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**Twenty Fifth Meeting of the Communications/
Navigation and Surveillance Sub-group (CNS SG/25) of
APANPIRG**

Video Tele-Conference, 18 – 22 October 2021

Agenda Item 12: Discuss and share experience and application of new technologies, including big data analysis, artificial intelligence, Digital Tower, counter UAS detection and identification system, UTM, etc.

**STANDARD ESTABLISHMENT OF DATA LINK FOR UAS-BASED
FLIGHT INSPECTION IN CHINA**

(Presented by China)

SUMMARY

The joint R&D team in China is drafting a minimum operational performance standard for special-purpose air-ground data link used in UAS-based flight inspection mission. The special data link is expected to transmit flight inspection raw data, mission payload status information, mission payload remote command etc. via radio communication, but not UAS command and control data which are specified in RTCA DO-362. The being drafted standard focuses on establishing featured requirements for the data link designed for UAS-based flight inspection scenario.

1. INTRODUCTION

1.1 The joint research and developing team in China have been collecting data, learning from experiences and lessons from a couple of trial flights during the work on UAS-based flight inspection technology development, with two generation of flight inspection systems deployed in fixed-wing and hybrid-wing UAS.

1.2 An independent, reliable, secure radio link for air-ground flight inspection mission data communication is essential and critical in this special application scenario, though in current experimental phase, a channel was assigned to flight inspection system from UAS's data link module.

1.3 The team is drafting a technical specification of the special datalink for UAS-based flight inspection mission ("special data link").

Agenda Item 12

18-22/10/21

2. DISCUSSION

2.1 The being drafted specification intends to guide and standard special air-ground datalink in China, covering system structure, error rate, communication distance, system delay, data rate, power supply and consumption, interface, security, applicable speed, environmental condition, reliability, quality assurance, anti-interference, self-test and miscellaneous, as well as noting to comply with national and local regulations on frequency, equipment control, operator qualification etc.

2.2 A typical special data link consists of airborne subsystem and ground system. Each subsystem contains radio equipment, antenna, and cables.

2.3 The actual frequency used should comply with national and local regulations, as well as the details specification, such as work pattern, central frequency, bandwidth, tolerance, adjacent channel leakage ratio, spurious emission, out of band emission, guard band, listen before talking, etc.

2.4 Other critical requirements include:

- An error rate of less than 10^{-6} is required to ensure mission data integrity and creditability;
- The LOS communication range should not less than 150km;
- System delay shall not be bigger than 100ms;
- The data rate with no video stream shall not less than 500kbps, while it is not less than 3Mbps when video stream is transmitted;
- The power input should adapt with 5/12/28VDC supplied by the UAV generator or battery. The airborne subsystem consumption is up to 150W while the ground one can be 300W at most;
- One RS-422 interface and one RJ-45 interface are required at least for both the airborne and ground equipment;
- Secure communication is requested with configurable AES encryption function; and
- The data link shall be operational well when the relative speed is up to 300km/h, with ability to communicate at general interfering circumstance (not a powerful, malicious attack).

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.
