

# Use of 3D Archives of Local Dwelling Space

-Visualizing History of Settlements beyond Disasters and Development-

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## 1. Introduction: Historical Documents in 3D

Methods for preserving data even after their formats became obsolete were developed in the previous study<sup>1</sup>. This study applied the developed methods to the data recording actual settlements, which integrate fragments of maps, photos that record historical parts of a settlement. Also ways to access to the source records from the 3D objects, to visualize them on the site, to convert them in any desired format were tried out, in order to extend the possibilities for future use.

## 2. Okushiri Island: experiencing Disaster

Coastal settlements of the island were destroyed by tsunami and fire after quake on July 12, 1993. However, they were quickly reconstructed through effective support provided by the Hokkaido prefectural government and the research institute for housing and urban planning<sup>2</sup>.

In this study, the settlements were reconstructed through analysis of old analog photos and maps.

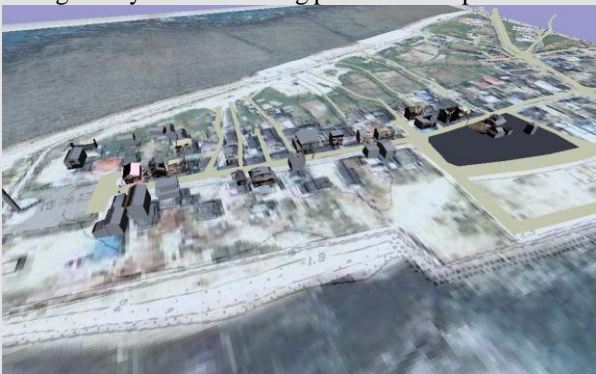


Figure Reconstructed Cape Area in Aonae Village

The area was totally destroyed in 1993, and become a memorial park after reconstruction. Houses were reconstructed through analysis of old photos. The settlement can be seen from any viewpoint. Each house can also be selected to access the old photos that record it.

The history prior to 1993 included a big fire in 1963 when the population was at its peak. Efforts for reducing the density, including land readjustment, extension of the width of roads, and the development of new towns on the hill were undertaken. A previous tsunami due to the Central Japan Sea Earthquake in 1983 caused damage smaller to those of 1993. Footpaths for evacuation to the new town on the hill were added. These components for disaster mitigation are common to those that were chosen after 1993, and the shared experience obviously provided conditions for rapid consensus on the reconstruction plan after the far larger disaster in 1993.

## 3. Tsukuba: experiencing Large Scale Development

The Japanese government decided to relocate several functions of the capital Tokyo to Tsukuba region in 1963. The development process of the region can be traced through official urban planning drawings, systematically taken air photos, design drawings of public buildings and photos after completion from the 45 organizations (mostly research institutes) involved in the relocation project, which comprised totally 2,700 hectares.

Seeking for a wider scope, the previous space of a research institute before the relocation was also surveyed in this study, and compared with the new campus.

The change of land use before 1963 was also surveyed.

The comparison revealed that the last large scale development after 1963 was one component of chain of changes of one site among forest, military airport, space for resettlements of the refugee from colonies after the war and current research institutes.

Also, histories of organizations show the chain of relocations within the metropolitan region, through which knowledge was continuously accumulated and overlaid.

## 4. Conclusion: toward a Stock of Empirical Wisdom

In order to achieve the legacy-free usage, the archived data file is attached with a metafile describing the procedure to read. A special common format/grammar of this metafile is defined for the developed Virtual Converter, which compiles the metafile to create executive operations that utilize the data.

This Virtual Converter is integrated in an Android based application (VC-3M) for tablets, that present the recorded data on site from the viewpoints and camera angles obtained from GPS, gravity and magnetic sensors.

The same source code of the Virtual Converter is also applied to a Windows-based web server application which can deliver the preserved data in any format defined by the attached metafile (VC-4D).

Hopefully, the rapidly changing ICT technologies will not accelerate the legacy process of recorded data and forgetting them, but contribute to the lasting succession of valuable empirical wisdom of each local settlement.

[Sources]

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- 4) <http://sim.nilim.go.jp/Tsukuba>(in Japanese)