Cosmic Shielding Corporation

CSC Test the Waters

$119,700 INTERESTED

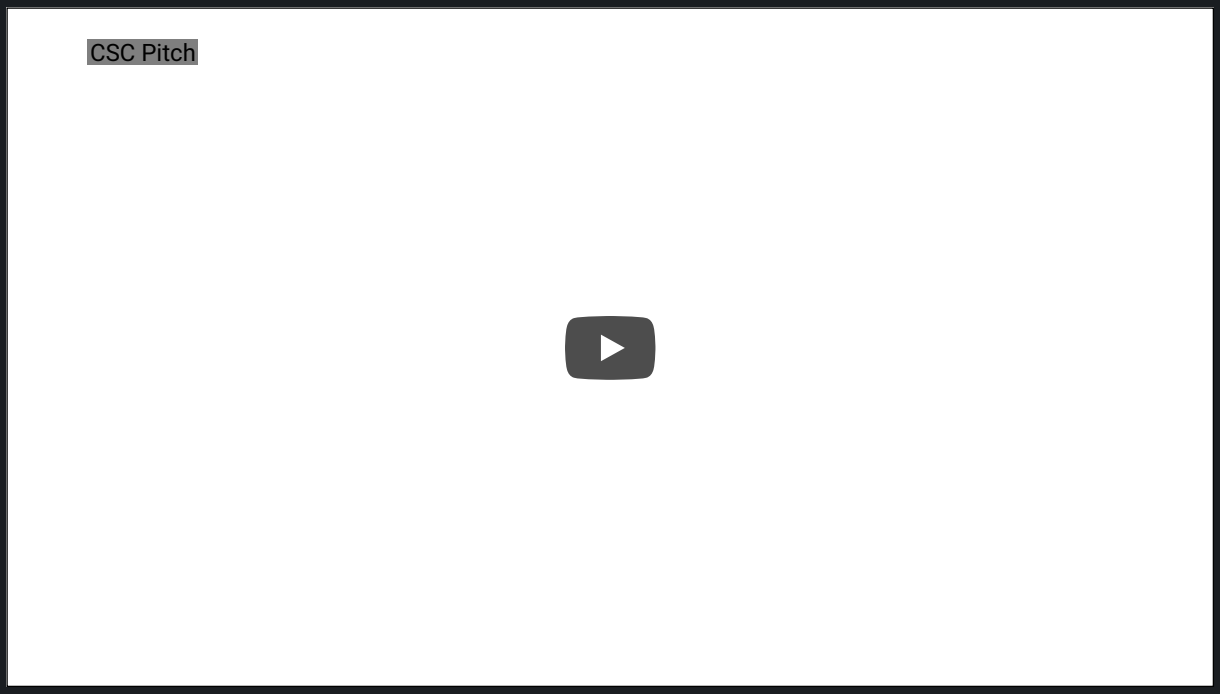
47% OF GOAL REACHED

45 INTERESTED

INDICATE INTEREST

Be the first to know when Cosmic Shielding Corporation launches. An indication of interest involves no obligation or commitment of any kind.

What is a Test The Waters (TTW) offer?



PITCH | COMPANY | DISCUSSION

PROBLEM

Space radiation severely limits spacecraft performance, is a barrier to long term human habitation, and results in billions of dollars of lost value.

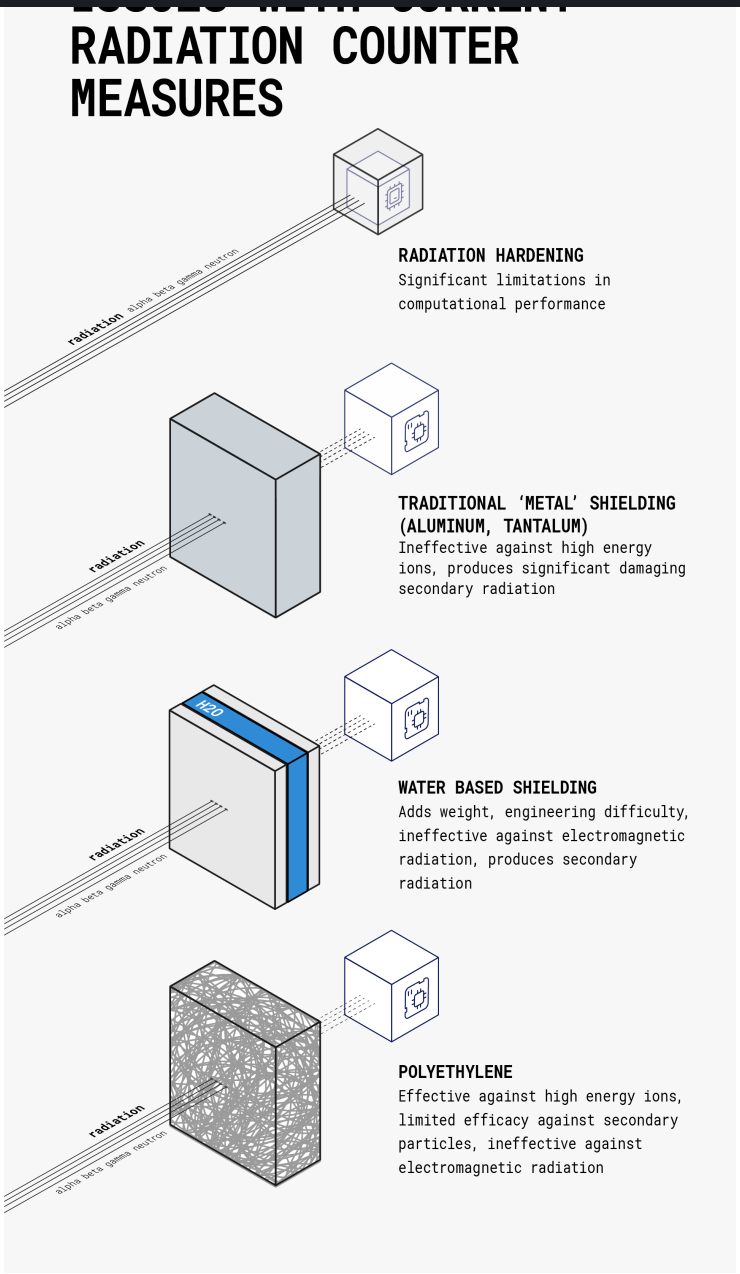
The damaging effects of space radiation have posed a key challenge to the exploration and commercialization of space since the launch of our first spacecraft. One of the most damaging typ space radiation is high energy particle radiation, which is notoriously difficult to shield against. This harsh radiation environment has long imposed strict design limitations on the capabilities of our satellites and spacecraft, and has thus far presented a fundamental roadblock to having a long term human presence in space.

power generation systems and cause rapid performance degradation. As a result, critical power systems, such as solar cells, can degrade up to 8x faster than they would on Earth (1). This results in the need to embed costly redundancies to maintain the operational life of these systems.

Upon interaction with high-energy particle radiation, heavy elements - such as metals - produce damaging secondary radiation through a process called target fragmentation. The heavier the element, the worse it gets.

In addition to damaging sensitive computer systems in this way, cosmic rays and solar particles also cause constant software and system glitches by flipping the charge or even damaging individual computer bits which can corrupt computer instructions at random. Expensive and outdated radiation hardened components are the primary way of protecting against these effects of space radiation today, but these add significant cost and lag far behind the latest consumer-off-the-shelf (COTS) components in processing power and efficiency.

The current radiation shielding landscape is highly limited and lacks comprehensive solutions that do not also sacrifice mission performance.



SOLUTION

State-of-the-art composite materials coupled with advanced radiation forecasting and modeling to deliver the most effective protection systems.

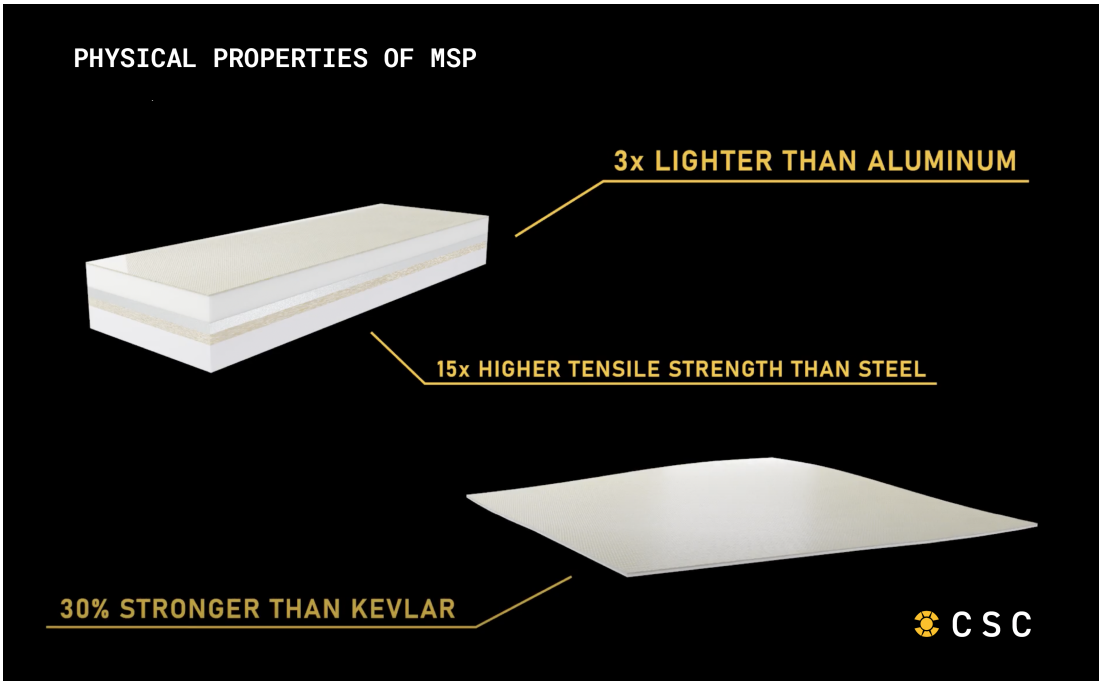
Based on decades of mission proven research from NASA and the European Space Agency, Cosmic Shielding Corporation's (CSC's) shielding, modeling, and forecasting technologies can enable unprecedented performance and reliability gains for the entire space industry.

CSC tackles the space radiation problem from two angles; protection and situational awareness.

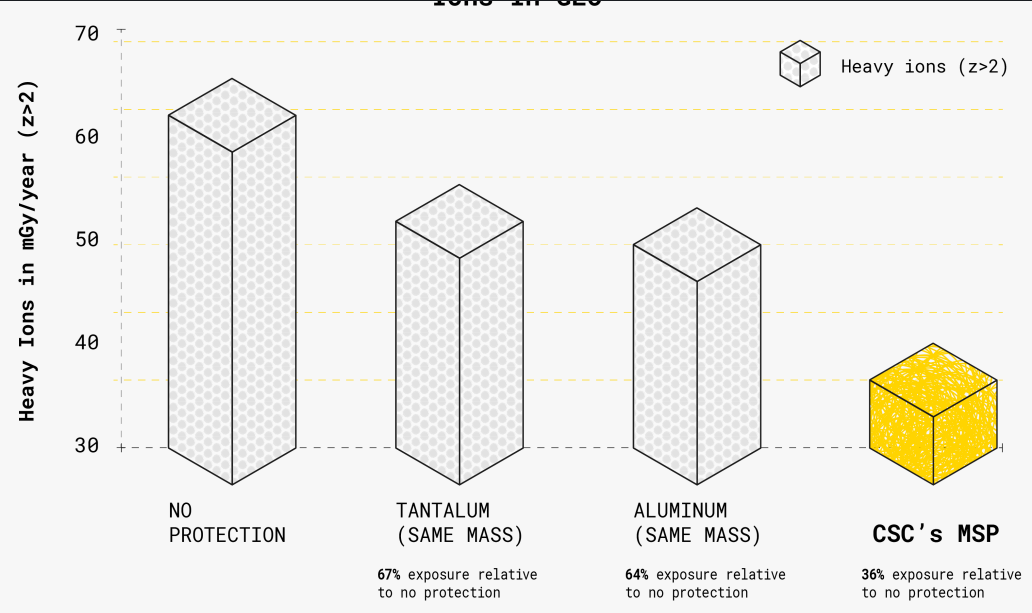
Protection

spacecraft; high powered computing in space, the ability to run modern AI algorithms, massive cost savings, and scalability improvements by allowing the use of off-the-shelf components, and even unlocking permanent human habitation in space.

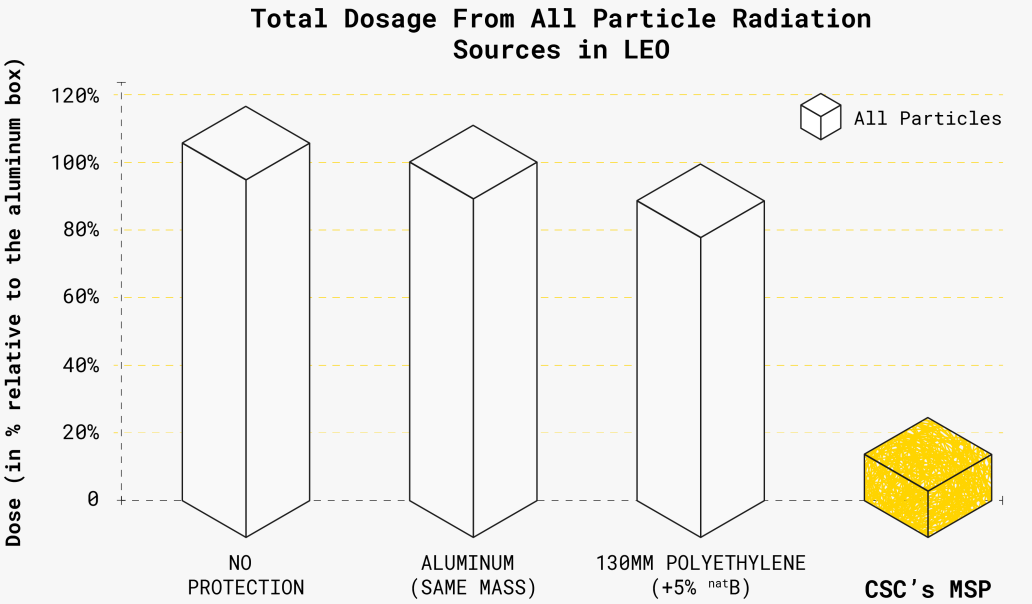
Based on decades of research from world leading physicists and materials scientists from NASA, ESA, and MIT, CSC's Multifunctional Shielding Polymer (MSP) represents the only solution capable of significantly mitigating both particulate and electromagnetic radiation, all while maintaining significant structural and weight advantages over traditional alloys.



The versatility of MSP allows it to fulfill a wide range of mission requirements; from being used as thin, flexible fiber layers for space suits, to rigid plates for satellite buses and stations. Furthermore, MSP can be 3D printed, allowing for rapid prototyping and design flexibility to service its wide variety of applications and form factors.



Galactic Cosmic Rays (GCRs) are made up of several different types of particles, with Heavy Ions being the main culprit of biological and electronic damage. For this reason, we wanted to highlight MSP's efficacy in shielding against GCR Heavy Ions.The simulation above modeled a GEO-like environment, with no protection from the Earth's magnetic field. [*GEO = Geosynchronous Equatorial Orbit.]*



The above chart compares efficacy in reducing TID (total ionizing dose) from all particle radiation sources (Trapped particles, Solar particles, GCRs) in a LEO-like environment under the protection of the Earth's magnetic field. This is a good illustration of the performance one might expect to see in the majority of commercial spacecraft, from satellites to space stations. [*LEO = Lower Earth Orbit.]*

Situational Awareness

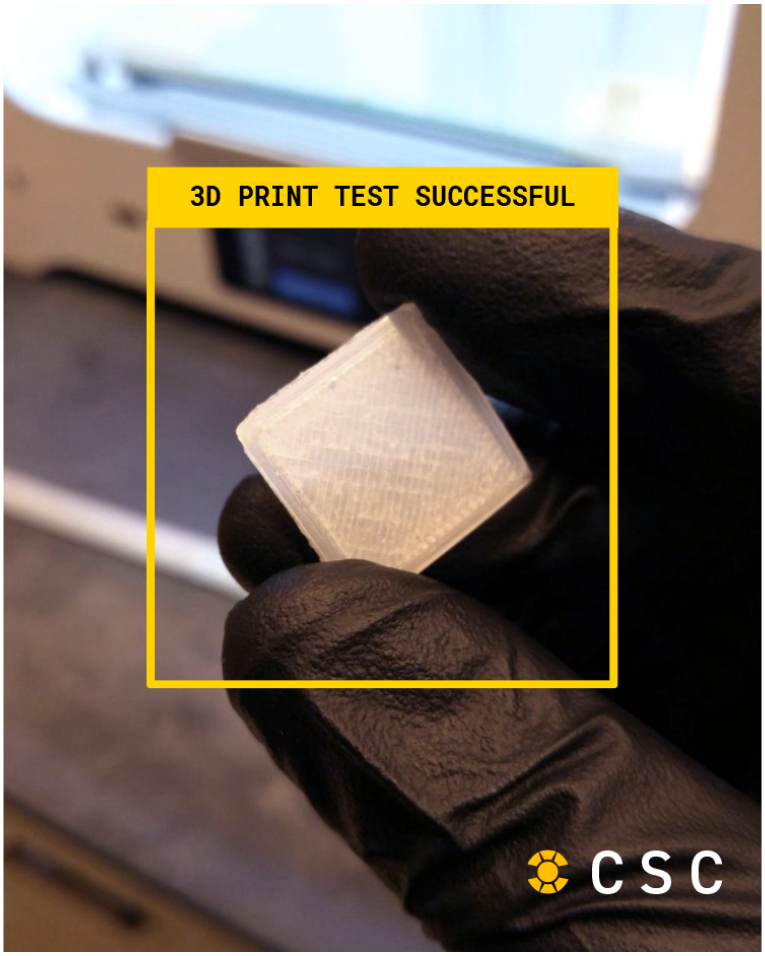
To enable unparalleled agility in design and prototyping, our cutting-edge radiation and space weather modeling system, Solar Engine, is used to provide any mission with the most optimized shielding design. Additionally, this system allows CSC to provide unparalleled situational awareness of the space

forecasting systems such as McIntosh provide significantly lower accuracy in their forecasts.

Our system has been mission-proven by the Space Radiation Analysis Group at NASA and has achieved TRL 9, the highest Technology Readiness Level.

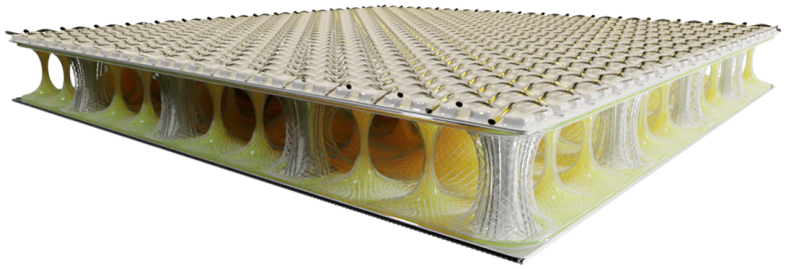
PRODUCT

Our Multifunctional Shielding Polymer (MSP) has the highest shielding performance on the market and is adaptable to any form factor.



This sample represents CSC's first successful 3D printing test of our Multifunctional Shielding Polymer (MSP), conducted on August 10, 2021.

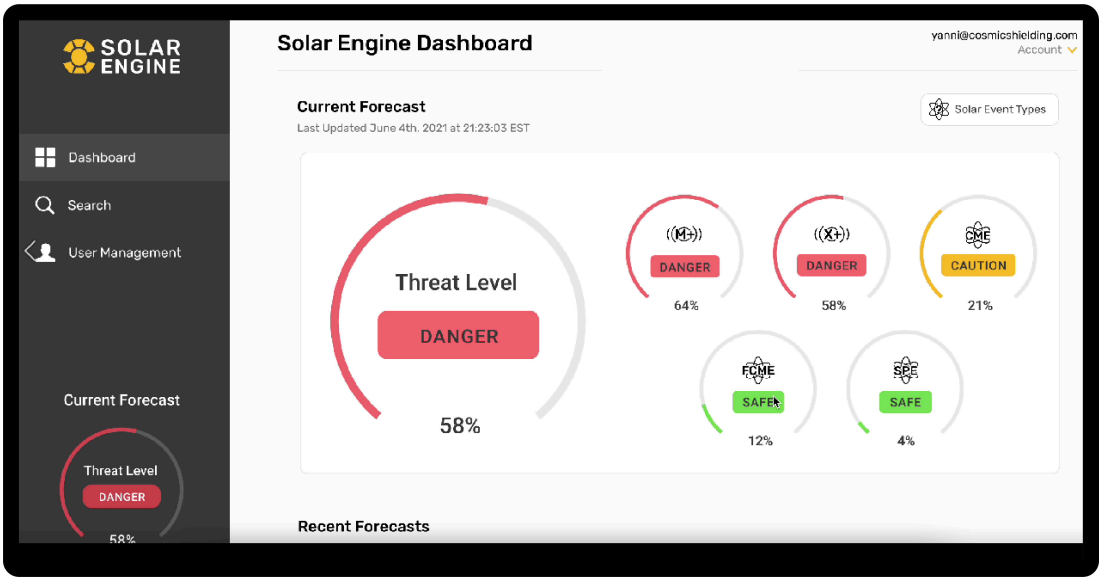
CSC's advanced multifunctional shielding composite is based off of it's revolutionary and patented Multifunctional Shielding Polymer (MSP) - a highly versatile polymer that allows the company to 3D print shielding solutions to virtually any form factor and application. Through our proprietary printing and extrusion techniques, our composite performance can be optimized to suit specific mission parameters; this provides significant mitigation against both particulate and Electromagnetic (EM) radiation, from galactic cosmic rays to gamma radiation, while retaining structural and weight advantages far exceeding that of traditional alloys. With a tensile strength of over 15 times that of steel, 30% greater than that of aramid fibers (such as Kevlar) and omnidirectional fiber strength, MSP can satisfy many mission requirements in a single package, significantly reducing spacecraft complexity



Due to its unique fiber structure, CSC's MSP can be printed to remain flexible for use in space suits, or modified for rigidity for use in component capsules and structural elements. CSC's 3D printing process allows for unparalleled speed and flexibility in the manufacturing process, with the potential to reduce the construction time for satellite buses from months to days – all at a reduced cost.

Validation samples of the MSP are now ready, and are being prepared for ground based and orbital testing for clients.

To complement the design of our material solutions, CSC's scientists have developed the world's leading radiation transport and space weather models which allow for an unprecedented understanding of the expected radiation environment. CSC's solar forecasting system, Solar Engine, is capable of accurately forecasting space weather events up to 2 days in advance, with precision and efficacy far exceeding current systems such as NOAA's McIntosh. Combining these capabilities with our advanced composites allows us to develop the most comprehensive, effective, and optimized shielding solutions.



Customer view of the solar event threat gauge from CSC's Solar Engine (weathering modeling system) demo from initial setup of our client-side API on June 18, 2021. System is expected to go live on August 30, 2021

TRACTION

5 LOIs/contracts with potential customers

⚑ Advanced material modeling complete, first prototype successfully produced

CSC is in the process of receiving Letters of Intent (LOIs) from the Air Force and major private aerospace companies for a wide range of applications, including on-orbit servicing spacecraft and space stations. CSC has already received 2 LOIs from major New Space companies as well as a supply contract offer from an up and coming orbital high powered computing provider. Additionally, CSC is working with the NASA Space Radiation Analysis Group (SRAG) and MIT on testing its shielding materials for the Artemis mission's IVA/EVA spacesuits. Commercial LOI details and contracts will be announced over the coming months.

In May 2021, CSC also closed a major pre-seed funding round of $1M ($988,572 post close) from the majority of major US early stage space venture capitalists such as SpaceFund, Starbridge, Space VC, Helios Capital and others. WorldQuant Ventures LLC, one of the world's leading technology investment firms, also took part in the fundraising round bringing established, generalist business and market expertise to our team. Among seed stage space companies, CSC has one of the strongest and most experienced venture teams in the industry.

Furthermore, the company just graduated from Seraphim Capital's 2021 Space Camp accelerator program as part of the mission #7 cohort in May 2021. Seraphim Space Camp is the world's leading space startup accelerator and has provided the team with invaluable industry relations and allowed us to streamline our business development strategies in preparation for our next stage of growth and development.

CSC Investors

SpaceFund™

HELIOS CAPITAL

WORLDQUANT VENTURES

SPACE.VC

starbridge VENTURE CAPITAL

SERAPHIM CAPITAL

CUSTOMERS

LETTER OF INTENT

Undisclosed Space Company (100+ Employee)
LETTER OF INTENT

Nebula
PILOT

Amentum Space
LETTER OF INTENT

The company has garnered significant interest from both NewSpace companies and established aerospace primes since our pre-seed close.

The company has received its first contract proposal and 3 LOIs from leading space companies, and is in engineering discussions with an additional 6 potential clients looking to improve computing performance, extend operational lifetime, and even explore complete structural replacements for satellites and components using CSC's 3D printed MSP. Our team is also leveraging our unique expertise to assist these companies with radiation transport modeling. This can allow us to secure early revenue and build important client relationships.

CSC is currently in engineering talks with major aerospace prime contractors about modeling and engineering contracts. We have also filed 4 Phase 1 and fast track Phase 2 SBIR and STTR proposals with the US Air Force and Space Force. Based on enthusiastic interest and feedback from key contacts at these organizations, we anticipate receiving multiple awards by October 2021.

BUSINESS MODEL

Subscription/Recurring Payment
Selling a product or service that customers pay on a recurring basis, usually month to month, or annually

Transactional
A one-time sale of goods or services

Service
The company provides a service to the customer, paying for time or expertise

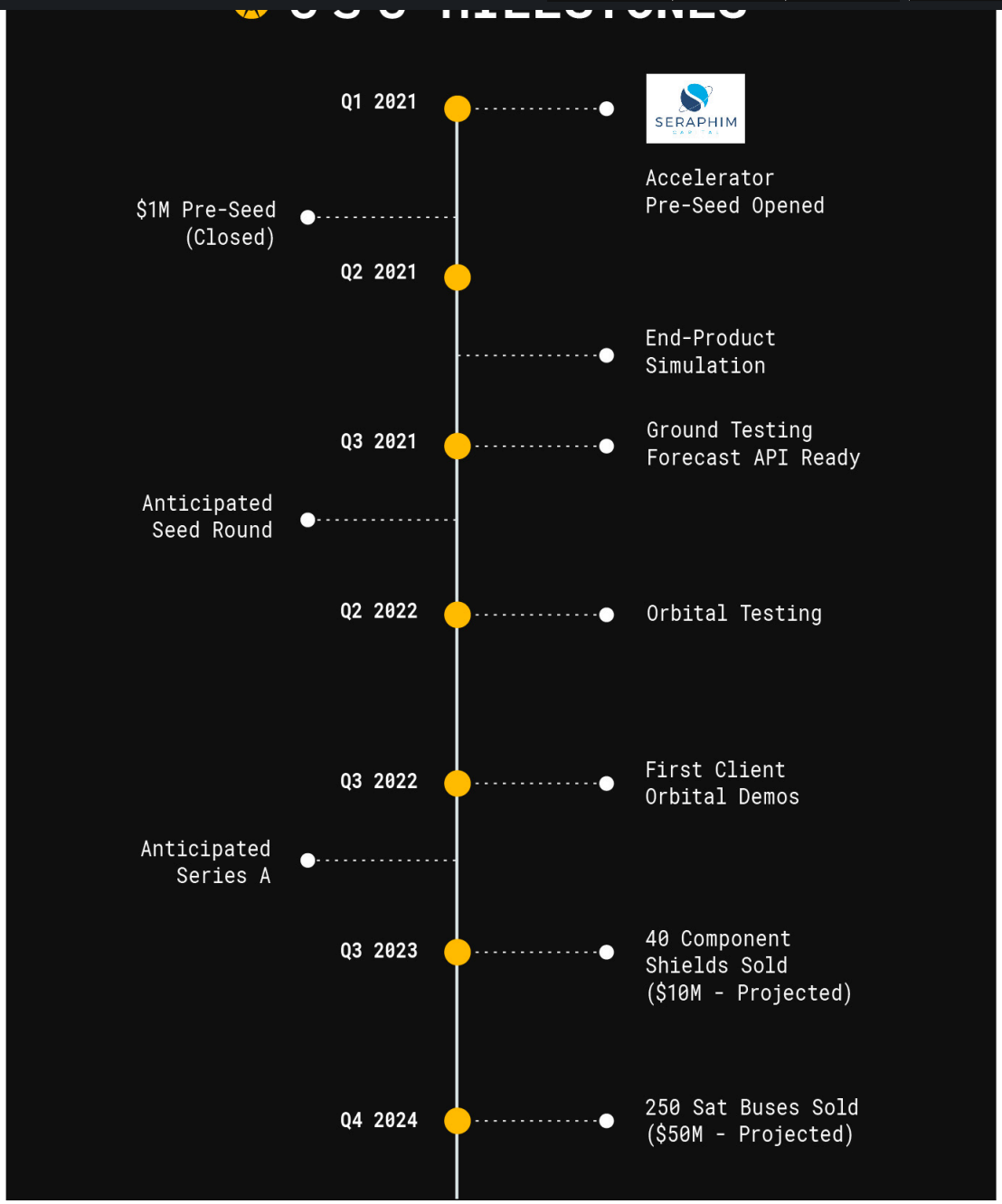
Direct hardware sales of component shielding capsules, satellite and spacecraft buses; SaaS licensing of radiation modeling and forecasting systems.

radiation protection solutions. Due to the unique and extensive experience and knowledge of CSC's technical team, we have received significant interest in providing prospective customers with radiation modeling and planning support, a process that will precede any future shielding contracts with prospective customers. In response to market demand, the company will also offer licenses to access its forecasting and modeling data as a value add. While our current focus is on the space industry, our technologies can service a wide range of terrestrial applications ranging from protecting critical power infrastructure, military applications, and aircraft design.

The flexibility of CSC's offerings and the expertise of our team allow us to add value to clients at any stage of product development, from concept to operation. The company is on track to generate early revenue while simultaneously de-risking our technology. Client acquisition has currently benefited from significant organic traction and interest by virtue of CSC's large and well respected investment team. The company is transitioning to a direct sales process and is currently pursuing channel distribution partners for its forecast data.

Component shielding systems will initially be offered at an estimated unit price of up to $50,000, at which price point the company aims to shield 500 craft payloads by 2023, resulting in up to $25M in revenue from our main offering. By 2024, increases in engineering and distribution capabilities are expected to allow the company to offer complete 3D printed bus solutions, with a target of the production of 250 smallsat buses at an average unit price of $200,000, up to $5M for large satellite buses and special applications.

Data licensing services will be determined on a per customer basis depending on mission type and duration. Current estimates indicate data licensing rates at $10,000/asset/month.



MARKET

$ 9 Billion/ Year
Approximate Total Market Size

Over $9B/year of value potential through the enabling of emerging markets such as space robotics and automation, space high powered computing, and space tourism and habitation.

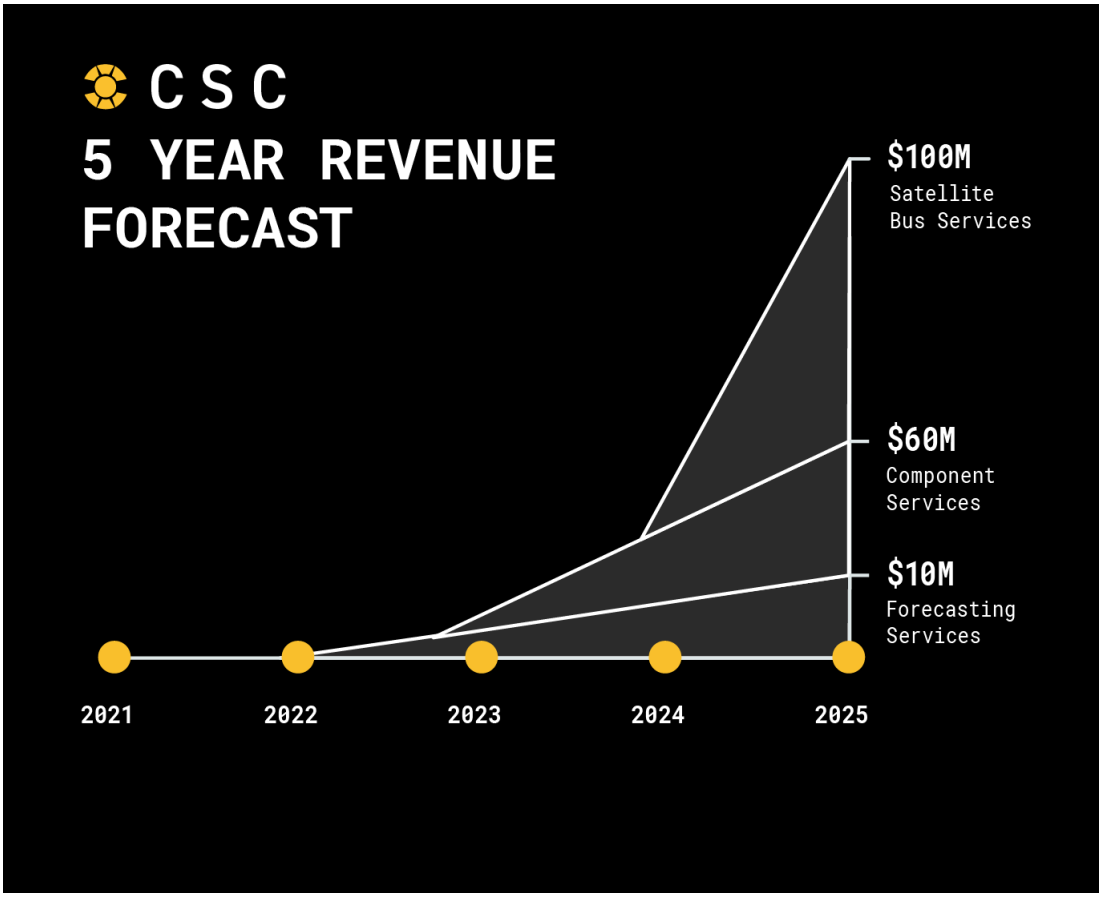
Radiation is responsible for a wide range of damages and limitations in both the space industry and even here on Earth. Solar modules in space suffer about 8x the degradation they do on Earth (2) – up to

watt (3), radiation can cost a typical communications satellite up to $24,000 in power redundancies. With the planned launch of over 9,000 communications satellites by 2028 (4), radiation power degradation costs alone can cost the industry over $216M a year.

Furthermore, space radiation continues to be an ever-present hazard for operations on Earth; a study by the UK National Grid found that the annualized cost of unsupplied energy due to space weather is $450M/yr (9). A severe solar storm could have catastrophic effects, causing an estimated $24B in damage to satellites alone (10). On the launchpad, space weather is strongly correlated with increased launch risk; 40% of all historical launch failures have been tied to geomagnetic storms (11).

When approaching the fields of high powered space computing and space based robotics and AI, the problem becomes much more inhibiting. Aside from requiring more consistent and stable long term power generation, these systems will require the use of commercial-off-the-shelf (COTS) computing components in place of slower, traditional rad-hardened chips. It is a well documented fact that COTS electronics will require advanced radiation mitigation techniques in order to be viable (5). Radiation shielding is a fundamental enabler for the fields of space edge computing and robotics/AI, representing markets of $7.5B/yr and $5.7B/yr, respectively (6, 7).

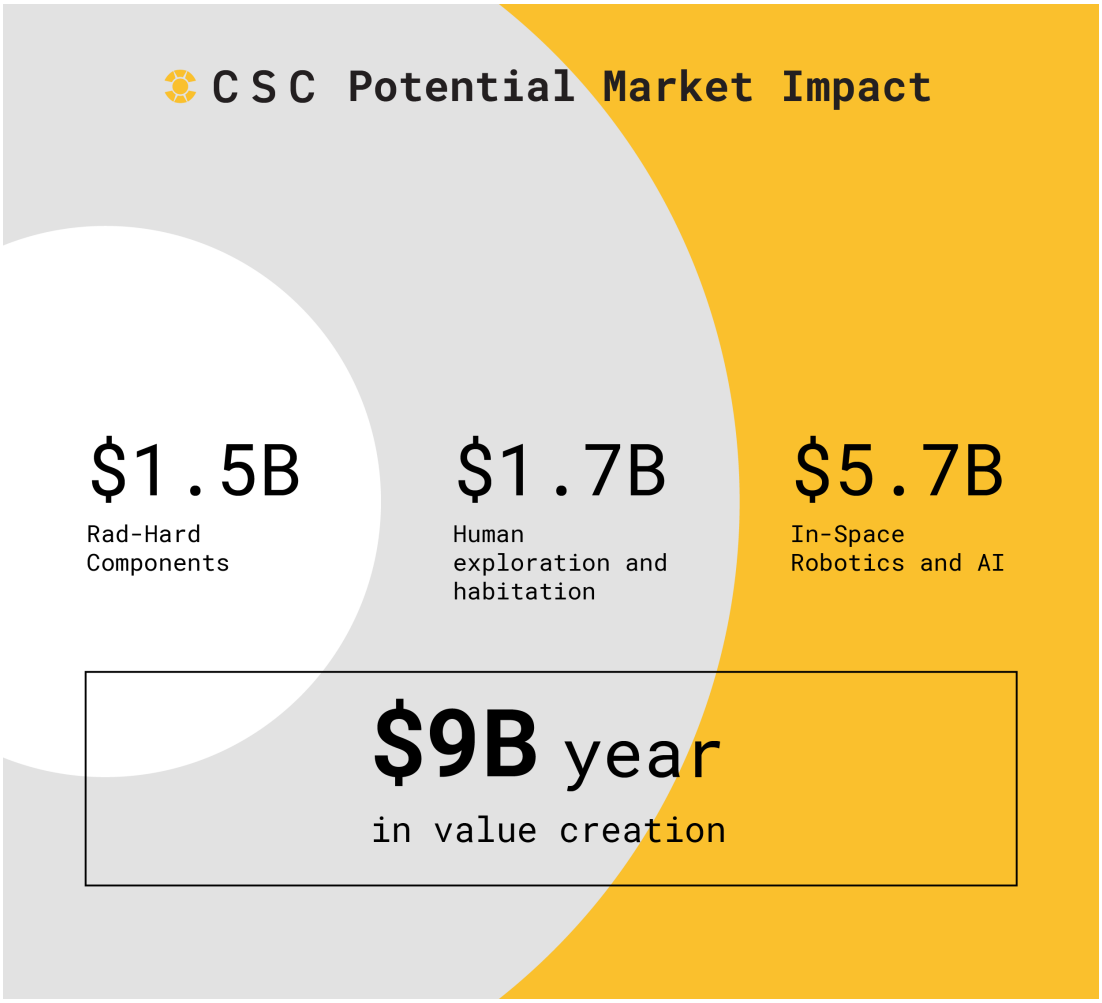
Perhaps the most important and exciting aspect of the space industry is in laying the foundations for a future home for humanity. No longer science fiction, space tourism and habitation is projected to account for a $1.7B a year market over the next 7 years (8). For living and breathing human beings, the dangers of space radiation represent a critical and fundamental barrier that must be overcome to enable the next chapter of space exploration.



The satellite and spacecraft component market is expected to grow exponentially over the next decade. CSC has a conservative goal of aiming to produce or shield at least 1% of all launched spacecraft by the end of 2025.

CSC is laying the foundation for new industries by providing better building blocks for the space economy. Through broad spectrum, versatile, and cost effective component and structural shielding solutions, CSC can disrupt the component shielding market by enabling the worry free use of COTS

respectively, which together represent a potential market impact of over $9B/year in value creation.



COMPETITION

Legacy solutions such as water based shielding, as well as a few non multifunctional, experimental shielding systems.

CSC currently has few direct competitors with regards to advanced radiation shielding, as most space assets are (at best) employing expensive, space-hardened electronics or forgoing radiation-hardening for planned obsolescence.

Other companies developing technologies with potential competitive viability are:

- Geocent: founded in 2008 and based in the United States. Developing a multifunctional shielding composite based on UHMW Polyethylene plates interlaced with different materials such as graphite. The complete shielding efficacy of polyethylene is limited, and the current composite structure seems to indicate limited mechanical and structural benefits. Geocent is attempting to win prime contracts in the future. The company is large, with over $100M in yearly revenue; however the team dedicated to this project is small and the project is in its early stages.

does not provide protection against secondary radiation effects. Team seems to have significant expertise in shielding Earth-based nuclear reactors, but no background in space radiation. They have previously raised $6M in funding.

- EmTDLab: founded in 2018 and based in Hong Kong. Developing new engineering materials using systematic, AI-based materials discovery techniques. Focused on advanced lightweight materials to shield and reduce radiation flux into spacecraft. Also pursuing applications for air and Earth-based systems that are sensitive to radiation. Currently in the conceptual stage, the company claims to be backed by undisclosed private investment.
- PolarOnyx: founded in 2002 and based in the United States. A leading provider of laser 3D manufacturing solutions, PolarOnyx was awarded a 2020 NASA Phase-I SBIR to develop 3D-printed shielding for nuclear reactors that can be used for other applications such as crewed spacecraft and satellites.

CSC retains clear advantages over these competitors in 3 key areas; performance, flexibility, and lead time. Our technical team is comprised of world leaders in the field who have worked closely together for decades, and many of the radiation modeling systems a company would use to develop its own shielding technology were developed by some of our members. In fact, many companies still rely upon older modeling systems developed by our team members that are now rendered obsolete as they paint an incomplete picture of the radiation environment. CSC utilizes the most recent advancements in the art to provide the most accurate representation of radiation effects on materials, which combined with extensive experience and specialist knowledge of the field, allows us to maintain a leadership position with regards to our ability to design and improve upon shielding solutions.

Furthermore, our MSP represents the most effective radiation shielding composite currently available in terms of radiation dose reduction. Our focus on matching shielding performance with favorable mechanical properties such as weight, strength, and form factor flexibility allow us to satisfy any mission parameter and requirement in a way that the aforementioned technologies cannot.

TEAM

World-leading nuclear & helio physicists and material scientists with 90+ years of combined experience developing radiation mitigation technologies.

Meet the team:

• Founded and funded first startup in 2016 at Georgia Institute of Technology
• Consulted in wide range of markets for driving business growth, competitive advantages, and market evaluations
• Raised $1M, completed Seraphim Capital Space Accelerator Program, and acquired first customer within the first year of CSC's founding

Dr. Lembit Sihver - Co-founder & CTO
• 35 years of international R&D experience as a researcher/professor in nuclear physics, nuclear chemistry, and space radiation protection and dosimetry
• Worked with NASA, ESA, and JAXA leading projects including numerous missions on the ISS
• Collaborated with the US Naval Research Laboratory and NASA on the effects of ionizing radiation for the past 30 years
• Co-editor and reviewer of ~40 international scientific journals, 150 peer reviewed publications and 400 conference contributions
• MSc in Chemical Engineering from KTH in Sweden, Licentiate and PhD of Technology in Nuclear Chemistry/Nuclear Physics at Uppsala University in Sweden

Tyler Craig, Chief Revenue Officer
• Business Development
• 28 year record of growing complex technical and scientific businesses including leading 100% revenue/600% profit growth over 3 years at NCR
• Forged a $10.5M joint venture for Lockheed Martin during his time at Skunk Works
• Former CEO of Conarc, data management SaaS company, led to exit
• Served on Aerospace Industry Association Board of Governors
• Featured in The Wall Street Journal, NY Times, Bloomberg, Aviation Week & Space Technology, and Flight International Magazine
• MBA and PhD in Mechanical Engineering from Georgia Institute of Technology, MS and BS in Aerospace Engineering from Auburn University

Research and Development Assistance

Dr. David Falconer, Heliophysics Research Partner
• Top leading Solar Physicist at NASA Marshall Space Flight Center
• Principal research scientist at the Center for Space Plasma and Aeronomic Research at the University of Alabama -- developed the most advanced model of solar activity currently available
• Led groundbreaking research discoveries on the human understanding of the Sun's inner workings
• Developed the MAG4 system -- received accolades from US Air Force, Software of the Year award from NASA, and Silver Snoopy Award (for significant contribution to the safety of current/future astronauts)

Dr. Svetlana Boriskina,
Material Science & Engineering Research Contractor
• Materials Science & Engineering
• Head Physicist and Engineer for the Boriskina Research Group at MIT
• Heading world leading research in polymer metamaterials, composite polymer films, hybrid organic-inorganic materials & devices, and multi-physics design and prototyping of fiber based materials
• Develops new smart materials/devices from solar energy harvesting, personal thermal comfort, night vision, space exploration, and bio-chemical sensing from studies in light-matter interactions on nanoscales

VISION

By using our advanced multifunctional composites, we're aiming to build a permanent future in space and a more sustainable future on Earth.

Our future in space is going to require unprecedented technical capabilities that can enable humankind to live and work in space - permanently. Since the beginning of the space age, we have been forced to compromise on what we can send into space. By providing multifunctional building blocks that can keep any asset or organism safe from the brunt of the damaging effects of the space environment, CSC hopes to allow the worry-free use of high powered computing components in orbit, enable next-generation space robotics for use in emerging industries such as space manufacturing, as well as allow for the construction of habitable space stations, compact space suits, and deep space exploration vehicles.

We also see this vision extending back to Earth.

Humanity's ability to innovate and prosper has always been dependent on the materials under its control. Just as the wood and cloth airframes of the Wright brothers evolved into the supersonic jet aircraft of today, so too must our idea of a space-worthy craft evolve to allow for our next expansion into space. The materials that will enable humanity to become a space faring civilization must be capable of not just surviving, but thriving, in a truly alien environment; An unforgiving vacuum prone to extreme temperature fluctuations that is filled with the radiation of supernovae light years away. CSC's smart, multifunctional composites enable this multiplanetary future and an even more promising future here on Earth; energy efficient buildings, lighter and stronger vehicles, more sustainable clothing, and a better environment.

CSC's materials are the building blocks of a future in space, and a space age future on Earth.

RISKS & DISCLOSURES

Cosmic Shielding Corporation is testing the waters under regulation crowdfunding.

Cosmic Shielding Corporation is Testing The Waters under Regulation Crowdfunding. No money or other consideration is being solicited, and if sent in response, will not be accepted. No offer to buy the securities can be accepted and no part of the purchase price can be received until the offering statement is filed and only through the intermediary's platform. An indication of interest involves no obligation or commitment of any kind.

Cosmic Shielding Corporation

Emerging Markets / Materials

Building a better frontier

CSC's multifunctional composites unlock previously unattainable levels of performance and reliability in orbit and beyond. CSC is the world's first company to offer a comprehensive solution to the threats posed by space weather.

45 INTERESTED

Indicate Interest