

A photograph of a person with their hand raised in a classroom setting. The person is seen from the back, wearing a dark long-sleeved shirt. The background is a green chalkboard with some faint markings. The lighting is warm, suggesting an indoor setting with artificial light. The overall mood is one of active participation or learning.

# EMERGING MARKETS:

The Development of New Space Talent

BY ANNE WAINSCOTT-SARGENT

In the second of a two-part employment series, *Via Satellite* takes a look at the state of technical hiring in the global satellite sector — what's driving it and what's next for young people looking for opportunities to make their mark in space.



## The satellite sector in the markets of

Asia, Europe, South America, the Middle East and Africa continue to see strong employment momentum. Hiring requirements are driven by the jump in new satellite build outs, with nearly 1,600 satellites forecast to launch in the next 15 years.

### A Graying Workforce?

Keeping engineers on a technical career path has not been an issue for SES. Approximately 40 percent of SES's 1,200 employees are technical staff. To attract key technical talent, SES has developed an associates program to bring in professionals with advanced degrees in engineering and offer them four six-month rotations throughout the company. At the end of the two-year program, some are moved into a technical leadership position.

"An important goal in the satellite industry is to recruit more women engineers," says Grace de Latour, executive vice president of HR at Luxembourg-based SES.

The Society of Satellite Professionals International (SSPI)'s Satellite Industry Workforce 2009 Report finds that the satellite industry suffers from a striking gender disparity with men making up 83 percent of the industry across all age groups. In engineering and operations roles, women only account for 13 percent of the workforce.

"The engineering schools only have a small percentage of women in their classes so I think we need to work with the secondary schools and colleges on internships to bring more young people into this industry and try to include as many women into that group as we can," says de Latour.

Other key findings in SSPI's report argue that the workforce isn't aging as rapidly as previously believed. The study found that while government and military aerospace programs may face the challenge of a graying workforce, the commercial industry does not, with 43 percent of the members falling within the age of

18 and 39 and 80 percent under the age of 54.

SES's experience globally reflects these numbers, however in the United States de Latour observes that "definitely the workforce is graying but the good news is that employees are working longer, which is a positive development."

One report finding is undisputed: many satellite employers need more specialized industry experience in their new hires, even those from university programs.

"The complaint you hear today is that a satellite or teleport operator specializing in the media industry can't find people with broadcast experience," says Robert Bell, president of SSPI.

He notes that when the satellite industry was smaller and less diverse — catering largely to broadcasters, telephone companies and the government — those customers acted as a natural training ground for satellite technology staff. "The industry has become far more diverse in its markets and applications since then. It has also become IP-centric," says Bell, recalling a recent conversation that he had with a middle manager, who said that he had learned not to try to teach RF engineers about IP.

"It worked better to hire IP people and teach them about RF, the manager told me," continues Bell. "The broadcast and telephony markets have also become far less stable and far more complex, further eroding the body of knowledge that a new tech hire is likely to have."

### Hiring in Emerging Markets

Major operators like SES and manufacturers such as Astrium are in hiring modes. Latour says her company is currently seeking to fill positions in the emerging markets in Africa, Eastern Europe and Latin America. She also says her company anticipates hiring nearly 50 staff in Luxembourg and the United States this year, mostly to support the company's satellite build out for O3b Networks, which is building a new fiber-quality, satellite-based, global Internet backbone for

telecommunications operators and Internet service providers in emerging markets. SES is the largest stakeholder in O3b.

"The most difficult technical jobs to fill are mechanical engineers, as well as workers with power thermal and altitude-control backgrounds," she says. "We are trying to tap directly into schools that specialize in technical degrees in space programs."

Astrium, one of the top space companies in Europe as well as worldwide, has seen significant growth among its workforce. The company's largest business unit, Astrium Satellites, which employs 9,500 people, has increased its workforce by 37 percent in the last five years, says Astrium Satellites CEO Evert Dudok. He attributes the hiring to the companies' commercial successes in the telecom satellite business. "As Astrium Satellites has a strong order book, we plan to grow in 2012 and 2013," he adds.

Astrium plays a major role in Galileo, the European navigational satellite system, with responsibility for four satellites, and has a 50 percent share in the next 22 satellites being constructed. "We are involved in system works, ground systems and many other aspects," Dudok adds.

In November, European space ministers will decide what future ESA missions will be built — a decision that will no doubt affect job creation for the entire region.

The Swiss Space Center at EPFL plans to introduce a master's program in space beginning in fall 2013 in response to the industry's need for more seasoned graduates. The center currently offers a space minor, which already attracts 40 students a year, even though Switzerland's space sector only has about eight to 10 full-time openings annually, says Dr. Volker Gass, director of the Swiss Space Center.

"With the master's program, we will offer a lot of hands-on practical project work so people understand the multi-disciplinary nature and complexity of space," he says.

Even the center's space minor is proving marketable to current students, he adds. "The teamwork skills students learn are directly applicable in other fields such as banking, watch manufacturing and food sectors," he says.

Gass, a 23-year space veteran, has raised the profile of the center after announcing plans to launch a CubeSat to clean up space debris. When he started his space career in 1989, Gass worked on the Huygens Cassini probe. By the time the probe successfully reached Saturn's moon Titan in January 2005, he had earned his PhD and built a company and sold it again.

## Asia and the Middle East

The uptick in hiring is also occurring with regional players in Asia and the Middle East. In Singapore, remote sensing, satellite communications, ground station activity and system project management have all led to an increase in demand for specialized technical talent.

"The Asia growth story is very real, with the regions beefing up satellite activity to cater to demand," notes Jonathan Hung, president of the Singapore Space and Technology Association. "Asia is highly diverse, with booming economies and a hotbed for new business, especially since satellite services and developmental work is now on the rise and in much greater demand."

Singapore is relatively new to satellite manufacturing, but the country recently celebrated Nanyang Technological University's successful launch of XSAT, Singapore's first domestically built experimental research satellite. With the launch of the commercial entity, ST (Satellite Systems), more engineering jobs are being created, Hung reports.

When it comes to management hires, Hung says that a steady number of high-caliber C-suite management positions have come to Asia from abroad during the last five years. "This is symbiotic to business poten-

tial as many satellite heavyweights are placing significant resources to engage the established and emerging countries in the region," he says.

Another newer space entrant, the United Arab Emirates (UAE), continues to grow its space sector employment base and to train engineers in technical roles as the country matures its space infrastructure.

"We can't find enough people to fill the vacancies we have," observes Salem Almarri, head of Space Missions and Project Management for the Emirates Institution for Advanced Science and Technology (EIAST). The government-run institute recently launched its earth observation satellite, DubaiSat-1, which provides government and private industry clients with optical imagery. The launch of DubaiSat-2 is on schedule for later this year.

"We're looking at hiring UAE nationals. It's very hard to find experienced engineers so we look at fresh graduates or engineers who have experience in fields such as computer engineering," says Almarri, who notes that more than 60 percent of the institute's employees are engineers.

He says engineers traditionally don't stay in the technical area for long as they seek advancement into higher paying management positions. "Keeping them in engineering jobs is key for us so part of what we are doing is introducing new benefits and incentives for them to stay in engineering."

## Digital Revolution

"You want to be in space? You have to commit for the long run." And for those who have aspirations to be entrepreneurs, Gass advises: "It's a marathon, not a sprint."

Mansat's Stott believes the digital revolution is what is driving the industry's growth and job creation. "This information renaissance is driving new ideas, new uses, and space is the absolute backbone of that — in fact, it's becoming the main backbone for every communication device and the

broadcast for every single piece of information on the planet. The challenge facing the industry is how do you communicate that excitement — that potential of space to the marketplace of global graduates?"

He believes the young people only have to look to the many Internet billionaires, who are all focused on space, for inspiration. "You've got Jeff Bezos with his own private space company, Blue Origin. You've got Elon Musk of SpaceX. You've got Paul Allen, who started the first space enterprise; you've got Peter Diamandis' joint venture, Planetary Resources, which just went public."

Then there's the work of non-profits such as the Conrad Foundation, which honors the legacy of Apollo 12 astronaut, Charles "Pete" Conrad, who went on to found four companies dedicated to the commercialization of space travel. Every year as part of its Spirit of Innovation Challenge, the Foundation selects 15 high school finalists who use science, technology, engineering and math skills to help solve global and local problems while supporting global sustainability. One of the awards is for space.

"It's fascinating to just see the passion of these high school students — it shows that passion for space is still out there," says Stott.

And that passion is what will continue to attract the best and brightest to the space industry. "We have one advantage over many other industries and that's the notion of reaching for the stars, Hung says. "Space is the final frontier, and our industry should capitalize heavily on how our combined efforts in technology breakthroughs, complex research and visionary engineering have catapulted us into the universe every day."

## The Legacy of the International Space University

The Isle of Man is a hive of activity in bringing through new international space talent. "We have definitely seen an increase in the number of

companies coming to the island. I think what's driving this is the shift from the government to the commercial side. In addition to the main satellite operators there is also a lot of smaller entrepreneurial firms as well — people who use remote sensing data and GPS data as a fundamental tool for their businesses and their economic offering," says Christopher Stott, chairman and CEO of Mansat.

The Isle of Man originates a number of CubeSat-style missions through firms like U.S.-based NanoRacks, which coordinates the transport of small experiments to the ISS on SpaceX Dragon and other launchers. "We've seen a lot of companies be created to take advantage of that one small step. They're facilitating more access to space," Stott says.

Twenty years ago when Stott began working in the satellite industry, space agencies like NASA and the European Space Agency dominated the sector, and even commercial satellite communications was run by large government institutions. Decision makers were influenced by the Cold War, having come of age during the U.S.-Russia race to space and NASA's Apollo program.

Stott, who is a member of the board of trustees of the International Space University (ISU), an innovative post-graduate training center for the satellite sector, says the students coming into the industry today have a completely different world view. "This is a generation that has grown up without the threat of the Cold War, where every human being is connected by a 10-digit number, and where they think they can get data to any part of the world in any format. They see satellite communications as a vital part of economic growth and sustainable development."

In its 25th anniversary year, ISU has become a powerful model for learning with its multi-disciplinary curriculum. The school's two-month Space Studies, one-year Masters and executive MBA programs are routinely

over subscribed. To date, some 3,300 students have graduated from ISU. In June, the latest nine-week ISU Space Studies Program began at the Florida Institute of Technology, with NASA's Kennedy Space Center co-hosting the program.

"In 10 years' time, the world will conclude that the ISU helped to create a positive impact on a billion people," says Michael Potter, who graduated from ISU's 1988 inaugural class where he completed the space studies program at MIT alongside Chinese and Russian students.

Many ISU graduates Stott and Potter talk to are motivated by social enterprise — seeking ways to use their space career to make the world a better place. "I don't know of any unemployed alumni at ISU. The global ISU community is extremely effective at identifying and absorbing talent," says Potter, who recently helped an ISU alumni from Australia network for potential space jobs in Denmark.

Potter himself credits his ISU connections with critical moments in his career — from helping him land at a joint a consulting firm in Washington, D.C., specializing in outer space consulting, to co-founding Esprit Telecom, a pan-European competitive telecommunications services provider, with a member of ISU's Board of Trustees. The company eventually went public and created more than 1,000 jobs.

Potter also interviewed many contacts from ISU for his award-winning film, "Orphans of Apollo," which tells the true story of a well-connected group of space enthusiasts and entrepreneurs who try to privatize the Russian Mir Space Station. The film has drawn a cult following among university students and those in the new space movement.

According to Stott, many students completing their graduate studies and encountering employment difficulties during the economic downturn have found ISU a compelling option. "In the last three to four years

there has definitely been an uptick in enrollments."

One recent graduate, Violetta Kuvaeva, completed the Space Studies Program in summer 2006 and then stayed on for ISU's master's program in space management. SES, a long-term supporter of the ISU, recruited Kuvaeva in September 2010 for the company's two-year associate program that brings people in with advanced degrees in engineering and gives them four, six-month rotations inside the company to groom them for a leadership position.

Kuvaeva, who also has a master's degree in engineering economics from Moscow Aviation Institute and worked on the aviation and human spaceflight side, has found her experience at SES eye opening. Her first rotation was in corporate development followed by asset management and finance. She's now completing her final rotation in business development with a geographic focus on the emerging markets of Europe, Middle East and Africa.

"This experience (at SES) has been invaluable — providing me with 360 degrees of industry knowledge and also a very strong function skill set that I'm sure I'll be able to rely on throughout my career," she says.

ISU's legacy is most evident in the accomplishments of its alumni, many of whom are leading the current wave of commercial innovation in space. According to Stott, the space sector, which employs less than 200 people on the Isle of Man, contributed \$2.58 billion in economic activity last year. "All of them are ISU graduates," he says. ▣



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