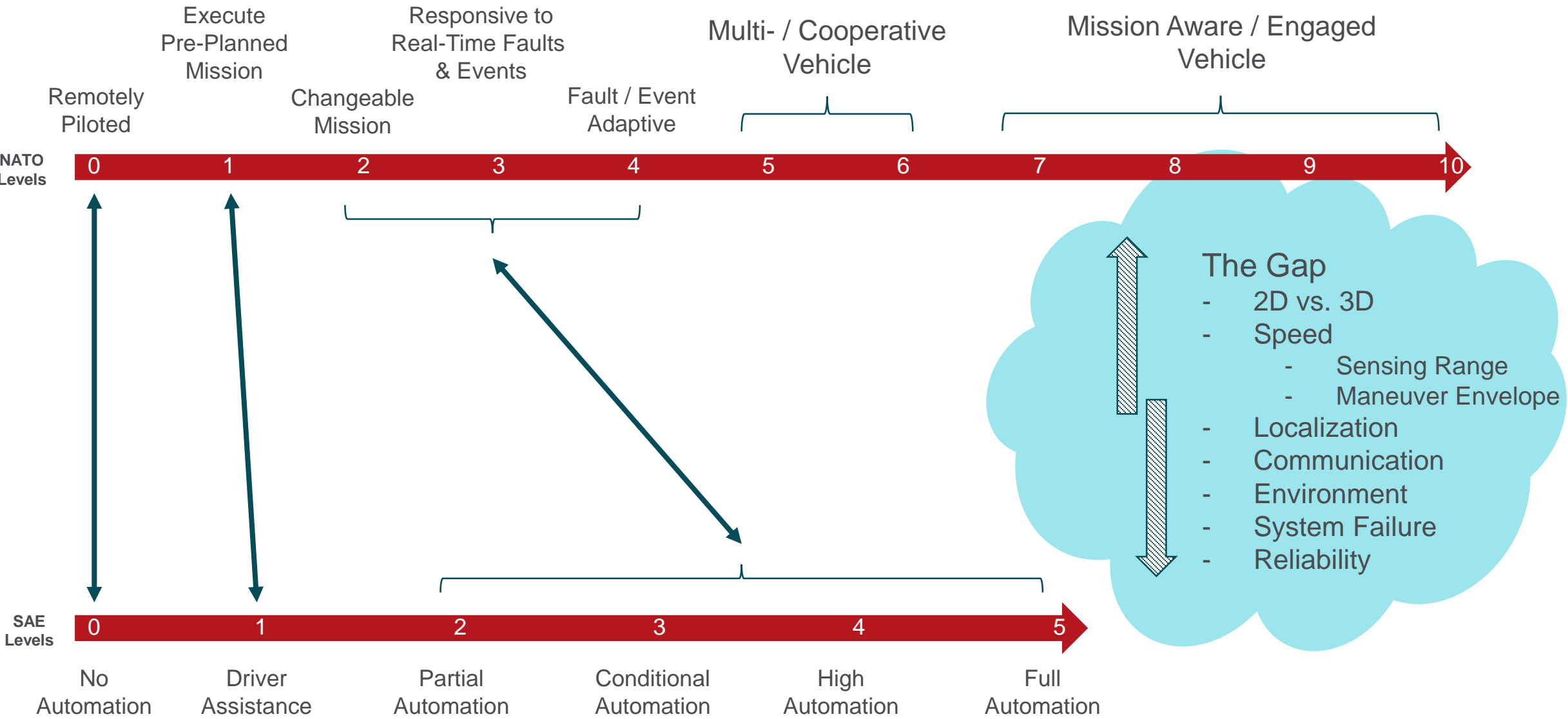




# General Characteristics of Human Interaction in Autonomy



# Controls & Autonomy – Key Differences Between Air and Ground





# CONVERGING TRENDS

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URBANIZATION



SHARED ECONOMY



INSTANT GRATIFICATION

# CONVERGING TRENDS

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ELECTRIC



HYBRID PROPULSION



DISTRIBUTED PROPULSION



CONTROL AUTONOMY



ARTIFICIAL INTELLIGENCE

# ON DEMAND MOBILITY

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## ON DEMAND

As soon as or whenever required

## Mobility

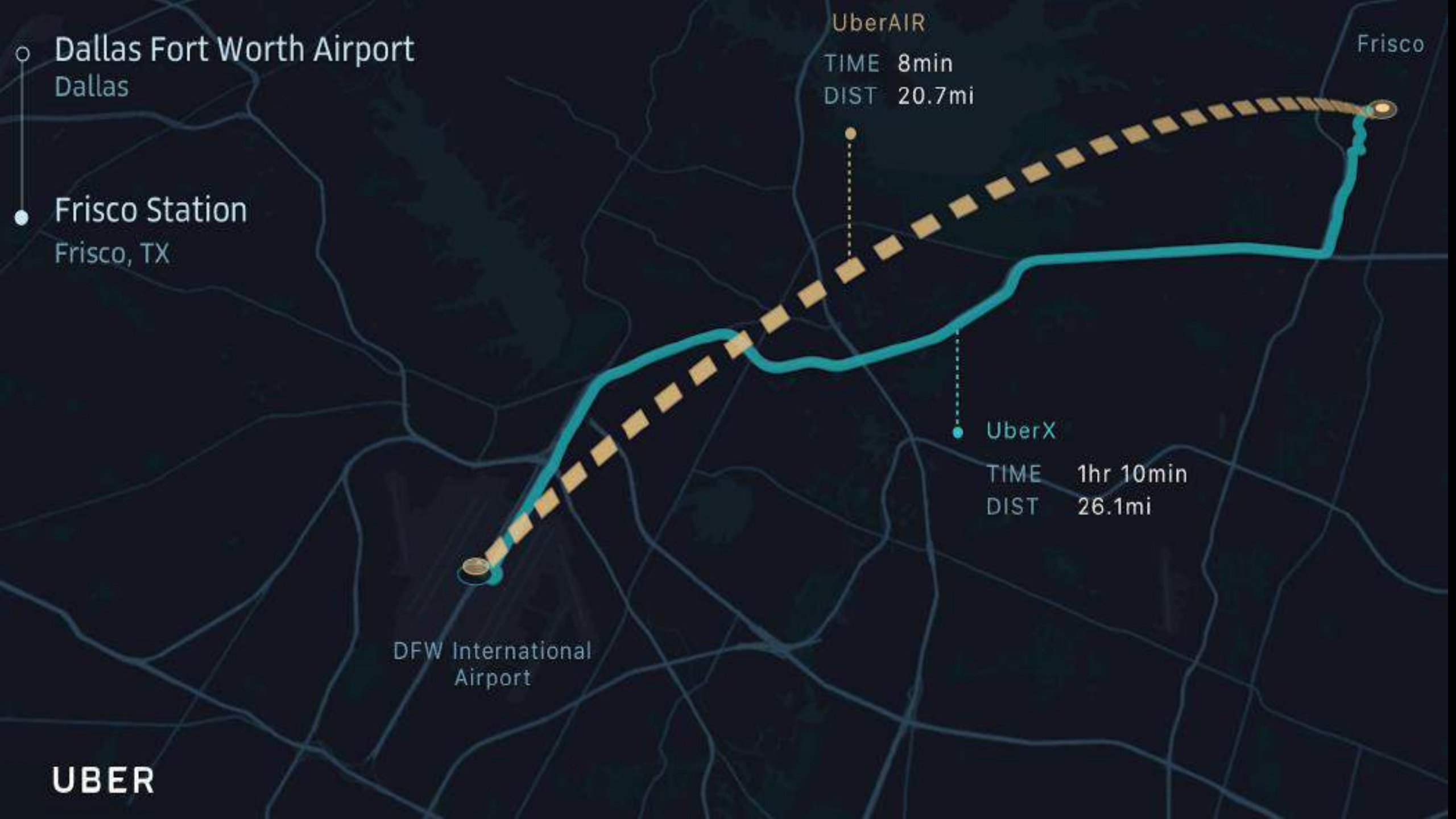
(1)

The ability to move or be moved freely and easily.

(2)

The ability to move between different levels in society or employment.





Dallas Fort Worth Airport  
Dallas

Frisco Station  
Frisco, TX

UberAIR  
TIME 8min  
DIST 20.7mi

Frisco

DFW International  
Airport

UberX  
TIME 1hr 10min  
DIST 26.1mi

UBER

# AIR TAXIS



## GLOBAL RIDE-HAILING

\$36B in 2016  
GROWING TO  
\$285B by 2030

(Goldman Sachs)

## URBAN AIR MOBILITY

750 million  
passenger trips  
ANNUALLY IN  
15 major US cities  
BY 2030

(NASA)

## AIR TAXI AIRCRAFT

900 – 1,500  
required by 2025

GLOBALLY

(Uber)

9,000 – 12,000  
required by 2035

GLOBALLY

(Uber)

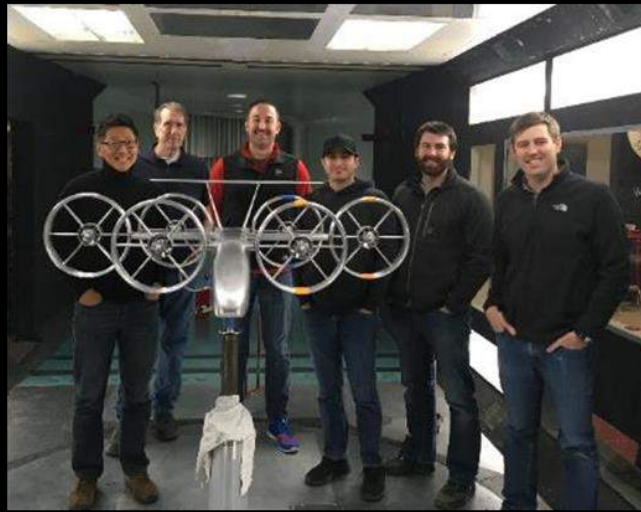








## Performance Testing



## Mfg/Process Verification





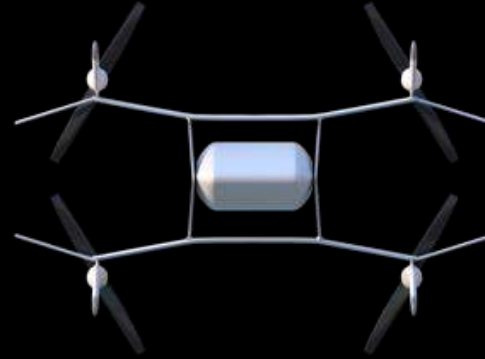
# LOGISTICS

## Package Logistics Opportunities **Beyond the Last Mile**





# LOGISTICS & DATA CAPTURE



## GLOBAL 3PL

\$802B in 2016

GROWING TO

\$1 trillion by 2020

(Armstrong & Associates)

## UAS PACKAGE DELIVERIES

500 million

ANNUALLY IN

15 major US cities

BY 2030

(NASA)

## DELIVERY DRONES

250,000

IN THE US

required by 2025

(McKinsey)

650K – 1.5M

10% –20% YoY GROWTH

required by 2035









SCALABLE

ADAPTABLE

VERSATILE





N314PC  
EXPERIMENTAL



## Performance Testing



UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION SPECIAL AIRWORTHINESS CERTIFICATE			
CATEGORY/DESIGNATION Experimental			
PURPOSE Research and Development			
MANU-FACTURER	NAME	N/A	
	ADDRESS	N/A	
FLIGHT	FROM	N/A	
	TO	N/A	
N 314PC	MODEL	APT70	SERIAL NO. 001
BUILDER	Boi	DATE OF ISSUANCE	04 Feb 2010
Unless sooner suspended, suspended, revoked, or the termination date of <b>04 Aug 2019</b> , this airworthiness certificate is effective under the conditions prescribed in 14 CFR, Part 21, Section 21.181 et 21.217.			
SIGNATURE OF FAA REPRESENTATIVE		DESIGNATION OR OFFICE NO.	
 Scott W. Moore		AIR-882	
<small>This airworthiness certificate is issued under the authority of Title 49, United States Code, § 1059 and Title 14 Code of Federal Regulations. Any alteration, repair or modification to a product covered by this certificate may be prohibited by certificate provisions, §§. 21.181 and 21.217. This portion of the certificate must be displayed in the aircraft in the applicable regulations.</small>			

## Mfg/Process Verification





# NASA Systems Integration and Operationalization (SIO)

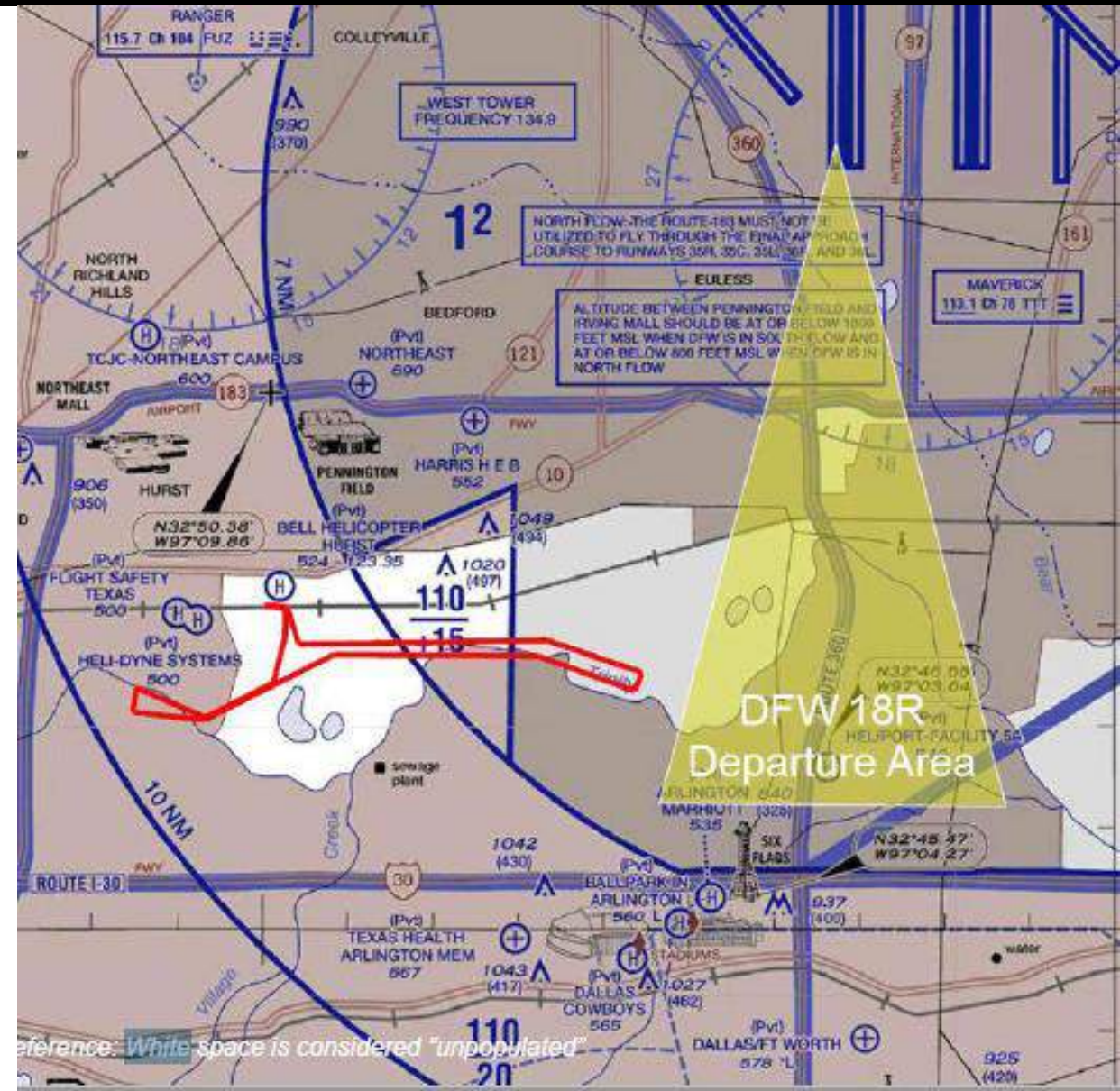
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## Objective:

- APT-70: 300+ lbs MTOGW w/ 70 lbs payload
- Demo commercial mission in the NAS
- Advance the tech for autonomous BVLOS
- Ops over people in urban environments
- Controlled Airspace

## Missions:

- Urban Critical Medical Transport
- Offshore Cargo Transport
- Disaster Relief









An aerial, top-down view of a dense urban landscape, likely a city center, with numerous high-rise buildings and skyscrapers. The entire image is overlaid with a dark teal or cyan color cast, giving it a monochromatic, futuristic feel. The buildings are packed closely together, and the perspective is from directly above, showing the tops of the structures and the intricate patterns of the city's layout.

**Thank You**