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Organizing diverse and dispersed information on the endangered cultural properties by a voluntary initiative: consortium for the earthquake-damaged cultural heritage (CEDACH)

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Challenges for cultural resource management (CRM) in the disaster areas

The earthquake and tsunami on March 11, 2011 caused immense damage to the residents, social infrastructure, and cultural heritage in East Japan [1]. In a press release on April 25, 2011, the Ministry of Education, Culture, Sports, Science and Technology stated that at least 511 registered cultural assets were damaged, including four national treasures, 140 important government-designated cultural properties, and 70 historical sites (Figure 1). The whole situation has not yet been fully grasped. However, it should be noted that cultural properties might be destroyed when debris is removed. Thus, expeditious action is required at the moment.

Figure 1. A historical building damaged by the earthquake. Tsuchiura castle, Ibaraki prefecture. Photo courtesy of T. Kimoto.

Consortium for Earthquake-Damaged Cultural Heritage (CEDACH)

In order to document and protect the endangered cultural properties, motivated archaeologists, historians, and CRM officers voluntarily established a "Consortium for Earthquake-Damaged Cultural Heritage" (CEDACH). The consortium organized a task force for "Cultural Properties Damaged by the Earthquake and Tsunami" (CUPDET) (Figure 2). This task force comprises a data management team to create a web-based geospatial database system for the compilation, management, and analysis of information on CUPDET, and an on-site technical support team to provide local CRM officers with a guideline for the documentation and conservation of CUPDET. The action plan of the data management team has mostly been designed, and it is presented in this letter.

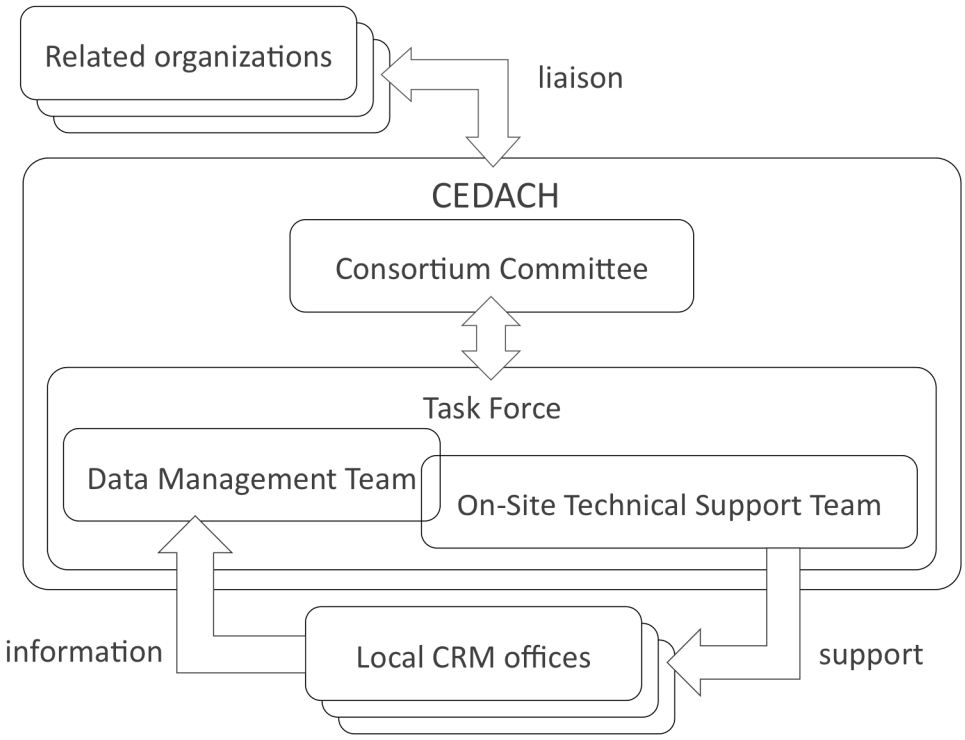

Figure 2. Provisional scheme of the Consortium for Earthquake-Damaged Cultural heritage (CEDACH).

CEDACH Data Acquisition System

The CEDACH's data management team plans to create a CUPDET database that conforms to the international standard set by the International Organization for Standardization (ISO) in order

to ensure global system applicability. For this purpose, the data acquisition method is designed to achieve a balance between technical standardization and urgent on-site projects. The fact that the potential users of the developed system are local CRM officers and volunteers rescuing/inspecting CUPDET, and that some of them may have limited PC, database, and information handling skills should also be taken into account. Such users would be too busy to be deeply involved in planning the tools and guidelines for collaboration. Therefore, the data management team attempts to apply the methodology of “working-oriented approach (WOA)”, in which the system is designed to fit the on-site process of inspection and all data acquired in day-to-day fieldwork are managed as “survey data objects” [2].

According to the current plan, the CEDACH data acquisition system will be an improved version of a field survey system named “Survey Data Archivist (SDA) for Client” (Figures 3). SDA for Client is based on the concept of WOA and is compliant with the ISO 191XX series. The application schema requires slight modifications to fit the on-site inspection of CUPDET to meet the needs of local CRM officers (Figures 4).

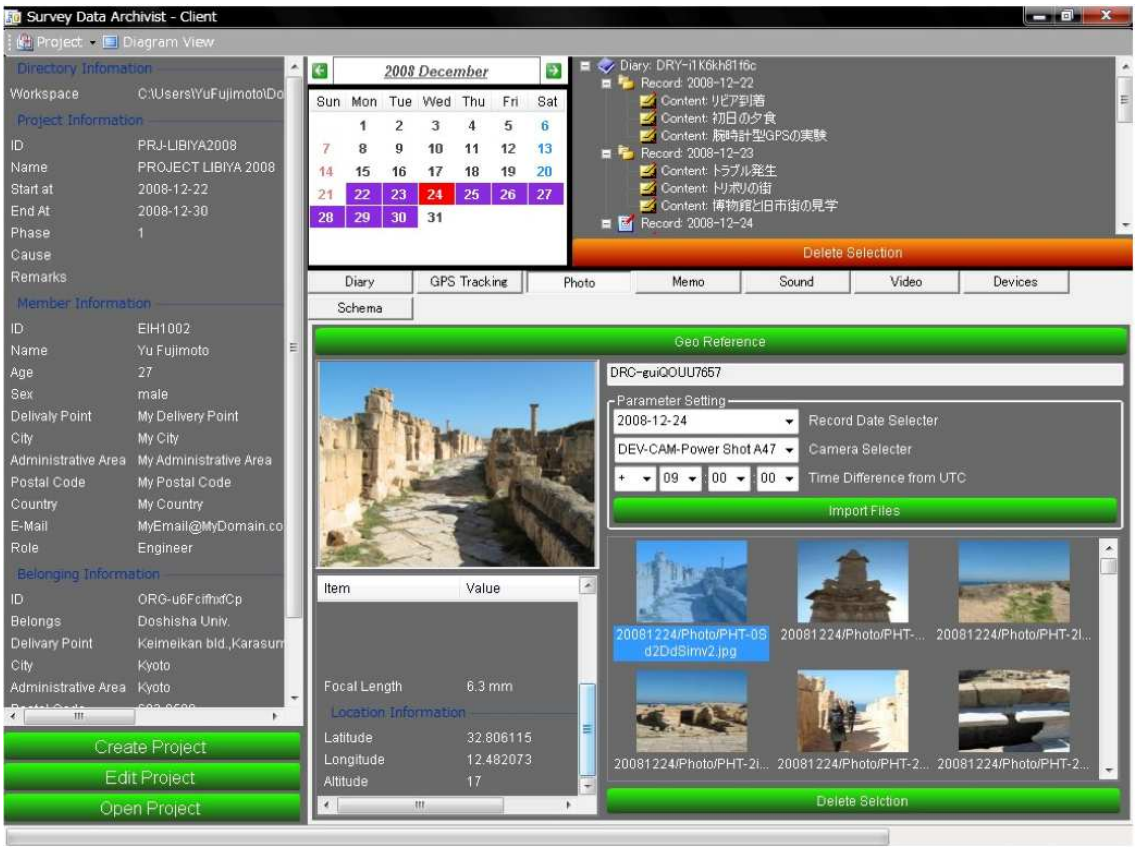

Figure 3. Screenshot of SDA for Client, a WOA data capturing program.

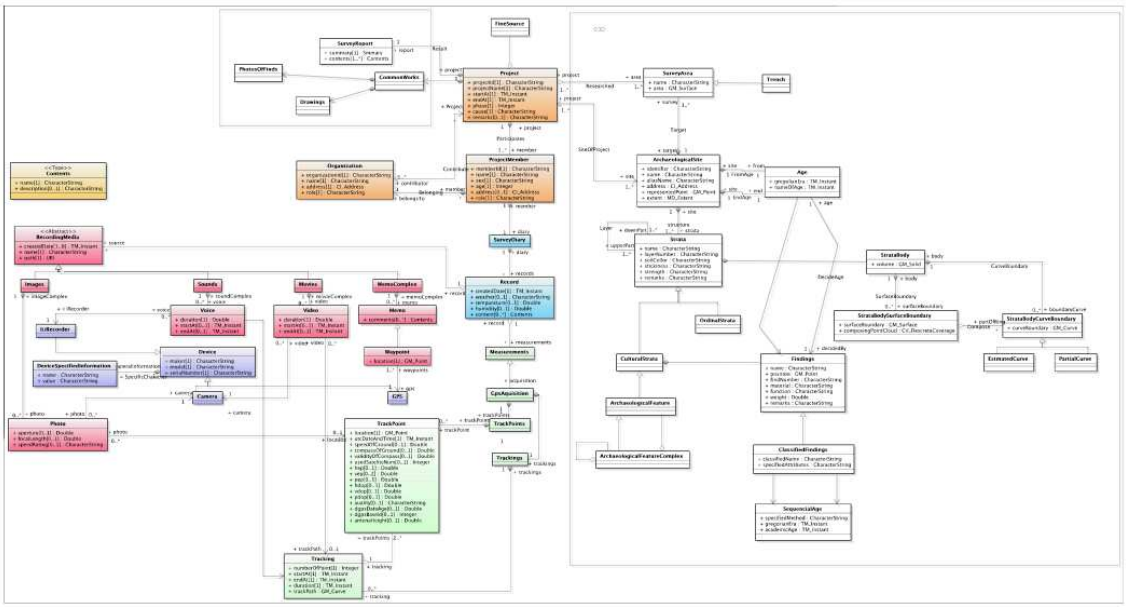

Figure 4: Current application schema of SDA for Client (colored classes).

In addition to field data acquisition, the team is planning to gather voluntary flash reports of CUPDET from the disaster areas. In fact, a barrage of news and rumors about CUPDET were posted to Facebook, Twitter, wikis (e.g., savemuseums@wiki [3]), and Internet message boards (e.g., Conservation Network for Historical Documents in Miyagi [4]). This flow of information helped us to grasp the condition of CUPDET. However, the information accumulated in high volumes and very rapidly and therefore, was difficult to organize. This instance was our first experience of the overflow of disaster-related information via social networking services. It is essential to define a standardized procedure to extract and sort important information from disorganized flash reports.

CEDACH GIS

The data management team also plans to employ a Geographical Information Systems (GIS) to map the location of CUPDET. The principal purpose of the system, is to obtain a geospatial overview of the situation by organizing information acquired during the on-site inspections. The system, tentatively named “CEDACH GIS,” will contain (1) topographical maps, (2) aerial and satellite imageries captured before and after the tsunami, (3) map of the earthquake intensity distribution, and (4) locations of local museums that will act as CEDACH activity bases, and (5) locations of individual CUPDET (Figures 5). The pilot study in the Onagawa Bay area has revealed that the tsunami covered some of archaeological sites located on the slope of hills

(Figure 6). These sites should be inspected as soon as possible, before the restoration activities destroy them.

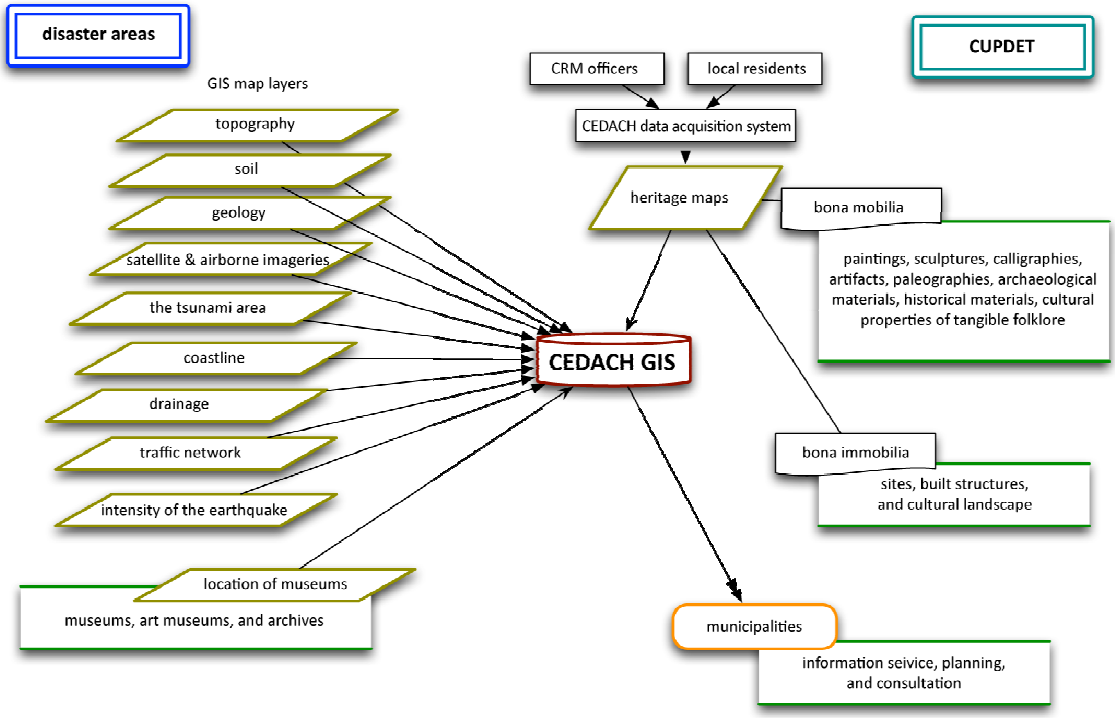

Figure 5. Scheme of CEDACH GIS.

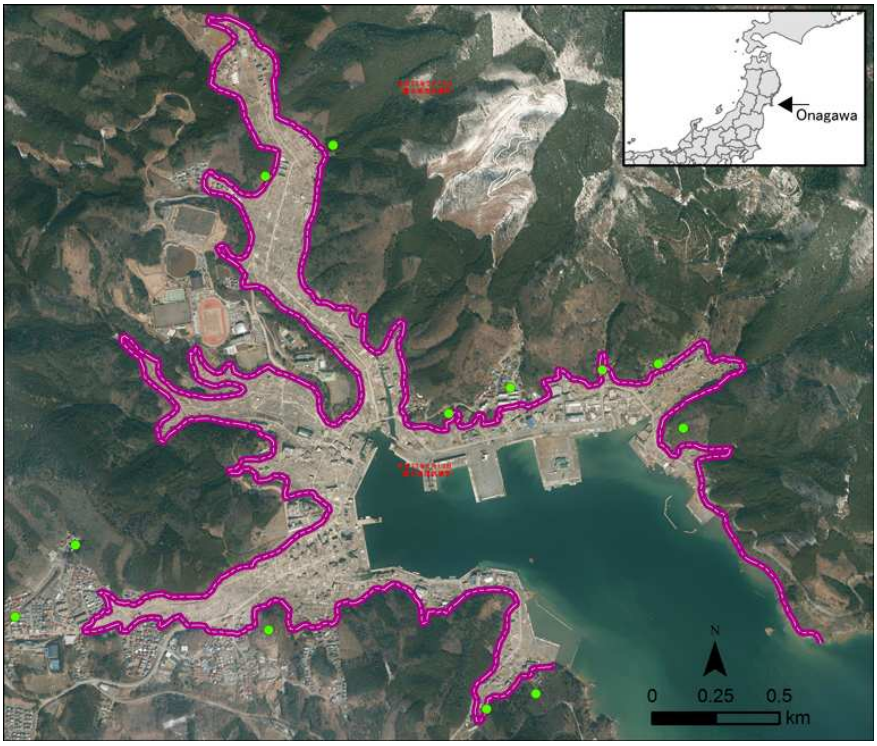

Figure 6. An example of CEDACH GIS – tsunami area (purple polyline as boundary) and

archaeological sites (green dots) of the Onagawa Bay, Miyagi Prefecture. The background aerial photograph was taken on March 19, 2011, and georectified to the orthoimagery by the Geospatial Information Authority of Japan [5]. The boundary of the tsunami area was cross-checked with the information provided by the Tsunami Mapping Team of the Association of the Japanese Geographers (AJG) [6] and Open Street Map [7]. The distribution of archaeological sites is based on the site database hosted by the Nara Research Institute for Cultural Properties [8].

Concluding remarks

Since CRM in such an immense disaster is a literally unprecedented task, our group has been carefully discussing the appropriate organization and action plan. It is also underlined that the methodology and tactics implemented by CEDACH could be applied to CRM in the natural and human disasters anywhere else in the world. Therefore, we welcome suggestions and support from our international colleagues.

Acknowledgement

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