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# AUTONOMOUS FLIGHT TERMINATION UNIT - MINIATURE (AFTU-M)

The L3Harris Autonomous Flight Termination Unit – Miniature (AFTU-M) is a compact version of the full-sized AFTU designed for use on NASA’s Space Launch System. The compactness of the AFTU-M supports missile, hypersonic and small-lift launch vehicles as well as air-breathing platforms where performance is critical and minimal size, weight and power are essential.

AFTU-M	
<b>Inputs</b>	
4 Sensor inputs: 3 external RS-422; 1 internal GPS	
2 MSTR ARM/SAFE CMD (A & B) discretes (Master Arm also available via serial interface)	
1 GPS RF antenna input	
2 Launch break wires	
1 Test port	
1 DS101 keying interface	
<b>Outputs</b>	
1 Terminate interface (500 mA continuous or 5.25A pulse split over 4 pins)	
1 RS-422 IRIG NRZ-L PCM TLM output	
1 GPS data cross strap (input to redundant AFTU)	
<b>Bi-directional Inputs/Outputs</b>	
1 Ethernet command/status for ground/vehicle/telemetry	
1 AFTU heartbeat cross strap	
<b>Power Supply</b>	
Supply Voltage	+28 VDC primary power
Power Consumption	< 12 W (including GPS), < 8 W (without GPS)
<b>Internal Heater</b>	
Supply Voltage	+28 VDC
Power Consumption	36 W

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS	
<b>Physical</b>	
Volume	8.71 in <sup>3</sup>
Dimensions	3.3 L x 2.2 W x 1.2 H in (with embedded GPS)
Weight	< 0.8 lb
<b>Reliability</b>	
Operating Life	10,000 hours
Storage	15 years
Reliability	> 0.9995 at 95% confidence
<b>Environments (Qual)</b>	
Thermal Environment	-55°C to +71°C (heater power required for operation below 40°C)
Pyro Shock	> 4,900 G @ 10,000 Hz
Acceleration	100 G 300 sec ea ± axis (1800 sec total)
Random Vibration	42 Grms, 23 min/axis (non-buffer)
	22 Grms, 3 min/axis (buffer)
	42 Grms, 30 min/axis (free flight)



## KEY FEATURES:

- > Embedded military code (M-Code) GPS receiver, RCC-324 compliant
- > AFTU-M RCC-319 compliant
- > Dual use for navigation and range tracking
- > GPS directorate approved
- > 10 Hz update rate
- > Mission programming & USAF-NASA CASS Enabled
- > Supports missile/hypersonic/ small-lift launch
- > Compatible footprint to CR-128, AFTR-925/EFTR-925 for AFTU upgrade
- > High-current destruct output
- > Compact size
- > Low weight

The AFTU-M is a configurable and fault-tolerant unit, equipped with a processor that runs the Core Autonomous Safety Software (CASS) developed by NASA and the Air/Space Force. This software forms the core of L3Harris' Autonomous Flight Safety System. Local and remote cross-strap heartbeat monitors ensure safe use of redundant hardware configurations.

RCC-319 certified, with an RCC-324 compliant M-Code GPS receiver, the AFTU-M is poised to support present and future flight termination requirements into 2030 and beyond. The AFTU-M may also be employed for redundant use in navigation and range tracking.

The AFTU-M has redundancy for the master safe/arm and local arm. Local and remote cross-strap heartbeat monitors ensure safe use of redundant hardware configurations.

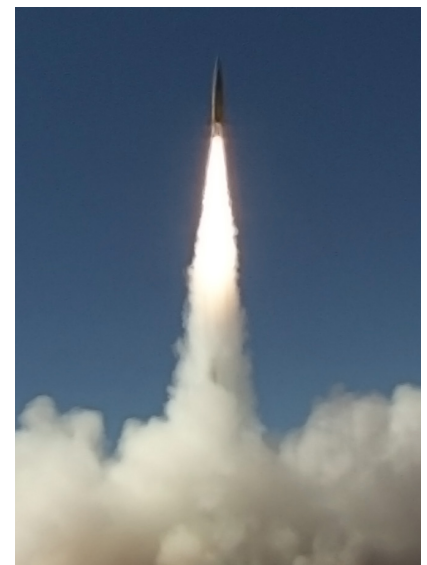
Built on a 60-year history of flight termination experience, including both commanded (High Alphabet and EFTR) and autonomous systems, the AFTU-M leverages heritage circuit designs on all functions listed above, with proven performance on Atlas V, Delta IV, Space Launch System, Space Shuttle, International Space Station and many other missions.

### **BUILT-IN M-CODE GPS RECEIVER**

The AFTU-M includes an optional embedded GPS receiver based on the L3Harris M2 GRAM Type II M-Code GPS receiver, providing true 10 Hz output rates and qualified for use by the GPS Directorate. In addition to cost, weight and space savings, the embedded GPS provides built-in compliance to the congressional M-Code mandate, saving future time and expense. While providing for a dual-string, self-contained tracking source for flight termination, the AFTU-M GPS receiver may also provide dual-use applicability for navigation and range tracking.

### **EXPERT SUPPORT**

The AFTU-M is designed, built, assembled and tested in one facility and is serviced and supported by engineering professionals with decades of flight termination design experience. Every AFTU-M delivered is accompanied by domain expertise in parts, materials, radiation analysis, mechanical engineering, power supply design, digital signal processing, radio frequency design and manufacturing engineering. L3Harris has been providing time-tested flight termination hardware for more than 60 years with zero operational failures across all product lines. The AFTU-M has a performance history that can be trusted for your next mission.



Images courtesy of NASA

#### **Autonomous Flight Termination Unit – Miniature (AFTU-M)**

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