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.

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

Pico Event Timer (P-PET)

London 1998

USB

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

Freq module Deggendorf	2 kH SLR PC Card Graz

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Prague Spring 2006

USB

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P-PET-C Block Scheme

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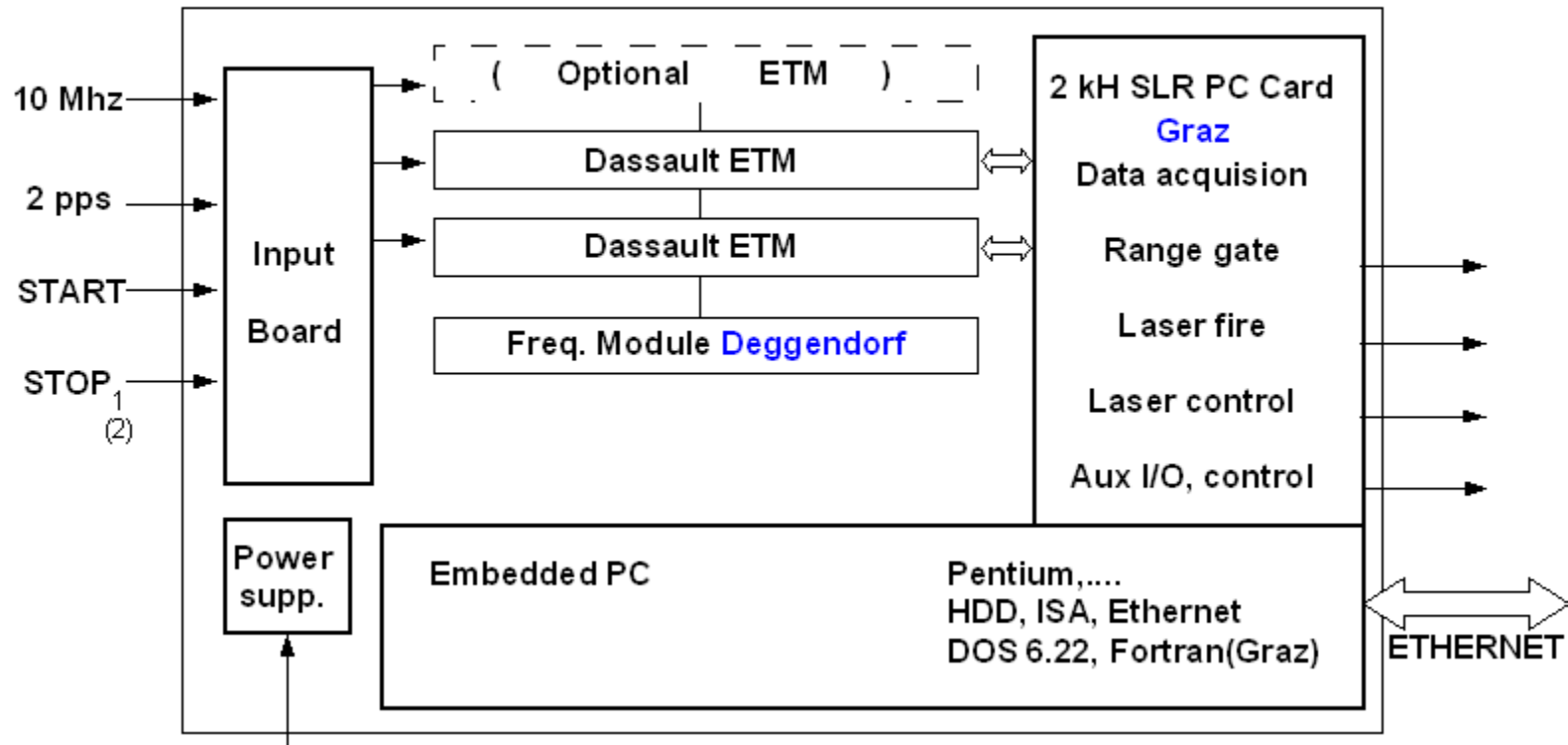
Parametres # 1

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

Parametres # 2

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

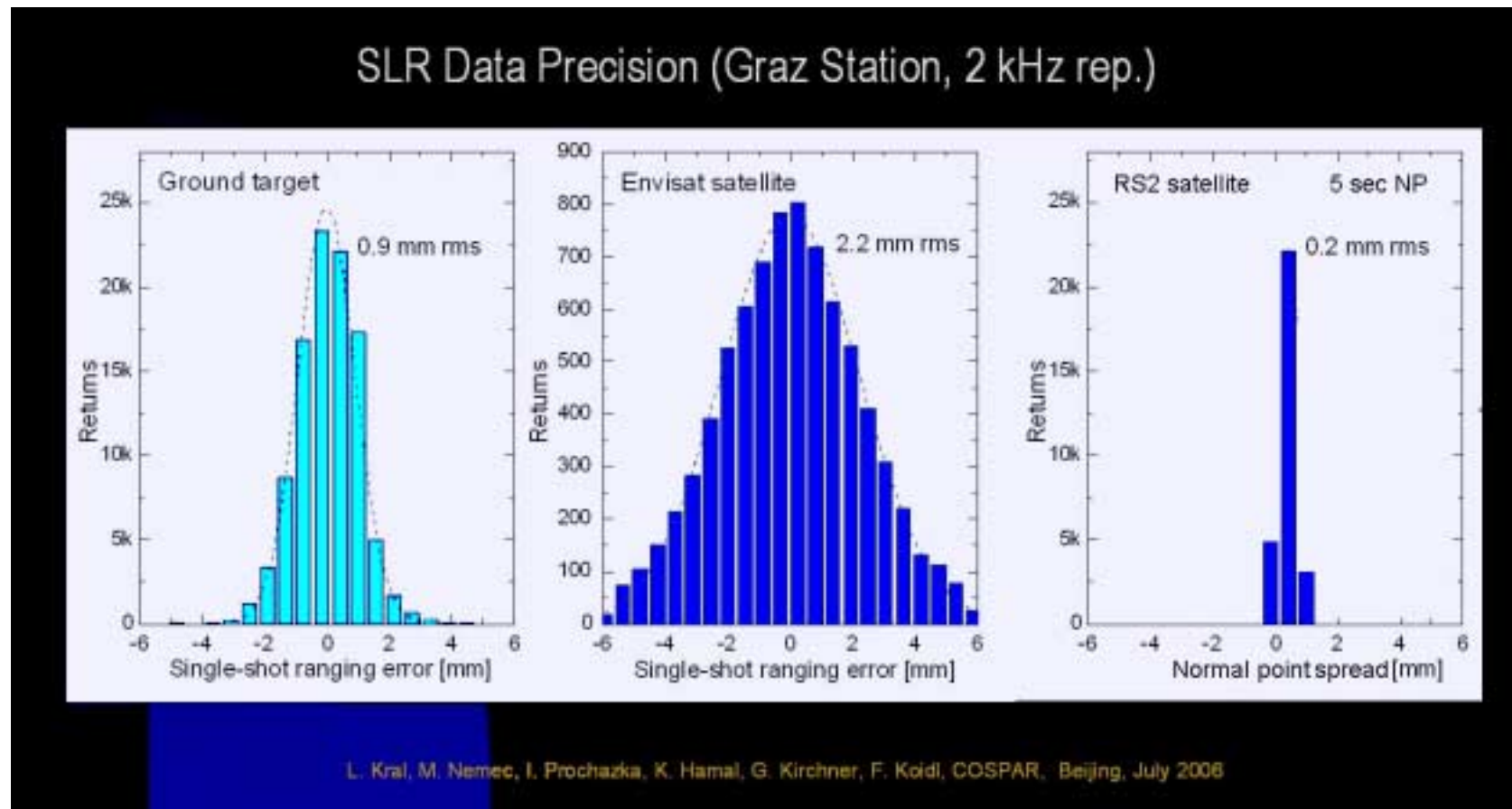dimension / mass / power 19' rack unit, 12' high / 30 kg / 200 W
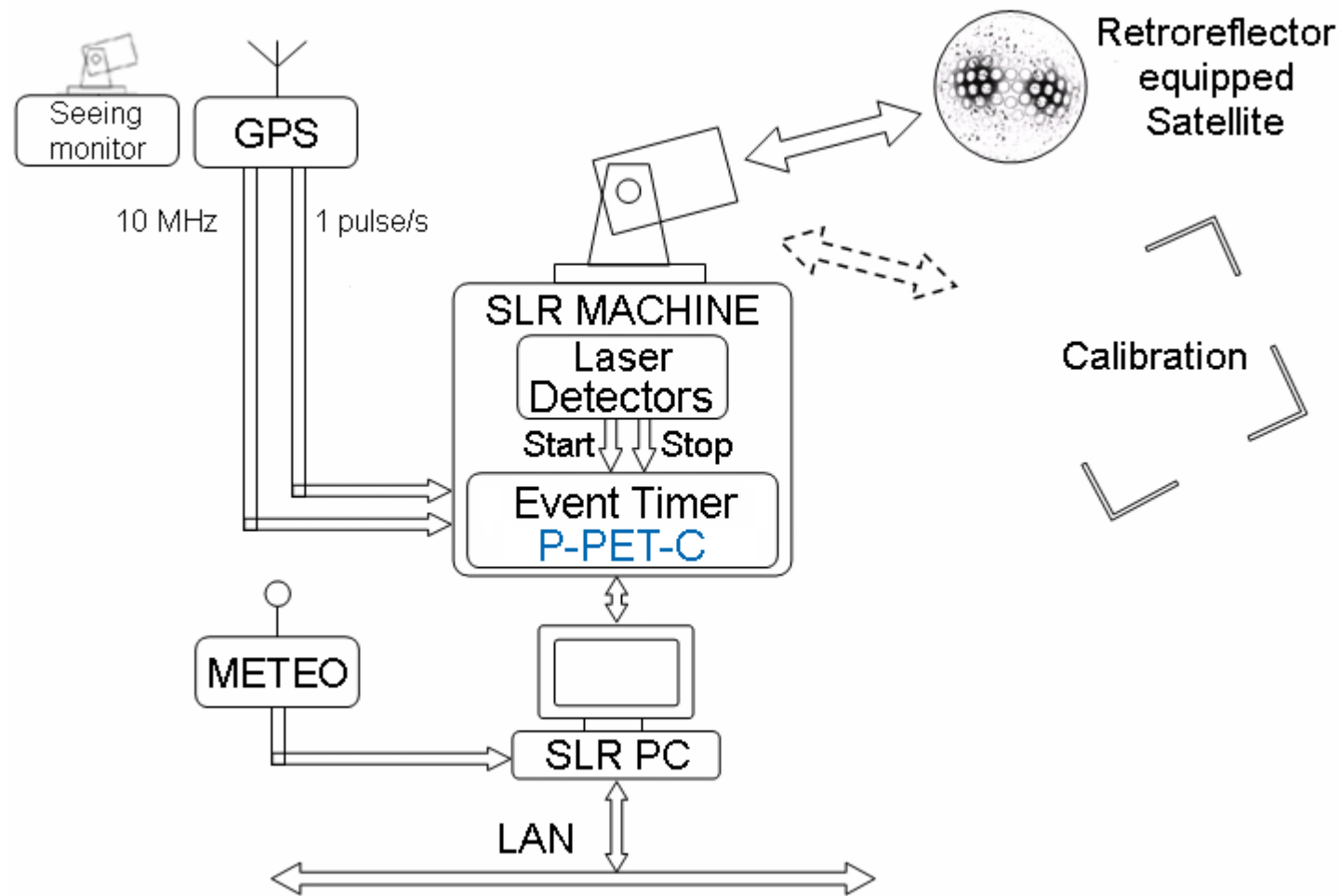
Expected parametres: Equal Graz

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Permanent installations of the PET timing technology

SLR station TIGO operated in Concepcion Chile,	WLRS , Satellite Laser Station Wettzell, Germany
PET4 operational since 1999.	PET4 operational since 1998

8 years no recalibration, no adjustment

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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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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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