

# Tragic Little Aerospace $\mu$ GTU

## FAQ

Last Updated 8/11/2010

### **What is your estimated ship time?**

*Currently with the rollout of our new v3.0.1 transmitter our earliest ship date will be 8/23/10*

### **Why doesn't my order ship immediately?**

We're a small company, consisting of 4 people who lead everyday lives and do this on the side. While we make every effort to ship your order within the week sometimes we have supply delays or such. We will keep you apprised of your ship date and do appreciate your business.

### **Does it require a HAM/Amateur radio license to operate?**

No. Our unit runs on the unregulated 900Mhz band, and doesn't require a license to operate in the United States and Canada.

### **Does the receiver come included?**

Yes. Our Starter Kit includes everything you need to get up and running

- 1  $\mu$ GTU Transmitter unit
- 1  $\mu$ GTU Receiver unit
- All necessary cables, software and instructions.

### **What other equipment do I need?**

You will need a windows based computer, running at least Windows XP SP3 and a free USB port.

### **How much does the transmitter weigh?**

The transmitter assembly is less than 39g including stub antenna, with a 9V battery for power it's fewer than 100g. If a different antenna solution is preferred, the assembly weighs approximately 23g without antenna or batteries.

### **Will it fit in my 38mm minimum diameter rocket?**

Yes! The unit is 30mm wide leaving you room to work with on both sides for mounting.

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### **What is the $\mu$ GTUs range?**

The radio is rated up to around 15 miles under perfect conditions with a high gain antenna and 6 miles with a dipole antenna. We have tested to just over 4 miles on the ground without problem.

### **What's the transmit rate?**

The  $\mu$ GTU comes factory set at 1 update per second, for a balance of performance and battery life. We can set your unit for up to 4 updates per second however doing so will severely affect battery life.

### **How do I power the $\mu$ GTU device?**

You can use a standard 9V battery, this gives you an hour of transmit time. You can also use a 7.4v Li-Ion battery. The device can run on anything between 5V and 15V.

### **How long is the antenna on the transmitter?**

The antenna is 4.5" from mount surface to the tip. It is a bulkhead mount with a 4.5" cable from the mount to the  $\mu$ GTU unit.

### **How fast can my rocket go and still maintain lock?**

The GPS limit is 1,185.5mph. We've maintained lock through boost on most of our launches. If we lose lock during boost we are still able to recover it during decent in time for landing positioning. Keep in mind, carbon fiber blocks radio signals very well and will block both the GPS and radio from working. This is a limitation of carbon fiber and similar materials.

### **How high can the $\mu$ GTU track?**

We have a theoretical line of sight limit of 15 miles with high gain antennae and have land tested to 4. The GPS is capable of 31 miles altitude however GPS altitude information can be unreliable during boost due to how it is determined. An add-on module is in development that will provide altitude data, data logging and other features.

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### **I purchased a previous version of your device, can I upgrade?**

You sure can, we can use the radio module and ship you a new  $\mu$ GTU base board all you have to do is drop your radio module into the new board and you're good to go. Please contact us directly for upgrade pricing

### **Is the $\mu$ GTU able to receive the GALILEO-L1 signals in the future?**

Yes, our unit is capable of receiving the next generation GALILEO GPS signals.

### **What's with the Tragic Little Aerospace name?**

It sounds cool and has a TLA of TLA. We may expand on the meaning in the future when we have copious amounts of spare time.

### **I have multiple rockets and want this in all of them, at the same time. Is this possible?**

It is. You would need multiple receivers, or handheld receivers (coming 2<sup>nd</sup> quarter 2011), in order to track multiple units at the same time. Support to track multiple transmitters with a single receiver is planned, but is not currently available.

### **How does the $\mu$ GTU handle interference?**

The  $\mu$ GTU utilizes FHSS (Frequency Hopping Spread Spectrum) technology to bounce along the 900Mhz band to ensure a quality transmission.

### **Can there be multiple units at the same launch?**

Yes, we factory set a unique ID to each unit we sell. There are 65,536 unique identifiers per channel and multiple channels.

### **I already have a receiver can I order multiple transmitters, you know in case of a ballistic return or something?**

Sure can, if you've ordered from us before you have a unique ID# and we will just program that in to any future transmitters you order. (Unless you specify otherwise)

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### **I want the nitty gritty technical details!**

Ok, here you go

Radio:

- Frequency Band: 910 - 918 MHz
- Spread spectrum type: FHSS (Frequency Hopping Spread Spectrum)
- Supported network topologies: Peer-to-peer, point-to-point point-to-multipoint
- Error handling: Retries & acknowledgements
- Filtration options: VID (Vendor ID Number), channels and addressing
- Channel capacity: 7 hop sequences share 25 frequencies
- Addressing: 65,000 network addresses available for each channel

GPS:

- 50 channel u-blox technology
- Quadrifial helix antenna
- 32 channel engine
- 1,000,000 effective correlators capable of massive parallel searches across the time/frequency space
- Time to First Fix (TTFF) of less than 1 second
- Capable of GALILEO-1 signal reception