

# NEW USB VERSION OF THE RIGA EVENT TIMER AND ADDITIONAL SOFTWARE SUPPORT FOR LINUX

Vadim Vedin<sup>1</sup>, Eugene Boole<sup>1</sup>, Girts Ozolins<sup>2</sup>, André Kloth<sup>3</sup>, Jens Steinborn<sup>3</sup>

<sup>1</sup> Institute of Electronics and Computer Science, Riga, Latvia, buls@edi.lv

<sup>2</sup> Eventech Ltd., Riga, Latvia, go@eventechsite.com

<sup>3</sup> SpaceTech GmbH (STI), Immenstaad, Germany, andre.kloth@spacotech-i.com

## Introduction

The Riga event timers (ET) are computer-based instruments that measure time instants when input events (represented by electrical pulses) occur. The Riga ETs are based on the innovative DSP-based technology for event timing (proposed by Yuri Artyukh in 2001), which uses a generation of a specific analogue signal directly from input events with its following digitizing and processing. This novel technology allows to create the extreme precise and high-speed Event Timers having world-competitive performance characteristic and attractive price.

## Riga ET modernization

During the last years the Riga ETs have obtained some advancements:

- Calibration of the internal interpolator provides the single-shot RMS resolution of less than 3 ps (Fig.1)
- Temperature compensation schematic provide this RMS stability in the wider temperature range (Fig.2)
- New USB2 interface provides 30 times higher measurement rate (Fig.3)
- The standard software package of ET provides both the local interaction with the device and network interaction for user application on the base of Client-Server model. This software is operable in all MS Windows systems. And now SpaceTech GmbH supposes the modernized Server and SLR application software for open Linux systems both for A032-ET and A033-ET with parallel interface.

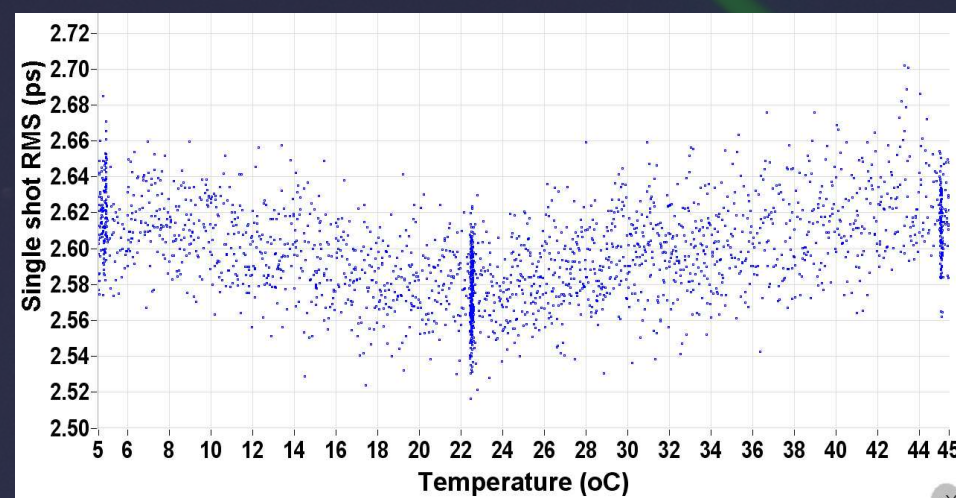


Fig.1. Resolution vs. temperature with periodical re-calibration

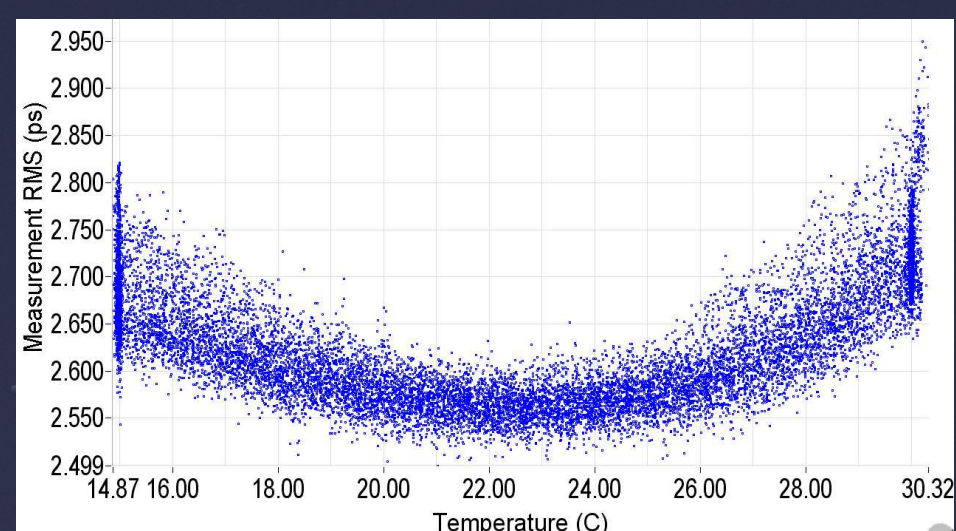


Fig.2. Single-shot RMS resolution vs. temperature for one calibration at 22.5°C

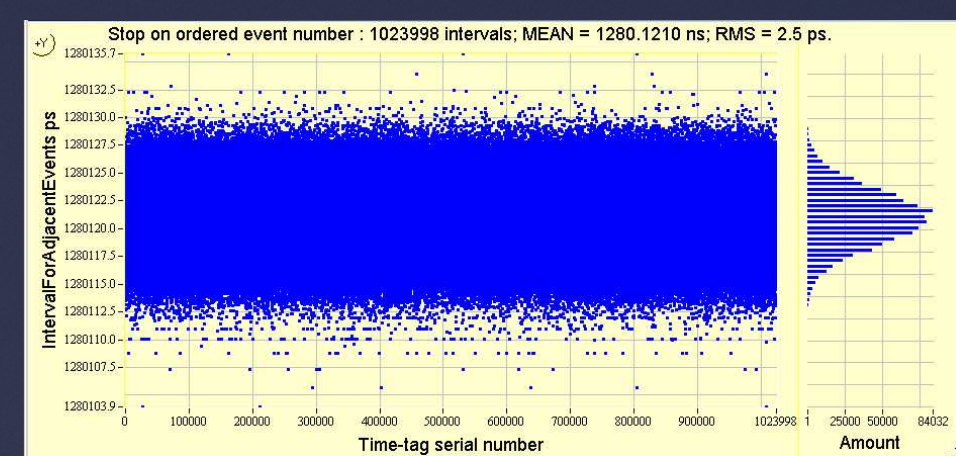
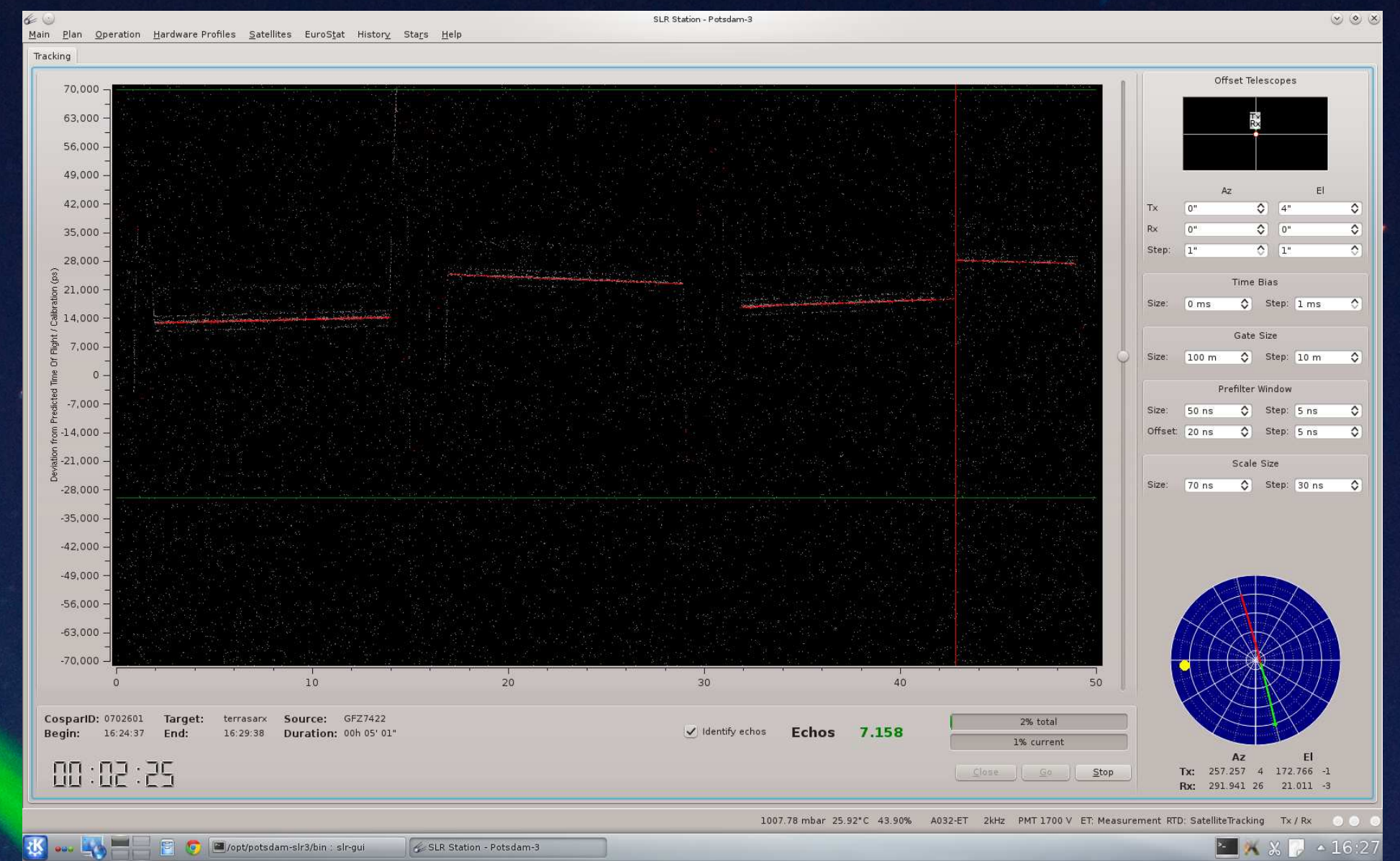


Fig.3. One million measurement results of time intervals 1280.1 ns generated by ETTG: values deviation and histogram.

The models A032-ET and modernized A033-ET are well known in ILRS community and are used in many SLR stations around the world. In 2011 under License Agreement the rights for manufacturing and distributing of A033-ET (and now for A033-ET/usb) are transferred to Eventech Ltd (Latvia). Today 62 devices and 12 ET modules are sold not only for SLR applications but also for Time Transfer by Laser Link, Gravimetry and Signal Analysis tasks.



ETD (A032-ET) daylight interleaving tracking of TanDEM-X and TerraSAR-X

## Event Timer Daemon

The Event Timer Daemon (ETD) is a complete replacement for the ET Server software running on Linux. The ETD has been developed by SpaceTech based on the original ET Server software from developers of the Riga Event Timer and allows a seamless integration into existing SLR systems. After two years of operational experience and good performance results at the GFZ SLR station in Potsdam, Eventech decided to offer this Linux software also to other Riga Event Timer customers.

### Advantages:




- Increased performance with Linux real time support
- Allows safe operation of additional software on the same Linux workstation ensuring proper timing constraints interacting with Event Timer hardware
- Supports easy integration also into embedded systems
- Low performance and memory requirements
- Available in a package with Even Timers A032 and A033 from Eventech

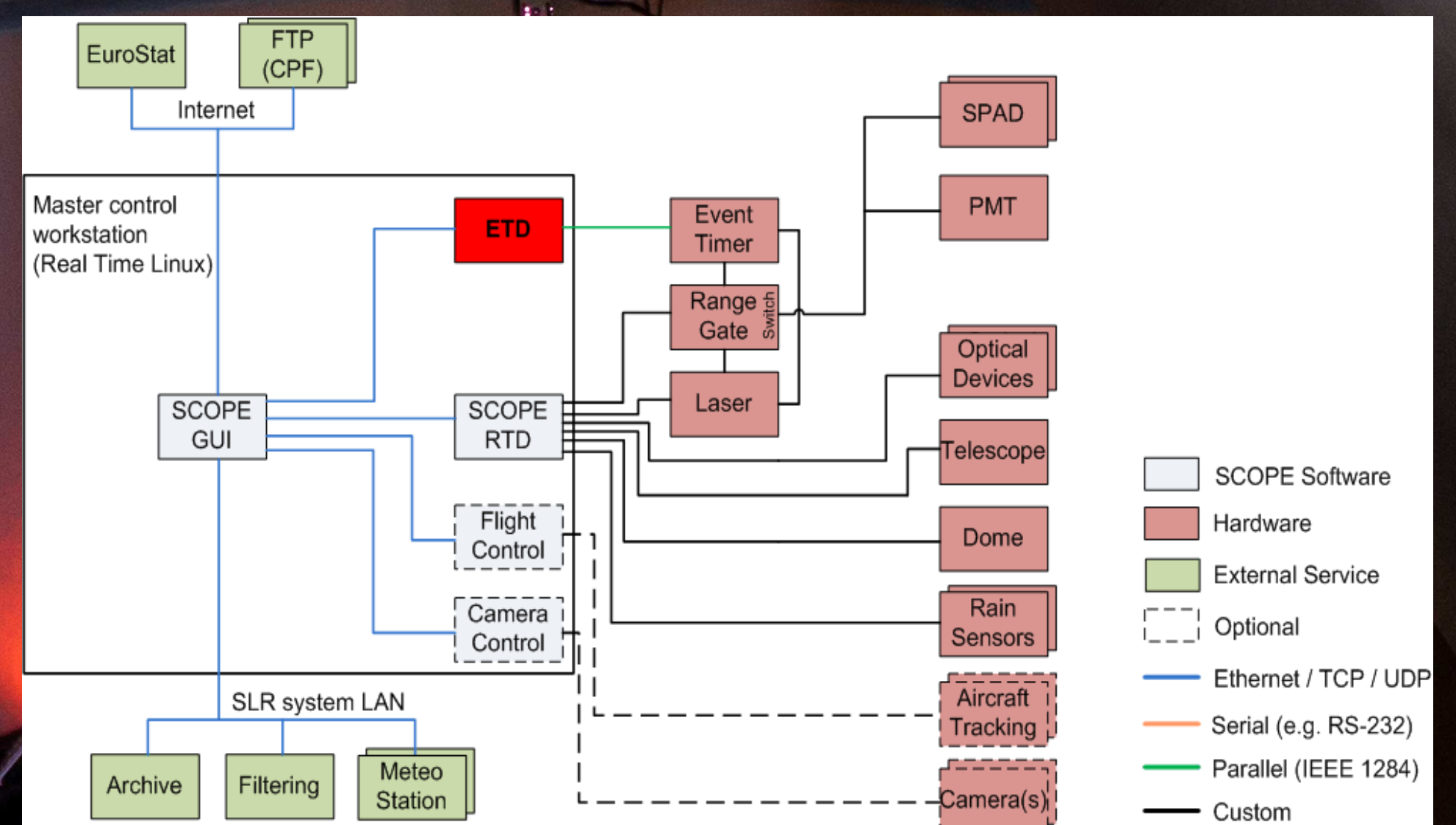
### Features:

- Support for Event Timers A032 and A033 with parallel port
- Written in ANSI C/C++ for maximum portability
- Provides the same TCP/IP communication protocol as Windows ET software
- Compatible with all existing ET client software
- Shipped with C/C++ programming API for integration into customer
- Much more features

### Support:

- Basic installation support included
- ET client software for performance and integration tests
- Programming API for rapid application development
- Extended software and embedded system support available upon request

Model	Single-shot RMS resolution for intervals, ps	Stability of RMS resolution in temperature, ps/°C	Integral nonlinearity, ps	Interval nonlinearity, ps	Single-input offset drift, ps/°C	Input-to-input drift, ps/°C	FIFO depth, kiloevents	Maximum burst rate, megaevents per second	Average measurement rate, kiloevents per second
<b>A032-ET</b> 	7-8	<1.5	<2	<1	n/d	0.4	12	16	10
<b>A033-ET</b> 	3	<0.5	~1	<0.5	<2	~0.1	16	20	>30
<b>A033-ET/usb</b> 	3	<0.5	~1	<0.5	<2	~0.1	16	20	>1000



ETD integration into a SLR system



Eventech Ltd.  
Dzerbenes street 14  
Riga, LV-1006, Latvia

fon: +371 26522982  
fax: +371 67751956  
<http://www.eventechsite.com/>



SpaceTech GmbH  
Seelbachstraße 13  
D-88090 Immenstaad

fon: +49 7545 93284-62  
fax: +49 7545 93284-60  
<http://www.spacotech-i.com/SLR.html>