



# Aviation Investigation Final Report

<b>Location:</b>	Overgaard, Arizona	<b>Accident Number:</b>	WPR19FA026
<b>Date &amp; Time:</b>	November 16, 2018, 15:46 Local	<b>Registration:</b>	N322JL
<b>Aircraft:</b>	Zenith CH601	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Controlled flight into terr/obj (CFIT)	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot and pilot-rated passenger were completing the second leg of a multileg flight. Flight data indicated that the final approach was below the glideslope for the runway and the airplane's airspeed was above the stall limit. During the approach, the airplane impacted a tall tree about 1,500 ft from the runway threshold, the roof of a house, and a second tree before coming to rest in a taxi area between houses. A postaccident examination of the airframe and engine revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation.

Although the pilot should have been familiar with the runway characteristics given that he had a hangar near the airpark and had flown into the airpark before, it is likely that the upsloping runway and paved surfaces before the displaced threshold gave the pilot the visual illusion that the airplane was at a higher altitude than it actually was and that the pilot thus flew a lower approach. Although a visual approach path indicator was positioned left of the runway threshold, the pilot likely did not monitor the indicator during the final approach.

## Probable Cause and Findings

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

The pilot's failure to monitor the airport's visual approach path indicator during the final approach to the upsloping runway, which resulted in a low approach path and impact with terrain.

## Findings

<b>Aircraft</b>	Descent/approach/glide path - Not attained/maintained
<b>Personnel issues</b>	Visual illusion/disorientation - Pilot
<b>Personnel issues</b>	Monitoring environment - Pilot
<b>Environmental issues</b>	Tree(s) - Effect on operation

## Factual Information

### History of Flight

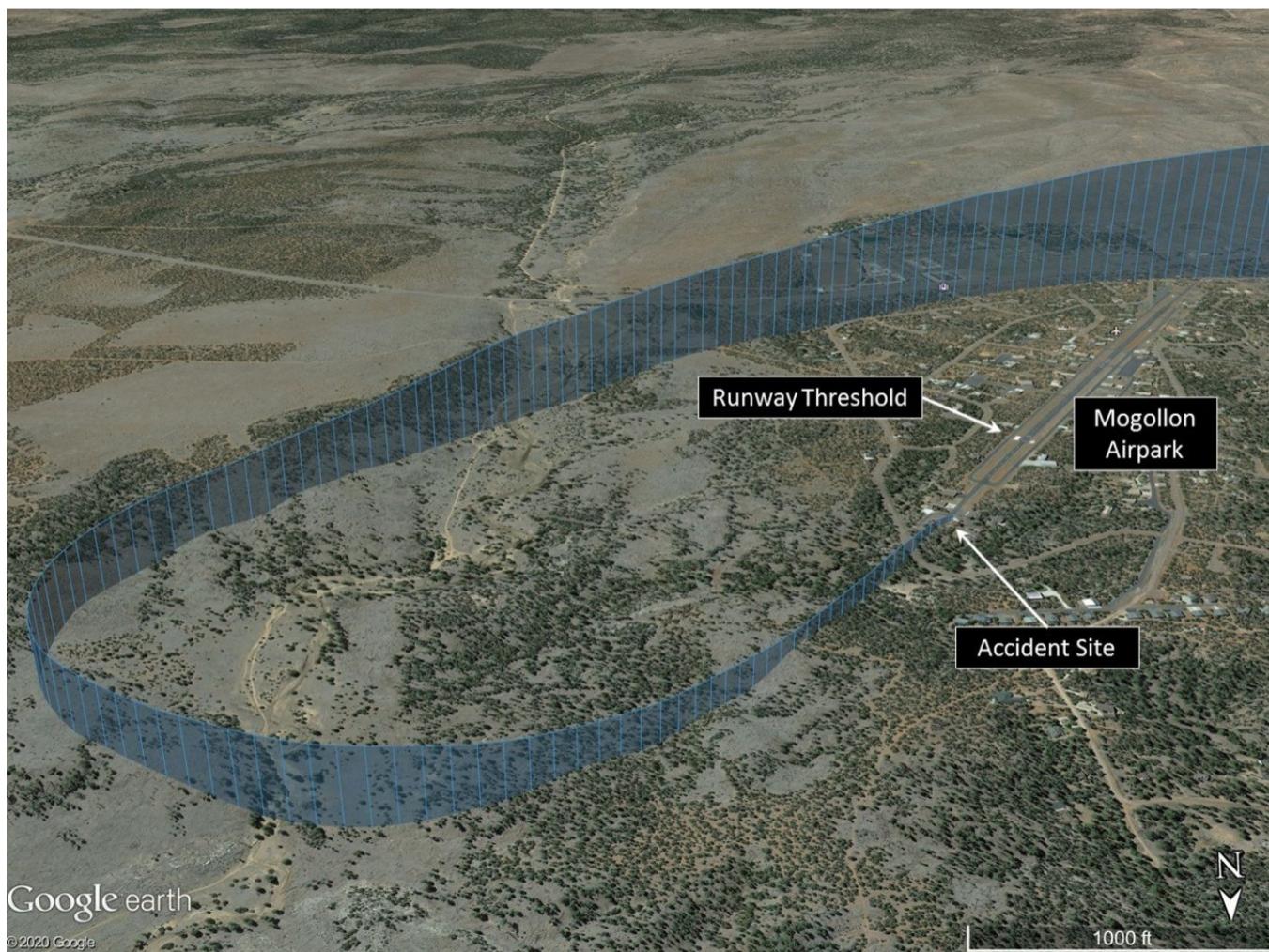
Approach-VFR pattern final	Controlled flight into terr/obj (CFIT) (Defining event)
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On November 16, 2018, about 1546 mountain standard time, an experimental, amateur-built Zenith Zodiac 601XL airplane, N322JL, was substantially damaged when it was involved in an accident near Overgaard, Arizona. The pilot and pilot-rated passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to a family member, the pilot and his son had planned a multileg flight from Fullerton Municipal Airport (FUL), Fullerton, California, to Orange Port, Florida. On the morning of the accident, they departed FUL and flew to Lake Havasu City Airport (HII), Lake Havasu City, Arizona. After landing at HII and refueling, they departed and were planning to stop at Mogollon Airpark (AZ82), Overgaard, Arizona, for the night, where the pilot owned a hangar. The family member stated that the pilot had flown into AZ82 in the past.

Flight data shows the airplane's turn onto the final approach to AZ82. (See figures 1 and 2.) While on runway heading, about 1/2 mile from the approach end of runway 21, the airplane was about 100 ft above ground level at an airspeed of about 62 kts. The remaining flight data showed the airplane track low, with airspeed increasing to about 70 kts. The last two targets of the flight track showed a slight right turn ending near the accident site.

Several witnesses in the area stated that they heard a loud thud or felt a vibration about the time of the accident. The wreckage was identified by nearby homeowners about 1 hour after the accident between residential hangars near the approach end of the runway.



**Figure 1-Flight track data and accident site location.**

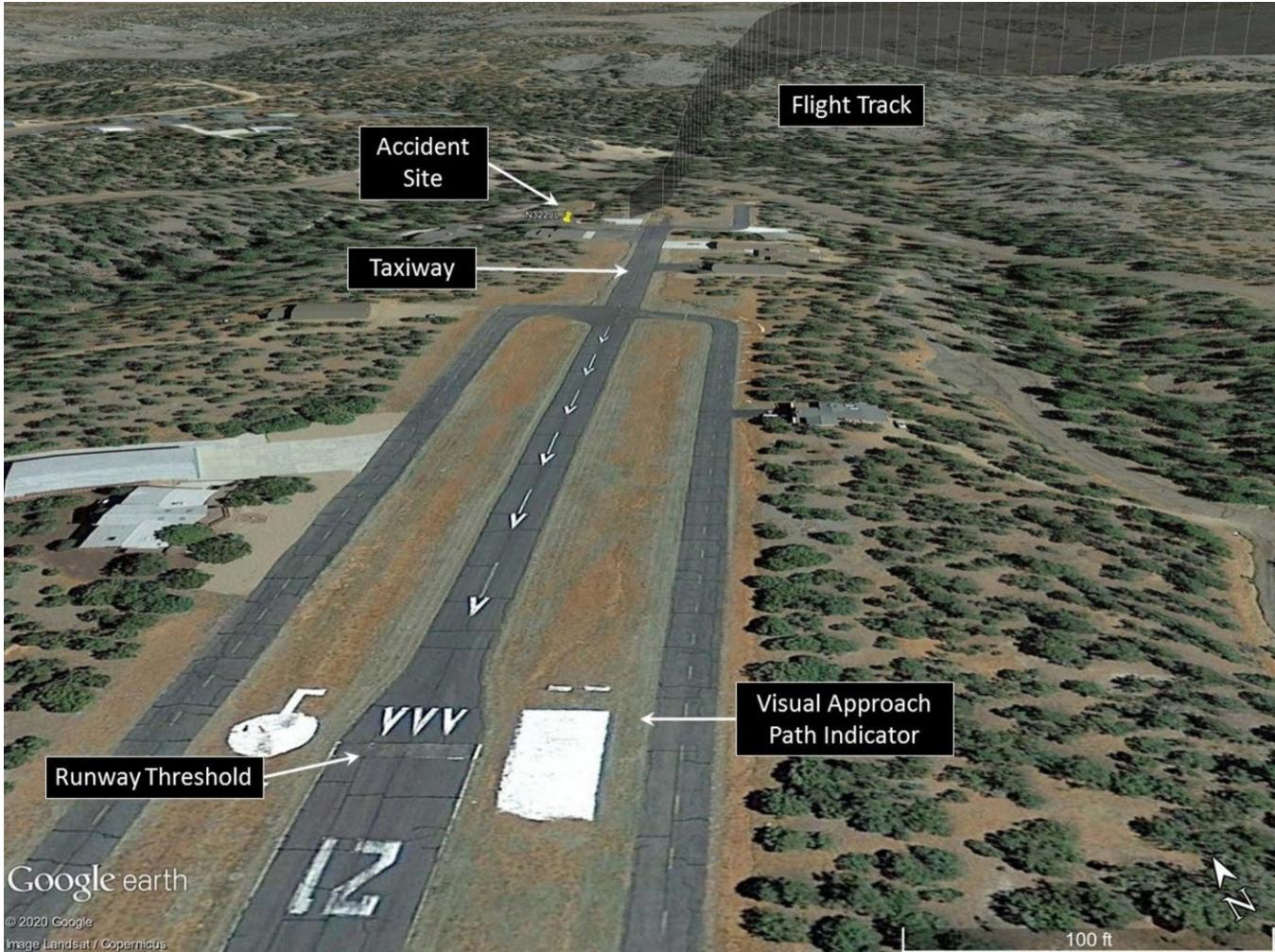


Figure 2-Runway approach end and flight track data.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	82, Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Unmanned (sUAS)	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 None	<b>Last FAA Medical Exam:</b>	December 17, 2002
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	1490 hours (Total, all aircraft), 36 hours (Last 90 days, all aircraft)		

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	52,Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 None	<b>Last FAA Medical Exam:</b>	June 10, 1994
<b>Occupational Pilot:</b>	UNK	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	0 hours (Total, all aircraft), 0 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Zenith	<b>Registration:</b>	N322JL
<b>Model/Series:</b>	CH601 XL	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2011	<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	5957
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>		<b>Certified Max Gross Wt.:</b>	1320 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>		<b>Engine Manufacturer:</b>	Jabiru
<b>ELT:</b>	C91 installed, not activated	<b>Engine Model/Series:</b>	3300
<b>Registered Owner:</b>		<b>Rated Power:</b>	
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	None

The airplane is a kit airplane series, optimized for sport-pilot and light-sport categories. The airplane's published stall speed with the flaps down is about 38 kts (44 mph) and its optimum published best glide speed is about 65 kts (74 mph).

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KSOW, 6411 ft msl	<b>Distance from Accident Site:</b>	27 Nautical Miles
<b>Observation Time:</b>	22:35 Local	<b>Direction from Accident Site:</b>	108°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	10 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	210°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	30.12 inches Hg	<b>Temperature/Dew Point:</b>	13°C / -18°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Lake Havasu City, AZ (HII )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Overgaard, AZ (AZ82)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class G

A privately owned weather station near the approach end of runway 21 recorded peak wind at 6 kts from the south about the time of the accident.

## Airport Information

<b>Airport:</b>	Mogollon Airpark AZ82	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	6657 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	21	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	3420 ft / 50 ft	<b>VFR Approach/Landing:</b>	Traffic pattern

AZ82 is a non-public privately-owned airpark. According to the airpark operating guidelines, runway 21 has a significant upslope from both ends and peaks near the middle; there is no line of sight between the runway ends from the surface. The runway has a 746-ft displaced threshold downsloping from the runway. A taxiway extends from the displaced threshold another 500 ft, also downsloping, in the same direction as the runway.

At the time of the accident, a visual approach path indicator (VAPI) was available for a 3° slope approach, positioned left of the runway 21 threshold. (See figure 2) The VAPI consisted of three large panels facing the final approach path. The two outside panels were positioned higher than the center panel, which was positioned behind and low to the ground. A light-colored background was used to help with visual clarity. During an approach, when the panels were aligned across, the airplane would have

been on a 3° glideslope to runway 21. After the accident, the VAPI was removed from the airpark for unknown reasons and was not replaced.

## **Wreckage and Impact Information**

<b>Crew Injuries:</b>	2 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	34.405834,-110.52416(est)

Examination of the accident site revealed the first identified point of contact (FIPC) was the top of an 80-ft-tall tree on the direct centerline view of runway 21 and about 1,500 ft from the runway threshold. A broken tree limb and a wingtip light assembly were found near the FIPC. About 226 ft from the FIPC, a wing impact mark and cuts consistent with rotating propeller blades were found on the roof of a house. (See figures 3 and 4). A propeller blade was found in several sections about 170 ft from the house. The airplane then impacted a second tree before impacting the ground in the taxi area between house. The empennage separated from the main wreckage and remained lodged in the second tree about 20 ft above the ground. The main wreckage was found inverted with leading-edge impact damage to the right wing and buckling to both wings. The fuselage was twisted, and the engine remained partially attached. Fuel was drained from the right wing during the recovery of the wreckage.

A postaccident examination of the airframe and engine revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation.



Figure 3-Right wing impact marks and runway location.



**Figure 4-Propeller strike marks and main wreckage.**

## **Additional Information**

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The Federal Aviation Administration *Pilot's Handbook of Aeronautical Knowledge* (FAA-H-8083-25B), chapter 17, Aeromedical Factors, indicates the following:

*An upsloping runway, upsloping terrain, or both can create an illusion that the aircraft is at a higher altitude than it actually is.... (See Figure 5) The pilot who does not recognize this illusion will fly a lower approach. Downsloping runways and downsloping approach terrain can have the opposite effect.*

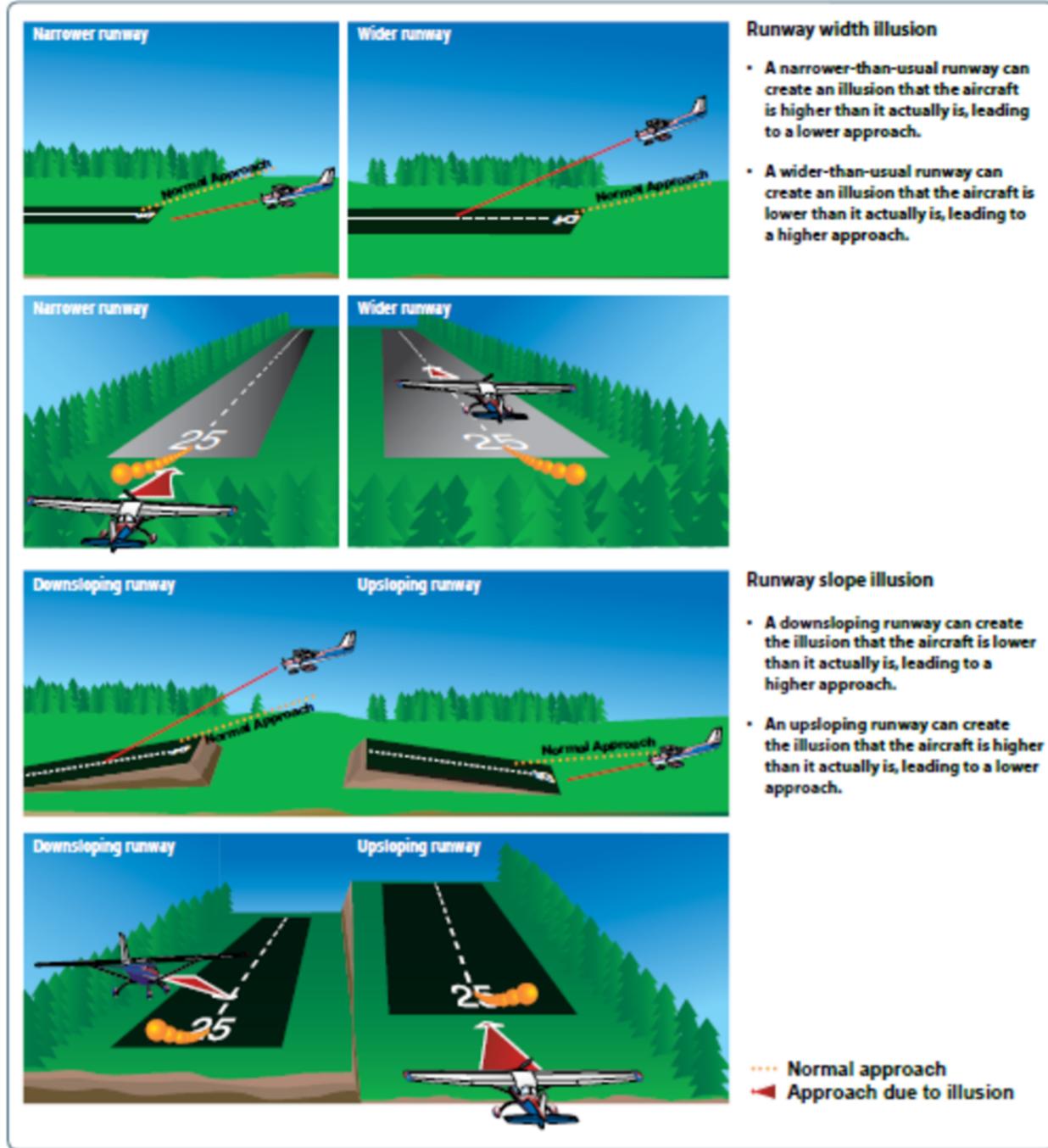


Figure 5-FAA Airplane Flying handbook figure.

## Tests and Research

During the investigation, three low approaches were flown into AZ82 to mimic the accident flight. The VAPI was visible to the left of the runway threshold.

An airplane performance study was conducted and revealed that the airplane initially intercepted the runway heading slightly above the 3° glide slope. It then increased its rate of descent and descended below the 3° glide slope. About 3,000 ft from the displaced threshold the airplane arrested its descent but did not regain the 3° glide slope before again descending. The final ADS-B return was 1,200 ft from the displaced threshold and approximately level with it.

During the final descent the airplane gained speed from 60 kts of calibrated airspeed to over 72 kts. The airplane's stall speed was reported to be about 38 kts (44 mph)<sup>1</sup> [1]. Its reported best glide speed is about 52 kts (60 mph). The airplane was faster than the recommended glide speed throughout the final approach.

## Administrative Information

**Investigator In Charge (IIC):** Swick, Andrew

**Additional Participating Persons:** Pete Kelley; FAA-FSDO; Scottsdale, AZ

**Original Publish Date:** May 27, 2021 **Investigation Class:** 2

**Note:** The NTSB traveled to the scene of this accident.

**Investigation Docket:** <https://data.ntsb.gov/Docket?ProjectID=98647>

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