論　文　要　旨
Thesis Abstract

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主論文題名　　（Title)

MULTI-UAV INTEGRATED INTERNET OF
THINGS SYSTEM FOR GENERATING SAFE
MAP IN POST-DISASTER

内容の要旨　　（Abstract)

The deployment of multi-UAV systems in disaster response missions is a relatively innovative solution faced with many practical challenges, such as the effectiveness and stability of the operations during the mission, the network and communication system, the flight plan design, energy requirements, and mission management. In this study, author proposes a new method to build safe maps through disaster-stricken zones by taking advantage of different scenarios of tracking pedestrians and area scanning. Tracking is usually achieved by following the refugees' mobile devices. However, sometimes refugees do not hold mobiles to track them. To overcome this problem, author exploits the tracking systems of the UAV system, which enable both image processing and mobile tracking depending on the scenario on the disaster area. UAV technology is a low-cost, flexible solution in missions that are difficult to execute by humans and other systems. After a disaster event, a safe map can be constructed from aerial imagery data of the moving pedestrians. Aerial data are also useful for evaluating damage in the stricken areas. The presently proposed system integrates UAVs into the Internet of Things technology and M2M communication, generating a pseudo scenario for the map generation. The framework considers all factors that influence the flight plan design, communication and control, and tracking and scanning processes. For example, in system validation chapter, the missions performed in an experimental area which had been stricken by the Tohoku earthquake and tsunami in 2011. The damaged areas are mapped and scanned in a simulator developed by the author. Network and communication of UAV and Multi-UAV systems have been discussed through experiments and simulations of real flight plans. In the conducted experiments, author confirmed the usefulness of low-cost UAVs in tracking and scanning missions in various scenarios of a communication system and without smart-phone tracking data.