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TLRS-3 SYSTEM UPGRADES

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LAGEOS, Ajisai, Starlette and ERS-1 satellites. During the upgrades and following completion of the system upgrades intercomparisons with the MOBLAS-7 were made to verify the integrity and accuracy of the system changes.

Several other groups of personnel participated in the TLRS-3 upgrade and they are: the Survey Section, the Precision Measurement Equipment Laboratory, the Architectural and Engineering Services Department, the Precision Timing Section and the station personnel at TLRS-3 and MOBLAS-7.

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Abstract

This presentation describes the upgrades to the Transportable Laser Ranging System, serial number three (TLRS-3), and the impact that these upgrades will have on the TLRS-3 performance in the field. The four major areas of system upgrades are the HP-380 computer, the Optical Attenuation Mechanism (OAM), the upgraded spatial, spectral and temporal filtering for improved daylight ranging capability, and the software upgrade to enable the system to track the Etalon satellites.

The TLRS-3 was returned to the Goddard Geophysical and Astronomical Observatory (GGAO) in December 1991 for system upgrades in preparation of the TOPEX/POSEIDON campaign scheduled to begin in the summer of 1992. Many system upgrades were incorporated into the system while interleaving planned facility maintenance making TLRS-3 a more versatile and more dependable laser ranging system.

The TLRS-3 was initially baselined with the MOBLAS-7 via simultaneous satellite ranging on the

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OBJECTIVES AND GOALS

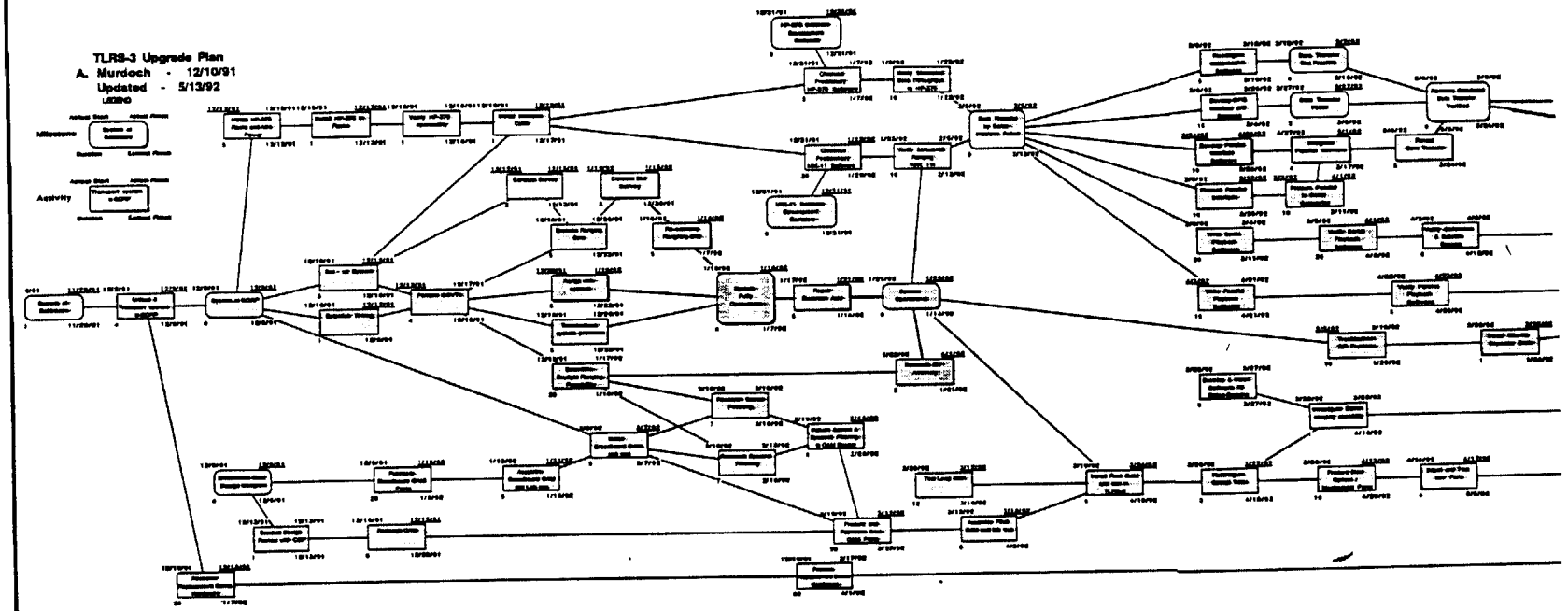
HP-380 COMPUTER UPGRADE

OPTICAL ATTENUATION MECHANISM UPGRADE

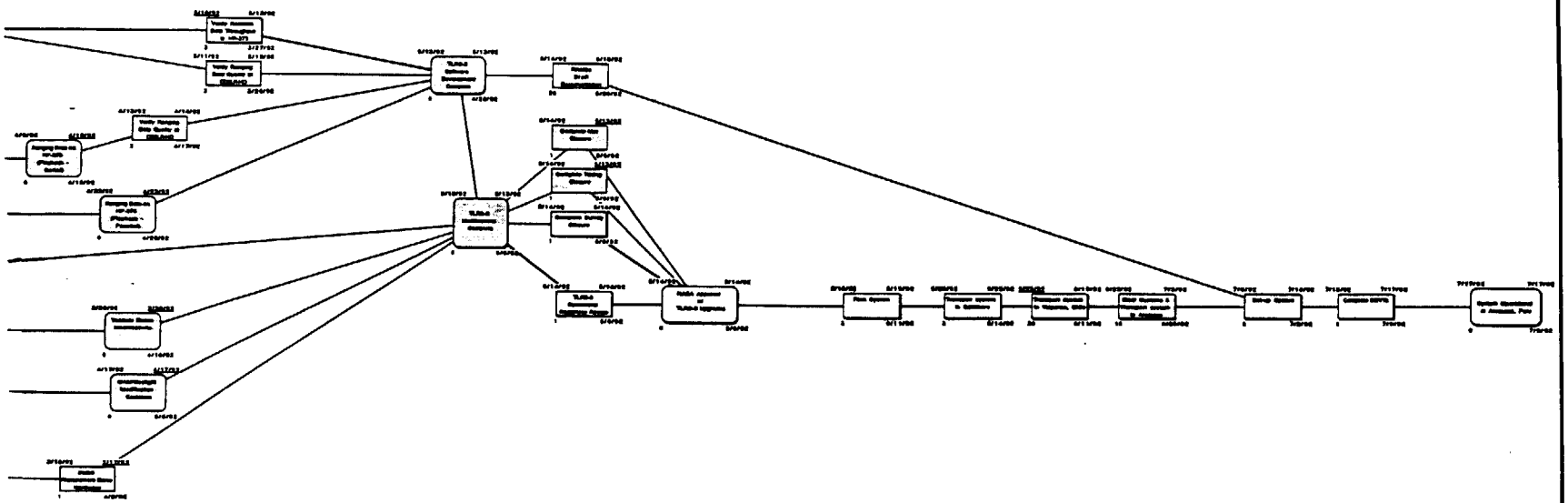
DAYLIGHT TRACKING CAPABILITY

ETALON RANGING CAPABILITY

FACILITY MAINTENANCE



Bendix Field Engineering Corporation



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HP 380 COMPUTER FEATURES

HP 380: 16MB RAM, 660MB HARD DISC, 330MB OPTICAL DISC, HP UX 8.0

REAL TIME DSP PARALLEL INTERFACE TO MIK-11/2 COMPUTER

INCLUDED MULTI-SATELLITE/MULTI-LEVEL OPERATIONS CAPABILITY

IMPROVED STAR CALIBRATION PROGRAMS (FK5, GLOBAL/KALMAN, 70 STARS)

ETALON RANGING CONTROL AND DATA AQUISITION

TUNED IRVs; ie TEMPORAL FILTER IMPROVEMENT

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OPTICAL ATTENUATION MECHANISM FEATURES

MANUAL CONTROLLED OPERATION

COMPUTER CONTROLLED OPERATION

SOLENOID ACTUATED TRANSMIT ND FILTER: FIXED VALUE

VARIABLE RECEIVE ND ATTENUATION RANGE: 0.01 to 4.0 ND

SOLENOID ACTUATED DAYLIGHT FILTER

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DAYLIGHT TRACKING

SPATIAL FILTER APERATURE REDUCED to 500 MICRONS

DAYLIGHT SPECTRAL FILTER REDUCED FROM 10 to 3 ANGSTROMS

ALIGNMENT COLLIMATOR MAKES DAYLIGHT STAR CALIBRATION POSSIBLE

TELESCOPE FOCUS MUST BE ADJUSTED FOR DAYTIME/NIGHTTIME TRACKING

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ETALON TRACKING

CAPABLE OF 5 pps OPERATION TO 135 MILLISECOND RANGE

DATA AQUISITION CHANGES TO 2.5 pps FOR GREATER THAN 135 ms

LOW SIGNAL AMPLITUDE RETURNS WHEN TESTED AT GGAO

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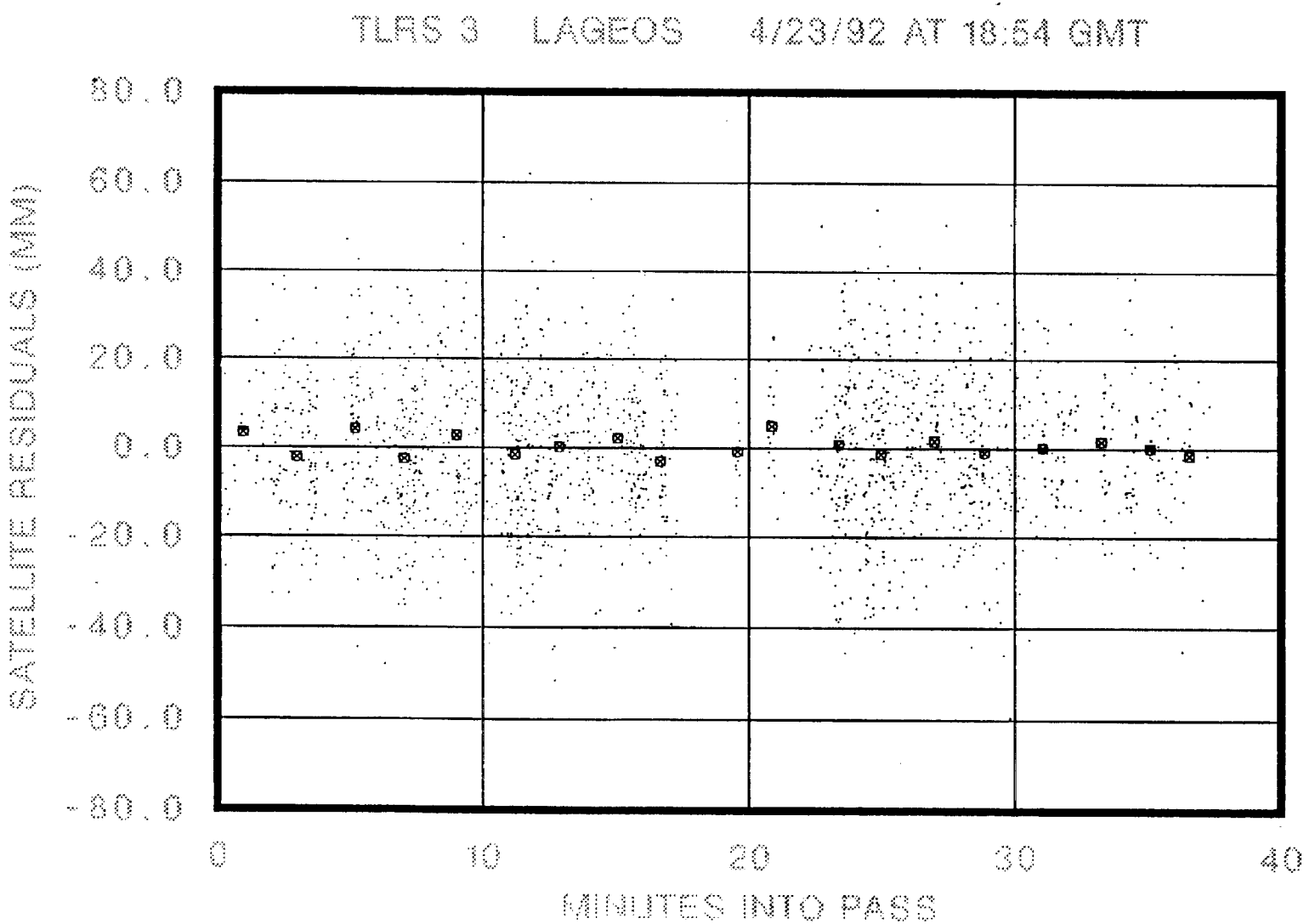
TLRS-3 IMPROVEMENT SUMMARY

- HP-380 COMPUTER SYSTEM
- OPTICAL ATTENUATION MECHANISM
- AUTOMATED TRANSMIT ND FILTER
- AUTOMATED 3A SPECTRAL FILTER
- COLLIMATOR ALIGNMENT TELESCOPE
- SIMMERED CAPACITOR BANK FOR LASER OSCILLATOR HEAD
- TEMPORAL FILTER REFINED
- SPATIAL FILTER TIGHTENED
- TRANSMIT/RECEIVE OPTICS RECONFIGURED
- BORESIGHT AND COELOSTAT ALIGNMENT PROCEDURES REDEFINED
- CESIUM FREQUENCY STANDARD REPLACED
- FREQUENCY STANDARD UPS REPLACED
- DOME AND VAN REPAIRED
- AC POWER RECONFIGURED

SATELLITE RESIDUALS



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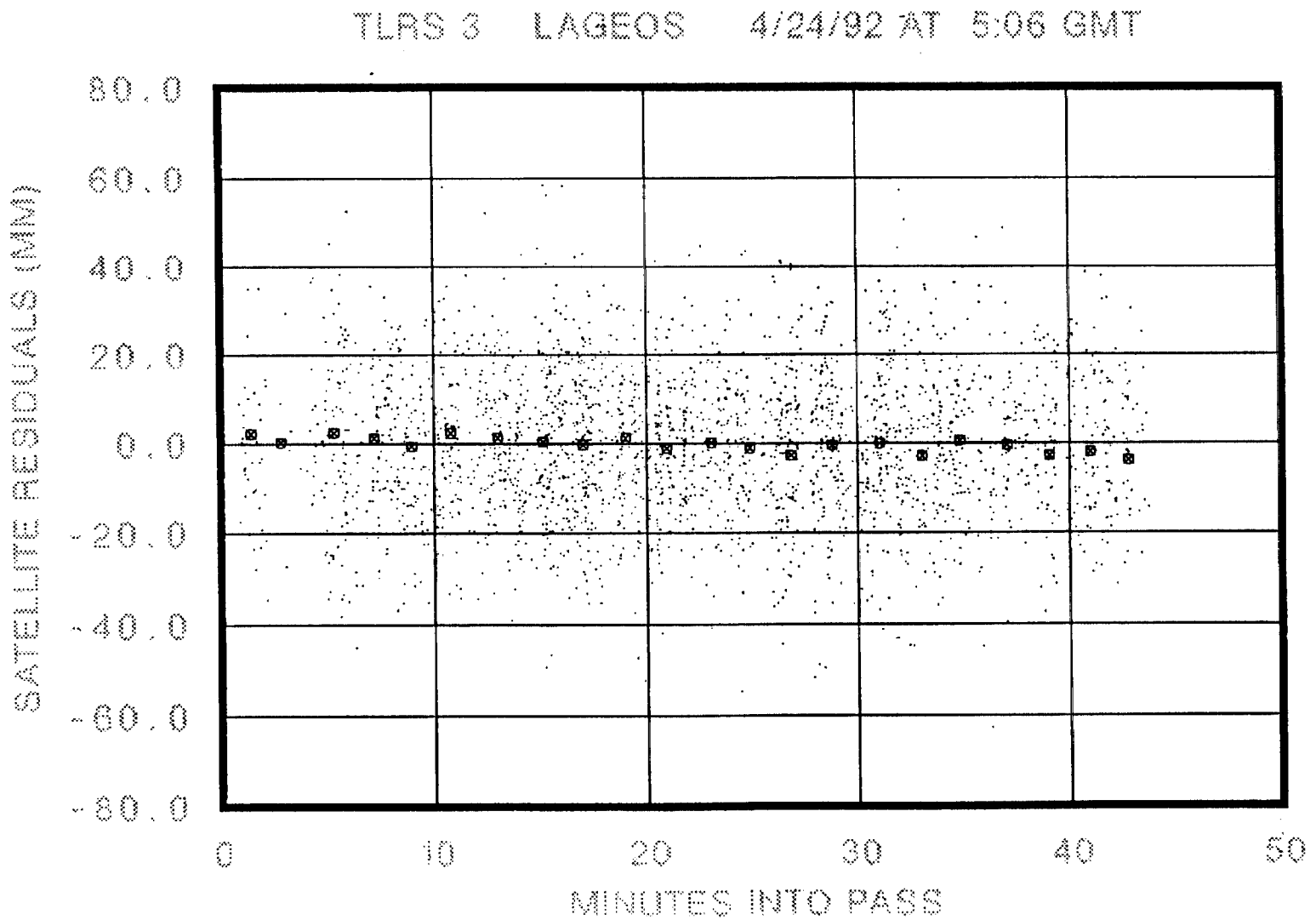
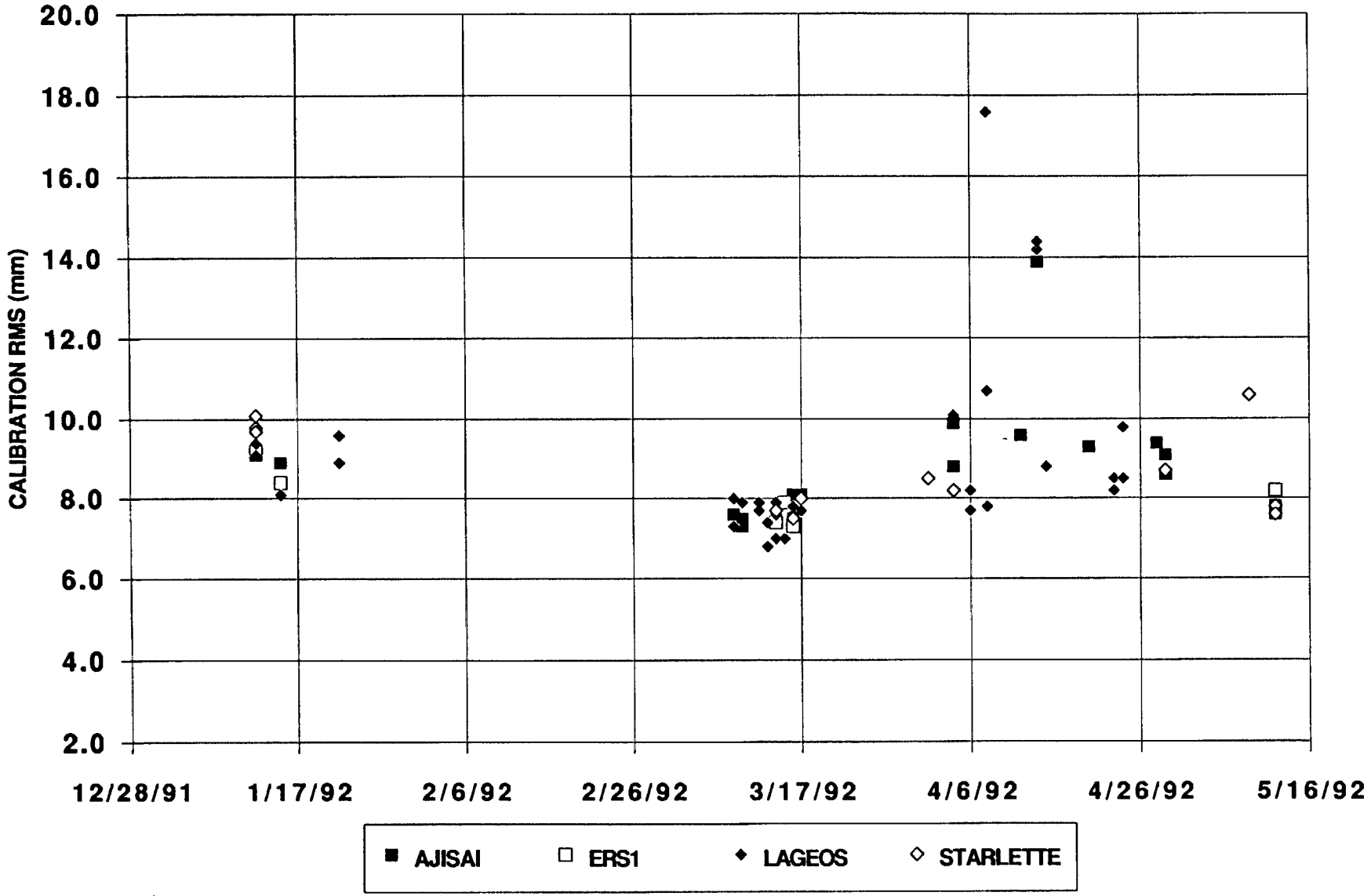


TLRS-3 vs. MOBLAS 7 GORF INTERCOMPARISON



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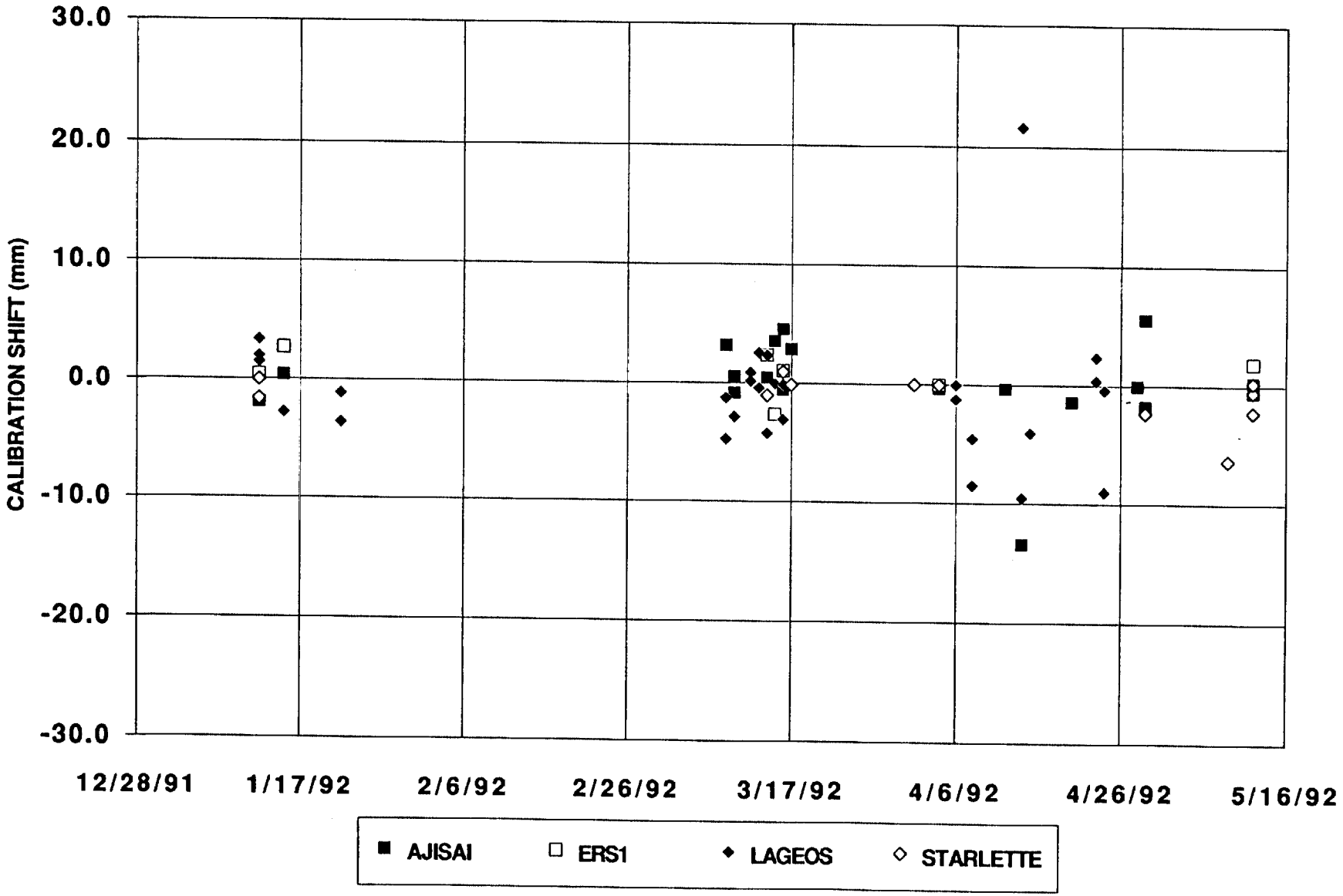

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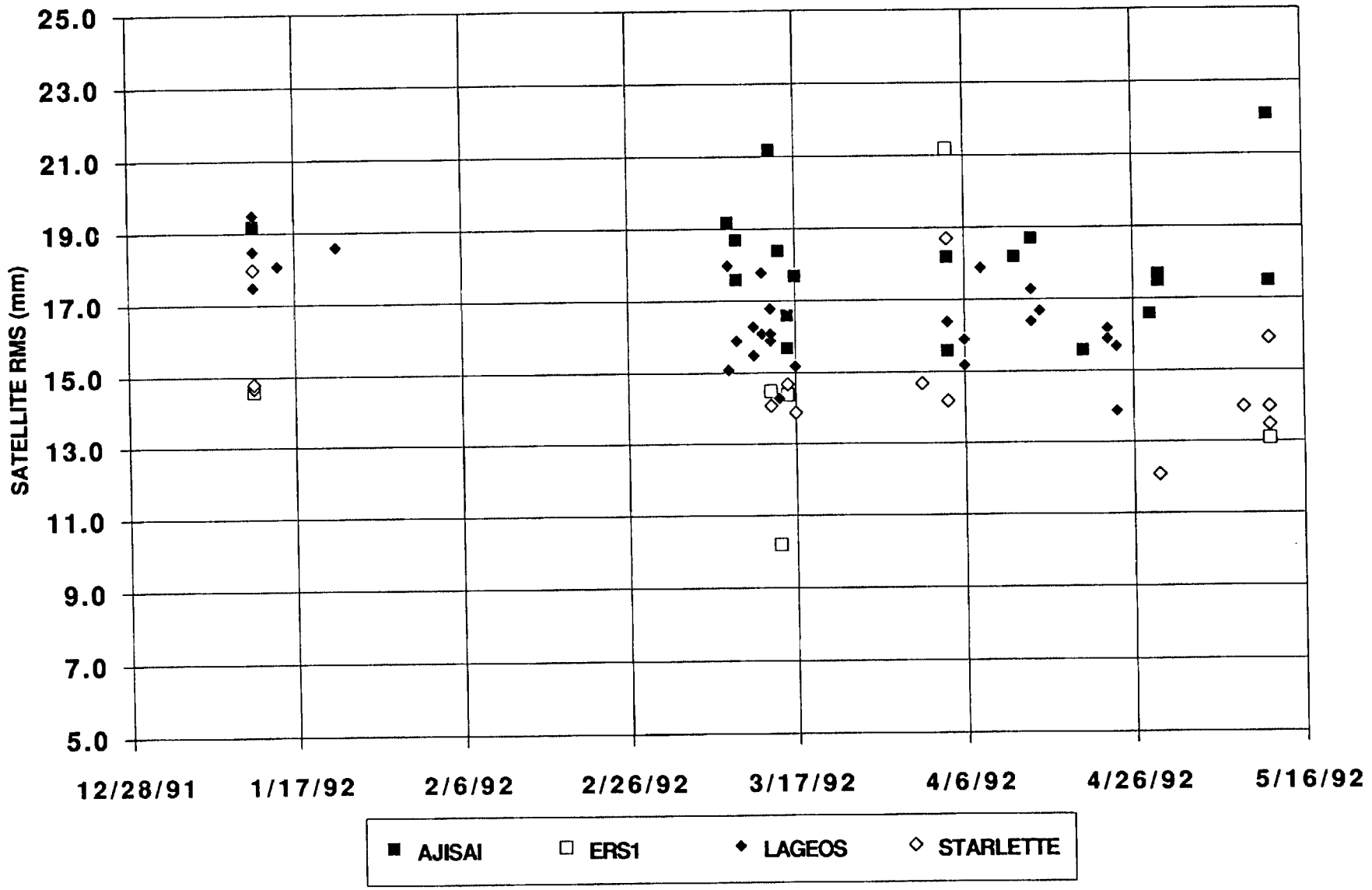

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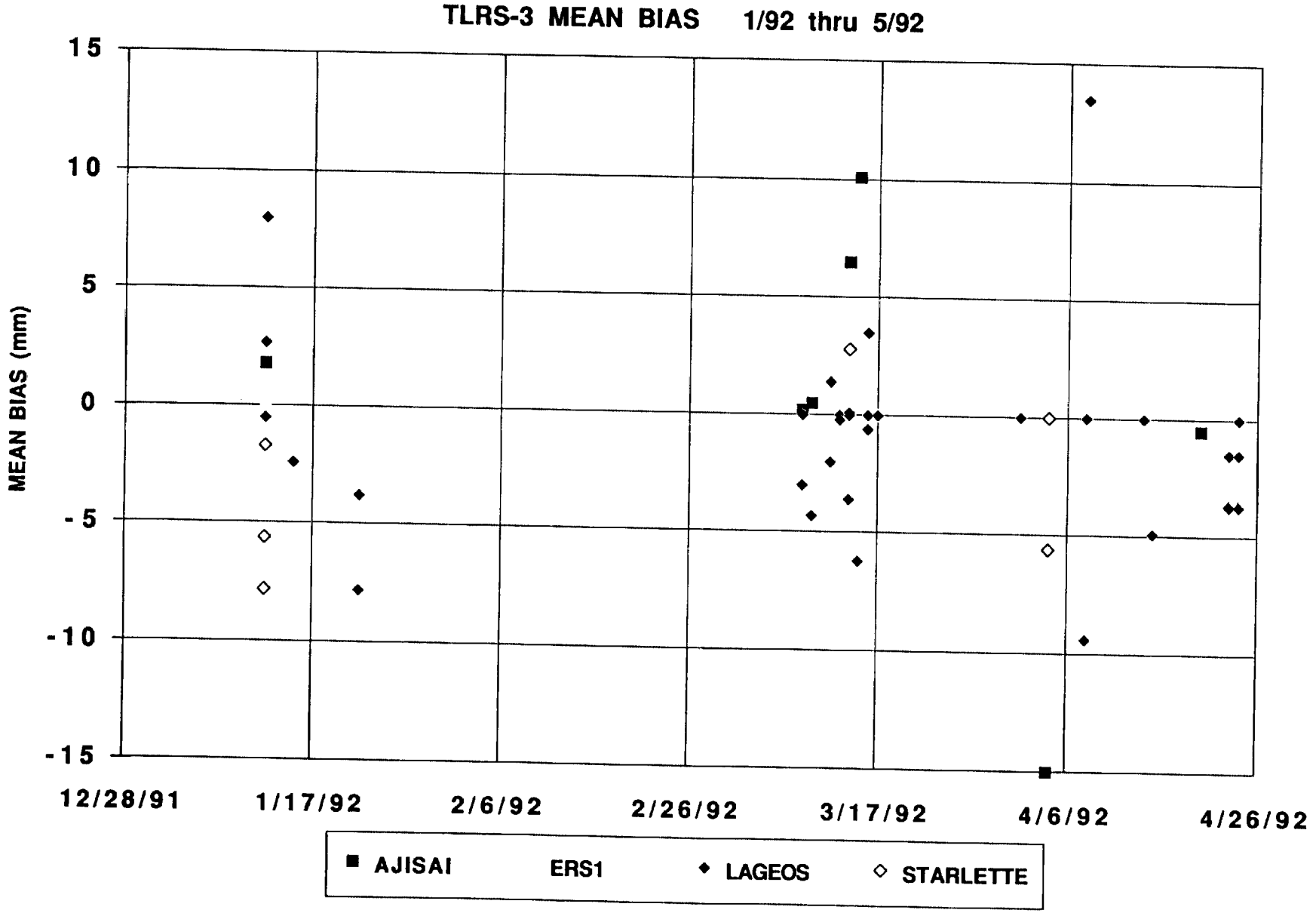

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