"A Community Development Support System" Using Digital Terrestrial TV

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Abstract

In the disaster-affected areas of the Great East Japan Earthquake, many people are still living in temporary housing shelters. In these areas, people are facing the issue of setting up "community functions," such as for the transmission and sharing of important information, and for communications among residents, etc. At the same time, they are facing the issue of their local communities collapsing due to depopulation and ageing. This is happening not only in the disaster-affected areas but also in various local municipalities. NEC's "community development support system" will contribute to establishing new communities in such areas and municipalities. The system employs digital terrestrial television, which is a familiar device to many people, as an information terminal, and broadcasts video content produced by local municipalities, town or autonomous neighborhood associations, NPOs, local residents, etc. in a timely manner.

1. Introduction

Acceleration of low birthrate, longevity and depopulation in local areas risks causing the collapse of local communities. Solitary deaths of elderly people are now an issue that affects our entire society. Such phenomena occur all over Japan, however, they may be seen typically in the disaster-affected areas of the Great East Japan Earthquake, where many people still live stressfully in temporary housing shelters. People living so originate from different towns and cities, so that some of them have already lost contact with their neighbors in their original towns. Some municipalities are facing crisis in losing their autonomy because more and more people have decided to leave their home towns. It can be said that the disaster-affected areas in the Tohoku region epitomize the regional issues that Japan faces. NEC has launched a "community development support system" project that aims to challenge these social issues. This paper introduces the challenges that we face and discusses case studies of activities that confront these issues.

2. Introduction of the "Community Development Support System"

2.1 Reasons for Establishing the Project

We first visited the disaster-affected area soon after the Great East Japan Earthquake occurred and listened to reports from NPOs that were providing support activities and collecting the opinions of victims from the affected area. We, then, initiated the project while considering what these people needed and what we could do for them by introducing ICT technologies.

While exchanging communications with NPO staff, we found that the two major points referred to below would influence our project.

The first point is that we should devise a system that does not place too big a burden on the staff of the municipality, because they are already very busy with so many things to do that relate to damage caused by the earthquake.

The second point is that we should create a system that is as simple as possible so that residents in the affected areas can operate the system on their own. What we aimed to do was to create the foundation of a new town where all residents in the

area could join and communicate with each other. By emphasizing these points, we began to develop the system.

2.2 Conditions at the Temporary Housing Shelter Sites

Below we describe the conditions of the temporary housing shelter sites (**Fig. 1**) that we had to consider first of all, before developing the system. The sites of the temporary housing shelters accept various people from different towns. Therefore, neighborhood communications among residents are not always adequate as the circulars that are passed around among residents sometimes get stopped half way. This may cause the issue that important information from the municipality or local community does not reach all of the residents. However, as in the case of municipalities, residents of entire towns had sometimes to move to the same temporary housing site. In such cases, communications among people were maintained favorably.

An even more serious problem is that of *hikikomori* (isolation from society), this issue occurs especially among elderly people. Less communication among residents accelerates the isolation of elderly people. Many municipalities allocate staff mainly for monitoring elderly people living in temporary housing shelters. However, some sites of temporary housing shelters are spread over wide areas of a town, so that it is a heavy burden for staff to visit each elderly person every day. Such support activities have sometimes to be continued for many years until elderly people begin to feel like they want to go out on their own, which may impose a huge burden on the municipalities.

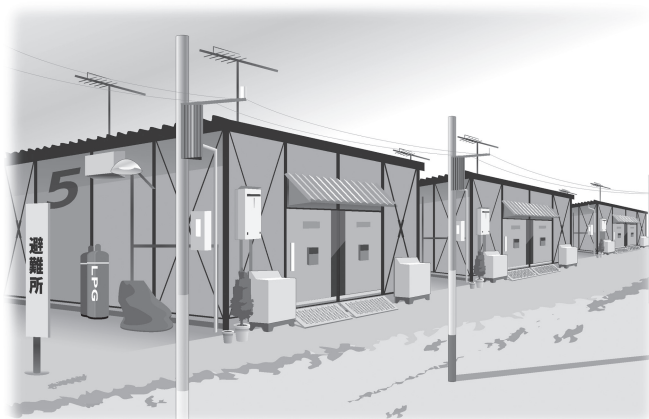We could have solved this issue from the standpoint of ICT

by delivering PCs to each temporary house. However, we found that operating a PC might have been too much for elderly people that had not even touched a computer.

It was urgent to establish new mechanisms that were easy to use even for elderly people and to thereby help to solve the major issues that the disaster-affected areas are facing.

2.3 Features of the "Community Development Support System"

We focused first on the fact that all temporary housing shelters are already equipped with digital terrestrial TV sets. All residents, even from elderly people to small children can operate digital terrestrial TV sets. They are able to watch programs just by turning on a TV power switch and tuning a channel. This led us to the concept that we should create a mechanism employing the digital terrestrial TV as an "information device." Our idea was that the mechanism should use TV exclusively and that not even an additional adaptor should be required.

As mentioned above, various people from different towns are living at the sites of the temporary housing shelters. First of all we tried to use the digital terrestrial TV as a mechanism to establish a community at the temporary housing site, such as using it as a notice board to inform of various events to be held at the community hall and as a broadcasting program to introduce residents to each other, etc. We have also suggested that such programs might be created using home video cameras, which are easy to operate and can be found in most homes.

Video programs shot with a home video camera can be distributed to digital terrestrial TVs in each household in a timely manner. Eventually, such features as the "community development support system" will thereby be developed satisfactorily.

2.4 System Outline

The "community development support system" is composed of four devices: a transmission unit, a PC, a video camera and a USB memory. A package of these is called a "standard unit."

The transmission unit (**Photo**) is the main device in the standard unit and also for this system. The significant point of this system is that everyone can run the system easily and at low cost. From this standpoint, the transmission unit was developed by focusing on simple operation. In this way

Fig. 1   Temporary housing shelters

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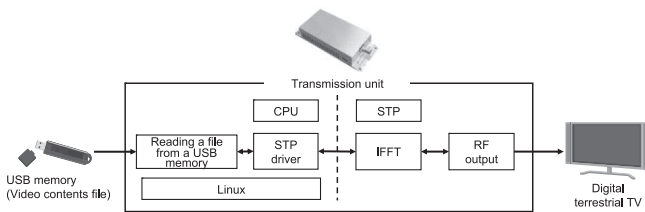Photo   The transmission unit.

Fig. 2   Block diagram of transmission unit function.

residents are able to operate a series of broadcasting operations by themselves, e.g. shooting a video program with a commercial home video camera, and converting the video file to store the data in a USB memory on a PC.

By following the operations detailed below, content created by residents themselves can be distributed to each temporary housing shelter.

1) Shoot a local event with a home video camera to create a video content.
2) Store the video file shot by the video camera in a PC and convert it to a file format that is compatible with the digital terrestrial TV format using exclusive software.
3) Copy the converted video file to a USB memory.
4) Insert the USB memory into a transmission unit to broadcast the video content to each temporary housing shelter.

The transmission unit incorporates a high-speed processor to convert the video file to be read from a USB memory into an RF output format file for digital terrestrial broadcasting (**Fig. 2**).

At the moment, the system only functions to broadcast video contents via the transmission unit. However, we will improve services in the future so that they will be able to provide data broadcasting, interactive functions, real-time broadcasting, direct broadcasting via LAN and contents to exchange with other areas via networks, etc., while at the same time examining the needs of local residents.

2.5 Introduction and Installation of the System at a Temporary Housing Shelter Site

In most of the temporary housing shelter sites, a community hall is built for approximately each 100 houses. First, we installed a standard unit consisting of a transmission unit, etc. in each community hall.

A temporary housing shelter generally consists of separate areas for 5 or 6 households. Broadcasting signals received by an antenna on the roof of a temporary housing unit are distributed to a digital terrestrial TV set located in each household via coaxial cables. With our system, broadcasting signals are distributed to each digital terrestrial TV set through the coaxial cable via a mixer (**Fig. 3** and **Fig. 4**). We also adjust the
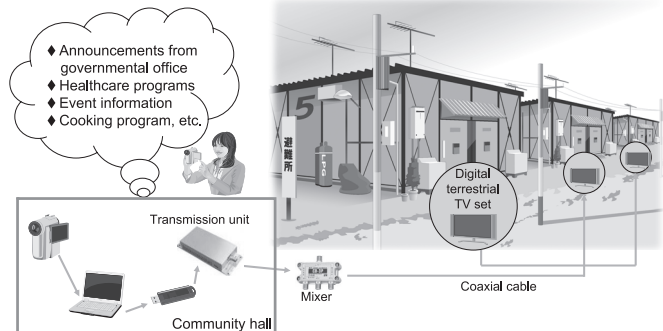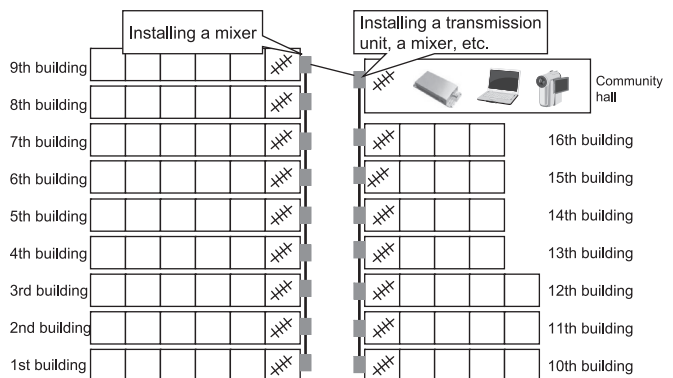

Fig. 3   System configuration.

Symbol legends: UHF antenna — Coaxial cable ▌ Antenna box

Fig. 4   Cable wiring diagram.

channel allocation of the digital terrestrial TV set so that local TV programs can be received at unused channels.

After providing such installation works, the system will become available. People can watch our contents via the same operations as watching ordinary broadcasting programs on a digital terrestrial TV set. For example, if channel 10 is set to the channel for one of our contents, people can watch the content distributed from our system just by selecting channel 10 with a remote controller.

Only households connected to this coaxial cable can receive our contents so that the broadcasting system can be used exclusively inside the limited area. This system is assumed to be used by people who know each other and live in the same area, and not by the general public.

2.6 Broadcasting Contents Examples Produced by Residents

Residents can easily produce their own video content and broadcast them on schedule. Our developed system equips a mechanism that allows residents to create various ways of use by employing their unique ideas. Some of the contents are explained below.

(1) **"Everyday enjoyable event" dispatched from the community hall**

Enjoyable contents are broadcasted such as information about various events (early-morning market, singing contest, etc.) to be held at the community hall as well as everyday activities conducted there. This procedure tends to make residents feel like visiting the community hall more often and it helps to establish a neighborhood community among residents.

Moreover, dispatching information regarding local area topics promotes conversation among residents about "common subjects" and this creates a familiar environment and contributes to preventing isolated lifestyles and *hikikomori* (isolation from society). Advancement of residents' health conditions also may be expected by distributing information related to healthcare management, calisthenics, etc.

(2) **"Important governmental information" dispatched from a local municipality**

A local municipality can use the system to dispatch important information to residents individually and confidently. By reading out information in audio or by inserting subtitles in broadcast programs, information can reach certain groups of elderly people whose eyesight and hear-

ing abilities are deteriorated. It is expected to promote the sharing of civic awareness among the municipality and residents and help the creation of an ideal community.

(3) **"Popular product information" dispatched from local shopping mall**

Information about seasonal foods and top selling products can be distributed as broadcast content together with other local information. Exposing such information toward residents via digital terrestrial TV will enhance the motivation of residents to come out from their temporary housings. At the same time, the vitalization of the local shopping mall can be expected.

3. Experimental Test Broadcasting at Wataricho, Miyagi Prefecture

In March 2012, we began experimental test broadcasting using this system targeting 85 families living in temporary housings at Wataricho in Miyagi Prefecture. Since June 2012, with the cooperation of the Wataricho municipality, temporary staffers of the community hall of the town, a community FM station and NEC have formed a committee to continue the experimental test broadcasting.

3.1 Verification Points

The Verification points below were discussed by the committee.

(1) Is this a necessary system for residents in temporary housings?

(2) Is everyday operation of the system easy enough for the content to be managed?

(3) Is the running cost of the system cheap enough to manage it continuously in the future?

(4) Are announcements from the municipality sure to reach every resident?

(5) Does the system contribute to forming and activating a residential community?

(6) Does the system help to promote the sharing of information among residents, such as local issues, civic awareness, hints for everyday life, etc?

3.2 Results So Far and Themes to be Examined for the Future

Here we introduce some of the results that were achieved

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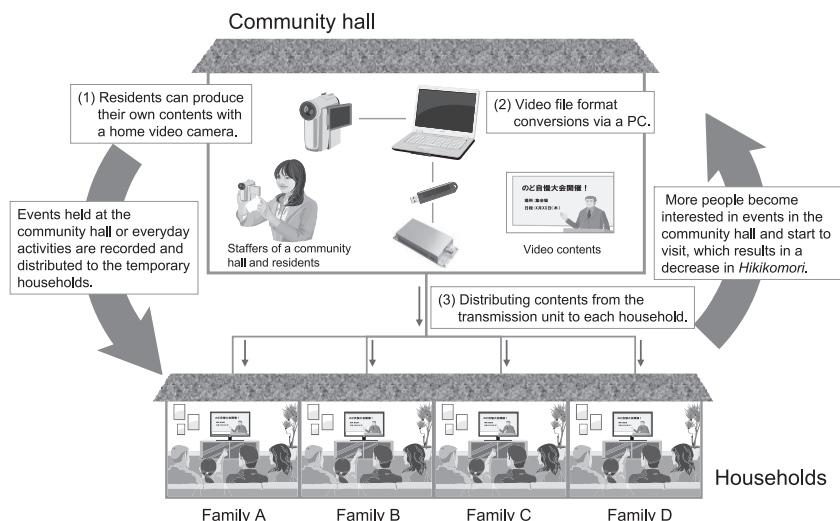
Community hall

Fig. 5   Illustration of the mechanisms of the system management.

from starting experimental tests in March 2012 until this May. We have broadcast various event information held in the community hall such as singing contests, etc. As a result, we found that more people started to visit the community hall after the event information was distributed to residents and some residents formed new friendships there. This resulted in the development of further communication among residents (**Fig. 5**).

At the same time, we discovered new issues to be examined for improving the system.

(1) **Management system**

At present, the system is managed mainly by full-time and temporary staff of the Wataricho local government office. However, we would like the residents to become more involved and even that mechanism enabling residents themselves to run the system should be examined in the future.

(2) **Contents production**

Most of contents produced at the moment are concerned with events held at the community hall. We try to conduct questionnaires to find out what sort of contents are expected by residents, so that we can produce contents meeting their real needs.

(3) **System operations**

We will examine procedures for an operational method that does not require an operations manual, so that all residents are able to operate the system confidently.

(4) **System introduction cost**

The system introduction cost is still too much for small town communities or municipalities. Countermeasures aimed at decreasing the capital burden of introducing the system are anticipated.

As described above, many issues remain. However, we have already received some favorable results. We have heard that some elderly people would like to become program presenters. We are confidently expecting that our system will contribute to an acceleration of residents' communications and will promote re-activation of their lifestyles.

4. Conclusion

This system allows local residents to create their own contents and to broadcast them on unused channels of digital terrestrial TV, which is one of the most familiar information transmission tools. Such a mechanism is expected to contribute to supporting and activating community development by distributing such contents to their neighbors via simple operations.

Experimental testing performed at the temporary housing shelters in Wataricho is achieving promising results for estab-

lishing and activating a new community. We have received various requests and plans regarding this system from other local municipalities, such as for distributing disaster prevention contents, providing community vision, employment as a suitable mechanism for forming residents consensus, etc.

This time, we started the experimental testing at temporary housing shelters. However, we are planning to develop the mechanism to be employed also at municipal housings for disaster victims. Moreover, we expect that this system will be used as an essential tool for establishing new communities, so that it will be able to sort out issues that local communities are facing, as well as contributing to the reconstruction of the Tohoku Region.

To conclude, we would like to mention that the transmission unit mounted in this system is manufactured with the engineering cooperation of Renesas Electronics Corporation and Shimafuji Electric Incorporated.

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[*]Linux is a registered trademark or trademark of Linux Torvalds in the U.S. and other countries.

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