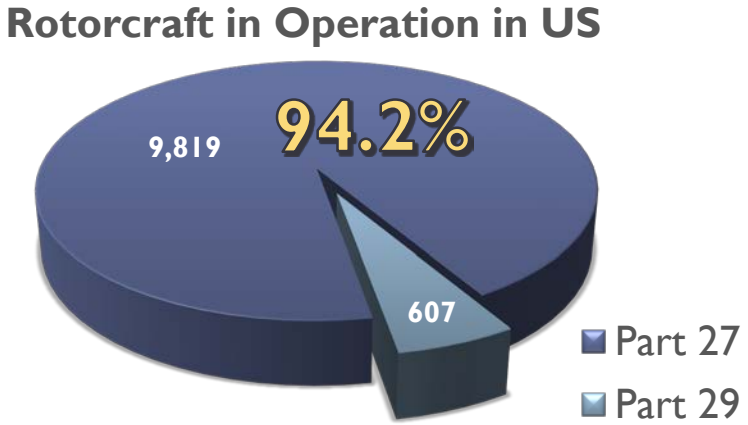
ARAC
Rotorcraft Bird Strike Working Group

August 22, 2017

94% of Operating Rotorcraft Have No Bird Strike Regulation

ARAC RBSWG

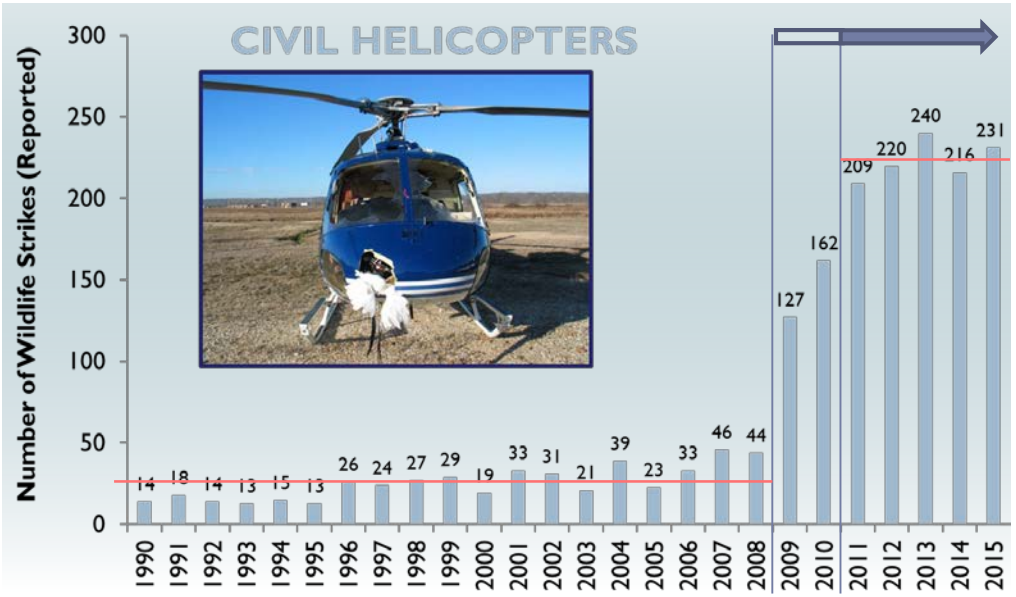
- Part 27 normal category rotorcraft
  - 9 seats or less (crew + passengers)



- Part 29 transport category rotorcraft
  - 10 or more seats (crew + passengers)

Stabilized Reporting of Bird Strikes

- Step increase in bird strike reporting occurred following two significant events early in 2009 with stabilized reporting 2011 and beyond
  - Jan 4, 2009 PHI N748P fatal crash outside Morgan City, Louisiana – the *only* fatal bird strike rotorcraft accident in the FAA's Nat'l Wildlife Strike Database
  - Jan 15, 2009 US Airways Flt 1549 ditched in the Hudson River following bird strikes
- **Jan 2009 – Feb 2016** is used for RBSWG study
  - Under-reporting skews conclusions drawn from data
  - Encompasses the only fatal rotorcraft crash due to bird strike

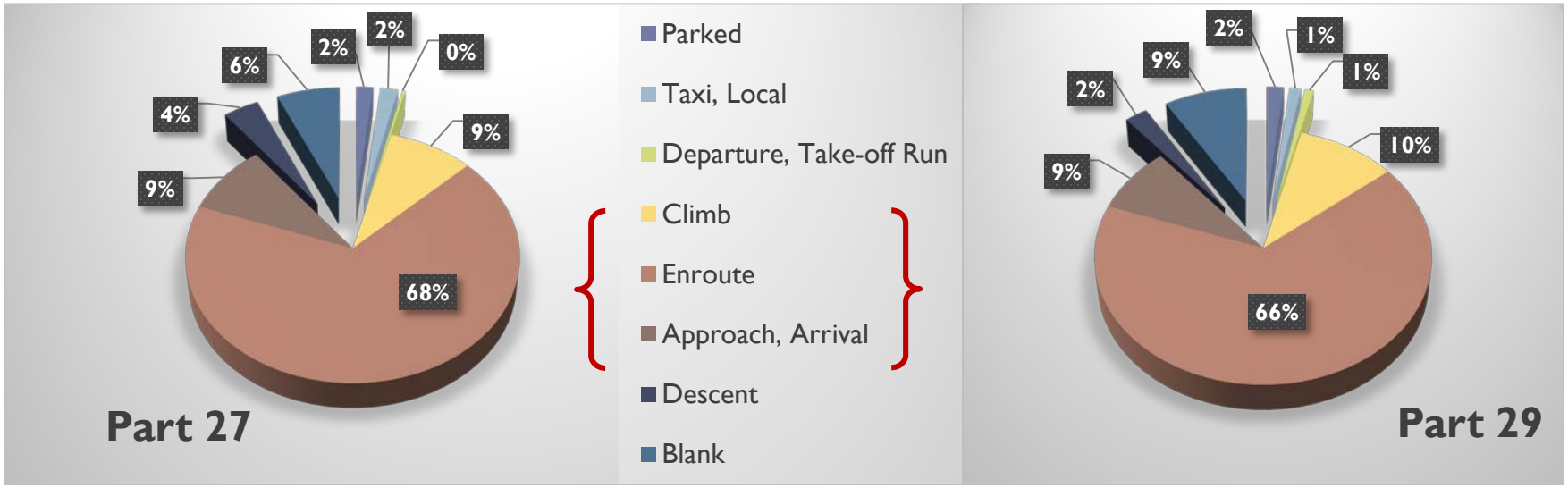


1990-2008 Mean = 25.4 strikes
2011-2015 Mean = 223.2 strikes

FAA's National Wildlife Strike Database (NWSD)

Bird Strikes During Flight Phase

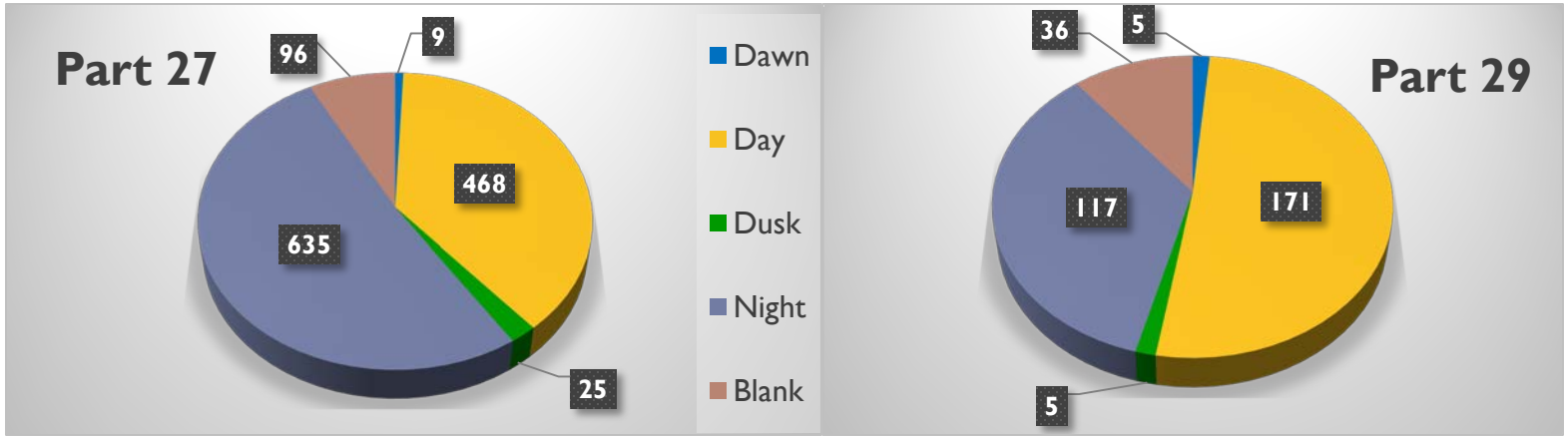
- All bird strikes in FAA's Nat'l Wildlife Strike Database between Jan 1990 – Feb 2016
  - Two-thirds (66-68%) occurred during the *enroute* phase
  - 8-9% during *approach*
  - 9-10% during *climb*
  - These three flight phases contain 85% of the reported bird strikes



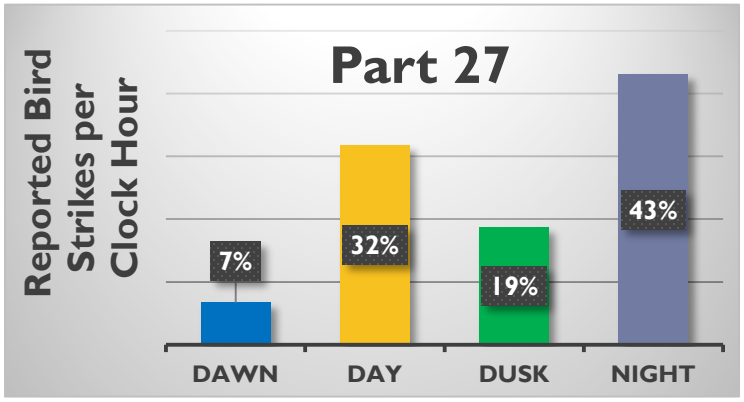
Rotorcraft bird strike threat could best be mitigated, not at airport, but with inflight detection: by bird (lighting); by flightcrew (inflight radar)

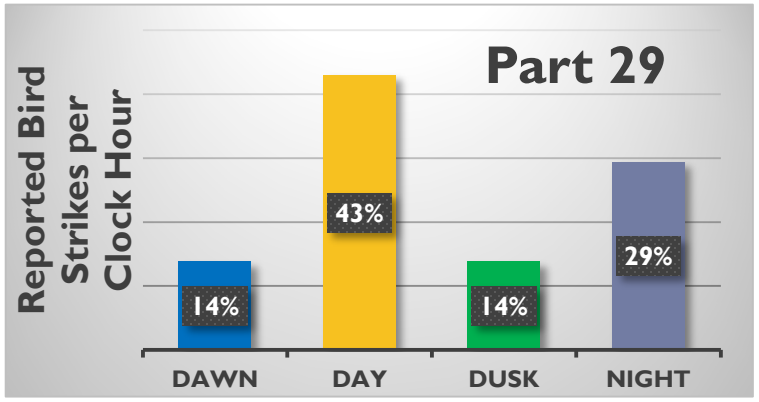
When Do Most Bird Strikes Occur

- Bird strikes in FAA's NWSD between Jan 1990 – Feb 2016



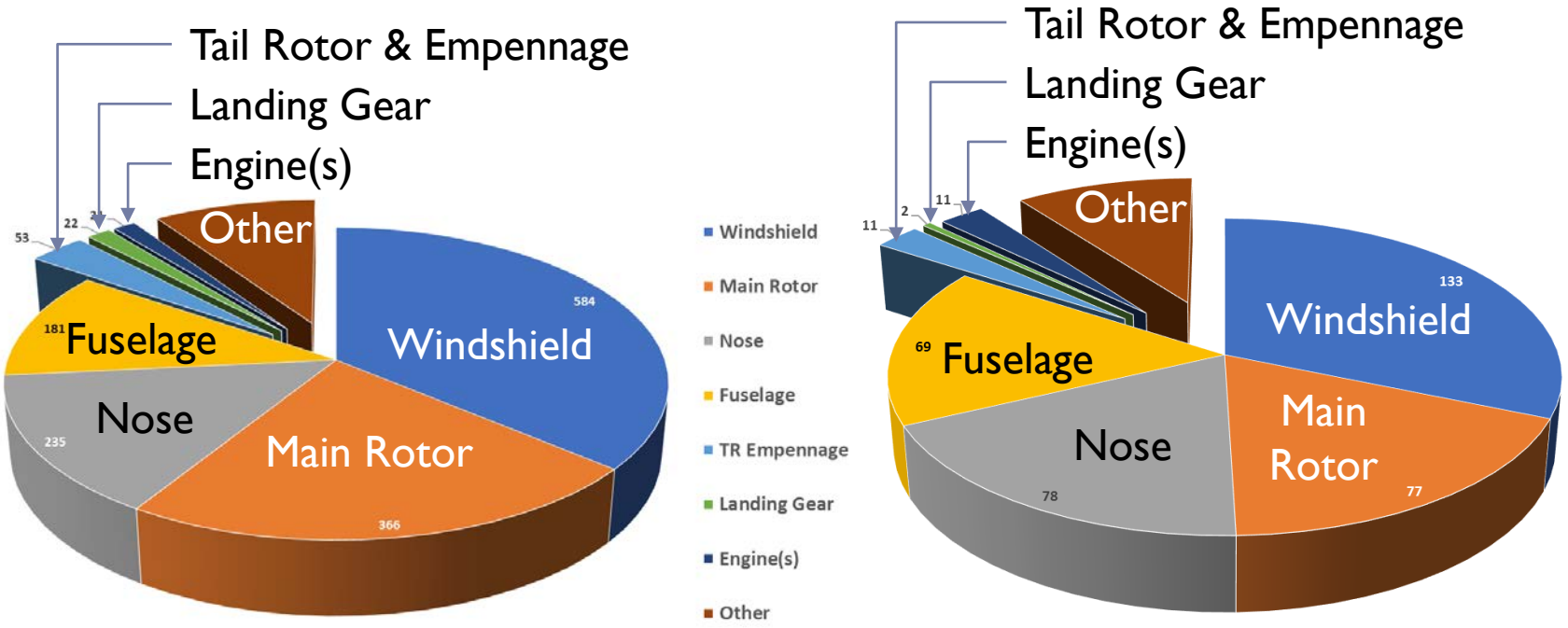
- Normalized by the duration of each time of day





Where Do Most Bird Strikes Occur

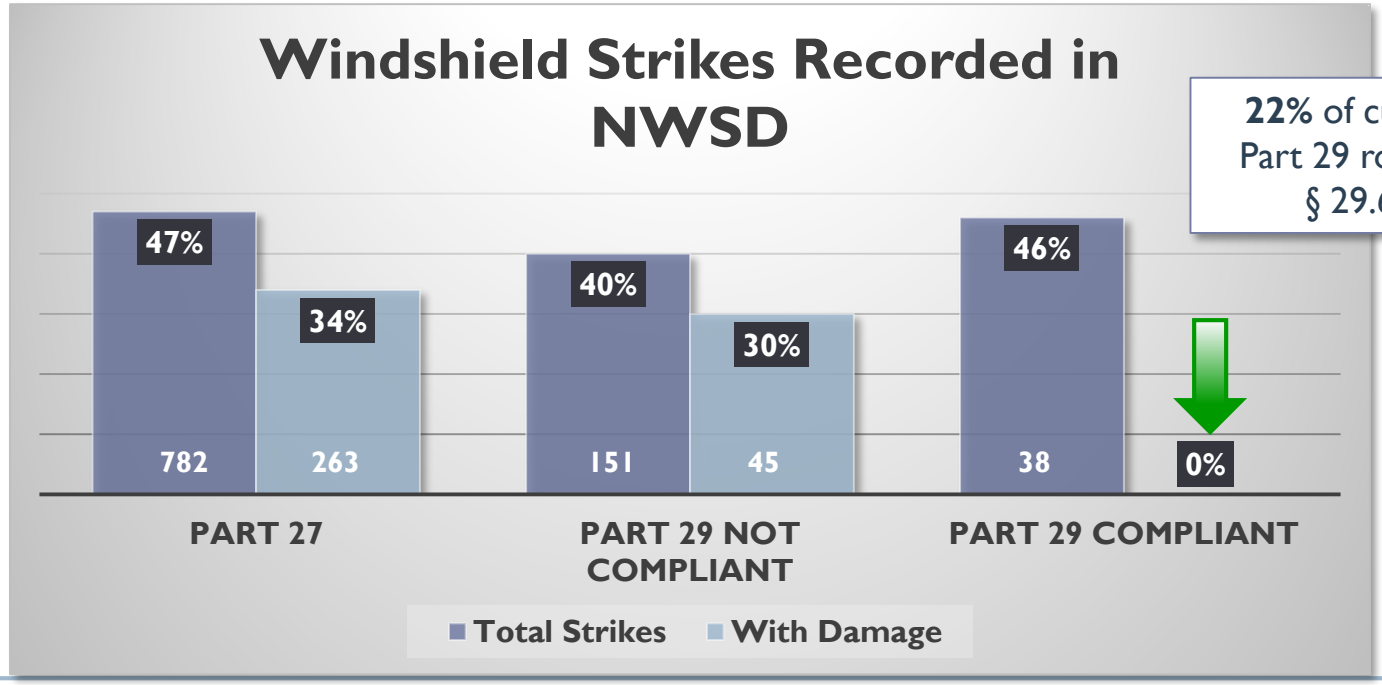
- Of all bird strikes in the FAA's Nat'l Wildlife Strike Database between Jan 1990 – Feb 2016
  - 84-85% of all bird strikes occur forward of the main rotor mast
  - 3-4% occur on the tail rotor or empennage



Part 27 **Part 29**

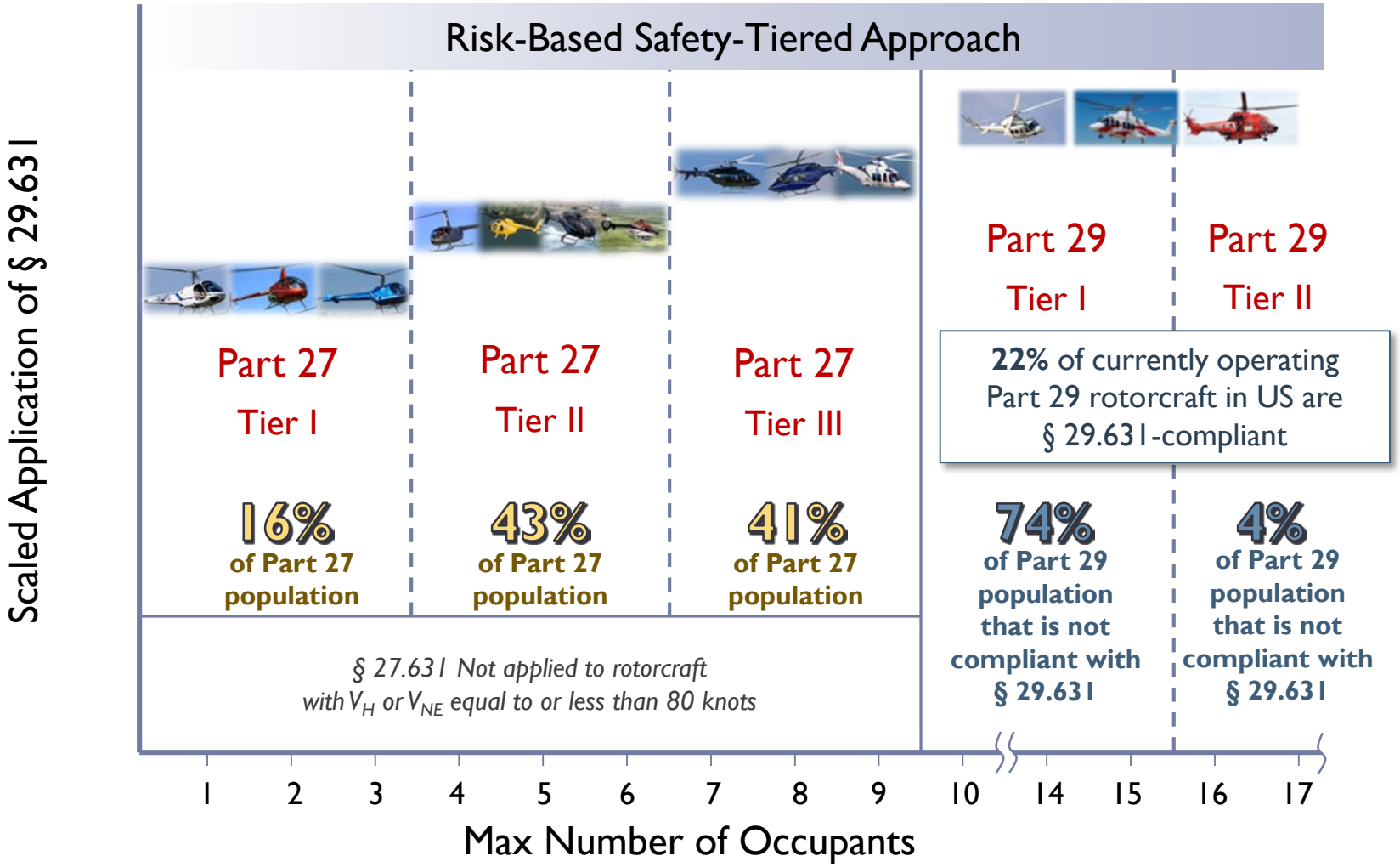
How Effective is Current Rule?

- 40-47% of reported bird strikes occurred on windshields for all rotorcraft during Jan 1990 – Feb 2016
  - No statistical difference between Part 27 & Part 29 helicopters
- 30-34% of strikes onto windshields resulted in damage for rotorcraft that were not certified to FAA bird strike airworthiness standard
- ZERO strikes onto windshields certified to § 29.631 resulted in damage (i.e., penetration) – *THIS IS STATISTICALLY SIGNIFICANT*



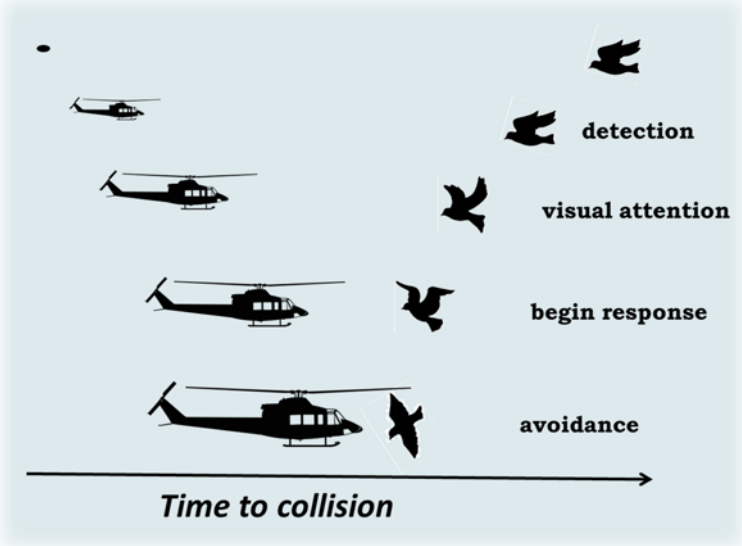
22% of currently operating Part 29 rotorcraft in US are § 29.631-compliant

Proposed Safety Continuum Tiered Approach



Non-Traditional Means: Speed

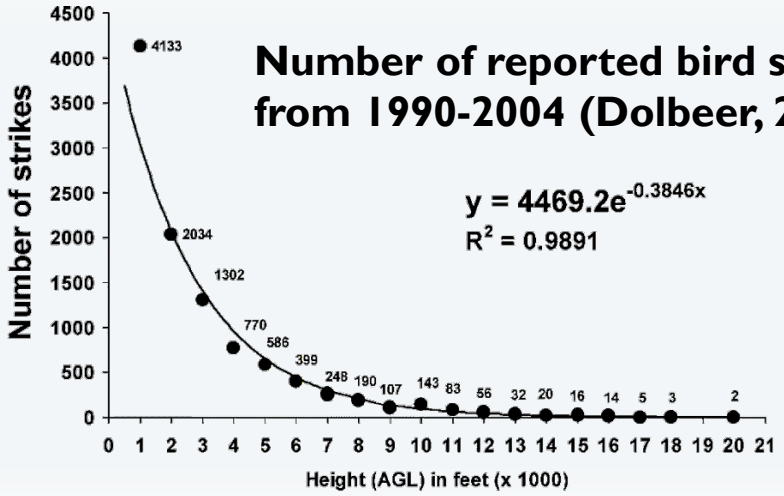
- Speed matters
  - Below 50-85 knots birds detect approaching rotorcraft and initiate evasion
  - Laboratory-based research indicates birds are less likely to avoid oncoming aircraft successfully as aircraft speed increases
  - Operators of rotorcraft have found strikes with some bird species can be reduced when limiting flight speeds to 80 knots



CAUTION
In areas of known high avian concentration, avoid airspeeds above 80 knots when possible

Non-Traditional Means: Altitude

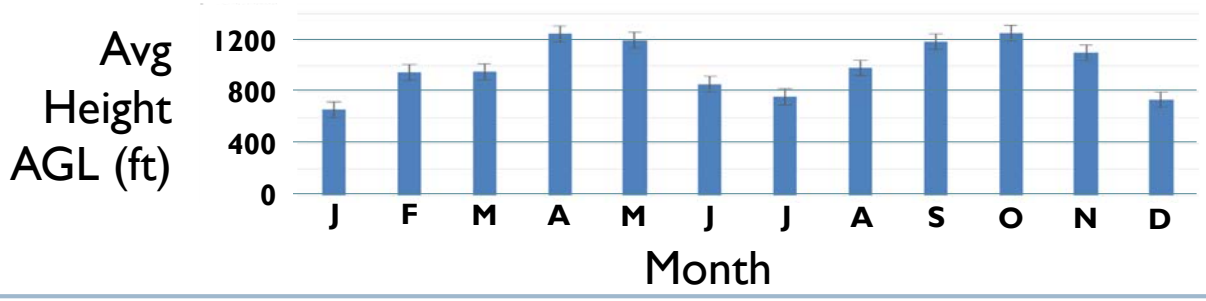
- Altitude matters
  - Presence of birds (i.e., threat) declines 32% for each 1,000-ft in altitude



Number of reported bird strikes with civil aircraft in the US from 1990-2004 (Dolbeer, 2006)

Dolbeer, R. A. (2006). Height Distribution of Birds Recorded by Collisions with Civil Aircraft, Wildlife Damage Management, Internet Center for USDA National Wildlife Research Center. *Internet Center for Wildlife Damage Management, USDA National Wildlife Research Center, Staff Publications, University of Nebraska – Lincoln*, 1345-1350

  - Altitude tends to be higher in spring and fall (probably due to migration) and at night



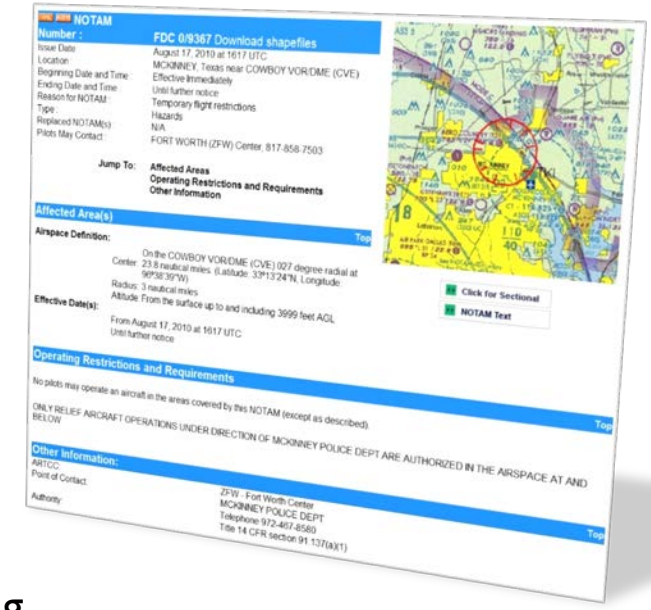
Non-Traditional Means: Visual Lighting Aid

- Lighting (pulsing, lasers, etc.)
  - Research suggests enhanced avian detection of approaching vehicle with appropriate contrast of vehicle to background conditions
    - Continuous full-spectrum light in sunny conditions
    - 2-Hz pulse of full-spectrum light in partly cloudy conditions

- Paint schemes
  - Aircraft coloring may provide specific species of birds with early detection of approaching aircraft allowing them to evade
- Further research is needed to support a recommendation requiring visual lighting aid technology

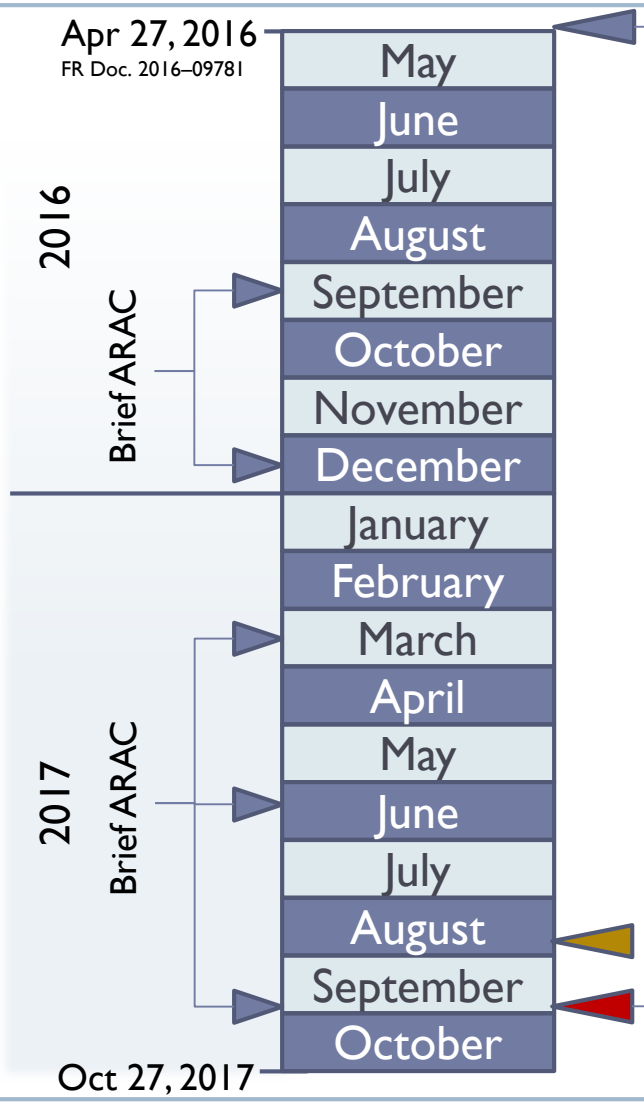
Non-Traditional Means: Awareness

- Training
  - Preflight planning should include brief on:
    - Location of bird concentrations during seasonal migrations
    - Local bird nesting and roosting habitats
    - Recent bird strike events
  - Locations of high probability of avian concentrations should be:
    - Published by FAA FSDO in Flight Service Briefing
    - Included in alert bulletins and flight service notifications to airmen (NOTAMs)



- Personal Protective Equipment (PPE)
  - When possible flight crews should use helmets and visors
  - Not applicable for all operations (e.g., tour operators)

Final Report Due to the FAA Oct 27th



ARAC RBSWG – Publication in FR Doc. 2016–09781

Task 9 – Submit report to ARAC with recommendations on findings and results 30 days prior to Oct 27th, 2017