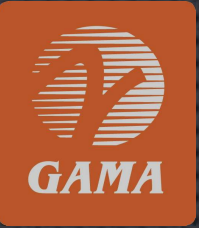




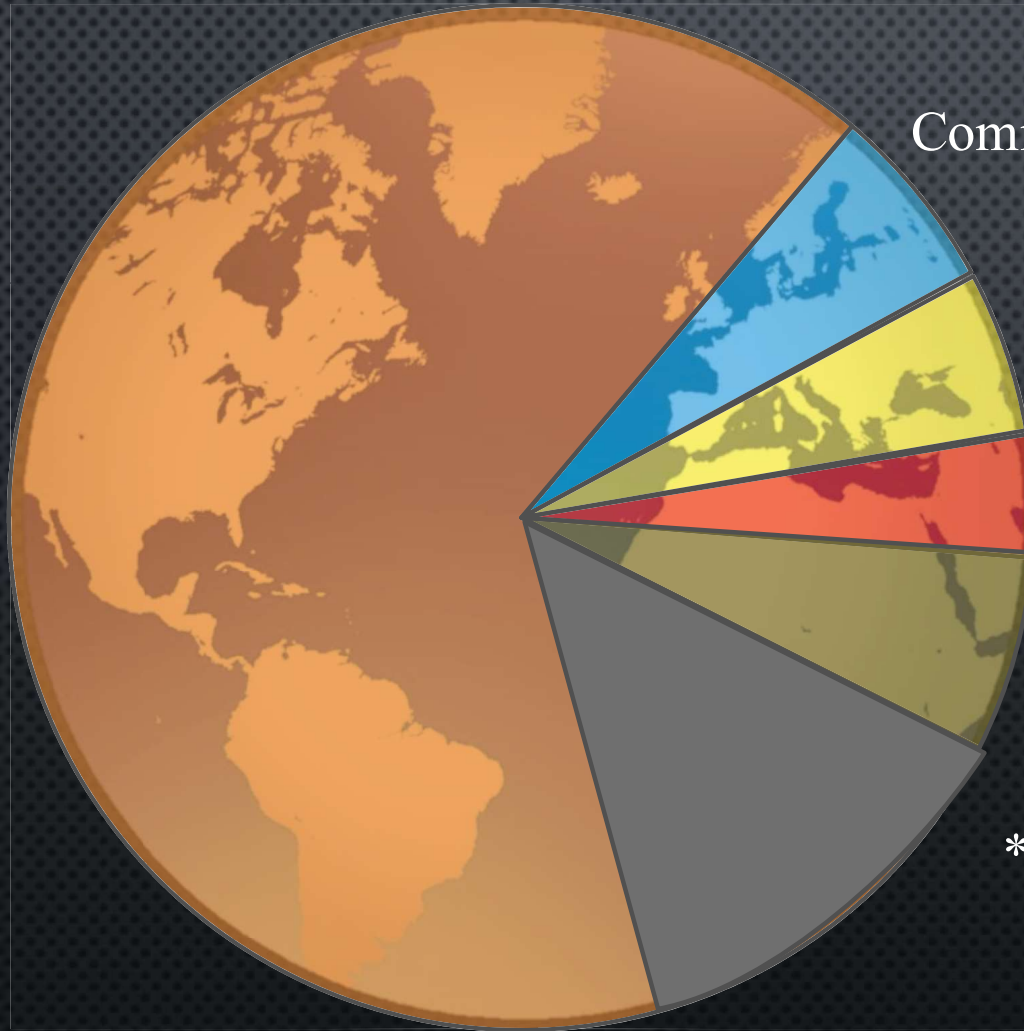
EMERGING TECHNOLOGIES IN BUSINESS AND GENERAL AVIATION

GLOBAL CIVIL TYPE CERTIFICATE AIRCRAFT

POPULATION \approx 334,000



Piston Planes \approx
265,000
2017: +6.5%



Commercial Airliners \approx 19,000



Business Jets \approx 17,000
2017: +1.3%



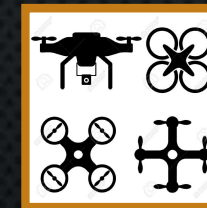
Turboprops \approx 12,500
2017: -3.3%



Rotorcraft \approx 20,500
2017: +1.4%



*Registered UAS \approx
1,200,000



GLOBAL GENERAL AVIATION DISTRIBUTION



North America = 60%

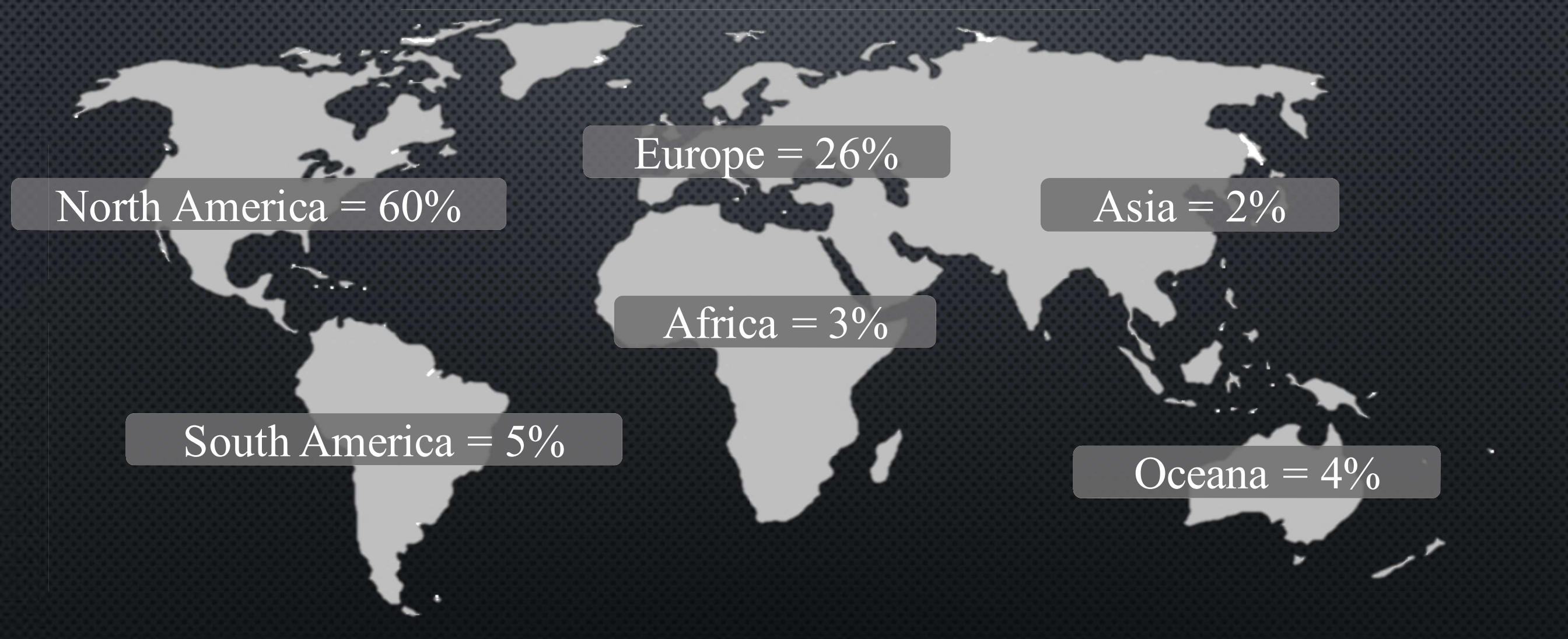
Europe = 26%

Asia = 2%

Africa = 3%

South America = 5%

Oceania = 4%





TRANSFORMATIONAL MANUFACTURING TECHNIQUES

MANUFACTURING



MANUFACTURING



ADDITIVE MANUFACTURING: MAKING HEADLINES



CW
CompositesWorld

Blog Zones Magazine Sourcebook Podcast Products News

Airbus expands use of additive manufacturing

UTC Aerospace Working Vigorously on Additive Metal Parts

Expects to qualify 20 to 30 non-engine parts in two to three years.

Lockheed Martin invests in metal powder atomization

\$5 million for Ottawa, Canada-based Equispheres to accelerate growth in additive manufacturing technologies.

June 4, 2018
Edited by Eric Brothers

[f](#) [t](#) [G+](#) [in](#) [e](#) [SU](#)

INTELLIGENT **AEROSPACE**
GLOBAL AEROSPACE TECHNOLOGY NETWORK

HOME MARKETS TOPICS DEPARTMENTS WEBCASTS

COMMERCIAL MILITARY AVIONICS ATC/ATM HELICOPTER

Home » News » Boeing accelerates, secures additive manufacturing with Asembrix cloud-based software technology

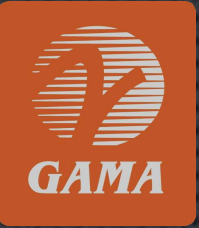
Boeing accelerates, secures additive manufacturing with Asembrix cloud-based software technology

MRO-Network.com Connecting the global MRO community

GE Expects Additive Metal To Transform Aerospace New-Make And Aftermarket

Henry Canaday | MRO Network Mar 19, 2018

One-Third of GE Aviation's New Turboprop Engine Will Consist of 3D Printed Metal Components



MILITARY TECHNOLOGY
TRANSFORMING CIVIL
AVIATION





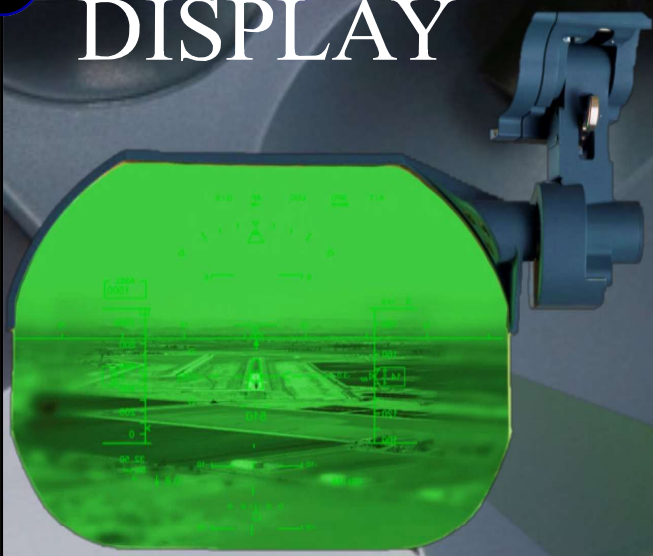
COMMERCIAL AVIONICS

Elbit Systems™





HEAD MOUNTED DISPLAY

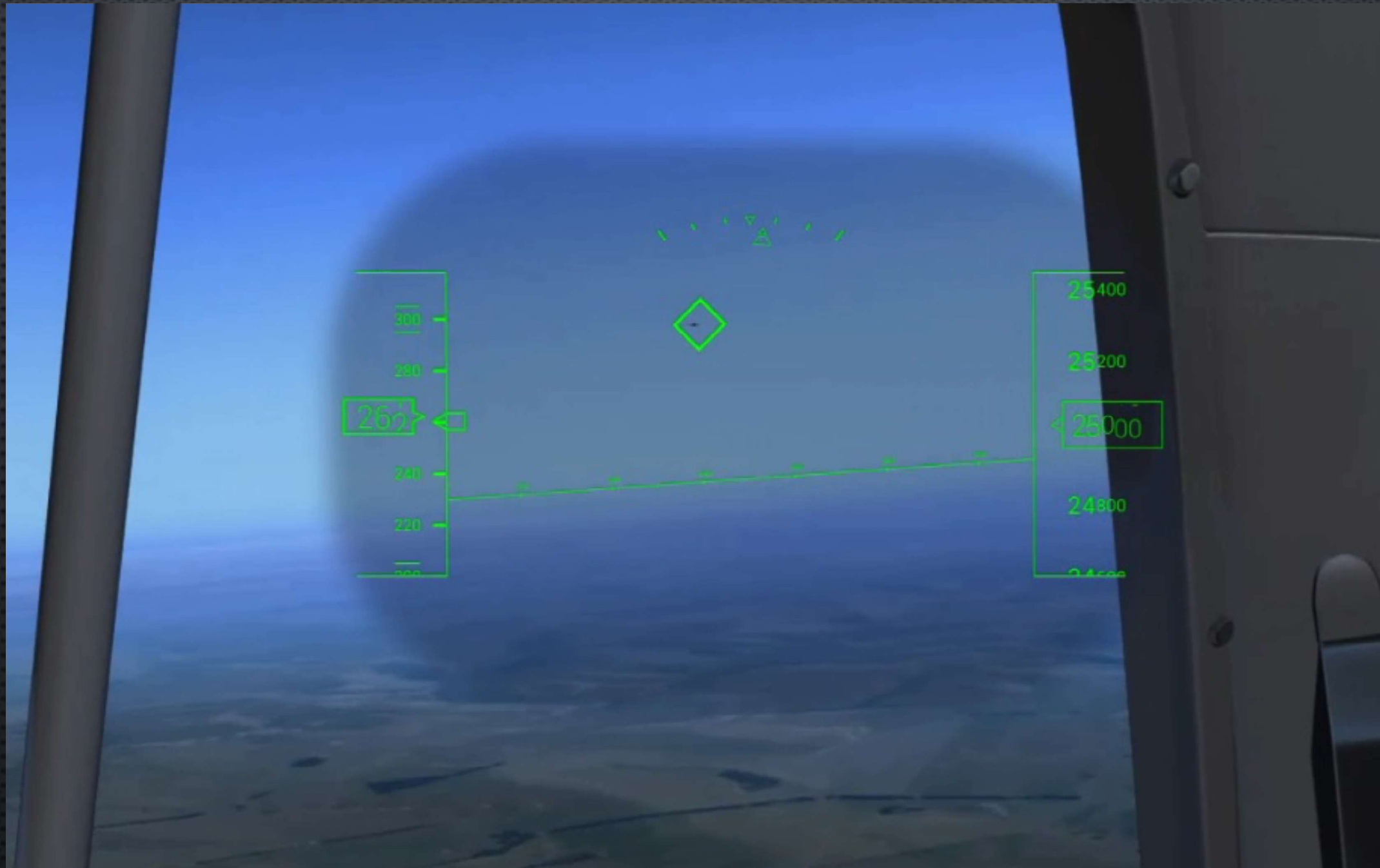


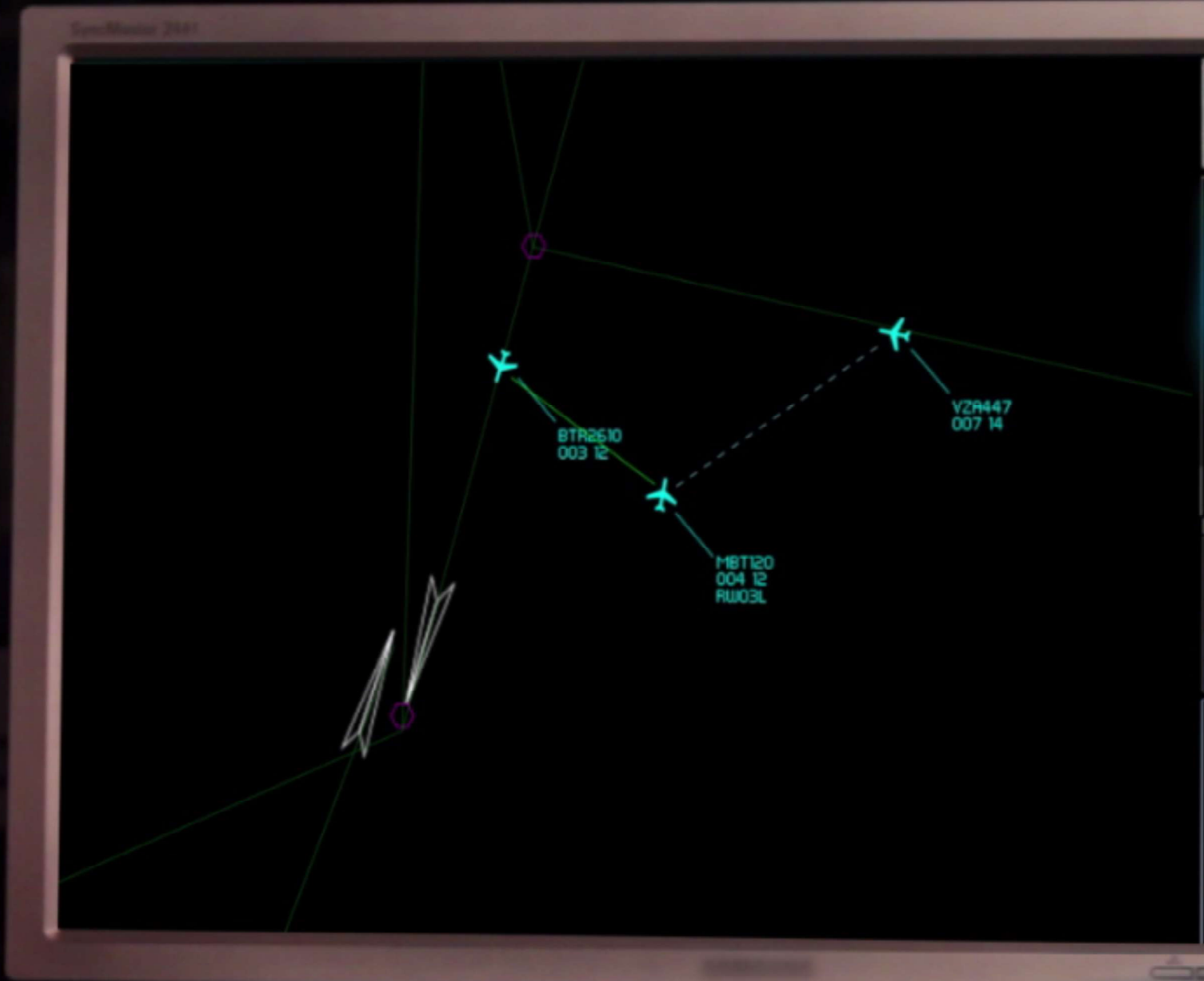
> New Disruptive Technology

> Easy Installation and cost effective solution to support:

- Air Transport and Airlines
- Small/Medium Business Jets
- Helicopters







MODE
001
002

MODE
001
002

MODE SETTINGS

ZOOM OUT	CNTR	Y
ZOOM IN		RES
COMP	REDS IS NR	TERR
APT 1	VOR 1	LOW AWY 1
ILS	NOB	FIX

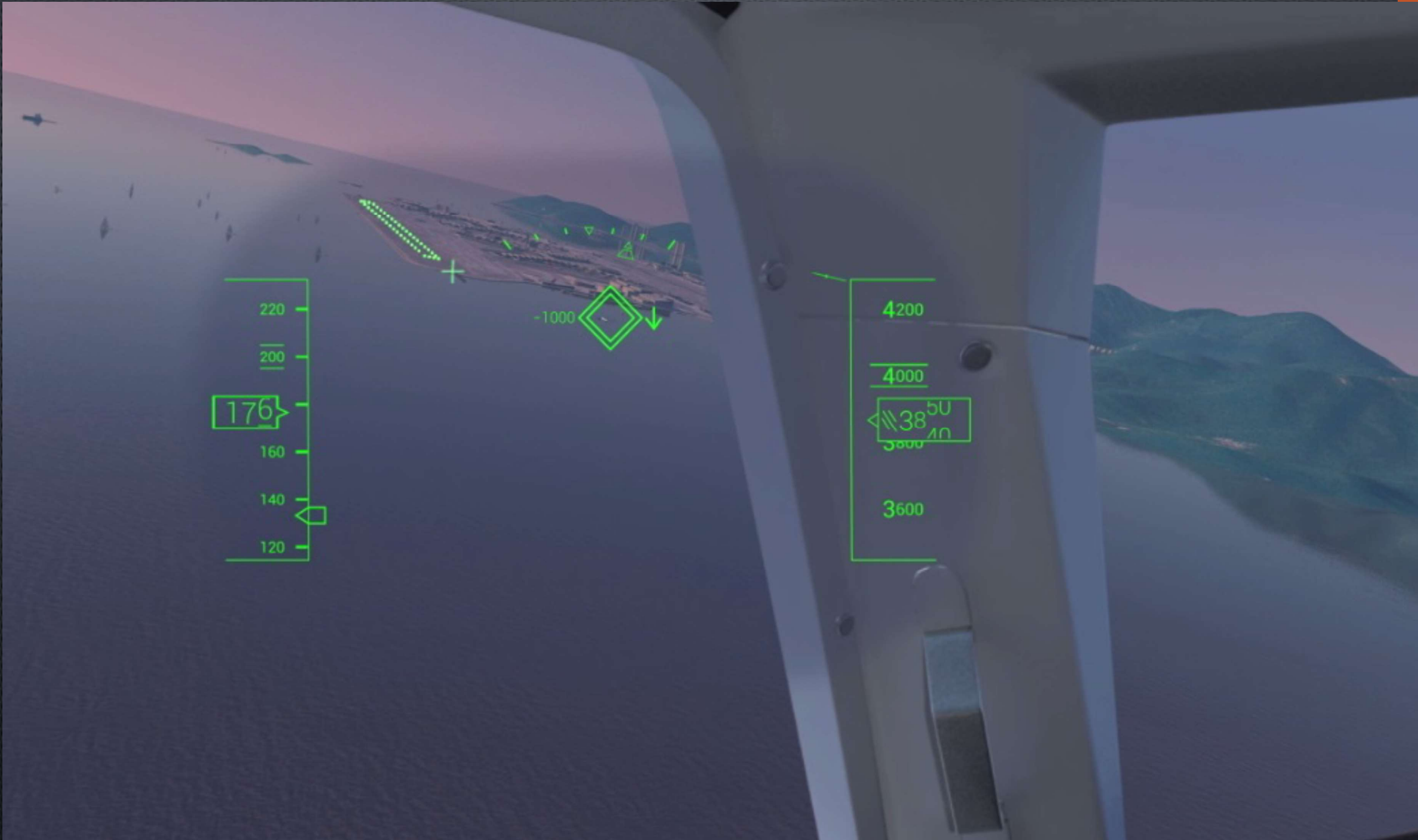
COMMUNICATIONS

122.95	119.0
TX	RCV

FREQUENCIES FOR ...

- APPROACH
- APPROACH
- APPROACH
- APPROACH
- ATIS
- CLEARANCE
- CLEARANCE
- DEPART





MGF HUD – MARKET FOCUS



STRONG INTEREST SEEN ACROSS A WIDE SPECTRUM OF THE INDUSTRY

PART 23 OPERATORS

LARGE FLEET OPERATORS OF SINGLE PILOT, MISSION CRITICAL FLIGHTS IN CHALLENGING CONDITIONS FLYING AIRCRAFT SUCH AS THE CESSNA 208 CARAVAN, PILATUS, & KING AIR



FIREFIGHTERS AND AGRICULTURE SPRAYING OPERATORS LOOKING TO KEEP EYES OUTSIDE THE AIRCRAFT LOW-LEVEL FLIGHT OPERATIONS.



SINGLE PILOT OPERATORS OF HIGH END SINGLES LIKE A CIRRUS, TURBO-PROP & LIGHT JETS



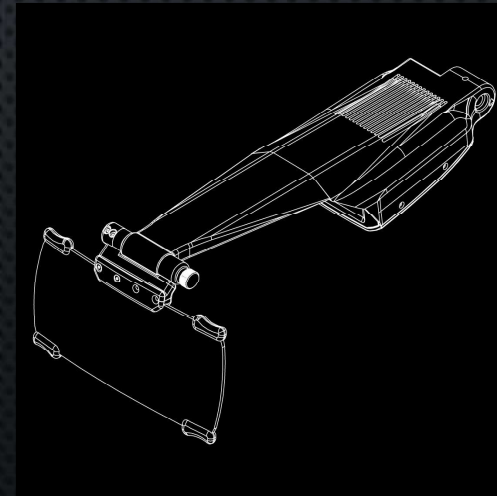
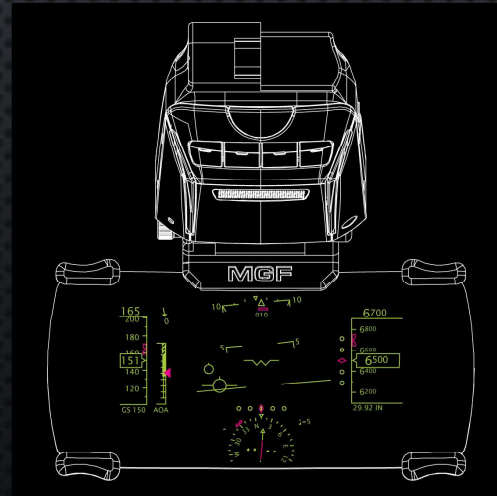
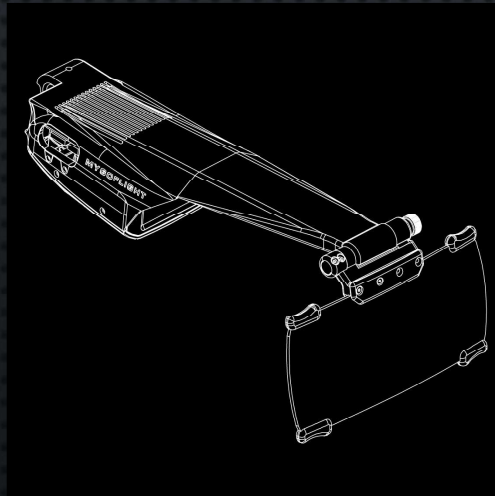
EXISTING AVIONICS MANUFACTURERS ESTABLISHED AVIONICS VENDORS LOOKING FOR WAYS TO ADD ADDITIONAL VALUE

- ASPEN AVIONICS
- AVIDYNE

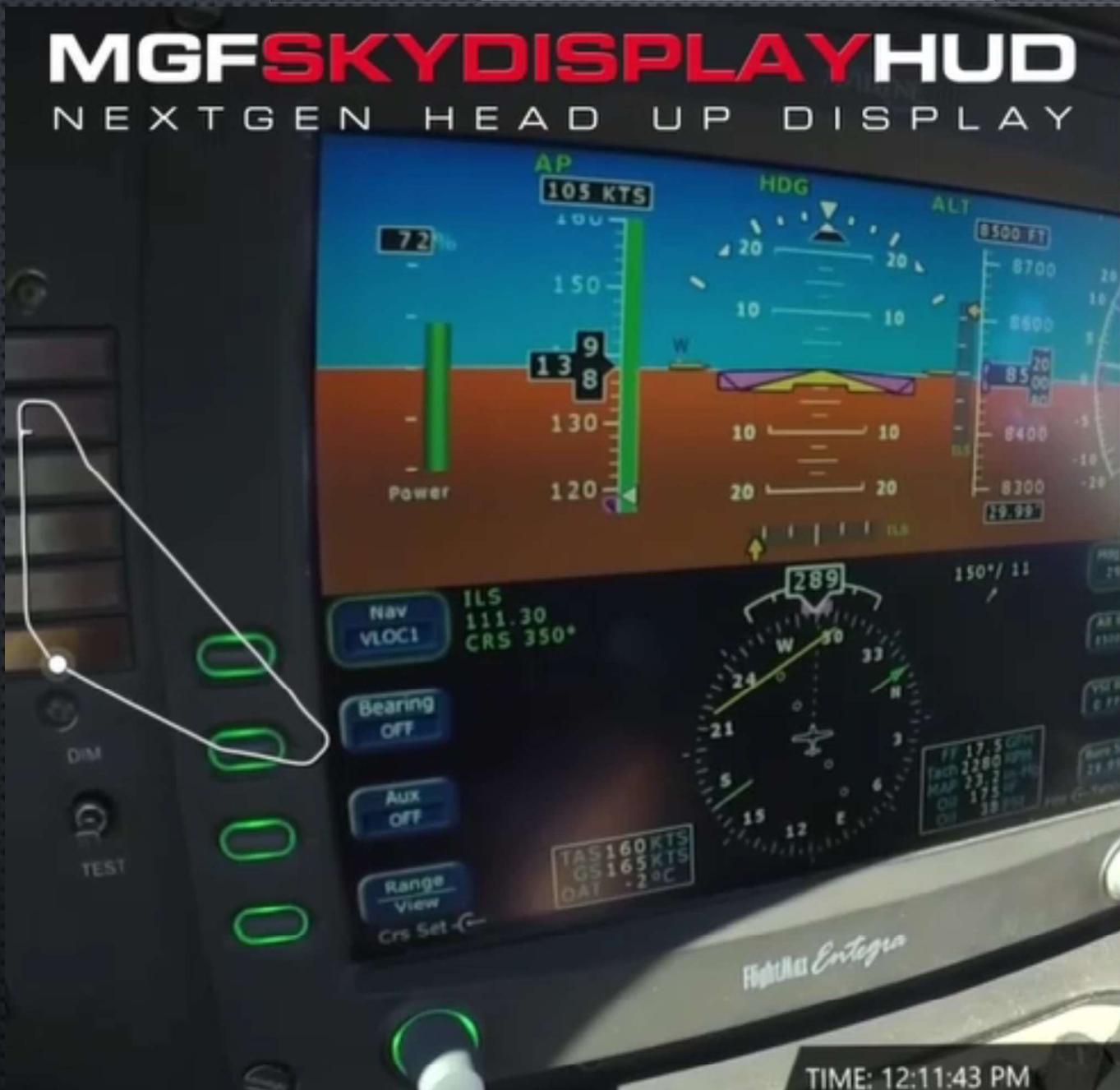
MGF SKYDISPLAY HUD



FULL COLOR DISPLAY, AIRCRAFT GRADE ALUMINUM HOUSING & ADJUSTABLE MOUNTING SYSTEM



MGF SKYDISPLAY HUD IN FLIGHT



DISRUPTIVE CHANGE



Easter morning 1900: 5th Ave, New York City. Spot the automobile.



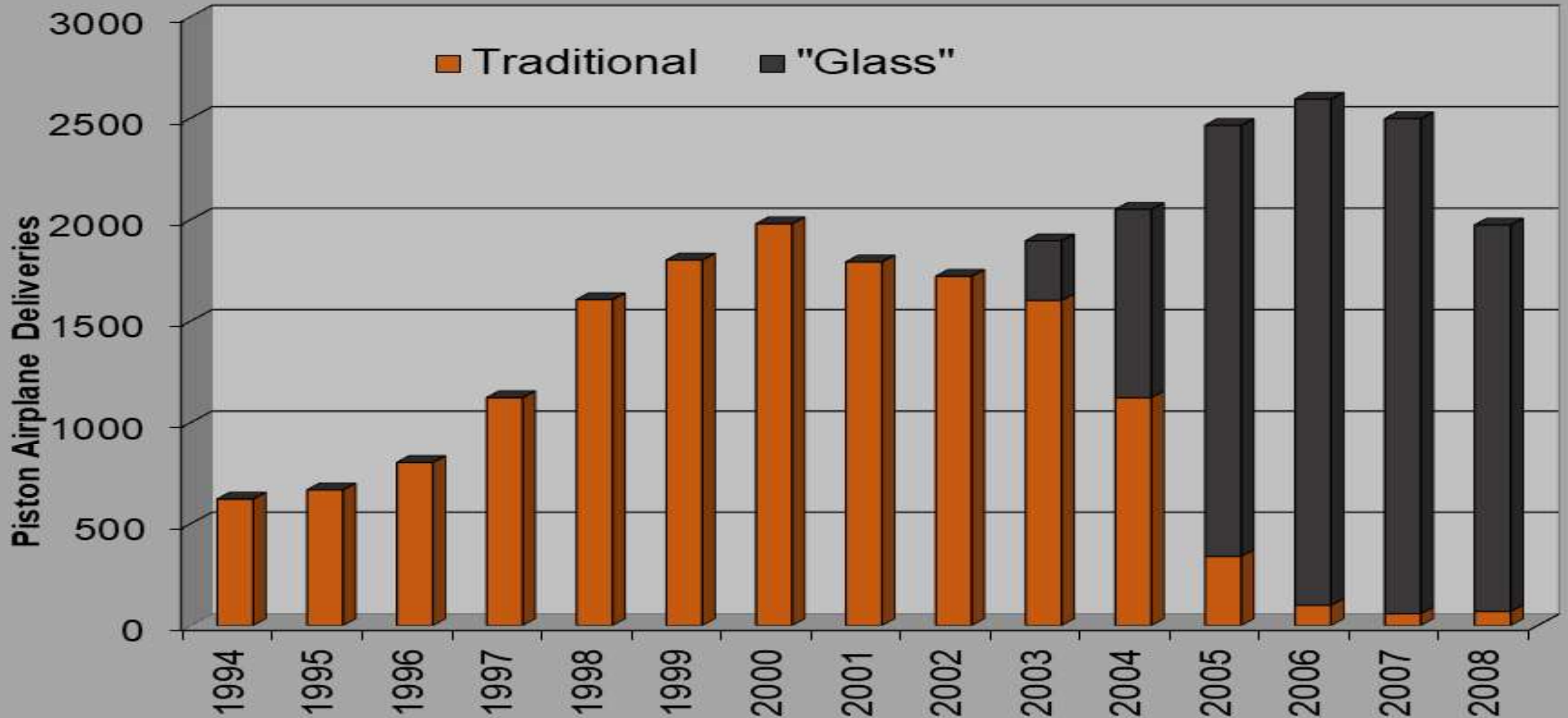
Source: US National Archives.

Easter morning 1913: 5th Ave, New York City. Spot the horse.

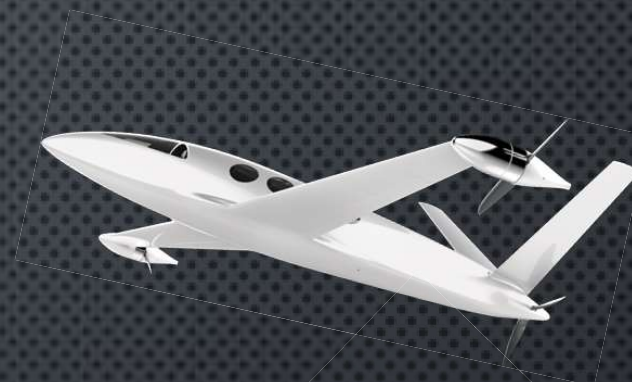


Source: George Grantham Bain Collection.

DISRUPTIVE CHANGE IN GENERAL AVIATION



HYBRID & ELECTRIC AIRCRAFT



PIPISTREL ALPHA ELECTRO FLIGHT - SLOVENIA



LIAONING GENERAL AVIATION COMPANY CHINA ELECTRIC AIRCRAFT MAIDEN FLIGHT – NOV. 2017



BYE AEROSPACE SUN FLYER 2 = U.S.



Forbes

Hybrid-Electric Passenger Jet Gets 100-Plane Launch Order From JetSuite



Evation secures funding for all-electric Alice

08 JANUARY, 2019 | SOURCE: FLIGHT INTERNATIONAL | BY: KATE SANSFIELD | LONDON



X-57 MAXWELL: DISTRIBUTED ELECTRIC PROPULSION



NASA'S QUIRKY BUT COOL X 57 (A.K.A MAXWELL)

14 MOTORS ON SKINNY WINGS

Top 2 are for cruising

12 smaller motors give more air over the wing for lift during take off

Powered only by batteries

Expected speed: 175 miles per hour

WHAT THIS INNOVATIVE PLANE DESIGN WILL DO

Reduce fuel emissions and noise

Reduce overall operational costs for small aircraft by **40 %**

TOI FOR MORE INFOGRAPHICS DOWNLOAD TIMES OF INDIA APP

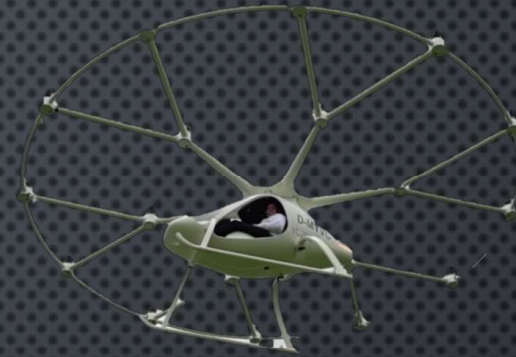
Available on the App Store

Google play

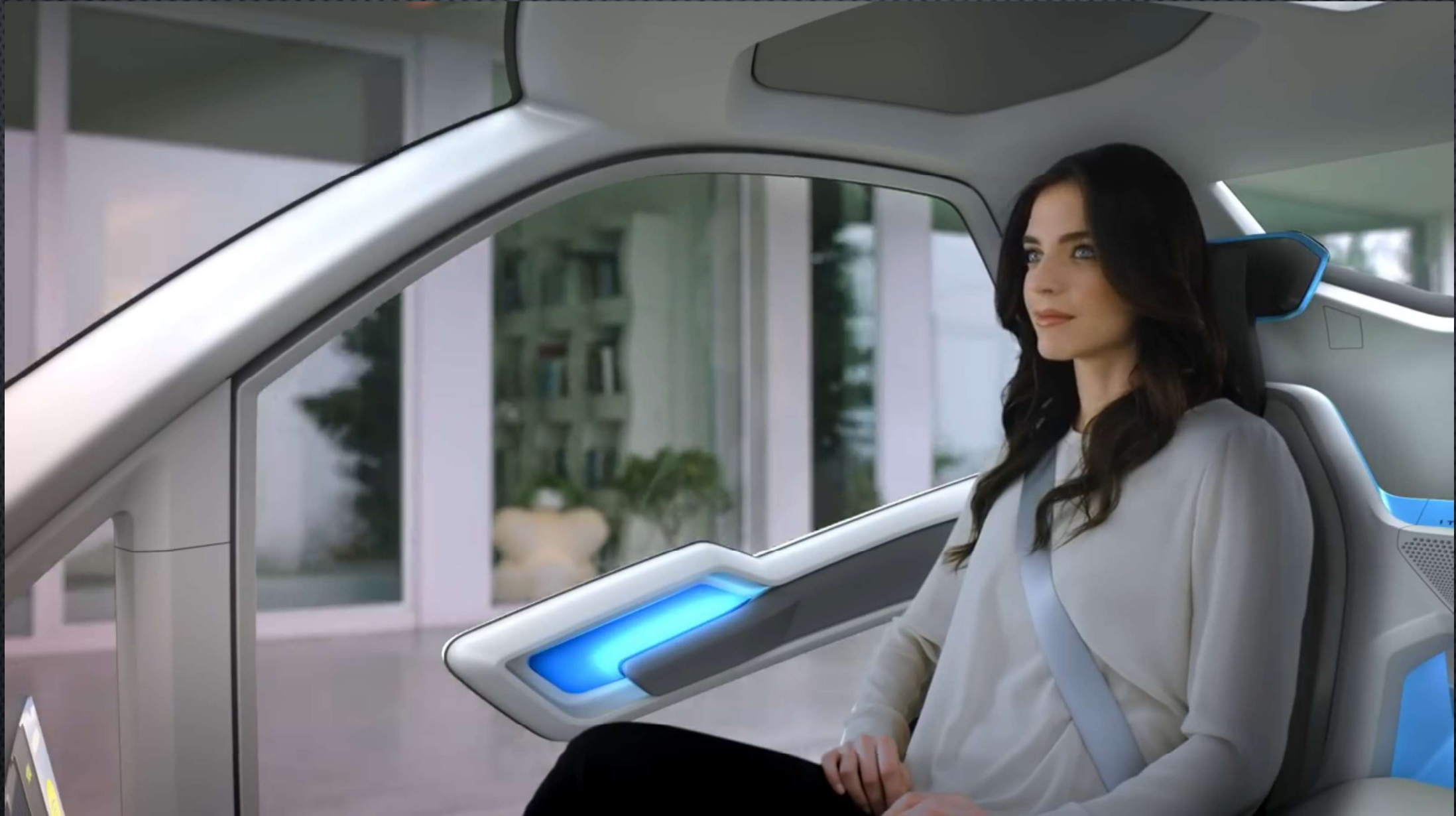
Available on the Google Play Store



eVTOL



AIRBUS 'POP.UP.' CONCEPT: MARCH 2017



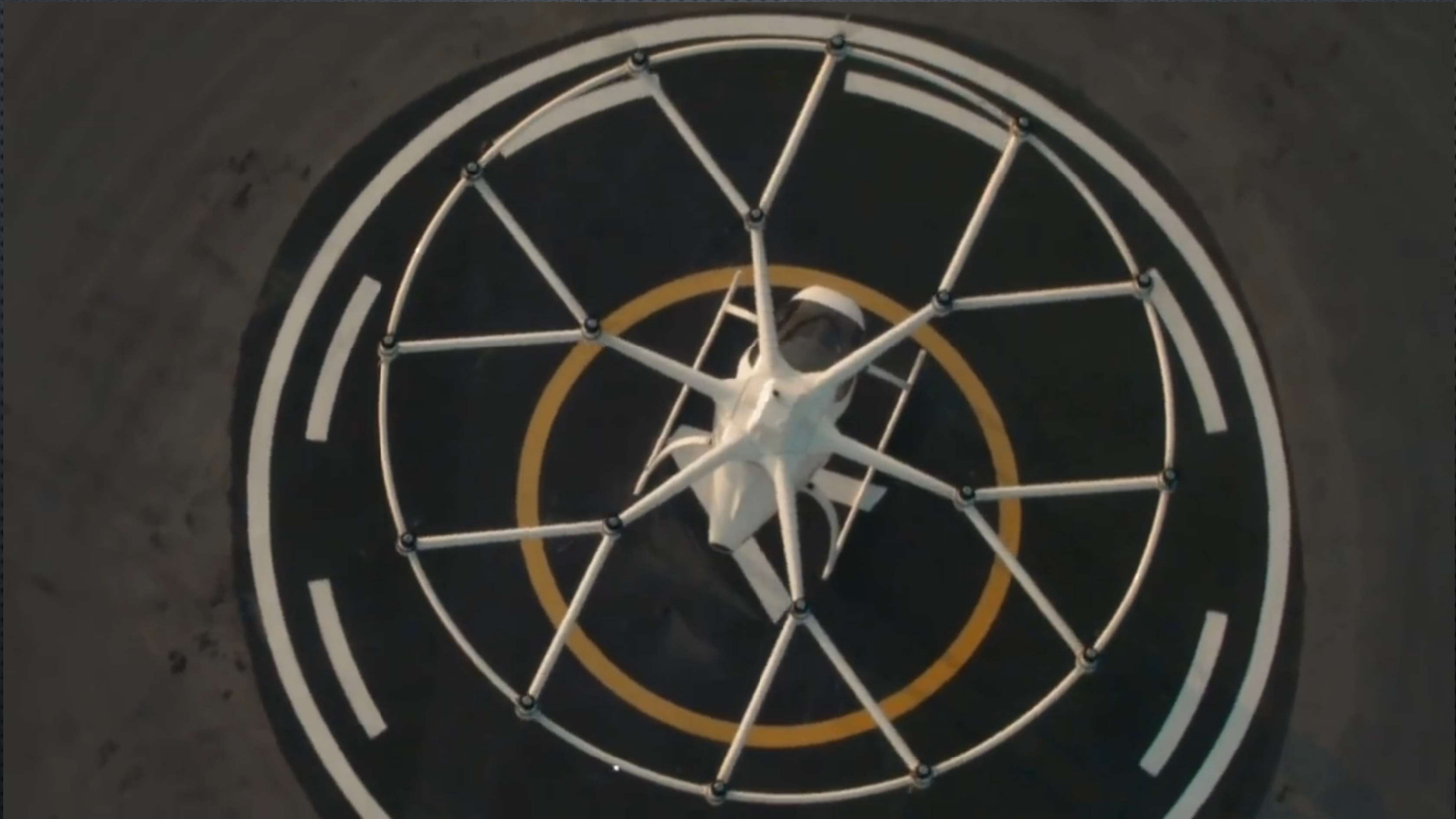
LILIUM FIRST FLIGHT – APR. 2017, GERMANY



Day of the first test flight



VOLOCOPTER AUTONOMOUS AIR TAXI – SEPT. 2017,
DUBAI



AIRBUS VAHANA FIRST FLIGHT— JAN. 2018, U.S.



KITTY HAWK - MAR. 12, 2018, NEW ZEALAND



MAY 7, 2018

 CBS THIS MORNING



 CBS THIS MORNING

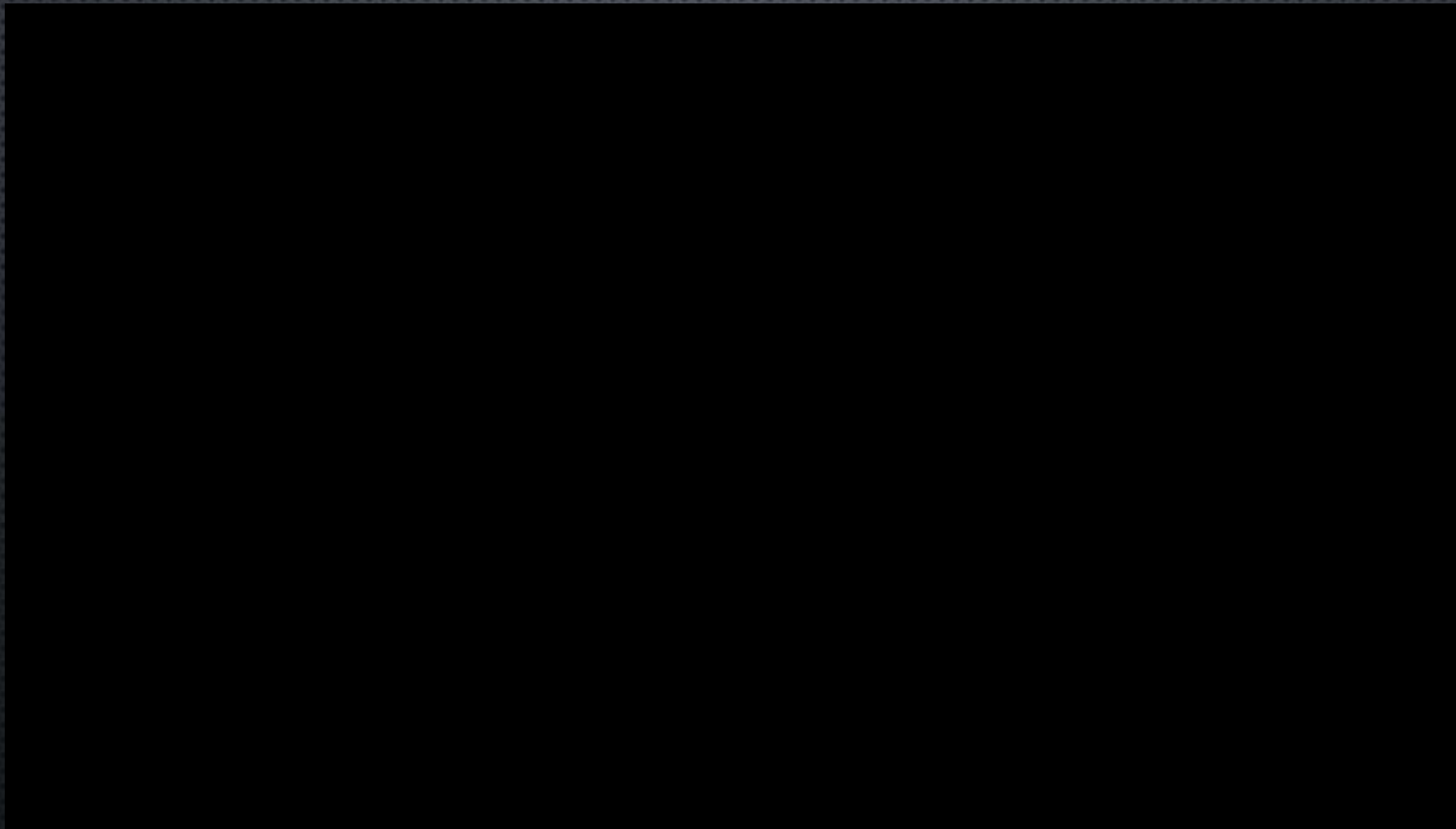
UBER'S FLIGHT PLAN

CBS NEWS GETS FIRST LOOK AT RIDESHARE'S PLAN TO FLY RIDERS

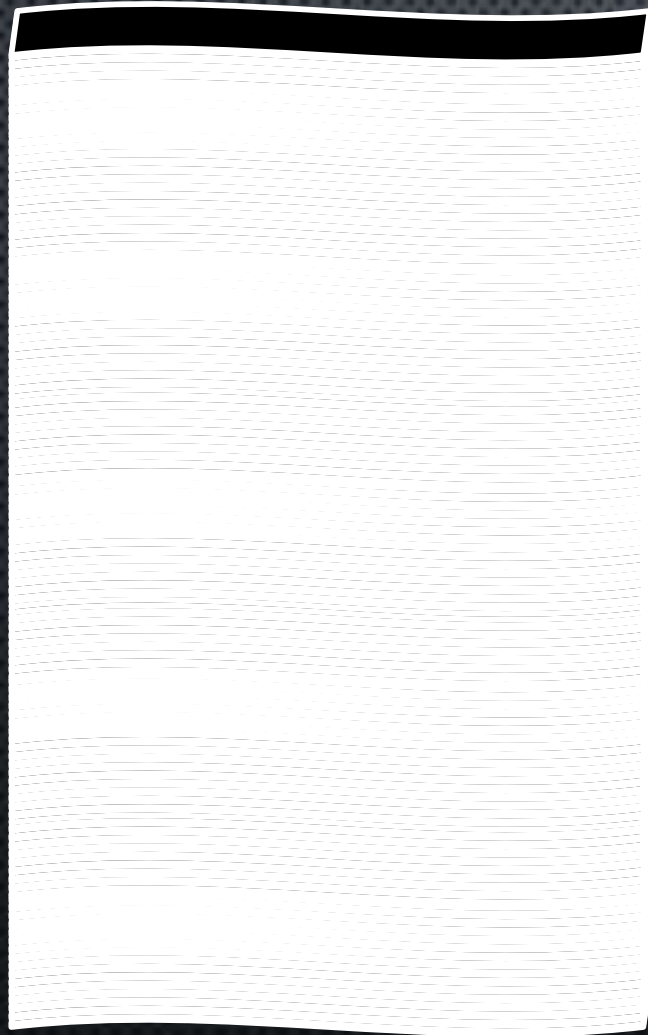
BLACKFLY 'OPENER' – JULY 2018



TERRAFUGIA TF-2 CONCEPT – AUGUST 2018

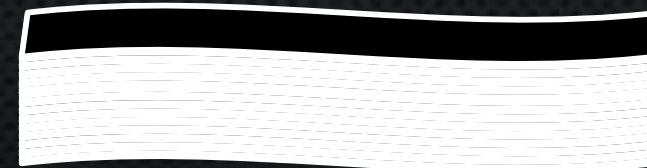
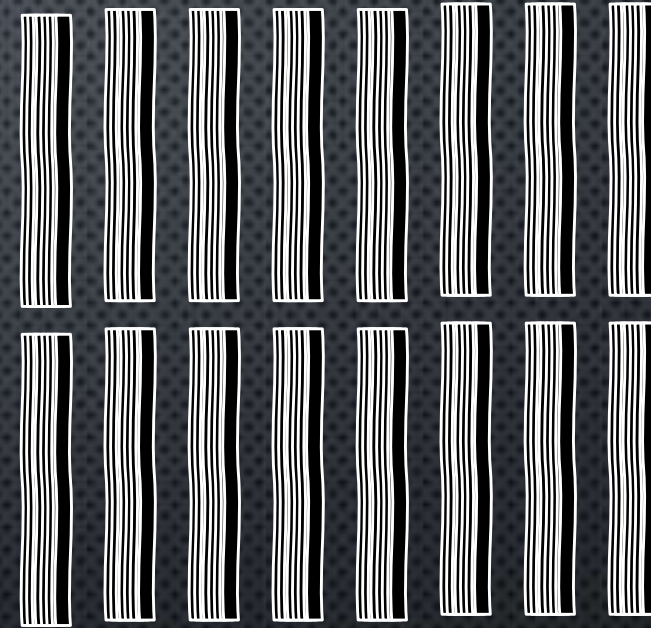


PART/CS 23 = A BIG OPPORTUNITY



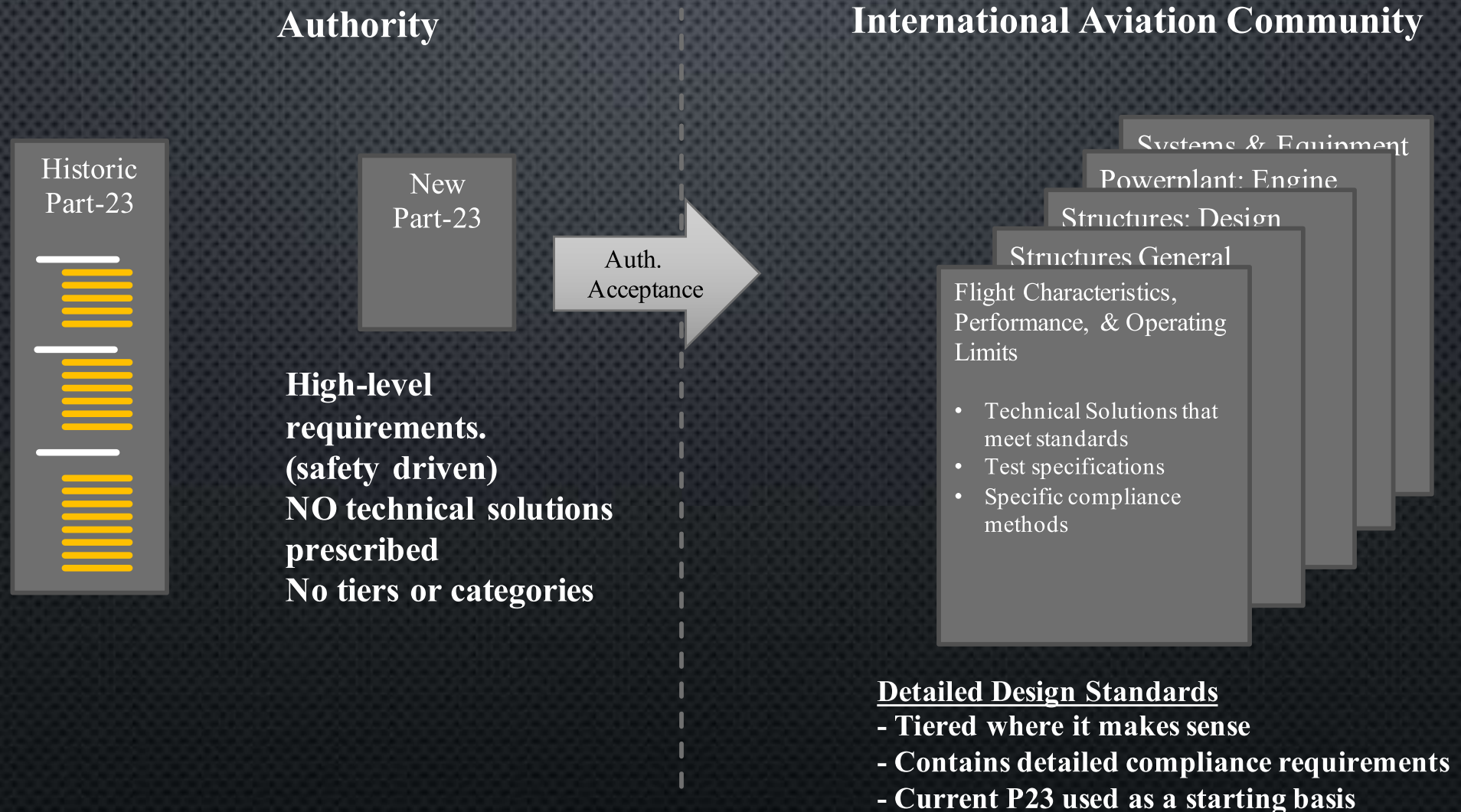
Part 23-63 (377 Regulations)

Consensus Stds.



Part 23-64 (71 Regulations)

SEPARATING SAFETY REQUIREMENTS FROM METHODS OF COMPLIANCE





Forbes

Who's Going To Fly The Plane? Forecasted Global Pilot Shortage Could Limit Future Air Travel Options

Pilot Outlook by Region Map



WHAT IS A PILOT?



Person



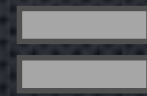
Knowledge



Flying Experience



Medical



Pilot

SIMPLIFIED VEHICLE OPERATIONS (SVO)



SIMPLIFIED VEHICLE OPERATIONS (SVO)



Decision Making

Planning

Inspection

Emerg. Proc.

Evacuation

Comm.

Detect & Avoid

System. Mgt.

Term. Proc.

Navigation

Basic Airmanship

T.O./Lnd.

ERA OF SIMPLIFIED VEHICLE OPERATIONS

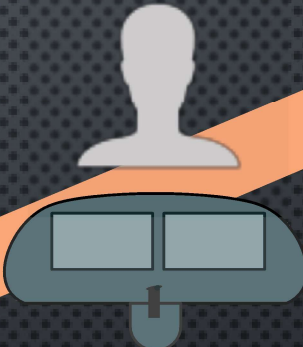
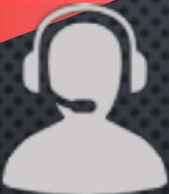


Workload

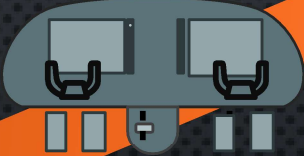
2000's - Today



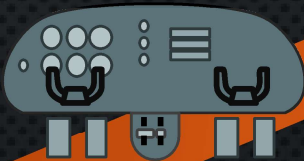
Front Row Seats



Simplified Cockpit



Integrated Cockpit



Federated Cockpit



Automation

NEW PRODUCT ANNOUNCEMENTS: MAY

2018



Embraer
Brazil



Pipistrel
Slovenia



Karem Aircraft
U.S.

EMBRAER X CONCEPT FLIGHT



NEW PRODUCT ANNOUNCEMENTS: CES 2019



Bell: Nexus
VTOL Aircraft



GAMA EPIC STRUCTURE



**GAMA Electric Propulsion and
Innovation Committee (EPIC)**

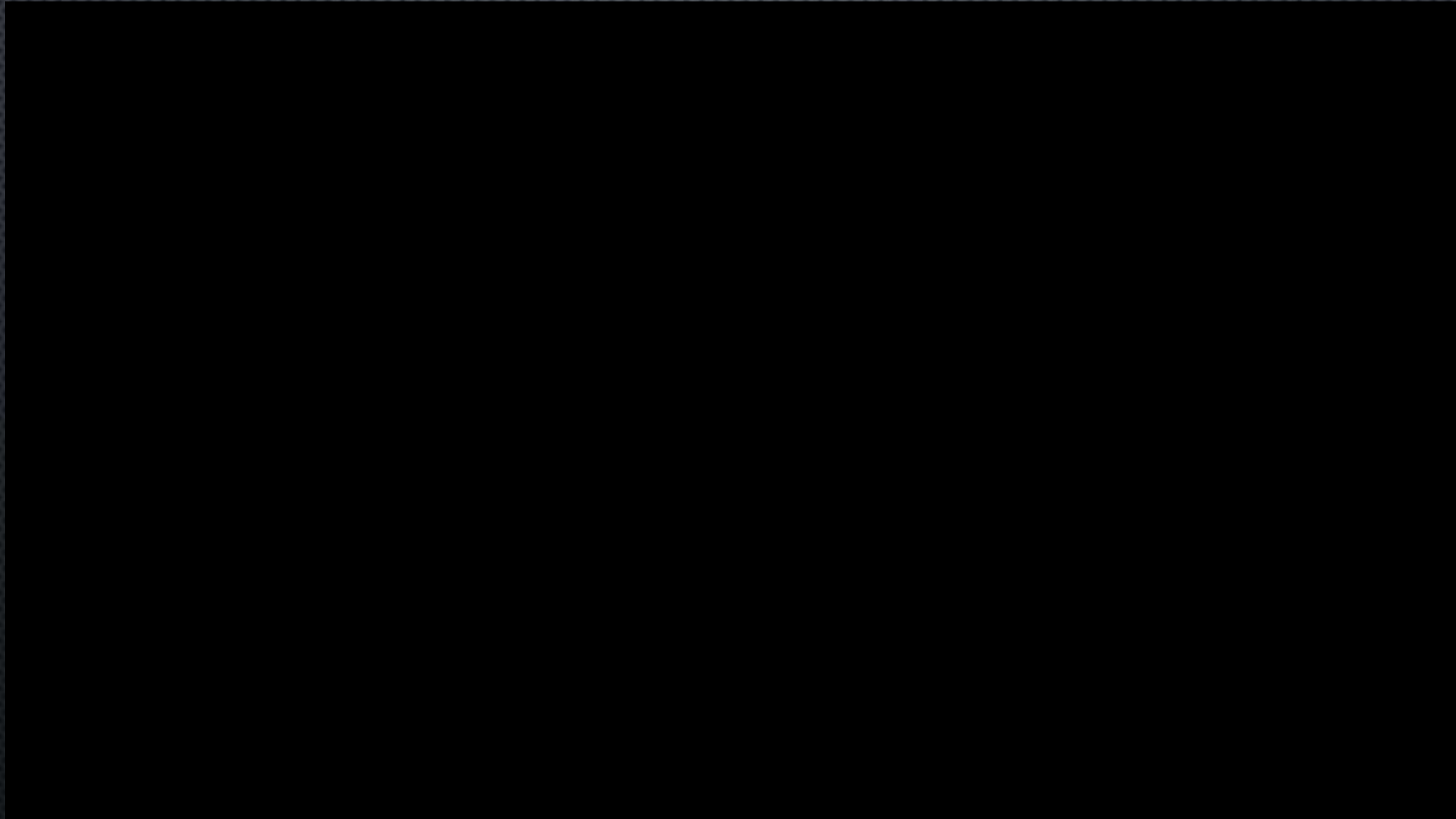
**Simplified Vehicle
Operations
Subcommittee (SVO)**

**Electric Propulsion
Subcommittee (ELC)**

**Infrastructure Ad-Hoc
Committee (INF)**

**eVTOL Ad-Hoc
Committee (eVTOL)**

Will passenger drones take flight at one of Miami's largest new developments?



ELECTRIC PROPULSION INNOVATION COMMITTEE (EPIC)



Chartered in 2016 to “enable hybrid & electric propulsion, increased automation and other key innovations into general aviation design, production, maintenance among the global aviation regulators in key states of design”

ELECTRIC PROPULSION REGULATORY

ENVIRONMENT: Q1-2016



Sport Aero



Sm. Aero



Lg. Aero



Rotorcraft



Engine

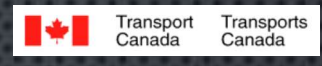


Prop



ELECTRIC PROPULSION REGULATORY

ENVIRONMENT: Q1-2017



Sport Aero



Sm. Aero



Lg. Aero



Rotorcraft



Engine



Prop



ELECTRIC PROPULSION REGULATORY

ENVIRONMENT: Q1-2018



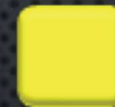
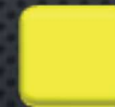
Sport Aero



Sm. Aero



Lg. Aero



Rotorcraft



Engine



Prop





FOR ONCE YOU HAVE TASTED FLIGHT YOU WILL WALK THE EARTH WITH YOUR EYES TURNED SKYWARDS, FOR THERE YOU HAVE BEEN AND THERE YOU WILL LONG TO RETURN.”

- LEONARDO DA VINCI -

1452 - 1519

