

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

November 6, 2012

17 - Engine Instrument

Specialist's Factual Report By Bill Tuccio

1 EVENT SUMMARY

Location: Nunica, Michigan
Date: September 17, 2011
Aircraft: North American AT-6
Registration: N217RK
NTSB Number: CEN11LA651

On September 17, 2011, about 1815 eastern daylight time, a North American AT-6, N217RK, sustained substantial damage when it impacted a tree and terrain after a loss of engine power during takeoff from runway 8 (3,600 feet by 100 feet, dry turf) at the Hat Field Airport (5N7), near Nunica, Michigan. The commercial pilot received serious injuries. The airplane, registered to Tailwinds Inc., was being operated under the provisions of the 14 Code of Federal Regulations Part 91. No flight plan was on file for the personal flight. Visual meteorological conditions prevailed at the time of the accident. The flight was originating at the time of the accident.

2 ENGINE INSTRUMENTS GROUP

An engine instruments group was not convened.

3 DETAILS OF ENGINE INSTRUMENTS INVESTIGATION

The Safety Board's Vehicle Recorder Division received the following engine instrument:

Recorder Manufacturer/Model: **Shadin Avionics Miniflo-L™ Fuel Flow Indicator**
Recorder Serial Number: **10749**

3.1 Shadin Avionics Miniflo-L™ Fuel Flow Indicator Description

The Shadin Avionics Miniflo-L™ is a digital fuel management system designed to provide fuel management information under real time flight conditions to the flight crew. The unit is connected to engine fuel flow transducers and can be connected to a Loran-C or GPS receiver serial port. The unit is also capable of transmitting fuel information to certain GPS receivers for additional calculations and display of fuel management data. The unit can display the following information to the crew:

- Fuel Flow per engine
- Fuel Used

- Fuel Remaining
- Fuel to Destination¹
- Fuel Reserve¹
- Specific Range¹
- Endurance

The unit does not interface with an aircraft's fuel quantity indicating system. The unit requires the flight crew to enter the initial fuel on board the aircraft. All calculations and data provided by the unit are based on fuel flow and any provided navigational information.

3.2 Shadin Avionics Miniflo-L™ Fuel Flow Indicator

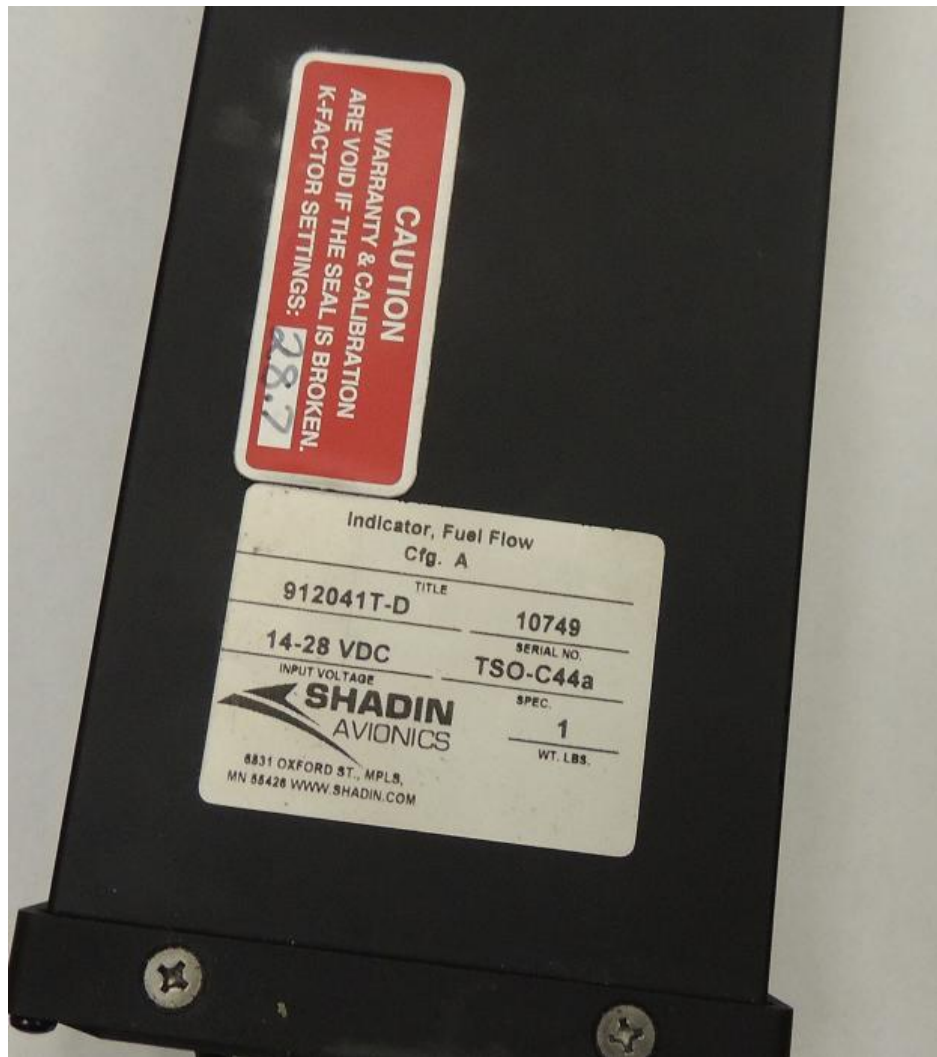
One Shadin Avionics Miniflo-L™ fuel flow indicator was received in good condition as shown in figure 1. Figure 2 shows the dataplate and calibration tag, with a k-factor value of "28.7."

Figure 1. Shadin Miniflo-L™ device.



¹ Real time calculation that requires an active Loran-C or GPS input.

Figure 2. Shadin Miniflo-L™ dataplate and calibration labels.



3.3 Shadin Avionics Miniflo-L™ Recorded Data

The unit contains non-volatile memory that retains setup information, fuel remaining and fuel used information, if power is removed from the unit.

4 RECOVERED DATA

The unit was inspected internally for damage prior to applying power only. The unit was not connected to any fuel flow sensors or GPS/Loran devices during the data recovery process. Using procedures described in the Shadin Avionics Miniflo-L™ operating manual, publication number OP91204E-Revision A, data was recovered by applying power to the unit and cycling through the displayed values. Upon applying power, the unit self test reported a value of “Good.” Table 1 contains recovered fuel and unit data.

Table 1 – Fuel and unit data

Data Description	Gal
Fuel Used	32.5
Fuel Remaining	77.1 ²
Full Fuel Setting	110.0
Unit SW Version	60.01.83
K-Factor	28.7

The unit was also configured to enable the inspection of the group 2 configuration settings³. Group 1 settings, in general, are set up by the distributor and contain information defined by the part number. Group 1 settings were not examined for this investigation.

Group 2 settings, in general, are set up by the user or installer to change Loran or GPS input and output parameters, warning type, and fuel flow filtering types. Table 2 contains the group 2 settings retrieved from the unit.

Table 2 – Group 2 Configuration Settings

Display	Value	Description
o	5	GPS/Output Type: Generic
l	1	GPS/Loran Input: On
d	0	Endurance Warning Time – 45 Minutes
F	1	Filter Type – Carburetor
u	0	With GPS, set to zero (0)
S	20.0	Low Fuel Level (gal)

The unit does not retain any information related to the four available rotary switch positions (nautical miles per gallon, gallons to destination, gallons reserve settings and endurance).

² Fuel remaining is calculated by the unit by subtracting fuel used from the initial starting fuel entered by the crew.

³ For further information on configuration settings refer to Shadin Avionics Miniflo-L™ operating manual for P/N: 91204XT-D, publication number OP91204E.