Abstract—Ultrasonographic images provide valuable diagnostic information about victims’ conditions at disaster sites. If physicians at hospitals can check these images in advance, they will be able to provide paramedics at the disaster site with instructions regarding appropriate measures for the injured patients although an appropriate attitude angle of an ultrasound probe is crucial for taking a desired ultrasonographic image. In the present study, we discussed the application potency of previous telemedicine systems using ultrasonographic images in disaster medical operations. And, to solve problems of these systems, we developed a new telemedicine system working with a tablet PC and a virtual probe based on an acceleration and geomagnetic sensor.

I. INTRODUCTION

Ultrasonographic images are useful to evaluate victims’ conditions at disaster sites. If physicians at hospitals can check these images in advance, they will be able to provide paramedics at the disaster site with instructions regarding appropriate measures for the injured patients. Furthermore, remote medical treatments and care by physicians in areas unaffected by the disaster may be needed if a few physicians must receive many injured patients together in the hard-hit area. In this study, we discussed the availability of some types of previous telemedicine systems using ultrasonographic images (tele-echography) in disaster medical operations and introduced a new tele-echography system based on the result of the discussion.

II. TELE-ECHOGRAPHIC IMAGE ARCHIVING SYSTEM

Basically, most of the previous tele-echography systems require a high-speed and constant connection to the Internet. However, communication networks are not stable in case of the occurrence of a wide-scale natural disaster. This means that these systems will be inoperative in disaster areas. In addition, the time required for setting up of the system and the examination must be restricted to the minimum necessary in disaster sites. In consideration of these restrictions, we developed a tele-echographic archiving system (TEAS) in the previous work [1]. A diagrammatic illustration of the system is shown in Fig. 1. This system is robust against communication failures. And the timing of acquiring ultrasonographic images at a measurer’s side and that of checking the images at a physician’s side is not necessarily the same. This enables the physician to check ultrasonographic images of multiple patients in a short time. Thus, this system will be available in the case that a few physicians must check many injured people in a disaster area.

In this study, TEAS was improved as shown in Fig. 2 (Prototype II). The image resolution of ultrasonographic images acquired in Prototype II is enhanced. And a new function is added to save pictures of examination scenes. The pictures are stored in the same way as the ultrasonographic images and the probe attitude information. The physician can visually understand not only the probe’s attitude but also affected areas of the patients through these pictures.

III. CONCLUSION

The application potency of previous tele-echography systems in disaster medical care was discussed. And the tele-echographic archiving system was introduced as a new system to solve problems of the previous systems.

REFERENCES