

Chandra Cal Workshop 2005

Chandra Aimpoint Drifts

Jonathan McDowell

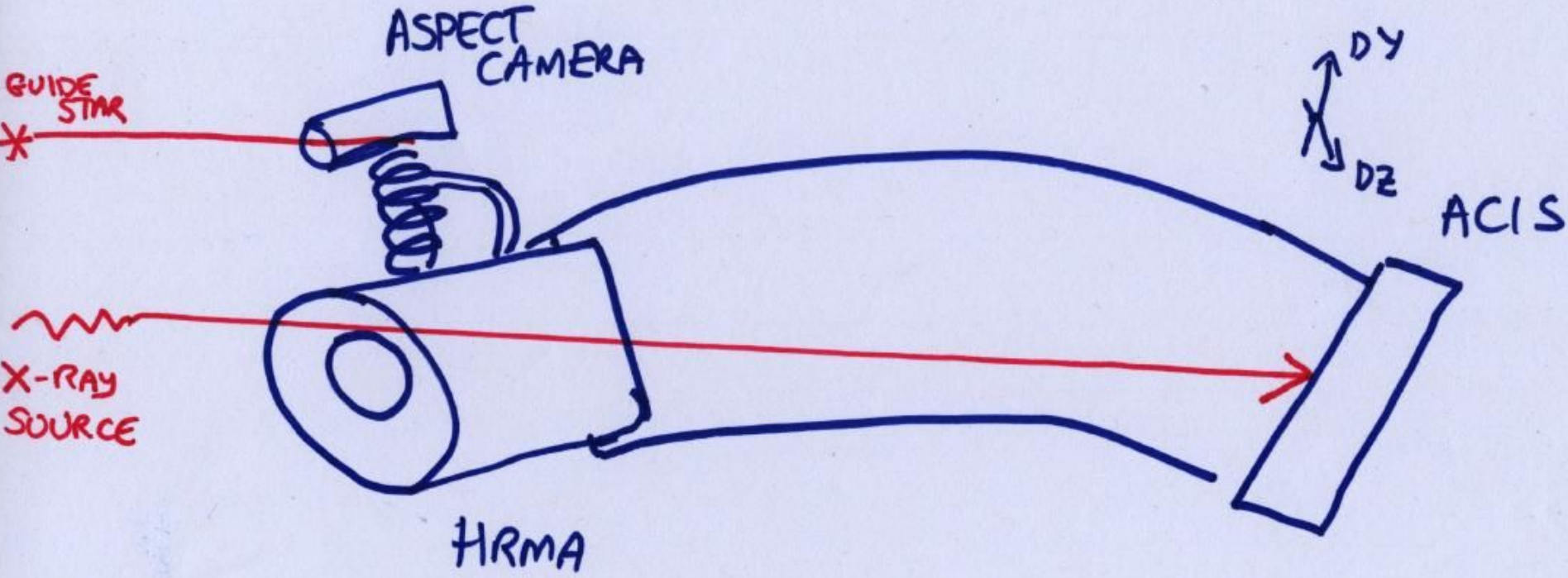
AIMPOINT GEOMETRY STUDY

- Tom Aldcroft – Aspect pipeline and calibration
- Ping Zhao – Optical axis measurements
- Jonathan McDowell – integrated study of aimpoint motions over mission lifetime
- Part of ongoing SDS support of the interface between analysis software and coordination

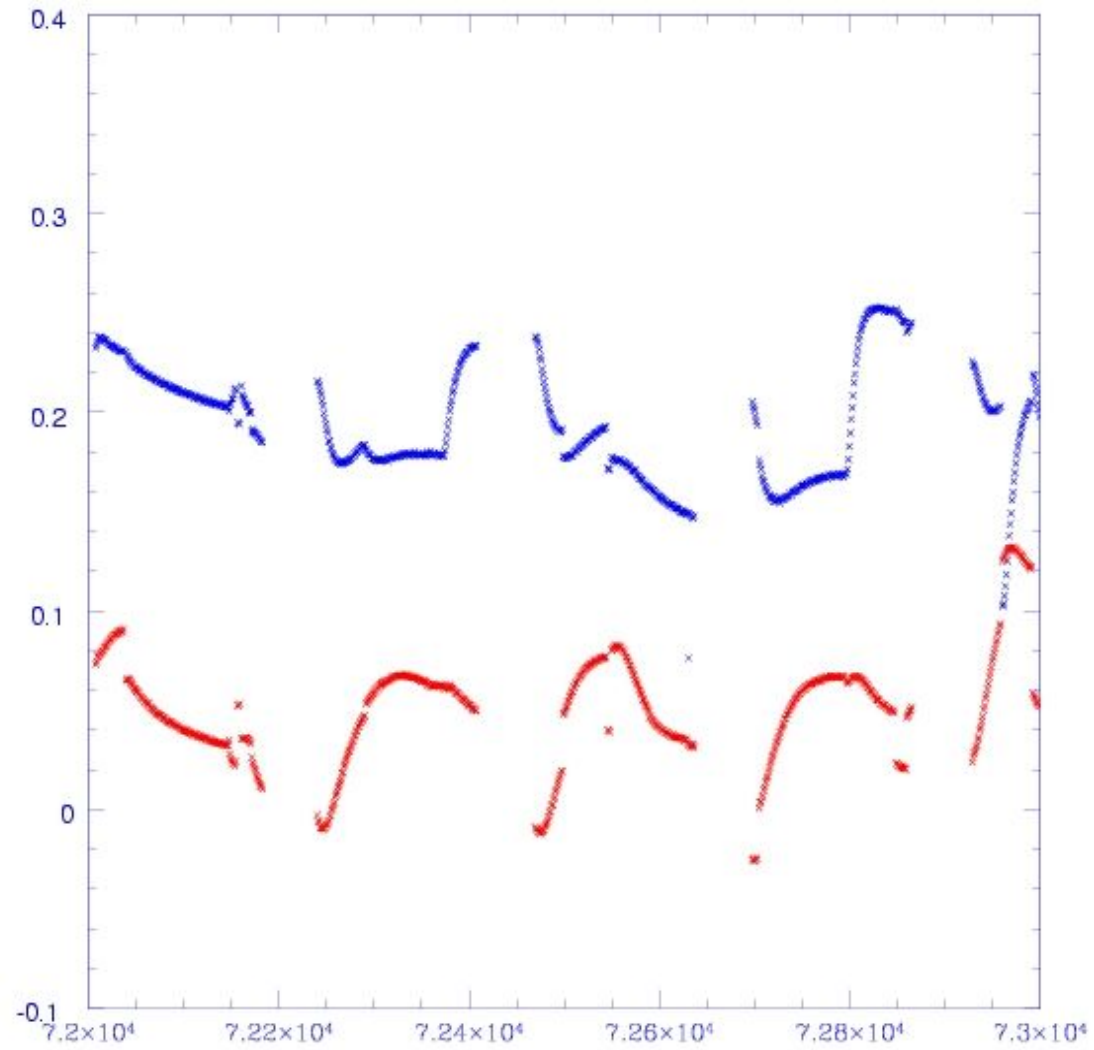
AIMPOINT GEOMETRY STUDY

- Optical Axis: the axis normal to the focal surface that goes through the best focus position
- Nominal optical axis: a fictitious approximation to the optical axis that we use in the ASOL files – the RA and Dec are of this axis
- Aimpoint – the chip coordinates where the target coordinates specified by the user land

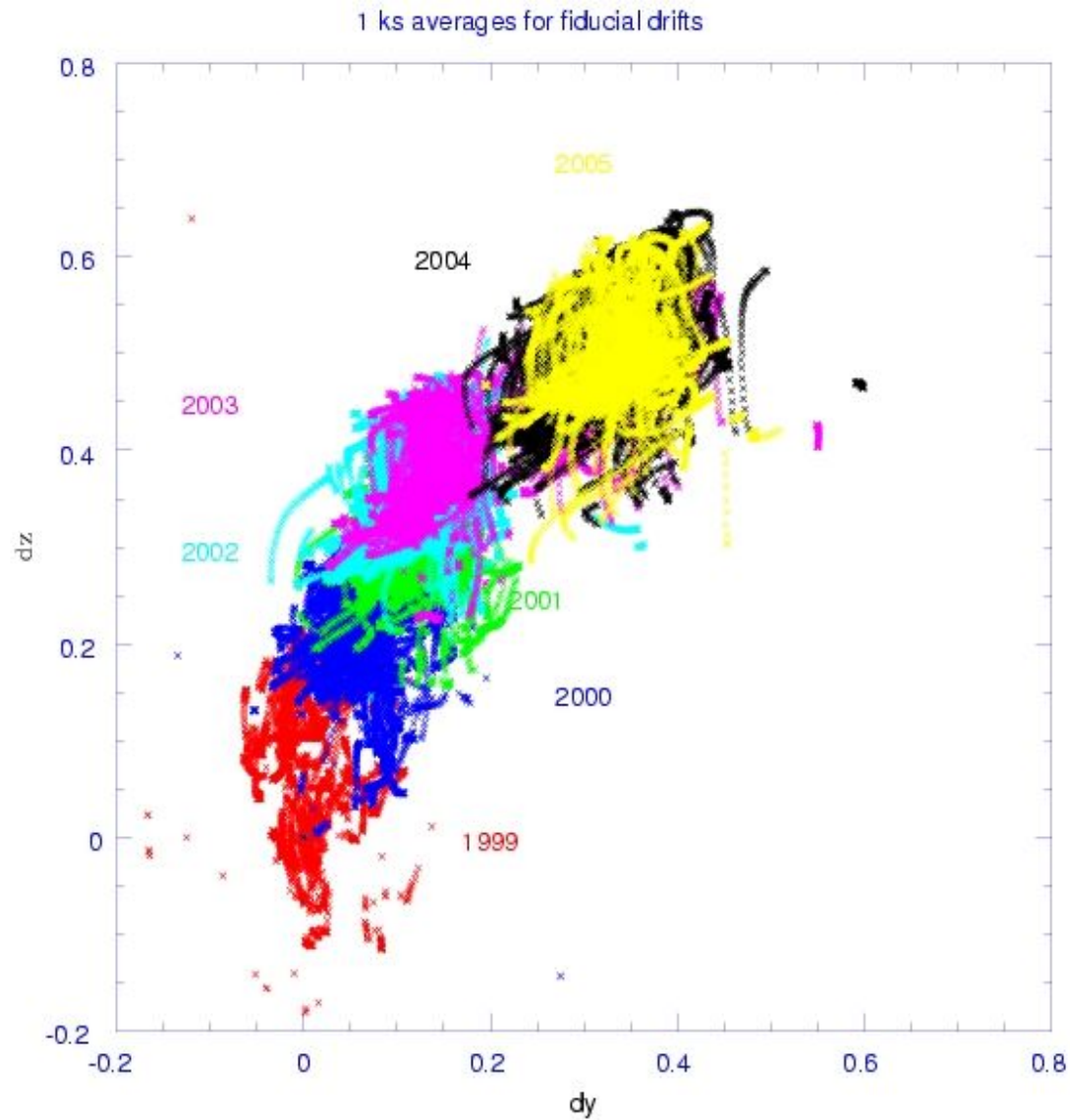
Chandra Geometry



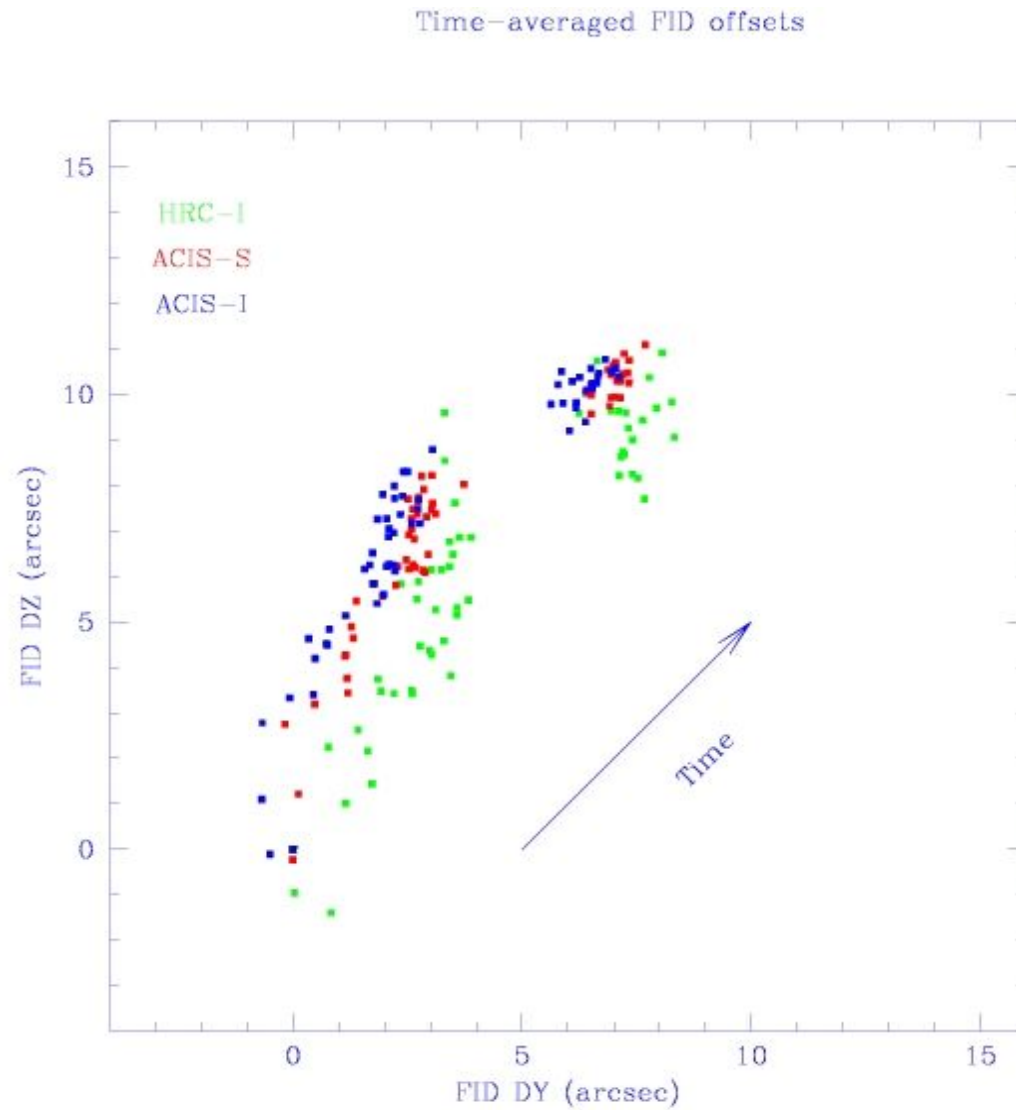
Aimpoint variation on orbital timescale



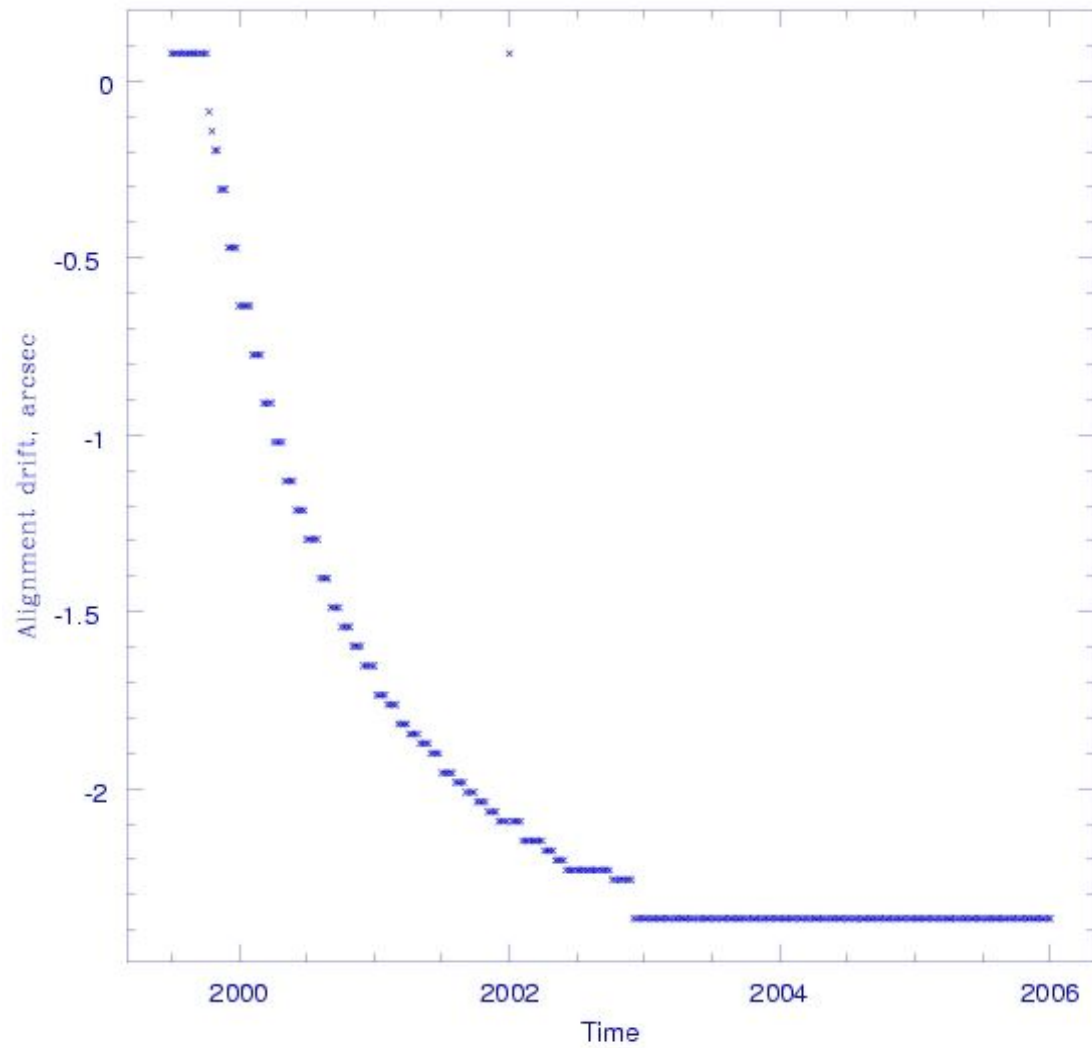
Fiducial drifts 1999-2005 (in mm, 1 ks averages)



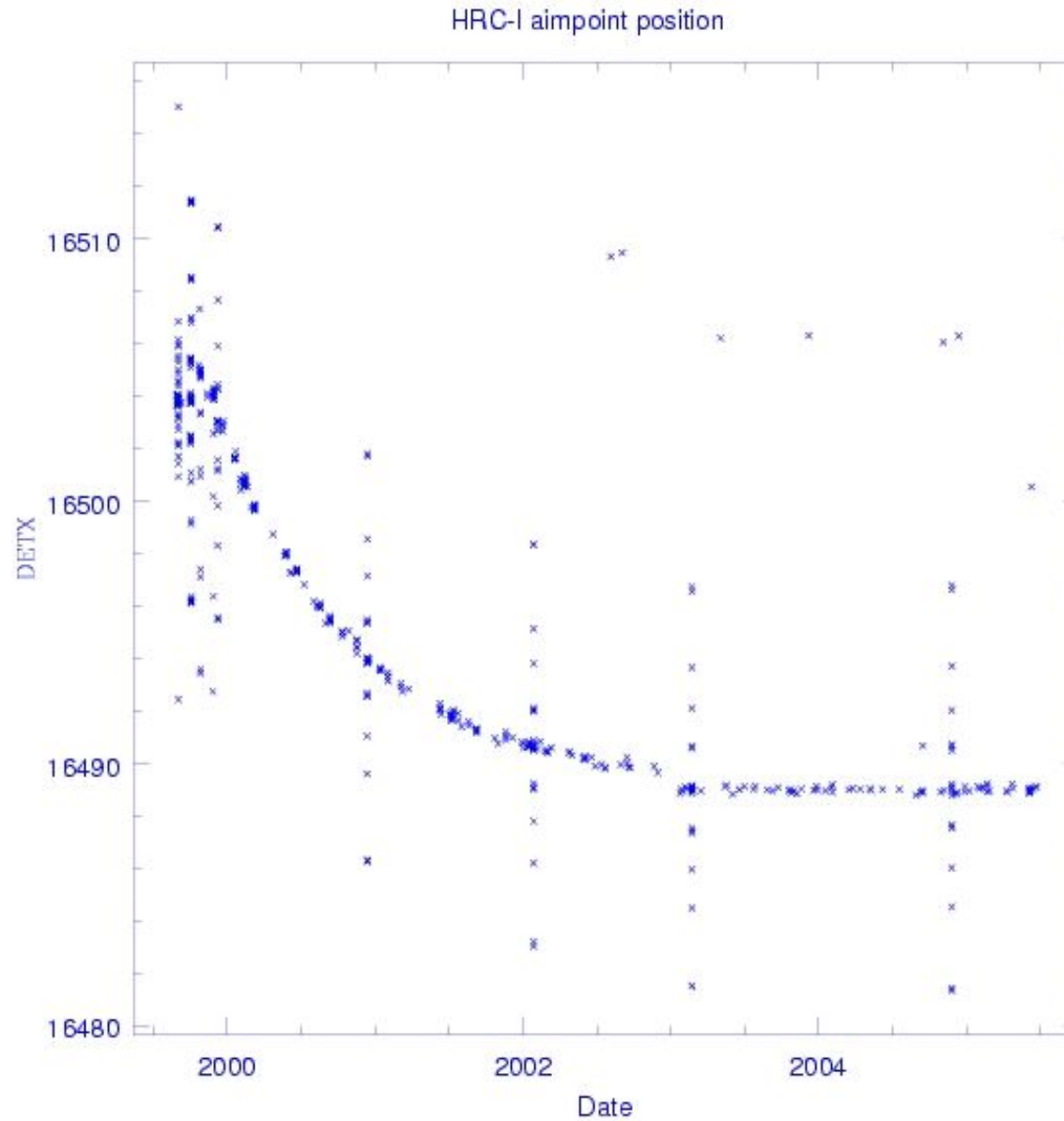
Fiducial drifts, time averaged and separated by instrument



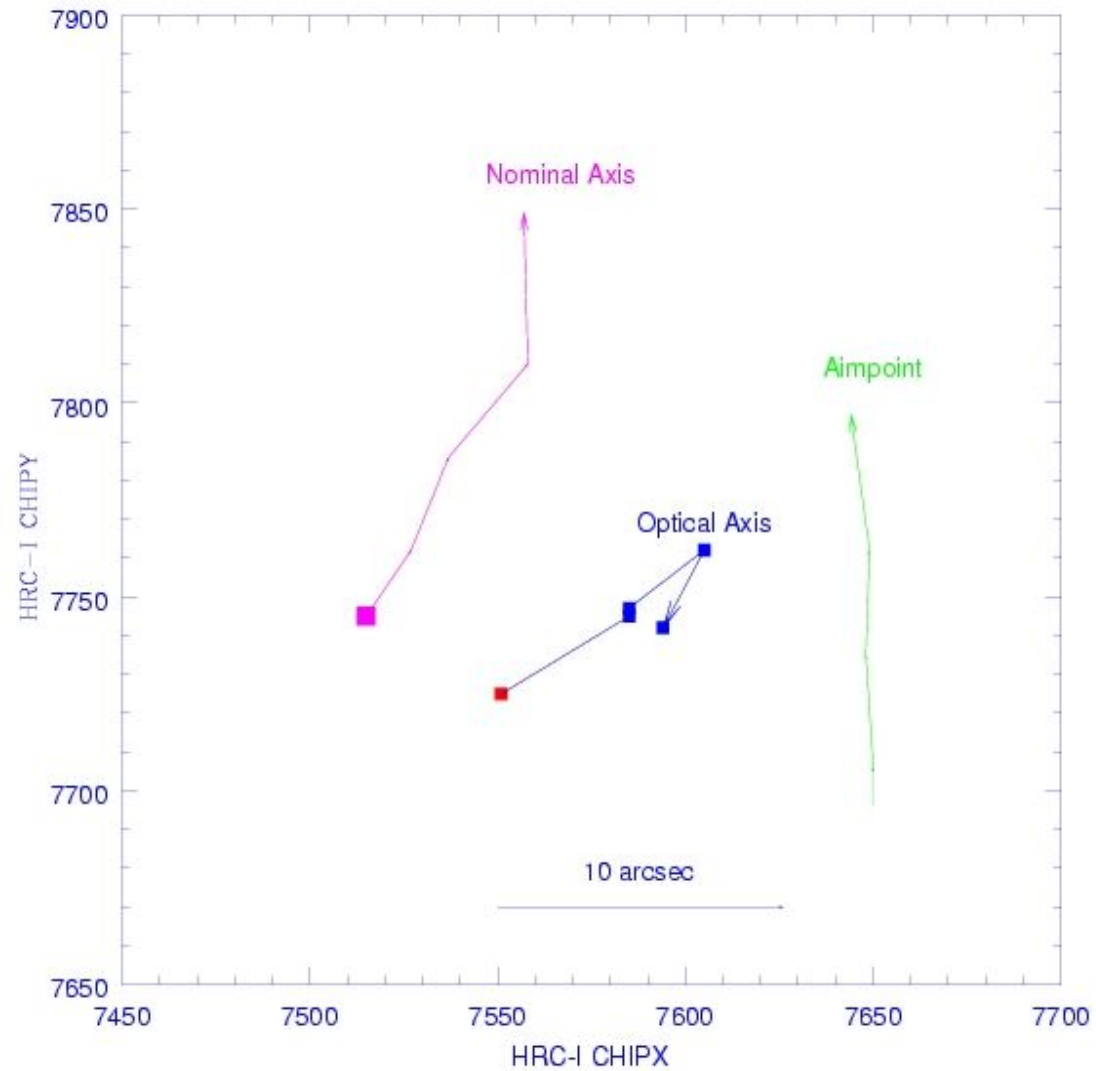
The CALALIGN matrix: 2" drift 1999-2004



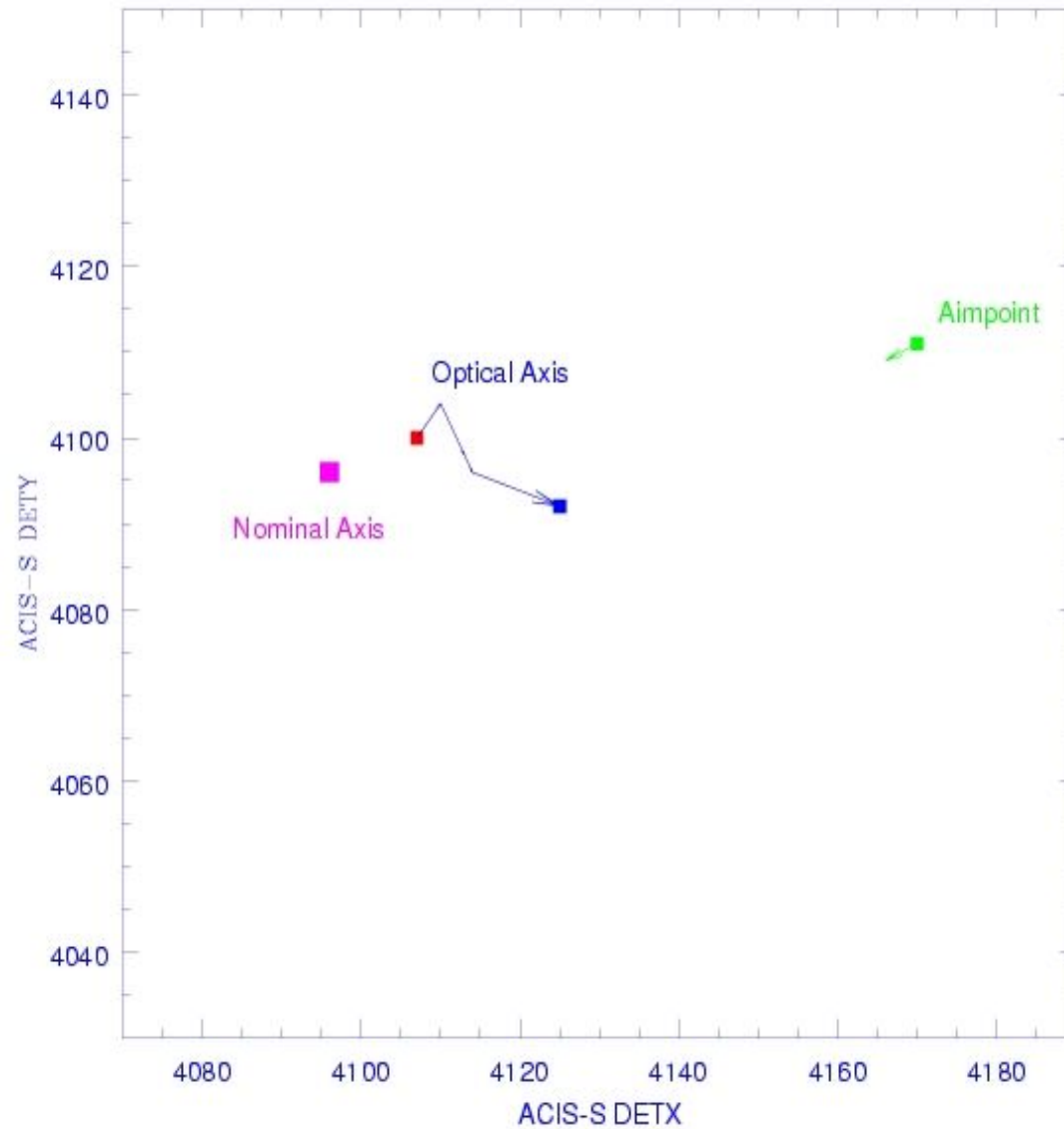
Aimpoint motion in detector coordinates (due to CALALIGN changes)



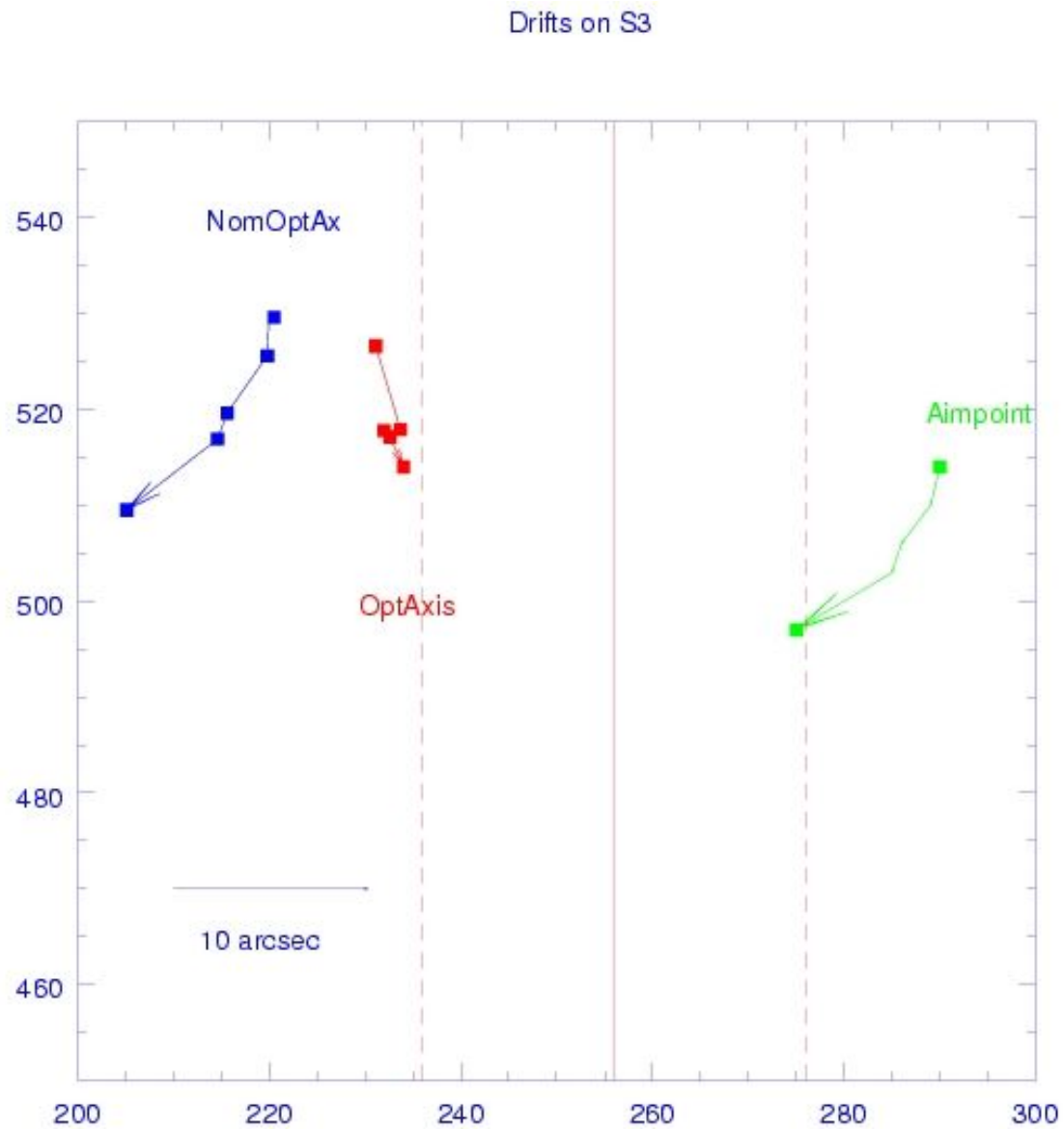
Aimpoint and optical axis motion in HRC-I coordinates



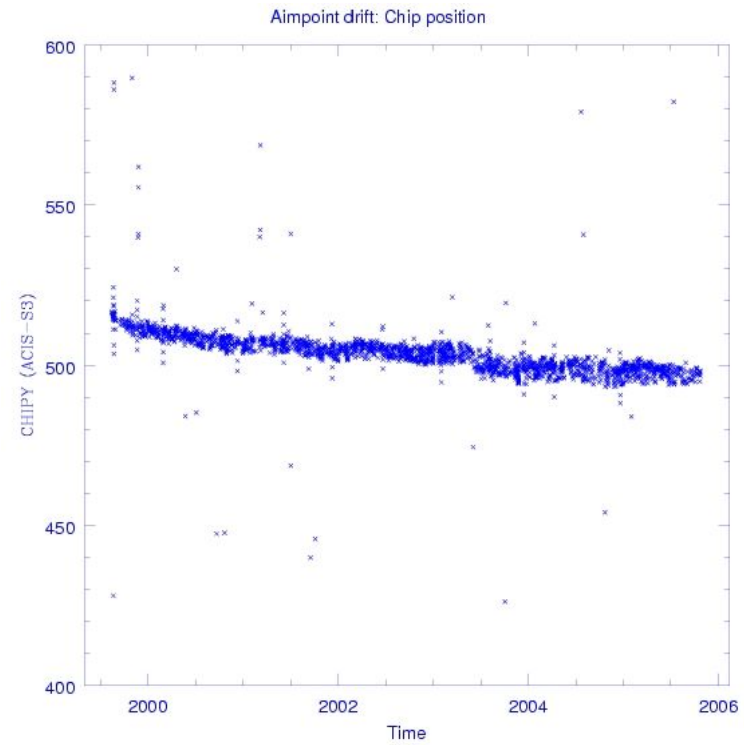
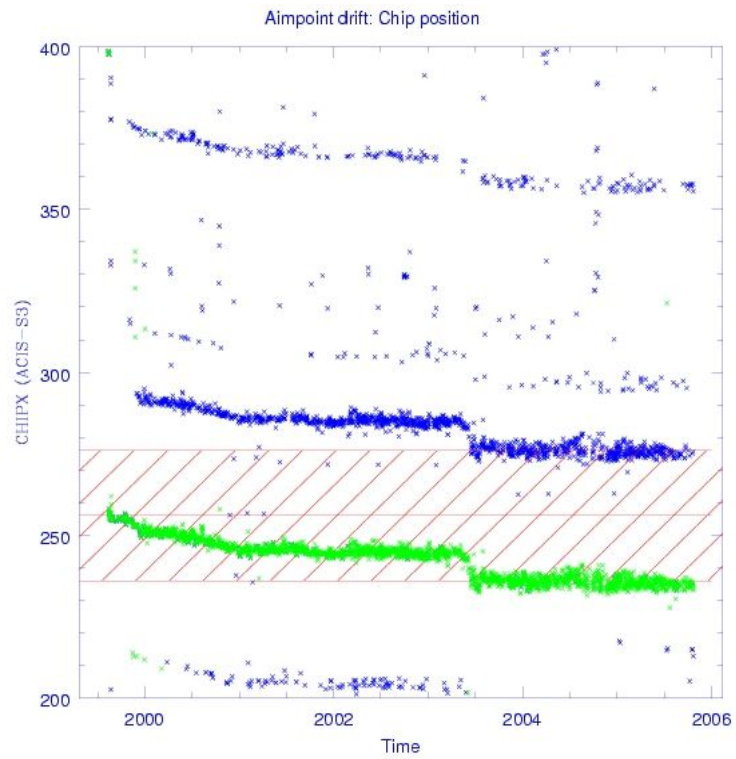
Aimpoint and optical axis motion in detector coordinates



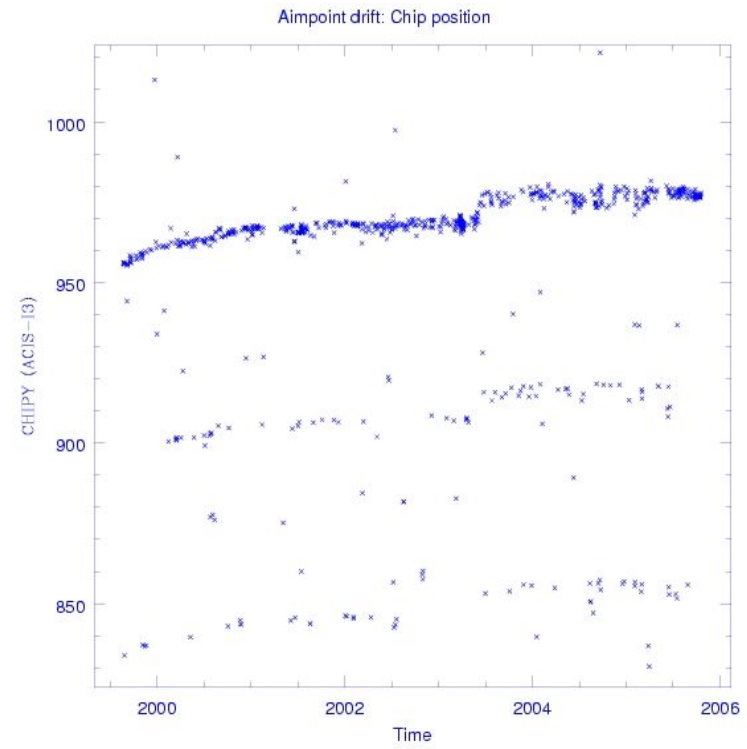
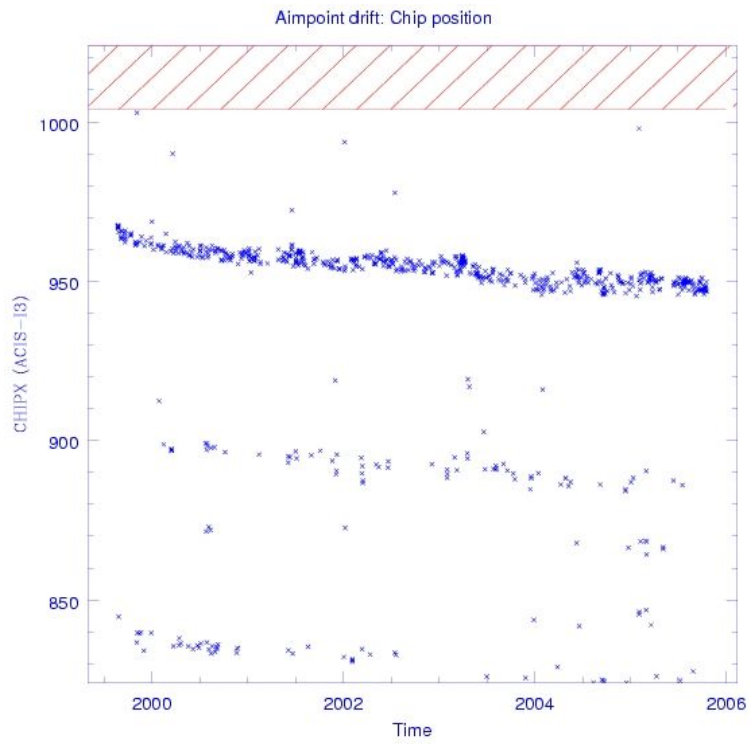
Aimpoint and optical axis motion on ACIS-S



Aimpoint motion on ACIS-S



Aimpoint motion on ACIS-I



SUMMARY

- ACA to SIM boresight has drifted by about 12-15 arcsec since launch
- Aimpoint fixed in ACA frame has therefore moved
- ACIS-S zero-offset aimpoint near node 0/1 boundary
- -20 arsec offset now also near boundary
- Recommend default +10 arcsec offset instead