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SAFETY DATA REPORT

U.S. NTSB ACCIDENT DATA 2016–2025

Fixed-Wing and Rotary-Wing Defining Events in GA Personal, Instructional, Aerial Application, Positioning, Flight Test and Other Operations

2016 — 2025

LET THE DATA SPEAK

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Independent analysis of NTSB-supplied accident records. Use of NTSB data does not imply NTSB review or endorsement.

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Terms and acronyms

Table 1 defines the key terms used throughout the report, and Table 2 lists the acronyms. NTSB data fields are defined in Section 2.9 (Table 6).

Table 1. Key terms

Term	Meaning in this report
Type of operation	The NTSB FlightOperationType of the flight, for example Personal, Instructional or Aerial application. Each type of operation is analyzed and reported separately (Section 2.2).
All analyzed types	All analyzed types of operation for one aircraft category combined, shown as context only. Business and Executive/Corporate are not included (Section 2.3).
Study period	Accidents with an event date from January 1, 2016, through December 31, 2025.
Defining event	The NTSB DefiningEvent category assigned to each accident. "Defining event" always means this category; "event" alone means one accident record, as in "two-aircraft events".
Accident, fatal accident, fatality	The three measures. Each accident is counted once within each grouping even when more than one aircraft is involved (event totals; Section 2.5).
n	Total: the number of accidents, fatal accidents or fatalities in the type of operation for the study period.
Share	A defining event's percentage of the type-of-operation total for the same measure. A share is not a rate.
Other (defining event)	The CICTT occurrence category for any occurrence not covered under another category (CICTT, 2017). Kept in totals and denominators but not ranked (Section 2.9).
Small totals	A type of operation with fewer than 20 fatal accidents. Shares are unstable and one accident can change a ranking.

Table 2. Acronyms

Acronym	Meaning
CAROL	Case Analysis and Reporting Online (NTSB)
CAST	Commercial Aviation Safety Team
CICTT	CAST/ICAO Common Taxonomy Team
FAA	Federal Aviation Administration
GA	General aviation
ICAO	International Civil Aviation Organization
IMC	Instrument meteorological conditions
LOC-I	Loss of Control In-Flight
NTSB	National Transportation Safety Board

Executive summary

This report analyzes National Transportation Safety Board (NTSB) records of general aviation accidents from January 1, 2016, through December 31, 2025, in the types of operation not covered by the 1st Edition: Personal, Instructional, Aerial application, Positioning, Flight test and the smaller types of operation (Kochan et al., 2026; NTSB, 2026). GA Business and GA Executive/Corporate, reported in the 1st Edition, are excluded, and Part 135 On-Demand is not in this file. Airplanes (fixed-wing) and helicopters (rotary-wing) are analyzed separately. The analyzed fixed-wing records contain 10,034 accidents, 1,706 fatal accidents and 2,844 fatalities; the rotary-wing records contain 1,007 accidents, 173 fatal accidents and 300 fatalities. In each type of operation, the NTSB defining-event categories are ranked three ways, by fatalities, by fatal accidents and by accidents, and each ranked defining event is reported with all three counts. Table 3 gives the ten-year totals for each charted type of operation with the leading defining event by each measure.

Table 3. Ten-year totals and leading defining events

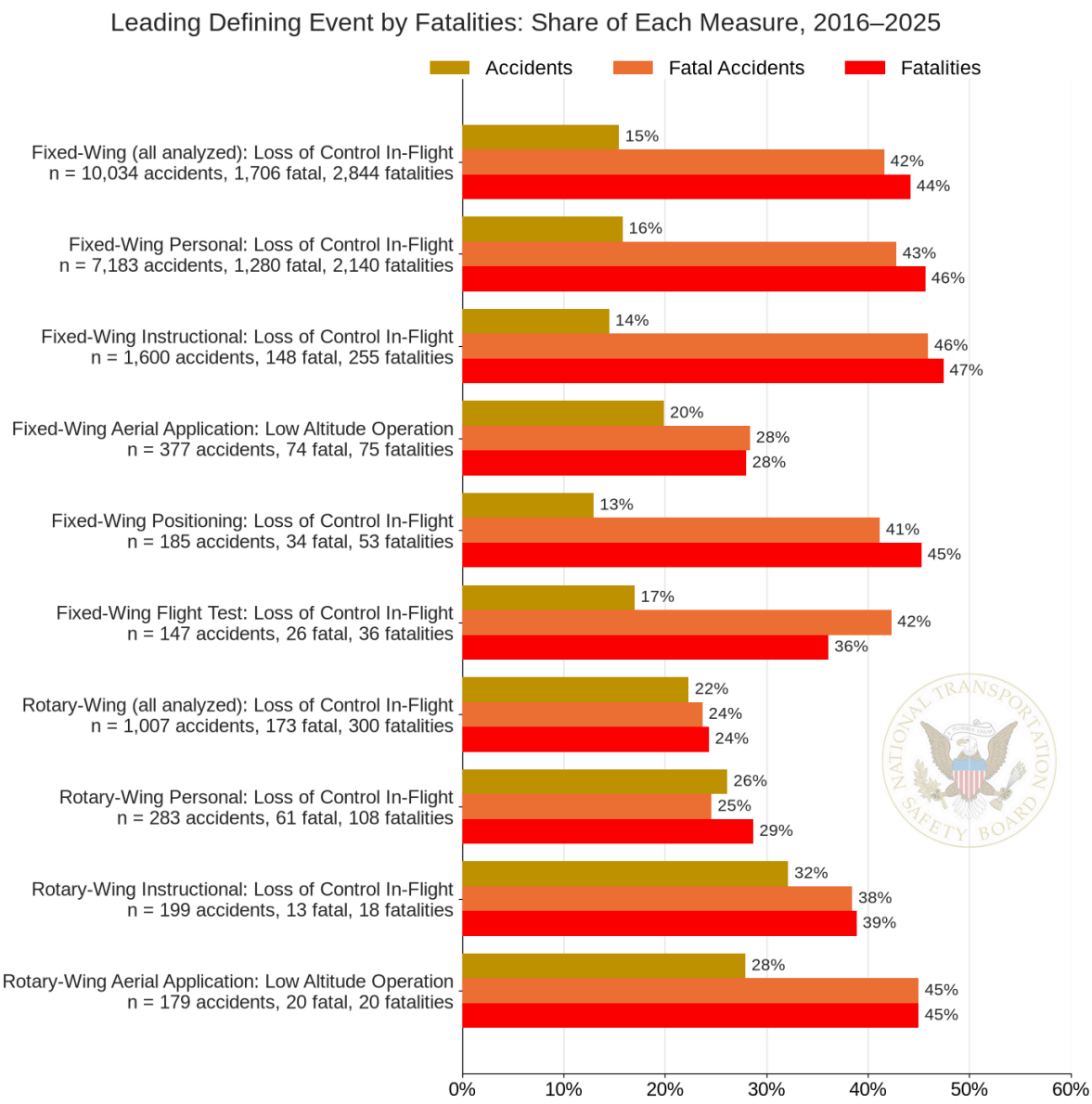
Aircraft	Type of operation	Accidents (n)	Fatal accidents (n)	Fatalities (n)	Leading defining event by fatalities (share of fatalities)	Leading defining event by fatal accidents (share of fatal accidents)	Leading defining event by accidents (share of accidents)
Fixed-wing	All analyzed types	10,034	1,706	2,844	Loss of Control In-Flight (44%)	Loss of Control In-Flight (42%)	Loss of Control on Ground (19%)
Fixed-wing	Personal	7,183	1,280	2,140	Loss of Control In-Flight (46%)	Loss of Control In-Flight (43%)	Loss of Control on Ground (19%)
Fixed-wing	Instructional	1,600	148	255	Loss of Control In-Flight (47%)	Loss of Control In-Flight (46%)	Loss of Control on Ground (22%)
Fixed-wing	Aerial application	377	74	75	Low Altitude Operation (28%)	Low Altitude Operation (28%)	Low Altitude Operation (20%)
Fixed-wing	Positioning	185	34	53	Loss of Control In-Flight (45%)	Loss of Control In-Flight (41%)	Loss of Control In-Flight (13%)
Fixed-wing	Flight test	147	26	36	Loss of Control In-Flight (36%)	Loss of Control In-Flight (42%)	System/Component Failure - Powerplant (22%)
Rotary-wing	All analyzed types	1,007	173	300	Loss of Control In-Flight (24%)	Loss of Control In-Flight (24%)	Loss of Control In-Flight (22%)
Rotary-wing	Personal	283	61	108	Loss of Control In-Flight (29%)	Loss of Control In-Flight (25%)	Loss of Control In-Flight (26%)
Rotary-wing	Instructional	199	13	18	Loss of Control In-Flight (39%)	Loss of Control In-Flight (38%)	Loss of Control In-Flight (32%)
Rotary-wing	Aerial application	179	20	20	Low Altitude Operation (45%)	Low Altitude Operation (45%)	Low Altitude Operation (28%)

Totals include accidents whose defining event is coded Other or Unknown; these are not ranked. Together they account for 331 of 2,844 fixed-wing fatalities (12%) and 71 of 300 rotary-wing fatalities (24%). The type-of-operation rows do not add up to "All analyzed types": some accidents are counted in two types of operation, and "All analyzed types" also includes the Unknown type and the smaller types shown in Appendix C. "All analyzed types" combines the analyzed types of operation for one aircraft category and is shown as context

(decision AG-D07). Charted types of operation have 100 or more accidents (AG-D08). Rotary-wing Instructional has small totals (13 fatal accidents).

Key findings

1. **Loss of Control In-Flight leads fatalities in every charted fixed-wing type of operation except aerial application.** It accounts for 44% of all analyzed fixed-wing fatalities (1,257 of 2,844), and 46% of Personal, 47% of Instructional, 45% of Positioning and 36% of Flight test fatalities (Figure 1).
2. **The defining event with the most fatalities is not the one with the most accidents.** In all analyzed fixed-wing operations, Loss of Control on Ground leads accidents with 1,857 (19%) but accounts for 1% of fatal accidents and 1% of fatalities. Loss of Control In-Flight accounts for 15% of accidents, 42% of fatal accidents and 44% of fatalities.
3. **In aerial application, Low Altitude Operation leads fatalities for both airplanes and helicopters.** It accounts for 28% of fixed-wing aerial application fatalities (21 of 75), with Loss of Control In-Flight one fatality behind at 27% (20), and 45% of rotary-wing aerial application fatalities (9 of 20). The fixed-wing margin is small, and 7 fixed-wing aerial application fatalities are coded Unknown.
4. **Loss of Control In-Flight leads rotary-wing fatalities in every charted type of operation except aerial application.** It accounts for 24% of all analyzed rotary-wing fatalities (73 of 300), 29% of Personal and 39% of Instructional fatalities (Instructional on small totals: 13 fatal accidents and 18 fatalities).
5. **Unintended Flight Into IMC is among the leading defining events by fatalities in personal flying.** It ranks third by fixed-wing Personal fatalities (162, 8%) and second by rotary-wing Personal fatalities (17, 16%).
6. **Midair ranks second by fixed-wing Instructional fatalities.** Midair accounts for 23 of 255 Instructional fatalities (9%) from 8 fatal accidents. Thirteen of these fatalities come from five collisions between an instructional airplane and a personal airplane, and two from a collision with a helicopter. Injury fields are event totals and do not show which aircraft each person was aboard, so these fatalities are also counted in the other aircraft's type of operation. This position depends on how two-aircraft accidents are counted (Section 3.8).



Share of the total for each type of operation on the same measure, including Unknown and Other. Business and Executive/Corporate are excluded (1st Edition). Source: NTSB accident data, 2016–2025 (extract of September 21, 2026). Analysis by the authors; not reviewed or endorsed by the NTSB.

Figure 1. Leading-event shares by measure

Figure 1 shows, for the leading defining event by fatalities in each charted type of operation, its share of accidents, fatal accidents and fatalities, 2016–2025. In every type of operation shown, the leading defining event's share of fatalities is larger than its share of accidents.

What the findings mean

The data direct attention toward the defining events associated with the most fatalities, not only toward those that occur most often. The two leading defining events by fatalities in each charted type of operation are:

- **Fixed-wing All analyzed types:** Loss of Control In-Flight (1,257 fatalities) and System/Component Failure - Powerplant (232 fatalities), of 2,844 total fatalities.
- **Fixed-wing Personal:** Loss of Control In-Flight (977 fatalities) and System/Component Failure - Powerplant (181 fatalities), of 2,140 total fatalities.
- **Fixed-wing Instructional:** Loss of Control In-Flight (121 fatalities) and Midair (23 fatalities), of 255 total fatalities.
- **Fixed-wing Aerial application:** Low Altitude Operation (21 fatalities) and Loss of Control In-Flight (20 fatalities), of 75 total fatalities.
- **Fixed-wing Positioning:** Loss of Control In-Flight (24 fatalities) and Unintended Flight Into IMC (8 fatalities), of 53 total fatalities.
- **Fixed-wing Flight test:** Loss of Control In-Flight (13 fatalities) and System/Component Failure - Powerplant (6 fatalities, tied with System/Component Failure - Non-power), of 36 total fatalities.
- **Rotary-wing All analyzed types:** Loss of Control In-Flight (73 fatalities) and Low Altitude Operation (29 fatalities, tied with System/Component Failure - Powerplant), of 300 total fatalities.
- **Rotary-wing Personal:** Loss of Control In-Flight (31 fatalities) and Unintended Flight Into IMC (17 fatalities), of 108 total fatalities.
- **Rotary-wing Instructional:** Loss of Control In-Flight (7 fatalities) and Fuel Related (2 fatalities, tied with Midair, Abrupt Maneuver and Unintended Flight Into IMC), of 18 total fatalities.
- **Rotary-wing Aerial application:** Low Altitude Operation (9 fatalities) and System/Component Failure - Non-power (2 fatalities, tied with Loss of Control on Ground), of 20 total fatalities.

The shares describe where recorded outcomes concentrated. They do not establish cause, and they are not rates.

1. Introduction and framing

1.1 Purpose

This report is a factual, traceable analysis of accident records supplied by the National Transportation Safety Board (NTSB) for accidents from January 1, 2016, through December 31,

2025 (EventYear 2016–2025). It extends the 1st Edition (Kochan et al., 2026) to the general aviation types of operation that report did not cover, using the same method. It identifies the defining events associated with the most fatalities, fatal accidents and accidents in each type of operation, for airplanes and helicopters separately, and presents those results in a consistent, repeatable format. The analysis is findings-led: it reports where outcomes accumulated and does not make causal claims from aggregate data. Defining-event names follow the occurrence categories of the CAST/ICAO Common Taxonomy Team (CICTT, 2017).

1.2 What reaches an accident report

Accident records capture only the most consequential end of a wider range of safety events. Heinrich (1931) introduced the widely reproduced idea that serious injuries sit at the top of a much larger base of less serious occurrences, a concept often drawn as a triangle or pyramid. The specific ratios Heinrich proposed have since been examined critically, and Manuele (2011) concluded that they are not soundly supported and that reducing the frequency of minor events will not necessarily produce an equivalent reduction in serious outcomes.

This report uses the triangle for one purpose only: to remind the reader that many events never reach an accident report. The accidents analyzed here are known, reported accidents; the underlying and precursor events that lead to them may be underreported. The report does not imply any fixed ratio between accidents and lesser events, and it does not estimate the number of unreported events from these data. Figure 2 is conceptual and not to scale.

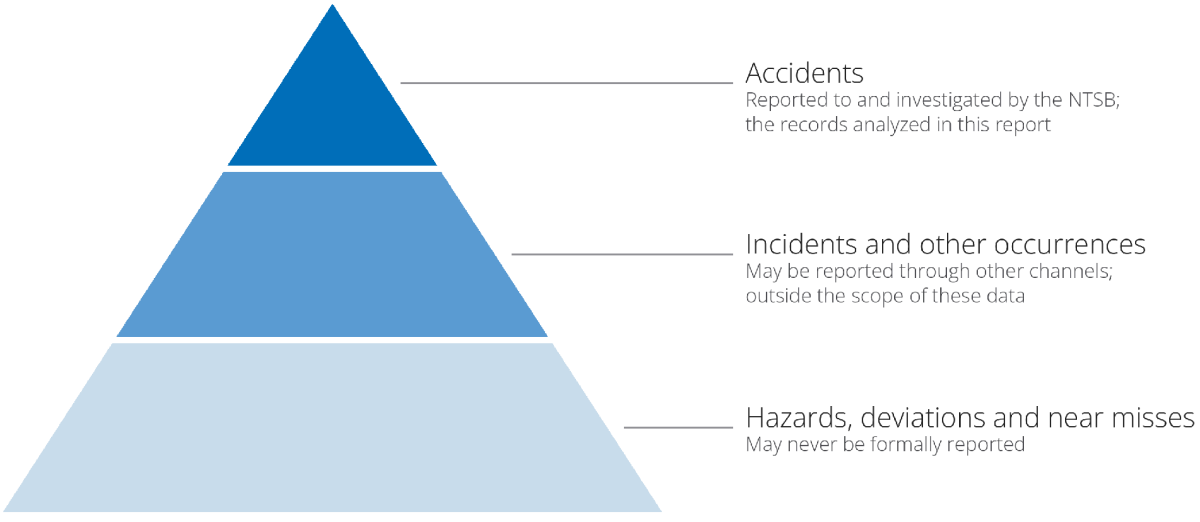


Figure 2. Conceptual framing of reported accidents

1.3 Contribution of this report

The 1st Edition ranked defining events by fatalities, fatal accidents and accidents for GA Business, GA Executive/Corporate and Part 135 On-Demand operations (Kochan et al., 2026). This report applies the same method to the remaining general aviation types of operation in a second NTSB file, including Personal and Instructional flying, which together account for most general aviation accidents in these data. Its method reproduces every NTSB summary table supplied with the file and the 1st Edition published totals (Appendix D).

1.4 How to read the findings

Each charted type of operation has three figures, presented in a fixed order: top three defining events by fatalities, by fatal accidents and by accidents. Every figure shows all three measures for each displayed defining event, so the reader can compare human consequence and frequency for the same defining event. The legend gives the total (n) for each measure. The callout on each figure identifies the leading defining event and its share of the full total for that type of operation on the ranking measure. Every bar carries its value. The supplied extract has no field that separates fatalities outside the aircraft, so every label shows the count only (Section 2.9).

2. Scope and method

2.1 Data source and permission

The accident records were supplied by the NTSB Office of Research and Engineering, Safety Research Division (NTSB, 2026). The NTSB Safety Research Division confirmed that the data may be used in a published report, with the NTSB identified as the data source and without implying NTSB review or endorsement of the analysis (NTSB Safety Research Division, personal communication, October 13, 2026). This confirmation covers the 2016–2025 data supplied by the NTSB in the same request, including the All-GA file used in this report. The fields are comparable to those of the NTSB investigation database available through the Case Analysis and Reporting Online (CAROL) system (NTSB, n.d.). The analysis reflects the extract obtained on September 21, 2026: 11,937 aircraft rows and 11,813 accident events. The source file is never edited; its SHA-256 fingerprint is given in Appendix A.

2.2 Study period and study operations

Study period. Accidents with an event date from January 1, 2016, through December 31, 2025 (EventYear 2016–2025, calendar years). Every record in the file falls in this period; an automated check stops the run if any does not. Case-number digits are not the event year.

Study operations. Each NTSB FlightOperationType value is reported as a separate type of operation, using the NTSB value verbatim (AG-D03). Table 4 lists the types of operation charted in this report; all other types of operation appear in Appendix C.

Table 4. Charted types of operation and source filters

Type of operation	Source filter
Fixed-wing All analyzed types	AircraftCategory = Airplane; all analyzed FlightOperationType values
Fixed-wing Personal	AircraftCategory = Airplane; FlightOperationType = Personal
Fixed-wing Instructional	AircraftCategory = Airplane; FlightOperationType = Instructional
Fixed-wing Aerial application	AircraftCategory = Airplane; FlightOperationType = Aerial application
Fixed-wing Positioning	AircraftCategory = Airplane; FlightOperationType = Positioning
Fixed-wing Flight test	AircraftCategory = Airplane; FlightOperationType = Flight test
Rotary-wing All analyzed types	AircraftCategory = Helicopter; all analyzed FlightOperationType values
Rotary-wing Personal	AircraftCategory = Helicopter; FlightOperationType = Personal
Rotary-wing Instructional	AircraftCategory = Helicopter; FlightOperationType = Instructional
Rotary-wing Aerial application	AircraftCategory = Helicopter; FlightOperationType = Aerial application

2.3 Aircraft scope and exclusions

One report contains two separate analyses: fixed-wing airplanes (AircraftCategory = Airplane) first, then rotary-wing aircraft (AircraftCategory = Helicopter), with no pooled totals. GA Business and GA Executive/Corporate airplane and helicopter rows are excluded because the 1st Edition reported them (AG-D02); they are re-derived only as a quality check, and all four published totals match (Appendix D). The 1st Edition covered airplanes and helicopters only, so the 22 balloon and 2 glider accidents in GA Business (4 fatal accidents, 21 fatalities) are included with the other aircraft categories in Table C38. Other aircraft categories appear in tables only (Appendix C.38). Aircraft category is taken from the source field and is not inferred from make or model. Table 5 shows how the 11,937 aircraft rows divide. Its accident column sums to 11,822, nine more than the 11,813 events, because nine events appear in two rows: four involve an airplane and a helicopter, and five involve an analyzed airplane and an excluded Business or Executive/Corporate aircraft.

Table 5. Supplied records by aircraft category and treatment

Aircraft category	Treatment	Aircraft rows	Accidents (events)
Airplane	Analyzed (Section 3 or 4)	10,139	10,034
Airplane	Excluded: Business or Executive/Corporate (1st Edition)	241	240
Balloon	Tables only (Appendix C.38)	22	22
Balloon	Tables only (Appendix C.38)	71	71
Glider	Tables only (Appendix C.38)	2	2
Glider	Tables only (Appendix C.38)	205	202
Gyroplane	Tables only (Appendix C.38)	99	99
Helicopter	Analyzed (Section 3 or 4)	1,011	1,007

Aircraft category	Treatment	Aircraft rows	Accidents (events)
Helicopter	Excluded: Business or Executive/Corporate (1st Edition)	37	36
Powered parachute	Tables only (Appendix C.38)	24	24
Powered-lift	Tables only (Appendix C.38)	7	6
Ultralight	Tables only (Appendix C.38)	4	4
Weight-shift	Tables only (Appendix C.38)	75	75

2.4 Records at non-U.S. locations

N-registered aircraft accident records at non-U.S. locations remain in the analysis as supplied, following the NTSB's confirmation for the 1st Edition that these records belong in the extract (NTSB Safety Research Division, personal communication, October 13, 2026). Registration and accident location are different attributes; the scope is therefore described as NTSB-supplied accident records, 2016–2025. The analyzed types of operation include 211 fixed-wing and 31 rotary-wing accidents with a non-U.S. or blank country field. The 165 fixed-wing accidents with an Unknown type of operation (61 fatal accidents, 142 fatalities; 138 at non-U.S. locations) are not charted on their own but are included in the "All analyzed types" totals (Table C6). No analysis of overseas accident factors is made.

2.5 Unit of analysis: event totals

The report uses the term event totals: each accident is counted once within each grouping, with aircraft involvement stated separately where it differs. No valid aircraft rows are deleted. The NTSB Safety Research Division confirmed this treatment for the 1st Edition (NTSB Safety Research Division, personal communication, October 13, 2026). Applied to this file, the rule reproduces all ten NTSB summary tables supplied with it, value for value (Appendix D).

2.6 Fatalities in multi-aircraft accidents

The injury fields in the supplied extract are event totals repeated on each aircraft row, so they are never summed across aircraft. The file contains 124 events with two aircraft rows: 121 two-aircraft events and 3 single aircraft listed on two rows that differ only in engine type (ERA16LA156, WPR22LA063, DCA24LA200), each counted once. Four situations are disclosed. First, 31 fixed-wing events involve aircraft in two different types of operation; each is counted once in each type (8 fatal accidents, 23 fatalities; AG-D06). Second, five fixed-wing events and one rotary-wing event within the analyzed types of operation carry a different defining event on each aircraft row and are counted once under each, as in the NTSB summary tables (AG-D05). Third, five events include an aircraft in an excluded type of operation; the event is kept through its analyzed aircraft row. Fourth, four events involve an airplane and a helicopter (CEN18LA087,

ERA17LA332, WPR22FA001, WPR23LA041); each is counted in both the fixed-wing and the rotary-wing analysis, which are never added together. Each case is listed in Appendix B.

2.7 Blank injury fields

Blank FatalInjuries and SeriousInjuries fields follow NTSB guidance: they generally mean zero, with possible exceptions (NTSB Safety Research Division, personal communication, September 29, 2026). The file has 3,269 rows with a blank FatalInjuries field and 3,341 with a blank SeriousInjuries field. No row with a blank fatality field has a Fatal highest injury level, and almost all blank fatality fields are in records from 2020 on. Original blanks are preserved in the source file and treated as zero only in calculations. Three events have HighestInjuryLevel recorded as Fatal and FatalInjuries of zero (CEN19FA235, WPR20LA279 and CEN20LA413); FatalInjuries governs, as in the NTSB summary tables.

2.8 Corrections protocol

Supported corrections and verified gap-filling are allowed. Original NTSB files remain unchanged; any change is made in a working copy with the original value and source recorded, and any change that affects the findings requires co-author agreement. No corrections have been made in this draft.

2.9 Field definitions

Table 6 defines the terms and NTSB data fields used in this report.

Table 6. Field definitions

Term	Definition used in this report
Accident	An aircraft accident as defined in the NTSB regulation (Definitions, 49 C.F.R. § 830.2, 2026): an occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and the time all such persons have disembarked, and in which any person suffers death or serious injury or the aircraft receives substantial damage. Counted as one unique event within each grouping (MKey).
Fatal accident	An accident with FatalInjuries of 1 or more. A fatal injury is one that results in death within 30 days of the accident (Definitions, 49 C.F.R. § 830.2, 2026). The fatal share of a defining event is its fatal accidents divided by its accidents, shown with both counts (Section 5).
Fatalities	The sum of FatalInjuries, counted once per event. The supplied extract has no separate onboard or ground injury field (see Ground fatalities).
Defining event	The NTSB DefiningEvent field, used as the primary category. The NTSB describes the defining event as "the point at which the flight turned from normal operation to abnormal" (NTSB, n.d., Defining Event entry). Category names are based on the CICTT occurrence categories, although some names differ (CICTT, 2017).
Unknown and Other	CICTT categories for occurrences with insufficient information to classify, or not covered by another category (CICTT, 2017). Retained in full lookup tables and in all denominators; not eligible as displayed top-three defined-event categories.

Term	Definition used in this report
Share (%)	Defining-event total divided by the full total for the type of operation on the same measure, across all defining-event lookups.
Type of operation	The NTSB FlightOperationType value, used verbatim (Section 2.2).
Ground fatalities	Persons fatally injured outside the aircraft. The supplied extract has no separate ground-injury field, so ground fatalities cannot be separated. The NTSB confirmed that FatalInjuries includes any persons fatally injured on the ground (NTSB Safety Research Division, personal communication, October 13, 2026).

2.10 Outcome shares, not rates

Percentages describe where recorded outcomes concentrate within each type of operation. They are not rates per flight, per departure or per flight hour, and the supplied records contain no exposure denominator. No exposure-based rates are estimated in this report: published FAA flight-hour estimates by type of use (Federal Aviation Administration, 2026) end with calendar year 2024, and a 2016–2025 rate would require imputing 2025 (AG-D10). Underlying totals for all three measures are shown alongside every share, and small totals are identified.

2.11 Chart construction

Each chart selects its own top three defined events, sorted by the stated ranking measure, and shows accidents, fatal accidents and fatalities side by side. The callout gives the leading defining event's share of the full total for the type of operation on the ranking measure, never only the displayed events. Ties follow the tie-break rule in Appendix A, and the chart footnote names every tie among the displayed events or with the next event below them. Types of operation with fewer than 100 accidents are reported in tables only (Appendix C). Each chart legend gives n for the three measures. The NTSB seal on each figure identifies the source of the data only; it does not indicate NTSB review, approval or endorsement.

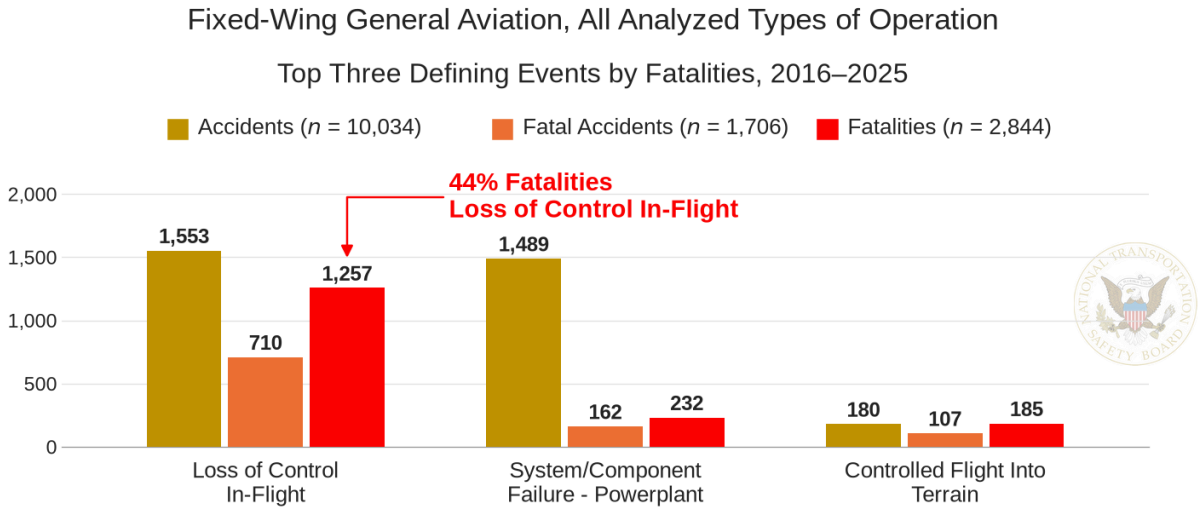
3. Fixed-wing findings

3.1 All analyzed types

This combined view covers every analyzed fixed-wing type of operation and is shown as context; each type of operation is also reported on its own. Together, these types of operations have 10,034 accidents, 1,706 fatal accidents and 2,844 fatalities, 2016–2025.

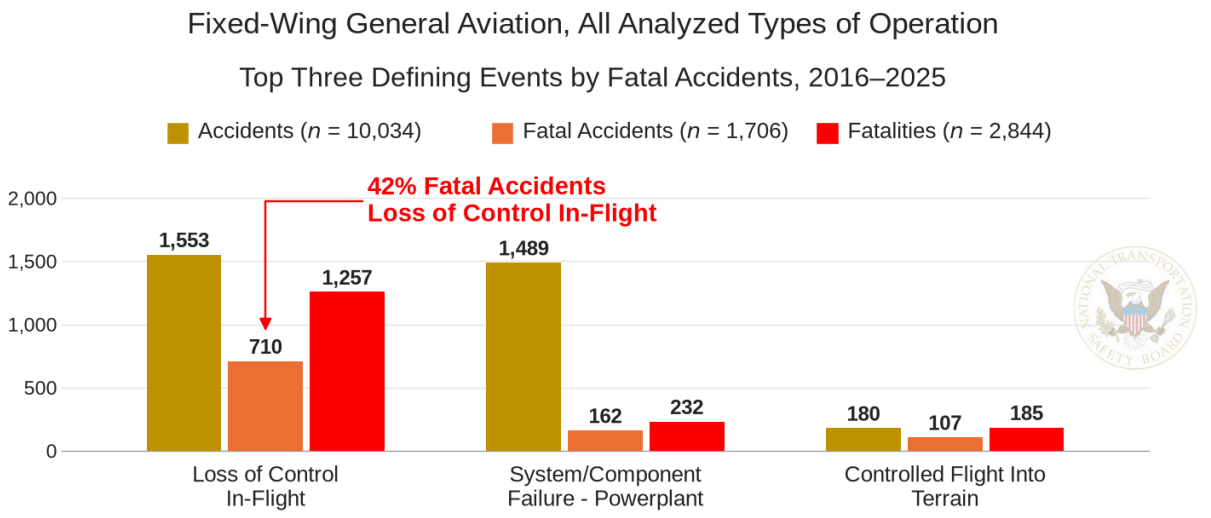
Figure 3 ranks all analyzed fixed-wing types of operation by fatalities. Loss of Control In-Flight accounts for 1,257 of 2,844 fatalities (44%); System/Component Failure - Powerplant follows with 232 (8%); Controlled Flight Into Terrain follows with 185 (7%).

Figure 4 ranks all analyzed fixed-wing types of operation by fatal accidents. Loss of Control In-Flight accounts for 710 of 1,706 fatal accidents (42%); System/Component Failure - Powerplant follows with 162 (9%); Controlled Flight Into Terrain follows with 107 (6%).



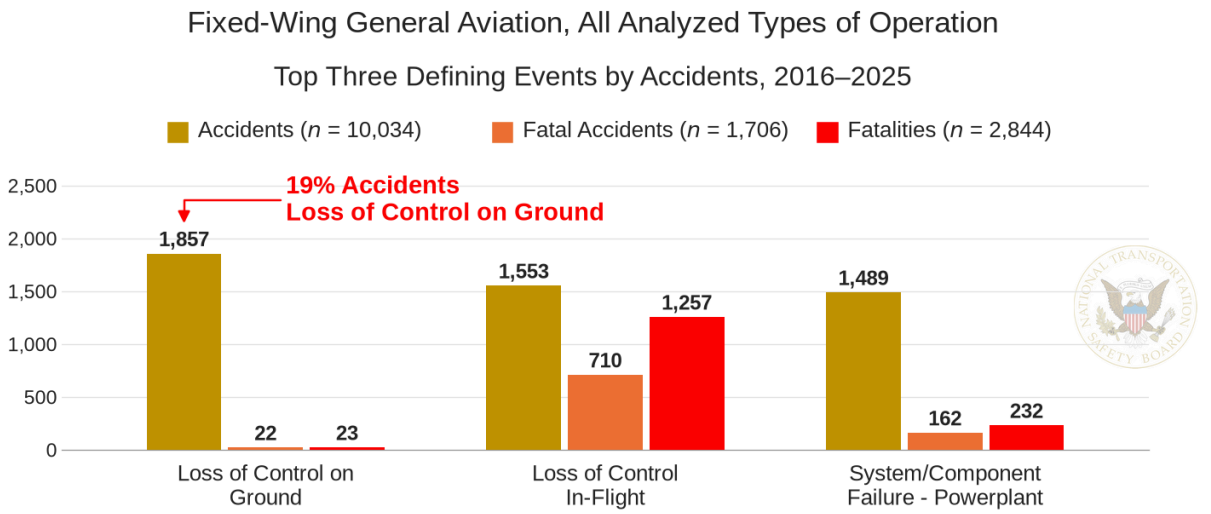
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Business and Executive/Corporate are excluded (1st Edition).

Figure 3. Fixed-wing All analyzed types: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Business and Executive/Corporate are excluded (1st Edition).

Figure 4. Fixed-wing All analyzed types: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Business and Executive/Corporate are excluded (1st Edition).

Figure 5. Fixed-wing All analyzed types: top events by accidents

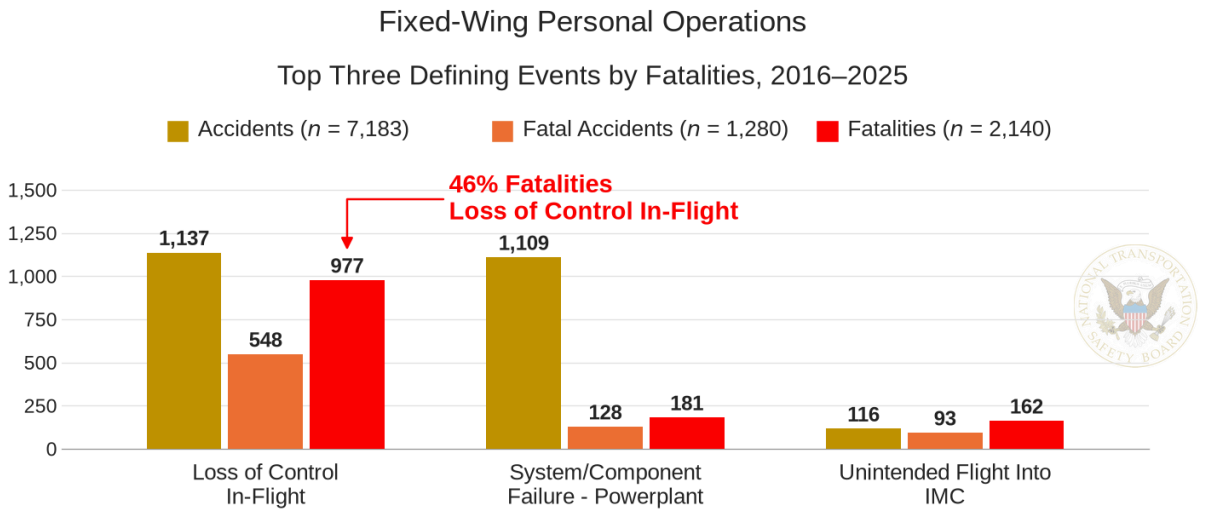
Figure 5 ranks all analyzed fixed-wing types of operation by accidents. Loss of Control on Ground accounts for 1,857 of 10,034 accidents (19%); Loss of Control In-Flight follows with 1,553 (15%); System/Component Failure - Powerplant follows with 1,489 (15%).

3.2 Personal

Personal flying is the largest fixed-wing type of operation in these data. This type of operation has 7,183 accidents, 1,280 fatal accidents and 2,140 fatalities, 2016–2025.

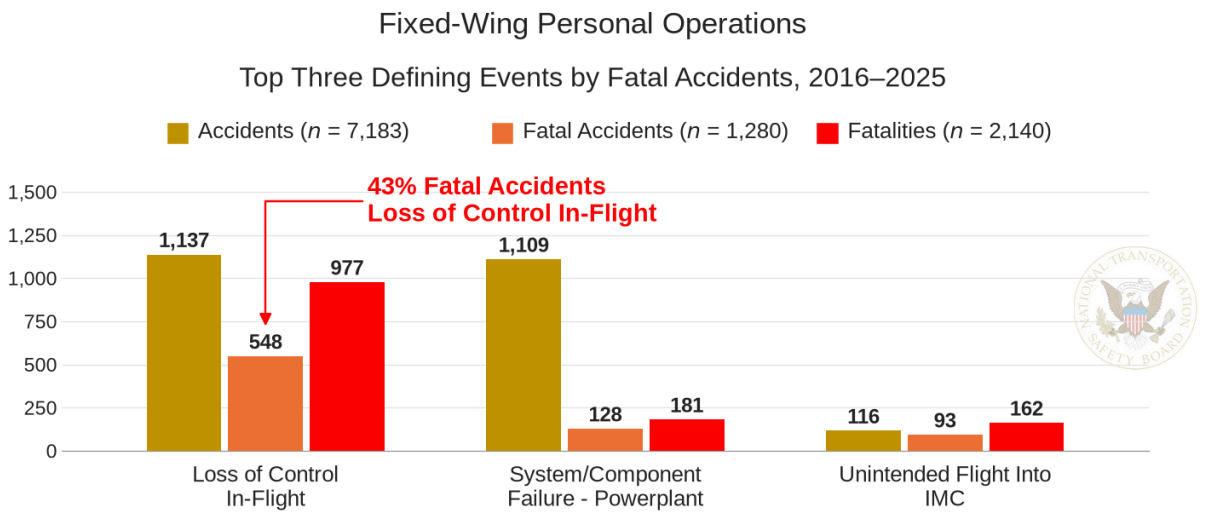
Figure 6 ranks fixed-wing Personal flying by fatalities. Loss of Control In-Flight accounts for 977 of 2,140 fatalities (46%); System/Component Failure - Powerplant follows with 181 (8%); Unintended Flight Into IMC follows with 162 (8%).

Figure 7 ranks fixed-wing Personal flying by fatal accidents. Loss of Control In-Flight accounts for 548 of 1,280 fatal accidents (43%); System/Component Failure - Powerplant follows with 128 (10%); Unintended Flight Into IMC follows with 93 (7%).



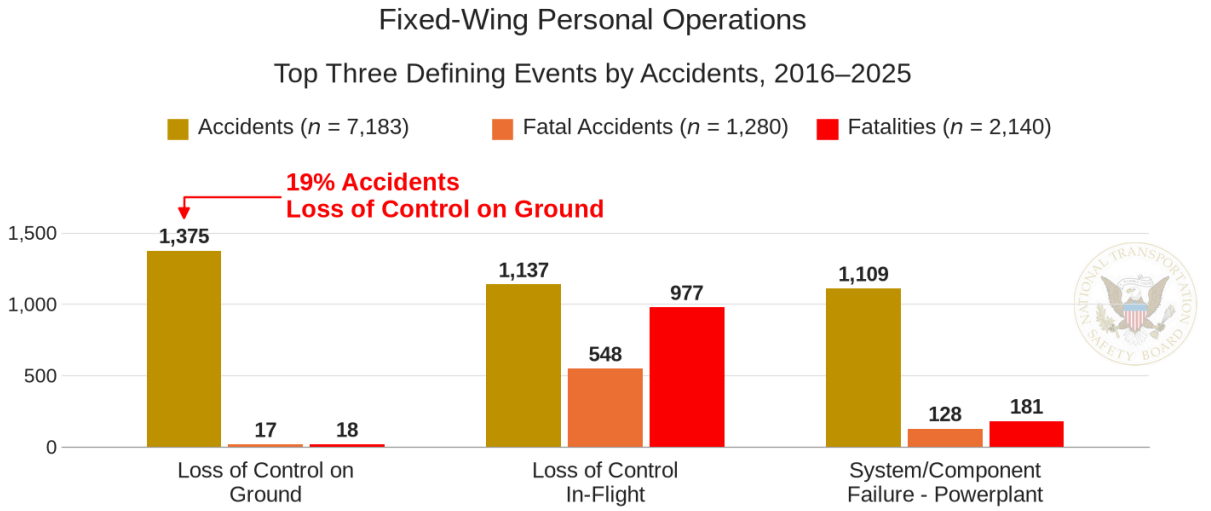
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 6. Fixed-wing Personal: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 7. Fixed-wing Personal: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 8. Fixed-wing Personal: top events by accidents

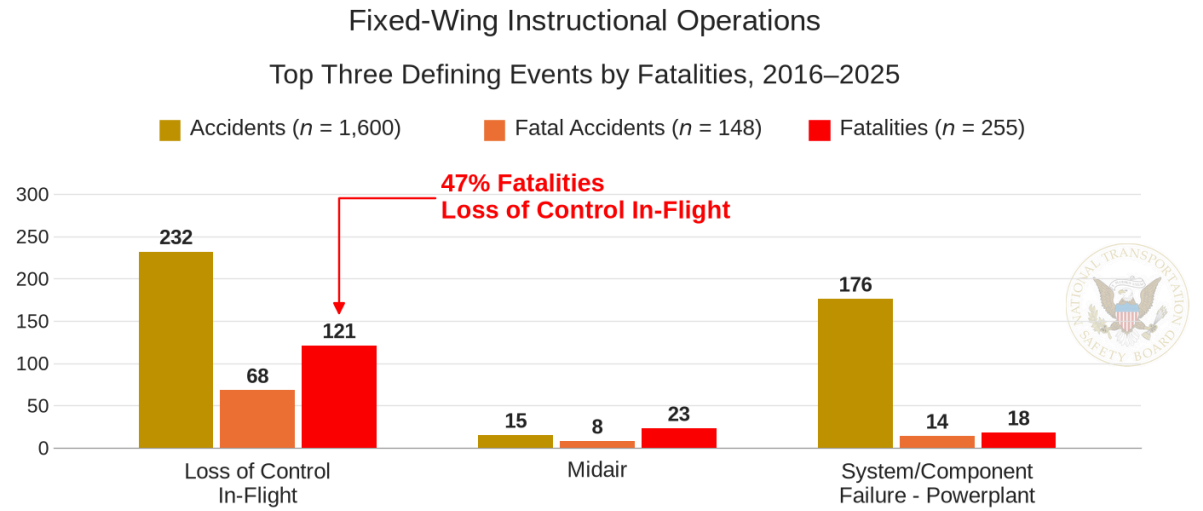
Figure 8 ranks fixed-wing Personal flying by accidents. Loss of Control on Ground accounts for 1,375 of 7,183 accidents (19%); Loss of Control In-Flight follows with 1,137 (16%); System/Component Failure - Powerplant follows with 1,109 (15%).

3.3 Instructional

Instructional operations are the second-largest fixed-wing type of operation. This type of operation has 1,600 accidents, 148 fatal accidents and 255 fatalities, 2016–2025.

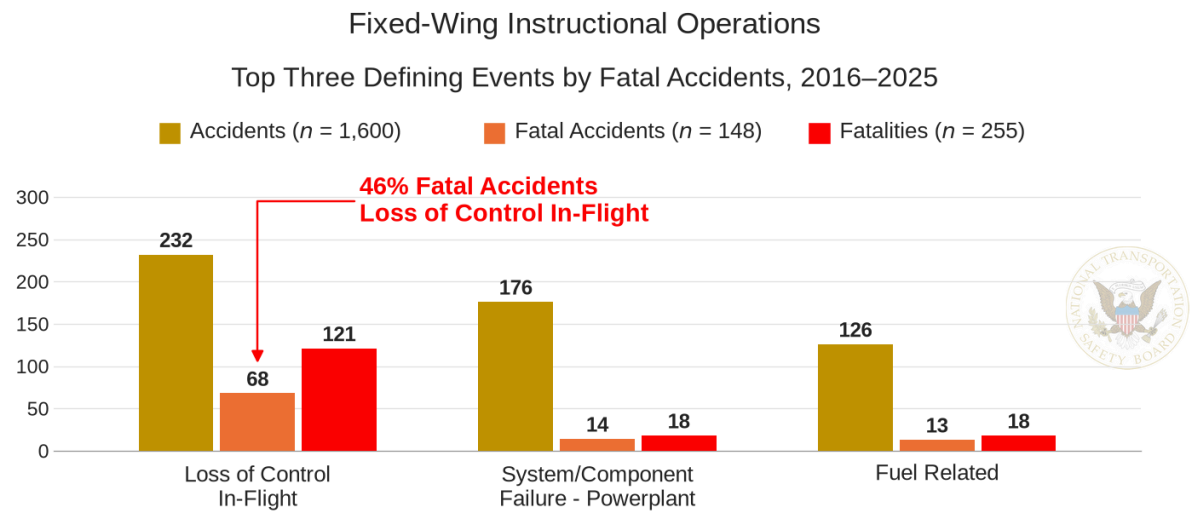
Figure 9 ranks fixed-wing Instructional operations by fatalities. Loss of Control In-Flight accounts for 121 of 255 fatalities (47%); Midair follows with 23 (9%), of which 13 are shared with fixed-wing Personal flying (Key finding 6); System/Component Failure - Powerplant follows with 18 (7%). Fuel Related also has 18 fatalities; the tie-break rule places it fourth (Appendix A).

Figure 10 ranks fixed-wing Instructional operations by fatal accidents. Loss of Control In-Flight accounts for 68 of 148 fatal accidents (46%); System/Component Failure - Powerplant follows with 14 (9%); Fuel Related follows with 13 (9%).



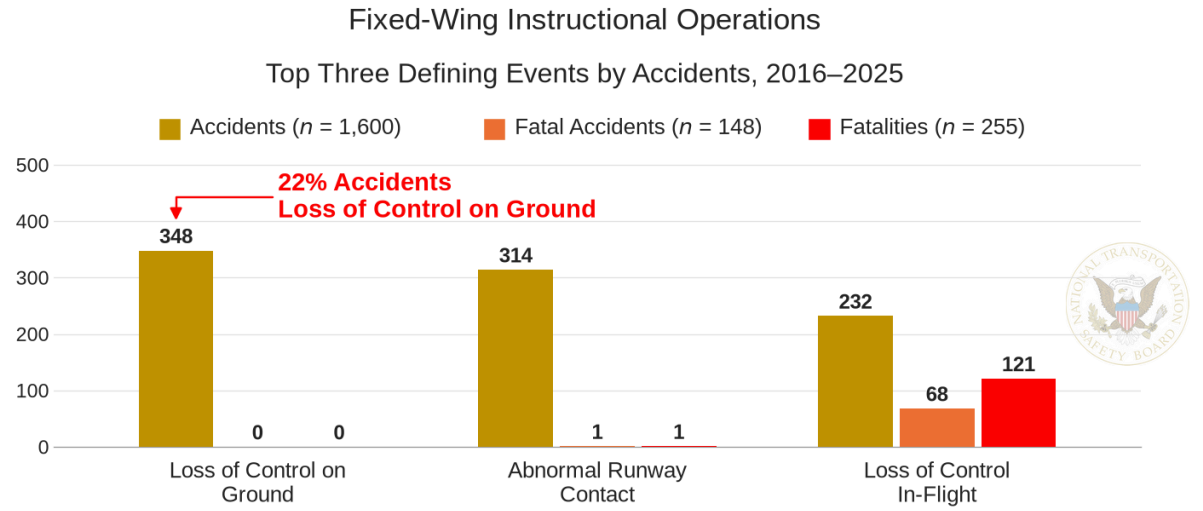
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB.
Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.
Also tied at 18 fatalities: Fuel Related; ranked below the third displayed event under the tie-break rule (Appendix A).
Midair's position depends on the counting rule for two-aircraft accidents (Section 3.8).

Figure 9. Fixed-wing Instructional: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 10. Fixed-wing Instructional: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 11. Fixed-wing Instructional: top events by accidents

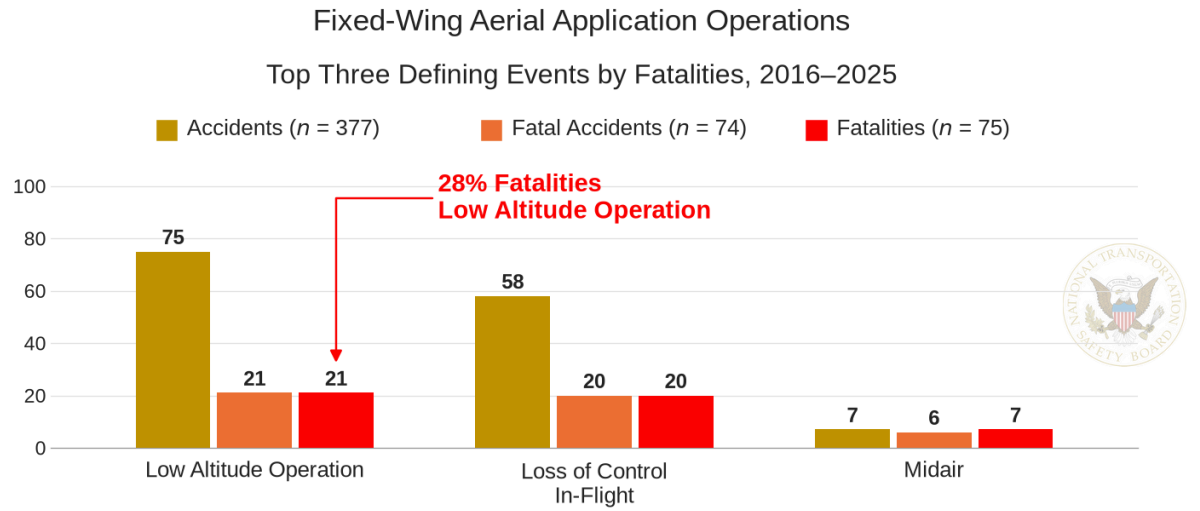
Figure 11 ranks fixed-wing Instructional operations by accidents. Loss of Control on Ground accounts for 348 of 1,600 accidents (22%); Abnormal Runway Contact follows with 314 (20%); Loss of Control In-Flight follows with 232 (14%).

3.4 Aerial application

Aerial application is the only charted fixed-wing type of operation in which Loss of Control In-Flight does not lead fatalities. This type of operation has 377 accidents, 74 fatal accidents and 75 fatalities, 2016–2025.

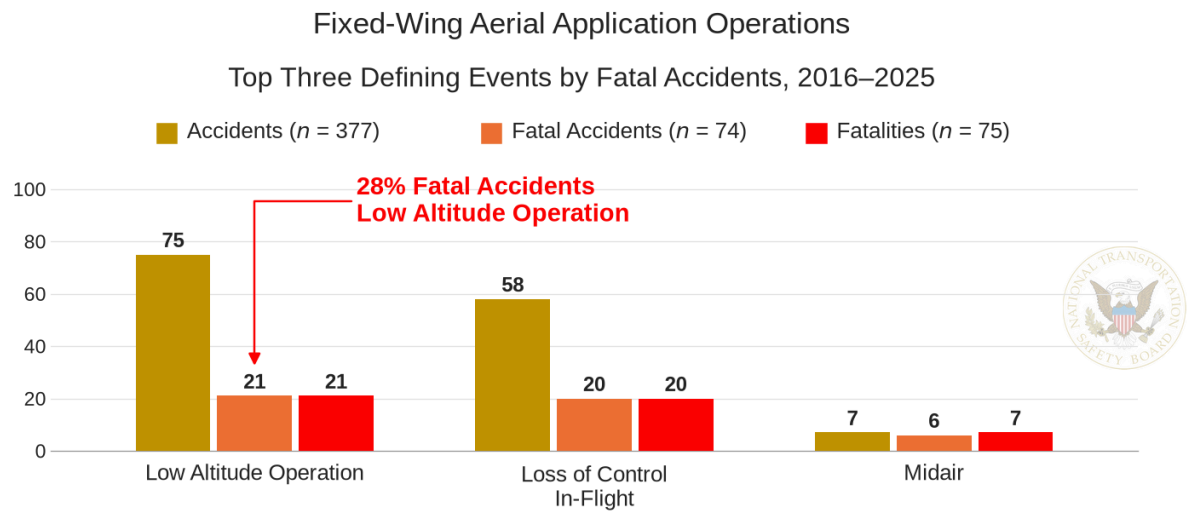
Figure 12 ranks fixed-wing Aerial application by fatalities. Low Altitude Operation accounts for 21 of 75 fatalities (28%); Loss of Control In-Flight follows with 20 (27%); Midair follows with 7 (9%).

Figure 13 ranks fixed-wing Aerial application by fatal accidents. Low Altitude Operation accounts for 21 of 74 fatal accidents (28%); Loss of Control In-Flight follows with 20 (27%); Midair follows with 6 (8%).



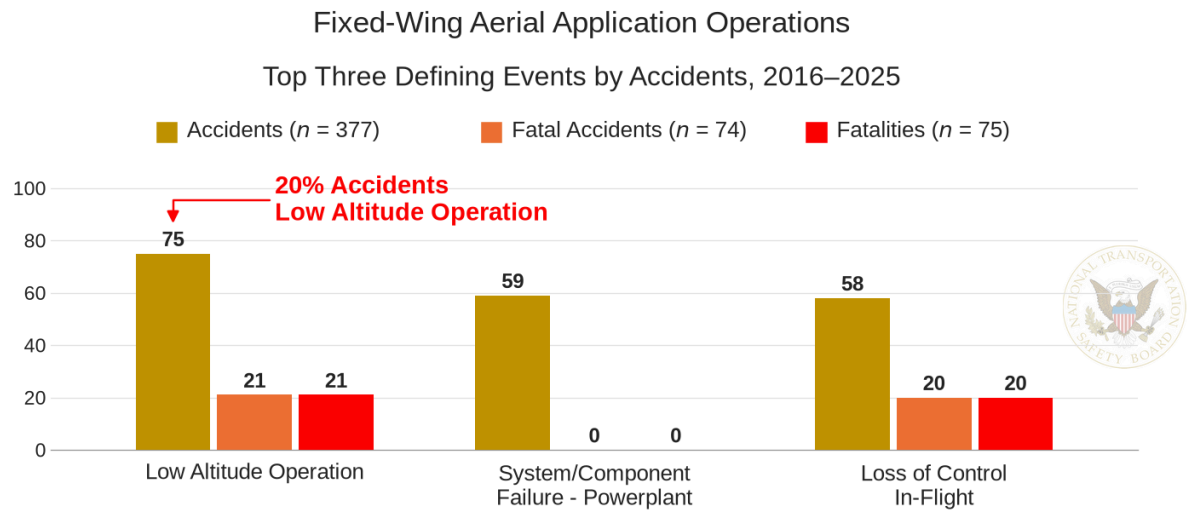
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 12. Fixed-wing Aerial application: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 13. Fixed-wing Aerial application: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 14. Fixed-wing Aerial application: top events by accidents

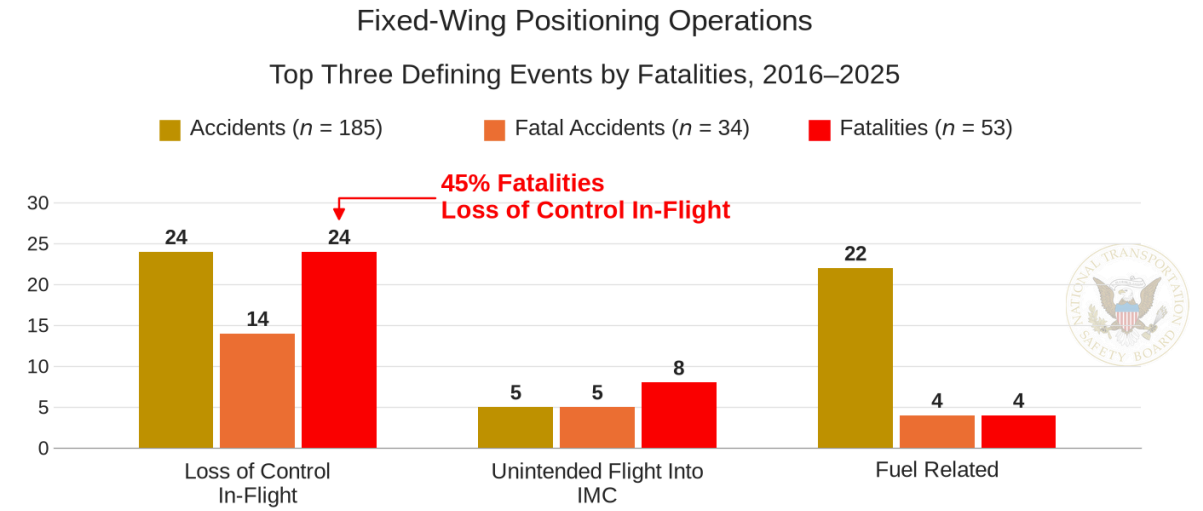
Figure 14 ranks fixed-wing Aerial application by accidents. Low Altitude Operation accounts for 75 of 377 accidents (20%); System/Component Failure - Powerplant follows with 59 (16%); Loss of Control In-Flight follows with 58 (15%).

3.5 Positioning

Positioning flights are a smaller type of operation; shares change noticeably with a few accidents. This type of operation has 185 accidents, 34 fatal accidents and 53 fatalities, 2016–2025.

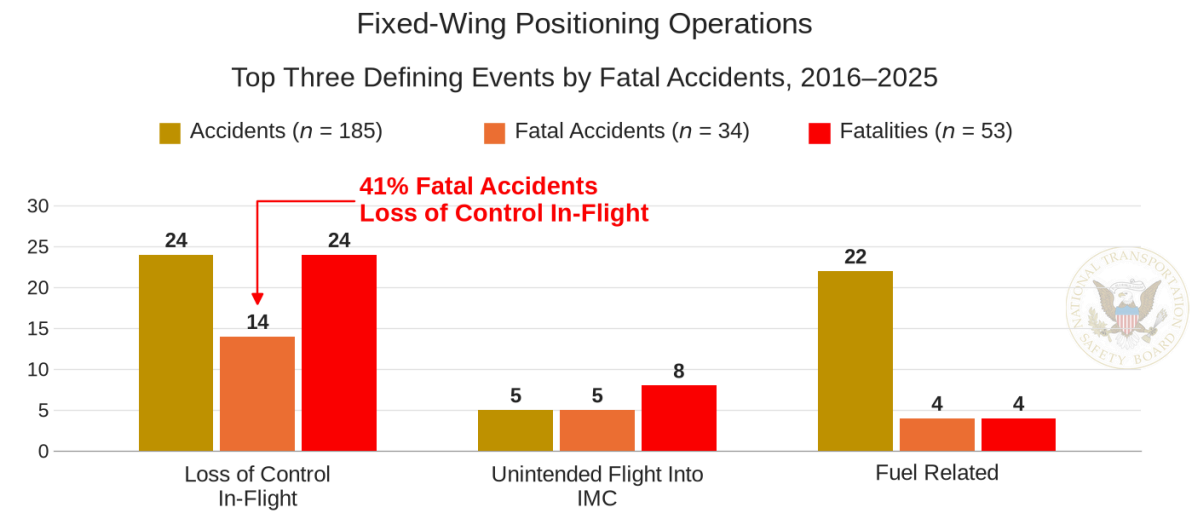
Figure 15 ranks fixed-wing Positioning flights by fatalities. Loss of Control In-Flight accounts for 24 of 53 fatalities (45%); Unintended Flight Into IMC follows with 8 (15%); Fuel Related follows with 4 (8%).

Figure 16 ranks fixed-wing Positioning flights by fatal accidents. Loss of Control In-Flight accounts for 14 of 34 fatal accidents (41%); Unintended Flight Into IMC follows with 5 (15%); Fuel Related follows with 4 (12%).



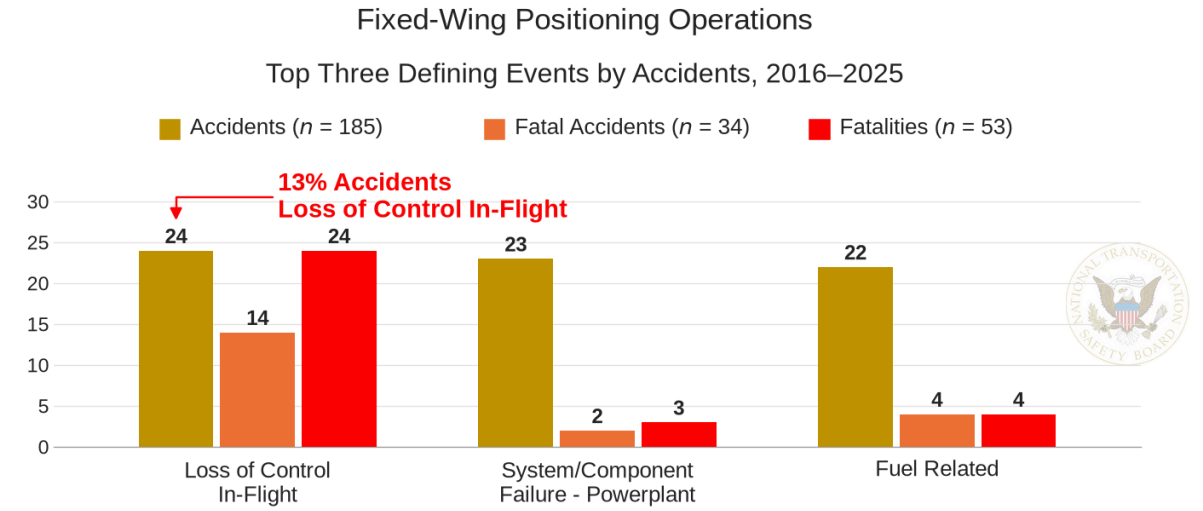
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 15. Fixed-wing Positioning: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 16. Fixed-wing Positioning: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 17. Fixed-wing Positioning: top events by accidents

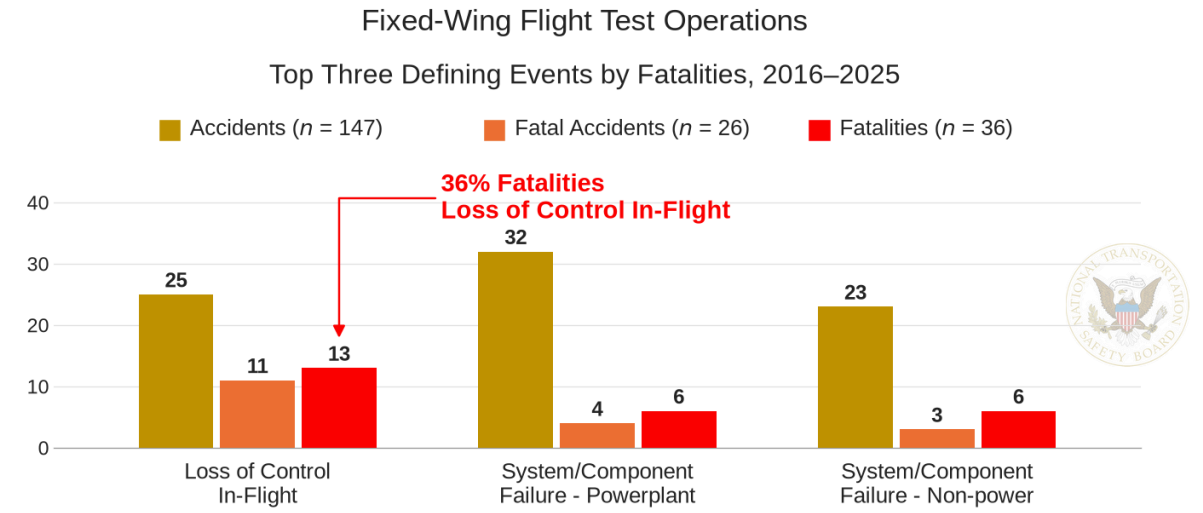
Figure 17 ranks fixed-wing Positioning flights by accidents. Loss of Control In-Flight accounts for 24 of 185 accidents (13%); System/Component Failure - Powerplant follows with 23 (12%); Fuel Related follows with 22 (12%).

3.6 Flight test

Flight test is the smallest charted fixed-wing type of operation. This type of operation has 147 accidents, 26 fatal accidents and 36 fatalities, 2016–2025.

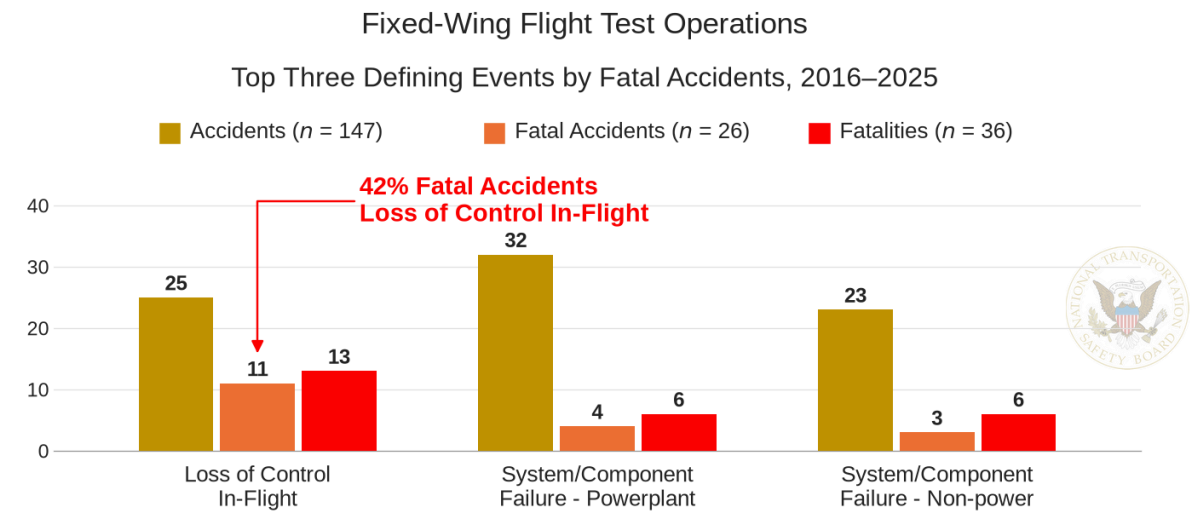
Figure 18 ranks fixed-wing Flight test operations by fatalities. Loss of Control In-Flight accounts for 13 of 36 fatalities (36%); System/Component Failure - Powerplant follows with 6 (17%); System/Component Failure - Non-power follows with 6 (17%). The second and third events are tied at 6 fatalities; the tie-break rule sets their order (Appendix A).

Figure 19 ranks fixed-wing Flight test operations by fatal accidents. Loss of Control In-Flight accounts for 11 of 26 fatal accidents (42%); System/Component Failure - Powerplant follows with 4 (15%); System/Component Failure - Non-power follows with 3 (12%).



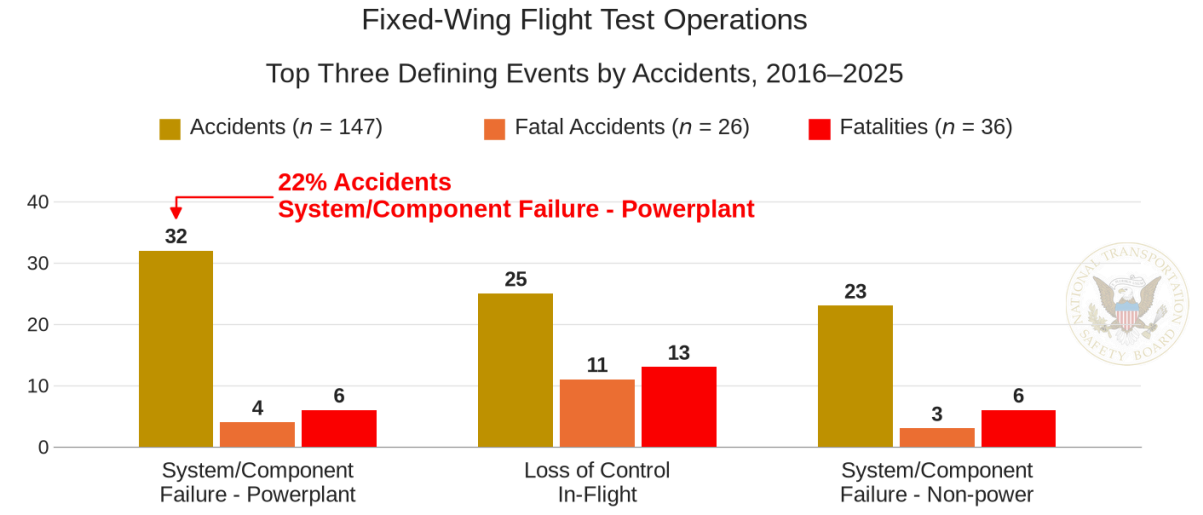
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.
Tie: System/Component Failure - Powerplant and System/Component Failure - Non-power have 6 fatalities each; the order follows the tie-break rule (Appendix A).

Figure 18. Fixed-wing Flight test: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 19. Fixed-wing Flight test: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 20. Fixed-wing Flight test: top events by accidents

Figure 20 ranks fixed-wing Flight test operations by accidents. System/Component Failure - Powerplant accounts for 32 of 147 accidents (22%); Loss of Control In-Flight follows with 25 (17%); System/Component Failure - Non-power follows with 23 (16%).

3.7 Same-event comparison across measures

Because every figure shows all three measures, the same defining event can be compared across frequency and consequence. Table 7 lists the top three defining events by fatalities in each charted fixed-wing type of operation with all three measures and their shares.

Table 7. Same-event comparison, fixed-wing

Type of operation	Defining event	Accidents (share)	Fatal accidents (share)	Fatalities (share)
All analyzed types	Loss of Control In-Flight	1,553 (15%)	710 (42%)	1,257 (44%)
All analyzed types	System/Component Failure - Powerplant	1,489 (15%)	162 (9%)	232 (8%)
All analyzed types	Controlled Flight Into Terrain	180 (2%)	107 (6%)	185 (7%)
Personal	Loss of Control In-Flight	1,137 (16%)	548 (43%)	977 (46%)
Personal	System/Component Failure - Powerplant	1,109 (15%)	128 (10%)	181 (8%)
Personal	Unintended Flight Into IMC	116 (2%)	93 (7%)	162 (8%)
Instructional	Loss of Control In-Flight	232 (14%)	68 (46%)	121 (47%)
Instructional	Midair	15 (1%)	8 (5%)	23 (9%)
Instructional	System/Component Failure - Powerplant	176 (11%)	14 (9%)	18 (7%)
Aerial application	Low Altitude Operation	75 (20%)	21 (28%)	21 (28%)
Aerial application	Loss of Control In-Flight	58 (15%)	20 (27%)	20 (27%)
Aerial application	Midair	7 (2%)	6 (8%)	7 (9%)
Positioning	Loss of Control In-Flight	24 (13%)	14 (41%)	24 (45%)
Positioning	Unintended Flight Into IMC	5 (3%)	5 (15%)	8 (15%)
Positioning	Fuel Related	22 (12%)	4 (12%)	4 (8%)
Flight test	Loss of Control In-Flight	25 (17%)	11 (42%)	13 (36%)
Flight test	System/Component Failure - Powerplant	32 (22%)	4 (15%)	6 (17%)
Flight test	System/Component Failure - Non-power	23 (16%)	3 (12%)	6 (17%)

3.8 Sensitivity of the counting rule

A sensitivity test counted each two-aircraft event only under its first aircraft row instead of under each aircraft's type of operation. Every charted fixed-wing ranking is unchanged except one: in fixed-wing Instructional fatalities, Midair (second) drops out of the top three and Fuel Related enters third. Row order in the NTSB file carries no analytic meaning, so the test shows how much this one position depends on attribution; it does not point to a better rule. The

adopted rule counts each aircraft's type of operation (AG-D06), and the test result is disclosed here so the reader can judge its effect.

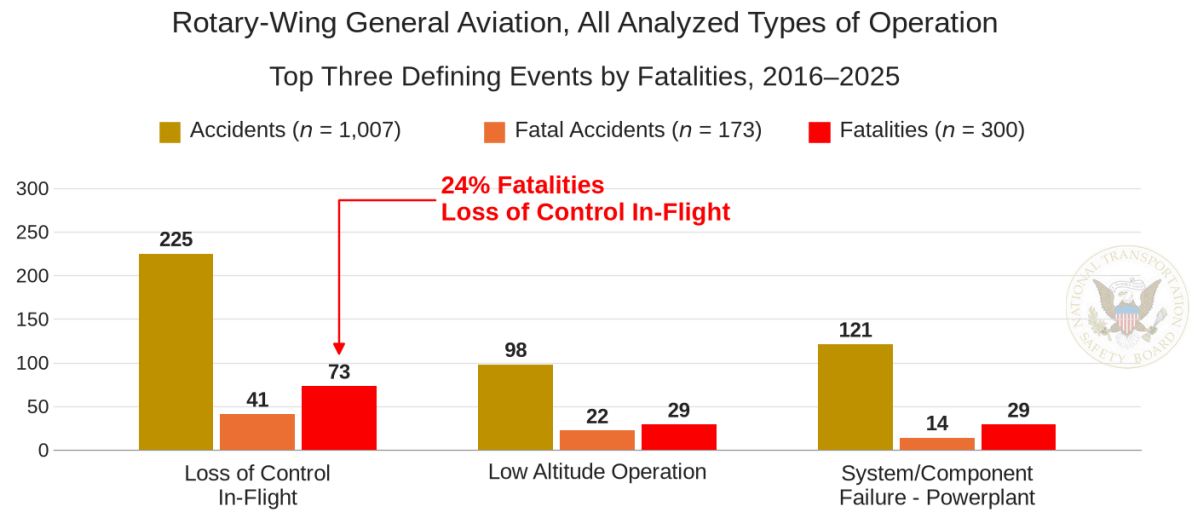
4. Rotary-wing findings

4.1 All analyzed types

This combined view covers every analyzed rotary-wing type of operation and is shown as context; each type of operation is also reported on its own. Together, these types of operations have 1,007 accidents, 173 fatal accidents and 300 fatalities, 2016–2025.

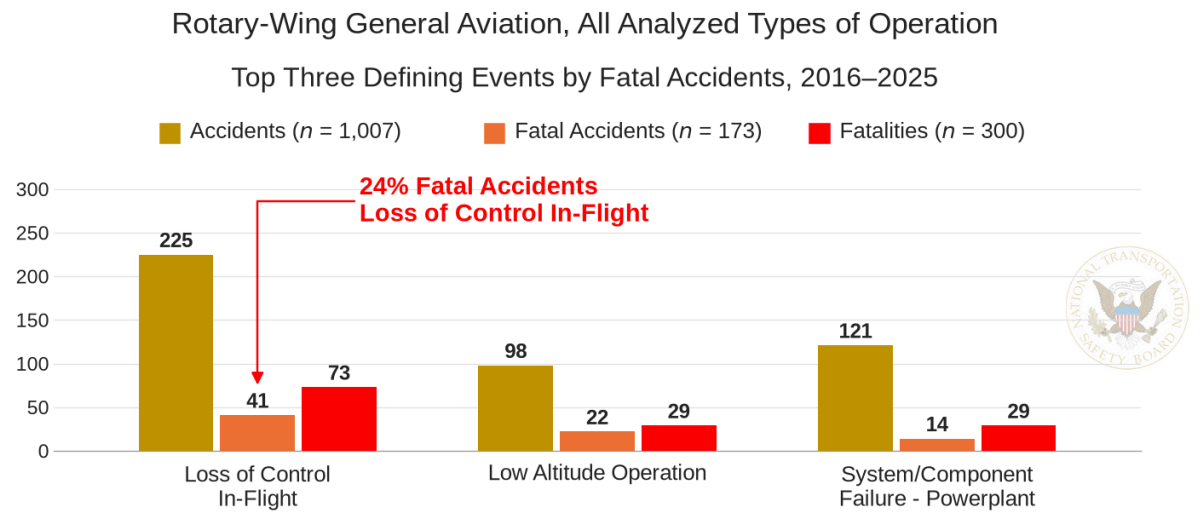
Figure 21 ranks all analyzed rotary-wing types of operation by fatalities. Loss of Control In-Flight accounts for 73 of 300 fatalities (24%); Low Altitude Operation follows with 29 (10%); System/Component Failure - Powerplant follows with 29 (10%). The second and third events are tied at 29 fatalities; the tie-break rule sets their order (Appendix A).

Figure 22 ranks all analyzed rotary-wing types of operation by fatal accidents. Loss of Control In-Flight accounts for 41 of 173 fatal accidents (24%); Low Altitude Operation follows with 22 (13%); System/Component Failure - Powerplant follows with 14 (8%). Unintended Flight Into IMC also has 14 fatal accidents; the tie-break rule places it fourth (Appendix A).



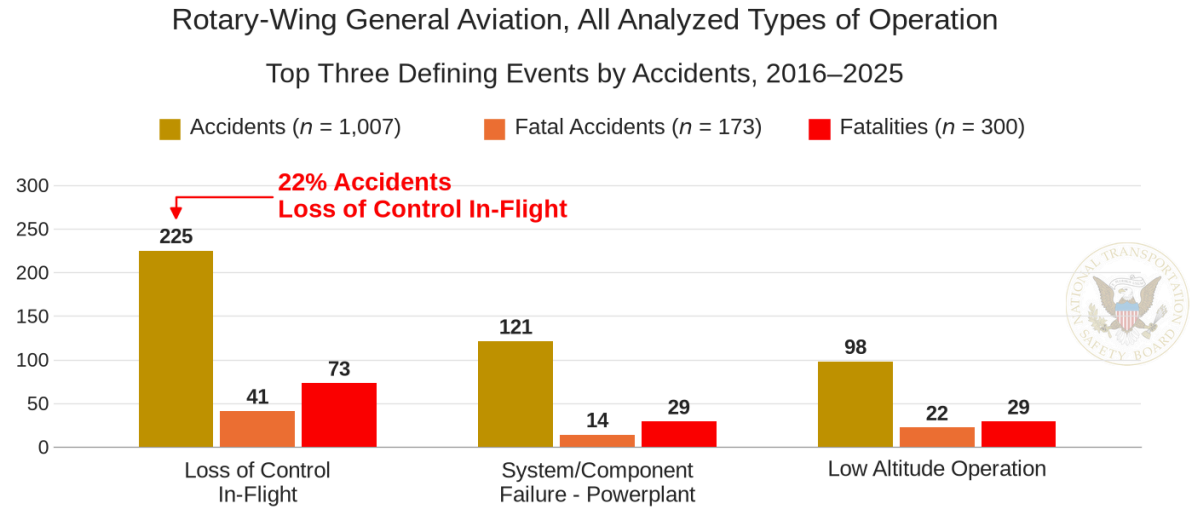
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB.
Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Business and Executive/Corporate are excluded (1st Edition).
Tie: Low Altitude Operation and System/Component Failure - Powerplant have 29 fatalities each; the order follows the tie-break rule (Appendix A).

Figure 21. Rotary-wing All analyzed types: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Business and Executive/Corporate are excluded (1st Edition). Also tied at 14 fatal accidents: Unintended Flight Into IMC; ranked below the third displayed event under the tie-break rule (Appendix A).

Figure 22. Rotary-wing All analyzed types: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Business and Executive/Corporate are excluded (1st Edition).

Figure 23. Rotary-wing All analyzed types: top events by accidents

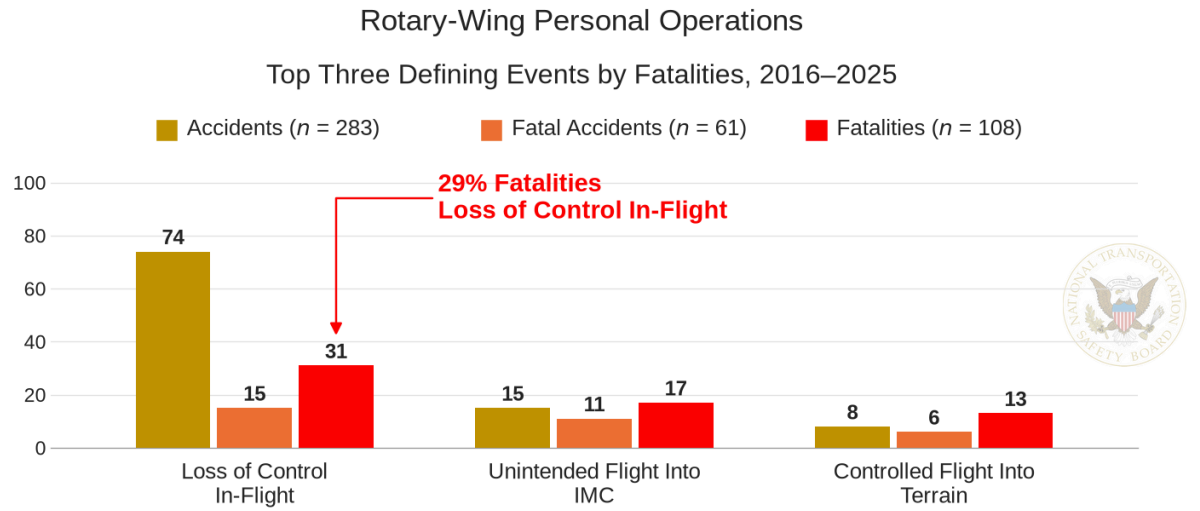
Figure 23 ranks all analyzed rotary-wing types of operation by accidents. Loss of Control In-Flight accounts for 225 of 1,007 accidents (22%); System/Component Failure - Powerplant follows with 121 (12%); Low Altitude Operation follows with 98 (10%).

4.2 Personal

Personal flying is the largest rotary-wing type of operation in these data. This type of operation has 283 accidents, 61 fatal accidents and 108 fatalities, 2016–2025.

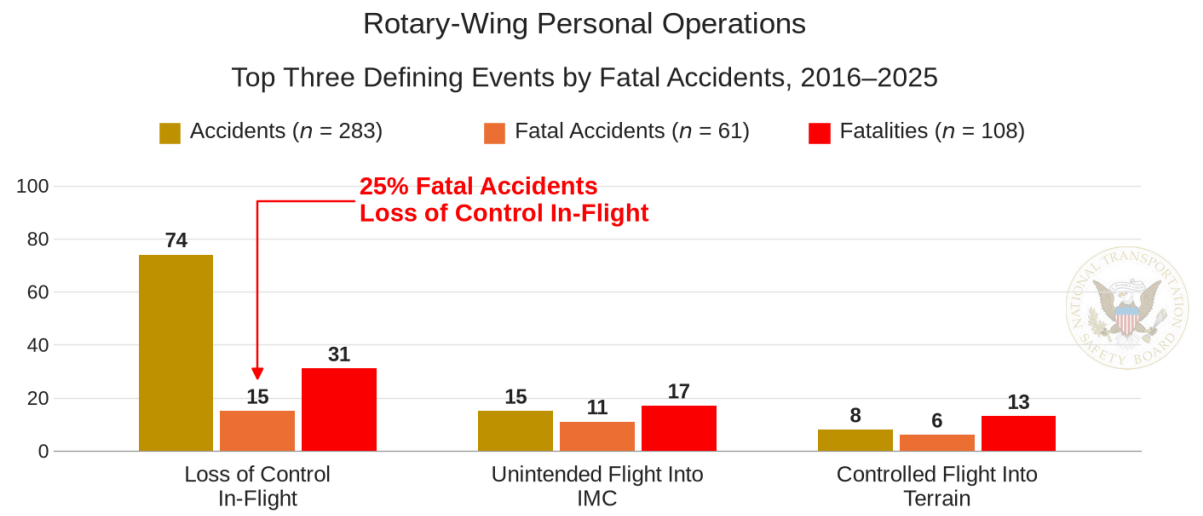
Figure 24 ranks rotary-wing Personal flying by fatalities. Loss of Control In-Flight accounts for 31 of 108 fatalities (29%); Unintended Flight Into IMC follows with 17 (16%); Controlled Flight Into Terrain follows with 13 (12%).

Figure 25 ranks rotary-wing Personal flying by fatal accidents. Loss of Control In-Flight accounts for 15 of 61 fatal accidents (25%); Unintended Flight Into IMC follows with 11 (18%); Controlled Flight Into Terrain follows with 6 (10%). Low Altitude Operation also has 6 fatal accidents; the tie-break rule places it fourth (Appendix A).



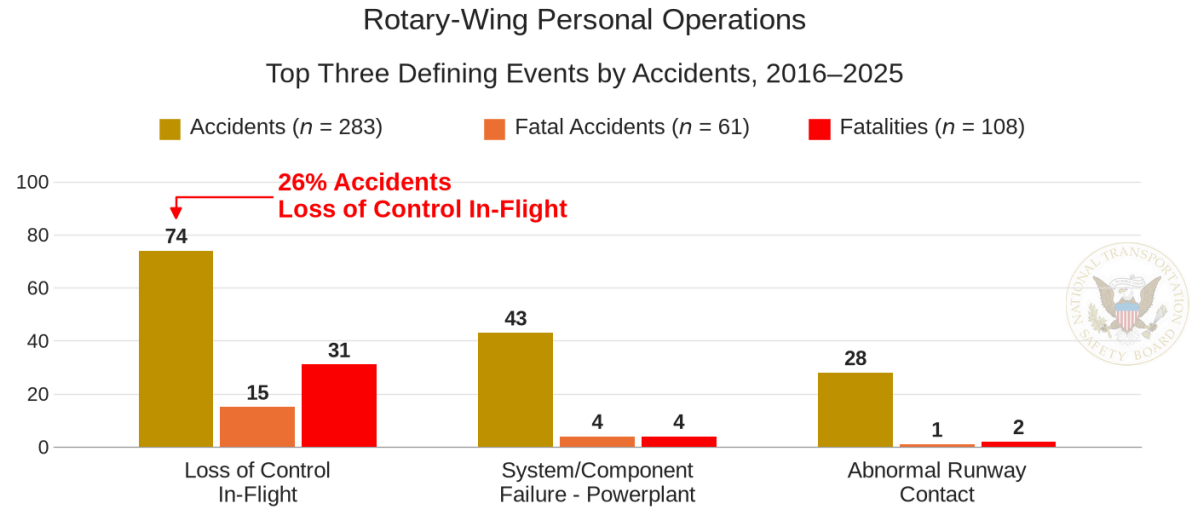
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 24. Rotary-wing Personal: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.
Also tied at 6 fatal accidents: Low Altitude Operation; ranked below the third displayed event under the tie-break rule (Appendix A).

Figure 25. Rotary-wing Personal: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 26. Rotary-wing Personal: top events by accidents

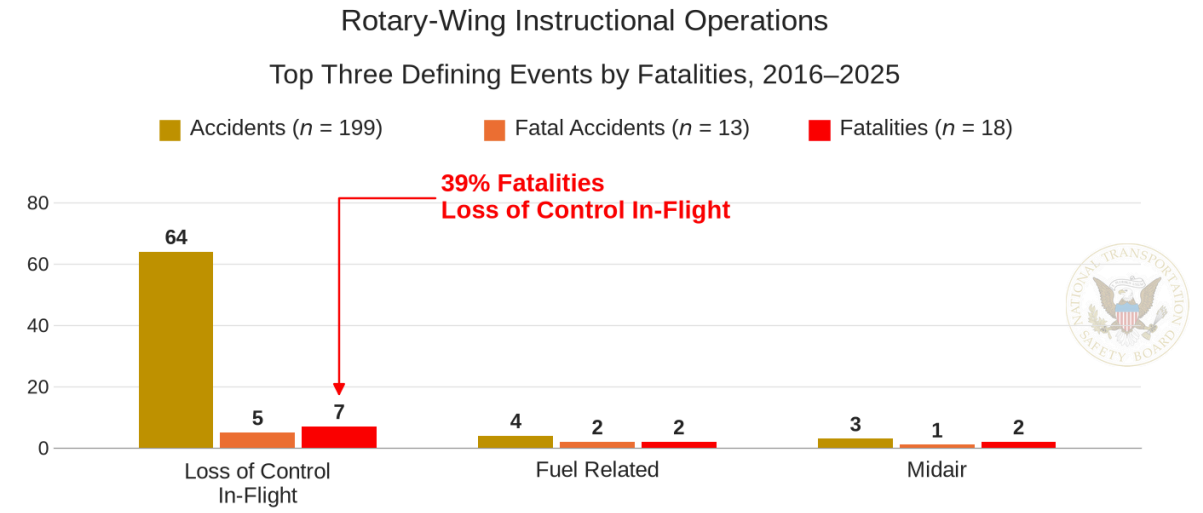
Figure 26 ranks rotary-wing Personal flying by accidents. Loss of Control In-Flight accounts for 74 of 283 accidents (26%); System/Component Failure - Powerplant follows with 43 (15%); Abnormal Runway Contact follows with 28 (10%).

4.3 Instructional

Rotary-wing Instructional has small totals (13 fatal accidents, 18 fatalities); one accident can change a ranking. This type of operation has 199 accidents, 13 fatal accidents and 18 fatalities, 2016–2025.

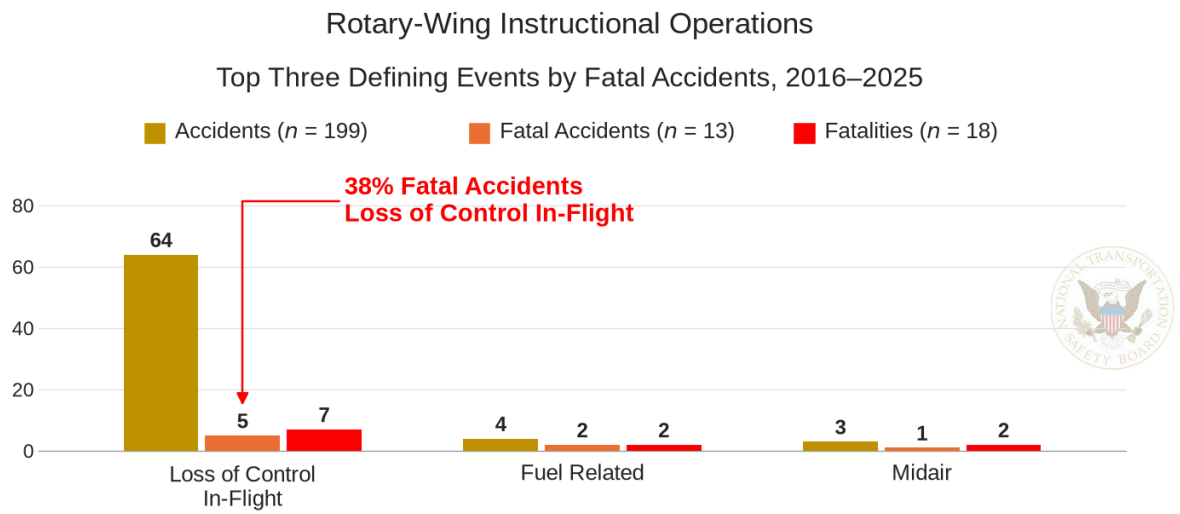
Figure 27 ranks rotary-wing Instructional operations by fatalities. Loss of Control In-Flight accounts for 7 of 18 fatalities (39%); Fuel Related follows with 2 (11%); Midair follows with 2 (11%). Fuel Related, Midair, Abrupt Maneuver and Unintended Flight Into IMC each have 2 fatalities; the tie-break rule sets their order (Appendix A).

Figure 28 ranks rotary-wing Instructional operations by fatal accidents. Loss of Control In-Flight accounts for 5 of 13 fatal accidents (38%); Fuel Related follows with 2 (15%); Midair follows with 1 (8%). Abrupt Maneuver and Unintended Flight Into IMC also have 1 fatal accident each; the tie-break rule places Midair third (Appendix A).



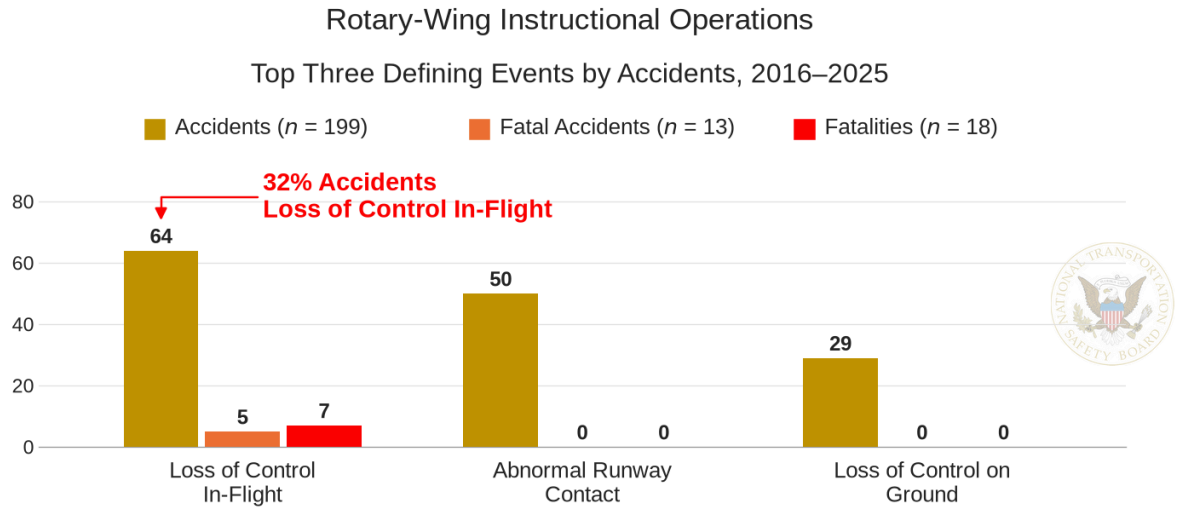
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB.
Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Small totals: one accident can change a share substantially.
Tie: Fuel Related and Midair have 2 fatalities each; the order follows the tie-break rule (Appendix A).
Also tied at 2 fatalities: Abrupt Maneuver, Unintended Flight Into IMC; ranked below the third displayed event under the tie-break rule (Appendix A). Midair's position depends on the counting rule for two-aircraft accidents (Section 3.8).

Figure 27. Rotary-wing Instructional: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Small totals: one accident can change a share substantially. Also tied at 1 fatal accident: Abrupt Maneuver, Unintended Flight Into IMC; ranked below the third displayed event under the tie-break rule (Appendix A). Midair's position depends on the counting rule for two-aircraft accidents (Section 3.8).

Figure 28. Rotary-wing Instructional: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked. Small totals: one accident can change a share substantially.

Figure 29. Rotary-wing Instructional: top events by accidents

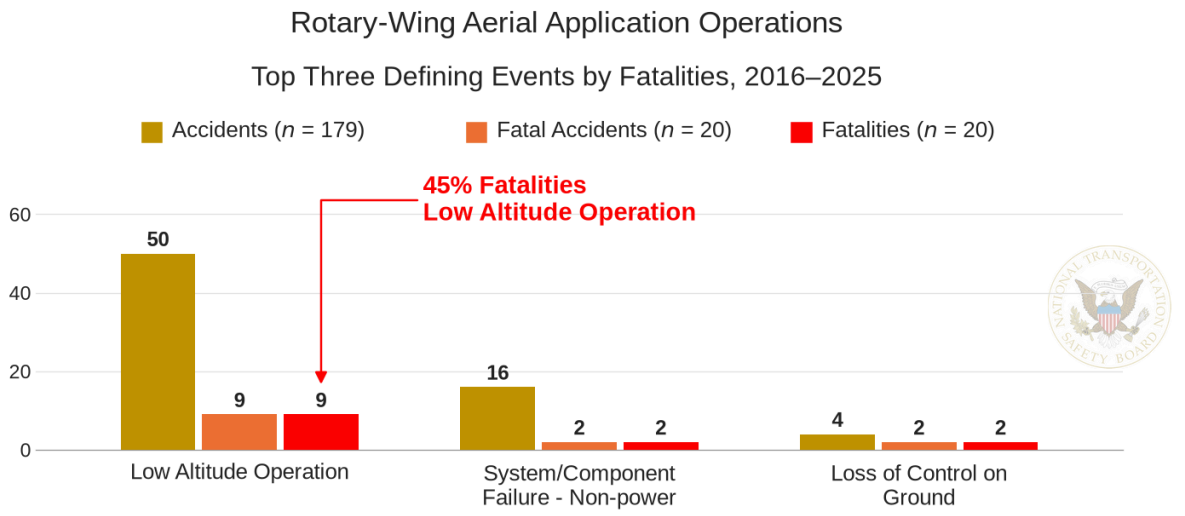
Figure 29 ranks rotary-wing Instructional operations by accidents. Loss of Control In-Flight accounts for 64 of 199 accidents (32%); Abnormal Runway Contact follows with 50 (25%); Loss of Control on Ground follows with 29 (15%).

4.4 Aerial application

Rotary-wing aerial application recorded one fatality in each of its fatal accidents. This type of operation has 179 accidents, 20 fatal accidents and 20 fatalities, 2016–2025.

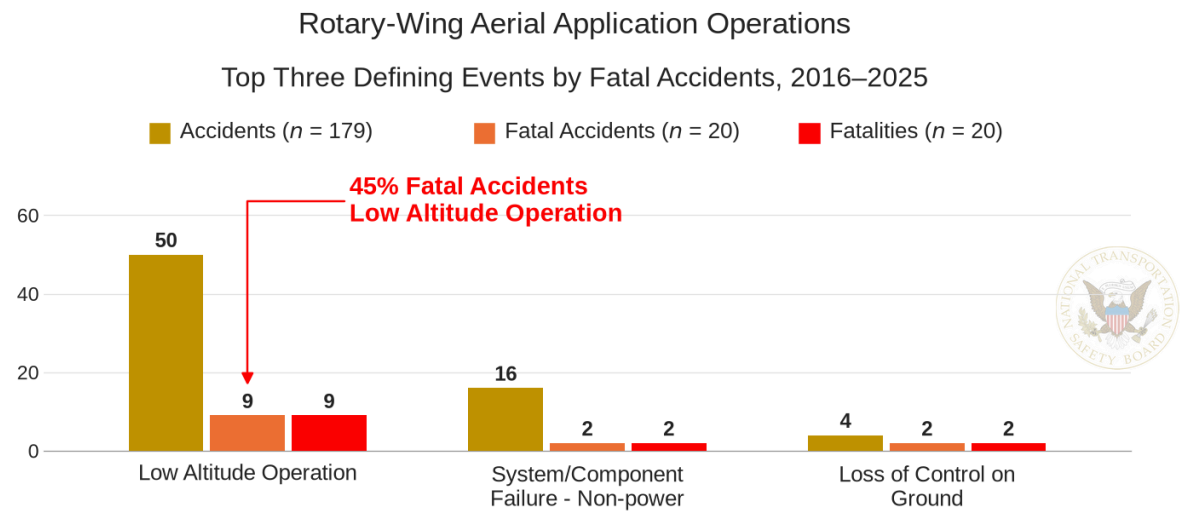
Figure 30 ranks rotary-wing Aerial application by fatalities. Low Altitude Operation accounts for 9 of 20 fatalities (45%); System/Component Failure - Non-power follows with 2 (10%); Loss of Control on Ground follows with 2 (10%). The second and third events are tied at 2 fatalities; the tie-break rule sets their order (Appendix A).

Figure 31 ranks rotary-wing Aerial application by fatal accidents. Low Altitude Operation accounts for 9 of 20 fatal accidents (45%); System/Component Failure - Non-power follows with 2 (10%); Loss of Control on Ground follows with 2 (10%). The second and third events are tied at 2 fatal accidents; the tie-break rule sets their order (Appendix A).



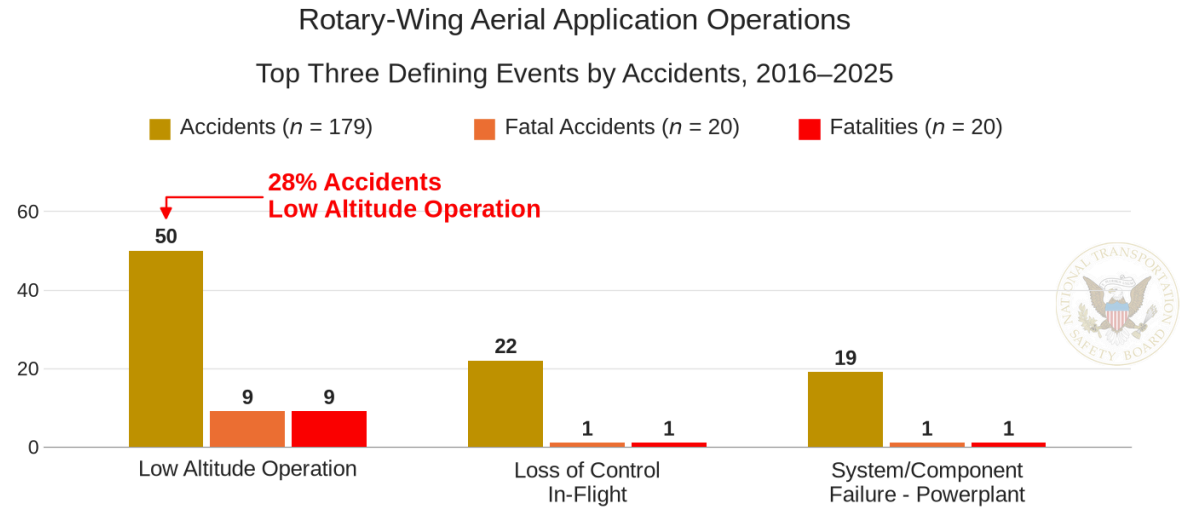
Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB.
Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.
Tie: System/Component Failure - Non-power and Loss of Control on Ground have 2 fatalities each; the order follows the tie-break rule (Appendix A).

Figure 30. Rotary-wing Aerial application: top events by fatalities



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.
Tie: System/Component Failure - Non-power and Loss of Control on Ground have 2 fatal accidents each; the order follows the tie-break rule (Appendix A).

Figure 31. Rotary-wing Aerial application: top events by fatal accidents



Source: NTSB accident data, extract of September 21, 2026. Analysis by the authors; not reviewed or endorsed by the NTSB. Accidents and fatal accidents count events; fatalities count persons. Shares use the full total on each measure, including Unknown and Other, which are not ranked.

Figure 32. Rotary-wing Aerial application: top events by accidents

Figure 32 ranks rotary-wing Aerial application by accidents. Low Altitude Operation accounts for 50 of 179 accidents (28%); Loss of Control In-Flight follows with 22 (12%); System/Component Failure - Powerplant follows with 19 (11%).

4.5 Same-event comparison across measures

Table 8 lists the top three defining events by fatalities in each charted rotary-wing type of operation with all three measures and their shares.

Table 8. Same-event comparison, rotary-wing

Type of operation	Defining event	Accidents (share)	Fatal accidents (share)	Fatalities (share)
All analyzed types	Loss of Control In-Flight	225 (22%)	41 (24%)	73 (24%)
All analyzed types	Low Altitude Operation	98 (10%)	22 (13%)	29 (10%)
All analyzed types	System/Component Failure - Powerplant	121 (12%)	14 (8%)	29 (10%)
Personal	Loss of Control In-Flight	74 (26%)	15 (25%)	31 (29%)
Personal	Unintended Flight Into IMC	15 (5%)	11 (18%)	17 (16%)
Personal	Controlled Flight Into Terrain	8 (3%)	6 (10%)	13 (12%)
Instructional	Loss of Control In-Flight	64 (32%)	5 (38%)	7 (39%)
Instructional	Fuel Related	4 (2%)	2 (15%)	2 (11%)
Instructional	Midair	3 (2%)	1 (8%)	2 (11%)
Aerial application	Low Altitude Operation	50 (28%)	9 (45%)	9 (45%)
Aerial application	System/Component Failure - Non-power	16 (9%)	2 (10%)	2 (10%)
Aerial application	Loss of Control on Ground	4 (2%)	2 (10%)	2 (10%)

4.6 Sensitivity of the counting rule

Under the same sensitivity test, rotary-wing Instructional is the only charted rotary-wing type of operation that changes: by fatalities and by fatal accidents, Abrupt Maneuver replaces Midair at the third position. Totals for this type of operation are small.

5. Discussion

Section 5 restates the factual basis for the main patterns in the findings, with the table or figure each draws on. It adds no new analysis.

5.1 Frequency and consequence diverge

Factual basis: in all analyzed fixed-wing operations, Loss of Control on Ground accounts for 19% of accidents and 1% of fatalities, while Loss of Control In-Flight accounts for 15% of accidents and 44% of fatalities.

5.2 Loss of control across types of operation

Factual basis: Loss of Control In-Flight is the leading defining event by fatalities in every charted type of operation except aerial application (Table 3). In fixed-wing operations it accounts for 46% of fatalities in Personal flying, 47% in Instructional, 45% in Positioning and 36% in Flight test. In rotary-wing operations it accounts for 29% of fatalities in Personal flying and 39% in Instructional. In aerial application, Low Altitude Operation leads in both fixed-wing (28%) and rotary-wing (45%) operations; Loss of Control In-Flight accounts for 27% of fixed-wing aerial application fatalities (Table 7) and 5% of rotary-wing aerial application fatalities (Table C24).

5.3 Low altitude operations in aerial application

Factual basis: Low Altitude Operation leads fatalities in aerial application for both airplanes and helicopters. It accounts for 28% of fixed-wing aerial application fatalities (21 of 75), with Loss of Control In-Flight one fatality behind at 27% (20), and 45% of rotary-wing aerial application fatalities (9 of 20), where Loss of Control In-Flight accounts for 5% (Table C24). The fixed-wing margin is small, and 7 fixed-wing aerial application fatalities are coded Unknown.

5.4 Weather, midair collisions and powerplant failures

Factual basis: in fixed-wing Personal flying, 93 of the 116 Unintended Flight Into IMC accidents were fatal (80%), with 162 fatalities (Table C2). Among the three leading defining events in Figures 6 and 7, it is the only one with more fatalities than accidents; in the full Personal lookup, Controlled Flight Into Terrain, Icing and Midair also have more fatalities than accidents. Controlled Flight Into Terrain shows a similar pattern: 82 of its 131 fixed-wing Personal accidents were fatal (63%), with 135 fatalities (Table C2). System/Component Failure - Powerplant is the contrast: it accounts for 1,109 fixed-wing Personal accidents, yet 128 of them were fatal (12%), with 181 fatalities (Table 7). In fixed-wing Instructional operations, Midair accounts for 15 of 1,600 accidents (0.9%), yet 8 of its 15 accidents were fatal (53%), with 23 fatalities (Table C3), and it ranks second by fatalities (Figure 9). The share of an event's accidents that were fatal is computed from the counts shown; it is not a rate.

6. Published context

6.1 Comparison with the 1st Edition

The 1st Edition reported GA Business, GA Executive/Corporate and Part 135 On-Demand operations for the same years (Kochan et al., 2026). The two editions cover different types of operation from separate NTSB files, use the same method and are not added together (Appendix D).

6.2 Published accident rates

This report computes no exposure-based rates (Section 2.10). Any published rate cited for context will be quoted from its source with its own years and definitions, and will not be combined with the totals in this report.

7. Limitations

- **Exposure.** The accident records contain no flights, departures or flight hours, and no exposure-based rates are estimated. Shares are not rates and cannot support per-flight risk comparisons.
- **Small totals.** Rotary-wing Instructional has 13 fatal accidents and 18 fatalities; most uncharted types of operation have fewer than 20 fatal accidents. Small totals make shares unstable, and a single event can change a ranking.
- **Unreported events.** The accidents in these data are known, reported accidents. Incidents and lesser events are outside these data, and their number is not estimated.
- **Ground fatalities.** The supplied extract has no separate ground-injury field, so fatalities outside the aircraft cannot be separated from occupant fatalities.
- **Recency and data maturity.** The extract was obtained on September 21, 2026. The share of fatal accidents whose only defining event is Unknown or Other rises in recent years: in fixed-wing operations, 21 of 181 (12%) in 2016 and 45 of 134 (34%) in 2025; in rotary-wing operations, 0 of 16 in 2016 and 8 of 17 in 2025. This is consistent with investigations still in progress, including events with only a preliminary NTSB report. Recent records may change as final reports are issued.
- **Counting method.** Events in two types of operation, or with two defining events, are counted under each (Section 2.6). The sensitivity test changes positions only in Instructional: in fixed-wing Instructional fatalities, Midair drops out of second place and Fuel Related enters third (Section 3.8); in rotary-wing Instructional, Abrupt Maneuver replaces Midair at third place by fatalities and by fatal accidents (Section 4.6).
- **Classification.** Results depend on the NTSB DefiningEvent and FlightOperationType fields. Unknown and Other records remain in denominators but are not displayed as defined events.
- **Combined view.** The "All analyzed types" view combines types of operation for context; it departs from the 1st Edition, which did not combine types of operation (AG-D07).
- **Location scope.** N-registered records at non-U.S. or unrecorded locations are included (Section 2.4).

8. Conclusions

In the 1st Edition, the conclusions restate findings presented in the report and add no new analysis. The same approach is followed here.

The conclusions restate three findings. First, Loss of Control In-Flight is the leading defining event by fatalities in every charted type of operation except aerial application (Section 5.2). Second, Unintended Flight Into IMC, Controlled Flight Into Terrain and Midair are low in occurrence, but a large share of their accidents are fatal (Section 5.4). Third, System/Component Failure - Powerplant is frequent, but a smaller share of its accidents are fatal (Section 5.4). Together, these findings point education and training toward Loss of Control In-Flight and the high-fatality events.

9. Repeatability and future work

The method is designed to be repeated with any NTSB-supplied file. One configuration file and three scripts run the full analysis, reproduce every NTSB summary table supplied with the file and re-derive the published totals of the prior edition before any finding is written. Every exception and decision is logged (Appendix B). Before release, the finished report goes through hostile reviews, and the authors reconcile every finding before the final review.

The annual data request cycle with the NTSB is: notice in March, reminder in August and final contact in early September.

Future work carried from co-author input includes accidents by airframe manufacturer grouped by engine type, a keyword-based review of human factors elements in the accident records, and a reading of the NTSB reports on fixed-wing Instructional Loss of Control In-Flight accidents for phase of flight and location.

Acknowledgments

The authors thank the NTSB Office of Research and Engineering, Safety Research Division, for supplying the accident records and for guidance on the data fields and, for the 1st Edition, on the counting method. Use of NTSB data does not imply NTSB review or endorsement of this analysis.

Generative AI and other electronic research and writing tools were used to assist with research, data organization and analysis, drafting and editorial refinement. The authors reviewed and verified the resulting content against the underlying data and cited sources and take full responsibility for all methodological decisions, interpretations, findings and conclusions.

Funding and competing interests. This work received no external funding. It is an independent study by the authors using tools resourced by Aviation Performance Solutions (APS), which publishes the report and provides upset prevention and recovery training. Paul Ransbury is its chief executive officer. While all authors hold roles in other aviation associations, they have no conflict of interest in the preparation of this document. The findings are limited to the NTSB data, and no training provider or other sponsor reviewed them before release.

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The personal communications (NTSB Safety Research Division, September 29 and October 13, 2026) are cited in text only, following APA 7. Appendices follow the reference list, in APA order.

Appendix A. Methodology and assumptions

- **Source control.** Row-level source: 2026-NTSB_LOCI_All-GA_2016-to-2025_Ransbury_09212026_AllGA_2016-2025.xlsx (SHA-256 a24de5d12493551346f63c2f30e883976e467bcc1a870f695143590bc594c51b). Read-only.
- **Scope.** Accidents from January 1, 2016, through December 31, 2025 (EventYear 2016–2025); AircraftCategory = Airplane (fixed-wing) or Helicopter (rotary-wing), analyzed separately; GA Business and GA Executive/Corporate excluded.
- **Unit.** Unique accident event (MKey) within each grouping.
- **Measures.** Accidents = unique events; fatal accidents = events with FatalInjuries of 1 or more; fatalities = sum of FatalInjuries, counted once per event. Percentages are rounded to whole numbers, with exact halves rounded to the even number (for example, 14.5% shows as 14%).
- **Blank injury counts.** Treated as zero for calculations per NTSB guidance; original blanks preserved.
- **Unknown, Other and blank.** Retained in full tables and denominators; excluded from top-three chart eligibility.
- **Denominators.** All percentages use the complete total for the type of operation, never only the displayed categories.
- **Top-three tie rule.** Fatalities: fatal accidents, then accidents, then name. Fatal accidents: fatalities, then accidents, then name. Accidents: fatal accidents, then fatalities, then name.
- **Chart threshold.** Types of operation with 100 or more accidents are charted; Unknown type of operation is not charted (AG-D08).
- **Exposure.** No exposure-based rates (AG-D10).
- **Change control.** Any change to source, filters, unit, classification, denominator, eligibility or tie rule requires a log entry, a QA rerun and reapproval of affected tables and visuals.

QA run: 56 automated checks passed and 0 failed. AI-assisted tools were used for data processing; the reported values were checked against the row-level NTSB source through the reconciliation described in Appendix D.

Appendix B. Exceptions and decision log

Sources: All-GA Exceptions and Decision Log (Part A decisions, Part B data exceptions). Table B1 lists the decisions and Table B2 the data exceptions with their handling and status.

Table B1. Decisions

ID	Decision	Basis	Status	Owner
AG-D01	Source is the All-GA extract of 2026-09-21; study period EventYear 2016–2025	Paul, 2026-10-24	APPROVED	Paul

ID	Decision	Basis	Status	Owner
AG-D02	Exclude Business and Executive/Corporate (reported in the 1st Edition); Part 135 not in file	Paul, 2026-10-24	APPROVED	Paul
AG-D03	Types of operation use FlightOperationType verbatim (this file's operation field; the 1st Edition file used OperationCategory)	Only operation field in file; 1st Edition totals reproduced exactly	APPROVED (2026-11-06)	Co-authors
AG-D04	Count unique events within each grouping; injury fields once per event	D1/D2, confirmed by NTSB 2026-10-13; reproduces all 10 NTSB tabs	APPROVED (carried forward)	Paul
AG-D05	An event whose two aircraft rows carry different defining events is counted once under each (5 fixed-wing events and 1 rotary-wing event in the analyzed types of operation)	NTSB convention in its own tabs	APPROVED (2026-11-06)	Janeen (method)
AG-D06	An event spanning two types of operation is counted in each type and once in the combined "All analyzed types" view (31 fixed-wing events)	NTSB convention; disclosed	APPROVED (2026-11-06)	Kipp (classificati on)
AG-D07	Report a combined "All analyzed types" view per aircraft category as context, alongside each type of operation	NTSB aggregates All-GA by category in its own tab; departs from the 1st Edition statement that types of operation are not combined	APPROVED (2026-11-06)	All authors
AG-D08	Chart types of operation with 100 or more accidents, excluding the Unknown type of operation; all others in full tables	Keeps charts to totals that are stable; 1st Edition charted smaller totals	APPROVED (2026-11-06)	All authors
AG-D09	Other aircraft categories (balloon, glider, gyroplane, powered parachute, powered-lift, ultralight, weight-shift) in tables only	Fulfills the D4 commitment to report them; small totals	APPROVED (2026-11-06)	All authors
AG-D10	No exposure-based rates; use only NTSB records with EventYear 2016–2025 (FAA hours end at CY2024)	Paul, 2026-10-24	APPROVED	Paul
AG-D11	Public-aircraft values (federal, state, local, unspecified) kept as separate NTSB values	Do not merge source categories	APPROVED (2026-11-06)	Kipp
AG-D12	Non-U.S. events kept and counted	D3	APPROVED (carried forward)	Paul
AG-D13	FatalInjuries governs where HighestInjuryLevel = Fatal but FatalInjuries = 0 (3 events)	Matches NTSB tabs	APPROVED (2026-11-06)	Paul
AG-D14	NTSB seal shown on figures as a data-source mark only, as in the 1st Edition (replaces the earlier no-seal rule)	1st Edition practice; each figure footnote and Section 2.11 state that the NTSB has not reviewed or endorsed the analysis	APPROVED (2026-11-07)	Paul
AG-D15	Report title, edition label and byline	Title, byline and suggested citation as shown on the cover	APPROVED (2026-11-06)	Paul
AG-D16	Hostile reviews are mandatory for this and every future NTSB dataset project. They run on the finished report, the authors reconcile every finding, and only then does the final review and release follow	Paul, 2026-10-24	APPROVED	Paul

ID	Decision	Basis	Status	Owner
AG-D17	Post-maintenance check flight breakout of fixed-wing Flight test operations (supplementary; main NTSB-coded Flight test count unchanged).	Prompted by Janeen's question 2026-10-25; sent to Kipp and Janeen 2026-10-25	CLOSED (separate review)	Paul, Janeen, Kipp
AG-D18	Whether to send the NTSB an early draft or courtesy copy	Prior practice: courtesy copy waits for a complete report and send approval	Open	Paul
AG-D19	Terminology: reader-facing text names the specific type of operation, with "type of operation" as the general term	1st Edition referees; Janeen, 2026-10-30	APPROVED	Paul
AG-D20	No "first" or "only" claim; comparison-with-other-analyses placeholder removed from Section 1	Kipp, Janeen agreed, 2026-10-30	APPROVED	Paul
AG-D21	Leading-two bullets state the measure (n fatalities of N total fatalities); wording only, values unchanged	Kipp, 2026-10-30	APPLIED	Paul
AG-D22	Fatal share of an event (fatal accidents divided by accidents, shown with both counts) used in the Discussion only; defined in Table 6	Kipp, 2026-11-01	APPROVED	Paul
AG-D23	Fixed-wing Instructional Loss of Control In-Flight by phase of flight and location deferred to future work (Section 9)	Kipp, 2026-11-01	DEFERRED	Paul, Kipp
AG-D24	Wording: "these data" kept (APA 7); Section 5.1 sentence revised; Janeen's suggested edits accepted	Kipp, Janeen, 2026-11-01	APPLIED	Paul
AG-D25	Section 5.4 factual basis extended with Controlled Flight Into Terrain and the powerplant contrast; survivability causes not attributed (not in these data)	Kipp, 2026-11-01	APPLIED	Paul
AG-D26	Open items worded plainly in report text, without author placeholders	Paul, 2026-11-01	APPLIED	Paul
AG-D27	All 31 charts approved; INTERIM lines removed below the figures; INTERIM stamp removed from all 31 chart images	Kipp, 2026-11-01; Janeen concurrence, 2026-10-31	APPROVED	Paul

Table B2. Data exceptions

ID	Type	Event	Detail	Handling	Status
EX-AG-001	Event includes an excluded aircraft row	CEN18FA132	Airplane / Personal / Ground Collision; Airplane / Business / Collision on Takeoff or Landing	Kept through the analyzed row. Injury fields are event totals and cannot be split by aircraft.	Applied; disclose
EX-AG-002	Event includes an excluded aircraft row	CEN26LA045	Airplane / Personal / Ground Collision; Airplane / Executive/Corporate / Aerodrome	Kept through the analyzed row. Injury fields are event totals and cannot be split by aircraft.	Applied; disclose
EX-AG-003	Event includes an excluded aircraft row	GAA17CA077	Airplane / Business / Ground Collision; Airplane / Instructional / Ground Collision	Kept through the analyzed row. Injury fields are event totals and cannot be split by aircraft.	Applied; disclose
EX-AG-004	Event includes an excluded aircraft row	WPR22LA143	Airplane / Instructional / Ground Handling; Airplane / Executive/Corporate / Ground Handling	Kept through the analyzed row. Injury fields are event totals and cannot be split by aircraft.	Applied; disclose
EX-AG-005	Event includes an excluded aircraft row	WPR24LA318	Airplane / Personal / Ground Collision; Airplane / Executive/Corporate / Ground Collision	Kept through the analyzed row. Injury fields are event totals and cannot be split by aircraft.	Applied; disclose

ID	Type	Event	Detail	Handling	Status
EX-AG-006	Event spans two aircraft categories	CEN18LA087	Helicopter / Personal / Midair; Airplane / Personal / Midair	Counted in each analyzed category it touches; never pooled.	Applied; disclose
EX-AG-007	Event spans two aircraft categories	ERA17LA332	Helicopter / Instructional / Midair; Airplane / Personal / Midair	Counted in each analyzed category it touches; never pooled.	Applied; disclose
EX-AG-008	Event spans two aircraft categories	WPR22FA001	Helicopter / Instructional / Midair; Airplane / Instructional / Midair	Counted in each analyzed category it touches; never pooled.	Applied; disclose
EX-AG-009	Event spans two aircraft categories	WPR23LA041	Airplane / Instructional / Midair; Helicopter / Instructional / Midair	Counted in each analyzed category it touches; never pooled.	Applied; disclose
EX-AG-010	Event spans two types of operation	ANC16FA052	Airplane / Instructional / Midair; Airplane / Personal / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-011	Event spans two types of operation	CEN18FA132	Airplane / Personal / Ground Collision; Airplane / Business / Collision on Takeoff or Landing	The other aircraft is in an excluded type of operation (Business or Executive/Corporate), so the event is kept through its analyzed row only (see EX-AG-001 to EX-AG-005). Not among the 31 fixed-wing events in Section 2.6.	Applied; disclose
EX-AG-012	Event spans two types of operation	CEN20LA419	Airplane / Instructional / Midair; Airplane / Personal / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-013	Event spans two types of operation	CEN21FA215	Airplane / Positioning / Midair; Airplane / Personal / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-014	Event spans two types of operation	CEN22FA424	Airplane / Instructional / Midair; Airplane / Personal / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-015	Event spans two types of operation	CEN23LA065	Airplane / Instructional / Ground Collision; Airplane / Personal / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-016	Event spans two types of operation	CEN24FA221	Airplane / Aerial application / Midair; Airplane / Unknown / Unknown	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-017	Event spans two types of operation	CEN24LA196	Airplane / Instructional / Ground Collision; Airplane / Other work use / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-018	Event spans two types of operation	CEN25LA059	Airplane / Aerial observation / Runway Incursion - Vehicle; Airplane / Personal / Runway Incursion - Vehicle	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose

ID	Type	Event	Detail	Handling	Status
EX-AG-019	Event spans two types of operation	CEN26LA045	Airplane / Personal / Ground Collision; Airplane / Executive/Corporate / Aerodrome	The other aircraft is in an excluded type of operation (Business or Executive/Corporate), so the event is kept through its analyzed row only (see EX-AG-001 to EX-AG-005). Not among the 31 fixed-wing events in Section 2.6.	Applied; disclose
EX-AG-020	Event spans two types of operation	ERA16FA312	Airplane / Personal / Midair; Airplane / Instructional / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-021	Event spans two types of operation	ERA17LA332	Helicopter / Instructional / Midair; Airplane / Personal / Midair	Helicopter and airplane in different types of operation: counted in rotary-wing Instructional and in fixed-wing Personal, two analyses that are never added together (see EX-AG-007). Not among the 31 fixed-wing events in Section 2.6.	Applied; disclose
EX-AG-022	Event spans two types of operation	ERA18LA109	Airplane / Instructional / Midair; Airplane / Personal / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-023	Event spans two types of operation	ERA18LA268	Airplane / Instructional / Collision on Takeoff or Landing; Airplane / Personal / Collision on Takeoff or Landing	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-024	Event spans two types of operation	ERA20LA034	Airplane / Instructional / Midair; Airplane / Personal / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-025	Event spans two types of operation	ERA22FA318	Airplane / Personal / Midair; Airplane / Instructional / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-026	Event spans two types of operation	ERA25LA331	Airplane / Personal / Ground Collision; Airplane / Instructional / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-027	Event spans two types of operation	ERA26LA025	Airplane / Personal / Ground Collision; Airplane / Instructional / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-028	Event spans two types of operation	GAA16CA127	Airplane / Instructional / Ground Collision; Airplane / Personal / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-029	Event spans two types of operation	GAA16CA454	Airplane / Positioning / Ground Collision; Airplane / Personal / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose

ID	Type	Event	Detail	Handling	Status
EX-AG-030	Event spans two types of operation	GAA17CA077	Airplane / Business / Ground Collision; Airplane / Instructional / Ground Collision	The other aircraft is in an excluded type of operation (Business or Executive/Corporate), so the event is kept through its analyzed row only (see EX-AG-001 to EX-AG-005). Not among the 31 fixed-wing events in Section 2.6.	Applied; disclose
EX-AG-031	Event spans two types of operation	GAA17CA097	Airplane / Personal / Ground Collision; Airplane / Instructional / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-032	Event spans two types of operation	GAA18CA275	Airplane / Instructional / Ground Collision; Airplane / Personal / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-033	Event spans two types of operation	GAA18CA319	Airplane / Instructional / Ground Collision; Airplane / Personal / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-034	Event spans two types of operation	GAA19CA068	Airplane / Personal / Ground Collision; Airplane / Instructional / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-035	Event spans two types of operation	GAA19CA079	Airplane / Personal / Ground Collision; Airplane / Instructional / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-036	Event spans two types of operation	GAA19CA468	Airplane / Instructional / Ground Collision; Airplane / Personal / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-037	Event spans two types of operation	GAA20CA021	Airplane / Personal / Ground Collision; Airplane / Skydiving / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-038	Event spans two types of operation	WPR19FA095	Airplane / Personal / Runway Incursion - Vehicle; Airplane / Instructional / Runway Incursion - Vehicle	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-039	Event spans two types of operation	WPR20FA206	Airplane / Personal / Midair; Airplane / Aerial observation / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-040	Event spans two types of operation	WPR22LA143	Airplane / Instructional / Ground Handling; Airplane / Executive/Corporate / Ground Handling	The other aircraft is in an excluded type of operation (Business or Executive/Corporate), so the event is kept through its analyzed row only (see EX-AG-001 to EX-AG-005). Not among the 31 fixed-wing events in Section 2.6.	Applied; disclose
EX-AG-041	Event spans two types of operation	WPR23LA123	Airplane / Personal / Ground Collision; Airplane / Instructional / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose

ID	Type	Event	Detail	Handling	Status
EX-AG-042	Event spans two types of operation	WPR24FA304	Airplane / Personal / Midair; Airplane / Instructional / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-043	Event spans two types of operation	WPR24LA318	Airplane / Personal / Ground Collision; Airplane / Executive/Corporate / Ground Collision	The other aircraft is in an excluded type of operation (Business or Executive/Corporate), so the event is kept through its analyzed row only (see EX-AG-001 to EX-AG-005). Not among the 31 fixed-wing events in Section 2.6.	Applied; disclose
EX-AG-044	Event spans two types of operation	WPR25FA097	Airplane / Personal / Midair; Airplane / Instructional / Midair	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-045	Event spans two types of operation	WPR25LA042	Airplane / Personal / Ground Collision; Airplane / Instructional / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-046	Event spans two types of operation	WPR26LA059	Airplane / Personal / Ground Collision; Airplane / Instructional / Ground Collision	Counted once in each type of operation; once in the combined "All analyzed types" view.	Applied; disclose
EX-AG-047	HighestInjuryLevel = Fatal but FatalInjuries blank or 0	CEN19FA235	Airplane / Personal / Loss of Control In-Flight; FatalInjuries raw = 0.0	Counted as non-fatal (FatalInjuries governs, as in NTSB summary tabs).	Applied; disclose (AG-D13)
EX-AG-048	HighestInjuryLevel = Fatal but FatalInjuries blank or 0	CEN20LA413	Weight-shift / Personal / Loss of Control on Ground; FatalInjuries raw = 0.0	Counted as non-fatal (FatalInjuries governs, as in NTSB summary tabs).	Applied; disclose (AG-D13)
EX-AG-049	HighestInjuryLevel = Fatal but FatalInjuries blank or 0	WPR20LA279	Airplane / Unknown / Security Related; FatalInjuries raw = 0.0	Counted as non-fatal (FatalInjuries governs, as in NTSB summary tabs).	Applied; disclose (AG-D13)
EX-AG-050	Two aircraft rows carry different defining events	CEN18FA132	Airplane / Personal / Ground Collision; Airplane / Business / Collision on Takeoff or Landing	The second defining event is on the excluded Business or Executive/Corporate row, so the event is counted only under the analyzed row's defining event (Ground Collision). Not among the six events in Section 2.6.	Applied; disclose
EX-AG-051	Two aircraft rows carry different defining events	CEN24FA221	Airplane / Aerial application / Midair; Airplane / Unknown / Unknown	Event counted once under each defining event (NTSB convention, reproduces NTSB tabs).	Applied; disclose
EX-AG-052	Two aircraft rows carry different defining events	CEN26LA045	Airplane / Personal / Ground Collision; Airplane / Executive/Corporate / Aerodrome	The second defining event is on the excluded Business or Executive/Corporate row, so the event is counted only under the analyzed row's defining event (Ground Collision). Not among the six events in Section 2.6.	Applied; disclose
EX-AG-053	Two aircraft rows carry different defining events	ERA25LA092	Airplane / Instructional / Loss of Control on Ground; Airplane / Instructional / Ground Collision	Event counted once under each defining event (NTSB convention, reproduces NTSB tabs).	Applied; disclose

ID	Type	Event	Detail	Handling	Status
EX-AG-054	Two aircraft rows carry different defining events	GAA24WA091	Airplane / Unknown / Midair; Airplane / Unknown / Unknown	Event counted once under each defining event (NTSB convention, reproduces NTSB tabs).	Applied; disclose
EX-AG-055	Two aircraft rows carry different defining events	WPR24FA201	Airplane / Aerial application / Midair; Airplane / Aerial application / Unknown	Event counted once under each defining event (NTSB convention, reproduces NTSB tabs).	Applied; disclose
EX-AG-056	Two aircraft rows carry different defining events	WPR24FA309	Airplane / Personal / Abrupt Maneuver; Airplane / Personal / Midair	Event counted once under each defining event (NTSB convention, reproduces NTSB tabs).	Applied; disclose
EX-AG-057	Two aircraft rows carry different defining events	WPR24LA302	Helicopter / Flight test / Midair; Helicopter / Flight test / Collision on Takeoff or Landing	Event counted once under each defining event (NTSB convention, reproduces NTSB tabs).	Applied; disclose
EX-AG-058	Blank Country	ERA16LA158	Atlantic Ocean; Country blank	Counted; shown as non-U.S. in the non-U.S. event tally	Applied; disclose

Appendix C. Full lookup tables

Each table lists every defining event in the type of operation named in its title, with all three measures and their shares of that type of operation's total. Events with two defining events are counted under each, so a column can total slightly more than the total for the type of operation; the bold row gives that total.

C.1 Fixed-wing All analyzed types

Table C1. Fixed-wing All analyzed types full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	1,326	13.2%	11	0.6%	13	0.5%
Abrupt Maneuver	46	0.5%	21	1.2%	49	1.7%
Aerodrome	7	0.1%	0	0.0%	0	0.0%
Bird Strike	88	0.9%	7	0.4%	14	0.5%
Collision on Takeoff or Landing	295	2.9%	35	2.1%	62	2.2%
Controlled Flight Into Terrain	180	1.8%	107	6.3%	185	6.5%
Fire - Non-Impact	70	0.7%	15	0.9%	24	0.8%
Fuel Related	921	9.2%	90	5.3%	115	4.0%
Glider Towing	2	0.0%	1	0.1%	1	0.0%
Ground Collision	131	1.3%	3	0.2%	6	0.2%
Ground Handling	43	0.4%	6	0.4%	6	0.2%
Icing	18	0.2%	10	0.6%	17	0.6%
Loss of Control In-Flight	1,553	15.5%	710	41.6%	1,257	44.2%
Loss of Control on Ground	1,857	18.5%	22	1.3%	23	0.8%
Loss of Lift	17	0.2%	1	0.1%	2	0.1%
Low Altitude Operation	163	1.6%	58	3.4%	73	2.6%
Medical Event	21	0.2%	17	1.0%	22	0.8%
Midair	57	0.6%	34	2.0%	84	3.0%

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Navigation Error	14	0.1%	3	0.2%	10	0.4%
Other	335	3.3%	69	4.0%	106	3.7%
Runway Excursion	224	2.2%	5	0.3%	10	0.4%
Runway Incursion - Vehicle	7	0.1%	1	0.1%	1	0.0%
Security Related	9	0.1%	4	0.2%	4	0.1%
Simulated/training event	3	0.0%	0	0.0%	0	0.0%
System/Component Failure - Non-power	451	4.5%	55	3.2%	83	2.9%
System/Component Failure - Powerplant	1,489	14.8%	162	9.5%	232	8.2%
Turbulence Encounter	26	0.3%	9	0.5%	11	0.4%
Undershoot/Overshoot	126	1.3%	5	0.3%	17	0.6%
Unintended Flight Into IMC	132	1.3%	105	6.2%	177	6.2%
Unknown	344	3.4%	133	7.8%	225	7.9%
Wildlife Encounter	48	0.5%	0	0.0%	0	0.0%
Windshear/Thunderstorm	36	0.4%	10	0.6%	18	0.6%
Fixed-wing all analyzed types total	**10,034**		**1,706**		**2,844**	

C.2 Fixed-wing Personal

Table C2. Fixed-wing Personal full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	915	12.7%	9	0.7%	11	0.5%
Abrupt Maneuver	36	0.5%	18	1.4%	33	1.5%
Aerodrome	5	0.1%	0	0.0%	0	0.0%
Bird Strike	40	0.6%	5	0.4%	7	0.3%
Collision on Takeoff or Landing	223	3.1%	26	2.0%	41	1.9%
Controlled Flight Into Terrain	131	1.8%	82	6.4%	135	6.3%
Fire - Non-Impact	46	0.6%	9	0.7%	12	0.6%
Fuel Related	675	9.4%	66	5.2%	84	3.9%
Ground Collision	91	1.3%	2	0.2%	5	0.2%
Ground Handling	25	0.3%	5	0.4%	5	0.2%
Icing	16	0.2%	10	0.8%	17	0.8%
Loss of Control In-Flight	1,137	15.8%	548	42.8%	977	45.7%
Loss of Control on Ground	1,375	19.1%	17	1.3%	18	0.8%
Loss of Lift	15	0.2%	1	0.1%	2	0.1%
Low Altitude Operation	71	1.0%	29	2.3%	41	1.9%
Medical Event	19	0.3%	15	1.2%	19	0.9%
Midair	35	0.5%	20	1.6%	51	2.4%
Navigation Error	10	0.1%	3	0.2%	10	0.5%
Other	224	3.1%	48	3.8%	81	3.8%
Runway Excursion	168	2.3%	4	0.3%	9	0.4%
Runway Incursion - Vehicle	6	0.1%	1	0.1%	1	0.0%
Security Related	3	0.0%	2	0.2%	2	0.1%
System/Component Failure - Non-power	294	4.1%	34	2.7%	48	2.2%
System/Component Failure - Powerplant	1,109	15.4%	128	10.0%	181	8.5%
Turbulence Encounter	19	0.3%	7	0.5%	9	0.4%
Undershoot/Overshoot	93	1.3%	3	0.2%	9	0.4%
Unintended Flight Into IMC	116	1.6%	93	7.3%	162	7.6%

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Unknown	232	3.2%	88	6.9%	155	7.2%
Wildlife Encounter	27	0.4%	0	0.0%	0	0.0%
Windshear/Thunderstorm	28	0.4%	8	0.6%	16	0.7%
Fixed-wing Personal total	**7,183**		**1,280**		**2,140**	

C.3 Fixed-wing Instructional

Table C3. Fixed-wing Instructional full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	314	19.6%	1	0.7%	1	0.4%
Abrupt Maneuver	4	0.2%	1	0.7%	2	0.8%
Aerodrome	1	0.1%	0	0.0%	0	0.0%
Bird Strike	38	2.4%	1	0.7%	3	1.2%
Collision on Takeoff or Landing	39	2.4%	2	1.4%	4	1.6%
Controlled Flight Into Terrain	18	1.1%	10	6.8%	17	6.7%
Fire - Non-Impact	12	0.8%	2	1.4%	3	1.2%
Fuel Related	126	7.9%	13	8.8%	18	7.1%
Ground Collision	43	2.7%	0	0.0%	0	0.0%
Ground Handling	13	0.8%	0	0.0%	0	0.0%
Icing	2	0.1%	0	0.0%	0	0.0%
Loss of Control In-Flight	232	14.5%	68	45.9%	121	47.5%
Loss of Control on Ground	348	21.8%	0	0.0%	0	0.0%
Loss of Lift	2	0.1%	0	0.0%	0	0.0%
Low Altitude Operation	3	0.2%	1	0.7%	2	0.8%
Midair	15	0.9%	8	5.4%	23	9.0%
Navigation Error	2	0.1%	0	0.0%	0	0.0%
Other	37	2.3%	5	3.4%	6	2.4%
Runway Excursion	19	1.2%	0	0.0%	0	0.0%
Runway Incursion - Vehicle	1	0.1%	1	0.7%	1	0.4%
Security Related	1	0.1%	1	0.7%	1	0.4%
Simulated/training event	3	0.2%	0	0.0%	0	0.0%
System/Component Failure - Non-power	66	4.1%	9	6.1%	16	6.3%
System/Component Failure - Powerplant	176	11.0%	14	9.5%	18	7.1%
Turbulence Encounter	4	0.2%	0	0.0%	0	0.0%
Undershoot/Overshoot	16	1.0%	0	0.0%	0	0.0%
Unintended Flight Into IMC	4	0.2%	1	0.7%	1	0.4%
Unknown	36	2.2%	9	6.1%	17	6.7%
Wildlife Encounter	21	1.3%	0	0.0%	0	0.0%
Windshear/Thunderstorm	5	0.3%	1	0.7%	1	0.4%
Fixed-wing Instructional total	**1,600**		**148**		**255**	

C.4 Fixed-wing Aerial application

Table C4. Fixed-wing Aerial application full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	6	1.6%	0	0.0%	0	0.0%
Bird Strike	1	0.3%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	16	4.2%	2	2.7%	2	2.7%
Controlled Flight Into Terrain	8	2.1%	2	2.7%	2	2.7%
Fire - Non-Impact	2	0.5%	0	0.0%	0	0.0%
Fuel Related	20	5.3%	1	1.4%	1	1.3%
Loss of Control In-Flight	58	15.4%	20	27.0%	20	26.7%
Loss of Control on Ground	38	10.1%	2	2.7%	2	2.7%
Low Altitude Operation	75	19.9%	21	28.4%	21	28.0%
Medical Event	1	0.3%	1	1.4%	1	1.3%
Midair	7	1.9%	6	8.1%	7	9.3%
Other	36	9.5%	4	5.4%	4	5.3%
Runway Excursion	10	2.7%	1	1.4%	1	1.3%
Runway Incursion - Vehicle	1	0.3%	0	0.0%	0	0.0%
System/Component Failure - Non-power	13	3.4%	3	4.1%	3	4.0%
System/Component Failure - Powerplant	59	15.6%	0	0.0%	0	0.0%
Turbulence Encounter	1	0.3%	1	1.4%	1	1.3%
Undershoot/Overshoot	4	1.1%	0	0.0%	0	0.0%
Unintended Flight Into IMC	5	1.3%	4	5.4%	4	5.3%
Unknown	17	4.5%	7	9.5%	7	9.3%
Fixed-wing Aerial application total	**377**		**74**		**75**	

C.5 Fixed-wing Positioning

Table C5. Fixed-wing Positioning full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	20	10.8%	0	0.0%	0	0.0%
Abrupt Maneuver	3	1.6%	1	2.9%	3	5.7%
Aerodrome	1	0.5%	0	0.0%	0	0.0%
Bird Strike	3	1.6%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	3	1.6%	1	2.9%	2	3.8%
Controlled Flight Into Terrain	4	2.2%	0	0.0%	0	0.0%
Fire - Non-Impact	1	0.5%	0	0.0%	0	0.0%
Fuel Related	22	11.9%	4	11.8%	4	7.5%
Ground Collision	7	3.8%	0	0.0%	0	0.0%
Loss of Control In-Flight	24	13.0%	14	41.2%	24	45.3%
Loss of Control on Ground	17	9.2%	0	0.0%	0	0.0%
Low Altitude Operation	2	1.1%	1	2.9%	1	1.9%
Midair	1	0.5%	0	0.0%	0	0.0%
Other	7	3.8%	0	0.0%	0	0.0%
Runway Excursion	10	5.4%	0	0.0%	0	0.0%
System/Component Failure - Non-power	19	10.3%	1	2.9%	3	5.7%
System/Component Failure - Powerplant	23	12.4%	2	5.9%	3	5.7%

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Turbulence Encounter	2	1.1%	1	2.9%	1	1.9%
Undershoot/Overshoot	4	2.2%	0	0.0%	0	0.0%
Unintended Flight Into IMC	5	2.7%	5	14.7%	8	15.1%
Unknown	6	3.2%	4	11.8%	4	7.5%
Windshear/Thunderstorm	1	0.5%	0	0.0%	0	0.0%
Fixed-wing Positioning total	**185**		**34**		**53**	

C.6 Fixed-wing Unknown

Table C6. Fixed-wing Unknown full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	24	14.5%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	5	3.0%	3	4.9%	11	7.7%
Controlled Flight Into Terrain	7	4.2%	7	11.5%	20	14.1%
Fire - Non-Impact	4	2.4%	1	1.6%	3	2.1%
Fuel Related	6	3.6%	1	1.6%	2	1.4%
Ground Collision	1	0.6%	1	1.6%	1	0.7%
Loss of Control In-Flight	25	15.2%	19	31.1%	53	37.3%
Loss of Control on Ground	10	6.1%	1	1.6%	1	0.7%
Low Altitude Operation	2	1.2%	0	0.0%	0	0.0%
Midair	2	1.2%	1	1.6%	1	0.7%
Other	6	3.6%	5	8.2%	8	5.6%
Runway Excursion	7	4.2%	0	0.0%	0	0.0%
Security Related	5	3.0%	1	1.6%	1	0.7%
System/Component Failure - Non-power	9	5.5%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	21	12.7%	3	4.9%	7	4.9%
Undershoot/Overshoot	1	0.6%	0	0.0%	0	0.0%
Unintended Flight Into IMC	1	0.6%	1	1.6%	1	0.7%
Unknown	29	17.6%	16	26.2%	32	22.5%
Windshear/Thunderstorm	1	0.6%	1	1.6%	1	0.7%
Fixed-wing Unknown total	**165**		**61**		**142**	

C.7 Fixed-wing Flight test

Table C7. Fixed-wing Flight test full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	15	10.2%	0	0.0%	0	0.0%
Fire - Non-Impact	1	0.7%	0	0.0%	0	0.0%
Fuel Related	15	10.2%	1	3.8%	2	5.6%
Ground Collision	1	0.7%	0	0.0%	0	0.0%
Loss of Control In-Flight	25	17.0%	11	42.3%	13	36.1%
Loss of Control on Ground	17	11.6%	0	0.0%	0	0.0%
Low Altitude Operation	1	0.7%	0	0.0%	0	0.0%

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Medical Event	1	0.7%	1	3.8%	2	5.6%
Other	4	2.7%	1	3.8%	1	2.8%
Runway Excursion	1	0.7%	0	0.0%	0	0.0%
System/Component Failure - Non-power	23	15.6%	3	11.5%	6	16.7%
System/Component Failure - Powerplant	32	21.8%	4	15.4%	6	16.7%
Undershoot/Overshoot	1	0.7%	0	0.0%	0	0.0%
Unknown	10	6.8%	5	19.2%	6	16.7%
Fixed-wing Flight test total	**147**		**26**		**36**	

C.8 Fixed-wing Aerial observation

Table C8. Fixed-wing Aerial observation full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	4	4.8%	0	0.0%	0	0.0%
Bird Strike	3	3.6%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	5	6.0%	4	19.0%	7	16.7%
Fuel Related	19	22.9%	0	0.0%	0	0.0%
Ground Handling	1	1.2%	0	0.0%	0	0.0%
Loss of Control In-Flight	11	13.3%	10	47.6%	21	50.0%
Loss of Control on Ground	9	10.8%	0	0.0%	0	0.0%
Low Altitude Operation	2	2.4%	2	9.5%	2	4.8%
Midair	1	1.2%	1	4.8%	8	19.0%
Other	3	3.6%	2	9.5%	2	4.8%
Runway Incursion - Vehicle	1	1.2%	0	0.0%	0	0.0%
System/Component Failure - Non-power	3	3.6%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	17	20.5%	2	9.5%	2	4.8%
Undershoot/Overshoot	1	1.2%	0	0.0%	0	0.0%
Unknown	3	3.6%	0	0.0%	0	0.0%
Fixed-wing Aerial observation total	**83**		**21**		**42**	

C.9 Fixed-wing Other work use

Table C9. Fixed-wing Other work use full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	8	10.5%	0	0.0%	0	0.0%
Abrupt Maneuver	1	1.3%	0	0.0%	0	0.0%
Bird Strike	2	2.6%	1	7.7%	4	12.1%
Controlled Flight Into Terrain	3	3.9%	1	7.7%	2	6.1%
Fire - Non-Impact	3	3.9%	3	23.1%	6	18.2%
Fuel Related	7	9.2%	1	7.7%	1	3.0%
Ground Collision	1	1.3%	0	0.0%	0	0.0%
Loss of Control In-Flight	11	14.5%	2	15.4%	3	9.1%
Loss of Control on Ground	14	18.4%	0	0.0%	0	0.0%

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Low Altitude Operation	2	2.6%	0	0.0%	0	0.0%
Midair	1	1.3%	1	7.7%	5	15.2%
Other	3	3.9%	0	0.0%	0	0.0%
Runway Excursion	4	5.3%	0	0.0%	0	0.0%
System/Component Failure - Non-power	3	3.9%	1	7.7%	1	3.0%
System/Component Failure - Powerplant	9	11.8%	2	15.4%	4	12.1%
Undershoot/Overshoot	1	1.3%	1	7.7%	7	21.2%
Unknown	2	2.6%	0	0.0%	0	0.0%
Windshear/Thunderstorm	1	1.3%	0	0.0%	0	0.0%
Fixed-wing Other work use total	**76**		**13**		**33**	

C.10 Fixed-wing Skydiving

Table C10. Fixed-wing Skydiving full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	6	12.2%	1	10.0%	1	3.7%
Abrupt Maneuver	1	2.0%	1	10.0%	11	40.7%
Collision on Takeoff or Landing	1	2.0%	0	0.0%	0	0.0%
Fire - Non-Impact	1	2.0%	0	0.0%	0	0.0%
Fuel Related	8	16.3%	1	10.0%	1	3.7%
Ground Collision	1	2.0%	0	0.0%	0	0.0%
Ground Handling	2	4.1%	1	10.0%	1	3.7%
Loss of Control In-Flight	3	6.1%	1	10.0%	5	18.5%
Loss of Control on Ground	3	6.1%	0	0.0%	0	0.0%
Other	4	8.2%	1	10.0%	1	3.7%
Runway Excursion	3	6.1%	0	0.0%	0	0.0%
System/Component Failure - Non-power	1	2.0%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	8	16.3%	2	20.0%	5	18.5%
Undershoot/Overshoot	4	8.2%	1	10.0%	1	3.7%
Unknown	3	6.1%	1	10.0%	1	3.7%
Fixed-wing Skydiving total	**49**		**10**		**27**	

C.11 Fixed-wing Ferry

Table C11. Fixed-wing Ferry full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	3	6.1%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	3	6.1%	1	8.3%	2	13.3%
Fuel Related	10	20.4%	1	8.3%	1	6.7%
Ground Handling	2	4.1%	0	0.0%	0	0.0%
Loss of Control In-Flight	4	8.2%	1	8.3%	1	6.7%
Loss of Control on Ground	9	18.4%	2	16.7%	2	13.3%
Other	1	2.0%	1	8.3%	1	6.7%

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Runway Excursion	1	2.0%	0	0.0%	0	0.0%
System/Component Failure - Non-power	7	14.3%	1	8.3%	2	13.3%
System/Component Failure - Powerplant	6	12.2%	4	33.3%	5	33.3%
Undershoot/Overshoot	1	2.0%	0	0.0%	0	0.0%
Unknown	2	4.1%	1	8.3%	1	6.7%
Fixed-wing Ferry total	**49**		**12**		**15**	

C.12 Fixed-wing Air race/show

Table C12. Fixed-wing Air race/show full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Bird Strike	1	2.9%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	2	5.9%	0	0.0%	0	0.0%
Ground Collision	2	5.9%	0	0.0%	0	0.0%
Loss of Control In-Flight	6	17.6%	5	35.7%	5	25.0%
Loss of Control on Ground	2	5.9%	0	0.0%	0	0.0%
Low Altitude Operation	3	8.8%	2	14.3%	2	10.0%
Midair	5	14.7%	2	14.3%	8	40.0%
Other	1	2.9%	1	7.1%	1	5.0%
System/Component Failure - Non-power	3	8.8%	1	7.1%	1	5.0%
System/Component Failure - Powerplant	6	17.6%	1	7.1%	1	5.0%
Unintended Flight Into IMC	1	2.9%	1	7.1%	1	5.0%
Unknown	2	5.9%	1	7.1%	1	5.0%
Fixed-wing Air race/show total	**34**		**14**		**20**	

C.13 Fixed-wing Banner tow

Table C13. Fixed-wing Banner tow full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Fuel Related	8	26.7%	1	14.3%	1	12.5%
Loss of Control In-Flight	6	20.0%	4	57.1%	5	62.5%
Loss of Control on Ground	2	6.7%	0	0.0%	0	0.0%
Other	2	6.7%	1	14.3%	1	12.5%
System/Component Failure - Non-power	4	13.3%	1	14.3%	1	12.5%
System/Component Failure - Powerplant	7	23.3%	0	0.0%	0	0.0%
Unknown	1	3.3%	0	0.0%	0	0.0%
Fixed-wing Banner tow total	**30**		**7**		**8**	

C.14 Fixed-wing Public aircraft - federal

Table C14. Fixed-wing Public aircraft - federal full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	2	8.7%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	4.3%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	3	13.0%	1	50.0%	2	66.7%
Fuel Related	2	8.7%	0	0.0%	0	0.0%
Loss of Control In-Flight	1	4.3%	1	50.0%	1	33.3%
Loss of Control on Ground	2	8.7%	0	0.0%	0	0.0%
Other	3	13.0%	0	0.0%	0	0.0%
Runway Excursion	1	4.3%	0	0.0%	0	0.0%
System/Component Failure - Non-power	2	8.7%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	6	26.1%	0	0.0%	0	0.0%
Fixed-wing Public aircraft - federal total	**23**		**2**		**3**	

C.15 Fixed-wing Glider tow

Table C15. Fixed-wing Glider tow full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	1	5.6%	0	0.0%	0	0.0%
Fuel Related	2	11.1%	0	0.0%	0	0.0%
Glider Towing	2	11.1%	1	33.3%	1	33.3%
Loss of Control In-Flight	4	22.2%	2	66.7%	2	66.7%
Loss of Control on Ground	2	11.1%	0	0.0%	0	0.0%
Navigation Error	2	11.1%	0	0.0%	0	0.0%
Other	1	5.6%	0	0.0%	0	0.0%
System/Component Failure - Non-power	1	5.6%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	3	16.7%	0	0.0%	0	0.0%
Fixed-wing Glider tow total	**18**		**3**		**3**	

C.16 Fixed-wing Firefighting

Table C16. Fixed-wing Firefighting full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	3	20.0%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	6.7%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	1	6.7%	0	0.0%	0	0.0%
Loss of Control In-Flight	2	13.3%	1	16.7%	1	10.0%
Loss of Control on Ground	2	13.3%	0	0.0%	0	0.0%
Low Altitude Operation	2	13.3%	2	33.3%	4	40.0%
Midair	1	6.7%	1	16.7%	2	20.0%
System/Component Failure - Non-power	2	13.3%	1	16.7%	2	20.0%
Unknown	1	6.7%	1	16.7%	1	10.0%

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Fixed-wing Firefighting total	**15**		**6**		**10**	

C.17 Fixed-wing Public aircraft - state

Table C17. Fixed-wing Public aircraft - state full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	2	20.0%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	10.0%	0	0.0%	0	0.0%
Fuel Related	1	10.0%	0	0.0%	0	0.0%
Loss of Control on Ground	2	20.0%	0	0.0%	0	0.0%
Other	1	10.0%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	3	30.0%	0	0.0%	0	0.0%
Fixed-wing Public aircraft - state total	**10**		**0**		**0**	

C.18 Fixed-wing Public aircraft

Table C18. Fixed-wing Public aircraft full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	3	30.0%	0	0.0%	0	0.0%
Loss of Control In-Flight	1	10.0%	1	100.0%	1	100.0%
Loss of Control on Ground	1	10.0%	0	0.0%	0	0.0%
Other	1	10.0%	0	0.0%	0	0.0%
System/Component Failure - Non-power	1	10.0%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	3	30.0%	0	0.0%	0	0.0%
Fixed-wing Public aircraft total	**10**		**1**		**1**	

C.19 Fixed-wing Public aircraft - local

Table C19. Fixed-wing Public aircraft - local full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Loss of Control In-Flight	2	28.6%	2	100.0%	4	100.0%
Loss of Control on Ground	3	42.9%	0	0.0%	0	0.0%
Other	1	14.3%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	1	14.3%	0	0.0%	0	0.0%
Fixed-wing Public aircraft - local total	**7**		**2**		**4**	

C.20 Fixed-wing Air drop

Table C20. Fixed-wing Air drop full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abrupt Maneuver	1	25.0%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	25.0%	0	0.0%	0	0.0%
Loss of Control In-Flight	1	25.0%	0	0.0%	0	0.0%
Loss of Control on Ground	1	25.0%	0	0.0%	0	0.0%
Fixed-wing Air drop total	**4**		**0**		**0**	

C.21 Rotary-wing All analyzed types

Table C21. Rotary-wing All analyzed types full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	97	9.6%	1	0.6%	2	0.7%
Abrupt Maneuver	16	1.6%	4	2.3%	10	3.3%
Bird Strike	3	0.3%	0	0.0%	0	0.0%
Cabin Safety Events	2	0.2%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	24	2.4%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	28	2.8%	11	6.4%	20	6.7%
External Load	12	1.2%	3	1.7%	4	1.3%
Fire - Non-Impact	5	0.5%	0	0.0%	0	0.0%
Fuel Related	43	4.3%	4	2.3%	5	1.7%
Ground Collision	3	0.3%	1	0.6%	4	1.3%
Ground Handling	6	0.6%	0	0.0%	0	0.0%
Loss of Control In-Flight	225	22.3%	41	23.7%	73	24.3%
Loss of Control on Ground	77	7.6%	3	1.7%	4	1.3%
Loss of Lift	4	0.4%	0	0.0%	0	0.0%
Low Altitude Operation	98	9.7%	22	12.7%	29	9.7%
Medical Event	1	0.1%	0	0.0%	0	0.0%
Midair	9	0.9%	4	2.3%	9	3.0%
Other	82	8.1%	19	11.0%	40	13.3%
Simulated/training event	1	0.1%	0	0.0%	0	0.0%
System/Component Failure - Non-power	75	7.4%	11	6.4%	18	6.0%
System/Component Failure - Powerplant	121	12.0%	14	8.1%	29	9.7%
Undershoot/Overshoot	1	0.1%	0	0.0%	0	0.0%
Unintended Flight Into IMC	22	2.2%	14	8.1%	22	7.3%
Unknown	52	5.2%	21	12.1%	31	10.3%
Windshear/Thunderstorm	1	0.1%	0	0.0%	0	0.0%
Rotary-wing all analyzed types total	**1,007**		**173**		**300**	

C.22 Rotary-wing Personal

Table C22. Rotary-wing Personal full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	28	9.9%	1	1.6%	2	1.9%
Abrupt Maneuver	9	3.2%	3	4.9%	8	7.4%
Bird Strike	2	0.7%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	4	1.4%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	8	2.8%	6	9.8%	13	12.0%
Fire - Non-Impact	2	0.7%	0	0.0%	0	0.0%
Fuel Related	14	4.9%	1	1.6%	1	0.9%
Loss of Control In-Flight	74	26.1%	15	24.6%	31	28.7%
Loss of Control on Ground	27	9.5%	0	0.0%	0	0.0%
Loss of Lift	2	0.7%	0	0.0%	0	0.0%
Low Altitude Operation	16	5.7%	6	9.8%	10	9.3%
Midair	3	1.1%	2	3.3%	4	3.7%
Other	13	4.6%	5	8.2%	8	7.4%
System/Component Failure - Non-power	10	3.5%	1	1.6%	1	0.9%
System/Component Failure - Powerplant	43	15.2%	4	6.6%	4	3.7%
Unintended Flight Into IMC	15	5.3%	11	18.0%	17	15.7%
Unknown	13	4.6%	6	9.8%	9	8.3%
Rotary-wing Personal total	**283**		**61**		**108**	

C.23 Rotary-wing Instructional

Table C23. Rotary-wing Instructional full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	50	25.1%	0	0.0%	0	0.0%
Abrupt Maneuver	2	1.0%	1	7.7%	2	11.1%
Bird Strike	1	0.5%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	2	1.0%	0	0.0%	0	0.0%
Fire - Non-Impact	1	0.5%	0	0.0%	0	0.0%
Fuel Related	4	2.0%	2	15.4%	2	11.1%
Ground Collision	1	0.5%	0	0.0%	0	0.0%
Loss of Control In-Flight	64	32.2%	5	38.5%	7	38.9%
Loss of Control on Ground	29	14.6%	0	0.0%	0	0.0%
Low Altitude Operation	2	1.0%	0	0.0%	0	0.0%
Midair	3	1.5%	1	7.7%	2	11.1%
Other	8	4.0%	1	7.7%	1	5.6%
Simulated/training event	1	0.5%	0	0.0%	0	0.0%
System/Component Failure - Non-power	7	3.5%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	17	8.5%	0	0.0%	0	0.0%
Unintended Flight Into IMC	1	0.5%	1	7.7%	2	11.1%
Unknown	6	3.0%	2	15.4%	2	11.1%
Rotary-wing Instructional total	**199**		**13**		**18**	

C.24 Rotary-wing Aerial application

Table C24. Rotary-wing Aerial application full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	4	2.2%	0	0.0%	0	0.0%
Abrupt Maneuver	2	1.1%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	3	1.7%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	6	3.4%	1	5.0%	1	5.0%
Fire - Non-Impact	1	0.6%	0	0.0%	0	0.0%
Fuel Related	14	7.8%	0	0.0%	0	0.0%
Ground Collision	1	0.6%	0	0.0%	0	0.0%
Ground Handling	4	2.2%	0	0.0%	0	0.0%
Loss of Control In-Flight	22	12.3%	1	5.0%	1	5.0%
Loss of Control on Ground	4	2.2%	2	10.0%	2	10.0%
Loss of Lift	2	1.1%	0	0.0%	0	0.0%
Low Altitude Operation	50	27.9%	9	45.0%	9	45.0%
Other	23	12.8%	4	20.0%	4	20.0%
System/Component Failure - Non-power	16	8.9%	2	10.0%	2	10.0%
System/Component Failure - Powerplant	19	10.6%	1	5.0%	1	5.0%
Unintended Flight Into IMC	1	0.6%	0	0.0%	0	0.0%
Unknown	7	3.9%	0	0.0%	0	0.0%
Rotary-wing Aerial application total	**179**		**20**		**20**	

C.25 Rotary-wing Aerial observation

Table C25. Rotary-wing Aerial observation full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	1	1.4%	0	0.0%	0	0.0%
Cabin Safety Events	2	2.9%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	5	7.2%	1	5.6%	2	5.0%
Fire - Non-Impact	1	1.4%	0	0.0%	0	0.0%
Fuel Related	6	8.7%	1	5.6%	2	5.0%
Loss of Control In-Flight	18	26.1%	4	22.2%	7	17.5%
Loss of Control on Ground	2	2.9%	0	0.0%	0	0.0%
Low Altitude Operation	5	7.2%	0	0.0%	0	0.0%
Other	5	7.2%	2	11.1%	3	7.5%
System/Component Failure - Non-power	7	10.1%	4	22.2%	10	25.0%
System/Component Failure - Powerplant	12	17.4%	3	16.7%	11	27.5%
Unintended Flight Into IMC	2	2.9%	1	5.6%	2	5.0%
Unknown	3	4.3%	2	11.1%	3	7.5%
Rotary-wing Aerial observation total	**69**		**18**		**40**	

C.26 Rotary-wing Other work use

Table C26. Rotary-wing Other work use full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	4	6.5%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	1.6%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	1	1.6%	0	0.0%	0	0.0%
External Load	1	1.6%	1	8.3%	2	7.1%
Fuel Related	1	1.6%	0	0.0%	0	0.0%
Loss of Control In-Flight	10	16.1%	3	25.0%	5	17.9%
Loss of Control on Ground	1	1.6%	0	0.0%	0	0.0%
Low Altitude Operation	10	16.1%	2	16.7%	2	7.1%
Medical Event	1	1.6%	0	0.0%	0	0.0%
Midair	1	1.6%	0	0.0%	0	0.0%
Other	12	19.4%	3	25.0%	13	46.4%
System/Component Failure - Non-power	6	9.7%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	7	11.3%	1	8.3%	3	10.7%
Unintended Flight Into IMC	3	4.8%	1	8.3%	1	3.6%
Unknown	3	4.8%	1	8.3%	2	7.1%
Rotary-wing Other work use total	**62**		**12**		**28**	

C.27 Rotary-wing External load

Table C27. Rotary-wing External load full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Collision on Takeoff or Landing	2	3.9%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	2	3.9%	1	7.1%	2	8.7%
External Load	7	13.7%	1	7.1%	1	4.3%
Fuel Related	2	3.9%	0	0.0%	0	0.0%
Ground Handling	1	2.0%	0	0.0%	0	0.0%
Loss of Control In-Flight	3	5.9%	2	14.3%	5	21.7%
Loss of Control on Ground	1	2.0%	1	7.1%	2	8.7%
Low Altitude Operation	10	19.6%	4	28.6%	6	26.1%
Other	8	15.7%	1	7.1%	3	13.0%
System/Component Failure - Non-power	2	3.9%	1	7.1%	1	4.3%
System/Component Failure - Powerplant	9	17.6%	2	14.3%	2	8.7%
Unknown	4	7.8%	1	7.1%	1	4.3%
Rotary-wing External load total	**51**		**14**		**23**	

C.28 Rotary-wing Positioning

Table C28. Rotary-wing Positioning full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	3	6.4%	0	0.0%	0	0.0%

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abrupt Maneuver	1	2.1%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	5	10.6%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	1	2.1%	1	12.5%	1	6.7%
Loss of Control In-Flight	11	23.4%	3	37.5%	6	40.0%
Loss of Control on Ground	5	10.6%	0	0.0%	0	0.0%
Low Altitude Operation	3	6.4%	1	12.5%	2	13.3%
Other	2	4.3%	0	0.0%	0	0.0%
System/Component Failure - Non-power	11	23.4%	1	12.5%	1	6.7%
System/Component Failure - Powerplant	3	6.4%	1	12.5%	4	26.7%
Unknown	2	4.3%	1	12.5%	1	6.7%
Rotary-wing Positioning total	**47**		**8**		**15**	

C.29 Rotary-wing Flight test

Table C29. Rotary-wing Flight test full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	1	4.0%	0	0.0%	0	0.0%
Abrupt Maneuver	1	4.0%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	4.0%	0	0.0%	0	0.0%
Fuel Related	1	4.0%	0	0.0%	0	0.0%
Loss of Control In-Flight	5	20.0%	2	40.0%	3	25.0%
Loss of Control on Ground	1	4.0%	0	0.0%	0	0.0%
Midair	1	4.0%	0	0.0%	0	0.0%
Other	4	16.0%	1	20.0%	4	33.3%
System/Component Failure - Non-power	7	28.0%	1	20.0%	2	16.7%
System/Component Failure - Powerplant	4	16.0%	1	20.0%	3	25.0%
Rotary-wing Flight test total	**25**		**5**		**12**	

C.30 Rotary-wing Unknown

Table C30. Rotary-wing Unknown full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Collision on Takeoff or Landing	1	4.0%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	3	12.0%	1	10.0%	1	5.3%
Ground Collision	1	4.0%	1	10.0%	4	21.1%
Loss of Control In-Flight	2	8.0%	1	10.0%	1	5.3%
Loss of Control on Ground	2	8.0%	0	0.0%	0	0.0%
Low Altitude Operation	1	4.0%	0	0.0%	0	0.0%
Other	4	16.0%	2	20.0%	4	21.1%
System/Component Failure - Non-power	1	4.0%	0	0.0%	0	0.0%
Unknown	10	40.0%	5	50.0%	9	47.4%
Rotary-wing Unknown total	**25**		**10**		**19**	

C.31 Rotary-wing Public aircraft - local

Table C31. Rotary-wing Public aircraft - local full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	2	11.1%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	5.6%	0	0.0%	0	0.0%
External Load	1	5.6%	0	0.0%	0	0.0%
Fuel Related	1	5.6%	0	0.0%	0	0.0%
Loss of Control In-Flight	4	22.2%	1	100.0%	1	100.0%
Loss of Control on Ground	3	16.7%	0	0.0%	0	0.0%
Other	2	11.1%	0	0.0%	0	0.0%
System/Component Failure - Non-power	2	11.1%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	1	5.6%	0	0.0%	0	0.0%
Unknown	1	5.6%	0	0.0%	0	0.0%
Rotary-wing Public aircraft - local total	**18**		**1**		**1**	

C.32 Rotary-wing Firefighting

Table C32. Rotary-wing Firefighting full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Collision on Takeoff or Landing	1	6.7%	0	0.0%	0	0.0%
External Load	2	13.3%	0	0.0%	0	0.0%
Loss of Control In-Flight	5	33.3%	2	50.0%	3	60.0%
Low Altitude Operation	1	6.7%	0	0.0%	0	0.0%
System/Component Failure - Non-power	3	20.0%	1	25.0%	1	20.0%
System/Component Failure - Powerplant	1	6.7%	0	0.0%	0	0.0%
Unknown	1	6.7%	1	25.0%	1	20.0%
Windshear/Thunderstorm	1	6.7%	0	0.0%	0	0.0%
Rotary-wing Firefighting total	**15**		**4**		**5**	

C.33 Rotary-wing Public aircraft - state

Table C33. Rotary-wing Public aircraft - state full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Collision on Takeoff or Landing	1	11.1%	0	0.0%	0	0.0%
External Load	1	11.1%	1	33.3%	1	16.7%
Loss of Control In-Flight	2	22.2%	1	33.3%	2	33.3%
Loss of Control on Ground	1	11.1%	0	0.0%	0	0.0%
Midair	1	11.1%	1	33.3%	3	50.0%
System/Component Failure - Non-power	1	11.1%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	1	11.1%	0	0.0%	0	0.0%
Undershoot/Overshoot	1	11.1%	0	0.0%	0	0.0%
Rotary-wing Public aircraft - state total	**9**		**3**		**6**	

C.34 Rotary-wing Public aircraft

Table C34. Rotary-wing Public aircraft full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	2	25.0%	0	0.0%	0	0.0%
Abrupt Maneuver	1	12.5%	0	0.0%	0	0.0%
Loss of Control In-Flight	3	37.5%	1	100.0%	1	100.0%
System/Component Failure - Non-power	1	12.5%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	1	12.5%	0	0.0%	0	0.0%
Rotary-wing Public aircraft total	**8**		**1**		**1**	

C.35 Rotary-wing Public aircraft - federal

Table C35. Rotary-wing Public aircraft - federal full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	1	12.5%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	12.5%	0	0.0%	0	0.0%
Ground Handling	1	12.5%	0	0.0%	0	0.0%
Loss of Control In-Flight	1	12.5%	0	0.0%	0	0.0%
Loss of Control on Ground	1	12.5%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	2	25.0%	1	50.0%	1	50.0%
Unknown	1	12.5%	1	50.0%	1	50.0%
Rotary-wing Public aircraft - federal total	**8**		**2**		**2**	

C.36 Rotary-wing Ferry

Table C36. Rotary-wing Ferry full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Abnormal Runway Contact	1	14.3%	0	0.0%	0	0.0%
Collision on Takeoff or Landing	1	14.3%	0	0.0%	0	0.0%
Controlled Flight Into Terrain	2	28.6%	0	0.0%	0	0.0%
Loss of Control In-Flight	1	14.3%	0	0.0%	0	0.0%
System/Component Failure - Non-power	1	14.3%	0	0.0%	0	0.0%
System/Component Failure - Powerplant	1	14.3%	0	0.0%	0	0.0%
Rotary-wing Ferry total	**7**		**0**		**0**	

C.37 Rotary-wing Air drop

Table C37. Rotary-wing Air drop full lookup

Defining event	Accidents	%	Fatal accidents	%	Fatalities	%
Other	1	50.0%	0	0.0%	0	0.0%
Unknown	1	50.0%	1	100.0%	2	100.0%
Rotary-wing Air drop total	**2**		**1**		**2**	

C.38 Other aircraft categories

Table C38. Other aircraft categories, totals

Aircraft category	Accidents	Fatal accidents	Fatalities
Balloon	93	9	31
Glider	204	39	46
Gyroplane	99	20	24
Powered parachute	24	7	8
Powered-lift	6	0	0
Ultralight	4	0	0
Weight-shift	75	28	34

Includes 24 GA Business accidents (balloon 22, glider 2), which the 1st Edition did not cover.

Appendix D. Reconciliation with NTSB tables and the 1st Edition

Every NTSB summary table supplied with the file was reproduced from the row-level records. Table D1 shows the result; "Matched" counts the table rows whose values were reproduced exactly. Table D2 re-derives the 1st Edition published totals from this file. The NTSB tables cover every aircraft category in the file; Results_DefiningEvent_OpCat_All, for example, combines all aircraft categories (airplanes, helicopters, gliders, gyroplanes, balloons and others) within each type of operation. The fixed-wing and rotary-wing figures in this report are filtered by aircraft category, so their values can be lower than the matching NTSB table rows.

Table D1. NTSB summary tables reproduced

NTSB table	Rows	Matched
Results_DefiningEvent_AcftCat_A	146	146
Results_DefiningEvent_AllGA	34	34
Results_DefiningEvent_OpCat_2nd	500	500
Results_DefiningEvent_OpCat_All	357	357
Results_LOCI_2ndPilot_AllGA	37	37
Results_LOCI_EngType_AllGA	69	69
Results_LOCI_NumEng_AllGA	54	54

NTSB table	Rows	Matched
Results_LOCI_Phase_AllGA	98	98
Results_LOCI_Summary_AllGA	10	10
Results_Summary_AllGA	10	10

Table D2. 1st Edition totals re-derived

Type of operation	Published (accidents / fatal / fatalities)	This file	Match
Fixed-wing Business	202 / 42 / 102	202 / 42 / 102	Yes
Fixed-wing Executive/Corporate	38 / 2 / 6	38 / 2 / 6	Yes
Rotary-wing Business	35 / 6 / 11	35 / 6 / 11	Yes
Rotary-wing Executive/Corporate	1 / 1 / 1	1 / 1 / 1	Yes

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