

When the Truck That Brings Your Satellite Dish Leaves, Does Your System Really Work?

Suppose you overheard the following conversation:

Speaker A: *You know, if there is such a thing as a "marriage made in heaven," it is the TVRO and colleges and universities.*

Speaker B: *That may be, but there are only a handful of colleges and universities that have discovered what TVRO can do for their campus programs. There are very few Creightons with an MATV and even fewer Lubbers.*

Speaker A: *By the way, have you heard? SCOLA is trying to get a license for Ku-Band. Wonder how long before Ka-Band comes on-line? When that happens, it will really stir things up.*

Speaker B: *If you think Ka-Band's going to have the last gigaHertz, wait till fiberoptic cables everywhere confuse everything.*

Speaker A: *Just what we need—more confusion. Satellite programming is just great, but how do we get students to actively learn languages or cultures with it? How are we going to make them watch 'Good Morning, Siberia' or 'ZDF Nachrichten' after they're hooked on soap operas? It may be problematic to get your LNAs, feed horns, and gigaHertz all lined up*

like little ducks in a row in order to catch Galaxy, Anik, Westar, and the other birds, but it's going to be even more problematic to use foreign language satellite programming in innovative ways to help students learn languages. "Go and watch the feed from Molniya and we'll discuss it in class," is neither innovative nor effective. If Annenberg wants to fund new and creative concepts in educational communications, how about projects designed to revolutionize traditional teacher-textbook methods? How about projects that discover and develop new ways to teach and learn languages with foreign language satellite programming?

The language of the dialogue is American English. Yet, how many of you injected the speakers' intended meanings into the words? What meanings did you inject into TVRO, MATV, Lubbers, Creighton, Ku-Band, Ka-Band, LNA, Galaxy, Anik, Westar, and other birds, SCOLA, Molniya, and Annenberg?

Because meanings are not in words but in people, all of us at one time or another inject wrong or inappropriate meanings (those not intended by the speaker or writer of the words) into the words we hear or read. This is true not only for acronyms and rarely used words but also for very common, often-used words.

Take, for example, the case of the young man who went to Las Vegas, met a girl, had a fabulous night, got drunk, got married and woke up the next morning. He said to her, "Look, I've got a surprise for you. Last night when I said I don't have a handicap, I meant I am no scratch golfer. I spend all my time on the golf course, and you're the first girl I ever went out with." The girl said, "Well, I have a handicap, too. I'm a hooker, and I can't stop." The kid took out his club and said, "Look, I can help. Next time, before you swing, just put your right hand high on the shaft. You'll do fine."

We may not know what meanings to inject into the telecommunicative "jargon;" nevertheless, those of us who work in language learning centers and teach languages clearly understand that video is very much "in." Many of the language laboratories I visit are incorporating video technology into their facilities; many lab directors and teachers from the U.S. and abroad who visit our facilities at the University of Georgia tell me the same thing: Video is very much in demand at their facilities as well. Although foreign language video seems a logical choice for teaching and learning languages, it is also being used by various university departments at many campuses world-wide in pursuit of other objectives.

Because telecommunications is weaving the world into a multi-cultural quilt, many of us concerned with practices and products for today's language learning will have to know about the technologies that bring us the world in living color. Those of us responsible for preparing traditional and non-traditional students to live and work in the world of the 1980s and beyond can no longer teach them about life and work (survival) in the United States; life and work in the United States is no longer possible in splendid isolation, far away from life and work (survival) in the rest of the world. Although the satellite—an off-shoot of space exploration—brought the rest of the world into our living rooms, in a sense, we Americans brought the rest of the world upon ourselves.

In a twelve-year period, home satellite dishes went from zero to an estimated 2 million. From the 29 satellites beaming down on North

America, today's dish owner can flip through 114 channels and tune in to you-name-it video. What we have here is the proverbial embarrassment of riches, especially for the three-billion-dollar industry that has grown up around the backyard satellite dish. In case you think that the backyard dish and 2 million consumers are the "marriage made in heaven," think again. Before you can understand why something that hasn't happened (satellite dishes on every campus) is something so highly prized both by marketers of the technology and some educators, you have to be able to inject the appropriate meanings into the words of the short dialogue that began this article. Before we can answer the question "When the truck that brings our satellite dish leaves, will our system really work?", we have to know something about the issues and concepts involved in receiving television programming from satellites.

TVRO

In the United States, many of us have a passion for acronyms. TVRO is probably the most often heard and read acronym in connection with receiving television programs from satellites.

What does it stand for? TVRO stands for television receive-only earth station. It is a station that can receive satellite TV signals; it cannot transmit or send them.

Components of the Basic TVRO System. The most obvious component of the basic TVRO system is the antenna, also known as the dish. This system component is considered by many to be the most important part of the system, hence the most time-consuming to install. Regardless of the other components, antennas can be any one of the many popular designs—even home-made—provided they produce at least 50 dB of gain (which means they must be at least 10 feet or larger). Even larger antennas are needed in areas where signal strength is low.

A typical satellite has up to 24 transponders; each transponder receives an earth signal (transmitted from an earth station that can send signals), changes its frequency, and retransmits it back to earth where it can be picked up by a TVRO system. The uplink signal is in the 6-gigahertz (GHz) band, and the downlink is in the 4-GHz band.

A transponder puts out approximately 5 watts (W) of power, which makes satellite signals extremely weak. The reasons for such weak signals have everything to do with the fact that all power must come from solar panels, and the equipment of the satellite must work reliably for years. (Repairs have been attempted during shuttle orbits; they are remarkable but still impractical).

Although the frequency overlap of adjacent transponders would normally cause interference, the vertical and horizontal polarizations allow only signals polarized in the same sense to be received, and if there are two polarization senses, twice as many signals can be sent. Receiving both polarizations requires a rotatable feed horn to match the channel being watched with the appropriate polarization.

The energy the antenna receives from its entire surface (the whole dish) is focused into the **feed horn**, often a cone-like apparatus in the center of the dish; like a magnifying glass that focuses the energy of the sun on a spot of paper and makes it burn, so the feed horn gathers the energy collected by the dish.

The collected energy in the feed horn is passed on to a special amplifier, the **LNA** (low noise amplifier). With respect to the quality of the video received, the LNA is the single most important component of the system. There are three basic types of LNAs: the transistor amplifier (most common and least expensive), the uncooled parametric amplifier (higher priced and often necessary in areas where signal strength is low), and the cryogenically cooled parametric amplifier (very expensive and in need of constant maintenance; used in areas of extremely weak signal levels).

The **transmission lines** used in the TVRO system are usually low-loss coaxial cables; these carry the signal to the receiver, usually located indoors. Several hundred feet of cable are normally required.

The **receiver** is responsible for the audio and video specifications in the system. A very important component, the receiver should be selected carefully for quality. Usually, the receiver is the most expensive component of the

system. It performs three functions: 1) it selects the transponder (channel) that is to be received; 2) it downconverts the 4-GHz signal to an intermediate frequency (usually 70 MHz); and, 3) it demodulates the audio and video from the intermediate frequency. Three types of receivers are available: 1) the fixed-tuned (tuned to one transponder or channel only); 2) the tunable (can be tuned to any of the 24 transponder frequencies); and 3) the switchable (frequency is preset by a selector switch or may be remotely controlled to select one of a group of specific channels).

The last component of a TVRO system is a **standard television set** or higher-cost **color monitor**. When a standard TV set is used, a modulator is needed to feed the signal from the receiver into an unused channel on the TV; this is not needed with a monitor.

The objective of TVRO owners and users is to determine which satellites have programming worth watching and to aim the antenna or dish accordingly.

Ku-Band and Ka-Band. Most of the present satellite television system is in what is called the **C-Band** at 4-6 gigaHertz, 4 billion cycles per second; this frequency is quite high and requires at least a 10-foot dish to pull in properly. Because of the cost of launching, maintaining, and powering C-Band broadcasting, there is a trend toward what is called **Ku-Band TV at 11-14 gigaHertz**. Ku-band can be collected with a 4-foot dish with a projected cost of less than \$500. Unlike C-Band, Ku-Band does not suffer from microwave interference. Coming—no one predicts when—is **Ka-Band at 20-30 gigaHertz** which can be pulled in by a little antenna on a TV set. Theoretically, the number of channels on Ka-Band are unlimited.

Galaxy, Anik, Westar and Other Birds.

Presently, about 29 satellites beam down on North America. Of these, about a dozen carry consistent television programming. It is estimated that by 1990, there will be close to 200 video channels.

Of particular interest to foreign language educators are satellites (also called birds) carrying

foreign language programming. **Galaxy 1**, for example, carries SIN (National Spanish Television Network which broadcasts Spanish language movies, sports, children's shows, musical and live weeknight newscasts from Miami and GALAVISION which also offers Spanish-language programming with first-run films, specials, and sports. **Anik B and Anik D1** carry French-language programming, including programming from Montreal. **Westar 4** carries Mexico's leading network station.

These satellites are known as geosynchronous satellites meaning they are in an equatorial orbit that turns at exactly the same rate of speed as the earth below and, therefore, appears as a stationary point in the sky. Arthur C. Clarke invented the concept of "geostationary" satellites for telecommunications in 1944 by showing how satellites 22,300 miles above the equator could be dependable re-transmission stations for coverage of broad areas of the earth.

Molniya. Geostationary satellites are not the only type of satellite nor do all satellites belong to the U.S.A. In addition to the geostationary type of satellites, there are also non-geostationary ones. A non-geostationary satellite system of interest to foreign language teachers is the Soviet Molniya system, a series of four non-geostationary satellites that share a single, highly elliptical orbit. This elliptical orbit carries Molniya more than 40,000 kilometers above Siberia to a low 400 kilometers above Antarctica. Because of the Earth's powerful magnetic field, each of the four Molniya satellites are propelled to a second 40,000 kilometers above Hudson Bay, Canada. In this position above North America, each Molniya transmits six hours of Russian programming. Just as one of the Molniya is pulled southward and its transmission stops, a second one arrives and so on. In this manner, four satellites equally spaced throughout the arc create a non-geostationary system capable of transmitting 24 hours a day.

Creighton. Creighton University, a coed university, founded in 1878, is known for many things, but most notably, perhaps, for its pioneering efforts in using satellite communications on a regular basis. Located in Omaha,

Nebraska, Creighton's TVRO system is one of the most unique and innovative in the world.

Concerned primarily with the informational aspect of television service, the Creighton TVRO system encompasses 27 channels, including a French network from Québec, a French network from Montréal, a Spanish International Network, a Mexican educational network, BRAVO (telecasting foreign films with English subtitles), a Russian television network and a 24-hour Russian radio network accompanied by satellite photos, and an assortment of CNN, Home Box Office, C-SPAN, WGN, WOR, etc.

One antenna is dedicated to the Russian Molniya satellite system. The system that tracks the four Russian satellites in their non-geostationary orbit was created by students and instructors at Creighton. A desktop computer has been programmed so that the path or pattern of the Molniya satellites is in computer memory. This computer memory drives the dish using a combination mount, namely, one that has both azimuth (left/right) and elevation (up and down) tracking drives. The computer knows where the satellite will be in its flight path over Canada; it tells the dish where to point and when.

Lubbers. Viewing TV as a vital tool for world learning, Lee Lubbers, a professional educator, is also known as the "father of campus TVRO." The Creighton University Jesuit who was born in Stoughton, Wisconsin, and holds the doctorate from the University of Paris, is articulate in French and German. Professor of Fine Arts, he also directs the manufacture of the Molniya computerized Russian satellite tracking system.

Known for pioneering the use of satellite services at Creighton, Lee Lubbers has also become known as a world-wide advocate of an international consortium of institutions of higher education using satellite communications on a regular basis.

MATV. MATV or master antenna distribution is a system that interconnects classroom facilities, language learning facilities, dormitory rooms, administrative offices, etc., so that television signals can be fed into these areas. At Creighton University, for example, the MATV system specializes in carrying the Russian Molniya

broadcasts, SPN's TeleFrance, Mexico City's XEW and other non-USA programming. According to Lee Lubbers, people on staff who showed no interest in foreign programming became intensely interested when they discovered it on the office TV dial. More than 1200 locations on the Creighton campus are "wired" for TV on the campus cable system.

SCOLA. An acronym which stands for Satellite Communications [for] LeArning Worldwide, SCOLA was born out of a three-day conference at Creighton University during the first satellite conference in May, 1983. More than 50 people attended the conference; so inspired were the conference attendees that they formed the association. Since 1985, SCOLA means **Satellite Communications for Learning, Associated.**

- SCOLA's primary charter is: to **import "live" broadcasts from critical foreign countries around the world** via satellite in an inexpensive "compressed" video form.

The "downlink" or reception of the "live" programming is at SCOLA headquarters in Omaha, Nebraska; from there, with added audio sub-carrier providing simultaneous translation, the foreign news will be re-uplinked to a domestic satellite for wider distribution throughout North America. SCOLA's programming is primarily educational, including "live" news from Germany, France, Spain, Italy, Holland, Sweden, Norway, Portugal, Luxembourg, Libya, Saudi Arabia, Nigeria, Sudan, England, India, Sri Lanka, China, Japan, Indonesia, Korea, Turkey, and Israel. Most evenings there are movies for the hearing impaired with Russian subtitles.

The principal market is colleges and universities—and thus far, primarily modern language applications. Schools who sign up for membership in SCOLA are charged distribution costs based on the number of students benefiting from the transmission. Large state universities with large language departments pay about \$500 per month; smaller colleges with 2000-5000 students pay about \$200 per month. Private dish owners pay \$10, and business and government agencies pay \$500 per month per building connected. For current fees, contact SCOLA.

Anyone interested in participating in SCOLA, contact: Lee Lubbers, Creighton University, 2500 California Street, Omaha, Nebraska, U.S.A. 68178. Telephone: (402) 280-2700. Telex: 910-622-0287.

Annenberg. It is one of the well-known and respected foundations that has made the funding of new and creative concepts in educational communications a top priority. SCOLA applied for an Annenberg grant and The FRENCH IN ACTION series received funding from an Annenberg grant.

Conclusions

There is no doubt that satellite programming from foreign countries can be used in the teaching and learning of languages. There is also no doubt that the technologies that uplink and downlink, receive and convert the signals will become even more impressive and less expensive to buy and operate. What is doubtful, however, is whether or not we who teach foreign languages in the classroom and those of us who support both teachers and students in language learning laboratories will have time, energy, and reward to develop truly innovative ways to use foreign language TV programming in our teaching.

Most of our students cannot remember a time without television. What they can remember, however, is that television is something you sit and watch passively—passivity is part of the television watching experience our students bring with them to our classrooms. When we ask them to watch 'Good Morning, Siberia,' they will watch it—if it doesn't come on at the same time as the incredible soap, 'General Hospital'—the way they have always watched television, namely, passively. Given enough time, even passively watching Chinese television programming may help viewers learn Chinese, but having watched Chinese TV in The People's Republic of China, I have my doubts.

Hearing and seeing the target language spoken by native speakers in foreign language television programs may give viewers an authentic look at culture in terms of verbal and nonverbal communication dynamics. There is always, however, the question of just how culturally authentic television programming is; just how

culturally authentic is Chinese culture portrayed in imitation American game show formats?

Satellite broadcasts from target language countries are the "next best thing to being there" provided we who are responsible for equipping students to function in a multi-lingual world come up with innovative ways to help them analyze, understand, put into context, and use what they hear and see on world TV. If we use foreign language satellite programs in the way we use

other technologies, that is, if we simply abandon our students to fend for themselves, we know that when the truck that brought the TVRO leaves, our system will not really work.

J.E.T.T. Contributor Profile

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