Aviation Investigation Final Report

Location:	Oshkosh, Wisconsin	**Accident Number:**	CEN23FA333
Date & Time:	July 29, 2023, 12:27 Local	**Registration:**	N193AZ (A1); N221EL (A2)
Aircraft:	Rotorway 162F (A1); ELA ECLIPSE 10 (A2)	**Aircraft Damage:**	Destroyed (A1); Destroyed (A2)
Defining Event:	Midair collision	**Injuries:**	2 Fatal (A1); 2 Serious (A2)
Flight Conducted Under:	Part 91: General aviation - Personal (A1); Part 91: General aviation - Personal (A2)		

Analysis

A gyroplane and helicopter collided midair while maneuvering for landing in day visual meteorological conditions. The aircraft were participating in a fly-in event that provided daily pilot briefings on flight operations and procedures. During the briefings, event coordinators informed pilots that 360° turns in the traffic pattern were prohibited.

Flight track information, witness statements, videos, and damage to the aircraft indicated that the gyroplane impacted the left side of the helicopter while performing a prohibited 360° turn on the base leg of the visual approach. The helicopter impacted terrain, came to rest inverted, and a postaccident fire ensued. The gyroplane impacted an unoccupied airplane. The gyroplane pilot had no recollection of the accident flight.

Postaccident examinations of both aircraft revealed no evidence of mechanical malfunctions or failures that would have precluded normal operations. The circumstances of the accident are consistent with the failure of the gyroplane pilot to see and avoid the helicopter while performing a prohibited maneuver in the traffic pattern, resulting in a collision with the helicopter.

Probable Cause and Findings

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

The failure of the gyroplane pilot to see and avoid the helicopter while maneuvering in the traffic pattern. Contributing to the accident was the gyroplane pilot's performance of a prohibited maneuver in the traffic pattern.

Findings

Personnel issues (A1)	Visual function - Pilot
Personnel issues (A2)	Knowledge of procedures - Pilot
Personnel issues (A2)	Decision making/judgment - Pilot
Personnel issues (A2)	Incorrect action performance - Pilot
Personnel issues (A2)	Monitoring other aircraft - Pilot

Factual Information

History of Flight

Approach (A1)	Midair collision (Defining event)
Maneuvering (A2)	Midair collision

On July 29, 2023, about 1227 central daylight time (CDT), a Rotorway 162F helicopter, N193AZ, and an ELA Eclipse 10 gyroplane, N221EL, were involved in a midair collision near Oshkosh, Wisconsin. The helicopter was destroyed, and the pilot and passenger were fatally injured. The gyroplane was destroyed, and the pilot and passenger received serious injuries. Both aircraft were operated as Title 14 *Code of Federal Regulations* Part 91 personal flights.

On the morning of the accident, both pilots attended an Experimental Aircraft Association (EAA) AirVenture Oshkosh Ultralight/Homebuilt fun fly zone (FFZ) daily rotorcraft briefing. A witness, who attended multiple daily rotorcraft briefings, reported that the briefings contained concerns from other pilots related to gyroplane operations. The gyroplane pilots were told by event coordinators, in part, to stop performing 360° turns and spirals while in the traffic pattern. In addition, coordinators repeated their daily request for pilots to communicate their intentions in the traffic pattern.

According to onboard GPS and Automatic Dependent Surveillance-Broadcast (ADS-B) data, the gyroplane departed Wittman Regional Airport (OSH), Oshkosh, Wisconsin, runway 36, traveled to the south, west, and back to the north to enter the ultralight/homebuilt rotorcraft runway traffic pattern near the intersection of Highway 26 and County Road N. According to ADS-B data and an onboard GoPro video camera, the helicopter departed the designated rotorcraft takeoff and landing zone, which was located to the west of the ultralight/homebuilt runway and began a left circuit in the rotorcraft short traffic pattern.

About 35 seconds before the collision, the rear seat passenger in the gyroplane began taking a video with his cellular phone camera. At this time, the gyroplane was on the base leg from the south and began a 360° left turn. The helicopter, which was positioned behind the gyroplane in the traffic pattern, was also approaching the runway on the base leg from the south, following the north/south paved road (see figure 1).

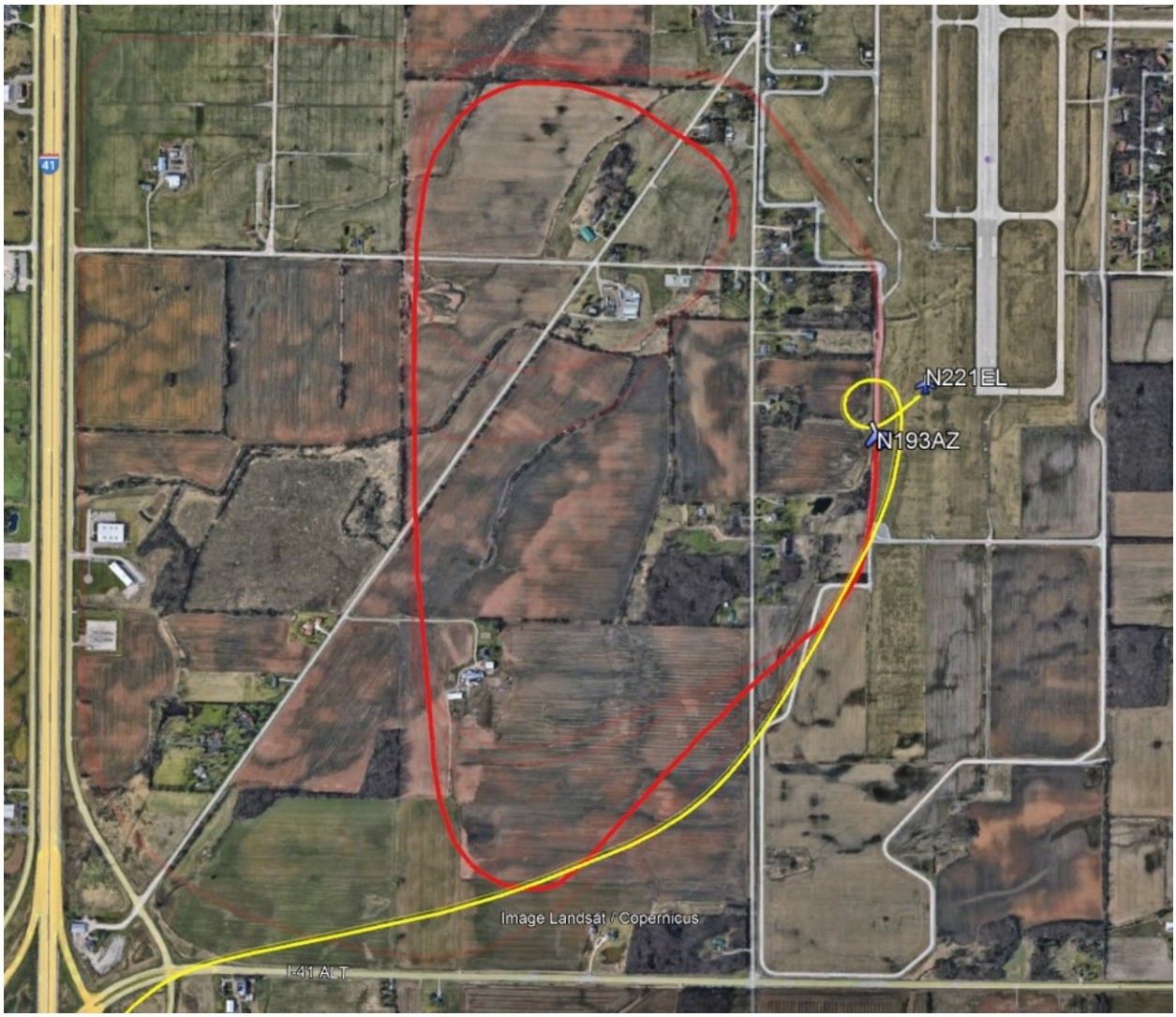

Figure 1. Flight tracks of the helicopter (red) and gyroplane (yellow).

The GoPro video showed that the helicopter's right-seat occupant flinched as the undercarriage and right side of the gyroplane, crossing from the left to the right in a left bank, are first visible though the helicopter windscreen. Three tenths of a second later, there was a sound of impact. At the time of the impact, the helicopter was at zero roll angle, the flight instruments indicated the helicopter was about 225 ft above ground level in a 200 ft-per-minute descent at an indicated airspeed of 77 mph, and the engine instruments were in the green range.

A witness reported that he observed two helicopters that were in front of the accident gyroplane; one helicopter was on the base leg to final approach, and one helicopter was on final approach. He reported that the accident gyroplane "made a hard 180° turn in the pattern, on a base leg over the trees, to what [he] thought was a go around for spacing." The witness did not observe the collision between the gyroplane and helicopter, but heard a loud bang, and then noticed aircraft debris falling to the ground.

Both aircraft descended in a near-vertical attitude with debris separating from both aircraft. The helicopter impacted terrain, came to rest inverted, and a postaccident fire ensued (see figure 2). The gyroplane impacted an unoccupied airplane that was parked between the north/south paved road and runway 36L (see figure 3). No ground injuries were reported.

Figure 2. Helicopter as it came to rest

Figure 3. Gyroplane and unoccupied parked airplane

A review of the GPS data from the gyroplane revealed that, the day before the accident, the pilot had performed a 360° turn near the northwest end of the ultralight/homebuilt runway.

Pilot Information (A1)

Certificate:	Commercial; Flight instructor	**Age:**	69,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	Yes
Medical Certification:	BasicMed Without waivers/limitations	**Last FAA Medical Exam:**	August 30, 2021
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	February 23, 2022
Flight Time:	8000 hours (Total, all aircraft), 7900 hours (Total, this make and model), 7750 hours (Pilot In Command, all aircraft), 35 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Pilot-rated passenger Information (A1)

Certificate:	Student	**Age:**	72,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	BasicMed None	**Last FAA Medical Exam:**	May 26, 2023
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	122 hours (Total, all aircraft)		

Pilot Information (A2)

Certificate:	Sport Pilot	**Age:**	54,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	Gyroplane	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Sport pilot None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	June 17, 2023
Flight Time:	600 hours (Total, all aircraft), 500 hours (Total, this make and model)		

The helicopter pilot had attended and flown for several years at the EAA AirVenture Oshkosh FFZ. The pilot was described by fellow FFZ pilots as very respected among his peers, assisted in the daily pilot briefings, and was considered an air safety advisor to the flight operations.

The gyroplane pilot reported that, due to his injuries, he had no recollection of the accident flight. EAA AirVenture 2023 was the gyroplane pilot's first event in which he flew his gyroplane. The pilot had flown the accident gyroplane at the FFZ the day before the accident.

The gyroplane passenger, who was seated in the rear seat, reported that he had not previously met the pilot before the flight, and he was a passenger for a demonstration flight. The passenger was provided a headset for the flight and could communicate with the pilot via the headset. He reported that, while coming into land, the pilot performed "an impressive tight left turn." He was not aware of the reason for the left turn.

Aircraft and Owner/Operator Information (A1)

Aircraft Make:	Rotorway	**Registration:**	N193AZ
Model/Series:	162F	**Aircraft Category:**	Helicopter
Year of Manufacture:	2012	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	6538
Landing Gear Type:	None; Skid	**Seats:**	2
Date/Type of Last Inspection:	April 1, 2023 Condition	**Certified Max Gross Wt.:**	1500 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	159.6 Hrs at time of accident	**Engine Manufacturer:**	ROTORWAY
ELT:	Not installed	**Engine Model/Series:**	RI 162F
Registered Owner:	On file	**Rated Power:**	150 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Aircraft and Owner/Operator Information (A2)

Aircraft Make:	ELA ECLIPSE	**Registration:**	N221EL
Model/Series:	10	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	04175281014
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	November 9, 2022 Condition	**Certified Max Gross Wt.:**	1168 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	218 Hrs at time of accident	**Engine Manufacturer:**	Rotax
ELT:	Not installed	**Engine Model/Series:**	914UL
Registered Owner:	On file	**Rated Power:**	115 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KOSH,785 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	10:53 Local	**Direction from Accident Site:**	11°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.08 inches Hg	**Temperature/Dew Point:**	24°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Oshkosh, WI (A1); Oshkosh, WI (A2)	**Type of Flight Plan Filed:**	None (A1); None (A2)
Destination:	Oshkosh, WI (A1); Oshkosh, WI (A2)	**Type of Clearance:**	None (A1); None (A2)
Departure Time:		**Type of Airspace:**	Class D (A1); Class D (A2)

Airport Information

Airport:	WITTMAN RGNL OSH	**Runway Surface Type:**	
Airport Elevation:	808 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information (A1)

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	On-ground
Total Injuries:	2 Fatal	**Latitude, Longitude:**	43.963719,-88.559711(est)

Wreckage and Impact Information (A2)

Crew Injuries:	1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Serious	**Latitude, Longitude:**	43.963719,-88.559711(est)

Postaccident examination of the helicopter revealed that both outboard sections of the main rotor blades were separated and came to rest in the debris field (see figure 4). The main rotor blade's structure displayed impact marks and white paint transfers, consistent with the gyroplane's structure and paint color.

The gyroplane's right horizontal and vertical stabilizers displayed shear cuts and separated structure consistent with helicopter main rotor blade contact (see figure 5). The gyroplane's main rotor mast was separated about mid-length with an impact signature consistent with the helicopter's main rotor blade (see figure 6).

Examination of both aircraft revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation.

Figure 4. Separated outboard sections of the helicopter's main rotor blades.

Figure 5. The upper photograph depicts the gyroplane's separated right horizontal stabilizer and lower vertical stabilizer. The lower photograph depicts the separated stabilizer section in comparison with the helicopter main rotor blade contact witness marks and white paint transfer.

Figure 6. Gyroplane's separated rotor mast section and the helicopter's main rotor blade contact witness mark.

Flight recorders

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received video files from a GoPro camera that was recovered from the helicopter, and a cellular phone camera video that was obtained from the gyroplane passenger. The timing of the files was correlated with local time by using the time of the impact on each video and aligning that event with available GPS and ADS-B data that showed when the aircraft collided. The Vehicle Recorder Division provided a summary of the recorded content.

Medical and Pathological Information

An autopsy of the helicopter pilot was performed by the Walworth County Medical Examiner. The autopsy report was reviewed by the NTSB Investigator-In-Charge. According to the autopsy report, the cause of death was multiple blunt force injuries, and the manner of death was accident.

Toxicology testing performed at the FAA's Forensic Sciences Laboratory found salicylic acid, metoprolol, rosuvastatin, and valsartan in the pilot's blood and liver. Salicylic acid is a metabolite of aspirin and used to treat minor pain and as an antiplatelet medication to prevent blood clots. Metoprolol is a beta blockage prescription medication that is used to treat high blood pressure and to prevent heart attacks in patients with coronary artery disease. Rosuvastatin is a prescription medication used to treat high cholesterol. Valsartan is a prescription medication used to treat high blood pressure. None of these medications are known to adversely affect performance.

Additional Information

The EAA AirVenture Oshkosh FFZ provides flight operations opportunities for powered parachutes, ultralight and light airplanes, and rotorcraft during the mornings and evenings of the EAA AirVenture Oshkosh fly-in event. The operations are typically conducted at the designated ultralight/homebuilt rotorcraft runway and rotorcraft landing zone. Flight operations are divided into separate time periods to allow similar performance aircraft in the traffic pattern at the same time. Pilot briefings for each type of flight operation were

conducted each morning of the event and were required attendance for piloting an aircraft at the FFZ.

During the morning rotorcraft briefings, an information sheet was provided to the attendees that included information related to flight operations and emergencies. In reference to potential traffic congestion while in the traffic pattern, pilots were verbally briefed not to perform a 360° turn for spacing, but to execute a side-step maneuver and perform another traffic pattern circuit. In addition, pilots were verbally briefed and provided a visual map on a short traffic pattern that would be communicated and implemented by the flight operations air boss. The decision to transition from the longer traffic pattern to the shorter traffic pattern during the rotorcraft flight operation's time period was at the discretion of the air boss. For aircraft equipped with a radio, pilots would typically announce their position in relation to certain landmarks, and their intention to conduct either a low pass, high pass, or full-stop landing.

Following the accident, the EAA implemented the following changes to the procedures and operations at the FFZ:

- Standardized briefing for all types of FFZ operations
- Standardized traffic pattern for all types of FFZ operations with exception of the powered-parachutes group due to speed performance
- Standardized aircraft spotter locations for all types of FFZ operations
- Implemented and designated a sterile corridor for traffic on base leg over the north/south paved road
- Employed a 1-strike rule for anyone that does not conform to FFZ procedures and operations

Administrative Information

Investigator In Charge (IIC):	Sauer, Aaron
Additional Participating Persons:	Michael Brockel; FAA FSDO; Milwaukee, WI
Original Publish Date:	May 16, 2024
Last Revision Date:	July 9, 2024
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=192738

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.