Activity of the GIS Volunteer in the East Japan Great Earthquake Disaster

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SUMMARY

Japan is a country with many disasters such as a typhoon, the earthquake, and collapse and the victim of the building occur almost every year. From the victim rescue operation of the recent earthquake, GIS volunteers gathered, and activity to introduce the situation and restoration activity of the damage into by GIS data became popular. The East Japan Great Earthquake Disaster that occurred in March, 2011 suffered very big damage. The activity of the GIS volunteer was the age that received a big evaluation at the same time. Participatory GIS and VGI and many groups played an active part for a setup, victim relief in WebGIS. Forms of the activity are various, but it is unchanged to have received the evaluation that a technique of the GIS is high in. Such an activity colonizes; big at the time of a disaster continuously; hope that help it.

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１．Introduction

The software of the GIS received stimulation of the development of the hardware and developed by a minicomputer, EWS, the flow called the PC, but did not develop linearly. The platform changed how a user evaluated a system as for it. A platform of the GIS shifted from EWS to a PC, but the system development using the system of the EWS was carried out again. A system has been used by the constitution of the system which accepted a purpose so that it was said with the system of a PC and a system of the EWS, a PC and the PC with the server client computer system because the PC was a client and achieved the function of the server. When a client server system using the Internet (intranet) came to be used when the 1990s began and input data in a client, new registration, data update, the accumulation of data were performed via the Internet to data of RDB in the server, and a system for the purpose of the maintenance of a fresh database appeared. It was called this the starting point of participation type GIS(Participatory GIS) unlike the daily fixed form duties..

However, the evaluation of the whole system was low from the evaluation of the system that a response was bad because the function of the communication line which it was hard to use because the participation type GIS using the then Internet or the client server system was not the system which considered convenience (Usability) of the user was low or the institutional problem that was not the structure which guaranteed precision (correctness) to input data. The client server system using the intranet was left, but the system using the internet was not used soon.

When the 2000s began, I made it the high speed of the peripheral devices such as improvement of the transmission rate by the change of the Web environment, GPS, the mobile system, and the participation type GIS revived in form called WebGIS by the increase of the talented person who could use the GIS. In increase of the typhoon damage, outbreak of repeated heavy earthquake damage, the talented people who could use the GIS from the need to convey the spot in the damage outbreak spot that was different from the regular intelligence system, local information gathered above all, and the evaluation of the participation type GIS that the collection, the information from the area sent data to in GIS became higher.

Static information was important at first, and the information (map information) in such a system managed the result that restored from a damage result, the damage that made out an aerial photograph, a man-made satellite image as map information and announced the map as information as needed to the output, the media. The collapse situation of the house or the loss result became the source of information who published "the damaged proof" later.S

It is East Japan great earthquake disaster in 2011 that VGI(Volunnteered Geographic

Information) conveying damage information, restoration information dynamically was appreciated using the technique that I developed in ISO/TC211 and OGC whereas participation type GIS is static information. For the information blank period at the time of the earthquake disaster outbreak, simulation by the participation type GIS was effective, but, with progress of the time, the use of the system which Mashu up(WMS, WFS, KML repeated map information by) dynamically, and displayed the information from a GIS volunteer became popular. With the simple history, I introduce the how to use.

２．Participatory GIS

Time of Hanshin, the Awaji great earthquake disaster that occurred in January, 1995 is said to a GIS volunteer having been dispatched at the time of disaster outbreak in Japan first. Because the position precision of the GPS was low, and the mobile system had only the low thing of the function, many volunteers recorded information on the site and were the situation that they input into a system of the EWS after returning to the base at that time. However, the difference that was clear between the data which they were not able to manage in data and the GIS which they managed in GIS in the debris processing appeared, and the activity of the effective volunteers whom it processed received a high evaluation.

At the time of Niigata Prefecture Chuetsu earthquake generated in October, 2004, Niigata Prefecture Chuetsu earthquake restoration, revival GIS project stands up, and a disaster volunteer network is formed under the umbrella, and gathered information such as the collapse of the building, slope collapse, the road traffic impossibility in the homepage of the project; as for whom can share information; functioned, and was big, and contributed to the next repair work. It was recognized that the destruction of the building, collapse information were the information that was important to "the damaged certificate" publication then and functioned for effective certificate issuance.

In the Niigata Chuetsu-oki offing earthquake generated in July, 2007, Niigata Prefecture provided the work place to the GIS team, and announcement continued a stage of the restoration by the map information that EMC(Emergency Mapping Center) made from the situation of the damage. The EMC was aggregate of the GIS volunteer whom a public employee, the engineer of the company, the researchers of the university gathered for. The volunteer who gathered from the private enterprise converted damage and Excel data of the restoration which the staff of the prefecture made into GIS data, and the EMC continued announcing the map information to the media. When many people were easy to understand the press release using the figure of output of the GIS of the Governor Niigata, an evaluation

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was high, and the EMC received Minister disaster prevention commendation later.

It may be said that the GIS volunteer who built dispatch, GIS at the time of Niigata Prefecture Chuetsu earthquake and Niigata Chuetsu-oki offing earthquake built participatory GIS. The GIS hardware, the GIS engine caught all the offer from a GIS vendor, and the volunteer was the static GIS which made GIS data from Excel data, and approximately 300 volunteers made approximately 200 kinds of maps of the subject

３．The East Japan Great Earthquake Disaster

In March, 2011, East Japan great earthquake disaster occurred. The activity of the GIS volunteer began complicated movement then. Professor Hayashi of Kyoto University which built EMC at the time of Niigata Prefecture Chuetsu offing earthquake occurrence, Professor Tamura of Niigata University gathered in Tokyo and borrowed a meeting room of the government and formed EMT (Emergency Mapping Team) promptly. EMT caught the offer from a GIS vendor with hardware of the GIS, GIS engines, and the volunteer received the offer from the company in engineers of the GIS, too. Because data of the GIS did not become available in the information interregnum just after the earthquake occurrence, the GIS volunteer simulated the damage of the earthquake from base map information and data such as the soil, a geological feature, a building, the population. The simulation predicted a toll from building collapse and expected the population that should shelter. As information became available, EMT output the position of the refuge, the road which I could pass, necessary relief supplies as GIS data and has begun to introduce information into the government and the media afterwards. These information is static information, and it may be said that EMT built GIS based on experience of the

One kind of another information of EMT was dynamic information. Mash up improved various map information to base map information; began them GIS volunteers repeated static map information on a base map and made the information that could judge the-like situation between the spatio-temporal and began dispatch in this information to the whole world using a homepage of ESRI.

EMT sent a branch to Iwate Prefecture. After having closed the office of Tokyo, as for the volunteer, they input data into a database of the GIS using Web, and the system is active now as WebGIS. The report that EMT output GIS data more than 1,000 kinds to date from March 11, 2011 is accomplished.

The latter system using mash up may say the system of VGI.

The big characteristic of EMT was Toyota, Honda, Pioneer, to have cooperated with the

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company of car makers and the car navigation makers called Nissan Motor. ITS Japan displayed the traffic results of the car which carried car navigation system on base map information. Because EMT showed the traffic results of the car on a homepage of EMT, the traffic results contributed greatly because the car which carried relief supplies chose the route.。

４．VGI

With an activity start of EMT, two GIS volunteer groups started activity in the country. With an activity start of EMT, two GIS volunteer groups started activity in the country.One is sinsai.info, and the other is All311. These two teams adopted OpenSourceGIS for software, but did not prepare for GIS the special hardware to build WebGIS. The volunteer acquired positional information with a mobile terminal or GPS and sent Text data to a database manager via Web. The database manager determined whether the information that received was correct and displayed the data which had high reliability in the homepage. The system of two groups aimed at the systems construction being aware of VGI from a beginning. As a matter of course, mash up assuming using WMS, WFS, KML from a beginning realized VGI. In addition, two teams collected satellite images as well as vector data. And it is to have prepared a translator in consideration of sending map information to the foreign countries from a beginning.

Sinsai.info gave a characteristic by conveying very local information, and, in ALL311, an evaluation was high because the contents of the relief supplies of the refuge told as well as map information.

５．Participatory GIS and VGI

I classify distinction of VGI as participatory GIS as follows.

1) The participatory GIS collects static map information and builds a database. VGI repeats map information of the static participatory GIS and makes dynamic map information.

2) The volunteer gathers in the fixed work place, and the participatory GIS builds a database of the map information. Because it is intended to build WebGIS from a beginning, VGI builds a system in distributed environment.

3) The participatory GIS makes feature data with polygon, line and point such as the conventional GIS, but VGI repeats GIS data in map information of the participatory GIS without being conscious of line, point.

4) Participatory GIS, VGI are the groups of GIS volunteers together

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In Japan, there was the history of the participation type GIS from the mid-1990s, but there were few reports of VGI. It is thought that a GIS volunteer grew up while a typhoon, an earthquake and a big disaster continue. When such an activity colonized, and a disaster occurred; big for victim relief; is hoped that help it.
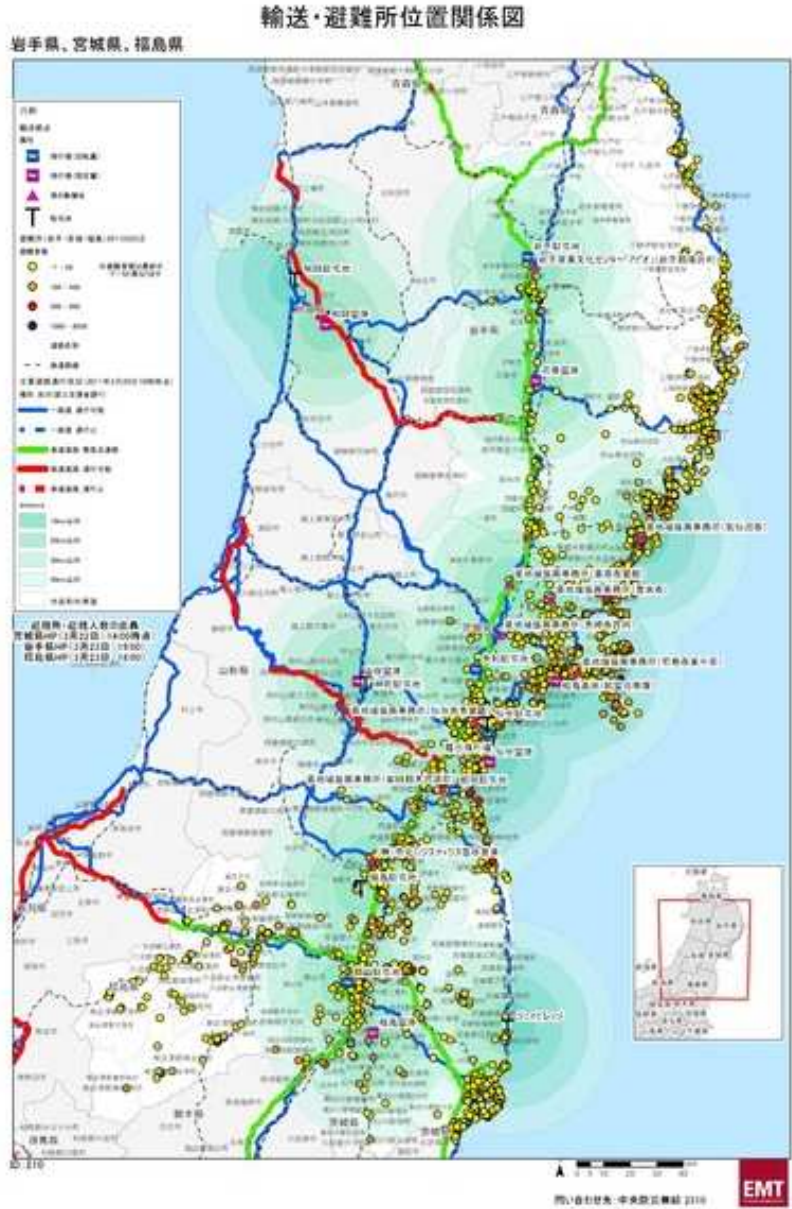

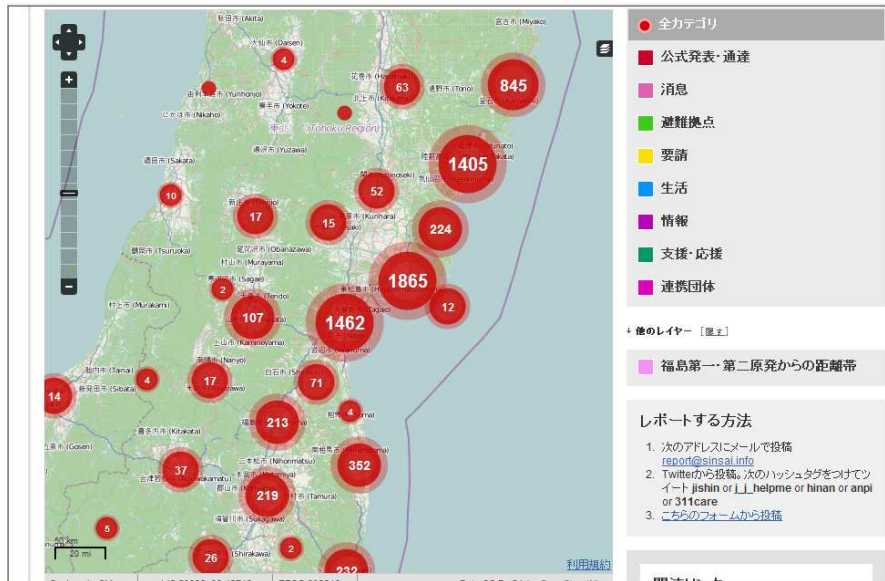Fig. 1 Transportation routes and the Evacuation sites for relief（EMT）

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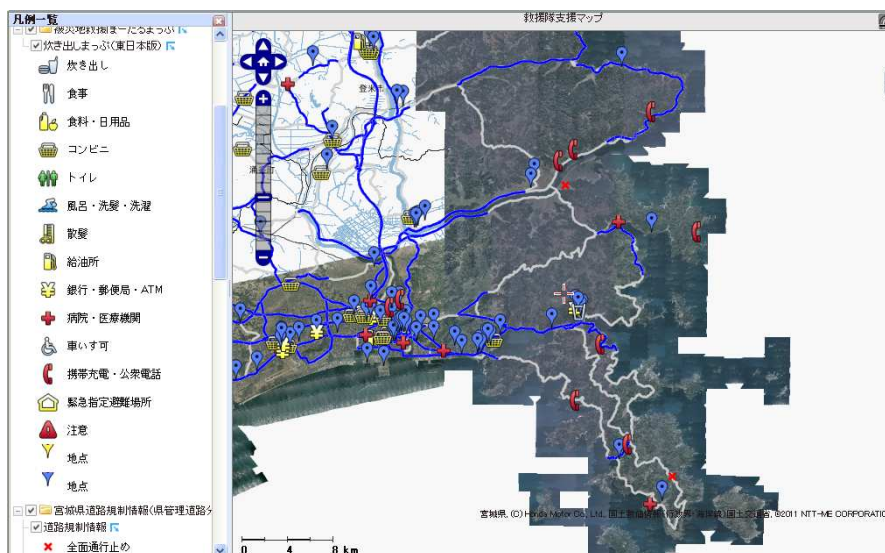Fig.2 Position figure of the information dispatch (sinsai.info)

Fig.3 Guide map for rescuers (ALL311)

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Mr Koichi Hirata is a Senior Researcher at GIS Institute, Japan Association of Surveyors. He obtained his bachelor degree from the Department of Biology, Faculty of Science, Hokkaido University, Japan in 1969. After having worked on the private enterprise more than 30 years, he works to the present post from 2005. He obtained his Consulting Engineer Registered, Applied Science、 in 1982.

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