

---

## Study of H-V Misalignment in Four SHARP Runs

M. Zou | March 2009

---

### Overview

*The four runs analyzed were:*

- February 2007
- April (2<sup>nd</sup> run) 2007
- August 2007
- September 2008

### Method

1 – Selected scan-mode files, computed FWHM, x, y center locations and Sigma using Fitgauss.

2 – Eliminated files not satisfying the following criteria:

FWHM	8 - 9 arcsecs
Centering (x, y values)	$51 \pm 3$ pixels
Sigma	$\sigma > 70$

3 – Measured H-V values (subarray misalignments) for each file, which were expressed in instrument coordinates as dx-instrument and dy-instrument. For each run, we found mean ( $\mu$ ), standard deviation ( $\sigma$ ) of dx-instrument and dy-instrument. We used  $\mu \pm 3\sigma$  as boundary values to eliminate outlier files (for both dx-instrument and dy-instrument). Units used for H-V are software pixels.

4 – Found UT and elapsed time (Cumulative Time, for duration of the run's data collection) of selected files, created 8 sets of graphs. See following pages.

5 – For each run, we listed the mean values and the uncertainty in the mean values for comparison to values found "by eye" during set-up. Please see last page. Units used here are instrument pixels. For "by eye" measurements, up is positive and right is positive. Also, "V" appears on the left on the IRC display.

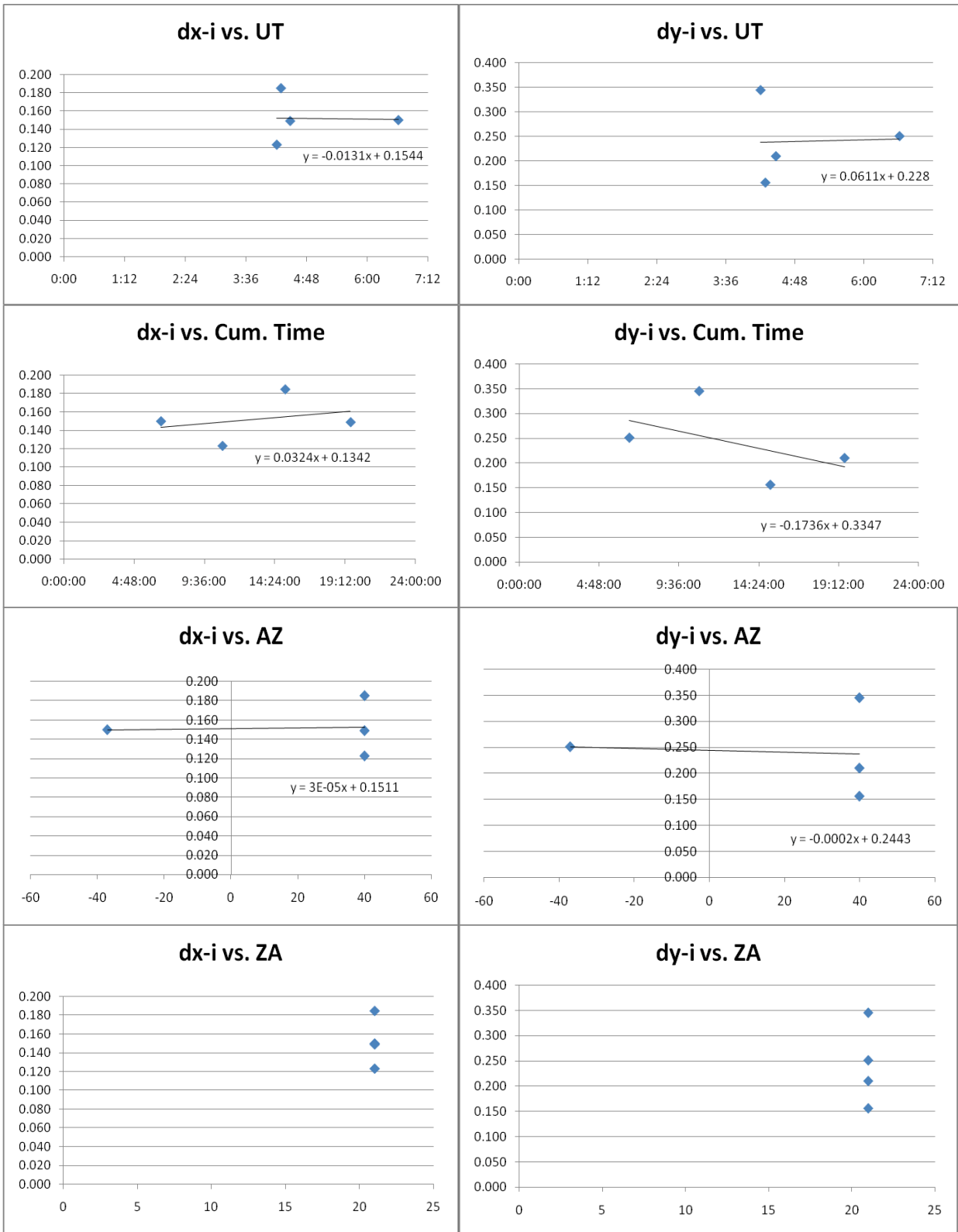
### Findings

There appears to be little to no direct correlation between the values of dx-instrument, dy-instrument and independent variables: UT, elapsed time, AZ angle and ZA angle.

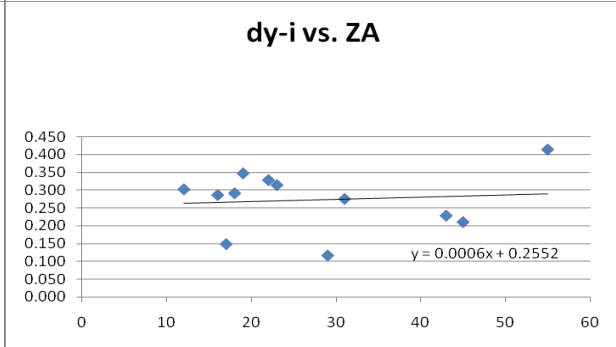
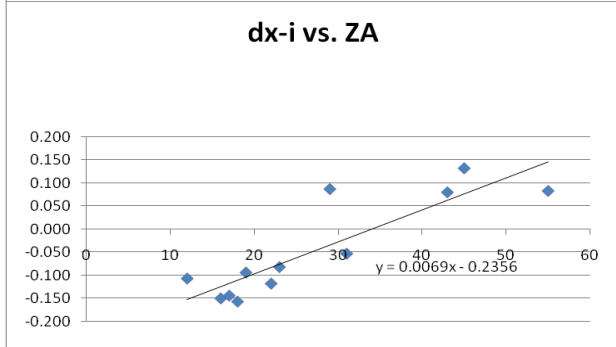
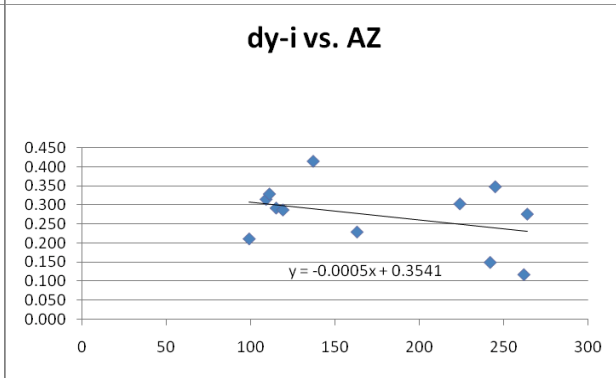
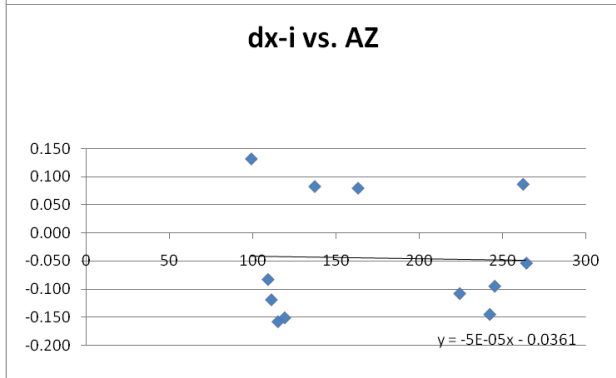
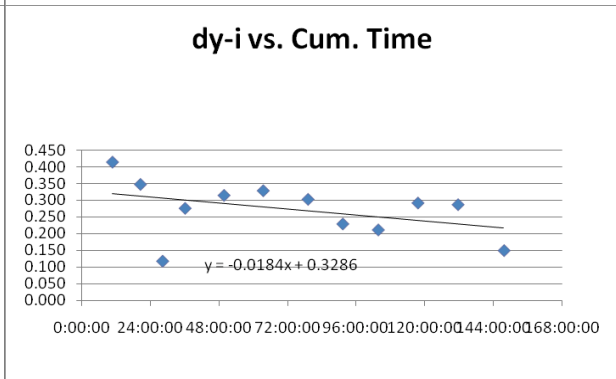
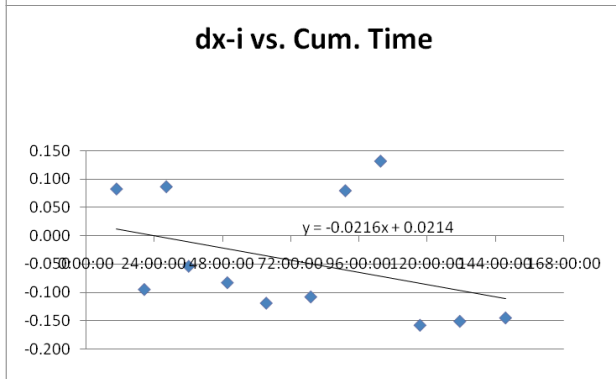
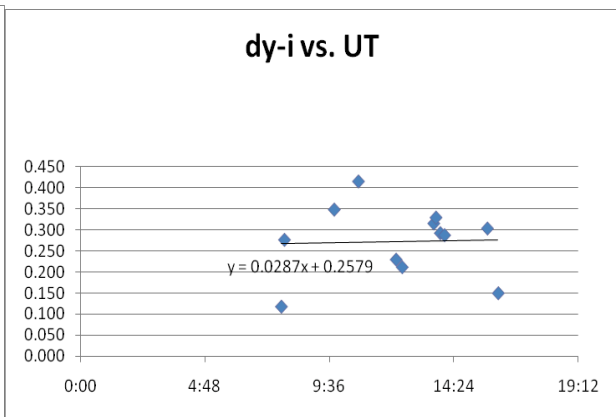
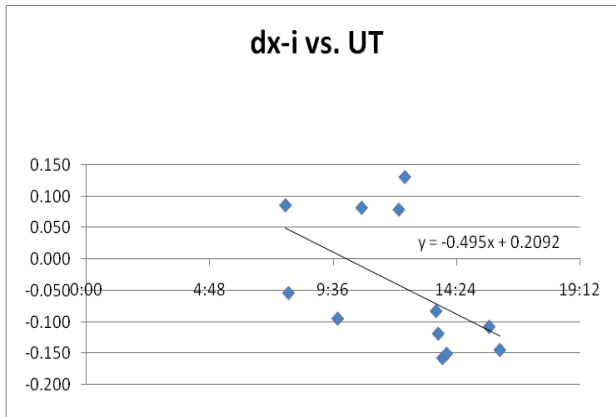
The uncertainty in the mean values of dx-instrument and dy-instrument is typically less than twenty-thousandths of an instrument pixel (see last page).

The mean values of dx-instrument and dy-instrument do not match those found "by eye" very well.

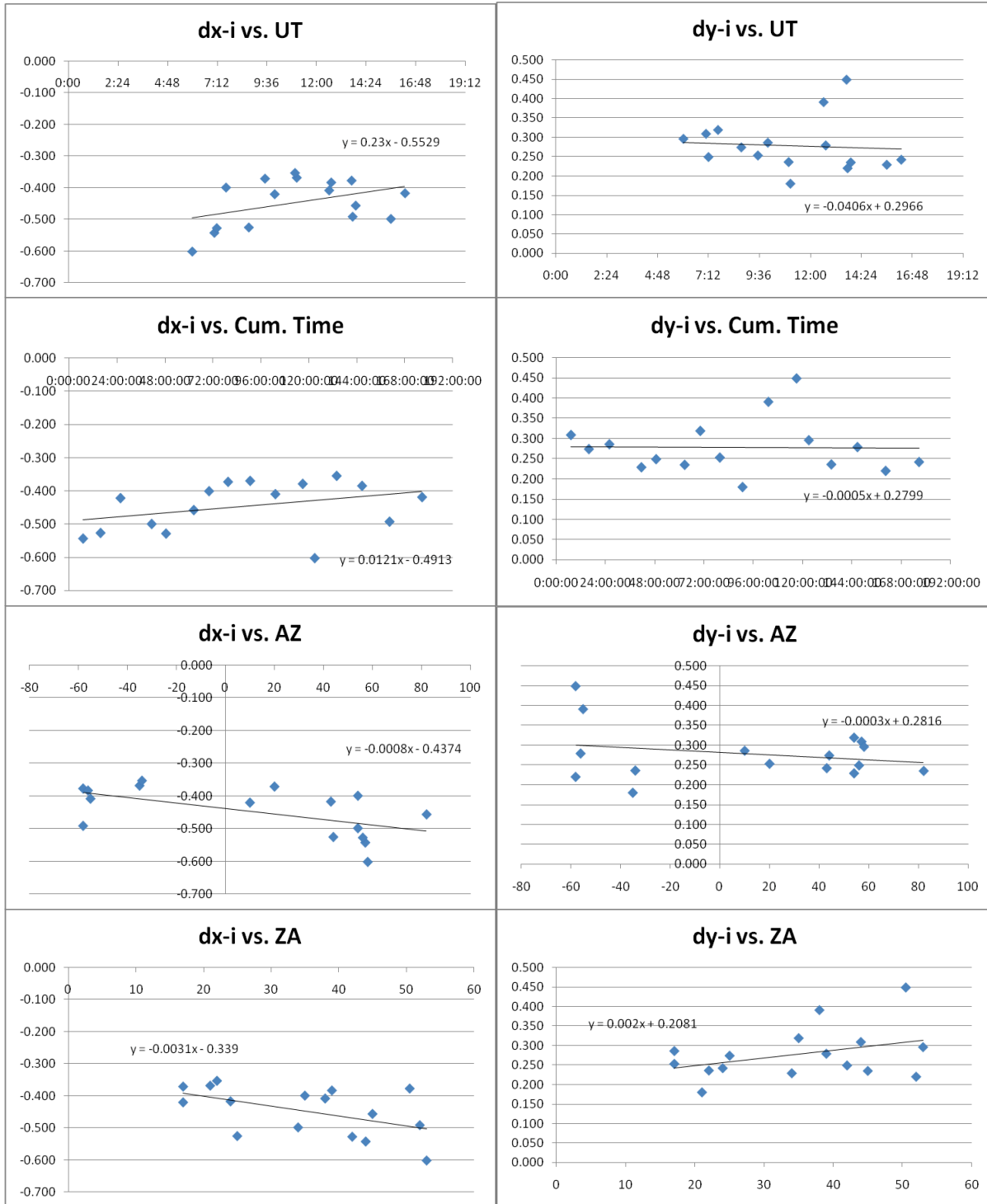
February 2007 Analysis & Trends (4 files)



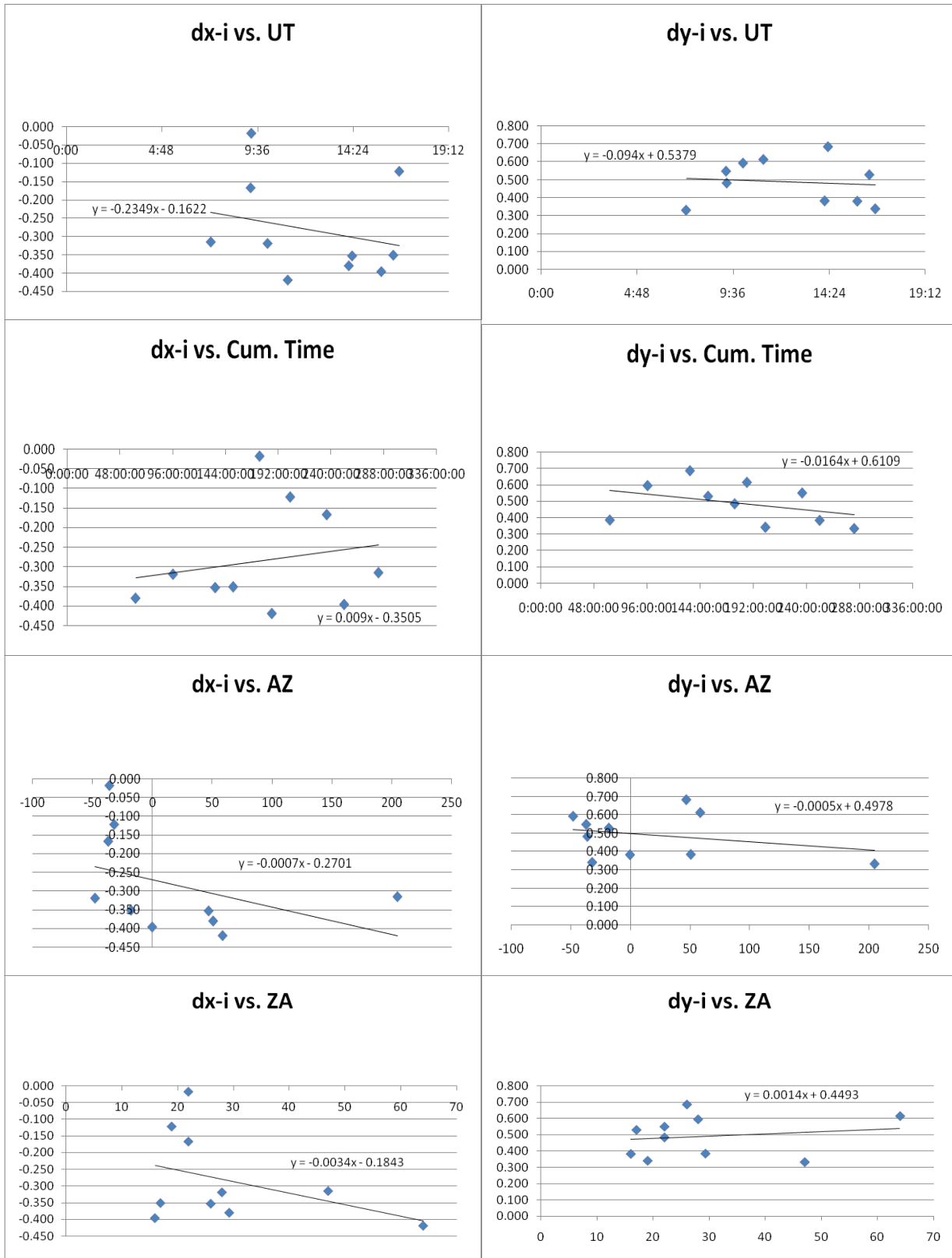
April 2007 Analysis & Trends (12 files)



### August 2007 Analysis & Trends (16 files)



September 2008 Analysis & Trends (10 files)



## H-V By Eye

Run		H L/R	H up/d	V L/R	V up/d	(H-V) L/R	(H-V) up/d
Feb '07 (171.jpg) log1 part4	entrance	0.30	0.00	0.30	-0.20	0.00	0.20
	exit	0.10	0.10	-0.10	0.10	0.20	0.00
	average	0.20	0.05	0.10	-0.05	0.10	0.10
	MZ result error					0.0760	0.1205
						0.0006	0.0200
Apr2 '07 (pg8.jpg) log2 part1	entrance	0.00	0.63	0.33	0.75	-0.33	-0.12
	exit	-0.42	0.75	-0.33	1.00	-0.09	-0.25
	average	-0.21	0.69	0.00	0.88	-0.21	-0.19
	MZ result error					-0.0120	0.1450
						0.0168	0.0111
Aug '07 (pg28.jpg) log2 part2	entrance	0.25	0.33	0.33	0.50	-0.08	-0.17
	exit	-0.13	0.66	-0.13	0.66	0.00	0.00
	average	0.06	0.50	0.10	0.58	-0.04	-0.09
	MZ result error					-0.2235	0.1390
						0.0094	0.0084
Sept '08 (pg61.jpg) log2 part3	entrance	0.75	0.125	1	-0.125	-0.25	0.25
	exit	0.88	0.00	0.88	0.25	0.00	-0.25
	average	0.82	0.06	0.94	0.06	-0.13	0.00
	MZ result error					-0.1420	0.2445
						0.0212	0.0198