Aviation Investigation Final Report

Location:	New Washoe City, Nevada	**Accident Number:**	WPR18FA247
Date & Time:	September 2, 2018, 13:36 Local	**Registration:**	N22XC
Aircraft:	Schempp-Hirth Duo Discus T	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The two pilots onboard the motorized glider, one of whom was an owner of the glider, were participating in an informal competition, the goal of which was to fly between two predetermined locations in the shortest time. The takeoff, tow to altitude, and initial stages of the flight appeared uneventful.

A low-resolution track of the glider's flightpath indicated that the glider was likely flying around 14,500 ft mean sea level (msl) and circling in thermal lift just before the accident. A group of paraglider pilots was preparing to launch from an 8,700-ft-high bluff on the mountain over which the accident glider was circling. Their attention was drawn to the glider, which appeared to be performing a series of tight maneuvers that they described as "loops." After a couple of "loops," the glider's wings began to flex upward almost vertically before one wing broke away and impacted the tail, and the glider descended to the ground. Ballistic trajectory analysis indicated that the glider likely broke up at about 11,500 ft msl while traveling in a steep descent toward the witnesses.

Most of the glider was consumed by fire on impact, with only the separated portion of the left wing and a series of control surface, skin, and cabin components strewn over a 1,500-ft-long debris path escaping thermal damage. Although sections of the horizontal stabilizer broke away during the breakup, the horizontal stabilizer mount and elevator control structure remained attached to the glider at impact.

Examination of the wreckage did not reveal any evidence of anomalies that would have precluded normal operation.

Given that the purpose of the flight was a timed competition and that performing aerobatics would have been out of character for the pilot/owner, it is highly unlikely that the pilots were intentionally performing aerobatic loops as described by the paraglider pilots, particularly over

a mountain ridge. Due to the witnesses' location relative to the glider, it is more likely that the witnesses were observing the glider in either a spin or a spiral dive rather than a loop. The position of the sun, which would have been generally behind the glider and to the right relative to their position, would have presented it in a high-contrast environment and could also have hindered their frame of reference. G-loading calculations revealed that a loop of the radius and period observed by the witnesses was not physically possible because the glider would have been subject to stress significantly beyond its ultimate design limit load and would have experienced structural failure well before completion of the first maneuver.

The published stall recovery technique requires that the pilot firmly ease the control stick forward and, if necessary, apply opposite rudder and aileron. With a more forward center of gravity, as was the case with the two occupants onboard, should the stall develop into a spin, the glider will enter a spiral dive after recovery, which is accompanied by a rapid increase in speed and acceleration that can quickly exceed limitations.

The glider's airbrakes can be extended at speeds approaching the never-exceed speed (Vne); however, damage to the left airbrake was consistent with an inflight separation, suggesting that the pilot had extended the airbrakes in an attempt to slow the glider and that the glider exceeded Vne. Excessive elevator control input during the attempted recovery from a high-speed dive would have resulted in the witness-observed upward bending of the wings and the subsequent failure of the wings due to overload. Such upward loading of the wings would not have been possible without the presence of the horizontal stabilizer and pilot input via the elevator.

Evidence of electrical arcing was present in wiring that would only have been energized if the retractable engine was in transit. Those wires were protected by circuit breakers and the engine was stowed; therefore, the arcing was likely the result of an electrical short circuit that occurred on impact or as the glider broke apart in flight. Additionally, the glider's FLARM collision avoidance system operated throughout the flight, further indicating that some form of electrical fire was unlikely.

No evidence of bird strike was observed to any of the recovered components, and radar information revealed no evidence of any conflicting traffic in the immediate vicinity of the accident glider before the accident.

The canopy was closed at impact; although both occupants were wearing parachutes, and one of them was not wearing the shoulder straps of his harness, there were no other obvious indications that they attempted to egress. Postaccident medical evaluation of the two pilots was limited due to the extent of injury. Whether a medical condition of either occupant contributed to the circumstances of the accident could not be determined.

Given the lack of mechanical anomalies, the overload failure of the left wing, and the glider's rapid descent before the accident, it is likely that the glider entered an inadvertent spin or spiral dive while maneuvering and that the pilot's delayed recovery resulted in a rapid increase in speed. It is likely that, during recovery, the pilot either used excessive pitch control beyond the glider's published maneuvering speed (Va) or the pilot exceeded the glider's Vne during the subsequent steep descent.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's delayed recovery from an inadvertent spin and/or spiral dive and an exceedance of the glider's design limit load during recovery, which resulted in an overload failure of both wings.

Findings

Personnel issues	Aircraft control - Pilot
Personnel issues	Delayed action - Pilot
Aircraft	(general) - Capability exceeded
Aircraft	Airspeed - Capability exceeded

Factual Information

History of Flight

Maneuvering	Loss of control in flight (Defining event)
Uncontrolled descent	Attempted remediation/recovery

On September 2, 2018, about 1336 Pacific daylight time, a Schempp-Hirth Duo Discus T motorized glider, N22XC, was destroyed when it was involved in an accident near New Washoe City, Nevada. The two pilots were fatally injured. The glider was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The flight was part of an informal competition (task), the goal of which was to obtain the shortest flight time between two predetermined locations. Each competitor's flight time would start when their glider flew over runway 2/20 of Truckee-Tahoe Airport (TRK), Truckee, California, and end upon reaching a predefined radius around Marine Corps Mountain War Training Center Heliport (7CL4), Bridgeport, California. There was no specific start time, the gliders departed at staggered intervals throughout the day, and any route could be taken.

The pilot of the towplane stated that the accident glider's takeoff and tow was uneventful, and the glider released after reaching an altitude of 8,000 ft mean sea level (msl), (about 2,000 ft agl) about 3 miles east of TRK over an area known locally as "Hot Rocks."

The accident glider and several other gliders flying in the vicinity were equipped with FLARM traffic awareness and collision avoidance systems. This data revealed that, after release, the accident glider began a series of climbing turns over Hot Rocks, reaching an altitude of about 10,500 ft msl. It then proceeded east on a meandering track while performing another series of climbing turns about 3.5 miles west of the summit of Slide Mountain. The last position was recorded at 1333 at an altitude of about 14,500 ft msl, 12 miles east of TRK, and 1 mile west of the 9,698-ft summit of Slide Mountain.

Another glider pilot competing in the task reported sharing a thermal with the accident glider for a few minutes beginning about 1331. He stated that they were both over the spine of the mountain just south of the peak of Mt Rose, at an altitude of about 14,000 ft msl. The accident glider appeared to be flying normally and there were no indications of distress. The pilot did not hear any radio calls from the accident glider, and a few minutes later, he flew north to the peak of Mt Rose, where he climbed to almost 16,000 ft. He reported that the lift at Mt Rose was strong, with climb rates averaging up to 10kts.

About the time of the accident, a group of paraglider pilots were preparing to launch from an 8,700-ft-high bluff on the eastern face of Slide Mountain. Their attention was drawn to a glider traveling near the face of the slope directly to the east and above their location.

One witness stated that, as he looked up, he saw a glider performing a series of “steep back loop” maneuvers, such that he initially thought it was a remote-controlled aircraft. He watched as the glider performed another loop. During that maneuver, he started to hear a high-pitched whistling/vibrating sound, and the wings flexed upwards such that the tips almost touched each other. One of the wings then broke off, followed by a loud "cracking" sound, and the sky was filled with confetti-like pieces of white debris. He could see that the canopy was closed and watched to see if anyone attempted to bail out, but they did not.

Another witness stated that when he first saw the glider, it was passing from left to right and performed 2 or 3 full “loops” that lasted about 2 to 3 seconds each. He stated that the wings of the glider were flexing upwards aggressively throughout the maneuvers, and as it rolled out of the final loop, the left wing broke away and struck the tail.

A third witness, who was a fixed-wing pilot, stated that he looked up and saw the glider perform a series of loop-like maneuvers, which had a radius of about two wingspans. He described the maneuvers as smooth and progressive, and that the glider appeared to be under positive load throughout. On completion of the second loop, the glider rolled out and the wings appeared to flex up like "rubber" and form a "U" shape when viewed from the front. He heard a buzzing sound, and then the left wing broke away, followed by a very loud snapping sound similar to cracking timber. The glider then immediately entered into a flat spin, and white shards of debris filled the sky surrounding the glider. After the first spin rotation, the glider appeared to level off, and the witness considered the possibility that the pilot had regained control. The glider then rolled over, and the right wing failed.

Witnesses stated that they did not see indications that the engine/propeller had been extended, and none of them described seeing any evidence of smoke or vapors trailing from the glider.

Pilot Information

Certificate:	Private	**Age:**	80,Male
Airplane Rating(s):	None	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	Glider	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 31, 2018
Flight Time:	(Estimated) 1000 hours (Total, all aircraft), 400 hours (Total, this make and model)		

Pilot Information

Certificate:	Private	**Age:**	60,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	Glider	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 1000 hours (Total, all aircraft), 100 hours (Total, this make and model)		

Rear Seat Occupant

The glider's co-owner, who occupied the rear seat, held a private pilot certificate with a glider rating. He did not hold a current medical certificate; however, the provisions of 14 *CFR* 61.23 notes that pilots exercising the privileges of a glider category rating are not required to hold a medical certificate.

Pilot logbooks were not available for review. Friends and acquaintances of the pilot stated that he had extensive flight experience in gliders, flew most weekends during the flying season, and had well over 1,000 hours of flight time. He had organized multiple similar tasks and was described as a "purist" who specialized in long-distance flights and held multiple records. One witness stated that the pilot flying aerobatics was, "not in his DNA."

Records on file at the pilot's local soaring club indicated that his most recent flight review was completed on March 31, 2018.

Front Seat Occupant

The front seat pilot held a private pilot certificate with ratings for airplane single-engine land and glider. He did not hold a current medical certificate.

No pilot logbooks were recovered; however, he had similar levels of flight experience and time as the rear seat pilot and owned a high-performance glider that he flew regularly.

Aircraft and Owner/Operator Information

Aircraft Make:	Schempp-Hirth	**Registration:**	N22XC
Model/Series:	Duo Discus T NO SERIES	**Aircraft Category:**	Glider
Year of Manufacture:	2003	**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	72
Landing Gear Type:	Retractable - Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	May 31, 2018 Annual	**Certified Max Gross Wt.:**	1543 lbs
Time Since Last Inspection:	20 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	300 Hrs as of last inspection	**Engine Manufacturer:**	Solo
ELT:	Not installed	**Engine Model/Series:**	2350 D
Registered Owner:	On file	**Rated Power:**	29
Operator:	On file	**Operating Certificate(s) Held:**	None

The Schempp-Hirth Duo Discus T is a high-performance, two-seat, T-tail glider constructed primarily of carbon fiber and glass fiber-reinforced composite materials. Its engine is referred to as a "sustainer" engine and is not sufficient for takeoff use. The engine/propeller combination was mounted on a pylon behind the cockpit, and the entire assembly retracted into the fuselage when not in use. The other owner stated that the accident pilot was apprehensive about using the engine, and both he and other acquaintances stated that he regularly performed off-airport landings rather than use the engine to return to the departure airport.

The glider was equipped with flight controls at both pilot stations as well as a supplemental oxygen system, which was filled to 2,000 psi the day before the accident.

Maintenance records were not recovered for the glider and presumed to have been destroyed in the fire. An invoice from the facility that performed the last maintenance event indicated that an annual inspection was competed on May 31, 2018. At that time, an avionics upgrade was performed, which included the installation of a new altimeter, air speed indicator, and integrated navigation and variometer system. According to the other owner, the glider had accrued about 300 hours of flight time at the last annual inspection.

According to the flight manual, the maneuvering speed (Va) was 97 kts. The manual stated that full deflections of control surfaces may only be applied at this speed and below, and stated, “Do not make full or abrupt control movements above this speed as the aircraft structure might get overstressed.” The glider was not approved for aerobatic maneuvers.

The stall speed (Vs) with the powerplant retracted and airbrakes closed at a maximum gross weight of 1,543 lbs, was 32 kts.

The never-exceed speed (Vne) was 135 kts. The manual stated, “Do not exceed this speed in any operation and do not use more than 1/3 of control deflection.”

The airbrakes may be extended up to Vne; however, the manual stated they should only be used at such high speeds in emergency or if the maximum permitted speeds are being exceeded inadvertently.

The stall recovery technique while flying straight ahead or in a bank called for “firmly easing the control stick forward and, if necessary, applying opposite rudder and aileron.”

The manual-provided instructions for spin recovery stated that with a rearward center of gravity, a steady spinning motion is possible that will stop within about ¼ and ½ rotation once the appropriate recovery technique has been applied. With the center of gravity in the foremost position, a steady spinning motion is not possible, and after spin recovery the glider will usually enter a spiral dive, which is accompanied by a rapid increase in speed and acceleration. Recovery could be achieved by easing the control stick forward and applying opposite rudder and aileron. An accompanying warning stated, “When pulling out of the dive, the permissible control surface deflections at Va / Vne are to be observed!”

The maneuvering load factor limits (in units of gravity or g’s) were:

With airbrakes locked and at Va, +5.3 g, -2.65 g

With airbrakes locked and at Vne, +4.0 g, -1.5 g

With airbrakes extended +3.5 g (no negative limits specified)

Engineers from Schempp-Hirth estimated the speeds and g-loading that would have resulted if the glider had performed a loop with a radius of two wingspans (130 ft) over a 2-second period, as observed by one of the witnesses. Under such conditions, the glider would have needed to travel at a speed of about 240 kts, and would have endured a load of about 40 g.

With a loop radius of 165 ft, performed in 4 seconds, the speed would have been about 150 kts, and the glider would have experienced a load of about 12.5 g.

The flight manual detailed a series for steps for opening the canopy during emergency situations, and stated as soon as it is opened, it will be torn from its hinges, and carried away by the airstream.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KTRK,5900 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	12:45 Local	**Direction from Accident Site:**	274°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	27°C / -3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Truckee, CA (TRK)	**Type of Flight Plan Filed:**	None
Destination:	Truckee, CA (TRK)	**Type of Clearance:**	None
Departure Time:	12:58 Local	**Type of Airspace:**	Class E

Pilot Observations

Pilots flying the task that day all reported good soaring conditions, including strong lift, good visibility, and minimal turbulence.

Surface Analysis

The National Weather Service (NWS) National Center for Environmental Prediction Surface Analysis Chart for 1400 depicted a general weak pressure gradient over the region with several thermal low-pressure systems to the northwest and southwest over California at 1005- and 1007-hectopscals (hPa) with a trough of low pressure extending between the lows. Additional thermal lows were also identified to the northeast over Idaho at 1012-hPa with a trough extending southwestward toward the accident site and to the southeast near the Nevada, California, and Arizona borders at 1004-hPa. No defined frontal boundaries were depicted over the western United States during the period.

The station models surrounding the accident site depicted light winds, a few clouds to clear skies, with temperatures near 89°F, with a dew point temperature of 29°F. No significant weather was depicted surrounding the area of the accident site.

Upper Air

The NWS Storm Prediction Center forecast constant pressure charts for 700-hPa (approximately 10,000 ft) depicted an upper-level low-pressure system off the southern California coast with wind from the southeast at 5 knots in the vicinity of the accident site, with

a temperature of 7°C, and dew point temperature of -7°C. Dry conditions were noted over the area.

The 500-hPa chart depicted a trough of low pressure to the west of the accident site with winds from the north over western California and from the southeast at 5 knots over the Reno area with a temperature of -9°C, and a dew point temperature of -45°C and indicated dry air conditions or the absence of clouds over the area.

Wind and Temperature Aloft Forecast

The NWS Winds and Temperature Aloft Forecast for Reno current during the accident period indicated light and variable winds at 6,000 ft; wind from 130° at 7 knots with a temperature of 13°C at 9,000 ft; and wind from 190° at 11 knots with a temperature of 6°C at 12,000 ft.

Sounding

The closest upper air sounding from the NWS Reno Weather Forecast Office at 1700 indicated a lifted condensation level (LCL) and level of free convection (LFC) at 10,121 ft above ground level (agl), with a convective condensation level (CCL) at 13,964 ft agl. The wind abruptly veered to the west at 11,000 ft with a low-level wind maximum near 14,000 ft with wind from 250° at 21 knots. The sounding supported strong thermal activity from the surface through 17,000 ft. Analysis of the sounding profile indicated a high probability of moderate turbulence at 12,000 ft or immediately below the low-level wind maximum with an 8.1 knot/1,000 ft vertical shear.

Solar Data

At the time of the accident, the altitude and azimuth of the sun when viewed from Slide Mountain would have been about 58° and 182°, respectively.

Airport Information

Airport:	Truckee-Tahoe TRK	**Runway Surface Type:**	
Airport Elevation:	5904 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	39.304169,-119.86096

The wreckage was located on the lower eastern flank of Slide Mountain at an elevation of about 6,630 ft msl, and 2.5 miles east-southeast of the last FLARM-recorded position. The glider ignited a fire upon impact, which eventually burned a 58-acre of brush uphill to the west. The main wreckage comprised the fuselage, engine assembly, right wing, and vertical stabilizer fragments, all of which were extensively damaged by fire, such that only composite cloth remnants remained. A secondary 1,500-ft-long debris field spread northwest from the main wreckage, outside of the burn area, and contained the front headrest and an outboard section of the left wing, along with plexiglass canopy and control surface fragments. The furthest identifiable piece from the main debris was a section of the horizontal stabilizer upper skin, 1,000 ft above the main wreckage.

The accident site and debris field were searched utilizing an unmanned aircraft system (drone); however, no additional wreckage was found.

Examination

The wreckage was removed from the accident site and examined by an airworthiness group, including a team of NTSB investigators, an NTSB aerospace structures engineer, and a design and engineering representative from Schempp-Hirth.

The glider suffered extensive fire damage and most of the composite fuselage structure along with the right wing was consumed by fire. The left outboard wing and inboard wing sections and fragments of the horizontal stabilizer and elevator were located in the debris field with no fire damage.

The center portion of the wing spars were intact and remained within the remnants of the fuselage. The main spar pin remined installed through the left- and right-wing spars. The right forward and aft wing pins were intact, but the surrounding composite structure was consumed by fire. The wing spar end pins were present in the inboard ends of the left- and right-wing main spars and the fuselage bushings were installed on the pins.

Left Wing

The left inboard wing was mostly intact with no fire damage, and exhibited fracture and failure features consistent with overload. Examination of the structure revealed multiple inspection

openings as required in Airworthiness Directive (AD) 2003-16-51. This AD was released to detect bonding problems of the spar cap and spar web, which had the potential to result in an in-flight failure of the wing.

Elevator

Examination of remnants of the vertical stabilizer revealed that the horizontal stabilizer mounting assembly components remained engaged with the vertical stabilizer. The horizontal stabilizer forward securing pin was still engaged in its respective socket assembly on the vertical stabilizer, and the elevator actuating bracket remained attached to the aft bellcrank assembly.

The vertical elevator push rod was intact and remained connected to the elevator actuating assembly at rear horizontal stabilizer attachment point. The elevator control arm assembly remained connected to the elevator torque tube.

The elevator inertia weight bracket was intact at the forward end of the elevator controls along with the weight mounting bolts; the weight had melted away.

The elevator trim locking control rod was found at the midrange position.

Airbrakes

The airbrake control system within the fuselage sustained similar deformation and thermal damage. AD 2015-20-11, which was released to prevent uncontrolled actuation of the airbrakes (symmetric or asymmetric), appeared to have been complied with based on the design of funnel bell cranks.

The left airbrake had separated from the wing, and its two lever arms were fractured at their respective bellcrank weldments. Corresponding damage was present on the aft edge of the brake well, consistent with the airbrake separating aft while extended.

Rudder

The forward and aft rudder pedals remained attached to their respective steel mounting structure. All cables were identified from the pedals to the rudder control horn. The upper rudder hinge assembly, lower hinge assembly, and control horn were located within the remnants of the vertical stabilizer.

Engine

The engine remained attached to its pivot assembly and to the steel fuselage truss. The engine sustained thermal damage, partially melting the case and exposing the crankshaft. The spindle from the engine pylon drive motor was in the retracted position, consistent with the engine having been retracted into the fuselage at the time of impact.

Cabin

Burnt remnants of the entire canopy frame were identified in the main wreckage. The canopy hinge rods and locking assembly were identified but were bent in several locations.

Both seat buckles were identified. Two belt latches for one buckle remained attached to the locking hub, and four latches remained attached to the other hub. Remnants of two parachutes were identified.

There was no evidence of bird remnants on any of the recovered glider components.

Electrical arcing damage was observed to multiple strands of 10 AWG wire in the area of the engine bay and pylon assembly. Review of the glider's electrical system indicated that wire of that gauge was used in three areas. The first was for the "power plant" battery ground line in the center section of the cabin. The second was for the line that connected that battery to the main power switch. The third was for the two lines that connected the pylon (DC spindle drive) motor, located within the engine bay, to the engine control unit.

The power plant battery, along with the electrical supply to the engine control unit were protected by 15- and 7.5-Amp circuit breakers respectively. The design of the system was such that the DC spindle drive lines were only energized when the engine pylon assembly was in transit, as commanded by the pilot.

In addition to a power plant battery, the glider was also equipped with two avionics batteries. Those batteries were protected by 6.3-amp circuit breakers. The avionics and power plant battery lines were bundled in the same harness in the forward section of the cabin.

Medical and Pathological Information

Rear Seat Occupant

According to the autopsy performed by Washoe County Regional Medical Examiner's Office, the cause of death was blunt force and thermal injuries. Only two coronary arteries were available for examination, revealing that both the left anterior descending and circumflex arteries were 95-99% occluded.

Toxicology testing performed by the FAA's Forensic Science Laboratory identified terazosin in liver and muscle.

According to personal medical records from the pilot's care at a multispecialty group practice, he was being treated for hypertension, high cholesterol, obstructive sleep apnea, prostatism, and over the last 3 months he had received physical therapy for upper back pain. His

medications included terazosin as well as amlodipine and losartan to treat his blood pressure. None of these medications are considered impairing by the FAA.

Front Seat Occupant

Autopsy results indicated that the cause of death was blunt force and thermal injuries. The heart was not examined due to the extent of injury and the brain did not demonstrate gross underlying natural disease.

Toxicology testing performed by the FAA's Forensic Science Laboratory did not identify any tested-for substances.

No grossly evident soot was present in the upper airways of either occupant.

Additional Information

Video

A video camera operated by the "ALERTWildfire" university consortium was located at an elevation of 9,590 ft on the top of Slide Mountain. The camera was pointing east-northeast and had a horizontal and vertical field of view angle of 60°, and 30° respectively. The camera was configured to capture images at 2-second intervals. During the accident period, it captured numerous images of paraglider and hang glider activity in the lower-left field of view.

For a 3-minute period between 1336:02 and 1338:58, the camera captured images of multiple pieces of debris passing from top to bottom on the right side of its field of view. White pieces of debris appeared to be descending and spinning and were captured in multiple images, while darker objects were captured in single images. The location of the falling debris corresponded to the general location of the debris field and main wreckage.

Radar Data

The accident glider was equipped with a Mode S transponder; however, review of radar data indicated that shortly after takeoff, it was intermittently transmitting a squawk code, but no altitude data. Within about 2 minutes of takeoff, it was no longer transmitting. Review of historical data for the last two flights indicated similar intermittent transmissions. The glider was equipped with two avionics batteries; power could be drawn from each independently in flight. According to the other owner, the avionics batteries were recently purchased and

installed about one week before the accident. The FLARM and transponder utilized the same avionics battery source.

The FAA RNO radar sensor captured a sequence of primary (no altitude information) targets in the Slide Mountain area during the accident period. Specifically, a set of targets appeared to match the approximate location of the glider when compared to the FLARM data and suggested that the glider was circling over a fixed point west of the mountain top, consistent with it climbing in a thermal. Five minutes later, the targets began to progress east of the last recorded FLARM point, and by 1335:15, the target was over the location of the accident site. For the next 80 seconds, a group of targets recorded at 5-second intervals remained in the same general vicinity. The targets then ceased, and 30 seconds later, the final target was observed at 1337:10, about 1/3 mile east of the accident site. The final target was about 1.2 miles laterally east of the paraglider witnesses.

Throughout the period that the accident glider was in the vicinity of Slide Mountain, there were multiple primary targets grouped around the east and southeastern slopes of the mountain. The targets presumed to be from the accident glider did not conflict with any other primary targets or aircraft on any discrete 1200 or 1202 (glider) squawk codes.

Ballistic Study

Ballistic trajectory calculations utilizing primary radar and winds aloft data, along with the physical properties of the debris and its distribution, indicated that the glider likely broke up about 700 ft east-southeast of the main wreckage, at an altitude of about 11,500 ft, while traveling northwest toward the witnesses. The glider's exact speed and flightpath could not be determined based on wreckage location alone. As such, interpolation revealed that if the breakup had occurred while the glider was traveling at a speed between Va and Vne, the flightpath angle would have been between about 60° and 70° below the horizon. Between Vne and 200 kts, the flightpath angle would have been between 70° and 77° below the horizon.

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott
Additional Participating Persons:	Aaron Southerland; Federal Aviation Administration FSDO; Reno, NV
Original Publish Date:	March 4, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98207