



Portraying

Mapping Japan

Creating maps that are the basis for all other maps

Accurately understanding the shape of Japan is an important mission for the country. The maps created by GSI are the basis of all maps and are essential for promoting national land management and disaster prevention measures.

The maps created are broadly divided into two types: "general maps," which provide basic information on roads, buildings, rivers, etc. throughout the country, and "thematic maps" which depict specific themes such as information of landform classification and active faults on the general maps. These maps are provided as digital media or paper maps, and are used by local governments to create hazard maps and by private companies to create tourist maps. The maps produced by GSI serve as base maps for many of those which you use in daily life.

General Map



Digital Japan Basic Map

Thematic Map



Land condition map (Landform classification data)



Creating maps using
editing software



Maps Produced by GSI

Digital Japan Basic Map—maps serving as base maps of the country

We are creating and updating the "Digital Japan Basic Map" as a map necessary for managing the national land. The Digital Japan Basic Map consists of "Cartographic information," "Orthophoto imagery," and "Geographical name information". In May 2021, it was designated as a "base registry," a database that serves as the foundation of society with accuracy and concurrence, and it must be constantly maintained and updated.

Cartographic information



Structures, etc., that are needed to manage Japan's land are added to Fundamental Geospatial Data ("FDG"), which is used to create maps that cover the entire country.

Orthophoto imagery



Aerial photographs taken from survey aircraft are processed into orthophoto imagery that can be overlaid onto maps.

Geographical name information



Information including populated area names, Geographical names of natural features, public facilities which is created as basic information, a key to finding positions.

*Fundamental Geospatial Data: Information such as road edges, peripheral lines on buildings, etc., is commonly used as position references on digital maps.

Lake Chart Thematic map of the use and conservation of lake and marsh

The "Lake chart" is a detailed bottom topographic map of major lakes and marshes in Japan, and is maintained and provided as basic information for lake use, environmental planning, fisheries, etc.

To create a lake chart, we obtain topographical data on the lake bottom using echo sounder installed on a survey boat, and then analyze the data and create maps. Since fiscal 2021, we have been using autonomously navigating unmanned surface vehicle (USV) to conduct surveys in shallow water areas.

① Lake chart survey



②Data analysis・plotting



Process of producing a lake chart

③ Complete the lake chart (part of lake Nakaumi)



The process of producing a map

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Prompt update

Maps updated upon the opening of a new road

In addition to aerial photos, blueprints that are provided by road builders and managers are also used to update maps. By collecting road blueprints before a road is opened, work can proceed beforehand to update the map. Through this work, maps of 130 new roads were updated in FY 2022 as soon as the roads were opened.



Before updating



Road plans are collected and reflected in maps



After updating

1 Aerial Photography

Taking aerial photos needed for producing maps

By using surveying aircraft, take aerial photos for producing maps. When taking such photos, plotting work is done by overlapping adjacent photos in order to create 3D images.



Image of aerial photography

Field surveys

3

Field surveys

Confirming unclear points with plotting work

Field surveys are carried out when road terrain, land-use conditions, etc., are difficult to confirm with aerial photos due to tree cover.



4

Map Editing

Editing maps to make them easy to understand

To show more clearly what mapping data represent, associated information such as roads and buildings is added. Furthermore, by annotating municipalities, etc., transcribing map symbols, etc., maps that will be familiar to everyone can be created.



Symbols, annotations, etc., are assigned to maps

Map Editing

Plotting data



After editing



Plotting



Plotting



Aerial Photography

2

Plotting

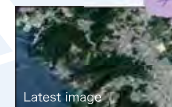
Plotting buildings, etc., from aerial photographs

In the plotting process, two aerial photographs with accurate positional information are viewed in 3D using a plotting instrument to draw roads, buildings, contour lines, etc.

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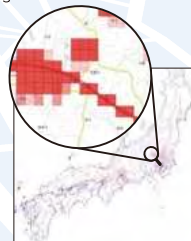
Understanding changes in the land — Utilization of AI and satellite images—

Visualize changes throughout Japan by identifying changes through comparisons between past and present satellite images



AI

Image that have identified changes



So far, the problem with map update was the inability to understand quantitatively which areas had undergone the most significant changes until aerial photographs were taken. Therefore, we are proceeding with efforts to identify areas of change through image analysis using AI from past and the latest satellite images. We hope that this will enable us to accurately understand changes in Japan's land and enable efficient photography for map updates.