

The New Face of Space

Mark Boggett is the CEO of Seraphim Space Capital, the world's first venture fund dedicated to financing the growth of companies operating in the Space ecosystem. In this article, he tells us how the business started, and the challenges faced by the companies they invest in.



Mark Boggett, CEO, Seraphim Space Capital

Why Seraphim Space Capital?

The trigger was that we were looking for a new area in which to launch (one of many unintentional puns!) a new \$100m fund. We identified space as a nexus of several megatrends, such as IOT, AI, autonomous transport and smart cities. Further investigation suggested that the traditional space sector was going through a period of disruption, primarily because the technology advances in different sectors had started to find their way into the space arena.

We saw a new paradigm emerging where there's certainly a trillion-dollar market that's available for the space tech sector, with the potential for long-term growth across a broad range of industries. Once we'd decided on investing in space, we were surprised to find there were no other space-tech focused venture

funds anywhere on the planet, not even in Silicon Valley and, to this day, we remain the only space-focussed venture fund.

Getting the investment, though, was far from easy. Most investors just saw space as rockets and satellites. And those that have been in the market have seen spectacular failures. The interest in the sector has really been generated by a group of celebrity billionaires: Bezos, Musk and Branson.

How have these personalities helped re-focus and drive investment in the sector?

There's absolutely no doubt that they've been instrumental in attracting the attention of the investor community. They're the people who've created headlines that raise public consciousness, which, in turn, has filtered through to the investment community.

Here at Seraphim, we decided to bring in our own celebrities, but from the space world. Michael Jones, for instance, who was the founder of the Keyhole Corporation, which later became Google Earth. More recently Matt O'Connell, co-founder of GeoEye, an earth observation business, and Candace Johnson, co-founder of SES/ASTRA, the largest satellite player in Europe.

These experts in space technology were all able to see Seraphim's potential to build and sell businesses in the sector with a new cohort of start-ups. They've joined as partners to help us identify opportunities and to scale them to become billion-dollar businesses in their own right.

It's interesting that you've decided to take this approach of growing companies from the very earliest point, but why go to all that effort when you could have been just a standard VC?

We took inspiration from the pharma and bio market, which is consistently the top-performing venture category. The reason they're so successful is that the majority of the investment in many of these VCs is through the pharma companies themselves. They're taking big stakes as LPs, then talking to the venture funds about the particular areas that they're interested in, before going out and finding the companies and taking them through the riskiest stage of their R&D product development. When they get through to a certain phase, the LPs acquire those businesses.

We've recreated this model in the space sector by bringing in a range of corporates, such as Airbus, Telespazio, SES, and Teledyne, along

with the European Space Agency, and using their knowledge and experience to help us do the due diligence on the businesses that we're identifying.

Currently, we have the resource and focus to invest in around four companies a year, even though we're seeing around 100 companies, globally, per month. To address this, we've developed different initiatives associated with Seraphim to enable us to work with a much broader group of earlier-stage start-ups that will ultimately act as a feeder to our fund.

In 2016 we created, alongside our partner, Newable, an organisation called *UK Space Tech Angel*. This is a group of more than 100 individuals to whom we refer interesting businesses with addressable markets in technology. The angels will then, typically, invest a million or so, and we can then track these businesses and then join them in their A-series.

Two years later we launched the *Seraphim Space Camp Accelerator Fund* to support companies who have great technology propositions but haven't been able to validate that through customer engagement. This has led to us bringing on board a whole range of additional corporate partners, such as Inmarsat, Eutelsat, Rolls-Royce, KSAT, Cyient and DSTL, who engage with these emerging businesses on a three-month basis to test and validate their technology, pricing and competitive positioning.

While that's going on, our venture team are working with the management teams to help them better articulate their business proposition and put together their pitch decks. We're evaluating the teams from an investor perspective and then at the end of the programme, we invite other venture funds to come along to our investor day and to invest into these companies. So far, we've put 23 spacetechnology companies through this programme.

You talk about how broad the sector is, but what do you see as the sweet-spot for Seraphim?

We are interested in data from above - satellites, high-altitude platforms and drones - and how that data can be applied to a very broad range of

verticals. There are billions of dollars' worth of opportunities to use this data now that it's available at high resolution, low cost and, most importantly of all, more or less real time. When this becomes fully realised, it'll enable a whole range of new activities such as change detection, identifying anomalies that can be fed into things such things as dynamic maps.

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That's our focus, but we're also investing into companies that already have sensors in space, but whose end goal is to provide data analytics from them. An example of this is ICEYE, a pioneering small-sat company using innovative radar imaging, but whose end goal is the analytics platform.

Launch is clearly the area that's attracted most capital from venture to date, but we're not looking to deploy capital in this area because we believe that there's been over-investment here - today over 100 launch companies are simultaneously coming to market whereas only a handful will survive. Over the next few years, as new rockets come on stream, there's going to be over-supply of access to space, which will be good news for the businesses we're interested in, because it's going to lead to continued price erosion and easier access.

Another area of interest, virtually overlooked by other investors, is something we call "downlink". This is the technologies associated with securely getting the data down from the skyborne platform to a ground station. There are only a limited number of companies currently trying to solve this problem, and the prize is going to be huge for whoever cracks it.

The final component we're focussed on is product, which is the fastest growing area of the space tech market. As satellites and constellations continue to get bigger, that data moves closer to real time and there are more and more applications that will need to be applied.

On the subject of the proliferation of satellites, how big an issue is space debris?

Every launch in history has led to the littering of space with cast-off components that are no longer required. It's estimated that there's somewhere between 250,000 and 750,000 pieces of debris circulating in orbit.

The problem with this is that operators are having to more closely monitor this debris to avoid their satellites being hit. To put this into perspective, a piece of debris that is just 2cm in diameter is the equivalent of a hand grenade going off if it hits another object. The requirement for new satellites to be able to de-orbit when they stop working or reach the end of their useful life is increasing and may become mandatory. For instance, you can have an independent propulsion system, that's totally independent from the rest of the spacecraft which, upon a separate signal, can send the spacecraft back down towards Earth, where it'll burn up in the atmosphere.

It's important that until the problem is resolved, operators maintain a stance of good citizenship to reduce the risks of space debris. Our reliance on satellites depends on it because we can't afford to have damage to GPS systems linked to, say, the New York Stock Exchange or atomic clocks.

One of the businesses we've invested in is LeoLabs. They have a series of ground-based radars that look up at the sky and monitor all the space debris. The information they gather is then passed on to operators, regulators, the military and governments who can then use this to work out the most efficient, safest paths to set their craft on. However, we imagine it's going to take at least one other major event before the regulators are going to get themselves together and implement the necessary controls.

What next?

This is just the beginning for Seraphim. Our first fund was \$100m and we are now heading towards a first close of our new \$200m fund and this will entail us opening new operations in Europe and Asia. Overall, \$4bn was invested in the sector last year to 31st March and this is growing exponentially.