



# Aviation Investigation Factual Report

<b>Location:</b>	Camarillo, California	<b>Accident Number:</b>	WPR12LA081
<b>Date &amp; Time:</b>	January 24, 2012, 15:52 Local	<b>Registration:</b>	F-WNXT
<b>Aircraft:</b>	MAS EVENTS NEMESIS	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Flight test		

On January 24, 2012, at 1552 Pacific standard time, an experimental amateur-built Nemesis NXT, French registration F-WNXT, sustained substantial damage during a forced landing near Camarillo Airport, Camarillo, California, following a partial loss of engine power. The airplane was registered to Dopic, Paris, France, and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91, as a performance evaluation flight. The airline transport pilot sustained minor injuries. The local flight departed Camarillo at 1430. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot reported that he departed in the airplane with the intention of ascertaining its fuel consumption and performance parameters in preparation for a transcontinental speed record attempt. He planned on flying for 3 hours, and had serviced the airplane to capacity with Jet-A fuel 2 days prior.

The first hour of the flight was uneventful, with the pilot reporting that all engine parameters were normal. A short time later, at an altitude of 18,000 feet mean sea level (msl), he began to feel a vibration in the airframe. He initially attributed the vibration to the propeller, and reduced the manifold pressure to diagnose. The vibration continued, but with reduced intensity, and as such, he elected to return to Camarillo. The airplane was not able to maintain altitude, and he noted that the manifold pressure was now about 20 percent lower than during the cruise portion of the flight. During the descent, the engine monitoring system indicated a reduction in exhaust gas temperature for one of the engine cylinders.

The airplane reached Camarillo Airport while still at an altitude of about 6,000 feet, and began a circling descent. Once on the downwind leg for runway 26, the pilot lowered the landing gear lever, but the three green landing gear "down" lights did not illuminate. He then attempted to extend the landing gear using the emergency extension system, but still did not observe the down indication. He then contacted air traffic control tower personnel, and asked for a visual confirmation of the landing gear position. They reported that the landing gear was partially extended, and he subsequently began to initiate a go-around. He initiated a left crosswind turn, but was unable to maintain altitude. Concerned that he would not be able return to the airport, he elected to perform an off-field landing in an adjacent plowed field.

The airplane subsequently landed in the field, about 3,400 feet south of the approach end of runway 26. During the landing roll, the airplane struck a berm about 500 feet beyond the initial touchdown point. After striking the berm, the airplane rotated, separating both wings, the landing gear, and sections of the horizontal stabilizer. The fuselage came to rest on its left side in a manner that prevented the pilot from opening the canopy. The pilot turned off all of the airplane's systems, and pulled all the circuit breakers while waiting for rescue personnel. A witness subsequently arrived at the accident site a few minutes later, and assisted the pilot in exiting the airplane.

## Pilot Information

<b>Certificate:</b>	Airline transport; Foreign	<b>Age:</b>	42
<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>	4-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Airplane multi-engine; Airplane single-engine	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	March 2, 2010
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	March 1, 2010
<b>Flight Time:</b>	4015 hours (Total, all aircraft), 55 hours (Total, this make and model), 3900 hours (Pilot In Command, all aircraft), 60 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	MAS EVENTS	<b>Registration:</b>	F-WNXT
<b>Model/Series:</b>	NEMESIS NXT	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2010	<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	10
<b>Landing Gear Type:</b>	Retractable - Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	August 30, 2011 Annual	<b>Certified Max Gross Wt.:</b>	2755 lbs
<b>Time Since Last Inspection:</b>	25 Hrs	<b>Engines:</b>	Reciprocating
<b>Airframe Total Time:</b>	75 Hrs as of last inspection	<b>Engine Manufacturer:</b>	SMA
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	SR305-230
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	230 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

The airplane was transported to the United States from France in August 2011 to perform in the Reno Air Races as part of the Big Frog Pylon Racing Team. Upon arrival, it underwent a conditional inspection, and flew in the races. The airplane was subsequently flown to California, where Federal Aviation Administration (FAA) records indicate it was issued a non-US special flight authorization (SFA) on January 19, 2012, for the purpose of performing flight evaluations in preparation for the record attempt. The SFA was valid for 11 days, and required that the airplane be flown within a 40-mile radius of Camarillo Airport.

The airplane was equipped with a three-blade MT Propeller and a Societe de Motorisations

Aeronautiques (SMA) prototype engine based on the SR305-230-1, four-cylinder, turbocharged diesel series. Modifications included the installation of SR305-230E engine pistons, turbocharger, and intake and exhaust manifolds. Additionally, the fuel injection pump timing had been adjusted.

The engine was manufactured in 2010, and had accrued a total of 30 flight hours since its installation on the airframe in August 2011. At the time of the accident, the airframe had accumulated a total of 75 flight hours.

### Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	CMA, 77 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	15:55 Local	<b>Direction from Accident Site:</b>	75°
<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>	6 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	290°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.15 inches Hg	<b>Temperature/Dew Point:</b>	18°C / 7°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Camarillo, CA (CMA )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Camarillo, CA (CMA )	<b>Type of Clearance:</b>	VFR
<b>Departure Time:</b>	14:30 Local	<b>Type of Airspace:</b>	Class C

### Airport Information

<b>Airport:</b>	Camarillo Airport CMA	<b>Runway Surface Type:</b>	Asphalt; Concrete
<b>Airport Elevation:</b>	77 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	26	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	6013 ft / 150 ft	<b>VFR Approach/Landing:</b>	Forced landing

### Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor	<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>	1 Minor	<b>Latitude, Longitude:</b>	34.206111, -119.124443 (est)

## Tests and Research

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### Avionics

The airplane was equipped with an MGL Avionics Voyager EFIS (electronic flight instrument system). Performance data was extracted from the unit, and sent to the NTSB Office of Research and Engineering for analysis. The data included multiple position, speed, and acceleration parameters, along with recordings of the engines cylinder head (CHT) and turbocharger turbine inlet temperatures. Examination of the engine sensor wiring revealed that the CHT sensor wires for cylinders one and four had been transposed, such that the temperature of cylinder four was displayed on the EFIS as cylinder one. The data revealed that for the first 35 minutes of flight, all four cylinder heads remained at relatively constant and closely matched temperatures of between 175 and 200 degrees C. The temperature of cylinder head four then dropped by about 10 degrees, remaining there for the next 19 minutes. Shortly thereafter, the temperature for that cylinder began a more pronounced divergence, dropping to 60 degrees, where it remained for the remaining 12 minutes of the flight.

### Airframe Examination

An examination of the airframe by the NTSB investigator-in-charge (IIC) did not reveal any anomalies that would have precluded normal operation. The landing gear and underside of the airplane sustained extensive fragmentation damage, and the failure mode of the initial landing gear failure could not be determined.

### Engine Examination

The engine was removed from the airframe, and shipped to the facilities of SMA Engines in Grand Prairie, Texas, where it was examined by the IIC and a representative from SMA.

Examination revealed that the high pressure fuel injection line for cylinder number four was loose at the fuel injection pump fitting. The fitting nut was removed, and the swaged nipple had separated from the line.

The engine was further examined, and no other anomalies were noted that would have precluded normal operation. A full examination report is contained within the public docket.

### High Pressure Fuel Line Examination

Examination of the high pressure (HP) fuel lines revealed multiple areas where they had come in contact with the carbon fiber baffling material, electrical wires, braided pneumatic sensor lines, and control cables. Specifically, the air shutoff control cable had come to rest on top of the number four line about 8 inches forward of the fuel injection pump.

The HP fuel lines for number three and four were subsequently removed as a complete assembly, and chaffing was noted to the upper surface of line number four in the area adjacent to the air shutoff control cable. Additional contact marks were noted to the underside of both lines just forward of the fuel injection pump. The assembly was sent to the NTSB Office of Research and Engineering for analysis.

Examination revealed that the failed surface of the swaged tube exhibited relatively flat fracture features with curving crack arrest lines, consistent with fatigue. The fatigue origin areas were at nearly opposite sides of the tube, and spanned the fluid passage. The line was further examined in the area adjacent to the fracture for any evidence of contact with the fitting nut. Circumferential impressions were observed on the swaged end of the tube consistent with contact at the sealing surfaces, however, no evidence of contact between the line wall and the nut was observed.

A full examination report is contained within the public docket.

#### Maintenance Procedures

The SMA Engine Maintenance Manual TP230-EMM (December 01, 2011), applicable to the SR205-230 engine, documented acceptable methods for HP fuel line, wire harness, and electrical harness installations. The manual made the following cautions regarding HP line installation procedures:

"CAUTION: THE HP FUEL LINE MUST NOT BE DISTORTED OR STRAINED. IT MUST NOT RUB AGAINST OTHER ENGINE PARTS."

"Do not use HP fuel lines for any wire or cable attachment"

#### **Additional Information**

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Using the emergency landing gear extension system required that the pilot deactivate both a 5-amp and 20-amp electrical circuit breakers located in the center console of the instrument panel. The pilot stated that during his attempt to activate the system he recalled pulling both circuit breakers, however, after the accident he checked the smaller 20-amp breaker, and it was not in the open position. He surmised that the thickness of his gloves prevented him from being able to positively trip this circuit breaker during flight. He acknowledged that this was most likely the reason the emergency landing gear system failed to operate.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Simpson, Elliott
<b>Additional Participating Persons:</b>	David T Voelker; Federal Aviation Administration FSDO; Van Nuys, CA Charlie Rustin; BEA; Paris
<b>Report Date:</b>	November 4, 2013
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=82741">https://data.ntsb.gov/Docket?ProjectID=82741</a>

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