SATELLITE FOOTPRINT

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In this column I first provide information on the move of PBS (Public Broadcasting Service), SCOLA (Satellite Communications for Learning), NTU (National Technological University), and SERC (Satellite Educational Resources Consortium) to a new satellite during 1994 and what you will need to access these services. Then Pete Smith, from the University of Texas at Arlington, will discuss satellite-delivered radio and how he is using it in his facility.

PBS, SCOLA, NTU AND SERC GO DIGITAL

By the time you read this, PBS should be broadcasting from its new home in the sky, TELSTAR 401 (T401). *[Note: TELSTAR 401 was successfully launched on December 15, 1993. —MNS]* This move is significant for the educational community since T401 will become the home of many distance learning services, creating an "educational neighborhood" on this satellite. The first residents of this neighborhood are PBS, SCOLA, NTU and SERC. Other services—to be named at a later date—are planning on joining them full time or occasionally (e.g., for teleconferencing).

WHAT IS TELSTAR 401 AND WHY USE IT?

TELSTAR 401 is one of the new generation of high-powered satellites designed to bring satellite communications into the 21st century. It has both C- and KU-Band transmitters and several other features that PBS was looking for when they decided to use T401 for program transmission. C-Band and KU-Band are each a range of frequencies assigned for satellite broadcasting. C-Band downlink frequencies are between 3.7 and 4.8 gigahertz (GHz, billion cycles per second) while KU-Band downlinking is done between 10.95 and 13.25 GHz. Think of C-Band as analogous to VHF TV (Channels 2 – 13) while KU-Band is analogous to UHF (Channels 14 on up). C-Band frequencies are shared with microwave services on earth, which can interfere with satellite reception. KU-Band signals are not shared, so there is no problem with interference. And KU satellites transmit a stronger signal (3 – 4 times stronger or more) than C-Band satellites. T401 will be located at 97 degrees west longitude; i.e., in the position now occupied by

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the KU-Band satellite SBS-2. Right next to SBS-2 is TELSTAR 301, which T401 replaces. If your satellite positioner is programmed with either of these satellites, you can use their presets to help locate T401. Both SBS-2 and TELSTAR 301 will be moved to new locations above the equator once T401 is launched.

PBS Use of T401

PBS will be using 7 transponders on T401. One transponder will be in the C-Band, and the others will be in the KU-Band. When the move from their present satellite takes place in February 1994, PBS will start transmitting most of their programs on KU-Band. Feeds of most of their National Program Service and all of their Adult Learning Satellite Service programming and teleconferencing will still be available on C-Band through the summer of 1995.

By the end of summer 1994, PBS will start transmitting some of their programming using a method that digitally compresses the TV signal and allows several different TV signals to be put into the space that one TV signal takes up now. To receive these programs, you will need to get a new satellite receiver (see below). PBS plans to be transmitting both digital and analog programming simultaneously through August or September 1995, when they will go all-digital.

SCOLA Use of T401

SCOLA plans to switch to T401 sometime in late fall 1994 or early spring 1995. When they do, they will have a period (up to 6 months) of transmission in both analog (as they are now) and digital. At that time, too, SCOLA is expected to start the first of 3 new channels in addition to its current all-news channel. SCOLA's second channel will consist of General Entertainment and Variety programs, including documentaries, films and children's programming. After they go all-digital, the only way to receive SCOLA programming is to have a special receiver and a license from SCOLA (similar to the way pay services operate).

What You Need and Estimated Costs

To receive the new digital programming, you will need to get a KU-capable system, which starts with a KU dish. The size of your KU dish will depend on how much of a margin you want between the point where the signal is usable and the maximum amount of signal the dish receives. Factors that affect this margin include the distance you are from the satellite and the quantity of snow and rain that fall in your area. To guarantee reception of programs from T401 under all atmospheric circumstances, a 4.2-meter (14-foot) diameter is recommended by PBS engineers. However, this recommendation is designed for the needs of broadcast stations. For most campus purposes a smaller margin between the dish's capabilities and the threshold of reception is appropriate. John Ernandez of PBS's engineering department has suggested that even a 1.8-meter (6-foot) dish would provide more than enough signal strength and an adequate margin for our use. The trade-off will be to put up with short periods where we lose the signal during heavy rain storms; if we get snow, we will have to clean off any accumulated snow before we receive programs we need. With digital video transmission the image remains clean as the signal gets weaker. When the signal gets too weak, the image disappears. With analog video transmission the image gets noisier as the signal weakens until the image is lost in the noise. The threshold where digital signals disappear is lower than the point where analog signals are really too noisy to use.

One-point-eight-meter dishes can be purchased for under $1,000 and—thanks to

their size—do not have to be mounted onto a concrete base or bolted to a roof. You can use a non-penetrating mount, which is basically a tray on which you place 100 or so pounds of concrete blocks. These counterbalance the satellite dish, which is usually mounted on a short pole attached at one end of the tray.

Your KU system will also need a digital-capable LNB (Low Noise Block Downconverter). The LNB is the part of the satellite system that is mounted in front of the dish; it stabilizes and reduces noise in a satellite signal by lowering the frequency, amplifying it and then sending it to the receiver. Contact your program supplier for detailed specifications. This type of LNB costs around $200. If you do not have a method of rotating the antenna element within the dish, you will need two of these.

In addition to the LNB you will need a digital receiver. Receivers are being designed now for release in late 1994. There are several manufacturers designing integrated receiver/decoders (IRDs), and there are many different cost estimates floating around for how much we will have to pay for them. Estimates range from a low of $1,200 for a no-frills digital receiver through $2,000 for a top-of-the-line IRD with all features included. When these receivers are ready for marketing, program suppliers will give you more details. If this information is available by the deadline for my next column, I will give a summary of what I know.

Your current C and KU receivers can be used to pick up analog programming off of T401 but cannot be adapted to pick up the digital signals that PBS, SCOLA and the others mentioned in this column will be using. Depending on which programs you want, you will have until the end of the summer of 1995 to upgrade your satellite reception system for digital signal reception.

In my next column I will have more details on the move of the four services to TELSTAR 401 and on any other services that will be moving there. And, at last, I will have information about satellite services originating outside of North America.

Now I turn this column over to Pete Smith, Director of the Language Acquisition Center at the University of Texas at Arlington (UTA). Pete will tell us about satellite radio and how it is being used at his facility.

SATELLITE SHORT-WAVE RADIO

The widespread use of satellite television technology has led to a little-noticed development for the collector of audio materials: satellite radio. Many major short-wave broadcasters now offer round-the-clock short-wave retransmission on U.S. domestic satellites. This list currently includes Deutsche Welle (DW), Radio France Internationale (RFI), Radio Canada International, and numerous other Canadian radio sources.

Satellite radio is available to listeners on an audio subcarrier, a separate audio signal which can be tuned in with your satellite receiver. Deutsche Welle television, for example, is available on the C-band satellite Satcom F4 (sometimes referred to as Satcom C4). The audio track for the television signal is 6.8 megahertz (MHz). Re-tuning of the satellite receiver to 7.05 MHz, however, brings the DW radio signal to the fore. Most satellite receivers allow for the easy adjusting of audio frequency and the reception of stereo signals (where available). At present, RFI is available at 5.41 MHz as an audio subcarrier which sits "under" the TV5 signal (satellite Anik 2, C-Band transponder 17). *[Note: RFI is also available on satellite ASC 1 C-Band transponder 23 at 5.8 MHz as a subcarrier of the SCOLA signal. —MNS]*

The Language Acquisition Center at UTA collects DW radio materials and makes these authentic offerings available to learners of German at all levels. Material is selected by the Center Director, in consultation with German language teachers. Selected programming is copied onto C-90 audiocassettes. (The DW stereo signal offers a near-perfect recording source.) A typical cassette includes at least 30 minutes of recorded material on each side, offering a wealth of timely and relevant language materials to the learner. Popular programming includes "Computer-Welt," "Treffpunkt (Das Jugendradio)" and "Volksmusik aus deutschen Landschaften." A detailed monthly schedule of DW radio offerings is available from their Köln office.

As is true with most major international short-wave broadcasters, Deutsche Welle has been extremely supportive of this use of their materials. When contacted concerning copyright permission, Wolfgang Pleines, Head of the Office of International Cooperation at Deutsche Welle, responded that "Radio Deutsche Welle has no objections...[to your] taping of portions of Deutsche Welle programs and the...[making] of copies of these materials for German language learners." He added that DW was "highly pleased" that we "make such good use of the programs." Similar permission letters have also been obtained from Radio Canada International.

Instructionally, such material is made available to learners at UTA as an "extra." Nonetheless, student reaction to these materials has been positive. Although not formally required to listen, learners from second semester on make good use of the recordings. Students note that they are inspired by timely and relevant show materials, especially on topics of personal interest. The portability of the audiocassettes is an added bonus. UTA is primarily a commuter campus, and the Language Acquisition Center is especially sensitive to needs for materials "which travel." Although lacking the visual stimulation available with video materials, authentic audio is accessible to learners with a Walkman (while jogging or working), or in a car stereo during a commute.

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