

## DOMAIN AWARENESS

BLUF TITLE	BLUF STATEMENT
Data Fusion for Space Command & Control	An Exploitation Toolkit for Space Command and Control that fulfils mission needs for advanced data analytic techniques for tactical Space Domain Awareness. The rapidly increasing sources of data is creating a big data problem in Space that requires techniques capable of ingesting legacy and new data with relative ease. The solution acts as an agnostic integrator for fusion of multiple data sources and an open architecture framework to infer intent via a combination of AI and Ontologies for Semantic Reasoning.
Defense	CubeSats - small and lightweight orbital satellites launched in flocks, are the future of global Defense recon. An impediment is atmospheric degradation of data by smoke, dust, and haze. Advanced Remote Sensing, Inc. (ARSI) has developed Simplified Method for Atmospheric Correction (SMAC) software with support from NSF SBIR and State of South Dakota. SMAC corrects image degradation to yield clear viewing for threat assessment and automated analysis of many hundreds of daily CubeSat images from reconnaissance programs like DARPA's Blackjack project. SMAC is superior to existing methods, applicable to any satellite including CubeSats and hyperspctral, rapidly adaptable to new satellites, and corrects atmospheric effects sensitively over all environments in near real time. All these capabilities are unique to ARSI's SMAC.
Mobile Multi-Sensor Tracker	Allosense developed a real-time situational awareness capability that helps military personnel track materiel assets while in transit or deployed on the field, including austere environments. Allosense designs and manufactures "always connected" asset trackers using satellite, cellular, and mesh technologies to reduce logistic inefficiencies. The asset trackers incorporate a suite of sensors for ensuring all valuables are readily available in real-time. Allosense delivers an easy user experience for integrating smart sensors and analyzing data. Our patent pending technology safeguard against inventory misplacement, saving the warfighter countless man-hours, stress, and deterioration of common operating picture (COP). With Allosense, the tracking of millions of mobile supplies, munitions, and vehicles is easily achievable.
The ATS Device	The ATS Device trains Spatial Disorientation brought on by Degraded Visual Environments, in-aircraft, to effectively train pilots to deal with the visual and vestibular illusions encountered in flight. Current methods fail to produce both visual and vestibular (inner ear) illusions leading to inadequate training. Simulators lack the ability to induce vestibular illusions which are critical to effective training of Spatial Disorientation.

<p>FrostyFlake   Real-Time Weather Monitoring</p>	<p>Many organizations rely on inaccurate and ill-timed weather information, generally in the form of forecasts or disjointed physical observations of the weather. Often, there are also challenges in properly communicating this information to key stakeholders and teams. Leading to increased risk, liability, and costs, while decreasing operational effectiveness, security, and customer service.</p> <p>The FrostyFlake weather monitoring service solves these problems. FrostyFlake is NOT another forecast but monitors the weather in real-time and notifies customers about their selected weather conditions as they happen. FrostyFlake uses proprietary artificial intelligence in conjunction with established nationwide camera systems to effectively “watch the weather”.</p>
<p>Descendably - A High-Speed Rappelling Braking System</p>	<p>Current warfighter fall protection systems vary depending on the type of application. The rapid descent braking system has the ability to be operated with a single hand (left or right) versus the required two hands for current technologies. The fall suspension system lessens the risk of injury or death by enhancing tasks performed upon rappelling, improving safety and rescue, removal of equipment, and protection in combat.</p>
<p>Emergency Evacuation Location System</p>	<p>This innovation is an emergency rescue IoT data platform, providing accurate real-time location information. Installed in occupied structures, the system can populate an emergency conditions map with executable data accessible to First Responders from anywhere in the US and send text to emergency call centers. Rescue locations are quickly conveyed by GPS while high-capacity exterior indicators insure quick visual location for aerial recon and ground-based SAR assets. As a non-mobile phone dependent system, rescue notifications are sustained by battery backup when internet access and building power fail. Activation is protected by unique encryption keys preventing false alarms. This innovation creates a novel approach to strengthen interoperability between key emergency stakeholders.</p>
<p>OLED-based infrared sensors</p>	<p>Our OLED-based sensor structure can realize significantly high-resolution (&gt;100 megapixels) infrared sensors even at incredibly low prices (&lt;\$500). Our unique infrared sensitive OLED technology can directly convert invisible infrared images to visible images in the very thin film. Thus, this technology allows CMOS image sensors, which are being tremendously used for a variety of high-resolution ultralow-cost visible cameras for now, to be even used as infrared image sensors as well. This technology can also be used for an infrared-stimulated self-emitting projection display which can provide not only a large screen size (&gt;100-inch) but also a high display quality.</p>

<p>MySmartPlans The Ultimate Construction Technology</p>	<p>MySmartPlans was developed and created by experienced people in the construction industry, who as a subcontractor, endured the lack of good document flow and the chaos of miscommunication. The need for audited information from multiple sources of technology that exist during the planning and execution of construction and the eventual turnover of the rich data to run the facility is the point of MySmartPlans. MySmartPlans hybrid approach combines the human element of a digital librarian with the proprietary software that allows a user to point and click and retrieve the pre-audited and linked information at the user's fingertips. Today's multitude of construction technologies are cumbersome and convoluted to say the least, what is needed is accurate information at your fingertips. MySmartPlans closeout assembly of the Digital Twin incorporates all data before construction, a full record of who what, and where of the construction data, and transfer of data to the owner, facilities management solutions. MySmartPlans creates transparency and accountability and is the one source of truth in project delivery. Trust But Verify.</p> <p>MySmartPlans Building A Better Way.</p>
	<p>Noice Industries secures all physical infrastructure, including access control, airspace, buildings, connected devices (IoT), facilities, equipment, land, operational technologies (OT) and property. Noice Industries produces autonomous and turnkey surveillance solutions that deliver actionable intelligence and situational awareness in real-time, from confined spaces or critical infrastructure to the most difficult and remote locations. We utilize drones and smart sensors to provide continuous day and night aerial, all-terrain, marine, sub-terrain, indoor, outdoor surveillance solutions. Experienced security companies may also purchase our UAV and sensors, hire its own pilots or personnel and implement a strategy designed and produced by Noice Industries.</p>

<p>Improved Orbit Determination and Visualization for Increased Situational Awareness (IODA VISA)</p>	<p>This product dramatically improves orbit determination, prediction, tracking and monitoring capabilities. Significantly faster and more accurate than TLE/SGP4 used today allowing many more objects to be correlated and cataloged with far fewer observations. Provides never before Optics-only solutions for Initial Orbit Determination (IOD) and Optics-Only Ranging. Addresses DoD, Industry and International needs for improved space object tracking, cataloging and real time situational awareness across the spectrum, from the battlefield, to operational mission planning to collision avoidance and beyond. Faster, more precise analysis coupled with operationally proven AI/ML and visualization products enables user-defined flexibility with standalone, integrated, bare metal or cloud implementations. Products integrated into one package: 1. Flexible Input 2. iOrbit algorithms 3. Proven data correlation and flexible user displays via DisCorT and VENOM technologies 4. Flexible Output to Real-time displays and parallel catalog updating 5. Dual Use - Bare metal, Cloud, Classified or Unclassified environments for Government or Industry</p>
<p>Parcell Smart Tool Crib</p>	<p>Aircraft maintenance squadrons are required to use onerous tool control processes, which decrease the time maintainers can spend on productive maintenance tasks. The Parcell Smart Tool Crib (STC) is a smart locker that automates the tool checkout process while conserving the integrity of the required protocols for prevention of Foreign Object Debris. The STC can be used in any setting where shared assets must be closely tracked, and it is designed as a modular unit that can be configured to hold a wide variety of assets in various settings. Because of its ease of implementation and broad applicability, the proposed Parcell product can have a significant impact on readiness and save hundreds of millions of dollars per year throughout the DoD.</p>
<p>Security and Environmental Awareness Virtual Reality Simulations</p>	<p>Our virtual reality (VR) hostile environment awareness simulations prepare individuals for difficult and dangerous scenarios during missions abroad. In our customizable VR simulations, individuals observe environmental cues, make decisions, and experience the consequences of their decisions. A VR headset transports learners to immersive, realistic environments where they practice de-escalation techniques in virtual replicas of informal checkpoints, detention centers, and kidnapping scenarios. VR simulations and debriefings train people for different missions in an engaging, time and cost-effective manner.</p>
<p>“One Touch” Rope Tie Down, Self-Tensioning Devise</p>	<p>“ONE TOUCH” Rope Tie Down and Cargo Nets are self-adjusting devices providing the power of communication enabled cargo management. “Smart” Rope &amp; Webbing will generate warnings and alerts if there is a problem due to load shift, loose device, tampering, or theft. Time saving safety features, fewer accidents, will benefit the entire transportation field. Less wear and tear on the user and equipment, less freight damage, lightweight, corrosion free equipment has longer lifespan with reduce fuel and replacement costs. Quickens readiness, “One Touch, One Product” will replace all 10K, 25K CGU / MB chain devices, simplifying storage and retrieval.</p>

<p>Single Stage to Orbit Fully Reusable Launch Vehicle</p>	<p>The use of our Aerospike Engine allows for a true Single Stage to Orbit Reusable Launch Vehicle, this will essentially turn rockets into airlines; fly up, fly down, refuel, fly again, all in one piece. This will create a robust fast response launcher to support the warfighter. It will deliver supplies to any FOB, asset, or front-line operation in two hours or less. This launch platform can also support any and all orbital payload insertion in days or hours, not weeks or months. Simply deliver the payload to the predesignated launch site, and with quick integration, the payload can be fired into desired orbit or landing zone within hours. If this system is properly stored and maintained, the warfighter will have a mission-ready, fully capable launch provider that has extremely long shelf life. The warfighter simply fuels up, launches, recovers, and reuses; providing true orbital sustainment.</p>
<p>SafeDefend Active Shooter Response and Crisis Management Solutions</p>	<p>Three critical elements have not been effectively addressed in an active shooter or targeted violence event. The three critical elements are: 1) The assailant will be within the perimeter. 2) Those in the immediate threat zone are on their own until help is notified and arrives. 3) Military Police, Security Forces, and/or local law enforcement response will not be quick enough. SafeDefend addresses the critical beginning moments of an active shooter or targeted event. SafeDefend provides comprehensive notification to 1st responders, those in harm's way, and those needing to manage the crisis within seconds. In addition, through training and our systems tailored response options, those managing the crisis are able to respond to the event much more effectively until help arrives. Immediate location information is conveyed to responders which facilitates and accelerates security response and the area can be locked down or avoided by those close to the crisis saving innocent lives.</p>
<p>H-Cubed Big Data Acquisition and High Performance Edge Computing</p>	<p>SaraniaSat's ultimate vision is to open up and grow the relatively small market for Satellite-based Earth Observation Data to match the trillion-dollar Smart Phone and Internet Data Markets. We believe that this can only be achieved via the daily acquisition and rapid Edge Processing of complex, Big Data. Multiple commercial and government verticals will benefit from daily availability of actionable information.</p>

<p>RFID-Enabled Smart Gun</p>	<p>SmartGunz, LLC is a firearms company providing next generation technology for law enforcement agencies. Our sole purpose for launching SmartGunz, LLC is to save both law enforcement and civilian lives – full stop.</p> <p>The job law enforcement officers have to do is hard enough without also having to protect themselves from a suspect or prisoner wrestling their weapon away from them! SmartGunz, LLC wants to remove that risk to our men and women who faithfully put themselves in harm’s way to protect us and give them one less thing to worry about.</p> <p>Americans are killed or wounded every day by handguns, whether they are targeted victims of domestic violence, children or bystanders harmed by accidental weapons discharges, or people suffering from mental illness intent on taking their own lives.</p> <p>SmartGunz, LLC believes one way to save lives lost from gunfire is to offer “smart gun” firearms technology where the firearm can only be operated by its intended user.</p>
<p>Stingray Stingerz</p>	<p>The Stingray is a revolutionary height pole warning sensor for the pilot car and oversize load transportation industry. It is a technology tool that communicates at the speed of light. The LED light on the device can be seen up to a half mile away when a low obstruction is hit, thus significantly decreasing the amount of accidents and damages that occur with oversize loads.</p>
<p>SYBor IoT Interoperability and Intelligent Video Surveillance Edge Computing Platform</p>	<p>The SYBor Technology Platform is the next-generation solution for facilities automation and intelligent video surveillance interoperability for monitoring and controlling one or more Internet of Things “IoT” smart device ecosystems in government, commercial and residential properties. Its state-of-the-art hardware is capable of supercomputing level performance to provide 24/7 autonomous monitoring addressing situational awareness in security, safety, cost savings, comfort and peace of mind all in an affordable small footprint with one easy-to-use app compatible with your desktop and mobile devices. With the SYBor Technology Platform and its superior performance, we are establishing smarter, safer homes and communities.</p>
<p>Electronic Security Strap</p>	<p>Safely securing firearms in open carry, concealed carry environments, and gun storage is challenging. Invented with protection for children, homeowners, and first responders in mind, the Electronic Security Strap (ESS) with a snap-type locking device provides maximum protection requiring unique user fingerprint combinations with an accelerometer trigger to release the locking mechanism. The ESS is designed to secure firearms but adaptable to a wide range of asset security applications. This patented strap technology is a TRL 2 under current efforts of advancement.</p>

<p>Extended-range prediction of weather hazards using artificial intelligence</p>	<p>WeatherDeep has combined a series of artificial intelligence and machine learning tools to deploy a flexible, customizable platform for forecasting extreme weather, including tropical cyclones (and their landfalls), tornadoes, hail, temperature, and wind with lead times out to 3 months. These extended-range forecasts are skillful and exceed typical 3-5 day timeframes for hazards offered by state-of-the-science forecast methods.</p>
<p>nCIS Low Light CMOS Image Sensor</p>	<p>3rdiTech's nCIS is an advanced Night Vision Sensor that provides the warfighter with rapid &amp; efficient target identification and clarity from day through twilight to starlight in an extremely SWaPC optimized product. This Low Light/ Near IR pixel architecture that can be applied to any standard CMOS Sensor without any process modification for 2X improvement in dynamic range, providing rapid &amp; effieicent target identification from very bright day light through twilight into starlight. It can function in both very high and very low light and can be scaled to provide true colour digital night vision in a very low cost, SWaP optimised product.</p>
<p>Smart Autonomous High Payload Delivery Systems</p>	<p>Aware Vehicles provides smart autonomous high payload delivery systems for Warfighter transportation and cargo applications.</p>