



CERTIFICATE OF TYPE APPROVAL

(EC Certificate of Type Examination - Module B)
(Marine Equipment Directive - 96/98/EC)

Applicant:-
Kelvin Hughes Ltd
New North Road, Hainault
Ilford, Essex IG6 2UR
United Kingdom

Manufacturer:-
Kelvin Hughes Ltd
New North Road, Hainault
Ilford, Essex IG6 2UR
United Kingdom

This is to certify that the applicant has submitted details of a:-

Shipborne Radar Equipment with Automatic Radar Plotting Aid (ARPA)
(COMMISSION DIRECTIVE 2002/75/EC – ITEM A.1/4.34)

Of system type known and designated as:-


a) **Nucleus 3, SharpEye™, S Band Marine Radar/ARPA Systems**

(Comprising component parts and having technical characteristics shown in schedules 1 to 6) and that these have been assessed, tested and when used in a combination of component parts as described in the attached schedules, is CERTIFIED as complying with the relevant parts of:

EN 60936-1:2000, "Marine Shipborne Radar Equipment"
EN 60872-1:1999, "Automatic Radar Plotting Aid (ARPA)"
EN 60945 : 2002, "General Requirements for Marine Navigation Equipment"

(being European Standards for Technical Characteristics and Methods of measurements equivalent to IEC 60936-1, IEC 60872-1 and IEC 60945, published by the International Electrotechnical Commission). It is also RECOGNISED that the equipment conforms to performance standards not inferior to those adopted by the International Maritime Organisation, and which are contained in Resolution MSC 64(67) Annex 4, Resolution A823(19) and the relevant parts of Resolution A694(17).

SIGNED:



DATE of ISSUE:

15th April 2008

P J Goddard

Authorised Signatory

DATE of EXPIRY :

1st July 2010

Certificate Number:

QQ-MED-08/08-02

EU/USCG Mutual Recognition Agreement
Council Decision 2004/425/EC

USCG Approval Number: 165.120/EC0191/0808-02
(ARPA display and function only)

This Certificate is Valid until expiry date shown, subject to the standard conditions of issue printed on the attached schedule
Kelvin Hughes Ltd are Module D registered with QinetiQ
in accord with standard condition 3, ref; Certificate DQAS-06/01-KH001R3.

QinetiQ
Cody Technology Park
Ively Road, Farnborough
Hampshire. GU14 0LX



Maritime and Coastguard Agency
The MCA is an Executive Agency of
the Department for Transport

Under the terms of the United Kingdom Statutory Instrument, No 1957 : 1999, QinetiQ Ltd has been Notified to the European Commission by the Maritime and Coastguard Agency as a Body authorised to conduct Conformity Assessment procedures under the provisions of the European Council Directive 96/98/EC (as amended) on Marine Equipment and issue Certificates of Type Approval.

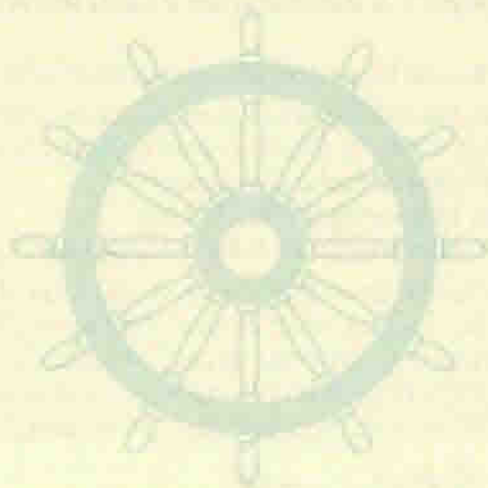
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Notified Body 0191

Certificate of Type Approval - Schedule 1

Nucleus 3, 5000, SharpEye™ Marine Radar/ARPA Systems

The applicant declared that the following units comprise the radar equipment of the system designation a)&b) shown on page 1. These units have been assessed & tested, and satisfactory details of these units were included in the technical file. These units form systems consistent with the Item Description A.1/4.34, given in Annex A1 of Commission Directive 2002/75/EC.

MAIN UNIT Comprising:-

- | | | | |
|-----------------------|---|--------------|----|
| 1 | Nucleus 3 5000 Desktop LCD Display
with integral Radar / ARPA Processor Unit | NNR-A62 | |
| 2 | SharpEye Transceiver/Turning Unit, 24RPM
and Drive control unit | DTX-A1 | |
| 3 | S-Band Low Profile Antenna, 3.9m | GTX-A24 | |
| | | LPA-A3 | |
| SOFTWARE:- Radar-ARPA | | Version 2.xx | *1 |
| ARPA 3 Software | | Version 4.xx | *1 |

----- End of List -----

And which may include any item or combination of items from the list of optional items found in schedule 2 on page 4.

NOTES:-

- This approval remains valid for equipment including subsequent Minor software amendments, as allowed by the N.xx format (xx represents numerals), where written details of any such modifications have been submitted to and accepted by QinetiQ.



Technical Characteristics

FREQUENCY OF OPERATION	2.93 to 3.07 GHz	20MHz instantaneous bandwidth
PULSE REPETITION FREQUENCY (PRF)	610Hz,1220Hz	
PULSE LENGTHS	0.1µs, 0.2µs, 0.4µs, 0.4µs	Pulse compression and coherent pulse Doppler
EMISSION CODE	20M0F3NAN	Solid State Transmitter
POWER CHARACTERISTIC	170W	(PEP)
RADAR DISPLAY CIRCLE	≥250mm	Effective Diameter
IEC 61162-1 SERIAL (NMEA) PORTS	Listner - 2 Talker - 2	Conformity to IEC 61162-1:2000. Optional multi-input serial controller/interface unit available.
TEMPERATURE RANGE Exposed & IEC 60945 CLASS Protected	-25°C to +70°C -15°C to +55°C.	-- Turning Units & Antenna -- All other units
POWER SOURCE	110-240V AC, 50/60Hz	A 3 phase supply is used by the S-Band turning unit.

Conditions of Issue of this certificate are printed the reverse of page 6.

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Hampshire. GU14 0LX

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Certificate of Type Approval - Schedule 2

Nucleus, Radar Systems - Ancillary and Optional Units

The applicant declared that the following units may be added to the basic radar systems illustrated in schedules 1 to 4. These units have been assessed & tested in conjunction with various Kelvin Hughes, Nucleus 3 and MANTA radar systems, and satisfactory details were included in the technical files.

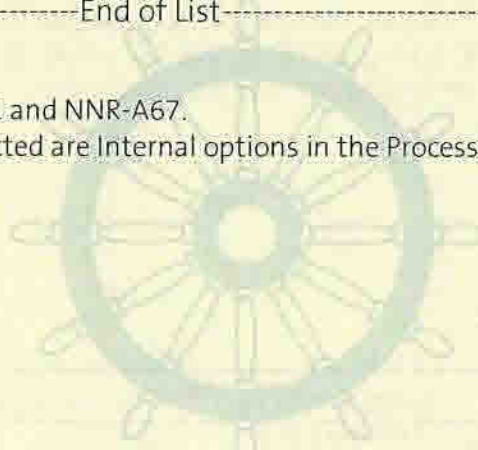
ANCILLARY UNITS:-

Dual Interswitch Unit	HRC-A9	
Ergonomic Trackerball Unit (Ergopod, Right hand)	NNR-A18	
Ergonomic Trackerball Unit (Ergopod, Left hand)	NNR-A18-2	
Remote Keyboard (alpha-numeric)	45-975-0083-001	
Remote Desktop Control Pod	NNR-A10-6	
Radar Control Panel Unit	FSD-A11	
Radar Interswitch (CAN Bus – 6 Channel) Unit (RIU)	NNR-A55	
Transceiver Interface Unit (TIU)	NNR-A66	
(incorporates CAN adaptor & cable converter PCBs)		*1
Multi Input Serial Controller (MISC) PCB	NNR-A589	*2
Master/Slave PCB	NNR-A285	*2
Slave Video Kit	NNR-A508	*2
Low Ratio Gyro Kit	HRC-A107	*2

-----End of List-----

* NOTES:-

1. Items NNR-A981 and NNR-A67.
2. These items if fitted are Internal options in the Processor Unit.



Conditions of Issue of this certificate are printed the reverse of page 6.

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Certificate of Type Approval - Schedule 3

Statement on Spurious and Out of Band Emissions and the Boundary between these emissions

The following Radar Transceivers, which forms part of the systems shown on earlier schedules, has been subject to a measurement procedure as detailed in IEC 60936-1, Annex D, as contained in Amendment 1, dated July 2002 and the guidelines contained in ITU-R Recommendation RM.1177-3. This standard defines the test method and requirements for shipborne radar to meet in order to comply with Appendix S3 of the Radio Regulations and ITU-R Recommendations SM.1539-1 and SM.1541-1.

The results of the measurement procedure were satisfactory and provide sufficient evidence that this Radar Transceiver is compliant with the criteria contained in the stated standards.

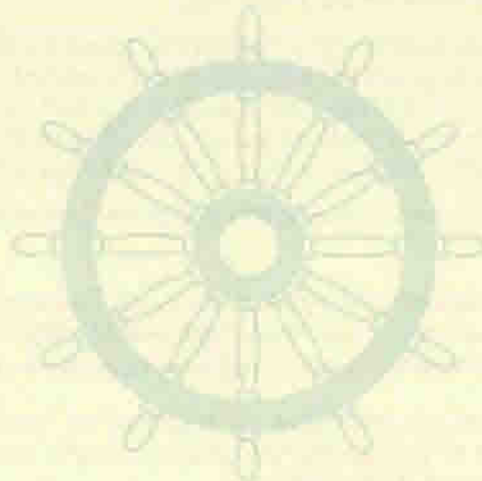
The Transceivers Measured were:-

Description	Model No.	SharpEye™ transceiver	Rotary Joint
SharpEye Transceiver/Turning Unit	DTX-A1	DTX-A101	GTX-A150-2

The test reports detailing the tests and test results obtained are:-

QinetiQ/IS/ICS/CR080251/1

These reports together with manufacturers drawings and declarations also detail the build standard regarding items such as Antenna, waveguide and any filters fitted to the test unit which the the test results specifically apply.



Notified Body 0191

Conditions of Issue of this certificate are printed overleaf.

QinetiQ
Cody Technology Park
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Hampshire. GU14 0LX

Certificate Number QQ-MED-08/08-02

Certificates of Type Approval Conditions of Issue

1. Each Certificate will be used in its entirety and not reproduced in part.
2. This certificate remains valid until the date shown (normally 5 years) unless cancelled or revoked, provided:-
 - i) the design and manufacture remain unmodified from the specimen tested and recorded in the Technical Construction File;
 - ii) any conditions contained in the schedule are complied with;
 - iii) Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply;
 - iv) and, the equipment remains satisfactory in service.
3. The mark of conformity may only be affixed to the equipment listed on this certificate and a manufacturer's Declaration of Conformity issued when the production Quality Assurance requirements laid down in Annex B, of the Directive (96/98/EC) is fully complied with and controlled by a written inspection agreement with a Notified Body. The use of the QinetiQ Notified Body Number (0191) in combination with the Wheelmark implies that the manufacturer is Registered with the QinetiQ Quality Assurance Scheme. A Certificate of Registration is issued to the manufacturer and should be made available on request. The manufacturer is responsible for ensuring that certification renewal and periodic surveillance are maintained.
4. USCG Approval Number, A Mutual Recognition Agreement (MRA) on marine equipment exists between the European Commission and the US Coastguard but only applies to equipment types included in the listing of marine equipment annexed to the MRA. For included equipment a USCG Approval number may be issued. This can be found under the MED certificate number on the first page and should be used on the main identity label of the equipment. Radio and Radar equipment continues to need separate or additional approval by the USA FCC.
5. This certificate does not confer any approval status to this equipment other than defined by, and tested according to the specifications listed on page 1.
6. The labeling requirements of IMO Resolution A694(17) shall be met. Descriptions of each unit of apparatus forming part of the equipment will be as given on this Certificate. Each unit of equipment will be marked with the minimum safe distance at which it should be mounted from a standard and steering magnetic compass.
7. No unit of apparatus shall be advertised or labeled as "approved" or "certified" on behalf of the Maritime and Coastguard Agency, the Department of Transport or the QinetiQ Group in any sense other than that it is a type that has been assessed as satisfactory against the specification;
8. The manufacturer must advise QinetiQ of any intended changes to the design or production of the equipment which might affect the equipment performance.
9. Minor Modifications to the equipment will be considered on a case-by-case basis. QinetiQ will review any factory test results, in consultation if necessary, with the test facility that conducted the original Type Approval testing on the equipment. QinetiQ will advise the manufacturer if any further testing is required to maintain valid certification.
10. If an equipment manufacturer wishes to have the type approved equipment designated under alternative names (e.g. agent/distributor's name and model number), a separate application should be completed and sent to QinetiQ.

QinetiQ Ltd
Marine Approval and Testing Service
Cody Technology Park, Room 1005/A5
Ively Road, Farnborough
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United Kingdom