

THE PERFORMANCE TEST OF AN INITIAL iNET-LIKE RF NETWORK USING A HELICOPTER

**Sei Ito, Takeshi Honda, Toshihisa Tanaka, Daiki Aoyama,
Aerospace Company
Kawasaki Heavy Industries, Ltd.
Kakamigahara, Gifu Japan**

ABSTRACT

Through the use of early iNET-prototype IP Transceiver technology, Kawasaki Heavy Industries, Ltd. (KHI) has been able to communicate with a flight test vehicle. This technology provides a two-way high-capacity communication that has not been achieved with conventional telemetry. KHI has been authorized to use S-band IP Transceivers since 2014 in Japan. Then various communication tests have been performed. Last year we presented the result of the performance test of initial iNET-like RF network using a tethered aerostat at ITC. As the next phase, we have a plan of the test using a helicopter. The test is going to be conducted in September. We will present the results at ITC. This paper describes plans of the test which includes improved data backfill techniques.

KEYWORDS

iNET, RF Network, IP Transceiver, backfill

INTRODUCTION

KHI has been responsible for the development of the Japan Self-Defense Force's aircraft, Japan Aerospace Exploration Agency (JAXA) experimental aircraft and KHI aircraft, such as the BK117 helicopter. We have utilized conventional telemetry systems in various flight tests for many years. Nearly a decade ago, we obtained information about iNET at ITC, and had a great deal of interest in the 52 user-case scenarios discussed at the CTTRA workshop. Since then, we have been working on research and development similar to iNET, especially two-way high-capacity communication, and has been promoting the introduction of such technology in Japan. In 2014 we conducted the performance test of initial iNET-like RF network using a tethered aerostat. As a result, we were able to demonstrate a two-way communication over 34km distances. In 2016 we move to the next stage. We are going to conduct two-way high-capacity high-speed mobile communication using a helicopter, and also over 100km distances. Furthermore, we are going to test the functions of automatic tracking antenna system on the ground using location information from GPS on the helicopter. This paper describes the plans of these tests, and also the flight test results will be presented at ITC.

TEST OBJECTIVES

KHI is going to carry out a two-way communication test between the helicopter with our network-telemetry equipment package and the ground system.

Specifically, we want to demonstrate and confirm the applicability of the following capabilities.

- Investigate available downlink capacity over 100km distances.
- Demonstrate the use of two-way high-capacity wireless IP communication, and investigate available transmission data rates.
- Confirm the improved data retransmission function: The missing data by lock-off is downloaded from an on-board computer by a command from the ground station .
- Demonstrate the function of downloading all the flight-test data on a data recorder on board during returning to a base.

TEST SETUP

BK117 C2 HELICOPTER

The network measurement system is installed on the company plane (BK117 C2) . The front row of seats are removed for a measurement rack. A telemetry antenna is installed at the space for a wire cutter. A GPS antenna is installed at a hand grip on the side of copilot's seat. The utility power source (28V) is used for power supply for the systems. The system configuration is shown in Figure 1.

IMPROVED DATA BACKFILL TECHNIQUES

Design Improvement

We have two major improvement as bellow.

- Data retransmission without pausing real time monitor: In previous version, we have to stop the real time history to use the data backfill technique. In latest version, we can get the data without stopping monitor.
- Address the lock-off during data retransmission: In previous version, if the lock-off occurred during data retransmission, lock-off data is not retransmitted. In latest version, Data retransmission is processed successfully.

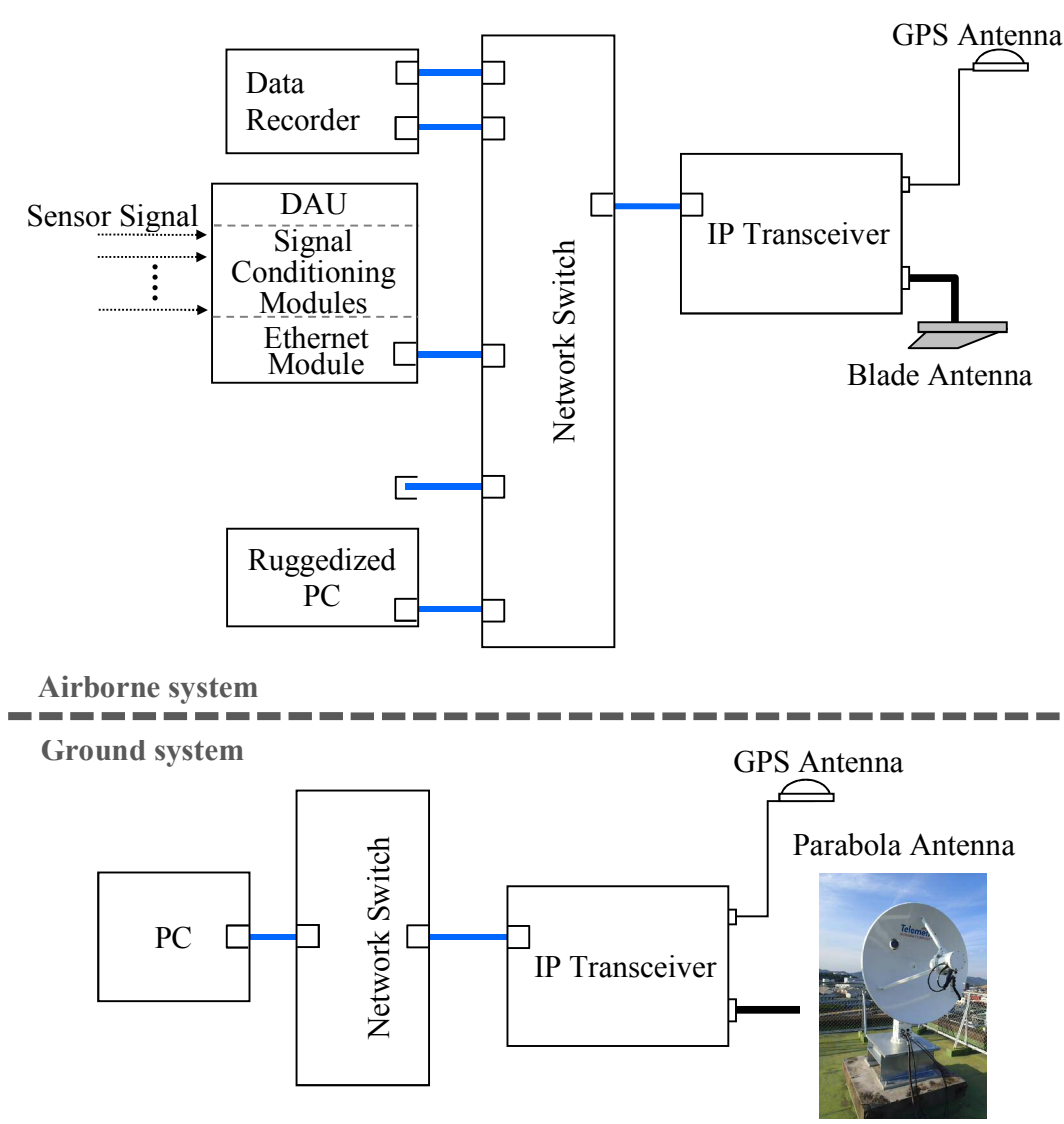


Figure 1 : System Configuration

CONCLUSIONS

- We are going to conduct the flight test in September.
- The results of the test is going to be presented in technical session at ITC.