



Part 135 and Business Operator Low Altitude Events: *An Analysis of ASRS Reports*

FAA InfoShare – Business / GA / Part 135

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**AVIATION SAFETY
REPORTING SYSTEM**



NASA Aviation Safety Reporting System (ASRS)

Program Background



NASA Aviation Safety Reporting System

- NASA ASRS is a **confidential, voluntary, non-punitive** reporting system that receives safety reports from Pilots, Air Traffic Controllers, Dispatchers, Cabin Crew, Ground Ops, Maintenance Technicians, and UAS Operators.
- ASRS welcomes reports describing close-calls, hazards, violations, and safety-related incidents.

Sample Report Topics:

- Airspace violations
 - Aircraft / equipment issues
 - Airport markings and signage
 - ATC procedures
 - Charting / navigation issues
 - Environmental hazards
 - Human error/slips/lapses
 - Miscommunication/misunderstandings
 - Near-mid air collisions
 - Runway/taxiway/ramp Incursions
- With 48 years of confidential safety reporting, ASRS has received more than 2,040,000 reports

When in doubt, fill it out! Contribute to aviation safety

<https://asrs.arc.nasa.gov>



Report Submission to ASRS

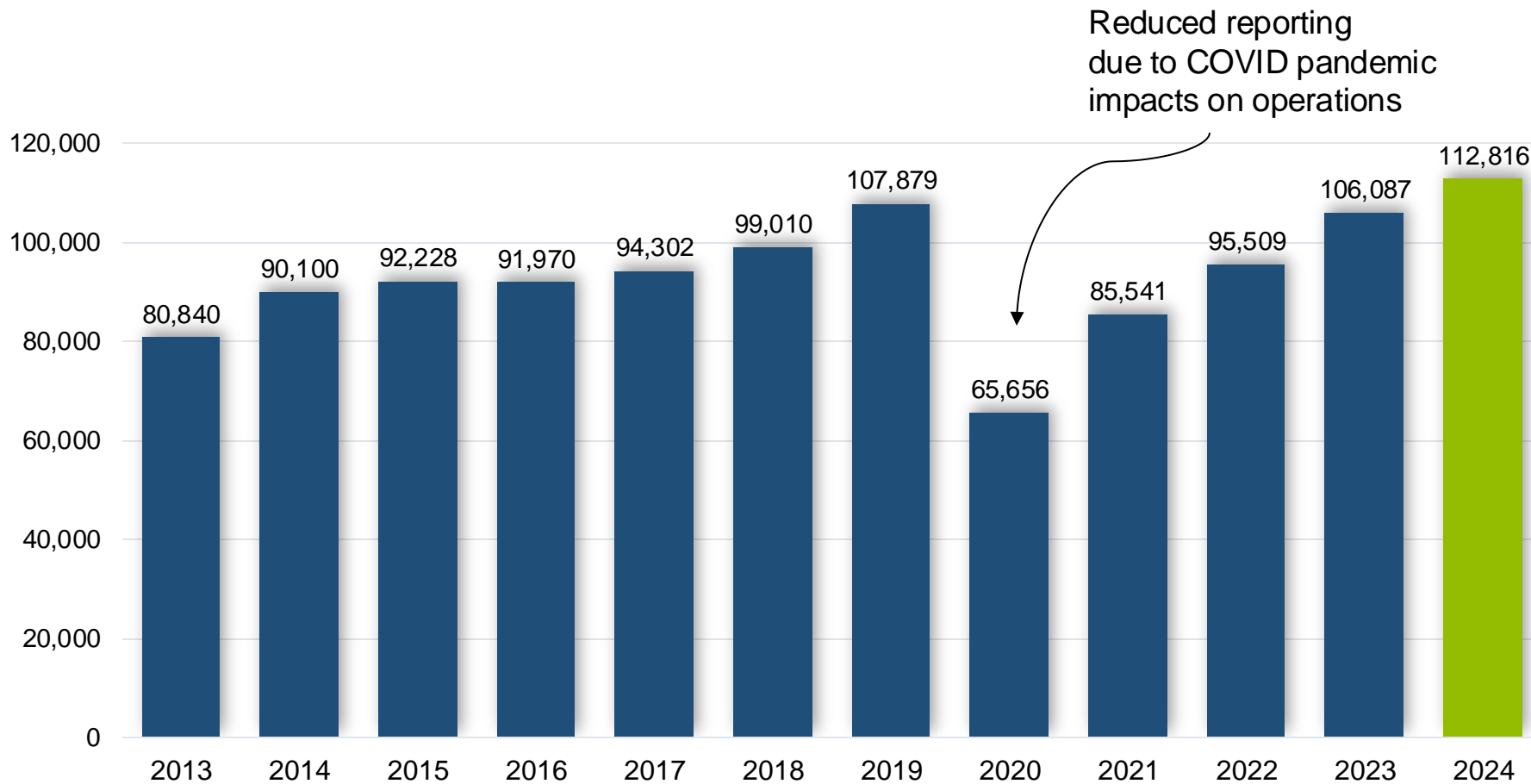
Options for reporting:

- Report directly to ASRS at: <https://asrs.arc.nasa.gov>
- Or SMS/ASAP programs can share reports with ASRS to receive ASRS benefits
- Pilots can use the General Report Form



The screenshot displays the ASRS website interface. At the top, the ASRS logo is on the left, and the text 'Aviation Safety Reporting System' is on the right. Below this is a navigation bar with four tabs: 'Program Information', 'Report to ASRS', 'Search ASRS Database', and 'Publications/Studies'. The 'Report to ASRS' tab is selected. The main content area is titled 'ELECTRONIC REPORT SUBMISSION (ERS)' and contains the following text: 'Securely send any of the four Aviation Safety reports to ASRS via the internet. For information on reporter confidentiality, immunity policy, and other program information please refer to the pages found under [Program Information](#).' Below this, it says 'To report electronically, select an ASRS Report Form:'. There are five report form options listed, each with a button and a text box: 'General Report Form' (e.g. Pilot, Dispatcher, Ground Ops, & Other), 'ATC Report Form' (e.g. Air Traffic Controller), 'Maintenance Report Form' (e.g. Repairman, Mechanic, Inspector), 'Cabin Report Form' (e.g. Cabin Crew), and 'UAS Report Form' (e.g. UAS Pilot, Visual Observer, & Crew). The 'General Report Form' button is highlighted with a red border.

ASRS Report Intake Profile



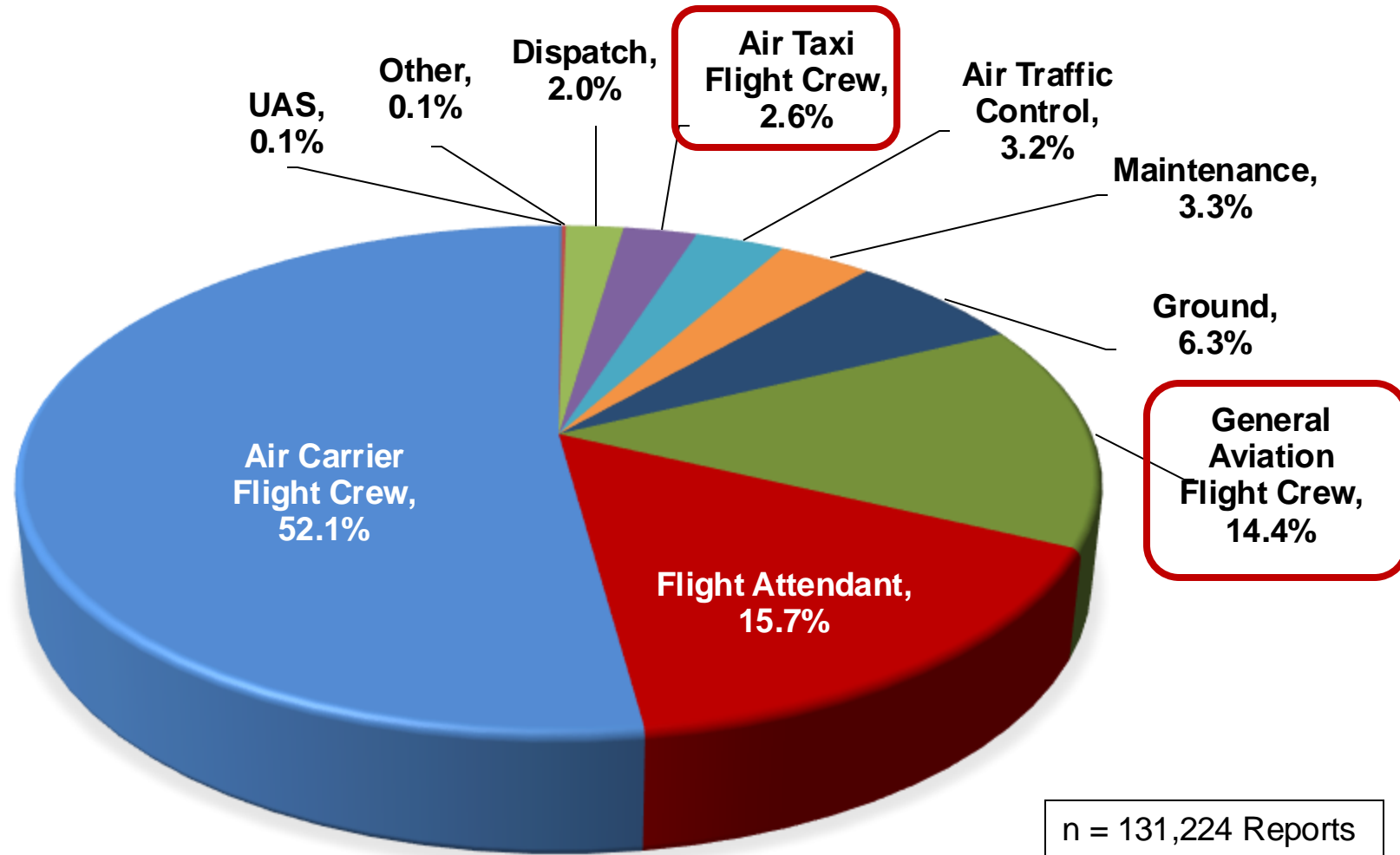
In 2024, ASRS is forecasting a return to pre-COVID levels with over **130,000** reports

*2024 data includes reports received through October 31st.



The Data: Incident Reporter Distribution

October 2023 – September 2024



Source: NASA ASRS Screening Data



Part 135 and Business Operator Low Altitude Events

January 2021- July 2024

ASRS Database Query

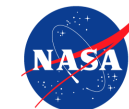
- Part 91 and Part 135 events involving Low Altitude Terrain events – Anomaly = CFTT*
- Time frame = January 2021 to July 2024
- A total of 732 records were retrieved

*CFTT – Controlled Flight Towards Terrain

Reporter Function	Total Count**
Pilot	441
Air Traffic Controller	298
Other (Observer)	1

**Each incident record may have more than one reporter.

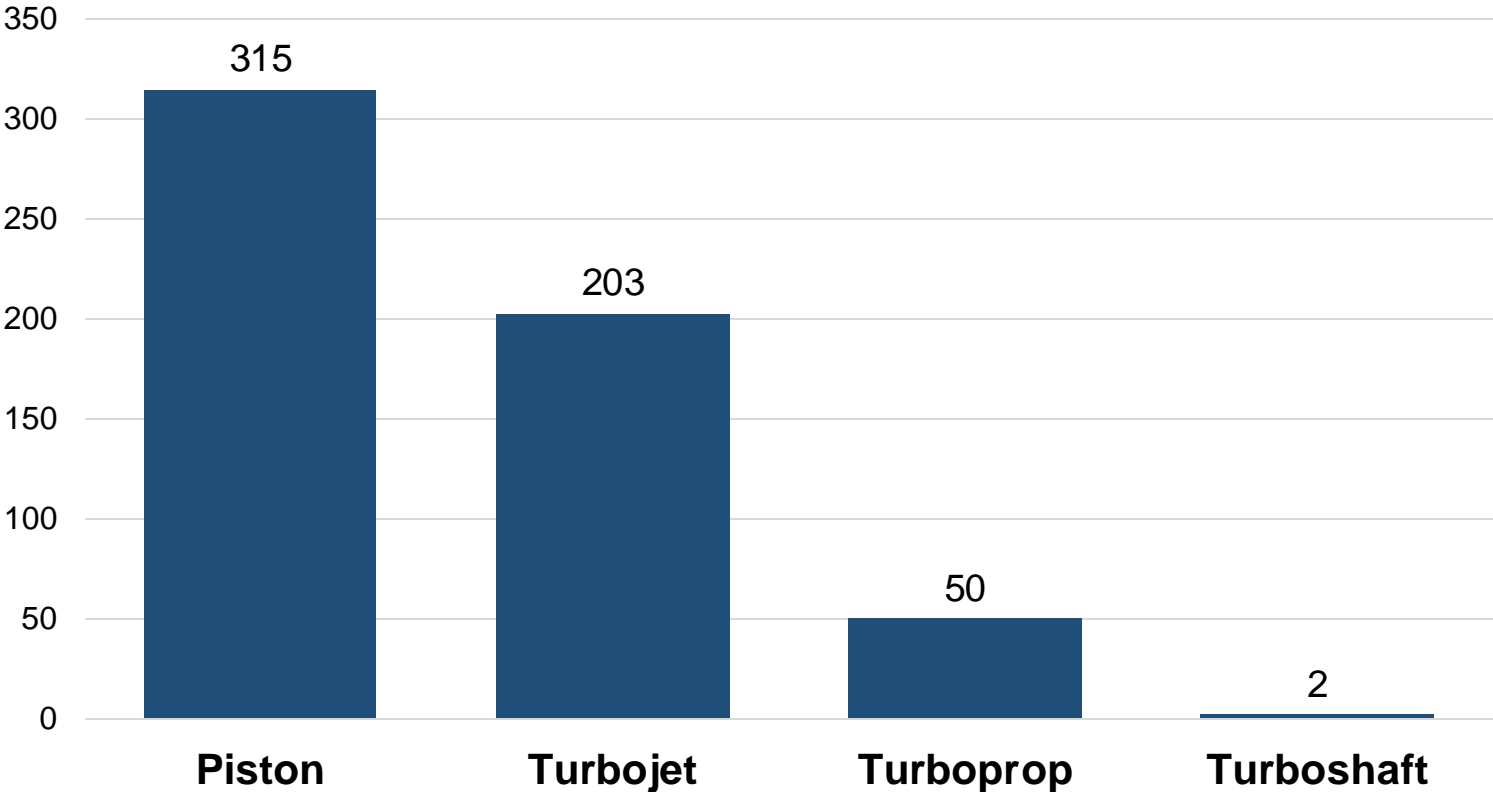
n = 732 Records



Part 135 and Business Operator Low Altitude Events

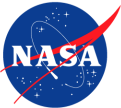
January 2021 - July 2024

Aircraft Propulsion Types*



n = 732 Records

*A total of 162 records do not contain Aircraft Propulsion data, therefore are not charted.



Part 135 and Business Operator Low Altitude Events

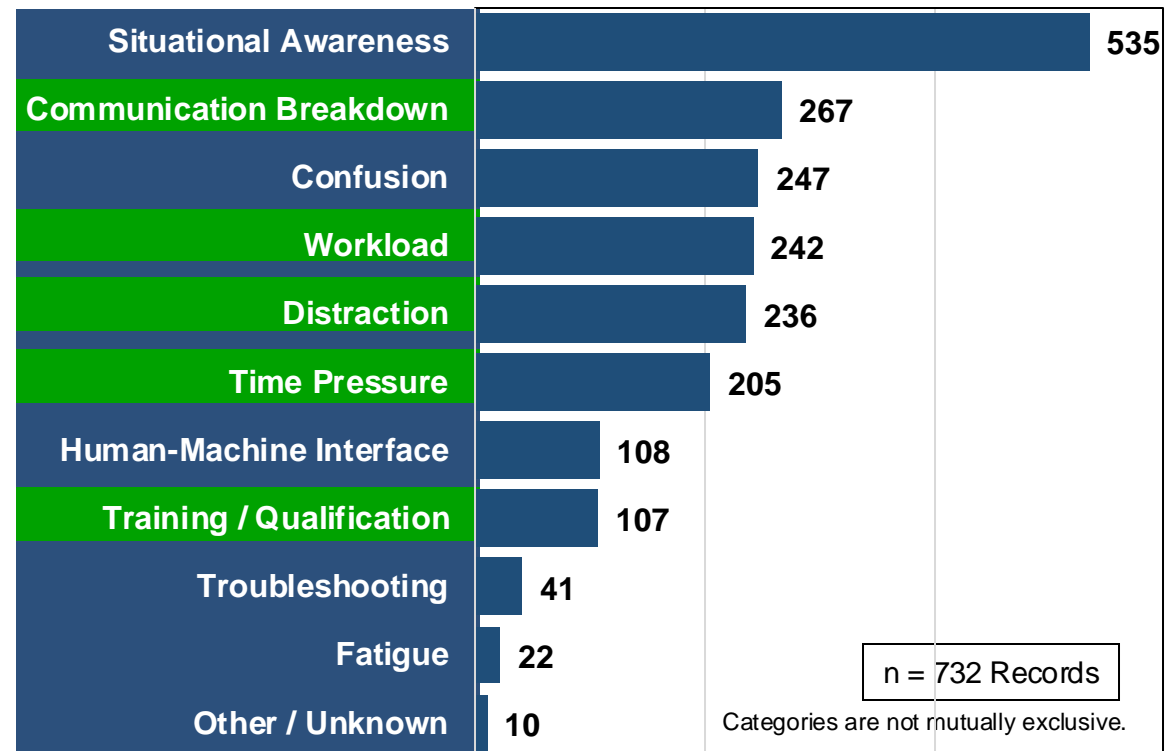
Part 135 and Business Operator January 2021- July 2024

Specific Human Factors*

Contributing Factors	Number of Records
Human Factors	653
Procedure	356
Airspace Structure	251
Chart or Publication	166
Environment - Non Weather Related	130
Weather	115
Aircraft	108
Software and Automation	61
ATC Equipment / Nav Facility / Buildings	47
Airport	20
Company Policy	18
Staffing	8
Manuals	7

n = 732 Records

Categories are not mutually exclusive.



n = 732 Records

Categories are not mutually exclusive.

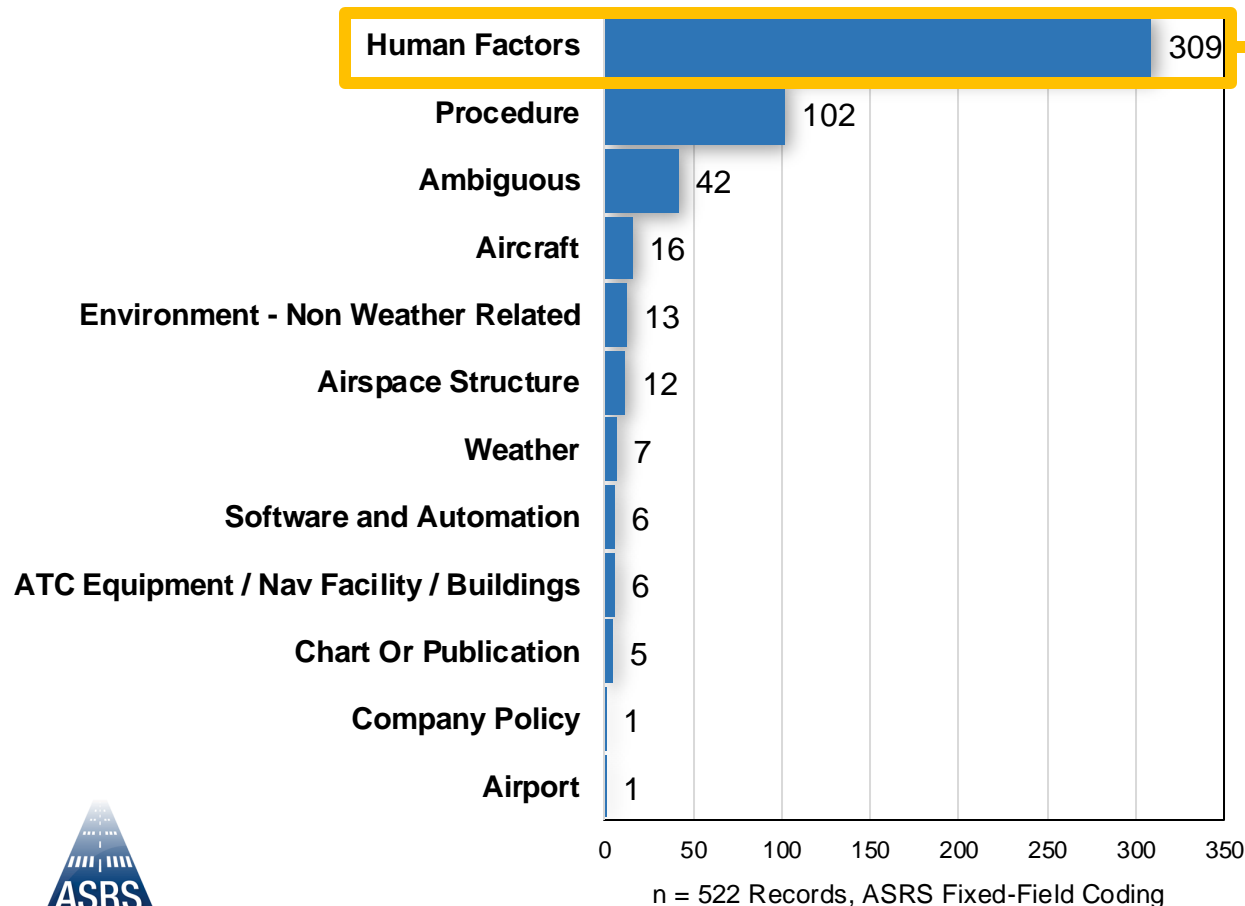
*Each incident record may have more than one reporter.



Part 135 and Business Operator Low Altitude Events

Contributing Human Factors Part 121

Data Coded as "Primary Problem"
by ASRS Expert Analysts



HUMAN FACTORS

- Communication Breakdown
- Time Compression
 - Workload
 - Distraction
 - Time Pressure
- Proficiency
 - Experience
 - Training
- Human-Machine Interface
- Confusion
- Training / Qualification
- Trouble Shooting
- Fatigue

N=309 records

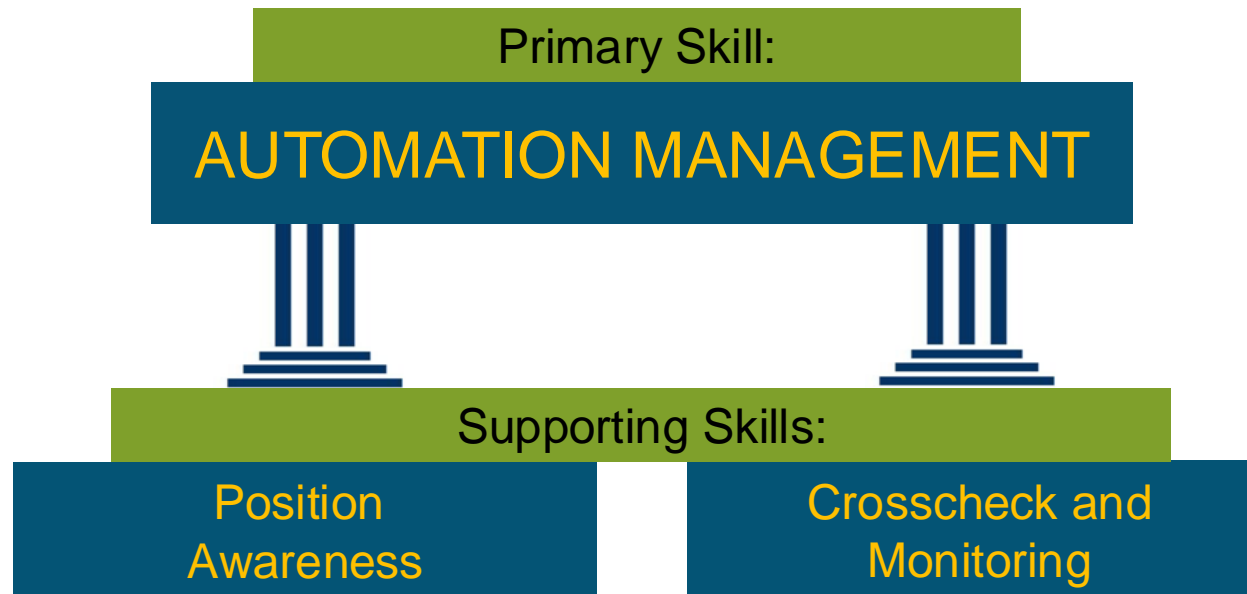


Part 135 and Business Operator Low Altitude Events

ASRS Subject Matter Expert (SME) Analysis of Part 121 Low Altitude Events



SME Analysis: Skill Degradation



Contributing Human Factors

- Communication Breakdown
- Time Compression
- Proficiency

Breakdown in Automation Management

Position Awareness & Crosscheck and Monitoring

Automation Management

“... **On our way down, we set 3000 for the missed approach altitude without realizing we did not capture the glideslope.**”

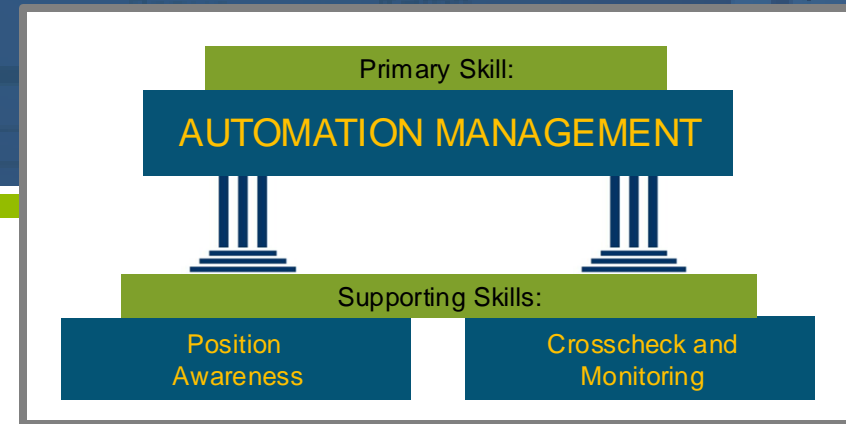
Solution: Not setting a higher altitude, even a missed approach altitude unless more attention is paid to current position and mode.” (2091566)

Position Awareness

“... As we began to descend ...it became clear that we're outside of the FAF ...the terrain callout was made from the GPWS. ... Cause: ...We were in VMC ...but **I forgot where the aircraft was in relation to the approach.**” (2092789)

Crosscheck and Monitoring

“We believe the pilot flying forgot to activate VNAV...This resulted in a caution terrain...Cause: Late runway change at destination. **Pilot monitoring (me) failing to trap the Captain error of not re-engaging VNAV.** (2063914)



Contributing Human Factors

Contributing Human Factors

- Communication Breakdown
- Time Compression
- Proficiency

Communication Breakdown

"**I could have been more assertive** recommending my FO give herself some more room on the visual instead of just telling her that I thought it was really tight. Instead of telling the FO we were too low and to level off, **I could have directed her to climb**" (2079128)

Time Compression

"**Multiple maintenance issues** before the flight ... increased the feeling of time pressure. **Short flight** which increased flight load. **Change of runway on approach** which increased workload" (2093496)

Proficiency

"In the last year I have flown with **numerous pilots with very limited time, no swept wing or jet experience.** I am an airline Captain, **I have become a flight instructor.** It makes my job much tougher and **I have minimal backup**" (2102890)

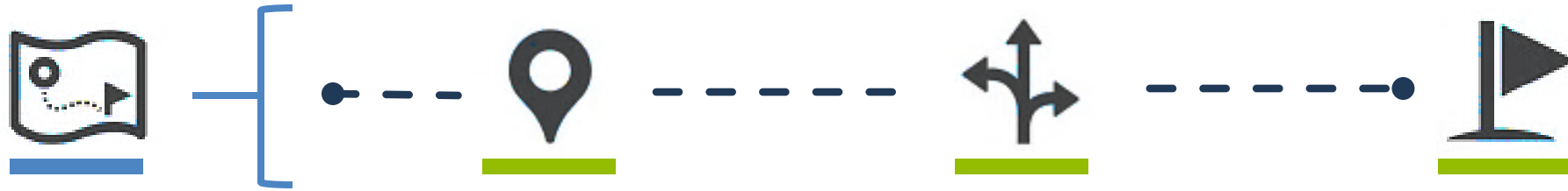


Part 135 and Business Operator Low Altitude Events

Two Part 135 / Business / GA Case Studies



Report Example Overview



Synopsis

Incident
summary

Prompt

The trigger
event, incident
or problem

Path

Steps taken to
respond,
challenges
encountered

Outcome

Results,
resolution,
lessons learned

Low Altitude Events: Case Studies



Loud But Not Clear

Low Altitude Events: Case Studies



Synopsis

- C25A crew reported being **instructed to go-around after a low altitude alert from ATC** during an ILS approach.



These graphics are for illustrative purposes only.

Low Altitude Events: Case Studies



Prompt

Citation flight crew on ILS approach encountered turbulence that led to **course and altitude deviations**. The Co-pilot had limited turbojet experience and zero time in type.

Quote: “...while conducting an ILS approach into ZZZ [airport]...we encountered strong shifting turbulence at about 5,000 to 4,000 feet...”

During course intercept, the crew overshot.

Quote: “...the Captain worked on getting the aircraft back on course. We were experiencing moderate to severe turbulence and at times unable to maintain course and altitude.”

Low Altitude Events: Case Studies



Path

The approach became increasingly unstable and the **copilot offered suggestions to the Captain, who did not respond**

Quote: *“I...suggested the Captain reduce power and increase pitch... Tower... canceled the approach... I advised the Captain to turn to 360 heading and climb to 3,000 because the Captain did not respond to ATC directions.”*

Quote: *“As the turbulence got worse I could tell the Co-pilot was making calls with ATC ... Co-pilot kept saying that we should Climb as the autopilot overcorrected...”*

Copilot continued to tell Captain to follow ATC clearance, but with no positive response

Low Altitude Events: Case Studies



Outcome

ATC issued a low altitude alert and immediate climb

Quote: *“The copilot said that the clearance was cancelled and we needed to go-around. At this point we started a slow climb...”*

Both pilots identified factors that contributed to the event

Quote: *“...I believe the Captain became fixated on the autopilot, the resultant loss of situational awareness resulted in...go-around...and low altitude alert.”*

Quote: *“Failure to complete the missed approach when directed by ATC was a combination of Communication issues with the Copilot and noises in the cockpit.”*

Low Altitude Events: Case Studies



Still Below MVA

Low Altitude Events: Case Studies



Synopsis

- Corporate jet flight crew reported a track heading deviation resulting in a CFTT event during departure from VNY airport.



This graphic is for illustrative purposes only.

Low Altitude Events: Case Studies

ACN 2090053

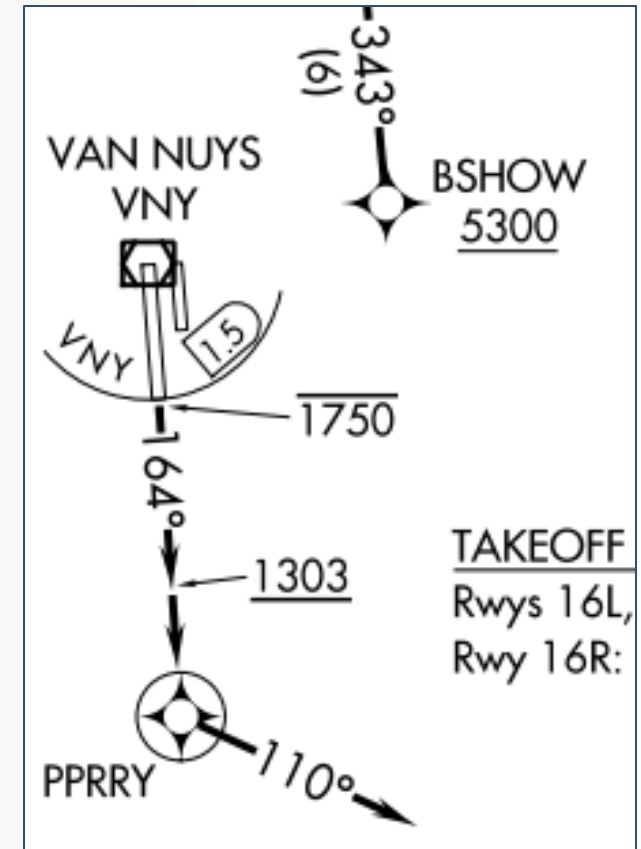


Prompt

Corporate jet **crew prepared carefully** to depart VNY airport.

Quote: *“We are not frequent to VNY airport so we looked over the departure numerous times to ensure we knew of all climb and turn restrictions.”*

Quote: *“The Captain and I briefed the departure...we cross checked the waypoints and altitudes with the FMS and they matched the chart.”*



Excerpt from FAA Digital Chart: (VNY) HARYS FOUR DEPARTURE (Not for Navigation)

Low Altitude Events: Case Studies

ACN 2090053



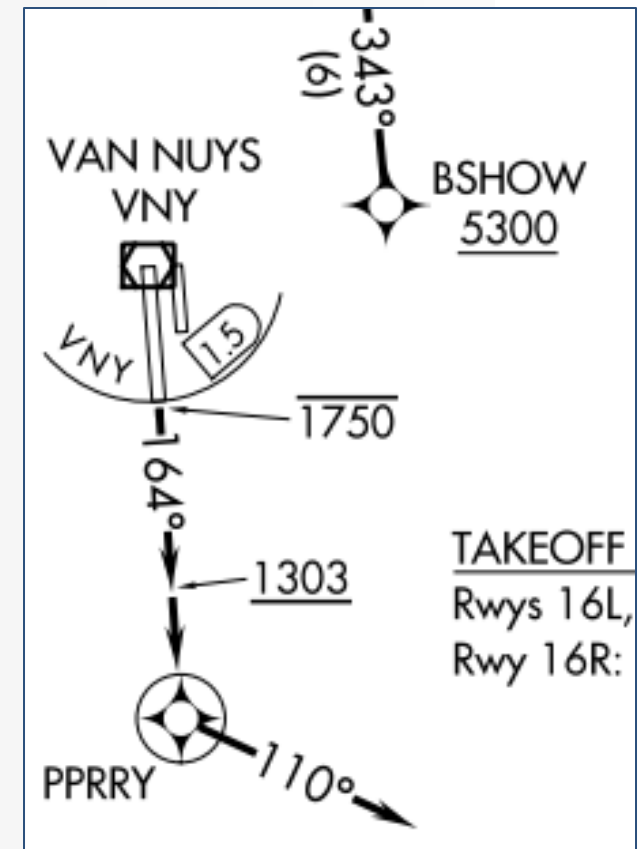
Path

Flight departed and complied with climb restrictions. The autopilot then **turned past the charted heading of 110.**

Quote: “At PPRRY intersection the departure calls for a turn to 110 HDG... As the airplane was turning...the FMS continued passed the 110 heading to about 090 as if it was going to head to **BSHOW** intersection.”

Pilots immediately reviewed chart to confirm required heading.

Quote: “The FMS still indicated the 110 HDG. As I was verifying the **First Officer was running the after takeoff checklist.**”



Excerpt from FAA Digital Chart: (VNY) HARYS FOUR DEPARTURE (Not for Navigation)

Low Altitude Events: Case Studies



Outcome

ATC instructed the crew to turn back to a 110 heading and expedite climb for terrain.

Quote: “...we once again reviewed the departure for accuracy and began corrective action when at the same time ATC advised us of a low altitude alert and advised a climb and a new heading.”

Quote: “I immediately followed ATC instructions and we were quickly above the MVA...after talking with ATC later they indicated altitude was the main concern with us not having climbed to the MVA yet.”

Flight crew considered what could have been done differently

- 1) “...**should have promptly verified with ATC** what heading they would like...”
- 2) “...**delay checklist usage by the pilot monitoring** on takeoff”
- 3) “...**while we brief...look at the charts**”

<https://asrs.arc.nasa.gov/>

ASRS Aviation Safety Reporting System

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What Would You Have Done?
September 2024, Issue 536

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