

Remote Radio from Challenging Venues on a Budget

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ABSTRACT

A live radio remote under the best of circumstances never seems to go “glitch free.” Imagine having to facilitate live remotes in venues where the entire country’s infrastructure is at best “technically challenged” or where “gaffers tape” is considered a luxury item. This paper is a real-life case study of live remotes in challenging locations where the availability of basic services were even in question. The equation is further complicated by the limitations of a budget.

From Cambodia to the Himalayas, getting a live call-in show on the air from a 300 room hotel that only has a total of seven outside telephone lines and suffers from daily power outages or, establishing a Voice Over IP (VOIP) connection where your 64K dialup constitutes one half of a town’s entire bandwidth can create a challenge or two.

While most broadcasters may not face such extreme challenges, solutions that are geared towards working with next-to-nothing can be insightful when working under optimal conditions. This paper will also examine a large range of remote gear and offer reviews of how it performed under extreme conditions.

INTRODUCTION

A radio engineer’s job is to provide the best quality audio using the most reliable delivery systems available. With limitless funds and long lead times everything is possible, but in most cases both time and money are limited. This is especially true for unplanned, special news events. This is when radio broadcast engineers must earn their keep through innovation, teamwork, begging, borrowing and (not that we admit to it) stealing. In short, with a little creativity and a lot of tenacity, great broadcasts can be aired under seemingly impossible conditions.

While this paper does not pretend to have the answers to every technical challenge you will ever see at a live remote, we sincerely hope it will feed the fires of your imagination and help you think beyond your current boundaries.

This paper summarizes eight years of various challenging international remote broadcasts including solutions used and lessons learned. We do not claim to ‘know it all’ but this paper will attempt to impart some wisdom learned along the way that will hopefully make your next live remote a little easier.

ABOUT RADIO FREE ASIA (RFA)

RFA broadcasts news and information primarily by shortwave to listeners in Asian countries where full, accurate, and timely news reports are unavailable or suppressed. Established by an act of Congress in 1996 RFA is a private, non-profit corporation.

RFA is heard in Burmese, Cantonese, Khmer, Korean to North Korea, Lao, Mandarin, Tibetan, Vietnamese and Uyghur. Native speakers make up the vast majority of each language service, whose distinctive programming reflects each of these unique cultures.

DISCLAIMER

In this paper, specific equipment and software is mentioned by manufacturer and model number. This should not be considered as either an independent review or a product endorsement on the part of RFA or the authors. Over the years a great number of different products were used and are still in use at RFA. For the sake of brevity, all products that have been or are still in use could not be covered in this paper.

Likewise the omission of any products should not be misconstrued to represent a non-endorsement by the authors. Generally we use what we have access to based on budgetary constraints. When products are mentioned it serves as both a historical notation and a means to allow the readers to access specifications in order to research comparable equipment.

VENUE CHALLENGES

All live remotes by nature can be considered a challenge for all broadcasters. Nothing ever works as planned even under the best of circumstances. At RFA we try to adhere to the general rule of thumb

that all broadcast technicians follow for any live remote; bring twice the equipment as you think you will need and then some.

Unfortunately by nature, physical realities on the ground or by a combination of these factors, some venues prove to be a little more challenging than others. This conundrum is caused in some instances by the technical infrastructure of the broadcast location itself. In other cases there is an issue with the level of press access RFA is granted. As a surrogate broadcaster, RFA is at times discouraged from attending events that are either held in, or that involve one (or several) of its broadcast target countries.

Other venues can become a self-inflicted challenge due to both financial and time limitations. In these cases a technician is generally flying in cold, on last minute notice, with a suitcase full of whatever equipment could be gathered in an hour, into a situation that is unknown. The following sections will examine these challenges in more detail and offer a few work-arounds.

INFRASTRUCTURE CHALLENGES

Infrastructure challenges can best be described as finding the expected telecommunications and utility services at a venue are just not there. When working primarily in a developed nation and then trying to setup a live remote in a developing nation, you quickly find how the designation 'developing' was determined. Everyday services you would normally take for granted become hard to procure. In one Eastern European country, if you entered a facility with a telephone line that had a dial tone, you were considered lucky. Otherwise it would take three weeks to activate the dial tone on the line. If you were unlucky enough to need an actual telephone line installed, it would take at least one year.

Generally the active agents for an infrastructure that is lacking are three fold; regulatory authorities, service providers and local users. Specific infrastructures we will now examine include electric power, telephone systems, Internet services and satellite access.

Regulatory Authorities

Most countries have regulatory bodies that set and monitor standards for telecommunications systems, frequency management, building and electric codes. These standards, when they exist, usually comply with applicable, well documented international standards. This holds true in all developed nations. In the United States, most European nations, Japan and South Korea for example; the telephone, electric and cell phones systems are world class, stable and

reliable. If specific location factors are taken in to consideration (e.g. ISDN interface used or electric power voltage, etc.) almost all professional broadcast equipment will work as specified by the manufacture.

Unfortunately in some developing countries, standards are used more as a loose guideline for building a telecommunications system or power grid. Local regulatory authorities, when they exist, focus more on limiting access based on the maximization of tariffs and fees. Additionally, in countries where both poverty and corruption are rampant, well intentioned regulatory authorities are sometimes subverted by dishonest representative agents freebooting.

In one country where RFA frequently does live remote broadcast from, the World Bank reported in regards to bribes that; *"Seventy one percent of large firms report that these payments are frequent. The private sector estimates that unofficial payments cost firms an average of 5.2 percent of total sales revenue."* The report further stated that *"Government employees are much more likely to think that corruption 'greases the wheel' and that most businesses pay bribes."*

Factoring in this reality it is easy to understand how businesses that provide any type of service can be confused as to what level of support they are officially authorized to offer. As a result service providers will tend to concentrate on expanding their customer base rather than then worrying about regulations or the overall quality of service.

Service Providers

It would be unfair to blame the regulatory authorities alone as the service providers also contribute to infrastructure problems. If rules can be skirted to maximize profits, they generally are. It is not unusual to find cell phone services oversold and networks busy because of saturation. Electric power comes in at low voltages regularly and loss of service is often experienced due to an overloaded grid.

In the capitol city of one developing nation, the largest cell phone service provider recently lost the ability to receive international calls. The Ministry of Post and Telecommunication blamed the problem on the service provider. The Ministry claimed the provider did not follow the technical regulations because of "greed." They further accused the service provider of overloading switching equipment that allowed for only a 100 users with up to 200 users and causing a breakdown in their own network.

In fairness to the service providers, there can be a great deal of confusion caused by the regulatory authority problems mentioned above. It can

sometimes be unclear if you just bought and registered a right to provide and distribute a specific level of service or paid off a corrupt lower level inspector to go away.

Local Users

Further compounding these problems in some developing nations there is the common problem of the 'piggyback-user.' The piggyback-user is a local who steals a service by simply tapping in. This is not taking advantage of open opportunity, such as turning on electric power at a meter box or connecting into an open cable port in a junction box as you would rarely find in the USA, piggybacking is actively connecting into another user's service.



Picture 1 Suspect Piggyback Utility Pole

An example of this would be finding that the POTs (Plain Old Telephone) line that you were expecting to use for field stringer reports is actually an ad hoc party-line. The party you now share the line with is unknown to the local phone service provider. Your new line-mate most likely climbed a telephone pole, spliced into a random telephone-pair and tossed a wire into their house through an open window. This not only applies to telephone service but all services that can be spliced into such as electric and cable TV.

Zip cord and electric tape seems to be the piggyback-users medium of choice. In some countries you can literally walk down the street and count dozens of these unauthorized taps denoted by their telltale electric tape splice where you can follow the zip cord into an open window.

Electric Power

In some developing countries electric power, in regards to both stability and reliability, can best be described as fluid. The most important considerations on a live remote when dealing with electric power is to both protect yourself (first) and your equipment (second). In some countries an electric ground is either not part of the code or is generally ignored. Grounding is not only essential to help ensure clean audio but also for your own safety.

Electric Power Solutions

When traveling outside the USA and using standard 120 VAC equipment, it is essential to bring along a reliable AC Line Voltage Regulator. As safety is a concern, this is one piece of equipment you do not want to skimp on. There are inexpensive voltage converters, commonly available, but it is best to avoid their use. These are essentially simple step up transformers in metal cases.

The Furman AR-PRO 30 Amp Worldwide Line Voltage Regular is a good choice. The unit delivers a clean 120 volts output from input ranges of 88 to 264 volts. The unit protects against line voltage irregularities including voltage sags, brownouts, or over-voltages while handling loads totaling over 20 amperes.

It is not a bad idea to use the AR-PRO or a similar device on all remotes, including domestic events in the USA. AC line filtering and controlled power regulation is never a bad thing. The only drawback when using one of these units is that they are not especially portable in the "throw it in a suitcase and go" sense. Weighing in at 50 lbs they are a considerable extra load to carry through an airport.

If you are using local power standard equipment it is best to purchase an Uninterruptible Power Supply (UPS) locally. A good rule of thumb is to buy the biggest and best UPS you can quickly procure. This will filter the local power and offer additional short-term backup if there is a power failure.

Regardless of whether you are using a Live Voltage Regulator or UPS, use this unit and only this unit, if at all possible under load conditions, as the only power source for all of your equipment. If additional outlets are required use power strips off the Voltage Line Regulator or UPS. Power strips should have ground-fault circuit interrupter (GFCI) circuit breakers if possible. The GFCI works on the principle that the hot and neutral wires in a single-phase circuit carry the same current when operating properly. If one of these wires carries unequal current than the other wire, then a ground-fault is assumed and the GFCI will trip and break the circuit.

Grounding Issues

As far as grounding goes it is sometimes easy to determine if an electric circuit you are using is grounded. If you are connecting to a receptacle with only two prongs then it is safe to assume there is no ground. Even if you see three prongs, do not assume a ground is present. Check the receptacle with a Volt Ohm Meter (VOM). It is always a good idea to carry a VOM on a live remote. If you forgot your VOM, they are fairly inexpensive and easy to find worldwide. If you do not know how to test a receptacle for ground with a VOM then you are better off staying away from this test. It is always a good rule of thumb not to stick things in an electric outlet if you do not know what you are doing.

If you are certain you do not have a ground then run one. Find some heavy gauge wire and a nearby source for ground which can be some part of the building's main support structure, preferably a cold water pipe. Using a clamp or even a pair of vice grips, securely attach the wire to the ground source. The other end of the wire is then attached to the case of the Line Voltage Regulator or the UPS. Once done it is now even more critical to connect all your equipment to only this grounded power supply source. If you use any other power source for your equipment you run the risk of a ground loop.

A ground loop is a condition where you have two or more ground references in a common system. When two or more grounds have a potential difference between them, then current can flow. This flow of current can interfere with the normal operation of or, if the potential is great enough, cause damage to the equipment in the system.

Telephone Systems

A telephone line in some countries is an adaptable concept. In an ideal situation, when ordering a POTs line you can expect a standard telephone line with the minimum frequency response of 300 to 3,400 Hz. This is the parameter that most modems and other telephone interface devices such as hybrids and codec's are designed to work under. Unfortunately this is not always what you get in developing countries where lines with reduced frequency response, excessive noise and ground loops are common.

There is not much you can do to troubleshoot a bad telephone line. Complaints to the Central Office (CO) are generally ignored. Trouble tickets in most situations are only generated for one problem and that is a loss of service. It is a good idea to check all the building D-Marks that you can find and straighten them out the best you can. Looking for loose connections and fixing them never hurts. It is generally a good idea, for safety sake, to try to stay

off utility poles regardless of how much they look like the need attention.

It is always a good idea to travel with good telephone line surge protectors. Telephone line surge protectors should be the first device that you should connect to any unknown telephone line.

Phone lines, worldwide, are susceptible to spikes, transients, surges, noise and disruptive interference which will also cause equipment damage. Do not go cheap on this, the cheap telephone line surge protectors, such as the ones you occasionally find on a power distribution strip should not be considered suitable and their use should be avoided. A good telephone line surge protector should cost between \$30 and \$50 each. This is a worthwhile investment if it saves a \$1,000 piece of equipment and keeps you on the air. A good supplier for telephone surge protectors is Electronic Specialists, Inc. in Natick, Massachusetts.



Picture 2 Troubleshooting a Telephone D-Mark

To ensure that you have the best POTs line that is locally available, ask the service provider if it is a 'fax line.' Internationally a fax line is usually a buzz word that denotes a clean decent telephone line. Fax lines can be expected to perform within the standard telephone frequency response range. As the name suggests, on a fax line a fax machine is guaranteed to work by the service provider. Therefore it is safe to assume most other telephone interface devices will work on a fax line. If a fax line is available, then it is a good indication the regular phone lines you are

being offered are in some way inferior. The availability of a fax line should be taken as a harbinger of more telephone trouble to come.

If a fax line is not available and if the phone line is of particularly poor quality, a little investigating may reveal you are not on a POTs line at all. In the USA, the concept of a 'station' cell phone is alien. In some countries this translates to an antenna on the roof that connects to a black box, usually in a closet, that breaks out one or multiple (depending on the number of SIMs in the box) cell phones to regular dial tone(s). The dial tone is then connected to standard telephone set equipment. If your phone line sounds like a cell phone then there is a very good chance that it actually is one.

Cell phone networks also come with their own particular problems. In developing countries networks are almost always oversold and at times it is hard to get reliable connections. In addition, providers not being hampered by regulatory limitations on cell transmission levels sometimes will save their cost on cell tower installations by boosting the network transmission power levels and spreading the cells as geographically far apart as possible. In a cell network this overpowering can cause distortion, call interruption and actually radiate noise into the other equipment you may be using for the broadcast.

We have witnessed equipment such as PC audio cards, minidisk recorders and consoles picking up a ring tone buzz every time a cell phone rings within three feet of the equipment. There is also general constant noise interference generated when cell phones from an overpowered network are used in any close proximity to the equipment.

In any country you manage to secure an ISDN circuit the chances are pretty good that all the phone services will work great. Generally speaking, it should be safe to assume at this point you are not in an infrastructure challenged venue but one with a fairly modern telecommunications system.

Telephone Solutions ISDN

When we can get an ISDN line, we generally use either the Telos Zephyr or the Nagra Ares C with ISDN interface. The Nagra is used for events where we want to make a safety backup recording of the entire event as it is primarily an audio recording device that uses a PCMCIA card as a storage media. Using the Nagra allows us a secure, worry free recording as the backup recording path is the same as the ISDN transmit path.

Regardless of the ISDN codec device you chose to use, it is important to do your research and make sure the ISDN interface is compatible for the country

where you are planning to use the device. If it is not, the manufacturer can usually supply you with the correct interface that can be easily installed in the unit.

Telephone Solutions POTs

For straight telephone line interfaces we generally pack in a best-to-worse case scenario order. For acceptable quality telephone lines, codec devices are our first preference. Codec's offer far superior audio quality compared to any type of telephone hybrid. We have used the Comrex Hotlines and Blue Boxes in several countries with great success.

When the telephone lines are of particularly poor quality, the Australian made TieLine TLF-200 Patriot has always performed well for us. Designed for use in the Outback, the TieLine has a very robust modem design capable of connecting at lower data rates and will sometimes work when other codecs can not connect. If the telephone line degrades further when in use, the TieLine will automatically shift down the data rate of the connection without loss of audio.

If the telephone line quality is so poor that using any codec is out of the question, we move down to a digital hybrid. Digital hybrids offer enhanced audio quality and better null separation over a telephone line than analog hybrids. Our digital hybrid of preference is the Telos One, standalone version.

Depending on the complexity of the show and if it requires multiple telephone line use, we use multiple line call-in show digital hybrids. The units we use will be either the Telos 2101 or the Gentner TS612. Both units have dual digital hybrids and can bring two callers to the audio console independently. Both units come with nice, intuitive control surfaces too. While they both work great, they also seem to be a little more sensitive to extreme telephone lines. It is from using these units and burning out input cards that we were converted to the church of telephone line surge protectors. The surge protectors are always in line first and now the units work great.

There are times though due to excessive telephone line noise and interference the digital hybrids, regardless of manufacturer, will not work. It is not so much that they do not work but they suffer from severe sound degradation. The audio quality becomes so bad the telephone earpiece actually sounds better than what you are getting out of the console.

When this situation occurs our next step down the equipment chain would be to old school and break out an analog device. Analog devices tend to be the most dependable when dealing with very low quality telephone lines. Our first choice in analog devices would be the Comrex LXT/R Single Line Frequency

Extender. This device works with on standard telephone lines and in a pinch over a cell phone connection. By using frequency shifting, the LXT/R allows the connection to pass an additional 250 Hz of low frequencies which sound substantially better than a straight telephone connection. It also sounds like it cleans up line noise even though the manufacturer makes no claim it does so.

Unfortunately, frequency extenders tend to be only half duplex and often require a second telephone line for Internal Fold-Back (IFB). When used as a one-way device, the LXT/R is usually used as the program transmission line.

There are still times when the telephone line is of such poor quality that even an analog frequency extender will not work. In some cases, we have been lucky to have one telephone line available and simply can not lose all communications and go half-duplex with it. When that happens, we dust off our Gentner SPH-1 analog telephone hybrid. While analog hybrids do not eliminate line noise or greatly enhance the audio quality, they do provide a broadcast interface and offer a greater degree of null separation.

In a pinch we have even been known to use simpler analog interface devices such as the THAT-1 by JK Audio. The choice of what method is used to interface with a telephone line is sometimes driven by what tools we have at hand. This is especially true in a geographical location where professional broadcast or electronic stores do not exist. Usually in this situation you can almost always find a device that connects between the handset and the telephone set itself. Most commonly called a phone tap, or some variation of, these small plastic devices can be found in the most remote electronic shops worldwide. While this is in no means a professional device, it offers at least a connection breakout point from the telephone set.

Telephone Solutions Cell

When we are in a situation where it is impossible to secure any telephone line, we often try to make due with a cell phone connection. The interface device we generally use for cell phones is the Flip Jack made by Conex Electro-Systems. The Flip Jack connects to the cell phones headphone/mic jack and yields balanced line or mic inputs and line outputs. When on the spot and no other connection can be found, the Flip Jack can supply a broadcast path, albeit at cell phone quality.

GSM cell phones will not be examined in any great detail in this paper. The reason why is most of the remote locations where we must broadcast a live event from, use of GSM translates to a roaming call over the existing cell network at local cell phone

quality. Wherever we have encountered true GSM quality service, both ISDN and good quality telephone lines have been available.

RFA is currently experimenting with PDA cell phones that are GSM, Bluetooth and WiFi capable. We are using these cell phones to primarily consolidate equipment for field reporters. These PDA devices combine cell phone, electronic messaging capability (including email), digital camera, digital audio recording/editing and audio file FTP functions. Where we previously sent out reporters equipped with laptops, audio recorders, cameras and cell phones, they are now packing only one PDA cell phone.

Satellite Phone Options

Satellite phones are an evolving stable technology in the sense it is safe to assume whatever model you buy will be obsolete in under a year. In 1997, RFA purchased its first satellite phone, a Nera Worldphone. This was a bag phone without ISDN capability but it did provide standard phone audio quality from remote, isolated locations where cell phone networks were not available.

Our next generation satellite phones were ISDN capable Thrane & Thrane Mini-M phones. Remote broadcasts suddenly had high quality audio from any location where landlines were unavailable. We have used ISDN satellite phones extensively from outside venues and other locations where we needed better than telephone line quality. These phones were only used if we could afford the satellite network cost which can be quite high.

For all the bag type satellite phones, ISDN or not, there is a separate antenna about the size of a laptop that needs to be precisely aimed towards the correct satellite. It is critical to know the locations of all available satellites and not assume the expected closest one will work. In many instances the satellite we thought was the furthest turned out to provide the best connection.

After running through several generations of handheld satellite phones we are now using ACeS (the Asia Cellular Satellite System) phones. These are dual mode satellite and GSM capable units and are the smallest handheld phone of its type. The phone will automatically switch to either the satellite or GSM network depending on availability.



Picture 3
Ericsson R190

The ACeS network footprint is exclusively in the Asia Pacific region. International calls by satellite cost in the range of approximately \$1 per minute. GSM calls are charged at the conventional roaming rate. While the Southeast Asian footprint is acceptable for Radio Free Asia it may not be a good satellite network for your needs. The actual satellite/GSM phone is an Ericsson R190 pocket phone. With a little research, we are confident that you will discover a network in the area you need to use it.

Internet Options

We normally find Internet access non-operational or nonexistent more often. We consider ourselves extremely lucky when we find we have venue with Internet access. Oddly enough having Internet access seems to be independent of the type of telephone service available. In most developing countries, telephone service providers and Internet Service Providers (ISP) are entirely separate operations. It is our theory the telephone service providers are making money off the Internet whether they actually provide service or not so why go to all the bother of actually providing Internet services?.

Dialup Internet Access

When dialup access is available the phone company charges per minute for the connection and you pay by the minute for access to the ISP. Both the telephone company and the Internet service provider make their cut off this arrangement. Generally you pay the ISP by purchasing time in advance usually in the form of a prepaid card. You must carefully monitor your ISP use. When your prepaid time is out you are bumped off the Internet and denied future access, until you buy another card that is.

If you are extremely lucky, you can secure a broadband Internet connection. This is surprisingly becoming more and more common as most all broadband in developing countries is being provided by wireless delivery methods. In one venue where we were working from a hotel room the entire 300 room hotel only had seven outside telephone lines but, they did have broadband Internet access.

When dialup Internet is available, we use it as a replacement for IFB in live events. AOL Instant Messaging (IM) replaces a secondary open telephone line. As an unexpected side effect the use of IM has brought about a new tone of civility over the IFB. It is hard to yell when you are typing, using all caps just is not the same as shouting over an IFB line in a panic.

Email is used for most advance coordination that needs to be done. Internet access, even at being billed twice at local phone rates, eliminates the need for a

hot international IFB telephone line to coordinate the event. Overall cost can be reduced greatly.

For remote features and reports that are not live, we use the Internet for FTP program transfer. Admittedly from all that you have been reading at times our overall program quality, especially when transmitted over a noisy international telephone or cell phone connection, can be best described as wanting. This is a tradeoff we make for the excitement of a live broadcast of an event from a venue no other broadcaster has access to. That said, for a repeat broadcast, Internet streaming and general reuse of the live program, a locally recorded safety copy is made for all live events. This safety copy is FTP-ed to the main office immediately after the live broadcast is complete. The next time the show is aired it will be of much higher quality.

As an FTP-client, RFA now uses FileZilla. FileZilla is an Open Source application that is a powerful FTP-client for Windows that allows the ability to resume uploads in the event of line interruptions (as when your prepaid card runs out). FileZilla is also secure and can make SSL connections and offers GSS authentication and encryption using Kerberos.

Live Broadcast Using the Internet

If we can manage to secure stable Internet speeds of 35k or better and do not have access to an ISDN circuit, we will usually use a Voice over IP (VoIP) program called Skype as our program transmission line. We cannot say enough about this powerful communications program.

Due to budgetary constraints at RFA, Skype lets us provide additional, and extended, live programming when it otherwise would not have been affordable. With a satellite ISDN feed costing up to six dollars a minute and an international telephone call costing up to four dollars per minute, you can see where 100 extra minutes of programming adds up. Skype lets us to establish a phone quality connection using the Internet.

Skype has been on our list of regular broadcast tools for almost 2-years. It is installed in all our on-air studio's and is used regularly between RFA headquarters in the USA and our offices in Asia. While we do experience occasional buffer and connectivity errors, Skype has been highly reliable, and most times sounds better than a standard telephone call.

Skype calls are secure with end-to-end encryption. Firewalls and routers present few issues, if any, so there is usually no special configuration needed. Skype needs unrestricted outgoing TCP (transmission control protocol) access to all destination ports above

1024. Voice quality and some other aspects of Skype are greatly improved by opening up outgoing UDP traffic to all ports above 1024, and allowing UDP replies to come back in.

Skype was created by the same people who created KaZaA. Like KaZaA, Skype also functions on a peer-to-peer connection unlike other Internet VoIP programs which connect through a central server. Skype also established multiple connections paths over the Internet and will automatically switch to the most dependable path with the least latency.

OTHER EQUIPMENT REGULARLY USED

In addition to equipment that has been mentioned previously in this paper the following is a short list of equipment and software we routinely travel with:

- The Shure SM-58 unidirectional (cardioid) dynamic microphone. Rugged construction with a shock mount system that stands up to rough handling
- The Shure FP-33 portable stereo mixer specifically designed for remote audio recording.
- The Yamaha 01V Digital Mixing Console. 24 input channels, including 16 built-in analog inputs and capable of programming 100 presets into memory.
- BSI's WaveCart software that is the digital replacement for the cart machines with fast WAV file playback.
- Syntrillium's Cool Edit 2000 digital audio recording and editing software.

This list is by no means all inclusive. The nature of packing includes the all too familiar "this is all I need, all this stuff and... this Comrex Mix Minus Bridge and... this Sampson Audio Adapter kit and... these mic stands and... these AKG Headphone Mics and...."

We like to call this the "last minute, still room in the suitcase/anvil case so throw it in" syndrome. When you get in this mode, viewing one inch of open space tends to transform equipment and other miscellaneous accessories into packing material in our minds. Why use bubble wrap when a few extra headphones fill that empty space nicely?

One last note about packing, take absolutely critical equipment as carry-on if you can and never lose sight of it. A Shure FP-33 Mixer, a Telos One (without the power supply), a couple of mics and a laptop will fit

easily in a carry-on bag. This will guarantee that you have the enough equipment on you to get something on the air.

EVENTS FORWARD

In the remainder of this paper we present case studies of a few live events that for one reason or other we considered challenging. There is no reason to bore you with events like the July 1997 Hong Kong Hand-Over where with great pomp and ceremony Great Britain surrendered control of Hong Kong to China. From a technical point of view this event was a piece of cake. We were fully credentialed, had a broadcast room at the event and were provided first class technical support services (including broadband Internet access, ISDN lines, house audio feeds and multiple telephone lines).

The events outlined below are by no means a list of all live events covered since the inception of RFA eight years ago but, a highlight of a few of the particularly tough ones.

The Rating System

We have used the following visual device to rate the events that are reviewed. Ratings are based on the on the following factors:



The Cost Factor One for- really cheap all things considered. Two for- could afford to do it again. Three for- really broke the bank.



The Technical Factor One for- easy an intern could have done it. Two for- required some work. Three for- impossible, it should have never worked.



The Quality Factor One for- intelligible (at least it was there). Two for- acceptable air quality. Three for- 100% air quality it sounded great.



The Overall Factor One for- hope to never do that again. Two for- would do it again but different. Three for- would do it again in a heartbeat.

EVENTS

Millennium Celebration

Angkor Watt, Cambodia

December 31, 1999 / January 1, 2000



Duration:

One Night, starting at 10 PM on New Year's Eve, RFA broadcast 3-hours of live interviews, commentary and sounds from the event.

Logistics:

One technician, battling migraines and the flu in transit, was sent from Washington DC after receiving only nine days advance notice. Travel to Cambodia takes a total of thirty-five hours. Once in the capitol city, Phnom Penh, it was another one and a half hours flight (by an ancient Russian prop plane at the time) into Seim Reip. All equipment used for this event was hand carried.

Overview:

In honor of the Millennium, Cambodia hosted a cultural festival and New Years celebration on December 31st, 1999 complete with their King, Sihanouk, in attendance. The main venue was located around the ancient temples of Angkor Wat which is located near the town of Seim Reip. The celebration climaxed with fireworks at midnight over the ancient temple sites.

The Angkor Wat temple complex was originally built by the Khmer empire. Construction is estimated to have been completed by the end of the 12th century. Angkor Wat was abandoned for hundreds of years and lost to the jungles of Southeast Asia until its rediscovery in the late 19th century.

Technical:

Initially the intention was to establish a link and audio feed using a satellite telephone. The event was primarily located outdoors. ISDN and leased telephone lines were not available even on a temporary basis. A mini-m satellite phone was brought from the USA to the event but we were unable to get a signal lock on any satellite in the area. In a last ditch attempt to get a connection, a desperate attempt was made to gain a position of height for the antenna. A local youth was paid \$5 to carry the satellite dish to a nearby rooftop without success.

With the Y2K bug still a real threat (remember everything was supposed to stop working at midnight) and the local cell phone networks already being periodically saturated, our technician and the show's anchor decided to move to an indoor base of operations with access to land telephone lines.

Fortunately a suitable space was found at the local United Nations Development Program office.

At this location, a makeshift studio was quickly setup. Equipment included two Shure SM-58 microphones, a Shure FP-33 mixer and two Telos One Digital Hybrids. The show's host and one guest did a running commentary of the events for three hours. They gave a continuous color report from what they could observe from a window and see on local television. One hybrid was dedicated to taking calls from two local reporters that were moving around the main venue and reporting back.

The second hybrid was to be used as the transmission path connecting Seim Reip to RFA's main studios in Washington DC. The emphasis here is on "was to be used". This turned out to be one of those locations, for whatever reason, digital hybrids function poorly when using the local telephone lines. While both hybrids would work fine taking cell calls from the stringers, neither would connect with acceptable quality over the available international circuits.

With no other interface from the console to the phone line, or without any other suitable transmission path, in desperation our technician placed a headphone earpiece onto the mouthpiece of the telephone set. Once he found that this was of acceptable broadcast quality he secured the setup with gaffer's tape.

Unbelievably this setup provided the best quality audio feed, as blindly identified as such by the receiving end, then any other method that was tried.

Comments:

Once again, gaffer's tape saved the day. Three hours after it started, the program ended successfully. This was a tough trip with over seventy hours of hard travel to do one three-hour live broadcast.

Speech by the Dalai Lama

Washington DC, USA

June 2000



Duration:

Less than one hour.

Logistics:

This event took place on home ground in Washington DC. Equipment was driven to the site early in the morning. While only one days notice to cover the event was provided, there was no difficulty in complying. Fortunately all the equipment that we needed was on hand.

Overview:

During the annual Smithsonian Folklife Festival on the National Mall there was a section dedicated to the Tibetan culture. Organized by the Conservancy for Tibetan Art & Culture (CTAC), the ten-day-long exhibit titled "Tibetan Culture Beyond the Land of the Snows" brought together more than one hundred traditional artists from Tibetan communities around the world to in order to celebrate the enduring richness of Tibetan heritage. Highlighting the event was a speech by their spiritual leader, His Holiness the Dalai Lama.

Technical:

This event marked the first use by RFA of the Thrane & Thrane ISDN satellite phone. At this event the Telos Zephyr ISDN Codec was used as the interface device. Since this was a local event we dragged along a spare Yamaha 03D digital console. A feed was provided from the Dalai Lama's podium by the CTAC.

The ISDN satellite phone was used as we had too short of an advanced notice to order special land lines. In the end, after calculating the short usage time, installation charges and actual usage cost, the ISDN satellite phone provided a more economical connection.

Comments:

This was an extremely easy event to do but it was important for several reasons. Being located in our hometown it allowed a good opportunity to evaluate some of our technicians in action that had not been previously tested in the field. It is better to know how someone will do with a live mix when they are ten minutes away rather the halfway around the world.

This was also a good chance to try out some new equipment from a venue where we were close enough to provide a work around quickly if needed.

That particular July in Washington DC, weather wise, felt just like Southeast Asia too. It was very hot and very humid. We felt the event gave both the staff and equipment a mini-field test under controlled conditions.

The Cambodian Elections
Cambodia
1998 to 2003



The Cambodian elections were more of a multi-year series of three national elections. Each election was for different national and local offices. The elections were being held for the first time in many decades or in some cases for the first time ever.

All coverage was staged from our local office in Phnom Penh, Cambodia and heavily supported by headquarters in Washington DC. The Phnom Penh office itself grew and evolved during this election cycle in both space, staffing and technical skill.



Picture 4 Election Lines in Cambodia

Cambodia is a developing nation and during this time period of the elections, the country itself also improved in regards to the availability of technical support services, general stability and security. The first election came less then a year after a military takeover of the Government. During the election there were guns, police, soldiers and bodyguards everywhere. Internet and telephone services were hard to procure at first as international investors tend to shy away from countries that are perceived as unstable. The entire series of elections were marred by violence and tension.

1998 Presidential Elections
July & August 1998



Duration:

20-Days of coverage were provided for both pre- and post-election. A total of 30 days of on the ground technical support was provided.

Logistics:

All the technical support staff was flown in from Washington DC. We were fortunate at the time by having one staff member who had lived in Cambodia recently and was familiar with the country and the political situation. This person was our primary in-country coordinator and remained in Cambodia for the entire thirty days.

Four other technicians traveled to Cambodia in two shifts of two per shift for 15 days each shift in country. All equipment used during the election was hand carried in.

Overview:

This election was first in the series and was to elect the President of the country. As the least important of the elections (Prime Minister is the real power holder) and due to the fact that our editorial operations in Cambodia were still in a new startup mode this was the easiest of the three elections as far as the programming demand.

Technical:

Program feeds were limited to no more than four-per-day. These were not live feeds and were FTP-ed to Washington DC by Switch-56 dialup modem.

On Election Day there was a small amount of live programming, interviews and roundtables but these were limited as segment insertions into the main show which was still being anchored in Washington DC. All live programming was transmitted to Washington DC over telephone lines using Telos One Digital Hybrids.

The RFA office in Phnom Penh was located in a second floor walkup. It housed two offices and one room that was used for a studio. RFA had just moved into this space a month previous to the election and was there on a short term lease agreement. As a result no major modifications could be made to the space and the studios therefore were not very well acoustically isolated. A Yamaha 12-Channel Analog console was used in the studio.

Comments:

This was considered a "practice run" for the elections cycle. While this was the second space RFA occupied in Phnom Penh, it was still considered a new office. Reporters were, for the most part, new hires and the political relevancy would increase with each election.

2002 Communal Elections

February 3 2002



Duration:

30 days of election coverage including an additional 15 days of pre-election staff training.

Logistics:

One local technician was hired six months before the election to support both the office and the election coverage. Two technicians traveled from DC and planned to be in Cambodia for forty-five days to support the election and do the pre-election staff reporter training.

One large Anvil rack case that contained a full studio of equipment was air shipped to Phnom Penh. Equipment in the rack included a Yamaha 01V,

Nagra Flash Recorders ISDN Unit, Telos Hybrids, Furman AR-PRO Power Regulator and more.

While the racks were shipped to the event, unfortunately they were not allowed into the country and were blocked at Customs. RFA had received advance assurances the equipment would be allowed in but for a yet undisclosed reason that did not happen. Fortunately the technicians from Washington DC were carrying with them what they thought would be some additional field equipment, last minute throw-ins and essential equipment. As we mentioned before, it is always critical to carry essential equipment on your person that you do not want to lose hold of. This equipment and what we could find in-country would become what was to be the bulk of all equipment used for the broadcast.

Overview:

This was the first ever local, or commune, elections in Cambodia's history. The election decided who would run the local villages, towns and districts. There were over eight registered political parties and hundreds of candidates around the country. The dominant parties in this election were expected to dominate the next national election.

Technical:

RFA had recently moved into new office space and now occupied two floors of a French colonial style row house in Phnom Penh. When the space was taken, a Washington DC based technician traveled to Cambodia to help prepare the space. He was there long enough to accomplish essential tasks like installing windows (standard construction was to have window opening with no glass), install a computer network, ordering phone lines and making sure that there was sufficient electrical power. The technician also did manage to locate a local Internet service provider who installed a wireless 128 Kbs Internet circuit.

While there our technician designated space where the two new studios would be built. In hindsight, this was a task we should have not let him do as he was primarily a network and computer technician. Complicating his poor decision even more was the fact that he was only in-country for twenty days. As a result, the optimum choice in identifying studio space was not made and no one was onsite for supervision of the actual construction of the studios.

As a result our studios ended up in what was once a large bathroom and a front facing bedroom, both on the second floor. The construction for the studios involved only basic work, removal of a toilet, sink and bathtub and repainting. For acoustic treatment, they used what was essentially some sort of foam packing material that was glued to the studio walls.

Twenty new local contract reporters were hired shortly before the election to assist an expanded local staff of reporters that now numbered six. In addition four reporters were sent on assignment from Washington DC. The total reporter staff that required our technical support numbered about thirty.

All of the new temporary reporters were also approved to purchase portable cassette recorders. Our budget did not allow for better quality Minidisk recorders (\$50 versus \$300) as we normally issue to the RFA staff reporters. Locally available handheld cassette recorders were tested and a Panasonic model was approved for purchase. Unexpectedly one of the new reporters had a bright idea that soon spread to all the new hires. This reporter decided that a no-name brand micro-cassette recorder was smaller, cheaper and easier to carry. On the face of this, we took this as an encouraging sign that these temporary journalists had the potential to be real reporters as they had already learned to sacrifice audio quality for their own personal convenience.

To accommodate all of these new temporary hires additional space was rented. This space was found on the first floor of a building next to the office, also a French colonial style row house. A French colonial row house is a very long, 87 feet, and narrow building, 13 feet across. To compensate for this long and narrow layout the ceiling heights are high at 13' feet. Since this was a temporary space, glass was not installed in the windows. The space served as a training area and staging point for the expanded reporter pool. Due to the dust (no glass) factor, we avoided placing equipment in this space except on a temporary basis.

When our two Washington DC based technicians arrived they did the best they could to straighten out the studios by rewiring and doing what acoustic treatment they could. Acoustic treatment was simple being limited to material that was available in country. This involved mostly hanging heavy drapes over the windows and placing area rugs over the tile floors.

Their next priority was to provide technical damage control to the new reporters. Before the arrival of our technicians, the new reporters were all bought pay-as-you-go cell phones. The purpose for these phones, as we were originally told, was to coordinate activity between the reporters in the field. All reporters were to return to the office to record and edit reports. Reporters, who would be providing coverage from the more remote regions, were to call in reports from landline telephones in their hotels.

The pre-election technical training sessions for the new reporters started with the gathering of all the micro-cassette recorders and reissuing Panasonic handheld cassette recorders. To this day we still have a box of micro-cassette recorders in the Phnom Penh office. Over the next fifteen days technical training was conducted that included computer use, digital audio editing, proper studio techniques and field reporting.

After the training sessions were completed, the temporary space reverted to a coordination point and short term temporary work space for the new stringer reporters when they were in town. Due the space not being properly enclosed, equipment could never be placed there on a long-term basis as the dust level and heat were a concern. The only accommodation we made for this space was to run one telephone line and a single network connection out of a window from the RFA office into an open window of the temporary space. This established some communications between the spaces. One older phone was left in the room and the network connection was used by a couple of the reporters who had laptops.

Election coverage started in earnest with the stringer reporters traveling to the villages. This is when we encountered our first technical glitch. Reporters were not traveling back to file their reports nor were they using hotel rooms with regular telephone lines. Instead they were calling in reports from their cell phones and trying to feed in actualities and interviews. Remember we were told before the election the cell phones would be used for field coordination only. We had brought a few Flip Jacks cell phone interfaces, just in case, but they were in the rack of studio gear we were unable to get into Cambodia; it was now in Bangkok working its way back to the United States.

The reporters were trying to send these unexpected feeds by holding the cassette recorder's speakers to the cell phone. This caused all types of problems, the worst being that the cell phone network was so overpowering in these isolated regions that when the cassette recorders were anywhere within proximity of an active cell phone, it emitted a loud buzz. This buzz of course was also being transmitted along with their program.

The reporters would not be dissuaded that this was an improper way to file a story so a solution had to be devised. At first we tried a short 12-inch cable with a pad arrangement out of the headphone jack of the cassette recorder into the microphone jack of the cell phone. This only yielded mixed results depending on the cell network that you happened to be in. Some cell networks were so strong that even with the cell

phone one-foot from the cassette deck, noise was still generated. The next setup, which was what was finally used, was a new cable that was three feet long. This allowed enough distance to eliminate the buzz between the cell phone and cassette recorder.

Now that the tempo of the coverage was set, a small staff would anchor a show from the Phnom Penh studio and replay reports that were filed from the field while additional color was added by live cell phone call-ins. This would be recorded and FTP-ed to Washington DC until we drew closer to the election when we would start augmenting the FTP-ed programs with occasional short live update programs and an occasional live insert or interviews to Washington DC.

All live feeds up to Election Day were fed into Washington DC by dialup telephone lines over a Telos One hybrid. This was a case where we were using a "fax line" telephone line. As it turned happened, out of the office's eight telephone lines three were of unacceptable quality for international connections and the other four were even worse. When traced out, they turned out to be "station" cell phone lines.

We used the one fax line for all international connections and the least-worst of the other three landlines to take the field reporters calls.

We had managed to have carried into Cambodia, well before the election, a Yamaha 01V console and a Telos 2101 dual digital telephone hybrid. This was accomplished by one of our staff technicians based in Hong Kong. This was already in use in the larger of the two studios before the election team arrived. After proper rewiring, it was functioning properly and this became the main broadcast and production studio.

Since we would not be receiving our rack of equipment from the US, we were down one studio that we had planned to use as the main broadcast studio. We were counting on having a second production studio separate from the main live broadcast studio but this did not happen either. The small (x-bathroom) studio had a locally purchased "Karaoke" console of unknown make and origin. With the addition of a Telos One, this studio was used to take feeds from the reporters in the field. With the new carpet on the floor and the drain holes covered you could barley tell that the room was once a bathroom.

Tight studio use and feed scheduling was enforced that allowed the entire thirty day program schedule to go fairly smoothly. We were at an advantage when any argument broke out over the schedule in that our

technicians did not understand the language. Traffic control is much easier when you do not understand what someone disagrees about and you can simply point to the schedule and say "your turn."

On the day of the election, the Phnom Penh studios were on the air with 2 two-hour live shows. For Election Day live coverage when a higher quality feed was required, the Thrane & Thrane satellite phone was used with a Telos Zephyr Codec as the interface. In order for the satellite phone to work the antenna had to be located on the buildings roof. This required our technicians to make a 50-foot antenna extension cable on the spot.

The Telos 2101 dual hybrid was used to queue and coordinate cell phone calls from the reporters who were now in remote villages all over the country. These feeds were inserted live into the Election Day show.

Comments:

This was an event where if something could go wrong it did. Telephone and cell phone networks were problematic for the entire month. Equipment did not show up and what was there was often used in the wrong manner when the technician's backs were turned. The event was a prime example of ample technical planning going astray due to unforeseen circumstances and poor coordination between the editorial and technical staff.

The election period was also subject to daily electric problems. The electricity in the city of Phnom Penh is supplied by diesel generators. In order to save fuel costs, one of the generators is turned off for several hours periodically. It is a random choice which generator would be turned off so you would never knew which day which area would experience a blackout. Blackouts, spikes and brownouts were common daily. At times overhead florescent lights had to be turned off in order to boot PCs. Four UPS units were lost due to power spikes.

Topping all of this off, on the actual Election Day we ended up down one USA based technician. He had rented a dirt bike without knowing how to operate a motorcycle and promptly crashed two days before the election fracturing his leg. This caused him to be medically evacuated to Bangkok for treatment thus he was absent for the actual election and our most important broadcast.

With the lessons learned from the last two elections we vowed that the third election would go better.

2003 National Elections

July 2003



Duration:

The election coverage itself started in late June and continued until August 15. We were active on the ground with an office renovation and hiring of an expanded local technical staff for one year before the coverage started.

Logistics:

With the office renovation, a USA based technician was on the ground in Phnom Penh for one year leading up to the election on a two-month rotational shift. These technicians were there to oversee construction and train newly hired local technicians. There was also regular travel to Phnom Penn by RFA's design and installation teams. Equipment was brought in throughout the year to outfit the new studios.

For the actual elections, one of the rotational technical staff members remained in country. By this time, the local technical staff now numbered five and was sufficiently trained. Two technicians traveled from Washington DC for the month of broadcast. An additional staff technician was also flown in from our Hong Kong office. All technicians traveling for the elections carried additional equipment in to Cambodia.

Overview:

This election was for the national parliament. It is the national parliament which in turn elects Cambodia's Prime Minister. This was the election that decided who ran the country. There were three major parties and several minor parties with hundreds of candidates contending for parliament positions.



Picture 5 Standard Phnom Penh Studio Setup

There were twenty-five temporary stringer reporters hired for this election. The full-time Phnom Penh

office staff had now increased to fifteen. Five additional reporters were assigned temporary duty for the elections from Washington DC. The total numbers of reporter staff was now at forty-five.

Technical:

The office renovation was a total remake and expansion of the space. A rooftop patio area was rented and enclosed in glass. This area served as the new training and stringer staging area. The number of studios was expanded to five including a large production studio. The number of split air conditioners used in the space went from eight to twenty-one.

All five studios were outfitted with the same compliment of equipment. This included a Yamaha 01V and Telos One hybrids. The larger production studio also had a Telos 2101 dual digital hybrid system and control surface. All studios had computers and were outfitted with Cool Edit.

A new office wide PBAX was installed and five extra telephone lines were added. Unfortunately these lines were only station cell phone lines. The telephone company told us that we already had "enough" landlines.

The ISP service connection was also upgraded to 512-Kbs albeit still wireless. The connection was undoubtedly in some way shared in a manner that was unknown to us. Most likely our feed was off a shared hub in the ISP. The old 128-Kbs would deliver a minimum 56-Kbs and the new 512 bottomed out at 256-Kbs depending on the time of day. High usage periods seemed to be between 4 to 7 PM. We were still better off then when we started.

So much additional equipment was added that we were required to upgrade the building electric service. For stability a building UPS and generator set was also installed. The office was ready for this election with an overall renovation and a new coat of paint both inside and out.

Election coverage was to be live for thirty days, two hours per-day, which was added on top of the regularly scheduled daily Khmer programming. Besides the two hours of original live programming from Cambodia, the office was also expected to contribute to RFA's regularly scheduled programming anchored in Washington DC.

Additionally the Phnom Penh office continued to produce a two-hour long live local call-in show twice a week.

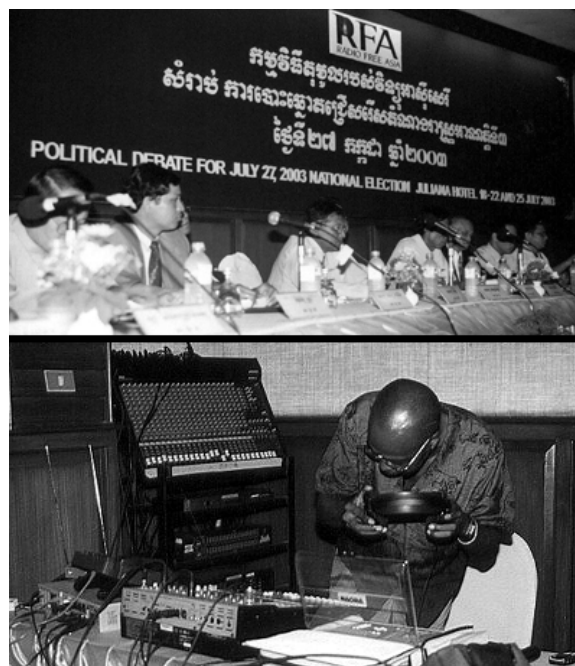
For the election this time around, all of the reporters in Cambodia were equipped with a Flip Jack, Nokia

6210 cell phone and a Sony Minidisk recorder. The quality of the audio coming from the field improved dramatically from what we heard during the communal election of 2002.

In the week prior to Election Day several different telephone codecs were carried in from the USA and tested. One emerged as the star of the production effort. For years bad phone lines and inconsistent service plagued transmissions from Cambodia, causing the quality of some programs originating in Phnom Penh to be spotty at best. Tieline Technologies' Patriot and Commander Codecs worked and managed to deliver a stable, clean 15-kHz of bidirectional audio over the "fax" line. This allowed us to send all live feeds to Washington DC over dialup and avoid the more costly use of the ISDN satellite phone.

BSI's WaveCart was also used extensively for the playback of audio WAV files during the live broadcast. In the past WAV file playback was done using Cool Edit which, is adequate as an editor but does not rise to the challenge as a playback engine. WaveCart's ten swappable decks and its sequential (or non-sequential) playback capability allowed program inserts to fire off on demand.

AOL Instant Messenger was also used extensively for the first time during any RFA broadcast. This helped tremendously for coordinating activities between the Phnom Penh studios, RFA's Master Control in Washington DC and our US based studios. For coordination between the studio and control room a new program was developed by RFA called Studio Slate. Studio Slate, using USB pen pads functioned as an IM white board that allowed for the virtual passing of notes between the studio and control room.



Picture 6 Live From a Debate

In addition to all of this special live coverage, RFA also sponsored and moderated a series of live debates. The debates were unprecedented in Cambodian history and for the first time Khmer voters had the opportunity to hear all the candidates. Hosted from local hotels, each 90-minute debate featured 22 candidates (yes, 22). Each candidate was allotted a specific time to outline their party's positions on the issues of the day.

During the debates, RFA technicians worked from the hotel controlling eleven microphones distributed between the candidates with two candidates sharing each mic. RFA technicians had to do the house mix over whatever sound system the hotel provided. A secondary broadcast mix using a Yamaha 01V was fed over the Thrane & Thrane satellite phone back to Washington DC for live shortwave broadcast. Using a Telos One, the debates were also fed by telephone to a local FM station in Phnom Penh for live broadcast. A Nagra Flash Recorder was used to record the debate and acted as the ISDN interface device.



Picture 7 Technician Doing a Live Rally Feed

Coverage leading up to the election was further augmented by sending teams out to local political rallies. Always an outdoor event, this coverage was usually recorded using whatever podium feed we could get into a Shure FP-33. The recording was done on a laptop using Cool Edit. On the rare occasions when these live rallies coincided with our live broadcast in Washington DC, the sound was fed live using the Thrane & Thrane ISDN satellite phone and Nagra as both a backup recorder and ISDN interface.

Coverage climaxed on Election Day. As well as our now routine two hours of broadcast per day, Phnom Penh also anchored the normal programming. With a studio full of expert guests (who were coming and going all day), stringers calling in from the polls all over the country and Washington DC staff participating, the day was hectic at best.

The primary program feed to Washington DC was over a telephone line using the TieLine. Washington DC was getting back into the studio over the same TieLine.

IFB between DC and Phnom Penh was over a dialup line using a Telos One and also with IM. The Telos 2101 dual hybrid was used to handle all the incoming stringer feeds. WaveCart was loaded and firing off filler material prepared in advance. Holding all of this together was a Comrex Mix-Minus Bridge.

Comments:

While the entire event was hectic and at times chaotic, it actually worked out well considering the complexity of what was happening. It was much easier to work from a newly renovated office that was outfitted properly. Coordination was better with editorial team because technical took ownership of systems and equipment earlier and maintained it throughout the event. Advanced planning allowed us to anticipate all possible reporter needs and we were seldom surprised or unprepared.

With proper training the local technical staff turned out to be a real asset. They learned fast and worked hard. They were also a great help when anything had to be purchased. Additionally our new “no rental dirt bike” rule contributed to the general health of the traveling technical staff.

Olympics



Overview:

The Olympics are interesting in the fact that for the three Olympiads RFA has covered Sydney, Salt Lake City and Athens we could not get accreditation. As a result we had to rent a house at each location.

The house acted as both our broadcast center and place of lodging. On occasion this caused a ‘too close for comfort’ situation with staff sharing bedrooms. Working and living together in close proximity for thirty days can cause its own unique type of stress.

Logistics:

Three technicians were sent to each Olympics. Once setup was finished two flew back, one stayed on for the duration of the Olympics and for breakdown.

The number of reporters fluctuated between three and six averaging out at four present most of the time.

All houses were located close to public transportation so once the events started, getting around was not a great issue. On flights, all equipment was carried in by the three technicians.

Technical:

Technically the setups were the same; Yamaha 01V consoles, Telos One Hybrids, laptops with Cool Edit, and Telos Zephyrs for ISDN Codecs were all used. All houses had ISDN lines installed for program transmission and Internet use established before the Olympics started. There were also at least two extra telephone lines installed in each house. All houses had cable television access.

One room in each house was converted to temporary studio. In Sydney it was a bedroom, in Salt Lake City a finished basement rec-room and in Athens a bedroom was used again.

Prerecorded reports were FTP-ed to headquarters in Washington DC and live reports were over dialup ISDN lines using the Telos Zephyr. As all the Olympics were held in western countries, telecommunications services were readily available and electric power was reliable and stable.

Comments:

Sydney was the longest flight; seventeen hours from Los Angeles. The house was fully outfitted so the move in was painless regardless of the jetlag.

In Salt Lake City, the house was partially furnished and all basic household goods were needed. These had to be procured and the long list included linens, towels, pillows, comforters, dishes, utensils, tables, chairs, telephones, toaster, coffee pot, food, soap, etc., etc. The house had to basically be put into livable condition by the advance technical team. Even smoke detectors needed to be purchased and installed.

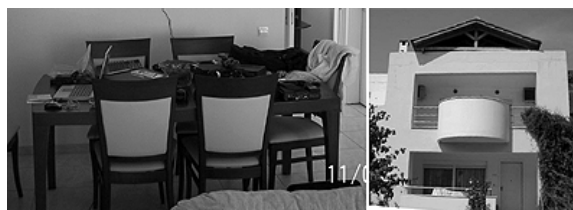
For Salt Lake City, we also decided to drive the equipment in from Washington DC. Unfortunately there was an accident just outside of Lincoln, Nebraska. The van was totaled and the U-Haul trailer containing all of our equipment was pretty banged up. The accident sent two of the three technicians to the hospital with injuries, one in critical condition. Replacement technicians were flown out to Nebraska in order to rent a new van and recover what equipment they could and then team up with the remaining technician.



Picture 8 RFA Salt Lake City Olympic Broadcast Center

Equipment suffered from the accident and every piece had to be un-racked, opened, and inspected upon arrival to Salt Lake City. All internal cables, boards and components connections had to be reseated. Repairs were made on the spot as necessary. After the accident and recovery, every other aspect of this Olympic event seemed easy.

Athens started out with delayed flights and reporters showing up unexpectedly early. Stories started being filed within two hours of taking possession of the house. This was also the first event that we experimented with replacing the reporter's minidisk recorders with PDA phone devices.



Picture 9 RFA Athens Olympic Broadcast Center

The PDAs were T-Mobil Pocket PCs with Microsoft Mobile as the OS. PocketREC software was installed for audio recording and editing. Local cell SIM chips were purchased so the phone would operate on local services and not GSM Roam. The experiment proved to be useful, the audio quality was good and the reporters enjoyed condensing all of the equipment they would normally drag around into one device.

While the technical team faced difficulties setting up a house to be a broadcast center, in all fairness the reporters had a much tougher job covering all of the Olympic events. Without accreditation they were, for the most part, locked out of the press centers. If they wanted to attend an event, they had to purchase a ticket. Most coverage was interviewing the fans attending the games and the athletes from their broadcast countries that would agree to meet with them.

**United Nations Development Project (UPDP)
Arts and Media Forum for Life
Sihanoukville, Cambodia
June 2004**



Duration:

This was a three day event.

Logistics:

Advance notice was less than one week. Two technicians were flown in from Washington DC and one from Hong Kong. All carried what equipment that they thought might be needed. This included a Thrane & Thrane Mini-M ISDN satellite phone and a Nagra Ares C with ISDN interface

Overview:

Cambodia's popular beachside resort, Sihanoukville, was host to The First Nation-wide Arts and Media Forum for Life. This AIDS awareness forum was sponsored by the United Nations Development Program (UNDP) in partnership with the Cambodian National AIDS Authority, TVK (Cambodia's only public television station) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

The Arts and Media Forum for Life invited top Cambodian media personalities to engage in a discussion on dealing with the HIV/AIDS crisis. The forum highlighted the important part they could play to help change the public's prevailing attitudes and behavior for the better.

The RFA Live Khmer call-in show was invited to do a series of remote broadcast from the Forum. The invitation allowed RFA to have wide access, in one location, to the top media and political stars of Cambodia.

Technical:

There were four difficult technical requirements for this event that had to be engineered around. One; it required the setup of a complete broadcast studio at The Sokha Beach Resort Hotel in Sihanoukville. Sihanoukville could only be accessed by car or buss; a five-hour drive from Phnom Penh. The studio could not just be a simple one room arrangement, it had to be a separate control room and studio as there was to be a constant parade of guests and an isolated area was needed for caller screening.

Two; we needed to provide call-in capability to the show for the regular listeners. This was easier said than done as The Sokha Beach Resort Hotel had a total of seven working outside telephone lines and would not guarantee easy access to the minimum three lines we needed. Additionally all calls, both incoming and outbound, had to be routed through the hotel's PBX system. The real possibility existed that callers would not be able to reach the hotel studio.

Three; RFA's regular Call-in show callers were all in Phnom Penh. It was a long distance call to Sihanoukville, something which the average caller could not afford. We had to establish a toll free way for the regular callers to reach the remote show.

Four; we had less than a week to plan how we were going to pull it all off and three days of that would be taken up by travel just to get there.

We arrived in Phnom Penh the weekend before the event and immediately disassembled the equipment from one of the five local studios in the Phnom Penh office. The equipment was packed into a van and transported with two of the traveling technicians and one Cambodian local technician off to Sihanoukville the next day.

Once at The Sokha Beach Resort Hotel, two adjoining rooms were rented in order to have a separate studio and control room. The studio equipment was reassembled. Equipment included a Yamaha 01V, Telos One 2101 dual digital hybrid,

cassette deck, minidisk recorder deck and several PCs.



Picture 10 Control Room Sokha Beach Resort Hotel

The idea to establish two hybrid-to-hybrid links between a Phnom Penh studio and The Sokha Beach Resort Hotel to relay local callers to the resort was quickly abandoned. The hotel simply did not have the capacity to provide two telephone lines.

The hotel could offer decent, stable Internet connection. We leased an in-room Internet connection and benchmarked it at a minimum 128-Kbs. The hotel also had its own generator which kept power fairly stable, except for the 30-second to 1-minute gap waiting for the generator to startup. This was no real problem as we had already packed UPS units.

With the Internet connection we tested the use of Skype as the link between Sihanoukville and Phnom Penh. Skype, an Internet peer-to-peer telephone program, had performed credibly in previous tests. Surprisingly the connection with Skype sounded better than anything we could establish over a telephone line (when we could get one).

With Skype up as a link between the callers and the show's hosts, the overall technical setup fell into place. A studio in Phnom Penh would receive the calls and feed them over two Skype links to Sihanoukville. Communications and coordination of the callers between these two locations would be over AOL IM.

The Thrane & Thrane ISDN satellite phone and Nagra would establish the program feed back to Washington DC for live transmission distribution. A telephone line would be used for IFB with Washington DC while we used AOL IM as a back up.

The technicians had arrived in the middle of a storm in Sihanoukville and at first it proved difficult to find any satellite transponders (AsiaSat in particular). In

desperation they started looking for any satellite that would work and soon managed to connect to one low on the horizon, the INTELSAT Indian Ocean Region (IOR) Satellite. The satellite phone locked in immediately with a strong signal.

To complicate matters, the Washington DC studios decided at the last minute to participate in the live shows. The back feed from the ISDN satellite phone was used to get Washington DC in to Cambodia. This necessitated sending a driver to Sihanoukville from Phnom Penh with the trusty Comrex Mix-Minus Bridge to keep all the feeds straight.

Comments:

Live programming went on for the entire three days of the Forum without too many hitches, all things considered. Cambodian listeners were impressed with the coverage of the event that only RFA managed to get live broadcast from.

Tibetan Call-In Show

Dharmasala, India
November 2004



Duration:

Started in November 2004 and is ongoing.

Logistics:

Two staff technicians, one from Washington DC and one from RFA's Ankara, Turkey office traveled to India to set this up. Both left at noon on a Saturday from Ankara where they purchased a Yamaha 01V console to carry into India. They flew into Delhi, India and after a seven hour stopover they rented a van and drove thirteen hours to the north into the Himalayan Mountains. The last 95 Kilometers took over three hours as they slowly made their way up steep, poorly maintained mountain roads.

Overview:

The purpose was to digitalize the RFA studio in Dharmasala with VOIP (Voice over IP) technology. The upgrade would allow the Tibetan in-exile community in Dharmasala to take part in daily call-in shows hosted by our Tibetan staff in Washington DC.

Technical:

In the past all programs from the Dharmasala office had to be fed by FTP over a 64-K ISDN Internet dialup connection. Real-time phone feeds of programs or live feeds were out of the question due to the poor quality of the telephone lines and the lack of access to low-cost international dialing services (i.e. AT&T). This reality eliminated most real time voice communications and the possibility of live program feeds from Dharmasala.



Picture 11 Studio in the Himalayan Mountains

The first phase was to completely rewire the studio, install the Yamaha 01V and upgrade of the studio's computer from an old Pentium II running Windows '98 to a new Pentium IV computer using Windows XP. The upgrade brought the Dharmasala studio to the same production standards as the rest of RFA's Asian offices.

Unfortunately this digital studio upgrade served to highlight other problems in the office that needed correction. One problem was the electrical distribution system. There was a lack of adequate UPS backup, bad grounds and generally over-loaded circuits. Work to correct this problem included removing "wooden" electrical junction boxes. In some cases, these wooden boxes were malfunctioning to such a point that one electrical plug was melted into the receptacle. With extensive rewiring and the addition of a new UPS unit, the power situation was upgraded to an acceptable level.

The next step in the operation was fixing the local telephone connection which buzzed excessively and often lost connection. Fixing this problem required the rewiring of the local building telephone junction box, which turned out to be in reality not a box at all but a messy convergence of wire splices.

Once all the new equipment was installed, and all the telephone and electrical problems were corrected, the Skype Internet telephone program was installed on the studio's new computer. Once installed, a bandwidth problem became apparent. The office only had a single 64-Kbs dialup ISDN circuit. This was the same bandwidth, and identical circuit, the largest, thirty PC, Internet café had in town. It was the maximum Internet circuit available. Load balancing was obtained by training the local staff to stay off the Internet during the time of our Tibetan call-in show.

A local technician was hired and trained to run the show which involves taking feeds off the local

telephone line using a Telos One. These call-ins are then relayed over Skype to the Tibetan studio in Washington DC where the phone calls are inserted into the call-in show with other calls from around the world.

Comments:

The work pace was hectic and only interrupted twice. The first time was for the return of the Dalai Lama. This shut down the town for several hours as shops closed and crowds massed outside of our office which was on his route to welcome him home.

The second interruption came the next day in the form of an earthquake. While the earthquake was reported to be "not a serious one," for RFA's traveling technicians it seemed serious enough as they were rocked out of their hotel beds and anxiously joined "panic gripped residents" in the streets.

CONCLUSION

Not all of your venues will be ones that require you to travel for days to an isolated region of the world but perhaps professional broadcast engineers should approach all events as if they were. Regardless of where your next live event will be, we think it is safe to assert for any venue that there is no such thing as:

- Being Too Prepared
- Packing Too Much
- Doing Too Much Planning

You will always be short of some piece of equipment you will wish you remembered. The unexpected will happen even at the best of venues, that is why it is called the unexpected. Being close to home sometimes spoils us with having access to stores that stock and sell professional equipment or spare parts.

Additionally, the close proximity to your home base or access to overnight delivery services that are really overnight (not four days) is a blessing that can not be overlooked.

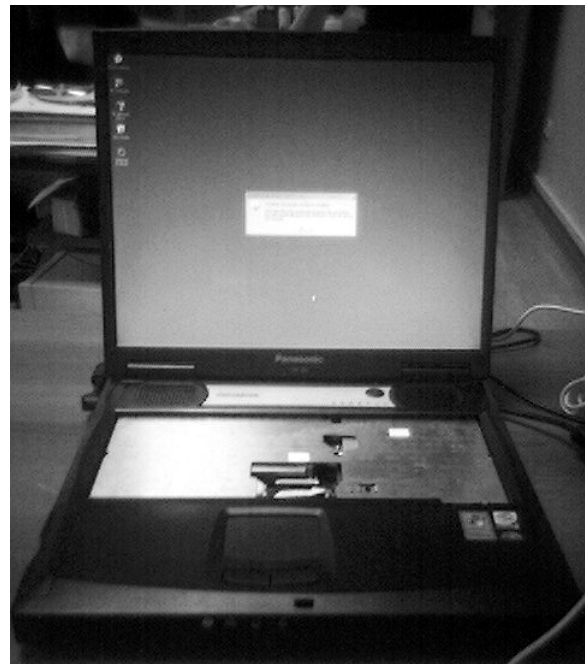
Experience is a great teacher but one must learn that experience should not translate to inflexibility. Some times an untutored idea like "why don't you just tape the cup from your headphones to the phone" may just save your broadcast.

Never be afraid to try to fix any piece of equipment in the field. What is the worst that can happen? Do you think you can break it worse?

The bottom line is to get on the air try anything and everything. Ask the receiving end if the quality is

acceptable and don't tell them what you had to do to get it to them until you get home.

Everyday we thank our lucky stars we ended up in radio broadcasting and not in television. Besides being too ugly for TV, it's too much equipment to carry. We would not know what to do with all the extra money we would be earning anyway. Besides all that, we are not sure we could get gaffer's tape to attach a video monitor to a telephone and make a video feed work.



Picture 12 Sick Laptop Still Doing Its Part Even Without A Keyboard

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