

ONE PLUS ONE IS TWO. REALLY?

When two pilots qualified to operate alone are flying together, do they add up to performing as a team of two? Michael R. Grüninger and Capt. Andreas Grauer investigate

SKYbrary provides a description of the accident as follows: “On 30 March 2008, a privately operated Cessna Citation 500 which had just taken off from Biggin Hill UK for Pau, France in day VMC reported ‘engine vibration’. Whilst positioning for a return to land, the aircraft descended, and the pilots reported a major power problem just before it struck the side of a house killing all five occupants and destroying the house and adjacent property in the intense fire which followed.”



The Flight Crew

Pilot A was 57 years old. He held a UK Airline Transport Pilot's License and had accumulated 18 hours on type and 8278 hours total flight time.

Pilot B was the older of the two pilots. He was 63 years old and had an experience of 4533 total flying hours, of which an unknown amount in excess of 70 hours was flown on the Cessna Citation on a FAA Commercial Pilot Certificate.

Both pilots had previous experience in multi-pilot operations on various aircraft types. However, both pilots had only received training and checking on operating the Cessna Citation in the single pilot role. Pilot A and Pilot B were thus properly licensed and qualified to operate the aircraft for single pilot operation only.

The Aircraft

The Cessna Citation 500 is a light twin-engine jet, thus a complex motor-powered aircraft. It is certified for single pilot private operation. For commercial operation, it must be crewed by two pilots. The aircraft had been maintained to the manufacturer's standards, and no maintenance deficiencies were detected by the investigation.

The Flight

Pilot B had arrived at the Biggin Hill Airport (UK) at 11:00 UTC and began flight preparations. Pilot A joined him 45 minutes later, and both continued to prepare for the flight jointly. At 13:00 UTC, the three passengers arrived at the terminal, and they were brought to the aircraft.

The take-off from Runway 21 at 13:33 UTC was uneventful. One minute into the climb, Pilot B transmitted “And Victor Papa Bravo Golf Echo er we’re making an immediate turn to return to the airport immediate turn to the airport.” Two minutes later, Pilot B made the following final transmission: “And er Victor Golf Echo we have a major problem a major power problem it looks as though we’re er going in we’re going in.” Shortly after that call, the aircraft crashed.

As the CE500 was not equipped with a voice or flight data recorder, we only have limited knowledge of what happened in the cockpit during that flight.

The BBC News reported on the outcome on the day after the accident: “Witnesses reported seeing the jet flying low over homes before crashing into the house in Romsey Close. Home owner Edwin Harman was away on holiday at the time of the crash, and his wife, Pat, who had returned early, was on her way to the house after spending the night at her daughter's. Coroner Roy Palmer said it was ‘extremely fortuitous’ that no one was in the house at the time and through ‘great good fortune’ that no one was killed on the ground.”

The Technical Investigation

In order to find out which factors had contributed to the fatal outcome, the investigators conducted extensive

SMASH
A Citation 500 crashed into a house near Biggin Hill Airport from where it had taken off.

research based on the wreckage, the radar flight path records, computer simulations and witness accounts.

Mark Jarvis, senior engineering inspector at the Air Accidents Investigation Branch, concluded that a damaged bearing of the plane's air-conditioning and pressurization system most likely caused the vibration, and that a rivet head missing from the left engine's fuel-cut-off lever could have caused the pilot to inadvertently shut the engine down when retarding the thrust lever.

Further, it was found that the engine emergency restart checklist was ambiguous with regard to the difference of starting one engine at a time or both engines simultaneously.

The report finally concludes that technical factors probably led to the shut-down of both engines but that it would have been possible to restart them in time and to escape the emergency, had the restart procedure been applied correctly.

The Crew Coordination Question

Two pilots qualified to operate alone flying together – do they add up to performing as a team of two?

In the absence of flight recorders, the investigators could not determine the nature or extent of any multi-crew cooperation issues nor the role of either pilot in trying to deal with the emergency. Hence, we do not know which pilot was actually handling the aircraft at the different stages of the flight.

We do know though that the two pilots had not been trained to interact as a team on the CE500.

The benefit of multi-crew operations can only be achieved if both pilots are trained to work together, by applying the same set of procedures and having a common understanding of the operator's operating policies.

European and US regulations as well as all airlines under their legislation acknowledge this by clearly outlining multi-crew requirements, training standards for commercial operations and well-defined task sharing between the Pilot-in Command and the First Officer. Pilots have to undergo Multi-Crew Co-operation (MCC) and Crew Resource Management (CRM) training and they have to do line flying under supervision in their role in order to be checked out as a fully qualified multi-crew flight crew member.



In corporate and private aviation things are handled differently at times although some of the operated aircraft are no less advanced nor less complex than airliners.

Often paid-by-the-day pilots are used to limit the crew expenditure to the times that the aircraft are actually in the air. Their record of accomplishment is difficult to trace. Owners and operators can hardly monitor their training standard if their crews are hired-in only occasionally. Individual crew member responsibilities and task sharing in the case of two freelance captains who are hired to operate a flight are often neither clear nor documented.

In the case of the Biggin Hill accident the investigation report states: "Pilot A was employed to fly the aircraft on behalf of its owners and it is understood that he was acting as the commander and handling pilot for the flight. He had recently completed a type conversion onto the aircraft and it is believed that he had wished to fly with another pilot who had more hours on type, acting as mentor, until he gained more experience. He occupied the left seat during the flight."

"Pilot B had operated this aircraft previously, both with and without Pilot A. His name appeared as the commander on the flight plan for the flight and he seems to have carried out much of the organization for the flight. However, as he held no instructor rating and occupied the right seat for the flight, it is believed he was fulfilling the role of mentor for Pilot A."

Of course, we cannot jump to conclusions pointing at the pilots' conduct because we simply do not know enough about the sequence of events and the communication in the cock-

pit. The whole investigation result is based on assumptions. Many factors may have contributed to the accident.

Nevertheless, we have to take note that accident rate in private aviation where freelance crews with different backgrounds and training standards are used is higher than in operations that work under the rules of commercial aviation.

There is statistical evidence that applying commercial rules increases the level of safety of an operation.

Owners and operators of private, complex motor-powered aircraft who have spent millions to acquire and maintain their high performance airplanes should therefore think twice before they consider saving on expenditure for standardized and comprehensive training programs for the pilots.

Any aircraft is only as good as the pilots flying it. 1+1 is not necessarily 2. To create a high performance team, it takes more than just flying together.



Michael R. Grüniger is managing director of Great Circle Services (GCS) Safety Solutions and Capt. Andreas Grauer is the deputy managing director of GCS. GCS assists in the whole range of planning and management issues, offering customized solutions to strengthen the position of a business in the aviation market. Its services include interim and start-up management, training and auditing (IS-BAO, IOSA, EASA), consultancy, manual development and process engineering. GCS can be reached at www.gcs-safety.com and +41-41 460 46 60. The column Safety Sense appears regularly in BART International since 2007.

WRECKAGE

A detached house was completely destroyed in the fireball created as the plane crash landed.