

Automated Sports Blackouts via Satellite



Support from: John Eberhard, VP Technology & Distribution, ESPN

CONTENTS

Blackout Scenarios 4
The Challenge 4
History 5
Integrated, Automated Systems 5
Building Virtual Networks 6
Granular Control 7
Telecommunications Companies Enter the Mix..... 9
Looking Ahead..... 9

Introduction

For a national broadcaster with the breadth of sports programming like ESPN, managing the complexity of blacking out specific games in markets of varying configurations is a daily challenge. Blackouts refer to a contractual agreement between media organizations like ESPN and sports leagues that prevents programming from being aired in certain areas in an effort to bolster other interests – local ticket sales, local sports operations, regional sports networks or locally oriented subscription services. During the last decade ESPN has worked with its vendors to develop an automatic blackout control solution, including an integrated receiver decoder (IRD) system that can do satellite port switching and retunes without any intervention on the part of its affiliates.

Blackout Scenarios

At ESPN, blackouts break down into three distinct scenarios:

- 1) Market blackout – in this case, ESPN is acting to protect a rights holder. For example, a local rights holder such as an over-the-air terrestrial broadcaster or a regional sports network, has the rights to broadcast for a specific window of time in a specific geographic area. In this case, other parts of the country can see ESPN's main program feed, but in the specific blackout, ESPN must provide alternate programming.
- 2) Market protection – in this case, an event *must* be seen in a certain market. Regardless of what is being carried on ESPN's national feed, the protected market will see a specific local market game.
- 3) Regionalization – in this scenario, ESPN has broad access to a league's output and thus wants the flexibility to hand pick the best event to air for different markets. So, for example, ESPN could simultaneously air one baseball game in the Northeast, a second in the Southwest and a third to the rest of the country.

The Challenge

The most challenging aspect of developing a sophisticated satellite network is that communication is essentially unidirectional, without the opportunity for the receiver to be controlled by any means other than the satellite link.

With no mechanism in place for automatic channel switching at the headend, blackouts were a highly manual procedure.

History

Until the early 1990's, ESPN had a single, primary FM analog version of ESPN carried on one satellite and an alternate channel carried on another satellite. With no mechanism in place for automatic channel switching at the headend, blackouts were a highly manual procedure. Three to four times per week, on average, ESPN would blast fax blackout notices to hundreds of cable headend affiliates with precise instructions as to when they were to tune in and tune off. Cable operators, in turn, had to roll trucks and send technicians to each headend where they would do nothing but manually switch the ESPN feed. Making this manual switch was critical; ESPN programming would blackout on a system if the switch was not made.

Circa 1992, ESPN deployed an analog retune satellite receiver. Retune is the name of an uplink/downlink process where the satellite receiver tunes to a different service upon command from the uplink.

Soon thereafter, the early drive toward digital networks led to ESPN's use of one of the first digital/analog integrated receiver/decoders (IRD) – the first that could support switch and retune in both analog and digital modes.

Today the company's two networks, ESPN and ESPN2, share a 10 virtual channel multiplex. Each network has a dedicated primary channel and they further share from a pool of eight ad-hoc channels that accommodate ESPN's daily programming requirements for market protection, blackouts and regionalization.

Integrated, Automated Systems

ESPN built its current operations using a system that provides ESPN operators with a single, integrated transmission system that includes system control, encoders, access control, modulation and receivers.

The IRD used by the system is charged with delivering the content in a format useful and appropriate to the end-user. The unique IRD specified by ESPN includes an eight-input RF selector for automatic program switching from various satellites. This is critical to enabling ESPN to look across its fleet of satellites and polarizations to enable the IRD to determine where the program that is being sent will come from. Once "tuned" to a specific satellite and transponder, a "multiplex" (several programs packaged within one carrier) is processed by the IRD. Although many different programs or data streams may be present in the multiplex, a given user is only entitled to a small subset of the content. The receiver is capable of demodulating, demultiplexing, decrypting, and formatting the content for any number of physical output formats.

ESPN's pioneered the deployment of the system in a virtual network mode. This approach makes use of ad-hoc networks built on the fly that are an aggregate of a set of guidelines used to define a single program feed, which in fact is an amalgam of bits and pieces of programming taken from any of the 10 feeds being carried at a point in time over the network's satellites.

Building Virtual Networks

The virtual network starts with a physical encoder with video and audio inputs coming out of a presentation suite, master control room, playout room, or other origination point. This is where all of the integration takes place, switching from Program A to Program B, interstitial material, ads, promos, etc. This network would also call out a specific satellite location, transponder frequency and transport stream all related to the specific program.

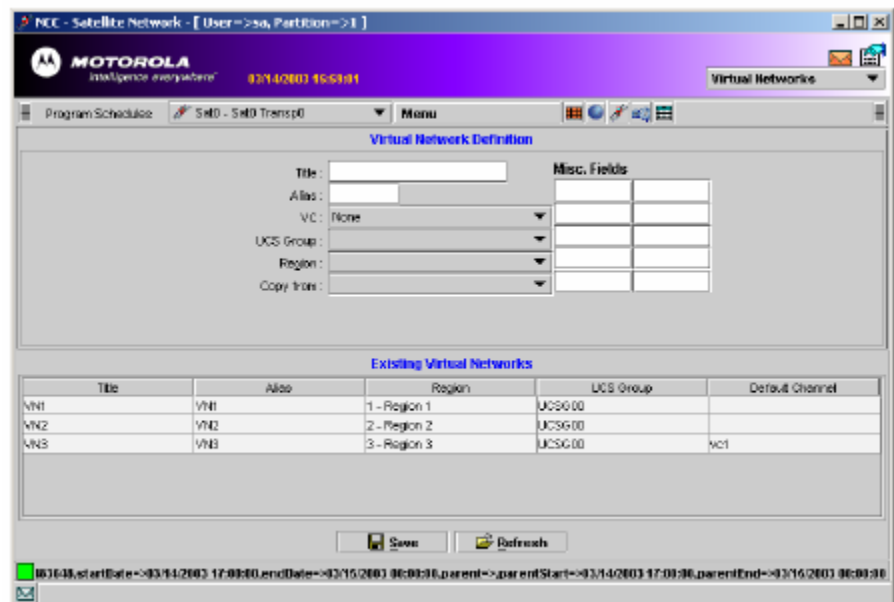


Figure 1. The virtual network programming screen.

ESPN assigns all of its decoders to virtual networks, enabling ESPN to manage programming at the satellite receiver level of granularity. This tells each individual IRD what it needs to get and where to get it from based on all the things ESPN has on the air.

When it comes to programming the IRDs, ESPN can look at up to 10 channels on a particular transponder. Looking at everything available in the sky, an operator can essentially build the virtual network simply by picking from a menu – take program 1 on Channel A, Program 2 on Channel B, Program 3 on Channel C, etc. ESPN can have the receiver switch from one to the other, creating the virtual network with this unique program schedule.

In effect, ESPN's network control system is able to remotely change the channel on its IRDs at the cable headends using a technique called a "retune". In this process, the target IRDs remain tuned to a given virtual network, but the uplink redefines the parameters of the virtual channel by downloading this new information to the channel map in the IRD. The IRD is still set on network 101, but the definition of "101" has been changed and the IRD will search for the right frequency and then lock to it.

The Retune IRD definition screen is used to define a unique name, IP address and assign a unique UCS to the IRD selected to monitor the retune status of a particular UCS.

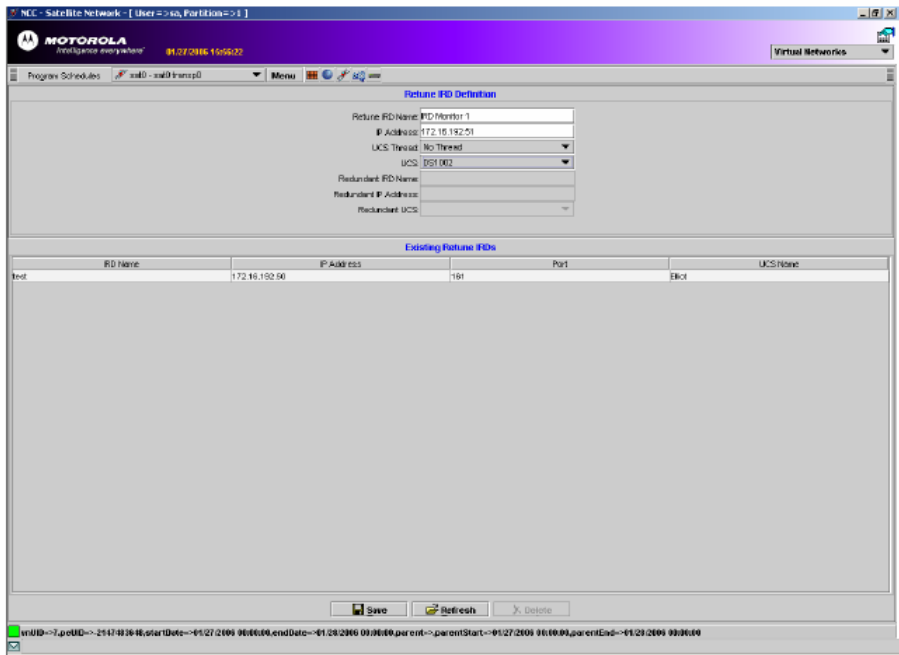


Figure 2.

Granular Control

The live television carried by ESPN requires significant flexibility. Sports have no script. Rain delays, rainouts, overtime, etc. all mean that ESPN cannot lock into a rigid time schedule. Instead the operators must quite literally cut-and paste, drag-and-drop on the fly to modify for changing conditions. To ensure that the IRD retunes to its home network, a start-time and end-time for the override is broadcast to the effected IRDs. If the sporting event runs long or short, new end times are continuously broadcast to guarantee that the IRD retunes appropriately

Often different rules apply for different regional networks. ESPN must deal specifically with each sports league to negotiate requirements as to blackout rules, size of territories, what ESPN's obligations are and how things are to be executed. Using its virtual network system, ESPN can readily define a blackout area by zip code with a geographic center and a radius (e.g., 50 miles around a stadium to protect ticket sales). Similarly ESPN can protect a specific DMA (designated market area). In addition, ESPN has its own proprietary rules detailing how it defines territories.

A JAVA-based graphical user interface called the Network Control Console (NCC) gives the ESPN engineer a sophisticated, single pane cockpit from which to drive the system. The NCC application controls programming, providing a graphical user interface designed to manage virtual networks and virtual network programs. The application was designed with an 'ATM' look and feel, driven by menus like an automated teller machine or like HTML pages on the World Wide Web. It can be used to manage Virtual Channel Programs, Virtual Networks, Virtual Network Programs, Affiliates, locations, decoders, bitrate display, IRD bulk changes as well as affiliate group management and Uplink Configuration.

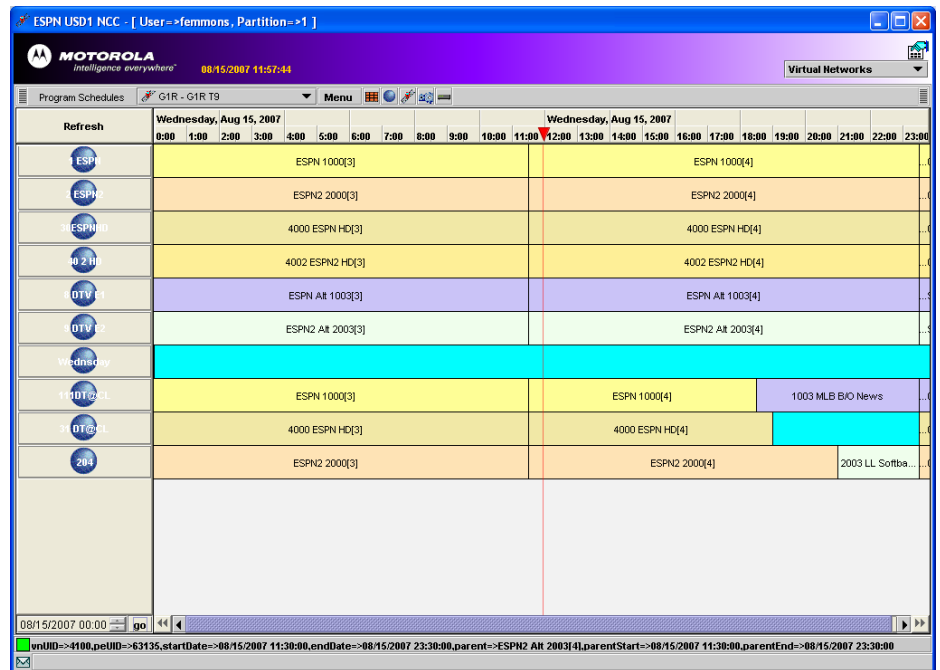


Figure 3. The Network Control Console showing available programming for a day at ESPN.

Switches typically takes place about 30 minutes prior to an event during which the audience will continue to receive the same national feed programming, only now being delivered via a virtual channel that is mapped to the main feed.

The system also includes a built-in disaster recovery mode that is based on the receiver performing a controlled satellite and transponder search. Should a satellite go offline, ESPN can restore its signal on another transponder which the IRD will automatically search out and lock onto. This system was designed to be completely hands-off for cable operators.

Telecommunications Companies Enter the Mix

The advent of television services delivered by telecommunications operators has added another wrinkle to the blackout process. In fact there have been several approaches taken by the Telco companies, however, the primary change is predicated on the Telco's use of super-headends which combine all of the receivers at a single facility, as opposed to the dispersed headend facilities used by cable. To date, two main approaches have been taken by the major operators.

In one case, the Telco takes the full MPEG transport stream via ASI and then distributes it to all of its VHOs (Video Hub Offices located in various regions across the U.S.). They deploy a switch and retune decoder with the ESPN specified retune protocol. The main difference from cable is that these units have no RF front end – only ASI. In practical purposes, the super-headend is invisible and the IRD acts just like a traditional local headend. In practical terms, these are simply IRDs with an exceptionally long extension cord to its satellite dish. Since the box is physically located in a local market, ESPN can map these boxes to its blackout requirements.

In another case, the operator receives the ESPN feeds, re-encodes them, and then applies its own control system to manage blackouts for itself. A software solution was developed using a technique for processing switching commands that replicates the process as if the commands were being processed by a traditional IRD. The command protocol that is sent from the ESPN uplink facility includes the capability for ESPN to specify the region codes that are allowed to view the signals. On the downlink, an IRD is assigned a region code also, allowing the match between the IRD and authorized viewing. Instead of utilizing an IRD, the middleware software now receives the control commands, leverages its knowledge of the blackout protocols, and then maps regions to zip codes. This middleware that is used to control the set tops in the viewer's home can then control, on a zip code basis, which ESPN channel a set top box in the consumer's home can watch.

Looking Ahead

Looking forward, there are a number of potential considerations for future evolution of the blackout system. Growth in demand for HD services, the deployment of new more efficient compression codecs such as MPEG4 AVC, higher levels of modulation, and more will impact the system. The underlying purpose of the system, to provide a totally hands-off solution that eliminates administrative costs for both ESPN and its operator carriers, will remain the same.





MOTOROLA

Motorola, Inc.

6450 Sequence Dr.

San Diego, CA 92121

www.motorola.com/ipvideo

MOTOROLA and the Stylized M Logo are registered in the U.S. Patent and Trademark Office. All other products or service names are the property of their registered owners. © Motorola, Inc. 2007