Fixed wing or helicopter?

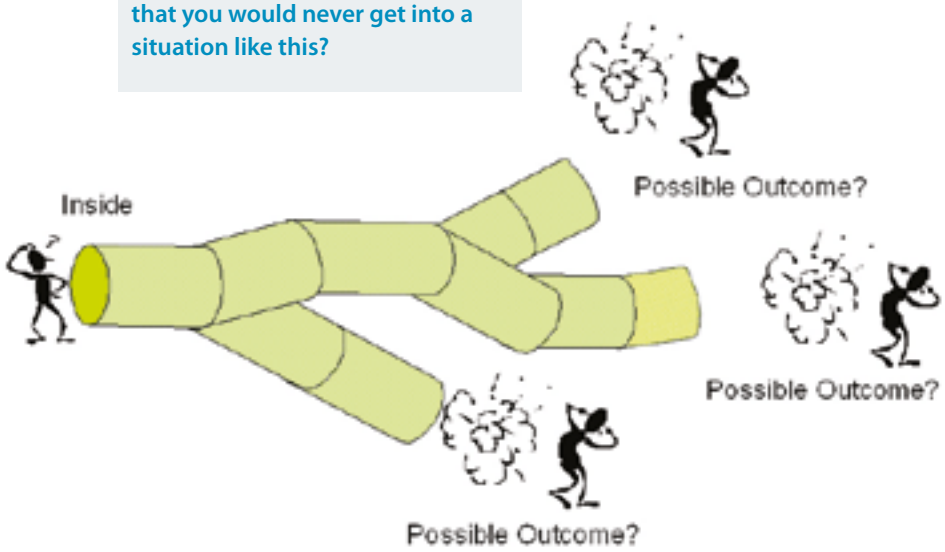
Editorial note: Situational examples are based on the experience of the authors and do not represent either a particular historical event or a full description of such an event. The scenarios are rather exemplified facts aligned to illustrate operational safety and human performance considerations.

p58

Fixed wing or helicopter? (cont'd)

THE FACTS

Read the story as it develops, position yourself in the context without knowing the actual outcome. How confident are you that you would never get into a situation like this?



It's a quiet day at the regional airport where you're working as a radar approach controller. The weather conditions are marginal, or at least below the limits for VFR operations. You've just finished a coordination phone call with details about an inbound IFR flight, a twin turbo propeller aircraft, which is a scheduled passenger flight to your airport.

An aircraft checks in on your frequency, but you're unable to understand the full call sign because the quality of the radio transmission is poor. After asking the pilot several times to repeat the call, you finally are able to get the five characters that make up the call sign (and aircraft registration). You also understand that the aircraft is a helicopter on a VFR flight plan, and that the pilot is requesting clearance to cross the control zone of your airport from the southeast to the northwest.

You are aware that normally requests for VFR crossing of the control zone are handled by the tower at your airport.

What would you do?

You decide you'll transfer the aircraft to the tower frequency in a proper manner. Since you have no flight plan data for this particular flight, you carry out an electronic search for the flight in the automated flight data system to which the radar equipment at your airport is linked. The search does not produce any results, but that is not unusual for VFR flights in your area. Consequently you make a manual flight plan input for the flight to appear in your automated system as a VFR crossing helicopter, using the minimum amount of required data to get the input accepted by the system. This input also produces a related flight strip in the tower.

You use the intercom system to coordinate with the controller in the tower about this flight. Since it's a helicopter, different limits for special VFR operations are applicable than for fixed wing aircraft and the tower controller and you both agree that the flight can be given permission to cross the control zone under special VFR procedures. You call the pilot and you give the clearance to cross the control zone special VFR at an altitude of 1200 feet. After the pilot acknowledges the clearance, again in a poor quality radio transmission, you instruct him to contact the tower for further guidance. The pilot switches to the other frequency, and you turn your attention to the inbound IFR passenger flight that has just checked in on your frequency. While providing the inbound passenger aircraft with radar vectors to the instrument landing system (ILS) for the runway in use at your airport, you monitor the conversation between the helicopter and the controller on the tower frequency. The quality of the transmissions by the helicopter is still poor, but you hear the pilot acknowledge the request from the tower controller to "report one minute before crossing overhead the airport".

What would you think?

Shortly thereafter the pilot of the IFR passenger flight reports established on the ILS, so you transfer that flight to the frequency of the tower controller. You continue to monitor the conversations on the tower frequency, and on your radar screen you also monitor the progress of the helicopter. You hear the pilot of the helicopter reporting "one minute before overhead" to the tower controller, and at the same time you see that the flight track of the he-

licopter will bring it rather close to the final approach track of the passenger flight on the ILS.

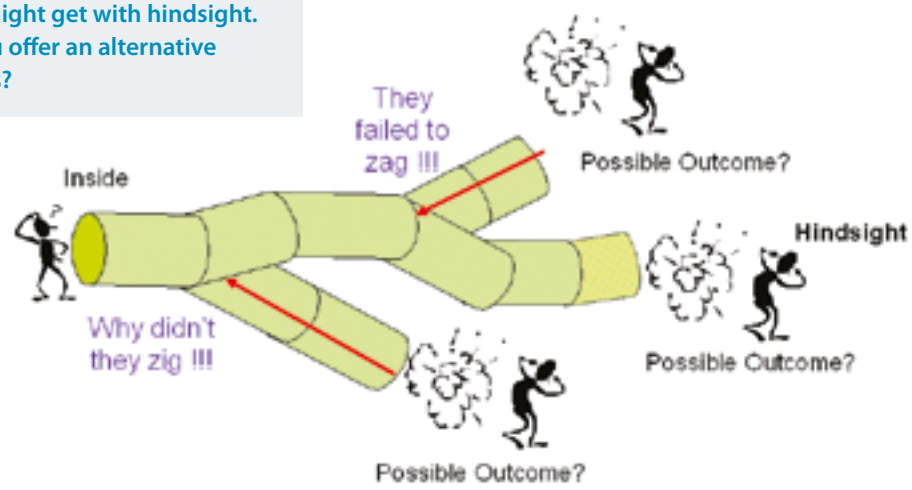
What would you think?

You hear the tower controller informing the helicopter about the presence of the inbound flight on the ILS and instructing the pilot to stay on the east side of the airport and well clear of the final approach area. It seems like the pilot acknowledges the instruction, but because of the poor radio quality you're not sure that this is what he said. You observe the helicopter making a rather wide right turn that initially will take it even closer to the final approach area.

What would you do?

Via the intercom you warn the tower controller about the developing conflict situation. The tower controller instructs the helicopter to turn further to the east, which is acknowledged by the pilot, and on your radar screen you see to your relief that the distance between the helicopter and the passenger flight is indeed increasing. The passenger flight lands without further problems, and after completing a full turn the helicopter continues its flight to the northwest.

This section is based on factors that were identified in the investigation of this occurrence. Read the story knowing the actual outcome. Reflect on your own and others' thoughts about the case, and see how easily judgmental these might get with hindsight. Can you offer an alternative analysis?



Factors that were identified in the investigation of this occurrence included:

Of the five characters that make up the call sign and aircraft registration, the approach controller got the first one wrong. When he searched for a corresponding flight plan in the automated flight data system, his input included the incorrect first character and consequently did not produce any result. Since there was no doubt in the controller's mind about the call sign and aircraft type ("helicopter"), he made a manual flight plan input in the automated system based on this information.

The crossing VFR aircraft was in fact a vintage fixed wing, a single engine advanced military training aircraft from the World War 2 era. The pilot mentioned the aircraft type in his first contact with the approach controller, but because of the poor quality of the radio transmissions from this aircraft the controller missed that piece of information.

> **The controller later stated that he was not familiar with that particular aircraft type, which may have contributed to him not noticing that it was mentioned by the pilot.**

Expectation bias. The poor quality of the radio transmissions from the historic aircraft was, in the experience of the approach controller, similar to transmissions from certain types of helicopters that he was used to working with.

Fixed wing or helicopter? (cont'd)

Furthermore the weather conditions may have subconsciously influenced the approach controller's impression that the crossing aircraft was a helicopter: it was below limits for VFR flying with fixed wing aircraft in the CTR, so logically there could only be helicopters asking to operate under special VFR rules because of the lower applicable criteria for that category.

Ignoring contradictory signs. With the benefit of hindsight it seems perhaps strange that the controller didn't notice that the speed of the "helicopter" was higher than usual, or that its turn radius was greater than expected. Similarly, it may seem odd that the controller accepted that the aircraft call sign consisted of an unusual combination of characters (compared to other call signs that normally operate in the area). Don't forget however that these anomalies become apparent in hindsight, i.e. after more details about the event are known than the controller had available at the time. The controller never doubted that the aircraft was a helicopter, and he also was convinced that he was using the correct call sign in his communications with the aircraft. He therefore wasn't looking for any clues that might suggest otherwise; he was just providing ATC service to an aircraft flying VFR in marginal weather that wanted to cross the control zone.

HUMAN PERFORMANCE - TEM ANALYSIS

NOTE: This section is offered as an alternative way of analysing the occurrence. For more information about the Threat and Error Management (TEM) framework, see [TEM item in Skybrary]

From the perspective of the radar controller the following Threats can be identified in the scenario: call for VFR crossing of the control zone on the approach control frequency; poor quality of the radio in the VFR aircraft; pop-up traffic (i.e. a call from an aircraft that was not previously announced or co-ordinated); no flight plan available for the VFR flight; marginal weather conditions. The controller made an Error when he started using an incorrect call sign for the VFR flight. He also made an Error when he assumed an incorrect aircraft category for the flight (helicopter instead of fixed wing). Arguably there was one more Error made when the controller didn't notice that the pilot mentioned the type of aircraft in one of the first transmissions, but since the controller wasn't familiar with the name of this type of aircraft there is room for discussion about how this should be classified in the TEM framework. The Errors were not adequately managed by the controller, which contributed to an Undesired State: the controllers in the APP and TWR believed they were dealing with a helicopter operating under special VFR where in fact they were dealing with a fixed wing aircraft that was operating below VFR limits.

FLIGHT DECK PERSPECTIVE

NOTE: the following item addresses aspects that strictly speaking are outside the ATC domain, and therefore the item may seem out-of-place in this article. It is only included to enable a more comprehensive understanding of this occurrence.

On the flight deck of the passenger flight the pilots had monitored the conversation between the tower controller and the crossing traffic. When passing 1350 feet on final approach they received a TCAS traffic alert; however, because of the marginal weather conditions they were unable to see the other aircraft. Since there was no TCAS resolution advisory or any instructions from ATC for avoiding action, they continued the ILS approach and made an uneventful landing.

While executing the descent manoeuvre, the pilots of Airline907 heard a TCAS Resolution Advisory that said "climb, climb, climb"[1], but since they already were committed to descend the captain decided to continue doing so.

It was established afterwards that the closest distance between the two aircraft had been less than 300 metres (i.e. less than 0.2 Nautical Miles). The encounter was within the parameters for the generation of a TCAS resolution advisory, but this advisory was suppressed on the flight deck of the passenger flight in accordance with the TCAS design criteria because at that time the altitude was below 1000 feet AGL.

Prevention Strategies and Lines of Defence

If the controller had correctly understood the aircraft call sign (registration), his subsequent action to look for the flight plan in the automated flight data system would have produced the flight plan, including the type of aircraft.

The controller was not familiar with that particular aircraft type, but he would have been able to look up the relevant characteristics for it, such as "fixed wing, single engine". It seems logical that in that case the aircraft would not have been given permission to operate in the control zone, for the weather was below (special) VFR limits for fixed wing aircraft, thus preventing the event from happening.

It therefore comes down to the poor quality of the radio transmissions from the VFR aircraft; however, there is very little (if anything) that an individual air traffic controller can do about that. Yet if the flight plan data for this flight had been actively provided (e.g. in printed form) to the controller, rather than being passively available in the automated system, the controller would have been able to anticipate a call from this aircraft, and he probably would have been in a better position to deal with it.

The radar controller eventually helped manage the situation by monitoring the progress of the "helicopter" after he had transferred the flight to the tower. He provided relevant information to his colleague in the tower, who used that information to give an additional turn instruction to the VFR aircraft which resolved the conflict.

KEY POINTS

As a result of poor radio quality the radar controller misheard the call sign of a VFR aircraft asking to cross the control zone in marginal weather conditions. The controller had no flight plan data available, and believed the aircraft was a helicopter whereas in fact it was a fixed wing aircraft. When the aircraft later was instructed by the tower controller to stay clear of the final approach area for a runway where a passenger aircraft was making an ILS approach, its turn took it closer than expected to the passenger aircraft. Because of the marginal weather conditions, none of the pilots involved were able to establish visual contact with the other aircraft.