Circle-to-Land Approach Hazards

Background

Circling approaches are a necessary part of general aviation operations due to certain airport environments or situations like unfavorable winds. However, circling approaches present an increased risk to general aviation operations because they require maneuvering at low altitude and low airspeed during the final segment of the approach to landing. This increases the opportunity for loss of control and collision with terrain, both of which are significant contributors to the general aviation fatal accident statistics. Between 2008 and 2023, there were 10 accidents involving Part 91 and Part 135 operators that occurred during a circle-to-land (or "circling") approach. These accidents involved 17 fatalities.

Summary

The Aviation Safety Information and Analysis Sharing (ASIAS) program conducted an analysis of circle-to-land approaches to identify the contributing factors of safety issues experienced by flight crews conducting this type of maneuver. The outcome of this analysis suggests several areas of interest for flight crews.

- **There's a subset of airports where conducting circling approaches is more common and conducted at a higher rate than other airports in the national airspace system.**
    - Flight crews should be aware of the individual characteristics that require circling approaches at these airports and conduct thorough pre-flight and pre-approach briefings.
- **Flight crews should be aware of the circling approach obstacle protected airspace for the individual approach and airport they are operating at. This airspace changes both with Minimum Descent Altitude (MDA) and aircraft category. Further, flight crews should pay particular attention to differences between standard and expanded circling airspace maneuvering areas.**
    - Use all available tools to remain aware of your distance from the airfield and stay within the obstacle protection area.
- **There's a linkage between circling approaches and subsequent unstable approaches.**
    - With proper pre-flight and approach briefings, flight crews can better prepare for these types of approaches and ensure a successful, stabilized approach to landing.

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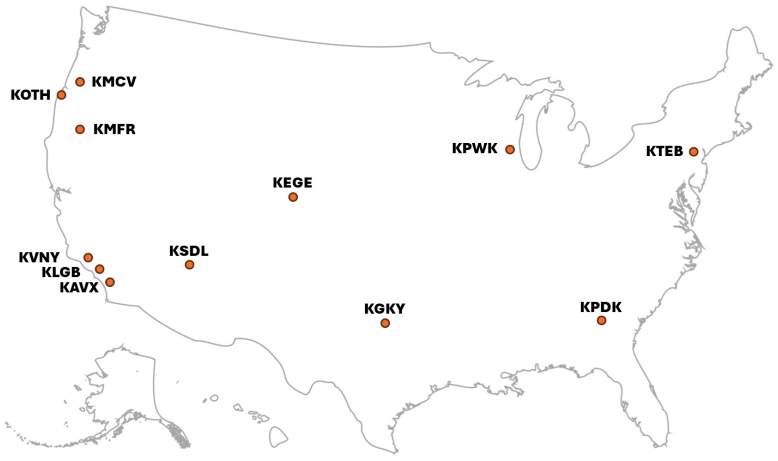
Key Findings

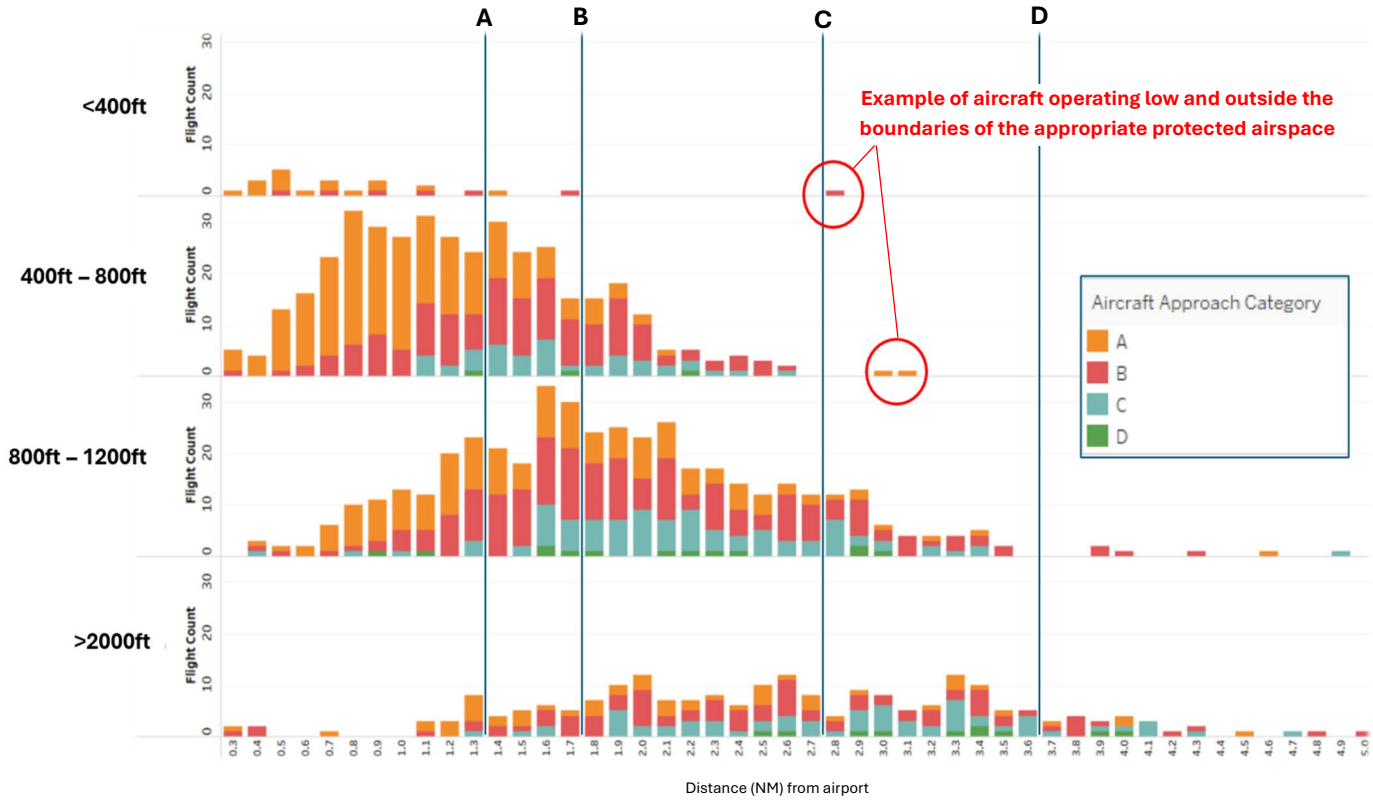
Locations:

There are several airports where circling approaches are conducted at a higher level than other airports across the system. Pilots operating into these airports should be aware of circle-to-land procedures and thoroughly conduct appropriate pre-flight and approach briefings. Characteristics for how circling approaches are conducted at each of these airports may differ.



Protected Obstacle Airspace:

The ASIAS study found that several flights appeared to be operating low and outside the boundaries of the appropriate category protected area. The ASIAS study also found that Category A and B aircraft that purposefully operate within Category C or D protected areas are operating at higher altitudes, which may mitigate proximity to obstacles, leading to a greater safety margin.



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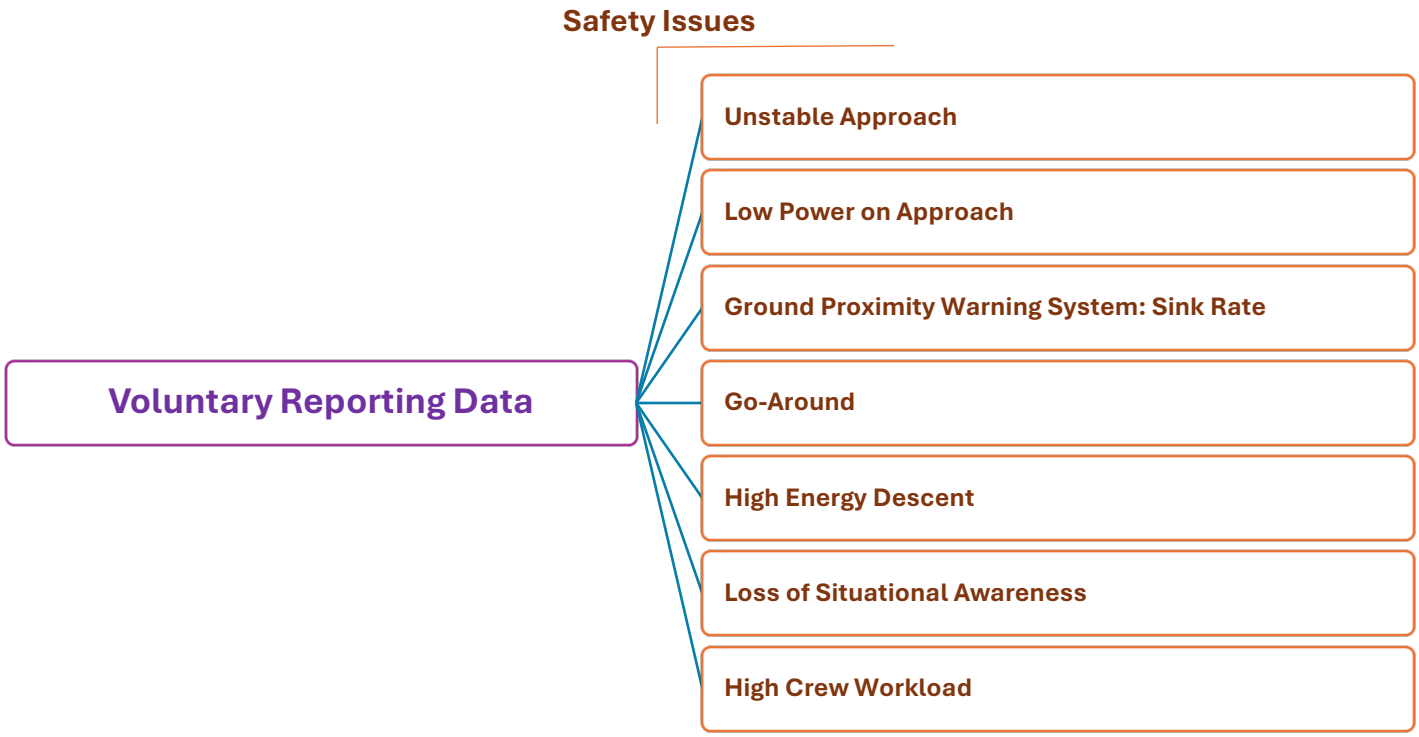
Voluntary Reporting Data:

The ASIAS review of Flight Operations Quality Assurance (FOQA) and Aviation Safety Action Program (ASAP) data showed that circle-to-land approaches can contribute to multiple safety issues, such as those shown below:



Other Considerations

If circling approaches are a necessary part of the operation, flight crews should review the following:

- Any differences in requirements for day versus night operations.
- Any notes/restrictions associated with the circling approach.
- The expected circle-to-land lateral and vertical path.
- Whether automation can support the circle-to-land maneuver.
- Choosing the correct minimums for the aircraft speed during the maneuver.
- The need to remain at or above minimums until positioned for landing.
- The hazards of being low and slow, high and fast, or unstable.
- The potential increase in workload and loss of situational awareness when conducting circling approaches.
- The impact of deteriorating weather conditions.
- The missed approach procedure and pattern from various circling positions.

Questions?

Please contact the General Aviation Issue Analysis Team (IAT) via asias@mitre.org