Study on Developing a System with IP Functionality to Monitor the Status of Containers in Maritime Logistics

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***Abstract*— There has been increasing demand from consignors and shipping companies for real-time monitoring of maritime cargo due to increases in fresh, dangerous, and high-value cargo. Although larger carriers have developed and integrated their own systems for such real-time monitoring services, small- and medium-sized shippers are struggling with the heavy costs and workforce associated with such capability. This study introduces a system that can do real-time monitoring of the location of shipping containers and their internal status by using IP-RFID that in cludes IP functionality. This system is composed of a tag, a smart point, and a service platform. The monitoring tags are attached to regular containers to track the opening and closing of the doors, the internal temperature, and humidity. The tags then send the data to the smart point where the GPS information is added. The data packet is then finally transmitted to the service platform for location tracking. In particular, as the tags in this system have IP functionality like Multicast, they are capable of communicating with the users and also allow users to control them. In order to provide such functionality, the smart points can serve as a gateway between the service platform and the tag. By managing the tag's connection information and the status of transmission at the smart point, the service platform can directly communicate with tags connected to the respective smart point. This technology could be applied in a diverse range of maritime and non-maritime areas including warehouse management. As for maritime logistics, it also often goes through ground, port, and air transportation phases. Further studies should monitor the actual performance of this equipment across the various phases of maritime logistics to empirically test the systems proposed herein.**

***Index Terms*—RFID, IP, Maritime Logistics, Monitoring, Container**

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