



Human Fatalities and Destroyed Aircraft Due to Wildlife Strikes, 1912 to Present A Military Focus

Phil Shaw, Richard Dolbeer & Jeff McKee

Acknowledgement:
John Thorpe &
John Richardson

USA Birdstrike Conference
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Overview

First recorded strike:	1905
First recorded fatal strike:	1912
Estimated Cost Civil (2016)	USD\$2B/annum

? Adverse effect on planned flight

? Adverse effect on conservation/animal welfare

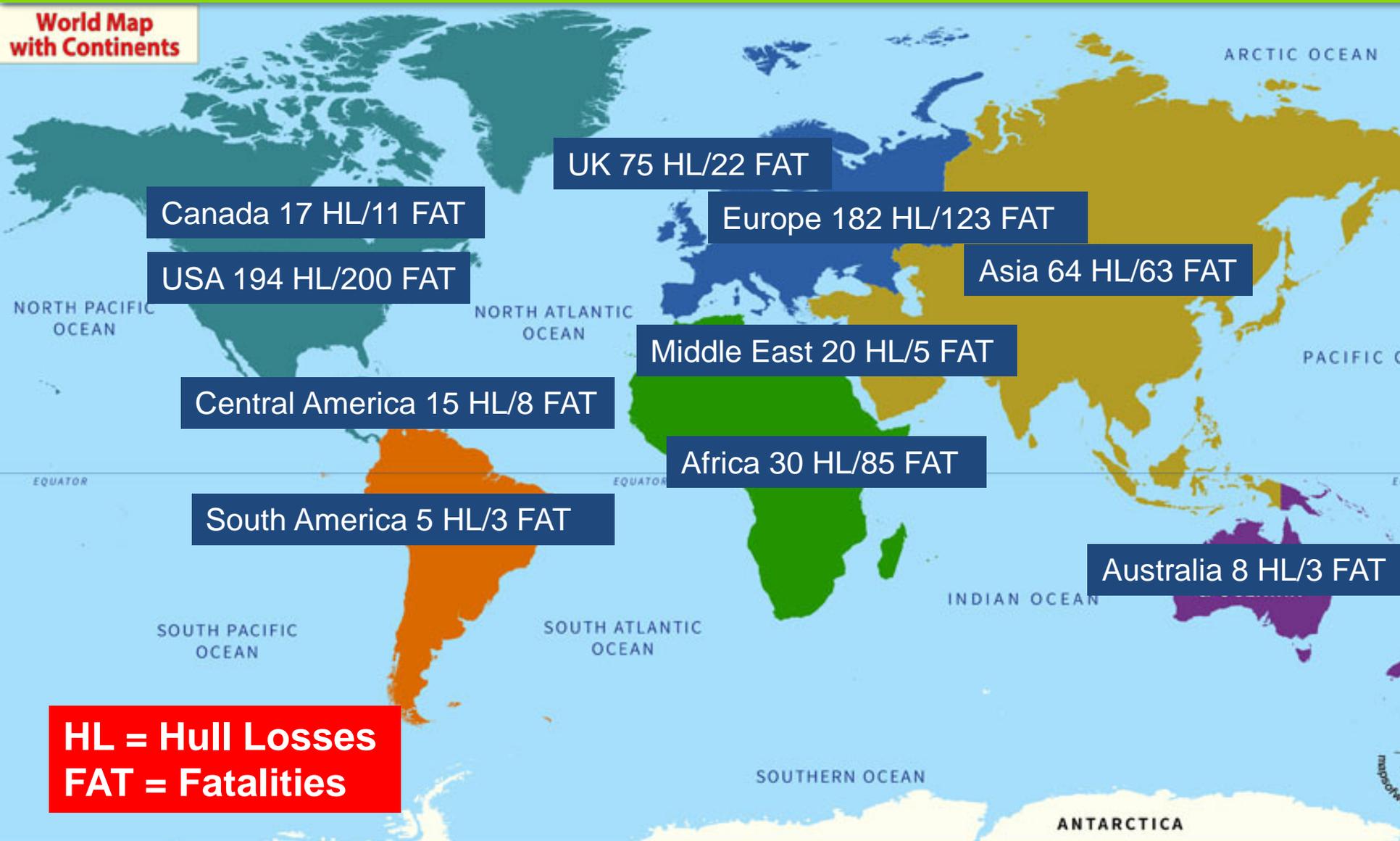
Reporting diligence varies significantly, figures are probably grossly underestimated

Fatalities and Destroyed Aircraft - Worldwide

	No. Hull Losses	No. Fatalities
Civil	202	334
Military	410	193
Total	612	527

Wildlife Caused Accidents by Region (Civil & Military)

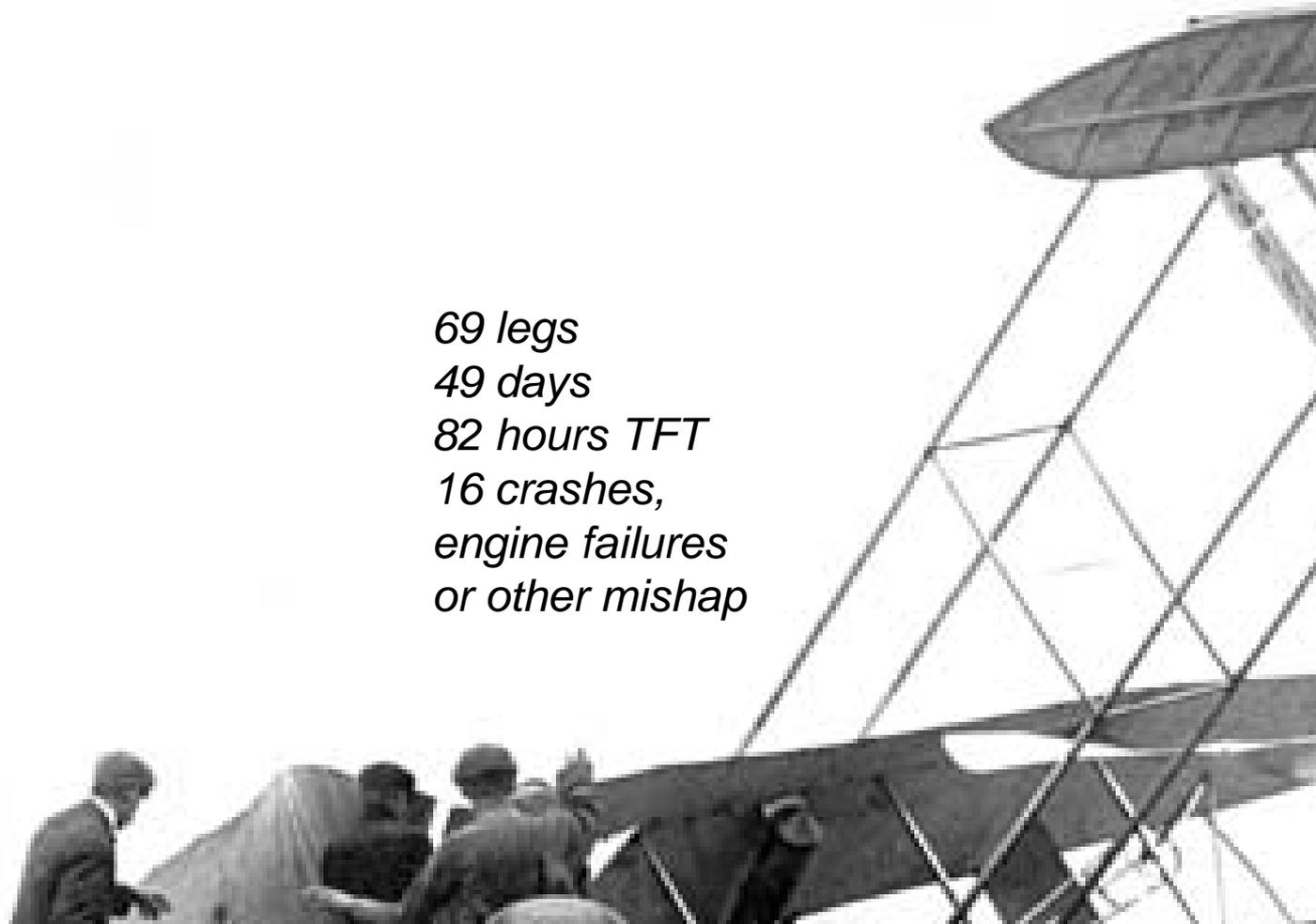
World Map
with Continents



1st Transcontinental flight – Calbraith Perry Rogers



*69 legs
49 days
82 hours TFT
16 crashes,
engine failures
or other mishap*



1st Birdstrike Fatality – Calbraith Perry Rogers

*Daily Times; Chattanooga, Tennessee;
April 4, 1912*



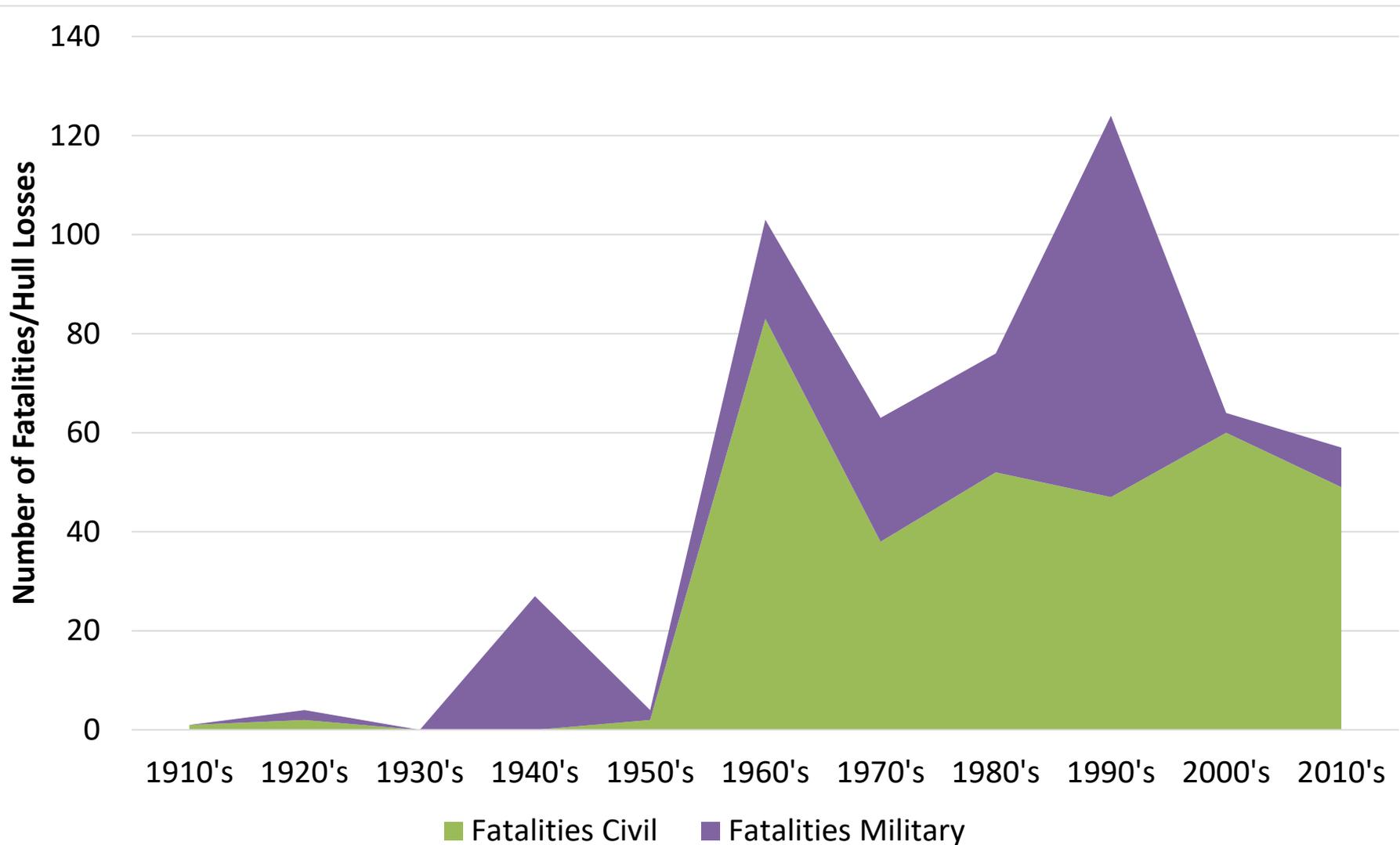
"Seeing a flock of gulls disputing themselves among a great shoal of sardines, just over the breakers, Rodgers again turned and dived down into them, scattering the seafowl in all directions."

"Highly elated with the outcome of his dive, Rodgers then flew farther out to sea, all the time gradually rising until he had reached a height of about 200 feet.

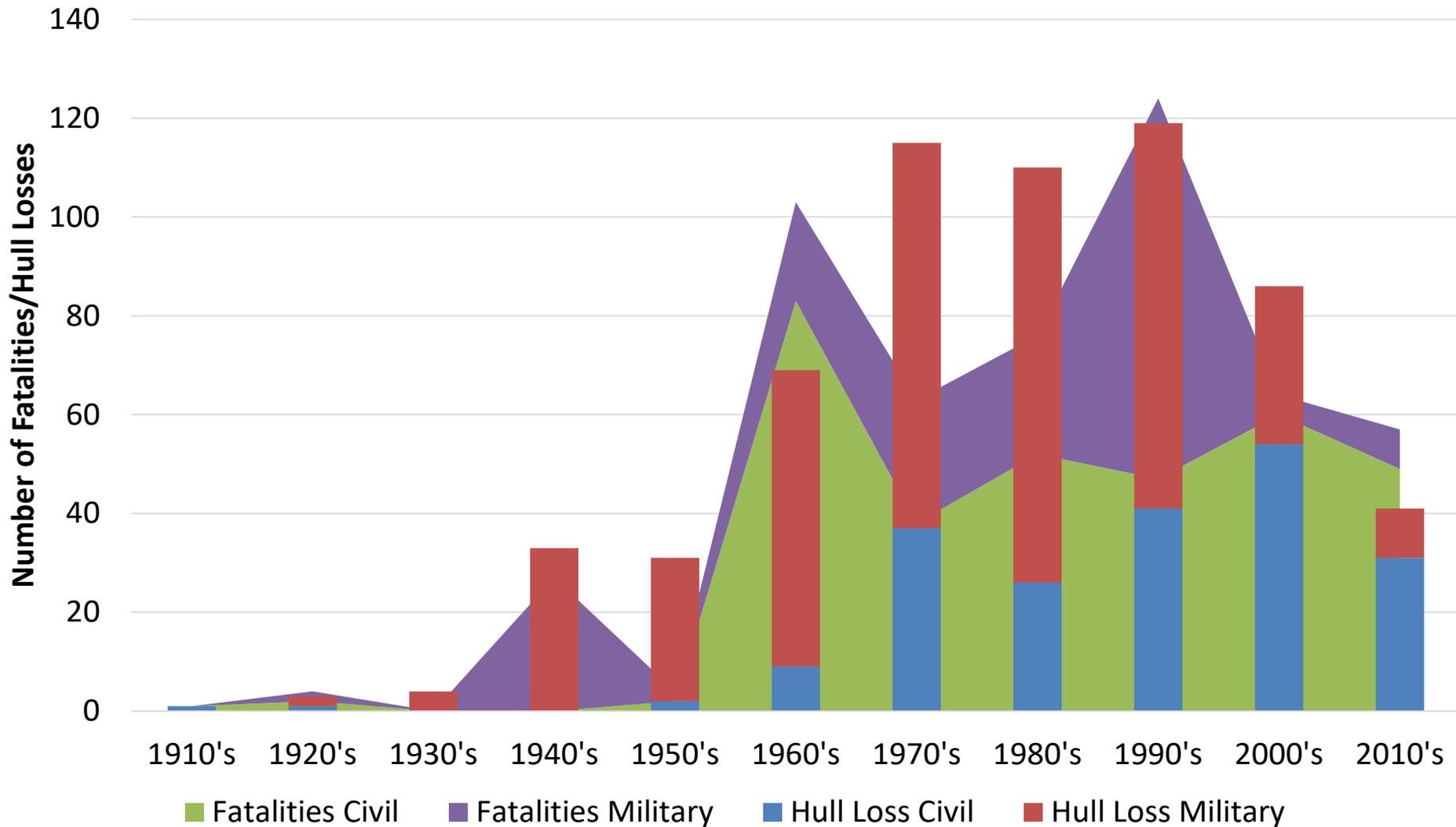
Making a short steep turn, he started at full speed for a pier, then suddenly dipped his planes and his machine began a frightful (rapid?) descent....."

HIS FATAL WRECK - LONG BEACH - CAL.

Fatalities Per Decade



Fatalities and Hull Losses Per Decade



The Intervening Years – 1912 to 1960

- Global movement rates very low
- A/C relatively noisy and slow
- WW1 and WW2 were the main attractions
- Best records from RAF



The Intervening Years – 1912 to 1960

- 1923 first MIL hull loss
- 1940s
 - 33 hull losses & 27 fatalities
(all MIL)



- 1950s & 1960s
 - The jet era /cold war
 - fatality rate per hull loss
low because of ejection
seats

Vickers Viscount Elliott City MA 1962



Struck Tundra Swan @ 6000ft
17 POB/fatalities
Lead to FAA empennage impact requirements

1st American Astronaut to Die – 1964

USAF CAPT Theodore Freeman



Northrop T38 Talon



1st American Astronaut to Die – 1964

- Ellington AFB Houston Texas on 1nm final
- Goose shattered canopy and dual engine ingestion
- Ejected outside the envelope
- NASA introduces “[The Goose Rule](#)”



Let's Engineer a Way Out

Rockwell B1B Lancer Nuclear Strategic Bomber



28th Sept 1987

- 600' AGL 560 knots
- AW Pelican ~6.33kg - wing strike
- 6 POB 3 Fatalities
- Wing designed to 3kg strike at 590kts
- Restricted high speed flight below 5000'AGL for the fleet
- Wing LE Strike protection kits fitted
- SPK = 5kg bird at 590kts???

The Roaring Nineties 1990 -1999

- 1990 Jetstream BAe 31 Both engines destroyed
- 1991 Citation 550 Lost engine
- 1992 PA28 hull loss
- 1993 Citation 550 Both engines replaced
- 1994 C210 Engine and landing gear replaced
- 1995 Concorde Uncontained Engine failure 2 engines replaced
- **1995 E3 Sentry AWACS (B707) Hull loss 24 fatalities**
- 1996 B727 Engine ingestion and one engine repaired
- **1996 E3 Sentry AWACS (B707) Hull loss**
- **1996 C130 Hercules Hull loss 34 fatalities**
- 1997 MD80 Damage all over and one engine replaced
- 1998 B727 Multiple strike Radome and engine destroyed
- 1999 B757 Both engines and wing 400 dead starlings found

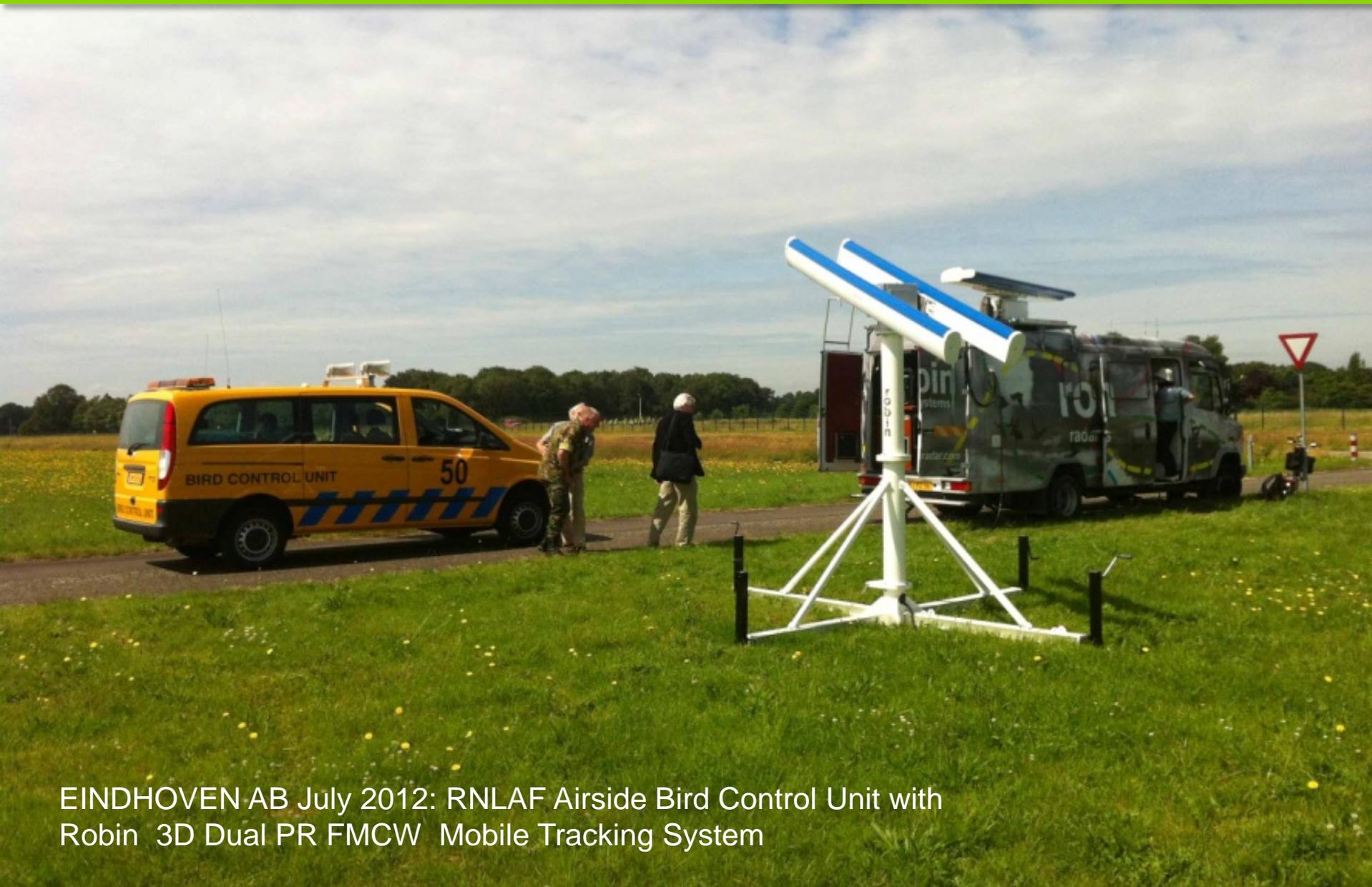


Eindhoven Airbase, Netherlands July 1996

- C130 Hercules
- Starlings on late final
- 3 engines lost
- Attempted missed approach with UCFIT
- 34 fatalities

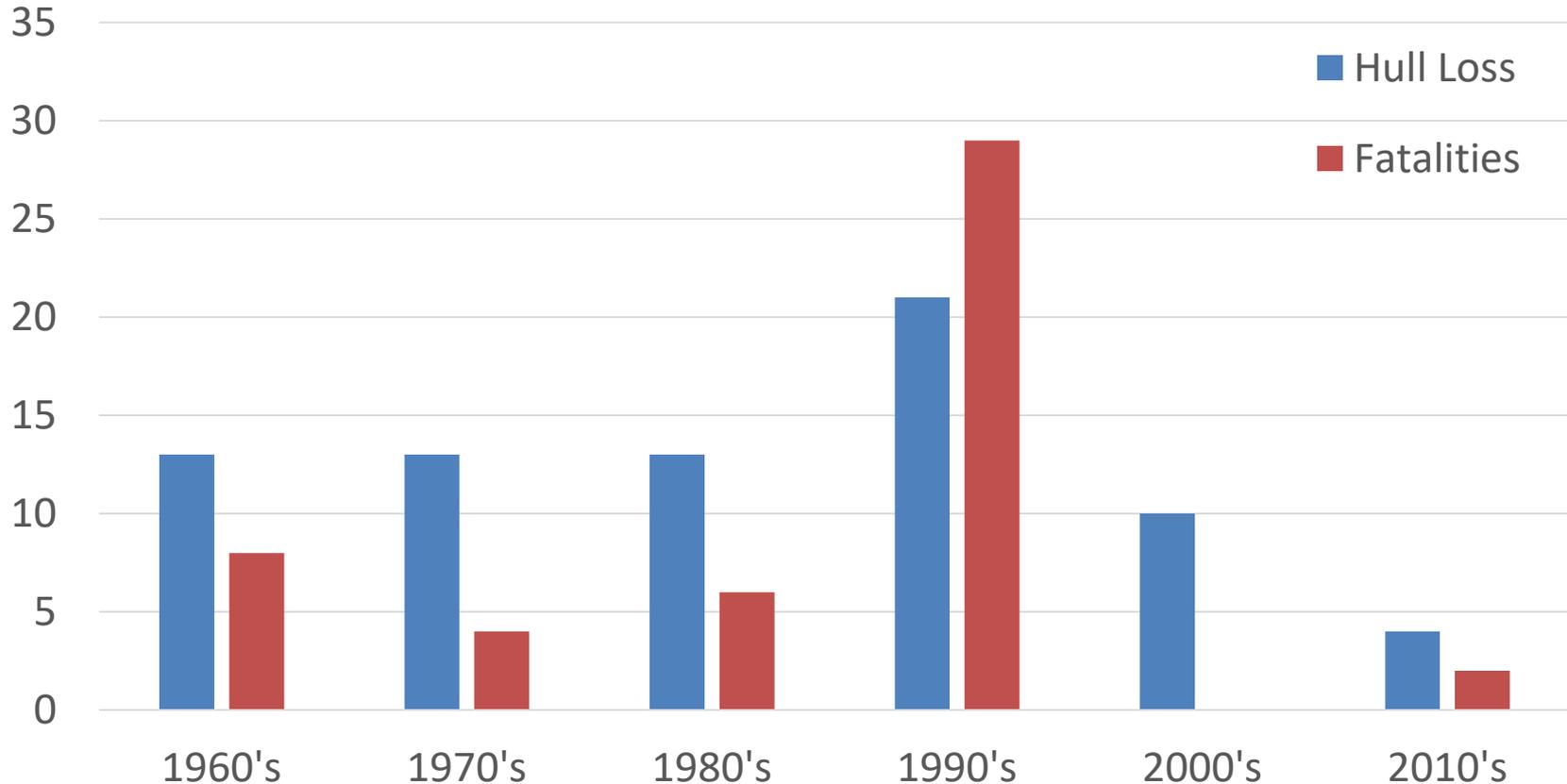


Eindhoven Airbase, Netherlands July 1996



EINDHOVEN AB July 2012: RNLAf Airside Bird Control Unit with Robin 3D Dual PR FMCW Mobile Tracking System

US Military by Decade



1990-1999 US Defence Force reports 30 aircraft and 31 live lost in combat

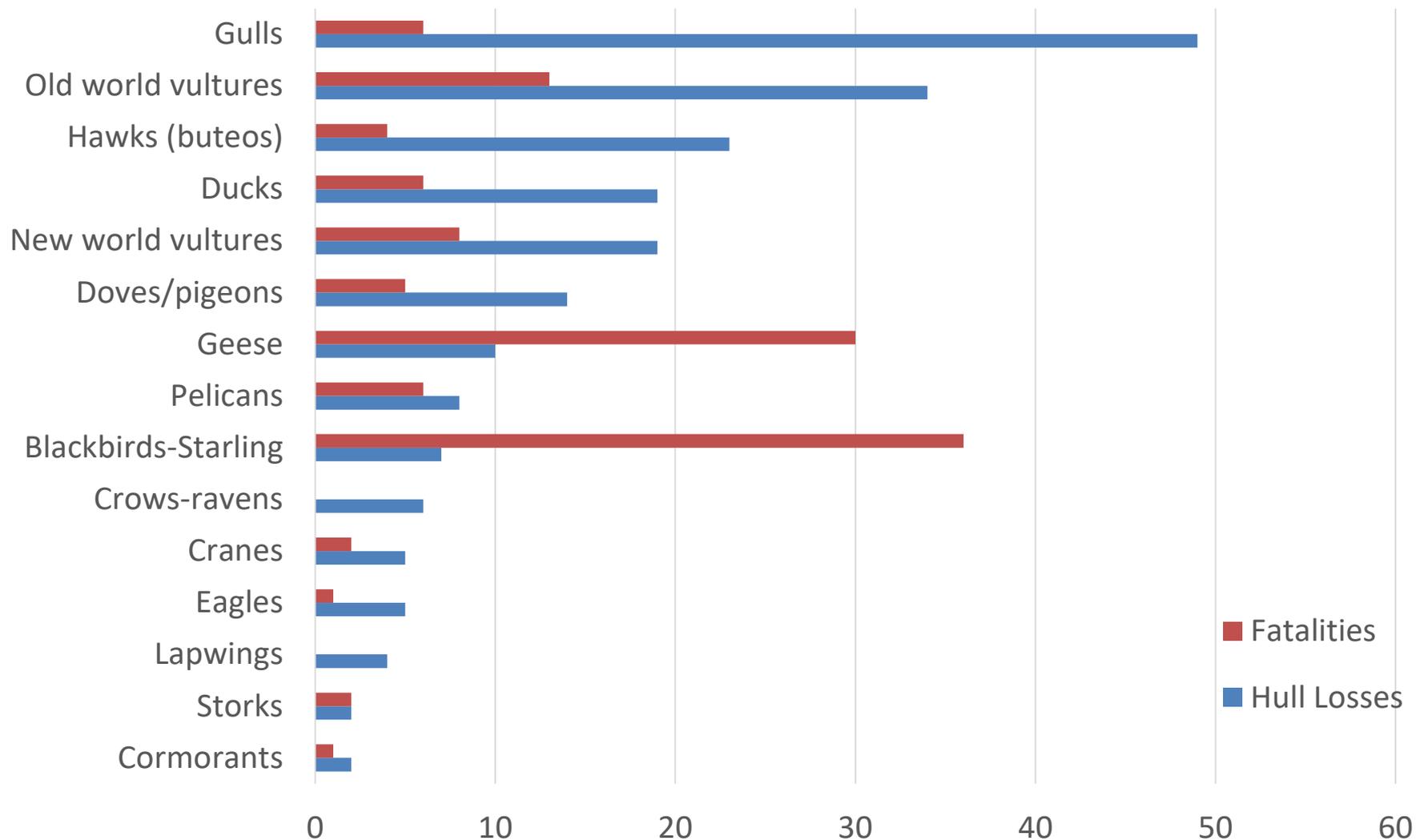
For the same period, 21 aircraft and 29 lives were lost to Wildlife Strike

The New Millennium

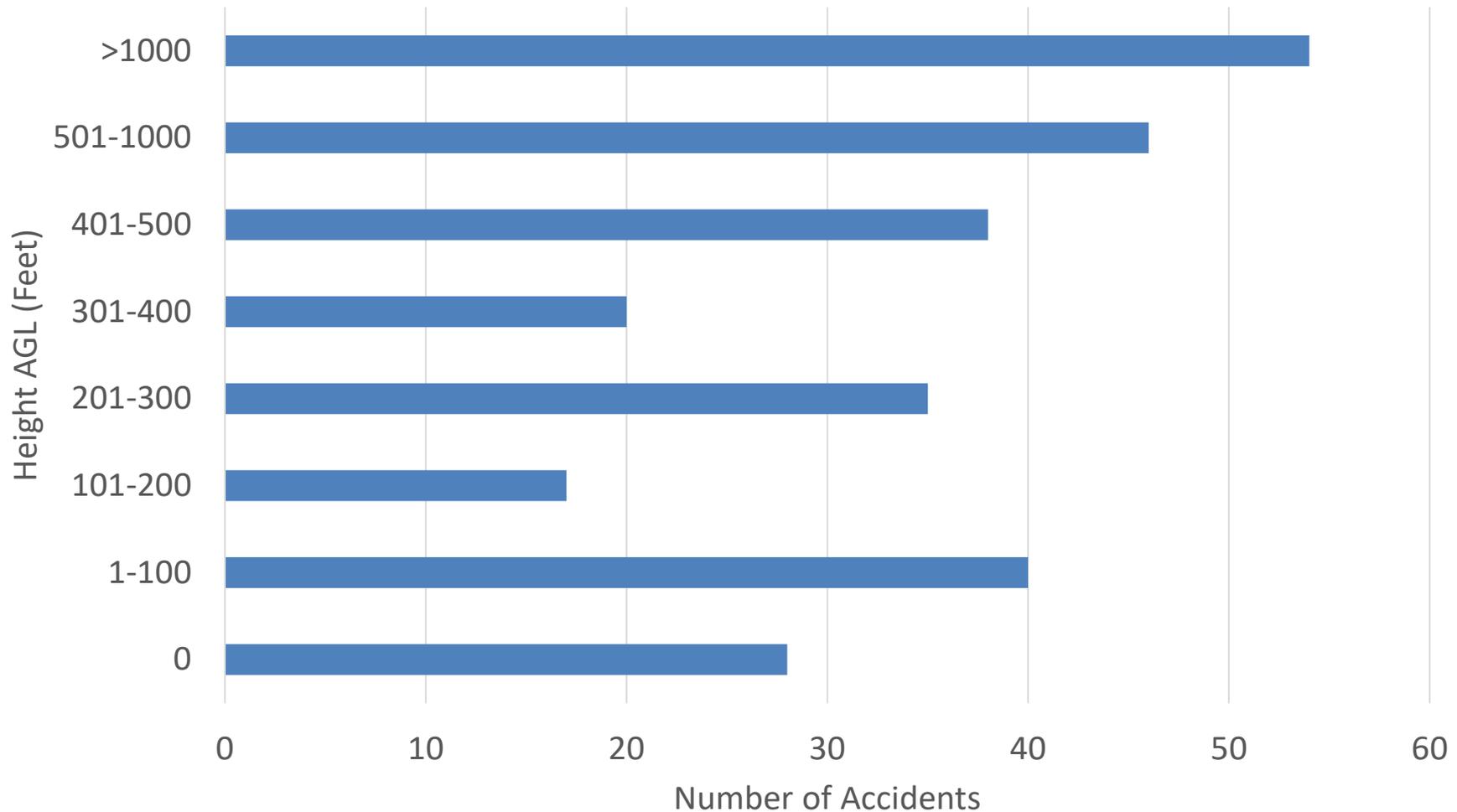


IFALPA Sept 2011
This is real safety issue

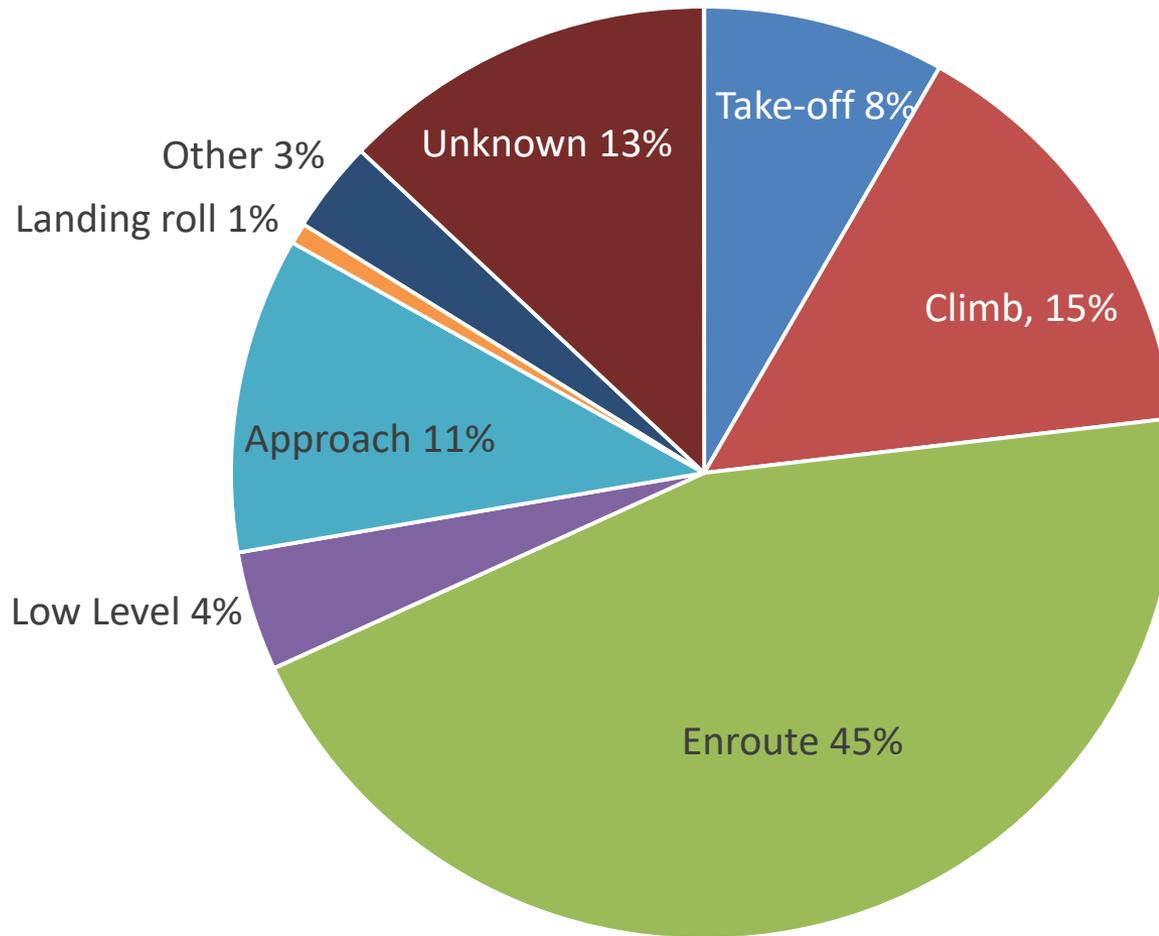
Bird Species (where known) Involved in Military Accidents Worldwide



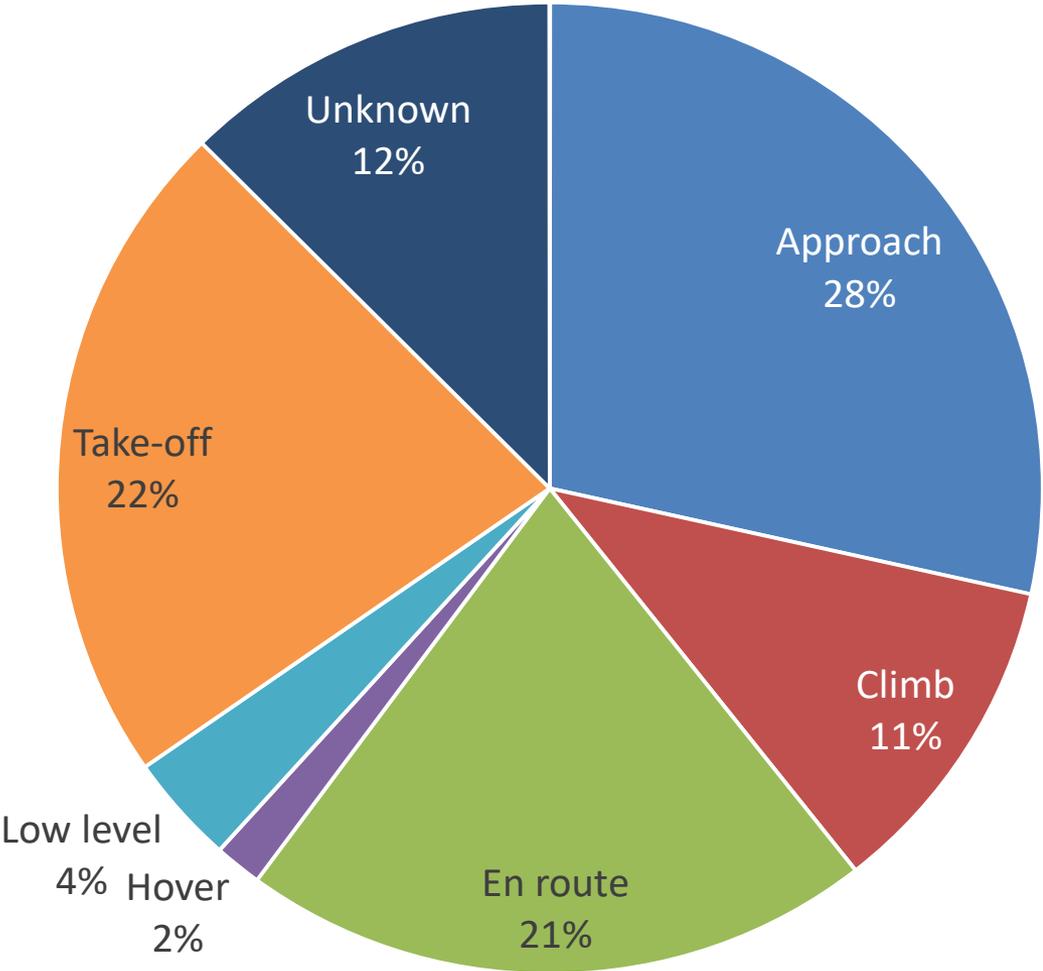
Altitude (where known) of Military Accidents Worldwide



Phase of Flight of Military Accidents Worldwide



Phase of Flight of Military Fatalities Worldwide





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Phil Shaw