
Portable Pico Event Timer and SLR Control (P-PET-C) System

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Abstract

We are reporting design, construction and parameters of the Portable Pico Event Timer and SLR Control (P-PET-C) System. It has been developed as a self-consistent system dedicated for the millimeter precision satellite laser ranging systems operating at high repetition rates up to 2 kHz. It provides real time control, measurement, data acquisition and data processing of the advanced satellite laser ranging station. It consists of the PET-C hardware and the software package. The system hardware has been developed on the basis of the Pico Event Timer (P-PET), which has been employed in laser ranging stations in Wettzell, Germany, TIGO Chile and in Portable Calibration Standard, a world wide accepted reference for pico-event timing for millimeter laser ranging. These systems have been operated at numerous stations around the world, including China, without any single failure for more than 8 years of continuous operation. The event timing is based on space qualified Dassault units no adjustment or re-calibration is needed. The 200MHz frequency generator was developed in FH Deggendorf. The real time control, measurement, data acquisition and data processing interface is based on the codes developed and operated at the satellite laser station in Graz, Austria, which is world first station operating a high repetition rate millimeter precision laser system. The real time control and data acquisition is provided by the built in PC. The first field operation was performed at the SLR Shanghai, China, 2006.

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Goals

- Portable Pico Event Timer and SLRControl 2kHz
- Self-consistent portable unit
- Built in PC
- Dassault Timing Units
- Range Gate Generator
- T/R Pulse Overlap Avoidance
- Dedicated for Portable Calibration Standard 2k

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SLR Workshop

Freq module
Deggendorf

2 kH SLR PC Card
Graz

Pico Event Timer (P-PET)

Portable Pico Event Timer
and SLR Control (P-PET-C) System

London 1998

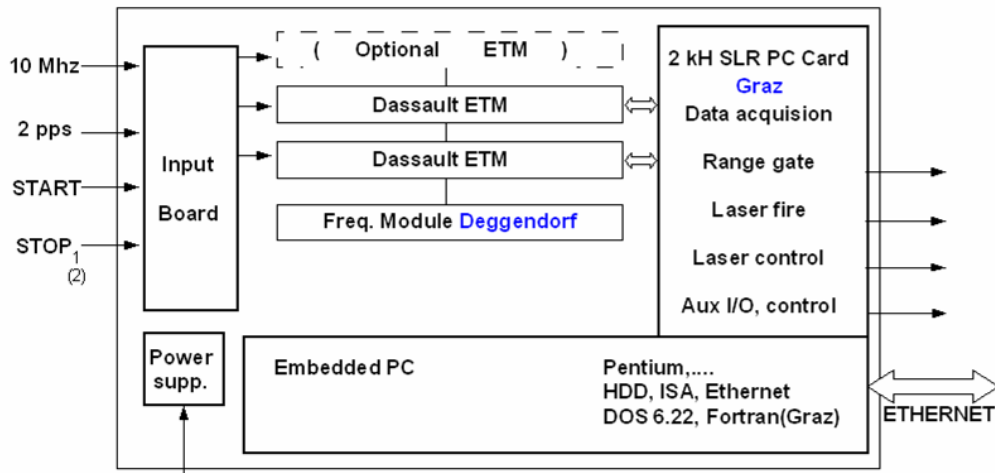
Prague, Shanghai 2006



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P-PET-C Block Scheme



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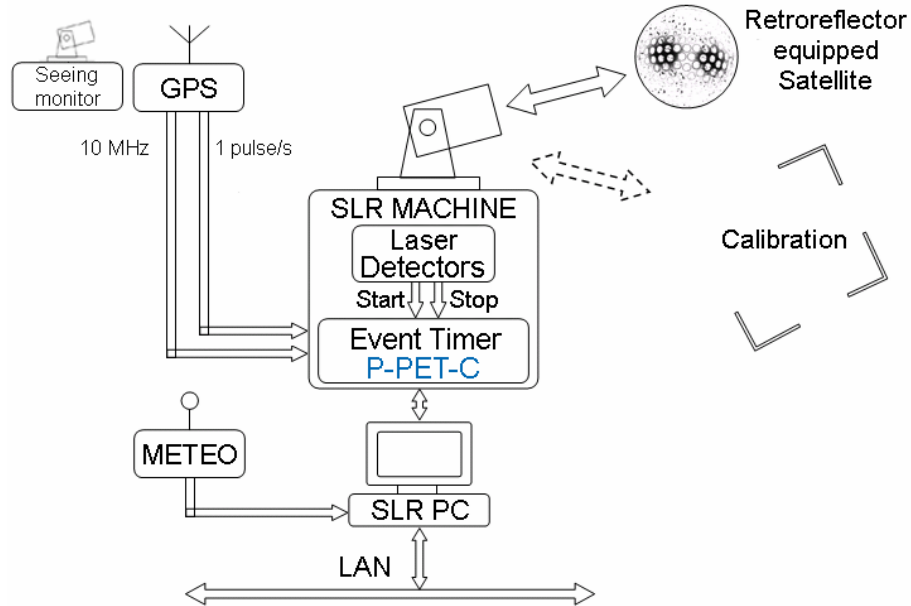
Parametres

timing principle	event timing
timing resolution	1.2 ps
precision	3 ps
timing stability	better than 1 psec / K, / hour
maximum repetition rate	2 kHz
range gate	1 ns steps pulses "in space" maximum time un-limited
processes under control	epoch and range timing, range gate laser fire, laser control echo energy monitor interfacing T/R pulses collision avoidance additional epoch timing devices optional I/O
computer	built in, industrial PC
software package	Fortran :-) code, DOS 6.22 field upgradable
dimension / mass / power	19' rack unit, 12' high / 30 kg / 200 W

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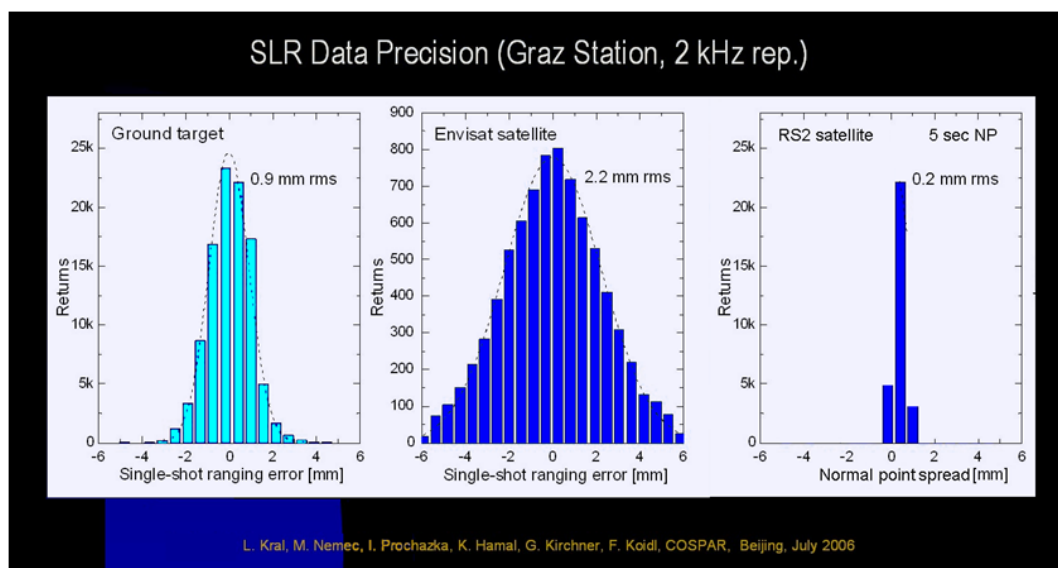
Portable Calibration Standard



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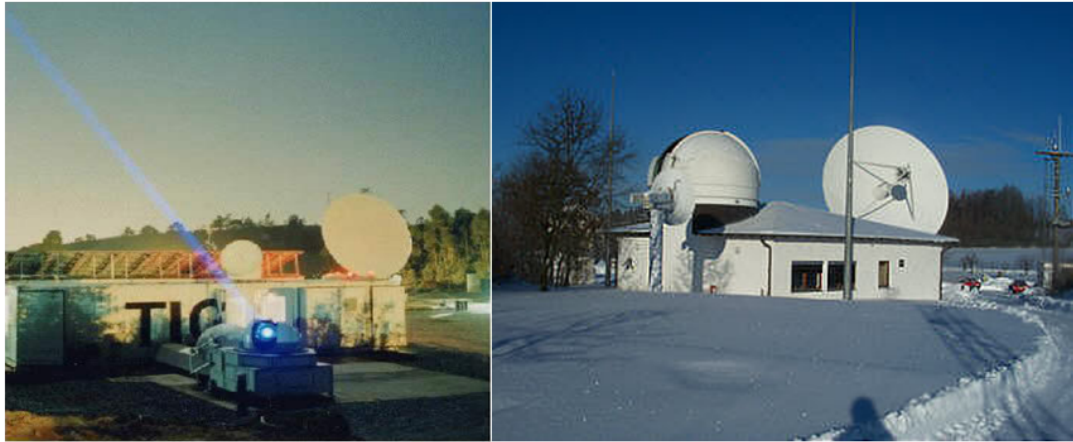
Expected parameters: Equal Graz



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Portable Pico Event Timer and SLR Control (P-PET-C) System

Permanent installations of the PET timing technology



SLR station TIGO operated in
Concepcion Chile,

WLRS , Satellite Laser Station
Wetzell, Germany

PET4 operational since 1999.

PET4 operational since 1998

8 years no recalibration, no adjustment

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Portable Pico Event Timer and SLR Control (P-PET-C) System

Conclusion

- 2kHz
- SLR control system
- Built-in PC
- Portable
- 8 years – no recalibration, no adjustment

- | | | | | |
|------------------|-----|-----|----|------|
| • Ground | RMS | 1 | MM | Graz |
| • Satellite ERS2 | RMS | 2,8 | MM | Graz |
| • Normal Point | RMS | 0,2 | MM | Graz |

- Price

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Portable Pico Event Timer and SLR Control (P-PET-C) System
Shanghai indoor test, July 2006



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Portable Pico Event Timer and SLR Control (P-PET-C) System
Shanghai outdoor test, July 2006



40W 2J

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