

SILENCE IS GOLDEN

Michael R. Grüninger and Capt. Carl C. Norgren highlights the importance of effective communication between flight crewmembers through the example of Gulfstream G-IV business aircraft accident



The calm and fresh spring night was still young. As the passengers arrived at the aircraft, the waiting came to an end for the crew of three.

In the early afternoon of the 31st of May 2014, the flight crew had steered the Gulfstream G-IV N121JM from its base at Wilmington New Castle Airport (Delaware) and delivered their passengers safely to an afternoon dedicated to a charitable event. By 21:28, the passengers had returned. The pilots acted swiftly from then on.

Within two minutes the engines were already running. After another two minutes, the aircraft was configured for take-off and started taxiing. After seven minutes, the airplane turned onto the runway; it was 21:39. The crew had not spoken much during these 11 minutes. Certainly there was no discussion or mention of checklists or take-off planning.

Maybe the pilots felt that many words were not needed anymore. They formed a veteran crew. The second-in-command on that leg was the chief pilot and director of maintenance for the owner's flight department. He was 61 years old and had worked for the airplane owners for the past 27 years. During his flying career, he totaled 18,530 flying hours of which 2,800 in G-IV airplanes.

The pilot-in-command, aged 45, was a junior to the second-in-command. He had accumulated 1,400 hours as PIC in G-IV airplanes out of a total of



11,250 flight hours. He was flying for SK Travel for seven years.

These two pilots had flown together often. There was no need to talk much. Things went smoothly and they understood each other without making much fuss of it. It was a cool operation – smooth, proficient and without any unnecessary talk. The passengers trusted their professionalism.

The Gust Lock

The G-IV is equipped with a big red handle next to the flap handle on the thrust lever quadrant. It is the gust lock handle. The handle and its mechanism are spring loaded. The spring pushes a lock pin into a slot to prevent the gust lock to either engage or disengage.

The gust lock must be released at the time of the start-up of the engines. In fact, it is one of the items of the start-up checklist. As the crew were

to learn during their take-off, it is impossible to release the gust lock once aerodynamic forces start to apply on the control surfaces.

Locked Controls, Locked Communication

As the aircraft accelerated down the runway, the SIC called '80 Kts', 'V1' and 'Rotate'. However, rotation was not possible. The gust lock was still engaged and it was impossible to disengage it as the airspeed increased and aerodynamic loads applied on the control surfaces speed.

Without verbal coordination, the SIC attempted to disengage the gust lock by removing the hydraulic power from the flight controls by setting the flight power shutoff valve (FPSOV) handle to the "on" position.

The FPSOV removes hydraulic pressure from the actuators for the spoilers and the primary flight controls. As the spoilers are normally

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The GIV crashed after overrunning the end of runway 11 during a rejected takeoff at Hanscom Field.

held down by their actuators, when hydraulic pressure is removed from the actuators, the surfaces will float due to aerodynamic loading on the spoiler surfaces.

However, since the aircraft was already at speed aerodynamic loading prevented the gust lock to be unlocked. The strategy of removing hydraulic loading to facilitate the release of the gust lock works only when the aircraft is on the ground at low speed.

During this time the aircraft continued to accelerate towards the runway end. The PIC retarded the throttles 15 seconds after reaching rotation speed. The airplane overshot the runway, crossed the safety area and fell into a ditch.



Instead of aborting the take-off, once the gust-lock condition “on” was recognized, the crew tried to unlock the gust lock by using a strategy most likely practiced when the gust lock had to be released after the engines had been started.

The four passengers and three crew survived the impact, but failed to exit the aircraft before it is consumed by an intense fire.

Habitual disregard of standard procedures proves to be a creative and effective solution to, sadly self-induced, problems. The well-established team work of the two veteran pilots seemingly trusted their improvised error correction capabilities. This time, it didn't work.

As in so many other previous cases, the pilot may have acted without a profound aircraft systems knowledge and by adopting a strategy based on acquired habits rather than on reasoned analysis.

Checklist Misuse

The crew most likely had not performed the checklist and forgot about disengaging the gust lock. The Human Factor research has identified four categories of checklist misuse. One of which is that sometimes crewmembers, for various reasons, simply do not do the checklist. The second category of misuse is skipping or forgetting one item while performing the checklist. The third checklist error is when a crewmember erroneously responds that an item is set or checked when in fact the item is not checked or set. And finally, the fourth misuse is when the checklist is started, but is interrupted and not completed.

Some researchers have found that deviations and misuse of checklists are caused by a set of reasons. None of these reasons actually comes as a surprise: distractions, individualism, complacency, boredom, humor and frustration. In view of the accident at hand, maybe one more reason should be added to the list: the attitude of ‘done it all, seen it all’. This attitude is probably a type of complacency and a sort of old trusted team complacency.

Communication is Gold

Hollywood movies suggest that heroes solve grave problems without talking to each other. There is the little nod or the slight raise of an eyebrow which start a complex and spectacular sequence of coordinated actions.

Real life is much less heroic despite the tragedies that occur in it. Pilots are no taciturn, “cool” heroes. Pilots are communicating professionals.

Flight crew need to have certainty about the intentions of their colleagues on the flight deck. They need to be sure about what their colleague has done, what he perceives and what he plans to do next.

Crew actions must be well coordinated during critical phases of flight. This requires structured and concise communication. Standardized wording allows complex information to be exchanged in short periods of time. This is even more critical when normal operations turn to non-normal operations. Dealing with abnormalities and emergencies requires a coordinated crew effort which is not possible without effective communication.

Heroic silence might sell movies; but, in real life, communication is gold.

Keep Talking to Each Other

Business Aviation pilots often accompany the aircraft owner for a lifetime. In such an environment, complacency can easily kick-in.

Routine and confidence in one's own creative error management becomes the dominant factor and every successful flight reinforces the misbehavior. A veteran winning team is at risk of adopting a cool attitude which goes well beyond the professional cool required by professional pilots and is counterproductive to achieving a high level of flight safety.

Even winning teams have to be challenged and should be changed every now and then. Sclerosis and complacent silence become a safety risk. Keep talking to each other.



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OVERSIGHT
The Gulfstream IV gust lock is at the center of the crash findings.