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Minimum Aviation System Performance Standards for C2 Link Systems Supporting Operations of Unmanned Aircraft Systems in U.S. Airspace

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FOREWORD

This report was prepared by Special Committee 228 (SC-228) and approved by the RTCA Program Management Committee (PMC) on March 21, 2019.

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 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 PURPOSE AND SCOPE

This document contains the Minimum Aviation System Performance Standards (MASPS) for a C2[1] Link System connecting a Control Station (CS) and an Unmanned Aircraft (UA).[2] It covers UA operations requiring a C2 Link System[3] that allows the UA to operate within visual line of sight (VLOS) and beyond visual line-of-sight (BVLOS) of a CS. The types of information that are exchanged over the C2 Link System include both:

1. The commands from the remote pilot,[4] i.e., the telecommands sent over a forward link from the CS to the UA, and
2. The status and annunciations from a UA, i.e., the telemetry data sent over a return link from the UA to the CS, that are associated with all of the activities the remote pilot is required to perform to safely execute the flight plan. These safety-of-flight[5] related information exchanges do not include normal payload information, i.e., the information associated with the UA mission payloads.

A more complete description of those information exchanges and the associated requirements on the C2 Link System are given within this MASPS.

1.1 Introduction and Purpose of Document

Subsection 1.1 contains a discussion of why and how this document was prepared and how it should be used.

1.1.1 Background

RTCA has supported the Federal Aviation Administration (FAA) for several years in developing the MASPS, and Minimum Operational Performance Standards (MOPS) needed to support UA flights within the U.S. airspace[6] and beyond the operational limits[7] placed on small unmanned aircraft systems (UAS).[8] From 2006-2012 the RTCA Special Committee (SC)-203 sought to develop a UAS MASPS document; although it was not completed, there was sufficient progress to provide much-needed groundwork. In 2013 the RTCA initiated SC-228 with a narrower scope; namely, to develop MOPS needed for (a) a UAS Detect and Avoid (DAA) system (the focus of SC-228 Working Group

[1] Note: When the term "C2" is used as part of the name of a system, i.e., C2 Link System, the term "C2" is used as a noun and not as an abbreviation of the words "command and control". Where it is used not as part of a name, then it would be an abbreviation for command and control.

[2] An Unmanned Aircraft (UA) is the physical aircraft that a remote pilot is operating.

[3] A C2 Link System is the logical connection used for the exchange of information between a CS and an UA, to enable the remote pilot to safely operate the UA in the authorized U.S. airspace.

[4] A remote pilot is the person who is operating an aircraft but is not physically on that aircraft. Within this document, this term is used instead of Pilot in Command (PIC) since PIC represents a legal responsibility not necessarily the pilot operating the aircraft.

[5] Safety-of-flight information is any information/data sent to or received from the UA that is necessary to ensure the UAS is operated/operating in a manner that protects people and/or property from harm due to unintentional events.

[6] U.S. airspace does not include Oceanic Airspace.

[7] The limits placed on small UAS are described in the June 29, 2016 Federal Register (Volume 81, No. 124/Rules and Regulations) which announces the amending of regulations to allow for the operation of small unmanned aircraft systems in the National Airspace System (NAS). This added a new Part 107 to Title 14 of the Code of Federal Regulations (14 CFR).

[8] Unmanned Aircraft System (UAS) means all of the components that are directly involved as a UA is being operated. In this document, this term is used instead of Remotely Piloted Aircraft System to leave open the possible use of the abbreviation UAS to include autonomous aircraft. This definition is also used by the International Civil Aviation Organization (ICAO).

