



STAR-TIDES Technology Demo 2019



Sharing To Accelerate Research - Transformative Innovation for Development and Emergency











Event Schedule





<u>About</u>

STAR-TIDES (Sharing To Accelerate Research-Transformative Innovation for Development and Emergency Support) is a research project dedicated to open-source knowledge sharing to encourage community and individual resilience to natural and man-made disasters and promote human security ("freedom from want "and "freedom from fear"). It stems from a research program at the U.S. National Defense University (NDU) called TIDES. The project provides reachback "knowledge on demand" to decision-makers and those working in the field. It integrates public-private, whole-of-government, and trans-national approaches to achieve unity of action among diverse organizations where there is no unity of control. STAR-TIDES addresses situations within the U.S. or outside, short term and long term, and with or without military involvement. No government organization covers such a range.

TIDES has four strategies that frame everything we do:

- Leverage Global Talent
- Promote Integrated Approaches
- Support Local Societies
- Change Behaviors



- <u>Leverage Global Talent</u>: STAR-TIDES is a global knowledge-sharing network that leverages worldwide talent through some 5,000 members, ranging from universities in Asia to NGOs in Europe, the U.S. military and the Red Cross. The heart of the network is a website, www.star-tides.net, where anyone in the STAR-TIDES community can publish their work for feedback and critique.
- <u>Promote Integrated Approaches</u>: STAR-TIDES infrastructure research seeks integrated approaches among equipment and organizations that support the core needs of populations before, during and after emergencies. It links ten infrastructures: power, shelter, water, integrated combustion and solar cooking, cooling/heating, lighting, sanitation and information & communications technologies (ICT), life support, and logistics.
- <u>Support Local Societies</u>: STAR-TIDES emphasizes the needs of local coalitions of business, government and civil society, with solutions that are suited to their worlds, not ours, and sustainable through the private sector, not government grants. Not all solutions suit all scenarios—building partner nation capacity to stabilize southern archipelagoes after cyclones calls for different answers than supporting mountain earthquake victims in winter.



<u>Change Behavior</u>: We cannot just put new technology into stressed environments and expect it to work. People, organizations, processes and technology must be addressed together and "sociology always trumps technology." STAR-TIDES thus works to connect research across the following areas: (1) Gather, Share and Evaluate Information on Capabilities, (2) Develop Social Networks and Build Trust, (3) Link Policy and Doctrine to Field Operating Procedures, (4) Understand Legal and Regulatory Requirements, (5) Gather and Distribute Resources, and (6) Train, Exercise, Educate and Incentivize to change behaviors and move beyond lessons "observed" to lessons "learned."

STAR-TIDES approaches work best when bottom up projects are facilitated by high-level support and coordination, enabled by global knowledge-sharing. As such, the first step is to establish a national level, public-private coordination mechanism to link local execution efforts to international knowledge and best practices. As the projects develop, the overall STAR-TIDES network coordination team may need to be strengthened to support the increased knowledge sharing activity.

Dr. Linton Wells II

FOUNDER, STAR-TIDES PROJECT

GMU C4I & Cyber Center



Dr. Linton Wells II is currently Executive Advisor for the Community Resilience Lab and the Center of Excellence in Command, Control, Communications, Computing, Intelligence (C4I) and Cyber at George Mason University. He is the former Director of the Center for Technology and National Security Policy (CTNSP) at National Defense University (NDU), and the founder of the TIDES Project and the global STAR-TIDES knowledge-sharing network focusing on building resilience and sustainability at community levels. He is also a Visiting Distinguished Research Professor at NDU. Prior to coming to NDU he served in the

GEORGE

ERSIT

Office of the Secretary of Defense (OSD) from 1991 to 2007, serving last as the Principal Deputy Assistant Secretary of Defense (Networks and Information Integration). In addition, he served as the Acting Assistant Secretary and DoD Chief Information Officer for nearly two years. His other OSD positions included Principal Deputy Assistant Secretary of Defense (Command, Control, Communications and Intelligence-C3I) and Deputy Under Secretary of Defense (Policy Support) in the Office of the Under Secretary of Defense (Policy). In twenty-six years of naval service, Dr. Wells served in a variety of surface ships, including command of a destroyer squadron and guided missile destroyer. In addition, he acquired a wide range of experience in operations analysis; Pacific, Indian Ocean and Middle East affairs; and C3I. Recently he has been focusing on



the Community Resilience Lab and C4I & Cyber Center at GMU, as well as STAR-TIDES. Dr. Wells was born in Luanda, Angola, in 1946. He was graduated from the United States Naval Academy in 1967 and holds a Bachelor of Science degree in physics and oceanography. He attended graduate school at The Johns Hopkins University, receiving a Master of Science in Engineering degree in mathematical sciences and a PhD in international relations. He is also a 1983 graduate of the Japanese National Institute for Defense Studies in Tokyo, the first U.S. naval officer to attend there. Dr. Wells has written widely on security studies in English and Japanese journals. He co-authored Japanese Cruisers of the Pacific War, which was published in 1997 and co-edited Crosscutting Issues in International Transformation, published in 2009. His hobbies include history, the relationship between policy and technology, and scuba diving. He has thrice been awarded the Department of Defense Medal for Distinguished Public Service.

Contact Information

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2019 Exhibitors





TIDES 13th Annual Technology Demonstration

30 September 2019 - 2 October 2019

03:30 pm - 07:00 pm

Merten Hall, 4441 George Mason Blvd, Fairfax, VA

The 13th Annual STAR-TIDES Technology Demonstration was held at Merten Hall, George Mason University (GMU), Fairfax Campus.

The Exhibition at GMU was followed by the TIDES tech demo at the Pentagon Center Court.

Event Schedule

Monday (Sep 30th)	Tueday (Oct 1st)	Wednesday (Oct 2nd)	Thursday (Oct 3rd)	Friday (Oct 4th)
STAR-TIDES Tech Demo	STAR-TIDES Tech Demo	STAR-TIDES Tech Demo	TIDES Tech Demo	TIDES Tech Demo
@ Merten Hall	@ Merten Hall	@ Merten Hall	@ Pentagon	@ Pentagon
11:30AM - 6:00PM (Open)	8:30AM - 6:00PM (Open)	8:30AM - 3:00PM (Open)	9:00AM - 12:00PM (Setup)	9:00AM - 4:00PM (Open)
Mason	Mason	Mason	12:00PM -5:00PM (Open)	



13th Annual Demonstration Speakers

VInt Cerf, Vice President and Chief Internet Evangelist - Google



Widely known as a "Father of the Internet," Cerf is the codesigner of the TCP/IP protocols and the architecture of the Internet. In December 1997, President Bill Clinton presented the U.S. National Medal of Technology to Cerf and his colleague, Robert E. Kahn, for founding and developing the Internet. In 2004, Cerf was the recipient of the ACM Alan M. Turing award (sometimes called the "Nobel Prize of Computer Science") and in

2005 he was given the Presidential Medal of Freedom by President George Bush. Cerf began his work at the United States Department of Defense Advanced Research Projects Agency (DARPA) playing a key role in leading the development of Internet and Internetrelated data packet and security technologies. Since 2005, he has served as vice president and chief Internet evangelist for Google. In this role, he is responsible for identifying new enabling technologies to support the development of advanced, Internet-based products and services. He is also an active public face for Google in the Internet world.

Kenneth Ball, Dean - Volgenau School of Engineering



Kenneth Ball was appointed Dean of the Volgenau School of Engineering in August 2012. He previously served as the L.S. Randolph Professor and Head of the Department of Mechanical Engineering at Virginia Tech from 2004-12, overseeing rapid growth in the department with research expenditures increasing five-fold to approximately \$20M, and with large increases in student enrollment. Prior to his appointment at Virginia Tech, he served for 15 years on the mechanical engineering faculty at The University of Texas at

Austin, where he was the Temple Foundation Endowed Faculty Fellow in Engineering. He is recognized internationally for his research in computational fluid dynamics and heat transfer. He has chaired three international conferences, is a past associate technical editor of the ASME Journal of Heat Transfer, and has served on several other engineering journal editorial boards. He is very involved in engineering program assessment and accreditation activities, both in the U.S. and internationally, particularly in the Middle East. Dr. Ball has supervised 13 PhD dissertations and 29 MS theses.



David Meyer, Mayor – City of Fairfax, VA



David Meyer is serving his second term as Mayor.

Meyer served five terms on the City Council (2008-17). As a Councilmember, Meyer served on the Board of Directors of the Metropolitan Washington Council of Governments (MWCOG), as well as on the MWCOG Transportation Planning Board.

Meyer has served on the board of directors of Historic Fairfax City, Inc. and is a co-author of the book *Fairfax*, *Virginia: A City Traveling*

Through Time. He was a member of the Livable City Task Force and the City of Fairfax Bicentennial Committee, and he served as president of the Old Lee Hills Civic Association. He was on the design committee for Daniels Run Elementary School and served as president of the Fairfax High School PTSA.

Fairfax County Office of Emergency Management (OEM)



The Fairfax County Office of Emergency Management (OEM) coordinates emergency mitigation, preparedness, response and recovery services to the residents of Fairfax County with the appropriate Fairfax County agencies and external partners. This typically occurs in our Emergency Operations Center (EOC) and efforts are guided by the Emergency Operations Plan (EOP), which is reviewed annually and updated every four years. Through outreach our office encourages residents to become more

resilient to ensure they are prepared for emergencies. We also manage the public alert and warning systems for Fairfax County, namely Fairfax Alerts to ensure residents are informed during an emergency.





VIP GlobalNet supported the participants in this STAR-TIDES tech demo through its expertise in business development, capture management and market intelligence. It brings experience in starting upfederal practices for a number of

companies, both large and small, who want to break into the federal marketplace, including lead generation and prospect development, partner development, advising on web and federal publications' presence, contracting, development of governmentspecific collateral, and other activities vital to starting up a federal government practice. We provide capture and proposal consulting for federal contractors and commercial companies.



13th Annual Demonstation Exhibitors

Company	POC	E-Mail
Solar Stik	Brian Bosley	bbosley@solarstik.com
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CYRZTAL CLEAR	Guido Fetta	guido.fetta@ssi-inc.org
HERO	Guido Fetta	guido.fetta@ssi-inc.org
ECO HOUSE	Guido Fetta	guido.fetta@ssi-inc.org
Dynatec Power Unit	Guido Fetta	guido.fetta@ssi-inc.org
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ChillerPlex by SSI	Tom Ashton	tom.ashton@qesttechnolgies.com
BoilerPlex by SSI	Tom Ashton	tom.ashton@qesttechnolgies.com
HydroMax by SSI	Fred Reidenbach	hydromaxinc@earthlink.net
Community Tech	Spencer Deese	spencer@thecommunity.tech
Aerial Applications	Greg Kiser	Greg.Kiser@aerialapplications.com
C6I Services	Tom Wasilewski	twasilewski@c6iservices.com
Sea Machines Robotics	Warren Freda	Wfreda@Sea-Machines.com



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SolarPure	Dave Ludwig	solarpure3@earthlink.net
Amplified Concrete Solutions Global (ACSG) intro by SSI	Brent Trainum	brent.trainum@trainum.net
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US Green Battery	Falguni Trevedi	usgb.info@gmail.com
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World Housing Solution	Ron Ben-Zeev	ronb@worldhousingsolution.com
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VIP GlobalNet, LLC.

VIP GlobalNet, LLC. is an information-based company providing numerous forums for the dissemination of top-notch information to clients around the globe through Conferences, Seminars, Expos, Summits, Symposiums and Meetings. Each event is custom-tailored to meet the needs of the topic at hand



by providing cutting-edge information through the perfect mix of presentation talent and technology.

Our Mission...

To facilitate the transfer of relevant knowledge within various industries allowing our participants to maintain a competitive advantage.

VIP GlobalNet, LLC. brings expertise in starting up federal practices for a number of companies, both large and small, who want to break into the federal marketplace, including lead generation and prospect development, partner development, advising on web and federal publications' presence, contracting, development of government-specific collateral, and other activities vital to starting up a federal government practice. We provide capture and proposal consulting for federal contractors and commercial companies.

VIP GlobalNet, LLC. provides business development, capture management, and market intelligence services to companies in the intelligence community and the DoD. We support our client's meetings with government agencies, potential prime contractors, potential teammates, and potential partners, all with the purpose of driving and closing business. We provide research assistance on upcoming acquisitions within the client's area of organic expertise as well as near neighbor mission areas.

For more information, contact Prateek Kumar: PrateekKumar@VIPGlobalNet.com

VIP Is currently supporting these companies.

- Frequency Electronics, Inc
- S2 Corporation
- ORTEC







FREQUENCY ELECTRONICS, INC.

FEI-Elcom Tech, Inc.

Designer and Manufacturer of RF/Microwave Synthesizers, Receivers, Tuners and Converters High-tech provider of precision time and frequency products used to synchronize voice, data and video transmissions in wireless communications systems. These systems are found in both ground-based stations and on-board commercial satellites.

QUARTZ MASTER CLOCKS



Quartz master clocks are *critical* for satellite communication. Internal satellite clocks and earth clocks must be in perfect synchronization.



GPS and secure timing capabilities

FEI-Zyfer provides GPS and secure timing ("SAASM") capabilities for critical military and commercial applications; FEI-Elcom Tech provides sub-systems for Electronic Warfare ("EW") and added resources for state-of-the-art RF microwave products.wireless communications systems. These systems are found in both ground-based stations and on-board commercial satellites.







CHEMICAL WEAPONS IDENTIFICATION

Portable Isotopic Neutron Spectroscopy (PINS) Systems

 Neutron-based, non-destructive assay system

 Senses chemicals inside thick steel containers and quickly determines if the contents are hazardous

• Designed to identify chemicals inside a container without the need for disassembly, contact, physical sampling or breech

Detective-200

Ruggedized, Ultra-High-Sensitivity, Transportable HPGe Radionuclide Identification System







Step 1 PINS uses atomic particles called neutrons.



Step 2 Neutrons pecetrate container walls and interact with atomic nuclei. The nuclei emit radiation colled gamma rays.

Step 3

The energy intensity pattern, or spectrum, of these gamma rays is unique for each chemical element.



Step 4

Analysis of a recovered item's unique gamma ray spectrum allows for identification of key chemical elements.



DRATION

THE SPECTRUM IN A FLASH

Unmatched high bandwidth capability to detect, characterize, and geolocate RF emitters and threats. 100% probability of intercept

GEO-LOCATION



FULL GEO-LOCATION BASED ON RF DIRECTION FINDING.

RF COMMUNICATIONS



ADAPTIVE AND COVERT RF COMMUNICATION SYSTEMS.

RADAR RECEIVER



RADAR RANGE-DOPPLER RECEIVER SYSTEM.

Kinkal Ket LLC





Strategic Solutions Integrated, Inc. (SSI) is Veteran-Owned small business headquartered in Reston, VA outside of the nation's capital. The company provides strategic advisory services for the public and private sectors. SSI's involvement with the energy and water industry is through development of highly innovative and disruptive technology. In support of STAR-TIDES, SSI

will feature cutting-edge, disruptive technology designed to provide solutions to the water industry's tough challenges of eliminating heavy metals from water, eliminating perfluoroalkyl substances (PFAS/PFOS), and providing a highly efficient reverse osmosis filter technology. Introduction of Eco House building technology for water and energy will also be featured.

<u>Access</u> Access to organizations with:

assessment

Independent analysis and

Subject matter expertise

Unmatched expertise on unique acquisition

Concept development Advisory support

methods to accelerate opportunities



Insight

- Opportunity to understand and leverage requirements, capability gaps and needs, and the funding picture
- Understanding of the strategic environment and its impact on the future direction of initiatives and the opportunities offered

Expertise

Consulting expertise in key cylinders of industry:

- Department of Defense, Department of Homeland Security, and Department of Health and Human Services
- Clean Water Industry
- Space Propulsion Systems
- · Cyber Security
- Innovation and Disruptive Technology





STAR TIDES Technologies: THE CRYZTAL CLEAR™ PFOA/PFOS

CHALLENGE

One of the primary concerns about PFOS and PFOA is that they are very persistent chemicals. As complex synthetic substances, they are not easily broken-down or degraded by natural processes. This means that once PFOS and PFOA are released into the environment they don't easily go away. Scientists have struggled to find ways to destroy or neutralize the chemicals, and there has been little success using even the most advanced technological strategies.

In March 2018, the Pentagon said there were <u>401 installations</u> where there are known or suspected releases of the two-best known PFAS chemicals, PFOS and PFOA, into groundwater. Source: DOD PowerPoint, Mar 2018



The Problem with PFOS and PFOA

These substances are durable, strong, poisonous materials which have the capacity to accumulate in the human body. The presence of levels over 70 parts per trillion in community water supplies is not safe. This can be equated to just one drop of the chemicals in 20 Olympic sized swimming pools. As of March 2019, at least 610 locations in 43 states are known to be contaminated, including drinking water systems serving an estimated 19 million people.

PFOA and PFOS in drinking water are carcinogenic. And are linked with increased risk for at least six major diseases:

Diagnosed High Cholesterol / Ulcerative Colitis / Thyroid Cancer / Testicular Cancer /Kidney Cancer

PFOA and PFOS could also be dangerous to pregnant women. Some studies have linked the chemicals to fetal growth problems, including low birth weight.

PFOA/PFOS may cause kidney, developmental, and reproductive issues; once in the body PFOS and PFOA have a half-life ranging from 2-9 years, which means that they persist in humans for a significant amount of time.

What is the CRYZTAL CLEAR**

Cryztal-clear is a technology which uses cavitation that is induced by piezo crystals. The cavitation causes intense heat within the acidic environment of a cavitation microbubble. The conditions created by this technology cause PFOS and PFOA compounds to be broken into short chain molecules which are less harmful than the PFOS and PFOA materials. The technology is comparable to a combustion process for eliminating PFOS and PFOA. The Cryztal Clear technology is scalable and capable of industrial scale reduction of PFOS and PFOA compounds.

CRYZTAL CLEAR Impact

- Scalable
- Fixed/Mobile Ops
- No Filter Required
- Min Maintenance
- Remote Monitoring
- Cost Efficient <\$.50/ Gallon for concentrated AFFF materials

Technology Talk

- Cryztal Clear eliminates PFOA and PFOS materials.
- This technology has been demonstrated to eliminate PFOS/PFOA.
- The technology is versatile and can be combined with other unit operations for large scale water clean-up.
- SSI's Cryztal Clear is proprietary technology which is a costeffective system for PFOS/PFOA mitigation





THE HERO™ (Highly Efficient Reverse Osmosis) Ocean View, VA – Ocean Water

Challenge

To create a highly efficient, low cost, mobile reverse osmosis processing system that can clean a wide variety of contaminated water sources for remote and emergency applications



Ocean View, VA: Seawater samples were taken from this area because of the runoff pipes that dump overflow water from the sewage system onto the beach area when that system is overloaded. It has a high salinity content and residual pollution from local and areas such as Norfolk. Because of this runoff there are numerous beach closings after any significant rainfall.

Ocean Water Pollution Issues

Most ocean pollution begins on land. Much of this runoff flows to the sea, carrying with it agricultural fertilizers and pesticides. Eighty percent of pollution to the marine environment comes from the land. ... Nonpoint source pollution can make river and ocean water unsafe for humans and wildlife. Swimming in polluted water exposes recreational users to disease-causing microorganisms, called pathogens, which are associated with a range of enteric and non-enteric illnesses. The most common recreational water illness (RWI) is acute gastrointestinal illness (AGI). AGI Symptoms include nausea, vomiting, diarrhea, stomachache, and fever. Many countries in the world draw their water source from the oceans via Desalination operations near shore where nonpoint pollution is present. A combination of the Desalination process and cleaning harmful contaminants from the source water is costly.

What Is The HERO[™]

The hero is a mobile desalination unit which uses reverse osmosis membranes to clean seawater, brackish water, and other contaminated water. The mobile unit can be equipped with optional ultraviolet, mineralization, ozonation, and pretreatment components to handle your specific water cleaning needs. The hero units come with onboard electrical generation capacity to run the reverse osmosis pumps, the optional equipment, and additional equipment that may be required on-site. The versatile, mobile unit can generate clean water, drinking water, and construction water for remote locations, or locations which require emergency water supplies.

HERO™ Impact

Technology Talk

Scalable Fixed and Mobile Ops Min Maintenance / Remote Monitoring Cost Efficient - <\$0.02/ Gallon operating cost SSI is developing a new reverse osmosis membrane to incorporate into our Hero unit. It is estimated that operating pressure for typical seawater desalination is less than 300 psi. The Hero is scalable from 1000 to more than 40,000 gpd.





Quantum Mechanical Systems (QMS) HydroPlex™

brought to you by Strategic Solutions Integrated, Inc.

The HydroPlex™ is a revolutionary breakthrough in cooling tower maintenance — the only turnkey maintenance solution that completely resolves all water treatment issues normally associated with cooling tower/chiller system operation. An advanced water treatment solution for steam and water circulating HVAC systems that provides **RESULTS** all companies seek.

Increased revenues

Rapid return on investment

Improved safety environment

Reduced environmental footprint

Some of the advantages QMS HydroPlex= brings our customers:

- Uses physics not chemistry to keep towers & equipment free of scale, algae, and bacteria
- Kills all bacteria within the cooling towers using copper and silver ionization, eliminating
- Legionella without the use of any toxic polluting chemicals
- Filters particulate contaminants and removes chlorine and disinfection by-products
- Highly energy efficient and reduces maintenance due to effective treatment of water
- Green profile with LEED certification capability
- Treats Causes, not Symptoms

Enjoy the cost benefits: Facility

liability risk reduction;

Reduction/elimination of toxic chemicals; Increased thermal transfer efficiency; Reduced operation costs; Reduced maintenance; Real-time electronic system monitoring; Eliminates paying sewer charges with optional deduct meter on tower water bleed off.

Feel proud of the environmental

benefits: Significantly reduces water consumption; eliminates need for toxic chemicals.



HydroPlex on Standard Water Cooling Tower





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The Smart ECO House

The SMART ECO HOUSE HYDROFLEX HYDAC/CRYSTAL CLEAR HYDAC/CRYSTAC CLEAR S3D / sheed are insolve programming UHDAC technology works on the providable of hydrodynamic containing using an entranto instruct fluid Hybrid create a greature ring in the Hudditectorizement of the online resulting in short lived microbubbles. When the Water Cooling Tower tial, non-characterizationates of the secting 3 Nevert minimizing alcordarianation including Legislands manybubbles sallague, they induce temperatures that tan result up to 15,189 K, which cause chemistals, heavy metals, and lossingicals to be denotrated and 111 Nambing • Draward acade to immedia apartiting efficient rendered thert. The institutie sets precipitate out and are removed. The HYDAZ eliminates a logit percentage of heavy metals, visues, and 48 in ing · Automaturamoual of debric from cooling tower basin Continuum of the control terms water Control and splitness summing terms control duritiesty Montage and prevent contensor biologicals. Significantly reduces water and electric consumption The Bettern Line: · 20-30% savings on cooling tower value and alextre consumption • Typical NOL writter 24 to 36 months Main Water · Prevent monokiplage al parkateration including ****** Inlet. Betwee the safety roks of chemical storage and 100 Filterboller, hut Molled water loops Prevent state formation to moreose operating 111 64.00 · Munitor and prevent corroson Reduce maintenance and increase egurpment life **Barrar** 27% payings in electric computation Double lifespan of bodient and closed loops Typical RCF within 24 to 34 months **Power Reduction Unit** Montest pour electricity mean efficient; class genere spikes and loovers processament denteed. Montest pour herearens: in the building from extended and internetion or Rearcest visiting intervene phased, classes endage and phase. Konstitution intervene phased. HYDROMAK/HERD 2 3 Max reverse concust systems are designed to misally remove up to 95.6% of the dissolved safe. Hydroddax reverse cores Insprovatible generative realizing thereas in certain buildings Instanti for able systems and 5 models for 2004 systems performing payments in as title as 12 months. · textualization moto do not sensed 25% Represente on agring maintenance cells Connects in parallel through a spare treasen in your electrical parall Dool not require customer's agrigment to be invicted off itumg installation



- Works with variable speed drives and any vesting power quality technology on site
 Inspresentile participants of power states and compressors
 Inspresentile participants of renewable energy systems when added to DC meetings

- Description Provers, pate bloanairth.
- Bernefits
- · harmone the safety mile of chemical storage and

BOILERPLEX/CHILLERPLEX

Benefit::

- Legiorielle
- · handing
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- The Bottom Line:



15% of the total organic content and over 30% of all particulate and collocial insternal from water lipidicaMae review contours systems are identify outed. for use at the printary means of water purification, as pretreatment to manifiled devances for altre pure water service, and for any other application requiring righ quality, purchad uniter. HERC



The Dynatek Power Unit (DPU)

brought to you by Strategic Solutions Integrated, Inc.









The DPU is a comprehensive solution to power management with a small footprint that is easily installed for a variety of customer requirements ranging from small to large applications.

Use what you pay for - only pay for what you use! The DPU

- · Makes your electricity more efficient
- Clips power spikes and lowers your maximum demand
- Mitigates the harmonics in the building from external and internal sources
- Balances voltage between phases
- Suppresses voltage sags and swells optimizing electrical voltage to equipment
- Improves the power factor reducing charges in certain buildings
- 5 models for 480V systems and 5 models for 208V systems
- Provides lightning protection for your building.
- · Provides reduction payback in as little as 12 months
- Installation costs do not exceed 35%
- · Requires no on-going maintenance costs
- · Connects in parallel through a spare breaker in your electrical panel
- Does not require customer's equipment to be switched off during installation
- Works with variable speed drives and any existing power quality technology on site
- Improves the performance of your motors and compressors.
- · Improves the performance of renewable energy systems when added to DC inverters

Multiple Benefits

kWh reduction kW spike elipping Voltage optimization Harmonic filtration Phase balancing Power factor correction Sag & surge mitigation Surge & lightning suppression Reduced maintenance on equipment Customers are saving between 15% and 26%







- Based upon an electromagnetic reactor core utilizing patented twin toroidal power quality transformer technology, ٠ the DPU consistently reduces kWh consumption and kW demand from 10-20%.
- The DPU electromagnetic reactor core dynamically monitors the incoming power from the electric utility and corrects any anomalies before they reach your electrical systems and sensitive electronic equipment.
- The DPU then monitors all the electric power running throughout your facility. ٠ instantaneously correcting any sensed anomalies as they occur.
- ٠ Electric current degraded by internal systems and loads cannot be utilized by other devices, so that portion of the energy you pay for at the meter is wasted.
- The reactor core captures the distorted, wasted energy and transforms it back into usable energy and then releases it ٠ into the building electrical network as your equipment and systems call for it.
- The DPU is the only known product that offers harmonic filtering, power factor correction, sag and surge mitigation, surge and transient clipping, phase imbalance, high voltage surge protection, and voltage optimization in a single package.



Harmonic Reduction Adjusting the spectral content of site voltage

and current waveforms that are comprised of frequencies other than the fundamental 60 Hz.



Surge Suppression

Reducing the effects of suddenly present high voltage disturbances like lightning that appear

Sags Mitigation

Phase Balancing

Technology Highlights



Compensating for changes in supply voltage that appear as reductions in the peak value of the supply voltage at various times and conditions,

values on individual supply phases.

Compensating for asymmetrical differences in power magnitudes that appear as differing site current draw

to be mixed in with the supply voltage or current.



Phase Angle Alignment Compensating for changes in site voltage



In-Rush Current Limiting

Compensating for changes in site voltage and current magnitudes that appear as sharp rises in peak current value when large loads switch on.

and current relationship that appear as angular

offsets between voltage and current at various times



Swells Mitigation

Compensating for changes in supply voltage that appear as expansions in the peak value of the supply voltage at various times and conditions.

Feature	Description	Consumer Benefit
Electromagnetic Solid- State Reactor Core	Evenly distributes load, captures wasted energy, and regenerates lost energy to usable power	Reduces power consumption and provides a reduction of kWh and kW from $10\%\mathchar`-20\%$
Lightning Protection and Surge Suppression	Provides whole building lightning protection and surge suppression	No need to purchase lighting protection or surge suppression devices for the building or individual equipment
Eliminates Harmonic Distortion	Patented active filtration technology	Reduces equipment maintenance and extends equipment life. No need to purchase harmonic filters for individual equipment.
Eliminates Sags and Swells	Energy management techniques balances the voltage supplied to equipment	Reduces impact on sensitive electronic control equipment eliminating waste for downtime
Phase Balancing	Distributes load across each phase evenly	Contributes to kWh savings and reduces infrastructure costs
Power Factor Correction	Power management techniques	Reduces Demand Charges levied by utility company.

Start Saving YOUR Company Energy Costs Today Contact

George Cunningham (703) 338-5177

Stephen Palac Jr. (330) 448-8005







BoilerPlex Water Loop Treatment System



1. PATENTED WATER CONDITIONER PREVENTS HARD WATER SCALE FORMATION

2. IONIZATION CONTROL UNIT ASSURES ACCURATE ION GENERATION

3. PATENTED ION GENERATING CELL ELIMINATES MICROBIOLOGICAL CONTAMINATION

4. MULTI STAGE FILTER ELIMINATES CIRCULATING PARTICULATES AND RUST

5. CIRCULATION PUMP MAINTAINS CONSTANT TREATMENT

6. CORROSION MONITOR CONTINUOUSLY MONITORS THE PLUMBING COMPONENTS AND PROVIDES A WARNING IF CORROSION IS OCCURRING

7.1 ½" SQUARE STOCK, FREE STANDING FRAME



Quantum Manufactured Systems



BoilerPlex Water Loop Treatment System

Distributed by Brilliant Source Energy

ABSTRACT

A comprehensive system designed to effectively treat chilled or hot water loops with minimal risk of handling treatment chemicals, and minimal time and maintenance requirements by personnel, while providing cost effective protection from microbiological contamination, erosive circulating particulates and energy robbing scale formation.

The Chilled Water Loop System[™] is comprised of the following equipment:

- · CWI series scale control unit
 - Filter
 - · Copper/Silver ionizer for bacteria control
 - · Ion generator control panel
 - · Pump

GENERAL

The BoilerPlex Water Loop System is designed as a self contained side stream to the existing loop. It pulls water from a position in the loop where the highest concentration of particulates are most likely to be found. The system will remove any existing scale and prevent the further accumulation of hard water scale while removing any circulating particles and eliminate microbiological contamination It will not interfere with the operation of the loop, or change any of the designed parameters of water flow or heat transfer.

COMPONENT

<u>CWI scale control unit</u> for the reduction or elimination of hard water scale. This component will prevent the formation of hard water scale without the use of chemicals, salt or electricity, The CVI unit will alter the structure of the electrically charged particles (ions of calcium and magnesium salts) to remove and/or prevent the formation of hard scale in the plumbing and in the colls. This component requires no maintenance. OPERATION

The CWI unit functions continuously and without any operator input or power requirements. Water is forced through the CWI system pump.

RESULTS

The system will operate far more efficiently when scale free. Considerable savings in energy are the result. Prolonged equipment life is an additional benefit.

COMPONENT

CorrView Corrosion Monitor Continuously monitors the loop plumbing and warns the operator if corrosion is occurring. OPERATION

The ConView unit is threaded into the loop system plumbing. The center of the ConView unit is a clear window. Behind the window is a white material. The back of the unit sticks into the water flow through the pipe. A plate on the back is 40 thousands of an inch thick. If this plate corrodes through, water will fill the hollow chamber that contains the white material, causing the material to tum red. **RESULTS**

If the operator sees the red window in the CorrView unit, it displays that there is corrosion occurring in the loop plumbing. The customer is provided with ample warning to take action before damage can destroy the loop and related components.

COMPONENT

Filter for removing particulates. This component will separate out the solids, including scale, rust etc. that are removed from the coils and other plumbing. The filter element is serviced as required to ensure clean water will circulate throughout the loop and all related equipment.

OPERATION

The filter element is either a bag or pleated element type dependent on the condition and requirements of each specific application. The filter housing is designed for ease of maintenance and the elements are cleanable or replaceable at low cost.

RESULTS

Circulating particulates, down to 5 to 20 microns, will be removed. This will prevent abrasive action on pumps, at elbows and in other areas of the loop system. Removing this debris will also lessen the chance of plugging the coils, controls and valves.

COMPONENT

<u>Copper/Silver Ion Generator</u> creates ions of Copper/Silver to eradicate microbiological contamination without the need for toxic and corrosive chemicals.

OPERATION

The ionizer electrodes are a sacrificial blend of silver and copper. A low voltage DC current is used to generate ions of silver and copper which are then swept into the circulating water. The quantity of ions generated are regulated by an adjustable duty cycle timer. BESULTS

Silver effectively kills bacteria. This system destroys any bacteria present without the need for toxic and polluting chemicais.

COMPONENT

Ion Generator Control Panel controls the output of Copper/Silver ions to insure economic operation while providing a sufficient quantity of ions to eliminate microbiological contamination. OPERATION

The controller converts 120 vac to low voltage DC current to power the sacrificial Copper/Silver anode. The duty cycle timer can be field programmed to maintain 1.0 ppm of copper in the water. **RESULTS** The quantity of Copper/Silver ions is easily maintained at prescribed levels with very little operator attention.

COMPONENT

Pump for continuous cleaning and permanent protection. The Water Loop System operates as a self contained side stream that includes it's own pump sized for the particular installation. This ensures continuous cleaning of the loop for maximum efficiency of heat transfer.

OPERATION

The pump is sized for the application and is wired to accommodate existing electrical availability.

RESULTS

The pump ensurers that the system will have proper water flow for optimum performance and efficiency.



Brilliant Source Energy 46 Front Street Berea, OH 44017 BrilliantSourceEnergy.com





HydroPlex Water Treatment System



1.PATENTED SCALE CONTROL SYSTEM PREVENTS HARD WATER SCALE FROM FORMING THROUGHOUT THE TOWER/CHILLER SYSTEM

2. ION GENERATING CELL CONTROLS ALGAE, BACTERIA AND LEGIONELLA

3. IONIZATION CONTROL UNIT ASSURES ACCURATE ION GENERATION

4. CENTRIFUGAL FILTER CLEANS TOWER SYSTEM WATER

5. AUTOMATIC PURGE VALVE PURGES SOLIDS FROM THE FILTER AND CONSERVES WATER

6. CIRCULATION PUMP MAINTAINS CONSTANT TREATMENT

7. SWEEPER JET SYSTEM CONSTANTLY CLEANS TOWER BASIN

8. CONDUCTIVITY CONTROL

9. CORROSION MONITOR



Quantum Manufactured Systems



HydroPlex Water Treatment System

Distributed by Brilliant Source Energy

ABSTRACT

The HydroPlex[™] is a synergistic, self-contained, chemical free system for the treatment of cooling towers. The HydroPlex[™] is standalone, side-streamed equipment that includes a circulation pump separate from your tower system. The HydroPlex[™] does not interfere with the operation of your cooling tower.

The HydroPlex[™] is comprised of the following equipment:

- · CWI Series scale control unit
 - · Centrifugal liquid solid separator
 - Automatic programmable purge valve
- Programmable copper/silver ion generator
- · Sweeper jets installed in the tower basin and
- powered by the HydroPlex pump
- Conductivity control

COMPONENT

<u>CWI SCALE CONTROL UNIT</u> for the control of hard water scale. This component will prevent the formation of hard water scale without the use of chemicals, salt or electricity.

OPERATION Installed as an integral component of the HydroPlex, in the NEMA 4 cabinet, the CWI unit will alter the structure of the electrically charged molecules (ions of calcium and magnesium salts) to form a soft sludge rather than a hard scale on the condenser tubes, tower fill and all other chiller/tower components and plumbing. The resulting sludge is removed by the purge (tower bleed system). This component requires no maintenance or operator attention.

RESULTS (eliminate toxic chemicals, conserve energy)

The tower/chiller will operate far more economically when scale free. Considerable savings in energy are the result. Prolonged system life is an additional benefit. A scale free tower/chiller system will conserve energy by operating far more efficiently. Additionally, the soft, water soluble film that forms on the chiller tubes helps to prevent corrosion without inhibiting heat transfer.

COMPONENT

CENTRIFUGAL FILTER will remove tower system debris normally associated with cooling towers. Cooling tower basin, or remote sump debris, harbor bacteria, including Legionella, and other bio-mass. Additionally abrasive particulates, if not removed, will circulate throughout the tower/chiller system causing accelerated wear, and can accumulate in low flow areas of the condenser. This mess normally requires extensive maintenance to clean out each year, if not more frequently. OPERATION This component operates without any moving parts. The pump integrated into the HydroPlex supplies water flow through the centrifugal. Clean water is returned to the tower while the particulates are contained in a separate component until purged.

RESULTS (reduce maintenance)

The debris normally associated with tower operation will be continuously removed as it tries to form in the tower basin. The basin will remain clean and free from any feed and breed ground for the formation of bio-mass, bacteria, including Legionella, and other undesirable materials.

The HydroPlex¹⁴ for complete cooling tower/chiller treatment requires only minimal attention by maintenance personnel to achieve economical, chemical free, maximum performance and protection.

COMPONENT

AUTOMATIC BLEED VALVE AND TIMER is integrated into the HydroPlex. The valve requires 120V electrical connection.

OPERATION The timer is programmable to meet the specific requirements of each installation. Normally the timer is set to bleed the tower for 15 seconds every four hours.

RESULTS (conserve water) The bleed valve will purge the debris captured by the filter and remove them from the tower water.

COMPONENT

COPPER/SILVER ION GENERATOR produces environmentally friendly and benign ions of copper (90%) and silver (10%) for economical and effective control of algae, bacteria i ncluding Legionella, and other bio-mass.

OPERATION Operates by passing low voltage DC current through a cell containing a blend of 90% copper and 10% silver in a sacrificial anode bar,. The concentration of copper/silver lons is

programmable through the HydroPlex control panel. Weekly copper level tests insure economical and effective biological control. The discharge of water containing the ions meets EPA standards.

RESULTS (eliminate toxic biocides) This treatment has been proven to be far more effective than traditional chemical treatment methods, and at a fraction of the price. Additionally, chemical treatments are highly toxic and polluting. The HydroPlex eliminates the need to handle, use and discharge these chemicals into the environment.

COMPONENT

SWEEPER JET SYSTEM will constantly flush the tower basin to remove any debris.

OPERATION The discharge water from the HydroPlex is pumped back to the tower basin through a series of sweeper jets which direct all the debris to the condenser supply. A "Spool Piece" is installed in this supply pipe to reduce the velocity of the water. A six inch tap at the end of the "Spool Piece" taps off water to supply the suction side of the HydroPlex pump.

RESULTS (eliminate breed grounds for Legionella, reduce

maintenance) Keeping the tower basin clean is absolutely essential for proper maintenance and control of algae, biomass and Legionella. The solution reduces hours of maintenance and eliminates potential contact with biological contamination.

COMPONENT

CORROSION MONITOR threads into the bailer piping. OPERATION The corrosion monitor threads into the bailer piping. The unit is a 1 1/2° plug with a hollow center. It is filled with a white material that turns red if water gets into the hollow center. A .040 plate is on the back of the unit. If the plate corrodes through, it allows water to fill the hollow chamber. There is a clear window on the front of the unit so that the red can be seen.

RESULTS (immediate detection) Gives ample warning if there is corrosion occurring in the boiler/loop system.

COMPONENT

CONDUCTIVITY CONTROL This field programmable component will maintain tower/chiller water at manufacturers recommended conductivity.

OPERATION Tower water is continuously monitored and bled off as necessary to maintain tower conductivity at prescribed levels. The water is bled through the HydroPlex bleed valve so no additional equipment is needed.

RESULTS (automatic conductivity control) Conductivity control is essential to allow the other HydroPlex components to operate at optimum efficiency. Scale and biological control will provide trouble free efficient operation while reducing maintenance and premature equipment failure.



MFIS Multi-Factor Intelligent Security[®]



Gatekeeper's Multi-Factor Intelligent Security (MFIS)[¬] combines several Gatekeeper solutions into one integrated platform to identify potential risks across vehicles, occupants, and cargo. With multiple factors of authentication—facial recognition, license plate analytics, vehicle classification, and undercarriage threat detection— Gatekeeper delivers the actionable intelligence that matters most for security.



With multiple levels of analysis, MFIS" is designed to work in the background, and engineered to rapidly filter out non-threats, while highlighting only the real ones—to save time and secure border crossings, ports of entry, industrial facilities, and transportation hubs.





Facial Recognition Intelligent Vehicle Occupant Detection (IVOD)TM

Performs real-time facial detection and recognition of all vehicle occupants (both front and rear seats) under a variety of challenging conditions including day, night, inclement weather, high-glare sunlight, and through heavily tinted glass.

License Plate Analytics

Intelligent License Plate Analytics (ILPA)™

Employing advanced machine learning, captures high-resolution images of vehicle and truck license plates to accurately provide the plates alpha-numeric value, country and state of origin under all environmental conditions.

Vehicle Classification

Intelligent Vehicle Classification Analytics (IVCA)™

Through use of advanced analytics, classifies make, model, and color of a vehicle, providing additional authentication when securing borders, controlling facility access, and in the identification of key vehicle information for use in higher level analytics.

Undercarriage Threat Detection

Intelligent Vehicle Undercarriage Scanner (IVUS)™

Using advanced signal processing, generates a "digital fingerprint" to automatically inspect a vehicle's undercarriage to identify make and model, detect foreign objects and anomalies, and provide alerts regarding potential threats—all within a matter of seconds.

LEARN MORE

gatekeepersecurity.com/multi-factor-intelligent-security

Multi-Factor Intelligent Security (MFIS)™

- Actionable intelligence in one integrated platform
- Identify multiple risks simultaneously
- Secure border crossings, ports of entry industrial facilities, and transportation hubs

Why Gatekeeper?

Since 2004—with over 1500 instatiations in more than 30 countries—Gatekeeper has the depth and breadth of experience that ensures our systems perform at unprecedented levels of accuracy availability and reliability. Our quality management and commitment to providing customer solutions mean our systems—proudly made in the USA—function without fail in the harshest of operating conditions. State-of-the-art research and development facilities staffed with highly credentialed scientists and engineers keep us on the cutting edge of intelligent optical inspection technology. With numerous patents granted and pending, we continue to lead the field in intelligent optical inspection technology innovations. Gatekeeper systems protect life and property at many of the most recognizable landmarks around the world.

- Trusted by the US Defense Department. Pentagon and scores of other military facilities in the US and overseas.
- Relied on by The US Dept of Homeland Security to protect its headquarters as well as countless sensitive facilities.
- Industry leader in border security—with over 2.5 million vehicles inspected at border crossings each year.
- Protecting several globally recognized hotel and resort chains and properties.
- Deployed at more royal palaces, presidential residences, embassies and critical government buildings than any other similar technology.

Washington D.C. - Philadelphia - Miami - Mexico City - London - Oubai - Riyadh GatekeeperSecurity.com



Aerial Applications

GEOINT for all your ops. Sharable. Secure. On any device.



How can drone mapping improve your Team?

Your team can act smarter, faster, and with greater precision. Experience sustainable, reliable improvements to ops efficiency.

Geospatial Intelligence (GEOINT) can drastically reduce costs for property and infrastructure management ops. Drone mapping makes it easy to see the "big picture." Aerial Applications makes it easy to integrate drone-based GEOINT into your operations to remove guesswork, improve safety, and automate human-intensive field surveying. Aerial Applications' software takes the grunt work out of GIS data modeling, analysis, and reporting by combining GPU-accelerated data processing with machine-learning analysis.

Our secure cloud-based processing makes information easily sharable, while eliminating the computational burdens that routinely cause computers to crash while generating 3D models.







"[The Aerial Applications] project is one of those rare instances where you can massively increase operational effectiveness while improving efficiency and reducing cost... It didn't take me more than five seconds to recognize the potential for Air Force wide impact."

- Marc Vandeveer, AFIMSC Chief Innovation Officer

Drone(s) collect data, supporting multiple sensors or drones collecting data simultaneously for rapid wide-area coverage Standard image files are uploaded to Aerial Applications for processing, either in mobile processing units, or in the cloud Processing deliverables are rendered as togglable map layers, and can be shared via permission to disseminate situational awareness

Want to learn more?

Contact Us

sales@aerialapplications.com (215) 550-1823 www.aerialapplications.com/ST19



Scan to Visit Our Website



AIRMICROGRID"



Next-Generation Microgrid Solutions CONUS, Africa Converting Obsolete Power Plants into Microgrids and Data Centers Star-Tides September 30-October 4, 2019

The US Military has been an enthusiastic early adapter of microgrids in efforts to ensure the power stays on in mission-critical operations

- US DOD contractors are deploying resilient microgrids to ensure base security
- Exacerbating the energy security mission; 18 coal plants serving U5 military bases will be closed in 2-3 years

In 2015, the U.S. led the world into the 4th Industrial Revolution ("4IR') known as the Cyber-Physical Revolution

4IRMicrogrid[™] demolishes, decommissions, cleans and repositions 2IR power plants into cyber-secure 4IR microgrids and data centers

4IRMicrogrid[™] Advantages

- Reposition Shuttered Coal/Nuclear Plants into Microgrids
 - 4IRMicrogrid[™] partner has \$1 billion track record decommissioning 2IR and 3IR power plants
 - Already controls sites near military bases
 - Already integrating data centers (U.S. Needs 4000 New Data Centers averaging 25MW)
 - By converting existing power plants, the 4IRMicrogrid[™] team saves time and money retooling salvageable cooling and distribution facilities
- One company 4IRMicrogrid[™] is associated with is willing to finance large micro grids over 25+ years (possibly on ESCO basis)
 - Contractors and IPP's typically look at 5-10-15 years.
- Unique combination of in-house legal services; the cornerstone to institutional funding
 - Power Purchase Agreement (PPA) specialist advises universities, African/MENA utilities and developers
 - Prepared over 100 Federal and Energy Contracts including with Defense and Security agencies
- USAFRICOM: Build Own Operate Maintain (BOOM) 20-250MW microgrids in Africa

Value Added Services

- Tailored legal expertise with keen understanding of funding protocols
- Technical Team led by engineer involved with building power plants in 12 Caribbean nations
- Seeking to work with defense contractors to deploy the next generation of cyber-secure microgrids in CONUS, Caribbean and Africa
- <u>Option</u>: provide solar EPC services by one of the world's most cost-effective firms

 100 Installs in four continents / Employed vets at largest solar projects in Georgia and Florida





Branded Energy Tech at the Following









-Not an Offering-





Powering the Cyber-Physical Revolution

Converting Shuttered Power Plants into Micro Grid and Data Centers



Evolution of the Four Industrial Revolutions to the Cyber-Physical



Sales Force



AirShip Technologies Group, Inc.



AirShip Endurance UAVs



Web: http://www.AirShipTO.com Industry: Aerospace Clean Tech, Unmanned Aerial Systems Team: 5. Incorporated: Jan 2014 Contact: Richard Lescallert/@AirShipTO.com

Company Organization:

A Delaware corporation headquartered in Oregon.

Company Stage:

- New product introduction/ demonstration
- Production Ramp-up
- On-going design engineering

DUNS: 05720876

CAGE: 7DQX9

AIRSHIP UAS Clean Tech Rising



ASTG-408 Product Offerings

High-Altitude, Long Endurance (HALE) Scalable Clean Technology

A leading developer of scalable, clean-tech Drones (unmanned aerial vehicles) for Defense, Homeland Security, Civil 1st Responders, and Commercial Agri-Business markets.

AT A GLANCE

- Oregon C-Corp aerospace drone manufacturer
- 3D-Printed airframes enable scalable strategic manufacturing
- Founder has 20+ years of aerospace and defense experience
- Partnering with Robotic Skies for UAS Global Maintenance and Support

BUSINESS SUMMARY

AIRSHIP produces 3D printed, clean tech, long flight endurance unimanned aerial vehicles with scalable payloads that provide AirScape intelligence, surveillance, and reconnaissance-as-a service for customers such as military. First Responders of law enforcement, fire departments, search & rescue, DOTs, Public Health, and news media.

Product/Services: The AirShip Endurance VI, V2, V5, V7 & V9 and Stinger-MAV Micro Intelligence are vertical takeoff and landing UAV's using solar film and/or hydrogen fuel cells that deliver multi-hour and multi-day flight endurance. AirShip is partnering with non-exclusive distributorships representing multi-million -dollar sales contracts. AirShip has just entered the micro aerial vehicle (MAV) market with its introduction of the AirShip Micro Intelligence (StingerMAV) planned for deployment with military units and 1" responder public safety organizations. The StingerMAV was submitted to NASA in their Vertical Lift Technology Lead Center solicitation for vertical lift inmovative technologies to improve reliability, performance and reduced environmental impact of small-scale, autonomous, vertical lift UAV's.

Think of a drone in every soldier's backpack! The AirShip Endurance UAVs and MAV use a game-changing disruptive propulsion that supports our "AirScape" ISR mobile app. Click here to listen to interviews with the inventor: <u>https://</u> www.youtube.com/wntch?v=fwRUREA1Ghw

Target Market: The Federal Aviation Administration expects some 600,000 new drones to be used commercially this year. The drone association expects the industry will create more than 100,000 jobs and generate more than \$82 billion for the US economy in the first 10 years of being integrated into the national airspace. The pace of military, civil and commercial (precision agri-business) use is growing as planners realize that UAS are significantly more efficient than manned aircraft.

What Customer Problem do we Solve? Emergency 1st Responders and the military need long flight endurance UAVs to conduct intelligence, surveillance and reconnaissance. Current UAV market for aerial ISR is delivered by drones that stay in flight 30 minutes to one hour and are powered by carbon producing combustible fuel or battery. Fuel pollutes and costs money, weighs down aircraft, and many of these aircraft require runways or launchers. These are severe limitations which AirShip's products overcome through the use of solar film and hydrogen fuel cells producing electricity to re-charge LiPo batteries, enabling customer's long flight endurance commercial or defense services.

Competitive Advantage: Our competitive advantage is unmanned aerial vehicle clean tech propulsion with long flight endurance, stealth acoustics, low cost of acquisition, and a design for submersible VTOL operations. We own the patent pending AIRSHIP ENDURANCE VTOL UAV and SOLAR TURBINE CLEAN TECH



AirShip Technologies Group, Inc.



Product Offerings

PROPULSION (US PATENT #13/650,508, 10/12/12). AIRSHIP continues to make progress on its AIRSHIP VX for logistics resupply and autonomous high altitude micro rocket launched nanosatellites.

AirShip UAVs are a combination vertical takeoff and landing (VTOL) and Fixed Wing (In-Flight video): https://www.dropbox.com/s/3ew8uc6g7jcin19/ATG11.mp47dl=0

Terrain Operation: Operates over flat, urban, at sea level altitudes and, as required in rural, mountainous terrain and jungle environments.

All Weather UAV: As an all-weather, 3D printed, uni-airframe UAV, it eliminates the use of airframe seams and maintains its performance in rain, snow, sand, extreme cold and heat.



ASTG-408 Product Offerings





WE CAN MAKE IT

HAPPEN

HEAVY LIFT & HYBRID SYSTEMS

HYBRID POWER SYSTEMS FOR IN-CLASS EXTREME ENDURANCE (GAS ENGINE CONVERTS TO ELECTRICAL)

GAS ENGINE HAS MUCH HIGHER POWER EFFICIENCY PER ITS WEIGHT COMPARED TO TRADITIONALLY USED LIPO BATTERIES

AMPLE POWER FOR HIGH POWER CONSUMING PAYLOADS

CLEAN UNDERSIDE FOR PAYLOAD ATTACHMENT & MODULAR FOR PAYLOAD INTERCHANGEABILITY

FULLY WEATHERIZED (RAIN & DUST PROOF)

RUGGEDIZED & ROTOR PROTECTION FOR INCREASED SAFETY

RAPID PROTOTYPING

HEAVY LIFT

Supply heavy lift and long endurance drones for the Idustrial, military, law enforcement, emergency management and transportation

ENGINEERING

Custom designed robotics for todays needs. Creating the next gen products today.

MARKET

* \$1278 Global UAS Market by 2025 * 20.1% Annual CAGR to 2025 * 65000 Gov Agencies & units





<u></u>

nits



APPLIED RESEARCH & Z PHOTONICS

Terahertz Nanoscanning Spectrometer & 3D Imager TNS3DI

3-D Nanometrology Sub-Surface, layer-bylayer Testing Instrument and Services

Terahertz time-domain Spectrometer with Nanoscanner and 3D imager. Fiber coupled beam delivery system for samples up to 450 mm x 450 mm. Depth of scan up to 50 mm available.

Semiconductor and nanomaterial metrology via lattice scale imaging

This is a camera-less, lattice-scale imaging technology without electron-microscope (overcoming the diffraction limit). T-ray can penetrate semiconductors and most non-metals. So, one can probe both the surface and sub-surface regions in a nondestructive and non-contact route. Layerby-layer imaging allows inspection of layers on a wafer one at a time.





470 Friendship Road, Suite 10, Harrisburg, Pennsylvania 17111 Web: <u>http://arphotonics.net</u>

Examples of real samples images



APPLIED RESEARCH & Z PHOTONICS

Features and benefit

- This is the first camera-less imaging technology with <1 Å resolution.
- See atomic lattice without electron microscope
- Surface, sub-surface and volume characterization
- Layer by layer inspection of semiconductor wafers and chips
- Non-destructive measurement of thicknesses of layers
- Measure Nanoparticle size and size distribution
- Defects nano-voids, delamination, inclusions, and other defects.
- Hidden features visualization and quantification, and more
- Cost-effective pricing; no consumables
- Table-top installation with in-line monitoring option

Spectrometer System configuration

Size: 20 x 16 x 7 inches (tabletop or optical table) Power: 120 VAC Weight: 120 pounds (without optical table)





Top: 200 mm wafer segment with dies. Below: 3D metallic nanolines on Si-wafer



Graphene exfoliates spun on SI water

Nanoscanner Housing options:

For 200 mm x 200 mm x 50 mm: On 18" x 12" Breadboard

For 250 mm x 250 mm x 50 mm and above: On gantry system on an optical table.

Operating software:

Keysight VEE platform integrated by ARP for control and data acquisition. Apps are provided Third party software installed for Fourier analysis, wavefront, eigen frequency analysis, data smoothing and other analysis for terahertz spectroscopy.

Three-D image generation, processing and analysis software is also preinstalled.

TNS3DI SYSTEM COST: Please ask for quotation (Includes installation, onsite training, software updates and documentation).

Contact Info Anis Rahman, PhD Phone: +1-717-623-8201 www.arphotonics.net

ARP instrument and technology are protected by patents.

470 Friendship Road, Suite 10, Harrisburg, Pennsylvania 17111 Web: http://arphotonics.net





C61 Services Corporation

Command & Control | Communications | Computers Cyber | Combat Systems | Intelligence

US Government, Federal, State, Local and Foreign Government Capabilities

C61 Services Corp "C61" provides a full life cycle of services to DoD & Federal organizations.

As a Services Disabled Veteran Owned Small Business (SDVOSB) & Small Disadvantaged Business (SDB), C61 specializes in providing engineering, program management, logistics, VSATs, mobile LTE, cyber ops and cyber security services that are best-in-class. As a small business, our flexibility allows us to provide Innovation, Adaptability and Critical Thinking into the Multi-Domain Battlefield to exceed our customers mission requirements.

Core Competencies Command & Control

Provide Warfighter support through network support, software sustainment and intelligence operations. We support GCCS-J, ABCS, CPOF, BCS3, FBCB2 and JBC-P in an operational environment.

Communications

Provided LAN, WAN, and MAN support in Afghanistan, Korea, Guantanamo Bay, Cuba, and CONUS locanons for Army, Joint, and Navy customers. Supported long-haul communications including MLOS, Microwave, SATCOM, and fiber optic DWDM infrastructure. Analyzed, Engineered, Procured, and Installed network equipment to provide backbone support to bases, camps, and FOBs in Afghanistan. Provided Engineering and Logistics support for PM TN SATCOM equipment.

Computers

Provided Tier I through Tier IV support worldwide, including help desk and remote repair. Utilized Information Technology Infrastructure Library (FIII, v3) best practices and processes to create streamlined and repeatable results while exceeding escalation matrix requirements.

Cyber

Services provided Cyber Security Solutions for Government, cyber-attack, antivirus remediation and patch management for Government clients. Our expert team establishes effective Cyber Security Solutions for Government to limit threats to invaluable data and agency network infrastructures. Services provided include IV&V, RMF accreditation process, Intrusion Detection & Analysis and firmware vulnerabilities.

Combat Systems

Provide system engineering, software engineering, software development, test engineering and software configuration management to AFATDS. Support systems include JADOCS, PFED, LFED, GDU-R, and CENTAUR.

Intelligence

Provide Prototyping, Research and Development to OGAs. Provide Global Intel Support.

Corporate Information DUNS: 079094964 CAGE: 6YDX3

FCL: TOP SECRET

Federal Certifications VA – SDVOSB (CVE)

Corporate Contact

Tom Wasilewski, Owner 33 Fenton Lane, Chesterfield, NJ 08515 Voice: (609) 752-9037 Fax: (609) 526-8496 Email: twasilewski/@c6iservices.com

www.c6iservices.com







C6I Services Corporation

Command & Control | Communications | Computers Cyber | Combat Systems | Intelligence



Products

C6I Provides communications that are secure when nothing is there.

LITE COMS

Designed for use in the most austere conditions, the Lite Sat 1.3M VSAT Terminal is the lightest weight Auto Acquire Carbon Fiber VSAT Terminal in the world.

Our customized transport packaging is smaller than most sub one-meter terminals, and the lightest weight (per case) of any Auto Acquire Terminal on the market.

Huckworthy

Tactical Mobile Network range provides turnkey reliable secure private networking over 4G LTF, 3G, Wi-Fi and Mesh Radio - or combinations of those technologies.

The TMN's data network can deliver any application to and from any environment globally through a range of off the shelf and custom packaging options to fit any need. TMNs are proven in military and civilian applications around the world, in our TMN-Traveller and ERSO variants, or as integration kits for airborne, vehicle, maritime and campus/smart city implementations.

CyVision

Cauldron is a automated network visualization and modeling tool that helps system administrators manage endpoints proactively defend their cyberenvironments from a wide variety of attacks in a way no other tool does, utilizing open and agnostic architecture. Now our ability to scan firmware for vulnerabilities. When you consider 1 million lines of code can run PRIOR to the Operating System begins, this is a new seam in the overall assessment process and is typically overlooked. Where NIST 800.53 and '171 compliance is critical, understand if systems have been compromised either directly or indirectly through the supply chain. The results of our firmware search are merged into the endpoint and ACL data sets.



www.c6iservices.com







COMMUNITY TECH

FINANCE

EASY TO OPERATE TOOLS

Our financial tools help you operate smoothly:

- iPad/iPhone Point of Sale -Payment Processing - AI Accounting

MANAGEMENT

FOCUS ON YOUR CUSTOMERS

Spend more time working with your customers. Use our system to handle the rest:

Inventory Management System
 Customer Relationship Management
 Customer Loyalty Application



PROTECT YOUR BUSINESS

Our Resilience Tools secure your business from any threat:

- WiFi mesh network -Back up LTE connected Internet - Audio/Video Security System

WE CHARGE 5% OF SALES. NO HARDWARE COSTS. NO MONTHLY SUBSCRIPTIONS

We donate 10% of our revenue back to the local community





Resource Industry

water in the second states water



Our Firm

Defining the offices of tampmone.

We are a ploted team of dedinated and experienced artiflasts, originaria, charmana, dasigner and incrinology professionale who share a common dealer - to help out claims classe livetse suchamate, and edwareast unless environments.

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IBI





IBI GROUP'S CONTRIBUTION TO THE RESOURCE INDUSTRY

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CREATING VALUE

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ECONOMY, ENVIRONMENT & SUSTAINABILITY

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EMPOWERING BYSTANDERS to help save lives

There is an imperative, universal need for bystanders to play a more active role in responding to emergencies that result from accidents, medical emergencies, and acts of violence.

The faster medical assistance is provided the better the outcome. While response times vary, it typically takes an average of 7 to 14 minutes for emergency medical services to arrive on scene.¹ The interactive **Mobilize Rescue System** includes the knowledge and equipment bystanders need to help victims during medical emergencies when EMS is en route.







PREPARING FOR THE UNEXPECTED IS SIMPLE

with the Mobilize Rescue System.

With the Mobilize Rescue System, organizations can efficiently and effectively prepare to manage severe bleeding, chest trauma, seizures, cardiac arrest, opiate overdoses, hypothermia, and more.

Mobilize Rescue Systems are easy-to-use solutions that guide bystanders through the best way to provide assistance to victims of various emergencies. From the Comprehensive unit to the Utility Kit, each Mobilize Rescue System contains medical equipment that pairs with interactive software to help bystanders manage emergencies.

Modern medical supplies paired with an innovative app – EMPOWERING BYSTANDERS TO SAVE LIVES.



The Mobilize Rescue App helps untrained bystanders assess, manage and monitor a spectrum of medical emergencies — while the ambulance is en route.

Modern supplies to manage severe bleeding, cardiac arrest, seizures, choking and more.



COMPACT

rescue station

COMPREHENSIVE rescue system







PUBLIC ACCESS rescue station







All the medical supplies are conveniently labeled and organized to match the instructions in the Mobilize Rescue app (each item is color-coded and numbered). The straightforward organization makes locating supplies easy, saving valuable time during an emergency and the app ensures that individuals have the 'just-in-time' training necessary to save lives using the supplies in the rescue kit.

¹ Mell, H., Murima, S., Hiestand, B., Carr, B., Holland, T., Stoppra, J. (2017, July 19). Emergency medical response times in rural, suburban and urban areas (Editorial). JAMA Surgery DOI: 10.1001/jamasurg. 2017. 2230

www.mobilizeRescue.com

Equip. Empower, Respond.

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Numerood Comparison







Next Generation Electrostatic Lubricant Filter ("ELF") Varnish 'Dialysis' Reduces Turbine Friction



Extends the life of turbines by reducing the harmful effects of lubricant contamination Reduce: Downtime, Lubricant Cost, Hazardous Waste, Man Hours and Catastrophic Issues

ELF filters mineral oil, especially lubricating oil such as:

- Turbine Oil
 Transformer Oil
 Hydraulic Oil
- Hydraulic Oil

ELF Can NOT process engine oil (because of detergents)



Every barrel of purified oil means one less barrel coming out of the ground to replace it, and one less barrel of used oil needing to be disposed of.





The ELF electrostatic method, operating in kidney loop mode off of the main reservoir (no interruption to the current flow)



ELF FEATURES

- Fast, efficient electrostatic Lubricant filtration system
- Compact (e.g. size of small refrigerator), cost-effective industrial electrostatic lubricant filter
- Removes varnish, oxidation by-products, large contamination particles, sub-micron contamination
- Strips varnish build-up from internal metal surfaces
- Easy to install. Not connected to turbine. Easy to maintain.
- Improves the environment by extending the life of lubricants
 - Lowers hazardous waste disposal
 - Reduces the need to constantly supply lubricants

Cost-Effective Solution Ready to Deploy:

- Power Generation Plants
- Oil Rigs and Refineries
- Mining Operations
- Paper Mills
- Ocean-going Ships

Future Application: Smaller units such as wind turbines

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318.455.1548



Why would I want a Solarstill?

powered distillation units produce the densiting uniter available on the meth The processe of slowly evaporating and ensing water from a gaseion state resimpre contaminants than any other cation system available the and result rate pure structured water from the s

you begin producing your own water a you will never want to drink any other again) You will notice the uncommonly h and clean tasts in every sip-a truly experience for those who have never tasted such pure water.

-

There are no energy costs associated with the process of evaporative distillation. Solar energy is free for everyone. Other processes, such as distillation from boiling water, can generate expensive electricity costs.

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Our units are easy to Install and require no messy replacement parts. Once your solar distiller starts producing water, you will never have to worry about working on it again! There is no maintenance required to perpetually produce healthy, pure, solar distilled water.

4

The fruits, vegetables, and plants in your garden will experience tremendous increases in growth rate and maturity size from the pure structured water our agripumps generate.

FOR MORE INFO PLEASE VISIT US ON THE WEBI www.solapure.com





Solar Household Energy, Inc.

iolar Cooking for Human Development and Environmental Relief

Solar Cooking: the cleanest, cheapest, safest way to cook food on any sunny day!

Solar Household Energy (SHE) strives to unleash the potential of solar cooking to improve social, economic and environmental conditions in sun-rich areas around the world.

Since 1998, Solar Household Energy has worked with governments, non-governmental organizations and the private sector to promote solar cooking with modern solar ovens (e.g. the "HotPot" developed by SHE), and introduce it in developing countries through projects that distribute solar ovens (best as part of integrated cooking), and provide training for users and monitoring and evaluation for implementing partners.

Solar Household Energy (SHE) has been a STAR-TIDES participant for over 10 years! We exhibit a variety of solar cookers for use by the military, for refugees, for households, and for the benefit of the environment.

This year featuring:

Haines Solar Cookers

A light-weight, compact panel solar cooker that has proven to be more powerful and easier to use than other panel cookers – and at a very low cost!



Haines Solar Cooker Model 1





Haines Solar Cooker Model 2 - cooks fine in snow

All solar cookers are easy to use; they have no emissions, use no fuels, and hence have no fuel costs. They save labor, like the slow cooker in your kitchen. Inventor Roger Haines with SHE's help has driven down the cost of solar cookers greatly, while increasing power and efficiency.



These light-weight cookers are suitable for disaster relief – for cooking food, boiling water etc. Why ship bottled water if you can ship a pallet of solar cookers and pasteurize water in-site?

Solar Household Energy, Inc. is prepared to analyze feasibility for solar cookers for any project, and to deliver appropriate solar cooker designs to suit the requirements in any quantity. Please contact us for further information.

www.she-inc.org Richard Stolz, Administrator Richard@she-inc.org





Core Competencies

- Designing and developing expeditionary power systems that provide for extended operational reach and prolonged endurance
- Tailoring hybrid power solutions to meet specific requirements while maintaining the capability for seamless modifications and technology updates
- Integrating intelligent power management, energy storage, renewable power generation, and generator auto-start/stop to reduce fuel consumption and generator maintenance
- Manufacturing ruggedized, portable solar generators to power electronic equipment being operated in remote locations under extreme climatic conditions





Past Performance

- Alternative Energy System (AES) to power the Persistent Surveillance System – Ground (PSS-G) for the U.S. Army
- Solar power systems for the RAM Warn platform as subcontractor to Northrup Grumman Corporation
- Hybrid power systems for the Rapid Equipping Force (REF) in support of the Energy to the Edge (E2E) project





Differentiators

- · System architecture with scalability and modularity features
- Power systems tested to MIL-STD-810G with Government acceptance of test results and issuance of Safety Confirmation
- Products proudly built in the United States using American-made components
- Experience delivering power solutions selected for use in support of contingency operations
- 24/7 Technical Support that makes readiving oustomer issues the #1 priority
- Program management responsiveness to customer needs throughout product lifecycle or project duration

Company Data

Since 2005, Solar Stik has been building portable power systems that enable selfsufficiency for the Warfighter. Solar Stik is headquartered in St. Augustine, FL, currently has 30 team members and continues to build high-quality Operational Energy solutions for worldwide deployment.

George Winsten

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THE MOST FOR YOUR MONEY

- * Research and Development
- * Training and Education
- * Fabrication
- * Testing
- * Fast Prototyping
- * Consulting
- * Low Density Population
- * Nearby Airport
- * IP Protection

THE ONE LOCATON FOR UNMANNED



- > Airspace Over sixty mile radius of uncontrolled G airspace surrounds the USA Drone Port
- > Flight Campus Runway, builder space, tools, equipment, machines, and an indoor flight facility, coming soon, .
- > Research Weather Lab Being built. test your equipment, batteries, drones, etc. in a climate controlled environment, with wind, rain, and thermal control.
- Four Seasons Kentucky has four seasons that support a varity of flying conditions.
- > Topography Everything in ONE location. We have mountains, valleys, flat land, trees, open land, lakes, and rivers.
- > Experience Combined, our team has, decades of unmanned flights, education development and business experience.

🥑 @usadroneport usadroneport

DRONE PORT

Tel: 01 859-334-0117 Email: bart.massey@usadroneport.com Web: www.usadroneport.com



THE ONE LOCATION FOR UNMANNED INNOVATION



GET THE MOST FROM YOUR INVESTMENT

AIRSPACE – Over 60-mile-radius of uncontrolled G Airspace surrounds the USA Drone Port

FLIGHT CAMPUS – Runway, builder space, tools, equipment, machines, and an indoor-flight facility (coming soon)

RESEARCH WEATHER LAB – Test your equipment, batteries, drones, etc., in a climatecontrolled environment, with wind, rain, and thermal control (under construction)

FOUR SEASONS – Kentucky has four seasons that support a variety of flying/training conditions

TOPOGRAPHY – All terrains are in one location – flat and open land, mountain ranges, trees, lakes, and rivers

EXPERIENCE – Combined, our team has decades of unmanned flights, education development, and business experience

REAL ESTATE AVAILABLE – There are miles of real estate available surrounding the USA Drone Port – adjacent properties include an industrial robotics park

Great incentives.

- Research and Development
- ✓ Training and Education
- ✓ Fabrication
- ✓ Testing
- ✓ Fast Prototyping
- ✓ Consulting
- ✓ Low-Density Population
- ✓ Nearby Airport.
- ✓ IP Protection
- Ask us about state, regional, and local incentives to locate at the USA Drone Port



built a collaboration platform Wire" was founded by Skype co-founder, Janus Friis, who that prioritizes security, ease of use and privacy.

About Wire"

Wire^w delivers a comprehensive set of messenger, voice, video, conference including features, collaboration

The most secure collaboration

platform.

Wire" won Capterra's 2019 "Best Ease of Use" Award based on customer feedback against 100 other platforms.

Trusted by leading organizations

700+ customers trust Wire" with their including: Joint Special Operations Command (JSOC), Navy Special Warfare, Intel, Ernst & Young, and SoftBank. security communications

Always accessible

bandwidth environments (even in 2G), Wire¹⁴ operates in extremely low to provide clear messaging, voice, video conference and file-sharing.

Or via email wesley, gasper@wire.com Get a free demo at <u>703-975-3361</u> Learn more at <u>www.wire.com</u> Contact us today









CORPORATE PROFILE

Legal Name: World Housing Solution, Inc. Established: 201 State of Incorporation: Florida Privately Held US - Owned DUNS: 064964896 CAGE: 6HZD7

www.WorldHousingSolution.com www.ClinicsOnWheels.com www.MobileResponseUnits.com

POINT OF CONTACT

Ron Ben-Zaev Founder/CEO Main: 407.545.3030 Direct: 407.221,7000 Email: Info@WorldHousingSolution.com

NAICS

236210 Industrial Building Construction 236220 Commercial/Institutional Building Construction 314910 Tents and Textiles 332311 Prefabricated Metal Building Manufacturing 332439 Other Metal Container Manufacturing 336212 Truck/Trailer Manufacturing 339999 All other Miscellaneous Manufacturing 541712 R&D in Physical, Engineering (Rapid Innovation) 624221 Temporary Shelters

INDUSTRY AWARDS

Inc S00 ranked #444 Fastest Growing Companies GrowFL "Top 50 Companies to Watch" SOFWERX Austere Base camp invited participant

World Housing Solution, Inc. 104 Challenger Court Sanford, FL 32771



CAPABILITIES STATEMENT

PRODUCTS

- Expeditionary Rigid Wall Structures
- Towable Crisis Response and Medical Vehicles
- Camp Structures: Latrines, MWR, DFAC, Billeting Offices, C4I, T-SCIF, TOC/JOC, Classrooms

PROBLEMS ADDRESSED

- Austere Base Camp Autonomy
- Energy (Fuel) Dependency
- Logistical burden
- Warfighter Efficiency
- Noise Abatement
- Environmental Protection
- Mold, Mildew, Ants, Termites, Snakes
- Air-Lifted Shelter Weight, Dimensions
- Military Construction Time to Build

DIFFERENTIATORS

- Relocatable Building (RLB) Criteria Met
- Thermally Efficient (300% Better than Tents)
- Highest Reduction in Thermal Transfer and Bridging
- Extremely Light, Extremely Strong
- · Prefabricated Panels
- Assembly by Unskilled Labor without Power Machinery
- 100% Man Made Composites; 20+ Year Life
- Deploy Flat-Packed in ISO or 463-L
- No Concrete Pad Required, Meets SOFA
- Integrated Alternative Energy and Storage
- High Wind and Snow Load Resistance

ORGANIZATIONS SERVED



rapabilities statement 05-01-19

www.WorldHousingSolution.com TEL: 407.545.3030 EMAIL: info@WorldHousingSolution.com





Rapidly Deployable Shelters (RDS) from World Housing Solution are easy to assemble. No skilled labor, lifting equipment, power machinery, or concrete pad required.



Clinics on Wheels" Mobile Medical Clinics

Mobile Response Units** Mobile Critical Response Trailer



World Housing Solution, Inc. 104 Challenger Court Sanford, FL 32771 UNITS WHEELS

www.WorldHousingSolution.com TEL: 407.545,3030 EMAIL: info@WorldHousingSolution.com