

SeaTel's Five-Satellite Antenna

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Self-adjusting satellite antennas are typically used on ships: they automatically adjust the position of the antenna according to the movement of the ship so that the antenna is always properly pointed to the desired satellite. The emphasis here is on "one satellite". But what if you want to receive five satellites at the same time? SeaTel, a division of Cobham, Plc, a large group of companies manufacturing and engineering many different communication systems for avionics, transport, government, etc, recently developed just such a system. TELE-satellite reported on their first prototype back in the 12-01/2009 issue. But now that they are mass producing these antennas, we want to see one of these systems in normal operation. So off we go to Florida to SeaTel's regional office in Fort Lauderdale where one of the first of these five-satellite antennas were recently shipped to.



■ DTV04 HD Antenna, 5-Satellite System with the dish system by DirecTV

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This regional office was opened in 2002 and for the longest time was a one-man office. However at the end of 2008 a large warehouse with a number of offices was rented near Fort Lauderdale's Hollywood International Airport. It's also just a few minutes by car away from the many coastal marinas where countless luxury yachts are anchored. Vincent Valdeperas is the Manager of SeaTel's Fort Lauderdale's office and explains, "We employ here two additional technicians that work together with technicians from SeaTel's headquarters in Concord, California and also from SeaTel in Southampton, England." The moment a SeaTel customer anywhere in the world has a problem with his antenna system, he has access to 24-hour technical assistance

even from the technicians in Florida. Who are SeaTel's customers? Vincent explains, "We reach our end users via our vast network of authorized and specially trained dealers who install, support and service Sea Tel products." We asked him how long a typical installation can take. "On average, two technicians need just one day", explains Vincent and continues: "A significant part of any installation is the running of cables, once these are installed the system must be lifted into place, after which the connection and commissioning process should take only a few hours. Typically our dealers would take a day to install and commission a system, although we would recommend a sea trial as this is when you really get to test the full functionality of the stabi-

lisation - this typically would occur on a second day."

And what are sales like for these antenna systems? We posed this question to Peter Broadhurst, SeaTel's Vice President and always on the go from one SeaTel office to the next. "Here in Florida we sold 300 systems in 2008 and 2009", says Peter Broadhurst, "but for 2010 we expect a slight increase over 300 systems." Such an excellent automatic satellite tracking system is high-tech in conjunction with high-quality. "The installed price of our new five-satellite system will be around \$35K", comments Peter Broadhurst and brings it into perspective: "This is an insignificant amount compared to the value of the vessel and



■ Vincent Valldeperas in his office. His official title is Technical Support Supervisor. Vincent, born in Venezuela and able to speak both English and Spanish fluently, has spent many years working on the technical side of marine applications installing and maintaining Autopilots, GPS units and V-SAT systems. He has been running the SeaTel regional office in Fort Lauderdale since the end of 2008. He explains, "We work here locally in Florida together with about 15 dealers, with another 30 dealers on the east coast of the USA and six more in South America. All of these dealers receive technical support from the regional Fort Lauderdale office. Every year in March and August we hold technical seminars for our dealers here in our conference room", explains Vincent, "giving every participant an opportunity to get to know a SeaTel system in detail."



the service it provides." In Fort Lauderdale's nearby yacht harbor, Vincent shows us the yachts with SeaTel antenna systems. "Here in the Bahia Mar Marina you will find the most expensive yachts", says Vincent as he gestures to all of the shiny clean super yachts.

We couldn't find a single yacht that didn't have at least one radome installed; most of them had two radomes. Vincent explains, "The completely white radomes are from SeaTel; those with a gray stripe near the bottom are from a competitor and the oval ones are from another competitor." More than three-quarters of the yachts we saw carried radomes from SeaTel.

So what about this five-satellite dish antenna? This concept really put our technicians to the test", explains Vincent, "but our TVRO Product Manager Bobby Jones managed to produce a marketable product." This new system utilizes a multi-satellite dish from DirecTV with a special feed holder that holds a single LNB and two monoblock LNBs as well as a special multiswitch.

This setup takes the signals from the 99 west satellite's Ka-band, on which can be found a large number of HD chan-

■ The SeaTel regional office in Fort Lauderdale, Florida. The office is part of SeaTel's Global Support Team with particular focus on the East Coast and South America regions.



■ Tom Torpey is a Field Technician. If there's a problem with a SeaTel system, the dealers call him up. If the problem can't be solved over the phone, Tom goes on-site and fixes the problem.





■ Steven Calice is also a Field Service Support Technician. Here we see him installing the new five-satellite system with DirecTV dish. The radome can be seen in the background and serves to protect the system on the yacht from weather and waves.

nels, and performs a frequency conversion on them. Vincent gestures to the multiswitch output on the feed holder: "Here we connect four extremely thin, extremely low-loss and extremely robust coax cables that are linked to this connector box on the inside of the radome."

The reason, of course, is that the dish antenna inside the radome is constantly moving so that it can stay focused on the five satellites, therefore the coax cables need to be especially stable. Normal coax cable is then used to connect this connector box to a receiver. "One of the multiswitch output is connected to the SeaTel control modul as a reference signal", explains Vincent, "this leaves three outputs to either connect directly to three individual DirecTV receivers or to a wide band multiswitch, when a lot more DirecTV receivers should be connected."

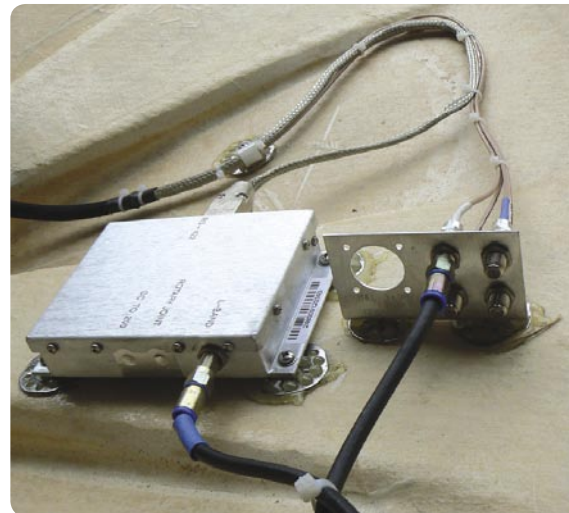
"The primary challenge", explains Vincent "was that we were not going to be using a prime focus antenna with Cassegrain like we have used with all of our other systems. Instead it involved a specially formed offset dish." It no longer

was enough to control azimuth and elevation; now the entire antenna had to follow polarization as well.

Vincent shows us exactly how this works using an actual production sample: he moves the palette on which the antenna is mounted to simulate the movement of a ship. The motorized mechanism of the antenna reacts instantly and regulates the dish such that it continuously points to the DirecTV satellites.

Obviously, a satellite antenna system meant only for DirecTV will have a limited group of buyers. "This system is designed for Yachts, commercial vessels, oil platforms, etc. that operate in US coastal waters within the DirecTV coverage area", comments Vincent, "since the DirecTV satellite footprints are focused only on the USA." SeaTel is working on an upgrade: "Soon we will expand the five-satellite system to a six-satellite system adding an LNB for DirecTV Latin America."

Vincent looks even further into the future: "The LNBs for the American satellites are circularly polarized; as soon as



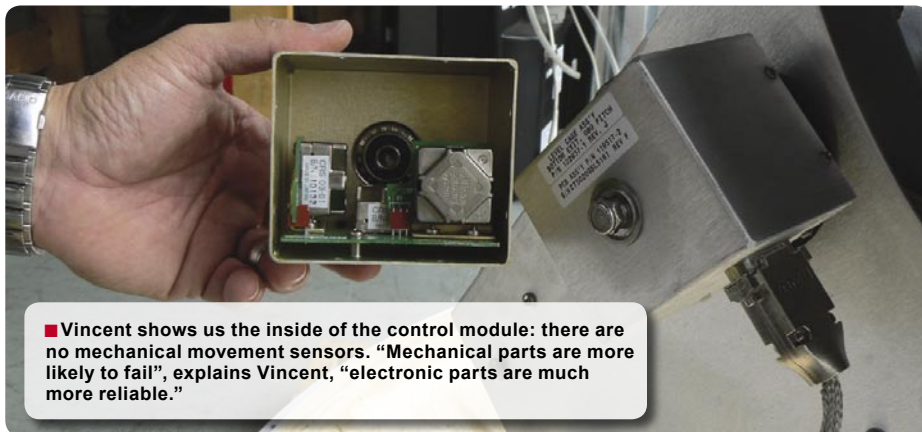
■ Close-up view of the connector unit: from the multiswitch integrated into the feed horn, four very thin cables emerge. The box on the left contains the connection for the motor and control cables. The two black cables that go to SeaTel's control module can be seen in the picture. This means that three receivers can be connected to the remaining three outputs.

our customers travel to Europe and the Mediterranean, we will adapt the system to linear polarized LNBs. "Then we should have the ability to receive in all ocean regions," highlights Vincent.

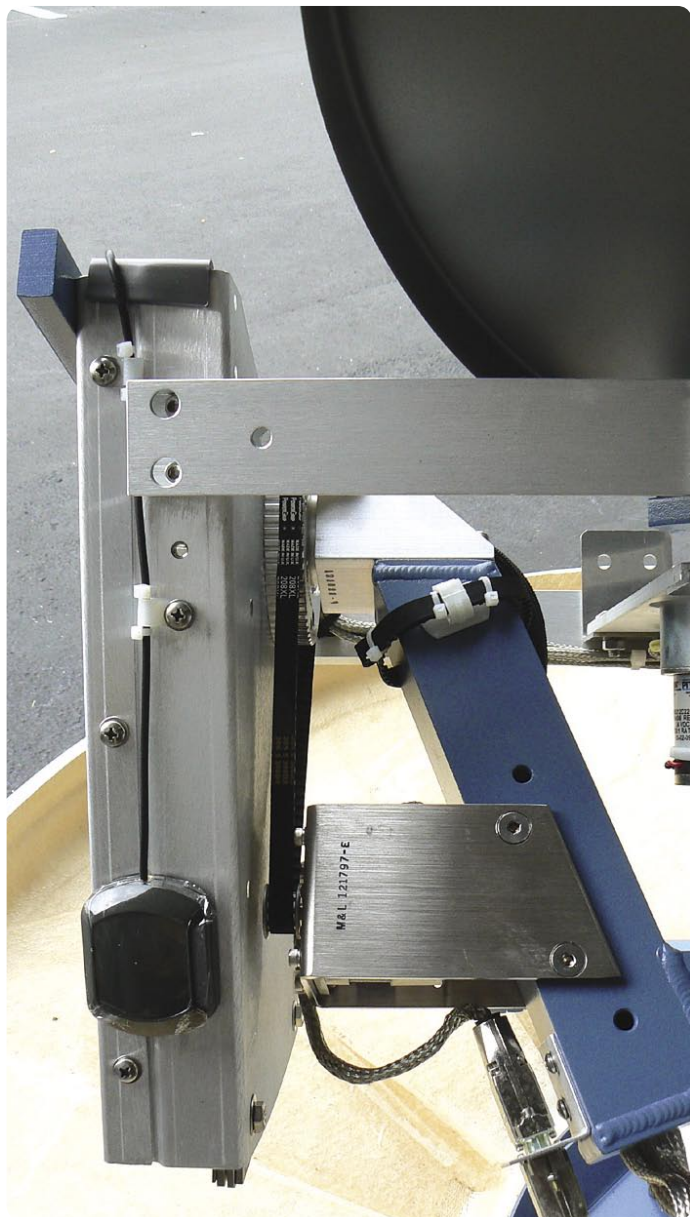


That's quite an outlook for the future! SeaTel is always looking to go beyond technological limits. They also don't limit themselves to maritime applications. TELE-satellite has already reported on SeaTel's automatic satellite tracking systems for trains. "We can visualize systems like this for airplanes as well", says Vincent, and adds: "perhaps in the near future one of our sister companies will offer such a system for airplanes."

No doubt, SeaTel will surprise us with exciting new products in the future!



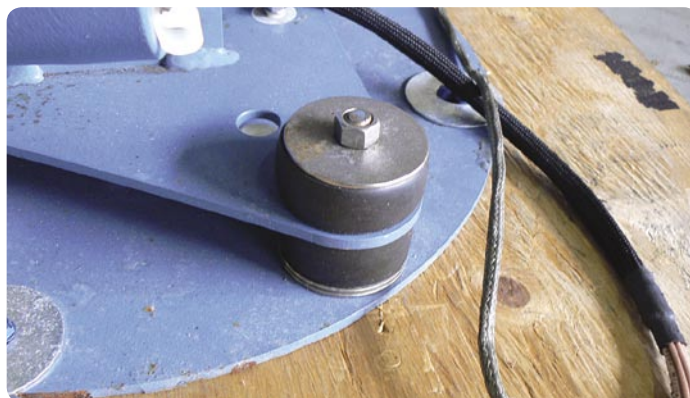
■ Vincent shows us the inside of the control module: there are no mechanical movement sensors. "Mechanical parts are more likely to fail", explains Vincent, "electronic parts are much more reliable."



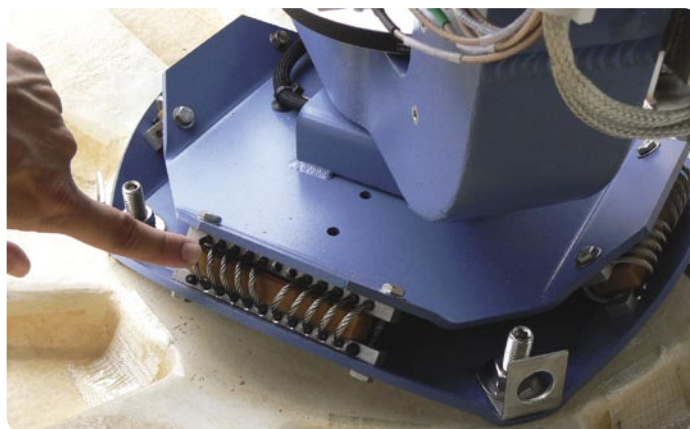
■ It's the little details that show the care and foresight that SeaTel puts into its products: a replacement V-belt is installed in the system in such a way that if the original V-belt should fail, the replacement merely needs to be moved into place. "It's not necessary anymore to take apart the entire system", comments Vincent Valldeperas, "I have yet to see a torn V-belt." Vincent points to the Kevlar insert: "The belt is extremely tear resistant." But as is always the case, if the user knows that the V-belt can be quickly and easily replaced, he'll be more at ease and relaxed when using the system.



■ Severe ship movements need to be absorbed. This picture shows the first generation of shock absorber: a simple spring with an internal rubber stopper. The problem: "You couldn't tell if the rubber inside the spring was still in good shape", explains Field Technician Steven Calice.



■ Then came the second generation: a screw holds a larger rubber stopper. "The system was good but there tended to be after-vibrations and thus was not optimal", says Steven Calice.



■ Vincent Valldeperas shows us the newest generation that is used on the five-satellite system: "A rubber strip is placed in this holder. It can easily be seen if it's still in good shape or if it's torn. Replacement is easy with the help of a wooden wedge." In this way SeaTel has step-by-step solved problems that simply appear but can often be quite complex.



■ The high point: does this new reception system work? The picture shows that, yes, the active transponders on 119 west are being received. SeaTel's control module is to the lower left. It controls the system motors based on actual reception data. The control module receives one of the signals from the multiswitch. The receiver is DirectTV's HD model. The white box is a projector that acts as the TV for demonstration purposes.

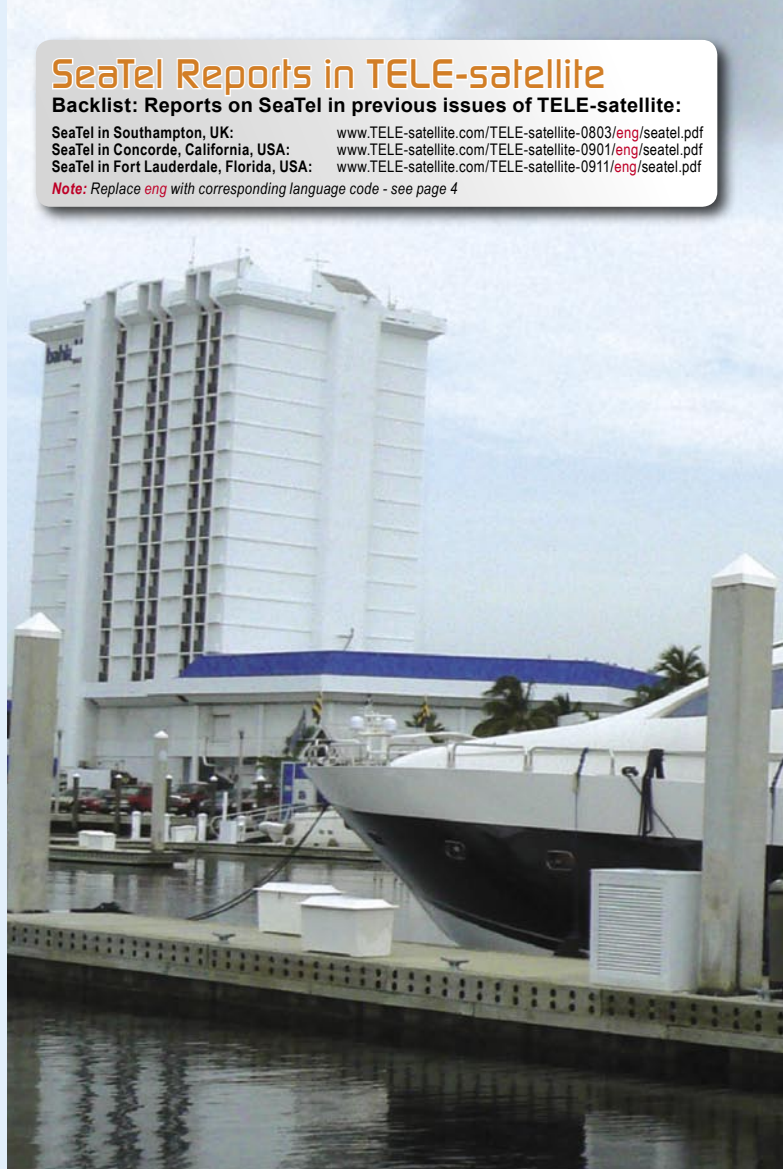


■ In Fort Lauderdale's Bahia Mar Marina: Vincent Valldeperas in front of a yacht with a SeaTel system

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■ The DirecTV receiver's system display shows that all five satellites are being received. (99 west in Ku and Ka band)



■ SeaTel radomes on every ship, sometimes more than one. One system is often used for TV reception while the second is used for Internet-via-Satellite.



■ Even here: SeaTel radomes. Most of the time the yachts here in Fort Lauderdale are anchored and constantly being attended to.



■ Wherever you look: nearly every yacht has a SeaTel reception system. Even without the logo, they are easily recognizable by the characteristic shape of the radome.

