Geo-location Errors

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What we did are

1.Investigate features of geo-location errors.

2. Decide the correction function

-> This correction function is applied the latest version.

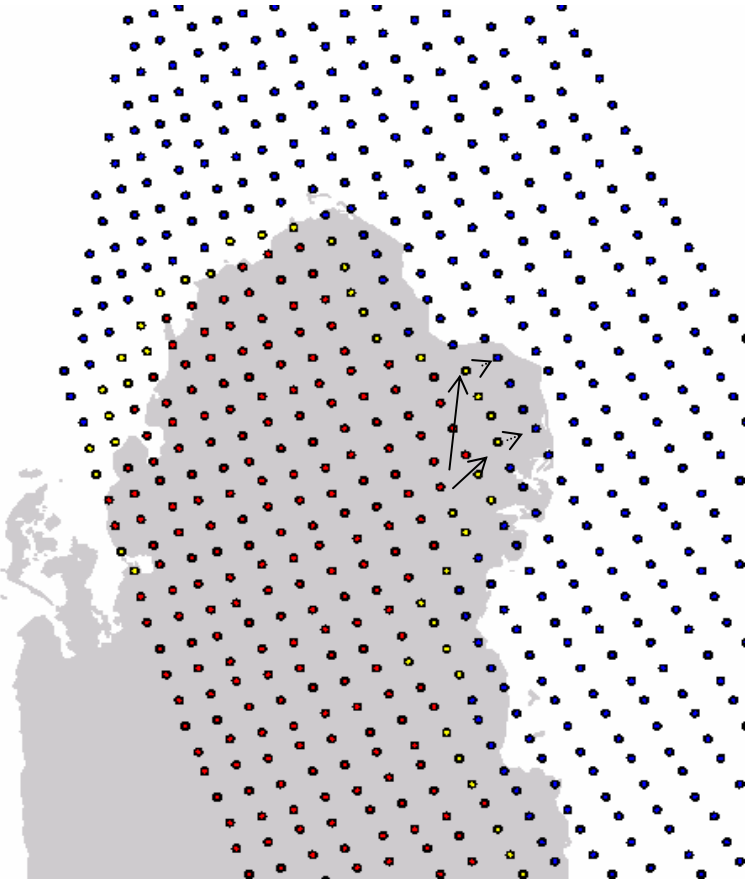
What we are doing is

3. Investigate the cause of error

（now working on)

1.1 Features of geo-location errors

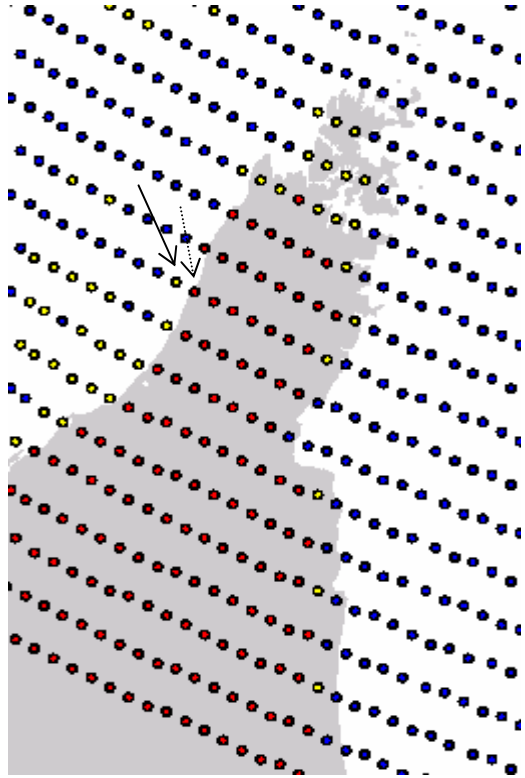
Analyzed by plotting on maps



030430158D (Near 760)

-> Seems line direction errors by 1 line

Red : Land
Blue : Sea
Yellow : Intermediate



030430158D (Near 720scan)

-> Seems pixel direction errors by 1pixe

-> These judges depend on human.

1.2 Features of geo-location errors

Analyzed by calculating correlation coefficient and look for the best much position

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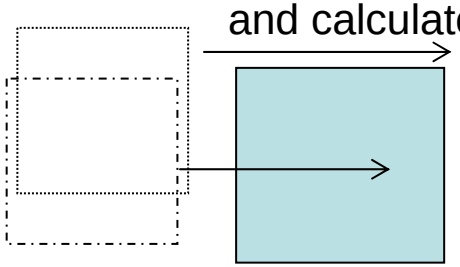
AMSR-E data (89GHz-A) Land/Ocean Flag (Provide the true position)

Sliding pixel by pixel
and calculate R at each position



89GHz-A Image

Land/Ocean Flag

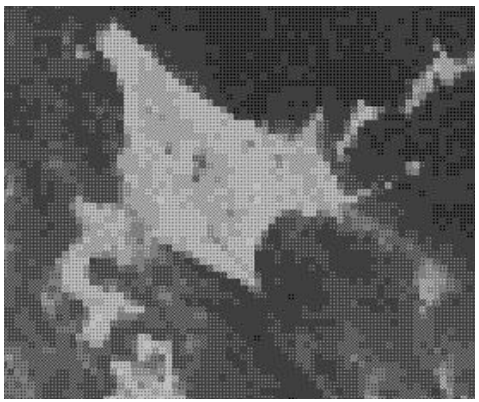
Correlation coefficient

$$R = \frac{\sum_x \sum_y \{(f(x,y) - \overline{f(x,y)}) \times (g(x,y) - \overline{g(x,y)})\}}{\sqrt{\sum_x \sum_y (f(x,y) - \overline{f(x,y)})^2 \times \sum_x \sum_y (g(x,y) - \overline{g(x,y)})^2}}$$

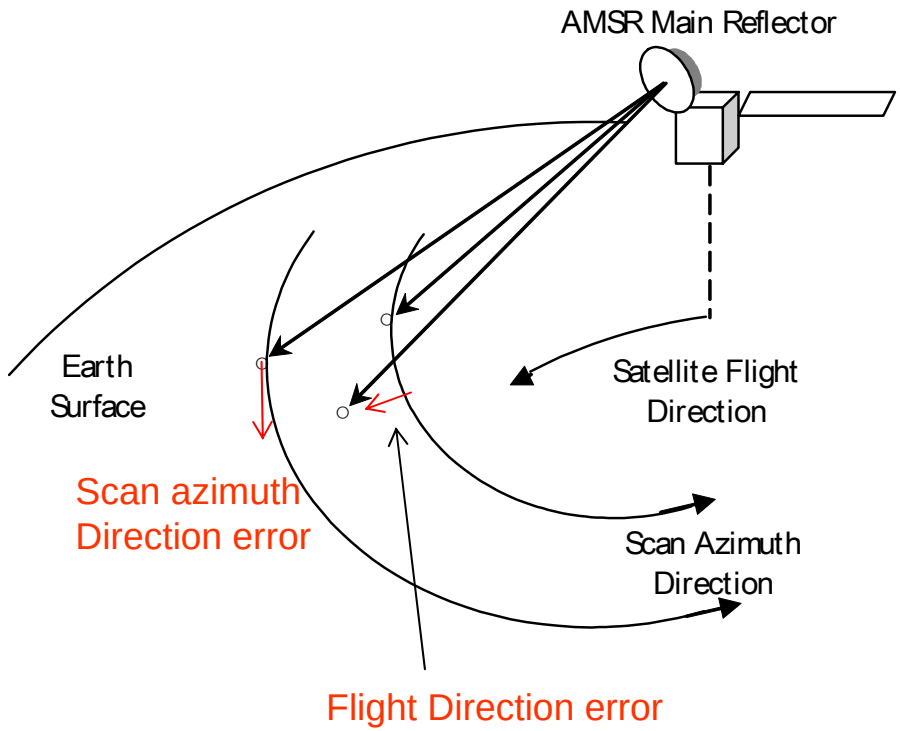
->Max R is the best match point

1.3 Features of geo-location errors

Measured direction of error (Scan Azimuth)



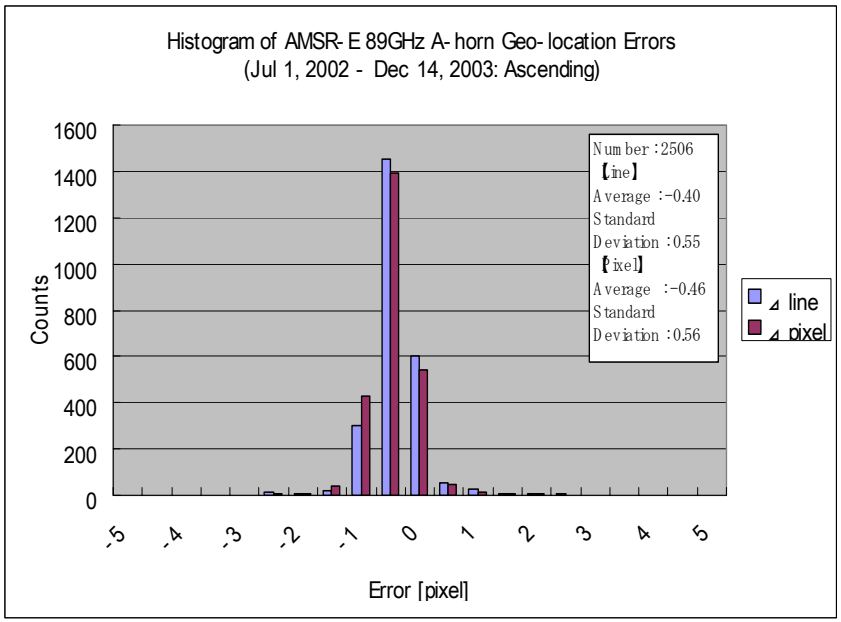
Measured direction of error (Flight)

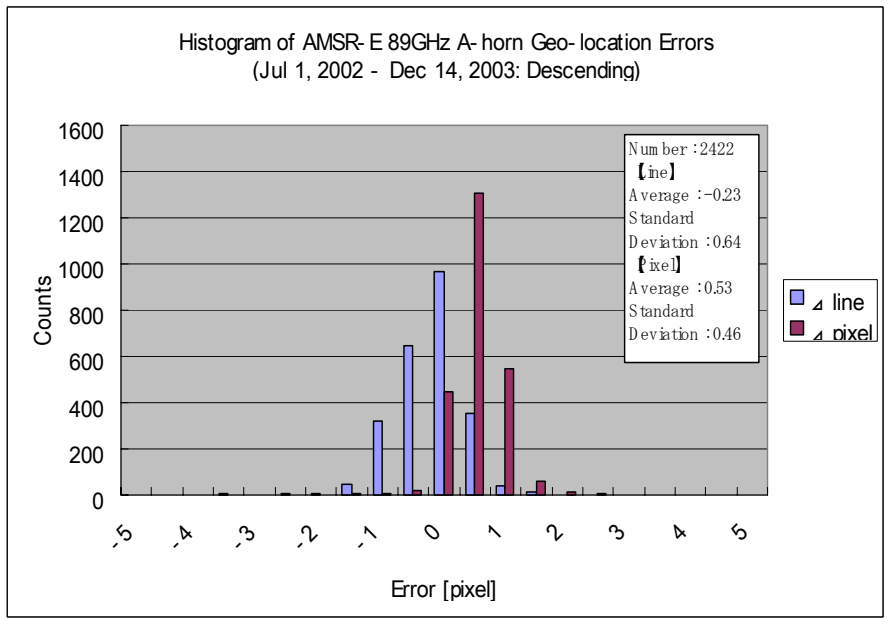


Express errors in image (pixel, line)

Express errors in satellite coordinate

1.4 Features of geo-location errors





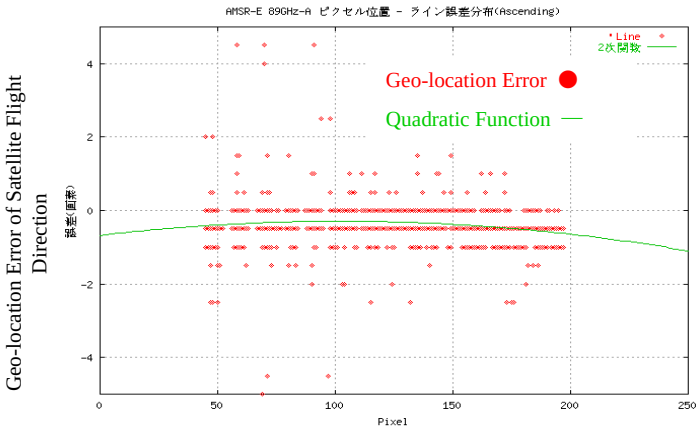
- **Geometric Accuracy : Within 1 pixel (by Average Value)**
  Satellite Fight Direction : Within 2 – 4 km
  Scan Azimuth Direction : Within ±5 km
- **Error Distributions of ascending data is differ from or these of descending observation.**

1.5 Features of geo-location errors

Geo-location Errors along the Satellite Flight Direction

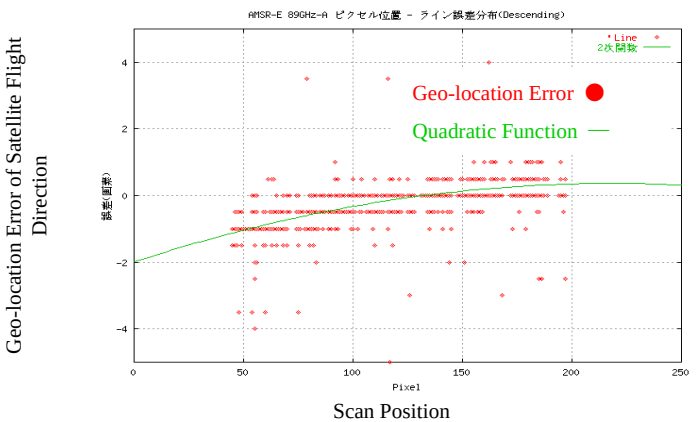
Ascending

AMSR-E 89 GHz A-horn (Ascending)



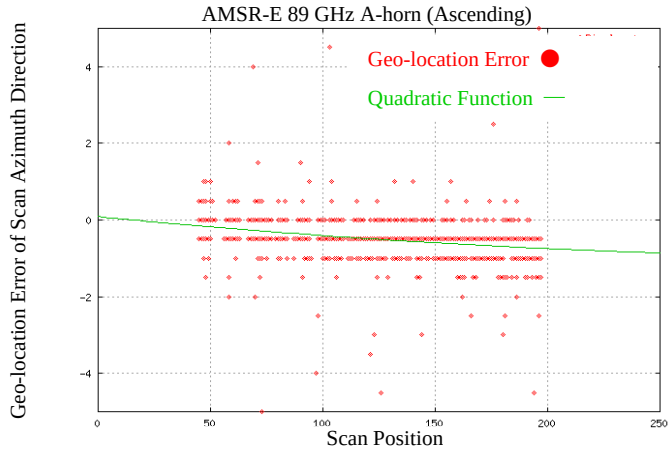
Descending

AMSR-E 89 GHz A-horn (Descending)

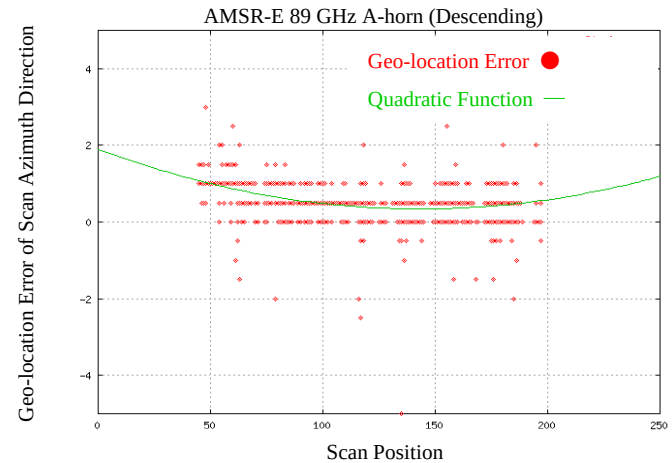


Geo-location Errors along the Scan Azimuth Direction

AMSR-E 89 GHz A-horn (Ascending)



AMSR-E 89 GHz A-horn (Descending)



Geo-location Errors also depend on the Scan Position (means the data number, in case of L1B,from 1 to 198) and more clearly in the descending data.

2. 1 Decide the correction function

Decide the correction function as follows

Equation : $F(\phi, p) = a \sin(\pi \phi / 180 + b) + c\ p + d$

ϕ: The argument of latitude

P: Scan Position

a, b, c, d means the constant decided for scan direction error and flight direction errors respectively.

Constants table

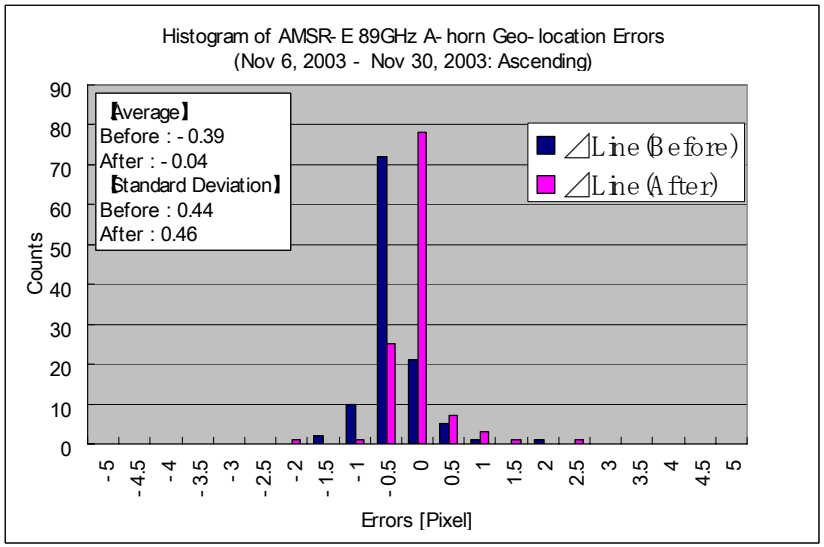
	Flight direction	Scan Azimuth direction
a	0.109257	0.600106
b	-1.68687	4.73268
c	0.00419236	-0.00340748
d	-0.809654	0.461518

Geo-location of Ver2 is corrected applied this correction

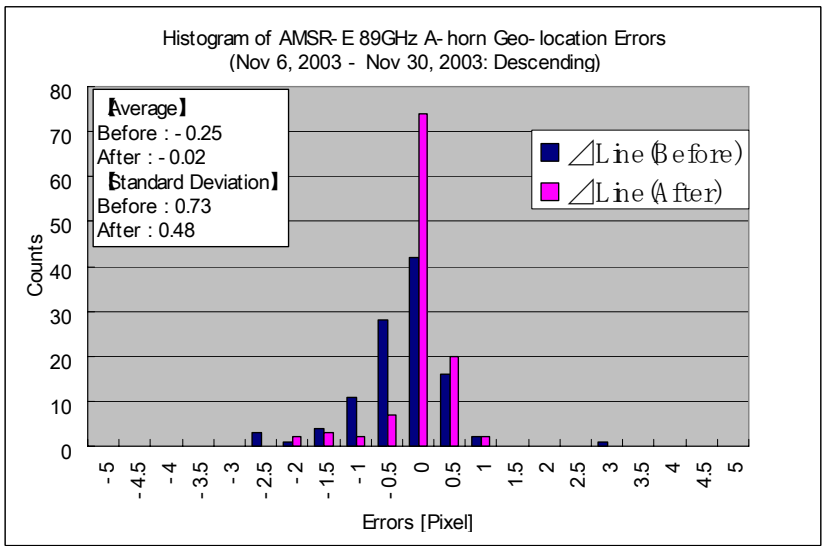
2. 2 Decide the correction function

Geo-location Errors along the Satellite Flight Direction

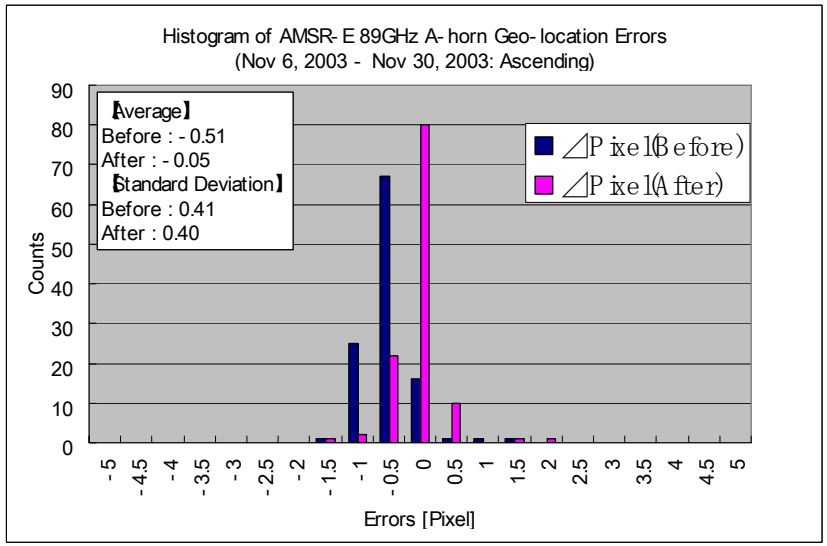
Ascending

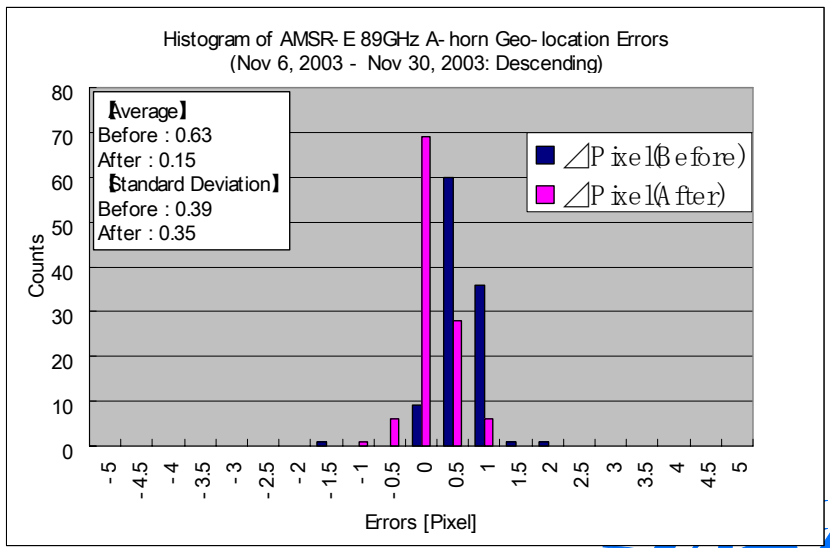


Descending

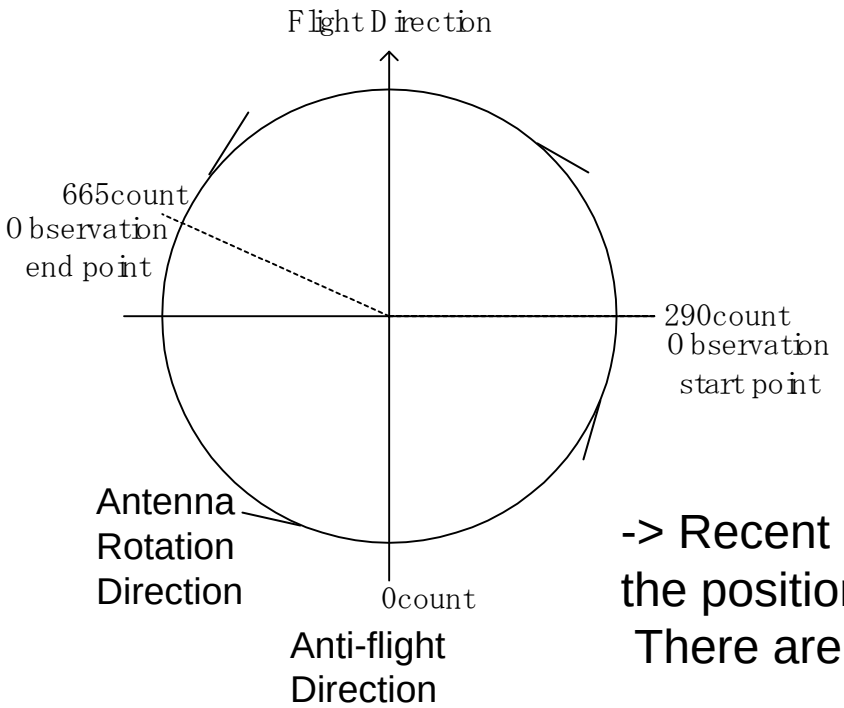


Geo-location Errors along the Scan Azimuth Direction





3.Cause of error



<u>AMSR-E observation sequence</u>

1. AMSR-E observation is controled by the interior counter, this counter counts every 1.3 msec.
2. The counter is cleared at the anti-flight direction.
3. The observation of 89GHz-A horn starts at 290 count and ends 665 counts in every revolution.

-> Recent discussion with HW people, they said the the position at 0 clear is not anti-flight direction precisely. There are a little bias -> Now checking.

-> But if the position at 0 clear is shifted, we can only explain the errors of scan azimuth direction, we cannot explain the difference of ascending and descending, especially line direction error. Now we are investigating.