

## **D1200869, aLIGO LLO Monuments**

1 )The intent is that this document (Excel spreadsheet of coordinates AND a drawing) cover all monuments for use in aLIGO Initial Alignment at LLO.  
2) Note that the Test Stand (TS1 and TS2) monuments have their own local coordinate systems, which are in general rotated (slightly) from the global coordinate frame.

THESE TS MONUMENTS SHOULD EACH BE ONLY USED AS A SET AND NOT IN COMBINATION WITH THE OTHER MONUMENTS!

### Sources:

D980499-C            ASC Equipment Layout, Louisiana Site

E1100374-v4        Survey Data for LLO

E1100374-v4 also includes 4 unlabeled along the Y-axis, which are not included in this table

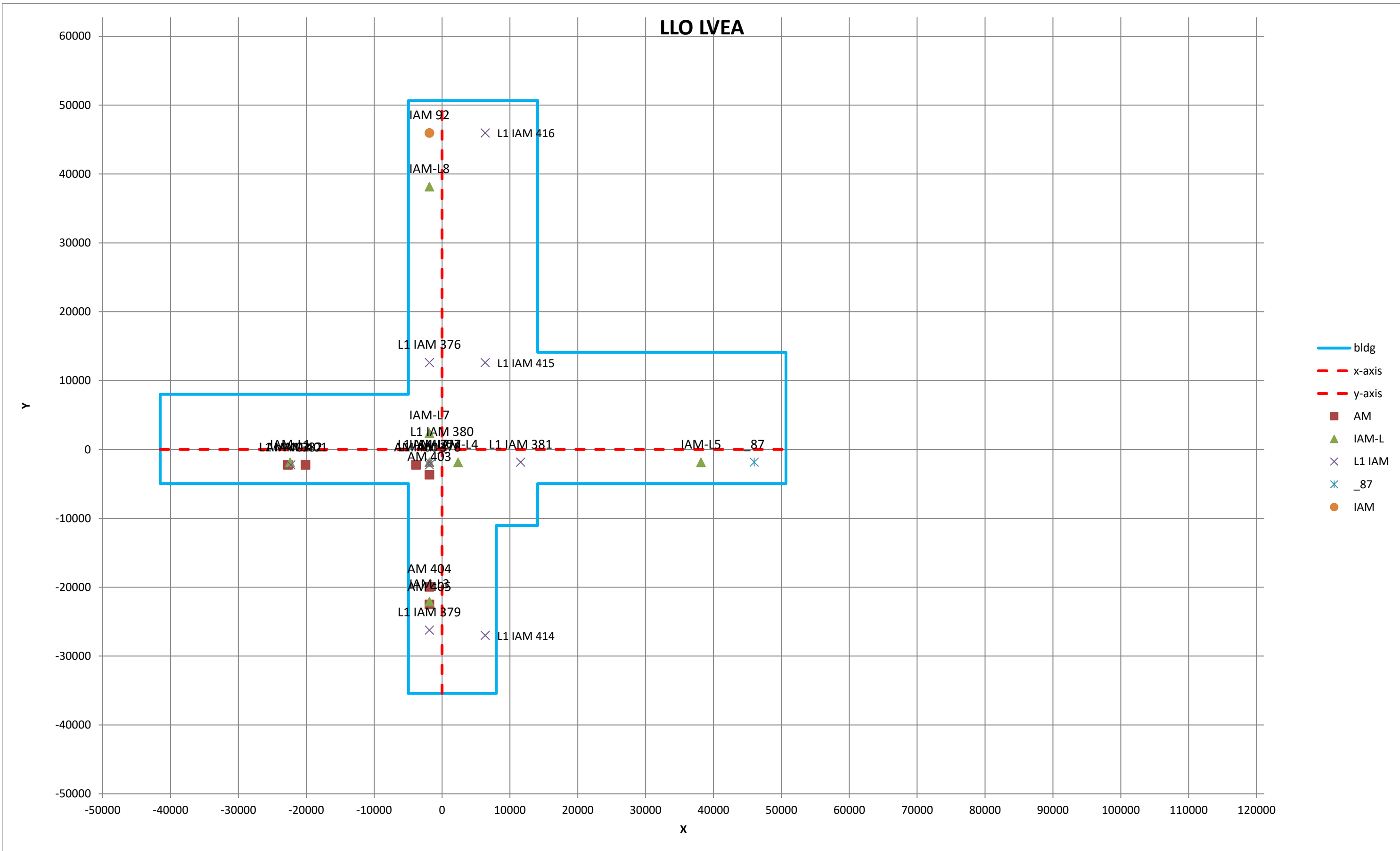
SEE ALSO C972856 -- MAY HAVE PSI MONUMENTS -- PAPER ONLY IN DCC

SEE ALSO C970811 -- ADDITIONAL MONUMENTS AT LLO

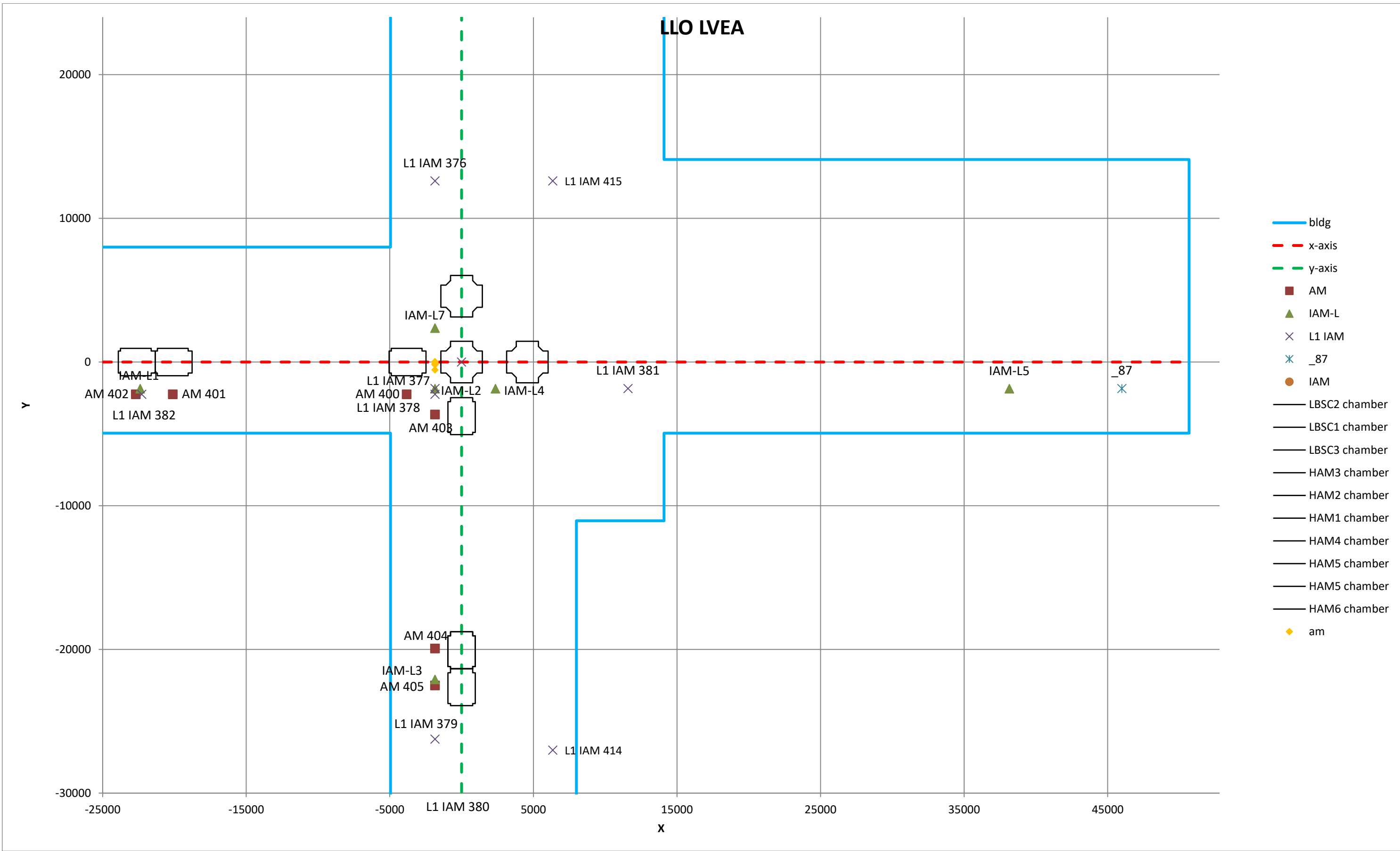
SEE ALSO C970708 -- BLDG SURVEY MONUMENT POINTS

D2000424-v10      A+ FCT layout

# LLO LVEA



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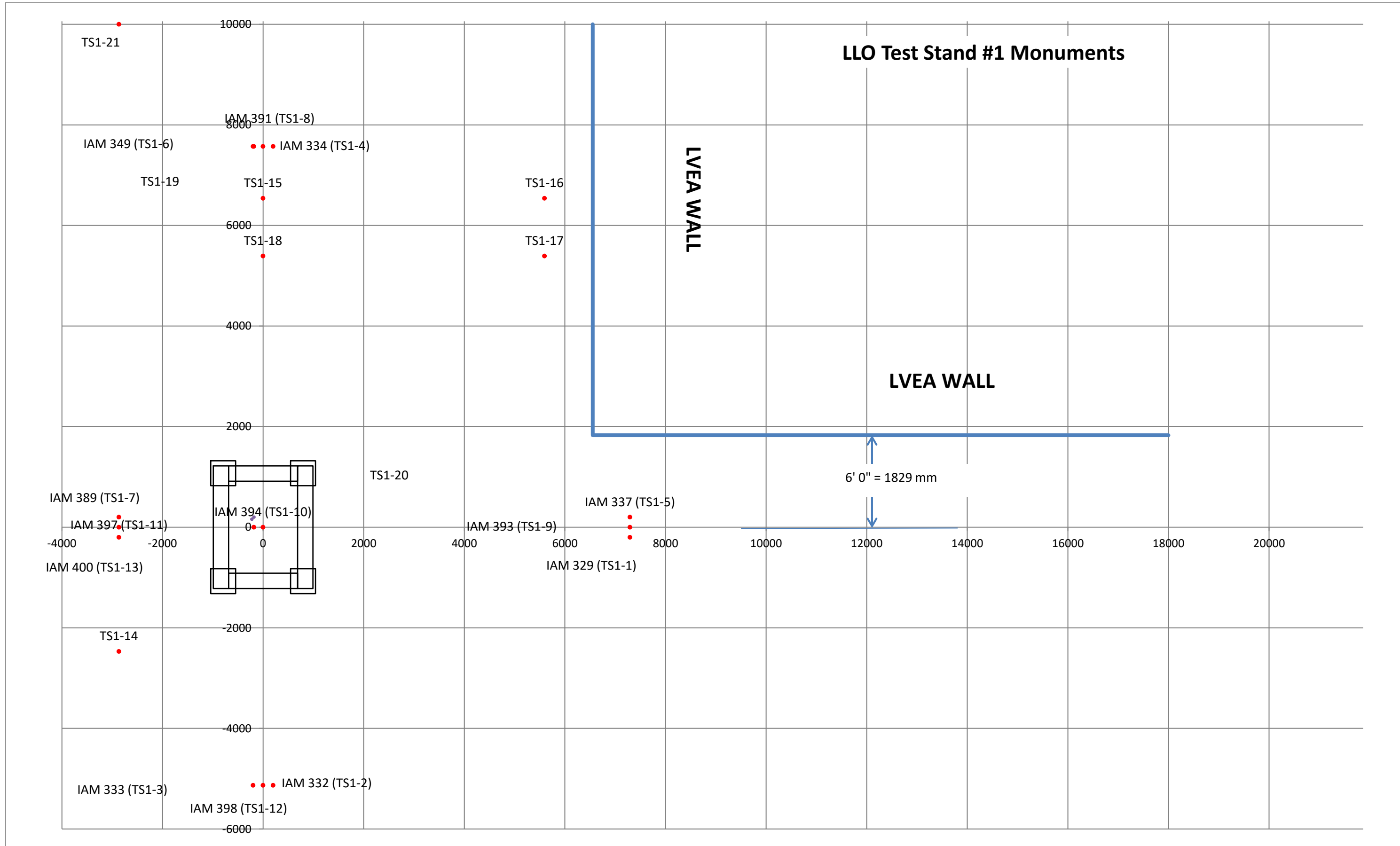
designation	X (mm)	Y (mm)	Z (mm)	Source	comment
_87	45990.8	-1845.1		E1100374-v4	
AM 400	-3831.1	-2245.5		E1100374-v4	
AM 401	-20122.1	-2245.5		E1100374-v4	
AM 402	-22692.0	-2245.5		E1100374-v4	
AM 403	-1858.0	-3650.0		E1100374-v4	
AM 404	-1858.0	-19941.0		E1100374-v4	
AM 405	-1858.0	-22503.2		E1100374-v4	
IAM 92	-1858.0	45962.2		E1100374-v4	
IAM-L1	-22382.3	-1854.2		D980499-C	
IAM-L2	-1854.2	-1854.2		D980499-C	
IAM-L3	-1854.2	-22089.6		D980499-C	
IAM-L4	2362.2	-1854.2		D980499-C	
IAM-L5	38154.0	-1854.2		D980499-C	
IAM-L6	220000.0	-1854.2		D980499-C	
IAM-L7	-1854.2	2362.2		D980499-C	
IAM-L8	-1854.2	38154.0		D980499-C	
IAM-L9	-1854.2	220000.0		D980499-C	
L1 IAM 376	-1858.0	12604.4		E1100374-v4	D2000424-v10 shows L1 IAM 376 Y = 12602.5
L1 IAM 377	-1858.0	-1845.1		E1100374-v4	
L1 IAM 378	-1858.0	-2245.5		E1100374-v4	Same coordinates in D2000424-v10
L1 IAM 379	-1858.0	-26239.4		E1100374-v4	D2000424-v10 shows L1 IAM 379 Y = -26231.2
L1 IAM 380	0.0	unknown		E1100374-v4	
L1 IAM 381	11591.0	-1845.1		E1100374-v4	
L1 IAM 382	-22283.5	-2245.5		E1100374-v4	
L1 IAM 414	6350.0	-27010.0		D2000424-v10	
L1 IAM 415	6350.0	12602.5		D2000424-v10	
L1 IAM 416	6350.0	45960.0		D2000424-v10	
am 500	-1858.0	-120.2		E1200797-v2	
am 501	-1858.0	0.0		E1200797-v2	
am 502	-1858.0	-144.4		E1200797-v2	
am 503	-1858.0	-544.4		E1200797-v2	
am 504	-1858.0	24.2		E1200797-v2	
am 505	-1858.0	0.0		E1200797-v2	
am 506	-1858.0	-183.2		E1200797-v2	

E1100374-v4 also includes 4 unlabeled along the Y-axis, which are not included in this table

SEE ALSO C972856 -- MAY HAVE PSI MONUMENTS -- PAPER ONLY IN DCC

SEE ALSO c970811 -- ADDITIONAL MONUMENTS AT LLO

SEE ALSO C970708 -- BLDG SURVEY MONUMENT POINTS

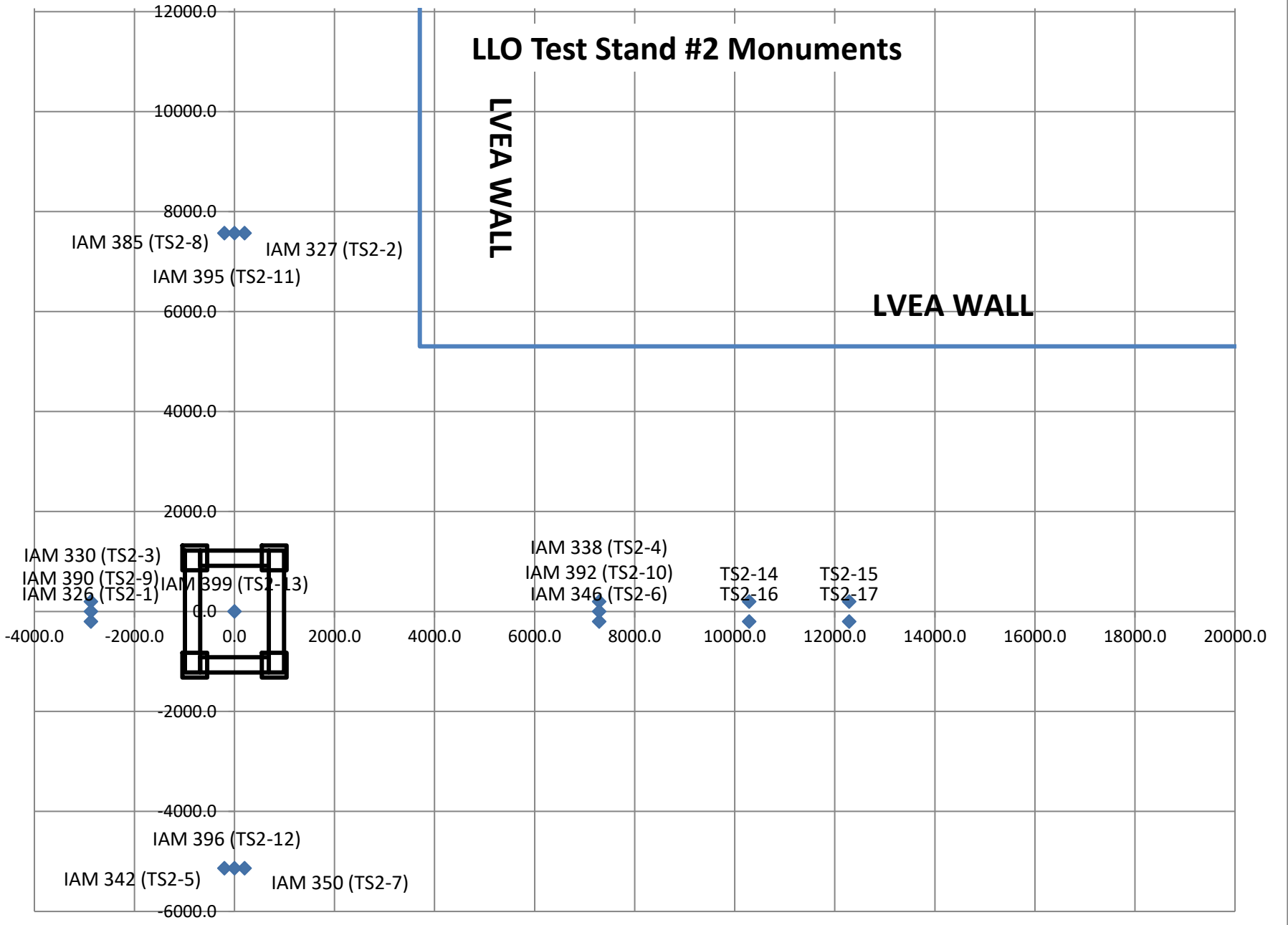


**TEST STAND #1**

designation	Incorrect Global from E1100374-v4 corrected TS1 relative coordinates per D. Cook & J. Oberling survey 6/26/2012		Corrected, approx. Global per Joe Hanson's 6/14/2012 measurements		Local		Source	comments
	X (mm)	Y (mm)	X (mm)	Y (mm)	X (mm)	Y (mm)		
IAM 329 (TS1-1)	14019.5	6968.4	14836.8	12068.2	7293.0	-200.0	E1100374-v4	Test Stand 1 (TS1)
IAM 332 (TS1-2)	6926.5	2037.4	7743.8	7137.2	200.0	-5131.0	E1100374-v4	Test Stand 1 (TS1)
IAM 333 (TS1-3)	6526.5	2037.4	7343.8	7137.2	-200.0	-5131.0	E1100374-v4	Test Stand 1 (TS1)
IAM 334 (TS1-4)	6926.5	14739.4	7743.8	19839.2	200.0	7571.0	E1100374-v4	Test Stand 1 (TS1)
IAM 337 (TS1-5)	14019.5	7368.4	14836.8	12468.2	7293.0	200.0	E1100374-v4	Test Stand 1 (TS1)
IAM 349 (TS1-6)	6526.5	14739.4	7343.8	19839.2	-200.0	7571.0	E1100374-v4	Test Stand 1 (TS1)
IAM 389 (TS1-7)	3859.5	7368.4	4676.8	12468.2	-2867.0	200.0	E1100374-v4	Test Stand 1 (TS1)
IAM 391 (TS1-8)	6726.5	14739.4	7543.8	19839.2	0.0	7571.0	E1100374-v4	Test Stand 1 (TS1)
IAM 393 (TS1-9)	14019.5	7168.4	14836.8	12268.2	7293.0	0.0	E1100374-v4	Test Stand 1 (TS1)
IAM 394 (TS1-10)	6726.5	7168.4	7543.8	12268.2	0.0	0.0	E1100374-v4	Test Stand 1 (TS1)
IAM 397 (TS1-11)	3859.5	7168.4	4676.8	12268.2	-2867.0	0.0	E1100374-v4	Test Stand 1 (TS1)
IAM 398 (TS1-12)	6726.5	2037.4	7543.8	7137.2	0.0	-5131.0	E1100374-v4	Test Stand 1 (TS1)
IAM 400 (TS1-13)	3859.5	6968.4	4676.8	12068.2	-2867.0	-200.0	E1100374-v4	Test Stand 1 (TS1)
TS1-14					-2867.0	-2471.3	E1200556-v6	Test Stand 1 (TS1)
TS1-15					0.0	6540.7	E1200556-v6	Test Stand 1 (TS1)
TS1-16					5594.5	6540.7	E1200556-v6	Test Stand 1 (TS1)
TS1-17					5594.5	5390.3	E1200556-v6	Test Stand 1 (TS1)
TS1-18					0.0	5390.3	E1200556-v6	Test Stand 1 (TS1)
TS1-19					-183.9	7571.0	E1200556-v6	Test Stand 1 (TS1)
TS1-20					-183.9	0.0	E1200556-v6	Test Stand 1 (TS1)
TS1-21					-2867.0	10000.0	D. Cook 6/28/2012 email	Test Stand 1 (TS1); Y-coordinate is only approximate!

BS HR	-202.63	-183.89			-183.89	202.63
BS AR	-160.32	-226.23			-226.23	160.32

# LLO Test Stand #2 Monuments



## TEST STAND #2

designation	Global from E1100374-v4 with some corrections - may be in error			Local		Source	comment
	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)		
IAM 326 (TS2-1)	6761.0	3503.9		-2872.0	-200.0	E1100374-v4	Test Stand 2 (TS2)
IAM 327 (TS2-2)	9833.0	11273.9		200.0	7570.0	E1100374-v4	Test Stand 2 (TS2) corrected Y relative to E1100374-v4
IAM 330 (TS2-3)	6761.0	3903.9		-2872.0	200.0	E1100374-v4	Test Stand 2 (TS2)
IAM 338 (TS2-4)	16922.0	3903.9		7289.0	200.0	E1100374-v4	Test Stand 2 (TS2) corrected X relative to E1100374-v4
IAM 342 (TS2-5)	9433.0	-1429.1		-200.0	-5133.0	E1100374-v4	Test Stand 2 (TS2)
IAM 346 (TS2-6)	16922.0	3503.9		7289.0	-200.0	E1100374-v4	Test Stand 2 (TS2) corrected X relative to E1100374-v4
IAM 350 (TS2-7)	9833.0	-1429.1		200.0	-5133.0	E1100374-v4	Test Stand 2 (TS2)
IAM 385 (TS2-8)	9433.0	11273.9		-200.0	7570.0	E1100374-v4	Test Stand 2 (TS2) corrected Y relative to E1100374-v4
IAM 390 (TS2-9)	6761.0	3703.9		-2872.0	0.0	E1100374-v4	Test Stand 2 (TS2)
IAM 392 (TS2-10)	16922.0	3703.9		7289.0	0.0	E1100374-v4	Test Stand 2 (TS2) corrected X relative to E1100374-v4
IAM 395 (TS2-11)	9633.0	11273.9		0.0	7570.0	E1100374-v4	Test Stand 2 (TS2) corrected Y relative to E1100374-v4
IAM 396 (TS2-12)	9633.0	-1429.1		0.0	-5133.0	E1100374-v4	Test Stand 2 (TS2)
IAM 399 (TS2-13)	9633.0	3703.9		0.0	0.0	E1100374-v4	Test Stand 2 (TS2)
TS2-14	19922.0	3903.9		10289.0	200.0	E1100374-v4	Test Stand 2 (TS2)
TS2-15	21922.0	3903.9		12289.0	200.0	E1100374-v4	Test Stand 2 (TS2)
TS2-16	19922.0	3503.9		10289.0	-200.0	E1100374-v4	Test Stand 2 (TS2)
TS2-17	21922.0	3503.9		12289.0	-200.0	E1100374-v4	Test Stand 2 (TS2)

Added monuments to give better separation of laser collimator returning beam from TM HR&AR beams