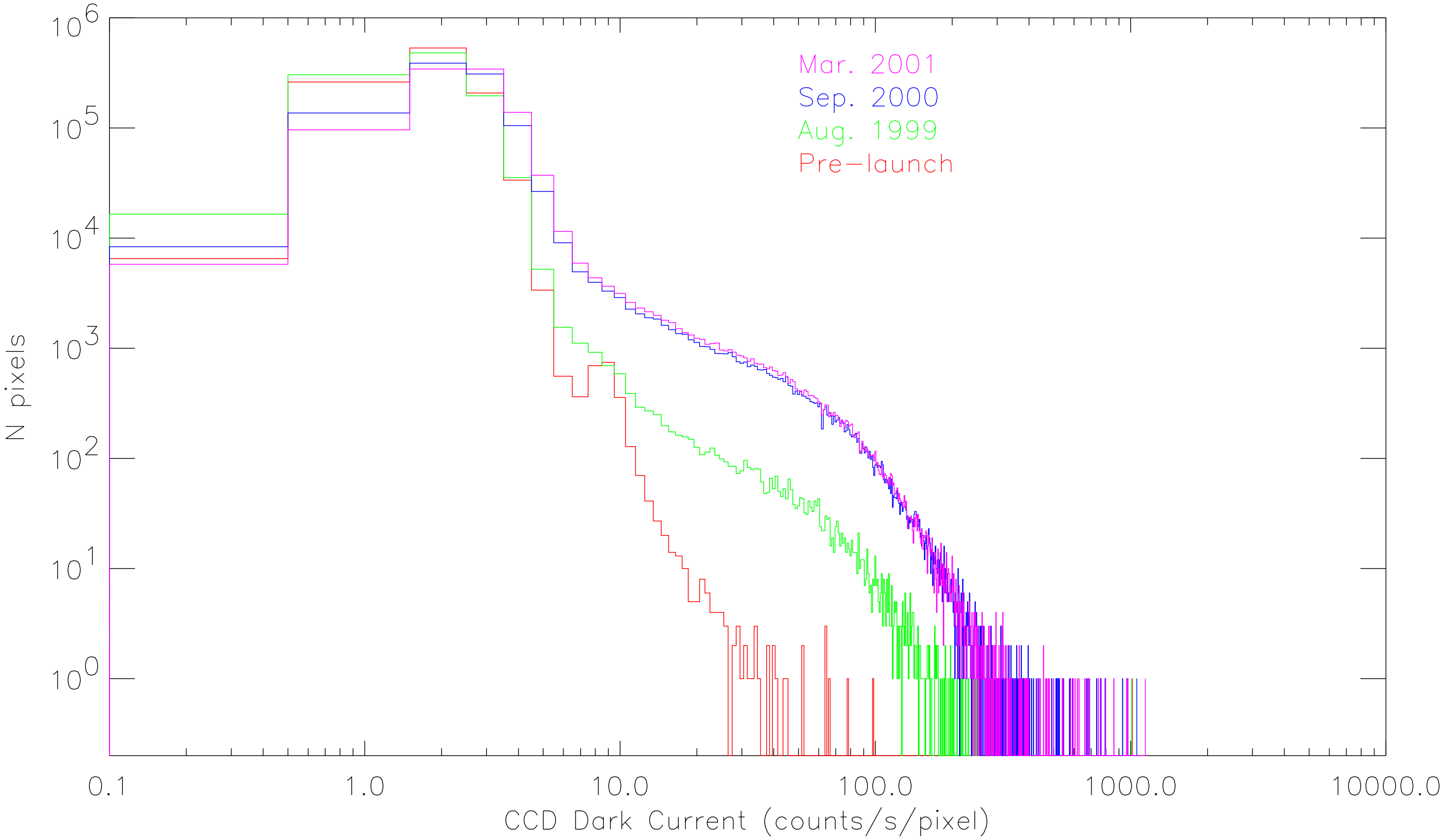
ASPECT CALIBRATION

Tom Aldcroft 30-Oct-01

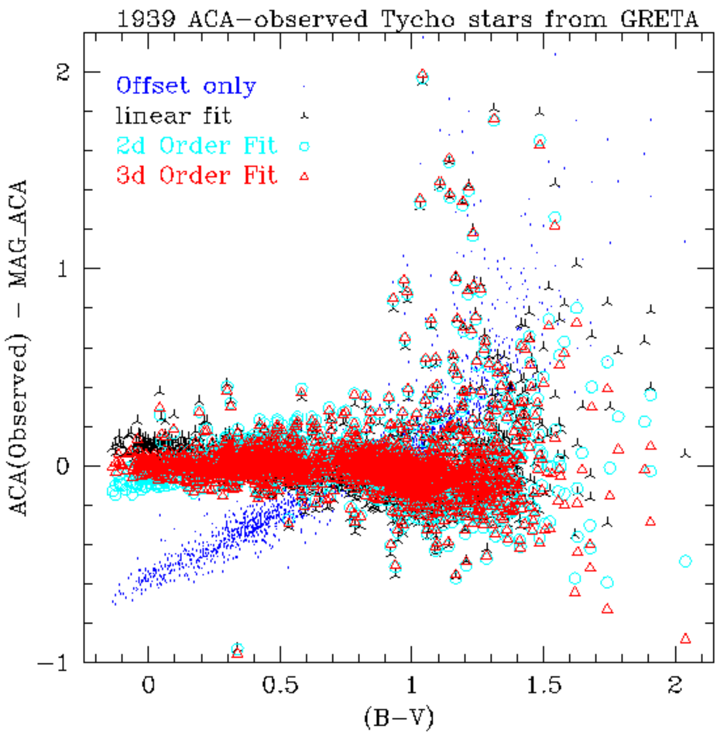
- ACA dark current
- ACA / AGASC magnitude
- ACA plate scale
- Chandra coordinate transformations
- ACA boresight

Chandra Aspect page (`http://asc.harvard.edu/mta/ASPECT`) has most recent information on issues related to aspect. This talk can be found there.

ACA Dark Current Calibration (R. Cameron)



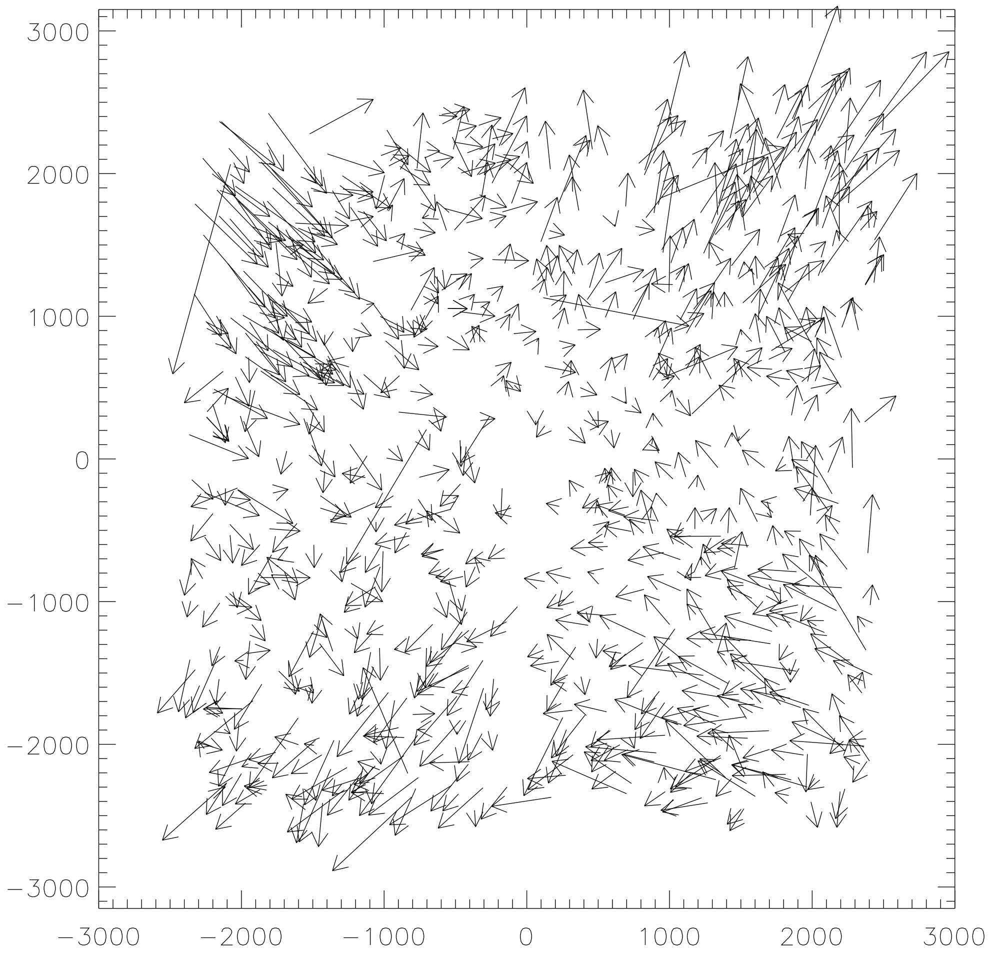
ACA / AGASC Magnitude Calibration (P. Green)



Full details in:

`http://hea-www.harvard.edu/asclocal/mp/html/AGASCupdate1p5.html`

ACA Plate Scale



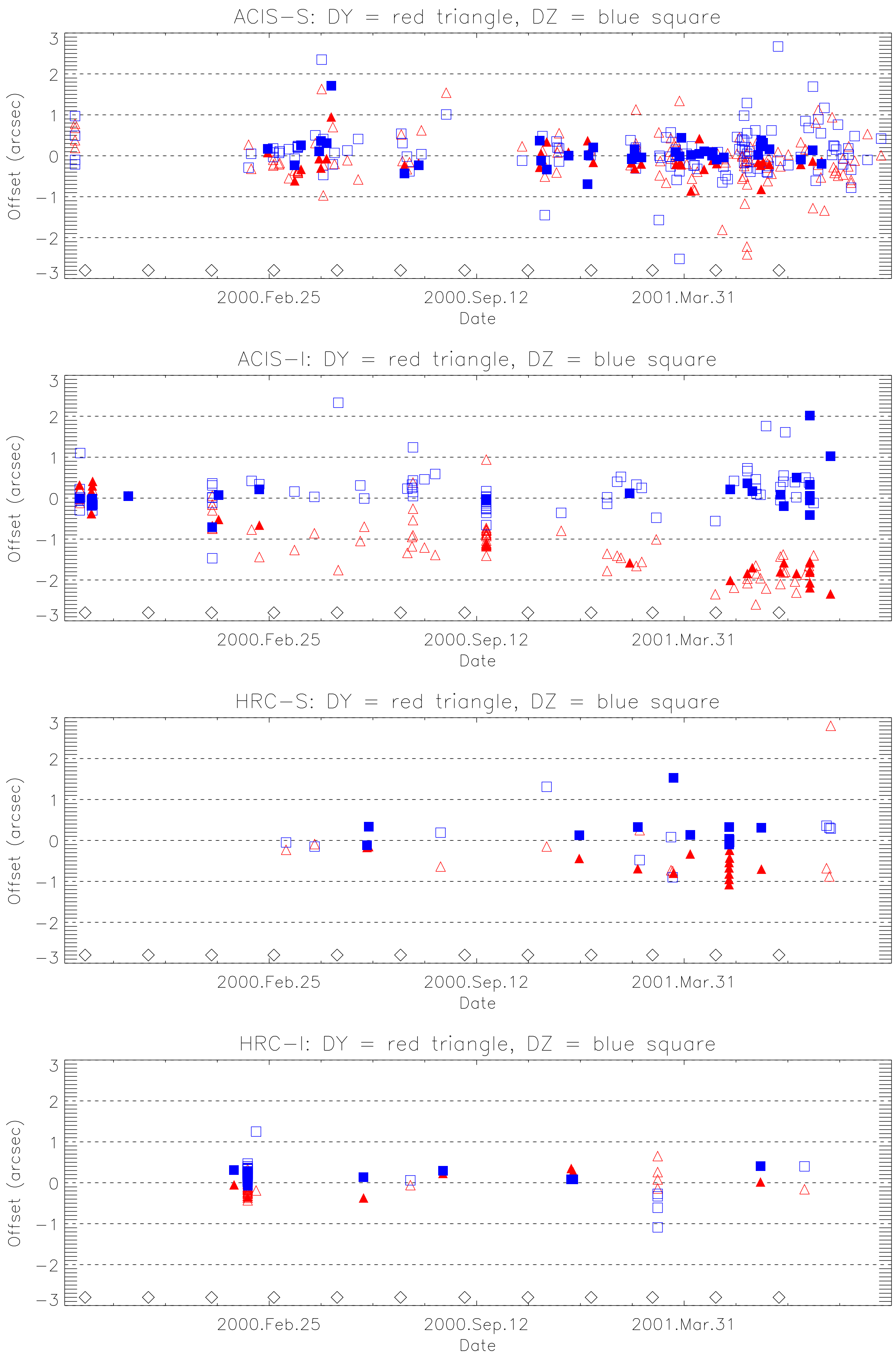
Chandra Coordinate Transformations

Physical	Angular	Transform	Input data
CPC (Chip)			
$\Downarrow$		Orient chips in detector 3D space	6-DOF chip location wrt detector (chip alignments)
LSI (SI)			
$\Downarrow$		Place detector on instrument table	(X,Y,Z) wrt instrument table
STT (SIM)			
$\Downarrow$		Place instrument table in ISIM	SIM X, Z (focus, translation)
STF (ISIM)			
$\Downarrow$		Orient instrument compartment relative to mirrors	Aspect solution ΔY, ΔZ, and $\Delta\theta_X$
FC (HRMA)			
$\Downarrow$		Include telescope focal length	HRMA Focal length (plate scale)
MNC	FSC		
$\Downarrow$		Account for mirror distortion	Mirror model
PTP	MSC		
$\Downarrow$		Apply aspect solution	RA, Dec, Roll of MNC (ACA boresight)
PSP	CEL		

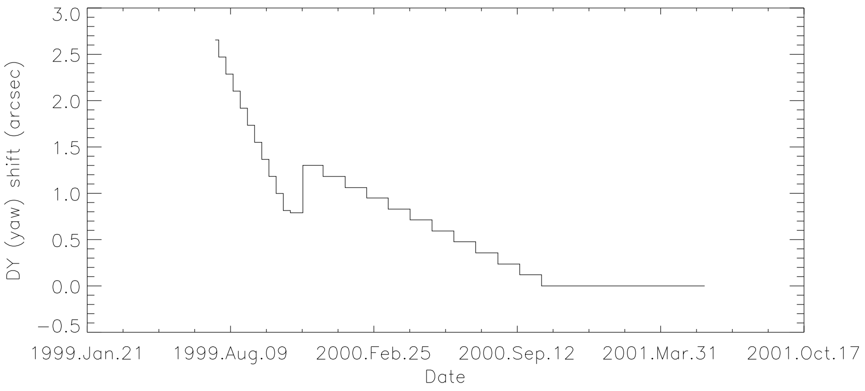
See `http://asc.harvard.edu/ciao/download/doc/ncoords.ps`

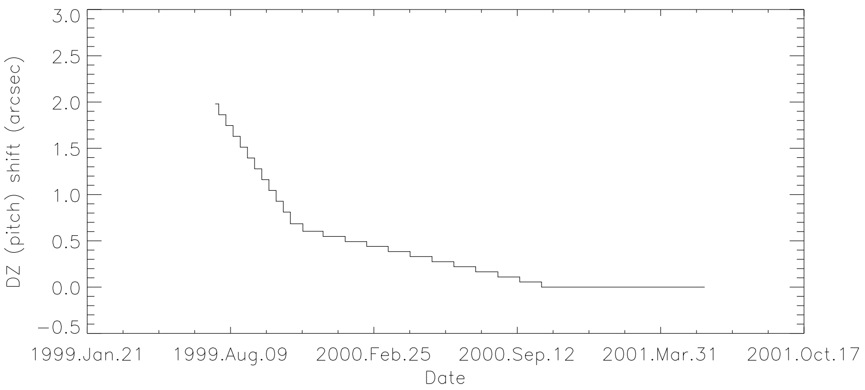
ACA Boresight Calibration

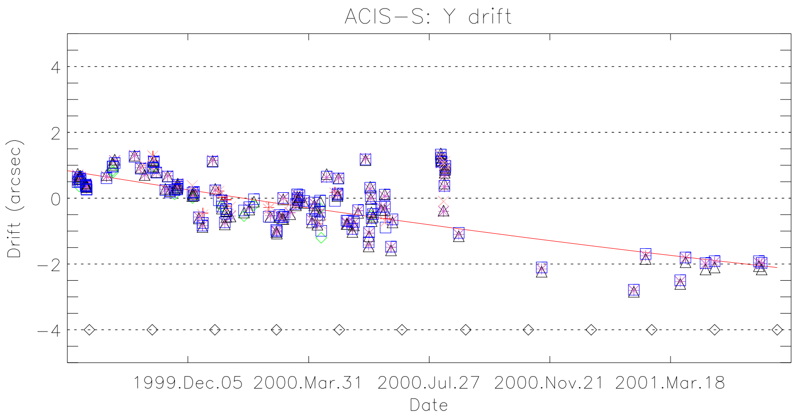
- Boresight calibration effectively measures the angle between the HRMA "optical axis" and the ACA boresight
- Initial boresight calibration based on observations of NGC 2516 in each detector
- Substantial time dependent drifts (several arcsec) have occurred since launch
- Boresight drifts are now tracked by the Celestial Location Monitor
  - Goes to archive, extracts event data, finds all detected sources (5-σ) within 4'
  - Cross-correlates with Tycho, USNO-A2.0, SIMBAD, 2MASS, and ICRS catalogs
  - Determines celestial location offset for each successful cross correlation
  - Produces a plot of the time history of offsets for each detector

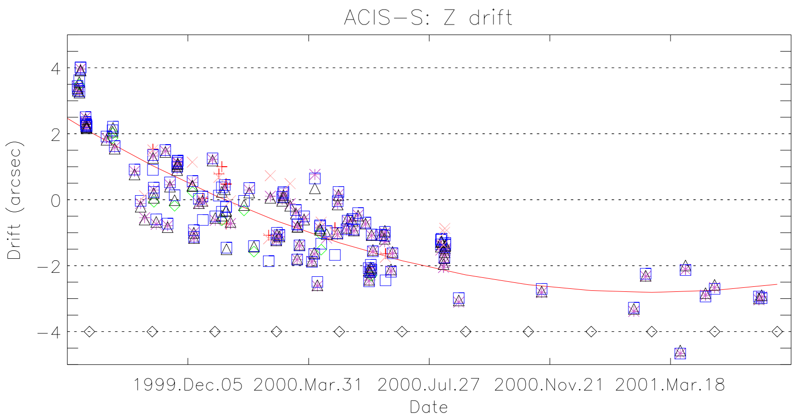


ACIS−S: DY = red triangle, DZ = blue square
ACIS−I: DY = red triangle, DZ = blue square
HRC−S: DY = red triangle, DZ = blue square
HRC−I: DY = red triangle, DZ = blue square
Offset (arcsec)
Date
2000.Feb.25
2000.Sep.12
2001.Mar.31


DY (yaw) shift (arcsec)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
1999.Jan.21
1999.Aug.09
2000.Feb.25
2000.Sep.12
2001.Mar.31
2001.Oct.17
Date


DZ (pitch) shift (arcsec)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
1999.Jan.21
1999.Aug.09
2000.Feb.25
2000.Sep.12
2001.Mar.31
2001.Oct.17
Date


ACIS−S: Y drift
Drift (arcsec)
4
2
0
−2
−4
1999.Dec.05
2000.Mar.31
2000.Jul.27
2000.Nov.21
2001.Mar.18
Date


ACIS−S: Z drift
Drift (arcsec)
4
2
0
−2
−4
1999.Dec.05
2000.Mar.31
2000.Jul.27
2000.Nov.21
2001.Mar.18
Date