सेना उड़नयोग्यता और प्रमाणीकरण केंद्र
CENTRE FOR MILITARY AIRWORTHINESS & CERTIFICATION

रक्षा अनुसंधान तथा विकास संगठन
DEFENCE R&D ORGANISATION
भारत सरकार, रक्षा मंत्रालय
GOVERNMENT OF INDIA, MINISTRY OF DEFENCE
मारत्तहल्ली कालोनी पोस्ट, बेंगलूरु – 560 037
MARATHAHALLI COLONY P.O, BENGALURU –560 037

वर्ग अनुमोदन सं.: 2062/Type Approval No.: 2062

विषय/Sub: एटीट्यूड हेडिंग रिफरेंस सिस्टम (एएचआरएस), पार्ट सं.: 1901400000000/

Attitude Heading Reference System (AHRS), Part No.: 1901400000000

यह प्रमाणित किया जाता है कि **मेसर्स एरोन सिस्टम्स प्राइवेट लिमिटेड,** प्लॉट सं. 7, लेन सं. 5, डी मार्ट के पीछे, लक्ष्मण नगर, बालेवाडी, पुणे-411 045 द्वारा अभिकल्पित, विकसित तथा उत्पादित "**एटीट्यूड हेडिंग रिफरेंस सिस्टम (एएचआरएस)**" पार्ट सं. **1901400000000**, को निर्धारित अप्रूवड कम्पोनेंट बिल्ड स्टैंडर्ड (ए सी बी एस) दस्तावेज़ सं. **एरोन/एसीबीएस/एएचआरएस/0010/14102021, दिनांक 14/10/2021**, के अनुसार और **आर सी एम ए (वायुयान)** द्वारा अनुमोदित तकनीकी विनिर्देश और क्वालिफिकेशन टेस्ट आवश्यकताओं के अनुकूल वर्ग अनुमोदित/नवीकृत किया जाता है। इस वर्ग अनुमोदन का आधार और संगत उड़नयोग्यता अनुमोदन सूचना वर्ग अनुमोदन डेटा शीट के परिशिष्ट-ए में विवरित किया गया है।

*This is to state that **"Attitude Heading Reference System(AHRS)",** bearing Part No.: **1901400000000** designed, developed and manufactured by **M/s. Aeron Systems Pvt. Ltd.** Plot No. 7, Lane No. 5, Behind D Mart, Laxman Nagar, Balewadi, Pune – 411 045 is hereby Type Approved / Renewed as per the Approved Component Build Standard (ACBS) vide document No. **Aeron/ACBS/AHRS/0010/14102021, dated 14/10/2021** and conforms to Technical Specification and Qualification Test Requirements approved by **RCMA (Aircraft)**. The basis for this Type Approval and the relevant Airworthiness Approval information are described in the 'Type Approval Data Sheet' at Appendix A.*

यह अनुमोदन निबंधन और शर्तों के अधीन तथा पृष्ट के दूसरी ओर उल्लेखित संशोधन सहित नवीकरण विवरणों के अनुसार जारी/नवीकृत किए गए दिनांक से (01-03-2022 से 28-02-2027 तक) पाँच वर्ष के लिए वैध है।

*This approval is valid for a period of **five years** from the date of issue/ renewal (from 01-03-2022 to 28-02-2027) subject to terms, conditions and renewal cum amendment details mentioned overleaf.*

सं. /No.: सेमिलैक/CEMILAC/5070/टीए/TA-2062

दिनांक / Date : 23 March 2022

फैक्ससं. / Fax No.: 080–2523 0856

ए.पी.वी.एस.प्रसाद / A.P.V.S. Prasad
उत्कृष्ट वैज्ञानिक / Outstanding Scientist
मुख्य कार्यपालक (उड़नयोग्यता)/
Chief Executive (Airworthiness)

Format as per: CEMILAC/TCS/5070, dated: 22nd March 2019

वर्ग अनुमोदन के निबंधन और शर्तें / Terms and Conditions of Type Approval

1. इस वर्ग अनुमोदन को जारी करने के फलस्वरूप उत्पाद को प्रदत्त अंतरिम निकासी सूपरसीड होती है। इसके उत्पादन के लिए अपनाई विधि को अब से सील कर दिया जाता है। उपरोक्त वर्ग अनुमोदन संख्या को सभी उपयुक्त दस्तावेज में उल्लेखित किया जाना चाहिए।

The Provisional Clearances accorded for this product are hereby superseded consequent to issuance of this Type Approval. The process adopted to manufacture this product is sealed henceforth. The Type Approval number quoted above must be reflected in all applicable documents.

2. यह वर्ग अनुमोदन जारी/नवीकृत किए गए दिनांक से **पाँच (05) वर्ष** तक वैध है बशर्ते इसे स्थगित, निरस्थ या रद्द नहीं किया जाता। विक्रेता को इस वर्ग अनुमोदन की अवधि समाप्त होने के **तीन (03) महीने** पहले ही अनुवर्ती नवीकरण के लिए निष्पादन फीडबैक को सम्मिलित करते हुए सभी संलग्न दस्वाजों के साथ सेमिलैक को सूचित करते हुए संबंधित **आर सी एम ए** से अनुरोध करना होगा।

*This Type Approval is valid for **five (05) years** from the date of issue/ renewal, unless otherwise cancelled or suspended or revoked. The vendor shall request the respective **RCMA** under intimation to CEMILAC, for subsequent renewal, **three (03) months** before the expiry of Type Approval, with all relevant documents including performance feedback.*

3. अगर इस वर्ग अनुमोदित उत्पाद में कोई परिवर्तन करना हो तो सेना उड्डनयोग्यता और प्रमाणीकरण केंद्र **(सेमिलैक)**, बेंगलूरु– 560 037की पूर्व सहमति लेनी होगी। यह वर्ग अनुमोदन सेमिलैक की पूर्वानुमोदन के बिना किसी अन्य अभिकरण को स्थानांतरित नहीं किया जा सकता है।

Any changes to the type approved product shall be effected only with prior concurrence of CEMILAC, Bengaluru – 560 037. The Type Approval is not transferable to any other agency without prior approval from CEMILAC.

4. यह वर्ग अनुमोदन, थोक उत्पादन के लिए डी.जी.ए.क्यू.ए, रक्षा मंत्रालय, भारत सरकार द्वारा गुणवत्ता नियंत्रण पक्ष की निकासी एवं स्पष्ट रूप से दर्शाए गए प्रोसेस के कड़े अनुपालन पर आधारित है।

*This approval is contingent upon strict adherence to the quality control aspects of bulk production as stipulated by **DGAQA,** Ministry of Defence, Government of India.*

5. यह वर्ग अनुमोदन किसी भी प्लैटफॉर्म पर फिटमेंट और एकीकरण के लिए प्राधिकृत नहीं करेगा जब तक प्लैटफॉर्म के ई एस ओपी में उल्लेखित नहीं हो या उद्देश्य के लिए विशेष सेवा मंजूरी नहीं दी गई हो।

Type Approval shall not constitute authority for fitment and integration on any platform unless called in the ESOP of the platform or specific service clearance to that effect.

Record of Provisional Clearances issued by RCMA		
SL. No.	**Reference of Provisional Clearance issued/ renewed with date**	**Validity**
01	RCMA (A/C)/HAL (BC)/902/PC-TA, dated: 18/12/2019	Two Year
02	RCMA (A/C)/HAL (BC)/902/PC-TA/31, dated: 23/12/2021	Six months

Record of Amendments approved by CEMILAC		
Sl. No.	**Amendment details**	**Basis and References**
01	---	---

Record of Type Approval issue and renewals			
Sl. No.	**Date of Issue/ Renewal**	**Sl. No.**	**Date of Issue/ Renewal**
1	----	2	-----

टीए सं./**TA No. 2062**

सेवा में/**Copy To**

क्र सं.	फर्म का पता		Sl No.	Firm Address	
1	**महा प्रबंधक** मेसर्स एरोन सिस्टम्स प्राइवेट लिमिटेड, प्लॉट सं. 7, लेन सं. 5, डी मार्ट के पीछे, लक्ष्मण नगर, बालेवाडी, पुणे-411 045		1	**The General Manager,** M/s. Aeron Systems Pvt. Ltd. Plot No. 7, Lane No. 5, Behind D Mart, Laxman Nagar, Balewadi, Pune – 411 045	
2	**क्षेत्रीय निदेशक** आरसीएमए (वायुयान), डीआरडीओ, सेमिलैक द्वारा मेसर्स एचएएल वायुयान प्रभाग, विमानपुरा पोस्ट, बेंगलूरु – 560 017		2	**The Regional Director** RCMA (Aircraft), DRDO, CEMILAC, C/o M/s. HAL Aircraft Division, Vimanapura Post, Bengaluru - 560 017	
3	**क्षेत्रीय निदेशक** एक्यूए (वायुयान) द्वारा मेसर्स एचएएल वायुयान प्रभाग, विमानपुरा पोस्ट, बेंगलूरु – 560 017		3	**The Regional Director** AQA (Aircraft), C/o M/s. HAL Aircraft Division, Vimanapura Post Bengaluru-560 017	
4	**महा प्रबंधक,** मेसर्स एच ए एल इंडिजनाइसेशन कक्ष, कार्पोरेट कार्यालय, 15 / 1 कब्बन रोड, बेंगलूरु– 560 001		4	**The General Manager** M/s. HAL Indigenization Cell Corporate Office 15/1 Cubbon Road Bengaluru – 560 001.	
5	**महा निदेशक,** डी जी ए क्यू ए, रक्षा मंत्रालय एच ब्लॉक, नई दिल्ली – 110 011		5	**The Director General,** DGAQA, Ministry of Defence 'H' Block New Delhi – 110 011.	
6	**निदेशक (वायुयान)** सेमिलैक बेंगलूरु – 560 037.	सूचनार्थ	6	**The Director (Aircraft)** CEMILAC Bengaluru – 560 037.	for information please

➡ For any clarifications please contact CEMILAC at the following contacts:-

1- 1st level of contact: Thippeswamy. H, Technical Officer-B, Directorate (TC&PI)
Ph.: 080-25121026 / 9611348424, Email: hthippeswamy.cemilac@gov.in

2- Next level of contact: A.R. Raghunath, Sc 'G', Director (TC&PI)
Ph.: 080-25121401 / 9449049457, Email: gd.tcs@cemilac.drdo.in

Note: In case, If the clarifications are not resolved at the above levels; you may escalate the issue to CE (A), CEMILAC at the following:-
Ph: 080-25121001, Email: chief.cemilac@gov.in

Table No.: 01

Sl. No.	Description	Details/ Document Reference
1	Product Name	Attitude Heading Reference System (AHRS)
2	Part number[1]	1901400000000
3	Name & address of Design & Development Agency[2]	M/s Aeron Systems Pvt. Ltd. Plot No. 7, Lane No. 5, Behind D'Mart, Laxman Nagar, Balewadi, Pune-411045
4	Name and Address of the Manufacturing agency[3]	M/s Aeron Systems Pvt. Ltd. Plot No. 7, Lane No. 5, Behind D'Mart, Laxman Nagar, Balewadi, Pune-411045
5	Brief Product end use application (about 10 words)	Attitude Heading Reference System (AHRS), Model No. OCT2 AN5300S provides accurate attitude and heading information for airborne application and it is intended to be used for 'Get U Home' purpose. It is equipped with tactical grade MEMS based Gyros and Accelerometers and built in a Magnetometer.
6	Technical Specification[4]	Doc No. 1901406006001, Ver 1.1 dated 30/10/2019
7	Drawing Applicability List (DAL) / Master Drawing Index (MDI) and Bill of Materials (BOM)[5]	MDI : Doc No. 1901406007001, Ver 1.1 dated 22/02/2019 BOM: Power Board Doc No.: 1901406204010, V1.1 dated 11/01/2019 Main Board Doc No.: 1901406204020, V1.1 dated 11/01/2019 IMU Board Doc No.: 1901406204030, V1.1 dated 11/01/2019 IMU Sensor Board Doc No.: 1901406204040, V1.0 dated 09/10/2018
8	Standard of Preparation (SOP)/ Approved Component Build Standard (ACBS)[6]	Aeron/ACBS/AHRS/0010/14102021 Date: 14/10/2021
9	Qualification Test Schedule (QTS)[7]	Ref. No.: 1901407019001, dated: 24/10/2018
10	Qualification Test Report (QTR)[8]	Doc No.: 1901407033001, Ver 1.1 dated 28/05/2019
11	Provisional Clearance & renewals / extensions (PC)[9]	Doc No.: RCMA(A /C)/ HAL(BC)/902 /PC-TA dated 18/12/2019 Doc No.: RCMA(A /C)/ HAL(BC)/902 /PC-TA/31 dated 23/12/2021
12	Any other relevant information	Nil

Table - 02

Qualification Test Schedule Compliance Statement

(As per QTS Reference No. **1901407019001, dated 14/10/2018**)

SL No.	QTS Clause No.	Name of The Test	Requirement	Compliance Status/ Remarks
1.	5.0	Static Test	Visual Inspection, Weight and dimension verification, input resistance check	Complied
2.	8.1	ESS Test Pre Thermal Random Vibration	05 min in each X, Y & Z axis MIL-STD-2164, Method 514.5	Complied
3.	8.2	ESS Test Thermal Cycling Test	From -40°C to +71°C for 10 Cycles & Dwell of 90 minute MIL-STD-810F	Complied
4.	8.3	ESS Test Post Thermal Random Vibration	05 min in each X, Y & Z axis MIL-STD-2164, Method 514.5	Complied
5.	9.3	EMI/EMC Test	RE102 MIL-STD-461E, section 5.16	Complied
		EMI/EMC Test	CE102 MIL-STD-461E, section 5.5	Complied
		EMI/EMC Test	CS101 MIL-STD-461E, section 5.7	Complied
		EMI/EMC Test	CS115 MIL-STD-461E, section 5.13	Complied
		EMI/EMC Test	CS116 MIL-STD-461E, section 5.14	Complied
		EMI/EMC Test	CS114 MIL-STD-461E, section 5.12	Complied
		EMI/EMC Test	RS103 MIL-STD-461E, section 5.19	Complied
6.	9.4	Random Vibration Test	i) Resonance search at 0.5g from 15Hz to 2000Hz. Initial & final resonance search shall be conducted before & after the vibration test. ii) As per method 514.5C-17, Procedure I, of MIL-STD-810F (0.04g2/Hz for 15Hz to 1000Hz and falling off at -6dB/octave from 1000Hz to 2000Hz), 1 hr per axis.	Complied
7.	9.10 & 9.11	Acceleration Test	i) Operational Acceleration test: '13' g for 1 min each in all 6 directions with the unit switched ON. ii) Structural Acceleration test: '17' g in all six directions, for 1 Minute in each direction with the unit switched OFF. BS3G100, Part 2, Sec 3, sub sec 3.6	Complied

SL No.	QTS Clause No.	Name of The Test	Requirement	Compliance Status/ Remarks
8.	9.9	Functional Shock test	15g,11msec,half sine wave and 3 shocks each in all 6 directions (Total 18 shocks) with units in ON condition. MIL-STD-810E, Method 516.4	Complied
9.	9.12	Transit Drop Test	Total number of drops confined to 26, with a height of 48" (122cms), locations of drop will be 12 edges, 8 corners & 6 faces of the unit. MIL-STD-810F, Method 516.5	Complied
10.	9.13	Thermal Shock Test	One cycle of a. -40°C for one hour, b. +71°C for one hour Total no. 3 cycles MIL-STD-810F, Method 503.4	Complied
11.	9.14	Drip Test	Water shall be dispensed at an overall rate not less than 280 liter/m2/hour for a period not less than 15 minutes. MIL-STD-810F, Method 506.4	Complied
12.	9.15	Fungus Test	Fungi to be applied and incubate the samples for a period of 28 days at 29°C, 95% Relative Humidity. JSS 55555 rev 3	Complied
13.	9.16	Fluid Contamination	Apply test fluid onto the external surface of plates. Store the samples in a chamber for 7 days at temperature 71°C ± 3°C. MIL-STD-810F, Method 504	Complied
14.	9.17	Corrosion Salt Fog Test	Maintain the chamber at 35°C and spray salt solution continuously for 24hours. Spray the salt solution such that Salt Fog collectors can collect 0.5 to 3mm of solution per hour per 10 cm diameter of the collector. Allow drying at ambient conditions for 24 hours. No. of cycles: 2. MIL-STD-810E, Method 509.3	Complied
15.	9.5.3	High Temperature Ground Survival Test	Unit subjected to a temperature of +90°C ± 2 and maintained for further 2 hrs. BS3G100, Clause 6.3.1.1	Complied
16.	9.5.4	Ground Operation Long Term Test	Unit subjected to +55°C ± 2 for 4 hours. BS3G100, Clause 6.3.3	Complied
17.	9.5.5	Ground Operation Short Term Test	Unit subjected a stabilized temperature of +71°C ± 2 and maintain this condition for further 1/2 hr. BS3G100, Clause 6.3.2	Complied

SL No.	QTS Clause No.	Name of The Test	Requirement	Compliance Status/ Remarks
18.	9.6	Low Temperature Test	Unit subjected to -55 °C ±2°C for 2 hours of stabilization, -40 °C ±2°C for a period of 4 hours. BS3G100, Clause 6.1.1	Complied
19.	9.7	Low Pressure (Altitude) Test	Operational condition, air pressure corresponding to 50,000 feet for 1 Hour. Non-functional excursion to air pressure corresponding to 60,000 feet for 2 Minutes. JSS55555:2000, Clause 3.2.1.4	Complied
20.	9.8	Humidity Test	Total 5 Cycles of 48 Hours MIL STD 810F, Method 507.4	Complied

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Note

1. Part number shall be unique to the product type approved (as in Provisional Clearance) and shall not be changed even if the product undergoes modifications in due course. In exceptional cases where the form, fit and function of the product is affected due to major modifications arising due to end use requirements, the modified product shall be taken up for supplementary type approval with a new part number. The extent of modification and the incremental qualification required for supplementary TA shall be evolved in consultation with RCMA and adequately documented as supplementary type record.
2. Generally, IPR rests with D&D agency and D&D agency (ies) shall be responsible for any Design changes, Modifications, Defect Investigations, Repair schemes, Lifing studies, etc., that may arise during the life cycle. Anything contrary to the above shall be explicitly captured in the TOT document duly approved by CEMILAC.
3. Manufacturer can be D&D agency itself or maybe a development partner during D&D phase or any other agency that may acquire manufacturing rights based on TOT from the D&D agency. Although multiple agencies may manufacture the type approved item with same part number, the product label should adequately capture the name and address of the manufacturer for traceability.
4. All technical specifications shall be approved and authenticated by RCMA. Partial compliance and Deviations to Technical specifications are generally NOT acceptable. However, in exceptional cases the product deviations to the technical specification shall be adequately captured and included in the type approval data sheet duly concurred by RCMA.
5. The DAL and MDI shall be updated whenever there are issue changes and/ or modifications to the product. The same shall be approved by RCMA and taken up for incorporation in the type record and TA certificate at the time of subsequent TA renewal.
6. The product build standard shall be completely defined in the SOP/ ACBS document incorporating the latest issues of the applicable DAL/ MDI and Modifications that may be approved during the

product lifecycle. The mod leaflets duly approved by RCMA shall be the authority for incorporating such changes till the amendment cum renewal to the TA is issued.

7. QTS shall capture the type certification test requirements in totality and shall be approved by RCMA.

8. QTR shall adequately capture the Compliance to QTS requirements and shall be vetted by DGAQA. DGAQA to coordinate all the Test reports carried out as per the QTS. Any deviations to test procedures and results shall be addressed completely and accepted by RCMA before recommending for type approval.

9. The renewal and validity and PC shall comply with relevant CEMILAC directives. The Type Approval issued supersedes all earlier PCs issued to the product. Even if the product undergoes modification that warrant field evaluation feedback, fresh PC shall not be issued.

10. D&D agency shall follow suitable Configuration Control mechanism (Document reference number, Issue/ version numbers, Sections, Page numbers, dates) for easy identification and traceability of all the above documents and their subsequent updates from time to time.

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