Aviation Safety Insights

Investigation Insights

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Seeing different pictures of the same sky

What happened?

A Robinson R22 helicopter was conducting normal circuit operations while a Pitts S2 approached the aerodrome to conduct an overhead join.

Both aircraft were operating in accordance with the expectations of an unattended aerodrome environment, where pilots are responsible for maintaining separation through visual lookout, radio broadcasts, and adherence to standard procedures.

As the Pitts joined overhead, the two aircraft came into close proximity, passing within approximately 50 feet of each other. Although no collision occurred, the event highlighted how quickly safety margins can erode when pilots are operating with different understandings of the same situation.

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Different pilots, different pictures

The R22 crew understood the situation through the lens of normal circuit operations. They expected aircraft joining the aerodrome to follow a predictable overhead join profile and to identify traffic already established in the circuit. From their perspective, standard radio broadcasts and visual scanning would provide sufficient warning of any developing conflict.

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The Pitts pilot was also actively managing traffic. Attention was focused on another aircraft operating overhead, and both the pilot and passenger were conducting lookout activities. Radio broadcasts were made and the pilot believed separation from other traffic was being maintained.

Neither pilot was acting recklessly or ignoring their responsibilities. Instead, each was operating from a different mental picture of the traffic environment. Those pictures were incomplete. Neither crew fully appreciated how close the aircraft were becoming.

The challenge of seeing and avoiding

At unattended aerodromes, the aviation system relies heavily on pilots seeing each other in time to take action. This works well most of the time.

However, the effectiveness of see-and-avoid depends on many factors:

- where pilots are looking
- what they expect to see
- aircraft visibility
- background clutter
- workload
- traffic density, and
- the speed at which aircraft are converging.



In this occurrence, the Pitts was travelling at a relatively high speed during the join. This increased the closure rate between the aircraft and reduced the time available for either crew to detect the conflict and respond. As the available time reduced, so did the opportunity for recovery.

A system with few safety nets

The primary defence against collision in this situation was human detection.

Neither aircraft had access to technological systems capable of alerting pilots to the developing conflict. The helicopter was not fitted with a transponder, reducing its electronic conspicuity. The aerodrome environment provided no air traffic control separation service, and there were no independent barriers available once visual detection failed to occur early enough.

The system therefore depended almost entirely on pilots building the same picture of the traffic situation at the same time. In this case, that did not happen.

What does this event tell us?

This occurrence was not the result of a single mistake. It did not occur because one pilot suddenly stopped looking outside, failed to make a radio call, or deliberately accepted unsafe risk. Instead, the event emerged from the interaction of several ordinary conditions:

- pilots focusing attention on different traffic threats
- high closure rates reducing available reaction time
- limitations inherent in see-and-avoid
- variability in how overhead joins are flown, and
- incomplete awareness of other aircraft operating nearby.



Each of these conditions was manageable on its own. Together, they reduced the margin for error until the conflict became visible too late to maintain normal separation.

What can we learn?

This event reminds us that safety at unattended aerodromes depends not only on what pilots do, but on how well the entire system supports a shared understanding of what is happening. Opportunities to strengthen that system include:

- maintaining speeds that support effective see-and-avoid
- promoting consistent overhead join techniques
- improving aircraft conspicuity
- recognising the limitations of visual scanning alone, and
- encouraging pilots to anticipate that other aircraft may be operating with a different picture of the traffic situation.

The lesson is not that a pilot failed. The lesson is that even experienced pilots can make reasonable decisions based on incomplete information.

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