



# GLOBAL COVERAGE

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## SCS Parylene Provides Component Protection in ExoMars Mission

Studying the universe and distant galaxies has captured the imagination of scientists for centuries. Long before Jules Verne wrote *From Earth to the Moon* in 1865, Galileo Galilei and Sir Isaac Newton provided significant contributions to science and astronomy, which was imperative for future space exploration.

Within the past century, society has witnessed extraordinary growth and development in space exploration. During the 1960's, "the space race" generated the first manned space flight by Yuri Gagarin of the USSR, only to be closely followed the very next month by NASA's Alan Shepard as part of the United States' Mercury project. Since then, society has witnessed some incredible accomplishments in space, including planetary fly-bys and landings on other planets.

One of the most recent space projects by the European Space Agency (ESA) is a mission named ExoMars, which has already completed the first portion of its objectives by sending an orbiting gas analyzer and a landing demonstrator to Mars. The second portion of the mission is to send what has been termed the Rover Module, a six-wheeled rover vehicle, to traverse the surface of Mars and complete an array of analyses using highly advanced technology, including Infrared and Infrared to Visible Spectrometry,

high resolution imagery, ground penetrating radar, neutron detection, Raman spectrometry and a capability termed Mars Organic Molecule Analysis. These analytical tools will be applied to surface-gathered

and core-drilled soil samples to further uncover secrets held by the Red Planet. The Rover Module, which is outfitted with an autonomous driving capability that has been developed through stringent modeling and testing, will be responsible for reliably carrying all of these instruments. ESA will be introducing this "self-driving lab" to the surface of Mars and leaving it on its own to traverse a wide range of known and unknown soil types, as well as navigating over and around the planet's surface features in order to reach target locations designated by its operators on Earth.



*Photo courtesy of the European Space Agency*

To ensure success, the Rover has been specially designed and tested as a six-wheeled vehicle supporting the main chassis. Each of the Rover drive wheels is independently powered and managed by the system, which is controlled by sophisticated software that uses sensor feedback and cutting-edge algorithms to manipulate the drive assemblies. The design results in a variety of movement options that can be used as necessary to navigate complicated ground conditions.

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## SCS Complies with RoHS and REACH Directives



As part of our ongoing series on quality and compliance, this issue of the *Global Coverage* will focus on Restriction of Hazardous Substances (RoHS) and Registration, Evaluation, Authorization and Restrictions of Chemicals (REACH). Although both directives originated in Europe and

have a common goal to protect humans and the environment from the dangers of chemical exposure, they are distinctively different.

### Restriction of Hazardous Substances (RoHS)

RoHS is a European directive restricting the use of specific hazardous materials found in electrical and electronic products. The original directive, known as 2002/95/EC, went into effect in the European Union (EU) in 2006. This directive outlined thresholds for six

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## SCS to Exhibit at CES® 2020

SCS will be exhibiting at CES®, scheduled to take place January 7-10, 2020, in Las Vegas, Nevada. SCS will exhibit its Parylene coating services and technologies in the Las Vegas Convention Center, South Hall 4, Booth #36261.

CES is the global stage for innovation. Each year, the show brings together industry leaders and rising stars in consumer electronics to unveil the latest world-changing products and technologies.

For over 45 years, numerous components, including circuit boards, sensors, MEMS, LEDs, elastomeric components, etc., have benefited from the chemical, moisture and dielectric barrier protection offered by Parylene conformal coatings. As a leading innovator in Parylene conformal coatings, SCS recently developed ParyFree®, a halogen-free variant of Parylene. ParyFree conformal coating offers manufacturers the same host of beneficial properties they have come to expect from the Parylene family but with improved barrier properties over traditional halogen-free variants, maintaining Parylene's highly recognized biocompatibility.



ParyFree-coated electronics have been tested and meet the requirements of IPX7 and IPX8, demonstrating protection from harmful effects due to the ingress of water. ParyFree conformal coating can protect a wide array of consumer electronics, including wireless headphones, smartphones, watches and other wearables, to name a few.

To learn more about Parylene conformal coatings or to schedule a meeting at the show, contact Aaron Thomas at 317.244.1200, ext. 0229, or [athomas@scscoatings.com](mailto:athomas@scscoatings.com).

## SCS to Showcase PrecisionCoat V at IPC APEX EXPO

SCS has announced plans to exhibit at the IPC APEX EXPO, scheduled to take place February 4-6, 2020, at the San Diego Convention Center. SCS will showcase its PrecisionCoat V, Ionograph® SMD V and Parylene coating services in Booth #2913.

Available in conformal coating, dispensing and/or potting platforms, SCS' PrecisionCoat V offers maximum flexibility and efficiency for manufacturers. The PrecisionCoat V's conformal coating and dispense valves move smoothly along the three axis system, with an option to add fully programmable fourth and fifth axes for tilt and rotation capabilities. The system's multi-valve technology allows for the application of dots, lines, fills, glob tops and spray coat areas. The PrecisionCoat V is a total system solution that ensures accuracy, repeatability and high throughput for a wide range of automated material application, all in a footprint that maximizes valuable production floor space.

SCS' PrecisionCoat Automatic Quick Change (AQC) feature will be available for demonstration on the PrecisionCoat V platform. This feature allows the use of five separate tools within a single machine. In standard systems, using multiple valves on the same machine limits head travel, which reduces the overall work envelop

of the system. In contrast, the AQC feature allows customers to use up to five valves or heads, individually positioned with independent materials and functionality.

SCS' Ionograph SMD V is designed for fast and accurate ionic contamination cleanliness testing. It provides an accurate, repeatable and rapid method for determining cleanliness and delivers immediate process control results, negating the need for outside laboratory testing.

SCS will also exhibit its Parylene coating services and technologies at APEX. With 19 coating facilities around the world and more than 45 years of applications experience in the electronics, transportation, medical device, aerospace and defense industries, SCS is a global leader in Parylene conformal coating services and technologies.

For more information about SCS' PrecisionCoat V, Ionograph SMD V or Parylene conformal coatings, or to schedule a meeting at the show, contact Hans Bok at 508.997.4136 or [hbok@scscoatings.com](mailto:hbok@scscoatings.com).



## SCS Webinars Available On Demand

If you are new to SCS or were unable to participate in our 2019 webinars, the events are now available on demand. These free webinars provide excellent information on Parylene conformal coatings, including their deposition process, properties, benefits and application examples. Webinars now available on demand include:

### **Robust, Lightweight Protection for Challenging Harsh Environments using Parylene Conformal Coatings**

The electronics, aerospace, defense and oil & gas industries have long utilized conformal coatings to protect products from their surrounding

environments. As technologies continue to progress, they are required to survive long-term exposure to very harsh environments, including the depths of space, years of widespread thermal cycles between land and air, harsh chemical and temperature exposure, and more. Many conformal coatings struggle to provide durable, lasting protection.

For over 45 years, Parylene conformal coatings have substantially enhanced the reliability of numerous devices and parts, including circuit boards, sensors, MEMS/semiconductor products, LEDs, implantable medical devices, and elastomeric and metal components,

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## SCS Holds Parylene Seminars in Europe

SCS is committed to educating manufacturers and engineers around the world about Parylene conformal coatings and how their attributes and properties can benefit innovative technologies. Recently, SCS hosted Parylene seminars in Pilsen, Czech Republic, and Weingarten, Germany.

Attendees were provided the opportunity to increase their knowledge of Parylene technology and the potential benefits to their products. The interactive seminars offered participants industry expertise on coating with Parylene and presented multi-industry coating topics designed to address some of the most common surface modification challenges facing the electronics, transportation, aerospace, defense and medical device industries.



For more information on Parylene or to schedule a seminar at your facility, please contact SCS at [scscoatings.com/contact](https://scscoatings.com/contact).

## SCS Parylene Provides Component Protection in ExoMars Mission (continued)

The locomotion modes for the ESA Rover Module include spinning on the spot, walking in a crab-like fashion and turning in curves of constant radii, all of which must perform flawlessly for years of anticipated service.

A key component of the Rover is the drive actuation system supplied by Maxon Motors, a Swiss participant in the ExoMars effort. Encoder boards are used in each of the wheel's motors for motion feedback and motion control, capabilities that will be critical for the successful travel of the Rover across Mars' terrain. Parylene HT®, applied by Specialty Coating Systems, was chosen as the protective conformal coating for the encoder boards as a result of its ability to provide high performance, thin-film protection while withstanding a wide range of conditions (e.g., temperature, gases, etc.). Parylene coatings also mitigate the formation of metallic whiskers that could be detrimental

to the long-term performance of circuit boards. Advanced processing steps within the Parylene HT coating process included the selective removal of the coating at critical connection locations; this removal was accomplished through the use of a picosecond laser system at New Technologies - Research Centre (NTC) at University of West Bohemia.

The collaborative Rover effort is the result of many participants under the managed direction of the ESA, in an effort to take Europe's next step of discovery to a foreign land. For more information on the project, visit the ESA website at <http://exploration.esa.int/mars/>.

For more information on the use of Parylene conformal coatings for space applications, contact Tim Seifert at 317.244.1200, ext. 0220, or [tseifert@scscoatings.com](mailto:tseifert@scscoatings.com).

## SCS Webinars Available On Demand (continued)

that are used in a wide array of applications and environments.

### Developments in Conformal Coatings for Tomorrow's Advanced Technologies

For decades, the most advanced industries have used conformal coatings to protect components, assemblies and devices from their operating environments, providing barrier protection, electrical insulation, improved lubricity, immobilization of particulates and stabilization of delicate structures.

While there is a growing list of conformal coatings that offer one coating characteristic or another, a drawback of many modern coatings is that they are unable to protect the small, increasingly complex devices that are being designed for the latest innovative technologies. Parylene is a dense, ultra-thin, transparent coating that meets these unique challenges, providing highly useful dielectric and barrier properties per unit thickness as well as extreme chemical inertness and freedom from pinholes.

SCS recently introduced ParyFree®, a new halogen-free Parylene coating that provides IPX8 waterproof protection.

### Enhance Product Design and Dependability with Advanced Coating Technologies

To improve quality and reduce critical failures, design engineers are turning to advanced conformal coatings. For over 45 years, Parylene conformal coatings have enhanced the reliability of products in a wide range of applications, including LEDs, sensors, medical implantables, elastomers and more.

In recent years, the rapid growth of intelligent IoT devices and consumer electronics has highlighted the need for advanced protection in mass-produced electronics. Headphones, smart watches and other wearables require a high level of defense from sweat and accidental spills during everyday activities.

Learn how Parylene conformal coatings safeguard a wide array of mass-produced applications.

To view these on-demand webinars, visit [SCSwebinars.com](https://scswebinars.com).

## SCS Complies with RoHS and REACH Directives (continued)

substances: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE).

Since the original 2006 directive, there have been two major revisions, including a CE-marking directive as well as the addition of eight new substances. The current directive, 2015/863 (RoHS 3), went into effect on July 22, 2019, and includes 14 restricted substances.

As required by the RoHS directive, SCS has reviewed the materials used within our coating services. Upon request, SCS provides customers with signed letters of compliance to the RoHS directive.

### Registration, Evaluation, Authorization and Restrictions of Chemicals (REACH)

REACH went into effect on June 1, 2007, for the EU. While the RoHS directive restricts the use of substances that are present in products, the EU REACH regulation pertains to all chemicals, including raw materials. This can include chemicals used in solvents, paints and more.

REACH requires companies who manufacture or import substances into the EU to register those substances under certain circumstances. Title I, Chapter 1, Article 2 of the REACH regulation provides a number of exclusions. One type of substance currently excluded from Title II (Registration of Substances) and Title VI (Evaluation) under REACH per Article 2(9) is polymers. SCS Parylene meets the definition of a polymer per Article 3(5), and is, therefore, excluded from the registration and evaluation requirements of REACH. Also, SCS Parylenes contain none of the currently-listed substances of very high concerns (SVHCs) under REACH.

In addition to SCS Parylene coatings, DPX dimer has also been reviewed. The European Chemical Agency (ECHA) has issued confirmation stating that SCS DPX dimer and the raw material

necessary to manufacture dimer have been pre-registered.

For more information about SCS' compliance with RoHS and/or REACH, or to obtain compliance documentation, please contact Alan Hardy at 317.244.1200, ext. 0261, or [ahardy@scscoatings.com](mailto:ahardy@scscoatings.com).

### RoHS Restricted Substances

- Cadmium (Cd): < 100 ppm
- Lead (Pb): < 1000 ppm
- Mercury (Hg): < 1000 ppm
- Hexavalent Chromium: (Cr VI) < 1000 ppm
- Polybrominated Biphenyls (PBB): < 1000 ppm
- Polybrominated Diphenyl Ethers (PBDE): < 1000 ppm
- Bis (2-Ethylhexyl) phthalate (DEHP): < 1000 ppm
- Benzyl butyl phthalate (BBP): < 1000 ppm
- Dibutyl phthalate (DBP): < 1000 ppm
- Diisobutyl phthalate (DIBP): < 1000 ppm
- Diisodecyl phthalate (DIDP): < 1000 ppm
- Di-n-octyl phthalate (DNOP): < 1000 ppm
- Diisononyl phthalate (DINP): < 1000 ppm
- Di-n-pentyl phthalate (DPP): < 1000 ppm

## Personnel Highlights



In April 2019, **Bill Sun** joined the company as Site Manager for SCS' coating facility in Shanghai, China. In this position, Bill is responsible for managing the daily operations of the site.

Bill received his master's degree in environmental engineering from Shanghai Jiao Tong University and his MBA from East China University of Science and Technology. Before

joining SCS, Bill worked in plant management at a global chemical company. He has also worked for a French engineering company and a steel manufacturer.

Bill is married with one daughter. In his spare time, he enjoys watching movies, cycling and fishing.



In **Mark Veith's** Inside Sales role for equipment product lines, he is responsible for the sales of SCS' Labcoter®, spin coater series, ionic contamination test systems and dip coating systems.

Mark brings 30 years of technical sales experience to SCS, selling a variety of products, systems and services, including precision measurement equipment, SCADA systems, industrial

truck scales and smaller weighing systems.

Mark attended Creighton University in Omaha, Nebraska, where he earned a bachelor's degree in physics. He is married with two stepchildren and four grandchildren. Mark enjoys hiking, kayaking, bicycling and swimming at the beach.

## Upcoming SCS Trade Shows

- January 7 - 10, 2020 | CES® | Las Vegas, Nevada
- February 4 - 6, 2020 | IPC APEX | San Diego, California
- February 5 - 6, 2020 | Pharmapack Europe | Paris, France
- February 11 - 13, 2020 | MD&M West | Anaheim, California
- February 26 - 28, 2020 | MEDIX Osaka | Osaka, Japan
- March 16 - 18, 2020 | Medtec Japan | Tokyo, Japan
- March 31 - April 1, 2020 | AmCon Orlando | Orlando, Florida
- March 31 - April 2, 2020 | MedtecLIVE | Nürnberg, Germany
- April 1 - 2, 2020 | Med-Tech Innovation | Birmingham, United Kingdom
- April 9 - 12, 2020 | CMEF | Shanghai, China
- April 22 - 24, 2020 | NEPCON China | Shanghai, China

For more information and booth numbers, visit [scscoatings.com/shows](http://scscoatings.com/shows).

## Connect with SCS



**Specialty Coating Systems** welcomes you to connect with us on social media. Be one of the first to explore new advances in Parylene technology, upcoming educational opportunities, trade show appearances and much more! Find us on Facebook, LinkedIn and Twitter.

## Contact Us

**7645 Woodland Drive, Indianapolis, IN 46278**

800.356.8260 | 317.244.1200 | [scscoatings.com](http://scscoatings.com)

- Medical Coating Applications | Dick Molin, Ext. 0271
- Electronics and Transportation Applications | Alan Hardy, Ext. 0261
- Aerospace and Defense Applications | Tim Seifert, Ext. 0220
- Inside Sales – Coating Service | Drew Clayton, Ext. 0611
- Customer Service – Coating Service | John Winkler, Ext. 0283
- PrecisionCoat and Cure Systems | Hans Bok, 508.997.4136
- Spin Coating, Instruments and Lab Systems | Mark Veith, Ext. 0610
- Equipment Technical Support | Steve Spencer, Ext. 0223
- Customer Service – Equipment | Joanna Sellars, Ext. 0280

### Regional Coating Sites

- Amherst, New Hampshire, USA | Chase Markey, 603.883.3339
- Austin, Texas, USA | Tom Zavada, 512.222.1292
- Clear Lake, Wisconsin, USA | Alex Dix, 715.263.2333
- Indianapolis, Indiana, USA | Joe Nedder, 317.244.1200
- Milford, Connecticut, USA | Jim Brearley, 203.283.0087
- Ontario, California, USA | Robert Kling, 909.390.8818
- San Jose, California, USA | Robert Kling, 909.390.8818
- Heredia, Costa Rica | Max Montero, 506.2239.8760
- Dublin, Ireland | Paul Murphy, 353.1.8422344
- Pilsen, Czech Republic | Pavel Perina, 420.371.372.150
- Pliezhausen, Germany | Hans Hargus, 49.0.7127.95554.0
- Woking, England | Ian Bottwood, 44.1483.541000
- Shanghai, China | Bill Sun, 86.21.5768.3135
- Shenzhen, China | Yoshiya Wada, 86.755.2935.3012
- Singapore | Hoon Heng Keat, 65.6862.8687
- Tokyo, Japan | Masatake Konno, 81.42.631.8680
- Chiba, Japan | Masatake Konno, 81.436.22.3155
- Bangkok, Thailand | Yoshiya Wada, 66.2260.8624

*The **Global Coverage** exists to promote a better understanding of Parylene and the capabilities of Specialty Coating Systems. For previous issues, visit [scscoatings.com](http://scscoatings.com).*

### Editors:

- Beth Austin | [baustin@scscoatings.com](mailto:baustin@scscoatings.com)
- Megan Popp | [mpopp@scscoatings.com](mailto:mpopp@scscoatings.com)



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