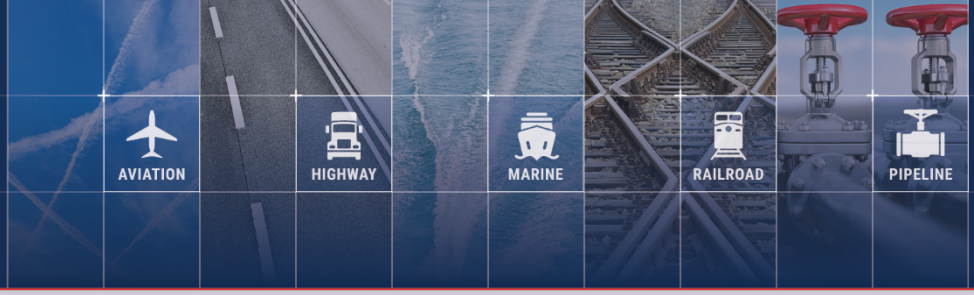

Aviation Investigation Final Report

Location:	Elgin, Arizona	**Accident Number:**	DCA23LA290
Date & Time:	May 15, 2023, 19:36 UTC	**Registration:**	N31EJ
Aircraft:	General Atomics MQ-9 BLOCK 1	**Aircraft Damage:**	Destroyed
Defining Event:	Collision with terr/obj (non-CFIT)	**Injuries:**	N/A
Flight Conducted Under:	Public aircraft		

Analysis

A General Atomics MQ9 Predator unmanned aerial system (UAS), operated by U.S. Customs and Border and Protection (CBP), registered as N31EJ, impacted terrain while returning to Sierra Vista Municipal Airport (FHU), Sierra Vista, Arizona. The flight was conducted as a non-military public aircraft operation under the provisions of Title 49 of the United States Code (U.S.C.) Sections 40102 and 40125, and a Federal Aviation Administration (FAA) Certificate of Authorization (COA). There were no injuries.

N31EJ departed from FHU to conduct a mission along the U.S - Mexico border. N31EJ was being operated by a Pilot-in-Command (PIC) and a Sensor Operator (SO). N31EJ flew an uneventful mission with no aircraft or operational anomalies. N31EJ began its transit back to Sierra Vista Municipal Airport (KFHU) and was handed off from approach control to the FHU tower, and N31EJ's instrument flight rules (IFR) clearance and radar services were terminated and was now proceeding on a visual flight rules (VFR) clearance. FHU tower cleared N31EJ to descend to 8000 feet mean sea level(ft-msl) altitude inside the Echo/Alpha sub-section on the west range of R-2303 special use airspace surrounding FHU. FHU Tower also cleared the flight to continue descent to pattern altitude of 5700 ft-msl. altitude at pilot discretion once they were ready to commence the approach from inside the Alpha/Echo airspace.

The PIC continued the descent while performing a series of left- and right-hand orbits. The PIC did this in order to maintain VFR conditions due to a scattered cloud layer at 9000 ft-msl. The spiraling descent was also performed to stay within the boundaries of the assigned airspace sub-section Alpha/Echo due to the size of the eastern and western boundaries and to ensure traffic deconfliction.

The final left orbit ended at 7000 ft-msl altitude at the northern most point of the orbit. The PIC then initiated a right-hand turn, completing one last 360 deg right hand orbit, descending through 7000 ft-msl. This series of manually flown orbits and turns while descending resulted in N31EJ's relative position moving to the northern portion of sub-section Echo airspace as the aircraft descended to FHU's pattern altitude of 5,700 ft-msl. N31EJ continued a descending right-hand turn through heading 040 towards the airport, with the intention of flying direct to the entry point for an Automated Takeoff and Landing Capability (ATLC) system landing at FHU.

During the right-hand turn towards the entry point for the ATLC system, the sensor operator stated that he observed and called out rising terrain that he observed on the right side of the video screen on the heads-up display (HUD) at his station. The PIC stated that he confirmed the proximity of the terrain, and initiated a left hand turn away from the terrain. The video feed then went black, and the last recorded data before the downlink was lost, indicated N31EJ at 5630 ft-msl altitude, a heading of 354 degrees, -415 feet per minute (fpm) rate of decent, 24.4 degrees angle of bank to the left, 103 knots indicated airspeed (kias)and a 122-knot ground speed. N31EJ impacted the ground about 9 miles northwest of the airport.

Examination of the impact site showed the landing gear initially contacted the terrain, and N31EJ continued moving forward, impacting a second hill where it was destroyed by impact forces. FHU tower was contacted to see if they had a visual on N31EJ and it was reported that they could see smoke on the north side of the mountains. N31EJ was completely destroyed by impact forces.

A review of flight data showed the PIC had entered an altitude command of 5700 ft-msl altitude into the autopilot, and during the orbits and maneuvering, N31EJ maintained a negative descent rate the entire final portion of the flight, despite entering an area of rising terrain in the Mustang mountains northwest of the airport. The descent rate varied between -500 and -1500 fpm during the final 30 seconds of the flight, as the flight entered a mountainous area of rising terrain. The rising terrain was noticed by the SO on their display, and once informed of the UAS's proximity to the terrain, the PIC was unable to maneuver N31EJ in time to avoid impact.

Probable Cause and Findings

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

The pilot's loss of situational awareness, resulting in the UAS's controlled flight into terrain.

Findings

Environmental issues	Mountainous/hilly terrain - Response/compensation

Factual Information

History of Flight

Enroute-descent	Collision with terr/obj (non-CFIT) (Defining event)

Information

Certificate:	**Age:**
Airplane Rating(s):	**Seat Occupied:**
Other Aircraft Rating(s):	**Restraint Used:**
Instrument Rating(s):	**Second Pilot Present:**
Instructor Rating(s):	**Toxicology Performed:**
Medical Certification:	**Last FAA Medical Exam:**
Occupational Pilot:	**Last Flight Review or Equivalent:**
Flight Time:	

Aircraft and Owner/Operator Information

Aircraft Make:	General Atomics	**Registration:**	N31EJ
Model/Series:	MQ-9 BLOCK 1 B	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	GA-6-1013
Landing Gear Type:	Retractable -	**Seats:**	0
Date/Type of Last Inspection:	May 10, 2023 100 hour	**Certified Max Gross Wt.:**	10500 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo prop
Airframe Total Time:	10416 Hrs at time of accident	**Engine Manufacturer:**	Honeywell
ELT:	Not installed	**Engine Model/Series:**	TPE331
Registered Owner:	Department of Homeland Security	**Rated Power:**	900 Horsepower
Operator:	US Customs and Border Protection	**Operating Certificate(s) Held:**	Certificate of authorization or waiver (COA), Other operator of large aircraft

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 8500 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	16.5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	128°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.26 inches Hg	**Temperature/Dew Point:**	26°C / 0°C
Precipitation and Obscuration:			
Departure Point:	Sierra Vista, AZ (KFHU)	**Type of Flight Plan Filed:**	
Destination:	Sierra Vista, AZ (KFHU)	**Type of Clearance:**	VFR;IFR
Departure Time:		**Type of Airspace:**	Restricted area

Wreckage and Impact Information

Crew Injuries:	N/A	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	N/A	**Latitude, Longitude:**	31.677333,-110.479

Administrative Information

Investigator In Charge (IIC):	Bower, Daniel
Additional Participating Persons:	Patrick Lusch; FAA
Original Publish Date:	July 18, 2024
Last Revision Date:	
Investigation Class:	Class 4
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=180444