

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Space-Based Navigation Systems and Services (1)

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EVALUATION OF THE REACHABILITY AND PROMPTNESS OF DELIVERING DISASTER AND
EVACUATION INFORMATION USING AN AUGMENTATION SIGNAL OF THE QUASI-ZENITH
SATELLITE SYSTEM**Abstract**

There may be many failures in the ground communication infrastructure following an earthquake such as the Great East Japan Earthquake. In such a case, disaster management agencies may not be able to alert residents to a disaster or provide evacuation information. We therefore developed the RedRescue system, which broadcasts disaster notifications and evacuation information using the L1-SAIF signal—an augmentation signal of the Quasi-Zenith Satellite System (QZSS). A feature of RedRescue is that disaster and evacuation information can be received without the use of a special device, such as a satellite phone, using a GNSS receiver (e.g., a smartphone) in the case of a breakdown in ground communication. In the development of RedRescue, from the points of view of reachability and promptness of disaster and evacuation information, we evaluated the transmission of information and verified the effectiveness of the system. First, we verified the reachability and promptness of disaster and evacuation information in an evacuation simulation. Second, we verified the usability and behavior of information using a simulator of disaster and evacuation information delivery capabilities through the QZSS. Finally, we verified the reachability and promptness of disaster and evacuation information transfer using the QZSS. This paper reports the results of the verification of the reachability and promptness of information in evacuation simulation. Specifically, we compared the performances of RedRescue and existing systems in delivering disaster and evacuation information, such as emergency broadcast systems and public announcements from vehicles fitted with loudspeakers, from the viewpoints of reachability and promptness. Existing systems can convey much information to a specific location; however, they can only convey information to a narrow range of locations. In contrast, RedRescue can convey information to a wide area in one go; however, it can only send data of small capacity. Hence, when notifying users of a disaster, we found that RedRescue is more effective than existing systems from the viewpoint of reachability and promptness, because it is able to transmit information more quickly than existing systems to many users without being affected by the position of the user. In addition, we found that the delivery schedule and delivery interval are important when RedRescue transmits information to different areas.