

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AXON ENTERPRISE, INC. AND DEDRONE HOLDINGS, INC.
Petitioners

v.

AIRSPACE DEFENSE, INC.
Patent Owner

Case No. IPR2025-00525
Patent 10,713,959

**PETITIONERS' SUBMISSION REGARDING THE AUGUST 27, 2026
ORDER (PAPER 43)**

Pursuant to the Board's Order (Paper 43) dated August 27, 2026 regarding *Dental Monitoring SAS v. Align Tech.*, 2026 WL 2291181 (Fed. Cir. Aug. 10, 2026), Petitioners submit herewith a claim chart for U.S. Patent No. 10,733,894 to Beard (EX1008) ("Beard").

The enclosed chart of Appendix A demonstrates that claim 1 of Beard is supported by U.S. Provisional Application No. 62/480,031 (EX1009) (the "'031 Provisional") filed March 31, 2017. The Petition (Paper 1) and Opposition (Paper 33) demonstrated where the specific subject matter relied on in Beard was supported by the '031 Provisional. *See, e.g.* Petition, 24-39 (analysis including citations to Beard (EX1008) and parallel citations to the '031 Provisional (EX1009)); Opposition, 7-17, 24-25 (same). Beard thus qualifies as prior art to U.S. Patent No. 10,713,959 under 35 U.S.C. § 102(a)(2) as of the March 31, 2017 filing date of the '031 Provisional. *See* Opposition, 8; Petition, 7-16.

Respectfully submitted,

BAKER BOTTS L.L.P.

A handwritten signature in black ink, appearing to read "Chad C. Walters", with a stylized flourish at the end.

Chad C. Walters (Reg. No. 48,022)
Lead Counsel for Petitioners

Date: September 1, 2026

APPENDIX A

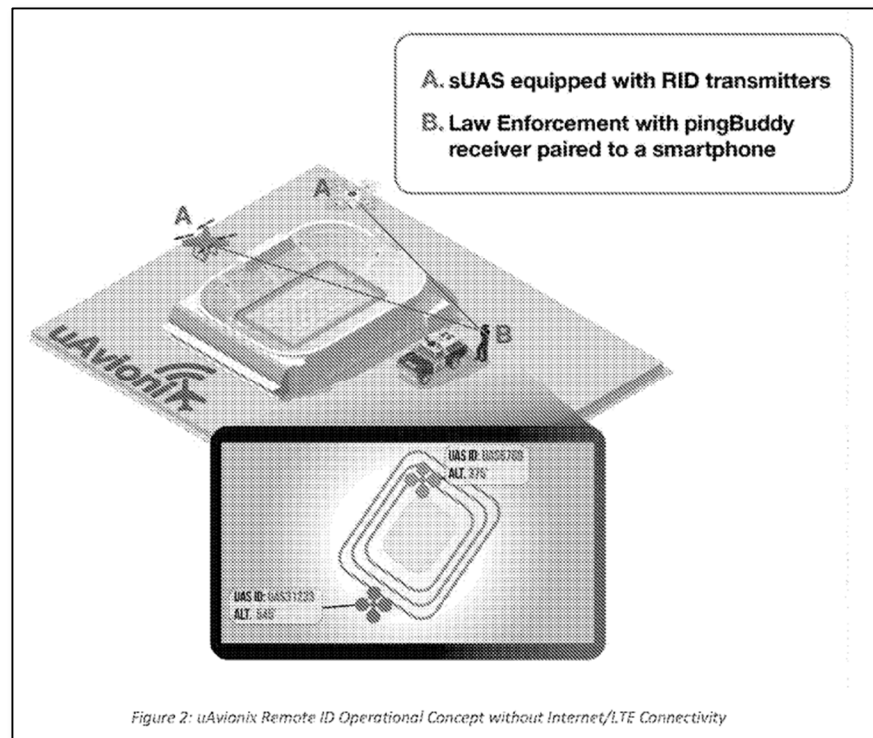
Beard (EX1008), Claim 1	U.S. Provisional Application No. 62/480,031 filed March 31, 2017 (EX1009) (the “’031 Provisional”) ¹
[1a] A direct-broadcast remote-identification (RID) apparatus attachable to an unmanned aircraft system (UAS), comprising:	The ’031 Provisional discloses a remote ID (RID) product that broadcasts position and identification information directly to a receiver, and is attachable to a sUAS aircraft, and thus supports <i>[a] direct-broadcast remote-identification (RID) apparatus attachable to an unmanned aircraft system (UAS) as claimed.</i> “The primary purpose of the RID solution is for law enforcement or security personnel to remotely identify the sUAS aircraft and operator through a number of key parameters to be transmitted from an RID transmitter onboard the sUAS and received by receivers which may be handheld, permanently mounted, onboard other aircraft, or anywhere within range of the RID transmitter.” EX1009, 17.² “Data items transmitted from the sUAS RID would include at a minimum the FAA UAS registration number and sUAS position. This concept is not unlike a license plate on a vehicle or an N-Number on an aircraft which can be used by an eyewitness of a dangerous event to provide information to law enforcement for further investigation.” EX1009, 17. “Installation options should range from solutions which are an integrated part of the sUAS "out of the box" as delivered by the sUAS OEM to those that are purchased and installed as "add on" or "aftermarket" units.” EX1009, 17. “The overall solution is architected to work with or without internet connectivity and provide maximum

¹ Bolding contained in the quoted portions is emphasis added.

² Page numbers referred to are the labeled page numbers.

flexibility and deployment options. At its core, the following components establish the basic functionality.

- 1. Airborne RID transmitter which broadcasts sUAS position and operator identifying data.**
- 2. Ground based RID receivers. Options for pocket-sized mobile receivers for roaming security personnel as well as permanently fixed receivers for persistent monitoring.**
- 3. Mobile app or apps which can operate in an internet denied or internet available environments to provide sUAS position and operator identifying information to viewer, as well as connectivity to the FAA registration database, UTM service providers, and publicly trusted TLS/SSL certificate for anti-spoofing capabilities such as AirMap's Drone ID.”** EX1009, 18.



EX1009, 18 (Figure 2, showing a “**Remote ID Operational Concept**” and direct broadcasting from RID transmitter on an sUAS to receiver).

“The following **description assumes the regulatory environment mandates RID equipment onboard the sUAS.** Depending upon the extent of the mandate and upon

	the level of integration supported by the sUAS OEM, the RID transmitter may be integrated tightly into the sUAS aircraft, or carried as a separate "stick on" solution." EX1009, 19. "The uAvionix proposal includes the ability to operate in an environment with no supporting communications infrastructure - to include LTE or internet connectivity - by providing the ability to connect to a pocket-sized mobile receiver (pingBuddy). This provides maximum flexibility for security operations." EX1009, 22. "The pingBuddy mobile receiver in its current form is a dual-frequency ADS-B receiver powered by micro-USB connector with integrated Wi-Fi for wireless connectivity to Electronic Flight Bag (EFB) applications. An updated firmware for the RID mission will frequency shift from the ADS-B frequencies to the target RID frequency." EX1009, 26. "In addition to broadcasting its own RID position and identification information, each RID device can act as a "repeater" for other RID devices which may be out of range of a ground receiver. Signals from each RID device would be intelligently rebroadcast by other airborne RID devices, extending the effective range of any ground based receiver by leveraging the airborne receivers as repeaters." EX1009, 28. "At the core of its receive/transmit (Rx/Tx) radio products is a custom-built software defined radio (SDR) which can not only operate within the ADS-B and Mode A/C/S protected aviation spectrum frequencies, but also in open industrial, scientific, and medical (ISM) radio bands applicable in the US and internationally." EX1009, 16.
--	--

[1b]

a position receiver configured to:

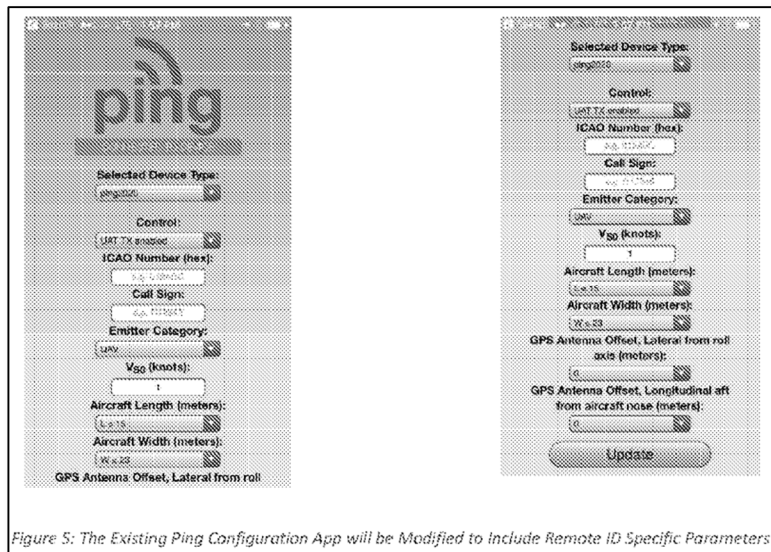
1) receive one or more satellite-based position signals via at least one antenna element; and

The '031 Provisional discloses that the RID product includes circuitry including a GPS receiver and antenna (*position receiver*), which allows the RID product to receive GPS signals from GPS satellites and determine its position (and thus the position of the sUAS the RID product is attached to), and thus supports *a position receiver configured to: 1) receive one or more satellite-based position signals via at least one antenna element* as claimed.

“Data items transmitted from the sUAS RID would include at a minimum the FAA UAS registration number and sUAS position.” EX1009, 17.

“Airborne RID transmitter which broadcasts sUAS position and operator identifying data.” EX1009, 18.

“The RID product in its base form will include the following: GPS Receiver and antenna....” EX1009, 25.



EX1009, 21 (Fig. 5, noting “GPS Antenna Offset”)

“The uAvionix RID device is both a transmitter and receiver. This enables authorized security personnel to send a signal to the RID to command the autopilot to perform any number of functions. To enable this functionality, the FAA would need to consider mandating

	"hooks" into sUAS autopilot systems to respond to remote commands which would be unable to be overridden by the operator. Examples of simple remote commands are: • Land Now • Return to Home • Hover/Orbit • Proceed to GPS Waypoint • Kill Switch All of the above commands could be implemented with simple discrete IO, with the exception of the GPS waypoint, which would require the ability to transmit a "go to" location." EX1009, 28.
[1c] [position receiver configured to:...] 2) determine, based on the received position signals and an altitude of the UAS , one or more of a) a launch position corresponding to a launch point of a UAS and b) a current position of the UAS;	The '031 Provisional discloses that the RID product includes the circuitry including the GPS receiver and antenna (<i>position receiver</i>) that implements a "return to home" mode that would have included determining a "home" position of the RID product (and thus the attached sUAS) from which the sUAS launches from at the beginning of its flight (<i>a launch position corresponding to a launch point of a UAS</i>). As an additional example, when the sUAS is in flight and the "return to home" mode is initiated, the circuitry including the GPS receiver and antenna (<i>position receiver</i>) determines a first position of the RID product (and thus the attached sUAS) from which the sUAS will launch from to go home (<i>a launch position corresponding to a launch point of a UAS</i>) and whether that first position is different from the instructed home position. As another example, the circuitry including the GPS receiver and antenna (<i>position receiver</i>) implements "proceed to GPS waypoint" functionality, which would have included determining an original position of the RID product (and thus the attached sUAS) (<i>a launch position corresponding to a launch point of a UAS</i>) and whether that original position is different from the instructed GPS waypoint position. In the "return to home" mode and "proceed to GPS waypoint" mode examples, the home position, first position, and original position would each be in terms of the "longitude, latitude, and altitude" of the

sUAS and be based on the received GPS signals and measured altitude of the sUAS. The circuitry including the GPS receiver and antenna (*position receiver*) also determines a current position of the RID product that is “longitude, latitude, and altitude” of the sUAS, and that is based on the received GPS signals and measured altitude of the sUAS. The ’031 Provisional thus supports the *position receiver configured to: ...2) determine, based on the received position signals and an altitude of the UAS, one or more of a) a launch position corresponding to a launch point of a UAS and b) a current position of the UAS as claimed.*

See element [1b].

“The following **description assumes the regulatory environment mandates RID equipment onboard the sUAS.** Depending upon the extent of the mandate and upon the level of integration supported by the sUAS OEM, **the RID transmitter may be integrated tightly into the sUAS aircraft, or carried as a separate "stick on" solution.**” EX1009, 19.

“The **RID product** in its base form will **include the following: GPS Receiver and antenna...Integrated barometer for approximate height above launching point.**” EX1009, 25.

“The uAvionix RID device is both a transmitter and receiver. This enables authorized security personnel to send a signal to the RID to command the autopilot to perform any number of functions. To enable this functionality, the FAA would need to consider mandating "hooks" into sUAS autopilot systems to respond to remote commands which would be unable to be overridden by the operator. Examples of simple remote commands are: • Land Now • **Return to Home** • Hover/Orbit • **Proceed to GPS Waypoint** • Kill Switch All of the above commands could be implemented with simple discrete IO, **with the exception of the GPS waypoint, which would require the ability to transmit a "go to" location.**” EX1009, 28.

	“The RID will transmit at a minimum the sUAS registration number and position data (latitude, longitude, altitude) of the sUAS and optionally a TIS/SSI. AirMap Drone ID signature that can be used for source validation.” EX1009, 19. “Data items transmitted from the sUAS RID would include at a minimum the FAA UAS registration number and sUAS position.” EX1009, 17. “Airborne RID transmitter which broadcasts sUAS position and operator identifying data.” EX1009, 18.
[1d] barometer configured to determine the altitude of the UAS;	The '031 Provisional discloses that the RID product includes a barometer that determines height of an sUAS above a launching point and thus supports a <i>barometer configured to determine the altitude of the UAS</i> as claimed. “The following description assumes the regulatory environment mandates RID equipment onboard the sUAS. Depending upon the extent of the mandate and upon the level of integration supported by the sUAS OEM, the RID transmitter may be integrated tightly into the sUAS aircraft, or carried as a separate "stick on" solution.” EX1009, 19. “The RID will transmit at a minimum the sUAS registration number and position data (latitude, longitude, altitude) of the sUAS and optionally a TIS/SSI. AirMap Drone ID signature that can be used for source validation.” EX1009, 19. “The RID product in its base form will include the following: GPS Receiver and antenna...Integrated barometer for approximate height above launching point.” EX1009, 25.

[1e] a memory coupled to the position receiver and capable of storing configuration data, the configuration data including a unique identifier corresponding to the UAS; and	The '031 Provisional discloses that the RID product includes a memory (<i>memory</i>) as well as the circuitry including the GPS receiver and antenna (<i>position receiver</i>), which provides that the memory is coupled to the circuitry (<i>memory coupled to the position receiver</i>). The memory stores configuration data including sUAS identification information, such as FAA registration ID, that an operator or user inputs via an application user interface. The '031 Provisional thus supports <i>a memory coupled to the position receiver and capable of storing configuration data, the configuration data including a unique identifier corresponding to the UAS</i> as claimed. See elements [1b] and [1c]. “The RID product in its base form will include the following: ...Persistent memory for configuration storage....” EX1009, 25. “The configuration application is produced by uAvionix and is used currently to program user specific configurations into uAvionix transmitting devices. Each device (including the proposed RID) includes a Wi-Fi hotspot capability. Upon connecting to the hotspot using an iOS or Android device, the user launches the "Ping" app which provides the capability to configure aircraft and pilot specific parameters as required. Upon entering the configuration data and selecting "Update" — the device is programmed with the configuration data which is stored in non-volatile memory for persistent storage.” EX1009, 20. “The following description assumes the regulatory environment mandates RID equipment onboard the sUAS. Depending upon the extent of the mandate and upon the level of integration supported by the sUAS OEM, the RID transmitter may be integrated tightly into the sUAS aircraft, or carried as a separate "stick on" solution. Prior to the operation, the sUAS operator will configure the identifying information into the RID through the use of
--	---

an app. Figure 5 is a screenshot of an existing configuration app for uAvionix products which connects via Wi-Fi hotspot to the device for parameter configuration. The fields in the app shown in the screenshot would be adapted to the appropriate fields for the RID device. The RID will transmit at a minimum the sUAS registration number and position data (latitude, longitude, altitude) of the sUAS and optionally a TIS/SSI. AirMap Drone ID signature that can be used for source validation.” EX1009, 19.

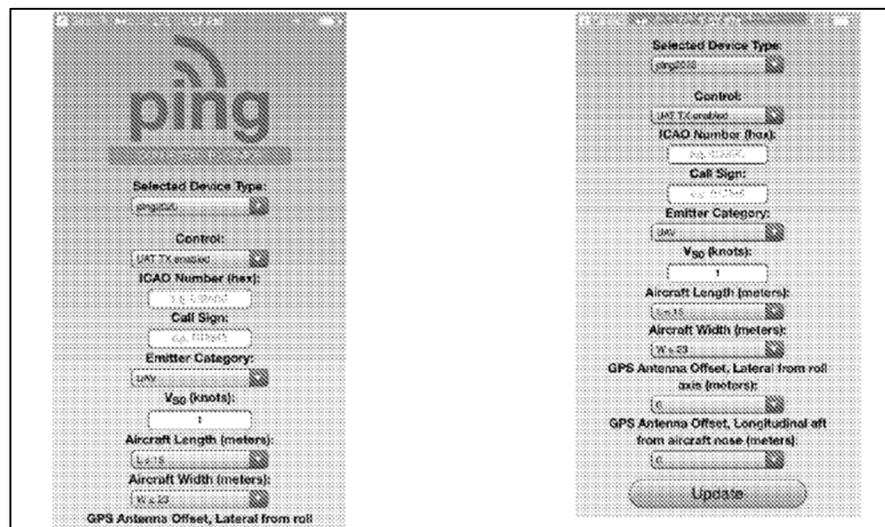


Figure 5: The Existing Ping Configuration App will be Modified to Include Remote ID Specific Parameters

EX1009, 20 (Fig. 5) (showing entry of call sign and also noting the app will be “**modified to include remote ID specific parameters**” where such parameters are “FAA registration ID” and “digital signature” as noted below)

“When in standalone mode, **only data received from the RID transmissions within range of the connected mobile app is available**. This would include **all parameters determined to be appropriate for the RID transmission, including at a minimum the FAA registration ID, digital signature, and position information of the sUAS.**” EX1009, 21.

[1f] a transceiver coupled to the position receiver and the memory, the transceiver including one or more processors and a radio frequency (RF) transmitter configured to:	The '031 Provisional discloses that the RID product includes a software defined transmit/receive radio that would have been executed by a processor (<i>transceiver</i>), the circuitry including the GPS receiver and antenna (<i>position receiver</i>), and the memory (<i>memory</i>), and these components are thus coupled to each other. The software defined transmit/receive radio executed by a processor (<i>transceiver</i>) includes the processor and, because it includes a transmit radio, a radio frequency (RF) transmitter. The '031 Provisional thus supports <i>a transceiver coupled to the position receiver and the memory, the transceiver including one or more processors and a radio frequency (RF) transmitter</i> as claimed. See elements [1b], [1c], and [1e]. “The RID product in its base form will include the following: ...10 mW (suggested) Transmit/Receive radio on TBD frequency....” EX1009, 25. “At the core of its receive/transmit (Rx/Tx) radio products is a custom-built software defined radio (SDR) which can not only operate within the ADS-B and Mode A/C/S protected aviation spectrum frequencies, but also in open industrial, scientific, and medical (ISM) radio bands applicable in the US and internationally.” EX1009, 16. “uAvionix ADS-B equipment currently operates within the protected aviation spectrum for ADS-B in both the 978MHz and 1090MHz frequency ranges. However, the underlying software defined radio at the core of uAvionix technology has some limited ability to frequency shift into other bands. (See also Section 6.1 regarding an option for an ADS-B only based solution.)” EX1009, 23.
--	--

[1g] [the transceiver including...a radio frequency (RF) transmitter configured to:] 1) encode at least one identifier signal based on one or more of the launch position, the current position, and the configuration data; and	The '031 Provisional discloses that the transmit radio (<i>radio frequency (RF) transmitter</i>) forms a signal to transmit that includes the FAA UAS registration ID of the sUAS and position data of the sUAS (<i>encode at least one identifier signal</i>). The position data of the sUAS includes the latitude, longitude, and altitude of the sUAS that is the current position of the sUAS, as well as the launch position of the sUAS when it is proceeding from that position in “Return to Home” mode or “Proceed to GPS Waypoint” mode. The FAA UAS registration ID is part of configuration data stored in memory. Additionally, the software defined transmit/receive radio that would have been executed by a processor (<i>transceiver</i>) includes the transmit radio (<i>radio frequency (RF) transmitter</i>) so thus also performs the above discussed functionality. The '031 Provisional thus supports thus supports <i>the transceiver including...a radio frequency (RF) transmitter configured to: 1) encode at least one identifier signal based on one or more of the launch position, the current position, and the configuration data</i> as claimed. See elements [1b], [1c], [1e], and [1f]. “The RID will transmit at a minimum the sUAS registration number and position data (latitude, longitude, altitude) of the sUAS and optionally a TIS/SSI. AirMap Drone ID signature that can be used for source validation.” EX1009, 19. “The uAvionix RID device is both a transmitter and receiver. This enables authorized security personnel to send a signal to the RID to command the autopilot to perform any number of functions. To enable this functionality, the FAA would need to consider mandating "hooks" into sUAS autopilot systems to respond to remote commands which would be unable to be overridden by the operator. Examples of simple remote commands are: • Land Now • Return to Home • Hover/Orbit • Proceed to GPS Waypoint • Kill Switch All of the above commands could be implemented with simple discrete IO, with the exception of the GPS waypoint, which
---	---

	would require the ability to transmit a "go to" location.” EX1009, 28. “Data items transmitted from the sUAS RID would include at a minimum the FAA UAS registration number and sUAS position.” EX1009, 17. “Airborne RID transmitter which broadcasts sUAS position and operator identifying data.” EX1009, 18. “When in standalone mode, only data received from the RID transmissions within range of the connected mobile app is available. This would include all parameters determined to be appropriate for the RID transmission, including at a minimum the FAA registration ID, digital signature, and position information of the sUAS.” EX1009, 21. “The RID product in its base form will include the following: GPS Receiver and antenna...Integrated barometer for approximate height above launching point.” EX1009, 25.
1[h] [the transceiver including...a radio frequency (RF) transmitter configured to:] 2) transmit the at least one encoded identifier signal at one or more operating frequencies.	The '031 Provisional discloses that the transmit radio (<i>radio frequency (RF) transmitter</i>) transmits the signal that includes the FAA UAS registration ID of the sUAS and position data of the sUAS (<i>encoded identifier signal</i>) at a frequency. Additionally, the software defined transmit/receive radio that would have been executed by a processor (<i>transceiver</i>) includes the transmit radio (<i>radio frequency (RF) transmitter</i>) so thus also performs the above discussed functionality. The '031 Provisional thus supports thus supports <i>the transceiver including...a radio frequency (RF) transmitter configured to:...2) transmit the at least one encoded identifier signal at one or more operating frequencies</i> as claimed. See elements [1b], [1c], [1e], [1f], and [1g].

“The RID product in its base form will include the following: ...10 mW (suggested) Transmit/Receive radio on TBD frequency....” EX1009, 25.

“At the core of its receive/transmit (Rx/Tx) radio products is a custom-built software defined radio (SDR) which can not only operate within the ADS-B and Mode A/C/S protected aviation spectrum frequencies, but also in open industrial, scientific, and medical (ISM) radio bands applicable in the US and internationally.” EX1009, 16.

“uAvionix ADS-B equipment currently operates within the protected aviation spectrum for ADS-B in both the 978MHz and 1090MHz frequency ranges. However, the underlying software defined radio at the core of uAvionix technology has some limited ability to frequency shift into other bands. (See also Section 6.1 regarding an option for an ADS-B only based solution.)” EX1009, 23.

“uAvionix recommends the following two options for frequency usage. Both options offer superior free space path performance and obstacle penetration.

5.5.1 Repurposing Distance Measuring Equipment (DME) Lower Bands

Distance Measuring Equipment (DME) are navigation aids used by manned aircraft. Recent discussions with FAA indicate that there may be an opportunity to repurpose a subset of the DME frequency bands for UAS surveillance. **This has a precedent, as a similar repurposing was undertaken for 978MHz Universal Access Transceiver (UAT) ADS-B technology. The primary advantage for this recommendation is the selected frequencies can remain in the "aviation protected spectrum" range and remain under the purview of the FAA for enforcement of infringements. uAvionix can easily adopt current receivers to the 960MHz to 1090MHz range, with better performance at the low end.**

5.5.2 TV White Space

White Spaces refer to frequencies allocated to a broadcasting service but are not used locally. This can be due to lack of TV or radio stations assigned specific frequencies in a region, or due to freed spectrum as a result of technical changes (such as the switch to digital television). A TV White Space database, or geolocation database — provides frequencies that are available for use in a specific geographic location. **The advantage to this solution is that the geolocation database is a known entity within the industry and the frequencies are freely available without requiring a spectrum license.** The disadvantage is that it adds complexity to the overall solution in that the RID device would "frequency hop" based upon its location, and a mechanism would be required to update the database whenever changes are made.

5.5.3 Other Less Desirable Options

The following are other frequency options that have stated limitations:

- **315MHz and 433MHz are legacy ISM bands used for garage door openers and keyless entry systems.**
- **915MHz is an ISM band principally used for cordless landline phones.**
- **Any frequency above 1GHz will have multipath and fading issues due to the short wavelength, and requires line of sight (LOS).**

It is expected that further discussion would be required with FAA and FCC regarding which frequency would be most desired.” EX1009, 23-24.

“The following description assumes the regulatory environment mandates RID equipment onboard the sUAS. Depending upon the extent of the mandate and upon the level of integration supported by the sUAS OEM, the RID transmitter may be integrated tightly into the sUAS aircraft, or carried as a separate "stick on" solution. Prior to the operation, the **sUAS operator will configure the identifying information into the RID through the use of an app.** Figure 5 is a screenshot of an existing configuration app for uAvionix products which connects via **Wi-Fi hotspot to the device for parameter**

configuration. The fields in the app shown in the screenshot would be adapted to the appropriate fields for the RID device. The RID will transmit at a minimum the sUAS registration number and position data (latitude, longitude, altitude) of the sUAS and optionally a TIS/SSI. AirMap Drone ID signature that can be used for source validation.” EX1009, 19.

“The primary purpose of the **RID solution** is for law enforcement or security personnel to remotely identify the sUAS aircraft and operator through **a number of key parameters to be transmitted from an RID transmitter onboard the sUAS and received by receivers which may be handheld, permanently mounted, onboard other aircraft, or anywhere within range of the RID transmitter.**” EX1009, 17.

“Data items transmitted from the sUAS RID would include at a minimum the FAA UAS registration number and sUAS position. This concept is not unlike a license plate on a vehicle or an N-Number on an aircraft which can be used by an eyewitness of a dangerous event to provide information to law enforcement for further investigation.” EX1009, 17.

“The proposed solution utilizes existing uAvionix hardware solutions which are fielded at TRL 9 to include both airborne and ground components. **Software/firmware updates are required to shift communications into an ISM frequency band and configure the transmitted data "payload".** However, such software modifications are minor and the software/firmware is assessed to be at TRL 8.” EX1009, 22.

“Much like the airborne component, the ground component consists of existing uAvionix product hardware repurposed with updated firmware **to meet the RID mission and frequency.**” EX1009, 26.

“The pingBuddy mobile receiver in its current form is a **dual-frequency ADS-B receiver** powered by micro-USB

	connector with integrated Wi-Fi for wireless connectivity to Electronic Flight Bag (EFB) applications. An updated firmware for the RID mission will frequency shift from the ADS-B frequencies to the target RID frequency. pingBuddy is small enough to fit in the pocket or glove compartment of every police cruiser.” EX1009, 26. “6.1 Low Power ADS-B Only Solution The use of low power ADS--B as the Remote ID protocol and frequency itself has significant merit. Rather than shifting to another frequency, remaining in the ADS-B spectrum (particularly 978MHz UAT) significantly increases safety benefits due to interoperability with manned aviation.” EX1009, 27.
--	--

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 1st day of September, 2026, **PETITIONERS' SUBMISSION REGARDING THE AUGUST 27, 2026 ORDER (PAPER 43)** was served by email on the following counsel for Patent Owner:

swadekar@princelobel.com

alesperance@princelobel.com

mvella@princelobel.com

jhall@princelobel.com

msaunders@princelobel.com

airspacedrone@princelobel.com

Respectfully submitted,

BAKER BOTTS L.L.P.



Chad C. Walters (Reg. No. 48,022)
Lead Counsel for Petitioners

Date: September 1, 2026

2001 Ross Ave., Suite 900
Dallas, TX 75201-2980
Phone: (214) 953-6511
Fax: (214) 661-4511
chad.walters@bakerbotts.com