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

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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

<table>
<thead>
<tr>
<th></th>
<th>No. Hull Losses</th>
<th>No. Fatalities</th>
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<tbody>
<tr>
<td>Civil</td>
<td>202</td>
<td>334</td>
</tr>
<tr>
<td>Military</td>
<td>410</td>
<td>193</td>
</tr>
<tr>
<td>Total</td>
<td>612</td>
<td>527</td>
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Wildlife Caused Accidents by Region (Civil & Military)

USA 194 HL/200 FAT
Canada 17 HL/11 FAT
Central America 15 HL/8 FAT
South America 5 HL/3 FAT
UK 75 HL/22 FAT
Europe 182 HL/123 FAT
Middle East 20 HL/5 FAT
Africa 30 HL/85 FAT
Asia 64 HL/63 FAT
Australia 8 HL/3 FAT

HL = Hull Losses
FAT = Fatalities
1st Transcontinental flight – Calbraith Perry Rogers

- 69 legs
- 49 days
- 82 hours TFT
- 16 crashes, engine failures or other mishap
Seeing a flock of gulls disporting 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……….
Fatalities and Hull Losses Per Decade

Number of Fatalities/Hull Losses

- 1910's
- 1920's
- 1930's
- 1940's
- 1950's
- 1960's
- 1970's
- 1980's
- 1990's
- 2000's
- 2010's

- Fatalities Civil
- Fatalities Military
- Hull Loss Civil
- Hull Loss Military

AVISURE
MITIGATING BIRD STRIKE RISK
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
Lockheed Electra Boston 1960

Logan Intl Boston USA
RWY 09  20000? Starlings just after rotation

72 POB
62 fatalities
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
The Roaring Nineties
Eindhoven AFB Holland  15th July 1996

- C130 Hercules
- Starlings on late final
- 3 engines lost
- 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
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
Altitude (where known) of Military Accidents Worldwide

### Number of Accidents

- **>1000**: Highest category
- **501-1000**
- **401-500**
- **301-400**
- **201-300**
- **101-200**
- **1-100**
- **0**: Lowest category

### Height AGL (Feet)

- **Number of Accidents**
  - 0
  - 1-100
  - 101-200
  - 201-300
  - 301-400
  - 401-500
  - 501-1000
  - >1000
Phase of Flight of Military Accidents Worldwide

- Take-off: 8%
- Climb: 15%
- Enroute: 45%
- Approach: 11%
- Landing roll: 1%
- Low Level: 4%
- Unknown: 13%
- Other: 3%

Total: 100%
Phase of Flight of Military Fatalities Worldwide

- Unknown: 12%
- Approach: 28%
- Take-off: 22%
- Climb: 11%
- En route: 21%
- Low level: 4%
- Hover: 2%