

EASA Rotorcraft and VTOL  
Symposium  
10-11 Dec 2019

## Safety Workshop

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HELICOPTERS

- Key Note Speech -

“Technological Developments in the Human -  
Machine Interface”

- From a Pilot's Perspective -

Bruce Webb, Airbus Helicopters Inc., Director of Aviation Education



**AIRBUS**

# Agenda

- 1 | Fixed Wing Fatal Accident Rates**
- 2 | Technology Leaps on Fixed Wing**
- 3 | Fatal accident rate evolution / Technology Generations**
- 4 | Human Eye / Mind Operation**
- 5 | Technology Progress on HMI for Rotorcraft**
- 6 | What are the Rotorcraft Statistics like?**
- 7 | First Limit Indication Concept – What is the target?**
- 8 | Safety Promotion – We are here for that!**

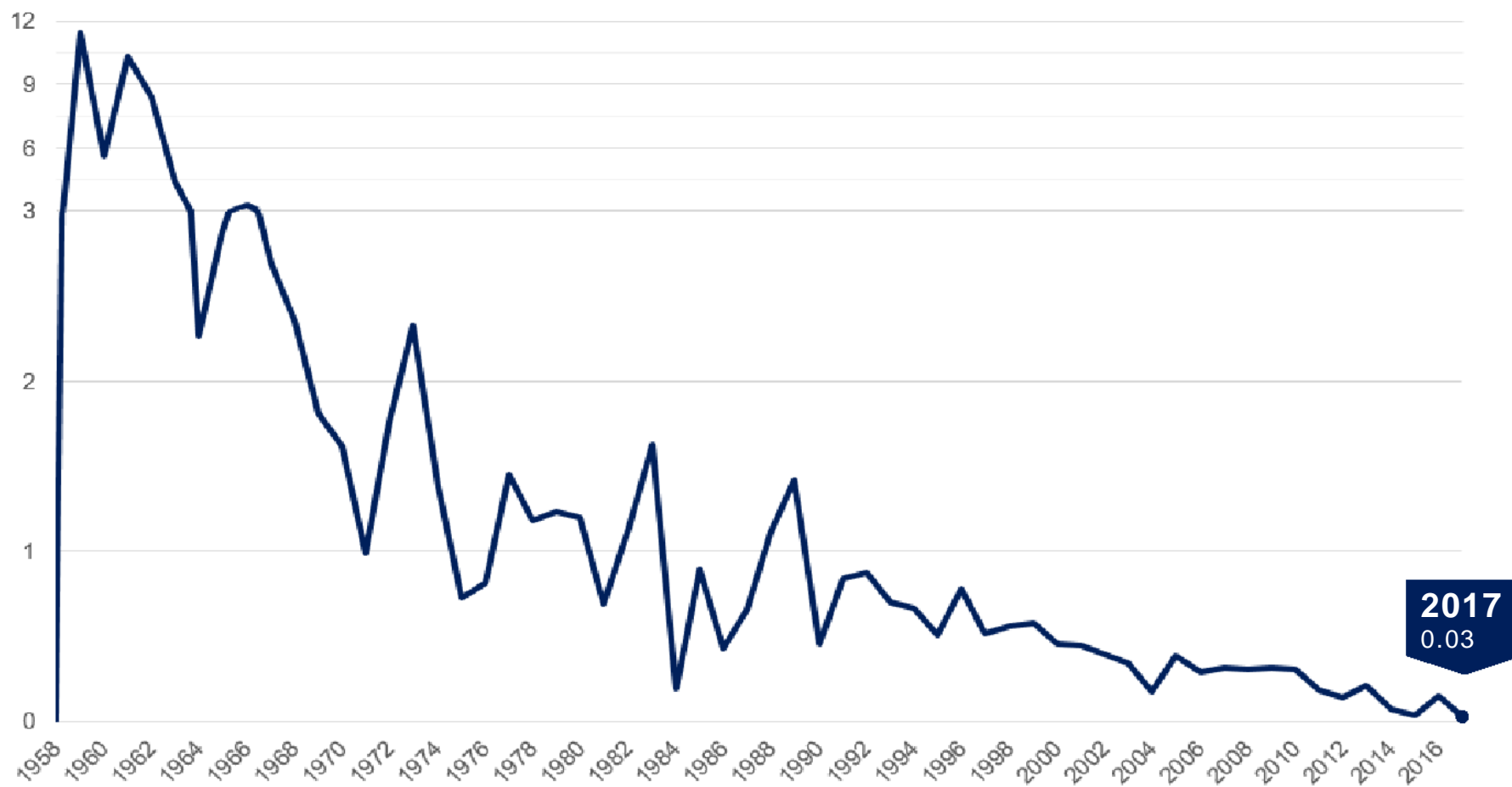
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# Fixed Wing Fatal accident rate 1958-2017

Accidents per million flights



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## Fatal accident rate

Steady decrease over time highlighting improved Safety

**0.03**  
Fatal accidents per million flights in 2017

Source: Ascend, Airbus

Western built jets above 40 seats

# Technology Leaps on Fixed Wing Aircraft

## Evolution of aviation technology

Four generations of technology have addressed major causes of accidents

Glass cockpits and FMS on generation 3 aircraft have helped reduce CFIT

Fly-by-wire on generation 4 has helped reduce LOC-I

1

### Early commercial jets



2

### More auto-flight systems



3

### Glass cockpits & FMS



4

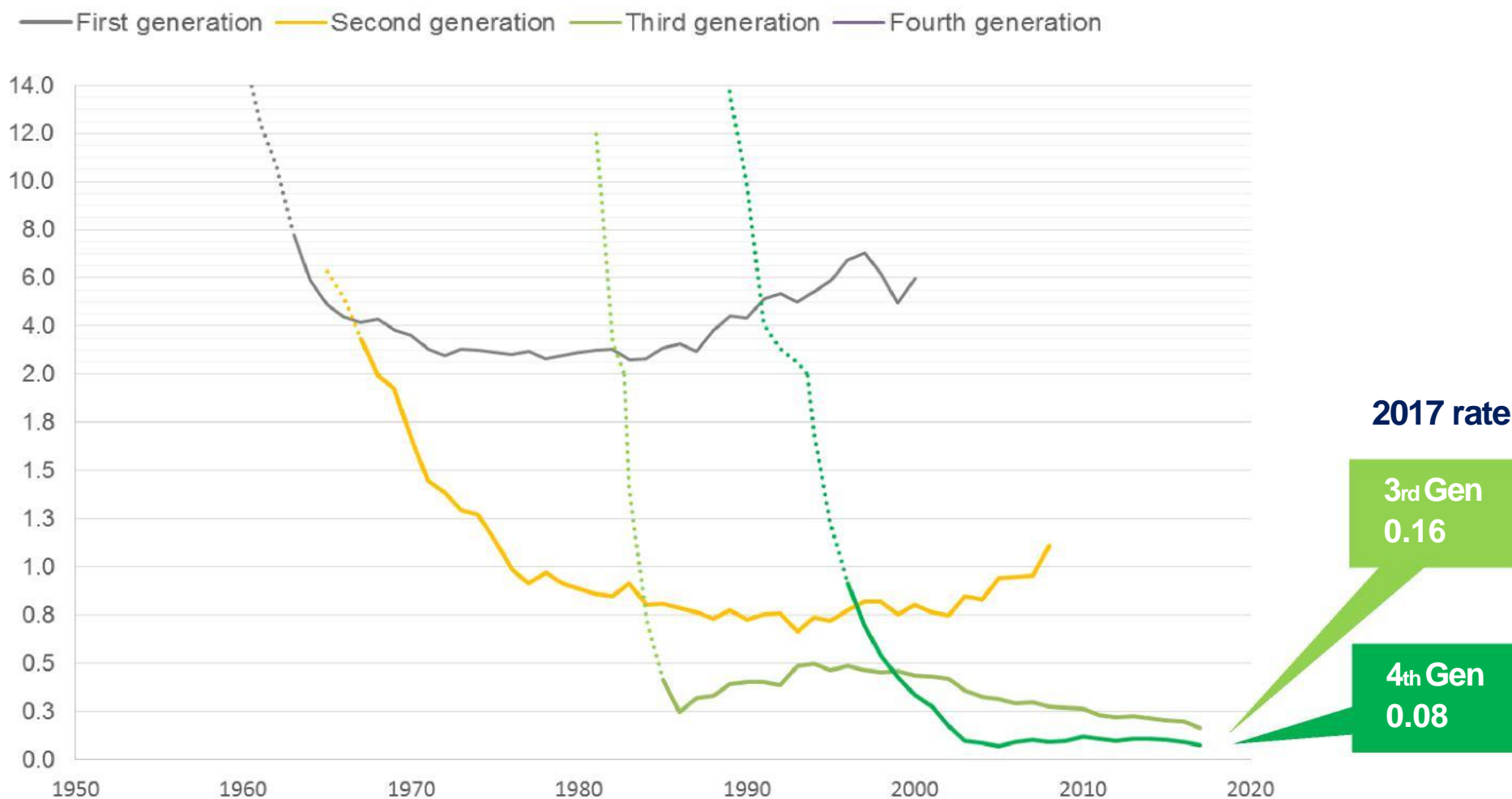
### Fly-by-wire



# Fatal accident rate evolution / Technology Generations

Fatal accidents per million flight cycles, 10 year moving average

What is the improvement driver in the Fixed Wing World?



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## Fatal accident rate evolution

Gen3 to Gen4  
**-50%**

4<sup>th</sup> generation of jet aircraft has half the fatal accident rate of the 3<sup>rd</sup> generation

Source: Ascend, Airbus  
Years with over one million FC

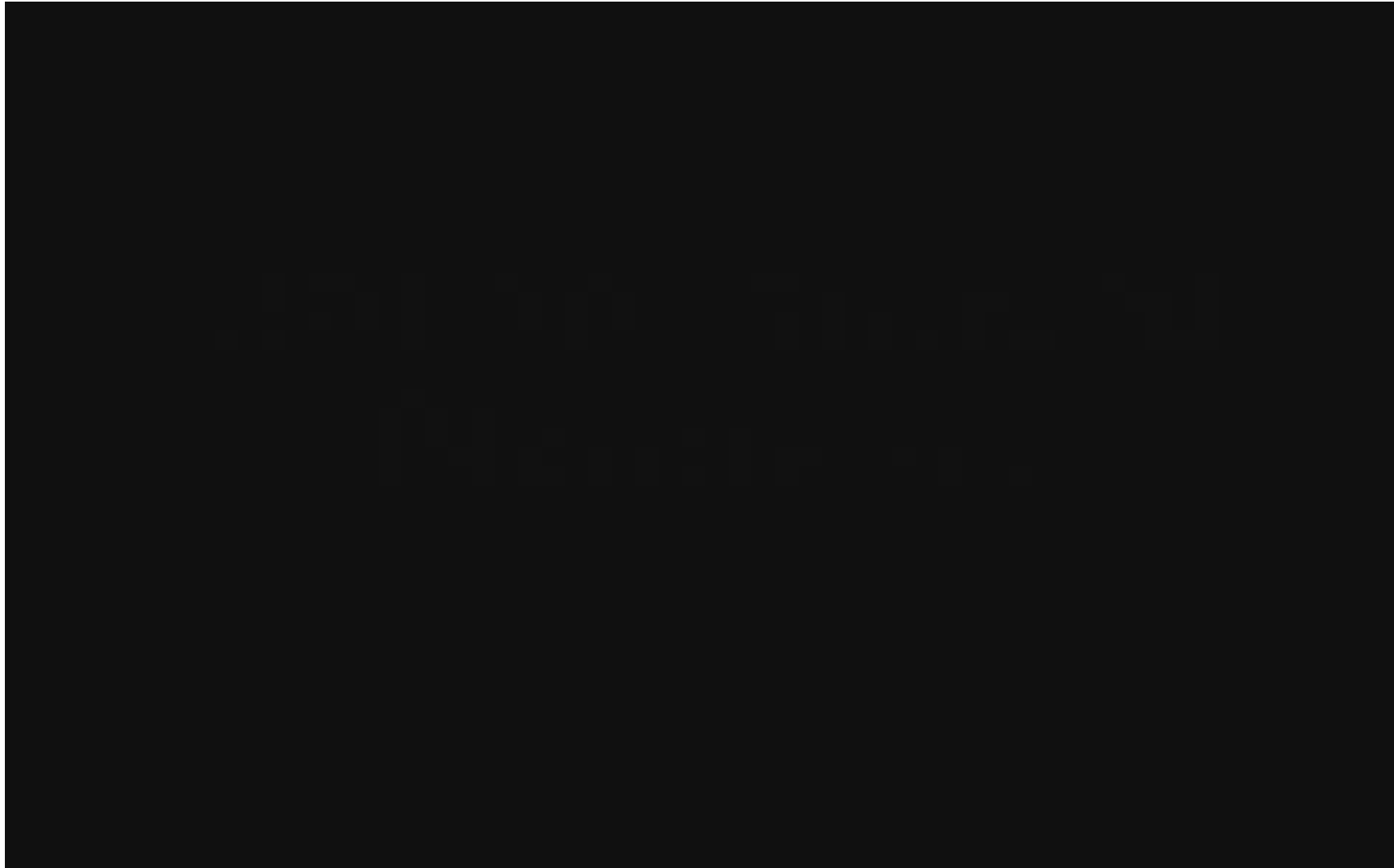
# Physical Blind Spot Detection

- With your right hand, hold the card at full arms length directly in front of you.
- With your left hand, cover your left eye.
- Focus your attention on the  , while remaining aware of the .
- Slowly move the card closer to your face...the  will disappear.
- You have found the blind spot for your right eye.

# Human Eye / Mind Operation



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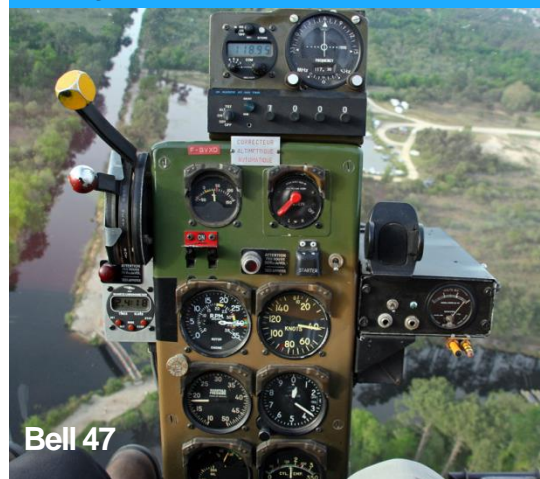


# Technology Progress on HMI for Rotorcraft

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1

## Early helicopters



2

## More Surveillance



3

## Glass cockpits & FMS



4

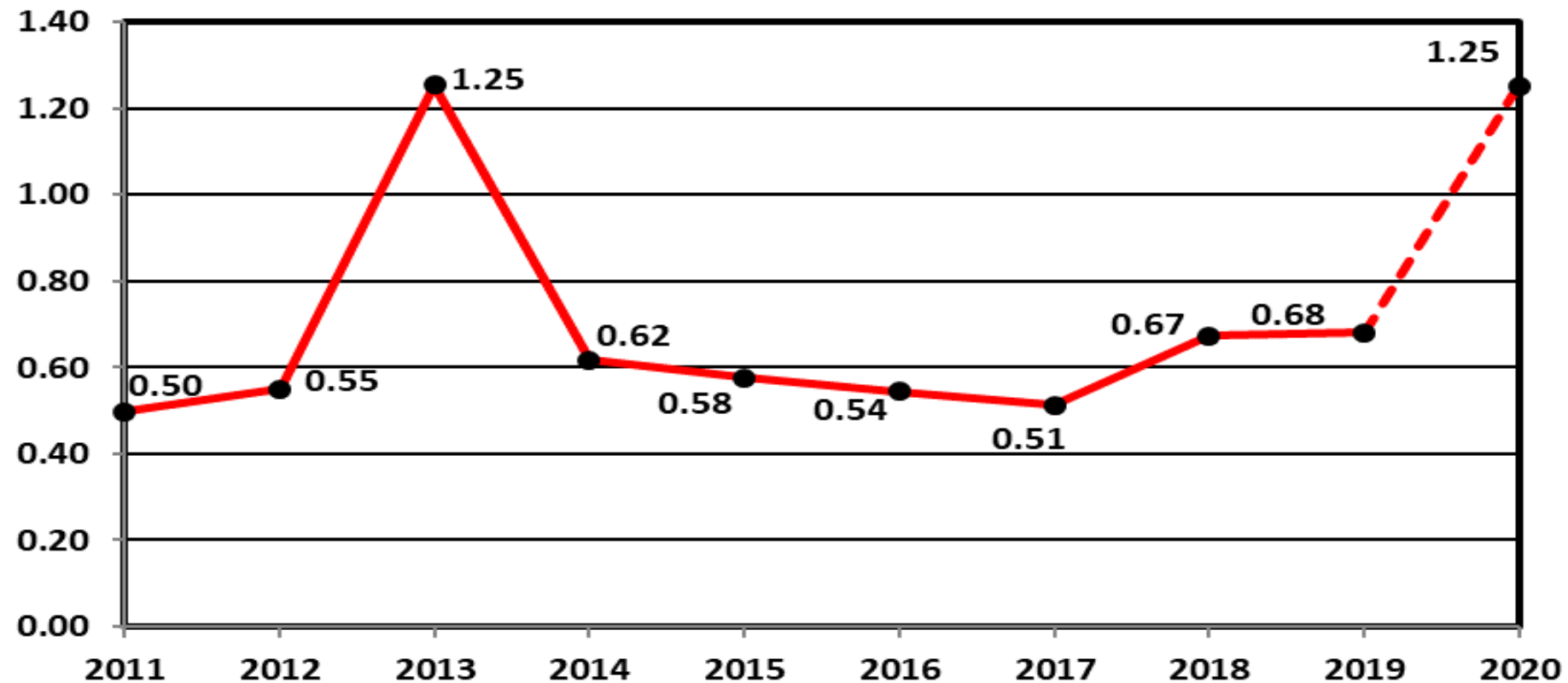
## Latest Gen. e.g. Airbus Helionix



# What are the Rotorcraft Statistics like?

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## Estimated U.S. Rotorcraft FATAL Accident Rate (per 100,000 hours) – 10 Year Lookback

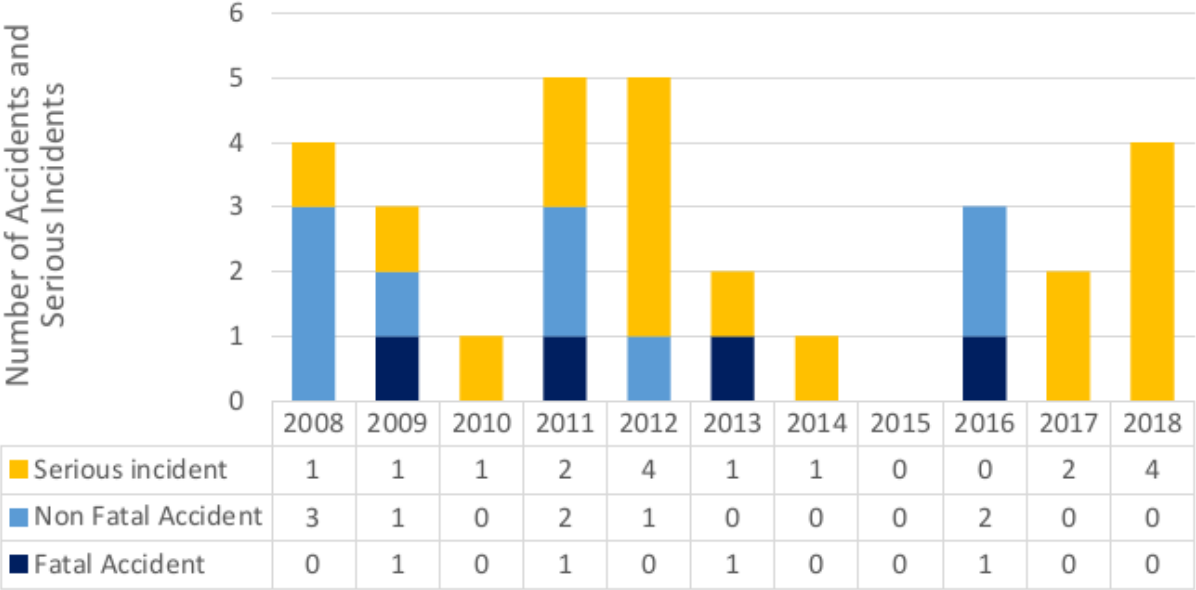


# EASA Rotorcraft Accidents & Incidents Statistics



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Number Of Accidents And Serious Incidents Per Year 2008-2018



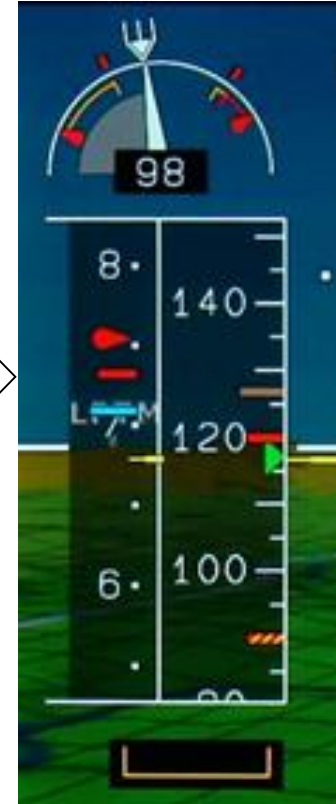
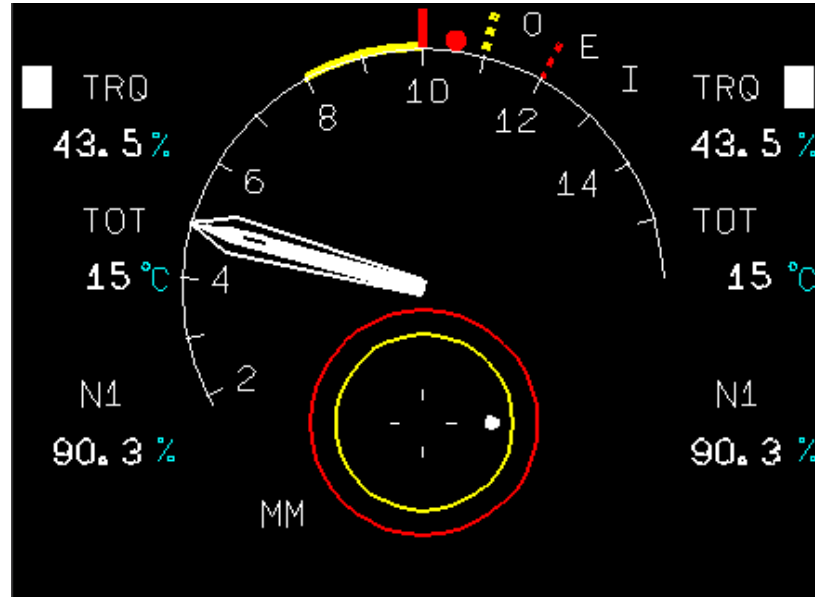
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# First Limit Indication Concept – What is the target?

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# Safety Promotion – We are here for that!



## Prevention Drivers

### Being forward thinking for Safety

#### Enhancement Systematics

Prevent accidents by Anticipation;  
→ Understand events & trends  
→ Action Taking before it happens

#### Digitalization

- Predictive approach
- Increase capability to exploit more information

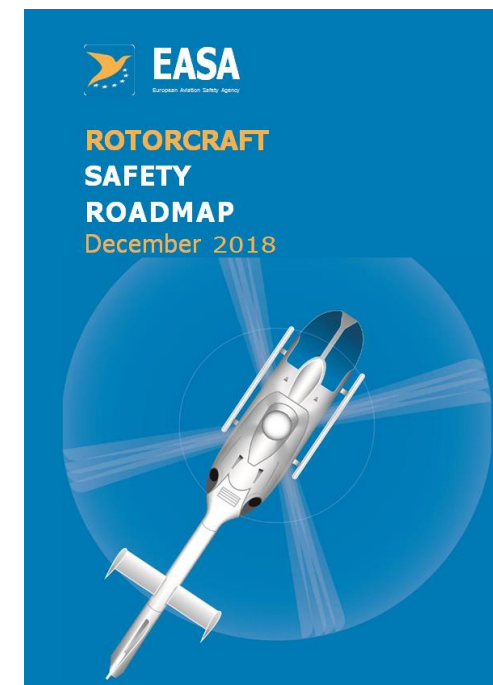
#### Training drives Safety!

- Develop new training devices & methods programs, using today's technology
- Enhance pilot skills, airmanship

#### Safety Enhancement Design Drivers

- Reinforce aircraft resilience to cope with abnormal operational conditions
- **Apply and buy!!**  
Technologies see  
EASA Safety Roadmap

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Thank you