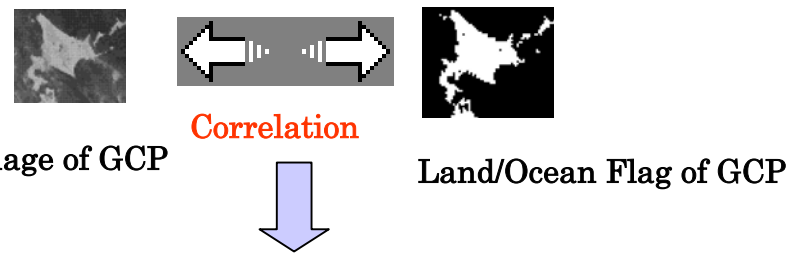
The Way of Improving Geometric Accuracy

- Evaluate the geometric error at GCPs for the following period:
  - AMSR: Feb. 1, 2003 – Oct. 4, 2003
  - AMSR-E: Jul. 1, 2002 – Dec. 14, 2003
- 10 GCPs are selected for the evaluation.
- The Geometric Error will be a function of orbital position and scan angle.
  - (1) Assumed Fitting Function of Geometric Error

$$F(p,\phi) = a\sin(\pi\phi/180 + bp^2 + cp + d) + ep^2 + fp + g$$

p : Scan Azimuth
ϕ : Argument of Latitude in degree

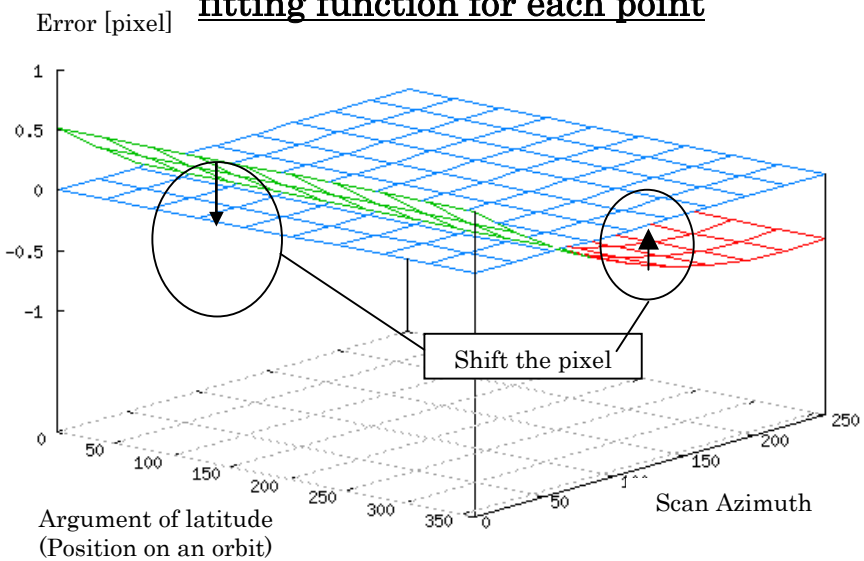
- Determine the seven parameters of fitting function with the Least Square Method



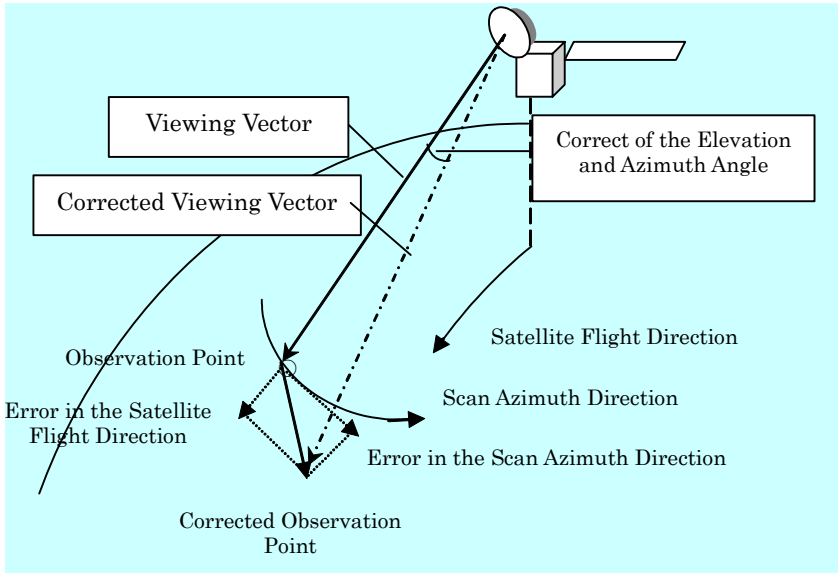
Evaluate the displacement at GCPs.
Calculate the scan azimuth and argument of latitude for every image of GCP.

Geometry of Correction Method

I. Remove the bias with the determined fitting function for each point

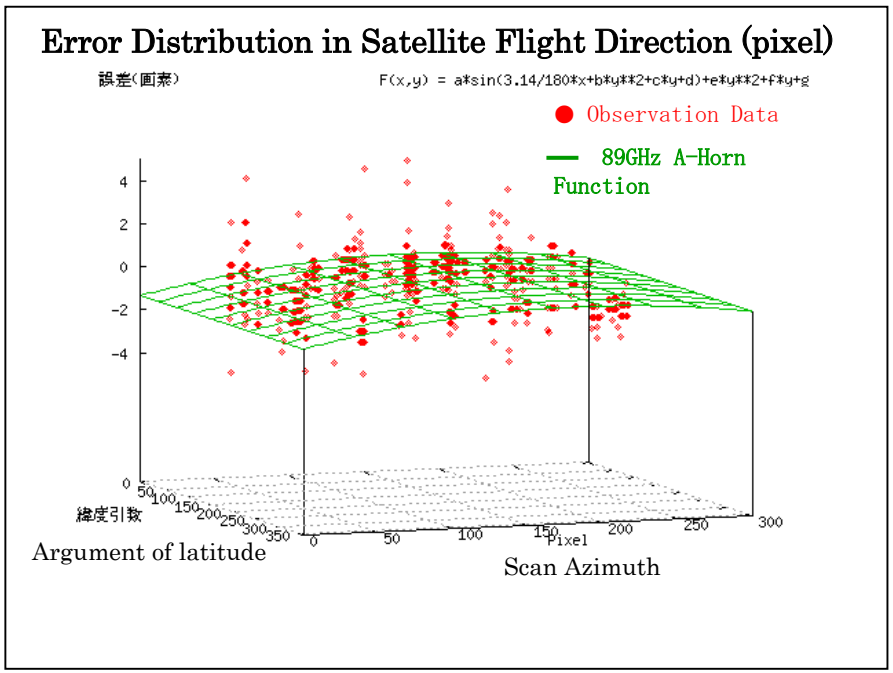


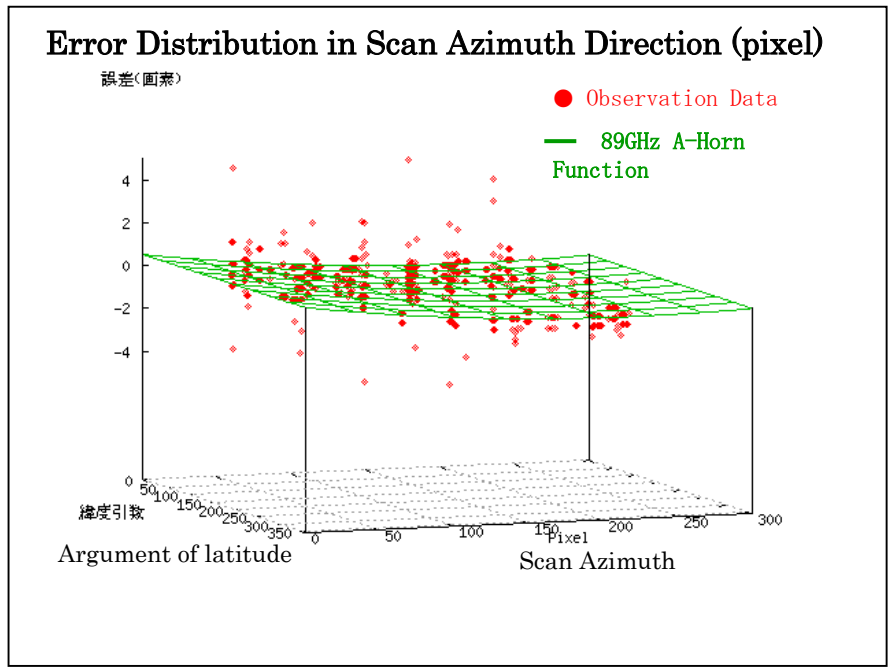
II. Correct the viewing vector



- Displacement on the earth is expressed as a function of the satellite orbital position and the sensor scan angle.
- Correct the viewing vector of 89GHz with the estimated displacement.

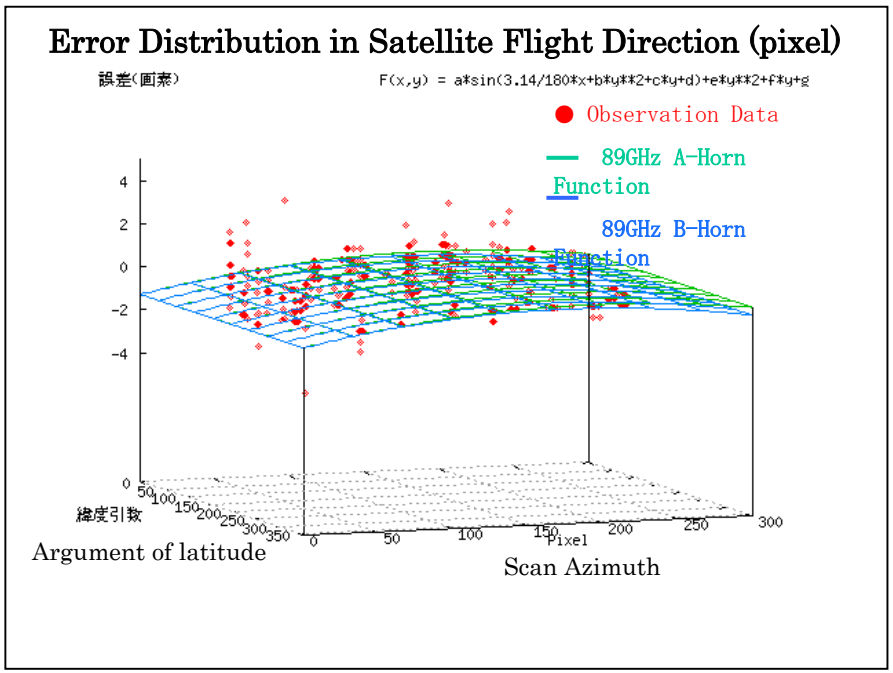
Results of AMSR 89GHz A-Horn

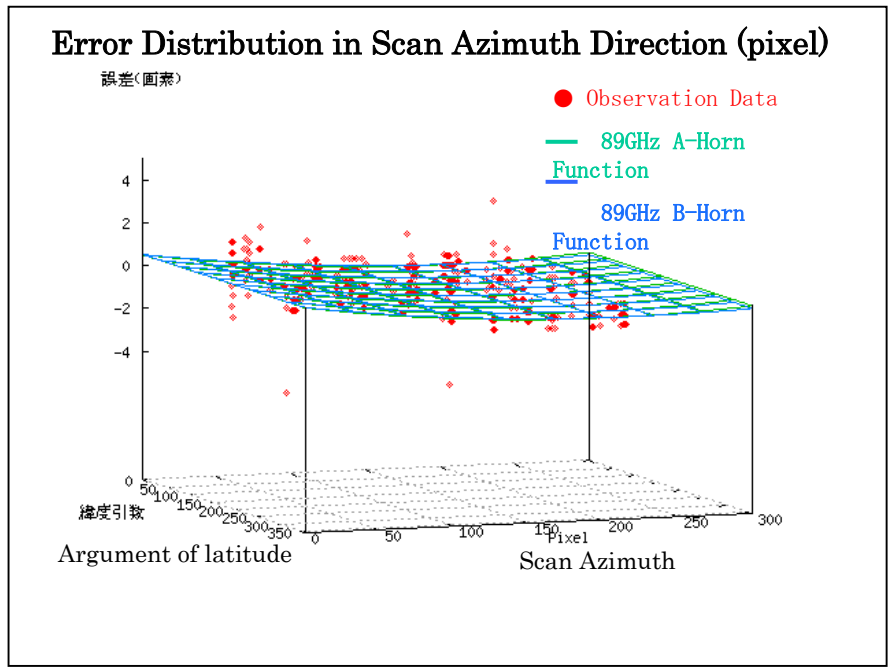




	AMSR 89GHz A-Horn	
Coefficient	Arg. Of Latitude	Scan Azimuth
a	0	0
b	0	0
c	0	0
d	0	0
e	-4.16459e-005	2.33962e-005
f	0.0153078	-0.0101463
g	-1.34262	0.542843

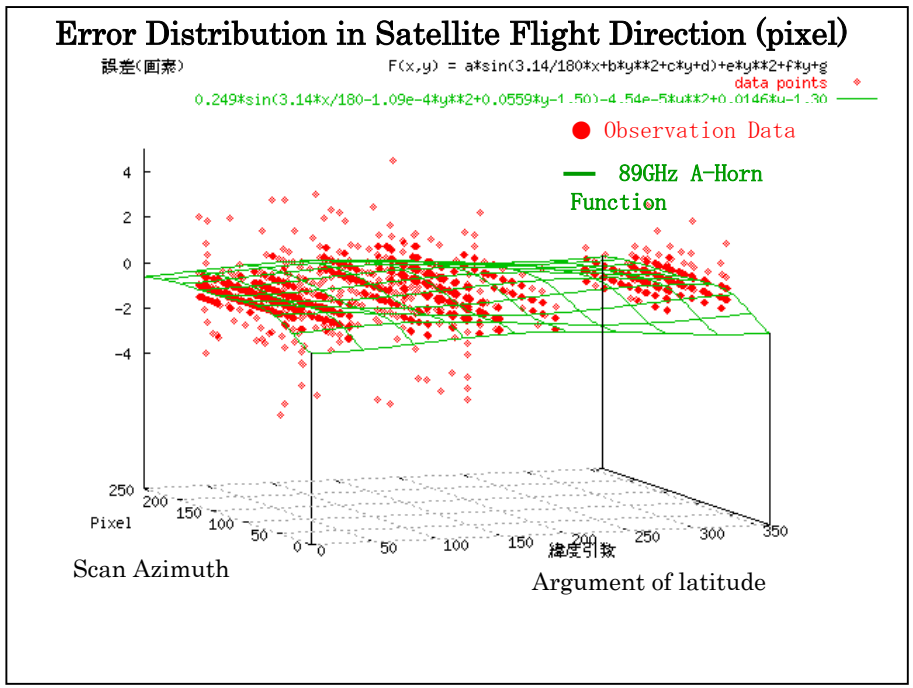
Results of AMSR 89GHz B-Horn

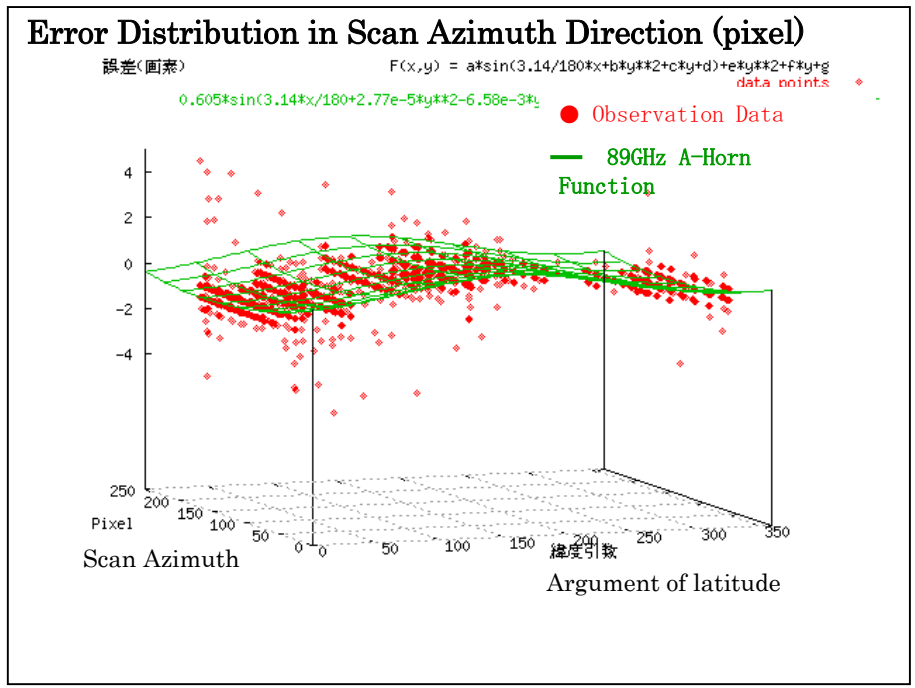




	AMSR 89GHz B-Horn	
Coefficient	Arg. Of Latitude	Scan Azimuth
a	0	0
b	0	0
c	0	0
d	0	0
e	-3.7967e-005	2.67539e-005
f	-0.01467	-0.0107007
g	-1.29202	0.5064

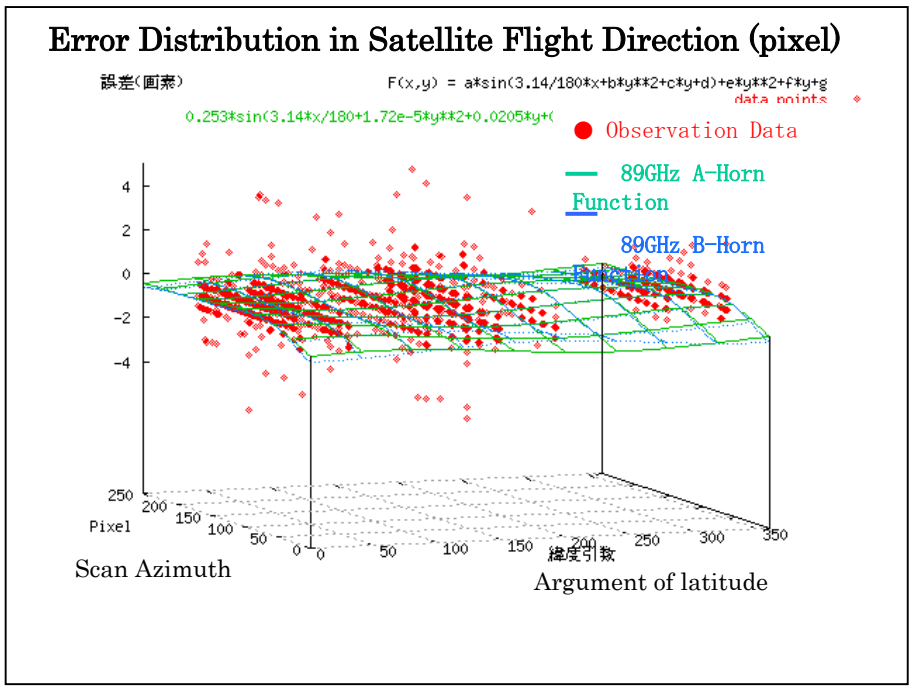
Results of AMSR-E 89GHz A-Horn

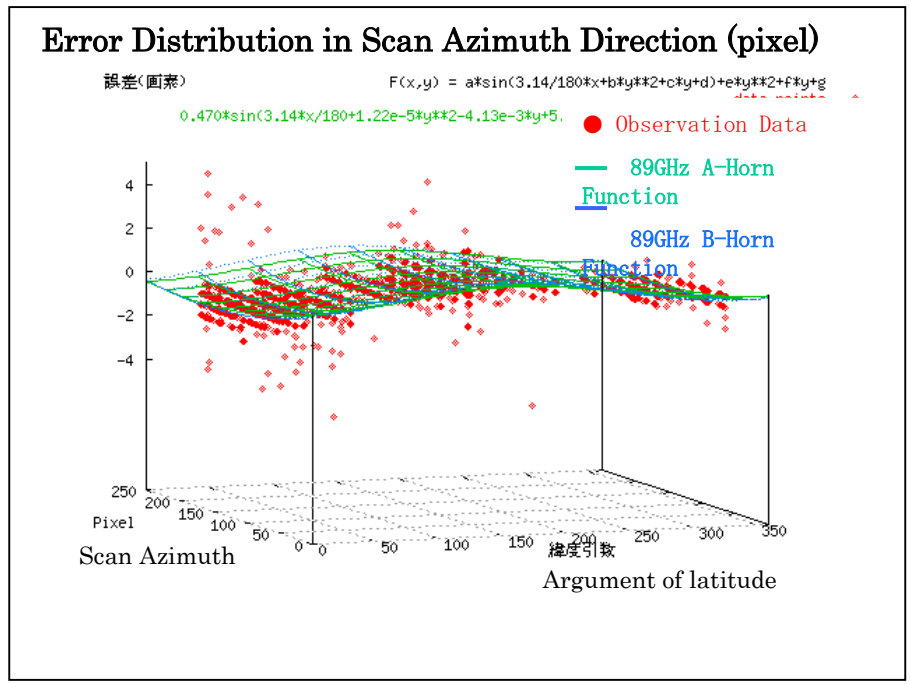




	AMSR-E 89GHz A-Horn	
Coefficient	Arg. Of Latitude	Scan Azimuth
a	0.248783	0.604741
b	-0.000109256	2.77074E-05
c	0.055854	-0.00658241
d	-1.49938	5.05718
e	-4.53803E-05	3.75259E-05
f	0.014576	-0.0124582
g	-1.29508	0.946932

Results of AMSR-E 89GHz B-Horn





	AMSR-E 89GHz B-Horn	
Coefficient	Arg. Of Latitude	Scan Azimuth
a	0.253167	0.469651
b	1.71791E-05	1.2232e-005
c	0.0204772	-0.00412658
d	0.486398	5.00532
e	-5.22647e-005	3.32991e-005
f	0.0165477	-0.0118968
g	-1.40645	0.922188

Backup Slides

10 GCPs for Geometric Evaluation

ID	Area Name	Latitude	Longitude
1	Tasmania Island	S 42.000	E 146.750
2	Courts Island	N 62.460	W 82.815
3	Nunibaku Island	N 60.042	W 163.333
4	Taiwan Island	N 23.729	E 121.042
5	Hainan Dao	N 19.190	E 109.846
6	Hawaii Island	N 19.549	W 155.467
7	Jamaica island	N 18.141	W 77.252
8	Lake Victoria	S 1.090	E 32.835
9	Garapagosu Island	S 0.637	W 90.988
10	Pulau Buru	S 3.413	E 126.613

Data Processing Software Delivery

AMSR-E Data Processing Software Version History

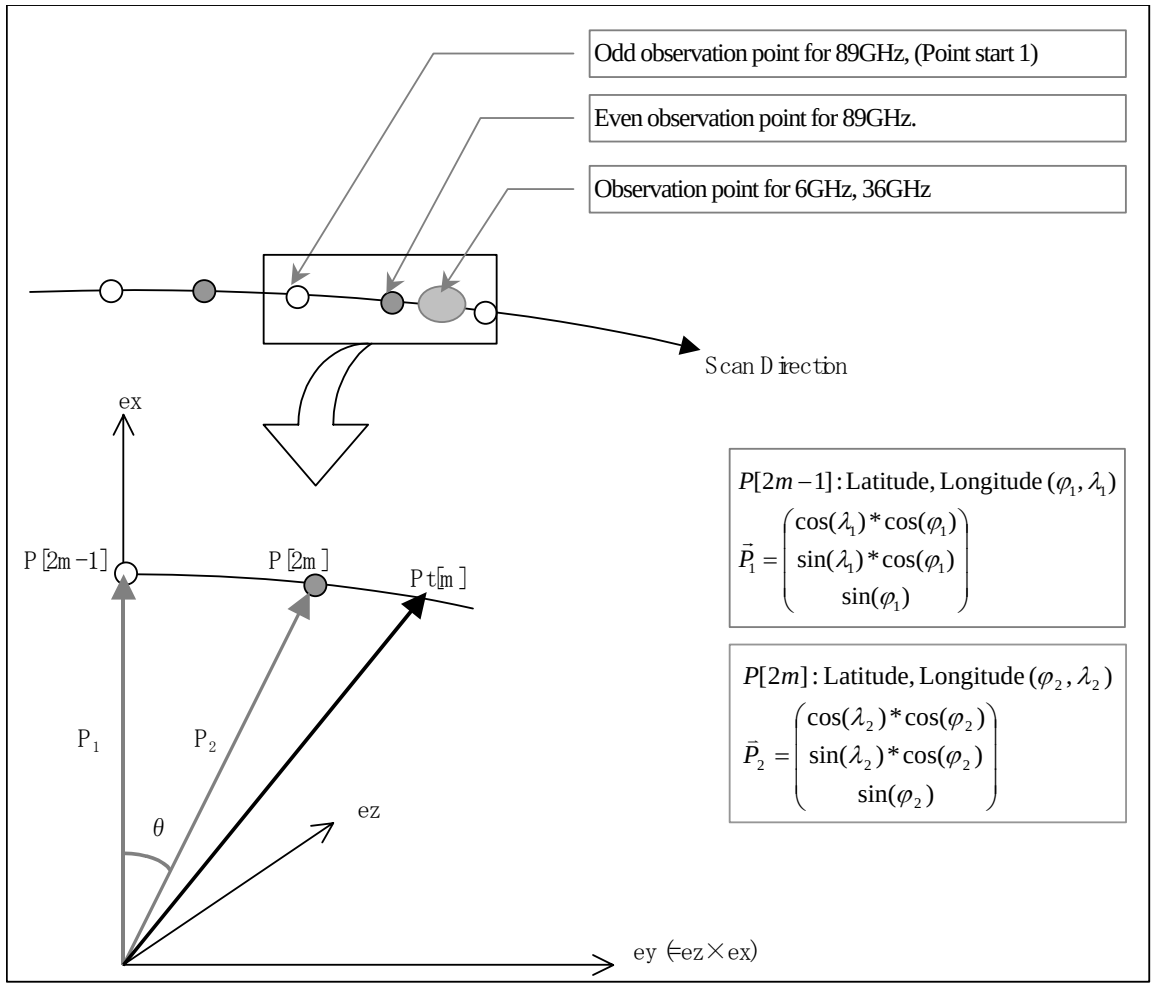
No.	Version Number	Shipping Date	Remarks
1	Engineering Version	Feb. 20, 2002	
2	Version 1.00	Jun. 18, 2003	(1) Applied the 6GHz Spill Over effect correction (2) Applied the Moon Light effect correction above 10GHz (3) Applied the HTS temperature correction
3	Version 1.10	-	(1) Changed the organization name from NASAD to JAXA
4	Version 1.20	Apr. 13, 2004	The current version (1) Changed the co-registration parameter
5	Version 2.00	Feb. 2004	As planned (1) Improving the geometric accuracy with new method.

Co-Registration Parameters

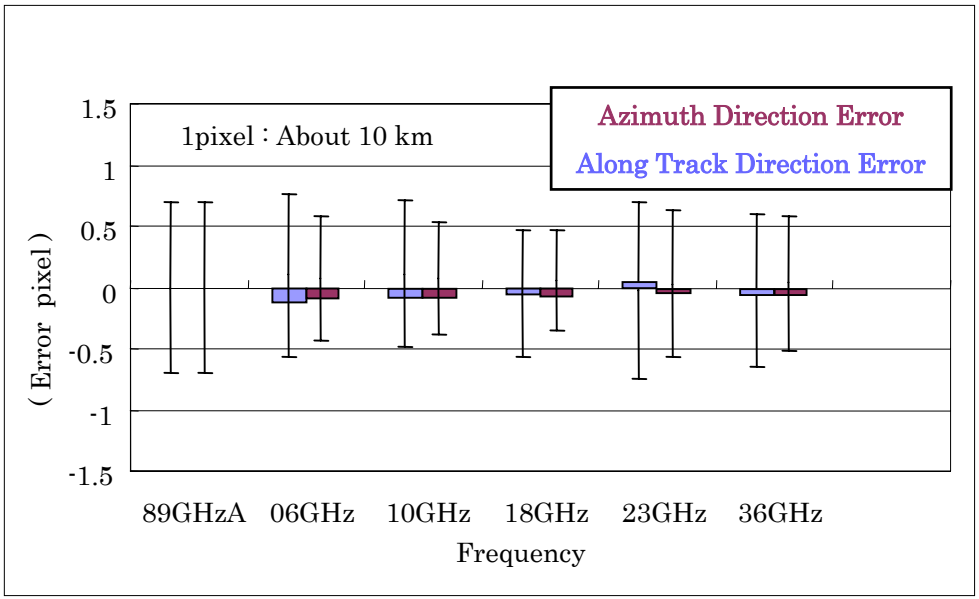
- **The co-registration parameters A1 and A2 for each frequency are stored.**
- **The co-registration parameters are used for calculating the position (latitude and longitude) of the observing point in each frequency except 89 GHz.**
- **The observing position data of 89GHz A-horn and B-horn are stored in the core-metadata.**

- **The m-th observing position Pt[m] is calculated from two 89 GHz A-horn observing position data P [2m-1] and P [2m].**
- **The detail formula is written in the Format Description Document.**

Calculation of Position with the Co-Registration Parameters



AMSR-E Band Co-Registration

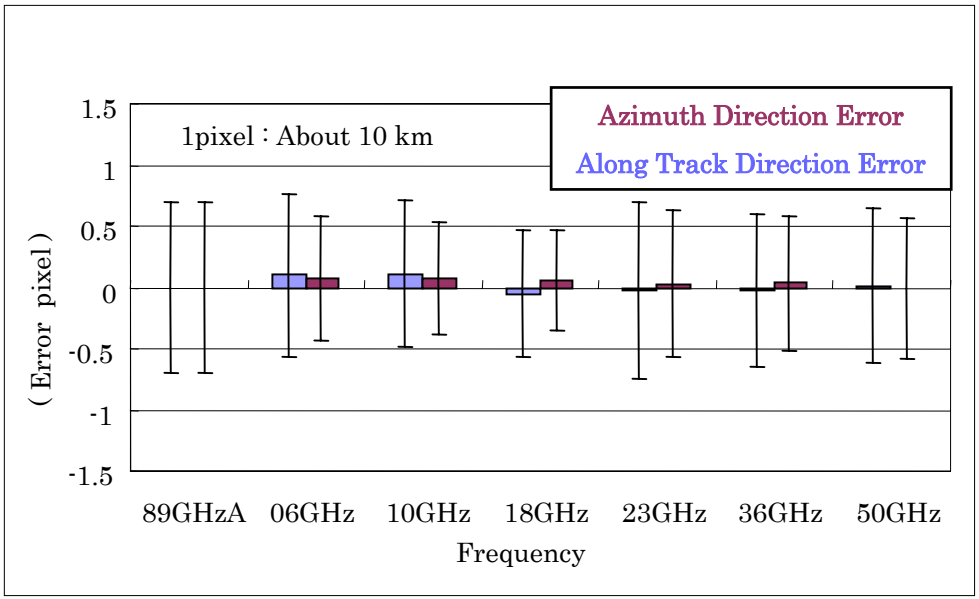


- Completed the AMSR-E Band co-registration analysis
- Co-registration error between the frequencies is within about 2km
- Co-registration parameters (a1, a2) in core metadata were applied on December 12, 2003.

AMSR-E Co-registration parameters (a1, a2)

	6GHz	10GHz	18GHz	23GHz	36GHz
a1 (After Adjustment)	1.15	0.857	0.818	0.808	0.722
A2	-0.678	-0.429	-0.031	-0.185	-0.069
Azimuth Direction Error (pixel)	-0.17	-0.07	-0.06	0.03	-0.06
Along Track Direction Error (pixel)	-0.1	-0.08	-0.09	-0.08	-0.09

AMSR Band Co-Registration



- Completed for AMSR Band co-registration analysis
- Co-registration error between the frequencies is within about 2km
- Co-registration parameters (a1, a2) in core metadata were applied on December 12, 2003.

AMSR Co-registration parameters (a1, a2)

	6GHz	10GHz	18GHz	23GHz	36GHz	50GHz
a1 (After Adjustment)	-0.275	-0.709	-0.544	-0.330	-0.459	-0.370
a2	0	0	0	0	0	0
Azimuth Direction Error (pixel)	0.07	0.08	0.05	0.03	0.04	-0.01
Along Track Direction Error (pixel)	0.1	0.11	-0.05	-0.03	-0.02	0.01