



# Aviation Investigation Final Report

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<b>Location:</b>	San Diego, California	<b>Accident Number:</b>	WPR22LA344
<b>Date &amp; Time:</b>	September 9, 2022, 13:14 Local	<b>Registration:</b>	N26FN
<b>Aircraft:</b>	GATES LEAR JET CORP. 36	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Runway excursion	<b>Injuries:</b>	2 Minor
<b>Flight Conducted Under:</b>	Public aircraft		

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## Analysis

The flight crew was supporting a United States Navy (USN) training mission and ended the flight early due to icing conditions. The flight crew calculated a landing reference speed ( $V_{ref}$ ) of 140 knots (kts) indicated airspeed (KIAS) and landing distance required of 4,200 ft for a wet runway and a flap setting of 20°. Due to underwing-mounted external storage, the landing flaps were limited to a maximum extension of 20°. The flight crew configured the airplane with 20° flaps and reported that the airplane touched down at 140 kts. Although the runway was 8,001 ft long, an arresting cable was located 1,701 ft from the runway threshold, resulting in a runway distance available of about 6,300 ft.

After landing, the second in command (SIC) reported that the pilot-in-command (PIC) deployed the spoilers and brakes, then announced that the airplane was not slowing down. The PIC stated that the airplane did not decelerate normally, that the brake anti-skid system was active, and that the airplane seemed to be hydroplaning. He cycled the brakes, which had no effect. The airplane subsequently overran the departure end of the runway, breached an ocean sea wall and came to rest in a nose-down attitude on a sandbar.

The airport weather observation system recorded that 0.06 inches of liquid equivalent precipitation fell between 18 and 9 minutes before the accident. In the 4 hours before the accident, the airport received 0.31 inches of liquid equivalent precipitation.

A landing performance study conducted by the airplane manufacturer modeled a variety of landing scenarios considered during the investigation. The modeling used factual information provided by the investigation, including ADS-B data, as well as manufacturer-provided airplane performance data specific to the airplane. The study considered the effect on landing distance of both a wet and dry runway, a contaminated runway, both full and intermittent hydroplaning,

a localized tailwind (which was not present in the weather data), and an inboard brake failure. The study showed that the most likely scenario, based on the available data, was that the airplane touched down with a ground speed well in excess of the 140 kts Vref speed reported by the crew, and that subsequent to the touchdown encountered full hydroplaning at speeds above 104 kts.

The airplane sat overnight on the sandbar and was submerged in saltwater before the airplane was recovered. As a result, the airplane's braking system could not be functionally tested. However, the physical evidence from the brakes as found postaccident, combined with the results of the landing distance modeling, did not indicate that a brake failure occurred. Similarly, ADS-B data did not support the presence of a localized tailwind when such a landing was modeled in the study. Thus, it's likely that the flight crew landed too fast and then encountered hydroplaning during the landing roll as a result of a recent heavy rain shower, which diminished the calculated stopping distance.

## Probable Cause and Findings

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

The flight crew's fast landing on a wet runway, which resulted in the airplane hydroplaning during the landing roll and subsequently overrunning the runway.

### Findings

<b>Aircraft</b>	Surface speed/braking - Attain/maintain not possible
<b>Environmental issues</b>	Rain - Effect on equipment
<b>Environmental issues</b>	Wet surface - Effect on equipment

## Factual Information

### History of Flight

Landing-landing roll	Runway excursion (Defining event)
Landing-landing roll	Abnormal runway contact

On September 9, 2022, at 1314 Pacific daylight time, a Gates Lear Jet Corp. 36, N26FN, was substantially damaged when it was involved in an accident near San Diego, California. The two pilots sustained minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* public use flight.

The flight crew reported that the flight originated from North Island Naval Air Station (Halsey Field) Airport (NZY), San Diego, California, to support United States Navy training off the coast of San Diego. The flight was conducted as briefed with no abnormalities; however, the flight was ended early due to icing conditions.

During the return flight to NZY, the crew planned for an instrument approach. Air traffic control advised that the airport was reporting VFR and that a visual approach was available if the flight crew had the airport in sight. The flight crew noted a staggered cloud base and maneuvered to maintain visual contact with the airport. The pilot in command (PIC) reported that the tower did not provide the flight crew with updated wind information, and he assumed that the wind was calm, as it had been when the flight departed.

The flight crew calculated  $V_{ref}$  (reference speed) as 140 knots indicated airspeed (KIAS) for the landing weight of 14,900 lbs with 20° of flaps. Due to underwing-mounted external storage, the landing flaps were limited to a maximum extension of 20°. The calculated landing distance was approximately 4,200 ft and included factors for 20° flaps and wet runway conditions. Runway 36 at NZY was 8,001 ft long; however, an arresting gear was located within the first portion of the runway (about 1,700 ft from the threshold).

The PIC, who was the pilot flying, reported that the approach speed and altitude were nominal, and that the airplane touched down within about 200 ft of the arresting gear as planned. The SIC reported that the PIC deployed the spoilers and brakes, then announced that the airplane was not slowing down. The PIC stated that the airplane did not decelerate normally, that the brake anti-skid system was active, and that the airplane seemed to be hydroplaning. He cycled the brakes, which had no effect. At the 1,000 ft remaining sign, the SIC called out, "100 knots." The PIC stated that insufficient runway remained on which to stop, and the airplane overran the runway and continued over the sea wall. After the airplane came to rest, the flight crew assessed their injuries and the "aircraft switches were secured, and the engines were shut down."

According to the flight crew, the automated terminal information service (ATIS) at the airport and the tower controller did not report standing water on the runway, nor did the pilots observe any.

Recorded ADS-B data showed that while on final approach to the runway, about 1,600 ft from the approach end runway, the airplane had a ground speed of 182 knots, at an altitude of 116 ft mean sea level (msl). The airplane had slowed to about 175 knots about 120 ft from the approach end of the runway, about 50 ft above ground level. The data showed that the airplane's approximate touchdown point was near the arresting cable which was located about 1,700 ft from the approach end of the runway at a ground speed of about 171 knots. The data showed that about 38 seconds after the approximate touchdown, the airplane overran the end of the runway at a ground speed of 63 knots.

Postaccident examination revealed that the airplane had exited the departure end of the runway, breached the sea wall barrier, and came to rest about 460 ft from the end of the runway overrun. The airplane remained intact with the nose cone crushed and pushed aft, which also crushed the forward pressure bulkhead. Prior to recovery, the airplane was submerged in salt water overnight, and water entered the cockpit and cabin areas. As a result of the saltwater immersion, the airplane's braking system was not functionally tested. Flat spots on both the left and right tires were identified.

#### METEOROLOGICAL INFORMATION

At 1255, the National Weather Service's Aviation Weather Center issued a convective SIGMET that was active for the accident location and valid until 1455. The SIGMET advised an area of embedded thunderstorms associated with Tropical Storm Kay.

The ASOS located on the airport reported that, about 9 minutes before the accident, the wind was from 200° at 6 knots, visibility 2 1/2 statute miles, heavy rain, mist, broken ceiling at 3,300 ft above ground level (agl), a broken cloud layer at 4,500 ft agl, overcast clouds at 5,500 ft agl, temperature 25° Celsius (C), dewpoint 23°C, and altimeter setting of 29.51 inches of mercury. The ASOS remarks included that 0.06 inches of liquid equivalent precipitation fell since 1252. According to NZY system reports, the airport received 0.31 inches of liquid equivalent precipitation between 0852 and 1305.

The Geostationary Operational Environmental Satellite (GOES)-17 data depicted cloudy conditions over the accident region.

A Terminal Aerodrome Forecast (TAF) issued for NZY and valid for the accident time, forecasted wind from 290° at 7 knots, visibility 5 miles, light rain, few clouds at 2,000 ft agl, scattered clouds at 5,000 ft agl, ceiling overcast at 10,000 ft agl, with frequent to moderate turbulence in clouds from 1,000 to 10,000 ft, and an altimeter setting of 29.47 inches of mercury. Also forecasted were temporary conditions of wind from 230° at 12 knots, visibility of 6,000 meters and moderate rain showers.

## TESTS AND RESEARCH

Two Honeywell Aerospace Digital Electronic Engine Controls (N1 DEECs) were installed on the airplane, one per engine.

Incident recorder and data fault history from both N1 DEECs were successfully extracted, with data showing that both engines were operating and responding to power lever inputs throughout the approach and accident sequence. About 30 seconds after touchdown, the Power Lever Angle (PLA) increased with corresponding appropriate response of N1 and N2 speeds, along with interstage turbine temperature (ITT). At the end of the downloaded data, a simultaneous fault between the left and right N1 DEECs was recorded and was consistent with an electrical power loss to both units.

A landing performance study conducted by the airplane manufacturer modeled a variety of landing scenarios considered during the investigation. The modeling used factual information provided by the investigation, including ADS-B data, as well as manufacturer-provided airplane performance data specific to the airplane. The study considered the effect on landing distance of both a wet and dry runway, a contaminated runway, both full and intermittent hydroplaning, a localized tailwind (which was not present in the weather data), and an inboard brake failure.

The modeling in the study “produced a profile consistent with the factual data when significant hydroplaning was assumed, likely due to the recent heavy rain and continued precipitation on the runway surface combined with a high aircraft ground speed. The model indicated that it was unlikely the high ground speed was due to a severe tailwind, and it also showed that all aircraft brakes were likely operational.” The model that best fit the available data showed that the airplane touched down with a ground speed well in excess of the 140 kts reported by the crew and that, subsequent to the touchdown, encountered full hydroplaning at speeds above 104 kts (See figure, below).

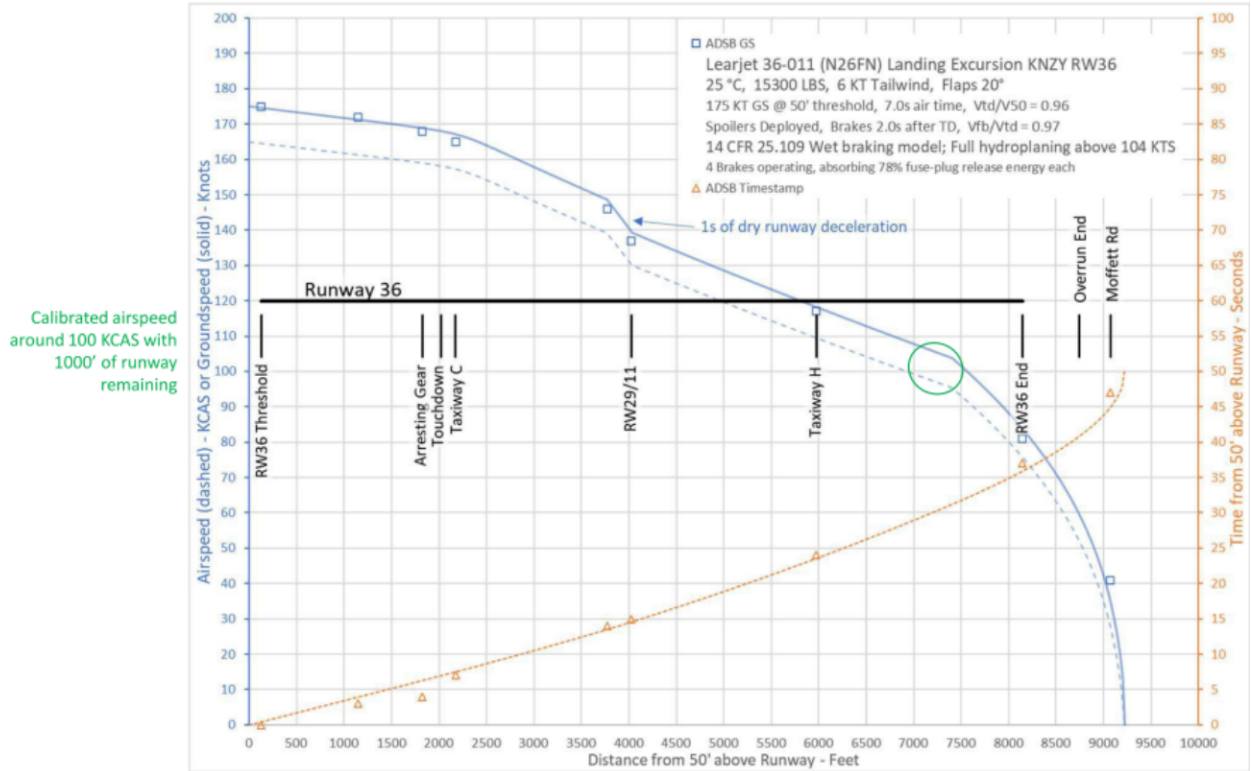


Figure plotting speed with landing distance along with runway features. Note the incorporated ADS-B data of groundspeed and time.

## Pilot Information

<b>Certificate:</b>	Airline transport	<b>Age:</b>	42, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 None	<b>Last FAA Medical Exam:</b>	March 24, 2022
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	July 27, 2022
<b>Flight Time:</b>	7200 hours (Total, all aircraft), 5250 hours (Total, this make and model), 5665 hours (Pilot In Command, all aircraft), 133 hours (Last 90 days, all aircraft), 46 hours (Last 30 days, all aircraft)		

## Co-pilot Information

<b>Certificate:</b>	Airline transport	<b>Age:</b>	66, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Unknown
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 2 None	<b>Last FAA Medical Exam:</b>	June 13, 2022
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	February 22, 2022
<b>Flight Time:</b>	18288 hours (Total, all aircraft), 165 hours (Total, this make and model), 12147 hours (Pilot In Command, all aircraft), 116 hours (Last 90 days, all aircraft), 21 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	GATES LEAR JET CORP.	<b>Registration:</b>	N26FN
<b>Model/Series:</b>	36	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1975	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal; Restricted (Special)	<b>Serial Number:</b>	011
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	3
<b>Date/Type of Last Inspection:</b>	May 3, 2022 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	15300 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Turbo fan
<b>Airframe Total Time:</b>	17024.1 Hrs at time of accident	<b>Engine Manufacturer:</b>	GARRETT
<b>ELT:</b>	C126 installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	TFE-731-2-2B
<b>Registered Owner:</b>	GH EQUIPMENT LLC	<b>Rated Power:</b>	3500 Lbs thrust
<b>Operator:</b>	Strategic Airborne Operations	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KNZY,14 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	13:05 Local	<b>Direction from Accident Site:</b>	157°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	2.5 miles
<b>Lowest Ceiling:</b>	Broken / 3300 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	6 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	200°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	29.51 inches Hg	<b>Temperature/Dew Point:</b>	25°C / 23°C
<b>Precipitation and Obscuration:</b>	Heavy - Showers - Rain		
<b>Departure Point:</b>	San Diego, CA	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	San Diego, CA	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class D

## Airport Information

<b>Airport:</b>	NORTH ISLAND NAS /HALSEY FLD/ NZY	<b>Runway Surface Type:</b>	Asphalt,Concrete
<b>Airport Elevation:</b>	25 ft msl	<b>Runway Surface Condition:</b>	Unknown
<b>Runway Used:</b>	36	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	8000 ft / 200 ft	<b>VFR Approach/Landing:</b>	Straight-in

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Minor	<b>Latitude, Longitude:</b>	32.698196,-117.21311(est)



## Administrative Information

<b>Investigator In Charge (IIC):</b>	Cornejo, Tealeye
<b>Additional Participating Persons:</b>	Oded Moore; Federal Aviation Administration; San Diego, CA Michael Lemay; Bombardier Aviation; Dorval, OF Jennifer McDuffie; Honeywell Aerospace; Phoenix, AZ David Lievanos; Aery Aviation; Newport News, VA
<b>Original Publish Date:</b>	October 3, 2024
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=105924">https://data.ntsb.gov/Docket?ProjectID=105924</a>

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](#).