



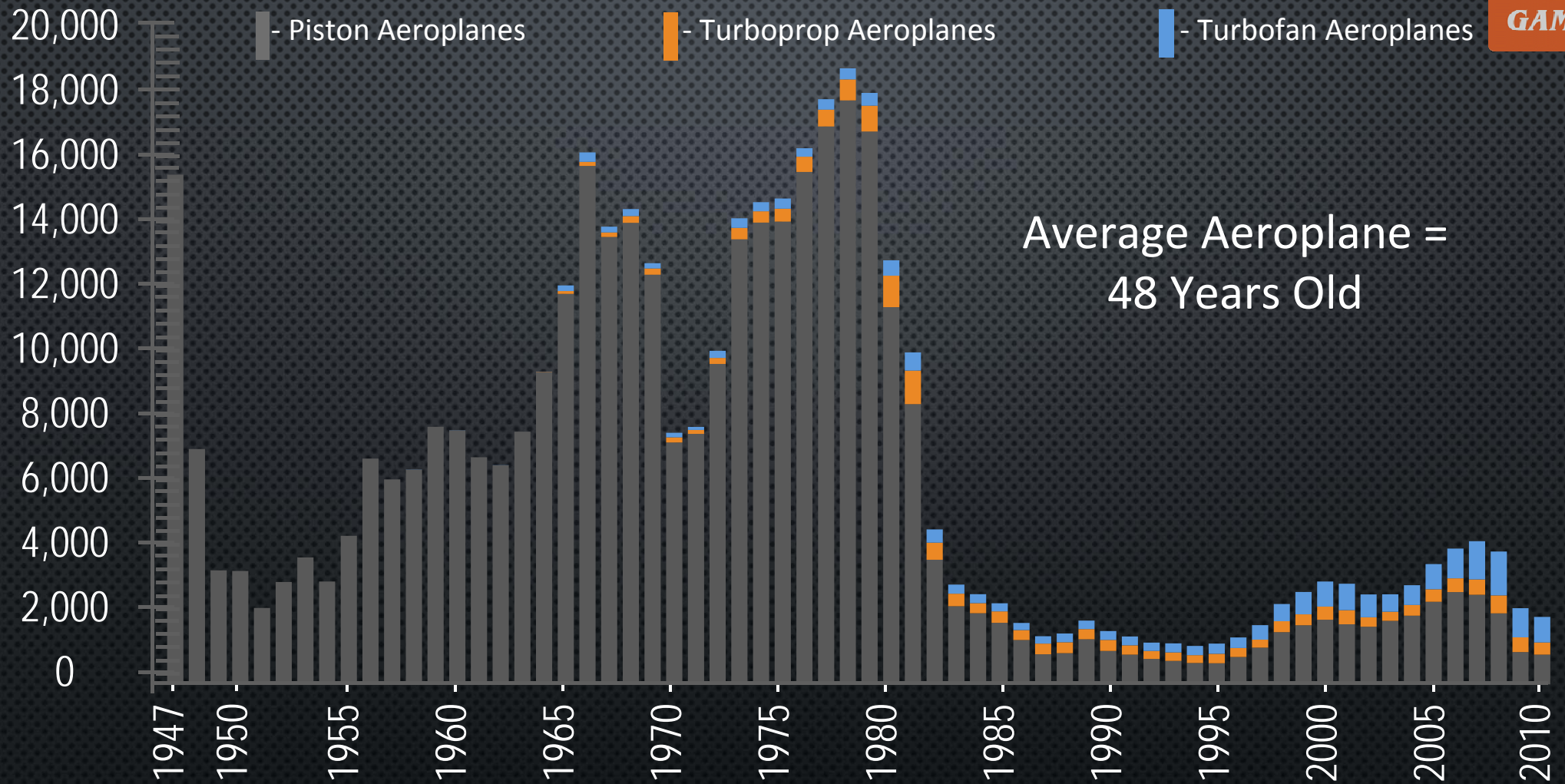
GAMA

GENERAL AVIATION MANUFACTURERS
ASSOCIATION

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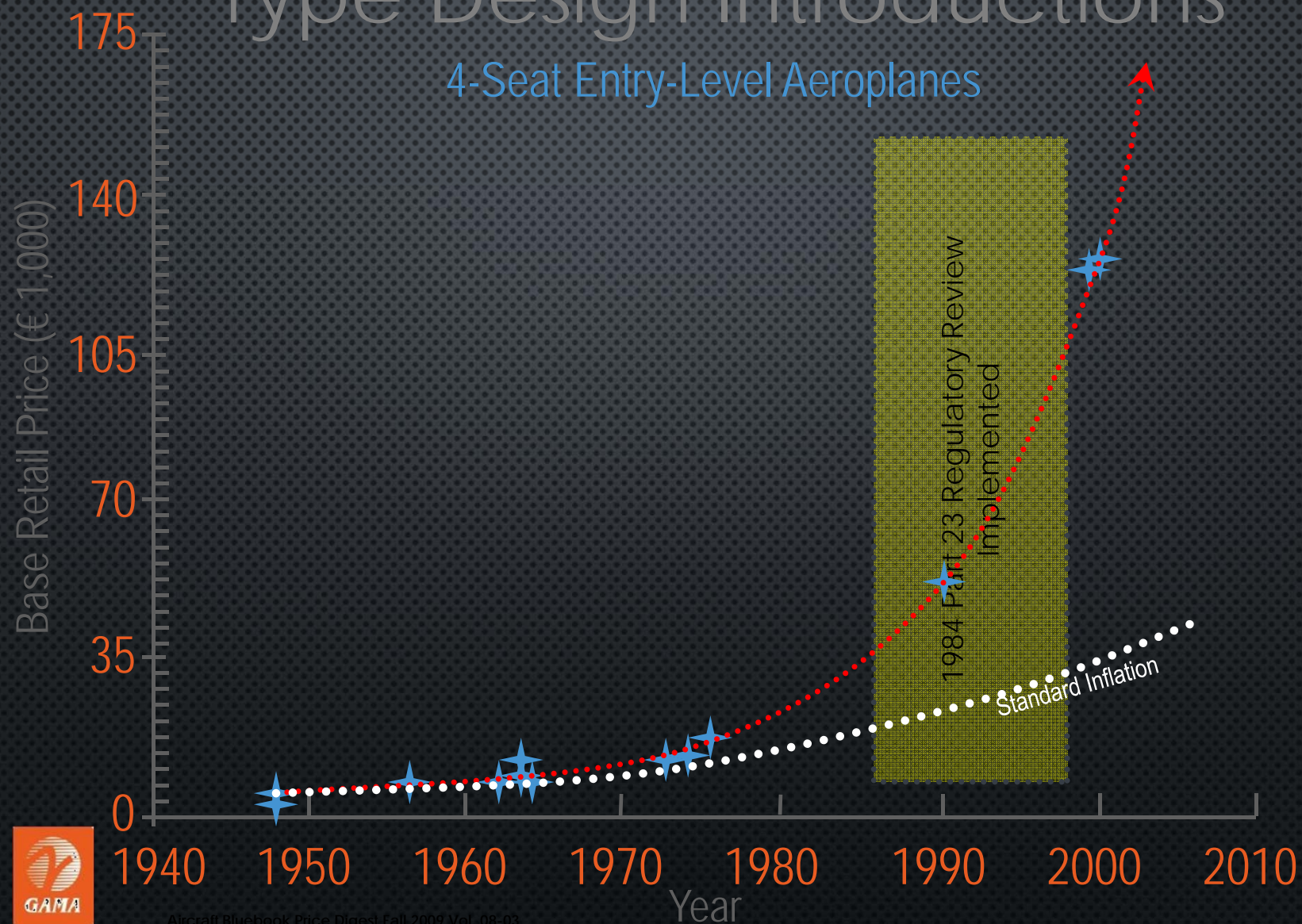
GLOBAL MANUFACTURING MEETING, COLOGNE
17.NOV.2017

CS-23 Aeroplanes Manufactured Annually



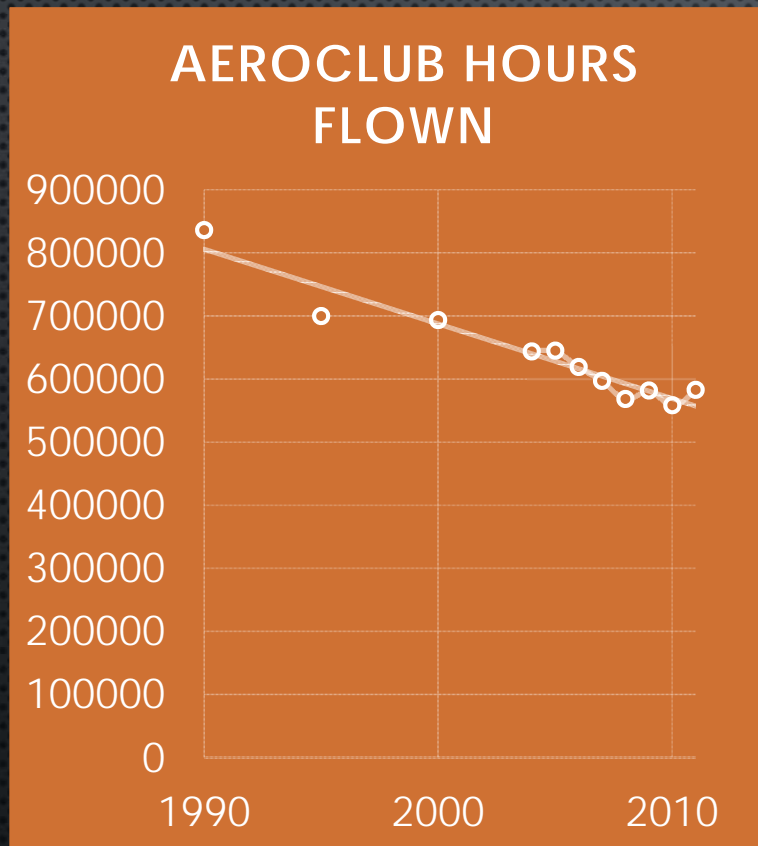
Type Design Introductions

4-Seat Entry-Level Aeroplanes

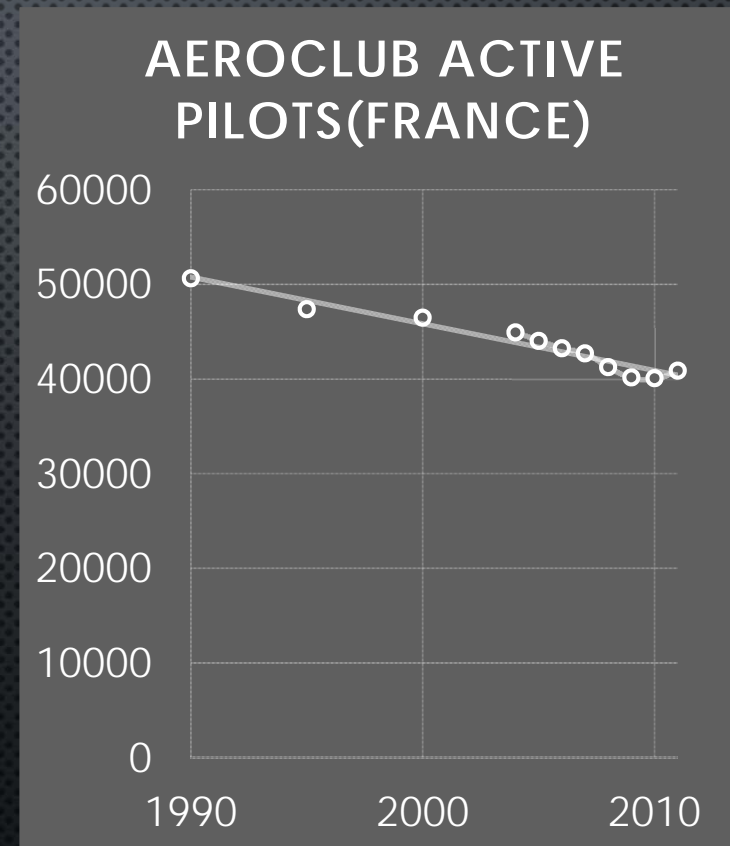


GA DATA FOR FRANCE

≈ 12,500 Fewer Hours per Year



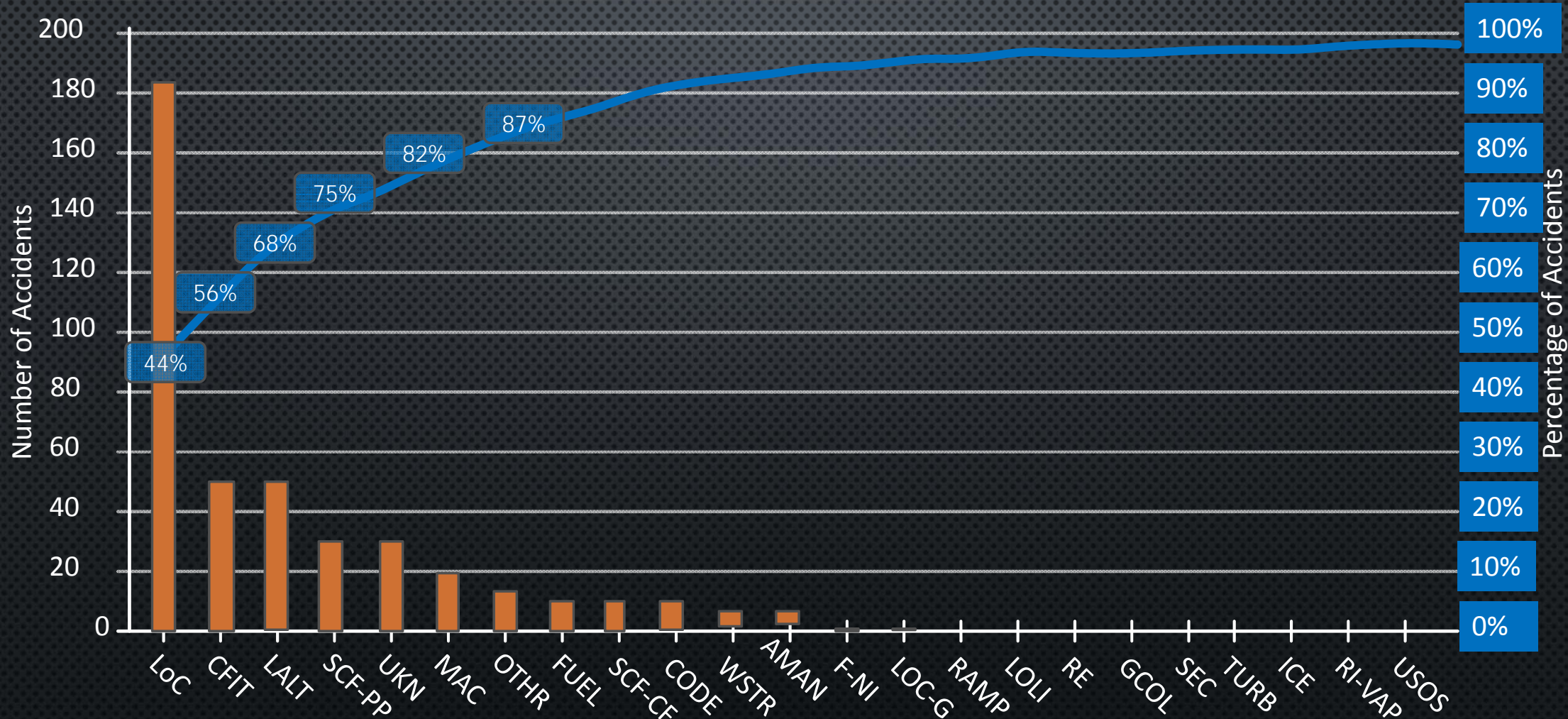
≈ 500 Fewer Pilots per Year



Source: DGAC France

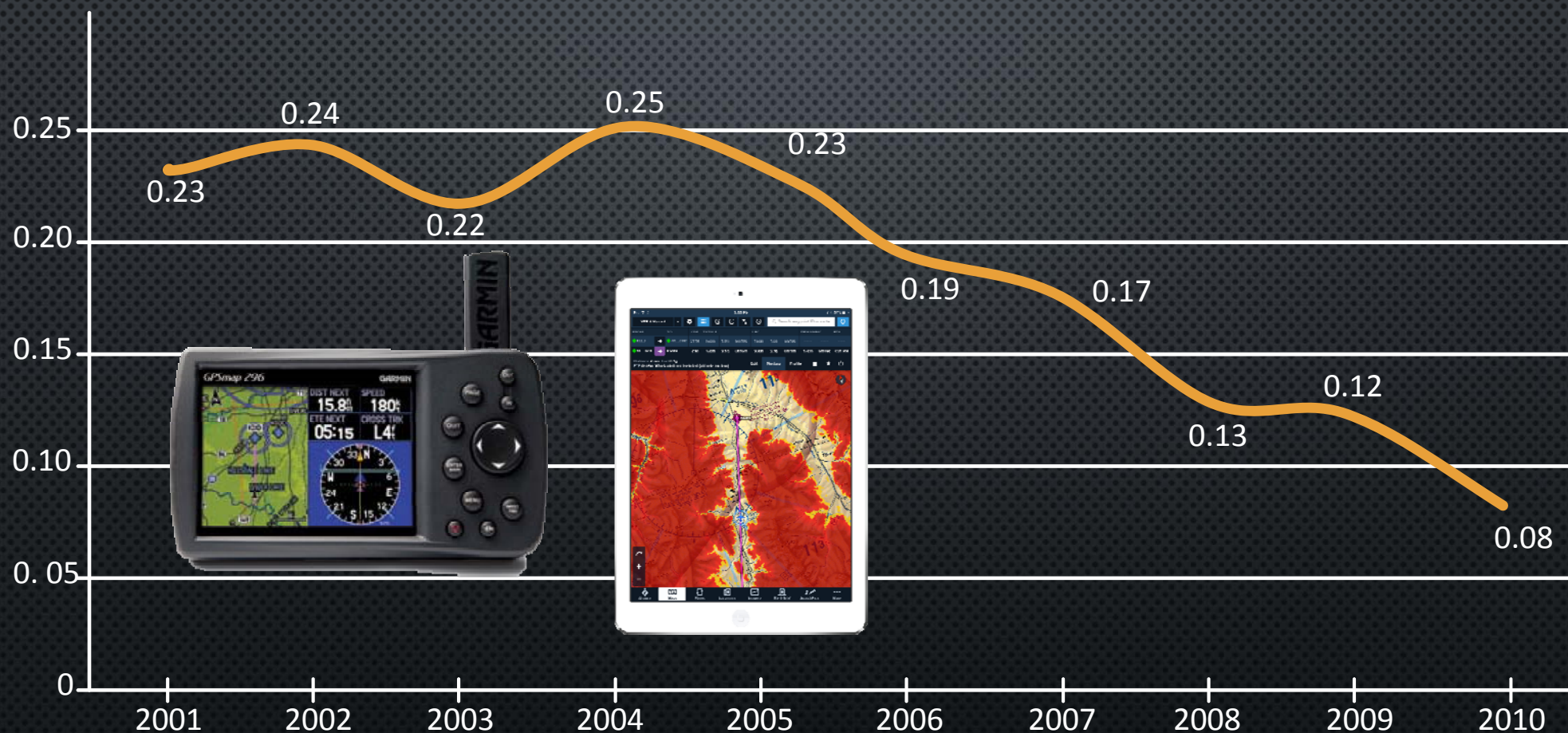
EASA GA FATAL ACCIDENTS

EASA ANNUAL SAFETY REVIEW DATA 2009-2014



CFIT ACCIDENT RATE

NTSB/GA-JSC DATA 2001-2010



MAY YOU LIVE IN EXCITING TIMES...



Airbus CEO sees 'flying car' prototype ready by end of year



ENTREPRENEUR

Lilium raises \$90 million to build flying taxis

PAUL SAWERS @PSAWERS SEPTEMBER 5, 2017 12:01 AM



VB Recommendations

Google's Pixel Buds v complexities a challenge

BBC is launching an i radio show for Echo

Final Fantasy Online defends monthly subscription the golden age of free (exclusive)

BUSINESS DAY

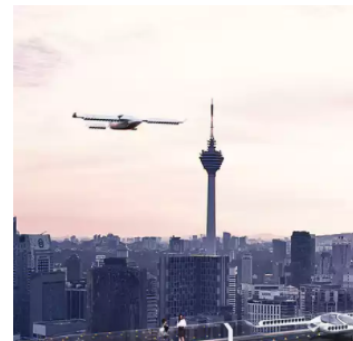
OCT. 5, 2017, 11:30 A.M. E.D.T.

Boeing to Buy Autonomous and Electric Flight Firm Aurora

theguardian

Is the flying car ready for takeoff?

At least six developers have re watch the skies



THE VERGE

TECH - SCIENCE - CULTURE - CARS - REVIEWS - LONGFORM - VIDEO - MORE -

TRANSPORTATION AVIATION

These hybrid electric jets could change how we live and work by 2022

Zunum Aero aims to reinvent regional air travel

by Andrew J. Hawkins | @andyjayhawk | Oct 5, 2017, 2:09pm EDT



The New York Times

HYBRID & ELECTRIC AIRPLANES

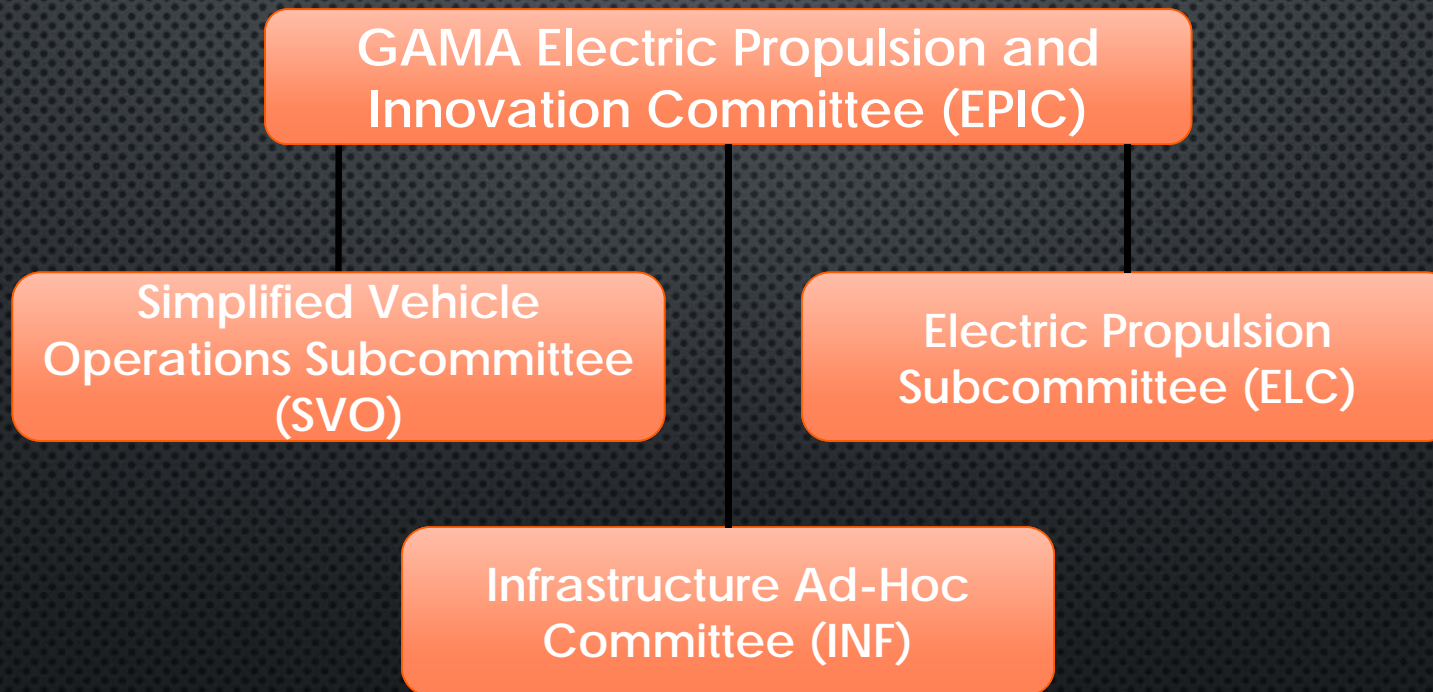


E-VTOL





EPIC STRUCTURE



GAMA EPIC COMMITTEE MEMBERS

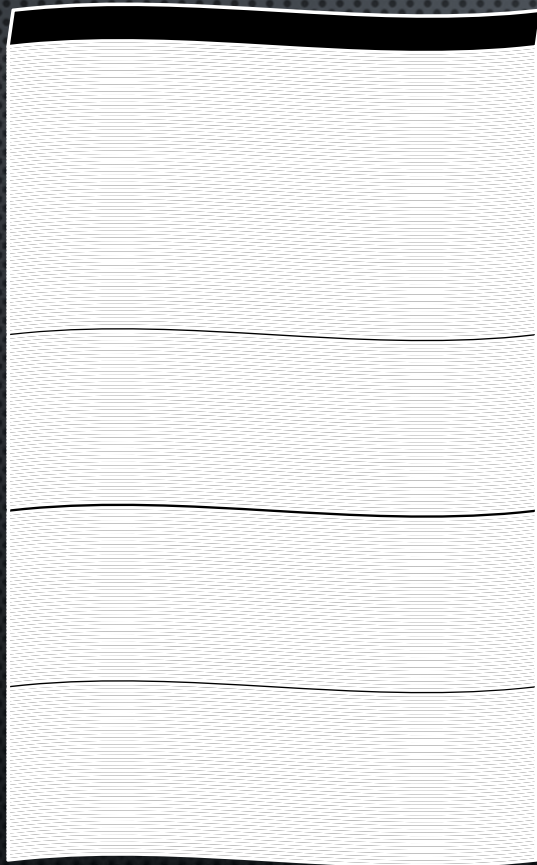




REGULATORY ENVIRONMENT

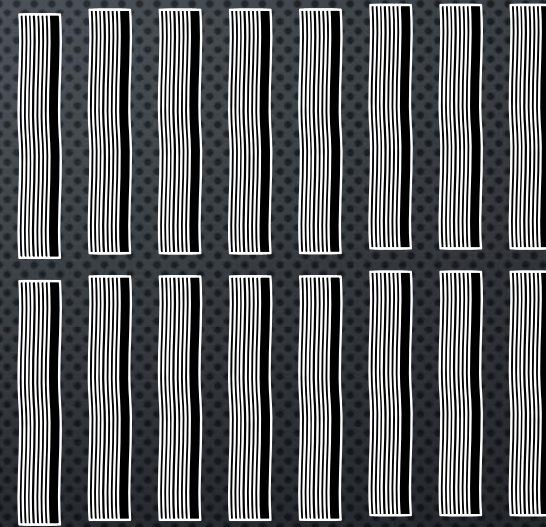
A) AIRCRAFT CERTIFICATION

NEW EASA CS-23 – A BIG OPPORTUNITY



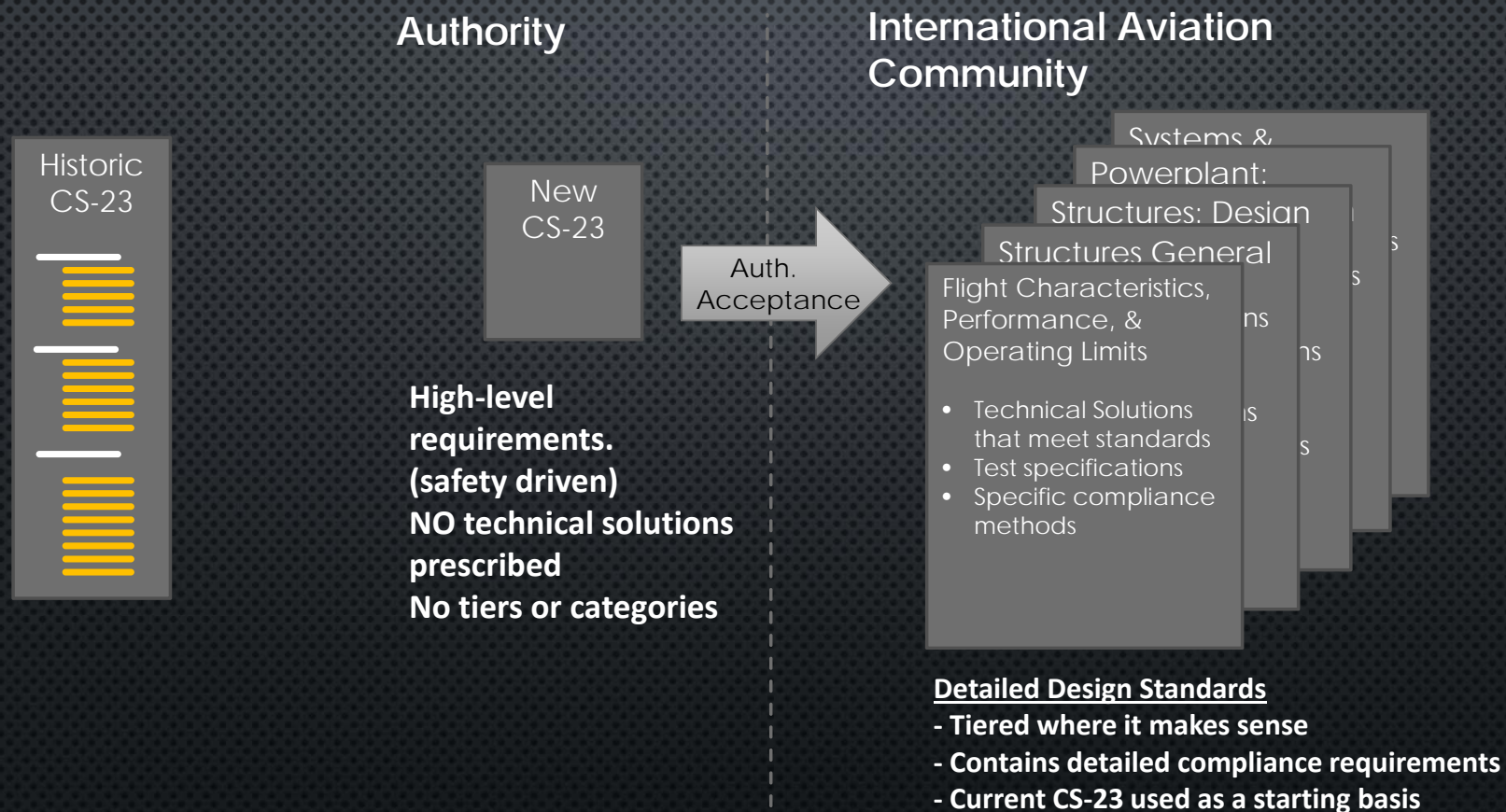
EASA CS-23 Amd.4 (377 Regulations)

Consensus Stds.



CS-23 Amd.5 (71 Regulations)

SEPARATING SAFETY REQUIREMENTS FROM METHODS OF COMPLIANCE





REGULATORY ENVIRONMENT

B) OTHER REGULATORY ASPECTS

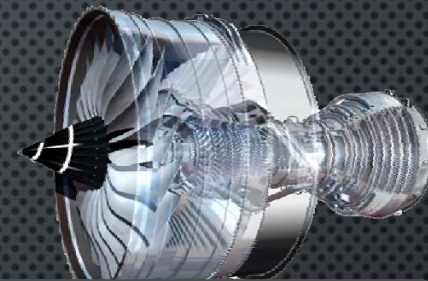
PILOT LICENSING STANDARDS



Piston Engine



Turboprop Engine



Turbofan Engine



Electric Motor



Hybrid Motor

PILOT LICENSING STANDARDS



Single Engine Pilot

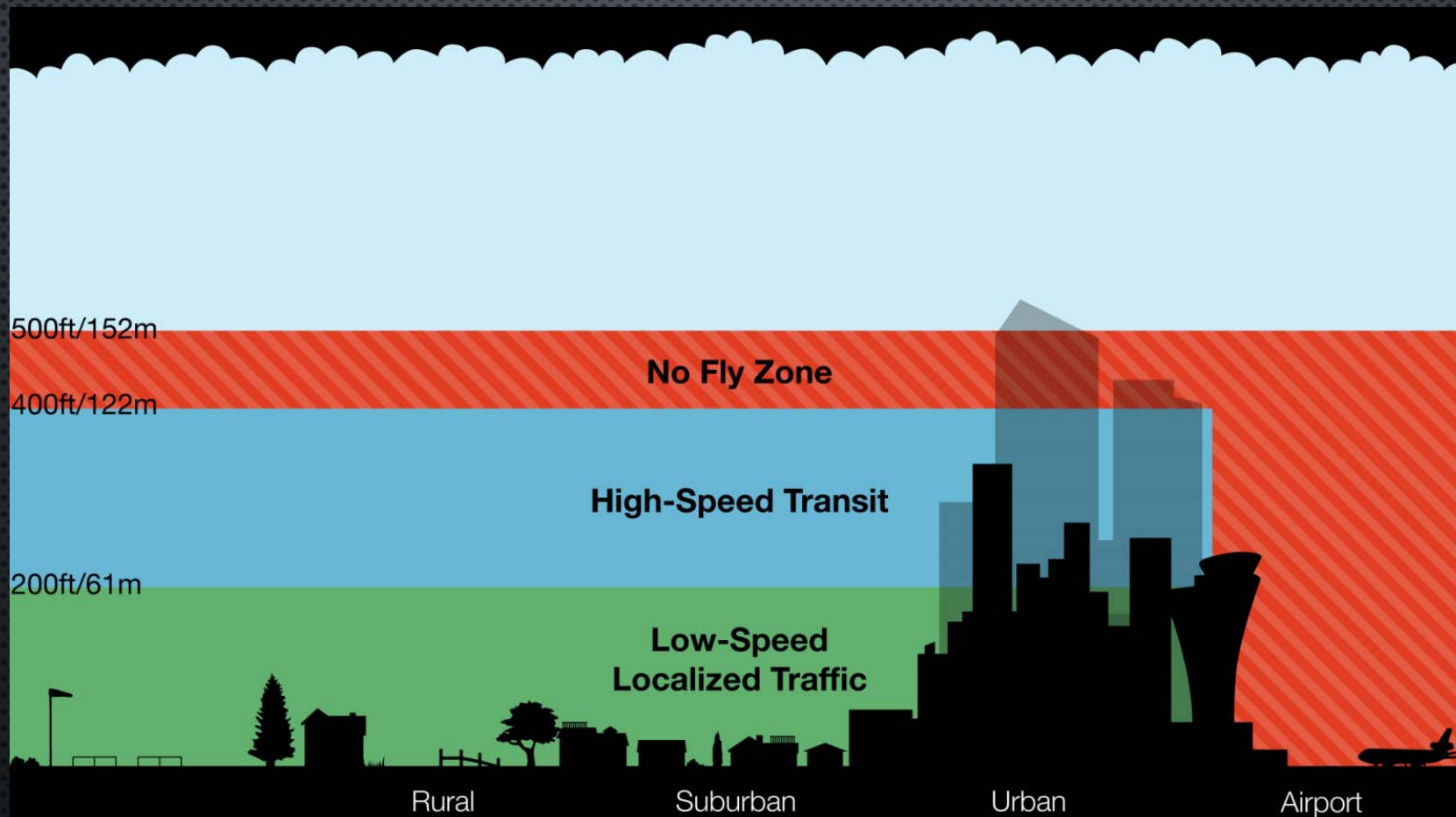


Multi Engine Pilot



?

OPERATIONAL CONSIDERATIONS



INFRASTRUCTURE



GAMA PUBLICATION 16



GAMA PUBLICATION NO. 16 – HYBRID & ELECTRIC PROPULSION PERFORMANCE MEASUREMENT

Version: 1.0

2.3 Traffic Pattern Flight

The traffic pattern flight scenario is intended to simulate traditional traffic pattern training work at a non-towered airport. The total energy required for the trip includes pre-flight, taxi, takeoff, completing the pattern, landing, normal shutdown and reserve energy. When following the standard for a traffic pattern, as detailed below, the number of traffic patterns, training time, and/or refuel (recharge) time are variables that can be measured and provided.



Number of Patterns: xxxxxx Flight Time: xxxxx (min.)
Refuel Time: xxxxx (min.) Total Energy: xxxxx (KWh)
Total Payload: xxxxxx (lbs.)

Airport Altitude: Sea Level (0 ft)

Conditions: ISA / no wind

Runway: Hard smooth surface no shorter than 2,500 ft

Pre-Flight & Start: Conduct normal preflight & startup procedures

Taxi: 1500 ft

Take off: Normal takeoff procedures

Climb: Runway heading at V_x to 50 ft AGL or clear of obstacles then runway heading at V_y to 500 ft AGL at no slower than 500 fpm, it is permissible to turn crosswind and downwind during the climb once above 500 ft AGL to a pattern altitude of 1000 ft AGL.

Traffic Pattern:

- Runway track at V_x to 50 ft AGL then V_y to 500 ft AGL
- Turn to crosswind while climbing to at least 1000 ft AGL
- Turn to downwind and maintain 1000 ft AGL until abeam landing point
- Fly conventional base and final legs and touchdown at no faster than V_{se}
- Execute a rolling take off again or taxi to parking
- Continue with training maneuvers as desired (assuring sufficient energy for safe landing plus reserve energy)

Landing: Fly conventional downwind leg at 1000 ft AGL until abeam landing point and begin descending fly conventional based and turn final and land.

Taxi: 1,500 ft to parking spot

Park & Shutdown: Conduct normal parking and shutdown procedures

Reserve: 30 minutes reserve at cruise power (based on speed & altitude used for downwind legs above) remaining at end of flight

Notes on Measured Parameters:

Number of Traffic Patterns: Number of complete circuits of the traffic pattern

Flight Time: Time measured from first takeoff to last landing



GAMA PUBLICATION NO. 16

HYBRID & ELECTRIC PROPULSION PERFORMANCE MEASUREMENT

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Washington, DC USA
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Version: 1.0
3 February 2017

AUTOMATION IN AVIATION



AINonline

BIZAV AIR TRANSPORT DEFENSE ROTORCRAFT PODCAST

NBAA CONVENTION NEWS

BUSINESS AVIATION

UBS: Pilotless Airplanes Represent \$35B Opportunity

by Kerry Lynch - August 9, 2017, 9:00 AM



The concept for the four-seat CityAirbus would be for shared passenger operations. Passengers would book an available seat via a smartphone app then take off from the nearest helipad.



A move toward pilotless airplanes represents a \$35 billion global opportunity, including \$3 billion in savings in the business aviation sector, and could technically be ready for commercial operations by 2025, a new report from Swiss analyst UBS asserts. The report—"Flying solo: how far are we down the path towards pilotless planes?"—delves into the cost savings and other benefits, technical feasibility and challenges facing the use of pilotless airplanes.

Industry is well en route to an automated airplane, the report states, noting, "In the not-too-distant future, we would expect to see a situation where flights are pilotless or the number of pilots shrinks to one, with a remote pilot based on the ground and highly secure ground-to-air communications."

Technology for remote-control drones exists today and this technology can be adapted for use in helicopters,

MACH

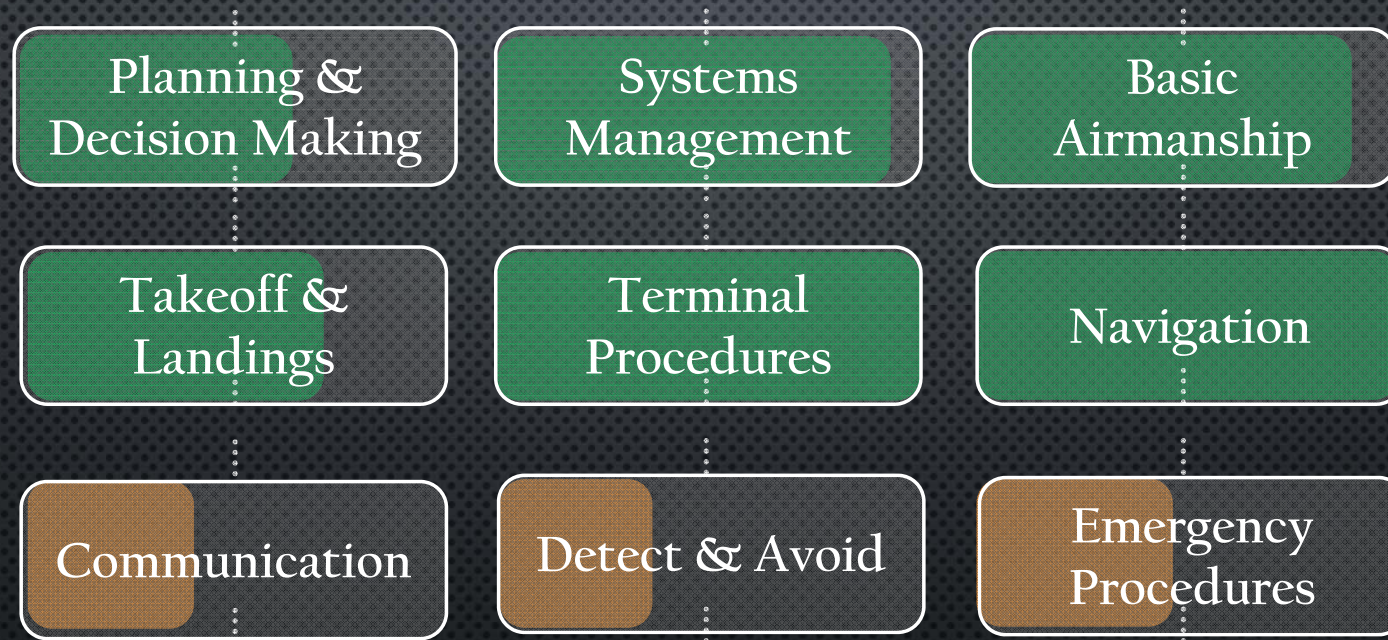
Self-Flying Planes May Arrive Sooner Than You Think. Here's Why

The technology is here, but will we trust planes without pilots?

by Dan Falk / Oct.11.2017 / 4:00 PM ET

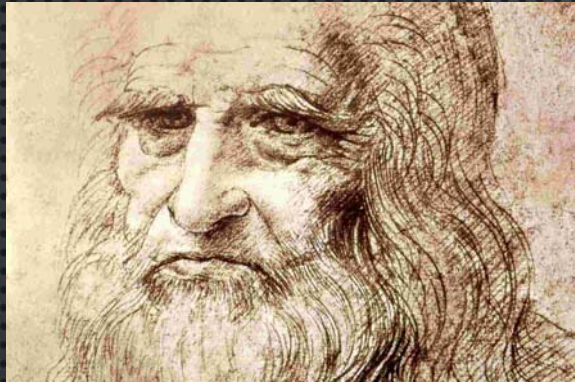


DECONSTRUCTED PILOT



*Boxes Represent FAA Pilot Training Areas

*Green Represents Current State of Technology (Average Pilot Capabilities are Half-Full)



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

