

ARGENTINA'S NEW HYDROGRAPHIC VESSEL "COMODORO RIVADAVIA"

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A.R.A. *Comodoro Rivadavia*, the Argentine Navy's new hydrographic vessel was built at the Argentine Dockyard Mestrina S.A., Tigre, and was handed over to the Argentine Naval Hydrographic Service in September 1976.

The ship has been designed specifically to carry out precision depth surveys with systems which permit her to cover both in range and depth the Argentine continental shelf, operating alone or in consort with her twin survey motor boats. The vessel, as well as the motor boats, are fit to remain grounded when the great amplitudes of the Patagonian tides reduce to almost zero the depths of some of our southern river ports.

Particulars of its hull design are as follows :

Length overall	52.15 m
Breadth moulded	8.80 m
Maximum draught	2.90 m
Displacement fully charged	816 tons
Operating speed	12 knots
Overall range	6 000 miles

Her complement includes 6 officers and 22 ship's company, and two scientists can be accommodated when necessary.

In order to operate in restricted water channels and inlets she is fitted with variable pitch propellers and an efficient steering complex which give her exceptional operational conditions.

Modern processing and computing hydrographic systems allow her to enter port with the survey completely processed, with a very low error probability. Also she is fitted with the equipment necessary to obtain oceanographic data directly connected with the survey, which completes the information of the chart.

The ship can be operated by a small complement, hence it is possible to provide comfortable and functional living conditions, including air-conditioning.

Propulsion is provided by twin Diesel engines, built in Argentina under licence of Stork Werkspoor, with 1160 HP and 600 r.p.m., driving two variable pitch propellers J.W. Berg, type 440 d, and a HC4 consol with its

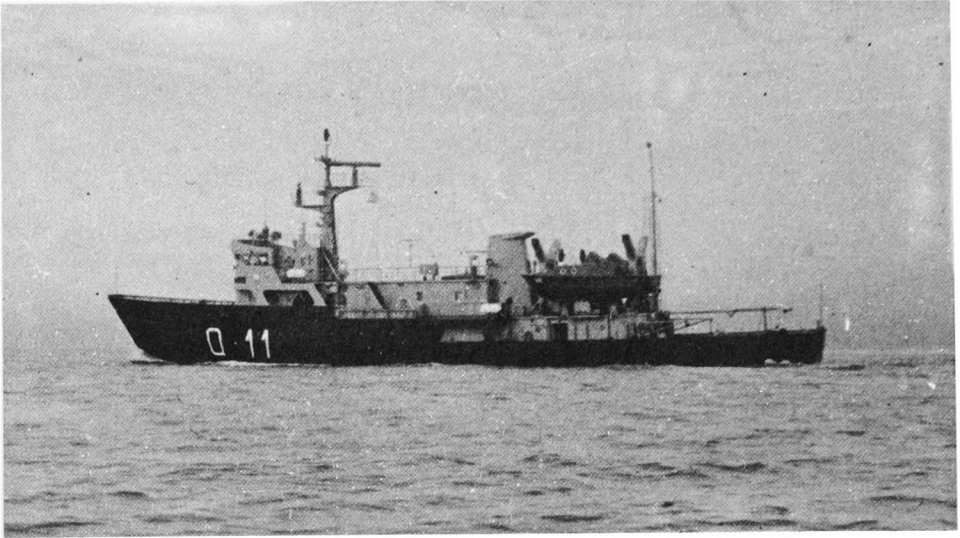


FIG. 1. — The hydrographic vessel A.R.A. *Comodoro Rivadavia*.

corresponding power and automated equipment, controlled from the bridge or the engine-room.

Ship's electrical power is provided from three 112 KVA alternators, driven by 135 HP Stork Werkspoor engines.

The ship has ability to distil her own fresh water, up to 3 tons per day.



FIG. 2. — The bridge.

Ship's navigational equipment includes :

- Automatic pilot with orders from the gyro or the magnetic compass.
- Digital log (Chesapeake).
- Fully automated Marconi radiogoniometer.
- Two Raytheon radars, RM 1660/128 on 10 cm and RM 1645/12 on 3 cm wavelengths, which permit operation both with stabilized north and with fixed bow.
- Kelvin-Hughes MS 32 echo sounder and an Anschütz-Kiel plotter.
- Electric SIAP anemometer.

Ship's communications are provided by solid state equipment including a RF 130 automatic syntony transmitter, superheterodyne RF 505 receivers, SC 600 F Tevicom SSB transceiver, four Collins 5151 type receivers, two radioteletypes and an emergency equipment. Furthermore, she has an Alden registering receiver and facsimile transmitters 18/9244 and 9165 D which permit receipt of weather charts and transmission of sounding sheets.

Ship to boat communications are provided by a MO COM 70 equipment.

The hydrographic operations of the ship are assured by the following systems :

1. Radio position fixing.
2. Bathymetric data.
3. Hydroplot.

1. For radio position fixing the ship has two Tellurometers MRB 201 transmitting simultaneously on 2800 - 3200 MHz, a Hastings Raydist DRS and an Alpine equipment used exclusively for running surveys, comprising

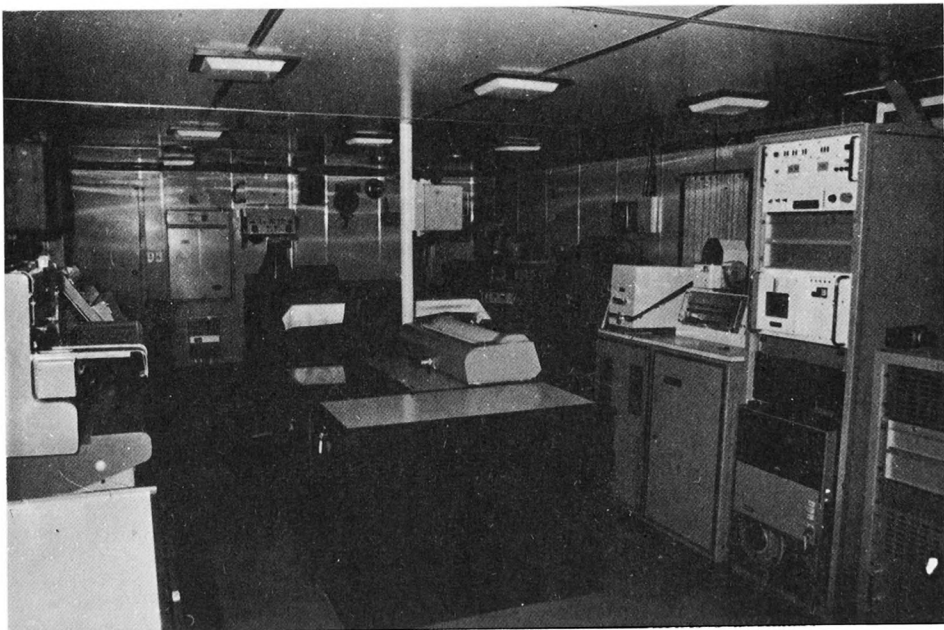


FIG. 3. — The Survey Control Centre.

two base station transponders (Mod. 477) and a digital Radar Ranging Unit (Mod. 436) operating jointly with the ship's Raytheon 1660/125S radar.

Hydrodist equipment includes a Digital Range Integrator which transforms information into optimal digital language to be processed by the Marconi Elliot 905 computer. Raydist also includes an analogue-digital converter (GA 56) which transforms its data into digital format for processing.

The Alpine equipment is not connected to the Hydroplot system.

2. The bathymetric data acquisition system comprises two Kelvin-Hughes MS 26 F echo sounders. The system's output runs through an Ado Kelvin-Hughes digitizer and codifier unit. The computer obtains 5 soundings per second, selects the least depth and then computes the maximum and minimum values every 10 seconds and logs them into the magnetic tape unit.

3. The Hydroplot system comprises a Marconi Elliot 905 computer, with a central processor, a memory unit, and paper tape input and output 35ASR Westrex Teletype (Videodata) Terminal 4000, a Calcomp plotter 563, and a magnetic tape logging unit (Racal T 7000). An accelerometer is placed at the ship's centre for registering the ship's vertical movement.

A Simrad Sur sonar completes the surveying equipment.

In the ship, the outputs of the Kelvin-Hughes echo sounder MS 26 F and of one of the positioning systems (Raydist or Hydrodist) are introduced in the Hydroplot Interface Control Unit. Jointly with the Marconi Elliot 905 computer, and by running the program ARGSYS " A ", this unit creates the coordinate data which govern the Calcomp 563 plotter and logs, in blocks, the position, time and depth data in the magnetic tape unit. These data can also be registered by means of a teletyper, which, together with the Video Data Terminal, the tape reader and the puncher, constitute the active and passive communication terminals between the computer and the



FIG. 4. — One of the *Comodoro Rivadavia's* launches.

operator. In the motor boats, the survey information is stored sequentially on cassettes, which are then processed with the ARGSYS " C " program and transferred to the magnetic tape unit to produce the first sounding sheet.

The information logged in the magnetic tape unit, both obtained in the ship and in the boats, is processed with the ARGSYS " B " program, introducing the draught and tidal data, and the necessary corrections to produce the final sounding sheet.

Oceanographic equipment includes a bathymetric winch and another winch for obtaining the various samples. *Comodoro Rivadavia* carries two 8 m long plastic-hull survey motor boats, capable of 7 knots. They are fitted with Tellurometers, Raydist and Kelvin-Hughes echo sounders. Their data are stored in CA 55 RTR data loggers which are then processed by the ship's Hydroplot system.

IT'S A SURVEYOR'S LIFE

It has been said by one of our surveyors that the reason for his enjoyment of the profession is the almost perfect balance between the physical aspects of surviving in the field, the intellectual demands of running a technically challenging survey, and the artistic abilities required for cartographic presentation and in the draughting of map sheets. To this must be added the very high degree of personal responsibility which he must accept for all aspects of a project to ensure that the technical specification and delivery programme are met within the financial resources available.

Whilst improving communications mean that advice and assistance from head office can now be provided within days rather than weeks, the surveyor must still be prepared and able to make far reaching decisions by himself.

In practice this means that as far as the surveyor is concerned, a nine-to-five job with two days per week to relax is something that other people do. Long hours in the field during daylight, computing in the evening and occasionally making astronomical observations at night are the normal contents of a surveyor's day. He must also find time for the organization of supplies, transport, labour, accommodation, import/export of instruments, medical care, and so on *ad infinitum*. Overseas, even comparatively simple problems may be compounded by difficult terrain, harsh climate and misunderstandings due to language differences; all this calls not only for resilience and versatility but also for a well developed sense of humour.

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