



# **MM/SPN-703**

**SURFACE SEARCH AND NAVIGATION RADAR**

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The MM/SPN-703 series radars are especially designed to be employed as a navigation aid in narrow water or open sea, and for surface search up to the radar horizon.

The most advanced solid-state techniques have been employed in designing, developing and producing these radars. Construction is modular and in full accordance with MIL specifications. Dimensions and weights have been reduced to a minimum (overall weight is about 110 Kg. in the basic configuration).

Remarkable flexibility and versatility have been obtained both for the antenna (several type antenna are available on request) and the transmitted power (7 Kw. or 20 Kw.). On request either a 75 Kw. transmitter or an additional 20 Kw. transmitter can be employed.

The MM/SPN-703 radar can be used either as a single radar or inserted into the electronics of a modern ship because of its capability to be linked to any gyro and several types of mains. Video, trigger and synchro data are available for transmission to the radar distribution switchboard together with data restitution for other systems. The most distinctive features of the MM/SPN-703 series radars are the full accordance with the MIL-E-16400G Specifications, the use of derated high quality components, the mechanical ruggedness, and the severe environmental tests to which the equipments are submitted to achieve reliability performance well above their specific class.

Modular construction and large amounts of plug-in printed cards permit easy maintenance, fast location of failures, quick replacement by spare parts, thus cutting down-time to a minimum. The troubleshooting is made easy by a BITE system.

The equipment operates in the I (X) band at a frequency of 9.375 MHz. with a peak-power of 20 Kw. (7 Kw. on request).

To obtain the required operative performances, the equipment is provided with 8 range scales in 1:2 ratio, between 0.25 n.m. and 40 n.m. with resolution and search characteristics automatically variable according to the selected range scale.

Emphasis is placed upon high resolution at the shortest range scales where it is most required, while the pulse length/PRF figure at longer range scales is chosen to optimize target de-

tection probability for the available radiated power.

The range resolution is 10 yds. for the shortest pulse and the minimum detectable range is 15 yds. Depending on the selected range scale, four different pulse lengths can be radiated with appropriate repetition frequencies. Two receiver bandwidths are switched-in according to the radiated pulses. The equipment is provided with automatic frequency control (AFC) and with manual tuning. The dynamic characteristics of the IF receiver can either be linear or linear-logarithmic.

The P.P.I. Indicator has 9" CRT and includes all the display controls. A control unit with the equipment controls can be assembled on the PPI indicator or elsewhere. On request the PPI indicator can be supplied with a True Motion Unit. The equipment input voltage is 115 V. 400 Hz. On request a suitable converter permits the use of 115 V. 60 Hz. or 110 V. DC. The radar can also be synchronized externally.

From the MM/SPN-703 basic configuration it is possible to obtain, with a suitable antenna and some auxiliary units, the MM/BPS-704 radar set to be employed on board submarines for air search and navigation aid.

When required, the antenna system can be installed on a stabilized mount against roll and pitch and provided with different vertical narrower patterns as cosec. squared coverage.

A suitable Track While Scan (T.W.S.) unit can be added to the MM/SPN-703 radar equipment to be used for on board weapon designation. Such a unit can be employed either in small ships to give a mini C.O.C. capability or on board medium-large war ships as back-up to their Command and Control Systems.

The following additional units can be provided upon request.

Sector scan unit: allows radiation in specific sectors therefore minimizing transmission interception.

Overlap unit: allows the best utilization of range scales and permissible discrimination.

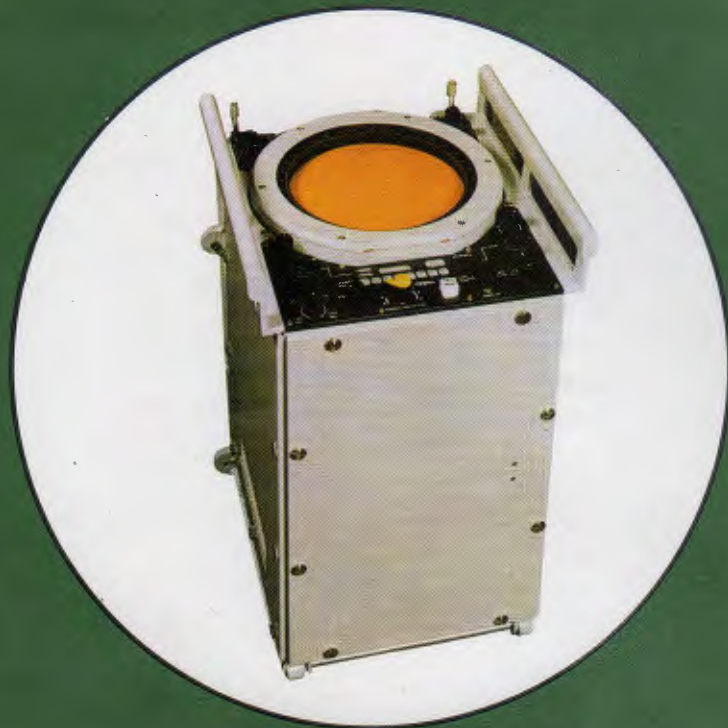
Active bite: allows on-line testing of the operative performances of the equipment.

Reflection plotter: allows the target's plotting and a graphic solution to navigational problems.

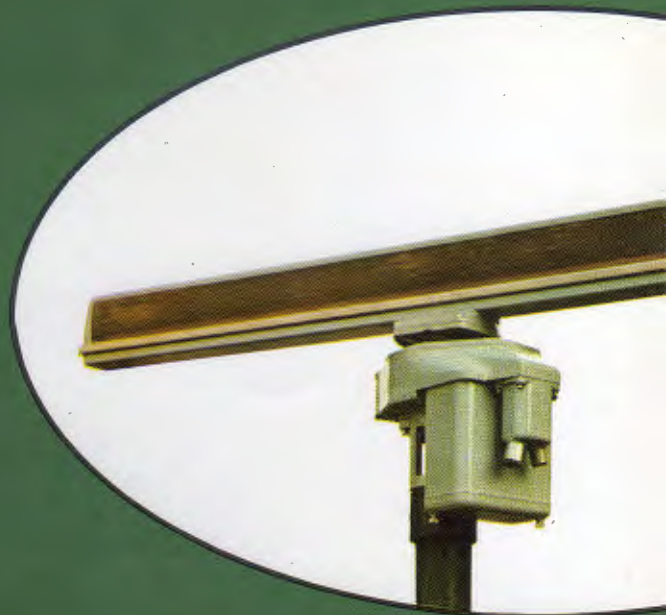
16" PPI repeater: allows tactical operations on board small ship.

# Radar Composition

P.P.I. UNIT

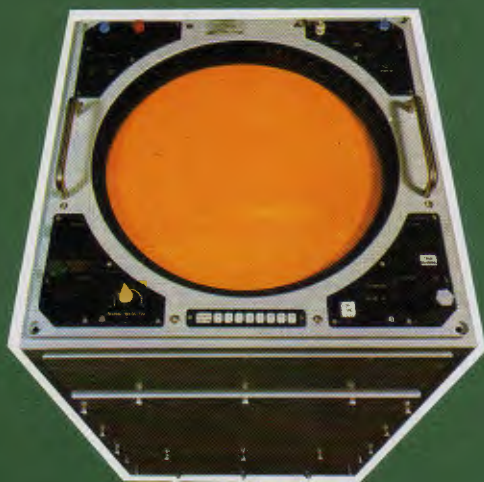


ANTENNA GROUP



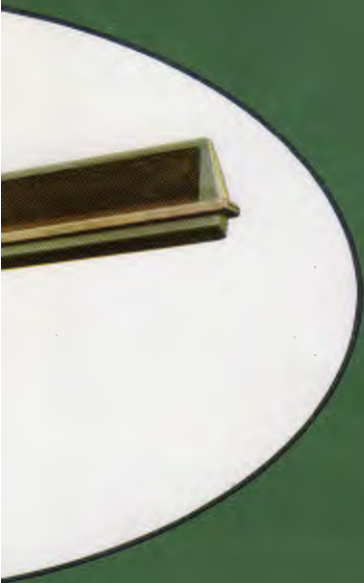
## Optional Units

16" P.P.I.  
REPEATER  
UNIT



TRUE MOTION  
UNIT

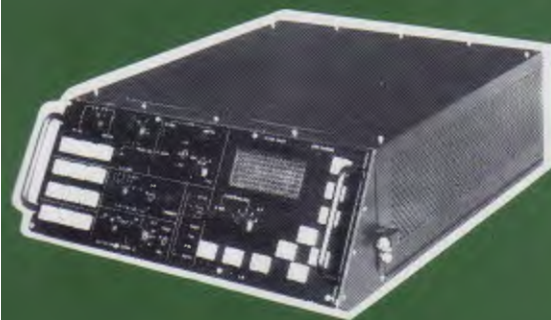
RECTIFIER &  
SAFETY SWITCH



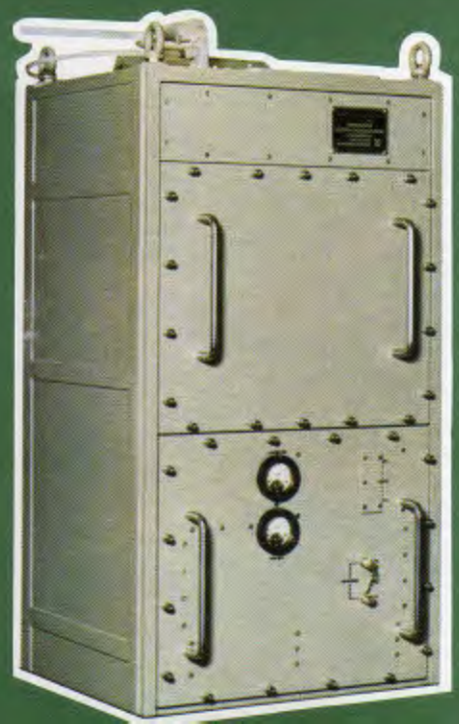
20 KW  
TRANSCEIVER  
UNIT

CONTROL  
UNIT

T.W.S.  
UNIT



75 KW  
TRANSCEIVER  
UNIT



# Technical Characteristics

## GENERAL PERFORMANCES

Minimum detectable range	≤ 15 yards.
Maximum displayed range	40 n.m.
Range discrimination	≤ 10 yards.
Angular discrimination	1,2° mount.

## ANTENNA

Type:	Waweguide slotted-line feeder and cylindric-parabolic reflector
Rotation diameter	1,88 meters
Polarization	Horizontal
Horizontal beamwidth (at -3dB)	1,2° for the 1,88 mt. antenna
Vertical beamwidth (at -3dB)	24° ± 2°
Side lobe level in the horizontal plane	≤ -22dB within ± 10° from the main lobe ≤ -26dB outside this interval
Rotation speed	25 r.p.m.
VSWR	≤ 1,3 including rotary joint
Gyrocompass servo	by means of CDX size 18 and TR size 18, located in the antenna pedestal
Ratio:	1X, 115VAC, 60/400 Hz.

Other antenna configuration are available on request.

## TRANSCIVER

Carrier frequency	(9.375 ± 30 MHz.)
Peak power	20 Kw. (nominal value)
Pulse lenght and PRF	0,05 μsec. with 5.200 Hz. (for the range scales of 0,25-0,5 n.m.) 0,15 μsec. with 2.600 Hz. (for the range scales of 1-2,5 n.m.) 0,5 μsec. with 1.300 Hz. (for the range scales of 5-10 n.m.) 1,5 μsec. with 650 Hz. (for the range scales of 20-40 n.m.)

Tuning	Manual and automatic
Mixer	Balanced
RF noise figure	≤ 11dB
Intermediate frequency	60 MHz.
IF bandwidth	24 MHz and 2,5 MHz (typical)
Receiver dynamics characteristics:	linear (up to 25dB)
Anticlutler circuits	lin-log (up to 70dB)
S.T.C.:	variable
F.T.C.:	with 2 time constant for each pulse duration

## P.P.I. INDICATOR

CRT diameter	9 inches
Range scales	0,25 n.m. (range rings of 0,1 n.m.) 0,5 n.m. (range rings of 0,1 n.m.) 1 n.m. (range rings of 0,2 n.m.) 2,5 n.m. (range rings of 0,5 n.m.) 5 n.m. (range rings of 1 n.m.) 10 n.m. (range rings of 2,5 n.m.) 20 n.m. (range rings of 5 n.m.) 40 n.m. (range rings of 5 n.m.)
Range rings accuracy	± 1% of the used range scale
Movable range marker (on request)	0-40 n.m. or 0-80.000 yards (selectable)
Accuracy of the movable range marker	± 0,5% of the fixed marks ± (LSB)
Off-centering (on request)	80% of radius for display and one radius for cursor along 45° - 135° - 225° - 315° axis

Electronic cursor (on request)

## MISCELLANEOUS

Maximum power consumption	600 w (in the basic configuration)
MTBF	≥ 600 hours
ERT	≤ 20 minutes

## OVERALL DIMENSIONS & WEIGHT (including installation mounting)

Unit	H (mm)	W (mm)	D (mm)	Weight (kg)
ANTENNA	590	1.880	420	25
P.P.I.	500	320	600	33
RX/TX	585	480	250	34
CONTROL	100	290	170	2,4
SAFETY SWITCH	148	224	295	7



**SMA**

**SEGNALAMENTO MARITTIMO ED AEREO**

**O. BOX 200 - FIRENZE (ITALIA) - TELEPHONE : 055/27501 - TELEX : SMARAD 570622 - CABLE : SMA FIRENZE**