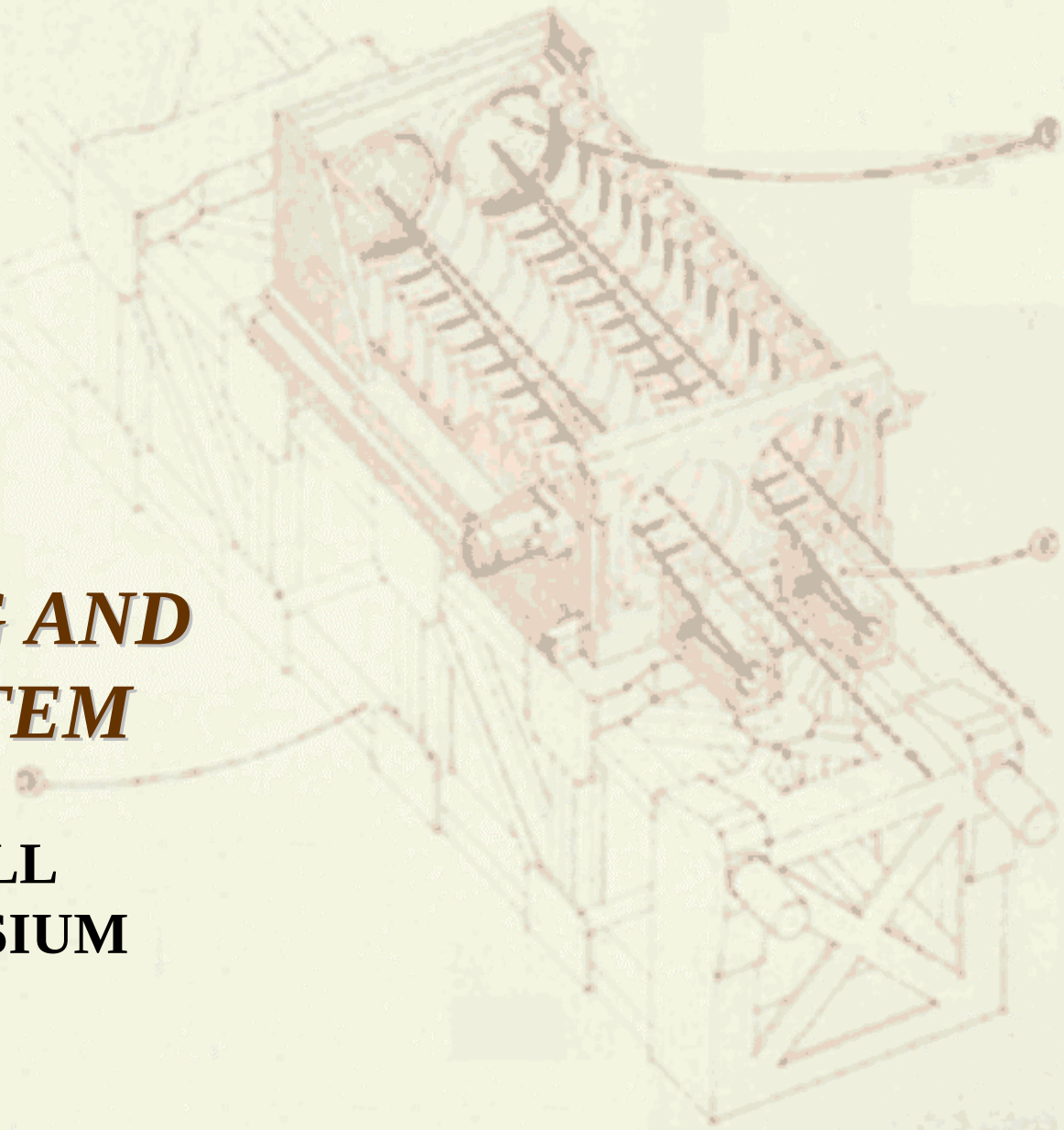


UVSTAR 3

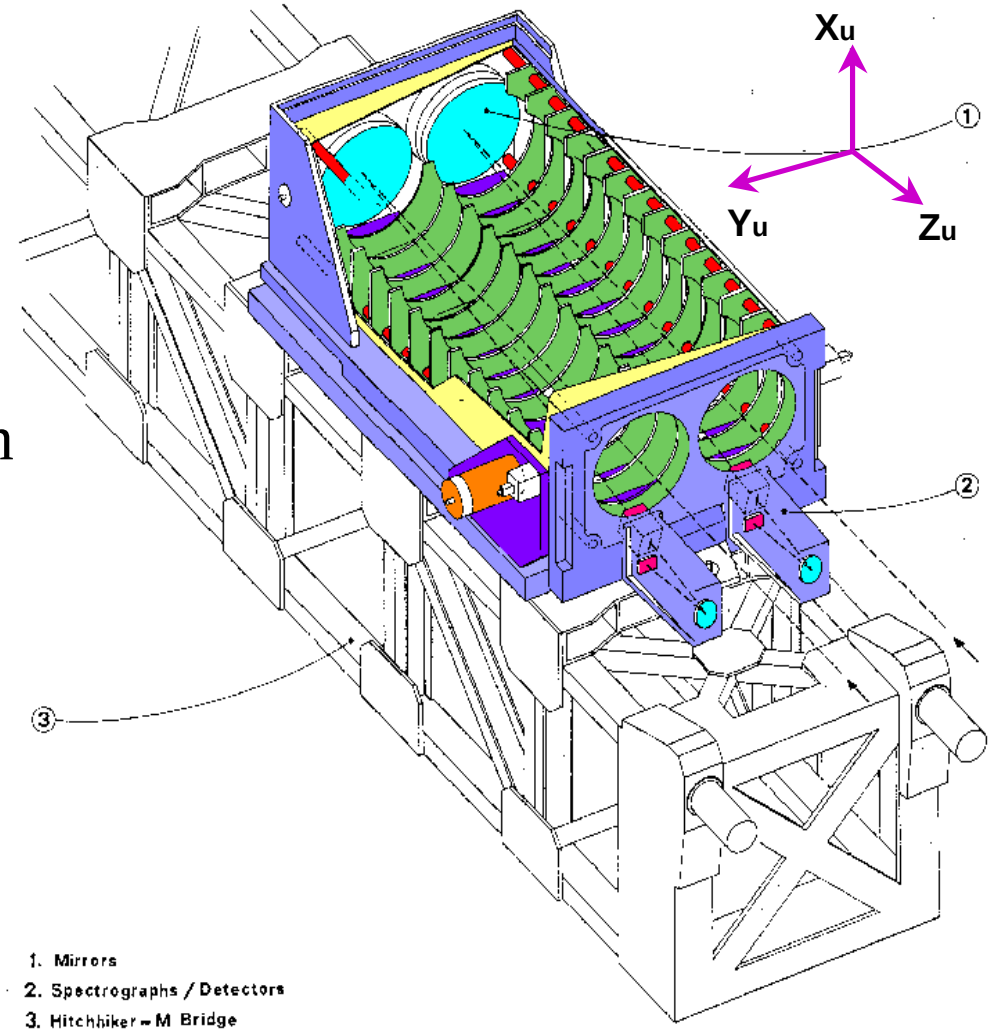
THE TRACKING AND POINTING SYSTEM

1999 SHUTTLE SMALL PAYLOADS SYMPOSIUM

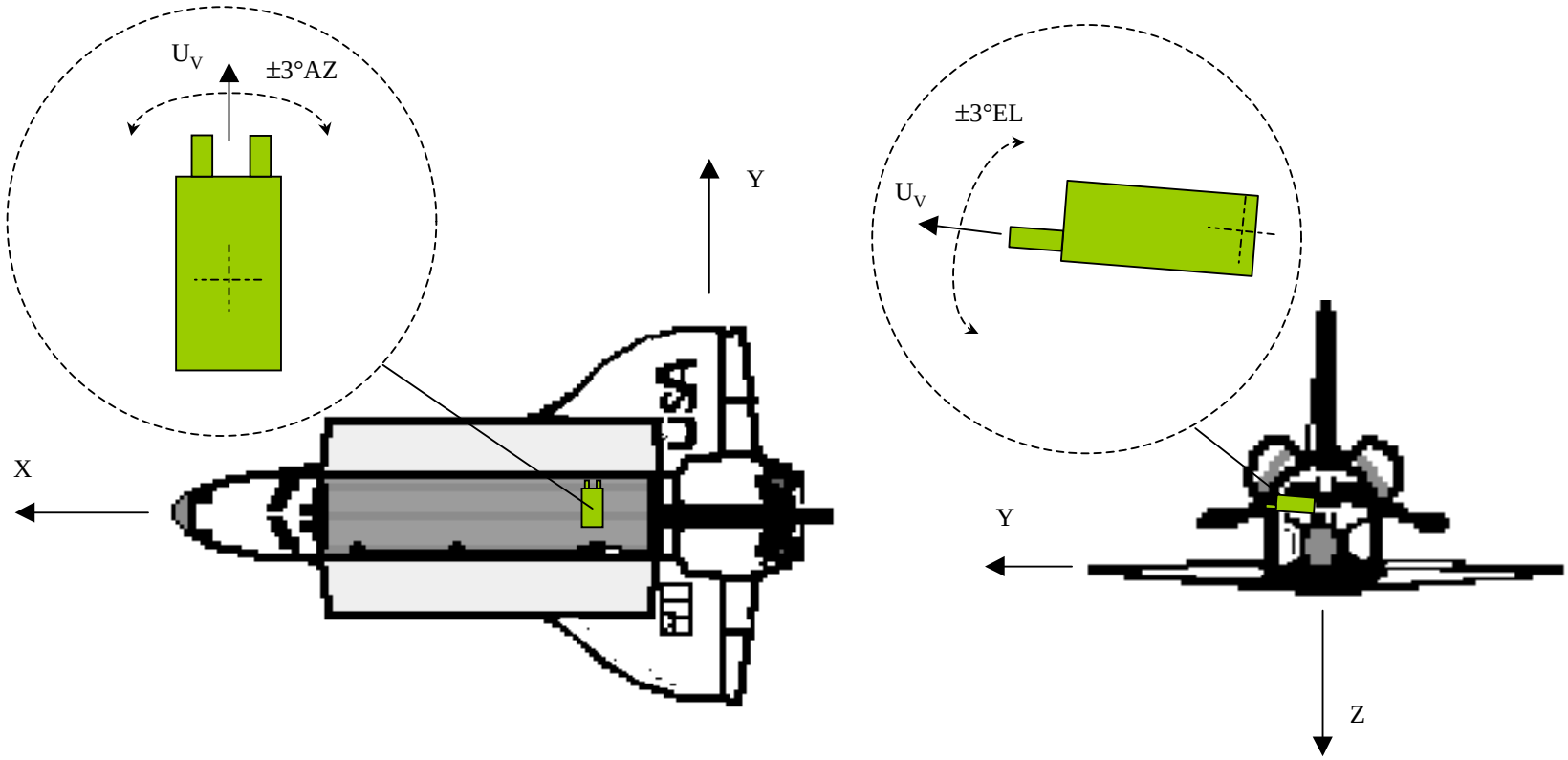
P.Trampus
CARSO, Center for Advanced Research in Space Optics, Trieste - Italy

THE TRACKING AND POINTING SYSTEM OF UVSTAR

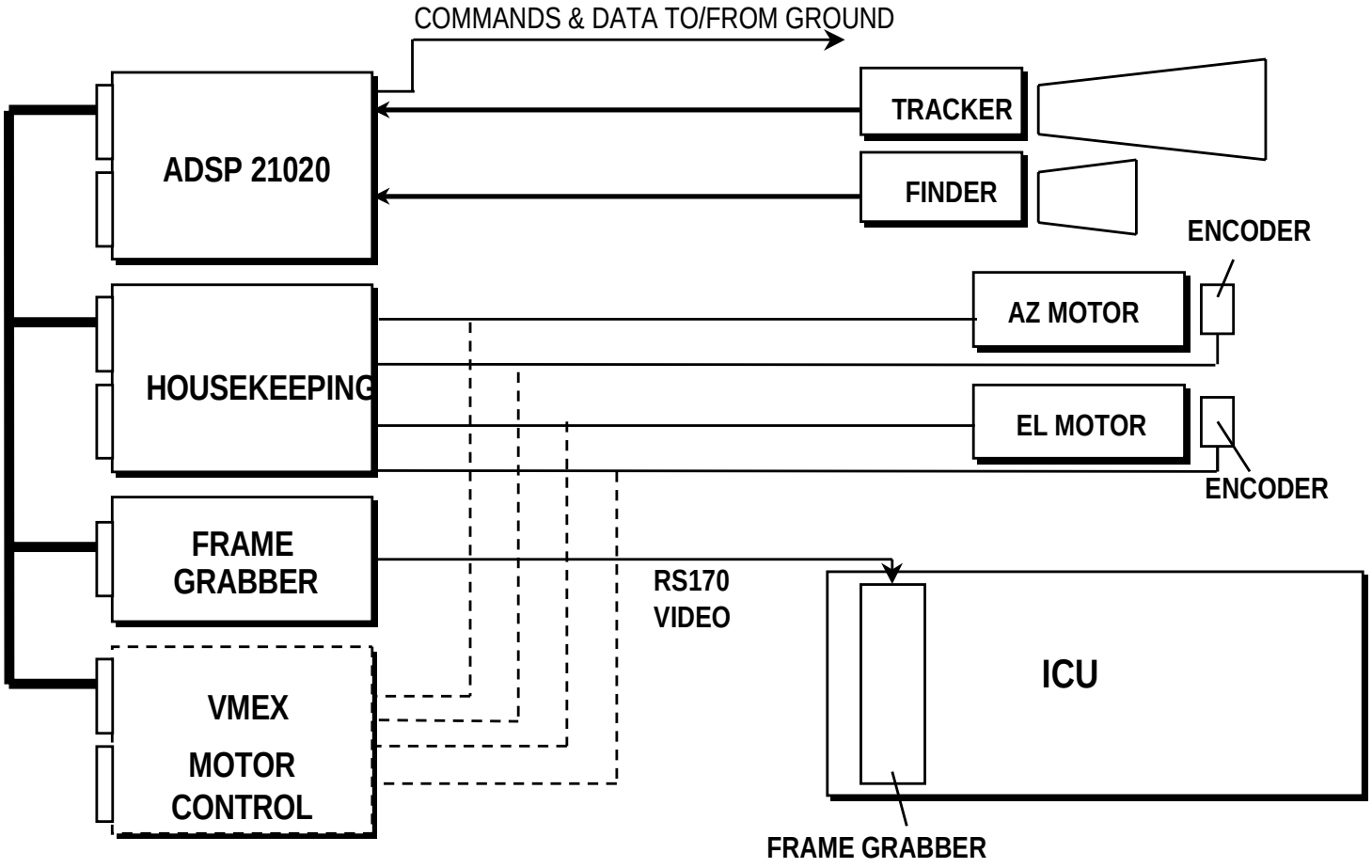
- UVSTAR pointing and tracking movement is around two motorized axes, elevation and azimuth, each with ±3° range. The system is fast and allows Shuttle motion compensation.



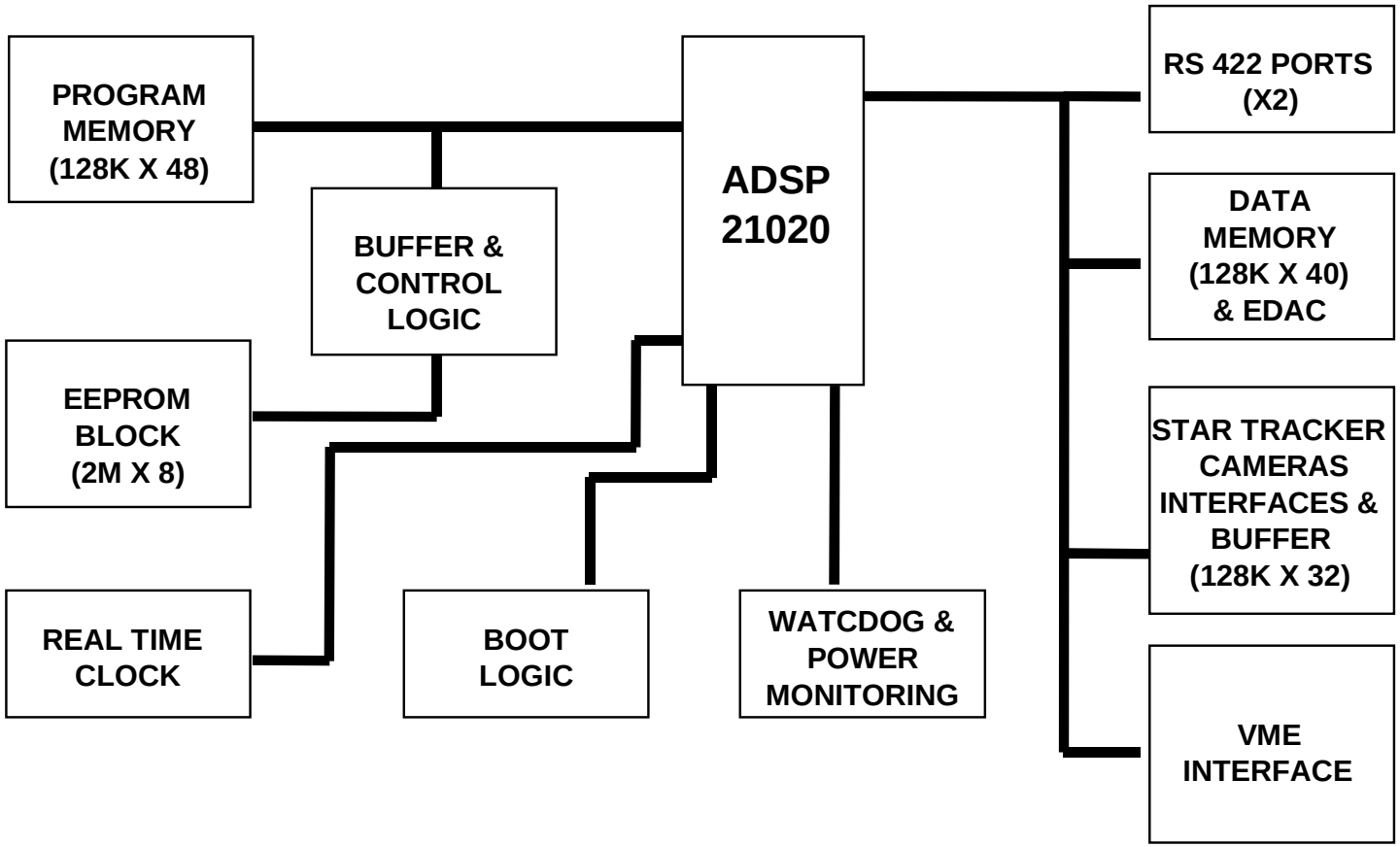
• UVSTAR ON SHUTTLE

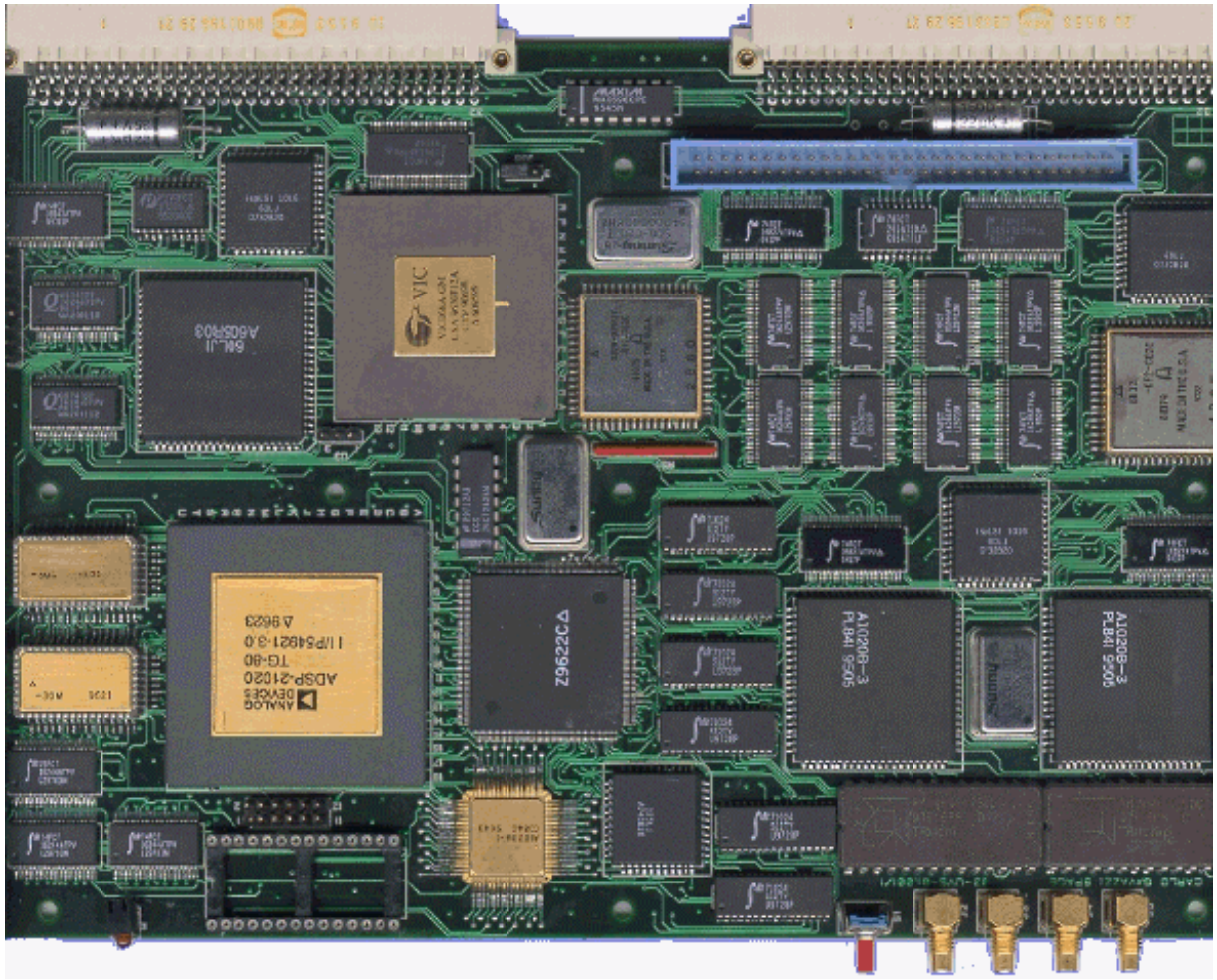


• FTCU

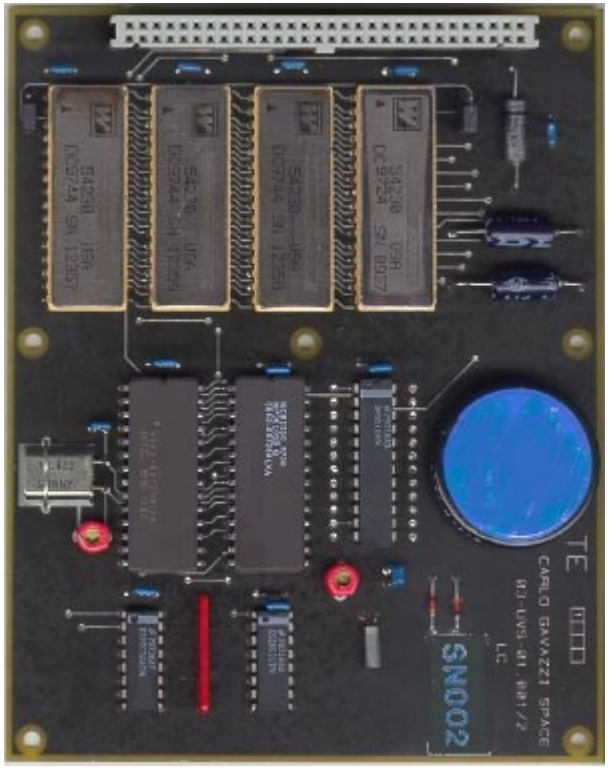

COMMANDS & DATA TO/FROM GROUND
ADSP 21020
TRACKER
FINDER
ENCODER
AZ MOTOR
HOUSEKEEPING
EL MOTOR
ENCODER
FRAME GRABBER
RS170 VIDEO
ICU
VMEX
MOTOR CONTROL
FRAME GRABBER

• DSP BOARD

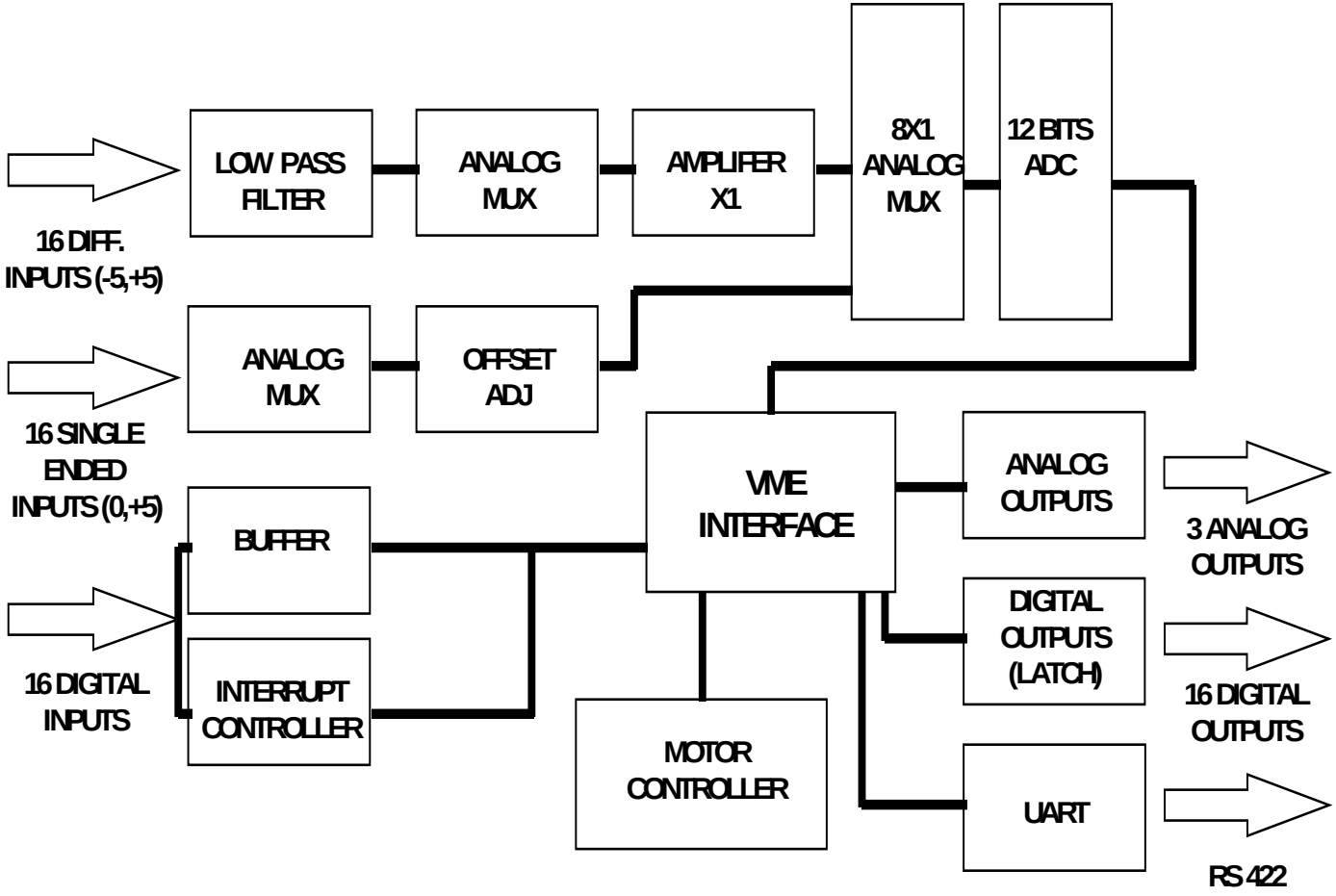

PROGRAM MEMORY (128K X 48)
BUFFER & CONTROL LOGIC
EEPROM BLOCK (2M X 8)
REAL TIME CLOCK
BOOT LOGIC
WATCDOG & POWER MONITORING
ADSP 21020
RS 422 PORTS (X2)
DATA MEMORY (128K X 40) & EDAC
STAR TRACKER CAMERAS INTERFACES & BUFFER (128K X 32)
VME INTERFACE

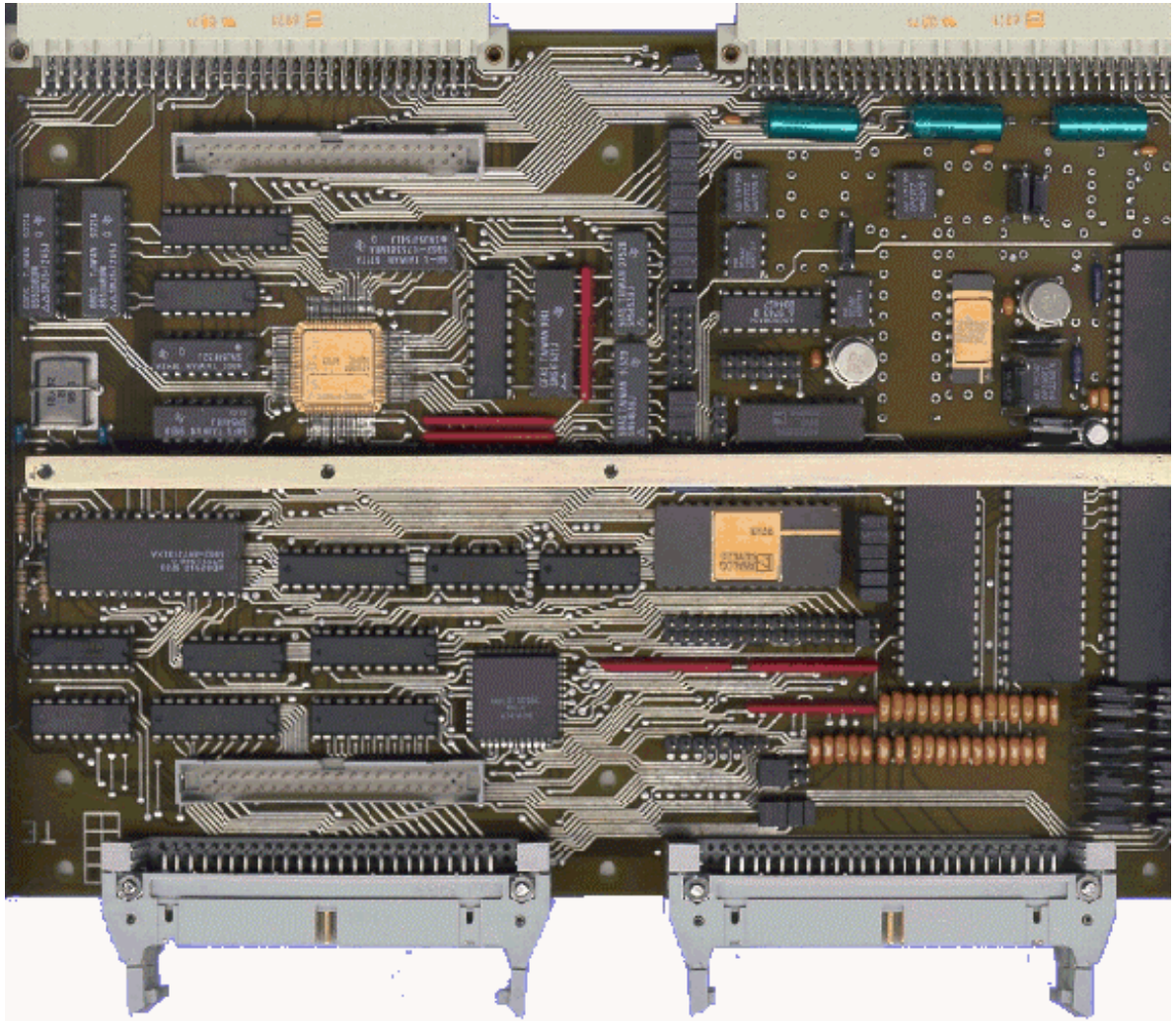


DSP BOARD

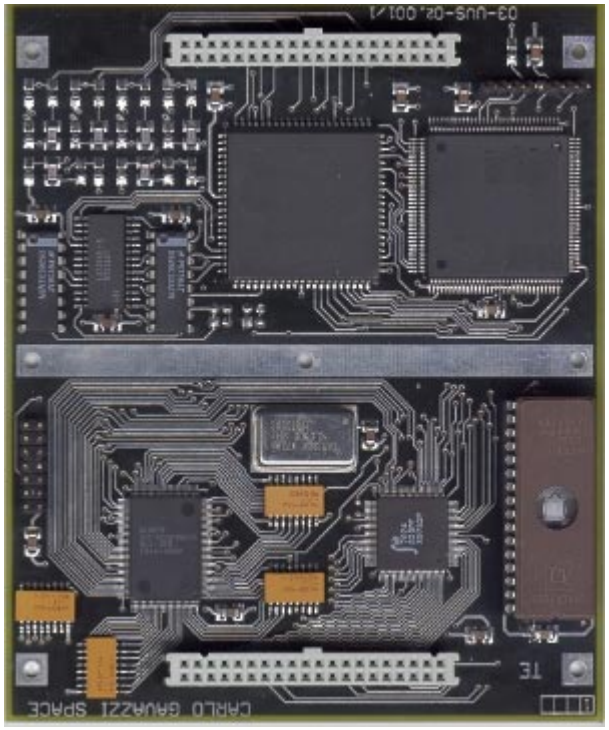


• HOUSEKEEPING BOARD





HOUSEKEEPING BOARD

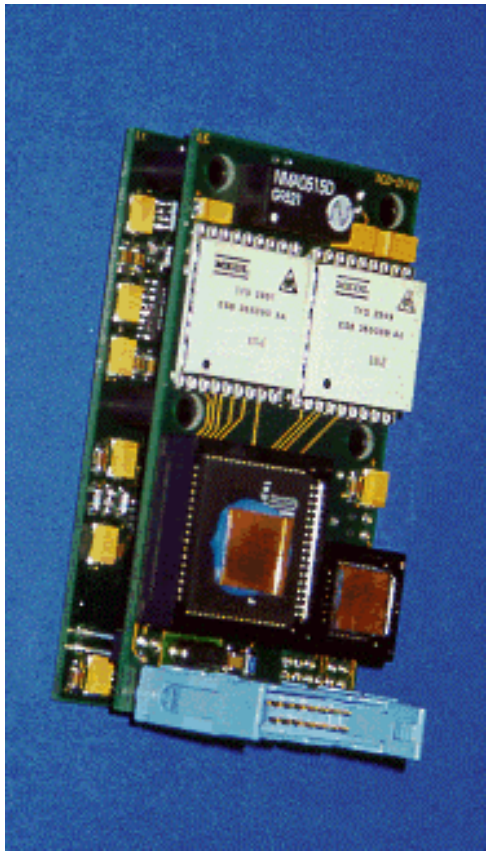


• POINTING SYSTEM TELESCOPES

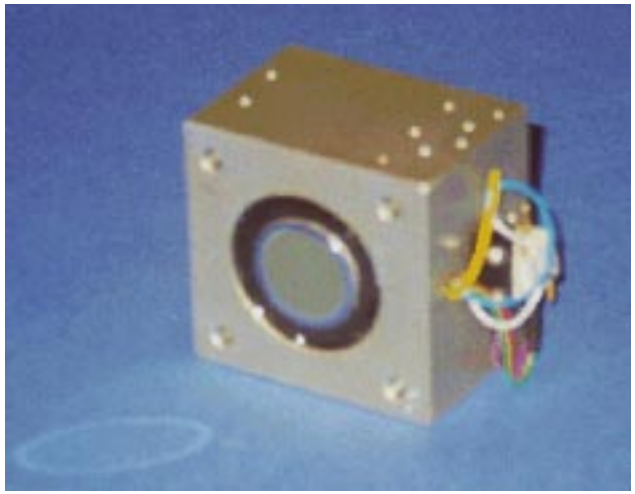
– **FINDER**
  - 75 mm-f1.2 lens
  - intensified CCD detector, 385 x 288 pixels
  - FOV : 6.5° x 4.5° (1 pixel ⇔ 60 arcsec)

– **TRACKER**
  - 1500 mm-f15 Cassegrain telescope
  - intensified CCD detector, 385 x 288 pixels
  - FOV : 0.32° x 0.24° (same as the science telescope) (1 pixel ⇔ 3 arcsec)

CCD CAMERA

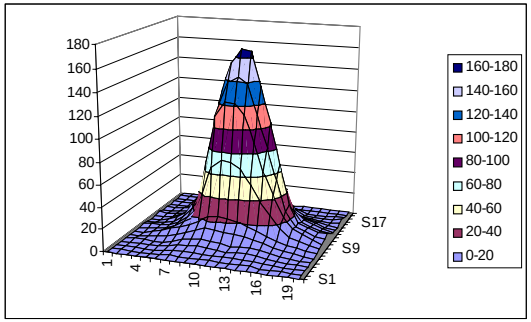


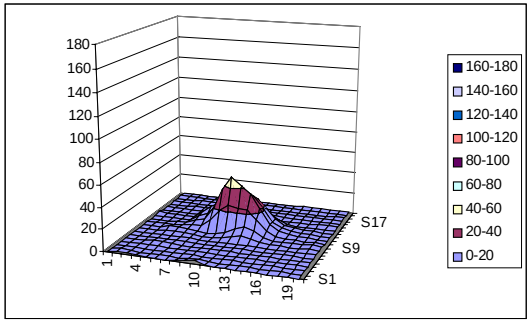
INTENSIFIER

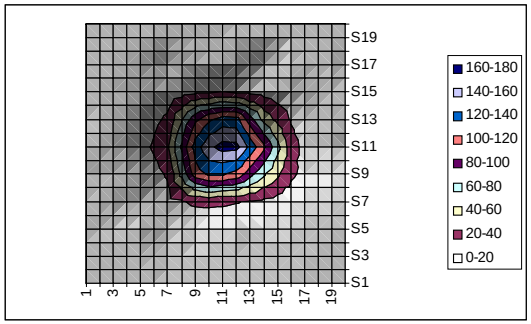


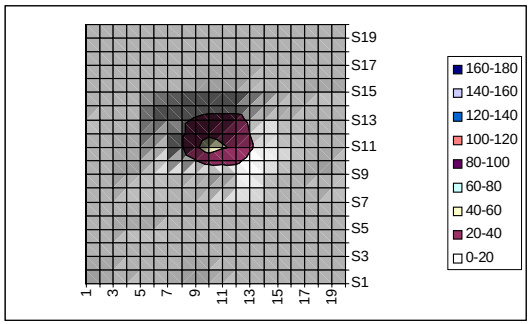
THE TRACKING AND POINTING SYSTEM OF UVSTAR

Mgv 1.6

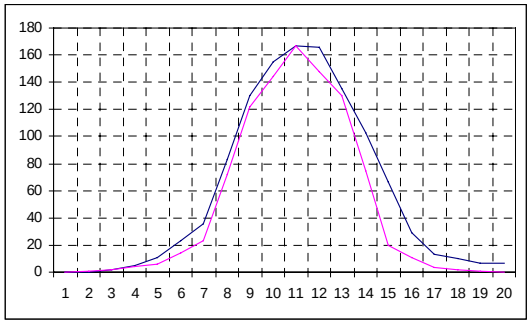


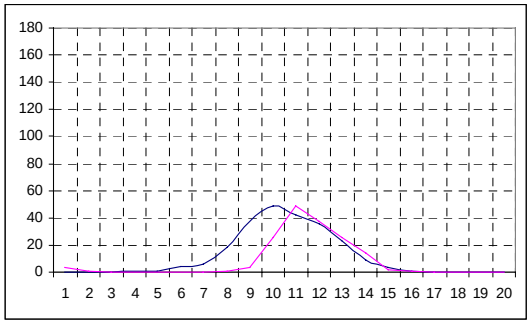






Mgv 3.7





- Pointing Modes

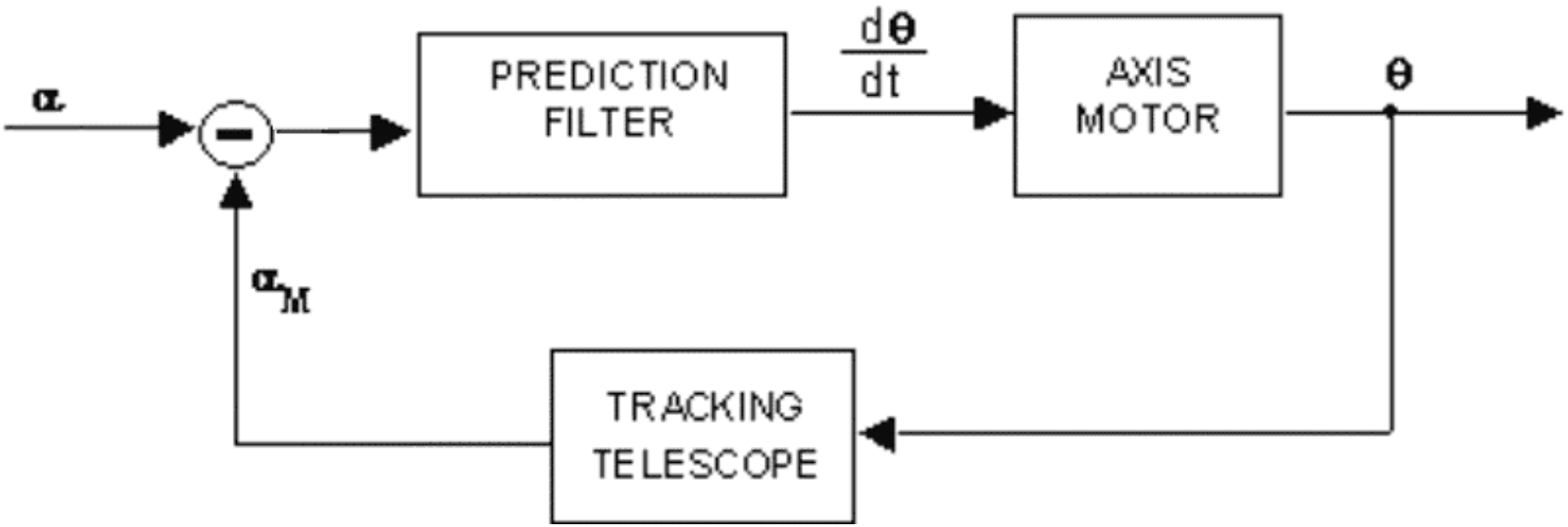
FINDER: **ATTITUDE** **STAR**

- Tracking Modes

FINDER: **ATTITUDE** **TRIAGULATION** **STAR**

TRACKER: **CCD** **PSD**

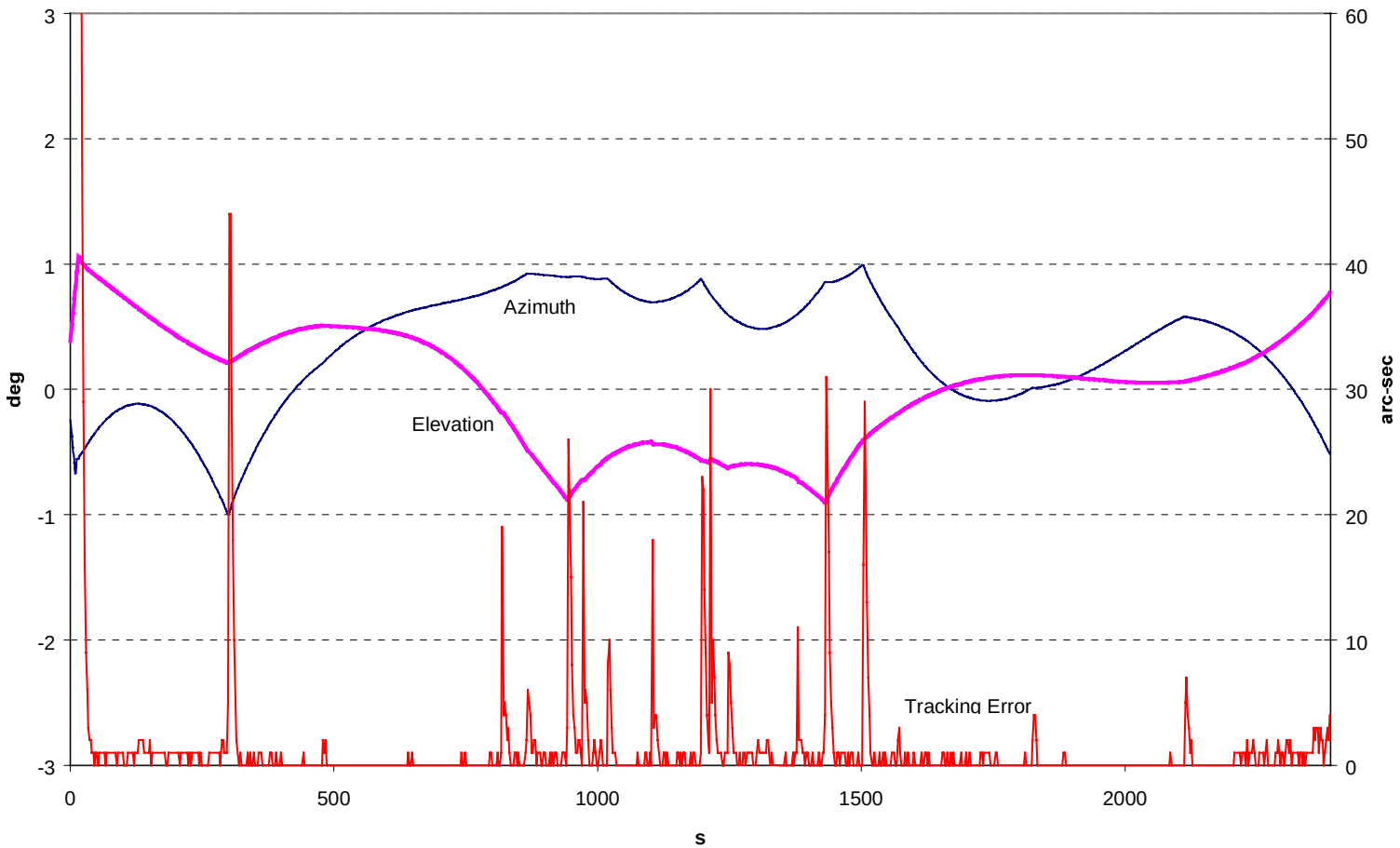
• TRACKING CONTROL LOOP



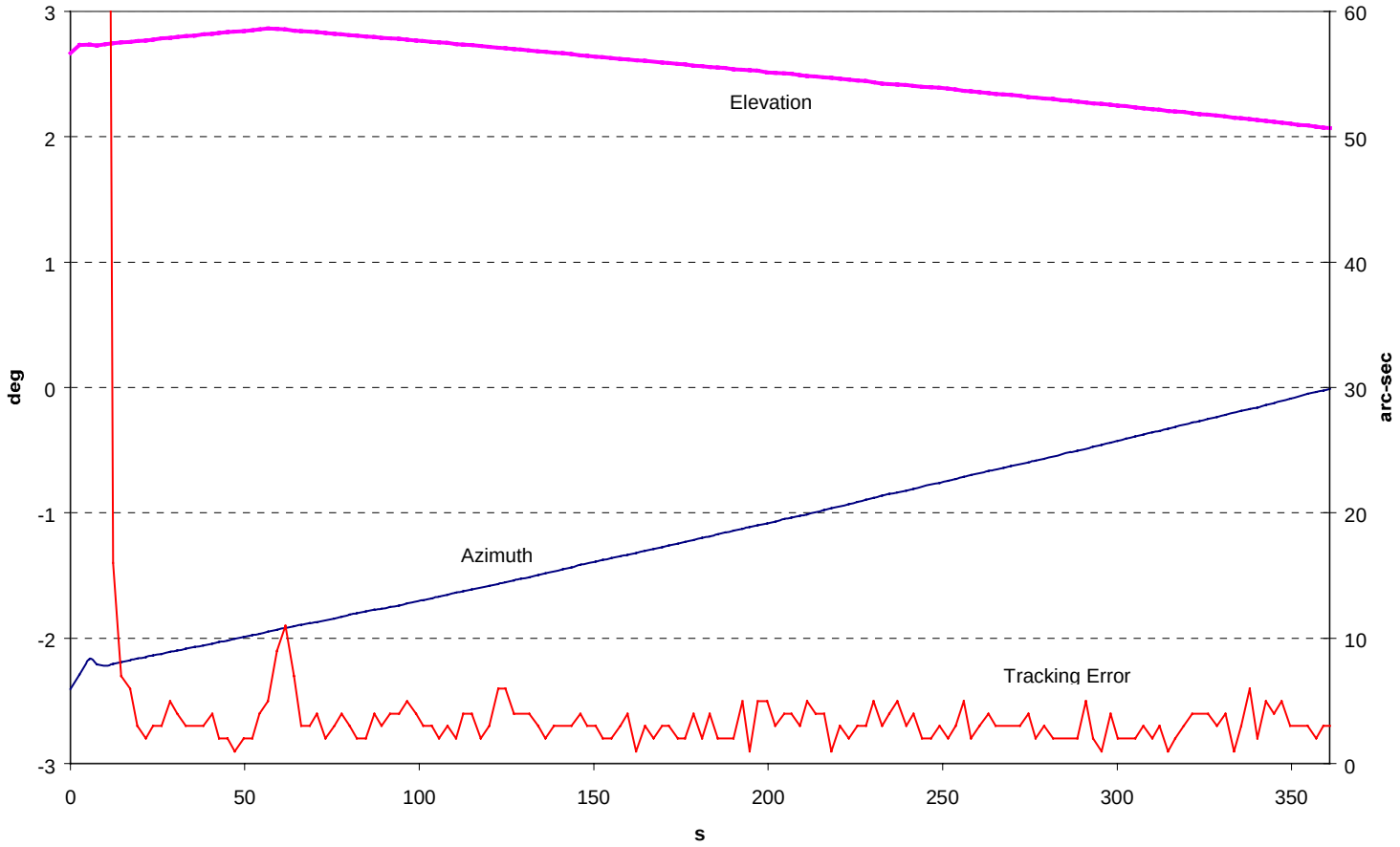
• TRACKING PERFORMANCES

	Jupiter	**Celestial**	**All**	
Tracking sessions	13	39	52	
Total observation time	420	327	747	min
Mean tracking error	2.31	4.89	3.73	arc-sec
Mean tracking error without alignment phases	**1.95**	**4.48**	**3.35**	**arc-sec**
Mean tracking session duration	32.3	8.4	14.4	min
Longest observation	47.8	39.4	47.8	min
Shortest observation	11.2	0.6	0.6	min

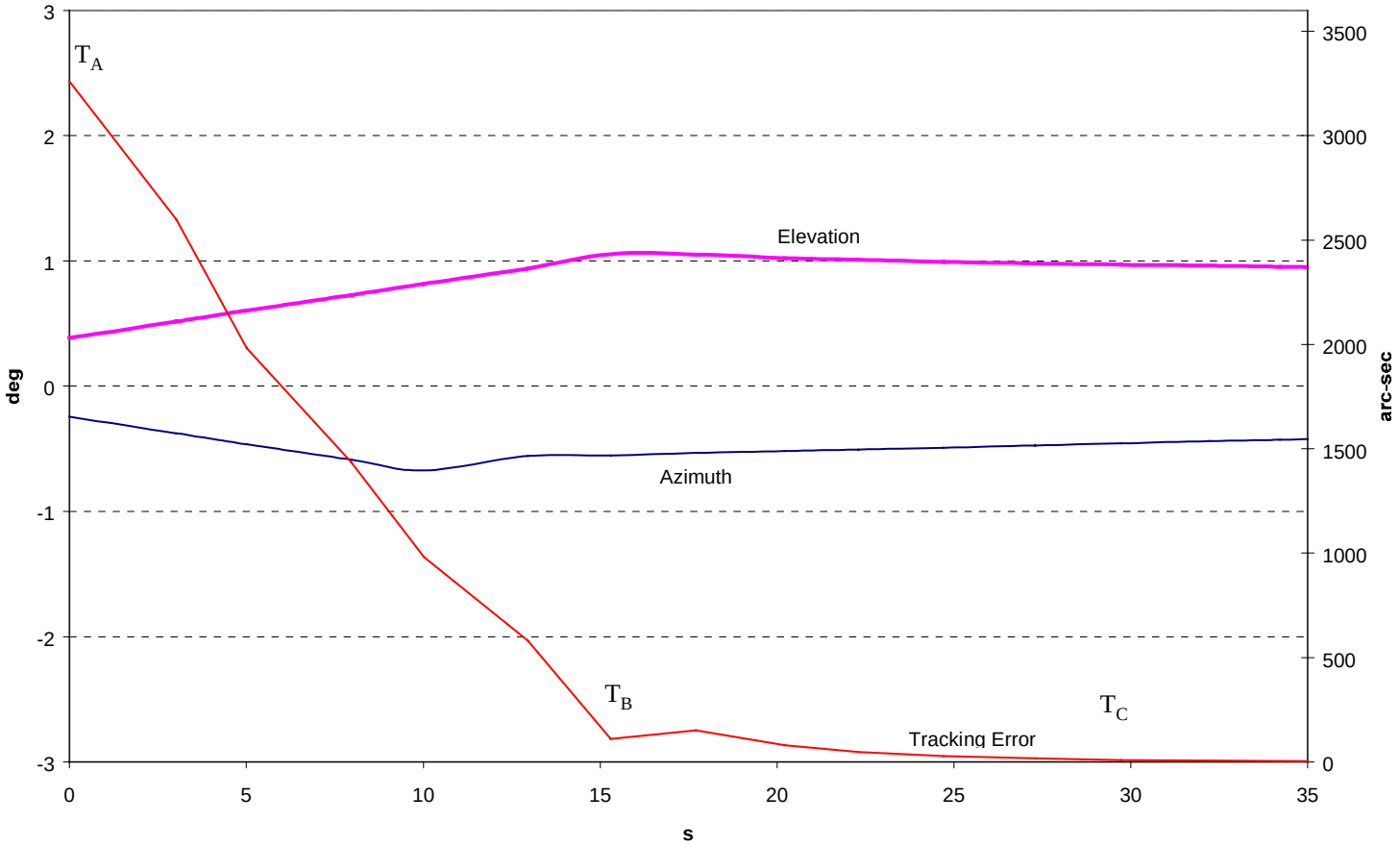
- **MET 2:16:08 ; Tracking error curve. Jupiter**



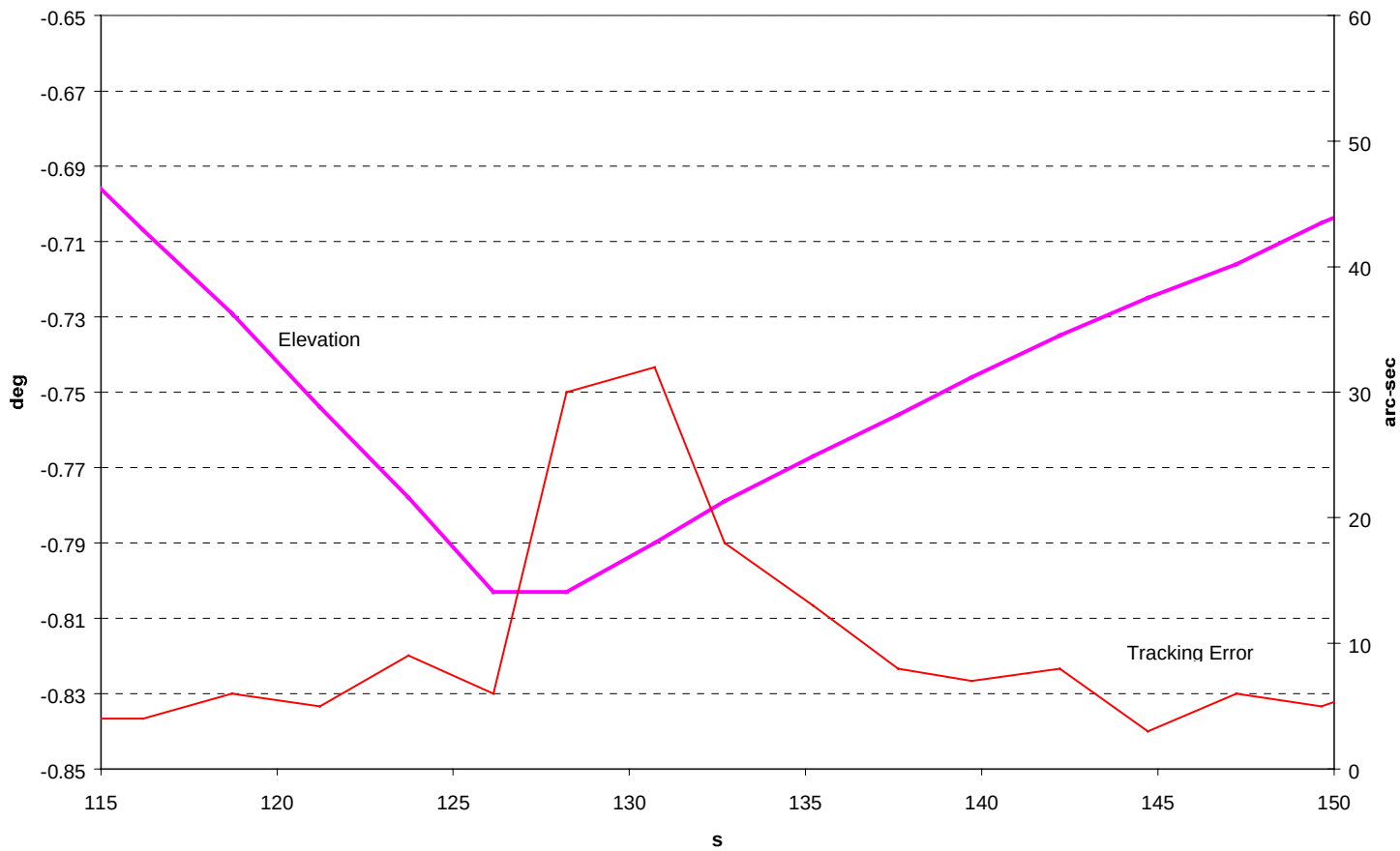
- **MET 4:19:38 ; Tracking error curve. HD 133792 (mgv=6.25)**

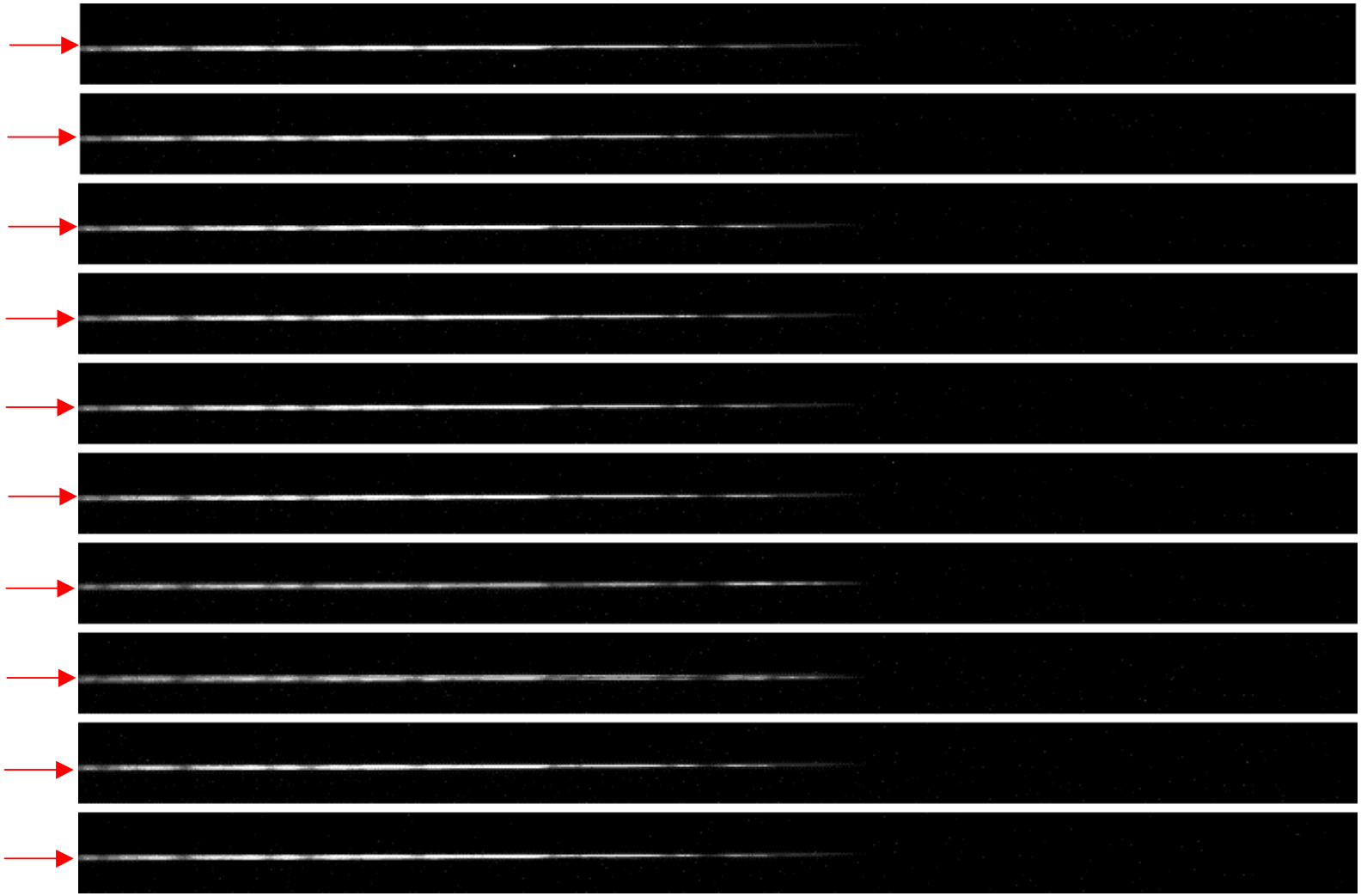
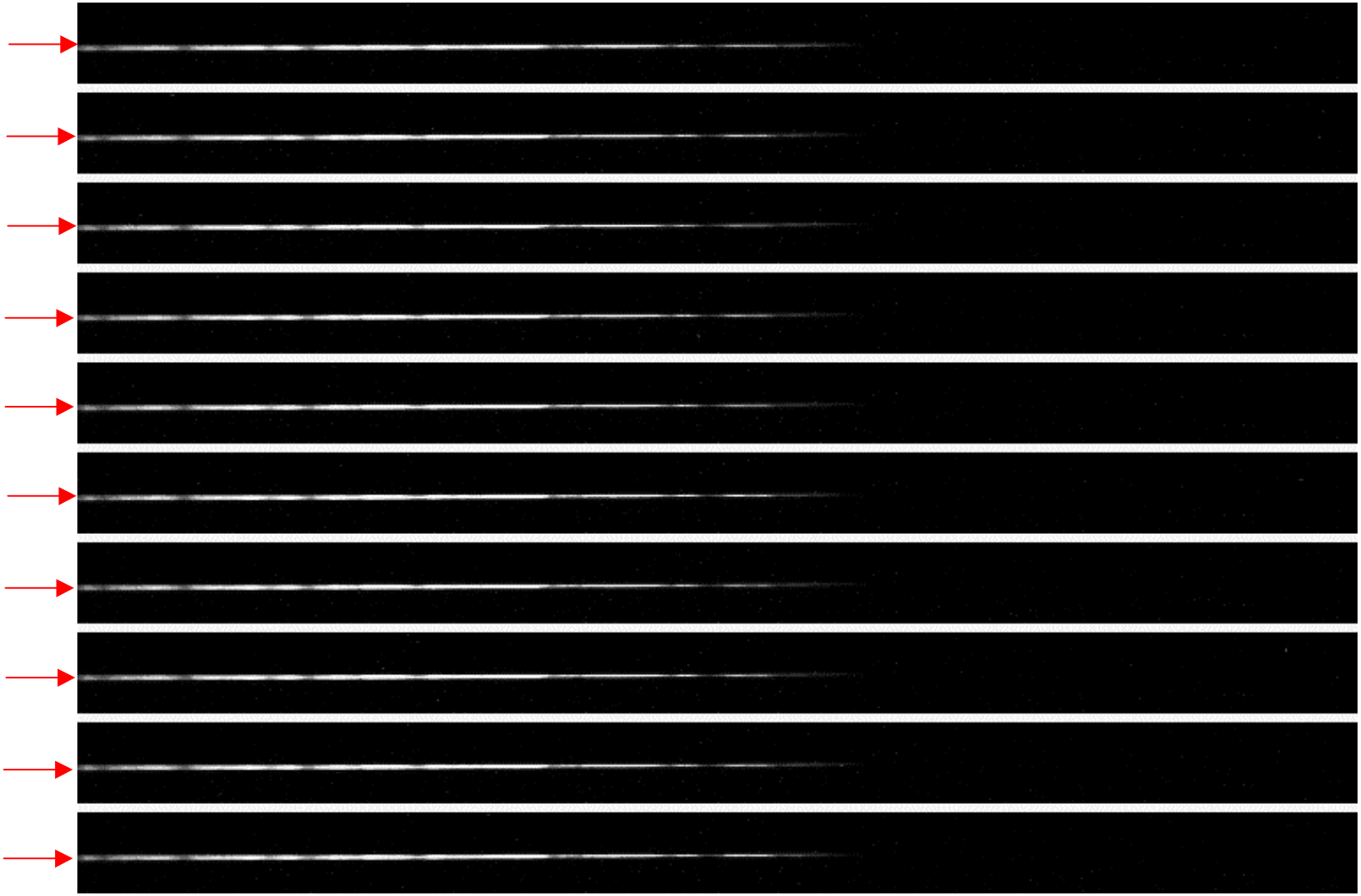
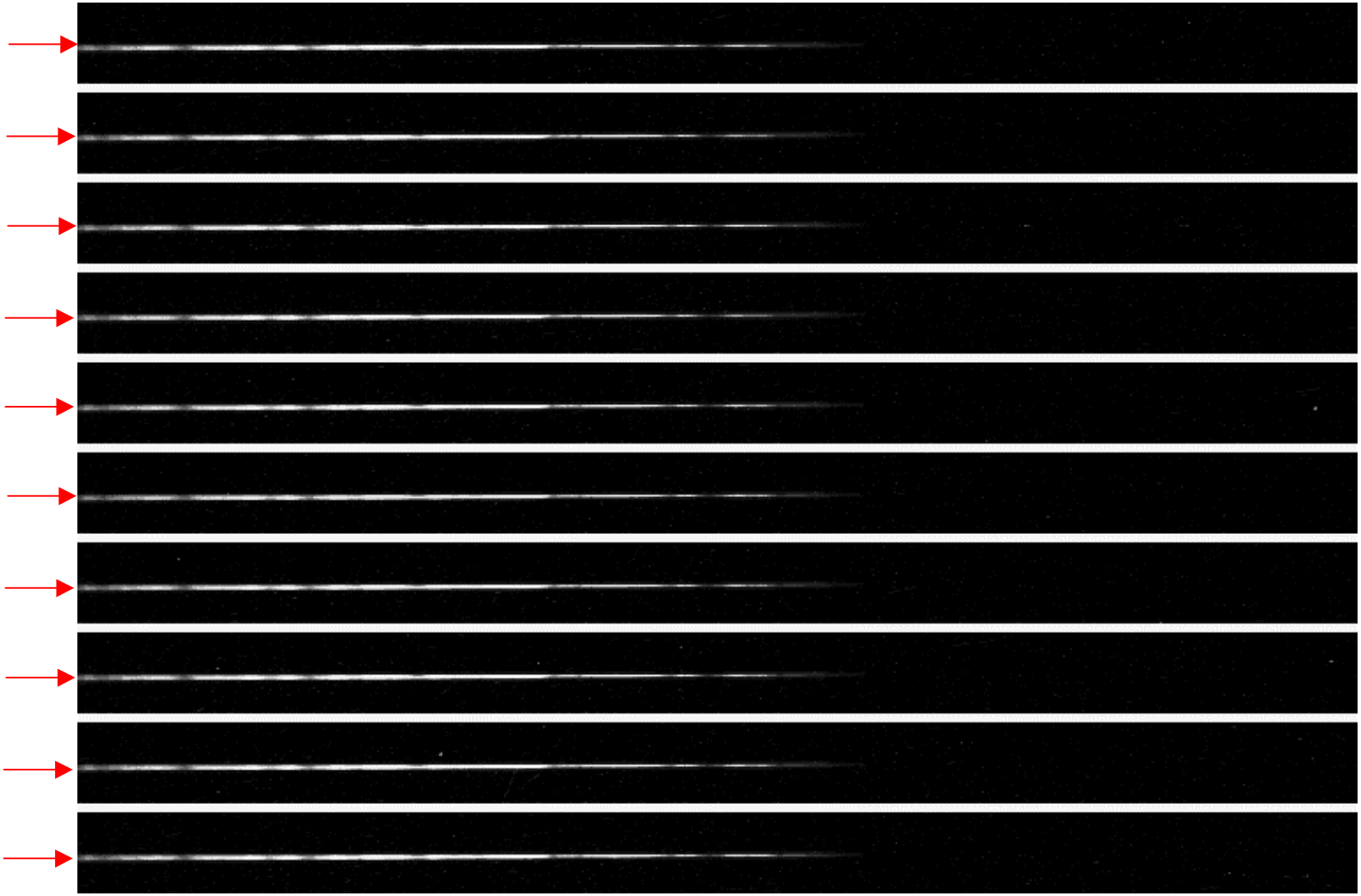
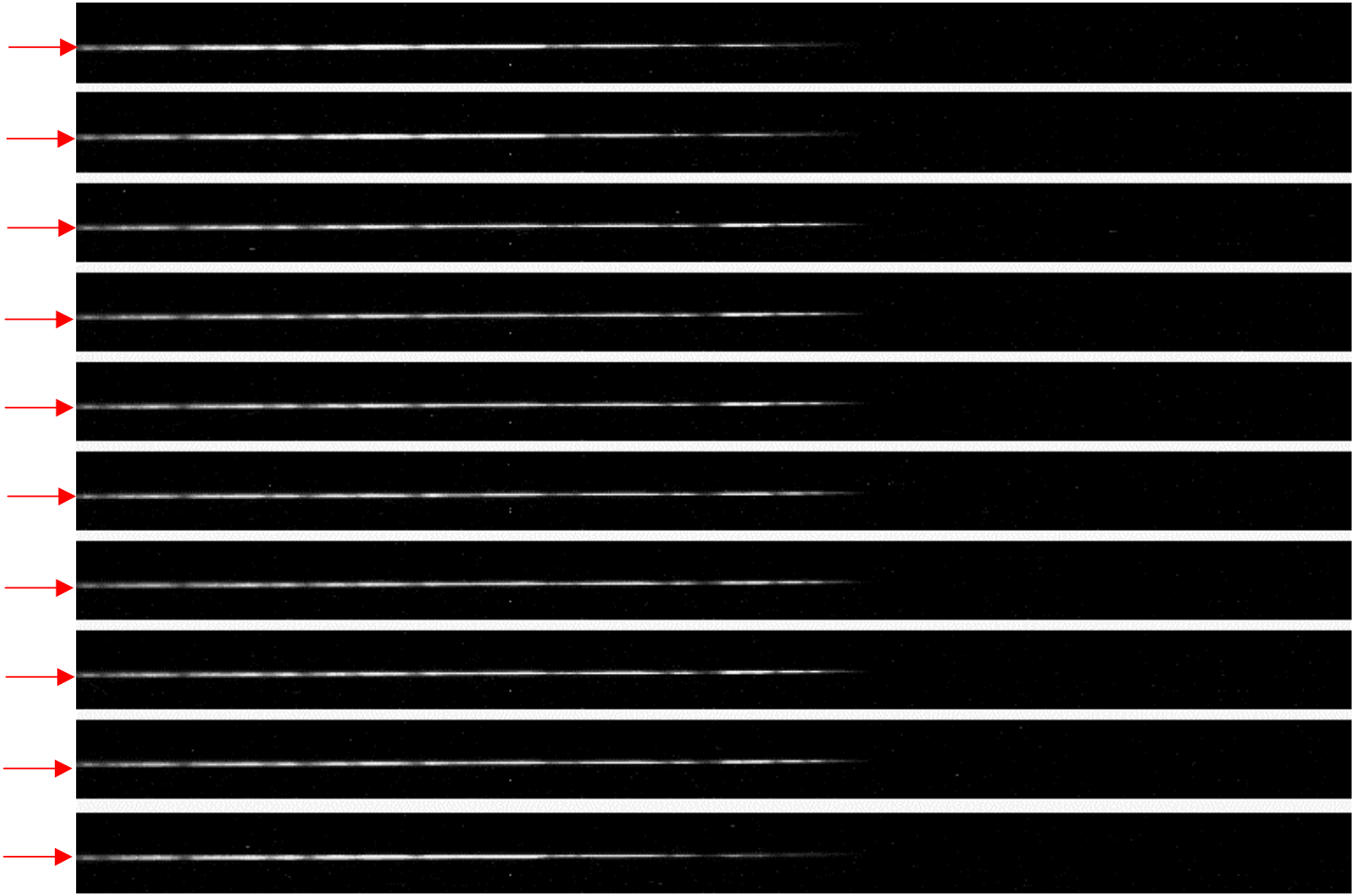


- **End of catching phase and beginning of tracking**



- **Tracking curve of the external galaxy F9 (mgv=13.23)**





εCMa , 16.38 s exposure, 4x1 conf (1 pixel=1.56 arc-sec)