THE THIRD GENERATION
SLR STATION POTSDAM NO.7836

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The new SLR station Potsdam has been installed uuring Winter 1991/1992 in an existing dome near to the old ruby laser at Helmert Tower. It has been built around a one-meter-Coude telescope and is equipped by a 50 ps Nd-YAG laser and a SPAD receiver. First successful LAGEOS passes were obtained in May 1992 demonstrating 2-3 cm rms at the single photon level.
The new station will be used for experimental work and selected observation campaigns as well.

HARDWARE SPECIFICATIONS

Mount and Telescope:

One-meter Coude system type TPL (Riga University)
common transmit-receive path switched by rotating mirrors
step motor drives for azimuth and elevation

Receiver Package:

Silicon avalanche photodiode type C 30902 S-TC (integrated Peltier cooling)
operated in the Geiger mode with passive quenching
standard interference filter, spectral width 2 nm

Laser:

Nd-YAG with passive modelocking by dye #3274 (own construction)
KTP frequency doubler
main data at 532 nm: 10-20 mJ, 35-50 ps, 10 Hz

Time Interval Counter:

Stanford Res. Labs. type SR 620

Time Base:

GPS- receiver Datum Inc. type 9390-55134, internal Rb- standard

Control System:

Standard PC (HP Vectra 386) interfaced via IEEE-488 to the
specially designed control unit (step motor controller,
gate pulse generator, epoch counter with 100 ns resolution)

SOFTWARE SPECIFICATIONS

Orbit Reconstruction:

numerical integrator using point mass model for the gravitational
field representation (Ch. Foerste)

Input : IRV's
Output: reference points in a space-fixed system, arbitrary time
spacing (usually 10 sec)

Real Time Tracking:

Input : reference points, real time corrections
Output: control information with 10 Hz rep. rate
raw data

Prefiltering:

Input : reference points, raw data
Output: filtered data
interactive filtering using the same reference orbit as for
tracking, polynomial fitting to the O-C's
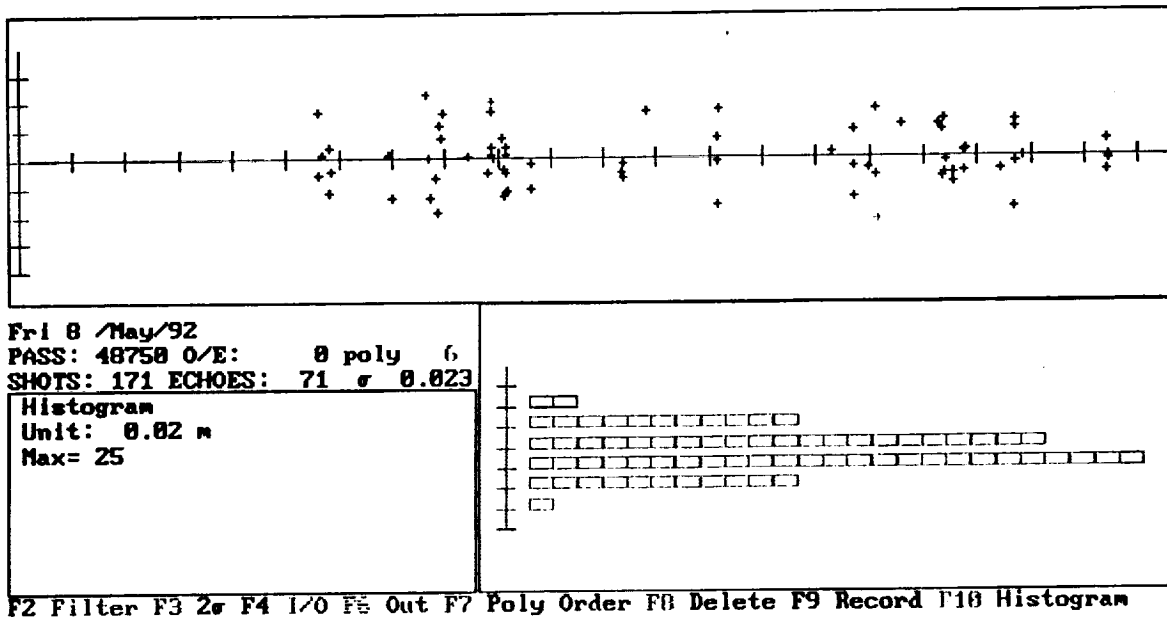(J. del Pino)

Star Calibration:

automatic star identification

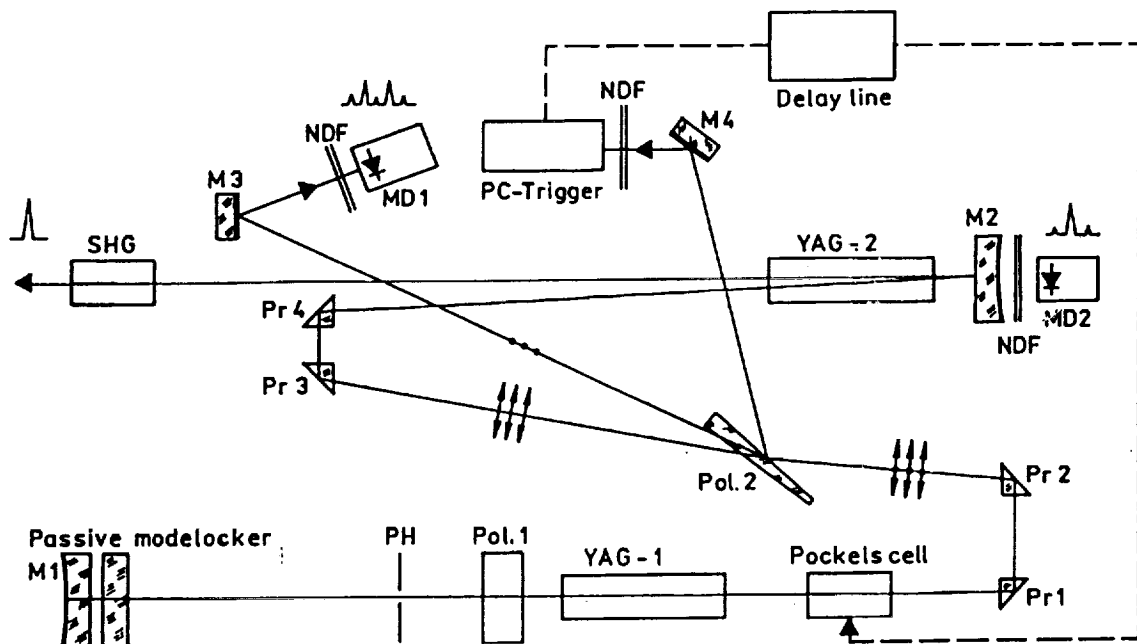Input : star positions (azimuth, elevation, epoch)
Output: mount-error-model parameters

On Site Normal Point Software:

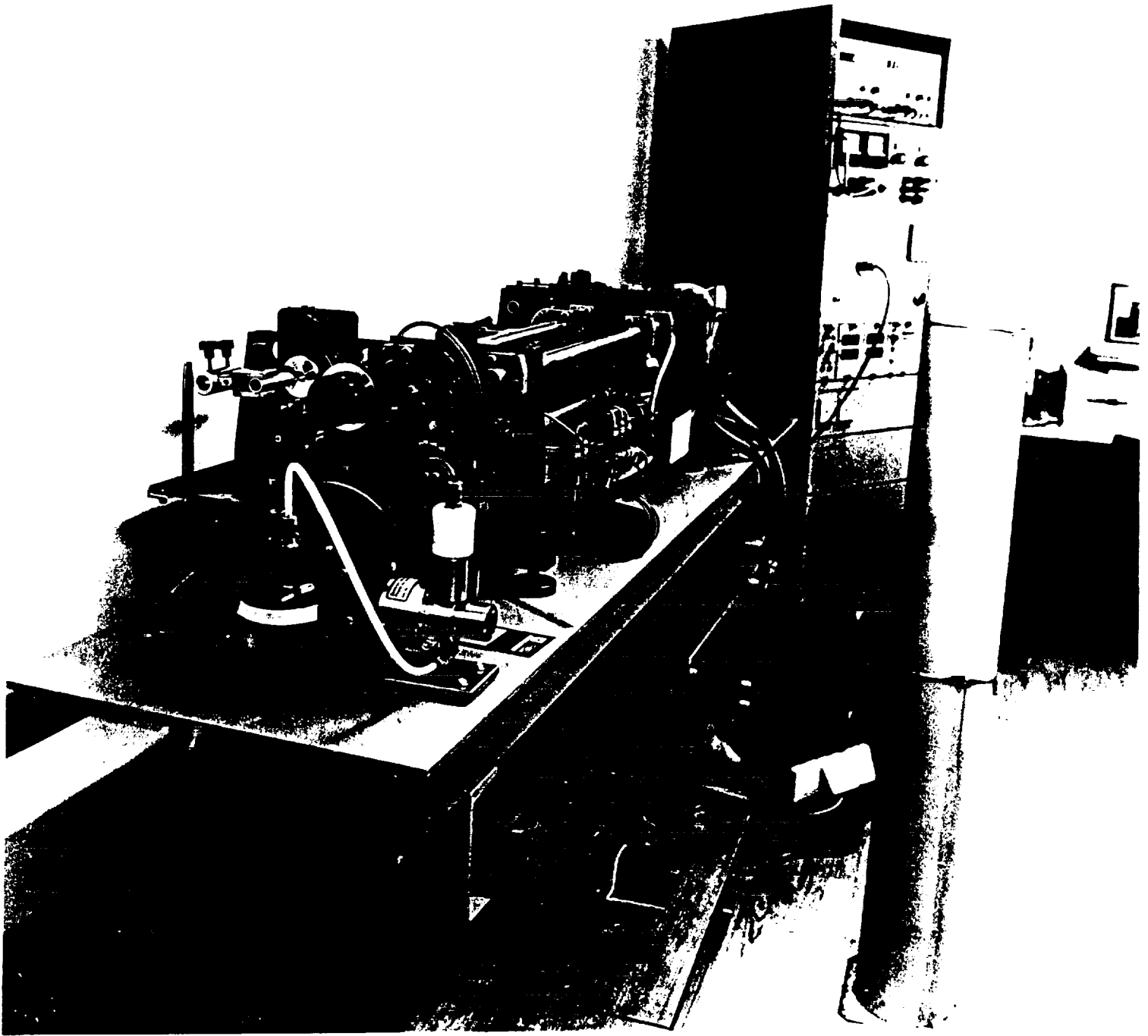EUROLAS OPAN S/W (Appleby and Sinclair)

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Fri 8 /May/92
PASS: 48758 O/E:        8 poly   6
SHOTS: 171 ECHOES:  71  σ  0.023
Histogram
Unit:  0.02 m
Max= 25
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```
F2 Filter F3 2σ F4 I/O F5 Out F7 Poly Order F8 Delete F9 Record F10 Histogram
```

Screen copy of a LAGEOS test pass after filtering and polynomial fitting
upper part: residuals versus time (23 mm rms)
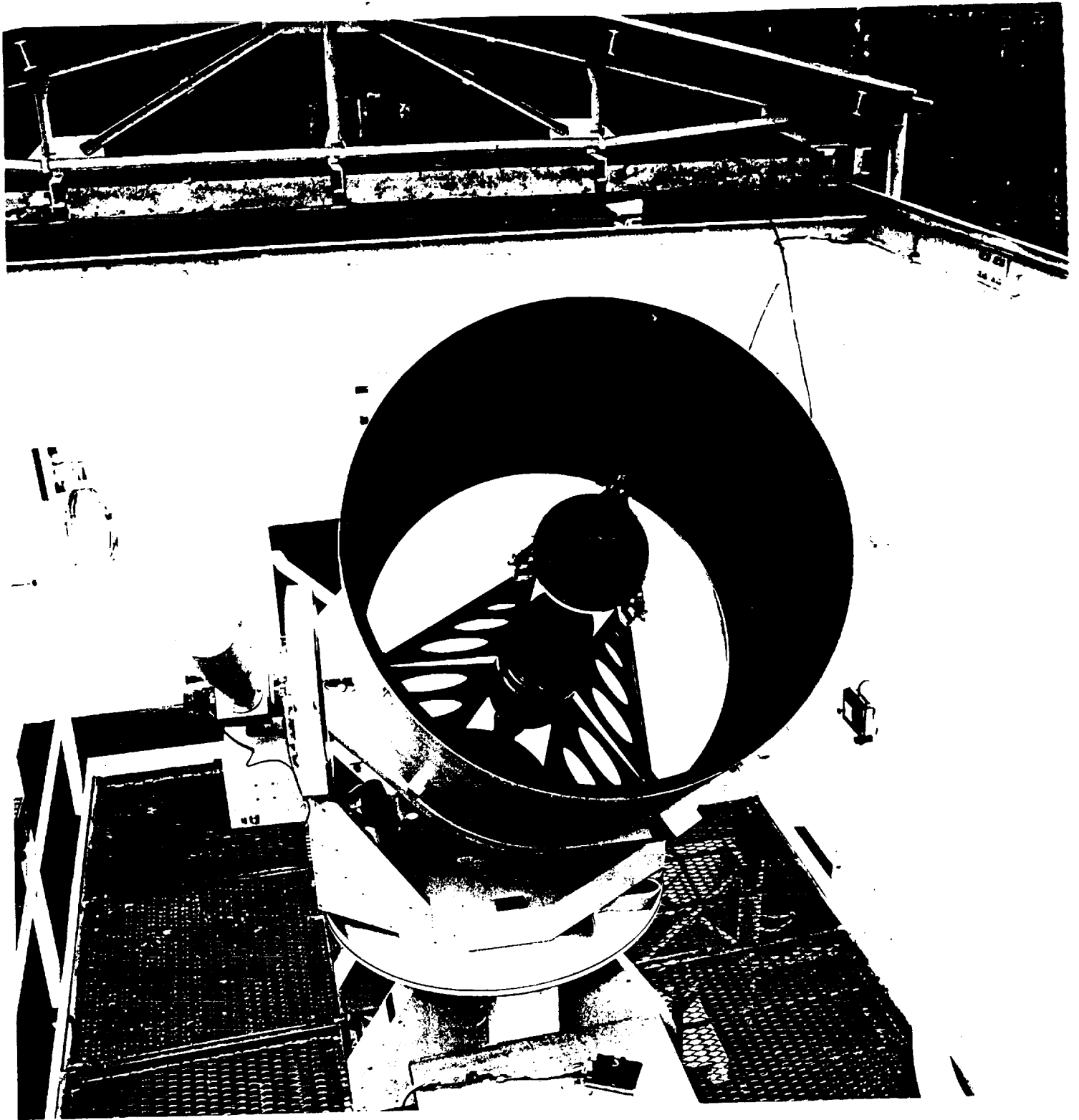**lower right: histogram of the residuals**

Optical scheme of the laser PLS-5
Symbols: Pr- prisms ; M- mirrors ; NDF- neutral density filters
MD- monitor photodiodes ; Pol- polarizers

14-17

Laser control room

Close-up view of the TPL mount and telescope