

about 3250km, with a maximum ground range of twice the latter, the 2m range can be exceeded considerably under lift propagation conditions. For example E layer ionisation will enable VHF and UHF signals to be received by the satellites when they are below your horizon.

TELEMETRY

Now you know where to listen for the satellites you will be able to hear many countries and it is interesting to copy the telemetry sent down continuously on the beacon frequencies.

The morse code telemetry from OSCAR's 8 and 9 consist of three figure groups while RS3-8 telemetry is made up of letters and figures in a variable format; at speeds between 12 and 20 words per minute. The telemetry gives details of such parameters as battery voltage, current and temperature, power outputs etc.

RTTY and ASCII telemetry carry similar parameters to the CW telemetry but with 60 channels available, more information can be transmitted. The tone frequencies transmitted by frequency modulation from UOSAT conform to the Kansas City CUTS system and are ideal for reception on a home computer. UOSAT also contains a speech synthesizer which will be used to 'speak' telemetry and other announcements as required.

Special report forms for telemetry reception are available from AMSAT-UK.

SIMPLE SATELLITE OPERATING

Ten steps on how to communicate through amateur satellites. For example working OSCAR 8 in mode A.

1. From orbital data, check when a convenient orbit will occur and calculate AOS/LOS times and any beam heading information needed.
2. Tune your 2 m transmitter to the 145.85-145.95 MHz segment before the calculated AOS time, using a dummy load.
3. If your aerials are rotatable point them in the direction from where the satellite will come over the horizon. Keep the beam orientation information

where it can be seen at a glance.

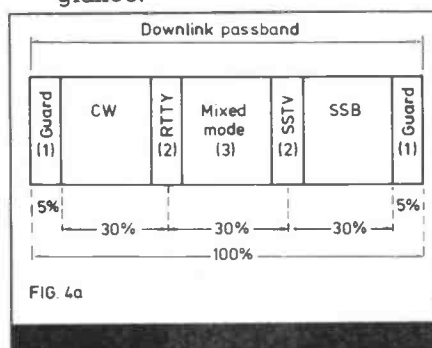


FIG. 4a

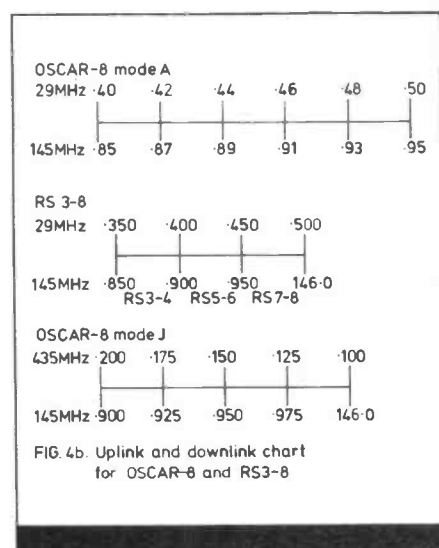


FIG. 4b. Uplink and downlink chart for OSCAR-8 and RS3-8

4. Set up your receiver to cover the 29.4-29.5 MHz part of the 10 m band and ensure the receiver is not muted or desensitised when the transmitter is used.
5. Listen for the telemetry on 29.402 MHz remembering the satellite is travelling towards you at about 4½ miles per second, causing a doppler shift upwards in frequency of about 700 Hz at the start of the orbit.
6. When the satellite is within range you should hear SSB and CW signals as you tune across the passband. Next find out if your signal is being relayed by the satellite. Do not transmit a powerful carrier or swish your BFO across the passband trying to hear yourself. This is very antisocial and unfortunately all too prevalent.

You can find your signal to within a few kilohertz on 10m. For example if you transmit on 145.900 MHz the middle of the uplink passband, your 10m signals will be in the middle of the downlink passband at 29.450 MHz. Due to the cumulative effects of doppler shift on both 2 m

and 10m you should tune 4-5 kHz away from the calculated frequency, higher if the satellite is approaching or lower if its receding from you. Fine adjustment of frequency can be obtained by swinging the receiver tuning in preference to swinging the transmitter.

7. Put out a 'CQ' call, monitoring your own signal on 10m, be prepared for someone breaking in; satellite working is the ultimate in break-in operation. Some CW stations are crystal controlled so tune around in case anyone is answering you on another frequency. Once contact is established a QSO should proceed in the usual way remembering the maximum 'visible' time of the satellite is between 15 and 25 minutes, most contacts are of 'contest style'.
8. If you generate the required ERP by a low power transmitter, feeding a high gain beam, don't forget to turn the aerial from time to time. Accurate time keeping is necessary to have the aerial pointing in the right direction at the right time. Turn the array in increments equal to the half-power beam width, for example, 45° for an 8 element yagi. In times of good propagation the 'true' path is not necessarily the best.
9. After you have made your contacts, and you wish to send a QSL card, mark the card with '145/29 MHz via OSCAR 8 orbit No...' in the frequency space on the card. Many operating awards and certificates for OSCAR operation cannot be claimed unless the QSL card specifies operation via satellite. A list of available OSCAR awards is available from AMSAT-UK.
10. The essence of successful satellite working is like any other Ham band operating, only more so, due to the short period you have to work in; listen first, most essential, don't hog the channel, use minimum power, having completed a QSO move off the channel, try to educate others in the correct methods of satellite operation.

UOSAT-OSCAR 9

Designed and constructed at the