

# ENGINE

# INE

The quarterly for BBC engineering, technical and operational staff

*SPRING 1993*

*No 52*

## BBC Radio now on Astra

Radios 1,4 and 5, along with BBC World Service in English are now available in mono on the Astra satellite system. Starting on page 3, Henry Price describes how these new services are transmitted and what is required to receive them.



Astra Marketing Ltd

Graphical illustration of Astra satellites 1A, 1B and 1C in orbit

### CONTENTS

ASTRA SATELLITE	
- BBC Radio Services now available	3
FAMILY TREE	
- Engineering Division	12
ITU	
- Its function and new structure	16
LOCAL RADIO	
- Cumbria refurbished	21
NETWORK RADIO	
- Radio 2's new transmission suites	7
NORTH REGION	
- Manchester's Edit Suite 5	23
RADIO-CAMERAS	
- RD's new switched-horn system	14
TELECOMMUNICATIONS	
- Part 5: self-provision of OB circuits	18
TRANSMITTER NEWS	2
WORLD SERVICE TV	
- Improvements to BBCfax	11

# ENGINEF

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As *Eng Infs* an internal BBC magazine, it would be appreciated if no reference was made to it in articles, magazines etc, published outside the BBC.

Stories for the Autumn issue should be forwarded to the editor by Friday 20th August, 1993.

## Transmitter News

The following services have opened or changed since our last issue:

### New TV relays

Farleigh Kent  
Farmingham Kent  
NeathAbbey West Glamorgan

### New FM stations

Barnoldswick N Lancashire  
Croeserw West Glamorgan  
Penmaen Rhos Clwyd  
Rheola West Glamorgan

### Radio 1 on FM

Kirkconnel Dumfries & Galloway

### Radios 1 and 4 on FM

Campbeltown W Strathclyde  
Girvan S Strathclyde  
Llanfyllin Powys  
Llanrhaeadr-ym-Mochnant Clwyd

### Local Radio

As featured on page 21, Radio Carlisle has moved into new stereo-equipped premises. The transmitters now broadcasting Radio Carlisle in stereo are Sandale, Kendal, Morecambe Bay and Windermere.

Further information from **EID** on White City (07) 25040.

## Radio Romania calls on BBC expertise

Following a request for assistance from Radio Romania, Jeff Bottom of Radio Projects has made three visits to Bucharest since last August.

According to Jeff: *"The Broadcasting House in Bucharest was built in the early 1950s and many of its facilities are from that original installation by Siemens. The building is H-shaped (similar to our BH EXT), with the transmission studios and CTA in the lower floors of the centre section. However, the structure of their building suffered severe earthquake damage in 1978, 1986 and again in 1990. As it cannot be repaired or strengthened while still occupied, and further earthquakes could cause a total collapse, a replacement facility is the only way forward."*

Assisted by Roy Newrick (previously of Radio Projects), Jeff has assessed the situation at first hand and reviewed various alternative strategies for the future. *"The concept of separate project management staff has been introduced and a project team has begun work on a brief*

*for consultants to prepare a feasibility study. An existing partially-completed museum building has been transferred to Radio Romania, as a way of speeding up the provision of new broadcasting facilities that are not subject to earthquake risk. A lot of time has been spent transferring knowledge gained from experiences in the BBC to the local staff who, although highly qualified and technically competent, have not had the opportunity to do any project work.*

While in Bucharest, Jeff was able to operate his own hand-held Amateur Radio equipment on 2 Metres FM, using the call sign YO/G3SDG under a permit from the Ministry of Communications. Many contacts were made in the Bucharest area, mainly using the repeater on channel RI (input 145.025 MHz; output 145.625 MHz) which resulted in Jeff being invited to operate on HF frequencies using local amateur stations.

Jeff leaves the BBC in July but discussions are in hand to determine the future of this cooperation with Radio Romania.

## Display Screen Equipment

Now that the *Display Screen Equipment* regulations are in force, all computer workstations in the BBC will have to be assessed for Health and Safety.

There are over 900 screens within the former Engineering Directorate and a Project Team has been recruited - comprising Les Davis, Tony Dent and Paul Kinsey - to assess these work-stations by the end of the year.

Not only are the obvious parts of the workstation (such as the degree of flicker on the screen) under scrutiny: incorrect posture can lead to Upper Limb Disorder, Repetitive Strain Injury (RSI), backache etc. Thus, properly chosen and correctly-adjusted chairs are critical to avoid these risks.

Martin Nutt  
Safety Services  
Engineering

## STOP PRESS...

Further to the article *inEng InfNo* 51 on the LS5/8 and AM8/20, Development Group now announces the AM8/21. This is effectively a stereo AM8/20 and comprises: one power supply, four amplifier channels and two cross-overs - all in a 3D 19" case with connec-

tion cooling. The price should be about 1/2 times that of the AM8/20 (ie, equivalent to two mono AM8/16s).

Further details can be obtained from Graham Whitehead at Avenue House. Tel: (036) 4273

# ASTRA SATELLITE

## BBC Radio Services now available

In early April, four of the BBC's radio services - Radio 1, Radio 4, Radio 5 and World Service in English - began transmissions in mono on the UK Gold channel of the Astra satellite. Henry Price gives some background to the Astra system and describes how to receive these satellite-delivered BBC radio services.

The Astra satellite system is owned and operated by the Luxembourg-based company SES (Societe Europeenne des Satellite). Presently, two satellites - Astra 1A and 1B - are used to transmit thirty-two television services and a similar number of radio channels to most of Western Europe. A third satellite - Astra 1C - was launched in mid-May 1993 and is expected to come into operation in July/August, increasing the capacity of the system to forty-eight television services in total. Additionally, 1C has two channels intended for cable television distribution which are outside the frequency range normally covered by domestic satellite receivers.

The satellites are located at nominally the same position in space: 19.2 degrees east on the geostationary orbit (about 36,000 km vertically above Zaire), so that a single dish antenna

will be able to receive all forty-eight channels. The three satellites, which each weigh up to 2.7 tonnes and are about the size of a double-decker bus, are all located within a 70 km cube. Their position is closely controlled from SES headquarters at Chateau Betzdorf, Luxembourg, to ensure that they do not collide or block one another's view of the earth.

The three satellites operate within the fixed services satellite (FSS) band as follows:

Satellite 1A	11.20 to 11.45 GHz
Satellite 1B	11.45 to 11.70 GHz
Satellite 1C	10.95 to 11.20 GHz

(The two cable channels operate just below 10.95 GHz)

The frequency range 10.95 to 11.70 GHz was originally intended for telecommunication satellites; not for

*Ariane launching an Astra satellite*

broadcasting, which has been allocated the range 11.7 to 12.5 GHz. As a result, Astra was not subject to the original European Community satellite broadcasting directive, introduced in 1986, which required all direct broadcast satellites (DBS) to use the MAC transmission system. Hence, broadcasters using Astra have been able to operate in PAL or MACAs has suited their purposes.

The satellites are powered from solar cells which are backed up by batteries. These come into play during the spring and autumn equinoxes when the satellite passes into the Earth's shadow. Over a period of 22 days, the eclipse builds up to a maximum of around 70 minutes at the equinox (about 22.10 to 23.20 hours GMT), then falls away to zero over the next 22 days. During the eclipse, the batteries have to provide the 2 kW of power the satellite consumes.

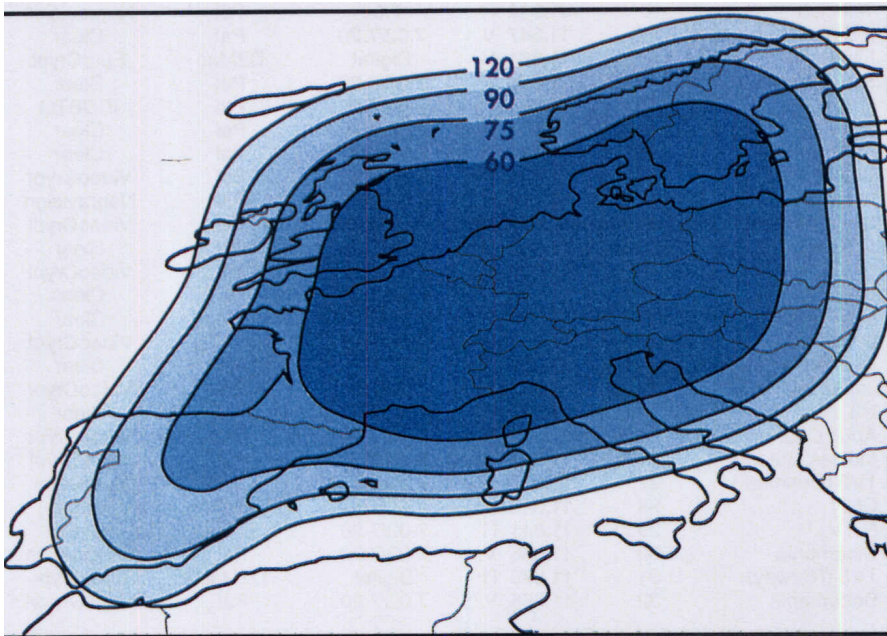


Fig 1: the footprint of Channel 23 on Astra 1B (UK Gold), showing the antenna diameter required (in centimetres) for direct-to-home reception