7. Registration Correction

Registration correction should be performed by using registration correction information calculated in section 6.4. Add offset address calculated as registration correction to the address of each pixel level 1B image to be generated, and calculate row image address and input pixel value. When there is no corresponding image pixel or when input image pixels reach saturation level (1023) during this registration. Use the upper 1 bit of each pixel value and insert a flag. Also, at the same time registration correction is performed, perform radiometric correction using radiometric coefficients calculated in 5. Level 1B image should be generated.

7.1 Generation Of Raw Image Address

Level 1A image (raw image) address corresponding to address (u,v) of each pixel of level 1B image is described as the following formula:

$$u = x + \Delta u + (S_u - S_x) / 2$$
$$v = y + \Delta v$$

(7.1-1)

Where, Δu and Δv are offset generated as registration correction information. S_u and S_x are size (number of pixels) of 1A image and 1B image in the direction of column respectively.   In case of GAC, since registration correction is performed during picking out input of level 0 data, registration correction processing should not be performed. (radio metric correction processing will be performed)

7.2 Radiometric Correction

Radiometric correction should be performed at the same time as registration correction. For radiometric correction, correction coefficients for each scanning of raw image should be used and correction should be performed by the following formula. (refer to section 5.2 and 5.3)

$$L_0 = aF^{-1}(cV_C + d) + b$$

(7.1-2)

Where a, b and c are correction coefficients calculated by each scanning and detector and F^{-1} is a look-up table by each band and detector.

In case of GAC, since registration correction is already performed on level 1A data and line numbers do not correspond to detector numbers, correction should be performed by referring to pick-out table and determine original detector numbers from pixel number of each pixel. Value L_0 is physical parameter as radiation brightness $(\mathrm{mW\ m^{-2}\ sr^{-1}} / \mu\mathrm{m})$ after correction, it should be converted to digital values by using absolute correction coefficients. That is, digital value d will be as follows:

$$d = [(L_0 - i) / s]$$

(7.1-4)

Where i is offset of absolute correction coefficient and s is inclination.

7.3 Addition Of Flag

(1) Saturation flag

In case pixel values of level 1A pixel are used for reference (1023), saturation flag should be placed at upper bit.   However, pixel values should be not changed.

(2) Out of scan flag

If the pixel of level 1A pixel used for reference comes before the first line (line 0) or it comes after the last line, or it comes outside of valid (appropriate) pixel range, dummy data should be set without referring to pixel and a flag should be placed at the upper bit.