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. IPR2025-00530
Patent 10,249,199

PETITIONERS' OPPOSITION TO PATENT OWNER'S NON-CONTINGENT MOTION TO AMEND

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LIST OF EXHIBITS

Ex. No.[1]	Description
1001	U.S. Patent No. 10,249,199 to Banga, "System and Method for Aerial System Discrimination and Action" (the "'199 Patent")
1002	File History for U.S. Patent No. 10,249,199
1003	Declaration of Dr. Girish Chowdhary
1004	Complaint for Patent Infringement, *Airspace Systems, Inc. v. Dedrone Holdings, Inc.*, Case No. 1-24-cv-01625 (E.D. VA), September 16, 2024
1005	U.S. Patent Application Publication No. 2019/0003807 to Whitmarsh *et al*., "UAV Defense System," ("*Whitmarsh*") filed December 8, 2016 and published January 3, 2019
1006	U.S. Provisional Application No. 62/267,393 to Whitmarsh *et al.*, "UAV Defense System," ("*Whitmarsh Provisional*"), filed December 15, 2015
1007	U.S. Patent Application Publication No. 2007/0239986 to Viggiano *et al.*, "Secure ADS-B Authentication System and Method," ("*Viggiano*") filed April 7, 2006 and published October 11, 2007
1008	U.S. Patent Application Publication No. 2016/0023760 to Goodrich, "Systems and Methods Countering an Unmanned Aerial Vehicle," ("*Goodrich*") filed July 16, 2015 and published January 28, 2016
1009	U.S. Patent No. 10,733,894 to Beard et al., "Direct-broadcast Remote Identification (RID) Device for Unmanned Aircraft Systems (UAS)," filed February 26, 2018 and issued August 4, 2020
1010	U.S. Provisional Application No. 62/209/221 to Beard, "Automatic Dependent Surveillance Broadcast Transmission within Whitespace," filed August 24, 2015

[1] Citations to patents are made by column and line cite; citations to patent publications are made by paragraph number; citations to Exhibit 1002 are made with reference to the Bates-stamped pagination; citations to other exhibits are made to the page number of the document itself.

1011	U.S. Patent No. 9,805,238 to Falk *et al*., "System for Identifying and Controlling Unmanned Aerial Vehicles," ("*Falk*") filed July 11, 2016 and issued October 31, 2017
1012	U.S. Provisional Application No. 62/301,858 to *Falk*, "System for Identifying and Controlling Unmanned Aerial Vehicles," ("*Falk Provisional*"), filed March 1, 2016
1013	Claim Listing of Challenged Claims
1014	Kayton, Myron and Fried, Walter, *Avionics Navigation Systems*, John Wiley and Sons, 1997.
1015	International Publication No. WO2016/154949 A1 to Gong *et al.*, "Authentication Systems and Methods for Generating Flight Regulations," filed March 31, 2015 and published October 6, 2016
1016	International Publication No. WO2015/043123 A1 to Wang *et al*., "Data Communication Systems and Methods," filed January 14, 2014 and published April 2, 2015
1017	Burnside, Joseph E., "ADS-B Out: 978 UAT Or 1090ES?," AviationSafety Magazine, published March 15, 2016.
1018	Nichols, Randall et al., *Counter Unmanned Aircraft Systems Technology and Operations*, New Prairie Press, 2020
1019	Austin, Reg, *Unmanned Aircraft Systems, UAVS Design, Development and Deployment*, Wiley, John Wiley and Sons, 2010
1020	Stipulation email on May 29, 2025
1021	Second Declaration of Dr. Girish Chowdhary
1022	International Publication No. WO2016/161637 to Gong et al., "Method, Apparatus and System of Providing Communication Coverage to an Unmanned Aerial Vehicle," filed April 10, 2015 and published October 13, 2016 ("Gong637")
1023	Transcript of Deposition of Dr. Nikolaos Papanikolopoulos

I. INTRODUCTION

The Petition challenges claims 1-9 ("Original Claims") of U.S. Patent No. 10,249,199 (the "'199 Patent"). Petition (Paper 13, "Pet.") at 10. In its Non-Contingent Motion to Amend (Paper 15, "MTA"), Patent Owner ("PO") replaces the Original Claims with new claims 10-18 ("Substitute Claims"). MTA at 1, 3-18. But the Substitute Claims are improper as they impermissibly enlarge claim scope, lack written description support, are indefinite, and are unpatentable in view of the prior art raised herein. PO's MTA should be denied.

II. PATENT OWNER HAS NOT MET ITS BURDEN TO SHOW IT IS ENTITLED TO AMEND ITS CLAIMS

A. The Substitute Claims Impermissibly Enlarge Claim Scope

A Motion to Amend "may not enlarge the scope of the claims." 35 U.S.C. § 316(d)(3). A "claim that does not include a limitation present in the original patent claims is broader in that respect," and for a claim that is broadened in certain aspects, an "amendment is improper even if, in other aspects, the substitute claim is narrower than the original claim." *Sisvel Int'l S.A. v. Sierra Wireless, Inc.*, 81 F.4th 1231, 1240-41 (Fed. Cir. 2023); *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 6-8 (PTAB Feb. 25, 2019) (precedential). PO amended the claims such that substitute dependent claim 18 (original dependent claim 9) now depends directly on substitute independent claim 10 rather than on intervening substitute dependent claim 17 (original dependent claim 8). MTA at 17. This amendment impermissibly

broadens substitute dependent claim 18 because the claim no longer requires "a control system for controlling the disruption system" as recited by substitute dependent claim 17 (original dependent claim 8). *Id.*; EX1021, ¶42. Regardless of whether PO narrowed other aspects of claim 18, the amendment is improper as this aspect was broadened. *Sisvel* at 81 F.4th 1240-41. Thus, the MTA should be denied.

B. The Substitute Claims Lack Written Description Support

The MTA should be denied because all Substitute Claims improperly add new subject matter. *Lectrosonics, Inc.*, IPR2018-01129, Paper 15 at 6-8; *L.A. Biomedical Rsch. Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly & Co.*, 849 F.3d 1049, 1057 (Fed. Cir. 2017) ("*L.A. Biomed*"); 35 U.S.C. §316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii). The written description must "reasonably convey" to a POSITA that the inventor had possession on the claimed priority date of each limitation of the later-claimed subject matter. *L.A. Biomed*, 849 F.3d at 1057. It is not enough that an earlier application's disclosure "renders the later-claimed invention obvious" because "the disclosure must describe the claimed invention with all its limitations." *Id.*

PO asserts that it demonstrates written description support by string citing to alleged "relevant portions" of the '199 Patent's underlying application—U.S. Patent Application No. 15/598,303 (the "'303 App.") (EX2002)—as well as the "corresponding portions" of U.S. Provisional Application No. 62/309,838 (the "'838 Prov.") (EX2003) and the '199 Patent itself (EX1001). MTA at 2 (FN2). But the

PO's string-cited portions do not demonstrate support for the Substitute Claims, and the PO's accompanying commentary regarding these portions not only mischaracterizes the disclosures but fails to adequately explain how the cites support the substitute limitations. PO thus has not met its burden, and the Substitute Claims lack written description support. *B.E. Tech., L.L.C. v. Google, Inc.*, 2016 WL 6803057, at *7 (Fed. Cir. Nov. 17, 2016) (patent owner had not met its burden by "only provid[ing] a string citation…without explaining how those various pages supported each of the proposed substitute limitations"). The MTA should be denied.

1. Independent Substitute Claim 10: [10.d]

Element [10.d] recites "wherein the identification receiver is configured to receive the aerial system identifier signal <u>and a second factor identifier associated with the aerial system</u>" (underlining showing newly added claim terms). MTA at 6-7. PO has not demonstrated written description support for this element.

PO first refers to its analysis of "element [10.b]" as alleged support, stating that it "disclos[es] the identification receiver receives from the identifier transmission system broadcast signals that include the aerial system identifier signal and the secondary / second factor." MTA at 6. But the portions cited for element [10.b] do not disclose this. Indeed, the '199 Patent does not describe any broadcast signals received from "the identifier transmission system" that include an "aerial system identifier signal and the secondary / second factor." *See* EX2002 at 4:15-24

(EX1001 at 2:57-3:3) (describing transmissions from "first and second transmission system" where a "first transmission system" is a "WiFi chipset" and a "second transmission system" is an "optical signal generator (e.g., a blinking LED)"). EX1021, ¶44. Instead, the analysis of element [10.b] cites to disclosures that describe an "identification system" that receives an "identifier signal 300" and how generic "broadcast signals" are received by the identification system. MTA at 5 (element [10.b], citing EX2002 at 2:18-20, 3:3-6, 8:7-8, 8:16-9:1, Figs. 1, 6; EX2003, ¶¶12, 13, 29, 30-32, Figs. 1, 6; EX1001, 1:60-63, 2:5-10, 4:44-46, 4:57-5:2, Figs. 1, 6). None of the disclosures provide details regarding the reception of both an "aerial system identifier signal" and a "second factor identifier," let alone an "identification receiver" that is configured to "receive the aerial system identifier signal **and a second factor identifier associated with the aerial system**" as claimed (emphasis added). EX1021, ¶44. The [10.b] analysis does not demonstrate support for [10.d].

The other portions cited by the PO for element [10.d] do not fare any better. Just like for element [10.b], PO points again to EX2002 at 8:16-9:1 and Figure 6, EX2003 at ¶¶30-32 and Figure 6, and EX1001 at 4:57-5:2 and Figure 6, but these sections do not support element [10.d] as noted previously. And the additional citations to EX2002 at 9:13-17 and 28:8-9, EX2003 at ¶59, and EX1001 at 5:20-27 and 14:60-64 do not support element [10.d], because they only describe reception by a receiver of a signal that is "interpreted" into an "aerial system identifier 310"

using, for example, “decryption.” MTA at 6-7. These citations say nothing about the receiver receiving an aerial system identifier and additionally receiving a “second factor identifier,” and thus do not support an “identification receiver” that is configured to “receive the aerial system identifier signal **and a second factor identifier associated with the aerial system**” as claimed. EX1021, ¶45.

PO provides commentary at the end of the element [10.d] analysis that purports to summarize PO’s cited sections, but it is wrong. MTA at 7. PO states that “[t]he ’303 App. and the '838 Prov. each [] teaches that the identification receiver receives ‘information broadcast by the aerial system’ and ‘broadcast signals from an aerial system,’ **which include the secondary / second factor identifier that is included in, and is thus associated with, the aerial system**.” *Id.* (emphasis added). But nothing in the cited portions of the ’303 App., the '838 Prov., or the ’199 Patent describe signals that include a “secondary / second factor identifier that is included in, and is thus associated with, the aerial system,” and PO provides no further explanation for where support can be found. Similarly, PO asserts that the ’199 Patent describes “determining the identifier includes ‘verifying the authenticity’ of the aerial system identifier, which is accomplished using the second factor identifier.” *Id.* Yet again, the cited portions say nothing about using a “second factor identifier” in this manner, and PO has not provided any explanation or citations that support its assertion. EX1021, ¶46.

Element [10.d] further lacks written description because the claim places no restriction on where the "second factor identifier associated with the aerial system" is "receive[d]" from—effectively claiming that it can be received from *anywhere*. MTA at 6-7; EX1021, ¶47. The specification is not so broad. *Id.* The only reference in the specification to a "second factor identifier" is found in EX2002 at 4:15-24, but this section requires that it is transmitted by a "second identifier transmission system." EX1021, ¶47. This narrow disclosure thus does not provide adequate written description support for the "second factor identifier" of element [10.d] that effectively can be received from *anywhere*. *ICU Medical, Inc. v. Alaris Medical Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009) (finding claim lacked written description where the specification described all embodiments as having a "spike" and the amended claim omitted the "spike"). PO has thus failed to demonstrate that element [10.d] has sufficient written description support.

2. Independent Substitute Claim 10: [10.e1]

Element [10.e1] recites "wherein the identification system is configured to determine and verify an authenticity of the aerial system identifier of the aerial system identifier signal using the second factor identifier, and to provide an authenticated aerial system identifier of the aerial system identifier signal when the authenticity has been determined and verified." MTA at 7-8. PO has not demonstrated written description support for this element. PO cites to EX2002 at

30:17-18, 30:24-31:1, and 4:15-20, EX2003 at ¶¶14 and 66, and EX1001 at 2:57-64, 16:6-8, and 16:17-18 as alleged support, but none of these sections support the claimed subject matter. *Id.*; EX1021, ¶48.

For example, element [10.e1] recites an "identification system is configured to **determine and verify an authenticity** of the aerial system identifier of the aerial system identifier signal **using the second factor identifier**." MTA at 7-8. None of the cited sections support this. EX1021, ¶49. EX1001 at 16:6-7 states that "[d]etermining an aerial system identifier 310 can optionally include verifying the authenticity of the aerial system identifier 310"—i.e., the determining of an ***identifier*** (not determining an "authenticity") can include verifying authenticity of the identifier—but PO has not shown that EX1001 (or the other cited exhibits) describe separate steps of "determin[ing]" an authenticity and separately "verify[ing]" an authenticity, let alone doing such "determin[ing]" and "verify[ing]" of authenticity using a "second factor identifier" as claimed.

For the same reasons, the citations do not support "to provide an **authenticated aerial system identifier** of the aerial system identifier signal **when the authenticity has been determined *and* verified**" of element [10.e1]. They do not describe to "determine" and "verify" **authenticity** an aerial system identifier using a "second factor identifier" as discussed. No disclosure of "provid[ing] an authenticated aerial system identifier" exists in the portions. EX1021, ¶¶50-51.

3. Independent Substitute Claim 10: [10.e2], [10.f], [10.g]

Elements [10.e2], [10.f], and [10.g] each recite "the authenticated aerial system identifier," referring to the previously recited "authenticated aerial system identifier" of element [10.e1]. As discussed with respect to element [10.e1], PO has not demonstrated written description support for the "authenticated aerial system identifier" of element [10.e1]. Section II.A.2, *supra*. The citations provided by PO with respect to elements [10.e2], [10.f], and [10.g] also do not support this term. MTA at 8-12; EX1021, ¶52. For example, EX2002 at 9:20-22 states that the chipset 608 "sends the *raw or processed signal* to the permissions module 103 for permissions determination, but that does not provide sufficient support for providing the "*authenticated* aerial system identifier" to the permissions module as claimed. As another example, EX2002 at 9:13-17 states that the chipset 608 "interprets the signal 300 into the aerial system identifier 310," but that again does not mean it provides the "*authenticated* aerial system identifier" to the permissions module. Nor does the bare description at EX2002 at 9:13-17 of "[d]etermining an aerial system identifier 310 can optionally include verifying the authenticity of the aerial system identifier 310" provide support for "providing the *authenticated* aerial system identifier to the permissions module." As such, PO has not demonstrated written description support for at least "the authenticated aerial system identifier" of elements [10.e2], [10.f], and [10.g]. EX1021, ¶52.

Element [10.g] is unsupported for an additional reason. As amended, this element requires "a disruption system configured to disrupt an operation of the aerial system (i) when it is determined by the permission module that the aerial system associated with the authenticated aerial system identifier of the aerial system identifier signal is not permitted to be in an airspace." MTA at 8-12. But none of the cited portions support disrupting operation of an aerial system associated with an authenticated aerial system identifier. EX1021, ¶53. Rather, each of the cited portions relate to disrupting "unauthorized" aerial systems or aerial systems that lack "permissions," not *authenticated* ones. *Id.*; *See, e.g.*, EX2002 at 3:10-17 (disruption system "automatically activated" for "unauthorized" UAV). Far from disrupting *authenticated* aerial systems, the cited portions in fact *disable* the disruption system when a UAV is "authorized." *Id*. In short, there is no disclosure of first authenticating a UAV and then disrupting it. Element [10.g] lacks support for this additional reason.

4. Dependent Substitute Claims 11-18

As independent substitute claim 10 has no written description support, dependent substitute claims 11-18 also do not have support. EX1021, ¶54.

III. THE SUBSTITUTE CLAIMS ARE UNPATENTABLE

A. Substitute Claims 10-18 are Indefinite

The Substitute Claims are indefinite because, light of the specification and prosecution history, they "fail to inform, with reasonable certainty," POSITAs about the scope of the invention" and do not provide "objective boundaries" for POSITAs.

Nautilus, Inc. v. Biosig Instruments, Inc., 134 S. Ct. 2120, 2124 (2014); *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014).

1. Independent Substitute Claim 10: Element [10.d]

Element [10.d] recites "wherein the identification receiver is configured to receive the aerial system identifier signal and a second factor identifier associated with the aerial system." MTA at 6-7. This renders substitute claim 10 indefinite for several reasons. It is unclear from the claims, specification, and prosecution history what a "second factor" identifier entails or what makes an identifier a "second factor" identifier. EX1021, ¶55. The ambiguity renders the claim indefinite.

Additionally, "a second factor identifier associated with the aerial system" is an inferentially claimed term and it is unclear whether the "second factor identifier" is received from the previously recited "identifier transmission system" (*see* element [10.a]) or an unrecited component. Adding to the confusion, PO suggests that the "second factor" is a signal received from the claimed identifier transmission system, but the '199 Patent includes no such disclosure. MTA at 7 ("The '303 App. and the '838 Prov. each also teaches that the identification receiver receives 'information broadcast by the aerial system' and 'broadcast signals from an aerial system,' which include the secondary / second factor identifier that is included in, and is thus associated with, the aerial system"); *supra*, Section II.B.1. Instead, the '199 Patent explains that a second factor is received from a second identifier transmission system

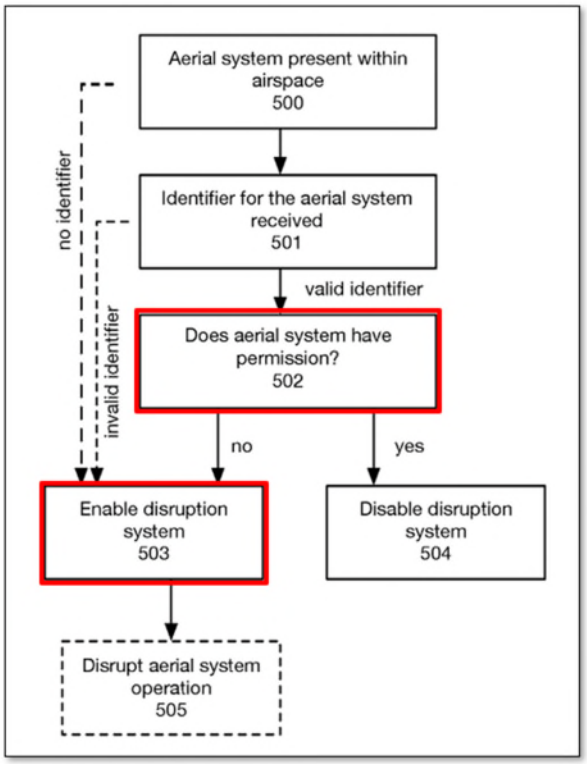
that is different from a first identifier transmission system that sends a first identifier. EX1001, 2:57-3:3. Due to the ambiguity introduced by element [10.d], a POSITA would not have been able to ascertain the scope of PO's alleged invention and substitute claim 10 is thus indefinite. EX1021, ¶55.

2. Independent Substitute Claim 10: Element [10.g]

Element [10.g] recites "wherein the disruption system is preemptively enabled based on the received aerial system identifier signal." MTA at 10-11. This renders substitute claim 10 indefinite, because the claims, specification, and prosecution history of the '199 Patent do not provide any insight into the meaning of "preemptively enabled," making substitute claim 10's scope ambiguous and unclear. EX1021, ¶56. The patent's only reference to "preemptively enabled" is that "certain scenarios may require the disruption system 105 to be ready to engage on short notice" and "[a]s **depicted in FIG. 5, the disruption system 105 may thus be preemptively enabled if certain conditions are met** (e.g. aerial system detected w/o an identifier 500, identifier is received but is invalid 501, identifier is valid but is not permissioned 502, etc.). EX1001, 19:14-25. The patent uses the term without explaining what it means. *Id.*; EX1021, ¶57. As such, the scope of substitute claim

10 would have been ambiguous and unclear to POSITAs.[2] EX1021, ¶57.

Figure 5 of the ’199 Patent adds to the confusion. This figure shows the three “conditions” 500, 501, and 502 that the specification says cause disruption system 105 to be “preemptively enabled.” EX1001, Fig. 5. But as shown below in annotated Figure 5, for condition 502 (“identifier is valid but is not permissioned”), the disruption system goes directly to being “enable[d]” at step 503 rather than “preemptively enabled.” EX1001, Fig. 5; EX1021, ¶58.



EX1001, Fig. 5 (annotated)

[2] The Petition addressed “preemptively enabled” as recited by the original claims under multiple possible interpretations. Pet. at 25-27, 44-47, 63-65.

The ’199 Patent is thus unclear in whether the meaning of “preemptively enabled” is the same or different to simply “enabled.” EX1021, ¶59. PO’s expert agrees, equating “preemptively enabled” to “activate.” EX1023, 80:2-15, 84:21-85:1. The term therefore has multiple potential meanings, which renders substitute claim 10 indefinite. *Interval Licensing*, 788 F.3d at 1371 (claim is indefinite if “claim language might mean several different things”).

3. Dependent Substitute Claims 11-18

Because independent substitute claim 10 is indefinite, dependent substitute claims 11-18 are also indefinite. Moreover, claim 18 is further indefinite, because there is no antecedent basis for the “the control system” within claim 18 itself or claim 10 from which it depends. EX1021, ¶¶60-61.

B. Substitute Claims 10-18 are Obvious

In the grounds, Petitioners address the limitations from the Substitute Claims added by PO in the MTA and relevant limitations from the original claims; limitations of the original claims unaddressed below are addressed in the Pet. Elements that are indefinite and/or lack written description support are addressed based on Petitioners’ understanding of PO’s position and as best understood by a POSITA.

Ground	Substitute Claim(s)	Basis (35 U.S.C. §)	Prior Art
7	10-12, 14-18	103	Whitmarsh, Viggiano, and Gong637

8	13	103	Whitmarsh, Falk, Viggiano, and Gong637
9	10-12, 14-18	103	Whitmarsh, Goodrich, Viggiano, and Gong637
10	13	103	Whitmarsh, Goodrich, Falk, Viggiano, and Gong637

Grounds 7-10 rely on original grounds 1-4 from the Petition and add Viggiano (EX1007) and Gong637 (EX1022).[3] Viggiano was used in grounds 5 and 6 of the Petition, and is prior art to the '199 Patent, as the Petition demonstrated. Pet. at 8. Viggiano is from the same field of art as the '199 Patent. *Id.* Gong637 (filed April 10, 2015) is prior art to the Substitute Claims under 35 U.S.C. §102(a)(2) as of the '199 Patent's earliest claimed priority date of March 17, 2016. EX1022, Cover Page; EX1001, Cover Page. Gong637 is in the same field of art as the '199 Patent and describes aircraft authentication similar to the '199 Patent. EX1022, ¶¶0094, 0122; EX1001, Abstract, 2:10-15; EX1021, ¶¶62-65.

1. Grounds 7 and 9: Substitute Claims 10-12 and 14-18 are obvious over Whitmarsh, Viggiano, and Gong637 (Ground 7)/Whitmarsh, Goodrich, Viggiano, and Gong637 (Ground 9)

a) Motivation to Combine

A POSITA would have been motivated to combine Whitmarsh, Viggiano, and Gong637 and to combine Whitmarsh, Goodrich, Viggiano, and Gong637 with a

[3] Gong637 is not the same as U.S. Patent No. 9,792,613 to Gong listed on the face of the 199 Patent. EX1001, Cover Page.

reasonable expectation of success.[4] EX1021, ¶70. Viggiano is directed to aircraft authentication techniques in which multiple forms of aircraft identification are used to authenticate the aircraft's identity. EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3. An authenticator receives from an aircraft identification information 32 and a message authentication code 38 that is formed from identification information 22 and a secret key 36 unique to the aircraft. *Id.* At the authenticator, another message authentication code 58 is formed using the received identification information 32. *Id.* A comparator compares the message authentication code 58 and message authentication code 38, and a match that results from the comparison indicates that the transmitting aircraft's identity (and thus identification information 32 and 22) is authenticated. *Id.*, ¶0015. "[T]wo or more consecutive" comparisons can take place, with two or more fail comparisons (i.e., no match) results in a "responsible higher command authority" being notified so they can "respond appropriately." *Id.* Gong637 discloses UAV aircraft authentication in which a UAV "may be authenticated through the entire flight path." EX1022, ¶¶0094, 0122. Gong637 explains UAV identification can be "authenticated by checking and confirming the

[4] A POSITA would have been motivated to combine Whitmarsh and Goodrich as discussed in the Petition. Pet. at 40-44.

identification with an authentication center on the communication network." *Id.* Failed authentication results in the UAV being "forced to land." *Id.*

A known problem in UAV systems was "spoofing" or fraudulent UAV identities. EX1007, ¶¶0003-0004; EX1021, ¶71. Bad actors using such techniques could gain access to unauthorized airspace. *Id.* Because Viggiano and Gong637 are highly relevant to addressing such known problems, a POSITA thus would have combined both Whitmarsh, and Whitmarsh and Goodrich, with Viggiano and Gong637. EX1021, ¶71. Indeed, Whitmarsh, as well as Whitmarsh and Goodrich, teach using a UAV MAC address to identify a UAV, and Viggiano and Gong637 provide enhancements by teaching identification authorization techniques as discussed above that help ensure such a UAV MAC address is properly authenticated. *Id.*; EX1005, ¶¶0020, 0027; EX1006, ¶¶0008, 0010, 0013, 0015-0017; Pet. at 18-19; EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3; EX1022, ¶¶0094, 0122. The combinations would have provided that the UAV MAC address is authenticated by "checking and confirming" the address, including by running consecutive authentication comparisons, and that action is taken (e.g., forcing landing) if authentication fails, as taught by Viggiano and Gong637. EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3; EX1022, ¶¶0094, 0122; EX1021, ¶71. After successful authentication, an authenticated UAV MAC address would have then been usable by both Whitmarsh's and Whitmarsh and Goodrich's system,

which would have benefitted the systems by ensuring that the MAC address is not fraudulent. *Id.* The combinations represent the mere application of known techniques (*i.e.*, known aircraft identification authentication techniques, as taught by Viggiano and Gong637) to a known system (e.g., Whitmarsh/Whitmarsh and Goodrich systems that utilize the MAC address of a UAV for identification) ready for improvement, the results of which would have been predictable and had a reasonable expectation of success. *Id.*

b) Claim 10

(i) [10.a]

Whitmarsh discloses wireless communications transmitted by UAVs comprise information or signatures unique to UAVs, such as a MAC address of the UAV, that is used to identify the transmitting UAV (*aerial system identifier signal comprising an aerial system identifier*). EX1005, ¶¶0020, 0027; EX1006, ¶¶0008, 0010, 0013, 0015-0017; Pet. at 16-18, 44; EX1021, ¶72.

(ii) [10.b]

Whitmarsh teaches that its UAV defense system would have included an *identification receiver* for the reasons discussed in the Petition. EX1005, ¶¶0020, 0027; EX1006, ¶¶0008, 0010, 0013, 0015-0017; EX1021, ¶73; Pet. at 16-25, 44. Moreover, Whitmarsh discloses that the UAV defense system can "identify the UAVs 14 by passive means, i.e., by simply detecting radio signals 54" and that "by capturing the MAC address, which is unique to each UAV 14, the UAV defense

system 10 will be able to specifically identify the detected UAV 14." EX1005, ¶¶0020, 0027; EX1006, ¶¶0008, 0010, 0013, 0015-0018, pp. 23-25. Due to this functionality that the UAV defense system implements, a POSITA would have thus understood, or at least found obvious, that Whitmarsh's UAV defense system comprises a computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (*identification system*), and that the computer system, processor, or similar component would have further included the parts forming an *identification receiver* that receives wireless communications and identification information (e.g., the MAC addresses) contained therein that is transmitted by UAVs (*identification system comprising an identification receiver*). *Id.*; EX1021, ¶73; Pet. at 16-25, 44.

(iii) [10.d]

Viggiano discloses an "authenticator" that receives both (1) an identification information 32 of an aircraft transmitter (which identifies an aircraft) and (2) a message authentication code 38 formed from identification information 22 of the aircraft transmitter (which identifies the aircraft) and a secret key 36 of the aircraft. EX1007, ¶¶0004, 0006-0007, 0011-0028, Figs. 1-3. Identification information 22 is a "unique id 22, for example, a Mode S address" of the aircraft that is "identifying content." *Id.*, ¶¶0012, 0023. The secret key 36 is also unique to each aircraft transmitter. *Id.*, ¶0021. The message authentication code 38 is used to ensure that

the "identity" of the aircraft transmitter (and thus, the aircraft) is authenticated. *Id.*, ¶0015; EX1021, ¶74. Viggiano thus teaches that Whitmarsh's parts forming an *identification receiver* would have received (1) UAV aircraft identification information that is the wireless communication signal including the MAC address of a UAV (*wherein the identification receiver is configured to receive the aerial system identifier signal*) as well as (2) a message authentication code formed from identification information of the UAV and a secret key of the UAV (*and a second factor identifier associated with the aerial system*). Sections III.B.1.a, III.B.1.b.i-ii; Pet. at 16-25, 44; EX1021, ¶74. The message authentication code forms a *second factor identifier* at least because it is formed from identification information and a unique secret key of the UAV and is a *second* piece of identification information that is received (the first piece of identification information is the MAC address of the UAV) and used to authenticate the UAV aircraft's identity. *Id.*; EX1007, ¶¶0004, 0006-0007, 0011-0027, Figs. 1-3, claims 1-4, 8-11, 17, 19.

With respect to Viggiano, PO states in the MTA that the "challenge response received from the aircraft by the ground station, whether unencrypted or encrypted, is not a second factor identifier." MTA at 21-22. Here, PO is apparently referring to response 18 of Viggiano that includes the message authentication code 38. EX1007, 0011-0024, Figs. 1-3. Notwithstanding the fact that PO's statement is bare attorney argument without any support, PO is wrong. EX1021, ¶75. The message

authentication code forms a *second factor identifier* for at least the reasons above, and PO's unsupported and generic disagreement that provides no explanation does not demonstrate otherwise. *Id.* Moreover, while Viggiano discloses embodiments in which a "challenge-response methodology" between the ADS-B transmitter and the Authenticator is employed, it also describes an embodiment that does not use "challenge-response." EX1024, ¶¶0012, 0019. For example, Figure 2 shows an example technique of "identity authentication" using the same components described in relation to Figure 1 and Figure 3 but "without using the authentication challenge-response methodology for airspace." *Id.*, ¶0019, Fig. 2; EX1021, ¶75.

(iv) [10.e1]

Viggiano discloses its "authenticator" uses the received identification information 32 to form a message authentication code 58 and then compares the message authentication code 58 to the received message authentication code 38. EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3. If a match results from the comparison, the identity (and thus identification information 32 and 22) of the transmitter aircraft is authenticated. *Id.*, ¶0015. "[T]wo or more consecutive" comparisons can take place, teaching this comparison to determine an authenticated identity occurs for an aircraft multiple times. *Id.*; EX1021, ¶76. Gong637 discloses that an "identification" of a UAV is "authenticated through the entire flight plan,"

where the UAV's identification is "authenticated by checking and confirming the identification with an authentication center." *Id.*; EX1022, ¶¶0094, 0122.

Viggiano and Gong637 thus teach that Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (*identification system*) would have authenticated the identity of a UAV by (1) forming a first message authentication code using the received UAV MAC address and (2) comparing the first message authentication code to the received message authentication code, where a match that results from the comparison indicates an authenticated UAV MAC address (*configured to determine…an authenticity of the aerial system identifier of the aerial system identifier signal using the second factor identifier*). EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3; EX1022, ¶¶0094, 0122; Sections III.B.1.a, III.B.1.b.i-iii; Pet. at 16-25, 44; EX1021, ¶77. Moreover, Viggiano and Gong637 teach that this authentication comparison is performed consecutive times and "check[ed] and confirm[ed]," thus teaching that this comparison performed consecutive times not only determines but also *verifies* that the authentication is accurate (*wherein the identification system is configured to…verify an authenticity of the aerial system identifier of the aerial system identifier signal using the second factor identifier*). *Id.* And successful authentication would have resulted in Whitmarsh's UAV MAC address having been authenticated, and thus provided an authenticated UAV MAC address (*to provide an authenticated*

aerial system identifier of the aerial system identifier signal when the authenticity has been determined and verified). *Id.*

(v) [10.e2]

The Petition explains that Whitmarsh teaches the UAV MAC address is provided to the components forming the *permission module*. Pet. at 19-20, 44. The combination teaches that successful authentication would have resulted in Whitmarsh's UAV MAC address having been authenticated, and thus provided the authenticated UAV MAC address to the *permission module* (*to provide the authenticated aerial system identifier of the aerial system identifier signal to the permission module*). Sections III.B.1.a, III.B.1.b.iv; EX1021, ¶78.

(vi) [10.f]

The Petition explains that Whitmarsh teaches the components forming the *permission module* determine that a UAV associated with a UAV MAC address is not authorized to be in a particular area. Pet. at 21-25, 44. The combination teaches that successful authentication would have resulted in Whitmarsh's UAV MAC address having been authenticated, and thus the components forming the *permission module* would have determined that a UAV associated with the authenticated UAV MAC address is not authorized to be in a particular area (*wherein the permission module is configured to determine that the aerial system associated with the*

authenticated aerial system identifier of the aerial system identifier signal is not permitted to be in an airspace). *Id.*; Sections III.B.1.a, III.B.1.b.iv; EX1021, ¶79.

(vii) [10.g]

The Petition explains that Whitmarsh teaches a countermeasures system that is configured to disrupt operation of the detected UAV by dispatching one or more security vehicles to intercept and collide with the UAV (*disruption system configured to disrupt an operation of the aerial system*). Pet. at 25-27, 44-47. This disruption occurs when the components forming the *permission module* determine that the UAV associated with the UAV MAC address is not authorized to be in a particular area. *Id.*, 21-27, 44; EX1005, ¶¶0017, 0018, 0028, 0029; EX1006, ¶¶0009-0011, 0013, 0016-0018; EX1021, ¶80. The combination teaches that successful authentication would have resulted in Whitmarsh's UAV MAC address having been authenticated, and thus the disruption provided by the countermeasures system would have occurred when the components forming the *permission module* determine that the UAV associated with the authenticated UAV MAC address is not authorized to be in a particular area (*disruption system configured to disrupt an operation of the aerial system (i) when it is determined by the permission module that the aerial system associated with the authenticated aerial system identifier of the aerial system identifier signal is not permitted to be in an airspace*). *Id.*

Viggiano and Gong637 teach that the authentication comparison is performed consecutive times and "check[ed] and confirm[ed]," thus teaching that this comparison is performed consecutive times to verify that the authentication is accurate. Sections III.B.1.a, III.B.1.b.iv. Moreover, Viggiano discloses that "two or more" consecutive comparisons that are not a match means identity authentication has failed and results in a "responsible higher command authority" being notified so they can "respond appropriately," and Gong637 discloses that a UAV having a failed authentication of UAV identification is "forced to land." EX1007, ¶0015; EX1022, ¶¶0094, 0122; EX1021, ¶81. As such, Viggiano and Gong637 teach to Whitmarsh that Whitmarsh's countermeasures system (*disruption system*) disrupts operation of the UAV by forcing it to land (*configured to disrupt an operation of the aerial system*) when the authentication comparison involving the UAV MAC address fails consecutive times and its authenticity is thus not verified (*when the authenticity of the aerial system identifier of the aerial system identifier signal is not verified*). Section III.B.1.b.i, iv; EX1021, ¶81. The combination further teaches *wherein the disruption system is preemptively enabled based on the received aerial system identifier signal* for the same reasons discussed in the Petition. Pet. at 25-27, 44-47.

c) <u>Claims 11-12 and 14-18</u>

The combinations teach substitute claims 11-12 and 14-18 for the reasons of the Petition for original claims 2-3 and 5-9. Pet. at 27-35, 47-51. EX1021, ¶82.

2. Grounds 8 and 10: Substitute Claim 13 is obvious over Whitmarsh, Falk, Viggiano, and Gong637 (Ground 8)/Whitmarsh, Goodrich, Falk, Viggiano, and Gong637 (Ground 10)

The combinations teach substitute claim 13 for the reasons of the Petition for original claim 4. Pet. at 35-40, 51. Moreover, a POSITA would have been motivated to combine Viggiano and Gong637 with Whitmarsh and Falk/Whitmarsh, Goodrich, and Falk for the reasons of Section III.B.1.a, *supra*. EX1021, ¶83.

IV. CONCLUSION

PO's MTA should be denied.

Respectfully submitted,

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Lead Counsel for Petitioners

Date: March 9, 2026

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 9th day of March, 2026, **Petitioners' Opposition To Patent Owner's Non-Contingent Motion To Amend** and **Exhibits 1021-1023** were served by email on the following counsel for Patent Owner:

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