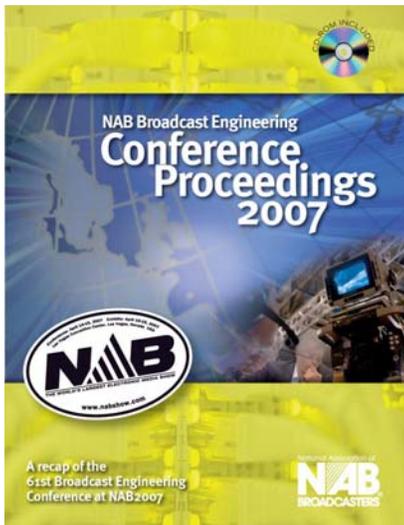




RADIO REMOTES USING NEW SATELLITE TECHNOLOGY



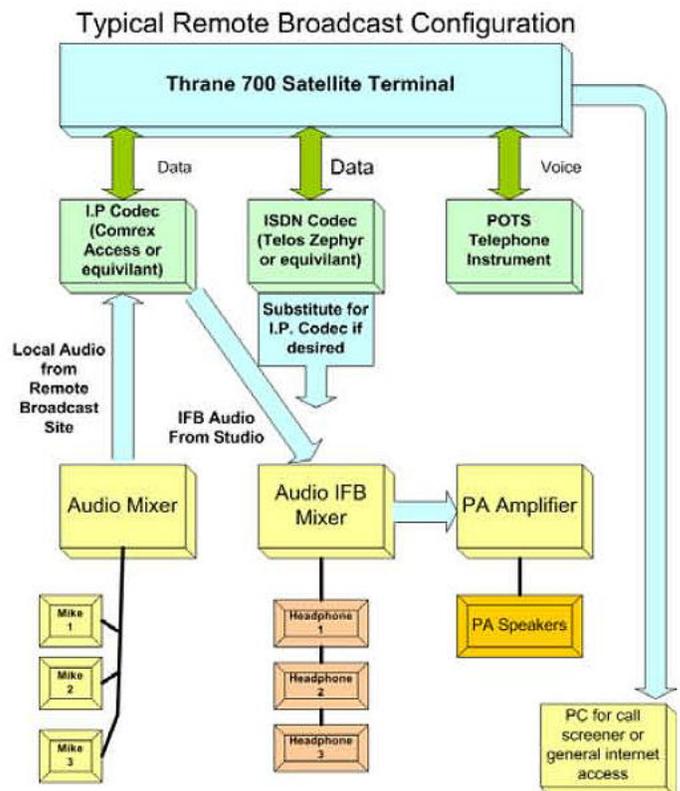
Supporting broadcast radio remotes is one task nearly every radio broadcasting engineer will face. A paper at the 2007 NAB Broadcast Engineering Conference (BEC, April 14-19, 2007, Las Vegas, NV – see below for additional information) entitled “Radio Remotes Using New Satellite Technology” discusses this topic including a detailed description of a portable satellite terminal solution for getting audio and data back to the station. This paper, authored by Paul Shulins, Director, Technical Operations, Greater Media, Boston, MA is excerpted here.

THE CHALLENGE – Greater Media owns five commercial class “B” FM radio stations in the Boston Massachusetts market. With five FM stations, the remote schedule can get quite busy, especially during certain times of the year. Programmers (especially those in the news business) are demanding high quality remotes, often on short notice in some cases in areas where telephone facilities or line of site RPU signals are non existent. Looking for alternative solutions, I purchased an IP Codec along with a portable satellite terminal to allow me to get the

data back to the studio via satellite and the Internet. The satellite terminal was portable (about the size of a laptop computer) and was easy and quick to set up and align. Data rates available on the hardware I used ranged up to 256 kbps.

HARDWARE OPTIONS – in order to participate in this technology, the hardware on the user end required is usually purchased and the airtime plan is selected. Once registered with the service provider, the system can be used at any time without prior coordination. There are several hardware manufacturers that offer options for ground based terminals. Your selection will depend on several factors including, size and portability, durability, ease of setup, maximum data rates desired, and of course price.

DATA SERVICE OPTIONS – Inmarsat owns and operates a network of three communications satellites that form the “bgan” (Broadband Global Area Network Service) network. The core of the bgan service is IP data connections provided as on-demand streaming or standard IP connections. Streaming services are provided with guaranteed data rates over the satellite of 32, 64, 128 or 256 kbps. Streaming transmissions over the satellite are prioritized requests and are billed by the minute. Most broadcast or UDP IP transmissions would be suited for this type of service.



Establishing a link to the network is generally a simple matter that should normally take no more than a minute or two. The earth terminal is powered up either by battery or by the included AC power adapter. After a short boot time, the panel antenna can be oriented to look to the sky (generally to the equator), and the azimuth and elevation can be adjusted by hand to maximize the signal strength as indicated on the LCD display on the terminal. The signal strength is also referenced by an audible tone that changed in pitch in proportion to the quality of the signal. After a short delay, the unit will register with the service provider, and a ready indication will appear on the terminal's display. At this point in time you may issue a command to initiate a streaming data connection to the Internet, place a voice or an ISDN telephone call at 64 kbps. An IP address will be assigned for background IP Internet browsing.

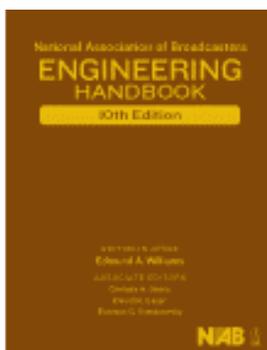
The block diagram illustrates a typical configuration used for my remote broadcasts. The diagram shows both an IP Codec and a typical ISDN Codec. The ISDN codec operates using a single "B" channel at 64 kbps, and the IP codec works well at data rates as low as 32 kbps.

CONCLUSIONS – the idea of using portable satellite terminals for remote broadcasts has finally come of age. Being able to instantly get on the air from just about anywhere on the globe with broadcast quality audio is an attractive option that has not been available to broadcasters until now. While the operating costs are still a bit high, having the hardware on hand along with an active data account allows a good measure of insurance for radio stations in case the primary method of broadcasting does not work, or there is just no other way of doing the broadcast. This is especially true during those times when there is no advance notice of the remote broadcast, and a line of site RPU shot will not work. Then there are those times when you think you have all the bases covered, you show up and the phone lines don't work or your RPU shot is being interfered with. With just minutes to go before the broadcast scheduled start time, you deploy your portable satellite terminal, connect to the Internet, and within minutes you are on the air. That is when this technology really shines!

This paper was part of the "Audio Solutions for Radio" session at the BEC, and is included in its entirety in the *2007 NAB BEC Proceedings*, available on-line from the NAB store (www.nabstore.com). The audio recordings of this session and all of the BEC sessions are also available at the NAB store.



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