



EUFAR TA BIOHYPE 2011 - VALENCIA FLIGHT REPORT

SCHEDULE

Pre-campaing meeting	September 5, 2011 UTC15:00 (CEST17:00). Valencia.
D01 Nominal date	September 6, 2011, starting at UTC10:00 or UTC11:00, depending on the survey option selected.
D01 Back-up window	September 7, 2011.

FLIGHTS PERFORMED

Flight ID	FLIGHT D01 CASI1500i diurnal survey
Date & time of the flight	September 07, 2011 starting measurements at UTC09:55 (CEST11:55).
Test site	Valencia urban area.
Purpose	CASI1500i data collection.
Flight patterns	VALENCIA FP01 and VALENCIA FP02. CASI-1500i 1m flight lines (x8) over Valencia urban area.
Weather conditions	Clear sky. Wind blowing from the East. Hazy atmosphere.
Coordination	With the local P.O.C.
Summary	Take off from Valencia airport (LEVC) at UTC09:44. Climb up tp MSL6750 flight level. FP01 (noon-2hr) pattern is started. First P11 with is done at UTC09:55 from the NW with 133° true heading. CASI is noticed not to be thermally stabilized yet. P11 is repeated at UTC10:08 this time from the SE with 313° heading. Afterwards P12, P13 and P14 are flown. CASI spectral configuration is changed from SPAT288 to "BIOHYPE 2010 GHENT SPATIAL MODE" (see Appendix I). FP02 is started at UTC10:56. Line P21 is done from its SE ending with 334° heading. Later on P22, from the opposite side in the NW, following a 160° heading and so on, P23 and P24, that is completed at UTC11:44.

VALENCIA FP01 FLIGHT PATTERN (@NOON-2HR) CASI-1500i SPATIAL MODE - 288 BANDS 1mx3.1m/MSL6750FT.

FLIGHT LINE ID.	CASI RECORDING ID.	TIME (UTC)	ALT. (MSL)	TRUE HDG.	LENGTH/DUR. (GS 72ms ⁻¹ 140KTS)	CASI-1500i CONFIGURATION	REMARKS
CASI BIOHYPE VALENCIA P11A CASI20110907D-SPAT288-P11A	CASI HD07 CASI_2011_09_07_095543.raw	09:55	6750FT (2060m)	133°	3.85NM(7.14km)/ 01min39s	SPATIAL-288 IT=43ms Max. aperture	No clouds. Some haze. Variable wind from the East. Drift angle=2°. CASI is found not thermally stabilised yet.
CASI BIOHYPE VALENCIA P11B CASI20110907D-SPAT288-P11B	CASI HD07 CASI_2011_09_07_100839.raw	10:08	6750FT (2060m)	313°	3.85NM(7.14km)/ 01min39s	SPATIAL-288 IT=43ms Max. aperture	P11 flight line is repeated.
CASI BIOHYPE VALENCIA P12 CASI20110907D-SPAT288-P12	CASI HD07 CASI_2011_09_07_101630.raw	10:16	6750FT (2060m)	137°	3.85NM(7.13km)/ 01min39s	SPATIAL-288 IT=43ms Max. aperture	
CASI BIOHYPE VALENCIA P13 CASI20110907D-SPAT288-P13	CASI HD07 CASI_2011_09_07_102428.raw	10:23	6750FT (2060m)	322°	3.84NM(7.11km)/ 01min39s	SPATIAL-288 IT=43ms Max. aperture	
CASI BIOHYPE VALENCIA P14 CASI20110907D-SPAT288-P14	CASI HD07 CASI_2011_09_07_104053.raw	10:40	6750FT (2060m)	148°	3.85NM(7.14km)/ 01min39s	SPATIAL-288 IT=43ms Max. aperture	

VALENCIA FP02 FLIGHT PATTERN (@NOON-1HR)
CASI-1500i “BIOHYPE 2010 GHENT SPATIAL MODE” - 144 bands 1mx1.7m/MSL6750FT.

FLIGHT LINE ID.	CASI RECORDING ID.	TIME (UTC)	ALT. (MSL)	TRUE HDG.	LENGTH/DUR. (GS 72ms ⁻¹ 140KTS)	CASI-1500i CONFIGURATION	REMARKS
CASI BIOHYPE VALENCIA P21 CASI20110907D-SPAT144*-P21	CASI HD07 CASI_2011_09_07_105707.raw	10:56	6750FT (2060m)	334°	3.85NM(7.14km)/ 01min39s	SPATIAL-144* IT=23ms Max. aperture	Some high clouds, cirrus (FEW). Wind from the East. Drift angle = 2°.
CASI BIOHYPE VALENCIA P22 CASI20110907D-SPAT144*-P22	CASI HD07 CASI_2011_09_07_111348.raw	11:13	6750FT (2060m)	160°	3.85NM(7.13km)/ 01min39s	SPATIAL-144* IT=22ms Max. aperture	Wind from the East. Drift correction = 3°.
CASI BIOHYPE VALENCIA P23 CASI20110907D-SPAT144*-P23	CASI HD07 CASI_2011_09_07_112802.raw	11:27	6750FT (2060m)	346°	3.84NM(7.13km)/ 01min39s	SPATIAL-144* IT=22ms Max. aperture	Wind from the East. Drift correction = 2°.
CASI BIOHYPE VALENCIA P24 CASI20110907D-SPAT144*-P24	CASI HD07 CASI_2011_09_07_114113.raw	11:40	6750FT (2060m)	173°	3.84NM(7.11km)/ 01min39s	SPATIAL-144* IT=22ms Max. aperture	Wind from the East. Drift correction = 3°.

*CASI spectral configuration “BIOHYPE 2010 GHENT SPATIAL MODE”. See Appendix I.



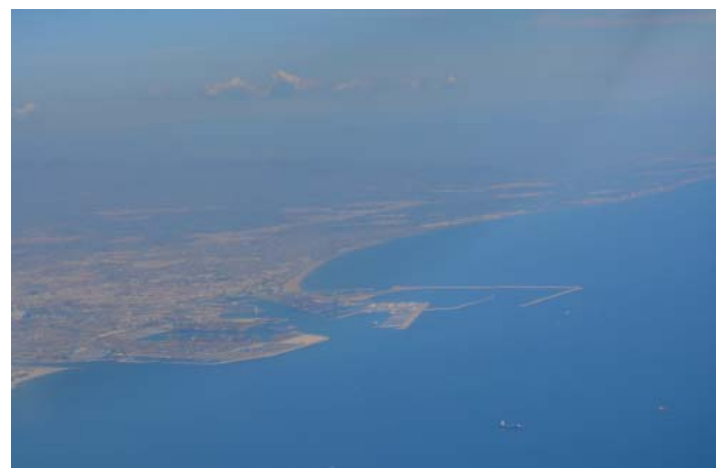
Valencia EUFAR TA BIOHYPE D01 flight. UTC10:07



Valencia EUFAR TA BIOHYPE D01 flight. UTC10:17



Valencia EUFAR TA BIOHYPE D01 flight. UTC10:11



Valencia EUFAR TA BIOHYPE D01 flight. UTC10:53



FLIGHT DATA & SENSOR SETTINGS

AIRCRAFT

Nominal aircraft ground speed
 Altitude above ground level
 Mean ground elevation
 Positioning

CASA 212-200 S/N270, "Paternina" (EADS)

GS 72ms⁻¹ (140KTS)
 AGL 2041m (6696FT)
 ELEV 20m (66FT)
 Real-Time DGPS based in StarFire constellation.

HYPERSPECTRAL SENSOR

Installation
 Positioning & orientation
 IMU installation
 Set up lever arms
 Boresight cal./bundle adjustment flight
 Operating mode

CASI-1500i (S/N 2516) (Itres Research Limited)

on the main cabin floor rear window
 Applanix POS/AV 410 V5
 (PCS S/N 2335 IMU LN200 S/N 414187)
 In CASI-1500i sensor head unit. ACTIVE
 See note 1 below.
 28/April/2011 BAF in Villacañas (Toledo)
 1st flight pattern: SPATial mode, 288 bands
 2nd flight pattern: SPATial mode, 144 bands
 ("BIOHYPE 2010 GHENT SPATIAL MODE", see Appendix I)
 43ms when SPAT288
 23ms for SPAT144
 0.49mrad / 0.698rad (40degrees)
 1500 pixels (SPATial mode)
 SPAT-288 Across track 1.0m @2041m(AGL6696FT)
 Along track 3.10m@IT43ms&72ms⁻¹(GS140KTS)
 SPAT-144 Across track 1.0m @2041m(AGL6696FT)
 Along track 1.66m@IT23ms&72ms⁻¹(GS140KTS)

Integration Time

IFOV/FOV

Number of pixels per line
 Pixel size/GSD @ nadir

Swath

Flight-line side-overlapping

Calibration date

1486m @ 2041m (AGL6696FT)

N/A

August 2011

(Further information about CASI-1500i can be found at www.inta.es, www.crepad.rcanaria.es/info/npoc/indexlab.html and www.itres.com)

Note 1. "Lever arms" for CASI-1500i SHU mounted on the rear nadir-looking window.

Ref. to IMU lever arm

X(m) = +0.155
 Y(m) = -0.053
 Z(m) = +0.063

Ref. to primary GPS lever arm

X(m) = +0.782
 Y(m) = +0.029
 Z(m) = -2.045

COORDINATES OF STARTING AND ENDING POINTS

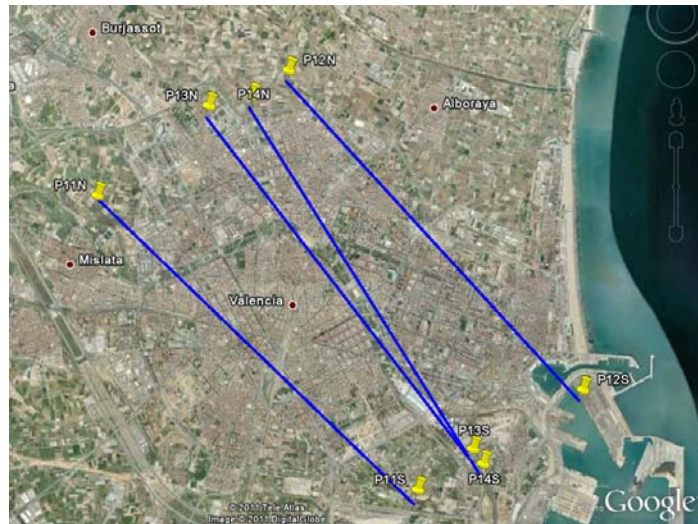
WGS84/ETRS89	LAT (DMX)		LONG (DMX)		ALT MSL
P11N	N39	29.096'	W000	24.879'	6750FT
P11S	N39	26.485'	W000	21.212'	6750FT
P12N	N39	30.207'	W000	22.687'	6750FT
P12S	N39	27.372'	W000	19.319'	6750FT
P13N	N39	29.892'	W000	23.602'	6750FT
P13S	N39	26.845'	W000	20.579'	6750FT
P14N	N39	29.977'	W000	23.109'	6750FT
P14S	N39	26.715'	W000	20.463'	6750FT

EUFR TA BIOHYPE 2011 VALENCIA STUDY SITE

FLIGHT PATTERN FP01 (@NOON – 2HR)

P11-P14 flight lines (provided by Luis Alonso on 17/08/2011)

Geographic co-ordinates in WGS84/ETRS89



EUFR TA BIOHYPE 2011 VALENCIA STUDY SITE

FLIGHT PATTERN FP01 (@NOON – 2HR)

P11-P14 flight lines (provided by Luis Alonso on 17/08/2011)

(Imaged in Google Earth)



EUFR TA BIOHYPE 2011 VALENCIA STUDY SITE

FLIGHT PATTERN FP01 (@NOON – 2HR)

Airplane track (coloured in yellow) along FP01 from T.O. at UTC09:44 to UTC10:46

(Imaged in Google Earth)

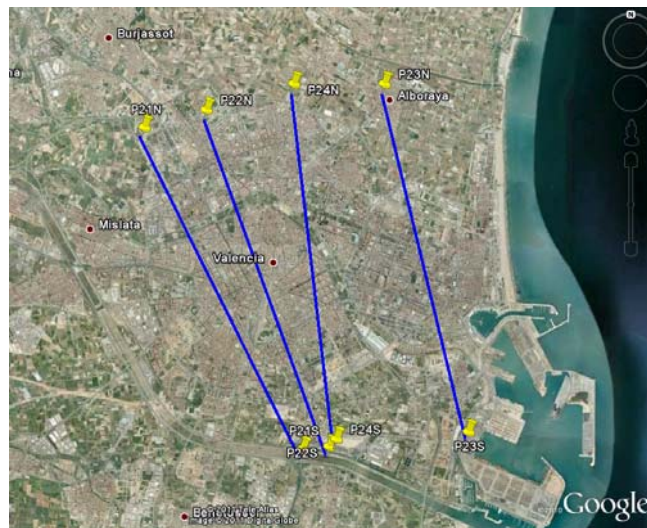
WGS84/ETRS89	LAT (DMX)		LONG (DMX)		ALT MSL
P21N	N39	29.563'	W000	24.440'	6750FT
P21S	N39	26.104'	W000	22.235'	6750FT
P22N	N39	29.750'	W000	23.576'	6750FT
P22S	N39	26.127'	W000	21.870'	6750FT
P23N	N39	30.030'	W000	21.097'	6750FT
P23S	N39	26.285'	W000	19.931'	6750FT
P24N	N39	30.030'	W000	22.358'	6750FT
P24S	N39	26.209'	W000	21.770'	6750FT

EUFAR TA BIOHYPE 2011 VALENCIA STUDY SITE

FLIGHT PATTERN FP02 (@NOON – 1 HR)

P21-P24 flight lines (provided by Luis Alonso on 17/08/2011)

Geographic co-ordinates in WGS84/ETRS89



EUFAR TA BIOHYPE 2011 VALENCIA STUDY SITE

FLIGHT PATTERN FP02 (@NOON – 1HR)

P21-P24 flight lines (provided by Luis Alonso on 17/08/2011)

(Imaged in Google Earth)

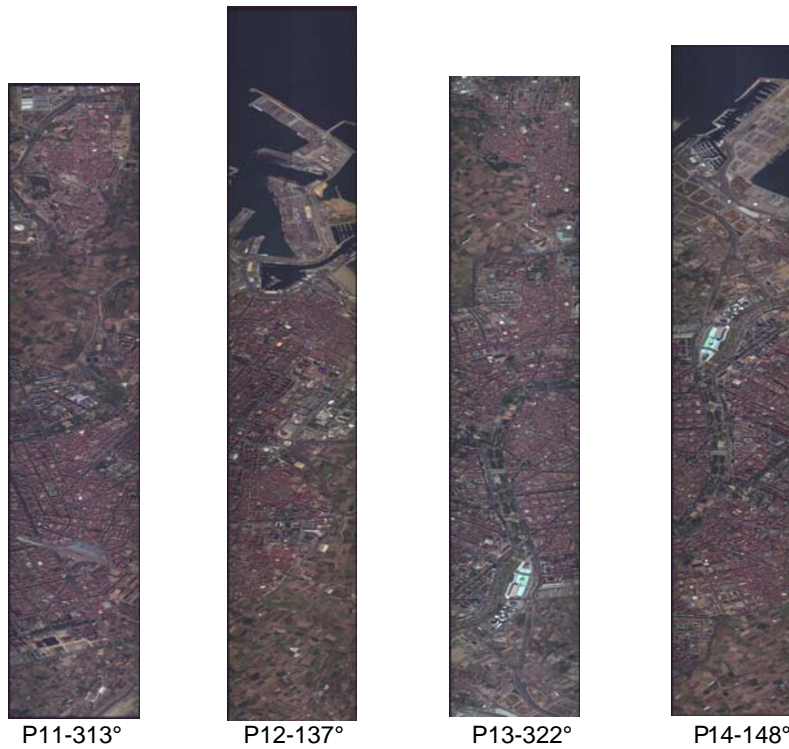


EUFAR TA BIOHYPE 2011 VALENCIA STUDY SITE

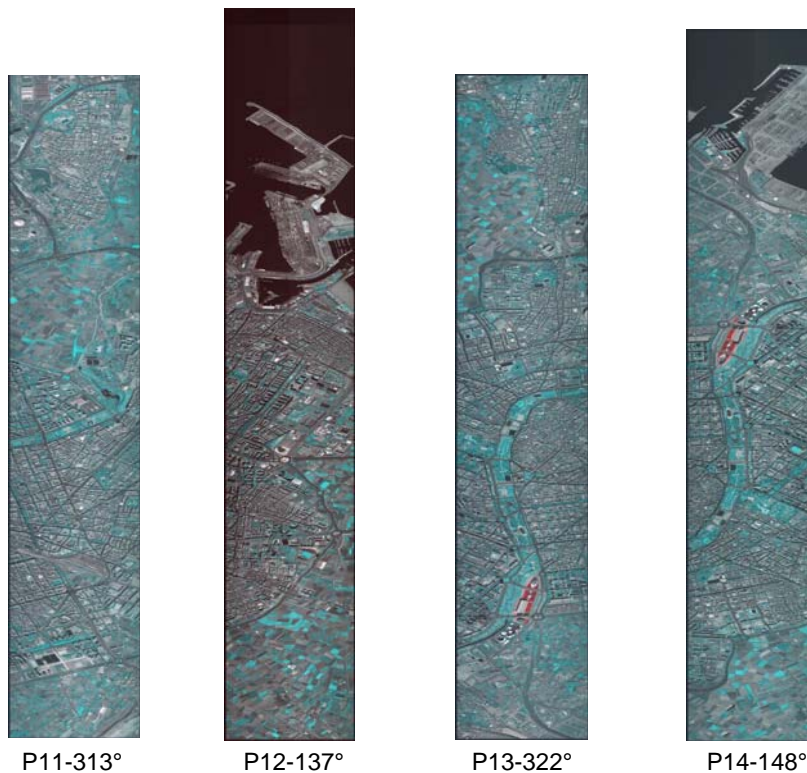
FLIGHT PATTERN FP02 (@NOON – 1HR)

Airplane track (coloured in yellow) along FP02 from UTC10:50 to UTC11:50

(Imaged in Google Earth)



EUFAR TA BIOHYPE 2011 VALENCIA STUDY SITE
 FLIGHT PATTERN FP01 (@NOON – 2HR)
 CASI-1500i quicklooks (RGB real colour composition)



EUFAR TA BIOHYPE 2011 VALENCIA STUDY SITE
 FLIGHT PATTERN FP01 (@NOON – 2HR)
 CASI-1500i quicklooks
 (RGB composition of oxygen absorption bands: 760nm-755nm-680nm)



TELEPHONES & ADDRESSES

ÁREA DE TELEDETECCIÓN / REMOTE SENSING AREA

Dpto. Observación de la Tierra, Teledetección y Atmósfera
Instituto Nacional de Técnica Aeroespacial – INTA
Carretera de Ajalvir, km 4
28850 TORREJÓN DE ARDOZ (MADRID) - SPAIN

Data Acquisition Flight Group +34639120154 (8420087) (cell)

Ground truth Group +34609045654 (8420143) (cell)

(Both available during the campaign)

Fax (Remote Sensing Area) +34 91 5201633 (8216633)

Alix FERNANDEZ-RENAU +34 91 5201991 (8216991) fdezra@inta.es
Eduardo DE-MIGUEL-LLANES +34 91 5201990 (8216990) demiguel@inta.es
José-Antonio GOMEZ-SANCHEZ +34 91 5201992 (8216992) gomezsj@inta.es
Marcos JIMENEZ-MICHAVILA +34 91 5201989 (8216989) jimenezmm@inta.es

ABBREVIATIONS & ACRONYMS

AGL	Above Ground Level	LWIR	Long-Wave Infra-Red
AHS	Airborne Hyperspectral System	MIR	Mid Infra-Red
BAF	Bundle Adjustment Flight	MIT	Minimum Integration Time
BB	Black-Body	MSL	Mean Sea Level
BKN	Broken sky (5/8 a 7/8)	MWIR	Mid-Wave Infra-Red
CASI	Compact Airborne Spectrographic Imager	N	North
DGPS	Differential GPS	N/A	Not Available
E	East	OVC	Overcast sky (8/8)
ELEV	ELEVation	PCS	POS Computer System
ETRS89	European Terrestrial Reference System 1989	POS	Position and Orientation System
EUFAR	EUropean Facility for Airborne Research	RS	Rows Summed (CASI-1500)
FEW	Scarse clouds (1/8 a 2/8)	S	South
FOV	Field Of View	SHU	Sensor Head Unit
FT	FooT/FeeT	S/N	Serial Number
GPS	Global Positioning System	SCT	Scattered clouds (3/8 a 4/8)
GS	Ground Speed	SKC	Clear sky (0/8)
GSD	Ground Sample Distance	SWIR	Short-Wave Infra-Red
ICU	Instrument Control Unit	TBC	To Be Confirmed
IFOV	Instantaneous Field Of View	TBD	To Be Defined
IMU	Inertial Measurement Unit	UTC	Universal Time Coordinated
INS	Inertial Navigation System	UTM	Universal Transverse Mercator
INTA	Instituto Nacional de Técnica Aeroespacial	VNIR	Visible & Near Infra-Red
IT	Integration Time	W	West
KTS	KnoTS	WGS84	World Geodetic System 1984
LT	Local Time	XTE	Cross Track Error

APPENDIX I

BIOHYPE 2010 GHENT SPATIAL MODE

(Provided by Luis Alonso for EUFAR TA BIOHYPE survey over Ghent in August 2010).

BAND#	FROM (nm)	TO (nm)	BAND#	FROM (nm)	TO (nm)	BAND#	FROM (nm)	TO (nm)
1	336.4	362.8	51	657.8	660.2	101	777.6	780.0
2	365.2	374.8	52	660.2	662.6	102	780.0	782.4
3	374.8	384.4	53	662.6	665.0	103	782.4	784.8
4	384.4	394.0	54	665.0	667.4	104	784.8	787.2
5	394.0	401.2	55	667.4	669.8	105	787.2	789.6
6	401.2	408.4	56	669.8	672.2	106	789.6	792.0
7	408.4	415.6	57	672.2	674.6	107	792.0	794.4
8	415.6	422.8	58	674.6	677.0	108	794.4	796.8
9	422.8	430.0	59	677.0	679.4	109	796.8	799.2
10	430.0	437.2	60	679.4	681.8	110	799.2	801.6
11	437.2	444.4	61	681.8	684.2	111	801.6	804.0
12	444.4	451.6	62	684.2	686.6	112	804.0	811.2
13	451.6	458.8	63	686.6	689.0	113	811.2	818.4
14	458.8	466.0	64	689.0	691.3	114	818.4	825.5
15	466.0	473.2	65	691.3	693.7	115	825.5	832.7
16	473.2	480.4	66	693.7	696.1	116	832.7	839.9
17	480.4	487.5	67	696.1	698.5	117	839.9	847.1
18	487.5	494.7	68	698.5	700.9	118	847.1	854.3
19	494.7	501.9	69	700.9	703.3	119	854.3	861.5
20	501.9	509.1	70	703.3	705.7	120	861.5	868.7
21	509.1	516.3	71	705.7	708.1	121	868.7	875.9
22	516.3	523.5	72	708.1	710.5	122	875.9	883.0
23	523.5	530.7	73	710.5	712.9	123	883.0	890.2
24	530.7	533.1	74	712.9	715.3	124	890.2	899.8
25	533.1	540.3	75	715.3	717.7	125	899.8	909.4
26	540.3	547.5	76	717.7	720.1	126	909.4	919.0
27	547.5	554.7	77	720.1	722.5	127	919.0	926.2
28	554.7	561.9	78	722.5	724.9	128	926.2	933.3
29	561.9	569.1	79	724.9	727.3	129	933.3	940.5
30	569.1	571.5	80	727.3	729.7	130	940.5	947.7
31	571.5	578.7	81	729.7	732.1	131	947.7	954.9
32	578.7	585.9	82	732.1	734.5	132	954.9	962.1
33	585.9	593.1	83	734.5	736.9	133	962.1	969.3
34	593.1	600.3	84	736.9	739.3	134	969.3	976.4
35	600.3	607.4	85	739.3	741.7	135	976.4	983.6
36	607.4	614.6	86	741.7	744.1	136	983.6	990.8
37	614.6	621.8	87	744.1	746.5	137	990.8	998.0
38	621.8	629.0	88	746.5	748.9	138	998.0	1005.2
39	629.0	631.4	89	748.9	751.3	139	1005.2	1012.4
40	631.4	633.8	90	751.3	753.7	140	1012.4	1019.6
41	633.8	636.2	91	753.7	756.1	141	1019.6	1026.7
42	636.2	638.6	92	756.1	758.5	142	1026.7	1033.9
43	638.6	641.0	93	758.5	760.8	143	1033.9	1041.1
44	641.0	643.4	94	760.8	763.2	144	1041.1	1048.3
45	643.4	645.8	95	763.2	765.6	145	1048.3	1055.5
46	645.8	648.2	96	765.6	768.0			
47	648.2	650.6	97	768.0	770.4			
48	650.6	653.0	98	770.4	772.8			
49	653.0	655.4	99	772.8	775.2			
50	655.4	657.8	100	775.2	777.6			