

The small satellite market takes off

Satellite manufacturers are successfully shrinking their products, making them much less expensive to operate. The development has pricked up the ears of multinationals and hedge funds looking to monitor their activity from space.

By Serge Maillard

“Many of the activities requiring a standard satellite can today be done with miniature machines.” For example, the UK firm SSTL, a pioneer in the field bought out by EADS in 2008, has developed metre-precise Earth imaging resolution from space. “We wouldn’t have been able to do that ten years ago because it would have required very large satellites,” says Phil Davies, head of business development at SSTL. As in other industries, satellite technology is becoming lighter, smarter and more frugal on energy.

In standard industry terms, “small satellite” refers to machines weighing less than a tonne. “Pico” satellites weigh between zero and one kilogram (such as the “Swiss-Cube”, Switzerland’s first-ever satellite launched in 2009 by EPFL for 600,000 Swiss francs using an Indian rocket), while “nano” satellites weigh in at between one and ten kilos, “micros” between ten and 100 kilos, and “minis” from thereon up to a tonne. The average weight of an SSTL satellite is 150 kilos, but, says Phil Davies, “We also build satel-

lites weighing 400 to 600 kilos. In all, we’ve launched 41 satellites in just under 30 years.”

The slim-down approach has enabled the satellite industry to generate major savings, since each kilo sent into space corresponds more or less to its weight in gold. The launch in late 2013 of the European Space Agency’s Gaia satellite telescope, weighing just over two tonnes, cost the tidy sum of €740 million, while the launch of a small satellite by and large remains under the €1 million mark.

A SECTOR IN RENEWAL

Some highly sophisticated activities such as astrophysics and telecommunications will no doubt continue to use large satellites for some time to come. But others, starting with Earth imaging, are opening up to manufacturers of small satellites.

“Based on our analysis, the satellite sector is the number one market for players in the new space industry, far ahead of launch providers or human space transport. We estimate this market at approximately

\$200 billion,” says Richard M. David, co-founder of NewSpace Global, a New York-based information service provider that tracks over 600 companies in the new space industry. NewSpace Global analysts note a “higher than anticipated” growth in the small satellite sector.

Meanwhile, the firm, Euroconsult, expects over one thousand satellites to be built between now and 2021, a full 36% more than in the last decade and a figure not seen since the end of the 1990s, when the first generation of satellites launched for cell phones led to a boom across the segment.

BIG DATA PLAYERS

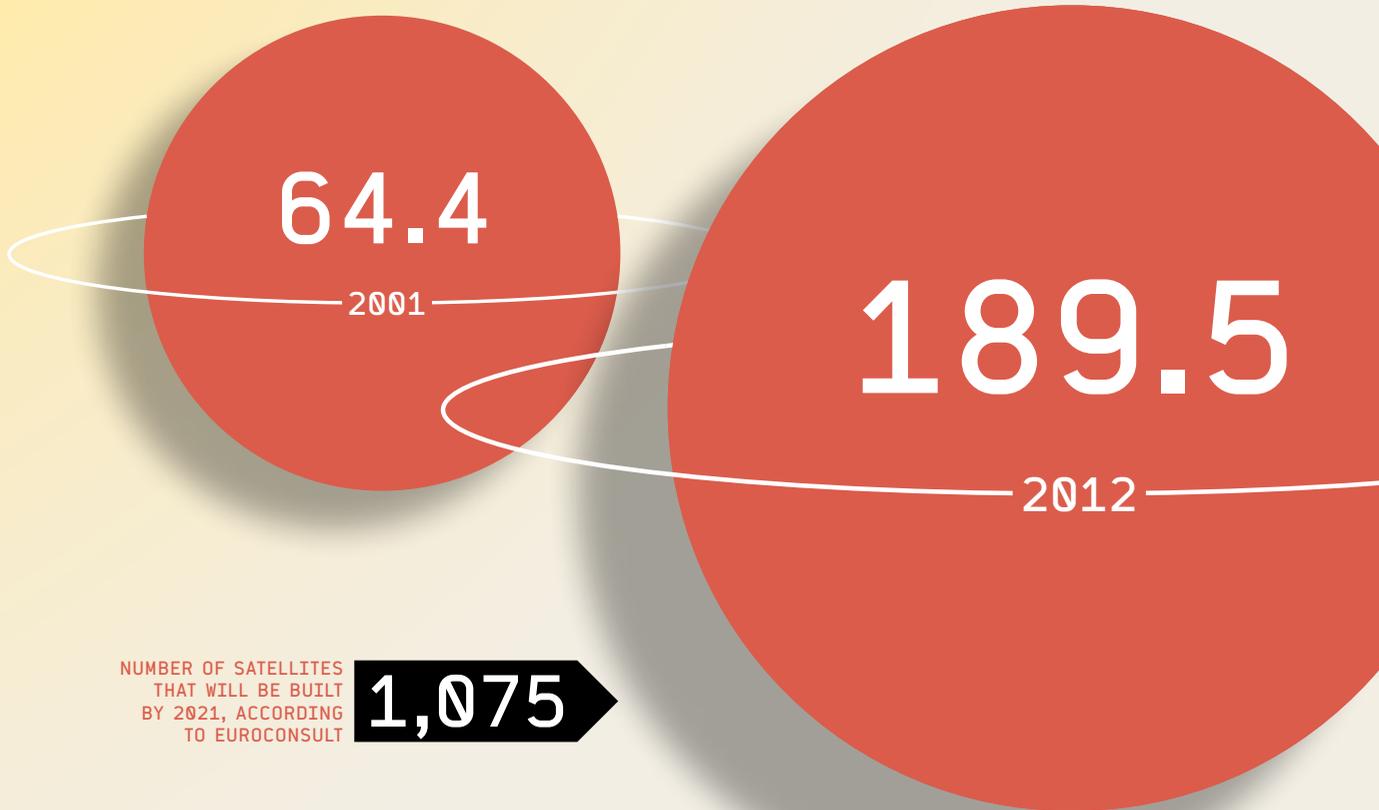
While satellites are getting smaller, the customer base is growing broader. Customers include scientists and government bodies, who use small satellites for research, agricultural surveillance and air traffic monitoring. But demand is coming increasingly from private customers attracted by the growing affordability of the sector.

“There is no better way of understanding what is hap-

THE SATELLITES INDUSTRY IS TAKING OFF

Revenue in the sector has nearly tripled since 2001, with average annual growth of approximately 10%.

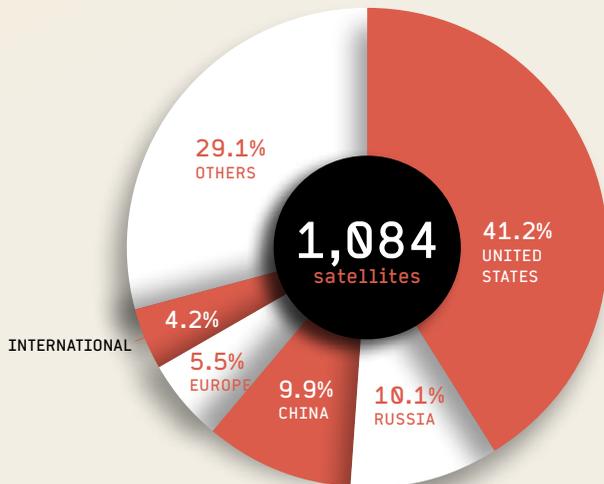
REVENUE OF THE SATELLITES INDUSTRY
In billions of dollars



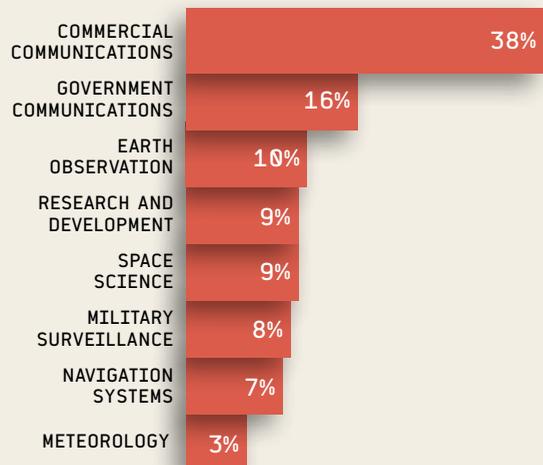
NUMBER OF SATELLITES THAT WILL BE BUILT BY 2021, ACCORDING TO EUROCONSULT

1,075

SATELLITES IN ORBIT...



...AND THEIR FUNCTIONS



SOURCES: UCS SATELLITE DATABASE, SATELLITE INDUSTRY ASSOCIATION (SIA), EUROCONSULT

pening on our planet than observing it from space,” says Richard M. David. “Banks and hedge funds are now using this information for their investment strategies. As are mass retailers, Walmart included. The new tools can be used to count cars in car parks and monitor sea and air trade flows along with truck and train freight. I know an analyst from UBS who uses this information.”

“In my opinion, Boeing has yet to pay sufficient attention to this market”

“What we are selling here is not just images, but information with high value added, such as the amount of fertiliser a farmer needs, or forecasts on annual harvests, which impacts the price of wheat on the stock markets,” says Phil Davies from SSTL. Manufacturers generally sell the images on to intermediaries, who process the data before supplying it to a range of private and public customers.

“One of the biggest such intermediaries, The Climate Corporation in San Francisco, which sells farming insurance on the basis of this information, was recently taken over by agri-food giant Monsanto,” says Richard M. David. Monsanto paid over €1 billion for the company. “All these businesses are taking advantage of the growing market

of ‘big data’ processed through earth observation satellites.” The information is also invaluable for large oil and gas companies, whose pipelines snake across the globe.

PLANET LABS ATTRACTS INVESTORS

Many of the players moving into the market are based in Silicon Valley. One of the best known is Planet Labs, a company founded by three former NASA researchers. The San Francisco firm recently raised over \$50 million to build small “dove” satellites weighing around five kilos that take high-resolution pictures of the Earth. Their target audience is scientists and companies looking to assess the scale of climate change and the impact on agriculture and deforestation. More than 30 such satellites have already gone into orbit.

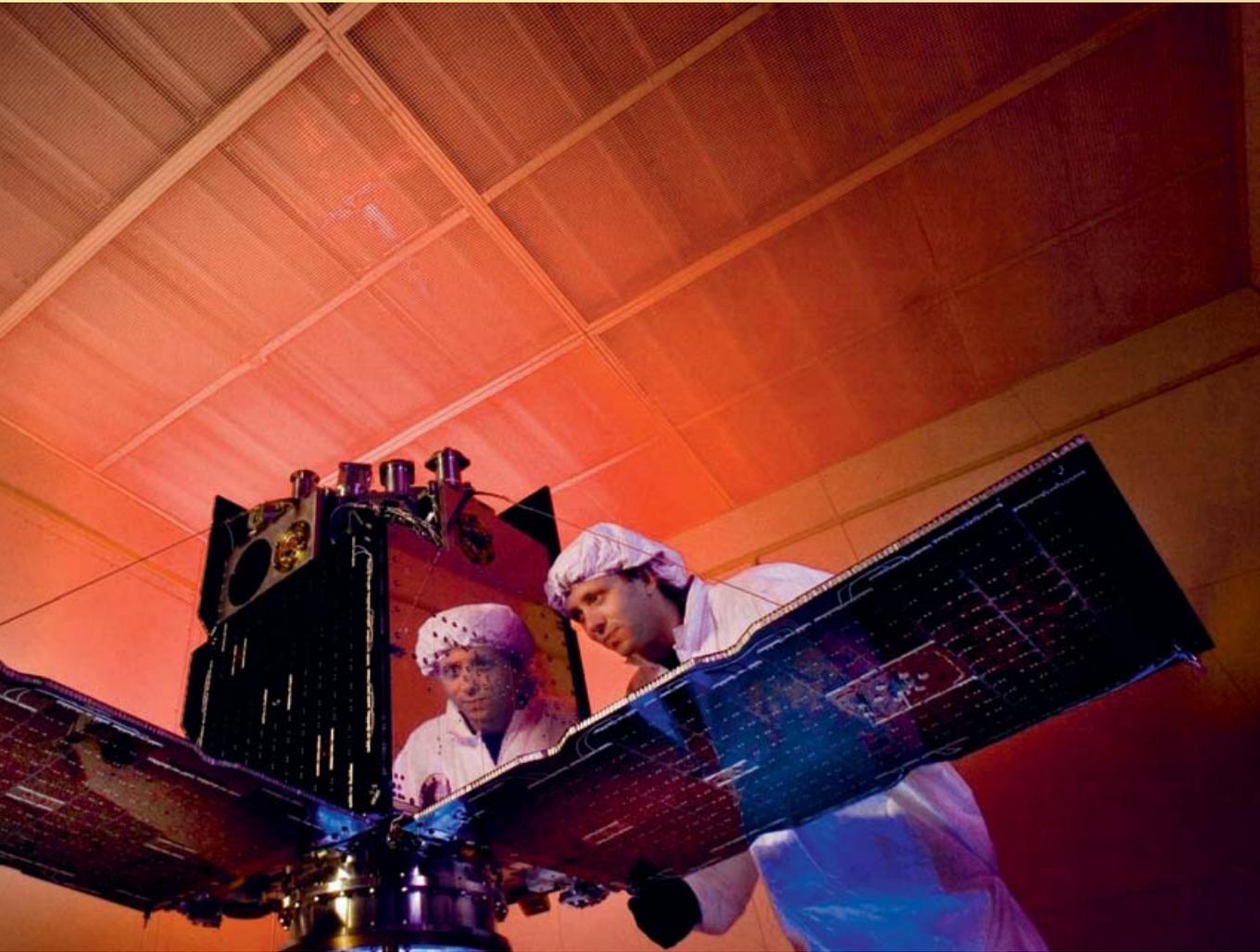
Another company active in the niche market, though with heavier satellites, is the start-up SkyBox Imaging, which has already raised \$91 million. Last December, it launched its first small satellite, SkySat-1 (100 kg) on the back of a Russian rocket. “To our knowledge, SkySat-1 is the smallest satellite ever flown that is capable of capturing imagery at better than 1 meter resolution,” said the company in a corresponding press release.

The Californian start-up NanoSats develops nano-satellites called ArduSats enabling a broad public to carry out experiments in space. The company’s main targets are universities



and students. “We want to contribute to the move to make space accessible,” says founder Peter Platzer. “It is vital that science students be able to carry out their own tests in the cosmos.”

So where do long-standing satellite customers such as Boeing stand? “They are also looking at miniaturisation and have a few projects, but they are waiting to see whether these small firms will really open up a new market,” says Chad Anderson from the



Assembly of a small satellite by Surrey Satellite Technology Ltd (SSTL). The UK firm was bought out by EADS, a sign that large companies are becoming more interested in the sector.

US-based Space Angels Network. He would not be surprised to see the big manufacturers move into the niche market in the coming years. "We can already put a lot of technology in small satellites. In my opinion, Boeing has yet to pay sufficient attention to this market."

BREAKTHROUGH TECHNOLOGY

But the big companies are starting to show interest, as seen by the EADS takeover of SSTL. "They realise that they don't have the skills in-

house to build small satellites," says Peter Platzer. The NanoSatisfi founder sees small satellites as meeting the criteria of "breakthrough technology", meaning they have the capacity to replace existing technology. "It's just like when the personal computer replaced the typewriter in the 1980s."

"Today we are reaping the benefits of the hundreds of billions invested in R&D by the IT, robotics and surveillance industry in the 2000s.

We are using their innovations on our satellites," says Peter Platzer. The emergence of standards on dimensions and weights enables researchers to coordinate their work and develop compatible parts. The growing number of projects is also encouraging research. "More nano-satellites have been launched in the last three months than in the preceding seven years," says Peter Platzer. As the technology becomes more widely available in the decade ahead, the sky will no longer be the limit. ▲