**4Links Limited**
**Booth Space: 80**
*www.4Links.co.uk*
Paul Walker- *paul@4Links.co.uk*

4Links test and simulation equipment for SpaceWire saves users time, delay, risk, and money. It does exactly what test equipment needs to do. It has proved to be interoperable with every design that it has connected to, while detecting faults including many not found by other methods. It provides information to resolve faults, including longstanding ones, and often without the need to reproduce the fault. And the same hardware can be used, for devices, subsystems and complete satellites, at all stages of a mission development.
Even before the technology acquired the name SpaceWire, 4Links supplied SpaceWire in CPLDs for test equipment that passed all tests at the first attempt. Customer recognition of 4Links quality has led to requests for SpaceWire IP and chips, and to numerous accolades such as "4Links equipment is good value, very reliable and very accurate".

**AAC Microtec North America, Inc**
**Booth Space: 98-99**
*www.aacmicrotec.com*
Jorge Freyer, CEO- *jorge.freyer@aacmicrotec.com*

Our goal is to commercialize the use of low cost satellites for a wide range of applications which include geo-information services and microgravity research. AAC has developed low cost, scalable, and highly configurable satellites, based on Space Plug-and-Play Avionics (SPA) standards which incorporate features for multi-processor and multi-network behavior. AAC offers complete solutions based on low cost and robust electronics under the trade name Rapid Integration Architecture™ (RIA). In addition, AAC is a leading supplier of miniaturized and robust multifunctional electronics systems for aerospace, military and industrial applications. By combining proprietary design and packaging techniques we offer solutions based on state-of-the art microelectronics and MEMS technology, and expert support for optimal life cycle performance.

**Aeroflex Colorado Springs**
**Booth Space: 71**
*www.aeroflex.com/HiRel*
Teresa Farris- *teresa.farris@aeroflex.com*

Aeroflex Colorado Springs is a supplier of integrated circuits and custom circuit card assemblies. We supply a broad range of standard products for HiRel applications including LEON 3FT Microprocessors, logic, FPGAs, 4M, 8M and 16M memories, serial communication interfaces for MIL-STD-1553, 1773, clocks, Muxes, an LVDS and SpaceWire family of products and a new line of Non-Volatile Memories (MRAMs and NOR Flash). Our RadHard-by-Design ASICs handle design complexities up to 3,000,000 usable gates, offers advanced technologies down to 0.90nm and are RadHard to 1 Mega rad. Aeroflex offers Circuit Card Assembly capabilities, which consists of full assembly, test and coat in a high mix/low to medium volume operation. Aeroflex RAD offers radiation testing services along with HiRel offerings such as A-to-D Converters and Power MOSFETs.

**Aeroflex Motion Controls**
**Booth Space: 72**
*www.aeroflex.com/Motion*
Karl Anderson- *karl.anderson@aeroflex.com*

Aeroflex Motion Controls offers a wide range of capabilities in the design and manufacture of components and systems for the space market. Our products include rotary and linear actuators, brushless DC motors, gimbals, scanners, electronic controllers, slip rings and twist capsules Aeroflex provides stepper (both hybrid and permanent magnet), brushless, full and limited-angle torquers, arc segment, zero-cogging, solenoid and voice coil motors. We offer precision gimbals for pointing and tracking, stabilized platforms and pedestals. Coupled with our electronic motion controllers and adaptive software, Aeroflex can provide a complete turn-key multi-axis system to meet your requirements. Aeroflex Airflyte slip rings are made in every configuration ranging in size from 0.250 inch diameter capsules to large assemblies with through bores in excess of 36 inches. Our slip rings have been used extensively in pan & tilt cameras, radar platforms, tracked vehicles, rate gyros, down hole equipment, and packaging machinery.

**Aeroflex Plainview**
**Booth Space: 71A**
*www.aeroflex.com/HiRel*
Teresa Farris- *teresa.farris@aeroflex.com*

Aeroflex Plainview is a manufacturer of advanced microelectronic Multi-Chip Modules (MCMs) for airborne, space, shipboard, ground based avionics. Our products include Mil-STD-1553, PWM controllers, Resolver-to-Digital converters, Analog Multiplexer modules, and Voltage Regulators.

Our Battery Electronics Unit (BEU), a Li-Ion battery balancer and cell telemetry electronics unit, performs autonomous cell balancing, high cell limit indication and low cell limit indication. Our latest product family, RadHard-by-Design Analog Function Series offers MUXs, comparators, op amps and AtoD/DtoA Converters.

**The Aerospace Corporation**

**Booth Space: 42T**
*www.aero.org*
Joseph Pope- *joseph.t.pope@aero.org*

The Aerospace Corporation, based in El Segundo, California, is an independent, nonprofit company that provides objective technical analyses and assessments for critical national security space programs and selected civil and commercial space programs in the national interest. Aerospace has been assuring space mission success for more than 50 years.

**Aitech Defense Systems, Inc.**
**Booth Space: 48**
*www.rugged.com*
Quintin Rodgers- *qrodgers@rugged.com*

Aitech is a leading supplier of radiation hardened and ruggedized Space qualified embedded computer subsystems for satellite bus, payloads and launch vehicles. Aitech offers rapidly available product solutions with its Space electronics product line including Space Single Board Computers (SBC), Gigabit Ethernet, Digital & Analog I/O, SpaceWire, Solid State Memory and power enclosures to fit your immediate mission needs. This year we are excited to introduce a new Single Board Computer and our innovative Remote I/O Next Generation solution. Celebrating its 30th Anniversary this year, Aitech has a long and impressive track record delivering superior cost-performance, reliability, and time-to-market benefits to our worldwide customers for launch vehicle, missiles and satellite applications. With a line of Space products performing up to 100krad TID and latch-up immune electronics, Aitech delivers the most cost effective solutions with expected robust functionality and performance you demand.

**AMERGINT Technologies Inc**
**Booth Space: 54**
*www.amergint.com*
Andrew Strange- *andrew@amergint.com*

At AMERGINT, we understand the hardware, software, networks, and protocols used in satellite ground station systems, from Antenna Site to Control Center, and how to test these systems. Our focus is on complete migration from legacy, black-box systems to customer-driven, software-defined solutions. Our extensible software products include: **Software Defined TT&C modems that support most narrowband satellite waveforms. **Telemetry and Command Front-End Processors, which handle Red/Black processing, frame synchronization, time-stamping, FEC, command/echo formatting, flow-control, WAN-transfer, as well as CCSDS and other space protocols. **Multi-Channel Data Recorders providing simultaneous record/playback of multiple data channels, real-time data quality checking, and record/playback scheduling. **Payload Front-End Processor/Recorder aggregate rates > 1Gbps. **TestExec framework that automates testing of ground station systems, captures results, and creates reliable test reports. **FEPLab Ground/Space Software Development Package, empowering end-users to efficiently implement/test space and ground software.

**Andrews Space**
**Booth Space: 21-23**
*www.andrews-space.com*
Melissa Wuerl- *mwuerl@andrews-space.com*

Andrews Space designs, develops and manufactures satellite products and systems for small satellite missions and applications. Our products include the CORTEX line of high-performance, CubeSat form factor, avionics boards, the PYXIS line of single-head, dual-head and fully integrated celestial navigation star trackers; torque rods, solar arrays, custom and COTS power systems, and fully integrated bus solutions with the SENTRY line. All products are produced domestically in the USA to AS9100C aerospace standards and quality controls.

**Applied Technology Associates**
**Booth Space: 15-16**
*www.atacorp.com*
Tiffany Sevieri- *tiffany.sevieri@atacorp.com*

ATA is a precision sensing, measurement and controls company providing custom hardware solutions and technical services to government, aerospace and commercial customers. Our market applications span Line of Sight Stabilization, Guidance, Navigation & Control, and Test & Evaluation solutions for ground, air and space systems. Among its current programs, ATA is supporting the Air Force Research Laboratory (AFRL) Space Vehicles technology efforts, is teamed with Northrop Grumman to build and integrate the Operational Responsive Space (ORS) Modular Space Vehicle (MSV) bus, and is building enabling stable platforms for defense and civil laser communication platforms.

ATA Aerospace, ATA's joint venture with ASRC Aerospace, is the prime contractor on AFRL's Space Technology Research and Integrated Vehicle Experiments (STRIVE) contract. On STRIVE, ATA Aerospace provides Program Management, Engineering Services, Integration and Test, Launch Support, On-Orbit Support, and Test Facility O&M for AFRL's satellite and high altitude systems and subsystems, including buses and payloads.

**Arianespace**
**Booth Space: 103**
*www.arianespace.com*
Yasmine Almond- *y.almond@arianespace.com*

Arianespace is the world's leading commercial launch services company, with over 200 missions safely delivering more than 300 payloads to space since 1980. Operating a family of launch systems from state-of-the-art facilities at the Spaceport on the Equator, Arianespace can place any payload into any orbit. The legendary Soyuz with the ASAP-S and the light Vega with the VESPA dual-launch system are optimized for launching smallsat payloads.

**Astro- und Feinwerktechnik Adlershof GmbH**
**Booth Space: 56**
*www.astrofein.com*
Stephan Roemer- *s.roemer@astrofein.com*

Small satellite busses (up to 200 kg) and payloads/components for small satellites (1 to 400 kg) are the core business activities of Astro- und Feinwerktechnik Adlershof GmbH. In this area we focus on high reliable and smart systems for LEO and deep space applications.
We are specialized in attitude control components (reaction wheels, IMUs, GPS systems, Magnetic Field Sensors) and complete AOC-subsystems, power subsystem components (PCU, PDU), structures and mechanism (booms, solar panels or deployment mechanism) and scientific and optical payloads (primary VIS and IR). Additional to that we offer ground support equipment (EGSE, MGSE, OGSE), like transport containers or AOCS test beds. The scope of services comprises the complete verification and environmental qualification of new space technologies and hardware (scientific and commercial), according to NASA/ESA/JAXA standards, which also includes vibration, pyro shock and thermal vacuum testing.

**ATK**
**Booth Space: 81-83**
*www.atk.com*
David Bluford- *david.bluford@atk.com*

ATK Aerospace Systems is an industry leader in small and micro-satellites; satellite components and subsystems; lightweight space deployables and solar arrays; and low-cost, quick to market launch solutions. ATK developed the platform for the successful Earth Observer-1, THEMIS, and TacSat-3 satellites and provided the spacecraft bus for the first Air Force Operationally Responsive Space satellite. Aerospace Systems is the world's top producer of solid rocket propulsion systems and a leading supplier of military and commercial aircraft structures, flares and decoys, energetic materials, and related technologies. The group also has extensive experience supporting human and space payload missions.

**Austin Satellite Design, LLC**
**Booth Space: 94T**
*www.AustinSat.net*
Tom Davidson- *TDavidson@austinsat.net*

Austin Satellite Design creates and manufactures products related to small satellites, such as Cubesats and Nanosats, with integrated attitude control systems, propulsive thrusters and GPS receivers. These components may be purchased individually or used in satellites that we produce. We also provide technical support and expert consulting in the areas of space systems and satellite design.

**AXELSPACE Corporation**
**Booth Space: 66**
*www.axelspace.com*
Yuta Nojiri- *nojiri@axelspace.com*

AXELSPACE is a Japanese micro-satellite manufacturer. We are fousing on micro-satellites weighing less than 100 kilograms and satellite components for nano- and micro-satellites. In our booth, we will exhibit the overview of our on-going nano-satellite project, WNISAT-1 and Hodoyoshi-1. both of the satellite will be launched in 2013. WNISAT-1 is a nano-satellite to monitor the Arctic Ocean and the customer of the satellite is Weathernews Inc., which is the world's largest private weather service company headquartered in Japan. Hodoyoshi-1 is a remote-sensing micro-satellite which has a 6.7mGSD optical telescope. We will also exhibit a high precision star-sensor AxelStar-2, a coarse sun-sensor AxelSun-1, a GPS receiver AxelNav-1 and other components for nano- and micro-satellites.

**Blue Canyon Technologies (BCT)**
**Booth Space: 87**
*www.bluecanyontech.com*
George Stafford- *stafford@bluecanyontech.com*

Blue Canyon Technologies is a small business founded in 2008, with a highly experienced staff that has developed, tested and flown components and systems on numerous diverse space missions. We offer a range of high performance, low recurring cost, and rapid response small satellite and CubeSat spacecraft systems and components. We specialize in precision pointing platforms based upon our high performance Attitude Determination and Control components, integrated systems, and our CubeSat bus. Products available from BCT include star trackers, reaction wheels, CMGs and complete spacecraft systems designed for capability and affordability. BCT development labs are co-located with our design offices and are used for rapid design and assembly of components. BCT products are developed and manufactured with quality aerospace processes, clean rooms, and test facilities.

**The Boeing Company**

**Booth Space: 18**
*www.boeing.com*
Cheryl Sampson- *cheryl.a.sampson@boeing.com*

Boeing is the world's largest aerospace company and leading manufacturer of commercial jetliners and defense, space and security systems. A top U.S. exporter, the company supports airlines and U.S. and allied government customers in 150 countries. Boeing products and services include commercial and military aircraft, satellites, weapons, C4ISR, electronic and defense systems, launch systems, and performance-based logistics and training.

Boeing has a long tradition of aerospace innovation. Its broad range of capabilities includes creating new, more efficient members of its commercial airplane family, creating advanced technology solutions for military customers and integrating aircraft, defense systems and warfighters through network-enabled solutions.

**Busek Co. Inc**
**Booth Space: 51**
*www.busek.com*
Dan Williams- *wdanwilliams@busek.com*

Busek Co. Inc. is a space propulsion and space systems company engaged in applied research, hardware development and specialty manufacturing in two complementary lines of business: space propulsion applications, emphasizing electric propulsion, and power electronics. Busek is a leading source for advanced electric propulsion thrusters for use on military, government, and commercial satellites. Some of our key accomplishments include: the first US Hall thruster in space; the first microPPT thrusters; the first flight electrospray thrusters; the first propellant-less CNT Field Emission Cathode; and the world's lowest noise thrust stand. Busek was founded by Dr. Vlad Hruby and is located in Natick, MA approximately 15 miles west of Boston. Busek has over 20,000 square feet of engineering, laboratory, product assembly, and testing facility floor space. Our extensive facilities are specifically designed and fully equipped for the development, testing, and assembly of sophisticated hardware and subsystems.

**CDA Intercorp**
**Booth Space: 69**
*www.cda-intercorp.com*
Michael Baba- *mbaba@cda-intercorp.com*

CDA InterCorp has been an industry leader in the design and manufacturing of highly engineered, extremely reliable, Controllable Drive Actuators for technologically advanced control systems for over 40 years. CDA offers seven standard frame sizes of motors from 0.75"-3" (Brushless Permanent Magnet, AC Induction, or DC Stepper motor), nine standard frame sizes of gearheads (0.75"-6"), linear actuation, and velocity/position feedback devices manufactured in Deerfield Beach, Florida.

**Clyde Space**
**Booth Space: 14**
*www.clyde-space.com*
Craig Clark- *enquiries@clyde-space.com*

Clyde Space has become a leading CubeSat provider and our hardware is used on at least 40% of all CubeSat missions, including the top missions in the USA such as SMDC-ONE, Colony 1, NASA Firefly and DICE. Our first complete satellite platform, UKube-1 is due for launch later this year. We are also a trusted supplier of small satellite subsystems, including Power System Electronics (incl. DC-DC Converters), Lithium Polymer Batteries, Solar Panels, Reaction Wheels and ADCS solutions. As the provider of the UK Space Agency's first mission, UKube-1, Clyde Space's expertise also extends to the delivery of complete spacecraft, meaning that we have an intimate understanding of the end-to-end process involved in CubeSat and Small Satellite missions.

**Cobham Life Support**
**Booth Space: 104**
*www.cobham.com*
Tom Yandle
*Tom.yandle@cobham.com*

Cobham designs and manufactures a range of space flight approved products for use in the extreme environment of space. These components are customized for specific applications and backed by a heritage dating to the Mercury program. Today, Cobham has been an integral part of the International Space Station since its first module flew, supplying life support components for most major modules including the Columbus Orbital Facility, Japanese Experimental Module and US Laboratory Module. Cobham Life Support has delivered more than 250 components for the International Space Station.

**Composite Technology Development (CTD)**
**Booth Space: 55**
*www.ctd-materials.com*
Holly Babcock- *holly.babcock@ctd-materials.com*

CTD miniaturizes deployable structures and mechanisms to allow "big space" deployable payloads and mission capabilities to be accommodated on small, micro, and nano satellites. Lightweight and simple systems enable greater mission capability for small spacecraft by increasing the surface area and aperture of planar arrays, antenna reflectors, and solar arrays, while decreasing stowed volume and complexity. Also, CTD's novel materials and composite design and manufacturing expertise resulted in extremely lightweight pressure vessels used on satellites and aircraft. In addition CTD's testing services, which focus on cryogenic environments, supported numerous space programs including JWST and commercial space ventures. Several of these enabling technologies will be on display at CTD's booth during this year's Small Satellite Conference.

**Design Net Engineering**
**Booth Space: 31-32**
*www.design-group.com*
Justin Smith- *jsmith@design-group.com*

Design Net Engineering specializes in the design, development and production of custom electronics and software for aerospace instrumentation and avionics. By focusing on responsive space and providing end-to-end system engineering/development, Design Net consistently delivers innovative, low-cost solutions on time and on budget. A mission driven systems design approach with supporting disciplines including FMECA, Structural, Radiation, and Thermal analyses, supports the demanding life cycle needs of our customers. Our instrumentation, electrical, and software designs support DoD client missions including Operationally Responsive Space (ORS), AFRL TacSats, NRL responsive space initiatives and NASA missions. Our software team is a well recognized asset in the responsive space community supporting development and implementation of Space Plug-and-Play (SPA) standards. Additionally, Design Net is a pioneer in the rideshare community, developing flight hardware for multiple launch vehicles and enabling technologies like the deployer sequencer subsystem. Contact Design Net to learn how our mission driven approach can help.

**Dytran Instruments, Inc**
**Booth Space: 91**
*www.dytran.com*
Laurie Talbot- *ltalbot@dytran.com*

Founded in 1980, Dytran Instruments, Inc. is a leading designer and manufacturer of piezoelectric and DC MEMS sensors, and has been serving the test and measurement community with innovative products and outstanding customer service for over thirty years. Their expansive product line includes piezoelectric and DC MEMS accelerometers, piezoelectric force and pressure sensors, impulse hammers, cable assemblies and support electronics. Dytran sensors serve both commercial and military markets, and can be found in a myriad of applications including modal analysis, structural dynamic, Environmental Stress Screening (ESS), and flight test applications to name a few. Dytran's headquarters is home to a 30,000 square foot, AS9100 and ISO9001:2008 certified manufacturing facility, and incorporates the use of state-of-the-art equipment, manufacturing amenities and product testing facilities to ensure high throughput, high quality end product. This includes a full in-house CNC machine shop operating in three shifts, an extensive engineering laboratory and dedicated service area.

**EyasSat**
**Booth Space: 68**
*www.design-group.com*
Gerry Murphy- *gmurphy@design-group.com*

EyasSAT LLC provides classroom satellites and related educational materials for education and workforce development. Our current Rev C+ EyasSAT has power distribution subsystems, a 3000maH Li-ion battery, torque rods, coarse sun sensors, fine sun sensors, configurable solar arrays, a momentum wheel, thermal experiments, housekeeping with temp, voltages and currents and arming plugs / separation switches which model prototypical satellite design/behavior. In addition, the EyasSAT has a data handling section, a communications section, an ADCS section, an experimental section, and optional magnetometer and GPS. Each of these can be utilized as a stand-alone module for training. Using the AFA developed coursework; the student can explore most aspects of current satellite technology in the classroom without risking flight hardware in experimentation. With the radio downlink and the free-fall stand (a one axis of freedom environment) the student can experience what actually happens when a command is sent to a satellite.

**GDP Space Systems**
**Booth Space: 90**
*www.gdpspace.com*
Steve Nicolo- *snicolo@gdpspace.com*

GDP Space Systems designs/manufactures ground-based telemetry and communications equipment. We offer products/services to support tracking and control as well as processing and acquisition of data. Products include Satellite Modems & Ranging Systems, Bit Synchronizers, Best Source Selectors, Decommutators, Data Link Testers, Receivers (i.e. CUBESAT), Modulators, Demodulators, SGLS, Communication Multiplexers & Network Appliances.

**Glenair, Inc**
**Booth Space: 67**
*www.glenair.com*

Carl Foote- *cfoote@glenair.com*

Glenair *Lightweight* Interconnect Cable Systems

It's possible to reduce the weight of interconnect cabling in satellite systems by pounds—with huge $ savings at launch—by replacing heavy, metal shielding materials with lightweight composite thermoplastics. Glenair has dozens of weight saving interconnect technologies, from composite EMI braid to ultra miniature circular and rectangular connectors—all designed with one thing in mind: saving weight in mission-critical interconnect systems. If someone were to offer you $1 bills for 50 cents each, would you say "yes"? That's our offer. When you trade the cost of a one pound weight reduction in interconnect hardware for the much more valuable $ savings you'll enjoy at launch, you'll literally be buying $1 bills for 50 cents each. Visit Glenair at booth 67 for the samples and materials that will make you a weight-reduction hero in your organization. Glenair: A World of Lightweight Interconnect Solutions.

**GomSpace**
**Booth Space: 89**
*www.gomspace.com*
Lars Alminde- *info@gomspace.com*

GomSpace's mission is to maintain a leading position as a driving force in the emerging market for nano-satellites and demonstrate new applications of nanosats. Our products and services help teams across the globe to realize their goals in space. We provide cost-effective reliable subsystems and platform solutions to the emerging nano-satellite and Cubesat markets. We do research in new technologies and mission concepts suitable for nano-satellites. We implement pre-operational demonstration missions of new nano-satellite based services that can be spun out as individual service businesses.

**Honeywell**
**Booth Space: 17**
*www.aerospace.honeywell.com*
Mark Covelli- *mark.covelli@honeywell.com*

Honeywell Aerospace is a world leader in advanced aviation technology. For almost 100 years, Honeywell has been synonymous with aerospace innovation that improves performance while saving time, fuel, money and lives. With products that pay for themselves. And technologies that create the future. From cutting-edge avionics to advanced propulsion systems, from space travel to logistics, Honeywell Aerospace solutions provide operational efficiencies that improve reliability and increase product lifespan and fuel efficiency, while reducing unscheduled maintenance, redundancy and spending. In other words, we help you do more for less. To learn more, visit http://aerospace.honeywell.com/

**IHI Aerospace**
**Booth Space: 70**
*www.ihi.co.jp/ia/en*
Takashi Arime- *t-arime@iac.ihi.co.jp*

IHI Aerospace (IA) is an aerospace and defense company. Space systems include development and manufacture of suborbital/orbital rockets, experiment racks and facilities for the International Space Station, re-entry system for recovery of space experiments and samples. Also, we get aboard development of H-II Transfer Vehicle(HTV), space station supply vehicle. We are in charge of developing the propulsion system, the Exposed Pallet (EP), the related mechanisms, and the HTV Resupply Rack (HRR) containing the supplies used inside the ISS.

One of important strategic objectives is to successfully develop small launch vehicle to meet emerging applications of small space systems. IA, as a prime contractor, is leading the development of JAXA Epsilon solid rocket. First flight is slated on summer, 2013. IA's technical expertise also is vital to METI Air-Launch System Enabling Technology (ALSET) program for micro/mini payload delivery and commercial nano-satellite launch system development.

**Instar Engineering and Consulting, Inc.**
**Booth Space: 43T**
*www.instarengineering.com*
Tom Sarafin- *tom.sarafin@instarengineering.com*

Instar Engineering and Consulting (Littleton, Colorado; founded 1993) provides engineering and management services and offers educational short courses to the space industry in the fields of structures (design and analysis), mechanical systems, vibration testing, thermal analysis, and project management. Instar has provided engineering services for over 10 small satellites, including the U. S. Air Force Academy's FalconSAT series, with emphasis on structural design guidance, mass properties management, stress and dynamics analysis, and development of notching and force limiting strategies to avoid excessive loading during vibration tests. Instar has performed similar services for separation mechanisms and rideshare adapters.

The short courses Instar offers vary from broad topics (e.g., "Ten Principles for Successful Space Programs" and "Engineering for Success in the Space Industry") to specialized ones ("Structural Test Design and Interpretation" and "Design and Analysis of Bolted Joints"). Instar has taught over 200 courses to more than 4000 aerospace engineers and managers.

**ISIS - Innovative Solutions In Space**
**Booth Space: 75-76**
*www.isispace.nl*
Jeroen Rotteveel- *J.Rotteveel@isispace.nl*

ISIS – Innovative Solutions In Space is a leading provider of nanosatellite missions, products, and services. The company employs over 40 engineers and operates on two continents from two sites. ISIS provides turnkey missions for institutional, governmental and commercial customers around the world, specializing in low-cost (< 1,000,000 USD), rapid development (<6 months) missions based on standardized systems and components. For new entrants into the space domain extensive support programs with training, development kits and engineering support are also available.

Standardized nanosatellite and CubeSat components are available online through ISIS' online portal www.cubesatshop.com, which offers products from ISIS and many other component providers from around the globe.

For launch opportunities for secondary and piggy-back payloads, ISIS' subsidiary Innovative Space Logistic (ISL) provides turnkey services on a host of different launch vehicles, while stand alone CubeSat and microsatellite dispensers and release mechanisms can be procured through www.cubesatshop.com at very affordable rates.

**JHU/Applied Physics Laboratory**
**Booth Space: 84**
*www.jhuapl.edu*
Margaret Simon- *Margaret.Simon@jhuapl.edu*

The Johns Hopkins University's Applied Physics Laboratory makes critical contributions to our nation's critical challenges. APL has built 68 spacecraft and instruments for a variety of applications, including New Horizons, MESSENGER, STEREO, and the Van Allen Probes. APL's 3U Cubesat will launch in 2013.

**Kratos Defense**
**Booth Space: 109**
*www.KratosDefense.com*
Tom Rivers- *trivers@integ.com*

For over 30 years Kratos has been the leader in providing secure management, delivery and distribution of data and information from space and terrestrial-based platforms into networks for defense, intelligence, government and commercial satellite and aerospace partners. Having supported over 250 space missions, our systems are based upon market leading innovative solutions combining our COTS products, custom developed modular software, and top notch engineering services to address the specific needs of our partners.
Kratos has developed new integrated products that specifically address the unique needs and mission requirements of small satellite command and control. Understanding the strict cost and schedule environments required for a successful small satellite mission, these products provide a turnkey capability that immediately reduce the cost and risk for the ground segment and let your team and budget focus on the rest of the mission.

**L-3 Communications**
**Booth Space: 24**
*www.l-3com.com/eti*
Ray Robinson- *raymond.e.robinson@l-3com.com*

L-3 Communications is represented by 2 divisions: Electron Technologies, Inc. (ETI) is featuring their space-qualified, high-reliability TWTs, EPCs, TWTAs and their 8cm XIPSTM, Electric Propulsion System. For additional information, go to L-3com.com/eti. L-3 Telemetry-West is featuring InControl™, Satellite Command and Control Software for On-Orbit, Factory Test and Ground System Monitor and Control. For additional information, go to L-3com.com/TW/Incontrol

**LoadPath**
**Booth Space: 86**
*www.loadpath.com*
Adam Biskner- *abiskner@loadpath.com*

LoadPath specializes in the development and delivery of advanced engineered products and services. The company's core capabilities focus on the design, analysis, testing, and manufacturing of aerospace structural systems and components, particularly those critical to the launch vehicle and satellite community. Our highly technical engineering staff has extensive experience in the design and evaluation of multiple payload adapters, deployable payloads, CubeSat components and launch accommodations, reconfigurable thermal control subsystems, missile structures, and reentry vehicles throughout the complete concept-to-flight development cycle. Additionally, we have exceptional manufacturing capabilities for the development and production of novel launch vehicle and satellite composite structures. LoadPath is a small business dedicated to developing and maintaining strong customer relationships by consistently exceeding their expectations.

**Lockheed Martin**
**Booth Space: 33-34**
*www.lockheedmartin.com*

Carol Hail- *carol.l.hail@lmco.com*

Headquartered in Bethesda, Md., Lockheed Martin is a leader in small satellite research and development, having successfully launched approximately 150 small satellites during the past 50 years. The company has advanced new technologies that will decrease the size, complexity and cost of small satellite development. These new innovations include a micro-propulsion system, miniature integrated avionics, model-based spacecraft software, and much more. Lockheed Martin's dedicated approach to innovation, backed by its extensive satellite experience, enables it to provide a mix of satellites to meet any mission focus - large, small, micro or nano. As small satellites increasingly grow in popularity and capability, Lockheed Martin continues to work to create reliable, high-quality products that perform complex missions to meet our customers' objectives.

**Micro Aerospace Solutions, Inc**
**Booth Space: 7T**
*http://www.micro-a.net*
Don Platt- *dplatt@micro-a.net*

Micro Aerospace Solutions, Inc. (MAS) is a small business based on Florida's space coast. Our goal is to provide low-cost innovative solutions to small satellite challenges. Our expertise includes R&D for small spacecraft attitude detection/control, propulsion systems, sensor systems, command and data handling, embedded systems, avionics integration and electronics. We specialize in low-cost, high performance solutions. In addition to our proven flight heritage in LEO, we're developing a full software suite for an interplanetary mission using agile software development techniques that minimizes required resources while maintaining quality and NASA NPR 7150.2A compliance. Our team is experienced in NASA processes and regulations, ISO9000 standards, and is Level 2 CMMI compliant. We offer testing capabilities including vibration, thermal-vacuum, and EMI testing. MAS can assist you in system design and analysis during the entire system life cycle from concept to decommissioning.

**Microcosm Astronautics Books**
**Booth Space: 1**
*www.astrobooks.com*
Dr. Nicola Sarzi Amade'- *bookstore@smad.com*

Our unique bookstore carries over 300 titles of technical astronautics books. We also publish (as Microcosm Press) our own books, these include "Space Mission Engineering: The New SMAD" and our newest publication "Fundamentals of Astrodynamics & Applications, 4th edition." We pride ourselves on providing the space industry with high quality books, low prices, and assistance in finding the right book for your needs. It's easy to order on-line, by phone, or by email or visit our near-to-LAX location. Our goal is to make access to our books and services incomparable. We have wholesale prices for resale and institutes of higher learning. Special conference prices!! If you have a book idea, ask me about publishing it.

**Micro-RDC**
**Booth Space: 44T**
*http://www.micro-rdc.com*
Sasan Ardalan- *sasan.ardalan@micro-rdc.com*

Micro-RDC will be exhibiting the Radiation Hardened ASIC System on a Chip (SoC) (7x7 mm) based on the 8051XC CPU supporting SpaceWire/USB/I2C/SPI and Power Management. We will also demonstrate the 3x3mm 8 bit RISC SoC chip (3x3 mm). Both chips were successfully taped out using the IBM 90nm CMOS 9LP process. Micro-RDC will also exhibit the chips packaged in 10x10 and 16x16 BGA's with 0.8mm pitch for the 7x7mm and 3x3mm chips respectively. The operation of the chips in the BGA packages will be demonstrated with compact development boards suitable for deployment in CubeSats. The Radiation Hardened ASIC Microcontrollers offer the smallest footprint and lowest power consumption along with high speed (75 MHz clock) operation for survival in the harshest space radiation environments.

**Millennium Space Systems**
**Booth Space: 106**
*www.millennium-space.com*
Jason Kim- *Jason.kim@millennium-space.com*

Millennium Space Systems provides alternative, relevant solutions to today's aerospace challenges, with emphasis on affordable, reliable and responsive space systems for the most demanding customers and their mission needs. The U.S. Intelligence Community, Department of Defense and NASA have all selected Millennium, for activities ranging from studies, detailed designs, and prototyping, through to full-scale development of flight systems. Millennium was recently the prime contractor and system integrator for NRO's Rapid Pathfinder Satellite, developed in just 24 months, including integration of three key mission payloads. Rapid Pathfinder was launched in February 2011, and continues to operate at over 99% availability on orbit, controlled from Millennium's dedicated mission operations center. Building on the success of Rapid Pathfinder, Millennium is now developing the ground-breaking SeeMe low-cost microsatellite platform for DARPA, and the Disaggregated Weather Satellite Program for USAF. Millennium is an independent, employee-owned business founded in 2001 and located in Southern California**.**

**Moog**
**Booth Space: 62-64**
*www.moog.com/space*
Joseph Maly- *jmaly@moog.com*

We welcome Broad Reach Engineering, an innovator in small satellite payload avionics and software.

Moog builds on extensive space flight heritage with concepts and product offerings for new small satellite missions. We design and manufacture payload, spacecraft, and launch vehicle components and systems including spacecraft attitude control and mechanisms, reaction wheels, sun sensors, solar array deployment actuators, antenna positioners and instrument motion control. We provide propulsion systems through Moog ISP and fluid control components that support chemical, electric and cold gas systems. Our launch vehicle offerings include thrust vector and steering controls, electric and hydraulic actuation and avionics including build-to-print. We offer spacecraft vibration and shock isolation systems including SoftRide, payload adapters including ESPA, CubeSat carriers supported by multi-payload sequencers, electromagnetic actuators, ground test equipment and shock testing services. Moog Broad Reach develops hardware and software for spaceflight missions and ground systems, integrating vehicle design, component design and engineering services.

**NASA Ames Research Center Mission Design Division**
**Booth Space: 39-40**
*www.nasa.gov/centers/ames*
Chad Frost- *ARC-SmallSats@mail.nasa.gov*

For over 60 years, NASA's Ames Research Center has led world-class research and development, providing NASA with advancements in entry, descent and landing technologies, information technology, next-generation aviation improvements, astrobiology, airborne sciences and is a leader in small spacecraft programs. Ames' Engineering Directorate supports the full mission life cycle with concept development, mission design, rapid prototyping and mission implementation; including flight hardware development, integration and test, launch and operations. The Office of the Chief Technologist serves as a technology and innovation focus for Ames in disciplines of interest to the Agency and the Nation. The Multi-Purpose Avionics Core Element (M-PACE), a 1U CubeSat technology demonstration built using advanced manufacturing and digital materials, and the Advanced Digital Materials and Manufacturing for Space Initiative (ADMMS) are featured. Ames' wide variety of ongoing research, technologies and flight projects will be on display at our booth.

**NASA HQ Space Technology Mission Directorate (STMD)**
**Booth Space: 96-97**
*http://www.nasa.gov/directorates/spacetech/home/index.html*
Julianna Fishman- *julianna.l.fishman@nasa.gov*

NASA's Space Technology Mission Directorate (STMD) is chartered with developing and providing new space related technologies to improve the way NASA explores and studies the universe. In addition to the Small Spacecraft Technology Program (SSTP), which develops and demonstrates technologies in space for small platforms, there are a number of other programs with potential benefit to the SmallSat community. These include the SBIR/STTR Program, the Space Technology Research Grants (STRG) Program, Centennial Challenges, the Game Changing Development (GCD) Program, NASA's Innovative Advanced Concepts (NIAC) Program, Technology Demonstration Missions (TDM), and the Flight Opportunities Program.

Information and representatives from many of these programs will be available via the Space Technology Mission Directorate booth at this year's SmallSat Conference.

**NASA Wallops Flight Facility**
**Booth Space: 9**
*http://www.nasa.gov/centers/wallops/*
Scott H. Schaire- *Scott.H.Schaire@nasa.gov*

NASA's Goddard Space Flight Center Wallops Flight Facility (WFF), located on Virginia's Eastern Shore, provides low-cost, responsive suborbital and orbital flight project services to government, industry, and academia customers. As WFF is dedicated to furthering science, technology, and commercial responsive access to space, WFF provides facilities and expertise to enable frequent flight opportunities worldwide. WFF manages research carriers, including sounding rockets, scientific balloons, science aircraft, unmanned aerial vehicles, and small spacecraft systems. WFF provides operational support through its launch range, mobile range, research airport, and orbital tracking station. In addition to flight projects, WFF is also home to Earth Science researchers as well as engineers responsible for developing flight systems and advanced technologies. WFF has highly capable flight hardware fabrication and testing capabilities used to support both its NASA and non-NASA customers. WFF supports the National Science Foundation CubeSat Program with Engineering, UHF CubeSat Groundstations, laboratories, and testing facilities.

**NASA's Launch Services Program**
**Booth Space: 4**
*http://go.nasa.gov/lsprockets*
Tiffany Nail- *tiffany.v.nail@nasa.gov*

The Launch Services Program (LSP) was established at Kennedy Space Center for NASA's acquisition and program management of expendable launch vehicle (ELV) missions. A skillful NASA/contractor team is in place to meet the mission of the Launch Services Program, which exist to provide leadership, expertise and cost-effective services in the commercial arena to satisfy agency-wide space transportation requirements and maximize the opportunity for mission success. The Educational Launch of Nanosatellites (ELaNa) is an exciting initiative created by NASA and managed by LSP to attract and retain students in the science, technology, engineering and mathematics disciplines. ELaNa reaches students by

introducing educational spaceflight in high schools and colleges across the United States. For up to date information on upcoming LSP launches and mission, go to: http://go.nasa.gov/nasalaunches. For more information on LSP, visit us at: http://go.nasa.gov/lsprockets.

**NEA Electronics, Inc.**
**Booth Space: 65**
*www.NEAElectronics.com*
David Novotney- *DNovotney@EBA-D.com*

NEA Electronics manufactures low shock release mechanisms used for solar array, antenna, gimbal, and spacecraft separation. We also manufacture battery isolation switches, piston actuators, and zero separation force connectors. NEA is a wholly owned subsidiary of Ensign-Bickford Aerospace and Defense, who is the premier ordnance/pyrotechnic supplier for the US launch vehicle and space industry since the 1950s.

**Northrop Grumman**
**Booth Space: 112**
*www.ngc.com*
Steve Goralczyk- *Steve.goralczyk@ngc.com*

Northrop Grumman Aerospace Systems is a premier provider of manned and unmanned aircraft, space systems, missile systems and advanced technologies critical to our nation's security. The sector's Space Park site in Redondo Beach and Manhattan Beach, Calif., is a world leader in the development and production of military and civil space systems, satellites, and advanced technologies.

**NovaWurks, Inc.**
**Booth Space: 108**
*www.novawurks.com*
James Greer- *James.greer@novawurks.com*

NovaWurks' vision is to provide access to space – for everyone. We do it by providing consulting, engineering and rapid prototyping services for developing, testing, launching, and operating nano-satellites, and delivering high technology, paradigm-shifting products and services for space systems. Our highly integrated design approach provides the needed high performance, while addressing and overcoming the issues of working with very limited resources (i.e. power, volume, processing, bandwidth). NovaWurks' unique development and production process delivers a shortened delivery window, and reduces the overall cost of delivery. Our leadership team has more than a century of experience in the space business, ranging from advanced technology developments for small satellites, to novel payloads, to vehicle and mission software, to on-orbit operations. NovaWurks' expertise is playing a significant role in DARPA's Phoenix and SeeMe Projects, in developing and exploring the bleeding edge of Satlet-based solutions.

**Orbital Sciences Corporation**
**Booth Space: 29-30**
*www.orbital.com*
Ken O'Keefe- *okeefe.ken@orbital.com*

As the industry leader in small space and rocket systems, Orbital provides a complete set of reliable, cost-effective products. Our satellites include low Earth orbit (LEO) spacecraft that perform remote sensing and scientific research, small and medium geosynchronous Earth orbit (GEO) satellites for communications and broadcasting, spacecraft for national security missions, and planetary probes to explore deep space. We also provide light- and medium-class launch vehicles to transport satellites into orbit, interceptor booster vehicles to protect against enemy missile attack, and target rockets to test missile defense systems. Orbital is also supplying commercial cargo resupply services for the International Space Station using our new Antares™ rocket and Cygnus™ advanced maneuvering spacecraft. In addition, Orbital provides full service engineering, production and technical services for NASA, Department of Defense, commercial and academic space programs. Orbital has delivered or under contract over 1000 satellites, launch vehicles and other space systems since 1982.

**Orbital Systems**
**Booth Space: 100**
*www.orbitalsystems.com*
Carl Schoeneberger- *info@orbitalsystems.com*

Orbital Systems, Ltd. is a leading manufacturer of ground station antenna systems including complete cost effective solutions for TT&C antennas used to control and monitor satellites. Orbital offers antenna positioners and integrated RF subsystems with single or multi-band feeds, upconverters, downconverters and HPAs in X, S and L bands, and in sizes from over 3.0m to as small as 1.5m. Orbital's field proven antenna systems are fully range tested, reliable and safe, and fully compliant with international standards. Let us show you how we can help save money and time.

**PASCO Corporation**
**Booth Space: 60-61**
*www.pasco.co.jp/eng*
Tatsuo Inui- *tiautn1265@pasco.co.jp*

Established in 1953 as the first aerial photographic survey company in Japan, PASCO has been actively involved in acquiring, analyzing and processing, and providing geospatial information using wide range of sensors from shipborne, ground, airborne, and spaceborne. As satellite business is one of the core sectors for PASCO, the company, being engaged in not only distribution and processing of archived and newly acquired satellite imagery data but also system and application development, is able to offer flexible and a comprehensive range of satellite data solutions to customers.

**Planetary Systems Corporation**
**Booth Space: 53**
*www.planetarysystemscorp.com*
Ryan Williams- *info@planetarysystemscorp.com*

Planetary Systems Corporation (PSC) provides lightweight, reliable, and test verified separation systems for the aerospace industry. Products include Motorized Lightband (MLB) for large payloads and Canisterized Satellite Dispensers (CSD) for cubesats. PSC has 100% on-orbit success over 10 years and 32 missions.

**PnP Innovations**
**Booth Space: 49-50**
*www.pnpinnovations.com*
Don Fronterhouse- *Don@pnpinnovations.com*

PnP Innovations Inc, celebrating its fifth year of operation, continues to develop and ship innovative new hardware and software products to enable users to rapidly develop modular Plug and Play (PnP) systems. A modular, standards-based approach to designing and building systems offers considerable cost and assembly time advantages when compared to traditional architectures. Our family of ASPIRE protocols provides the standardized communications interface between various plug and play avionics and sensor components. Our hardware offerings include embedded processor boards, high speed SpaceWire routers, cPCI/PCIe boards, video interface boards, and other custom designed solutions. Our PnP Catalog provides the community ASPIRE compatible software, hardware, and development/test tools. Modular flight software (including autonomous activity agents) discovers and binds to data sources from these devices to create a functional system. Our development tools provide an integrated help environment to support rapid prototyping and testing.

**Prototron Circuits**
**Booth Space: 2**
*www.prototron.com*
Rob Zippo- *robz@prototron.com*

Prototron Circuits was founded in 1987 to serve the Quick turn PCB market in the Northwest. The company quickly grew to become a true preferred source of companies nationwide needing reliable QTA PCBs. Prototron offers a 5 day standard lead time and can produce boards up to 14 layers in as little as 24 Hrs. Prototron offers engineering and design support, and is very experienced with RF designs and exotic materials such as Rogers, Taconic and hybrid laminations. Prototron has facilities in Redmond, Washington and Tucson, Arizona. Both facilities are ITAR Registered and ISO 9001:2008 certified. The Tucson facility is also certified to Mil Spec 55110G Please visit our Website www.prototron.com to learn more or to request a quotation.

**Pumpkin, Inc.**
**Booth Space: 5-6**
*http://www.cubesatkit.com*
Andrew Kalman- *info@cubesatkit.com*

Pumpkin is the leading provider of space-proven CubeSat components and technologies. Pumpkin's COTS CubeSat buses, solar panels and solar arrays, electronics, battery systems and test equipment all form a comprehensive architecture for science, technology, defense and experimental nanosatellite missions. Hundreds of Pumpkin customers world-wide benefit from the most cost-effective, strongest, lightest, most modular, scalable and customizable space-proven nanosat bus available. Aeneas, CINEMA, CSSWE, QbX, Caerus/Mayflower, DICE, Delfi-C3, Libertad-1 and RAX are just some of the Pumpkin-enabled CubeSat-class missions launched to date. Pumpkin end-users benefit from in-stock and on-time delivery, COTS pricing, a wide range of possible configurations, the CubeSat Kit open standard, and comprehensive electronics, software and CAD support. Third-party support through Pumpkin's partners includes ADACS, EPS, BATT, COMM and propulsion solutions tailored to the Pumpkin architecture. Please stop by our SSC2013 booth to see MISC 3 – Pumpkin's Colony-class 3U bus successor – and Pumpkin's 6U nanosat architecture.

**QinetiQ North America**
**Booth Space: 8T**
*www.qinetiq-na.com*
Bernard Gudaitis- *bernard.gudaitis@qinetiq-na.com*

QinetiQ, a global company, delivers world-class technology, responsive services, and innovative solutions for the aerospace industry including NASA, ESA, DoD, and commercial customers. We provide a full range of products, scientific support and engineering services that leverage detailed mission knowledge and proven, reliable tools and methodologies to meet the rapidly changing demands for the challenges of space exploration, national defense, homeland security and information access. QinetiQ provides advanced engineering, mission assurance, independent verification and validation, risk assessment, launch operations and support for Government and commercial customers in the space industry. We also design,

build, and test advanced small satellites (100 kg class), scientific instruments/facilities for microgravity research, advanced subsystems and ground operations. So far, we are the sole supplier of small satellites for the European Space Agency and we gradually built up the skills to develop small complex systems as small systems integrator / prime for the European Space Agency.

**Rockwell Collins**
**Booth Space: 59**
*www.rockwellcollins.com*
Wolfgang Kupferschmitt- *wkupfers@rockwellcollins.com*

Rockwell Collins is a world leader in the production of momentum and reaction wheels for spacecraft applications and the European market leader in airborne data processing for tactical military aircraft. Our standard wheels feature lightweight design, 15+ year life time. Delivery time is less than 12 months for off the shelf products. Rockwell Collins TELDIX ® Space Wheels are available in five different sizes with an angular momentum storage capacity spanning a range between 0.04 Nms and 68 Nms. The wheels accommodate the requirements of attitude control systems for satellites weighing less than 65 kg as well as for geostationary satellites reaching a mass of three tons or more. To date, 1120 wheels installed in 392 satellites have been launched, representing 5,935 years of in-orbit operation (as of March 2013)

**RT Logic**
**Booth Space: 37-38**
*www.rtlogic.com*
Mark Lombardi- *mlombardi@rtlogic.com*

RT Logic will demonstrate its T400CS Channel Simulator that enables comprehensive RF testing of communication system components without actual flights. The instrument adds physics-compliant propagation effects to signals, including phase-continuous Doppler shift (carrier and signal), range delay, range attenuation, fading, noise, and phase offset. An advanced signal generator produces test and interference signals in many modulation formats. A sophisticated spectrum/interference analyzer displays modulation type, data rate, C/No, BER, Eb/No and C/I along with advanced carrier-under-carrier analysis. The instrument is controlled locally or remotely by GUI, TCP/IP connections from user-written software, from pre-created profiles, and through Analytical Graphics, Inc.'s STK software. The T400CS is used for laboratory test, classroom/lab demonstration and instruction, and on-air work with on-station satellites. Channel simulation is ideally suited to the fast and thorough testing, characterization and optimization, satellite communication systems, critical to the success of University, commercial, military and government space programs.

**RUAG Space**
**Booth Space: 92**
*www.ruag.com/space*
Patrick McKenzie- *patrick.mckenzie@ruag.com*

As the largest independent supplier of space technology in Europe, RUAG Space develops, manufactures and tests subsystems and equipment for satellites and launch vehicles. From our locations in Switzerland, Sweden, and Austria, RUAG's space division offers a comprehensive portfolio of products and services for institutional and commercial space missions. Heritage and flexibility as well as outstanding reliability have made RUAG Space a long lasting partner of choice for satellite and launcher primes worldwide. The skills and services RUAG offers cover all the essential aspects of space projects, ranging from mission analysis, systems engineering and project management through engineering services, assembly and integration, to support and testing at the launch site. Our newly opened office in Denver, Colorado, RUAG Space USA, provides increased visibility and communication with both existing and potential customers.

**SEAKR Engineering**
**Booth Space: 28**
*www.seakr.com*
Dave Jungkind- *kimberly.pontillo@seakr.com*
SEAKR Engineering, Incorporated is a world-leading provider of advanced state-of-the-art electronic avionics for space and airborne applications. Since its inception in 1982, SEAKR has delivered over one hundred flight units. More than ninety of these units have launched and are operating as designed. SEAKR's leading edge space electronics includes IP routers, reprogrammable MODEMS, high-performance payload processors, modular command and data handling systems, solid state recorders, and manned space avionics. SEAKR has a reputation for high-level performance and reliability in severe environments. SEAKR is a small business proud to serve its customers and country. For more information about this and other SEAKR products, call, or write SEAKR Engineering, Incorporated, 6221 South Racine Circle; Centennial, CO. 80111-6427, 303.790.8499 or email at info@seakr.com and visit our Web Site at www.seakr.com.

**Sierra Nevada Corporation**
**Booth Space: 25-27**
*www.sncspace.com*
Krystal Scordo- *krystal.scordo@sncorp.com*

Sierra Nevada Corporation's (SNC) Space Systems was formed as a Business Area in early 2009 through the consolidation of the technology and years of experience garnered from SNC's subsidiaries SpaceDev Inc.,(including SpaceDev's subsidiary Starsys Research), and MicroSat Systems, Inc. SNC's Space Systems Business Area provides customers with innovative, responsive and cost effective space products including: Spacecraft Systems, home to the only US small satellite production line and satellite operations center; Propulsion Systems, which include SNC's own green,

safe, reliable, hybrid rocket motor tested over 100 times; Space Technologies, sending a mechanism or component to space every 14 days on average totaling 4000 devices flown on 400 missions without a failure; and Space Exploration Systems, partnering with NASA as part of the Commercial Crew Program to design and build a commercial system capable of transporting crew and cargo to and from low Earth orbit.

**Silicon Space Technology**
**Booth Space: 102**
*www.siliconspacetech.com*
David Duff- *dduff@siliconspacetech.com*

Headquartered in Austin, Texas, Silicon Space Technology (SST) is a provider of radiation-hardened and extreme temperature-hardened IC components for the Hi-rel marketplace. SST designs and develops high density SRAMs and logic ICs using its patented HardSILTM technology to simultaneously provide superior radiation and temperature endurance performance. SST also provides custom ASIC design services using its hardened Metal Programmable System On Chip (MPSOC) platform capability. For more information, visit us during Small Sat at booth #102 or at our website www.siliconspacetech.com.

**Sinclair Interplanetary**
**Booth Space: 74**
*www.sinclairinterplanetary.com*
Doug Sinclair- *dns@sinclairinterplanetary.com*

Sinclair Interplanetary has supplied sensors and actuators to satellite programs ranging in scope from large commercial constellations to small university missions, with 19 satellites currently on-orbit. Qualified off-the-shelf products include star trackers and reaction wheels. Custom avionics such as power supplies, actuator drives and C&DH components are available on extremely aggressive schedules. Whether you are getting ready to start phase A of your satellite project, or you are in a last-minute panic as the launch looms, Sinclair Interplanetary can lend a hand. Please take a moment to visit the booth, say 'hello,' and see if we can solve your problems.

**Southwest Research Institute**
**Booth Space: 58**
*www.swri.org*
Don Heihn- *don.heihn@swri.org*

Southwest Research Institute® (SwRI®) was founded in 1947 as a public service scientific corporation to provide contract R&D to both industrial and government clients. The Institute provides extraordinarily technical capabilities through 11 technical operating divisions, with approximately 3000 staff members and gross annual revenue of $581 million. SwRI's Department of Space systems has a long and distinguished track record of producing high quality, high reliability spacecraft avionics for NASA, DoD, ESA, and commercial space missions. Since the first SC-1 spaceflight computer was developed in 1979, SwRI has developed hardware for over 53 space flight missions without a single on-orbit failure. The track record of the last 32 years is a product of a strong commitment to support the current and future needs of the space community. SwRI is recognized as one of the leaders in space instrument design and development, command and data handling (C&DH) systems and mission management.

**Space Dynamics Laboratory**
**Booth Space: 11-12**
*www.sdl.usu.edu*
Jim Marshall- *Jim.Marshall@sdl.usu.edu*

Celebrating over five decades as a leading university-affiliated research and engineering laboratory, the Space Dynamics Laboratory (SDL) develops innovative solutions for scientific and defense remote sensing challenges. SDL's expertise includes space, air and ground-based IR, visible, UV, and hyperspectral sensors; small-satellite technologies; concept validation studies and demonstrations; and solutions for all stages of intelligence, surveillance, and reconnaissance operations – from data acquisition to end-user data exploitation. SDL's products include a family of miniaturized spacecraft systems and components such as the Digital Imaging Space Camera (DISC), a compact modular avionics system (MODAS), the PEARL CubeSat platform, and other technologies that enable modular spacecraft and constellation architectures. SDL is also developing NanoSat technologies to fill capability gaps in attitude control and processing performance required for high-value science missions.

**Space Electronics LLC**
**Booth Space: 52**
*www.space-electronics.com*
Paul Kennedy- *pkennedy@space-electronics.com*

Space Electronics is the Leader in Mass Properties Measurement Instruments. Our products include high accuracy instruments to measure mass, center of gravity (CG), moment of inertia (MOI), and product of inertia (POI) and accommodate test items weighing from a few grams to over 10 tons. In addition we provide measurement and balancing services. Over the last 50 years our innovative approach has allowed our customers to achieve significant advances in their technology. Space Electronics also manufactures spherical and hemispherical air bearings used as space simulating platforms for testing attitude control systems. Some of the specialty products we offer include igniter circuit testers, gimbal balancing instruments, moment weight scales, and inertial decay measurement systems.

**Space Flight Laboratory**

**Booth Space: 78**
*www.utias.utoronto.ca*
Dr. Robert E. Zee- *rzee@utias-sfl.net*

The Space Flight Laboratory (SFL) is Canada's premier microspace organization. SFL builds low-cost microsatellites and nanosatellites that continually push the performance envelope. Missions are typically developed with stringent attitude control and data requirements that are striking relative to the budget available. SFL adopts an innovative, highly focused approach to development in order to achieve order of magnitude reductions in cost compared to similar satellites developed elsewhere. SFL's operational satellites in orbit include: MOST, Canada's first space telescope; CanX-2, a technology demonstrator and atmospheric science satellite; NTS, a ship-tracking satellite developed in only six months and launched in the seventh; AISSat-1, Norway's first maritime monitoring satellite; and BRITE-Austria and UniBRITE, the world's smallest satellites for space astronomy. SFL arranges launches through its Nanosatellite Launch Service (NLS) and provides customizable separation systems called "XPODs" for those launches. As part of its complete end-to-end mission capabilities, SFL maintains a mission control center consisting of multiple ground stations. Come visit us to discuss your microspace mission needs today!

**Space Micro**
**Booth Space: 77**
*www.spacemicro.com*
Paul Brammer- *sales@spacemicro.com*

Space Micro celebrated its 10 year anniversary in 2012, and continues to support the National and International Space Industry with a continually growing backlog of products and capabilities. We have earned a strong reputation in the Space industry for innovative, affordable and high performance communication products. We are an engineering-driven, small business, focused on technology development, and product implementation. Our portfolio of products include Digital Computer products, SGLS/STDN TT&C Transponders, X/Ku/Ka-Band Payload Transmitters, custom RF products, and enabling components including Flash Memory, Reed Solomon Encoders, etc. Space Micro is also a leader in patented radiation hardened by design technologies. These technologies have been implemented in our highly successful ProtonX-Box Avionics Suite which features the Proton 200/400k series single board computers providing industry leading performance and affordability. Recent contract awards include our IPC-5000 Image Processing Computer (heritage ORS-1) and a very high data rate Ka-Band Transmitter for a major launch provider.

**Space-SI**
**Booth Space: 3**
www.space.si
Petra Merjasec- office@space.si

SPACE-SI Slovenian Centre of Excellence for Space Sciences and Technologies was successfully initiated in 2010 with the main focus on nano- and micro- satellite technologies and applications. The RTD goals of the consortium consist of academic institutions, high-tech SMEs and large industrial and insurance companies focused on high precision interactive remote sensing, precise maneuvering of small spacecraft in formation flying missions and network based services for near real time processing of remote sensing data. To achieve this, a ground control RX/TX infrastructure GCS and new multidisciplinary laboratory for closed loop investigations of materials, structures, micro-propulsion systems, electronic components and visual based control algorithms in simulated space environments are currently in construction. The experimental techniques in the laboratory will be combined with virtual models for primal and sensitivity analyses of components, subsystems and platforms and for their characterization by inverse numerical analyses and optimization of their design for performance and reliability.

**SparkFun Electronics**
**Booth Space: 46T**
*http://www.sparkfun.com/*
Mike Grusin- *mike.grusin@sparkfun.com*

SparkFun Electronics (sparkfun.com) manufactures and sells electronic components that are used by our customers for everything from blinking LEDs to sophisticated prototypes. We specialize in our own line of circuit boards that leverage the latest in commercial technology (accelerometers, gyroscopes, RF, etc.) in form-factors that can be used by anyone. We are uniquely committed to open source hardware and software in the belief that when you know every aspect of a design, you can get the most out of it. We also specialize in education; from tutorials covering electronic basics to a full department working to revolutionize STEM education through low cost, open source hardware. Our customers include students, engineers, artists, and educators, and our products are used all over the world (and off). SparkFun was started in 2003 by engineering student Nathan Seidle, and has grown to an 130 employee, 27 million dollar corporation located in Boulder CO.

**SSBV Space & Ground Systems**
**Booth Space: 57**
*www.ssbv.com*
James Barrington-Brown- *jbb@ssbv.com*

SSBV Space & Ground Systems is a high-tech engineering company, which designs and provides innovative solutions for space and ground applications. In the space domain, the company designs and manufactures sensors and sub-systems for high reliability small satellite and cubesat applications and is involved in the development of a new generation on-board computer and on-board payload data processor for the commercial smallsat market. It is also developing a capable, yet affordable, FMCW X-Band SAR radar for small satellites. For the ground segment, the company

focuses on the domains of High-Rate & TTC Modems, Data Processing Systems, TTC & TM/TC Systems, Simulation & Testing (EGSE), RF Test Systems and Earth Observation ground stations. The company is a member of the SSBV Aerospace & Technology Group and operates from the United Kingdom and The Netherlands.

**STAR-Dundee Ltd.**
**Booth Space: 73**
*www.star-dundee.com*
Gregor Cranston- *gregor.cranston@star-dundee.com*

SpaceWire is established as one of the main data-handling networks for on-board spacecraft, and is used on many ESA, NASA and JAXA missions and by research organizations and the space industry worldwide. STAR-Dundee is dedicated to the development and advancement of SpaceWire technology providing a product line of test and development equipment that tests across all levels of SpaceWire standard, industry-leading flight IP cores, chip designs, design services and expert support to users and developers of SpaceWire technology. SpaceFibre is an emerging ESA standard aiming to complement the SpaceWire standard capabilities: improving data rate to 2 Gbits/s and to 20 Gbits/s with multi-laning, providing FDIR and QoS mechanisms, operating over fibre-optic and copper cable, reducing cable mass and providing galvanic isolation. STAR-Dundee can now provide SpaceFibre IP Cores and chip designs, SpaceFibre interfaces, SpaceWire to SpaceFibre Bridge, and SpaceFibre link analysis tools supporting early adoption of this new technology.

**Surrey Satellite Technology US LLC**
**Booth Space: 19-20**
*www.surreysatellite.com*
Brent Abbott- *babbott@surreysatellite.com*

With over 25 years of experience and 41 missions launched, Surrey Satellite Technology is a world-leading small satellite provider, delivering operational space missions for a range of applications including Earth observation, communications, and science. Surrey designs, manufactures, and operates high-performance satellites and ground systems for a fraction of the price normally associated with space missions.
Surrey is "Changing the Economics of Space" as the premier provider of space missions and products by combining cost effectiveness, reliability, and rapid response.

**SYRLINKS**
**Booth Space: 101**
www.syrlinks.com
Gwenael Guillois- gwenael.guillois@syrlinks.com

Syrlinks is a French SME which is specialized in Time/Frequency, Radio Communication & Geolocation (Argos – Cospas/Sarsat) / Navigation (GNSS) for Space and Defense markets. For Space market, Syrlinks has been working with CNES for over 15 years. The reliability of our products has been demonstrated by the development and manufacturing of 44 S-band TTC transceivers in 8 years for Myriade satellites (delivered to CNES, EADS Astrium, Thales Alenia Space). Syrlinks is also developing for CNES an embedded GNSS (GPS/Galileo) receiver optimized for the needs and constraints of small platforms for which small volume, low mass and low power consumption are important. Moreover, Syrlinks recently provided to ESA, 3 Flight models of TMHD (Telemetry High Data Rate) in X-band for the Proba-V mission which was successfully launched in early May 2013. End of 2011, Syrlinks and CNES started to develop a new version of this X-band TMHD for CubSat.

**TCS Space & Component Technology**
**Booth Space: 111**
*www.TCSspace.com*
Alex Nichols- *anichols@telecomsys.com*

TCS' Space & Component Technology division is a worldwide full service provider of integrated ground station equipment and services for, satellite and launch vehicle telemetry, tracking and command. TCS offers cost effective and reliable site management, operations & maintenance, system hardware and software engineering specialized in ground station design and operations. With more than 35 years in the industry, TCS is devoted to providing customers with the most cost effective approach that will ensure mission success even under the most difficult technical and environmental conditions. In addition to ground station services, TCS has a line of mid-range antenna positioning and control products that provide customers with the option to size the cost and precision that best fits their needs. These products include antenna control units, antenna positioners and handheld antenna systems, each allowing for flexible selections and multiple configurations. TCS prides itself in its ability to match every customer's requirements while still providing low-cost, reliable solutions.

**Teledyne Judson Technologies**
**Booth Space: 85**
www.teledynejudson.com
Joseph Kimchi- jkimchi@teledyne.com

Teledyne Judson Technologies (TJT) is the recognized leader of infrared detectors in discrete and array format for space applications. TJT has a rich heritage of successful space programs over the past 25 years. TJT can supply space-qualified Ge, InGaAs, InSb, and HgCdTe detectors/arrays and space-qualified packaging and integrated optics to meet every mission. We pride ourselves on providing the best value with off-the-shelf affordable detectors to meet fast delivery of prototypes and proof of concept detectors and a fully structured space program with engineering and

qualification models prior to flight delivery. We have delivered multi-band detectors for weather satellites (GOES, TIROS, InSAT, MTSAT, and COMS). We have delivered detectors for atmospheric spectroscopy (SABER, SOFIE, and ACE) and remote sensing arrays (MIVIS, MODIS, ASTER, E-MAS). We invite you to stop by our booth to discuss your space needs. Please ask for Joe Kimchi.

**Tethers Unlimited, Inc.**
**Booth Space: 88**
*www.tethers.com*
Rob Hoyt- *information@tethers.com*

Tethers Unlimited Inc. (TUI) develops advanced propulsion, power, and communications technologies to provide revolutionary capability enhancements and dramatic cost savings for applications in space, sea, and air. TUI was founded in 1994 to develop spacecraft propulsion systems based upon space tether technologies. Since then, TUI has expanded its capabilities to address needs for high-performance components for small satellites, software-defined radio based communications systems, as well as on-orbit manufacturing and assembly of space systems. Among the products on display at TUI's booth will be: the KRAKEN™ Robotic Arm, a high-dexterity, compact manipulator that enables nanosatellites to perform on-orbit servicing missions; the Water Electrolysis Thruster (WET) Propulsion System, a 'green' propulsion technology which enables CubeSats to perform missions requiring orbital agility; and the SWIFT family of Software Defined Radios, which provide high-performance communications, relative position, and synchronization for CubeSats and other small spacecraft.

**Thermal Management Technologies (TMT)**
**Booth Space: 41T**
*www.tmtsdl.com*
Scott Schick- *information@tmtsdl.com*

Thermal Management Technologies (TMT) is a small business focused on applying thermal-mechanical solutions to everyday challenges. TMT brings broad thermal, mechanical, and systems engineering experience and a willingness to work closely with customers to provide valuable engineering services and solutions for challenging industries. As the core of our business, Thermal Management Technologies is developing technologies for the space industry. Two recent items of interest are Thermal Control Panels and Advanced Deployable Radiators. These technologies, developed principally under SBIR funding managed by AFRL, enable highly efficient thermal control of space systems. TMT is also recognized for technologies developed for other industries including cryogenics, non-intrusive thermal flow meters, and water purification solutions. As a small business we are personal with customer needs and our focus is on our customer's success.

**TriSept Corporation**
**Booth Space: 47**
*www.trisept.com*
Daniel Lim- *dlim@trisept.com*

TriSept Corporation is a leading technical services small business comprised of elite industry and technology veterans possessing broad-based space experience to integrate the full program lifecycle. TriSept performed launch integration services for a broad variety of missions on numerous different boosters at all US launch sites and has successfully integrated payloads ranging from over 22,000kgs to CubeSats, including dedicated primary, multi-payload, and rideshare missions. TriSept's primary areas of expertise (space systems, software engineering and security services) provide the satellite and launch vehicle communities with seasoned program managers, systems engineers, and technical consultants. TriSept's personnel have an average of 29+ years experience in all aspects of mission integration. Launch brokering through TriSept enables seamless multi-payload mission planning, execution and contracting, allowing each individual payload to buy their own piece of a mission. We have missions in the planning stage, so please ask about our open slots. TriSept Corporation: Integrity, Expertise, Innovation…

**Tyvak Nano-Satellite Systems LLC**
**Booth 105**
*www.tyvak.com*
Charles S. "Scott" MacGillivray- *scott@tyvak.com*

Tyvak Nano-Satellite Systems LLC provides NanoSat and CubeSat space vehicle products and services that target advanced state-of-the-art capabilities for government and commercial customers to support operationally and scientifically relevant missions. The company provides a full range of products and services that include: 1) Complete CubeSat bus and vehicles to support advanced mission needs, 2) Key components and subsystems to support other organization's internal development activities, 3) Research and Development of advanced performance miniature avionics and mechanisms, 4) Consulting services to assist other organizations with their internal CubeSat projects, and 5) Launch integration services and ground station to support mission operations. Tyvak™ product and system architecture supports the use of standard interfaces to easily integrate with other products. This extensibility enables use of other best-of-class products (e.g., radios, propulsion, mission payloads) to ensure your advanced mission needs are supported.

**Universal Space Network**
**Booth Space: 35-36**
*www.sscspace.com*
Kevin Mortensen- *kmortensen@uspacenet.com*

As a trusted partner, SSC enables hundreds of customers to help Earth benefit from space by providing cost-effective, mission-critical solutions for advanced space programs worldwide. SSC's broad range of systems, products and services is unmatched in the market. Built on decades of experience in developing programs from concept to operation, the SSC Group offers proven expertise in space subsystems and satellite operations, as well as development of rocket systems and experiment payloads. Through SSC's companies: Universal Space Network – an industry leader and world's largest multi-mission, commercial satellite ground network service provider; ECAPS – an innovative green propulsion company with flight-demonstrated technology; and NanoSpace – a Micro Electro Mechanical Systems-based product developer focused on propulsion systems; SSC propels customers to the leading edge of space enterprise with trusted experience, extensive competence and a broad range of solutions.

**Vanguard Space Technologies**
**Booth Space: 13**
*www.vst-inc.com*
Duane Krumweide- *kkimble@vst-inc.com*

**VECTRONIC Aerospace GmbH**
**Booth Space: 107**
*http://www.vectronic-aerospace.com/*
Marcel Anklam- *manklam@vectronic-aerospace.com*

VECTRONIC Aerospace is a manufacturer of electronic subsystems for small satellites, with a domain on attitude determination and control and power control and data handling. The portfolio comprises flight proven components such as star trackers, reaction wheels, magnetometer and magnet torquer, which have shown their reliability in various space missions. Furthermore, VECTRONIC Aerospace offers customer specific solutions for flight, ground support, and laboratory equipment. The company is located in Berlin, Germany, and was founded in 2000. Since then, many international research institutes and universities have trusted in the products and experience of VECTRONIC Aerospace.

**Virginia Commercial Space Flight Authority / Mid-Atlantic Regional Spaceport (VCSFA / MARS)**
**Booth Space: 10**
*http://marsspaceport.com*
Dale K. Nash- *dale.nash@vaspace.org*

MARS is an FAA licensed, fully operational spaceport located at the NASA Wallops Flight Facility on the mid-Atlantic coast. MARS provides low cost access to mid-inclination orbits for small, medium and medium-heavy class ELVs, sub-orbital launchers, RLV launch and landing, and payload recovery. Its location provides unobstructed access to the ISS orbit and is the primary launch site for Antares ISS cargo re-supply services. MARS offers two FAA licensed launch pads, sub-orbital launch rails, vehicle/payload storage and processing facilities, heavy-class horizontal vehicle assembly facility, hypergolic fueling facility, large capacity ELV liquid fueling facility, co-located airport, flexible mission support, and an accommodating schedule for commercial and government aerospace customers. The MARS facilities readily support the Pegasus, Minotaur, Taurus, Athena, Antares and Falcon 9 family of ELVs. Its unique location, capabilities, and cost advantages make it the test, demonstration, and operational launch site of choice for government, commercial, and academic missions.

**VPT, Inc.**
**Booth Space: 110**
www.vptpower.com
Paul Andersen- vptsales@vptpower.com

VPT, Inc. powers space applications worldwide with high reliability, small size DC-DC converters, EMI filters, and custom engineering services. VPT's space qualified series of rad hard DC-DC converters rad hard, TOR compliant, and available on DLA SMDs to MIL-PRF-38534. With engineering modules that typically ship from stock, VPT offers short lead times for the rapid development of your most critical power systems. For 20 years, VPT's award-winning products and engineering services have powered LEO, MEO, GEO and deep space missions for world class organizations including NASA, JPL, SpaceX, ESA, Astrium, ITT, L-3, Orbital, and more. For complete information, visit http://www.vptpower.com.

**Vulcan Wireless, Inc.**
**Booth Space: 79**
*www.vulcanwireless.com*
Kevin Lynaugh- *klynaugh@vulcanwireless.com*

A Proven Partner in Digital Communications. Vulcan Wireless Inc. provides complete turnkey wireless designs for our domestic and international customers. We provide comprehensive, cost effective, engineering services as well as product development. We enable our customers to smoothly transition from marketing concept to mass production. Our customers meet the critical market window by us aggressively supporting their scheduling needs. Vulcan Wireless Inc. is focusing on advanced communications and software defined radios for the small satellite and CubeSat applications. Vulcan provides turnkey software defined radios, antenna systems, encryption, and ground terminals for small satellite systems. Our designs are capable of operating in harsh space as well as small form factor. We have designs that cover VHF to Ka-Band. Please visit our booth for demonstrations and products that meet your overall needs.

**Wyle**
**Booth Space: 93**
*www.wyle.com*

Burt Sanchez- *Burt.sanchez@wyle.com*

Wyle El Segundo, CA - a leading provider of test services to the U.S. and International Space market. Test services include, but not limited to, Vibration, Shock, Acoustic Noise and Thermal Vacuum. Wyle is committed to the Small Satellite market as a test facility that supports testing for Nanosatellites, Picosatellites, and CubeSats. Wyle is also a provider of Rocket Engine testing for smaller payload launch vehicles. Please stop by our booth to discuss your testing needs.

**Xiphos Systems Corporation**
**Booth Space: 95T**
*www.xiphos.com*
Stephane Germain- *stephane.germain@xiphos.com*

Xiphos has provided unique avionics solutions for over 15 years for the nanosat and cubesat market in the US, Canada and internationally. Xiphos solutions are built around flight-proven miniature processing products; examples include RF signal extraction and message demodulation from overlapped, collided, corrupted, Doppler-shifted ship location (AIS) transmissions, remote management of high-resolution images and video (e.g. space station cameras), real-time image and video enhancement techniques, and networked payload interface and control solutions (e.g. ISS payload interfaces). Xiphos solutions "hybridize" software and logic implementation of computing-intensive algorithms and use industrial-grade components in a fault-tolerant architecture intended for use in space environments. We then implement all of the above while minimizing size, mass and energy requirements. The resulting avionics solutions deliver high-end performance at much lower cost than traditional avionics on-board spacecraft.

**ZARM Technik AG**
**Booth Space: 45T**
*http://www.zarm-technik.de/*
Holger W. Oelze- *holger.w.oelze@zarm-technik.de*

ZARM Technik AG was founded in 1997 as a spin-off from the Centre of Applied Space Technology and Microgravity, an institute of the University of Bremen. As the institute successfully contributed to several German Space missions the field of work of ZARM Technik focused on development and manufacturing of components for satellite attitude control system. Since its founding ZARM Technik became one of the leading manufacturers of magnetotorquers and magnetometers in Europe and worldwide. Components produced for satellites are in use on most European and numerously international spacecrafts. ZARM Technik AG manufactures for nearly all large system integrators, universities and Space agencies worldwide. By now more than 95 missions have been supplied. A number of these are in service on orbit for more than years as for instance the Grace mission since 2002. Over the last years ZARM Technik AG has received several awards for successful work in different projects.

# UNIVERSITIES

**Australian National University Research School of Astronomy and Astrophysics**
**Booth Space: 8U**
http://rsaa.anu.edu.au
Dr Naomi Mathers- naomi.mathers@anu.edu.au

The Australian National University (ANU), Advanced Instrumentation and Technology Centre (AITC) is a national facility in Canberra, Australia. It was established to support the development of the next generation of instruments for astronomy. The specialist environments, advanced processes, precision manufacturing and rigorous test requirements, which are essential to meet the needs of the astronomical community, also make the AITC a world-class facility for the assembly, test and integration of space-based instruments and small satellites. The AITC offers an end-to-end capability with expertise in the design, manufacture, integration and test of precision instrumentation and complex systems. In addition to offering professional services, the AITC supports the development of future capability through workshops, academic programs, technical training and practical placements.

**California Polytechnic State University**
**Booth Space: 1U and 6U**
www.cubesat.org
Dr. Jordi Puig-Suari- jpuigsua@calpoly.edu

The CubeSat and PolySat programs started at Cal Poly in 1999 with the objective of providing students with the opportunity to develop and launch satellites in an academic lifetime. The CubeSat program is responsible for maintaining the CubeSat Design Specification (CDS), developing, maintaining and flying the Poly-Picosatellite Orbital Deployer (P-POD) and coordinating launches for CubeSats. The CubeSat Program has successfully tested and integrated 39 P-PODs for 12 missions on 10 different launch vehicles since 2003. The PolySat program, which incorporates a mix of undergraduate and graduate students, has developed and launched 6 different satellites, 3 of which are still on orbit. We are currently developing 4 different projects, 2 of which will be launched within the next 12 months (IPEX and CP9). Cal Poly's motto is "learn by doing," and in that spirit, PolySat develops nearly all of our own subsystems in house. More information can be found at www.polysat.calpoly.edu.

**George Washington University, Micropropulsion and Nanotechnology Laboratory (MpNL)**
**Booth Space: 14U**
https://www.mpnl.seas.gwu.edu/
Dr. Michael Keidar- keidar@gwu.edu

The Micropropulsion and Nanotechnology Laboratory, of the Department of Mechanical and Aerospace Engineering, at The George Washington University (Washington, DC) is active in the experimental and theoretical study of plasmas. Current application areas include plasma propulsion, plasma medicine and plasma-based nanotechnology, and the novel Micro-Cathode Arc Thruster (MCAT) micropropulsion system, designed for use in Small Satellites for Attitude and Orbit Correction applications. In 2012, MCAT technology was selected by NASA Ames Research Center, via a Center Innovation Fund 2013 research grant, "Micro-Cathode Arc Thruster Phonesat Experiment", as a potential in-space propulsion system for LEO operations of a Phonesat, a Cubesat form factor spacecraft bus. In addition, scalable MCAT derivatives are being actively investigated for in-space propulsion needs of a range of spacecraft, from Nanosatellite (1-10 Kg) to bigger than Microsatellite (~100 Kg) in a variety of mission scenarios.

**Montana State University- Bozeman**
**Booth Space: 3U**
www.montana.edu
David Klumpar- klump@physics.montana.edu

The Space Science and Engineering Laboratory at Montana State University was created in 2000 as an interdisciplinary center for space research, space technologies and collegiate-level experiential hands-on training in spaceflight systems. The primary objectives of the program are to perform cutting edge Space Science; to develop operational space capabilities; to develop, apply, and demonstrate technologies for Small Satellites; and to train a new generation of space scientists and space engineers. The laboratory's students and staff have delivered three free-flyer satellites for launch, the most recent of which, The Hiscock Radiation Belt Explorer, continues to operate after 18-months in orbit (as of April 2013). Other laboratory projects have included experiments to International Space Station, rockets and rocket payloads. In CY2013 the laboratory's flight hardware will fly on eleven newly launched satellites including the dual FIREBIRD satellites, PrintSat, and the 8-satellite EDSN swarm. Mountains and minds; "Today's Students – Tomorrow's Engineers and Scientists"

**Naval Postgraduate School, NPS Small Satellite Design Program**
**Booth Space: 5U**
*www.nps.edu/SpaceSystems/*
Dan Sakoda- *dsakoda@nps.edu*

Naval Postgraduate School (NPS) Small Satellite Design Program exhibit displays ongoing research and development in micro- and nano- satellites and access to space programs within the Space Systems Academic Group.

**Space Systems Research Laboratory of Saint Louis University**

**Booth Space: 12U**
cubesat.slu.edu
Michael Swartwout- mswartwo@slu.edu

The Space Systems Research Laboratory (SSRL) of Parks College, Saint Louis University, has delivered two CubeSats for launch: COPPER, an infrared imaging mission will fly in Q3 2013 as part of ORS-3. Argus, a collaboration with Vanderbilt University on improving the modeling of the effects of space radiation on modern electronics, is scheduled to fly in late 2013 as part of ORS-4. Both launches are sponsored by NASA's ELaNa program, and both missions were developed in part with support from AFRL's University Nanosat Program. At our booth, SSRL students will demonstrate the engineering units of both spacecraft and discuss the development of our third mission, Rascal.

**AggieSat Lab, Texas A&M University**
**Booth Space: 13U**
http://aggiesatweb.tamu.edu
Helen L. Reed, Ph.D.- helen.reed@tamu.edu

AggieSat Lab at Texas A&M University has recently been engaged in 3 projects: 1) Lonestar - Working closely with NASA Johnson Space Center and the University of Texas at Austin, a multidisciplinary team of Texas A&M freshmen through graduate students has been designing a 50 kg satellite (AggieSat4) for release from the International Space Station through the airlock via Cyclops in 2014. This is the 2nd in a series of missions to advance autonomous rendezvous & docking technologies of national interest. 2) STARE – The goal of this partnership with Lawrence Livermore National Laboratory and Naval Postgraduate School is to develop pathfinder satellites with optical payloads. 3) The Aerospace Corporation Ground Station Network – AggieSat Lab is hosting a ground station unit that is networked with units in California and Florida to provide command and telemetry coverage across the United States.

**U.S. Naval Academy Satellite Lab**
**Booth Space: 11U**
http://www.usna.edu/AeroDept/
Jin S. Kang- kang@usna.edu

The U.S. Naval Academy Satellite Lab in the Aerospace Department serves students, faculty and staff throughout the Academy, including students in the various Engineering and Weapons Departments. The main focus of the lab is to support small satellite development projects for both students and faculty. Six satellites have been launched and operated in the past, and three more satellites are being developed to be launched in the next two years. Future missions will bring insights to how to implement tethers more effectively in space and optimal use of small satellites for communication capability augmentation and fast response services. Larger scale missions include characterization of orbital debris in LEO and technologies that will reduce the overall mission cost. While the key objective of the program is education and training of the Midshipmen, the satellite lab at the USNA is also dedicated to conducting cutting-edge research in space system technology.

**Colorado Space Grant Consortium (COSGC), University of Colorado at Boulder**
**Booth Space: 4U**
spacegrant.colorado.edu
Brian Sanders- brian.sanders@colorado.edu

The Colorado Space Grant Consortium, based at the University of Colorado at Boulder, provides Colorado students access to space through innovative courses, real-world hands-on satellite programs, and interactive outreach programs. The COSGC has a number of near space ballooning projects, sounding rocket payloads and small satellite development efforts to engage students at any level of experience to help develop tomorrow's workforce for NASA and the Aerospace Industry.

**University of Michigan**
**Booth Space: 10U**

The Michigan Exploration Laboratory (MXL) works to achieve a comprehensive blend of education, research, and entrepreneurship within the University of Michigan College of Engineering. The collaborative MXL environment has already yielded flight-proven achievements in small satellite design and enabling research, with even more innovations resulting from the analysis of completed missions. Based in the department of aerospace engineering, MXL brings together students, researchers, and engineers from across a multitude of academic engineering disciplines in order to create finely tuned and well-balanced engineering design and development teams.

**Surrey Space Centre (SSC), University of Surrey**
**Booth Space: 9U**
www.surrey.ac.uk/ssc
Dr. Chris Bridges- c.p.bridges@surrey.ac.uk

Surrey Space Centre (SSC), at the University of Surrey's Faculty of Engineering and Physical Sciences in the UK, has pioneered small low cost satellites for over 25 years. SSC's 100 strong team of academics, researchers and students have prominent research in technology and science missions for advanced developments for both microsatellite and nanosatellite missions. Our latest mission STRaND-1 has successfully launched and has enabled SSC & SSTL to continue working on advanced concepts. Other missions include CubeSail, a joint SSC & EADS Astrium "solar sail" and electric propulsion technology mission for use in de-orbiting space junk, and AARReST, a joint SSC & CalTech/JPL mission on the next generation

space telescope to autonomously guide reconfigurable mirror elements to form a large aperture. SSC's facilities include air-bearing systems, class 100,000 cleanroom, VHF/UHF GENSO groundstation, thermal-vacuum systems, robotics labs, and formation flying air-cushion propulsion tables; allowing them to carry out world-leading research.

**Texas Spacecraft Laboratory (TSL)**
**Booth Space: 7U**
https://www.facebook.com/UTSatLab
E. Glenn Lightsey- lightsey@mail.utexas.edu

The Texas Spacecraft Laboratory (TSL) at The University of Texas at Austin employs graduate and undergraduate students to design spacecraft and conduct space flight missions. The TSL has launched 3 satellites since 2009 and is working on four missions which will fly in the next 2 years. The TSL is a two-time winner of the national University Nanosatellite Program. Students in the TSL complete all phases of a satellite project, including mission design, spacecraft fabrication, integration and testing, operation, and analysis. Students in the TSL conduct research on space technology and systems related subjects, including: guidance, navigation, and control systems; attitude determination and control; formation flying, satellite swarms, and satellite networks; cooperative control; proximity operations and unmanned spacecraft rendezvous; space based Global Positioning System receivers; radio navigation; visual navigation; propulsion; satellite operations; and space systems engineering.

**Utah State University**
**Booth Space: 2U**
www.usu.edu
Marina Samuels- marina@byubob.com

Three-axis Satellite Simulator and Star Camera: A small satellite simulator with precise attitude determination and control is being designed and implemented in hardware. The simulator will consist of inertial sensors as well as a star camera for attitude determination, and a pyramidal four-wheel momentum exchange system as the control actuators. The simulator will be placed on a spherical air bearing platform to allow three-degree-of-freedom operation. The reaction wheel system will incorporate commercially-off-the-shelf (COTS) components and will serve as a low cost, ground-based version of the micro reaction wheel systems currently being developed for small satellites. Separate research objectives will be addressed by each of the three graduate students developing this small satellite simulator: incorporating Kalman filter estimation using Modified Rodriguez Parameters, star camera integration, and exploring nonlinear control techniques such as feedback linearization.