

# National Transportation Safety Board

Office of Research and Engineering

Washington, D.C. 20594

## Performance Study

### Specialist Report

Marie Moler

#### A. ACCIDENT

Location: Salt Lake City, Utah  
Date: November 12, 2019  
Time: 20:08 mountain standard time (MST)  
Airplane: Agusta A109, N271HC  
NTSB Number: WPR20LA029

#### B. SUMMARY

On November 12, 2019, about 20:08 MST, an AgustaWestland A109SP helicopter, N271HC, was substantially damaged during cruise flight near Spanish Fork, Utah. The airline transport pilot and flight nurse were not injured. The helicopter was registered to and operated by IHC Health Services Inc as an unscheduled air medical flight, conducted under the provisions of Title 14 Code of Federal Regulations Part 135. Visual meteorological conditions prevailed, and a company flight plan was filed for the local flight, which was destined for an off-airport location in Spanish Fork, Utah.

#### C. PERFORMANCE STUDY

The aircraft was equipped with an Appareo which recorded time, latitude, longitude, altitude, groundspeed, vertical speed, course, heading, pitch, and roll and their respective rates of change. Accelerations in the vertical, longitudinal, and lateral direction were also recorded. The Appareo also recorded forward-facing video from above and behind the pilot and flight nurse.

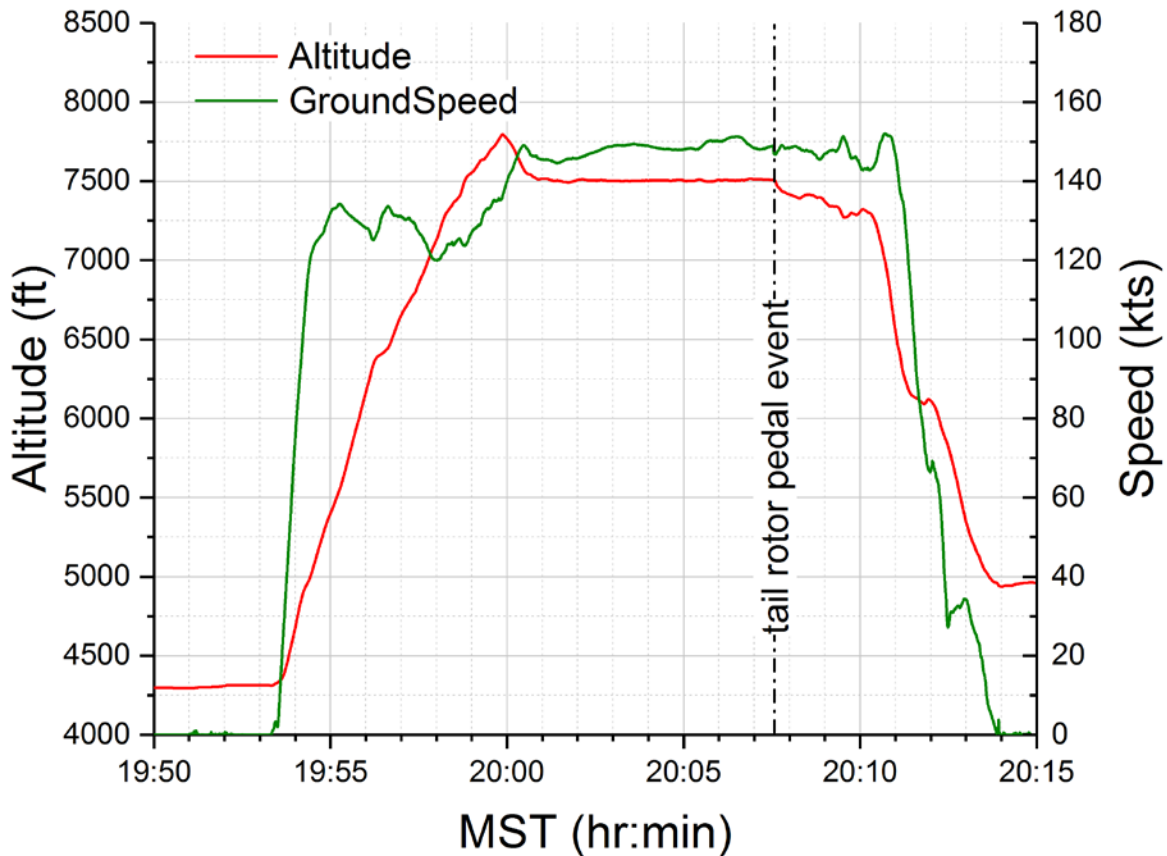
Figure 1 shows the helicopter flight path and Figure 2 the altitude and groundspeed. The helicopter departed Murray, Utah and traveled southeast to a motor vehicle accident. The pilot reported that about five minutes from the destination, the flight nurse, seated in the left front seat, inadvertently stepped on the left tail rotor pedal when attempting to activate a floor-mounted press-to-talk radio microphone. The pilot reported immediately countering the resulting yaw to left with right tail rotor pedal input. The helicopter was at an altitude of about 7,500 ft msl (mean sea level) and a groundspeed just under 150 kts when the event occurred. Ground elevation in the area was about 4,500 ft. A post-flight inspection revealed damage to the tail boom and tail rotor blades, indicating that the tail rotor blades had impacted the tail boom.

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Figure 1. Accident flight in blue with select times and altitudes in msl annotated in blue.

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**Figure 2.** Altitude (msl) and groundspeed during the accident flight.

Figure 3 shows the recorded change in heading and yaw rate of the event and the motion in roll and pitch. The helicopter was on a heading of  $153^{\circ}$  at 20:07:30.5 when it rapidly went to  $142^{\circ}$  by 20:07:31.75, a yaw rate of nearly 20 deg/s. The right tail rotor pedal input by the pilot is reflected in the data as the helicopter returned to  $151^{\circ}$  by 20:07:33.25. In addition to the lateral motion, the helicopter also responded by rolling from level to  $-15^{\circ}$  left side down and then to  $15^{\circ}$  right side down in under four seconds before returning to level after the event. Pitch briefly went from  $-2^{\circ}$  nose down during level flight to briefly nose level. The helicopter slowed and descended after the event, reaching its destination by 20:12 and landing at 20:15.

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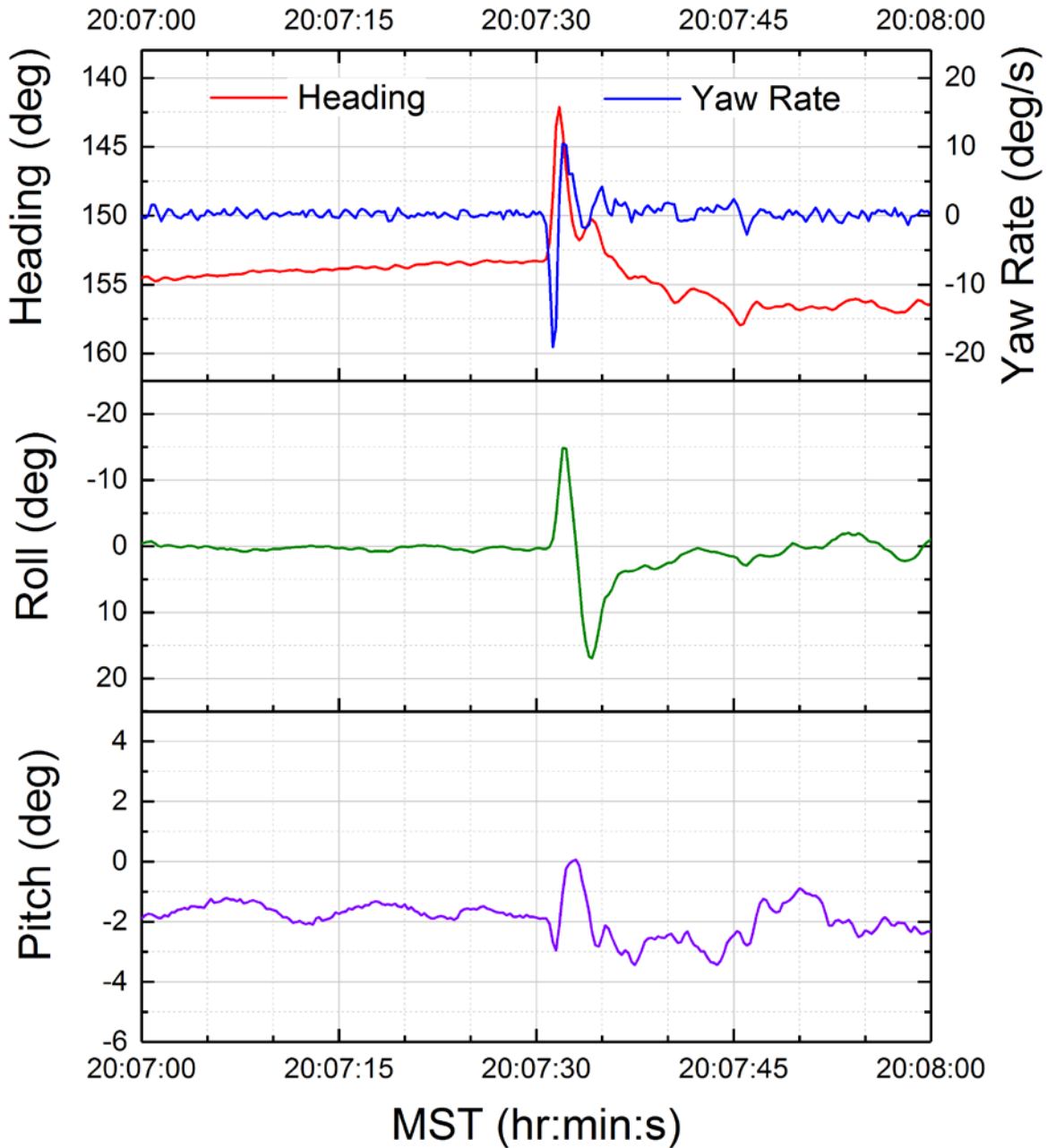


Figure 3. Recorded heading, yaw rate, roll, and pitch.

An Agusta A109 has a main rotor that rotates counterclockwise (viewed from above) and a clockwise natural yawing motion. The tail rotor, mounted on the left side of the vertical stabilizer, imparts an opposing anti-torque to maintain heading. The accident helicopter is shown in Figure 4.





**Figure 4.** Image of accident helicopter.

When the flight nurse stepped on the left pedal, the pitch of the tail rotor blades would have increased, increasing tail rotor thrust, and yawing the aircraft counterclockwise. This is consistent with the heading change to the left. When the pilot countered with right pedal, the tail boom would have swung back towards the rapidly unloaded the tail rotor. It is likely that this is when the tail rotor blades impacted the tail boom.

#### **D. CONCLUSIONS**

The helicopter was flying at 7,500 ft msl and a groundspeed of 150 kts when the pilot reported the flight nurse inadvertently stepped on the left tail rotor pedal. Onboard data recorded that at 20:07:30.5 the helicopter rapidly turned left from a heading of 153° to 142° in 1.25 seconds. The pilot reported immediately countering with right tail rotor pedal, which is reflected in the data as the helicopter returned to 151° by 20:07:33.25. The helicopter also responded by rapidly rolling from level to -15° to 15° and pitching up 2° before returning to its original attitude.

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Marie Moler  
Specialist – Airplane Performance  
National Transportation Safety Board