

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

**DECLARATION OF DR. GIRISH CHOWDHARY IN SUPPORT OF
PETITIONERS' OPPOSITION TO PATENT OWNER'S NON-
CONTINGENT REVISED MOTION TO AMEND**

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Third Declaration of Dr. Girish Chowdhary

I. INTRODUCTION

1. My name is Dr. Girish Chowdhary. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters contained herein.

2. I had previously authored and then signed a declaration on February 10, 2025, which I understand was submitted as Exhibit 1003 to the Patent Trial and Appeal Board (“PTAB”) of the United States Patent and Trademark Office in case number IPR2025-00530. I may alternatively refer to the February 10, 2025, declaration as “Exhibit 1003” or “Original Declaration.”

3. I previously authored a declaration on March 9, 2026, which I understand was submitted as Exhibit 1021 to PTAB in case number IPR2025-00530. I may alternatively refer to the March 9, 2026, declaration as “Exhibit 1021” or “Second Declaration.”

4. In this Third Declaration, I incorporate the facts and opinions provided in my Original Declaration and in my Second Declaration.

II. EXPERIENCE AND QUALIFICATIONS

5. My experience, qualifications, CV, and consulting fee are outlined in my Original Declaration.

III. TASK SUMMARY AND MATERIALS REVIEWED

6. My Original Declaration addressed U.S. Patent No. 10,249,199 (EX1001, “’199 Patent”).

7. I have been informed that Airspace Defense, Inc. (“Patent Owner” or “PO”) submitted Non-Contingent Revised Motion to Amend for the ’199 Patent (Paper 25, “Revised Motion to Amend” or “RMTA”) in case number IPR2025-00530 on April 20, 2026, in which it has proposed “Substitute Claims” 10-18 to replace “Original Claims” 1-9 of the ’199 Patent. Counsel has informed me that the Motion to Amend was filed as “non-contingent,” which I understand means that the Board will issue a final decision on the patentability of the Substitute Claims rather than determining the patentability of the corresponding Original Claims.

8. I have been asked to review the RMTA filed by PO regarding the ’199 Patent, the proposed Substitute Claims, and the exhibits cited by PO. I have been asked to provide an understanding of the technology relevant to the RMTA, to review certain prior-art references, and analyze whether or not those references disclose or teach limitations of the proposed Substitute Claims. The opinions stated in this declaration are from the perspective of a person of ordinary skill in the art (“POSITA”).

IV. LIST OF EXHIBITS

9. In forming my opinions, I have reviewed the ’199 Patent, its prosecution history and references cited by the Examiner, the materials cited in the

List of Exhibits, and the materials cited throughout my Original Declaration and Second Declaration, and this Third Declaration.

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, <i>Airspace Systems, Inc. v. Dedrone Holdings, Inc.</i> , Case No. 1-24-cv-01625 (E.D. VA), September 16, 2024
1005	U.S. Patent Application Publication No. 2019/0003807 to Whitmarsh <i>et al.</i> , “UAV Defense System,” (“ <i>Whitmarsh</i> ”) filed December 8, 2016 and published January 3, 2019
1006	U.S. Provisional Application No. 62/267,393 to Whitmarsh <i>et al.</i> , “UAV Defense System,” (“ <i>Whitmarsh Provisional</i> ”), filed December 15, 2015
1007	U.S. Patent Application Publication No. 2007/0239986 to Viggiano <i>et al.</i> , “Secure ADS-B Authentication System and Method,” (“ <i>Viggiano</i> ”) filed April 7, 2006 and published October 11, 2007

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.

1008	U.S. Patent Application Publication No. 2016/0023760 to Goodrich, “Systems and Methods Countering an Unmanned Aerial Vehicle,” (“ <i>Goodrich</i> ”) 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
1011	U.S. Patent No. 9,805,238 to Falk <i>et al.</i> , “System for Identifying and Controlling Unmanned Aerial Vehicles,” (“ <i>Falk</i> ”) filed July 11, 2016 and issued October 31, 2017
1012	U.S. Provisional Application No. 62/301,858 to <i>Falk</i> , “System for Identifying and Controlling Unmanned Aerial Vehicles (“ <i>Falk Provisional</i> ”), filed March 1, 2016
1013	Claim Listing of Challenged Claims
1014	Kayton, Myron and Fried, Walter, <i>Avionics Navigation Systems</i> , John Wiley and Sons, 1997.
1015	International Publication No. WO2016/154949 A1 to Gong <i>et al.</i> , “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 <i>et al.</i> , “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?,” <i>AviationSafety Magazine</i> , published March 15, 2016.
1018	Nichols, Randall et al., <i>Counter Unmanned Aircraft Systems Technology and Operations</i> , New Prairie Press, 2020

1019	Austin, Reg, <i>Unmanned Aircraft Systems, UAVS Design, Development and Deployment</i> , 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
1025	U.S. Patent 9,087,451 to Jarrell, “Unmanned Aerial Vehicle Communication, Monitoring, and Traffic Management,” filed July 28, 2014, issued July 21, 2015 (“Jarrell”)
1026	U.S. Patent Application Publication No. 2016/0125740 to Pasko et al., “Unmanned Aerial Vehicle Identity and Capability Verification,” filed May 20, 2014, published May 5, 2016 (“Pasko”)

V. TECHNICAL BACKGROUND

10. See Section IX of my Original Declaration (EX1003) for a technology background pertinent to the ’199 Patent.

VI. OVERVIEW OF THE CHALLENGED PATENT

11. See Section VI of my Original Declaration (EX1003) for an overview of the ’199 Patent.

VII. LEGAL STANDARDS

12. The Legal Standards provided to me were described in my Original Declaration.²

13. In addition to those legal standards, I have been informed by counsel as to a legal background on indefiniteness. I have been informed that, in order to be valid, the claims of a patent must be sufficiently definite that one skilled in the art can determine the metes and bounds of the claimed invention. I have been informed that a patent claim is deemed “indefinite” if the claim, read in light of the patent’s specification and prosecution history, fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention. I understand that a claim must be precise enough to afford clear notice of what is claimed, thereby apprising the public of what is still open to them.

14. In addition to these legal standards, I have been informed by counsel as to the legal background on lack of written description. I have been informed that, in order for claims to be valid, the claims of a patent must provide written description support for each limitation of the claims. I have been informed that a patent claim lacks written description if the specification fails to convey with reasonable clarity to a POSITA that the inventor was in possession of the invention as of the filing date sought. I have been informed that this requirement relies on an objective inquiry into what is contained within the specification, and that while the precise terms appearing

² EX1003 (Original Declaration), § V.

in the claims need not necessarily appear in the specification, there must be sufficient detail in the specification that a POSITA can clearly conclude that the invention described in the claims had been invented as of the filing date sought.

15. I have been informed that to satisfy the written description requirement, the specification must actually or inherently disclose each element of the claims.

16. I have been informed that for the disclosure to be inherent, the missing descriptive matter must necessarily be present in or unavoidably be taught by the specification, such that a POSITA would recognize such disclosure.

17. I have been informed that subject matter that is not disclosed, but would be obvious over what is expressly disclosed, does not satisfy the written description requirement.

18. I have been further informed that a claim is not patentable if the claimed invention was otherwise available to the public before the effective filing date of the claimed invention.

VIII. OVERVIEW OF THE SUBSTITUTE CLAIMS

A. TABLE CORRELATING ORIGINAL CLAIM TO SUBSTITUTE CLAIM

19. I understand that in Patent Owner's Motion to Amend, Patent Owner has sought to amend the independent claims by proposing new substitute claims. The table below compares the Original Claims to the Substitute Claims, with independent claims emphasized in bold italics.

Original Claim	Dependency	Substitute Claim	Dependency
<i>1</i>	None	<i>10</i>	None
2	1	11	10
3	1	12	10
4	1	13	10
5	1	14	10
6	1	15	10
7	1	16	10
8	1	17	10
9	8	18	10

B. LIST OF SUBSTITUTE CLAIMS

20. Patent Owner also provided annotations showing the changes it made to the Original Claims of the '199 Patent. This is found in "Claims Appendix" of the Motion to Amend. These changes are shown below.

21. Substitute Claim 10:

[[1]]10[.pre] A discrimination system comprising:

[10.a] an identifier transmission system coupled to an unmanned aerial system, wherein the identifier transmission system is configured to broadcast an aerial system identifier signal comprising a first identifier unique to the unmanned aerial system;

[10.b] an identification system comprising an identification receiver;

[10.c] a permission module,

[10.d] wherein the identification receiver is configured to receive: (i) the aerial system identifier signal comprising the first identifier from the unmanned aerial system, and (ii) a second identifier from a computing system that is remote relative to the discrimination system, the second identifier functioning as a second factor identifier for the unmanned aerial system;[[and]

[10.e1] wherein the identification system is configured to determine the first identifier from the aerial system identifier signal, and verify an authenticity of the first identifier using the second identifier, and to provide an authenticated first identifier of the aerial system identifier signal when the authenticity has been verified, and

[10.e2] to provide the authenticated first identifier of the aerial system identifier signal to the permission module, and

[10.f] wherein the permission module is configured to determine that the unmanned aerial system associated with the authenticated first identifier of the aerial system identifier signal is not permitted to be in an airspace; and

[10.g] a disruption system configured to disrupt an operation of the unmanned aerial system (i) when it is determined by the permission module that the unmanned aerial system associated with the authenticated first identifier is not permitted to be in the

airspace, or (ii) when the authenticity of the first identifier is not verified, wherein the disruption system is preemptively enabled based on the received aerial system identifier signal.

22. Substitute Claim 11:

[[2]]11. The system of claim 10, wherein the identifier transmission system and the identification receiver communicate using a radio chipset that is compatible with a communication protocol selected from the following: WiFi, LTE, or Bluetooth.

23. Substitute Claim 12:

[[3]]12. The system of claim 10, wherein the identification receiver is a mobile device.

24. Substitute Claim 13:

[[4]]13. The system of claim 10, wherein the identifier transmission system is configured to be reassigned from a first aerial system to a second aerial system.

25. Substitute Claim 14:

[[5]]14. The system of claim 10, wherein when the disruption system is enabled the aerial system is caused to be removed from the airspace.

26. Substitute Claim 15:

[[6]]15. The system of claim 10, wherein the disruption system comprises of a projectile launcher and an interdiction module.

27. Substitute Claim 16:

[[7]]16. The system of claim 10, wherein the disruption system comprises of an interceptor drone coupled with an interdiction module.

28. Substitute Claim 17:

[[8]]17. The system of claim 10, further comprising a control system for controlling the disruption system.

29. Substitute Claim 18:

[[9]]18. The system of claim [[8]]10, further comprising a logging system that is configured to record activity of at least one of the identification receiver, the permission module, or the control system.

IX. PRIORITY DATE OF THE SUBSTITUTE CLAIMS

30. The application leading to the '199 Patent was filed on May 17, 2017, as U.S. Application 15/598,303 (the "'303 Application"). Ex. 1001, items (21), (22). The '199 Patent claims priority to provisional application No. 62/309,838 (the "'838 Provisional"), which was filed on March 17, 2016. *Id.*, item (60). Because the '303 Application was filed more than 12 months after the '838 Provisional's filing date, applicant filed a petition to restore priority to the '838 Provisional on March 23, 2018. Ex. 1002, 157-158. This petition was granted on April 5, 2018. *Id.*, 146-149. For the purposes of this petition, I assume without conceding that the priority date of the '199 Patent is March 17, 2016. However, I show below that many terms of the Substitute Claims are not supported by the '199 Patent, the '303 Application, or the '838 Provisional.

X. CLAIM CONSTRUCTION

31. I have been informed by counsel for Petitioner that the challenged claims of the '199 Patent are to be given their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention in light of the specification and the prosecution history pertaining to the patent. I also understand, however, that a claim term will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the claim term in the specification. In this case, the claim term will receive the definition set

forth in the patent. I have followed these principles in my analysis set forth in this Declaration.

32. To the extent the Applicant has expressly defined a claim term in the specification, I have used that definition. With respect to claim terms for which the applicant has not provided an express definition, I have applied the ordinary and customary meaning of the claim terms in light of the specification and the prosecution history in my analysis of the claims and the prior art herein.

33. I note that I identified and construed “permission module” under 35 U.S.C. §112(f) in my Original Declaration. EX1003, ¶¶65-68. I agree with that construction. I note that the Board construed permission module under 35 U.S.C. §112(f) in the Institution Decision (Paper 10), stating “[t]he recited function of the claimed permission module is ‘determining that the aerial system associated with the aerial system identifier signal is not permitted to be in an airspace,’ and the corresponding structure is ‘storage on-board the disruption system, storage on-board the identification receiver, a remote computing system connected to the disruption system or any other suitable computing system programmed to compare an aerial system parameter, such as an identifier, with the permissions for the airspace.’” Paper 10, 6-8. I have applied that construction in my analysis as well.

XI. SUMMARY OF CONCLUSIONS AND GROUNDS FOR CHALLENGE

34. Based upon my review of the Petition, the Motion to Amend, the materials cited in my Original Declaration, Second Declaration, and this Third Declaration, and the materials listed in the LIST OF EXHIBITS above, it is my opinion that Substitute Claims 10-18 of the '199 Patent are rendered obvious by the Grounds listed in the table below:

Ground	Substitute Claim	Basis (35 U.S.C. §)	Prior Art
7B/7C	10-12, 14-18	103	Whitmarsh, Jarrell, Gong637 (7B)/ Whitmarsh, Jarrell, Gong637, Pasko (7C)
8B/8C	13	103	Whitmarsh, Falk, Jarrell, Gong637 (8B)/ Whitmarsh, Falk, Jarrell, Gong637, Pasko (8C)
9B/9C	10-12, 14-18	103	Whitmarsh, Goodrich, Jarrell, Gong637 (9B)/ Whitmarsh, Goodrich, Jarrell, Gong637, Pasko (9B)
10B/10C	13	103	Whitmarsh, Goodrich, Falk, Jarrell, Gong637 (10B)/ Whitmarsh, Goodrich, Falk, Jarrell, Gong637, Pasko (10C)
11	10-12, 14-18	103	Whitmarsh, Viggiano, and Gong637
12	13	103	Whitmarsh, Falk, Viggiano, and Gong637
13	10-12, 14-18	103	Whitmarsh, Goodrich, Viggiano, and Gong637
14	13	103	Whitmarsh, Goodrich, Falk, Viggiano, and Gong637

35. It is further my opinion that Substitute Claim 10 is invalid as indefinite because a POSITA lacks reasonable certainty as to the scope of “*a computing system remote relative to the discrimination system*” as recited in this claim.

36. It is further my opinion that Substitute Claim 10 is invalid as indefinite because a POSITA lacks reasonable certainty as to the scope of “*wherein the disruption system is preemptively enabled based on the received aerial system identifier signal*” as recited in this claim.

37. It is further my opinion that Substitute Claims 11-18 are invalid as indefinite at least because they depend on indefinite claim 10.

38. It is further my opinion that Substitute Claim 18 is indefinite because there is no antecedent basis for the “*the control system*” within claim 18 itself or claim 10 on which it depends.

39. It is additionally my opinion that Substitute Claim 10 is invalid for lack of written description because the specification of the '199 Patent does not reasonably convey to a POSITA that the inventor had possession of “[*a discrimination system comprising: an identifier transmission system coupled to an unmanned aerial system . . . [and an] identification receiver [that] is configured to receive . . . a second identifier from a computer system that is remote relative to the discrimination system . . .*”

40. It is additionally my opinion that Substitute Claim 10 is invalid for lack of written description because the specification of the '199 Patent does not reasonably convey to a POSITA that the inventor had possession of “*to provide the authenticated first identifier of the aerial system identifier signal to the permission module.*”

41. It is further my opinion that Substitute Claims 11-18 are invalid for lack of written description at least because they depend on independent substitute claim 10 that is invalid for lack of written description.

XII. THE SUBSTITUTE CLAIMS LACKS WRITTEN DESCRIPTION SUPPORT

A. INDEPENDENT SUBSTITUTE CLAIM 10: ELEMENT [10.D]

42. Element [10.d] recites *wherein the identification receiver is configured to receive: (i) the aerial system identifier signal comprising the first identifier from the unmanned aerial system, and (ii) a second identifier from a computing system that is remote relative to the discrimination system, the second identifier functioning as a second factor identifier for the unmanned aerial system.* RMTA, 6-7. In my opinion, this amendment, as well as its other amendments to SC 10, introduces an architectural contradiction that lacks written description support.

43. SC 10 recites, in part, ***[a] discrimination system comprising: an identifier transmission system coupled to an unmanned aerial system . . . [and an] identification receiver [that] is configured to receive . . . a second identifier from a***

*computer system that is remote relative to the discrimination system . . .*³ RMTA, 3-7 (emphasis added). Thus, SC 10 requires that the *identifier transmission system* is **part of** the *discrimination system*. *Id.* I thus understand that to prove written description support for the new requirement that the *second identifier* is received from a *computer system that is remote relative to the discrimination system*, PO must show the specification discloses the *second identifier* originating from somewhere *other than* the *identifier transmission system*.

44. In my opinion, PO cannot show this support. The '303 Application provides only one source for the transmission of the *second identifier*: the *identifier transmission system* itself. EX2002, 2:18-22; RMTA, 3. This *identifier transmission system*, though, is described and claimed as part of the *discrimination system*, not remote to it. *Id.* The specification explains in its description of transmitting a “second identifier” that “the aerial system 100 can include a first and second identifier, transmitted by a first and second identifier transmission system.” EX2002, 4:15-20. The “second identifier” is not described as being transmitted from anywhere other than an “identifier transmission system.” *Id.*

45. I further note that none of PO’s cited disclosures provide sufficient support. RMTA, 6-8. PO appears to primarily rely on two disclosures: a “second identifier, transmitted by a . . . second identifier transmission system” and a

³ Claim language is italicized throughout unless otherwise noted.

“dynamic aerial system identifier” that can be “generated remotely (e.g., at a remote computing system).” RMTA, 7-8 (citing EX2002, 4:15-20 and 14:23-15 [SIC]). However, as explained above, the first disclosure shows that the second identifier is transmitted by the “identifier transmission system” that is part of the *discrimination system*, not *remote* to it. EX2002, 4:15-20. And the second disclosure relates to the “aerial system identifier 310” that is recited elsewhere in the claim (the *first identifier unique to the unmanned aerial system*) and is not described as the claimed *second identifier*. EX2002, 14:23-15:7; *see also id.*, 6:1-3, 9:13-17, 14:6-17; RMTA, 3-5. Moreover, that the “dynamic aerial system identifier” can be **generated** remotely from the aerial system itself does not say where it is **transmitted** from or where the identification receiver **received** it from. *Id.* And the context of the specification reveals that this “aerial system identifier 310” is transmitted from the “identifier transmission system 101”—which, again, is part of the discrimination system itself and not remote to the discrimination system. *Id.*, 15:15-16 (“The identification transmitters of the identifier transmission system 101 functions to transmit the aerial system identifier 310.”), 6:1-3, 14:6-12.

46. PO’s remaining citations relate to its amendments that the identification receiver receives the *aerial system identifier signal comprising the first identifier from the unmanned aerial system* or authentication of the aerial system identifier 310, but do not demonstrate support for receiving the *second identifier from a*

computing system that is remote relative to the discrimination system. See, e.g., RMTA at 7-8 (citing EX2002, 8:16-9:1 (describing receipt of an identifier signal 300 and information broadcast by the aerial system 100), 9:13-17 (describing interpreting signal 300), 30:17-18 and 30:24-31:1 (describing verifying authenticity and use of a “secondary authenticator”).

47. To summarize, a component cannot be *remote relative to* the system it is a part of. Because the specification exclusively ties the transmission of the *second identifier* to the *identifier transmission system* that is claimed as part of the *discrimination system*, PO cannot show possession of an architecture where that transmission originates *remote to* the *discrimination system*. Patent Owner introduces unsupported new matter and SC 10 lacks written description.

B. INDEPENDENT SUBSTITUTE CLAIM 10: ELEMENT [10.E2]

48. Element [10.e2] recites *to provide the authenticated first identifier of the aerial system identifier signal to the permission module*. RMTA, 9.

49. In my opinion, the specification does not disclose that any authenticated identifier, let alone an *authenticated first identifier of the aerial system identifier signal*, is provided to a permission module. EX2002, 4:15-5:1, 30:16-31:8. Indeed, the specification discloses a “permissions module 103” that is part of the discrimination system 110. EX2002, 2:18-20. Figs. 1, 6. Permissions module 103 is “connected” to a “chipset 608 of the identification receiver 102,” where chipset 608

“interpret[s] the received aerial system identifier signal 300 into the aerial system identifier 310 (e.g., decrypts the signal, etc.)” and can “alternatively interpret the signal 300 into a set of data indicative of the identifier 310, or otherwise interpret the signal 300.” *Id.*, 9:13-23, Fig. 6; *see id.*, 8:21-23. Chipset 608 sends the “raw or processed signal to the permissions module 103 for permissions determination.” *Id.*, 9:20-22; *see id.*, 3:8-10, 18:7-19:21, 30:16-31:8, 32:19-36:2. But nowhere does the specification disclose that an *authenticated first identifier* is provided to the permissions module. *Id.* Neither an “interpret[ed]” signal that is, for example, “decrypt[ed],” nor a “raw or processed signal,” is disclosed by the specification as being an *authenticated first identifier* as claimed. *Id.* And that “[d]etermining an aerial system identifier 310 can optionally include verifying the authenticity of the aerial system identifier 310” says that an authenticity of the identifier is verified; it does not say that any *authenticated* identifier is provided *to the permission module*. EX2002, 30:17-18. I further note that PO’s alleged support references “element [1.b],” but this element does not exist. Element [10.e2] has no written description support.

C. DEPENDENT SUBSTITUTE CLAIMS 11-18

50. Because independent substitute claim 10 does not have written description support, dependent substitute claims 11-18 also do not have written description support.

XIII. THE SUBSTITUTE CLAIMS ARE INDEFINITE

A. INDEPENDENT SUBSTITUTE CLAIM 10: ELEMENT [10.D]

51. Element [10.d] recites *a computing system remote relative to the discrimination system*. RMTA at 6-8. In the context of SC 10, the limitation *a computing system remote relative to the discrimination system* renders the claim indefinite because it introduces a logical inconsistency that, in my opinion, precludes a person of ordinary skill in the art from determining the claim's scope with reasonable certainty. A person of ordinary skill cannot understand the boundaries of SC 10 due to this limitation.

52. SC 10 recites a *discrimination system* that itself includes *an identifier transmission system*. RMTA, 3. Later in the same claim, SC 10 requires an *identification receiver* configured to receive a *second identifier functioning as a second factor identifier* from a computing system that is “*remote relative to the discrimination system*.” *Id.*, 6-7. The only source of the *second identifier functioning as a second factor identifier* is the identifier transmission system. *See* Section XII.A. But if the identifier transmission system is the source of the identifier, it cannot logically be *remote relative to* the very discrimination system of which it is claimed to be a part. A system cannot be remote from itself. Thus, in my opinion, a person of ordinary skill is left to guess as to how to resolve this internal inconsistency, and SC 10 and its dependent SCs 11-18 are indefinite.

B. INDEPENDENT SUBSTITUTE CLAIM 10: ELEMENT [10.G]

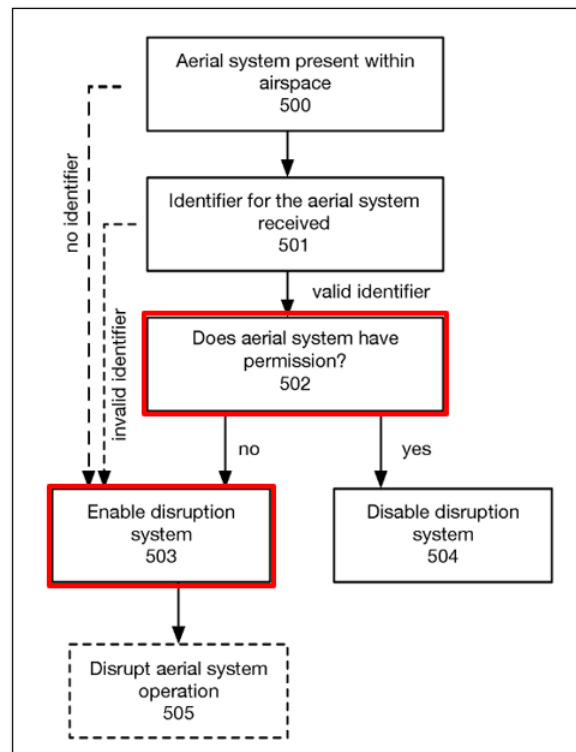
53. Element [10.g] recites “*wherein the disruption system is preemptively enabled based on the received aerial system identifier signal.*” RMTA at 10-13.

54. In my opinion, this element renders SC 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 SC 10’s scope ambiguous and unclear. The ’199 Patent does not differentiate between the meaning of “*preemptively enabled*” and “*enabled*,” which sows uncertainty into SC 10 for persons of ordinary skill in the art and provides that this claim language has several different meanings.⁴

55. 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 (emphasis added) (parenthetical in original).

⁴ I note that the Petition addressed “*preemptively enabled*” as recited by the original claims under multiple possible interpretations. Pet. at 25-27, 44-47, 63-65.

56. Figure 5 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 and does not show anything that is “*preemptively enabled*.” *Id.* This contrasts with condition 500 that, if there is no identifier, enables the disruption system preemptively—i.e., without checking conditions 501 and 502. *Id.* This also contrasts with condition 501 that, if there is an invalid identifier, enables the system preemptively—i.e. without checking condition 502. *Id.*



EX1001, Fig. 5 (annotated)

57. In my opinion, the '199 Patent is thus unclear to persons of ordinary skill in the art in whether the meaning of “*preemptively enabled*” is the same or different to “enabled.” I note that PO’s expert agrees, equating “preemptively enabled” to “activate.” EX1023, 80:2-15, 84:21-85:1. “[P]*reemptively enabled*” thus has multiple potential meanings and the specification provides no guidance on which is correct, rendering SC 10 indefinite.

C. DEPENDENT SUBSTITUTE CLAIMS 11-18

58. Because independent substitute claim 10 is indefinite, dependent substitute claims 11-18 are also indefinite.

59. 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.

XIV. THE SUBSTITUTE CLAIMS ARE OBVIOUS

60. In my opinion, the Substitute Claims would have been obvious under 35 U.S.C. §103. In the grounds, I address the limitations from the Substitute Claims added by PO in the MTA and certain other relevant limitations; limitations from the original claim not addressed below are addressed in the Petition and in my original declaration. I note that elements that are indefinite and/or lack written description support are addressed based on my understanding of PO’s position and as best understood by a POSITA.

61. I have reproduced the unpatentability grounds under 35 U.S.C. §103 below.

GND	SC(s)	Basis	Prior Art
7B/7C	10-12, 14-18	103	Whitmarsh, Jarrell, Gong637 (7B)/ Whitmarsh, Jarrell, Gong637, Pasko (7C)
8B/8C	13	103	Whitmarsh, Falk, Jarrell, Gong637 (8B)/ Whitmarsh, Falk, Jarrell, Gong637, Pasko (8C)
9B/9C	10-12, 14-18	103	Whitmarsh, Goodrich, Jarrell, Gong637 (9B)/ Whitmarsh, Goodrich, Jarrell, Gong637, Pasko (9B)
10B/10C	13	103	Whitmarsh, Goodrich, Falk, Jarrell, Gong637 (10B)/ Whitmarsh, Goodrich, Falk, Jarrell, Gong637, Pasko (10C)
11	10-12, 14-18	103	Whitmarsh, Viggiano, and Gong637
12	13	103	Whitmarsh, Falk, Viggiano, and Gong637
13	10-12, 14-18	103	Whitmarsh, Goodrich, Viggiano, and Gong637
14	13	103	Whitmarsh, Goodrich, Falk, Viggiano, and Gong637

62. Grounds 7B-10B/7C-10C rely on original grounds 1-4 from the Petition and add Jarrell (EX1025) and Gong637 (EX1022) (and for 7C-10C, Pasko (EX1026)).⁵

63. Grounds 11-14 rely on original grounds 1-4 from the Petition and add Viggiano (EX1007) and Gong637 (EX1022).

⁵ 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.

64. I understand Jarrell (filed July 28, 2014, issued July 21, 2015) is prior art to the SCs under 35 U.S.C. §§ 102(a)(1) and 102(a)(2) as of the '199 Patent's earliest claimed priority date of March 17, 2016. EX1025, Cover Page; EX1001, Cover Page. Jarrell is in the same field of art as the '199 Patent and describes aircraft authentication similar to the '199 Patent. EX1025, Abstract, 1:14-17, 13:23-14:14; EX1001, Abstract, 2:10-15.

65. I understand Gong637 (filed April 10, 2015) is prior art to the SCs 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.

66. I understand Pasko (filed May 20, 2014) is prior art to the SCs under 35 U.S.C. §102(a)(2) as of the '199 Patent's earliest claimed priority date of March 17, 2016. EX1026, Cover Page; EX1001, Cover Page. Pasko is in the same field of art as the '199 Patent and describes aircraft authentication similar to the '199 Patent. EX1026, Abstract, ¶¶0020, 0035-0042; EX1001, Abstract, 2:10-15.

67. Viggiano was used in grounds 5 and 6 of the Petition, and is prior art to the '199 Patent, as the Petition demonstrated. Petition (Paper 13, "Pet."), 8. Viggiano is from the same field of art as the '199 Patent. *Id.*

A. OVERVIEW OF JARRELL (EX. 1025)

68. Jarrell is directed to techniques to “authenticate or validate the registration or license identifier of [] [a] UAV.” EX1025, 13:23-14:15. A UAV transmits its identifier to a “communications station 101.” *Id.* The communications station 101 communicates with a “control center 148 remote from the communications station 101, to authenticate or validate” the identifier of the UAV. *Id.* Specifically, the control center 148 “provide[s] a list, and the communications station 101 may compare the UAV registration or license identifier to the list and make a determination regarding the UAV’s compliance.” *Id.* If the UAV fails this comparison and has an invalid registration or license identifier, the communications station 101 “transmit[s] a message for receipt by a communications device at police department” or “civil airspace authority,” to “inform that the UAV has invalid registration or license.” *Id.*

B. OVERVIEW OF PASKO (EX. 1026)

69. Pasko discloses techniques for authenticating UAVs. EX1026, Abstract, ¶¶0035-0042. In Pasko, a UAV transmits “credentials,” that include an “identification number,” “model number,” “serial number,” “identifier of a UICC,” and “government registration number”—all associated with the UAV—to a computing platform 230. EX1026, Abstract, ¶¶0010, 0020, 0022, 0026, 0035-0042. The computing platform then uses “account information” from a distributed (i.e.,

remote) database 235 to authenticate the UAV (and its associated credentials). *Id.* The account information includes “information associated with authenticated and registered UAVs” such as “identification numbers of UAVs,” “public and/or private keys of UAVs,” and “account status” of UAVs, as well as a government registration number. *Id.*, ¶¶0037-0038. For example, the computing platform authenticates the UAV by comparing the serial number and government registration number of the UAV credentials against stored identification information and a government registration number of the account information, to determine whether the UAV is registered with the computing platform, an account associated with the UAV is in good standing, and the UAV is “registered with the appropriate authority.” *Id.*

C. OVERVIEW OF VIGGIANO (EX. 1007)

70. Viggiano discloses a “system for authenticating the identity of ADS-B systems,” and is directed to aircraft authentication techniques in which multiple forms of aircraft identification are used to authenticate the aircraft’s identity. EX1007, Abstract, ¶¶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, verifying an authenticity of the identity. *Id.*, ¶¶0015. "[T]wo or more consecutive" comparisons can take place, with two or more failed comparisons (i.e., no match) results in a "responsible higher command authority" being notified so they can "respond appropriately." *Id.*

D. OVERVIEW OF GONG637 (EX. 1022)

71. Gong637 discloses UAV aircraft authentication in which a UAV "may be authenticated through the entire flight path." EX1022, ¶¶0094, 0122. Gong explains that UAV identification can be "authenticated by checking and confirming the identification with an authentication center on the communication network." *Id.* Failed authentication results in the UAV being "forced to land." *Id.*

E. GROUNDS 7B/7C AND 9B/9C: SCs 10-12 AND 14-18

1. Motivation to Combine

a) Motivation to Combine (MTC) 1

72. In my opinion, a POSITA would have been motivated to combine Whitmarsh, Jarrell, and Gong637 (GND 7B) and to combine Whitmarsh, Goodrich, Jarrell, and Gong637 (GND 9B) with a reasonable expectation of success.⁶ Jarrell is

⁶ A POSITA would have been motivated to combine Whitmarsh and Goodrich as discussed in the Petition. Pet. at 40-44.

directed to techniques to “authenticate or validate the registration or license identifier of [] [a] UAV.” EX1025, 13:23-14:15. In Jarrell, a UAV transmits its identifier to a “communications station 101.” *Id.* The communications station 101 communicates with a “control center 148 remote from the communications station 101, to authenticate or validate” the identifier of the UAV. *Id.* Specifically, the control center 148 “provide[s] a list, and the communications station 101 may compare the UAV registration or license identifier to the list and make a determination regarding the UAV’s compliance.” *Id.* If the UAV fails this comparison and has an invalid registration or license identifier, the communications station 101 “transmit[s] a message for receipt by a communications device at police department” or “civil airspace authority”, to “inform that the UAV has invalid registration or license.” *Id.*

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

74. UAV systems were known to present “unauthorized or intrusive surveillance opportunities that could arise as unmanned aerial vehicles become more prevalent.” EX1025, 1:44-47. Another known problem in UAV systems was

“spoofing” or fraudulent UAV identities. EX1007, ¶¶0003-0004; EX1025, 13:23-14:15. Bad actors using such techniques could gain access to unauthorized airspace. *Id.* In my opinion, because Jarrell and Gong637 are highly relevant to addressing such known problems, a POSITA would have combined both Whitmarsh, and Whitmarsh and Goodrich, with Jarrell and Gong637. Indeed, Whitmarsh, as well as Whitmarsh and Goodrich, teach using a UAV MAC address to identify a UAV, and Jarrell and Gong637 provide enhancements by teaching identification techniques as discussed above that help ensure such a UAV MAC address is authentic and thus not fraudulent. EX1005, ¶¶0020, 0027; EX1006, ¶¶0008, 0010, 0013, 0015-0017; Pet. at 18-19; EX1025, 13:23-14:15; EX1022, ¶¶0094, 0122. The combinations would have provided that a received UAV MAC address is authenticated, by Whitmarsh’s computer system, processor, or similar component that identifies UAVs based on their received MAC addresses, by checking the address against a list received from a remote center—thus verifying an authenticity of the UAV MAC address—and that the UAV is forced to land if authentication fails (i.e., authenticity of the MAC address of the UAV has not been verified), as taught by Jarrell and Gong637. EX1025, 13:23-14:15; EX1022, ¶¶0094, 0122; EX1005, ¶¶0020, 0027; EX1006, ¶¶0008, 0010, 0013, 0015-0018, pp. 22-25; Pet. at 16-25, 44. After successful authentication, an authenticated UAV MAC address would have then

been usable by Whitmarsh's system/Whitmarsh and Goodrich's system, which would have benefitted the systems by ensuring that the MAC address is valid. *Id.*

75. In view of the above, the combinations represent the mere application of known techniques (*i.e.*, known aircraft identification authentication techniques, as taught by Jarrell and Gong⁶³⁷) to a known system (e.g., Whitmarsh system/Whitmarsh and Goodrich system that utilizes 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. The combination would have used known authentication techniques that were straightforward to implement and thus would have had predictable results with a reasonable expectation of success. *Id.*

b) Motivation to Combine (MTC) 2

76. A POSITA would have been further motivated to combine Whitmarsh, Jarrell, and Gong⁶³⁷ with Pasko (GND 7C) and to combine Whitmarsh, Goodrich, Jarrell, and Gong⁶³⁷ with Pasko (GND 9C) with a reasonable expectation of success. Pasko discloses techniques for authenticating UAVs, and is thus highly relevant to solving the same known problems noted in MTC1. EX1026, Abstract, ¶¶0035-0042; Section XIV.E.1.a, *supra*. In Pasko, a UAV transmits “credentials,” that include an “identification number,” “model number,” “serial number,” “identifier of a UICC,” and “government registration number”—all associated with

the UAV—to a computing platform 230. EX1026, Abstract, ¶¶0010, 0020, 0022, 0026, 0035-0042. The computing platform then uses “account information” from a distributed (i.e., remote) database 235 to authenticate the UAV (and its associated credentials) by comparing the received credentials and received account information. *Id.* The account information includes “information associated with authenticated and registered UAVs” such as “identification numbers of UAVs,” “public and/or private keys of UAVs,” and “account status” of UAVs, as well as a government registration number. *Id.*, ¶¶0037-0038. For example, the computing platform authenticates the UAV by comparing the serial number and government registration number of the UAV credentials against received identification information and a government registration number of the account information, to determine whether the UAV is registered with the computing platform, an account associated with the UAV is in good standing, and the UAV is “registered with the appropriate authority.” *Id.* This technique verifies an authenticity of the UAV (and its credentials) in multiple ways. First, authenticity of the UAV’s serial number is verified as the serial number is associated with a properly registered UAV and good standing account through the comparisons. *Id.* Moreover, the technique verifies an authenticity of the UAV’s serial number as the serial number is associated with a UAV that is properly registered with a government authority. *Id.*

77. In my opinion, a POSITA would have combined Pasko's teachings with Whitmarsh, Jarrell, and Gong637 (GND 7C)/ Whitmarsh, Goodrich, Jarrell, and Gong637 (GND 9C) such that Pasko's remotely stored account information (including identification information and government registration number) is present at Jarrell's remote control center, where Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (1) receives credentials including the identifier UAV MAC address and government registration number from a UAV, (2) receives the account information from Jarrell's remote control center, and (3) authenticates a received UAV MAC using the account information, comparing the UAV MAC address and government registration number of the UAV credentials against identification information and a government registration number of the account information. EX1026, Abstract, ¶¶0010, 0020, 0022, 0026, 0035-0042; EX1005, ¶¶0020, 0027; EX1006, ¶¶0008, 0010, 0013, 0015-0018, pp. 22-25; Pet. at 16-25, 44. After successful authentication, an authenticated UAV MAC address would have then been usable by Whitmarsh's system/Whitmarsh and Goodrich's system, which would have benefitted the systems by ensuring that the MAC address is valid/validated. *Id.* The combination would have further provided the same benefits as those discussed above for MTC1 (Section XIV.E.1.a, *supra*), and would have further improved system security and reliability, providing an additional layer of authentication through verification of additional

information (e.g., government registration number). EX1026, ¶0008. Additionally, the combination would have been easily implementable because it simply involves storing additional data in a remote database and performing authentication using such data. Section XIV.E.1.b, *supra*. Such concepts are well known to POSITAs and would have been routine, with the predictable result of performing authentication with such data, and would have thus had a reasonable expectation of success. *Id.*

2. Claim 10

***a)* Element [10.a]**

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

***b)* Element [10.b]**

79. 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; 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. 22-25. Due to this functionality that the UAV defense system implements, in my opinion, 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.*; Pet. at 16-25, 44.

c) Element [10.d]

80. **GND7B/9B:** The combinations teach that Whitmarsh’s parts forming the *identification receiver* would have received (1) the wireless communications that include information or signatures unique to the UAV, such as the MAC address of the UAV, from the UAV (*wherein the identification receiver is configured to receive: (i) the aerial system identifier signal comprising the first identifier from the*

unmanned aerial system) as well as (2) a list of valid MAC address identifiers that includes a valid MAC address identifier relevant to the UAV, received from a remote control center (*and (ii) a second identifier from a computing system that is remote relative to the discrimination system*). EX1025, 10:53-59, 11:49-55, 12:12-17, 12:47-65, 13:23-14:15, 18:31-35, 25:13-47; Sections XIV.E.1.a (MTC1); XIV.E.2.a-b ([10.a], [10.b]); Pet. at 16-25, 44. As combined, Whitmarsh’s computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (*identification system*) “compare[s]” the MAC address of the UAV to the list of valid MAC address identifiers, where a match between the MAC address of the UAV and the valid MAC address identifier relevant to the UAV (*the second identifier*) located on the list “authenticate[s]” the MAC address of the UAV. *Id.*; see also EX1025, 13:23-59; Section XIV.E.1.a (MTC1). As such, the valid MAC address identifier relevant to the UAV of the list (*the second identifier*) is *functioning as a second factor identifier* for the UAV (*for the unmanned aerial system*) because it is a second identifier to the UAV’s transmitted MAC address that authenticates the transmitted MAC address and determines whether the UAV is compliant. *Id.* **GND7C/9C**: The analysis for GND7C/9C is the same as for 7B/9B, except that the (*ii) a second identifier from a computing system that is remote relative to the discrimination system* is formed by account information (e.g., government registration number) received from Jarrell’s remote control center,

which is used by Whitmarsh's computer system, processor, or similar component that identifies UAVs (*identification system*) to authenticate the received UAV MAC (*first identifier*). Section XIV.E.1.b (MTC2). And in the GND7C/9C combination, Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (1) receives credentials including the identifier UAV MAC address and government registration number from a UAV, (2) receives the account information from Jarrell's remote control center, and (3) authenticates a received UAV MAC using the account information, comparing the UAV MAC address and government registration number of the UAV credentials against identification information and a government registration number of the received account information. EX1026, Abstract, ¶¶0010, 0020, 0022, 0026, 0035-0042; EX1005, ¶¶0020, 0027; EX1006, ¶¶0008, 0010, 0013, 0015-0018, pp. 22-25; Pet. at 16-25, 44; Section XIV.E.1.b (MTC2). An authenticity of the UAV's MAC address is verified as the MAC address is associated with a properly government registered UAV and good standing account through the authentication comparisons. *Id.* Moreover, an authenticity of the UAV's MAC address is further verified as the MAC address is associated with a UAV that is properly registered with a government authority. *Id.* Additionally, the received account information (*the second identifier*) is *functioning as a second factor identifier* for the UAV (*for the unmanned aerial system*) because it is a second identifier (including UAV identification number, UAV

public/private keys, UAV account status, and government registration number) to the UAV's transmitted MAC address that authenticates the MAC address. *Id.* The account information is also a different piece of information (e.g., a government registration number) from the UAV MAC address that is used in an additional comparison (e.g., between government registration number of the received account information and government registration number of the received UAV), which further provides the account information (*the second identifier*) is *functioning as a second factor identifier* for the UAV (*for the unmanned aerial system*). *Id.*

d) Element [10.e1]

81. Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (*the identification system*) uses the parts forming an *identification receiver* to receive wireless communications and identification information (e.g., the MAC addresses) contained therein that is transmitted by UAVs. *See* Section XIV.E.2.b ([10.b]). As combined, a POSITA would have understood or at least found obvious that Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (*the identification system*) would have been configured to determine the MAC address of the UAV from the wireless communications (*is configured to determine the first identifier from the aerial system identifier signal*). *Id.* This is because the combination teaches that Whitmarsh's computer system, processor, or

similar component that identifies UAVs based on their received MAC addresses (*the identification system*) performs authentication of the UAV's received MAC address, and would have thus deciphered the MAC address from the wireless communications that take place using, for example, radio frequency, cellular, or IEEE 802-based protocols. See Sections XIV.E.2.c ([10.d]), XIV.E.1.a-b (MTC1, MTC2); EX1025, 22:19-52. Moreover, for **GND7B/9B**, as discussed in Section XIV.E.2.c ([10.d]), Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (*the identification system*) "compare[s]" the MAC address of the UAV (*first identifier*) to the list of valid MAC address identifiers to perform authentication and thus check an authenticity of the MAC address of the UAV (*verify an authenticity of the first identifier*), where a match between the MAC address of the UAV (*first identifier*) and the valid MAC address identifier relevant to the UAV (*the second identifier*) located on the list "authenticate[s]" the MAC address of the UAV (*verify an authenticity of the first identifier using the second identifier*). See Section XIV.E.2.c ([10.d]); Pet. at 16-25, 44; XIV.E.1.a (MTC1). For **GND7C/9C**, the analysis is the same as for 7B/9B, except that *the second identifier* is formed by account information from Jarrell's remote control center, which is used by Whitmarsh's computer system, processor, or similar component that identifies UAVs (*identification system*) to authenticate the received UAV MAC address (*verify an*

authenticity of the first identifier using the second identifier), verifying an authenticity of the UAV's MAC address as the MAC address is associated with a properly government registered UAV and good standing account through the authentication comparisons, and further verifying an authenticity of the UAV's MAC address as the MAC address is associated with a UAV that is properly registered with a government authority. XIV.E.1.b (MTC2). For all grounds, successful authentication would have resulted in Whitmarsh's UAV MAC address having been authenticated, and thus provided an authenticated UAV MAC address (*and to provide an authenticated first identifier of the aerial system identifier signal when the authenticity has been verified*). See Section XIV.E.1.a-b (MTC1, MTC2); Section XIV.E.2.c ([10.d]); Pet. at 16-25, 44.

***e)* Element [10.e2]**

82. 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 first identifier of the aerial system identifier signal to the permission module*). Sections XIV.E.1.a-b (MTC1, MTC2), XIV.E.2.d ([10.e1]).

***f)* Element [10.f]**

83. 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 unmanned aerial system associated with the authenticated first identifier of the aerial system identifier signal is not permitted to be in an airspace*). *Id.*; Sections XIV.E.1.a-b (MTC1, MTC2), XIV.E.2.d ([10.e1]).

g) Element [10.g]

84. 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 unmanned 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. 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 unmanned aerial system (i) when it is determined by the permission module that the unmanned aerial system associated with the authenticated first identifier is not permitted to be in an airspace*). *Id.*; Section XIV.E.1.a-b (MTC1, MTC2). Within the combinations, Jarrell teaches that the authentication is performed and fails when there is not a match between the MAC address of the UAV and the list of valid MAC address identifiers, thus providing that the authenticity of the MAC address of the UAV has not been verified. Sections XIV.E.1.a-b (MTC1, MTC2), XIV.E.2.c ([10.d]), XIV.E.2.d ([10.e1]); EX1025, 13:23-14:15. The failure results in taking an action, such as transmitting a message to police, "civil airspace authority (or other appropriate authority)." EX1025, 13:60-14:14. Gong637 discloses that a UAV having a failed authentication of UAV identification is "forced to land." EX1022, ¶¶0094, 0122. As such, Jarrell 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 unmanned aerial system*) when the authentication of the UAV's MAC address fails and

authenticity of the UAV's MAC address is not verified *((ii) when the authenticity of the first identifier is not verified)*. Sections XIV.E.1.a-b (MTC1, MTC2), XIV.E.2.c ([10.d]), XIV.E.2.d ([10.e1]). 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.

3. Claims 11-12 and 14-18

85. The combinations teach claims 11-12 and 14-18 for the same reasons as in the Petition for original claims 2-3 and 5-9. Pet. at 27-35, 47-51.

F. GROUNDS 8B/8C AND 10B/10C: SC 13 IS OBVIOUS OVER WHITMARSH, FALK, JARRELL, AND GONG637 (GROUND 8B)/ WHITMARSH, FALK, JARRELL, GONG637, AND PASKO (GROUND 8C) AND WHITMARSH, GOODRICH, FALK, JARRELL, AND GONG637 (GROUND 10B)/ WHITMARSH, GOODRICH, FALK, JARRELL, GONG637, AND PASKO (GROUND 10C)

86. The combinations teach SC 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 Jarrell and Gong637, and Jarrell, Gong637, and Pasko, with Whitmarsh and Falk/Whitmarsh, Goodrich, and Falk for the reasons of Section XIV.E.1.a-b (MTC1, MTC2).

G. GROUNDS 11 AND 13: SCs 10-12 AND 14-18 ARE OBVIOUS OVER WHITMARSH, VIGGIANO, AND GONG637 (GROUND 11)/WHITMARSH, GOODRICH, VIGGIANO, AND GONG637 (GROUND 13)

1. Motivation to Combine

87. A POSITA would have been motivated to combine Whitmarsh, Viggiano, and Gong637, and to combine Whitmarsh, Goodrich, Viggiano, and Gong637, with a reasonable expectation of success.⁷ 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, verifying an authenticity of the identity. *Id.*, ¶0015. "[T]wo or more consecutive" comparisons can take place, with two or more failed 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,

⁷ A POSITA would have been motivated to combine Whitmarsh and Goodrich as discussed in the Petition. Pet. at 40-44.

¶¶0094, 0122. Gong637 explains UAV identification can be “authenticated by checking and confirming the identification with an authentication center on the communication network.” *Id.* Failed authentication results in the UAV being “forced to land.” *Id.* Gong637 further discloses that its UAV transmits data using a first communication unit (dedicated communication unit 426) and a second communication unit (public communication unit 428), where the communications from each unit are receivable by a terminal having two communication units that receive data from the UAV’s first communication unit and second communication unit, respectively. EX1022, ¶¶0087-0098.

88. A known problem in UAV systems was “spoofing” or fraudulent UAV identities. EX1007, ¶¶0003-0004. 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. 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. Gong637 further teaches basic

and well-known communication techniques of using separate communication units for different transmissions—for example, transmissions that take place according to different methods. EX1022, ¶¶0087-0098.

89. The combinations would have thus provided that Whitmarsh's component for receiving wireless communications and the identification information would have received (1) UAV aircraft identification information that is the wireless communication signal including the MAC address of a UAV, from a first communication unit of the UAV, as well as (2) a message authentication code formed from identification information of the UAV and a secret key of the UAV, from a second communication unit of the UAV. Sections XIV.G.2.a ([10.a]), XIV.G.2.b ([10.b]), XIV.E.2.b ([10.b]); EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3; EX1022, ¶¶0087-0098, 0122; Pet. at 16-25, 44. Moreover, Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses would have verified an authenticity of the received UAV MAC address 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 the UAV's MAC address (identity) is verified and no match indicates authenticity is not verified— with Whitmarsh's countermeasures system disrupting operation of the UAV if not verified by forcing the UAV to land.

EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3; EX1022, ¶¶0094, 0122; Sections XIV.G.2.a-c ([10.a], [10.b], [10.d]); Pet. at 16-25, 44. After successful authentication, an authenticated UAV MAC address would have then been usable by both Whitmarsh's system 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 and communication 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.*

2. Claim 10

(a) [10.a]

90. See Section XIV.E.2.a ([10.a]).

(b) [10.b]

91. See Section XIV.E.2.b ([10.b]).

(c) [10.d]

92. 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.

93. Gong637 discloses a UAV that transmits data using a first communication unit (dedicated communication unit 426) and a second communication unit (public communication unit 428), where the communications from each unit are receivable by a terminal having two communication units that receive data from the UAV’s first communication unit and second communication unit, respectively. EX1022, ¶¶0087-0098.

94. Viggiano and Gong637 thus teach 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, from a first communication unit of the UAV (*wherein the identification receiver is configured to receive (i) the aerial system identifier signal comprising the first identifier from the unmanned aerial system*), as well as (2) a message authentication code formed from identification information of the UAV and a secret key of the UAV, from a second communication unit of the UAV (*and a second*

identifier from a computing system that is remote relative to the discrimination system). Sections XIV.G.1 (MTC), XIV.G.2.a ([10.a]), XIV.G.2.b ([10.b]), XIV.E.2.b ([10.b]); EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3; EX1022, ¶¶0087-0098, 0122; Pet. at 16-25, 44. Moreover, the message authentication code (*the second identifier*) is *functioning as a second factor identifier for the unmanned aerial system* at least because it is formed from identification information and a unique secret key of the UAV, is a *second* piece of identification information that is received (the first piece of identification information is the MAC address of the UAV), and is 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.

(d) [10.e1]

95. 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. *Id.*

96. Viggiano thus teaches that Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses

(*identification system*) would have verified an authenticity of the UAV's MAC address 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 the UAV's MAC address (identity) is verified (*configured to...verify an authenticity of the first identifier using the second identifier*). EX1007, ¶¶0004, 0006-0007, 0011-0024, Figs. 1-3; EX1022, ¶¶0094, 0122; Sections XIV.G.1 (MTC), XIV.G.2.a-c ([10.a], [10.b], [10.d]); Pet. at 16-25, 44. Moreover, because Whitmarsh's computer system, processor, or similar component that identifies UAVs based on their received MAC addresses (*the identification system*) forms the first message authentication code using the received UAV MAC address, a POSITA would have understood or at least found obvious that Whitmarsh's computer system, processor, or similar component (*the identification system*) would have deciphered the received MAC address from the wireless communications it was contained in (*is configured to determine the first identifier from the aerial system identifier signal*). *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.*

(e) [10.e2]

97. 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 XIV.G.1 (MTC), XIB.G.2.c-d ([10.d], [10.e1]).

(f) [10.f]

98. 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 unmanned aerial system associated with the authenticated first identifier of the aerial system identifier signal is not permitted to be in an airspace*). *Id.*; Sections XIV.G.1 (MTC), XIB.G.2.c-d ([10.d], [10.e1]).

(g) [10.g]

99. 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 (*a disruption system configured to disrupt an operation of the unmanned aerial system*). Pet., 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. 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 unmanned aerial system (i) when it is determined by the permission module that the unmanned aerial system associated with the authenticated first identifier is not permitted to be in an airspace*). *Id.*

100. Within the combinations, Viggiano teaches that the authentication comparison is performed and a comparison that is not a match provides that the authenticity of the MAC address of the UAV has not been verified. Sections XIV.G.1 (MTC), XIB.G.2.c-d ([10.d], [10.e1]); EX1007, ¶0015. "[T]wo or more"

consecutive comparisons that are not a match results in a “responsible higher command authority” being notified so they can “respond appropriately.” EX1007, ¶0015. Gong637 discloses that a UAV having a failed authentication of UAV identification is “forced to land.” EX1022, ¶¶0094, 0122. 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 unmanned aerial system*) when the authentication comparison involving the UAV MAC address fails and authenticity of the UAV’s MAC address is not verified ((ii) *when the authenticity of the first identifier is not verified*). Sections XIV.G.1 (MTC), XIB.G.2.c-d ([10.d], [10.e1]). 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.

b) Claims 11-12 and 14-18

101. The combinations teach SCs 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.

H. GROUND 12 AND 14: SC 13 IS OBVIOUS OVER WHITMARSH, FALK, VIGGIANO, AND GONG637 (GROUND 12)/WHITMARSH, GOODRICH, FALK, VIGGIANO, AND GONG637 (GROUND 14)

102. The combinations teach SC 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 XIV.G.1.

XV. CONCLUSION

103. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. I further understand that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code. I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 1, 2026.



Dr. Girish Chowdhary