PERFORMANCE TEST OF INITIAL iNET-LIKE RF NETWORK USING HELICOPTER (2018)

Sei Ito, Takeshi Honda, Toshihisa Tanaka, Daiki Aoyama, Katsuhiko Abe, Takafumi Morimatsu
Aerospace Company
Kawasaki Heavy Industries, Ltd.
Kakamigahara, Gifu Japan

ABSTRACT

Kawasaki Heavy Industries, Ltd. (KHI) has been authorized to use S-band IP Transceivers since 2014 in Japan. We have been involved with tests for two-way high-capacity communication. We presented the results of the performance test using a helicopter at ITC2016. We continued further performance test in 2017-2018.

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 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 were able to demonstrate a two-way high-capacity high-speed mobile communication using a helicopter over 50km distances. From 2017, we have been to continue flight test to demonstrate certain transmission rate at about 100km communication distance. We also test the performance of an improved retransmission program that sends missing data from a buffer of an on-board computer. This paper describes the plans of above 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 program: 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.
- Confirm the performance of automatic tracking antenna system on the ground using location information from GPS on the helicopter.

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 a major improvement as bellow.

Improved resend speed of data retransmission program : It needs only about 0.5 sec to resend 1sec of missing data. In previous version, It needed more time.

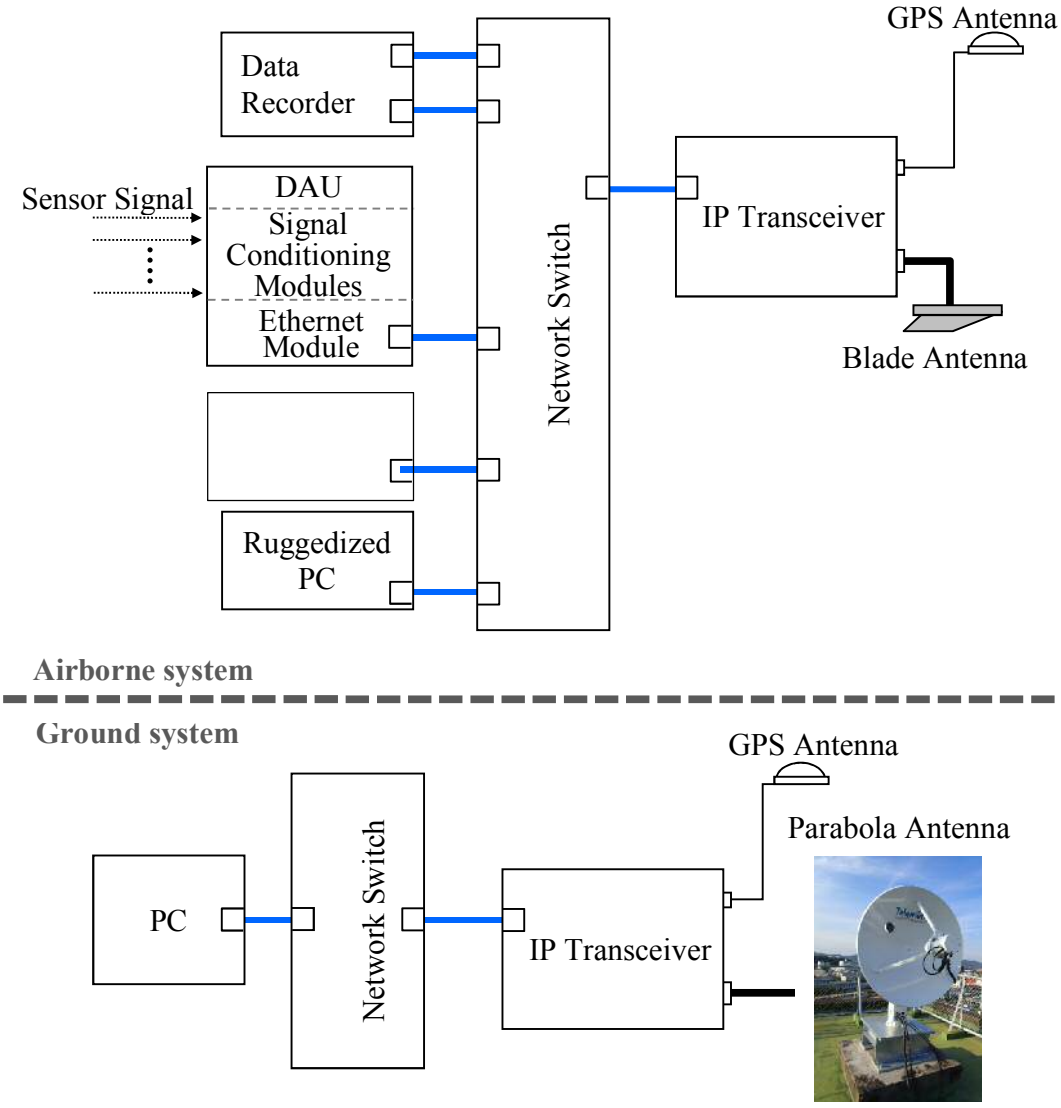

Figure 1 : System Configuration

CONCLUSIONS

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