



U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of the Chief Counsel

Enforcement Division
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U.S. CERTIFIED MAIL, RETURN-RECEIPT REQUESTED
and FIRST-CLASS MAIL

SEP 14 2017

Mr. William A Moffitt
President, NavWorx, Incorporated
3706 Big A Rd.
Rowlett, TX 75089-4000

RE: NavWorx, Incorporated, Case No. 2016SW560001

Dear Mr. Moffitt:

Based on the following facts and circumstances, it appears that NavWorx, Incorporated, "NavWorx," violated the regulations of the Federal Aviation Administration for the following reasons:

1. NavWorx holds the following FAA-issued Technical Standard Order Authorizations (TSOA) to produce Automatic Dependent Surveillance-Broadcast (ADS-B) equipment in accordance with TSO-C154c—model Number ADS600-B:
 - a) Part No. 200-0012, UAT ADS-B;
 - b) Part No. 200-0013, UAT ADS-B with ARINC 429 interface;
 - c) Part No. 200-0010, TSO-C154c ADS-B UAT receiver;
 - d) Part No. 200-0011, TSO-C154c ADS-B UAT receiver with ARINC 429 interface;
 - e) Part No. 200-0110, TSO-C154c ADS-B UAT receiver with TSO-C154c GPS;
 - f) Part No. 200-0111, TSO-C154c ADS-B UAT receiver with TSO-C154c GPS and ARINC 429 interface
 - g) Part No. 200-0112, UAT ADS-B; and
 - h) Part No. 200-0113, UAT ADS-B with ARINC 429 interface.
2. These ADS600-B units must conform to TSO-C154c if marked as "TSO-C154c."
3. These ADS600-B units are "appliances" as defined in 14 C.F.R. part 1.
4. These ADS600-B units may be installed on type-certificated aircraft for use below 18,000 feet MSL, in other than Class A airspace.

COUNT I

NavWorx Produced ADS600-B Units Contrary to its TSOA

The above paragraphs are incorporated herein.

5. Under TSO-C154c, ADS-B equipment is required to transmit a Source Integrity Level (SIL) value that is defined by the integrity criteria of the GPS source for reporting the aircraft's position.
6. Effective **August 11, 2010**, the FAA's *Automatic Dependent Surveillance—Broadcast (ADS-B) OUT Performance Requirements to Support Air Traffic Control (ATC) Service*, Final Rule was issued adding 14 C.F.R. § 91.227(c)(1)(v) which requires that the aircraft's SIL must be "3." The compliance date for this final rule is January 1, 2020, hereinafter referred to as, "2020 compliant," or the "2020 mandate."
7. On **March 14, 2012**, NavWorx applied for a TSOA for its ADS600-B Universal Access Transceiver (UAT) part numbers 200-0012 and 200-0013.
8. These units contain an *uncertified* internal GPS source which lacks the integrity criteria to transmit a SIL>0.
9. On **July 29, 2013**, NavWorx was granted a TSOA for its ADS600-B Universal Access Transceiver (UAT) part numbers 200-0012 and 200-0013, and authorizing NavWorx to identify and mark the units "TSO-C154c."
10. Based on the integrity criteria of the GPS source used by NavWorx's ADS600-B units listed in subparagraph 9 above, which consisted of an *uncertified* internal GPS source, TSO-C154c, requires the equipment to transmit a SIL=0.
11. NavWorx issues a signed and dated "Certificate of Compliance" with each unit sold certifying that the unit complies with TSO-C154c.
12. The NavWorx's ADS600-B units listed above as 1(a) and 1(b), when produced in accordance with TSO-C154c—with the *uncertified* internal GPS source, were never designed, nor manufactured to meet the January 1, 2020, ADS-B **OUT** requirement in 14 C.F.R. § 91.227(c)(1)(v), which requires that the aircraft's SIL must be 3.
13. To modify these units to be "2020 compliant," NavWorx would have to replace the current *uncertified* internal GPS source with a GPS source of sufficient integrity criteria that would allow the aircraft to broadcast a SIL=3.
14. On **January 7, 2014**, NavWorx applied for and received a TSOA for its ADS600-B part numbers 200-0112 and 200-0113.

15. However, unlike its -0012 and -0013 UATs, these units contain a certified internal GPS source of sufficient integrity criteria that meets the January 1, 2020, ADS-B OUT requirements.

16. To date, NavWorx continues to use only the *uncertified* GPS chips in its model -0012 and -0013 units.

17. On **February 9, 2015**, the FAA issued a Final Rule; technical amendment, amending 14 C.F.R. § 91.225, *Automatic Dependent Surveillance-Broadcast (ADS-B) Out equipment and Use*, as follows:

(b) After January 1, 2020, and unless otherwise authorized by ATC, no person may operate an aircraft below 18,000 feet MSL and in airspace described in paragraph (d) of this section unless the aircraft has equipment installed that—

(1) Meets the performance requirements in—

(i) TSO-C166b; or

(ii) TSO-C154c, Universal Access Transceiver (UAT) Automatic Dependent Surveillance-Broadcast (ADS-B) Equipment Operating on the Frequency of 978 MHz;

(2) Meets the requirements of § 91.227.

18. On March 31, 2015, the FAA notified the aviation community via the FAA's NextGen website, <http://www.faa.gov/nextgen/programs/adsb/media/> that it was changing its Traffic Information Service–Broadcast (TIS-B Service). In short, the notification informed the aviation community that:

“1) aircraft equipped with uncertified ADS-B Out devices, apparently to obtain TIS-B services, are “invisible” to other aircraft using TSO-compliant ADS-B-In systems; 2) following a study to determine a low risk, cost-effective, technically beneficial strategy for modification of the FAA TIS-B service, TIS-B/ADS-R Client Status logic was being modified to only provide TIS-B/ADS-R client status to aircraft broadcasting ADS-B with NACp>4, NACv>0, SDA>0, **SIL>0**, and NIC>4; and, 3) the change would be effective on or after January 4, 2016, allowing more than one year for industry to modify uncertified products and notify customers appropriately.

The results of these changes will be that: 1) all ADS-B-In systems will see other aircraft equipped with ADS-B Out and transponders in areas with FAA radar/WAM coverage; 2) the aeronautical protected spectrum will be more efficiently used, and 3), FAA will eliminate the current incentive for operators to equip with ADS-B Out systems that are not compatible with certified ADS-B-In systems.”

19. Effectively, no later than **March 31, 2015**, NavWorx knew that its ADS600-B part numbers 200-0012 and 200-0013, listed above as 1(a) and 1(b), would no longer be able to receive TIS-B/ADS-R Client Status on or after January 4, 2016.

20. On or about **June 6, 2015**, NavWorx conducted an analysis review of what NavWorx identifies as “Issue #908.”

21. In its **Software and/or FGPA Change Analysis—Issue #908**, NavWorx described Issue #908 as follows:

Recent FAA change to TIS-B/ADS-R ground station services will result in ADS600-B not receiving traffic services. ADS-B IN traffic functionality will be compromised unless actions are taken to restore these traffic services internal to the ADS600-B. Action required is to change SIL from 0 to 3.

22. NavWorx identified the “Modified Software Low Level Requirement” as follows: “Write SIL shall set the System Integrity Level (SIL) to a specified SIL code.”

23. NavWorx defined the Scope of Changes accordingly: “Modify logic to change SIL from 0 to 3 for internal ADS-B compliant GPS receiver.”

24. On **June 6, 2015**, William Moffitt, President of NavWorx, approved these changes.

25. However, the internal GPS source in part numbers 200-0012 and 200-0013 remained unchanged (*uncertified*) and lacks the integrity criteria of a GPS source capable of broadcasting a System Integrity Level (SIL) of 3 as required by TSO-C154c.

26. Knowing that the software modification caused the units to broadcast a SIL=3 instead of 0, beginning **June 30, 2015**, with serial number 15270001, NavWorx began installing version 4.0.6 and later software modifications in its ADS600-B part number 200-0012 and 200-0013 UATs with the knowledge that the software modifications caused them to broadcast a SIL=3.

27. As a result of these software modifications, NavWorx ADS600-B part numbers 200-0012 and 200-0013 no longer complied with TSO-C154c.

28. Nevertheless, NavWorx intentionally continued to affix the TSO-C154c label to each unit.

29. NavWorx continued to make a record titled, “Certificate of Compliance,” which it signed, dated, and issued with each unit, to each customer, certifying that the unit complied with TSO-C154c when NavWorx knew that it did not.

30. The signed and dated Certificate of Compliance, along with the TSO label, are material as used by NavWorx to show ADS600-B part number 200-0012 and 200-0013 UATs complied with part 21, when NavWorx knew that the units did not.

31. On **July 15, 2015**, Mr. Moffitt approved a **Hardware/Software Configuration Index for ADS600-B Software/FPGA** Release 4.0.6, 243-0002-14, Revision 17, for part numbers including 200-0012 and 200-0013.

32. In **Appendix B—Issues Pertaining to Release**, page 32 of 33, Mr. Moffitt entered the following description of the change, “Redmine Issue #” 908, “Change SIL to major (3) based on amended FAR 91.225 (2/9/2015).”

33. On **July 15, 2015**, the NavWorx **ADS600-B Software Accomplishments Summary**, 243-0002-18, Revision 5, page 11 of 17, Approved by Mr. Moffitt, Engineering Manager, Section 10, Change History, The Problem Reports resolved for version 4.0.6 of the ADS600-B software are listed below—

“Redmine Issue #” 908, “Change SIL to major (3) based on amended FAR 91.225 (2/9/2015).”

34. By letter dated **September 8, 2015**, to the FAA’s Fort Worth Aircraft Certification Office (ACO), NavWorx submitted a design change notification for software (only) changes to ADS600-B part numbers 200-0012 and 200-0013 (Release 4.0.6, Issue #908) reflecting that the units would now transmit a SIL=3 instead of 0.

35. NavWorx did not submit any data with its design change indicating that the *uncertified* internal GPS source in its ADS600-B units met the integrity criteria for GPS source performance requirements of TSO-C154c to transmit a SIL=3.

36. The NavWorx transmittal letter contained the following description of the design changes:

These lifecycle documents record the minor changes made to the ADS600-B software Release 4.0.6. The software changes are classified as minor per a change impact analysis performed per AC 20-115C, section 9.b.(4). No changes have been made to the ADS600-B hardware for this release.

The following is a summary of the minor software changes for ADS600-B release 4.0.6:

1) Issue #908. Changed SIL from 0 to 3 for compliant TSO-C154c GPS position source. Recent FAA change to TIS-B/ADS-R ground station services will result in ADS600-B not receiving traffic services. ADS-B IN traffic functionality will be compromised unless actions are taken to restore these traffic services internal to the ADS600-B. Action was required to change SIL from 0 to 3.

Signed by William Moffitt, Operations Manager.

37. On **September 10, 2015**, NavWorx advised the ACO of design changes to its software including version 4.0.7, which continued to cause the units to broadcast a SIL=3.

38. The ACO reviewed this design change notification and determined that the change causing the NavWorx ADS600-B part numbers 200-0012 and 200-0013 units to transmit a SIL=3 rendered such parts to be non-compliant with TSO-C154c.

39. **On October 5, 2015**, the ACO advised NavWorx by email that because the design change made the ADS600-B part numbers 200-0012 and 20-0013 units non-compliant with TSO-C154c, NavWorx must return the SIL value to 0.

40. By transmitting a SIL=3, these models incorrectly broadcast to Air Traffic Control and to other aircraft in the National Airspace System (NAS) that they use a GPS source with the higher integrity when, in reality, they contain an *uncertified* internal GPS source of unknown integrity.

41. As a result, the operation of these units due to the transmission of potentially inaccurate aircraft position data could result in an unsafe condition in the NAS, as well as circumventing the stated goal published by the FAA in its March 31, 2015, change in TIS-B Service.

42. **On October 6, 2015**, NavWorx stated in an email to the FAA that it would return the SIL value to "0."

43. NavWorx failed to return the SIL value to "0."

44. **On December 3, 2015**, the ACO inquired whether NavWorx had returned the SIL value to "0."

45. In a **December 14, 2015**, email, NavWorx responded that it would **not** return the SIL value to "0."

46. **On December 18, 2015**, NavWorx advised the ACO of changes to its software, versions 4.0.8 and 4.0.9, which continued to cause the affected units to broadcast a SIL=3.

47. **On January 26, 2016**, and again on **February 29, 2016**, the FAA notified NavWorx that because the design change made the equipment non-compliant with TSO-C154c, NavWorx must return the SIL value to "0."

48. NavWorx refused to comply with this FAA direction.

49. **On March 13, 2016**, NavWorx notified the ACO that it had issued software version 4.1.0, which continues to cause the affected units to broadcast a SIL=3.

50. **On April 21, 2016**, in a meeting with the ACO at the FAA's Regional Office, the ACO told NavWorx that the SIL must be returned to a value of 0.

51. NavWorx refused to comply with this FAA direction.

52. NavWorx electronically transmitted version 4.0.6 and later software changes to existing owners of ADS600-B part numbers 200-0012 and 200-0013.

53. Version 4.0.6 and later software changes caused ADS600-B part numbers 200-0012 and 200-0013 to broadcast a SIL of 3 instead of 0, which resulted in the units no longer conforming to TSO-C154c.

54. As of **May 29, 2017**, ADS-B Performance Reports prepared by the FAA's Surveillance and Broadcast Services (SBS) Program ADS-B Performance Monitor, show aircraft with NavWorx ADS600-B part numbers 200-0112 and 200-0013 installed are transmitting a SIL=3.

55. As a result, by programming its ADS600-B part numbers 200-0112 and 200-0013 to broadcast a SIL=3 rather than SIL=0, NavWorx produced **334** of these units contrary to its TSOA but; nevertheless, labeled them with the TSO-C154c marking and issuing certificates of conformity stating that they complied with TSO-C154c.

COUNT II

The NavWorx website advertisements omitted material information, and made, or caused to be made, misleading statements.

The above paragraphs are incorporated herein.

56. In June 2015, NavWorx knew that its ADS600-B part numbers 200-0012 and 200-0013 contained an *uncertified* internal GPS source, which lacks the integrity criteria to broadcast a SIL>0 and cannot meet the FAA's 2020 ADS-B OUT requirements.

57. NavWorx also knew that these same units would no longer be able to receive TIS-B Service as a result of the March 2015 FAA technical amendment distributed via the FAA's NextGen website.

58. Nevertheless, NavWorx continued to advertise to the public that its ADS600-B units were "2020 compliant ADS-B Out (transmit)," "met TSO-C154c performance requirements," and complied with "FAR 91.225 and FAR 91.227."

59. On **June 14, 2016**, the NavWorx website, <http://www.navworx.com/> conveyed to potential customers the following information related to an advertisement or sales transaction:

"Equip now to meet the 2020 mandate, and enjoy the benefits of traffic & weather today!"

The ADS600-B is a remote mounted Universal Access Transceiver (UAT), providing 2020 compliant ADS-B Out (transmit) and ADS-B IN (receive) for installation in certified aircraft.

- Compliant to FAR 91.225 and FAR 91.227
- TSO/STC for 2020 ADS-B OUT mandate

Note:

The ADS600-B meets the ADS-B Final Rule Technical Amendment, dated 2/9/2015, affecting 14 CFR 91.225(b)(1)(ii) which permits ADS-B OUT in the NAS with devices that meet the performance requirements of TSO-C154c.

60. On **September 22, 2016**, the NavWorx website, <http://www.navworx.com/> conveyed to potential customers the same information related to an advertisement or sales transaction as above.

61. On **December 19, 2016**, and again on **December 29, 2016**, the NavWorx website, <http://www.navworx.com/> conveyed to potential customers the following information related to an advertisement or sales transaction:

“THE FAA SABOTAGED OUR BUSINESS”

“Our version 4.0.6 made our 12/13 products transmit SIL 3, which the FAA ground stations would recognize as sufficient to resume sending TIS-B traffic to our customers. This then removes the threat of mid-air collision from our 12/13 customers whenever they fly.”

“Equip now to meet the 2020 mandate, and enjoy the benefits of traffic & weather today!”

The ADS600-B is a remote mounted Universal Access Transceiver (UAT), providing 2020 compliant ADS-B Out (transmit) and ADS-B IN (receive) for installation in certified aircraft.

- Compliant to FAR 91.225 and FAR 91.227
- TSO/STC for 2020 ADS-B OUT mandate

Note:

The ADS600-B meets the ADS-B Final Rule Technical Amendment, dated 2/9/2015, affecting 14 CFR 91.225(b)(1)(ii) which permits ADS-B OUT in the NAS with devices that meet the performance requirements of TSO-C154c.

62. In conveying information related to an advertisement or sales transaction, NavWorx made or caused to be made these statements on its website.

63. The prominent wording that appears in the NavWorx website advertisement, “**Equip now to meet the 2020 mandate, and enjoy the benefits of traffic & weather today,**” is a material misrepresentation that the NavWorx ADS600-B part number 200-0012 and 200-0013 UATs meet the FAA’s 2020 mandate for ADS-B OUT, as well as receiving traffic and weather data.

64. The advertisement omits and materially misrepresents the essential fact that the NavWorx ADS600-B part number 200-0012 and 200-0013 UATs do not meet the 2020 mandate as they contain an internal *uncertified* GPS source, which lacks the integrity criteria to broadcast a SIL>0, and cannot meet the FAA’s 2020 ADS-B OUT requirements.

65. The advertisement omits and materially misrepresents the essential fact that the NavWorx ADS600-B part number 200-0012 and 200-0013 UATs only receive traffic and weather data because NavWorx deliberately changed the unit’s software to cause the units to transmit a SIL=3, contrary to TSO-C154c.

66. NavWorx’s advertisement misleads customers to believe that its ADS-B units are “2020 compliant,” and that they meet all FAA regulatory requirements, and are produced according to its TSOA, when in fact, they are not.

67. Action was taken in reliance upon this representation as customers purchased these units, rather than units from other manufacturers, to comply with FAA regulations to equip their aircraft with ADS-B equipment.

By reason of the foregoing, it appears that NavWorx failed to comply with the following Federal Aviation Regulations:

- (a) 14 C.F.R. § 3.5(c)(2) When conveying information related to an advertisement or sales transaction, no person may make, or cause to be made, through the omission of material information, a representation that a type-certificated product is airworthy, or that a product, part, appliance, or material is acceptable for installation on a type-certificated product in any record if that representation is likely to mislead a consumer acting reasonably under the circumstances.
- (b) 14 C.F.R. § 21.616(c) Each holder of a TSO authorization must— Ensure that each manufactured article conforms to its approved design, is in a condition for safe operation, and meets the applicable TSO.

Pursuant to 49 U.S.C. § 46301(a)(5), NavWorx is subject to a civil penalty not to exceed \$13,066.00 for each violation of the Federal Aviation Regulations. After careful consideration of all available information, we are willing to accept **\$3,685,000.00** in settlement of this matter.

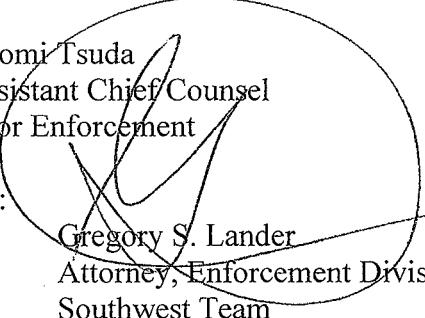
We will take no further action for a period of 30 days after your receipt of this letter to afford **NavWorx** an opportunity to submit the suggested amount in settlement or furnish additional information pursuant to the procedures described in the enclosure. Please direct all

NavWorx 2016SW560001
CP Letter

communications to **Gregory S. Lander, Attorney, Enforcement Division Southwest Team, Federal Aviation Administration, 10101 Hillwood Parkway, Fort Worth, Texas, 76177, telephone: 817/222-5083.**

Naomi Tsuda
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Enclosures: Information Sheet and Reply Form
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