

Via Satellite's

Tech Focus REPORT



Bringing High Technology Down to Earth

As we consume more media, increasing demands are being placed on satellites. Consequently, satellite monitoring is now more important than ever. The way we acquire and monitor signals for satellite communications is changing rapidly, and in many ways. The demand for smaller, embedded spectrum analyzers is on the rise. One company is stepping up to the plate here. Avcom has become a major force globally by providing the technical glue required by their customers in this area. In the process, the company has increased their global market share significantly.

AVCOM
Of Virginia Inc.

Avcom has gone through a lot of changes since their inception back in 1976, but the company has undergone a seismic shift in recent years. Before then, Avcom had been known for having reliable and affordable test equipment that worked great but was not used for applications where accuracy was critical. They were typically used for verifying a signal was present or for finding a satellite, but not for locating a satellite beacon or for monitoring a small carrier. Over the last few years, the company has made drastic changes and has become a formidable player in the spectrum analyzer business.

The changes can be traced back to 2004, when Avcom decided to hire Jay Evans to be its new president. Evans brought with him a new philosophy of running the business from the ground up. "Changes had to be made not only to bring the Avcom products into the 21st century. But, just as important, we have to continue investing in automated equipment giving us a vertically integrated advantage against the competition", says Evans. "We have successfully put in place a perpetual inventory system with Material Requirement Planning (MRP) capability giving us standard product costing, all of which allows us to have shorter lead times helping Avcom to target large government contractors and go after the big programs."

Avcom changed its philosophy on sales and diversified their focus into other markets such as maritime, oil & gas and military markets. "We found ourselves too reliant on one particular customer or large program and found that when the well dried up there was nothing left to fill the void," says Pat Piper, director of worldwide sales, Avcom. "We had to act fast and our big break was the Sprint/Nextel 2GHz Broadcast Auxiliary Service (BAS) Relocation Program which carried us for a good 18 month period. During that period we had to work hard to refine our existing analog 1RU Remote spectrum analyzer. We had to tighten up the specs, develop a new Graphical User Interface (GUI), and change our whole philosophy on manufacturing to improve quality and ease of manufacturing the product. It was a painful process but it forced us to act quickly and assemble a top notch engineering team overnight"

Embedded Spectrum Analyzer Evolution

Avcom spent a lot of time in front of customers trying to find out what the market was looking for and what the next logical step was in the world of spectrum analyzers. The overwhelming feedback was to develop a small, card based spectrum analyzer that could be embedded into a terminal, antenna pedestal, or antenna controller that

would be transparent and could be used when needed to acquire satellites or used to troubleshoot for interference or other signal related problems. To add to the problem, it not only needed to be small, but also had to have a fast refresh rate in order to be able to peak on the satellite and monitor for transients in the signal as well, and most importantly it had to be affordable.

During that time Avcom formed a close relationship with Telecommunication Systems (TCS). The two companies worked together closely to develop a solution for the SNAP program (Secret Internet Protocol Router (SIPR) and Non-secure Internet Protocol Router (NIPR) Access Point (SNAP) Very Small Aperture Terminal (VSAT) Satellite Systems), called the RSA SBS (Single Board Solution) analyzer, which is offered as a RSA-2150B-SBS (950 to 2,150MHz) and the RSA-2500B-SBS (5MHz to 2.5GHz) single card spectrum analyzer. "Winning the SNAP Program was key to Avcom's success because it forced us to complete the design of a small single card analyzer that is now the engine of all of our existing designs. It also gave us credibility to work with companies like Boeing, L-3 Communications, General Dynamics, and Swe-Dish (Rockwell Collins) to develop platforms around our product and to use it as a critical element in their designs," says Piper. This has now become Avcom's most popular product and is an integral part of most of the large government contractors compact satellite terminals today.

Need for Embedded Spectrum Analyzers

Many experts have concerns about some of the so-called "point and shoot" solutions being offered that do not have an onboard spectrum analyzer or means of monitoring the signal. "There are significant issues with satellite interference and a lot of these issues can be caused inadvertently by the user/equipment and with many terminals employing auto acquisition and terminals being operated by operators rather than technicians/engineers. Tools to analyze the target satellite can only assist in identifying and mitigating the growing problem of satellite interference and the economic harm it inflicts on our industry," says Mark Steel, engineering senior director, land systems Cobham, SATCOM. "Avcom will play a vital part in updating our current product portfolio as well as development of our new products. Over the years I have worked with the Avcom product line and it has developed and advanced significantly, and today's products are high quality, high performance and they have maintained the low cost, which has significant impact on the overall

system price that includes one of these analyzers making it an easy decision to embed this analyzer in our systems."

Another application where the Avcom embedded spectrum analyzer is being used is in the antenna controller market. Avcom is currently working with several antenna manufacturers and antenna controller companies which are offering an on board spectrum analyzer as an option in their systems. One such company is Research Concepts (RCI) who have been working closely with Avcom to develop a product where the analyzer will be embedded in their antenna controller. "We evaluated the Avcom Remote spectrum analyzer and found it to be very responsive, making it exceptionally useful while finding satellites with a moving antenna. We expect to integrate it into our Satellite Locator products offering satellite identification via spectrum analysis alongside our Beacon Receiver and DVB Receiver capabilities," says Jim Ronnau, engineer, Research Concepts.



Avcom SBS Series Embedded Spectrum Analyzer

Importance of Refresh Rate

When Avcom designed the single card analyzer their goal was to design a very accurate compact spectrum analyzer that could maintain a high refresh rate that could be used for a number of applications where refresh rate is critical. "This was not an easy task since we knew reducing the size of the product would require us to redesign much of our original legacy designed RF Engine and use digital technology as much as possible," says Evans. Avcom found a happy median that sets them apart from their competitors and it works well for most all of their customer's applications. Avcom found a way to offer refresh rates up to 10 frames/sec, while offering excellent frequency accuracy and stability. This has been a perfect solution for applications where the customer must have a quick response time such as an antenna controller for peaking on a satellite or in an application such as Satcom on the Move (SOM) where the reaction time is critical.

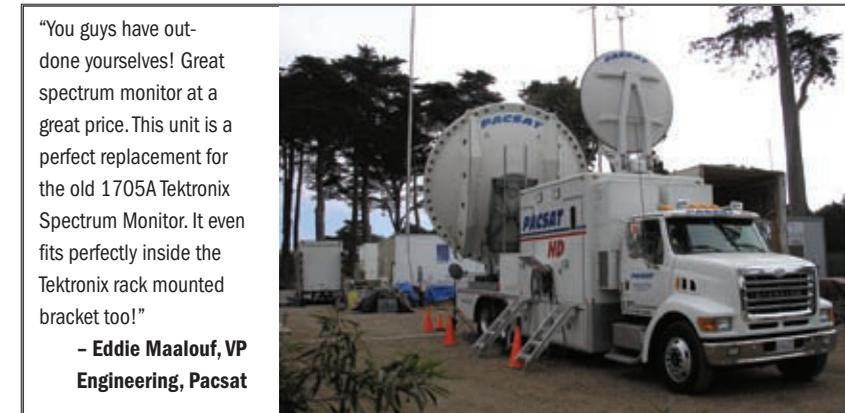
Remote Spectrum Analyzer/Carrier Monitor

With the single board analyzer design complete the next logical step was to design a new and improved single rack unit (1RU) Remote Spectrum Analyzer (RSA) that would replace the analog RSA Avcom released for the Nextel 2GHz BAS Relocation Program. Avcom based the new RSA around the SBS engine and developed a new and improved GUI. Avcom hired Dave Wilbon who brought with him a vast knowledge of system automation from his days working at General Electric. Avcom worked with the National Instruments (NI) Labview Platform and implemented a new GUI based on Labview that would allow Avcom to get a system up and running quickly. "Dave did a tremendous job at taking feedback from a number of reputable sources in the industry and implementing their ideas and suggestions into the GUI we have today. Dave spent a lot of time with customers such as SES Americom, Boeing, Turner Broadcasting, and Eurovision and developed a GUI that is very functional and a useful tool for remote carrier monitoring," says Piper. Globecomm Systems, another Avcom customer, has found the Avcom RSA a very useful, cost-effective alternative to the other products offered for carrier monitoring. "Working with the Avcom technical and sales staff is a pleasure because Avcom understands what our objectives are and are quickly available to become involved in our various SATCOM based monitoring applications", says Walter Wattaull, chief RF engineer, Globecomm Network Services. The Avcom RSA is a very powerful tool for the money and offers a lot of features you would find in many of the high dollar systems. Features such as alarming, carrier masking, Data Acquisition (DAQ), and multi-user functionality are all standard features in the Avcom RSA product GUI. The new Avcom RSA is offered as a RSA-2150B (950 to 2,150MHz) and RSA-2500B (5MHz to 2.5GHz) and can have up to 6 inputs as an option.

The New SNG-2500C Fills the Void

Two years ago, Tektronix discontinued the 1705A spectrum monitor. "The Tektronix 1705 was an analog spectrum monitor developed by Tektronix in the mid 80's. It quickly became a benchmark in the SNG industry for over 25 years and can be found in almost every satellite truck on the road," says Piper. Avcom offered a drop in replacement called the MSA-4570E, but it was an analog product that was lacking in frequency accuracy and had limited resolution bandwidth. "When I joined Avcom back in 2003 I saw a huge potential with this product, but I knew the current design would

not be widely accepted in the SNG Industry," says Piper. "I spent 16 years in this industry with Harris Corporation and know a lot of these guys personally so I went to work collecting information to find out what features they needed and what changes had to be made to the current product" The SNG-2500C is the culmination of many of the suggestions and ideas and is based on the Avcom SBS Engine which gives it all of the frequency accuracy and resolution needed, while at the same time delivers the 13+ frames/sec refresh rate needed as well. The SNG-2500C also offers a full VGA color display that gives you crisp carrier definition. "The large, multi-color display is incredibly easy to read, even from outside the truck", says Jay Silvio, president and chief engineer, SkyWire Communications, Inc.. "Free-ranging reference points allow the operator to be able to easily recognize at a glance parameters that are the most important. The fact that these reference points can be customized to the individual usage at the time is vital"



"You guys have outdone yourselves! Great spectrum monitor at a great price. This unit is a perfect replacement for the old 1705A Tektronix Spectrum Monitor. It even fits perfectly inside the Tektronix rack mounted bracket too!"
- Eddie Maalouf, VP Engineering, Pacsat

Avcom's PSA Series Portable Spectrum Analyzer

Avcom also released a new series of portable spectrum analyzers, the PSA-2150C and PSA-2500C. The new analyzers are much smaller and lighter than their predecessors (PSA-45D and PSA-37XP) and are also based on the SBS engine, so they deliver the same frequency accuracy and specifications as the SNG Series. The new PSA Series weighs in at only 6 lbs. including the internal battery pack that will give you over one hour of battery power in the field while powering an LNB at the same time. If you do not use the LNB power you can get up to two hours of battery power. "The new PSA Series has been very widely accepted by all of our customers and will be a great product for us going forward," says Piper. "The new PSA Series has a very user friendly on board menu that was designed for an inexperienced operator to be able to use in the field without a

vast knowledge of using high power test equipment. We had feedback from some of our military and broadcast customers to keep it simple and easy to use and our engineering team nailed it!" Both the new SNG Series and PSA Series offer full remote capability and all of the features found in the Avcom GUI. This will allow for local and remote control simultaneously via the Ethernet port from anywhere in the world.

Avcom and SATCOM on the Move

There has been a lot of talk lately about SATCOM on the Move (SOM) and a lot of companies are working hard on a system that will meet the needs and specifications required by the Government Agencies that are looking for the right solution. Many of these companies are using the Avcom SBS embedded spectrum analyzer or the Ultra Portable "Clam Shell" analyzer in their systems as a useful tool for locating and locking onto the satellite. "These small antennas, especially in the dynamic environment are

more susceptible to adjacent satellite interference (ASI) and the Avcom remote spectrum analyzer has proven to be a very useful tool in detecting and controlling such interference. We recently had a shipboard application which required two SOM antennas with automatic switchover to mitigate blockage. Using three Avcom RSA-2500B analyzers was invaluable to fully characterize the switching performance and overall operation," says John Whetstone, principle engineer, JW Communications.

The future of Avcom

Avcom has many plans for next generation products in 2010. "Avcom's future plans are simple; continue listening to our customers wants and needs, design product solutions that will fill those needs at a reasonable price point and back it up with outstanding quality and service," says Evans. ■

"There is no question that the working relationship I have had with Avcom over the years has been exceptional. They consistently supplied equipment to validate and utilized feedback for design changes and clearly involve their customers and potential customers. They are also extremely efficient in adapting their product to fit the needs of the customer, and in many cases modified designs to accomplish the requirement. During integration phases working with the right people is key to keeping cost down and Avcom have always supplied the right team to get the job done."



Pat Piper, Director of Worldwide Sales, Avcom (Left) and Mark Steel, Eng. Sr. Director, Land Systems, Cobham Satcom (Right).

– **Mark Steel, Engineering Sr. Director, Land Systems, Cobham Satcom.**

"GNSC is beginning to utilize the Avcom RSA-2500B-SW4 4-channel L-Band spectrum analyzer product with Ethernet interface for monitoring teleport DVB (Digital Video Broadcast) carriers.



K. Miller International Teleport, Globecom Network Services

In addition, single channel remote analyzers are beginning to be deployed at certain remote sites as well. Our overall experience with Avcom has been a success where last year we implemented our first low cost carrier monitoring subsystem based on the 4-channel Avcom product which was used as a pilot for the start of our extensive carrier monitoring objectives."

– **Walter Wattaal, Chief RF Engineer, NSC Teleports.**



"We have found AVCOM to be very open and flexible, providing samples, CAD models and making product changes when requested. AVCOM has always met delivery promises, invested in prototypes and demonstrated a long term approach to pricing and continuously demonstrates an exceptional level of customer focus. In short, we could not have made this a reality without AVCOM. As normal, as soon as we announced the product was imminent a high profile customer placed an order and demanded a quick demonstration of functionality - AVCOM jumped into the fire with us and provided excellent support, on time, on budget and fully functional product. We couldn't ask for more!"

– **Mike Creamer, CTO, Rockwell Collins (Formerly SWE-DISH Satellite Systems)**

"The Avcom embedded spectrum analyzer is a great troubleshooting tool for the user to help in identifying any potential issues. The user can use the spectrum analyzer to manually peak the antenna without having to stow/redeploy or recalibrate the terminal. The Avcom SBS is embedded into the terminal, which means that the spectrum analyzer is always there and ready to be used and there is no chance of losing the spectrum analyzer or any of its components and cables. The Avcom unit is extremely easy to use and does not require a trained individual to be able to get useful information from it. You can also see more than L-Band frequencies (5MHz to 2.5GHz) with the Avcom unit which makes it a great tool for troubleshooting and allows the user to not have to do any math to figure out what they are looking at on the display. In short, Avcom has been very responsive and easy to work with in the past",



– **Jeff West, Senior Director, Integrated Solutions, Telecommunication Systems (TCS).**

"MTN Satellite Communications (MTN) includes Avcom spectrum analyzers as an integral part of our turnkey VSAT system solution that is currently deployed on 500+ systems



MTN Super Yacht Installation, Miami, FL

worldwide. MTN chose Avcom products for its low cost, high quality spectrum analyzers that allow MTN technicians and our customer a tool that provides a visual aid for monitoring and troubleshooting of our satellite link. The spectrum analyzer is preferred by many of our customers over other signal link monitoring tools and we have also found that troubleshooting and circuit restoration is accelerated using the Avcom spectrum analyzer."

– **Sal Salvador, VP Operations, MTN**

"Golf Channel first purchased Avcom's remote spectrum analyzers (RSA-2150B) and are pleased with the units' price and performance. In our search for a replacement for the Tektronix 1705A spectrum monitors, a demonstration of Avcom's SNG-2500B proved to be the replacement we were looking for."

– **Bob Van Deering, director of transmission, The Golf Channel**

The Golf Channel Earth Station, Orlando, FL

