3GPP Release 17 – Building Blocks for UAV Applications

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Abstract

This report describes how mobile networks supporting the Third Generation Partnership Project (3GPP) Release 17 specifications can enable uncrewed aerial vehicle (UAV) applications. It discusses how 3GPP's work fits with other specifications to address UAV needs and shows how the 3GPP system can be used to enhance the opportunities to safely use UAVs for commercial and leisure applications.

Foreword

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1. Introduction

UAVs are heavily dependent on wireless communications to address multiple requirements including command and control, location finding, cooperative perception and collision avoidance, and remote identification. The widespread availability of mobile cellular networks makes them an obvious candidate for utilization by UAVs. To better serve UAV applications, 3GPP Release 17 specifies mobile cellular capabilities that address UAV use cases.

Because UAV applications interact with several different parts of the 3GPP system, it can be difficult to fully appreciate how 3GPP addresses UAV requirements by direct reference to the specifications. In many cases, the capabilities in 3GPP specifications are intended to be integrated with other standards to build complete solutions. Hence the importance of understanding how 3GPP specifications fit in to the puzzle with other initiatives.

This report aims to help technical decision makers and system architects understand the role of 3GPP specifications for UAVs. It describes how 3GPP Release 17 specifications enable UAV applications and align with other specifications to address UAV needs. This report also shows how the 3GPP system can be used to enhance the opportunities to safely use UAVs for commercial and leisure applications.

2. Status of 3GPP Release 17 and Beyond

3GPP Release 17 was frozen in June 2022. Following normal 3GPP processes, Release 17 is an interoperable specification of a mobile cellular system for both 4G Long Term Evolution (LTE) and 5G New Radio (NR) interfaces from the system architecture point of view. Release 17 evolves previous 3GPP releases and is backward compatible with them. Support for UAV applications has been one component of 3GPP's Release 17 architecture work.

From the 3GPP Radio Access Network (RAN) perspective, 3GPP has addressed UAV requirements with the introduction in Release 15 of User Equipment (UE) Aerial Features. This work in Release 15 covers LTE RAN only. However, 3GPP has agreed to begin work on a Release 18 5G NR work item for the second half of 2022. This work item will align NR solutions with the existing LTE UAV solutions and specify NR-specific enhancements. The four general objectives of this work will include the following:

1. Specify enhancements to measurement reports as follows: UAV-triggered measurement report based on configured height thresholds; reporting of height,