

Center of mass offset for SLR s/c

Some practical aspects

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Table 2. Center-of-Mass Correction for Single-Photon Systems^a

	LAGEOS	AJISAI	ETALON
Standard	251	1010	576
No system noise (1-ps FWHM)			
No clipping	242	962	552
Iterative 3.0-RMS clipping	245	976	556
Iterative 2.5-RMS clipping	247	985	564
Iterative 2.0-RMS clipping	250	997	580
Herstmonceux noise profile (ERS-2)			
Gaussian fit and iterative 3.0-RMS clipping	245	985	565

^aIn millimeters.

Available Information?

- (Too) much information available for some s/c
- Not at all for others
- Lack of a “synthesized” standard procedure for CoM selection by ACs
- Major error source in analysis
- Need to act NOW

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OTSUBO AND APPLEBY: SATELLITE CENTER-OF-MASS CORRECTION

Table 3. Center-of-Mass Correction for C-SPAD Systems^a

	LAGEOS	AJISAI	ETALON
Standard	251	1010	576
1-ps FWHM pulse width			
Iterative 3.0-RMS clipping	245/249/256/257	977/990/1020/1023	558/573/608/613
Iterative 2.5-RMS clipping	247/250/256/257	985/996/1020/1023	565/581/609/613
Iterative 2.0-RMS clipping	250/251/256/257	997/1004/1021/1023	580/592/610/613
100-ps FWHM pulse width			
Iterative 3.0-RMS clipping	245/247/251/252	976/989/1012/1016	558/571/600/604
Iterative 2.5-RMS clipping	246/248/251/252	985/995/1013/1016	565/578/600/604
Iterative 2.0-RMS clipping	249/249/251/252	997/1002/1013/1016	580/590/601/604

^aIn millimeters. Four numbers separated by slashes are center-of-mass corrections for average number of detected photons of 0.1, 1, 10, and 100.

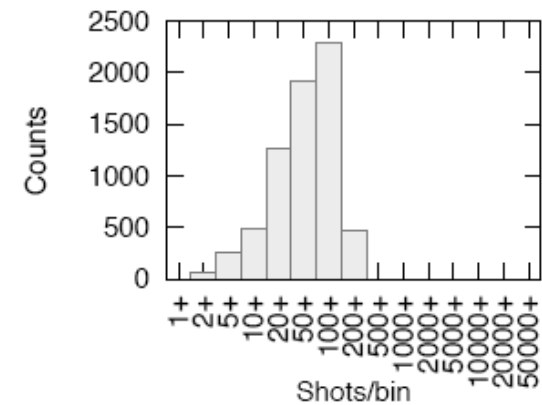
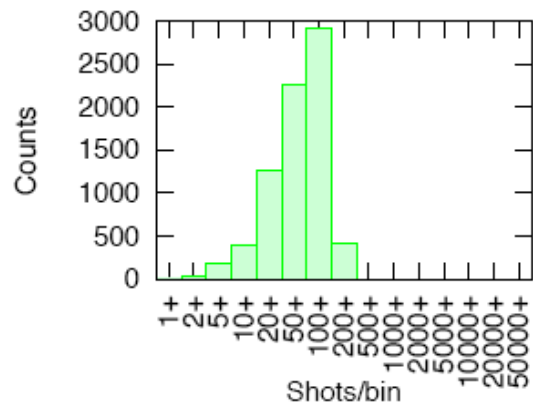
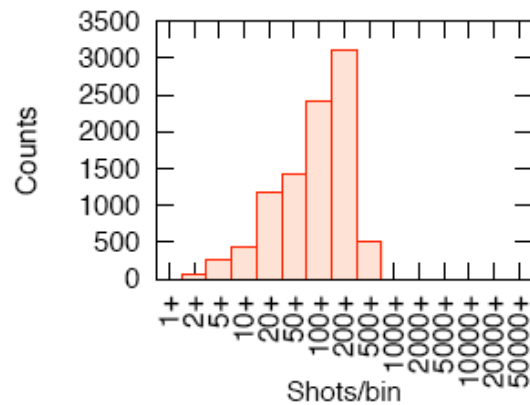
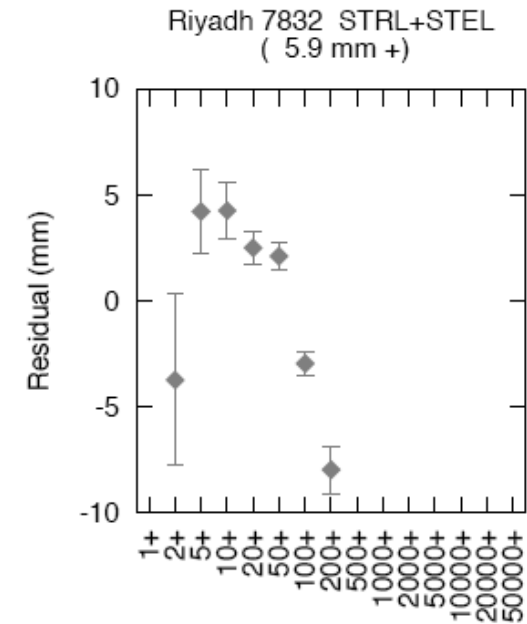
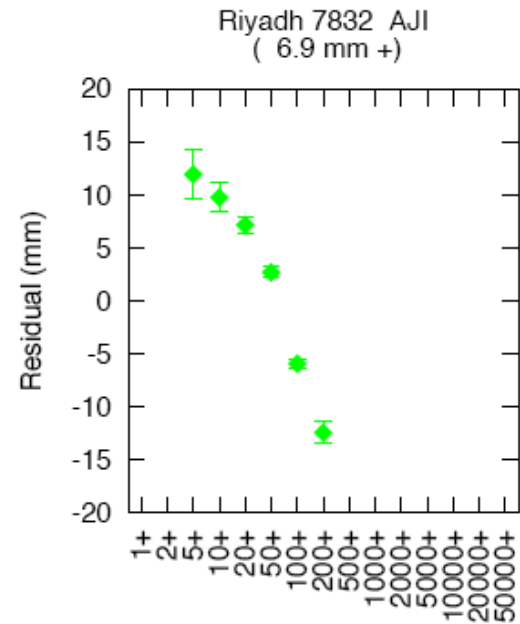
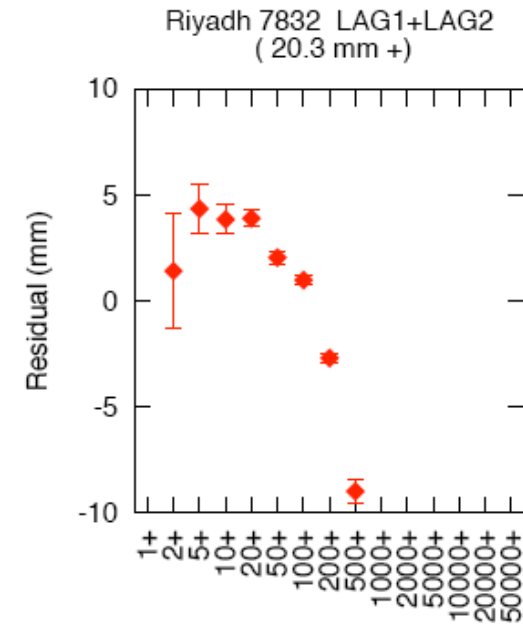
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Table 4. Center-of-Mass Correction for Leading Edge Half Maximum Systems^a

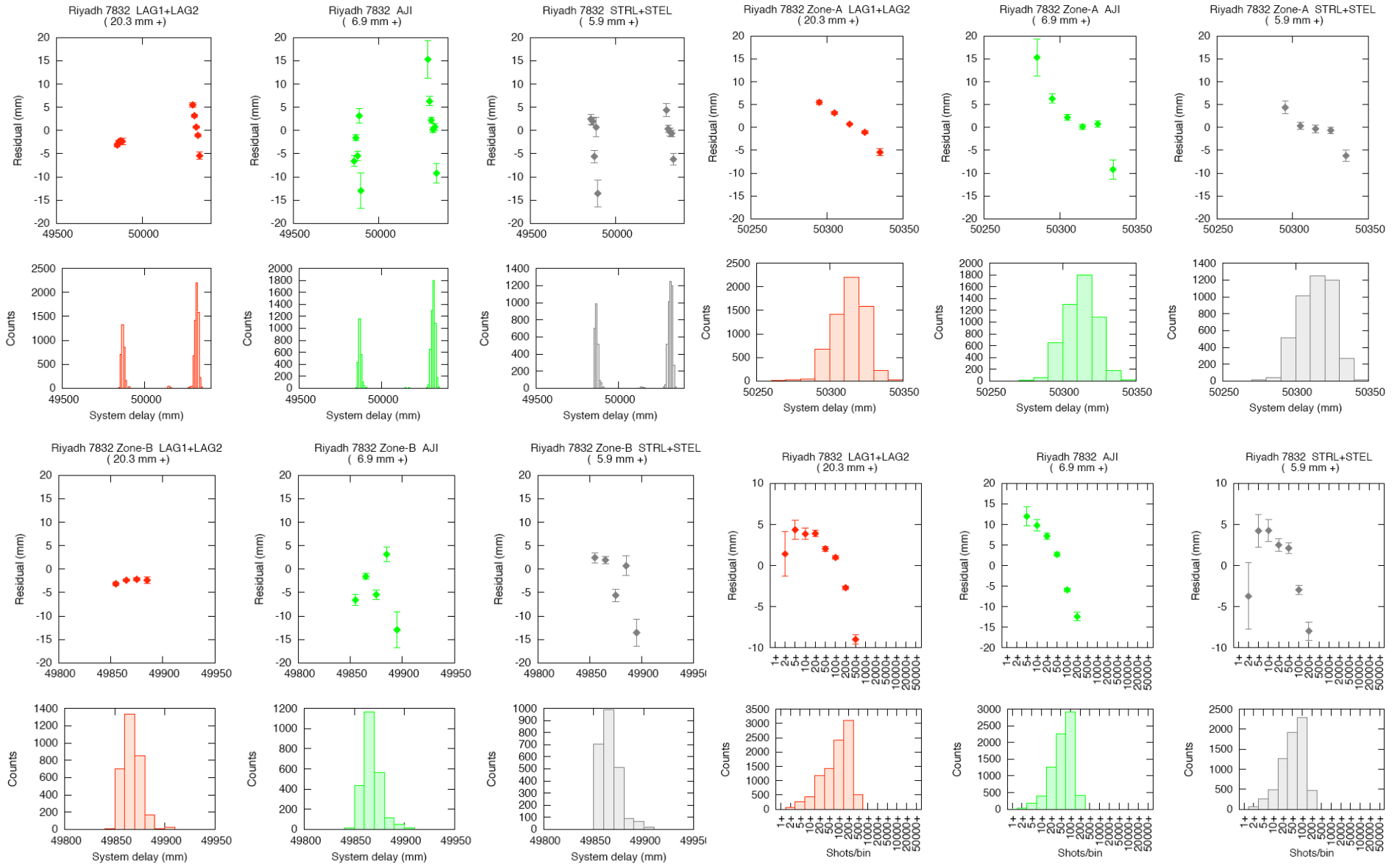
	LAGEOS	AJISAI	ETALON
Standard	251	1010	576
1-ps FWHM pulse width	256	1022	612
100-ps FWHM pulse width	252	1017	607
300-ps FWHM pulse width	248	1009	598
1-ns FWHM pulse width	244	993	578
3-ns FWHM pulse width	243	976	562

^aIn millimeters.

Bias vs. Intensity (Otsubo '06)



Bias vs. Delay (Otsubo '06)



Latest table for LAGEOS (Appleby '07)

ILRS stations - System configuration and CoM corrections for LAGEOS								
<i>Stn pad ID</i>	<i>Name</i>	<i>Pulselength</i>	<i>Detector</i>	<i>Regime</i>	<i>Processing</i>	<i>Calib.</i>	<i>LAGEOS</i>	<i>LAGEOS</i>
		<i>(ps)</i>		<i>(single, few, multi)</i>	<i>level</i>	<i>St. error (mm)</i>	<i>St. error (mm)</i>	<i>CoM (mm)</i>
1873	Simeiz	350	PMT	No Control	2.0 sigma	60	70	248-244
1884	Riga	130	PMT	Controlled s->m	2.0 sigma	10	15	252-248
7080	Mc Donald	200	MCP	Controlled s->m	3.0 sigma	8.5	13	250-244
7090	Yaragadee	200	MCP	Controlled f->m	3.0 sigma	4.5	10	250-244
7105	Greenbelt	200	MCP	Controlled f->m	3.0 sigma	5	10	250-244
7110	Monument Peak	200	MCP	Controlled f->m	3.0 sigma	5	10	250-244
7124	Tahiti	200	MCP	Controlled f->m	3.0 sigma	6	10	250-244
7237	Changchung	200	CSPAD	Controlled s->m	2.5 sigma	10	15	250-245
7249	Beijing	200	CSPAD	No Control, m	2.5 sigma	8	15	250-248
7355	Urumqui	30	CSPAD	No Control	2.5 sigma	15	30	255-247
7405	Conception	200	CSPAD	Controlled s	2.5 sigma	15	20	246-245
7501	Harteb.	200	PMT	Controlled f->m	3.0 sigma	5	10	250-244
7806	Metsahovi	50	PMT	?	2.5 sigma	15	17	254-248
7810	Zimmerwald	300	CSPAD	Controlled s->f	2.5 sigma	20	23	250-244
7811	Borowiec	40	PMT	No Control f	2.5 sigma	16	23	256-250
7824	San Fernando	100	CSPAD	No Control s->m	2.5 sigma	30	25	252-246
7825	Stromlo	10	CSPAD	Controlled s->m	2.5 sigma	4	10	257-247
7832	Riyadh	100	CSPAD	Controlled s->m	2.5 sigma	10	15	252-246
7835	Grasse	50	CSPAD	Controlled s->m	2.5 sigma	6	15	255-246
7836	Potsdam	35	PMT	Controlled s->m	2.5 sigma	10	20	256-252
7838	Simosato	100	MCP	Controlled s->m	3.0 sigma	20	40	252-248
7839	Graz	35	CSPAD	No Control m	2.2 sigma	3	9	255-250
7839	Graz kHz	10	CSPAD	No Control s->f	2.2 sigma	3	9	?
7840	Herstmonceux	100	CSPAD	Controlled s	3.0 sigma	8	17	246-244
7841	Potsdam 3	50	PMT	Controlled s->f	2.5 sigma	10	18	254-248
7941	Matera	40	MCP	No Control m	3.0 sigma	1	5	254-248
8834	Wetzell	80	MCP	No Control f->m	2.5 sigma	10	20	252-248

Procedure for CoM adoption for each s/c?

Given the s/c, e.g. LAGEOS, ETALON, STAR/STEL, AJ, etc.:

JGR '03 ?

Bias vs. Intensity?

Bias vs. Delay ?

Where do the SCI
come from?

Same for all s/c?

Time dependent?

CoM = ???

Are we sure all ACs will pick the same value all the time?