

THE FIRST TRANSATLANTIC TELEPHONE CABLE (TAT 1)

Where the first transatlantic telephone cable was inaugurated on 25 September 1956 it was hailed as a major breakthrough in telecommunications. It was designed to link both the US and Canada to the UK, with facilities for some circuits to be leased to other West European countries, giving them direct communication with US and Canada. It provided 30 telephone circuits to the US and 6 to Canada, as well as a number of telegraph circuits to Canada. Most were for communication with the UK, the remainder were permanently connected through London to give direct circuits to Germany, France, the Netherlands, Switzerland, and a circuit for Denmark which also carried American traffic with Norway and Sweden. The whole project took 3 years to complete, at a cost of £120 million, during which time the system had to be planned, manufactured and installed, requiring the development of new machinery and techniques for placing the cable in deep waters.

Telegraph links between the UK and America had been in existence from the middle of the previous century, and 1927 saw the first commercial radiotelephone service between the UK and America. Initially this was just one circuit, with an average of 2000 calls per year. The cost of calls was prohibitive; in 1928 the basic rate for calls and New York was reduced to £9 for 3 minutes' conversation. The system was subject to atmospheric disturbance and fading, and at best had a limited number of frequencies available for circuits.

In the 1920s and 30s the feasibility of a telephone cable between Europe and America was frequently discussed, but always seen as having too many technical difficulties, notably the need for the cable to be divided into sections and to have repeater stations, to boost the signal across such a great distance, installed along its length. The repeaters had to have sufficient strength and reliability to work below 2 miles of ocean, because of the obvious problems in adjusting and repairing them once they had been laid.

It was only with the development of coaxial cables with polyethylene insulation, carrier frequency equipment and broadband submerged repeaters that transatlantic telephony by cable could be realised - this equipment was gradually developed just before and during the Second World War.

Research on repeaters in the United States led in the early 1950s to two repeatered cables being laid between Havana and Key West in Florida. In Britain work was mostly done on repeaters suitable for the medium depths in which cable would be laid around the coast and to the European mainland. In 1943 the first submerged repeaters (suitable for depths of 200 fathoms) was laid in the Irish Sea between Anglesey and the Isle of Man, and this was followed by considerable development in submarine coaxial cables and submerged repeaters linking UK with Germany, the Netherlands, Belgium and Denmark. Once these small experimental projects had been seen to work successfully, it was then possible to begin the more ambitious transatlantic project.

On 1 December 1953 the Postmaster General announced that the Agreement for the first transatlantic telephone cable had been signed. The scheme was to be undertaken by the Post Office Engineering Department, the Long Lines Department of American Telegraph and Telephone Company, Bell Telephone Laboratories and the Canadian Overseas Telecommunications Corporation. 50% of the shares were held by the American companies, 40% by the Post Office and 9% by the Canadian Corporation.

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One of the first difficulties encountered was in selecting a route for the 2 cables required, as the shortest, and perhaps the best, were already occupied with telegraph cables. In the winter of 1953 suitable sites to land the cables were chosen in Newfoundland and Scotland.

The Scottish site was a few miles south of Oban, and was linked by an improved coaxial cable line to carry 900 inland and transatlantic circuits via Glasgow to International Exchange, London. On the other side of the Atlantic the cables came ashore at Clarenville, Newfoundland, then crossed the Cabot Strait to Sydney Mines, Nova Scotia. From Sydney Mines to the US border a line-of-sight microwave radio link completed the system; in New Brunswick, Maine, the route branched to Montreal to connect with the Canadian network.

The main Atlantic link, designed by Bell Laboratories, consisted of 2 cables (one for each direction of transmission) with 51 one-way flexible repeaters installed at 37-mile intervals along each cable. The Post Office 2-way repeater system, with rigid repeaters spaced about 20 miles apart, was developed at the Dollis Hill Research Station, and was used for the shallow waters of the 300-mile Cabot Strait, enabling transmission in both directions over a single cable. Armoured cable, protected by steel, was necessary to safeguard against damage by ships' anchors and trawler gear, almost all of which was manufactured in a new factory at Erith, Kent.

Apart from the short shore ends the whole of the transatlantic cable was laid by the cables ship 'Monarch'. 'Monarch', built for the post Office in 1945 to replace the ship of the same name destroyed during the war, was the only existing cables ship capable of conveying the 1,500 nautical miles of cable which had to be laid in one piece across the deepest part of the Atlantic. The ship had been employed in 1952 laying cable for Bell Laboratories in the United States, and replacing an 800 mile stretch in the middle of one of the early transatlantic telegraph cables. TAT 1, however, was so revolutionary that the whole of 'Monarch's' cable laying machinery had to be either replaced or modified. The size of the cable engine drums had to be altered to avoid damaging the flexible repeaters as they were being introduced.

Nevertheless, the use of these repeaters brought extra benefits. Their structure enabled them to pass along the ship's laying gear while it was still travelling, although at a reduced speed. When laying rigid repeaters it was necessary for a cable ship to stop each time.

In February 1955 the first lengths of cable were manufactured, and in March 'Monarch', equipped with new cable-laying gear, undertook trials off Gibraltar, and shortly afterwards began work on laying the first transatlantic cable, from west to east.

Each cable was to be laid in 3 continuous lengths complete with repeaters. At the end of June 1955 'Monarch' laid 200 miles of shore and cable from Clarenville. After picking up a fresh supply of cable it returned to the buoyed cable-end of Clarenville and, avoiding the North Atlantic icebergs, laid the 1500 nautical miles across the Atlantic to Rockall Bank. The journey was uneventful, apart from the severe storms which occurred near Rockall, the result of Hurricane Ione. In the meantime cables ship 'Iris' sailed for Oban to lay the Scottish end cables. 'Monarch' reloaded with cable, returned to Rockall Bank to lay the last 500 miles towards Oban where the final joint was made with the shore end cable on 26 September, completing one cable

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link. Speech could then be transmitted in one direction, and answered by radiotelephone to test the system.

The project continued once weather conditions in the Atlantic improved the following spring. By April 'Monarch' had left to install the single cable across Cabot Strait, and by the end of May 'Iris' had laid the Scottish shore end of the second cable. 'Monarch', starting from the end of this cable, laid the main deep-sea section in August, to which the Clarendville shore end was joined on 14 August. TAT 1 had been completed, 3 months ahead of schedule.

At the inaugural ceremony at Lancaster House in London at 4.00 pm on 25 September 1956 the service was opened by the Postmaster General, who spoke to the Chairman of AT&T calling from New York, and to the Canadian Minister of Transport. The 250 people present listened with individual earphones to the first conversation over the transatlantic telephone cable; TV cameras recorded the event.

In the first 24 hours of public service there were 588 London-US calls and 119 from London to Canada. This was the start of a substantial increase in the number of calls made. During the first full week of operation the number of calls to Canada was 85% higher than the average weekly traffic over the radiotelephone circuits; calls from Canada were 100% higher. Calls made at the full rate to the United States were up by 60% and at the cheap rate by 50%. Business callers were the main users of the service. Except for the busiest period between 3.00 and 5.00 pm (10.00 am and 12 noon New York time) calls were connected within about 10 minutes and, as the Post Office Magazine proudly announced in 1957 "it is rare for any call to be delayed beyond an hour, except for causes outside the operator's control". During its first year of service TAT 1 carried twice as many calls as the radio circuits had done in the previous 12 months - about 220,000 calls between Britain and the United States, and 75,000 between Britain and Canada. This brought in £2 million revenue to be shared between the three countries.

In 1956 the first transatlantic telephone cable was regarded as a major technological achievement, not least as a base for future research and improvements, developments which have led to the sophisticated transatlantic projects of TAT8 and TAT9 involving the use of optical fibre cables and digital technology.

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