Date: 11/08/2022

TO: Federal Communication Commission
7435 Oakland Mills Rd
Columbia, MD 21046

Exhibit Subject: Request for Re-use of Software Defined Radio.

We, Astronics CSC, submit this formal request to the FCC Authorization and Evaluation Division for an expedited review of a new authorization application. The purpose of this exhibit is this application includes a Software Defined Radio (SDR) from another FCC ID.

This exhibit follows guidance in ***FCC KDB 442812 D01 SDR Apps Guide V02r03*** and it provides the operational and security description of the Software Defined Radio.

1- Introduction:

Astronics CSC has created a new product called the CabinAXe Cabin Wireless Access Point (CWAP). This new product incorporates an existing certified Software Defined Radio (SDR) (manufactured by Aruba Networks) into the new CabinAXe product housing. The Astronics integration removes the complete electronics assembly from the Aruba enclosure and incorporates it without making changes to the electronics into the new CabinAXe IFE product housing.

The electronics from the certified Aruba Access Point are certified as noted:
Date of Grant: 07/29/2021
The Aruba WiFi Access Point is certified as FCC ID: Q9DAPIN0635.
Equipment Class: DTS, UNII-TX
Rule Parts: 15.247, 15.407
Frequency Range(MHz) 2400-2484
Frequency Range(MHz) 5150-5250; 5250-5350; 5470-5725; 5725-5850
Frequency Range(MHz) 5850-5895; 5925-6425; 6425-6525; 6525-6875; 6875-7.125

The Aruba electronics are integrated into the CabinAXe system with a new certification as noted:
Date of Grant: New Grant
The new Astronics CabinAXe system is being certified as FCC ID: 2AL4H-70000016.
Equipment Class: DTS, UNII-TX
Rule Parts: 15.247, 15.407

Frequency Range(MHz) 2400-2484
Frequency Range(MHz) 5150-5250; 5250-5350; 5470-5725; 5725-5850
Frequency Range(MHz) 5850-5895; 5925-6425; 6425-6525; 6525-6875; 6875-7.125

2- Explanation of Differences:

The Aruba WiFi Access Point (FCC ID: Q9DAPIN0635) electronics/PCBs and antenna(s) are removed from the housing in which the Aruba electronics are certified. The Aruba electronics/PCBs and antenna(s) are then integrated into the Astronics CabinAXe (FCC ID: 2AL4H-70000016). The antennas are located beneath a radome of the CabinAXe. The integration of the Aruba electronic assembly into the new CabinAXe host does not change any of the hardware, firmware, or software as initially certified by Aruba except for Country Roaming support.

3- Country Roaming and Worldwide operation support:

The Aruba WiFi Access Point (FCC ID: Q9DAPIN0635) only supports the US regulatory domain. Astronics CabinAXe (FCC ID: 2AL4H-70000016) supports worldwide operation.

An Aruba custom Worldwide (WW) SKU is provided to Astronics to allow the Cabin Axe radio regulatory domain to be changed based on the aircraft's geographic location Global positioning information is provided by the aircraft's avionics data bus (ARINC 429) and processed by the Network Server System (as defined by ARINC 763) that acts as the master device for controlling regulatory compliance.
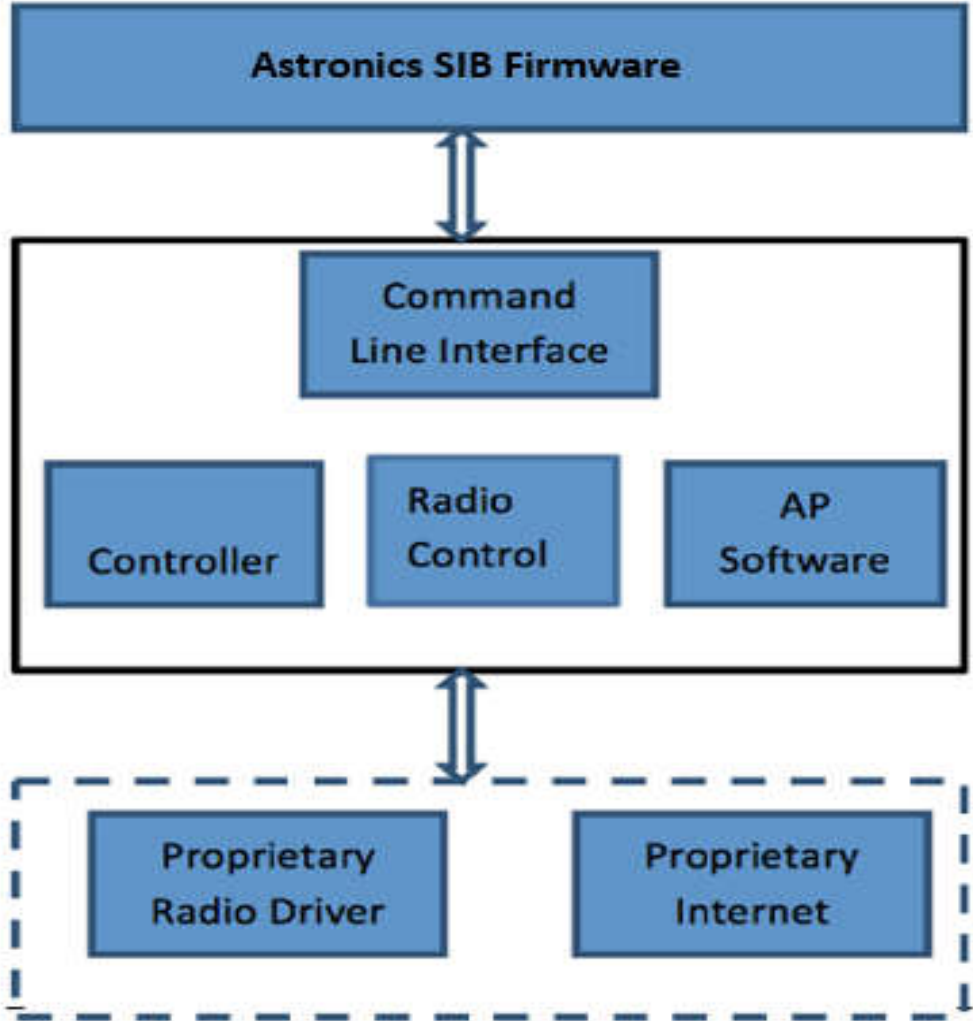
4- Reference Section:

The following table noted below provides form 731 Software Defined Radio Security Description in support of Astronics CSC submission for FCC ID 2AL4H-70000016.

Sincerely Yours,

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Form 731: Astronics CSC CabinAXe - 442812 D01 Software Defined Radio Description

1	Description Software (Section 2.944 (c))	1.1	General software operational description. **The CabinAXe Software is comprised of 3 parts. Astronics Signal Interface Board (SIB) Firmware, ArubaOS Feature Functionality, and ArubaOS Radio Control. These software components provide wireless access service to standard 802.11-compliant client devices on commercial aircraft that travel across multiple regulatory domains.** **The hardware's radio operating channel and transmission power is controlled by ArubaOS Radio Control and is based on Regulatory Domain settings. The Hardware transmission power is further limited to 20 dBm EIRP by the Astronics SIB firmware to comply with aircraft manufacturer's regulations.**
		1.2	Describe all the radio frequency parameters that are modified by the software without any hardware changes. **Transmission power and Channel Frequency are parameters that can be modified by software. The Tx Power values and allowed Channels of operation can be adjusted by the Professional Installer but are limited to values encoded in the AOS/RC. The values in the AOS/RC software are programmed to the limitations of the regulatory approvals. The Tx Power is further reduced, if required, by the Astronics SIB/FW to adhere to the 20 dBm EIRP limit.**
		1.3	High level (simplified) block diagram of the software architecture.

| 2 | Labelling | 2.1 | How is the device to be labeled? Will the device have a single label, or will it use an electronic label per Section 2.925 (e)?

 The Device will have a single label. |

| | | 2.2 | How can the FCC verify, in the field, that the correct version of the software is running in the device? Submit a description of this capability and instructions for the FCC to use in the field to verify that proper software is operating in the device.

The software version can be verified by establishing a serial connection to the unit by connecting to the maintenance port and watching the output while the unit boots-up. Please refer to the User Manual for information on establishing this connection.

During boot-up the unit displays the Astronics SIB Firmware version as shown below:

SIB: Booting firmware [part number]: 900-00071-001 [version]: 1.0.0BL1

The unit also displays the ArubaOS version as shown below:

ArubaOS Version 8.10.0.0-8.10.0.0 (build 83812 / label #83812) |
| | | 2.3 | Describe the means by which software version numbers can be related to any future Class III permissive changes. For example: v01.01 was the software version for the Initial grant. Version v17.01 was for the first Class III Change. Any Version between V01.001 to V16.99 is assumed to be representative of the equipment exhibits in the initial grant. Version V22.15 would represent the version as modified by the Class III change. Class III change.

Only Radio Control (RC) Maintenance releases will reflect Class III permissive changes. ArubaOS software releases are defined as Major, Minor, Maintenance, Patch, and Hotfix, as follows: |
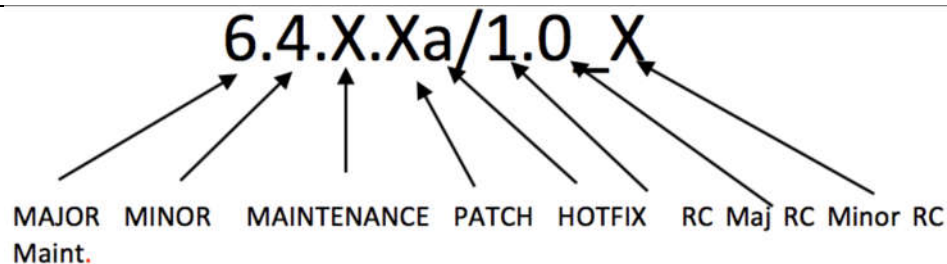
			Figure 1: Software Release Naming Convention Example · **A Major release contains significant new functionality, changes in the way configuration is performed, architectural changes, and in some cases incompatibility with previous Major releases.** · **A Minor release contains new functionality but is built on the same architecture, uses the same configuration and operating methods, and is generally compatible with the previous Major release.** · **A Maintenance release contains no or very limited new functionality and consists primarily of bug fixes. Maintenance releases go through a full quality assurance process including full regression testing.** · **A Patch release contains a small number of bug fixes or in some cases a single bug fix. Patches are issued approximately every two to four weeks and are to be used only until the next Maintenance release is shipped. Patch releases do not go through full regression testing – only the specific bug fixes in the patch receive full testing.** · **A Hotfix release (formerly known as an "emergency patch") is issued by Aruba Customer Advocacy to a specific customer to solve a high-priority network problem. Hotfix releases are built on demand and do not go through full regression testing – only the specific bug fixes in the release receive full testing.** · **Radio Control (RC) is where the radio channel and power are controlled. Like the AOS maintenance release, a Radio Control maintenance release will go through a full quality assurance process including full regression testing.**
3	Security	3.1	Describe the procedure that ensures that third parties (Professional installers, qualified personnel, authorized certified technicians, end users, etc. – not direct employees) cannot operate US sold devices on any other regulatory domain frequencies, or in any manner that is in violation of the certification.

			CabinAXe units are sold into the Aerospace industry, installed on commercial aircraft, and operated under FAA/EASA/CAA regulations.
		3.2	Explain if any third parties have the capability to operate a US sold device on any other regulatory domain frequencies, or in any manner that is in violation of the certification. **CabinAXe units support Country Roaming as required by the ARINC 763 standard. Country Roaming provides a means for the operators to switch the regulatory domain of the unit to match the aircrafts geographical position. The global positioning information is provided by the aircraft's ARINC 429 data bus and processed by the Network Server System (defined by ARINC 763) which acts as the master device for controlling regulatory compliance.**
		3.3	Describe how the software updates are distributed for all regulatory domains and what procedures ensures that a product sold in the US can only operate as granted on US frequencies and at authorized radio parameters. **N/A**
		3.4	If the product cannot be modified by third parties and can only operate as granted on US frequencies and with authorized radio parameters, explain how this is achieved. **N/A**
		3.5	What stops third parties from loading non-US versions of software onto products intended for US sale? **The CabinAXe software does not differentiate based on regulatory domain.**
		3.6	Can third parties make factory level changes to reload non-US domain codes, etc. **No third party has such ability.**
4	Unauthorized changes (hack) to the software (Section 2.944).	4.1	Describe how open source is the operating code for granted RF properties. Describe the difficulty and proprietary nature of the code that controls the RF parameters as granted.

		ArubaOS does not contain any open-source code that controls RF properties. The RF control logic is fully proprietary and the ArubaOS code is digitally signed using a X.509 certificate, which prevents it from being tampered or modified by third-party in the field.