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Command and Control (C2) Data Link White Paper

RTCA WP-2
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FOREWORD

This report was prepared by RTCA Special Committee 228 (SC-228) and approved by the RTCA Program Management Committee (PMC) on (date)

RTCA, Incorporated is a not-for-profit corporation formed to advance the art and science of aviation and aviation electronic systems for the benefit of the public. The organization functions as a Federal advisory committee, and develops consensus-based recommendations on contemporary aviation issues. RTCA's objectives include but are not limited to:

- coalescing aviation system user and provider technical requirements in a manner that helps government and industry meet their mutual objectives and responsibilities;

- analyzing and recommending solutions to the system technical issues that aviation faces as it continues to pursue increased safety, system capacity and efficiency;

- developing consensus on the application of pertinent technology to fulfill user and provider requirements, including development of minimum operational performance standards for electronic systems and equipment that support aviation; and

- assisting in developing the appropriate technical material upon which positions for the International Civil Aviation Organization and the International Telecommunication Union and other appropriate international organizations can be based.

The organization's recommendations are often used as the basis for government and private sector decisions as well as the foundation for many Federal Aviation Administration Technical Standard Orders and several advisory circulars.

Since RTCA is not an official agency of the United States Government, its recommendations may not be regarded as statements of official government policy unless so enunciated by the U.S. government organization or agency having statutory jurisdiction over any matters to which the recommendations relate.

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1 BACKGROUND

The Federal Aviation Administration (FAA) established the Unmanned Aircraft Systems Integration Office to integrate Unmanned Aircraft Systems (UAS) safely and efficiently into the National Airspace System (NAS). The UAS Integration Office is working closely with the UAS community to develop the performance and certification standards for the civil Command and Control (C2) Data Link. An initial phase of standards development will provide standards for the C2 Data Link using L-Band Terrestrial and C-Band Terrestrial data links. A second phase is envisaged to provide standards for the use of SATCOM in multiple bands as a C2 Data Link to support UAS.

To support the FAA mission above, RTCA Special Committee 228 Minimum Performance Standards for Unmanned Aircraft Systems (SC-228) was established by the RTCA Program Management Committee (PMC) on 20 May 2013 with Terms of Reference (TOR) given in RTCA Paper No. 109-13/PMC-1089. The remainder of this introductory section contains relevant text extracts directly from the TOR as background for this paper.

Terms of Reference Guidance

> The focus of the C2 data link will be to provide the command and control function as the primary use of the spectrum. During a period of transition to the FAA's digital voice switch network, a secondary capability will be included on the C2 Data Link for ATC voice communications relay. It is expected that this voice communications relay function will no longer be included in the C2 Data Link once the digital voice switch network is fielded in the NAS. See section 6.4 for further discussion. [1]
>
> The International Telecommunications Union (ITU) has identified multiple spectrum bands as candidates for use for this C2 Data Link. These include:
>
> - L-Band Terrestrial
> - C-Band Terrestrial
> - SATCOM in multiple bands
>
> In order to validate use of the spectrum and thereby to protect the frequencies under consideration for UAS use, there is an implied urgency to define, establish performance characteristics, and validate and verify the developed standards.
>
> As the Phase One C2 Data Link Minimum Operational Performance Standard (MOPS) will not contain requirements for Satellite Communication (SATCOM), UAS operations using the Phase One deliverables of SC-228 will involve having any use of satellite Data Link in those operations covered through bilateral agreements between the operator and the FAA. [2]

[1] This is a relay of controller/pilot voice communications for retransmission to and from the aircraft over standard VHF aeronautical channels.

[2] WG-2 believes that the highlighted section of the SC-228 TOR should read: "Phase One deliverables of SC-228 involving any use of satellite Data Link in those operations will be covered through bilateral agreements between the operator and the FAA." A request for an editorial change in the TOR will be requested.