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RESEARCH DEPARTMENT

Visit to Telefis Eireann

5th and 6th March 1964

VISIT REPORT No. A-083

1964/27

**THE BRITISH BROADCASTING CORPORATION
ENGINEERING DIVISION**

RESEARCH DEPARTMENT

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E.R. Rout (Research Department)

A handwritten signature in dark ink, appearing to read 'E.R. Rout', written in a cursive style.

(E.R. Rout)

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1. INTRODUCTION

I visited Telefis Eireann at the invitation of Mr. Eric Spain (Head of Planning and Equipment Section) on 5th and 6th March. Much of the visit was devoted to matters of general interest, although particular attention was paid to standards conversion and the problems of asynchronous working. This report is based upon discussions with Engineering and Administrative staff, and upon observations of pictures at the studio centre, a transmitting station, and in homes and hotels in the Dublin area.

2. DEVELOPMENT OF TELEVISION IN SOUTHERN IRELAND

Television was already established in Southern Ireland before Telefis Eireann began its transmissions some three years ago, viewers in the northern counties of Eire and in the Dublin area having watched BBC 405-line transmissions from Divis in Northern Ireland since that station opened in 1955. Because many thousands of 405-line receivers were already installed, Telefis Eireann started their transmissions on 405-lines, although it was intended that television transmissions in Ireland should ultimately use a 625-line system, with the same transmission parameters as that in the United Kingdom. These 625-line transmissions began in the Autumn of 1962 and since then all Telefis Eireann 405-line transmissions have duplicated the 625-line programmes; a standards converter is used to couple the two networks.

The electricity supply in Eire is not synchronized to the British grid system so viewers in Eire have always been accustomed to viewing British 405-line transmissions under "asynchronous"* conditions. Telefis Eireann have taken advantage of this acclimatisation and use crystal-locked waveform-generators for both their 405- and 625-line transmissions.

* In this context "asynchronous" means that the vertical scanning of the television picture is not synchronous with the electricity supply.

At the present time there are five main transmitting stations and about 400,000 receivers. It is expected that the number of receivers will ultimately be between 500,000 and 600,000.

3. FINANCING OF TELEFIS EIREANN

Telefis Eireann is the television service organisation of Radio Eireann and is financed in the same way. The buildings and equipment are provided by a Government loan (approximately £3,000,000) and the revenue is derived from renting time to advertisers and from the issue of receiving licences. The present cost of a combined sound and television receiving licence is £5, of which £4 is passed by the Treasury to Radio Eireann; of this £4 about £2 10s. Od. is used for television. The Telefis Eireann income from 400,000 licence holders is, therefore, about £1,000,000 per year and an equal revenue from advertising yields a total income of about £2,000,000.

The number of hours of television per day is approximately seven and, of this, just over half consists of home produced programmes. The average cost of programmes is about £800 per hour.

4. TELEFIS EIREANN FACILITIES

4.1 Accommodation

Apart from transmitter and link sites all Telefis Eireann activities are based in a modern building that was designed for the purpose and is situated in Donnybrook, a suburb some three miles to the South East of the centre of Dublin. There are 700 administrative, production, and engineering staff in this building.

4.2 Studios

There are four studios at Donnybrook. Studio 1 is of moderate size and is equipped with four cameras. Studio 2, which is half the size of Studio 1, has three cameras. Both of these studios use E.M.I. type 203 cameras equipped with 4 1/2" image orthicons. The English Electric Valve Company provides tubes for one studio and E.M.I. provide tubes for the other. This is because it has been found difficult to match cameras if the tubes are not made by the same manufacturer. It is sometimes necessary to break this rule in an emergency because the spare camera, that is kept switched on during studio operations, is shared between the two studios.

The third studio is a small news and interview studio using two E.M.I. vidicon cameras and the fourth studio is a very small presentation studio equipped with one E.M.I. vidicon camera.

4.3 Film

All the film material produced by Telefis Eireann is photographed on 16 mm stock and processed by their own Lawley machines; it is usual to edit and transmit negative film. Feature films and advertising material from outside suppliers are often on 35 mm positive stock.

Some 15 film cameras are used for news and other work but there are no film telerecording facilities available in Eire. Film records of television programmes are made for Telefis Eireann by the BBC, using tape recordings flown to London.

The present telecine installation consists of two Cintel polygon scanners and one E.M.I. vidicon scanner, all with 16 mm and 35 mm traction mechanisms. The E.M.I. machine has a slide-projector which is frequently used for "commercials".

4.4 Video Tape Recording

One Ampex 1000 C machine fitted with "Interswitch" and "Intersync" is installed at Donnybrook; a second machine and electronic editing equipment are on order. Another Ampex 1000 C is installed in a vehicle; this vehicle also carries two E.M.I. vidicon cameras and tows a motor generator.

4.5 Outside Broadcast Equipment

In addition to the two vidicon cameras in the tape-recording vehicle, there is a mobile control room equipped with three 4 1/2" image-orthicon cameras. A number of mobile radio links are also available.

4.6 Standards Conversion

Standards conversion is very important to Telefis Eireann since one of their networks always duplicates the programmes carried by the other. In general a programme originates on 625 lines and the output of the presentation mixer is converted to 405 lines using a standards converter designed and built by Telefis Eireann. This converter employs a special 14" (36 cm) Ferranti cathode-ray tube, with willemite phosphor and magnetic focusing, which is incorporated in a modified E.M.I. studio monitor. The converter camera is an E.M.I. type 203 with a 4 1/2" image-orthicon, type P 812. Spot wobble is applied to the display, and a non-linear amplifier, using a diode network, provides an overall display gamma which is close to unity. The camera uses a standard studio lens and is substantially unmodified.

This converter works extremely well and the resulting picture has good resolution, a satisfactory signal-to-noise ratio, and a good grey scale.

Movement portrayal is similar to that of the present day Eurovision converters at Tolsford Hill and the converter appears to be reliable; it needs little attention apart from some care in avoiding the "sticking" of static pictures.

A second converter was made by E.M.I., based upon the BBC Research Department design, and uses a 9" (23 cm) Ferranti cathode-ray tube and a C.P.S. Emitron camera. This is normally used for conversion between the 525 line, 60 field and 625 line, 50 field standards and also for converting 405-line BBC pictures, received from Divis, to 625 lines. When not used for either of these purposes the E.M.I. converter is used to provide reserve facilities in case of breakdown of the image-orthicon converter.

The E.M.I. converter was seen converting 405-line pictures from Cheltenham Races to the 625-line standard; the performance of the converter seemed satisfactory, but below that usually provided by similar converters installed at Television Centre.

Telefis Eireann intend to purchase a line-store converter from the BBC and to sell their E.M.I. converter to ITN. When this happens they will be without a converter capable of operating between 60-field and 50-field standards and this gap will be filled by a further converter which is in the course of development in Telefis Eireann. This will use a Ferranti 5" (13 cm) high-brightness cathode-ray tube, a vidicon camera, and a flicker-correction system using a vertical reference stripe alongside the picture.

4.7 Waveform Synchronisation

All the waveform generators in Telefis Eireann are of the Ferguson WG 61 type. The crystal oscillators provided in these generators are used as the frequency reference for both 405 and 625 transmissions and the built in "Synclock" device is used for "genlocking" when it is necessary to lock two picture sources together.

The standards converters have a special switchable waveform-generator provided by E.M.I.

It was emphasised that crystal-lock is used instead of mains-lock at all times, principally because the mains-supply frequency can

change very rapidly within a range of ± 1 c.p.s. and this upsets the operation of VTR machines and some types of television receiver.

4.8 Transmitters

There are five main transmitting stations in Eire, covering the population centres of Sligo, Dublin, Kilkenny, Cork and Gort. The Sligo and Dublin stations radiate both the 625-line and 405-line signals.

All the main transmitters radiate in Band III except the Gort 625-line transmitter which occupies Channel B in Band I (53.75 Mc/s vision carrier frequency). There are several 405- and 625-line low-power transmitters and Laragh, Stepaside and Dungloe have transmitters for both line-standards in Band I.

A two-way permanent microwave-link system joins all the main transmitters to the Donnybrook studio centre. The links are also used for telephones and music-line connections, by means of a multichannel telephone system. These links use Italian equipment, installed by the Post Office, but operated and maintained by Radio Eireann staff. This does not seem to be a very satisfactory arrangement.

The microwave-link system is also used to convey BBC 405-line programme contributions, received from Divis by a receiver at a link-station in County Cavan, to the Donnybrook centre.

It is intended to extend the sound services of Radio Eireann by introducing a VHF/FM service having transmitters co-sited with the existing television transmitters. There are suggestions that these new sound transmissions may be circularly polarized for the benefit of the VHF transistor portable.

A table summarising the location, vision-carrier frequency etc. for the main Eire transmitters is given below. The 405-line and 625-line Channel designations are those in use in Southern Ireland.

PRINCIPAL TELEVISION TRANSMITTERS IN SOUTHERN IRELAND

TOWN (Station).	405-LINE			625-LINE		
	Channel	Vision Mc/s	E.R.P.	Channel	Vision Mc/s	E.R.P.
SLIGO (Truskmore)	B.11	204.75	100 KW	I	215.25	100 KW
DUBLIN (Kippure)	B.7	184.75	100 KW	H	207.25	100 KW
KILKENNY (Mt. Leinster)	-	-	-	F	191.25	100 KW
CORK (Mullaghanish)	-	-	-	D	175.25	100 KW
GORT (Maghera)	-	-	-	B	53.75	100 KW

5. TELEVISION RECEPTION IN SOUTHERN IRELAND

As Eire is a "fringe area" for all BBC television transmission, all the 405-line receivers are "fringe" models.

Most of the 625 and 625/405 receivers in Eire are British-made "export" receivers which provide for 625-line reception on Bands I and III but have no tuners for Bands IV and V. The prices of these receivers are similar to those sold in Britain (65 to 75 gns for a 19" table-model) and the receivers include line-flywheel timebases and H.T. smoothing circuits consisting of a reservoir capacitor (usually 400 μ F), a series choke and a smoothing capacitor, (usually 200 μ F). This improved H.T. smoothing makes these receivers better suited to "asynchronous" transmissions than those on sale in Britain, which frequently use a resistor as the series element in the H.T. smoothing circuit. Some of the receivers used in Eire incorporate gated AGC for 625-line operation and mean-level AGC for 405 lines. Most have A.C. coupling between the detector and the cathode-ray tube, but one or two recent models have used full D.C. coupling.

Engineers at Telefis Eireann made the following comments about domestic reception:

"Most people who have 625/405 receivers in the Sligo and Dublin areas prefer to watch Telefis Eireann transmissions on 405 lines. This saves operating the "standards" switch when tuning to a BBC programme, and, in general, they see a better picture on 405-lines despite the use of standards conversion."

"The 625-line picture on a dual-standard receiver is often poor because of inaccurate tuning, indifferent I.F. response, oscillator and timebase radiation from neighbouring receivers, and reflections from nearby buildings. These effects are all less serious when viewing 405 lines."

"Most receivers are fairly free from hum except for some horizontal picture wobble caused by mains-frequency components in the supplies to the line-flywheel circuit. In general, viewers are not disturbed by receiver hum until the mains-frequency differs from the field frequency by more than 0.3 c/s. This condition is almost always accompanied by a severe voltage drop which disturbs scan sizes, focus, and brightness, thus masking the effects of hum. Only one viewer has complained to Telefis Eireann about picture wobble or brightness hum in the last three months."

"People often buy a 625-only receiver rather than a dual-standard set, as a single-standard receiver is a few pounds cheaper and gives a better 625-line picture. This outweighs the disadvantage of not being able to view BBC transmissions."

My own observations agreed with most of these comments but it should be stressed that, in Eire, very few pictures seen in the home would be considered of good quality by British standards. BBC reception is invariably noisy, Telefis Eireann 405 transmissions are derived from a standards converter, and the effects of propagation and interference and the shortcomings of receivers frequency spoil the local 625 pictures. On some of the receivers seen in homes and hotels there was considerable vertical picture wobble, particularly at the bottom of the picture; presumably the smoothing choke was near the bottom of the cathode-ray tube.

6. ACKNOWLEDGEMENTS

Telefis Eireann staff made me very welcome and gave me all the demonstrations and information I asked for. They are an extremely keen and cheerful group of engineers and my thanks are due to Mr. Eric Spain who arranged my visit, and to Messrs. Cyril James and Jerry Fitzgerald who used so much of their time for my benefit.

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