

# Executive Spotlight On...

## STUART DAUGHTRIDGE

Executive Vice President, Commercial Division  
Integral Systems

Interview by Hartley Lesser, Editorial Director, SatNews Publishers

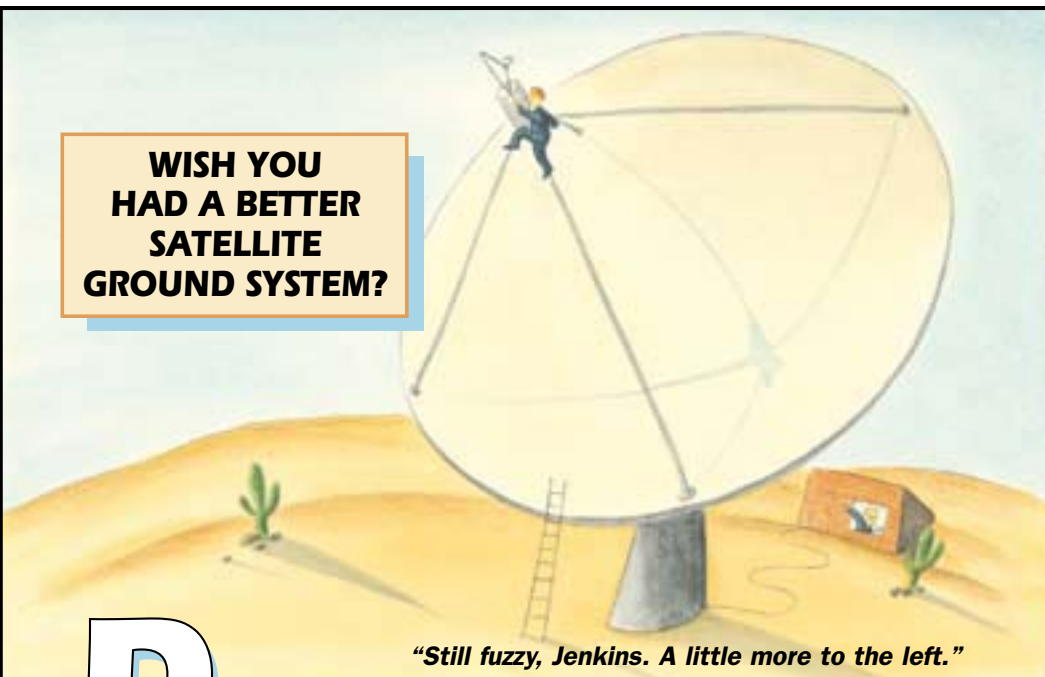
As executive team availability at Integral Systems can be intensely guarded, due to the press of business, obtaining

the time necessary to converse with Stuart Daughtridge was quite momentous.

### Hartley

Good day, Stuart, and thanks for giving us the time to find out more about your position and Integral Systems. Can you tell us about your career, prior to joining Integral Systems?

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Integral Systems, Inc.

### Stuart

I graduated from Lafayette College in 1986 with a B.S. degree in electrical engineering. I began my career working for Spacecom as a spacecraft engineer on the TDRSS (Tracking and Data Relay Satellite System) program. When I left the company, it had become part of **Contel**. Now, that group from Contel is part of General Dynamics.

In 1990, I joined Intelsat and spent two years as a spacecraft engineer to support the operations of the Intelsat 5 and 6 fleet, and the construction of the Intelsat K satellites. Then an opportunity to become the manager of Spacecraft engineering at a startup company called Orion Satellite Corporation. Orion was sold to Loral in 1999 at which time I decided to join Integral Systems.

### Hartley

What are the commercial group's responsibilities at Integral?

### Stuart

The Commercial Division is comprised of Integral's core commercial Command and Control (C&C) group and three wholly owned subsidiaries—

# Executive Spotlight On...

Integral Systems Europe (ISE), SAT Corporation and Newpoint Technologies.



SAT Corporation supplies automated RF signal monitoring systems for satellite and terrestrial spectrum management applications in some 50 countries around the world. Integral Systems Europe specializes in providing ground station solutions, offering hardware and software services based on the ISI product family. Newpoint is deeply involved in satellite and terrestrial network management systems.

The commercial group provides customer solutions based on three distinct technologies and associated product lines through Integral Systems and the aforementioned subsidiaries:

- In satellite command and control, Integral has the **EPOCH IPS** (Integrated Product Suite), the world's most widely used satellite control system.



- For RF monitoring, SAT Corporation is the world's technology leader in RF monitoring and interference detection systems for satellite signals and terrestrial signal monitoring, including *Direction Finding (DF)* systems.
- For element and network management, including *Manager of Managers (MoM)* systems, Newpoint Technologies provides the **Compass/TrueNorth** product line.

## Hartley

What are the primary markets the Integral Commercial group addresses?

## On-The-Move Network Connectivity



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# Executive Spotlight On...

## **Stuart**

The Integral Commercial Division's primary focus is on the ground system needs of commercial satellite operators and service providers worldwide, such as Intelsat, EchoStar, Telesat Verizon, Qwest, Arrowhead, Artel, SES Global and many others. We also work on the ground system needs of governmental agencies around the world. Integral's C&C group and Integral System Europe (ISE) focus on satellite C&C and larger, turnkey systems that span one or more aspects of the ground segment. Additionally, SAT and Newpoint have significant business in other markets, including the satellite user community, military ranges, television broadcasters, terrestrial remote monitor and control applications as well as with government and commercial integrators. Other organizations within Integral are keyed in on the specific ground system needs of the U.S. government.

## **Hartley**

It sounds as if though you have three distinct markets to address... the Command & Control, carrier management, and network management markets. However, there must be some synergy between them to ensure they are all within the commercial division umbrella?

## **Stuart**

Actually, it is because of this synergy that Integral sought out and acquired SAT and Newpoint, especially as they were the leading providers of their respective systems.

By integrating these three product lines, Integral can offer a fully integrated ground system solution, based on the leading products. As satellite operations is a single operation typically executed by multiple systems controlled by multiple operations teams, our integrated solution can provide satellite operations team with full situational awareness across entire operations. Such integration improves operator efficiency, responsiveness, quality of service, and the overall safety of operations, all the while reducing operations costs and outage times.

We are accomplishing this work beyond satellite operations, as well. Newpoint is expanding their Compass/TrueNorth product line to offer the same, fully integrated approach and full situational awareness using a Manager of Managers (MoM) approach for communications, broadcast, and network operations. A MOM system is a top level management system communicated with all of the other management systems in the network to provide the user a single system from which the entire network

can be managed, even though there are several different management systems actually interfacing with and controlling the different hardware elements of the overall system.

## **Hartley**

And how is this different than what your competitors are offering and what most satellite operators use today?

## **Stuart**

Typically, satellite operators procure stovepipe systems for each operation area, such as satellite control, CSM [Communications System Monitoring], M&C (Monitor & Control), network management, frequency planning, and geolocation. Many operators still employ several independent systems for each application. For example, they may have different satellite control systems for various satellites, dissimilar M&C systems for each Earth station, as well as unsimilar network/modem control system for each communications network. Unfortunately, each of these systems are specifically designed for their own specific task and have little to no ability to interface with other systems.

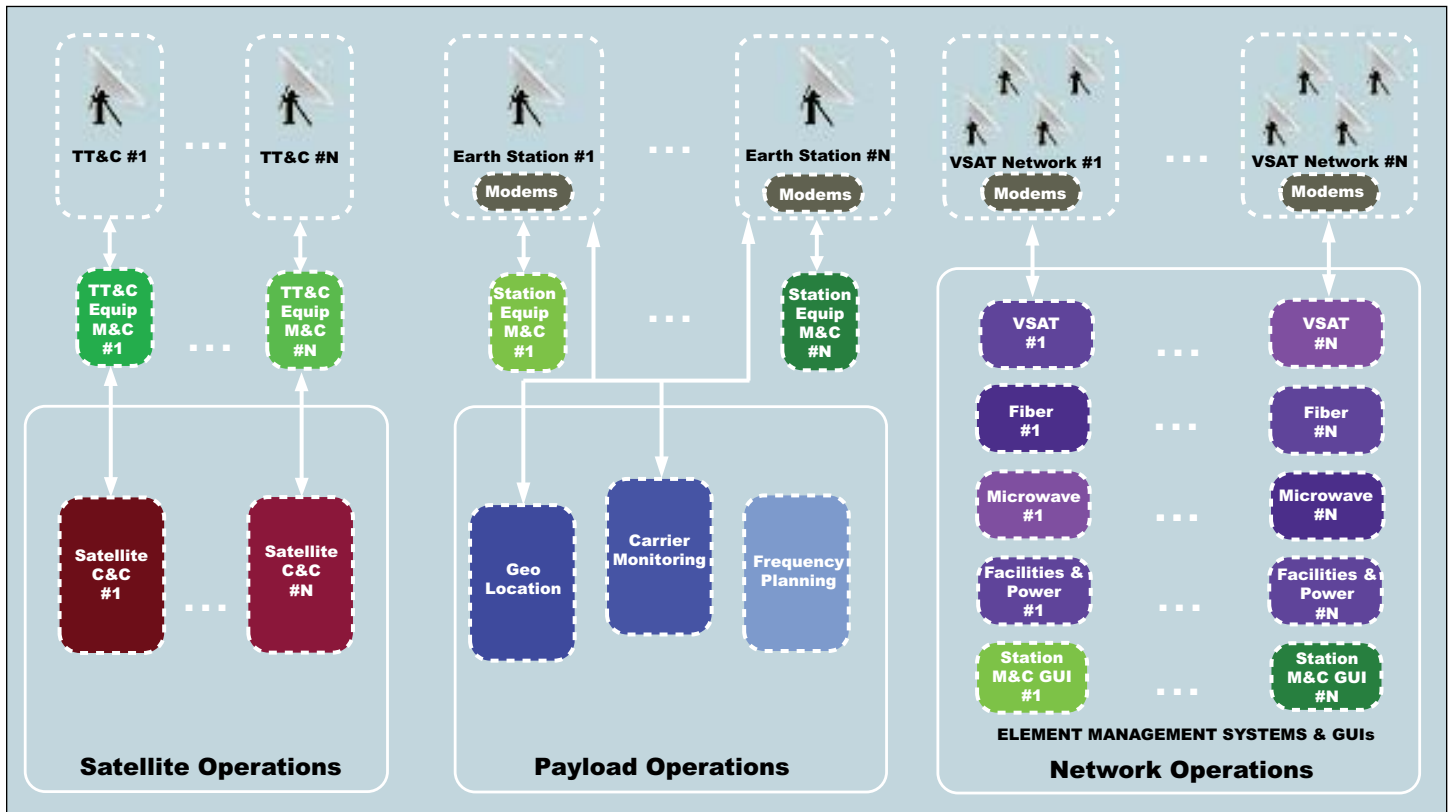
## **Hartley**

Can you give us an example of how an integrated system would save effort, as compared to the manner in which most operations are run today?

## **Stuart**

Certainly. Take the case where of a failure at a teleport that causes the loss of a large carrier. In a typical stovepipe operation where all of the systems are stand-alone, the teleport M&C system will alarm on the equipment failure, notifying the operator of both the problem and the source of the problem. Simultaneously, the payload operations center monitoring the RF links, and is the primary interface to the end customer, will receive an alarm in their CSM system due to the loss of the carrier telling them there is a problem, however there's no information available to the CSM system on the source of the problem. At the satellite control center, the satellite control system will alarm on the change in helix current on the amplifier (due to the loss of drive), notifying the operator of a problem. Once again, there's no information available on the source of the problem. As a result, this one problem has been reported on three different systems to three different operations groups, all of who will start anomaly investigations. Only one of the groups has the information to identify the cause of the predicament and the resources to resolve the problem.

# Executive Spotlight On...



Numerous “stovepipe” systems to operate and maintain that cannot readily share data between systems and cannot be readily expanded to support growth of your operation

With an integrated system, all three systems and their associated operations teams would be able to immediately recognize the cause of the problem was a failure at the teleport uplink site. As a result, only one anomaly investigation is generated and the payload operations team has the information to proactively notify the customer of the problem and the planned resolution. For this case, having an integrated system prevents wasted manpower and allows for proactive—and much appreciated—customer support.

## Hartley

Haven't operators attempted to integrate their systems by themselves?

## Stuart

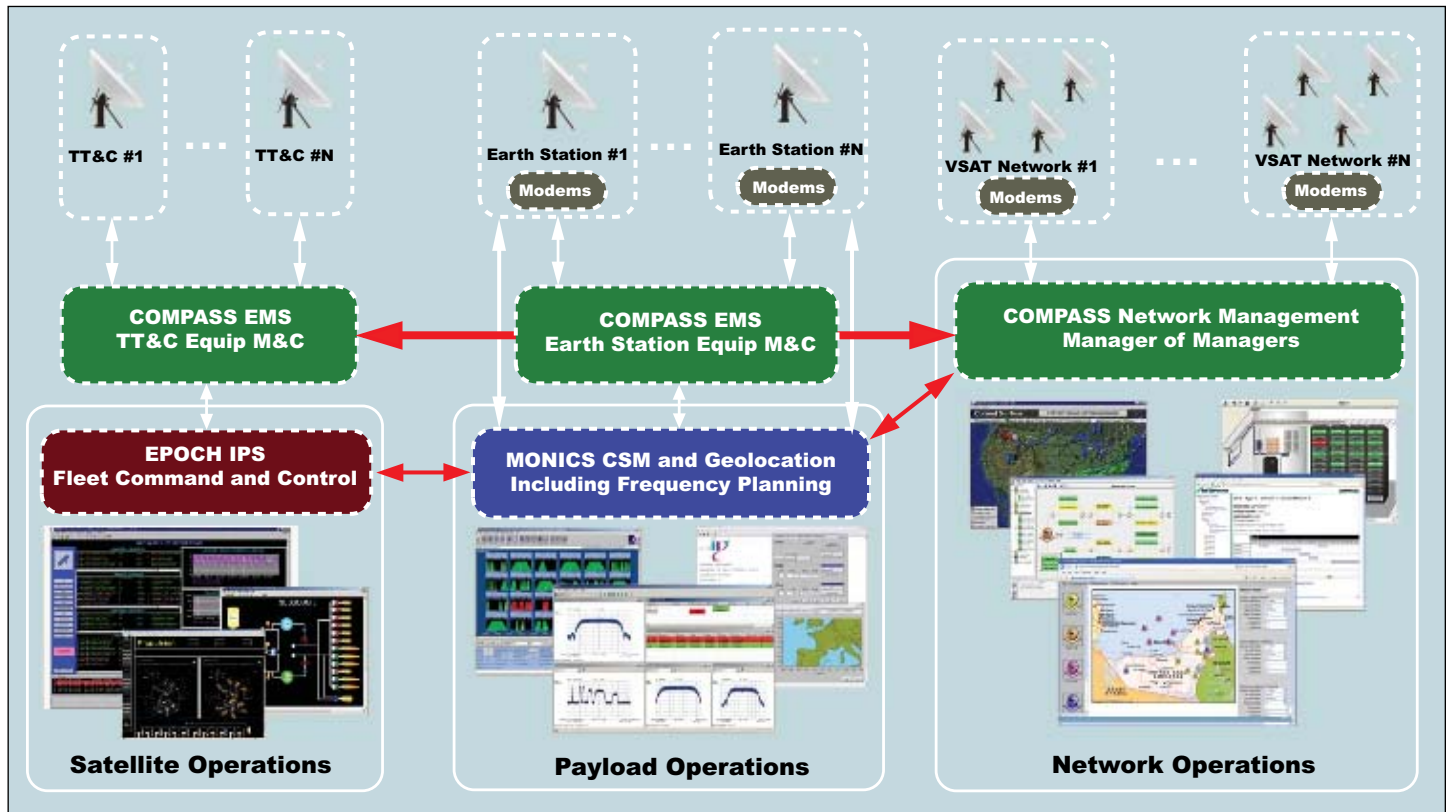
There have been a few operators who have tried to integrate systems themselves. On the military side, there have been several large system integrators who attempted to build so-called “best of breed” systems when they don't control the majority of the core products going into the system.

There have been two primary problems with these integration efforts. First, at the product level, the basic products them-

selves are stovepipe products without the interfaces or infrastructure built into them to support and take advantage of integration with, and data from, other systems. For example, as when trying to obtain a real-time command and control system that can receive, understand, display RF data, and vice versa. As a result, when a third party (satellite operator or a system integrator) tries to integrate the products, it is usually technically difficult, expensive, and the end results do not live up to the original expectations.

The second problem, primarily for commercial satellite operators taking this approach, is that the efficiency gains and operations cost reductions achieved in operations from these integration efforts are swamped by extra costs. These costs are associated with the need for a full-time software development and support team to integrate and maintain the integrated systems. The forgotten element is that a system does not stay static for long—the speed at which hardware, operating systems, and general software technology change drive the need for continual investment in maintaining and upgrading your software systems. As a result, for companies that try to bolt together a variety of different stovepipe systems, there ends up being a significant long-term support and sustainment effort required to maintain these systems.

# Executive Spotlight On...



*An illustration of a fully integrated solution where each operations group is given full situational awareness*

If you are a government contractor building a “best of breed” system, this is great news, as you have now locked your government customer into requiring your services for as long as they have a need for your system of systems. However, if you are a commercial satellite operator attempting to reduce operations costs by integration of your systems, you will find that those costs have actually increased because the costs to maintain the integrated system is larger than the efficiency gains you achieved through the integration effort.

## **Hartley**

How is Integral’s approach different and how are the problems you present alleviated?

## **Stuart**

The main difference is we actually handle the integration processes at the core product level. As a result, the products are now designed for integration as well as to support the receipt and display of data from other systems. The full advantage of having a fully integrated system can then be realized. As Integral has already completed the integration as part of our R&D efforts, there is no development risk for the end customer.

Let’s take this a step further. By completing the integration at the product level, the interfaces are now a part of the standard product. They are fully supported and tested to ensure backwards compatibility in future releases. An operator can safely upgrade one of their systems and remain confident the upgraded system will continue to work seamlessly with the other systems in their operations. As our solutions are built on our COTS products, they are proven and come with long-term software maintenance programs that fix the operators maintenance costs over the life of the system. In this way, the operators can have a state-of-the-art system through periodic system upgrades, all as part of the maintenance program over the entire life of the system, at no extra cost.

## **Hartley**

What about systems that Integral does not initially provide?

## **Stuart**

To be able to offer a turnkey fully integrated solution, we realize we need to team with industry partners. Three key areas are required in order for Integral to provide turnkey systems: RF and antenna systems, frequency planning system (a system that helps operators optimize the use of their communications payload), and a geolocation system.

# Executive Spotlight On...

For the RF and antenna systems, as these are primarily hardware systems controlled by the M&C system, we can work with any vendor, although we definitely have preferred vendors.

For the frequency planning and geolocation systems, we initially sought out the two best systems in the industry—Complan by Optimal Satcom and satID from QinetiQ—and we teamed with them to develop our integrated solutions that include their systems.



With QinetiQ, we have also gone one step further—we host the satID software in SAT's **SAT-DSA** unit to create the sat-IDS A product. This product is a low cost, state-of-the-art solution that provides a CSM system with the industry's leading interference detection and characterization and is combined with the superb geolocation capabilities packaged in a rack mount product solution that shares common hardware resources.

Recently, **IN-SNEC** has come on the market with a new geolocation offering. As a result, we are already working with them to integrate our **Monics CSM** software with their offering to allow our customers the option to choose between the two best geolocation technologies on the market.

## **Hartley**

What about satellite operators and satellite users that already have existing infrastructure—how can they achieve an integrated system?

## **Stuart**

All of our products have easy to use and well-documented interfaces. As a result, legacy systems can be integrated to the extent that those systems can support the technologies. In addition, our open interfaces allow us to interface to other third party systems, such as billing systems, CRM systems, and so on. For example, we have integrated our products with systems to allow automatic billing for actual time of use for occasional use services as well as for automatic reporting for contracts that contain service level agreements.

## **Hartley**

You mentioned the MOM Concept Newpoint is addressing. Could you explain further?

## **Stuart**

Newpoint is expanding their Compass/TrueNorth product line to offer fully integrated, full situation awareness from any terminal for the communications and network side of the satellite operator and satellite users needs. The Compass product can manage existing element and network management systems and allows for a single, fully integrated view and control of the entire ground network. That includes the satellite RF links through the integration with SAT's Monics system. Customers may have teleports with different M&C systems and diverse networks from different providers. And they're running their own proprietary network management systems. They can have all these systems integrated and controlled by a single source. This hides the multiple systems from the operator and gives a single system for entire ground system control. This greatly improves efficiency, improves response times, reduces training and operations costs, and reduces the chances of operator errors.

## **Hartley**

Stuart, can you offer an example of how Newpoint's MoM approach could help a communication network operator?

## **Stuart**

Consider the case when an end customer link is implemented using different networks that are owned by the service provider, such as a hybrid fiber/satellite network link. Without a Compass MoM type of system, when a customer calls in due to a service problem, it is often difficult to track the problem down, as the operator will have to examine several systems to obtain a complete picture of the end-to-end service. Another predicament for operators is when there is an equipment failure, it is not always easy to know exactly what customers are impacted—operators only see the equipment failure. With the Compass MoM system, when such an equipment failure occurs, operators can see all of the effected customer services affected by the equipment failure.

## **Hartley**

What is the future for technology beyond integrated systems?

## **Stuart**

We believe satellite operations software will follow an evolutionary model quite similar to business software. First, there

# Executive Spotlight On...

were custom and then COTS stovepipe systems for each operations area. Today's stage of industry maturity finds automation within each of the systems and integration of the separate operational systems to provide the added efficiency and cost effectiveness of full situational awareness. The next step, following the business software model, is the enterprise level solution for satellite and network operations.

## **Hartley**

What do you mean by an "enterprise level solution for satellite and network operations"?

## **Stuart**

An enterprise level solution analyzes the data from the integrated data set from the different systems to provide real-time access to key performance indicators. This information is available to company management to improve the performance and efficiency of the company and operations.

At Integral, we have already started development of our enterprise level dashboard system. We will be deploying a prototype system to the first customer in the spring of this year. An example of the type of data the dashboard will be able to provide includes:

- Real-time as well as average satellite and individual transponder use
- Available power equivalent bandwidth available per region, satellite, and transponder
- Real-time running averages and reports on service outages. These will be available on satellite, transponder, and customer basis and can be used in support of customer service agreements. Outages will be able to be categorized by type (satellite problem, RF interference, sun outage, ground system problem, operator error, and so on)
- Planned satellite activities (such as maneuvers, commissioning, new customers, or even listings of occasional use customer events)

Hopefully you can see the potential value of easy, real-time access to this data by satellite operations and service providers' management teams, sales teams, engineering and operations management teams, etc.

## **Hartley**

Stuart, before we leave you in peace on this busy day, would you summarize your opinion of where you believe the satellite ground system industry is heading?

## **Stuart**

We believe the future of satellite ground systems will eventually become fully integrated systems with intelligent automation, designed to support operations and also the business of satellite operators. As a result of that belief, Integral is investing our R&D funding into making this a no risk, low cost reality for our customers. ■



Stuart Daughtridge joined Integral Systems in January 1999. In February 2000, he was appointed Executive Vice President of the Commercial division. In this role, Mr. Daughtridge oversees four operational groups including Integral Systems Commercial Command & Control, based in Lanham, MD, and subsidiaries Integral Systems Europe, based in Toulouse, France; SAT Corporation, based in Sunnyvale, California; and Newpoint Technologies, based in Salem, New Hampshire. Under Mr. Daughtridge's leadership, the combined capabilities of Integral Systems' satellite command and control, SAT Corporation's carrier and interference monitoring, and Newpoint Technologies' network management all work together to provide a complete integrated ground system solution approach for satellite operators around the world.

Prior to joining Integral Systems, Mr. Daughtridge worked in several management positions in the spacecraft engineering and satellite operations division of Orion Satellite Corporation (which later became part of Loral). His last position at Orion was Director of Satellite Operations. From 1990 to 1992, he worked at INTELSAT on various aspects of the design, development and operations of the INTELSAT K spacecraft and the INTELSAT V, IV and VII series of satellites. From 1986 to 1990, he worked for Contel (which later became part of GD) as a spacecraft engineer for NASA's Tracking and Data Relay Satellite System. Mr. Daughtridge graduated from Lafayette College in 1986 with a B.S. degree in electrical engineering.