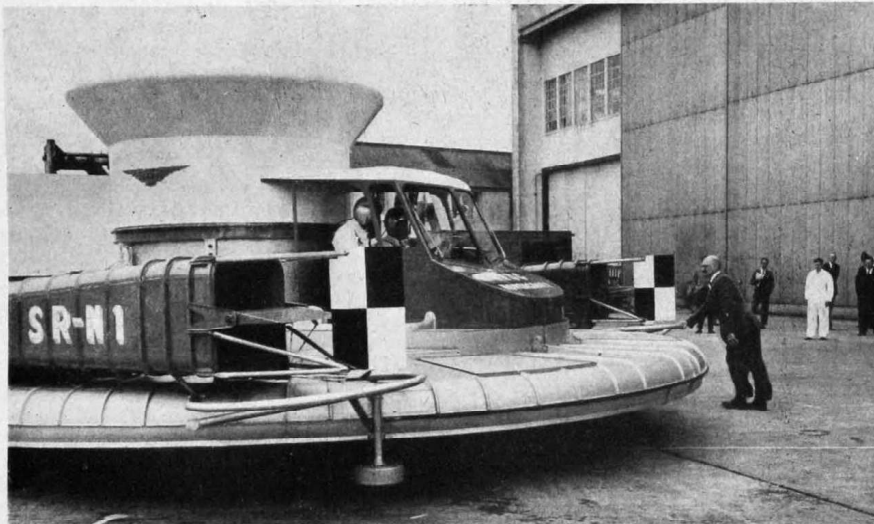
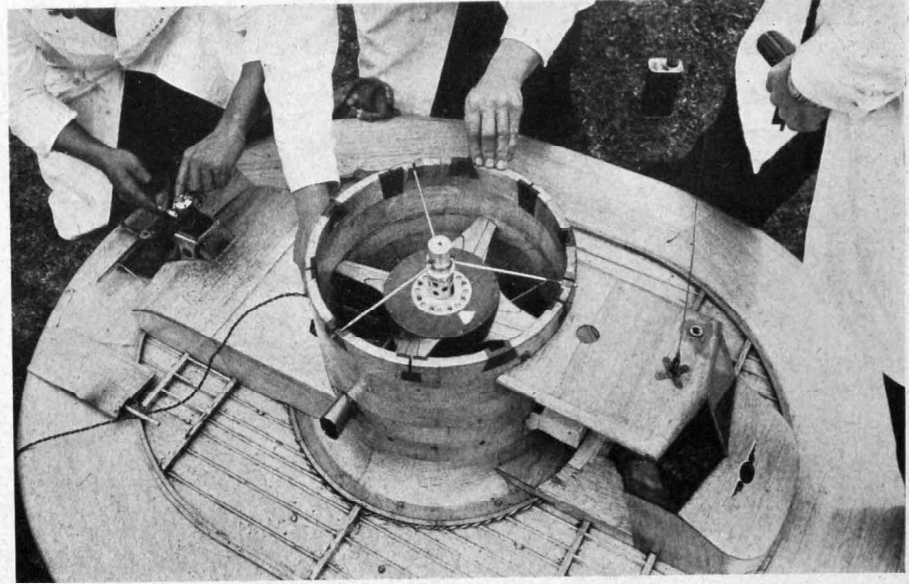
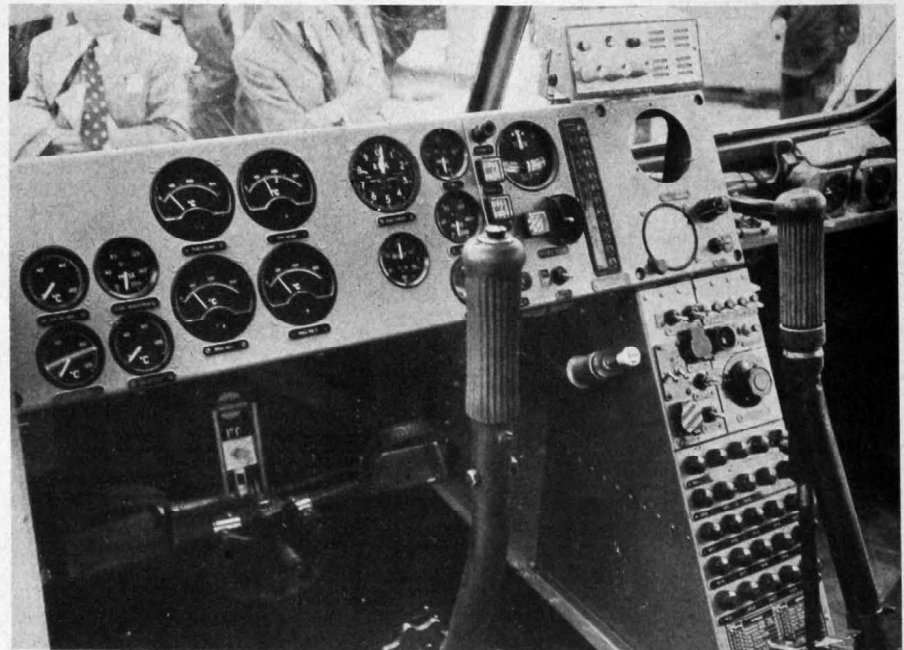


Ground Effect Aircraft

There was demonstrated last week at the Cowes works of Saunders-Roe, Ltd., the "Hovercraft" research vehicle built under the sponsorship of the National Research Development Corporation. The principle of operation is closely related to that of the jet flap, a pressure difference being sustained by the change in momentum of the jet sheet: the product of "cushion" pressure and hovering height has proved to be, as simple theory predicts, the change of momentum in deflecting the jet sheet into the horizontal plane. One feature of this design which is claimed to be distinctive is that the initial direction of the jet is not vertical but inwardly inclined to increase the pressure developed. To minimise the energy demand for a given momentum change, low pressures are optimal, and the manned research vehicle supports 10 lb per square foot within the "curtain" at its periphery and 17 lb per square foot within a second curtain 3ft further inboard.



The CENTRE picture shows the "SR-N1" hovering: it is, in effect, floating on an air bearing, and the inventor, Mr. C. S. Cockerell, is seen in the act of moving the machine. In the foreground can be seen one of the four propelling nozzles with the control vanes that allow a transverse or vertical component of thrust to be developed. The yaw vanes at the rear nozzles are extended upward to give directional stability and improved yaw when flying forward. Acceleration is controlled by altering the distribution of air between forward and aft nozzles by means of vanes in the ducts. The cabin, RIGHT, includes apparently normal controls, the rudder pedals rotating all the vertical vanes in the same direction and the joystick rotating all the horizontal vanes in the same direction when it is moved fore and aft and oppositely in diagonal pairs when it is moved sideways. A thrust lever at the pilot's right distributes the propulsive effluent: at the demonstration the tail of the machine was ballasted so that the machine hovered with this lever in the forward sector. The instrumentation is largely engine supervisory gear, the four large dials being temperatures at various points on the power plant. The crew, a pilot and an observer to monitor the instruments, wear protective helmets as a precaution against disintegration of the fan behind them.



The anticipated applications of such machines were outlined in our previous article (May 1, 1959, page 700). It can readily be seen that as the size increases the power demand of the curtains increases linearly but the lift as the second power of a dimension, and although larger machines must be designed for greater operating heights there is expected to be a substantial change in power/weight ratio with size: the development machine weighs about 7500 lb and has a 435 h.p. Alvis "Leonides" helicopter engine. In its initial configuration it is expected to attain about 25 knots at a height of about 15in.

The TOP illustration shows a dynamically similar machine built for model tests: it has been "flown" over waves in a towing tank to predict the behaviour in high seas, leading to the expectation of performance much superior to that of a conventional hydroplane. The model is built on normal lines of balsa and tissue: it is powered by model aircraft engines, the lift engine spark ignition and the thrust engine compression ignition.