

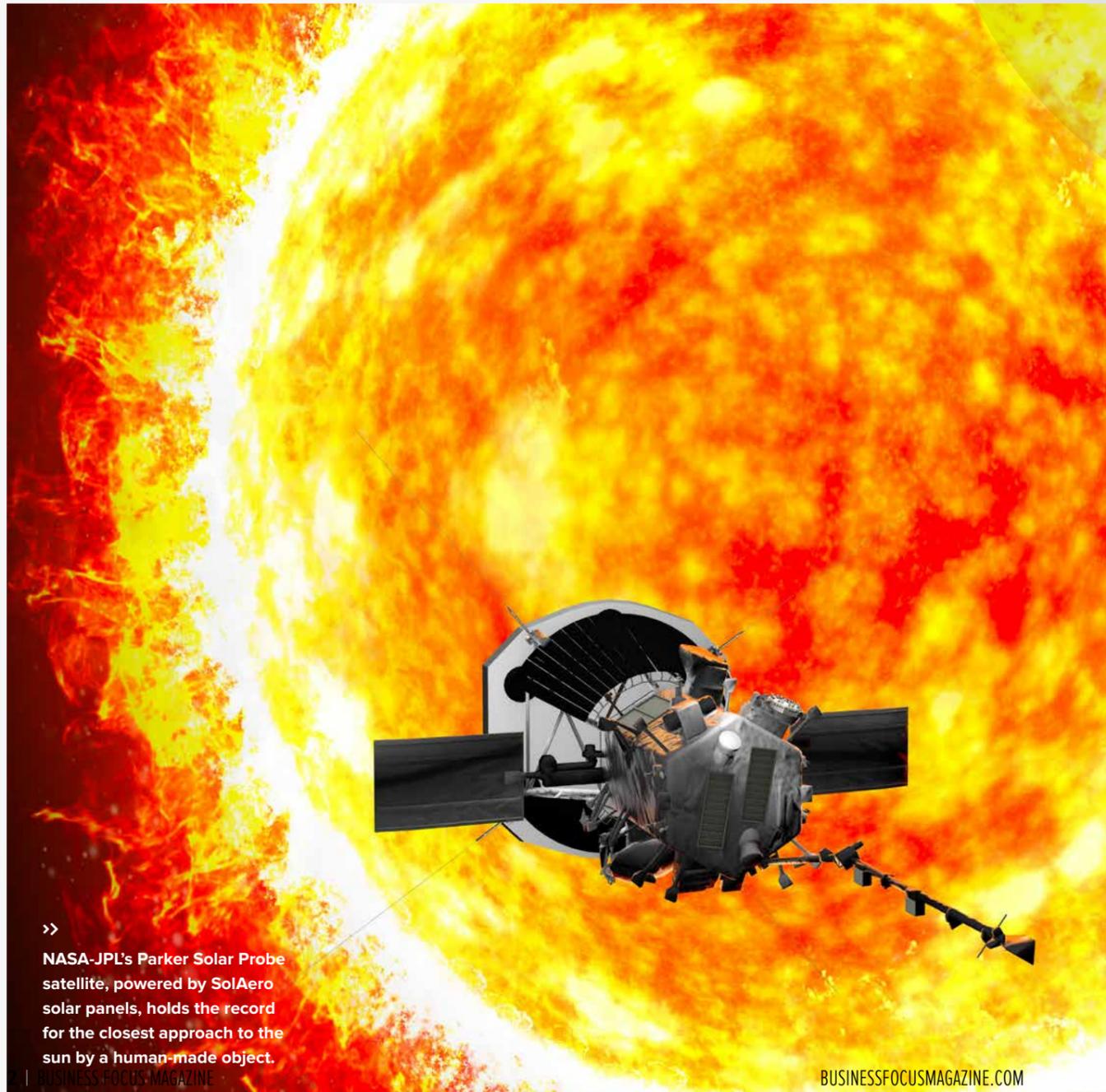
SOLAERO TECHNOLOGIES CORPORATION TO BOLDLY GROW



THE SPACE INDUSTRY IS EXPANDING LIKE NEVER BEFORE, BUT AS SOLAERO EXPLAINS, SPACE INDUSTRY BUSINESSES WILL HAVE TO ADAPT TO THRIVE IN THIS NEW FRONTIER...

TO BOLDLY GROW

PROJECT MANAGED BY: TIMOTHY GARWOOD



>> NASA-JPL's Parker Solar Probe satellite, powered by SolAero solar panels, holds the record for the closest approach to the sun by a human-made object. BUSINESSFOCUSMAGAZINE

At Business Focus Magazine we've talked with a lot of businesses that design and manufacture products to survive in extreme environments, but SolAero has to have set some kind of record.

“We’ve been in business here for 20 years, and over these 20 years we’ve accomplished missions in basically every realm of space - near to the sun, deep space, Mars, moon and over 400 satellites in Earth orbit, be it civil, defence, or commercial,” explains Brad Clevenger, CEO and President of SolAero Technologies. “One of our missions has travelled over 7 billion miles since leaving Earth, and another has made the closest approach of any manmade object to the Sun.”

SolAero might be the world's leading supplier of satellite solar power. There are three major companies in the sector, and if you compare the total number of kilowatts launched into orbit with the amount that SolAero presently ships, their market share is nearly as much as their two competitors combined. “On the space power side we start with a wafer, we build a solar cell, we build up the carbon composite panel substrates, and put the cells on those panels we make ourselves. It's the most vertical integration of its kind, including amongst the world's biggest satellite prime contractors.”

In addition to space solar power, SolAero also provides carbon composite structural solutions for satellites.

“We build the chassis, the solar panel substrates, and work on the thermal management side of the satellite,” Clevenger says. “About two-thirds of our business is space solar power and one third is structural and thermal solutions. Prime contractors can simply install their payload and electronics in our products. From that point of view, we're the only

supplier in the world vertically integrated that way.”

THE BIG BANG

This vertical integration positions SolAero perfectly to take advantage of a huge expansion in the industry.

“In each of 2015, 2016 and 2017 more venture capital was invested in space than in the prior 15 years combined, with total investments in 2018 reaching a record \$3.2 billion,” Clevenger says. For good reason

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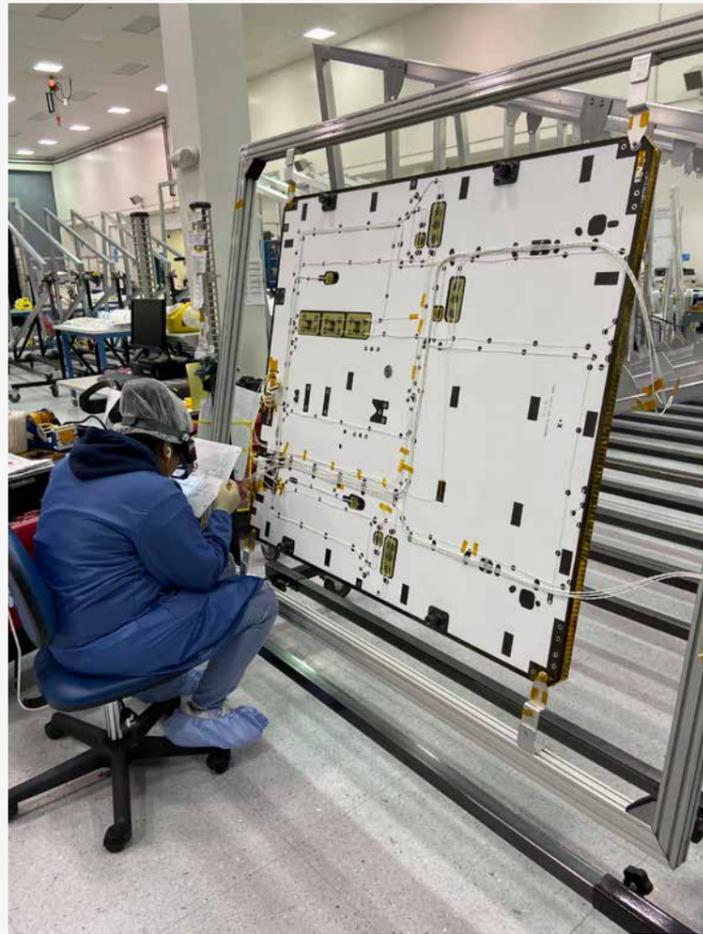
companies like SpaceX get the headlines, but there are so many companies now doing really exciting things. Goldman Sachs, Morgan Stanley and Bank of America all think the space economy will grow to over a trillion dollars in 20 years. That's triple its current value, and most of that will come from new commercial applications in space.”

This huge industry expansion is going to have a fundamental effect on the way space industry businesses work. When we think of space the words that jump to mind aren't “handcrafted” or “traditional”, but since the days of the Apollo programme, this is how a lot of what we've put into space gets built. For most of the history of spaceflight, almost everything that's been launched has been a unique creation and has required a level of precision that you simply can't get on a production line. But things are changing.

“For the last 50 years everything has literally been laid out by hand,” Clevenger >>



<< SolAero Technologies is headquartered in Albuquerque



“SOLAERO’S SOLUTION TO THIS “NEW WAY OF BUILDING THINGS” IS, FOR ALL INTENTS AND PURPOSES, TO BUILD THEMSELVES A SECOND BUSINESS”

we can’t abandon the reliable, high-quality way of doing things but must do it with modern manufacturing technology.”

SolAero’s solution to this “new way of building things” is, for all intents and purposes, to build themselves a second business.

“We realised we needed to take on this alternative business model,” Clevenger says. “We believed we couldn’t effectively integrate bespoke manufacturing and new production methods and do it all on one production line. So, for high-volume, low-cost production we handpicked leaders to establish this new capability, then hired new staff to come into our second facility. It’s based on what we have done traditionally but putting things

together in an all-new way. It requires a different culture.”

The question facing SolAero now, and the industry as a whole, is what role will they play in the new space age? The growth brings challenges as well as opportunities.

“There are going to be capacity constraints. A lot of new money is going to flow into the space economy, inviting new players and some competitors, and we’re all figuring out how to navigate the new dynamics that are emerging,” Clevenger admits. “You can’t do everything for everyone. In the traditional space market, a major player could bid for virtually every new project, but now some of the individual programmes are bigger than an entire year’s worth of traditional production. Trying to be all things to all potential customers is not necessarily something you can do responsibly.”

So far, SolAero’ has found its niche taking on out of the box challenges with which others might struggle. That adaptability is what has set SolAero apart.

“Customers come to us when something new and special is needed,” Clevenger says. “Whether that’s meeting the demands of a unique mission environment around the Earth, going into deep space or implementing an entirely new manufacturing model, that’s when they call us.”

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says. “The recent trend with companies entering the business is that instead of everything being so bespoke, someone needs 100’s of identical satellites built on an assembly line’. We are one of the companies in the sector offering a new level of automated manufacturing.”

This is how SolAero became a supplier to OneWeb, one of the largest satellite constellations being launched. The company is supplying solar panels for 700 satellites, an unprecedented project in the almost artisanal space industry.

Clevenger tells us, “We’re delighted to have the opportunity to produce for so many repeat units, and it means the new commercial stage of the space

industry has come to us. It requires new manufacturing methods but also the same level of engineering and reliability as our most challenging civil and defence missions.”

It’s also a project that shows the potential future of the sector. As Clevenger says, “When OneWeb first announced their plans, it was a massive programme, 700 satellites for high speed, reliable internet. It is a really ambitious project, but now there are more than half a dozen projects looking to compete with it, some of which are even larger.”

“The new wave of small commercial satellites has changed the industry entirely,” he adds. “You’ve got to take the bespoke manual labour out, which has meant a huge change in the business model, one where

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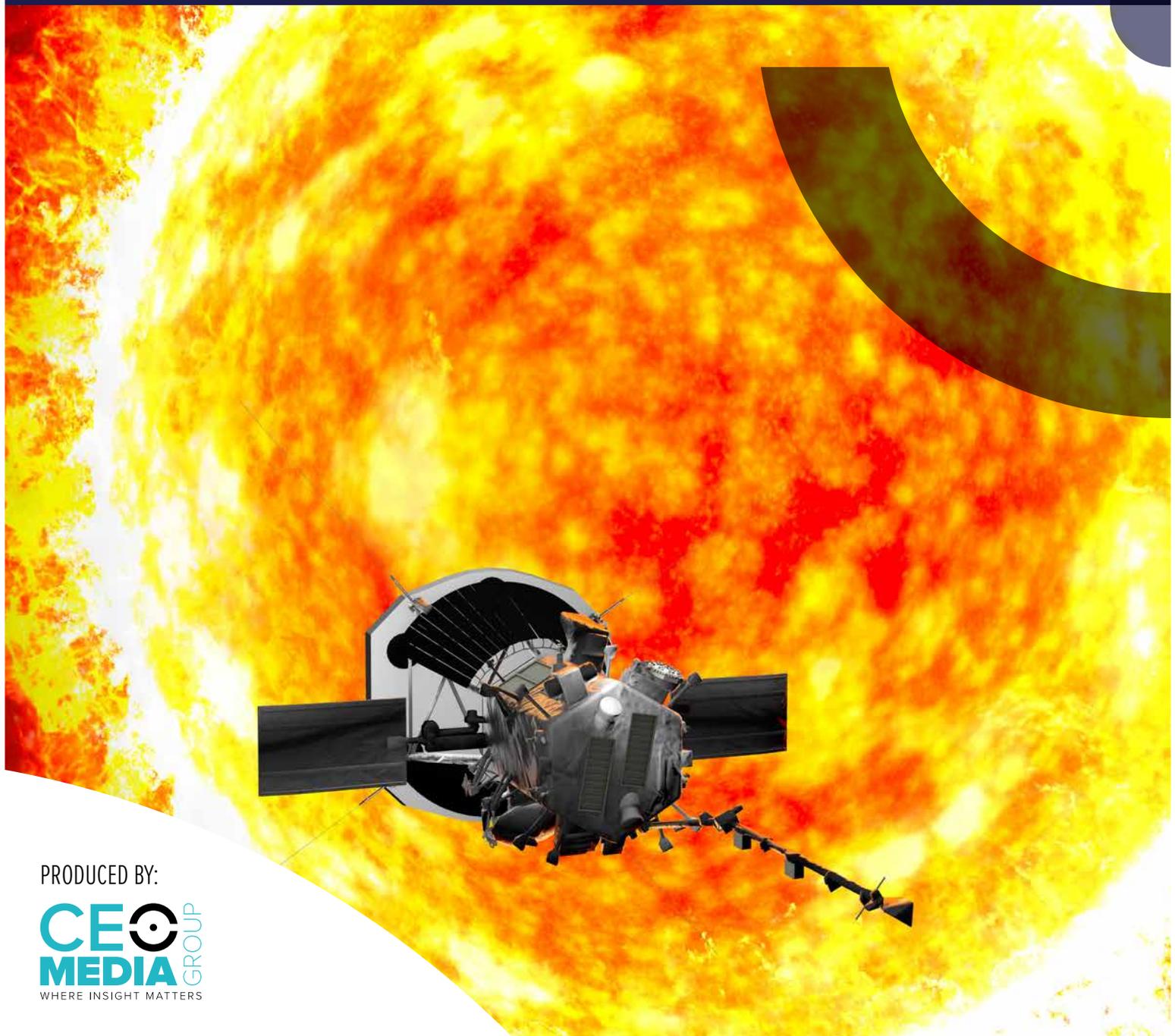
Umicore and SolAero Technologies have been connecting our world over the last 20 years as industry leaders in powering communications satellites. We are excited to continue to support the growth of SolAero with Germanium wafers in pursuit of new missions to the moon, Mars and deep space. Together we are ready to connect the future.

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