Aviation Investigation Final Report

Location:	Franksville, Wisconsin	**Accident Number:**	CEN24LA012
Date & Time:	October 15, 2023, 09:00 Local	**Registration:**	N42VZ
Aircraft:	TVAP 4	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot of the experimental, amateur-built airplane stated that the airplane sustained a total loss of engine power during the departure climb. The pilot then performed a forced landing on a field near the departure end of the runway. During the landing, the airplane's landing gear dug into soft terrain resulting in a nose over of the airplane. The airplane sustained substantial damage to both wings.

Postaccident examination revealed the airplane was equipped with a supplemental ignition system. Two units of the supplemental system were installed with fuses that were not called for in the system installation instructions. One of the fuses was blown, which disabled one of the two units and did not allow for the airplane's magneto system to continue providing engine ignition, resulting in a total loss of engine power.

Probable Cause and Findings

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

The improper installation of the supplemental ignition system, which resulted in a total loss of engine power.

Findings

Aircraft	Ignition power supply - Incorrect service/maintenance
Aircraft	Ignition power supply - Failure
Personnel issues	Installation - Other

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Enroute-climb to cruise	Powerplant sys/comp malf/fail (Defining event)
Landing-landing roll	Nose over/nose down

On October 15, 2023, at 0900 central daylight time, a Zant TVAP-4, N42VZ, was involved in an accident near Franksville, Wisconsin. The airplane sustained substantial damage. The pilot was uninjured. The airplane was operated under Title 14 *Code of Federal Regulations* Part 91 as a personal flight.

The pilot, who was the airplane owner, stated that the airplane sustained a total loss of engine power while climbing through 200 ft above ground level. The pilot then performed a forced landing on a field near the departure end of the runway. During the landing, the airplane rolled for about 100 ft before the landing gear dug into soft terrain resulting in a nose over of the airplane. The airplane sustained substantial damage to both wings.

The airplane was equipped with a Generation 3 Ignition (G3i), which is an electronic ignition control system that is interfaced with the engine's magneto ignition system on homebuilt, experimental aircraft. The G3i system is comprised of a MSD Ignition Multiple Spark Discharge (Ignition Amplifier) unit and a G3i Ignition Interface unit. Each unit was installed with a 7.5-amp fuse; however, the G3i Installation Manual (Series-1 and Series-2) did not call for the installation of fuses for either unit.

The G3i Installation Manual stated, in part:

"The G3i module interfaces the aircraft magnetos with (MST) Multiple Sparking Technology ignition system. G3i compliments the synchronized firing event in all naturally aspirated and supercharged Lycoming & Continental engines. The MST amplifier discharges synchronized multiple sparks, which lasts for 20° of crankshaft rotation.

The G3i system operates by switching the magnetos from their typical normal state to the more versatile electronic MST ignition."
Postaccident examination of the airplane revealed that, with the airplane's electrical power and magneto systems on and the G3i system off, the engine's ignition system functioned normally. When the G3i system was turned on, the magneto system did not function. The 7.5-amp fuse installed for the MSD unit was blown.

The G3i Installation Manual stated *"NOTE: In flight loss of engine power or suspected G3i ignition system failure, Toggle off the power to the G3i ignition system to revert back to default magneto mode."* According to the Federal Aviation Administration Aviation Safety Inspector who conducted the postaccident examination of the airplane, the pilot was unaware of the G3i Installation Manual note since no aircraft build records were provided to him as the buyer of the airplane. The pilot stated to the National Transportation Safety Board Investigator-in-Charge that he did not toggle off the G3i system because he did not have time to diagnose the cause of the engine power loss. The pilot said that he did not have an engine-out checklist.

There was no G3i flight manual supplement/placard for emergency procedures relating to the failure of the G3i system, and such a supplement/placard was not required.

Pilot Information

Certificate:	Private	**Age:**	38,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	August 24, 2022
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 1, 2022
Flight Time:	(Estimated) 312 hours (Total, all aircraft), 60 hours (Total, this make and model), 278 hours (Pilot In Command, all aircraft), 69 hours (Last 90 days, all aircraft), 29 hours (Last 30 days, all aircraft), 0.3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	TVAP	**Registration:**	N42VZ
Model/Series:	4	**Aircraft Category:**	Airplane
Year of Manufacture:	2017	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	1080
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	February 22, 2023 Condition	**Certified Max Gross Wt.:**	2400 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	63.6 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-360-C1E6
Registered Owner:	On file	**Rated Power:**	200 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:	MKE,728 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	09:52 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:	Few / 5000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots / 24 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.08 inches Hg	**Temperature/Dew Point:**	11°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Franksville, WI	**Type of Flight Plan Filed:**	None
Destination:	Camp Douglas, WI (VOK)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	Cindy Guntly Memorial Airport 62C	**Runway Surface Type:**	Grass/turf
Airport Elevation:	784 ft msl	**Runway Surface Condition:**	Soft;Vegetation;Wet
Runway Used:	1	**IFR Approach:**	None
Runway Length/Width:	2381 ft / 70 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	42.811389,-88.094089(est)

Administrative Information

Investigator In Charge (IIC):	Gallo, Mitchell
Additional Participating Persons:	Michael Brockel; Federal Aviation Administration, Milwaukee FSDO; Milwaukee, WI
Original Publish Date:	May 14, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=193241