Open Drone ID

WiFi Broadcast Specification

Draft Specification Version 0.61.1

Protocol version 0

December 10, 2018

Contents

Update History

Version	Date	Changes	Author
0.60.0	8/23/2018	Established a separate WiFi spec document	G. Cox
0.61.0	11/8/2018	Updated diagrams to sync with Message Spec (removed Unique ID from header, increased remaining message size from 21 to 25 bytes.	G. Cox
0.61.1	12/10/2018	Removed wrong diagram in doc (Bluetooth frame diagram), changed message scheme to use the SSID as the message rather than Vendor specific tag (which is not compatible with IOS/Android). Max Message frame size is now 22 with a payload of 21 bytes due to encoding overhead of UTF-8.	

1 Introduction

On December 19th 2017 the Federal Aviation Administration (FAA) published the UAS Remote Tracking & ID ARC Report[1] to update the public about the latest results from the Aviation Rulemaking Committee (ARC) chartered by the FAA.

Within the ARC recommendation were some options for "Broadcasting" a Drone ID. This specification is designed to meet such needs expressed in the ARC Report.

This document is currently in *DRAFT* and is under a standardization process within the ASTM F38 Remote ID Workgroup. The outcome of this collaboration will most certainly result in many changes as a part of this process.

2 Related Documents

Open Drone ID – Message Specification: Contains the details of the Open Drone ID Messages that are referenced in this document.

3 Implementation Overview

As detailed in this specification, a connectionless broadcast mechanism can be implemented using WiFi as well using a similar mechanism by attaching to the standard beacons that are routinely broadcast by WiFi access points (what we ordinarily see as the SSID). This approach encodes the messages within the SSID. Just like Bluetooth, using this does not require connecting to any specific wireless network since (on the receiver) it utilizes the mechanism that simply listens for SSID broadcasts and makes the data available for display.

[1] https://www.faa.gov/news/updates/?newsId=89404

4 Transmitting Frequency

These 22 byte long messages, as defined in the *Open Drone ID Message Specification*, shall be sent by each drone beacon. Depending on whether the data is static or dynamic, the messages will be sent at a low or higher frequency (respectively).

As such, the following message frequencies shall be maintained:
Static: Every 3 seconds.
Dynamic: Every 1 second.

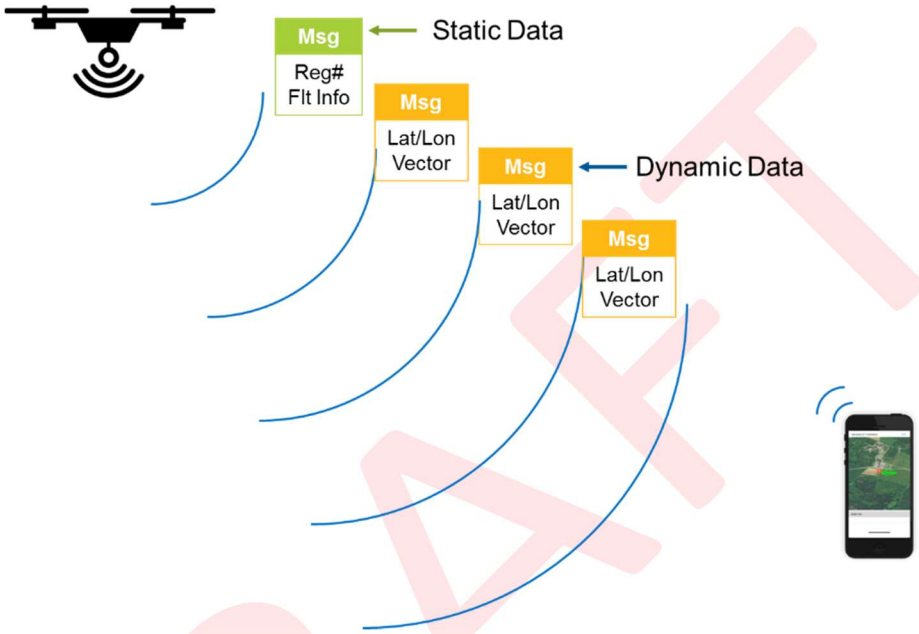
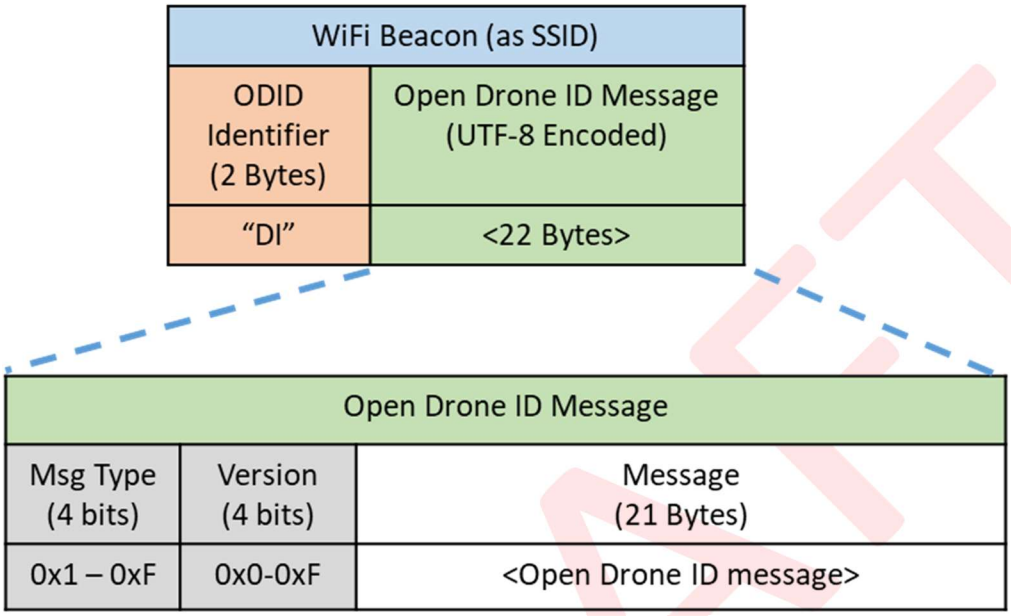


Figure 1 - Static and Dynamic Messages

5 WiFi Beacon Frames

For aircraft implementing this protocol beacon frame sent by the aircraft, a "management frame" of type "beacon" as prescribed by the *IEEE 802.11-2016 Part 11*[2] WiFi specification must be sent at the interval described in section 4 . This frame is simply and SSID broadcast that is encoded in the following way:



WiFi Beacon (as SSID)	
ODID Identifier (2 Bytes)	Open Drone ID Message (UTF-8 Encoded)
"DI"	<22 Bytes>

Open Drone ID Message		
Msg Type (4 bits)	Version (4 bits)	Message (21 Bytes)
0x1 – 0xF	0x0-0xF	<Open Drone ID message>

The details of these messages are contained in the *Open Drone ID Message Specification*.

Therefore, each message sent by the aircraft will simply appear as a SSID.

When sending multiple static frames at their prescribed interval defined in section 4, they must be sent consecutively. For example, if static messages are to be sent every 3 seconds, then at each 3 second interval, all required static messages shall be sent consecutively.

6 Compliance and Interoperability

As of this version, compliance can be "self-certified" using the following means:

1. Every "shall", "must" and any other logical directive in this document must be implemented. (See IETF RFC2119 for adopted definitions of imperatives: https://www.ietf.org/rfc/rfc2119.txt)
2. Interoperability shall be verified against "known working" clients for both BLE 4 and Bluetooth 5 Extended Advertising receivers.
3. Hardware/RF/Signal compliance TBD.
4. If a system is not compliant with this spec, then it may not claim, advertise or display references to "Open Drone ID".

[2] 802.11-2016 - IEEE Standard for Information technology--Telecommunications and information exchange between systems Local and metropolitan area networks--Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
https://ieeexplore.ieee.org/document/7786995/