Validation of Daichi PRISM Single Imagery for Revising 1:25,000 Topographic Maps

Hiroaki Tanaka[1]; Yoshiyuki Mizuta[2]; Bokuro Urabe[3]

[1] Technology Development Office, Topogaraphic Dept, GSI.; [2] GSI; [3] Geographical Survey Institute

1.Background

Japan's official 1:25000 topographic maps (hereafter called 'the topographic maps') which Geographical Survey Institute (GSI) has been providing is the largest scale base map covering whole area of Japan.

GSI has been carrying out studies about making and revising of the topographic maps and GIS data using satellite imageries, and discussed it with Japan Aerospace Exploration Agency (JAXA) from the design stage of 'Daichi'. In addition, GSI concluded an agreement of collaboration with JAXA preceding 'Daichi' launching, and 'Inspection on ability of Daichi images for making and rapid revision of 1:25000 topographic maps ' is one of the principal activities stated in that.

I report present status about a study of interpretation by 'Daichi' PRISM single image in this paper.

2. Validation technique

2.1 Validation area

In this study, I used a panchromatic image covering Otofuke town, in the north of Obihiro city, Hokkaido for interpretation test. A relative height difference of Otofuke town district is about 30m, and there is no taller building than 20m. In addition, this is a premeditatedly designed area, and most of the roads are built straight, and interpretation is easy because there are many large-scale features. For evaluation, I carried out a field work in this study to confirm this interpretation result.

2.2 Test image

The image was taken on July 26. When the image was taken, 'Daichi' operation was still under the validation phase. On this account, the geometric information of the image was different from those of currently provided products.

3. Results and consideration

3.1 Validation of interpretation

In this study, the interpretation test is applied mainly to roads, rivers, and buildings. At current point, I have got following result from the study.

3.2.1 Roads

The interpretation test is performed according to the classes of road width. It was able to recognize all roads with four traffic lanes. I was able to recognize most of two-lane-roads and one-lane-roads, too. On the other hand, urban streets and narrow paths were difficult to identify. Urban street means a road with one or two traffic lanes through into crowd places.

3.2.2 Rivers

The reading results of narrow rivers were varied among easily recognized cases and unrecognized cases. For the reasons of unrecognized cases, besides the small width of the rivers, trees and plants grow thick and hide the narrow rivers. On the other hand, as a result, interpretation improved in cases there were river institutions such as concrete river walls or culverts around rivers.

3.2.3 Buildings

The reading test of buildings is applied to large independent buildings and high constructions of which the short side is more than 25m.

There was no problem to identify independent rectangular shaped buildings. On the other hand, in the cases of buildings that shape is complicated, recognition as a building was possible, but it was hard to grasp accurate shape of it. In addition, there were some cases which made out adjacent plural buildings as the same building.

4. Summaries

This study was carried out using PRISM panchromatic images which are acquired during the period when 'Daichi' operation was still under the validation phase.

Major constructions such as roads with more than two traffic lanes and independent large buildings were understood being recognizable from the images I used for the study. On the other hand, it was difficult to recognize all of small roads and complicated buildings precisely.

Interpretation results may differ according to the operator's experience, and also to the quality of the images to use. I want to continue further studies from now on.