Space Communications Division

Marconi is Europe's largest manufacturer of satellite communication earth terminals and is the only company in the United Kingdom to have sold civil and military stations.

Its capability derives from a number of related factors, all combining to produce a competence which is unrivalled in the industry.

The Company has always been, and continues to be, a leader in *communications*, having designed and commissioned large communication networks throughout the world.

It possesses an advanced capability in microwave techniques, in designing sophisticated receivers and continuous wave pulse and swept transmitters, and fully integrating them into complete communication *systems*.

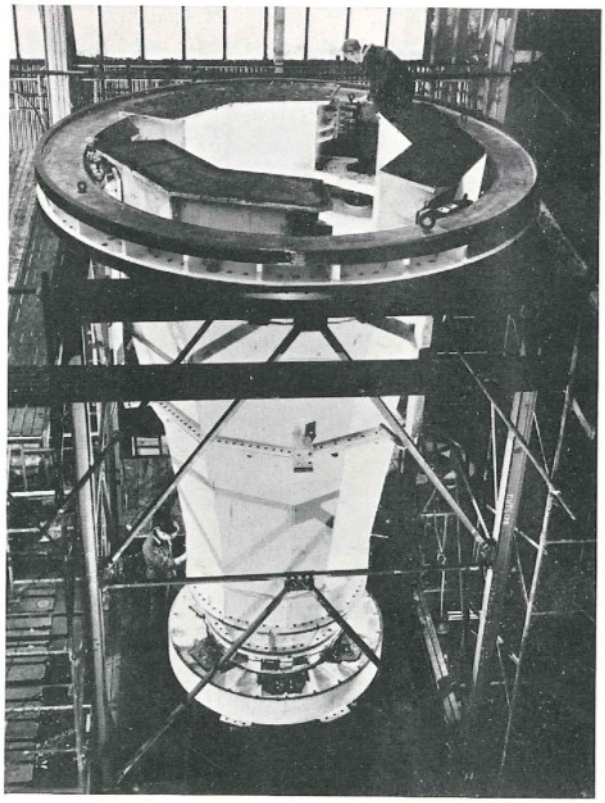
The Company is also experienced in antenna design and possesses facilities for the production of precision steerable antennas. It is one of the few communication companies which designs and manufactures its own servo-controlled antenna mounts.

The experience acquired through these activities was invaluable when Marconi, recognizing the potential of satellites as a communication medium, initiated extensive studies and development in those aspects of technology relating to ground station terminals. Under contract, it studied a wide variety of military and civil satellite communication stations and systems, from static to helicopter-portable and shipborne designs. In 1965 it formed the Space Communications Division and was ready and able to meet Britain's first requirement for satellite earth stations when this arose in that same year.

Achievements

The contract awarded by the Ministry of Defence in 1965 covered the design, manufacture, testing and commissioning of three air-transportable military satellite communication earth stations for use in a joint Anglo-American project, using near-synchronous communication satellites in equatorial orbit 18,300 miles above the earth. Three years later, one of the most valuable military space terminal contracts ever placed outside the U.S.A was awarded to Space Communications Division by the Ministry of Technology. It covered the modification of two of the original stations which were operating overseas, and the supply and installation in this country of a complete fixed station of a new Marconi design.

DEVELOPMENT *A servo-control and drive unit under development in the Division's laboratories*



BEARING ASSEMBLY *The Marconi designed pivot assembly on which dish structures of 100 tons or more rotate on sliding surfaces made of a synthetic material*

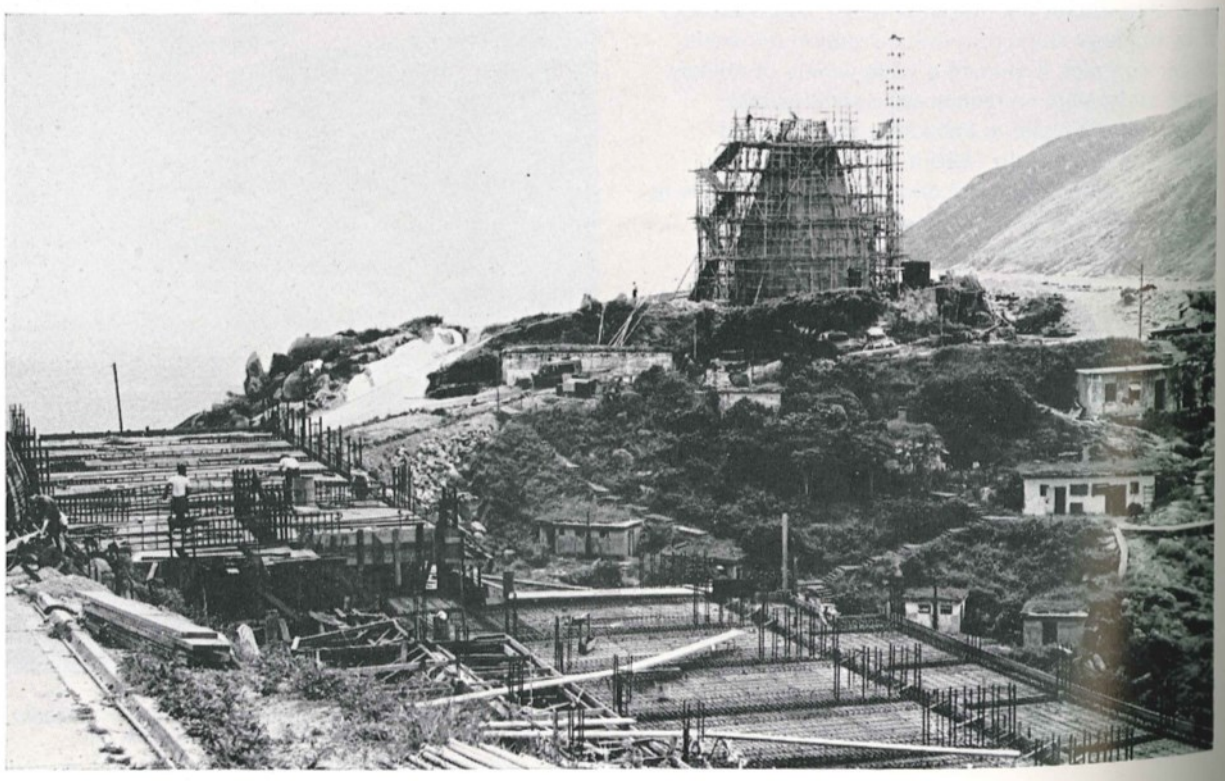
Also in 1965, Britain's first overseas civil satellite communication system was required, and Cable and Wireless, Ltd, responsible for providing and operating it, placed with Space Communications Division the contract to design, build and install the system. Through a synchronous satellite 22,300 miles over the west coast of Africa, this station on Ascension Island provides key communication facilities with the Goddard Space Flight Centre in Maryland, via the Andover, Maine, earth station and is playing a vital role in America's 'man-on-the-moon' project, Apollo. The Ascension Island station, which was cited in the Queen's Award to Industry for outstanding achievement in technological innovation, was fully operational in less than a year from the date the order was received.

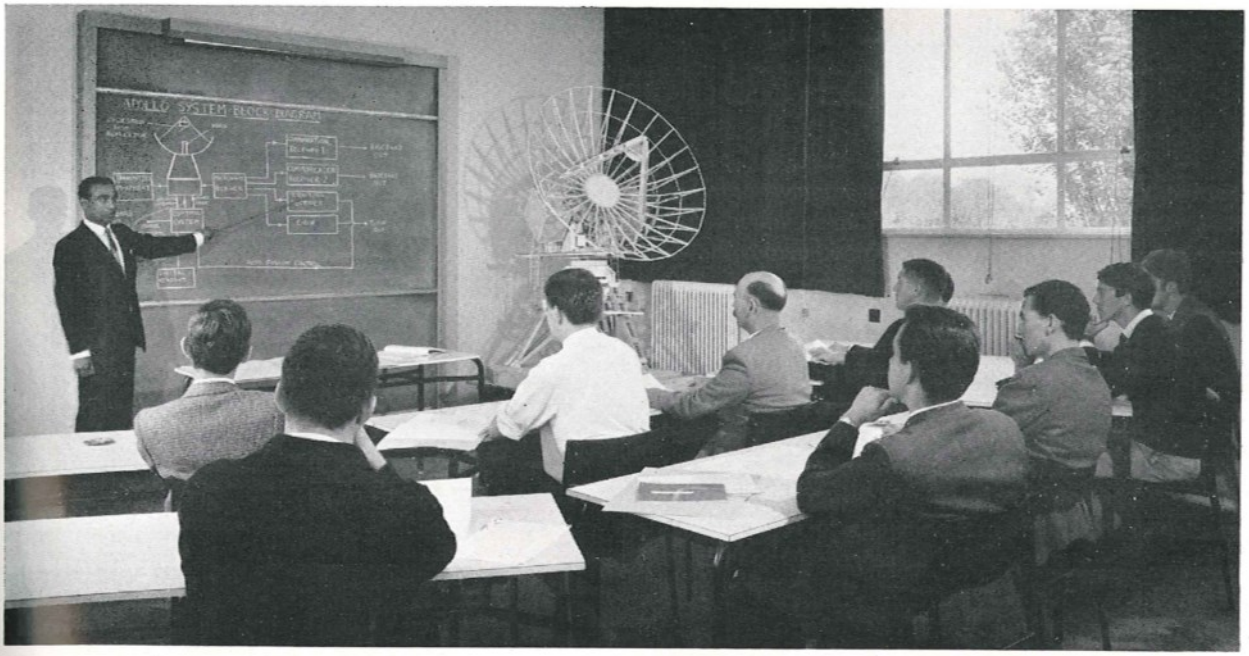
A contract placed with the Division by the British Post Office, covered responsibility for building a complete new station at Goonhilly, a responsibility embracing all civil engineering at the antenna site and the overall design, production, installation and testing to stringent Post Office specifications. With its 90-ft diameter antenna and sophisticated transmitters and receivers, the station will cover the entire satellite communication band. It is capable of receiving simultaneously a television signal and a large number of telephone channels, and when the INTELSAT III launching programme is completed it will be able to provide comprehensive telephone, data and television links between Britain and well over two-thirds of the inhabited area of the earth.

The stations ordered by Cable and Wireless Limited for Hong Kong and Bahrain are also designed to operate through INTELSAT III satellites. Both have 90-ft diameter dishes mounted on 60-ft towers; the antennas are fully steerable, both have fully duplicated electronic equipment, and are capable of transmitting up to four, and receiving up to twelve, r.f carriers. The Hong Kong antenna structure incorporates special features which will enable it to withstand typhoon conditions.

At the time of going to press, the Division's most recent success has been to obtain the contract for the design, construction and installation of a satellite earth station for the East African External Telecommunications Company. The order was won against strong international competition from the U.S.A, Canada, Italy, Germany, Japan and from within the United Kingdom. The station includes a 97-ft

CONSTRUCTION IN HONG KONG *where Space Communications Division is providing a station for Cable and Wireless, using a 90-ft diameter dish antenna*





TRAINING *Students in one of the lecture rooms at Marconi College, which provides intensive equipment and maintenance courses for customers' personnel*

diameter, fully steerable dish antenna which will be capable of operating through INTELSAT III satellites over both the Indian and the Atlantic oceans.

Systems Capability

Space Communications Division's success is attributable to two combined factors—first-class equipment and first-class systems capability. Marconi is, and always has been, a systems company, specializing in 'turnkey' projects for which it accepts complete responsibility from the time the contract is signed to the time the commissioning has been successfully completed. In close co-operation with the customer, Space Communications Division will translate an operational requirement into a detailed technical system. This involves topographical, propagation and site surveys, environmental studies of geography and climate and the selection of individual equipments. In addition to planning, designing, manufacturing and installing the electrical, electronic and mechanical elements of a station, the Division will also undertake responsibility for the planning and installation of the buildings, power stations, access roads, air conditioning and other facilities which may be required.

The Division employs the most modern techniques, including PERT and computer-assisted processing of the project programme, to co-ordinate and execute the diverse activities associated with the installation of a large station.

QUEEN'S AWARD WINNER *The Cable and Wireless station on Ascension Island, designed, manufactured, installed and commissioned by Space Communications Division in less than a year from receiving the order*

After Sales Service

The supply of technical documentation and equipment spares is the responsibility of the Company's Central Division, whose considerable stocks and rapid delivery service ensure that loss of operating time due to equipment failure is kept to a minimum.

The expiry of the contractual guarantee period does not signal the end of Space Communications Division's interest in the stations it has installed and its customers know that they can rely upon the help and advice of the Division's engineers at any time.

Training

The Company's training organization is described in the introduction to the catalogue and ensures that the personnel operating a station are fully conversant with the latest engineering standards and techniques. Qualified instructors can also be provided to give training on site.

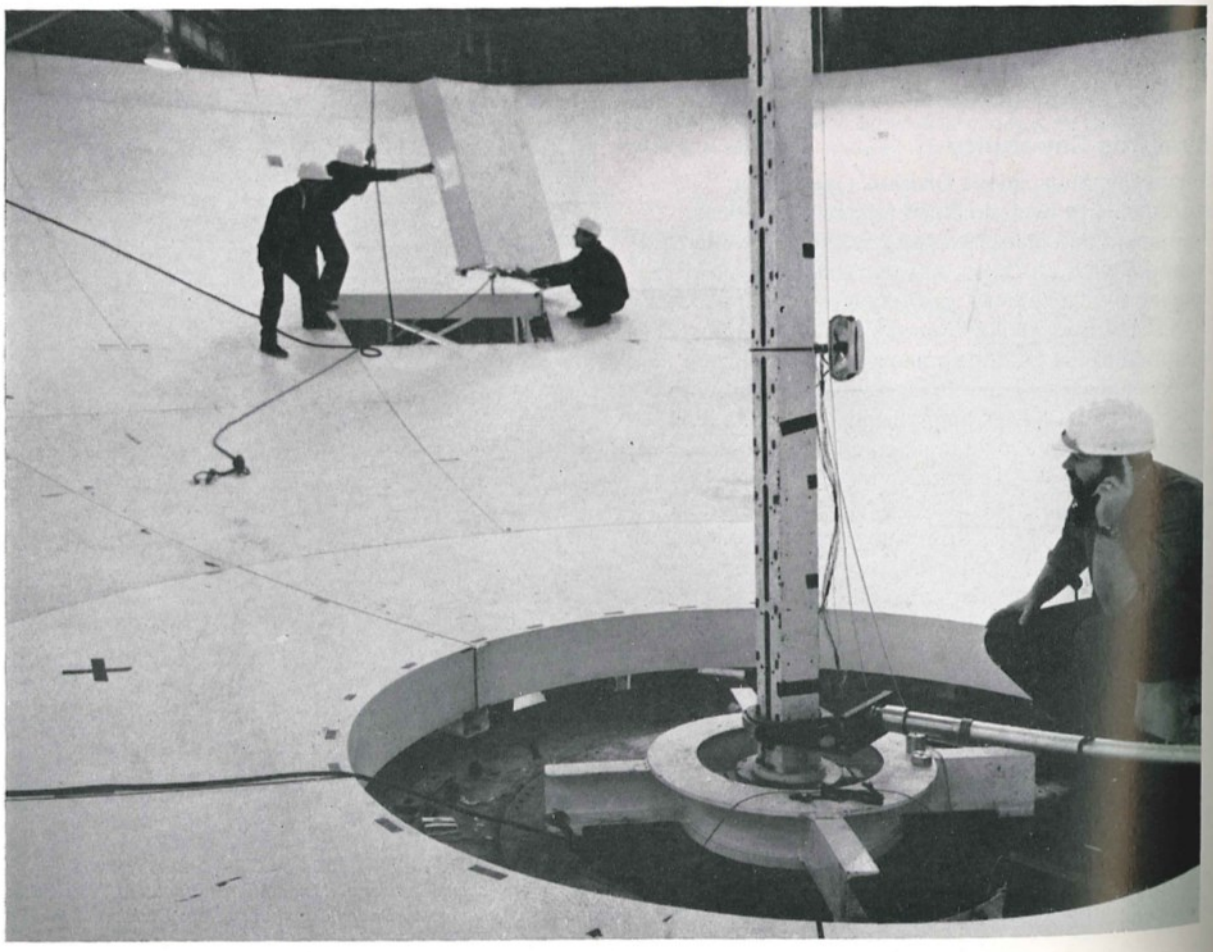
Development

Development is a continuing process. It has led to the modular approach in the design of the electronic equipment associated with an earth station, thus permitting greater system flexibility for differing customer requirements and allowing for future expansion at minimum cost.

One of the most significant breakthroughs to emerge from the Division's development laboratories has been a pivot assembly on which huge dish structures, weighing 100 tons or more, rotate on sliding surfaces made of a synthetic material. Thus, the problem of failure which can occur with metal ball or roller bearings has been eliminated, it is now possible to rectify within a day any fault that is likely to arise and the cost of spare bearings has been cut to a fraction.

For the future, Space Communications Division has

TEST *Satellite communications earth station is assembled for test at Marconi's Rivenhall establishment prior to installation in Bahrain*



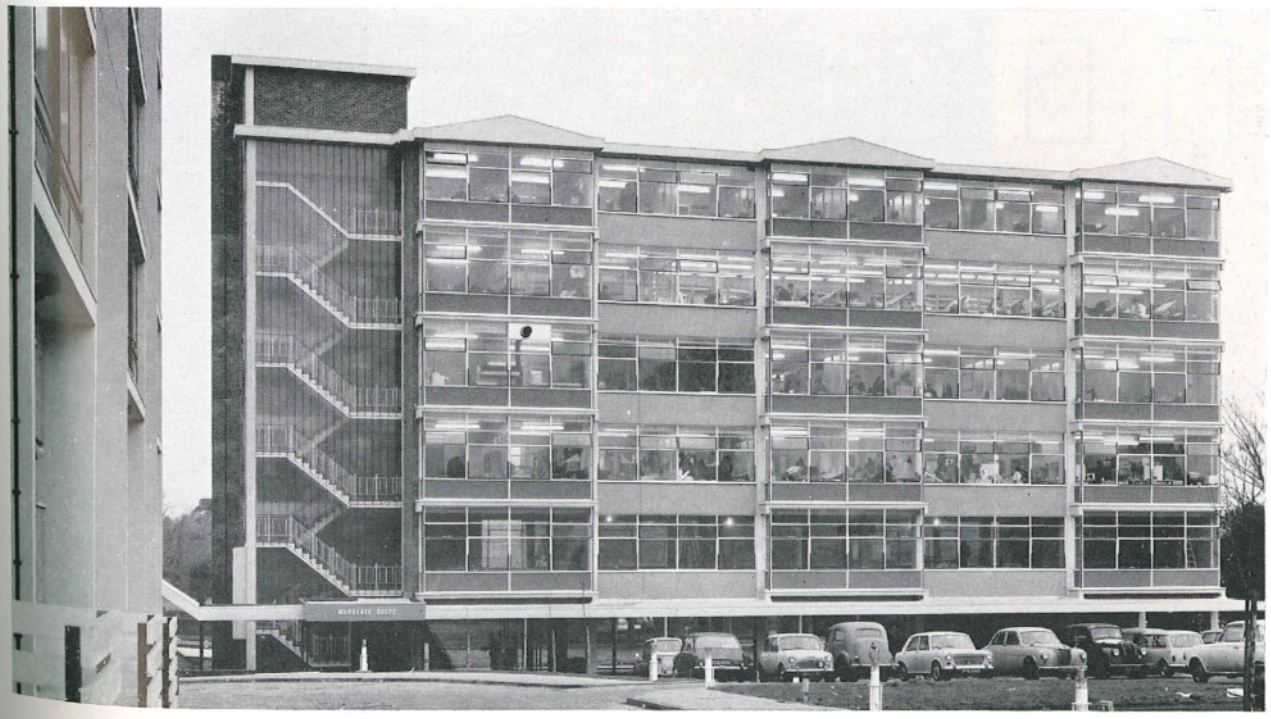
ON-SITE ASSEMBLY *at Goonhilly, where the Division has built the GPO's second earth station*

its sights set on the application of satellites to radio and television broadcasting, air traffic control, navigation, meteorology, exploration, reconnaissance and high-speed data transmission.

Marconi Communications Journals

Marconi publishes a quarterly journal, *Point to Point Telecommunications*, with French, Spanish and German summaries, and a quarterly newspaper, *Telecommunications News*, in English only.

HEADQUARTERS *of Space Communications Division at Great Baddow, Essex*



Typical system block diagram of a 97ft diameter satellite communications earth station