

X-PAD Ultimate FAQ Series

Entering Slant Height in X-PAD, with iG8 as an example

More FAQ's like this one are available here: [[X-PAD FAQ Series](#)]

Date: 9/24/2022

Filename: Document1



Thesis

X-PAD allows you to enter the slant height for a GNSS Base, however the image is completely bogus. In this FAQ, we will look at the iG8 as an example and verify that the X-PAD computation is correct.

This FAQ is structured as to be a model for checking other receivers as needed.

A better help image is proposed.

Antenna Values for the iGage iG8

For IGS modeled receivers/antennas you can download the .atx and .gra files from the IGS distribution website:

`https://files.igs.org/pub/station/general/`

the file:

`antenna.gra`

will have the physical descriptors for all modeled antennas and the latest version of the file:

`igs20_2247.atx`

will have the antenna models.

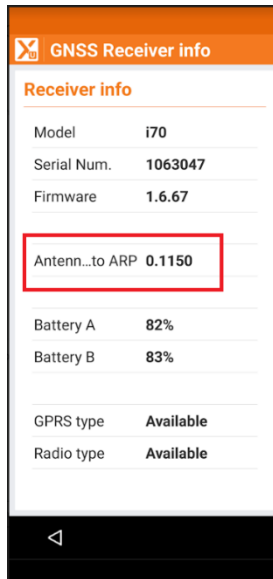
L1 Offset

For the iG8, the L1 offset can be found in the G01 section of the master .atx file, highlighted below:

IGAI8		NONE		Geo++ GmbH		5	23-OCT-17	START OF ANTENNA																															
ROBOT								TYPE / SERIAL NO																															
5.0								METH / BY / # / DATE																															
0.0 90.0 5.0								DAZI																															
4								ZEN1 / ZEN2 / DZEN																															
IGS20_2247								# OF FREQUENCIES																															
# Number of Calibrated Antennas GPS: 005								SINEX CODE																															
# Number of Individual Calibrations GPS: 014								COMMENT																															
# Number of Calibrated Antennas GLO: 005								COMMENT																															
# Number of Individual Calibrations GLO: 014								COMMENT																															
# GLONASS PCV (metric)								COMMENT																															
# derived from Delta PCV per 25.0 MHz								COMMENT																															
# for frequency channel number k=0								COMMENT																															
G01								START OF FREQUENCY																															
-0.76		+0.28		+114.00				NORTH / EAST / UP																															
NOAZI		+0.00		+0.21		+0.67		+1.01		+0.88		+0.21		-0.75		-1.50		-1.65		-1.11		-0.22		+0.51		+0.66		+0.27		-0.20		-0.13		+0.68		+1.65		+1.40	
0.0		+0.00		+0.16		+0.59		+0.92		+0.81		+0.16		-0.78		-1.55		-1.78		-1.38		-0.58		+0.21		+0.70		+0.92		+1.19		+1.80		+2.62		+2.90		+1.51	
5.0		+0.00		+0.15		+0.58		+0.90		+0.78		+0.13		-0.80		-1.55		-1.76		-1.35		-0.57		+0.17		+0.62		+0.83		+1.14		+1.87		+2.84		+3.23		+1.78	
10.0		+0.00		+0.15		+0.57		+0.88		+0.75		+0.10		-0.81		-1.54		-1.73		-1.31		-0.56		+0.13		+0.51		+0.68		+1.02		+1.86		+3.01		+3.56		+2.12	
15.0		+0.00		+0.15		+0.56		+0.86		+0.72		+0.07		-0.83		-1.53		-1.69		-1.27		-0.54		+0.09		+0.38		+0.48		+0.81		+1.74		+3.08		+3.84		+2.50	
20.0		+0.00		+0.14		+0.55		+0.84		+0.69		+0.04		-0.84		-1.51		-1.64		-1.21		-0.50		+0.06		+0.25		+0.25		+0.54		+1.52		+3.02		+4.02		+2.88	

The L1 Phase Offset from the ARP is 0.11400 meters.

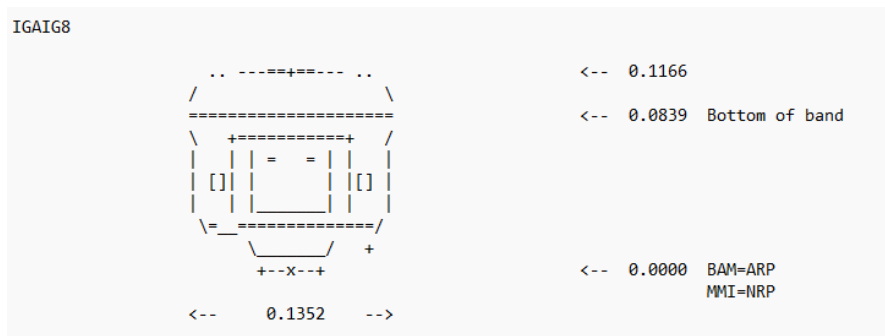
In X-PAD, if you go to the GNSS Status screen and click on the battery icon at the top of the screen while the iG8 base is selected:



X-PAD is using 0.1150 meters which is 0.001 meters (0.003 feet) in error. This is close enough for GNSS work.

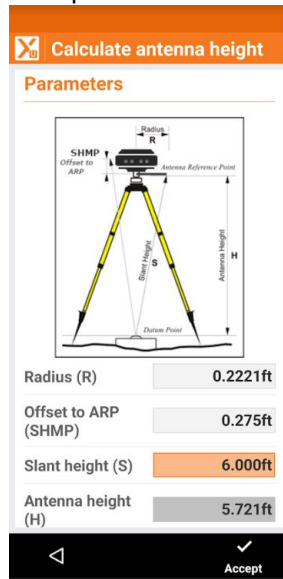
Radius, SHMP

Here is a reproduction of the iG8 .gra file from the IGS site:



With all measurements shown in meters. The SHMP is the bottom of the blue band.

For the example where the slant height is 6.000 feet exactly, X-PAD has this helper screen:



3

Here is an excel spreadsheet to assist with the conversions and comparisons:

	A	B	C	D	E	F
1		Note: this worksheet is in FEET!				
2		X-PAD	iG8.tab		Formulas used in Col B and C	
3	S	6.0000	6.0000			
4	dia	0.4442	0.4436	=2*B5		=-0.1352/0.3048
5	radius	0.2221	0.2218			=+C4/2
6	SHMP	0.2750	0.2753			=-0.0839/0.3048
7						
8	Hshmp	5.9959	5.9959	=+SQRT(B3*B3-B5*B5)		=+SQRT(C3*C3-C5*C5)
9	H	5.7209	5.7206	=B8-B6		=C8-C6

Where:

- S slant height measured to the bottom of the blue band, 6.000 feet slant
- dia diameter of the iG8 receiver
- radius ½ the diameter
- SHMP the distance from the ARP (bottom of receiver) up to the bottom of the blue band
- Hshmp vertical distance from GM (Ground Mark) to bottom of blue band
- H vertical distance from GM to ARP

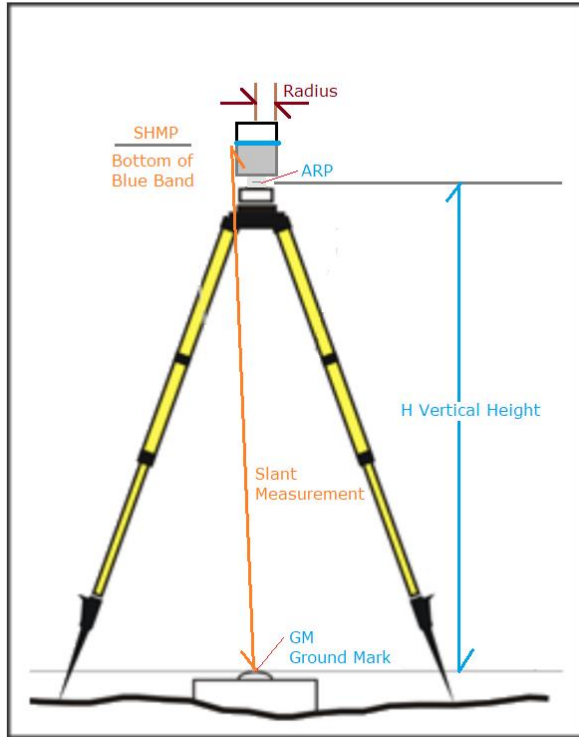
For the 6.000 foot slant to bottom of blue band example at hand, the resulting H vertical height from GM to ARP is within 0.0003 feet of the optimum value.

So, X-PAD works for the iG8.

[A better picture](#)

The picture that X-PAD shows is completely misleading.

This picture may be clearer:



Conclusion

X-PAD works as expected and is within an acceptable margin of error for the iG8 receiver.