CRV LEONARDO

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Propulsion/Ship Service	**Diesel Electric:** **2 x Cummins 236KW (silenced)** **1 x Cummins 700KW**
Motors x 2	**DC Rectified from 380V 60Hz 12 Pulse thyristor converters and transformers to minimise harmonic interference**
360º Azimuthing Thrusters	**Twin Schottel Tractors, Hypoid Bevel Gearing. Schottel Pump Jet as bow thruster**
Total Power	**1170KW**
Range/Endurance/ Speed	**1500nm / 7 days/ 11.5 knots**
Power Management System	**Diesel Load Optimization**

LEONARDO
MAIN CHARACTERISTICS

Dynamic Positioning (DP)	Kongsberg SDP11 with joystick control
Navigation	Kinematic GPS, ECDIS, X&S band radars
AUV/ROV Track	Kongsberg USBL - HiPaP
Communications	GMDSS, Globalstar e-mail
2 Cranes	1 x 1.5T SWL, 1 x 1T SWL
A-Frame	1 x 2.5T SWL
Winches	3 All portable drums and re-configurable
Diving Facilities	Platform/Compressed Air/Store
Aft Work Deck Space	65sq.m (585sq.ft)
Laboratory	35sqmm (315sq.ft)
Berths	5 Crew, 5 Science. Lifesaving 12
Container	Standard 20ft
Noise Abatement	0-5 Knots. Low Noise condition

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The following information concerning the operation and operational planning considerations for the vessel are drawn from the RV LEONARDO Ship Management Manual. The information contained within this manual is considered MANDATORY for safe ship operations and has been endorsed by the Director.

Copies of the Management Manual are available on the vessel and in SMO.

2.1 Pre-Cruise Planning Considerations

R.V. LEONARDO is a sophisticated research platform but remains limited in endurance, sea state, carrying capacity and crewing levels.

When planning cruises, the following factors should be observed:

Minimum acceptable depth of water	5m
Minimum acceptable depth of water with HiPap deployed	7m (maximum speed 6 knots)
Maximum scientific personnel	5 (7 for day running in inshore waters)
Maximum carrying (lifesaving) capacity	12
Maximum planned number of sea days per annum	150 (± 5 days) (subject to funding)
Block leave to be taken:	- 10 days around Easter - 20 days in August - 2x5 day periods outside these times as convenient to vessel schedule.

When deployed away from La Spezia in excess of 10 days, one day per week should be made available in harbour for cleaning, essential maintenance, victualling and rest. This day should be planned as convenient to the scientific programme, the weather, sea conditions, et al. The Master and the SIC should mutually agree these 'maintenance' days to optimise vessel utilisation.

The watchkeeping routines detailed below are to be observed at all times.

2.1 Stability and Securing for Sea

R.V. LEONARDO has been designed to carry a scientific load of 12 tonnes. All scientific equipment for embarkation should be clearly labelled with weight and the loading plan presented to the Master at the pre-cruise safety meeting.

All equipment should be properly secured onboard and it is the responsibility of the SIC/EC to ensure this happens prior to sailing. Heavy lift operations at sea are, unless emergency requirements arise, to be conducted during daylight hours only.

2.2 Watchkeeping Routines

Minimum sleep and rest rules, as laid down by M-Notice 1602 are to be observed and are as follows:

- An uninterrupted period of at least 7 hours off duty in every 24 should be available for rest;
- If above is not practicable, periods of rest aggregating at least 16 hours off duty in every 48 hours is to be adhered to.
- Normal maximum daily operations should be based on a 10 hour day.

In general and as convenient to the experiment, a reasonable midday meal break is to be provided so that the crew, who are otherwise on their feet all day, have a chance to relax.

R.V. LEONARDO was designed, built and is crewed as a day running research platform.

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2.1 Scientific Trials, Standard Operating Procedures, Risk Assessment

SACLANTCEN will provide as part of the Sailing Instructions specific safety guidelines relating to the employment of scientific equipment and diving operations. The provision of these guidelines shall in no way abrogate the Master's responsibility for the safety of the vessel and personnel, and at all times the Master's decision in these matters is final.

Should the vessel be ordered by written Sailing Instructions or by the direction of the Scientist-in-Charge into areas or locations which may imperil the safety of the vessel or persons onboard, the Master has discretion to refuse such orders. In the case of such an eventuality, the Master must fully document his decision giving specific reasons and circumstances.

Standard Operating Procedures (SOPs) for the employment of scientific equipment form an integral part of the SMS and should be referred to as necessary for specific safety instructions and guidelines for the use of such equipment.

Where SOPs do not exist and in exceptional circumstances only, scientific equipment may be operated provided the Master is satisfied that a formal risk assessment, including hazard identification, has been conducted and all personnel have been correctly briefed.

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LEONARDO

Research Vessels

ALLIANCE & LEONARDO

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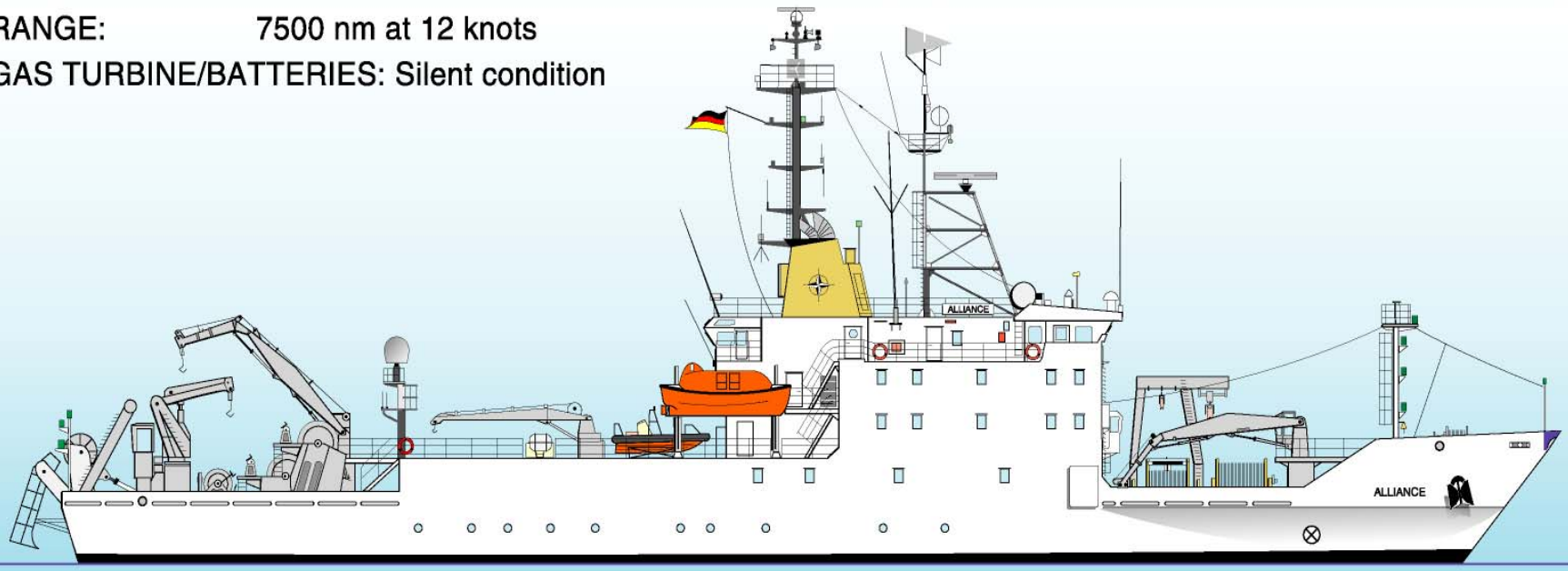
RESEARCH VESSEL ALLIANCE

Feb 2001

GENERAL

STATUS:	German Public Vessel Commercial Operation Classed by A.B.S.
COMPLEMENT:	24 crew, 23 research staff
AVAILABILITY:	330 Days per annum
DIMENSIONS:	93m / 15.2m / 5.2m / 2920 Tonnes
RANGE:	7500 nm at 12 knots
GAS TURBINE/BATTERIES:	Silent condition

ACTIVITIES	DAYS AT SEA 1998	1999	2000
SPOW CRUISES/EXERCISES	135	177	168
CHARTER	59	6	32
TOTAL SEA DAYS	194	181	200



ACOUSTIC OPERATIONAL STATES

	State	Speed	Duration	Power Supply
1	quiet drift	0	1 h on, 6 h off	batteries
2	semi-quiet drift	0	12 h on, 4 h off	silent ship service generator (SSSG)
3	semi-quiet tow	6	12 h on, 4 h off	auxiliary propulsion and SSG
4A	cruise	5	continuous	(as above)
4B	cruise (low speed tow)	8	continuous	(as above)
4C	cruise	10	continuous	(as above)
4D	cruise (high-speed tow)	12	continuous	main propulsion and SSG
4E	cruise transit	16.3	continuous	(as above)

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R.V. ALLIANCE - SOME SYSTEMS

- 4 DECK CRANES - 2 TO 5 TONNES
- “A” FRAMES - 16 AND 20 TONNES
- 5 WINCHES - VARIOUS
- 2 DIESEL JET BOATS
- 2 TOWING WINCHES - 20 TONNES/12 KNOTS
- 1 DEPLOYMENT WELL
- VIBRATION MONITORING SYSTEM

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R.V. ALLIANCE - SHIP SYSTEMS

- INTEGRATED NAVIGATION SYSTEM - DISTRIBUTED LAN
- WIDE AREA DGPS x 2
- E.C.S. - ARCS (RASTER WITH DX-90 VECTOR OPTION)
- ADCP - 75 KHZ
- SWATH MAPPING SYSTEM - 49.5 KHZ - 80 BEAMS
- INFORMATION MANAGEMENT SYSTEM
- COMPUTER BASED PMS - E-MAIL
- VARIETY OCEANOGRAPHIC SENSORS

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QUESTIONS

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