



RECORD OF CONVERSATION

All persons listed were interviewed by Zoë Keliher:

The following is a summary of conversation:

MIKE SEES (FAA)

The annual condition inspection on 4/9/2018 used the incorrect language on the entry as required in the operating limitations issued by Craig Roberts (paragraph 9) and is technically invalid. The records indicate the aircraft hours as 568 on 6/29/16, then 516 on 9/1/16, and finally 570.6 on 4/9/18. Assuming the 9/1/16 entry is a typo, the aircraft only had 2.6 hours flown over nearly 2 years.

There are no entries to indicate damage was sustained to the wing. Never-the-less, the corrosion found on the broken wing spar of the right wing suggests that there was damage that was never reported or repaired and probably caused the uncommanded right turn when the spar failed.

NEIL BUNGARD (AIR CREATIONS)

Inspection of Airborne XT-912 Mustang III 19 meter wing (N107PW) at Deer Valley Airport The Inspection of the Airborne XT-912 Mustang 19 meter wing at Deer Valley Airport revealed some interesting results. I will outline several issues that could have contributed to loss of control of the aircraft and offer my opinion of the most likely cause.

Wing/Carriage Compatibility

First of all the carriage appeared to have about 560 hours total time and the wing was new with maybe only a few hours of total operation. In addition, the wing was a Northwing 19 meter Mustang III which is not manufactured by Airborne, the carriage manufacturer. This means that the wing and carriage flight characteristics were not matched by the aircraft manufacturer and a Phase 1 flight test would need to be accomplished to establish the compatibility of the wing/carriage combination. The phase 1 is also required by regulation when switching wing types on an experimental light sport trike. This begs the question of whether the Phase 1 was completed and entered into the aircraft maintenance log. The second issue is if the phase 1 was accomplished then who did it? The phase 1 is usually accomplished by the owner of the trike. If this was Rex Reed the test itself might have been problematic. Steve Shelltoff, an individual familiar with Rex Reed and present at the crash, told me that the pilot (Rex Reed) was a high time airplane pilot with very few hours in weight shift control. If this is correct then Mr. Reed would not have been qualified to evaluate proper operation of the aircraft and could have contributed to loss of control. Determination of which phase of flight the trike was in at the time of the crash should be established through the maintenance record. After reviewing the aircraft records, I discovered that permission to proceed to phase 1 was granted by FAA in October of 2016 by Craig Roberts Scottsdale FSDO. There is no logbook record placing the aircraft into phase 1 or back into phase 2. It appears that 2.6 hours have been flown on the aircraft in the last two years. I would conclude that those hours were flown illegally, Phase 1 flight testing was not accomplished and flight characteristics of the wing/carriage combination could not be known.

Environmental Conditions

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The aircraft accident occurred at around 6:30 am near the Lake Pleasant Airport. I trained at this airport and the katabatic flows at this time of the day can make landing tricky. In particular, the katabatic flows will establish a wind gradient such that you will experience no wind speed on the ground and 25 mph at 200 ft. The wind is laminar during these flows and flight will be smooth through the entire approach. Steve Shelltoff indicated that the winds were calm on the ground and was told that there was significant flow at altitude. Approach in these conditions can easily be mismanaged because it is possible to fly into stall during approach as your headwind diminishes with altitude. Proper reaction to a stall on approach in this condition is opposite to your intuition. The pilot should allow the stall condition to occur and not try to arrest the stall with an abrupt bar forward motion. As the trike descends (assuming you have altitude) it will begin to fly normally, your control bar will be established in a rearward position, and you will be left with stored energy in the wing for rotation and flair. If you attempt to arrest the stall condition with a bar forward motion you will slow the trike and when the trike begins normal flight upon descending, your control bar will be full forward and no energy will be available for rotation and flair resulting in loss of control and possibly uncontrolled contact with the ground. More to the point of this particular accident, if you accomplish a descending, turning approach in these conditions and do not manage the wind gradient properly, the resulting accident would be exactly as described in the pilots report given to the FAA by Mr. Reed. To make matters worse in this scenario, you must strongly consider the pilots history and experience. This pilot had a lot of experience in airplane. Weight Shift Control movements appear opposite to those in airplane and in my 17 years as a weight shift CFI, low time trike pilots with airplane background experience always reverse control when under stress! This would result in a decent command when the pilot intended to climb. Aircraft Integrity The Northwing Mustang III was a new wing with very few hours flown and was in a new condition. Much of the metal structure was bent from the impact of the accident and of particular interest were the outboard leading edges which were completely broken off. Before discussing the outboard leading edges, I will discuss a condition that has lead to other crashes of this nature. Unlike an airplane, a trike must be tied down in the presence of any wind. If a trike is left unattended and not tied down, even a slight wind can cause the wing to lift and the aircraft will rotate around the rear wheels and place the wingtips of the wing on the ground with the front wheel pointing straight up. This accident appears benign and usually the pilot just pulls the front wheel back to the ground, dusts off the wingtips and goes flying. However, this accident is capable of creating a condition that will eventually result in a catastrophic failure of the leading edge of the aircraft. Each leading edge of a Weight Shift aircraft consists of two long aluminum tubes. The inboard tube is closer to the nose of the wing and is larger in diameter than the outboard tube. The outboard tube, being smaller, is inserted into the inboard tube to make one long leading edge. If the aircraft is rotated back on the wingtips as described in the accident above, a plastic deformation can occur at the junction where the outboard and inboard tubes meet. This deformation crystallizes the aluminum imperceptibly and in a location that is not accessible to a preflight inspection. The tubes in a Weight Shift control wing constantly bend and flex during flight and the deformation will evolve into a crack as the metal is work hardened. Once this happens, the outboard leading edge separates and control of the aircraft is not possible. The aircraft will descend rapidly in a spiral motion with no recovery.

So the question is, were the outboard leading edges broken off in the impact of the accident or was one of the outboard leading edges damaged in a previous impact and failed during approach which resulted in an uncontrolled spiral? The left outboard leading edge was clearly 'snapped' off as a result of impact but the right outboard leading edge showed signs that indicate that it stayed intact long enough to create wear to the fractured edges. In addition, the fractured edges had material embedded in its structure which is consistent with a rubbing motion against some other material. The cloth at the fracture site of the right outboard leading edge appeared to be frayed rather than torn which is consistent with the fractured edge of the tube rubbing the cloth to failure. Reports from both Rex Reed, the pilot, and John Wilkelmeyer the mechanic that accomplished the condition inspection and test flew the aircraft, indicated that the wing was not flying correctly just prior to the accident. The problems appeared to be issues with roll control which is consistent with a leading edge failure. As I explained this failure mode during our meeting at Deer Valley airport, Steve Shelltoff indicated that he recalled that there was some problem with the wing that had to be repaired as a

result of some incident that damaged the wing. If proper maintenance logs were maintained on this aircraft there may be information in those logs that can collaborate any damage to any part of the wing structure.

After reviewing the aircraft records, there is no indication of any maintenance being done on the aircraft for its 560 hour life, including any maintenance on the Mustang III wing. In Conclusion In offering my opinion for the loss of control in this accident, my observations are consistent with the failure of the right outboard leading edge. As best that I can determine there is no information collaborating any prior damage to the wing. But evidence suggest that the right outboard leading edge failed resulting in a spiral accident on approach and landing. Other mitigating circumstances in this case cannot be ignored. Wing/carriage incompatibility, inexperience in type of aircraft, and mismanagement of wind gradient conditions could have easily contributed to this accident. One more interesting but unrelated issue About 1 1/2 years ago there was a Weight Shift control accident that was investigated by NTSB. One of the results of this investigation was that NTSB found no placards warning first responders that there was a ballistic parachute installed on the Trike. Given that a ballistic parachute could easily kill first responders if accidentally deployed, this issue made its way through FAA and finally to ASTM, the committee that establishes requirements for Light Sport manufactures. As the ASTM Weight Shift committee chairman I was charged with writing the requirements for ballistic parachute placards for all new Light Sport Weight Shift control aircraft and I am currently working on those requirements. The Ballistic Parachute on this Rex Reed accident was accidentally deployed by the first responder while attempting to extract him from the aircraft. There were no Ballistic Parachute placards on the aircraft that I could see. Thankfully no one was injured.