

# NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division  
Washington, D.C. 20594

November 20, 2012

## 17 – Electronic Devices Factual Report

Specialist's Factual Report  
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### 1. EVENT

Location: Chuckey, Tennessee  
Date: October 11, 2012  
Aircraft: Arion Lightning  
Registration: N290AL  
Operator: Private  
NTSB Number: ERA13FA017

On October 11, 2012, about 1350 eastern daylight time, an experimental amateur-built Arion Lightning, N290AL, operated by a private individual, was substantially damaged when it impacted the ground during takeoff from Hensley Airpark (04TN), Chuckey, Tennessee. The commercial pilot was seriously injured and a pilot-rated passenger sustained minor injuries. Visual meteorological conditions prevailed and no flight plan had been filed for the local personal flight that was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

### 2. DETAILS OF DEVICE INVESTIGATION

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

Device 1: Grand Rapids Technology (GRT) Engine Information System (EIS) 6000  
Device 1 Serial Number: 21511  
Device 2: Grand Rapids Technology (GRT) Electronic Flight Information (EFIS) System Sport SX  
Device 2 Serial Number: 1031

#### 2.1. GRT EIS 6000 Device Description

The GRT EIS Model 6000 is a panel mounted engine monitor. The device contains a back-lit, sunlight readable display providing the operator graphical and digital displays of various engine parameters. The device also assists the pilot to lean the engine, and allows for various alarms when monitored systems exceed various settings. Engine parameters that may be monitored and displayed include:

- Exhaust Gas Temperatures (EGT);
- Cylinder Head Temperatures (CHT);
- Tachometer (engine rpm);
- Oil Temperature;
- Oil Pressure;
- Manifold Pressure;
- Fuel Pressure; and
- Flight Timers.

The device also contains a serial output port for the operator to allow for data recording to a laptop PC or a compatible Electronic Flight Information System (EFIS) display. The device does not contain any internal memory for the recording of engine information.

### 2.1.1. GRT EIS 6000 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had not sustained any damage, as shown in figure 1. Power was applied to the unit and information extracted by manually navigating the screens.

Figure 1. GRT EIS 6000 photograph.



#### 2.1.2.2.1. GRT EIS 6000 Data Description

Two values were extracted from the device pertinent to the investigation. The unit displayed total engine hours of “15.1.” The prior flight time displayed was “0:08:00.”

### 2.2. GRT EFIS Sport SX Device Description

The GRT EFIS Sport SX is an integrated avionics panel. The non-TSO'd Sport SX displays primary flight information including information from an integrated attitude and heading reference system (AHRS). Depending on installation options, the unit can display engine information, navigation information, synthetic vision, XM weather information, and aircraft state information (i.e., flight control positions). The unit can integrate with ARINC 429 radios and navigation equipment, magnetometers, and another Sport SX unit for redundancy and dual AHRS integrity monitoring.

The unit contains non-volatile memory<sup>1</sup> capable of maintaining unit configuration information and limited flight information. When a USB memory device is inserted into the rear of the unit, parameter information may be recorded onto the USB memory device.

### 2.2.1. GRT EFIS Sport SX Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had not sustained any damage, as shown in figure 2. Power was applied to the unit and information extracted by manually navigating the screens.

Figure 2. GRT Sport SX unit photograph.



### 2.2.2. GRT EFIS Sport SX Data Description

The unit retained numerous configuration settings. The configuration settings indicated the device was connected to an engine monitoring system, an “SL40” radio, a GPS, an autopilot, and a fuel/air data system. Various speeds were configured in the system in knots, as shown in figure 3. As shown in figure 4, auxiliary functions configured included flaps, elevator trim, and left and right fuel.

Figure 5 shows the initial screen display after power was applied to the unit at the NTSB laboratory. Many values were not displayed as the unit was not connected to external sensors in the laboratory.

<sup>1</sup> Non-volatile memory is semiconductor memory that does not require external power for data retention.

The GRT Sport SX retained limited historical information consisting of an event log history. Figure 6 contains a screen capture of the last 5 events recorded on the unit. The source of the dates and times and other information were not verified. The unverified information indicates two events on September 27, 2012, one from KLUG to KSYI, and another event recorded at KSYI. On September 29, 2012, an event from KSYI to 04TN was recorded. On October 11, 2012, two events were recorded at 04TN.

Figure 3. GRT Sport SX speed configuration settings.

Setting	Value
▶ Up reference	Heading
Tape Style	Version 2
Nav/A/P Status Style	Auto
Stall speed, landing config (Vso)	40
Stall speed, clean config (Vs1)	45
Max flap extension speed (Vfe)	76
Max structural cruise spd (Vno)	110
Never exceed speed (Vne)	180
Convert Vne from TAS to IAS	No
Speed bug 1 (X)	77
Speed bug 2 (Y)	87
Speed bug 3 (G)	70
Below stall	Red
HITS frame color	Magenta
Attitude Reference Index	Bars
GPS CDI	On
Slip indicator	On
Turn rate indicator	On

Figure 4. GRT Sport SX auxiliary functions configuration.

Setting	Value
EFIS Volt2 Graph Min	0
EFIS Volt2 Graph Max	0
EFIS Volt3 Graph Min	0
EFIS Volt3 Graph Max	0
Fuel Flow MAX FUEL	20.0
Flow Rate Bar Graph Max	15
Prompt for Fuel Added	Yes
Aux1 Function	Flaps
Aux2 Function	Elevator Trim
Aux3 Function	Right Fuel
Right Fuel Integer/Decimal	Decimal
Right Fuel Graph Min Level	0.0
Right Fuel Graph Max Level	16.0
Aux4 Function	Left Fuel
Left Fuel Integer/Decimal	Decimal
Left Fuel Graph Min Level	0.0
Left Fuel Graph Max Level	16.0
Aux5 Function	None

Figure 5. GRT Horizon SX flight display screen.



Figure 6. GRT Sport SX logbook screen.



The image shows a digital logbook screen with a blue header bar that reads "LOGBOOK (26)". The screen displays a table of flight records. The columns are labeled: "Saved", "Date", "Orig", "Dest", "Hrs", "Fuel", "Dep", and "Arr". Below these, there are sub-columns for "Eng-Hr", "V/I", "Pas", "FA", and "OA". The data is organized into rows, each representing a flight. The first row is highlighted with a white border. The text is white on a dark background, with some green text for "Eng-Hr" and "V/I".

Saved	Date	Orig	Dest	Hrs	Fuel	Dep	Arr
N	2012-10-11	04TN	04TN	0.0	0.1	17:55	17:56
	15.1 VFR	-	0.0 0.0				
N	2012-10-11	04TN	04TN	0.1	0.1	17:53	17:54
	15.1 VFR	-	0.0 0.0				
N	2012-09-29	KSYI	04TN	1.9	11.0	16:34	18:17
	14.9 VFR	-	0.0 0.0				
N	2012-09-27	KSYI	KSYI	0.9	6.0	20:49	21:40
	13.0 VFR	-	0.0 0.0				
N	2012-09-27	KLUG	KSYI	0.6	2.1	19:49	20:15
	12.0 VFR	-	0.0 0.0				