



CERTIFICATE OF TYPE APPROVAL

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

Applicant:-

Northrop Grumman Sperry Marine B.V.
118 Burlington Road, New Malden
Surrey, KT3 4NR
United Kingdom

Manufacturer:-

Northrop Grumman Sperry Marine B.V.
118 Burlington Road, New Malden
Surrey, KT3 4NR
United Kingdom

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

Shipborne Radar Equipment with Electronic Plotting Aid (EPA)
(COMMISSION DIRECTIVE 2002/75/EC – ITEM A.1/4.36)

Of system type known and designated as:-

- a) Bridgemaster E, EPA(L)18 - 180mm Display, X-Band Radar/EPA Systems
- b) Bridgemaster E, EPA(L)18 - 180mm Display, S-Band Radar/EPA Systems
- c) Bridgemaster E, EPA(L)25 - 250mm Display, X-Band Radar/EPA Systems
- d) Bridgemaster E, EPA(L)25 - 250mm Display, S-Band Radar/EPA Systems

(Comprising component parts and having technical characteristics shown in schedules 1 to 5)
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 60872-3:2001, "Electronic Plotting Aids (EPA)"

EN 60945 : 1997, "General Requirements for Marine Navigation Equipment"

(being European Standards for Technical Characteristics and Methods of measurements equivalent to
IEC 60936-1, IEC 60872-3 and IEC 945, 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 the relevant parts of
Resolution MSC 64(67) Annex 4 and Resolution A694(17).

SIGNED:

DATE of ISSUE: 4th June 2004

DATE of EXPIRY : 11th June 2008

P J Goddard Authorised Signatory

Certificate Number: QQ-MED-32/03-03R

This Certificate is Valid until expiry date shown, subject to the
standard conditions of issue printed on the attached schedule

Sperry Marine are Module D registered with QinetiQ, ref;
Certificate DQAS-16/04-NGS001 & Condition 3.

QinetiQ
Fraser Range
Fort Cumberland Road, Eastney
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*Under the terms of the United Kingdom Statutory Instrument, No 1957 : 1999, the QinetiQ Group PLC (formerly known as DERA) 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 on Marine Equipment and issue Certificates of Type Approval.*

Certificate of Type Approval - Schedule 1

Bridgemaster E, EPA(L)18 - 180mm, X-Band Radar/EPA System

The applicant declared that the following units comprise the radar equipment of the system designation a) given above. 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 A1/4.36, given in Annex A1 of Commission Directive 2002/75/EC.

MAIN UNIT Comprising:-

Radar Display - LCD Monitor	65815C	
or Radar Display - CRT Monitor	65814F or R	
Processor - Radar/EPA	65800PA#◇ or PD#	*1, 2
Transceiver/Turning Unit (10kW)	65810#A# or #D#	*3, 4, 5
or Transceiver/Turning Unit (25kW)	65825#A#	*3, 4, 5
or Transceiver Bulkhead (10kW)	65810A, B, E, F, G, H, L, P, T or W	
or Transceiver Bulkhead (25kW)	65825A, B, E, F, G, H, L, P, T or W	
and Turning Unit	65801BAR or CA#	*4, 5
X-Band Antenna (4, 6 or 8ft)	65604A or 65606A or 65608A	
SOFTWARE:- Main System Software	Version SC1.03	*6, 7

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

And which may include any item or combination of items from the list of optional items found in schedule 5 on sheet 6.

NOTES:-

- 1 A 3rd letter (#) suffix (M or N) is used to denote the choice of Compass option.
- 2 A 4th letter (◇) suffix (A, B, C, or D) is used to denote the choice of controls which may include Keyboard and Joystick or Rollerball.
- 3 A 1st letter (#) suffix (M, N, P, T or W) is used to denote the choice Bias limiter, extra short pulse transmit or additional facilities
- 4 A 3rd letter (#) suffix (R, T or U) is used to denote the choice of pulse or syncro azimuth signal.
- 5 This item is link selectable on installation to 24 or 48 RPM antenna speed
- 6 Previous software versions SC1.01 & SC1.02 also meet the specification requirements.
- 7 Software Modification: This approval is valid for equipment including subsequent software versions only where written details of such versions have been submitted to and accepted by QinetiQ.

Technical Characteristics

FREQUENCY OF OPERATION	9.410 GHz	±30MHz
PULSE REPETITION FREQUENCY (PRF)	1800, 1800, 785	3000 on 'G', 'L', P' & 'T' 1 st Suffix TxRx
PULSE LENGTHS	0.05µs, 0.25µs, 0.75µs	
EMISSION CODE	3M00P0NAN	
POWER CHARACTERISTIC	10kW or 25kW	(PEP)
RADAR DISPLAY CIRCLE	≥180mm	Effective Diameter
IEC 61162-1 SERIAL (NMEA) PORTS	Listener - 2 Talker - 2	Conformity to IEC 61162-1:2000.
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	100-240V AC, 50/60Hz 24V DC	

Conditions of Issue of this certificate are printed the reverse of sheet 7.

QinetiQ
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Certificate Number **QQ-MED-32/03-03R**

Certificate of Type Approval - Schedule 2

Bridgemaster E, EPA(L)18 - 180mm, S-Band Radar/EPA System

The applicant declared that the following units comprise the radar equipment of the system designation b) given above. 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 A1/4.36, given in Annex A1 of Commission Directive 2002/75/EC.

MAIN UNIT Comprising:-

Radar Display - LCD Monitor	65815C	
or Radar Display - CRT Monitor	65814F or R	
Processor - Radar/EPA	65800PA* \diamond	*1, 2
Transceiver/Turning Unit (30kW)	65830M \S R or N \S *	*3, 4
or Bulkhead Transceiver (30kW)	65831A or B	
and Turning Unit	65830B \S R or C \S *	*3, 4,
Scanner Control Unit	65837A \emptyset	*5
S-Band Antenna 12ft	65612A	

SOFTWARE:- Main System Software Version SC1.03 *6, 7

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

And which may include any item or combination of items from the list of optional items found in schedule 5 on sheet 6.

NOTES:-

1. A 3rd letter (*) suffix (M, or N) is used to denote the choice of Compass option.
2. A 4th letter (\diamond) suffix (A, B, C, or D) is used to denote the choice of controls which may include Keyboard and Joystick or Rollerball.
3. A 2nd letter (\S) suffix (E, F, G, H, J, K, L, M, P, Q, R or S) is used to denote the choice of operating voltage and 24 or 48 RPM antenna speed.
4. A 3rd letter (*) suffix (R, T or U) is used to denote the choice of pulse and/or syncro azimuth signal.
5. A 2nd letter (\emptyset) suffix (B, C, E, F or H) is used to denote the choice of operating voltage and 24 or 48 RPM antenna speed.
6. Previous software versions SC1.01 & SC1.02 also meet the specification requirements.
7. Software Modification: This approval is valid for equipment including subsequent software versions only where written details of such versions have been submitted to and accepted by QinetiQ.

Technical Characteristics

FREQUENCY OF OPERATION	3.050 GHz	± 10 MHz
PULSE REPETITION FREQUENCY (PRF)	1800, 1800, 785	
PULSE LENGTHS	0.05 μ s, 0.25 μ s, 0.75 μ s	
EMISSION CODE	3M00P0NAN	
POWER CHARACTERISTIC	30kW	(PEP)
RADAR DISPLAY CIRCLE	≥ 180 mm	Effective Diameter
IEC 61162-1 SERIAL (NMEA) PORTS	Listener - 2 Talker - 2	Conformity to IEC 61162-1:2000.
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	100-240V AC, 50/60Hz	Turning Unit can be 1 or 3 phase

Conditions of Issue of this certificate are printed the reverse of sheet 7.

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Certificate Number **QQ-MED-32/03-03R**

Certificate of Type Approval - Schedule 3

Bridgemaster E, EPA(L)25 - 250mm, X-Band Radar/EPA System

The applicant declared that the following units comprise the radar equipment of the system designation c) given above. 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 A1/4.36, given in Annex A1 of Commission Directive 2002/75/EC.

MAIN UNIT Comprising:-			
Radar Display - LCD Monitor	65817C		
or Radar Display - CRT Monitor	65821#		*1
Processor - Radar/EPA	65800PA#◇ or PD#◇		*2, 3
Transceiver/Turning Unit (10kW)	65810#A# or #D#		*4, 5, 6
or Transceiver/Turning Unit (25kW)	65825#A#		*4, 5, 6
or Transceiver Bulkhead (10kW)	65810A, B, E, F, G, H, L, P, T or W		
or Transceiver Bulkhead (25kW)	65825A, B, E, F, G, H, L, P, T or W		
and Turning Unit	65801BAR or CA#		*5, 6
X-Band Antenna (4, 6 or 8ft)	65604A or 65606A or 65608A		
SOFTWARE:- Main System Software	Version SC1.03		*7, 8
----- End of List -----			

And which may include any item or combination of items from the list of optional items found in schedule 5 on sheet 6.

- NOTES:-
- 1

A 1st letter (#) suffix (F, K, R or V) is used to denote display resolution and buffered O/P
- 2

A 3rd letter (#) suffix (M or N) is used to denote the choice of Compass option.
- 3

A 4th letter (◇) suffix (A, B, C, or D) is used to denote the choice of controls which may include Keyboard and Joystick or Rollerball.
- 4

A 1st letter (#) suffix (M, N, P, T or W) is used to denote the choice Bias limiter, extra short pulse transmit or additional facilities
- 5

A 3rd letter (#) suffix (R, T or U) is used to denote the choice of pulse or syncro azimuth signal.
- 6

This item is link selectable on installation to 24 or 48 RPM antenna speed
- 7

Previous software versions SC1.01, & SC1.02 also meet the specification requirements.
- 8

Software Modification: This approval is valid for equipment including subsequent software versions only where written details of such versions have been submitted to and accepted by QinetiQ.

Technical Characteristics

FREQUENCY OF OPERATION	9.410 GHz	±30MHz
PULSE REPETITION FREQUENCY (PRF)	1800, 1800, 785	3000 on 'G', 'L', 'P' & 'T' 1 st Suffix TxRx
PULSE LENGTHS	0.05µs, 0.25µs, 0.75µs	
EMISSION CODE	3M00P0NAN	
POWER CHARACTERISTIC	10kW or 25kW	(PEP)
RADAR DISPLAY CIRCLE	≥250mm	Effective Diameter
IEC 61162-1 SERIAL (NMEA) PORTS	Listner - 2 Talker - 2	Conformity to IEC 61162-1:2000.
TEMPERATURE RANGE	Exposed -25°C to +70°C & IEC 60945 CLASS Protected -15°C to +55°C.	-- Turning Units & Antenna -- All other units
POWER SOURCE	100-240V AC, 50/60Hz 24V DC	

Conditions of Issue of this certificate are printed the reverse of sheet 7.

Certificate of Type Approval - Schedule 4

Bridgemaster E, EPA(L)25 - 250mm, S-Band Radar/EPA System

The applicant declared that the following units comprise the radar equipment of the system designation d) given above. 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 A1/4.36, given in Annex A1 of Commission Directive 2002/75/EC.

MAIN UNIT Comprising:-

Radar Display - LCD Monitor	65817C	
or Radar Display - CRT Monitor	65821x	*1
Processor - Radar/EPA	65800PA*o	*2, 3
Transceiver/Turning Unit (30kW)	65830M§R or N§≠	*4, 5
or Bulkhead Transceiver (30kW)	65831A or B	
and Turning Unit	65830B§R or C§≠	*4, 5,
Scanner Control Unit	65837Aø	*6
S-Band Antenna 12ft	65612A	
SOFTWARE:- Main System Software	Version SC1.03	*7, 8
-----End of List -----		

And which may include any item or combination of items from the list of optional items found in schedule 5 on sheet 6.

NOTES:-

1. A 1st letter (x) suffix (F, K, R, or V) is used to denote display resolution and buffered O/P.
2. A 3rd letter (≠) suffix (M or N) is used to denote the choice of Compass option.
3. A 4th letter (o) suffix (A, B, C, or D) is used to denote the choice of controls which may include Keyboard and Joystick or Rollerball.
4. A 2nd letter (§) suffix (E, F, G, H, J, K, L, M, P, Q, R or S) is used to denote the choice of operating voltage and 24 or 48 RPM antenna speed.
5. A 3rd letter (≠) suffix (R, T or U) is used to denote the choice of pulse and/or syncro azimuth signal.
6. A 2nd letter (ø) suffix (B, C, E, F or H) is used to denote the choice of operating voltage and 24 or 48 RPM antenna speed.
7. Previous software versions SC1.01 & SC1.02 also meet the specification requirements.
8. Software Modification: This approval is valid for equipment including subsequent software versions only where written details of such versions have been submitted to and accepted by QinetiQ.

Technical Characteristics

FREQUENCY OF OPERATION	3.050 GHz	±10MHz
PULSE REPETITION FREQUENCY (PRF)	1800, 1800, 785	
PULSE LENGTHS	0.05µs, 0.25µs, 0.75µs	
EMISSION CODE	3M00PONAN	
POWER CHARACTERISTIC	30kW	(PEP)
RADAR DISPLAY CIRCLE	≥250mm	Effective Diameter
IEC 61162-1 SERIAL (NMEA) PORTS	Listener - 2 Talker - 2	Conformity to IEC 61162-1:2000.
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	100-240V AC, 50/60Hz	Turning Unit can be 1 or 3 phase

Conditions of Issue of this certificate are printed the reverse of sheet 7.

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Certificate Number QQ-MED-32/03-03R

Certificate of Type Approval - Schedule 5

Bridgemaster E Radar Systems - Ancillary and Optional Units

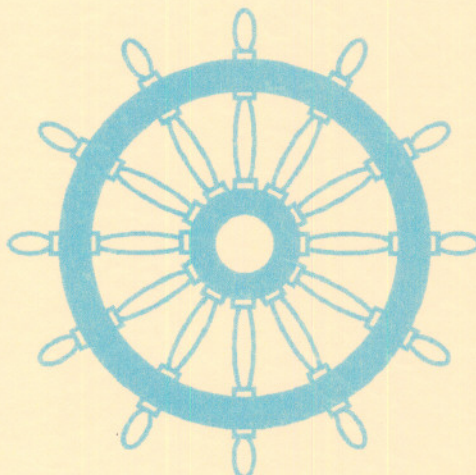
The applicant declared that the following units may be added to the basic radar systems illustrated in schedules 1 to 4. These units have been assessed & tested in conjunction with various Sperry Marine, Bridgemaster E, systems, and satisfactory details were included in the technical file.

ANCILLARY UNITS:-

Serial Interface adapter	65848A	
Slave Junction Box	65849A	
Pedestal (250mm Display Monitor)	65821660	
Transceiver Compatibility Unit	65841A or D	*1, 2
Display Compatibility Unit	65840A	*1, 3
----- End of List -----		

* NOTES:-

- 1 Units required when interfacing Bridgemaster E system to existing legacy equipment onboard.
- 2 Used when interfacing Bridgemaster II radar transceiver to a Bridgemaster E Display.
- 3 Used when interfacing Bridgemaster II Display to a Bridgemaster E radar transceiver.



Notified Body 0191

Conditions of Issue of this certificate are printed the reverse of sheet 7.

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Certificate Number **QQ-MED-32/03-03R**

Certificate of Type Approval - Schedule 6

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

The following Radar Transceivers, which form part of the systems shown on earlier schedules, have 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 M.1177. 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 and SM.1541. The results of the measurement procedure were satisfactory and provide sufficient evidence that these Radar Transceivers are compliant with the criteria contained in the stated standards.

The Transceivers Measured were:-

Description	Model No.	Modulator PCB	Magetron
Transceiver/Turning Unit (10kW)	65810### *1	65810812	MG5473
or Transceiver/Turning Unit (25kW)	65825### *1	65825812	MG 5424
Transceiver/Turning Unit (30kW)	65830### *1	65830812	MG5223 or M1302A

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

QinetiQ/FST/CMT/CR012225
QinetiQ/FST/CMT/TR022173

These also detail the magnetron, modulator circuit, rotary joint*2 and any filters fitted to the test unit to which the results specifically apply.

The Transceiver Modules contained in the above Transceiver/Turning units are also found in the following Bulkhead units. Since the applicable electronic circuitry and component parts are identical and the addition of the waveguide/helix feeder is known to have band limiting properties, a presumption of conformity can be applied by analogy

Transceiver Bulkhead (10kW)	65810##*1
Transceiver Bulkhead (25kW)	65825##*1
Bulkhead Transceiver (30kW)	65831##*1

- Note *1 The symbol # or ### denotes a 1 or 3 letter suffix detailing aspects of the build standard. Details of the suffixes are provided on the appropriate equipment schedule pages.
- *2 The manufacturer declared that the build standard of the rotary joint is suitably defined by the turning unit designation.

Conditions of Issue of this certificate are printed overleaf.

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