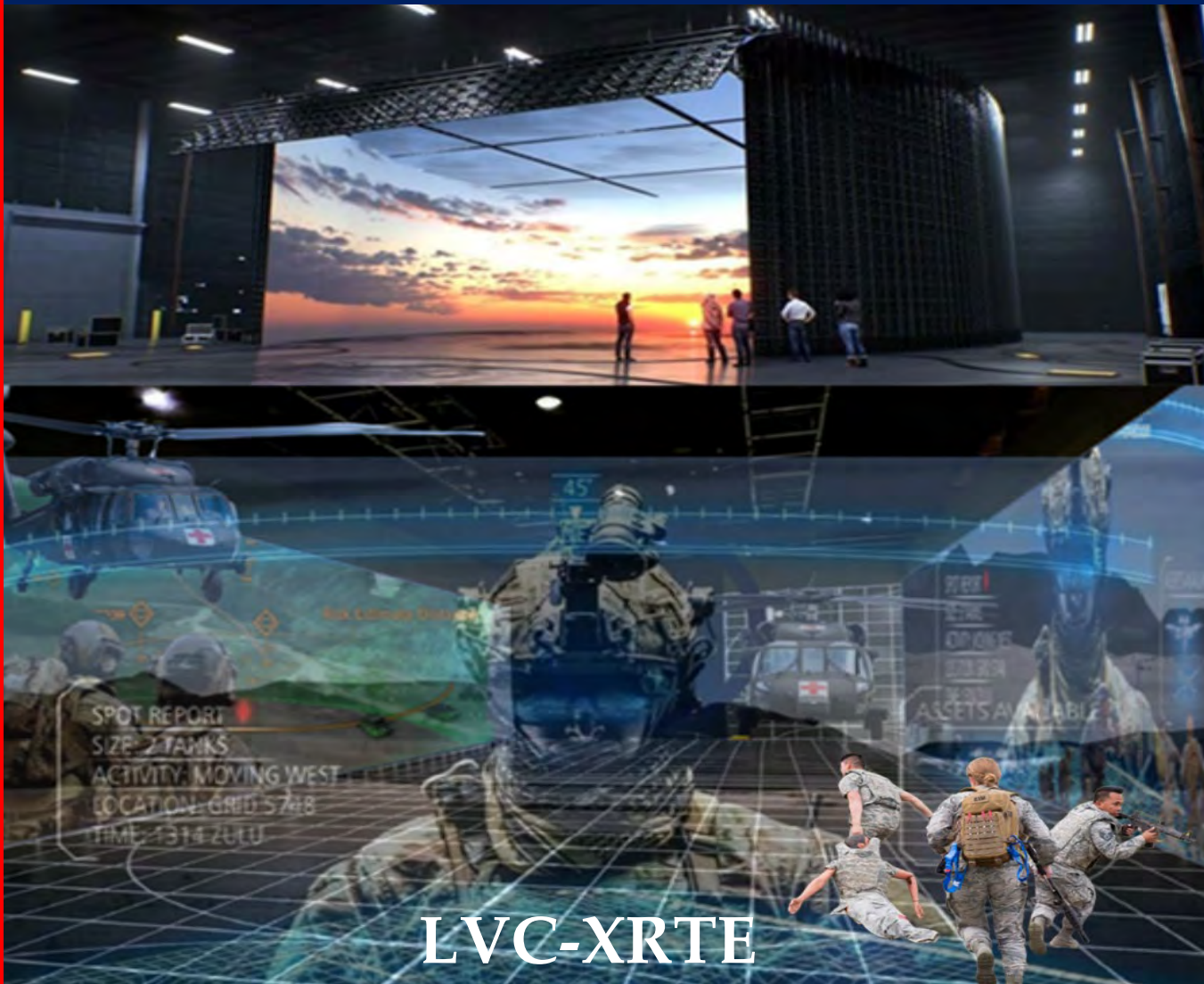




JWCC ACE CAVE



COMBATANT & MEDICAL COMMAND
INTEROPERABLE INTELLIGENT INTERACTIVE INTEGRATED

JOINT WARFIGHTER CLOUD CAPABILITY
AGILE COMBAT ENVIRONMENT
COLLABORATIVE AUGMENTED VISUALIZATION ENGINE

MARCO FEDERAL SERVICES
2525 MONTANA EL PASO, TX, 79903
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WHAT IS SPECIAL PROJECT GEMINI?

Special Project Gemini is a highly specialized task force of industry leaders, service providers and subject matter experts, strategically aligned to directly address the Defense Health Agency's (DHA) statement of objectives (SOO), J7 training requirements, and Department of Defense Instruction 1322.24 MEDICAL READINESS TRAINING.

To achieve the objectives set forth by the Department of Defense requires an all-hands-on deck team approach with a can-do-attitude. Training our expeditionary warfighters, requires a team of professionals who are combat veterans, subject matter experts, medical advisors, live, virtual, constructive event production, and training experts. Complemented by the best of the very best AI, Unity, and Unreal Engine 5 developers 2 TEAM GEMINI Software Factory.



THUNDER VISION

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What is Force Design 2030?





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J7 LVC-TE



J7 refers to the Joint Staff, Joint Training Division of the US Department of Defense (DOD) and is responsible for developing, implementing, and monitoring joint training strategies, policies, and programs across the entire DOD. All members of the military must complete certain training in order to be considered qualified to perform their duties. This includes basic training, specialty training, and ongoing professional development training.

DoDI 1322.24, also known as the "**Medical Readiness Instruction**," is a directive issued by the Department of Defense (DoD) that provides guidance for the management of medical readiness within the DoD. The instruction covers a wide range of topics related to medical readiness, including personnel medical readiness, deployment health assessments, medical support for operations, and medical evacuation procedures. It provides detailed instructions on how the military services should prepare and sustain their medical personnel, resources, and capabilities to support military operations and respond to health threats. The purpose of DoDI 1322.24 is to ensure that all DoD personnel are medically ready to support the missions of the Department and to promote the health and well-being of military personnel.

Interoperability between Combatant and Medical Commands is critical to the ability of different military commands to work together effectively and efficiently in support of joint operations.

The JCS is responsible for overseeing the development and implementation of policies that promote interoperability between combatant and medical commands. The goal of interoperability is to ensure that medical support is seamlessly integrated into military operations and that medical personnel, resources, and capabilities are aligned with the needs of combatant commanders. This can include ensuring that medical information is shared between different commands, that medical equipment is compatible, and that medical personnel are trained to work effectively in a joint environment. The purpose of interoperability between combatant and medical commands is to improve the effectiveness and efficiency of military operations, and to ensure that medical support is readily available to meet the needs of military personnel.



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"Delivering the LVC-TE to the Fleet Marine Force in support of Project Tripoli is my top acquisition priority," Reynolds concluded. "Our continued collaboration with TECOM, as well as cross-sharing information with our Team Orlando partners, is vital as we continue to make strides on this effort in support of [Force Design 2030](#). Upon its implementation, the LVC-TE will not only bolster the Marine Corps' combat-effectiveness by integrating and rendering real-time data from multiple training environments, but its modularity will allow us to avoid antiquation by allowing for the rapid incorporation of new training systems with our legacy training systems." Force Design 2030, also known as FD2030, is a force restructuring plan by the United States Marine Corps to reshape its combat power for future near-peer adversary conflicts.



LtCol Marcus J. Reynolds, USMC
Program Manager, PM TRASYS
MARCORSSYSCOM

It is designed to prepare the Marine Corps for a naval war against China. Given the military's continuing effort to "train as we fight," warfighters must be prepared to collaborate with other services. There is a need to ensure coordination and interoperability within and across the services with respect to simulation-based training. However, because of organic changes in policies and organizational structures, there are significant challenges for the services to coordinate within their own organizations and to collaborate with one another while working toward joint training needs.

Concurrent with the growing need for virtual distributed training capabilities, the military simulation-and-training market is growing, and this market includes substantial efforts to develop new training-simulator capabilities. However, technological development is not always driven by training needs, especially for cross-service exercises. Development of training simulators often drives the users rather than the reverse, especially with respect to distributed training systems.

With a focus on air and ground training simulators for Tier 3 and Tier 4 exercises—i.e., training at the service component (operational) and individual unit (tactical) levels, key findings define the gap between joint training needs and currently available and forthcoming technology in the training-simulator field. With a broad analysis of the simulation-based joint training needs, organizational and policy mechanisms for coordination between services, and incentives structures for cross-service simulator development.



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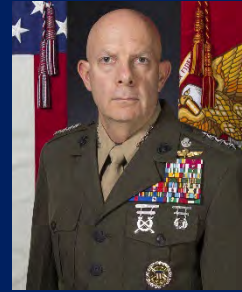
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PROJECT



TRIPOLI

Project Tripoli supports the Commandant of the Marine Corps' update of Force Design 2030, in which he described innovation as a hallmark of the Marine Corps and critical to the service's ability to evolve. He emphasized the importance of intellectual rigor, close and consistent coordination, ruthless analysis, and potential abandonment of familiar ideas, capabilities and platforms, noting that the anticipated proliferation of expeditionary long-range precision fires, loitering munitions, infantry battalion organic precision fires, unmanned systems and electronic warfare capabilities, among others, will pose an enormous challenge to the ability to train collectively and create combat readiness. Additionally, he offered that emerging Marine Corps capabilities will quickly outpace current training infrastructure, live-fire ranges, and exceed environmental and other local governmental policies and restrictions in both the Continental United States and overseas.



GENERAL DAVID H. BERGER

The 38th Commandant of The Marine Corps

To mitigate these issues, the Commandant prioritized modernization of training capabilities as one of the top three investments in support of Force Design 2030 and Project Tripoli is seen as the means through which the Marine Corps will train at all echelons, across all domains and in disparate locations which will breathe life into Force Design 2030 while developing and refining a warfighting capability able to meet tomorrow's challenges. It also provides the infrastructure for commanders to plan and execute with careful and deliberate consideration of the operational environment and allows for numerous training iterations with minimal training costs and reduced setup times."

According to [Mr. Joseph Lomangino, LVC-TE Lead in the Synthetic Training Integration and Management Branch at TECOM](#), the LVC-TE training environment is intended to deliver a number of primary benefits. "For example, by making training ranges as complex as the battlefield is expected to be in 21st Century warfare, we not only will train as we fight, but do so in an environment designed to enable observations, decisions and processes that are only currently experienced in on-the-job training or in a real battlefield," he said. "In addition, the products of a digitally connected set of capabilities will reduce training inefficiencies by increasing training opportunities for hard-to-get assets. So the LVC-TE is expected to give Marines a more complex mental experience, which will lead to faster and more effective battlefield decisions."

He added, "The second piece that I'll go into is that we also use simulations to accomplish training that many times simply cannot be done in a live environment. And that's for various reasons. There could be range limitations, costs, safety and also classification limitations that really prohibit us from getting the full return on investment in the live environment. It's nothing against the Marine on the ground out there in the field trying to do his best. There are just some things that are problematic to execute in those live environments. And with the advent of Force Design 2030, and some of the modernization efforts we're seeing in military operations right now, this is really the sweet spot that the live virtual constructive training environment, in Project Tripoli, is aimed at hitting."

"We've been working hand in hand with that team at the Battle Simulation Center, as well as our requirements sponsor, TECOM, to make sure that that initial capability release is accomplished on time next spring," he said. "This is an iterative process," Lomangino clarified. "This is long term. It's going to take more than a year. This is a total modernization of how the Marine Corps trains and how we are going to incorporate blending live virtual constructive training to meet all the demands of multidomain operations."

"We see real world operations where there is the expanded use of expeditionary long range, precision fires, unmanned systems, and electronic warfare. There are a lot of things we need to replicate in order to ensure that our Marines and our partners are experiencing and training to what it will be like on a battlefield and enabling Marines to go through these training situations in conjunction with our partners in our sister services, and international partners as well. That is one of the key goals that Project Tripoli will provide to our Marines — the ability to execute training tasks that are problematic to do in the live environment."



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Key Findings

A primary challenge is balancing centralized coordination with decentralized training needs.

- With respect to Tier 3 and Tier 4 training, current joint coordination is minimal.
- Although the services must be free to tend to their specific training needs at the tactical level, acquisition that supports these needs must be coordinated at a joint level.
- Incentives must be balanced between both "carrots" and "sticks."

Demand for joint training can be unclear at lower levels.

- The need for interoperability among training simulators across services for Tier 3 and Tier 4 exercises is unclear.
- With unclear joint training needs, services may pursue goals independently, with minimal coordination. The consequent signal to industry as to how it might support joint collaboration can be unclear.

There is limited transparency regarding training-simulator capabilities and acquisition plans.

- Resources for data and information are not as centralized as they could be.
- Mechanisms and organizations should be in place to provide relatively easy-to-access data regarding current simulator capabilities, current usage (regarding training exercises), and planned development.

The Office of the Secretary of Defense (OSD), the services, the Joint Staff, and industry have a way forward.

- The U.S. Department of Defense could make changes within and across services to ensure the existence of organizations with some level of centralized coordination.
- Rather than a significant change in funding or policy, the first step could simply be transparency and frequent dissemination of information and data. Changes in policy and financial resources ultimately will be helpful to incentivize services to collaborate.

Recommendations

- Centralized coordination should increase. Within each service and within the Joint Staff, there should be one organization that aggregates information concerning simulator capabilities, requirements, and acquisition.
- Each service should fund and require modeling-and-simulation offices to carry out coordination with respect to technical information and capabilities.
- Service acquisition offices should acquire and upgrade training simulators in coordination with their respective weapon systems as a matter of course.
- The Under Secretary of Defense for Acquisition and Sustainment (USD[A&S]) should help further fund interoperability.
- The Joint Staff Force Development Directorate (JS J7) should reinforce the importance of the Universal Joint Task List program by continuing to fund it and by distributing related data more broadly.
- The Chairman of the Joint Chiefs of Staff should exercise Title 10 authority for technical standards more frequently in the context of training.
- JS J7 should resume its training gap analysis forums as a mechanism to support joint coordination.
- Joint Interoperability Test Command should again be responsible for testing simulator interoperability.
- The Joint National Training Capability should gather additional data concerning joint training exercises on the Tier 3 and Tier 4 levels.
- USD(A&S) should focus future acquisition programs not just on simulators but on supporting capabilities.
- The Deputy Assistant Secretary of Defense for Force Education and Training (DASD[FE&T]) should advocate for establishment of technology readiness levels and standards for interoperability.
- OSD should take the lead in implementing an accessible and efficient marketplace and process to bring together industry and DoD.



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ATEC MISSION



The ATEC Modeling and Simulation Division at White Sands Missile Range is a part of the Armament Technology and Engineering Center (ATEC), which is a research and development organization that operates within the US Army. The division is located at White Sands Missile Range in New Mexico, which is one of the largest military testing and training areas in the world. The ATEC Modeling and Simulation Division at White Sands Missile Range is responsible for developing and using computer simulations and models to support the testing and evaluation of armament systems. The division uses advanced computer technologies and software to create virtual environments that accurately simulate real-world scenarios, allowing engineers and scientists to evaluate new armament technologies and systems in a controlled and cost-effective

manner. By using computer simulations, the ATEC Modeling and Simulation Division at White Sands Missile Range helps to improve the performance and effectiveness of armament systems, ensuring that they meet the needs of the US Army and other military organizations.

JWCC OBJECTIVE



The Joint Warfighter Cloud Capability (JWCC) is a Department of Defense (DoD) initiative aimed at modernizing and improving the military's ability to access, store, and process data. The objective of the JWCC is to provide the warfighter with a secure and highly available cloud computing environment that enables them to access, share, and analyze critical data and information in real-time. The JWCC aims to improve decision-making and situational awareness by providing warfighters with the ability to access and process data from a variety of sources, including intelligence, surveillance, and reconnaissance (ISR) platforms, unmanned aerial vehicles (UAVs), and other platforms. The JWCC will also help to improve collaboration and coordination

across different military units, enabling more effective and efficient operations in the field. Additionally, the JWCC will help to streamline the acquisition and deployment of new technologies, allowing the military to quickly leverage the latest innovations in cloud computing, data analytics, and artificial intelligence. The JWCC is a critical part of the DoD's broader effort to modernize its IT infrastructure and improve its ability to support the warfighter in a rapidly changing and increasingly complex operational environment.

ACE PURPOSE



The Agile Combat Environment (ACE) is a program initiated by the US Army to modernize and improve its ability to conduct operations in complex, dynamic, and rapidly changing environments. The purpose of ACE is to provide the Army with a modern and adaptable technology architecture that can quickly respond to new threats and changing operational needs. The ACE program aims to provide soldiers with enhanced situational awareness, mobility, and firepower through the use of cutting-edge technologies such as artificial intelligence, machine learning, robotics, and autonomous systems. The goal is to create a more connected, informed, and agile force that can quickly respond to threats, provide decisive firepower, and operate effectively

in complex and challenging environments. The ACE program also seeks to improve the interoperability and collaboration between different military units, allowing them to better coordinate and execute missions. Additionally, ACE is designed to reduce the time and cost of acquiring and deploying new technologies, enabling the Army to quickly field new capabilities in response to emerging threats. Overall, the purpose of the ACE program is to provide the US Army with a modern, flexible, and effective technology architecture that can support the warfighter in a rapidly changing and increasingly complex operational environment.



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CAVE DEFINITION



The Collaborative Augmented Visualization Engine (CAVE) is an extended reality disguise (XR) volume that creates a virtual environment using LED panels. The panels are arranged in a specific shape to create a volume and the virtual environment is projected onto this volume. The technology provides an immersive and interactive experience, allowing users to interact with virtual objects in a way that feels real. This technology is commonly used various fields such as education, training, design, and simulation, and provide a

collaborative platform. Unreal Engine 5 (UE5) includes a new technology called Nanite, which allows for incredibly detailed and realistic virtual environments and characters. It also has new lighting and sound systems that make the games created with it more immersive and lifelike. Additionally, Unreal Engine 5 features improved tools for level design and asset creation, making it easier for game developers to create and publish their games. The engine is widely used in the game industry and is also becoming increasingly popular for use in other industries such as architecture, automotive, and film.

UE5 is a game engine developed by Epic Games and included new features, performance improvements, and bug fixes. Unreal Engine 5.5 is designed to make game development more efficient and accessible, with a focus on providing new tools and features to streamline the development process. Some of the notable additions in Unreal Engine 5.5 include improved support for cross-platform development, expanded support for virtual and augmented reality technologies, and new tools for animation and rigging. Unreal Engine 5.5 continues to be widely used in the gaming industry and is also being adopted by other industries such as architecture, automotive, and film, due to its advanced features and capabilities.

The Joint All Domain Command and Control (JADC2) Cross Functional Team is a team established by the Department of Defense (DoD) to support the development and implementation of JADC2 capabilities. JADC2 is a DoD-wide effort to improve the ability of military commands to share information and coordinate operations across all domains of warfare, including land, sea, air, space, and cyberspace. The JADC2 Cross Functional Team is composed of representatives from various military branches and agencies, who work together to develop and integrate JADC2 capabilities into military operations. The team is responsible for developing requirements, conducting assessments, and coordinating the development and fielding of JADC2 technologies and capabilities. The goal of the JADC2 Cross Functional Team is to improve the ability of military commands to share information and coordinate operations, to enhance the effectiveness of military operations, and to support the decision-making process of military leaders.



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PURPOSE AND INTENDED AUDIENCE

OBJECTIVE: Development of extended reality immersive holodeck for White Sands Test Center with motion capture (mocap) and haptic feedback to create a highly realistic and interactive simulation environment for healthcare professionals to practice procedures and techniques. The integration of mocap and haptic feedback technologies enables the simulation to respond to the user's movements and provide sensory feedback, creating a truly immersive experience. This allows healthcare professionals to experience procedures in a way that closely mimics real-life scenarios, improving their knowledge and skills and reducing the risk of harm to patients. The use of extended reality immersive holodecks for medical training is a powerful tool for improving the quality and efficiency of healthcare education.

PURPOSE: Extended reality immersive holodecks for White Sands Test Center with motion capture (mocap) and haptic feedback enhance the quality and efficiency of healthcare education by providing healthcare professionals with a realistic and interactive simulation environment. This technology creates an experience that closely mimics real-life medical scenarios, allowing healthcare professionals to practice procedures and techniques in a safe and controlled environment. The integration of mocap and haptic feedback technologies allows the simulation to respond to the user's movements and provide sensory feedback, improving the learning experience and enhancing the retention of information. The ultimate goal is to prepare healthcare professionals to provide the highest standard of care to patients and reduce the risk of harm.

TRAX International Corporation is a leading provider of professional and technical services for U.S. federal government agencies, and energy solutions for commercial clients. Headquartered in Las Vegas, NV, TRAX has 1,300 employees globally. TRAX's technology and engineering division (TTEC) is based in Las Cruces, NM. Joe Stufflebeam, PhD, Director, TTEC 915.248.8270 JStufflebeam@TRAXINTL.COM
Charles Garcia White Sands Missile Range, NM — Manager for Trax International, LLC (575)678-0184

The U.S. Army Electronic Proving Ground (EPG) Scientific and Engineering Support Services (SESS) contract at Fort Huachuca, AZ is a contract awarded to a company or organization to provide scientific and engineering support services to the EPG. The EPG is a division of the U.S. Army Test and Evaluation Command (ATEC) and is responsible for conducting research and development, test and evaluation, and technical analysis of Army communications, electronics, and intelligence systems. The SESS contract provides the EPG with access to a wide range of scientific and engineering expertise and capabilities that are critical to its mission. The goal of the SESS contract is to provide the EPG with the support it needs to effectively test and evaluate new and emerging technologies, to identify and solve complex technical problems, and to provide decision-makers with the information they need to make informed decisions about the development and procurement of new systems. The SESS contract is an important part of the EPG's efforts to support the U.S. Army's mission by ensuring that new technologies are developed and deployed effectively and efficiently.



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WSTC



Norman G. (Jerry) Tyree is the Deputy to the Commander and Technical Director, White Sands Test Center (WSTC), Army Test and Evaluation Command (ATEC) at White Sands Missile Range (WSMR). He is responsible for command direction, resource management, supervision and leadership of a team of civilian and contractor personnel engaged in Research, Development, Test and Evaluation activities for the Department of Defense providing test program design, planning,



measurements, data collection, conduct, analysis and reporting. He directs the development of new philosophies, methods and test technologies for the test and evaluation of future capabilities and current materiel ranging from sensors and laser weapons, command and control systems, tactical networks, sensors, UAVs, and tactical missiles to integrated air and missile defense systems.

Prior to being selected as the Deputy Commander and Technical Director of the White Sands Test Center, Mr. Tyree served as the Director of Materiel Test at WSMR from August 2012 to January 2017 where he led a team of engineers, technicians and analyst interest design, conduct and reporting directly interfacing with Program Managers and Executive Offices on achieving acquisition goals. During his tenure as Director Materiel Test, Mr. Tyree was selected WWW.ITEA.ORG 20 for a unique developmental assignment under the Army Military Deputy for the Assistant Secretary of the Army Acquisition Logistics Technology (ASA(ALT)) where he established methodologies for effective and efficient operational assessment of the common operating environment and assisted with analysis of Army acquisition programs. From 2007 to 2012, Mr. Tyree served as the Deputy for Materiel to Brigade Modernization Command and PEO Integration Staff Engineer providing guidance and direction on Army Acquisition, program management, resources and technical capabilities for Network Integration Evaluations and technical oversight and guidance on the Doctrine, Organization, Training, Logistics, Materiel, Personnel and Facilities (DOTLMPF) assessments. As Staff Engineer, Systems of Systems Integration (SoS-I) Directorate he served as technical expert and lead Engineer for Army capability set integration design, training, and fielding. Mr. Tyree played a key role in transitioning systems of systems concept from FCS to the establishment of the Agile Process and Network Integration Evaluations.





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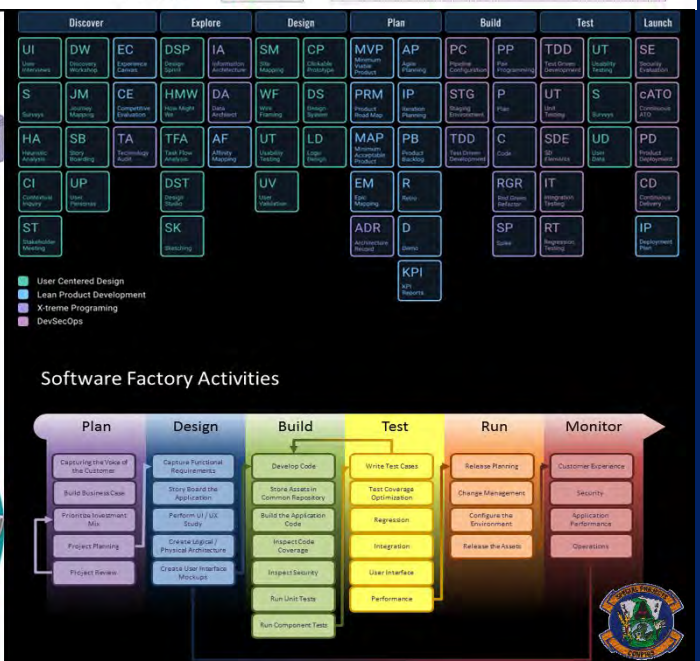
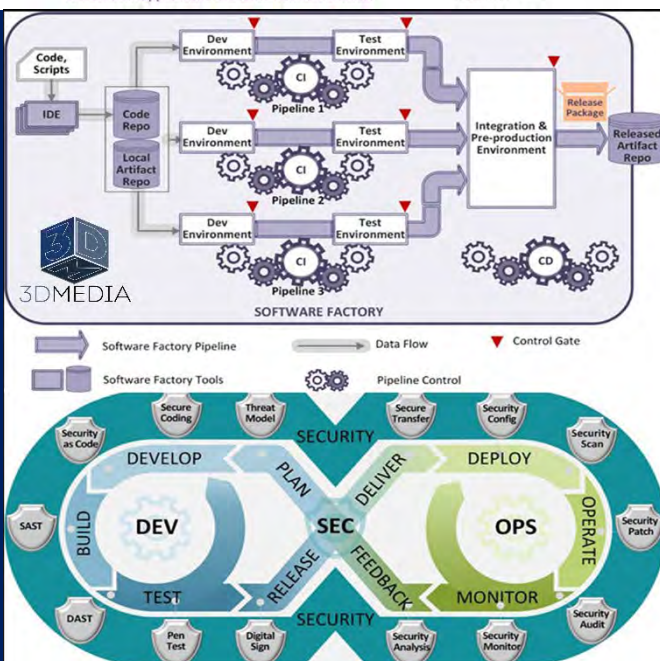
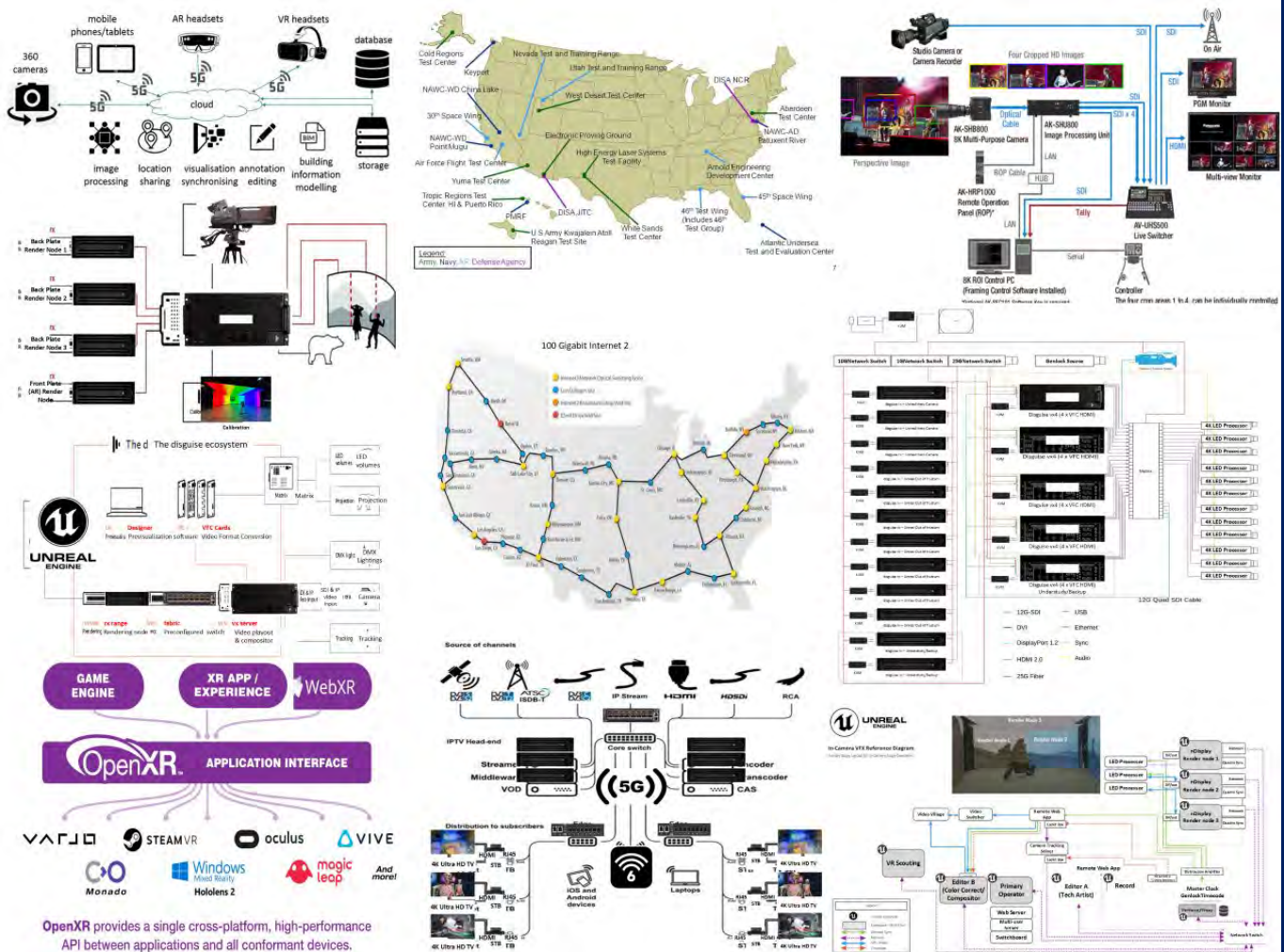
PROJECT CONVERGENCE





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A JOINT VENTURE BETWEEN

Southwest Range Services Joint Venture Member Companies

SRS was formed specifically for, and dedicated solely to, supporting the MSS contract. Comprised of four test and evaluation (T&E) service providers at WSMR and other MRTFBs, our developmental and operational test capabilities and experience span data collection and analysis; instrumentation development, operations, and maintenance; modeling and simulation (M&S); and research and assessment of weapons systems. Our test engineering capabilities include nuclear effects, HHSTT, kinetic energy weapons/hypersonics, urban environments, cybersecurity, directed energy (DE), and radar, telemetry, and optics development. Our Member companies provide personnel for range O&M and T&E efforts in support of all WSMR critical occupations and hard-to-fill positions. The result is a high expectation of SRS successful performance on the WSMR MSS program.



- 20+ years supporting MRTFB T&E and range operations and maintenance (O&M) contracts.
- Current WSMR presence supporting two Army O&M contracts.
- Proven WSMR staffing solution that capitalizes on the talent pool from Alamogordo, Las Cruces, El Paso, and surrounding communities.



- Managing partner of the NewTec JV from 1997-2010
- 35+ years supporting MRTFBs, including WSMR.
- 2,300+ range employees



- Current WSMR presence on one DOD range support contract.
- 20+ years supporting ATEC T&E ranges; 35+ years' operating maintaining and developing radars and threat simulation.
- 20+ years supporting the OSD Director, Operational Test & Evaluation and Test Resource Management Center (TRMC) delivering electromagnetic spectrum environments and cyber.



- 25+ years supporting DTRA RDT&E activities, including WSMR.
- 35+ years supporting weapons development activities and nuclear weapons effects modeling and simulation and T&E.



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Organization Information

- A. Name and address of Organization. MARCO Federal Services in partnership with Team Gemini.
 - Technical point of contact:
 - Anthony Sullivan 915-504-1323, Anthony@marcofederal.com
 - Business points of contact:
 - James Cordova 915-217-8500, James@marcofederal.com
 - Christine Mass 443-754-0480 Christine@marcofederal.com
- B. DUNS Number is: 080120705 UIE: V9LRAFZKHNP3 CAGE: 86KC9.
- C. We are not under NAICS 334310 Audio and Video Equipment Manufacturing. We feel that this code is not able to provide everything you will need to make the project work.
 - We suggest code-541519: Other Computer Related Service, Professional, Scientific and Technical Services
- D. At least 50% of the cost of contract performance incurred for personnel will be expended for employees of the prime contractor.
- E. MARCO Federal is a small, disadvantaged business.
 - The president of MARCO Federal is a veteran as is the technical P.O.C. Anthony Sullivan.
- F. MARCO Federal Services is an 8(a) company in good standing with the SBA.

Describe how your firm could complete the proposed upgrade requirement while maintaining compatibility with current WAVE systems and subsystems.

Compatibility with current WSTC systems and subsystems.

- ✓ **White Sands Test Center - System of Systems Integration Plan (WSTC-SoSIP)** will outline the approach and strategies for integrating multiple, autonomous systems into a cohesive whole. The goal of a WSTC-SoSIP is to ensure that the individual systems can effectively and efficiently work together to achieve common objectives and provide desired capabilities. The WSTC -SoSIP covers topics such as system architecture, data integration, communication protocols, and governance and management processes. The WSTC -SoSIP is a critical tool for ensuring the successful integration of complex, multi-disciplinary systems.

To ensure compatibility:

1. Identify and understand the requirements.
2. Determine what the plan needs to be compatible with and what the constraints are.
3. Research and assess available options.
4. Look into different products, technologies, and platforms that can fulfill the requirements and ensure compatibility.
5. Test and validate compatibility.
6. Before finalizing the plan, test it in a controlled environment.
7. Confirm that it is compatible with the necessary systems and technologies.
8. Document the compatibility plan.
9. Once you have confirmed that the plan is compatible, document the process and the results to ensure future reference.
10. Continuously monitor and update, technology changes quickly.
11. It is important to regularly monitor the compatibility of the plan.
12. Make any necessary updates to maintain compatibility.



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Upgrade from projectors to LED displays, consider a few factors.

1. **Compatibility:**
 - ✓ Ensure that the LED display is compatible with your existing system.
 - ✓ Can LED display the same resolution as your projector.
2. **Brightness:**
 - ✓ LED displays are brighter than projectors.
 - ✓ You need to make sure that the brightness level is suitable for your room and environment.
3. **Size:**
 - ✓ LED displays come in various sizes, choose one that fits your space and provides a good viewing experience.
4. **Cost:**
 - ✓ LED displays are more expensive than projectors, but they have a longer lifespan and lower maintenance costs.
5. **Installation:**
 - ✓ LED displays and Volumes requires professional installation.
 - ✓ After considering these factors, you can proceed with engineering and design.

Pixel Pitch (mm)	Visual Acuity Distance (feet / inches meters)	Average Comfortable Viewing Distance
0.75mm	8ft 6in 2.58m	4ft 3in 1.29m
1.00mm	11ft 3in 3.44m	5ft 8in 1.72m
1.25mm	14ft 1in 4.30m	7ft 1in 2.15m
1.50mm	16ft 11in 5.16m	8ft 6in 2.58m
1.75mm	19ft 9in 6.02m	9ft 11in 3.01m
2.00mm	22ft 7in 6.88m	11ft 3in 3.44m
2.25mm	25ft 5in 7.74m	12ft 8in 3.87m
2.50mm	28ft 2in 8.60m	14ft 1in 4.30m
2.75mm	31ft 0in 9.45m	15ft 6in 4.73m
3.00mm	33ft 10in 10.31m	16ft 11in 5.16m
4.00mm	45ft 1in 13.75m	22ft 7in 6.88m
5.00mm	56ft 5in 17.19m	28ft 3in 8.60m
6.00mm	67ft 8in 20.63m	33ft 10in 10.31m
7.00mm	78ft 11in 24.07m	39ft 6in 12.03m
8.00mm	90ft 3in 27.50m	45ft 1in 13.75m
9.00mm	101ft 6in 30.94m	50ft 9in 15.47m
10.00mm	112ft 10in 34.38m	56ft 5in 17.19m

What is pixel pitch?

Pixel pitch describes the density of the pixels (LED clusters) on an LED display and correlates with resolution. Sometimes referred to as pitch or dot pitch, the pixel pitch is the distance in millimeters from the center of a pixel to the center of the adjacent pixel. Since pixel pitch indicates the amount of space between two pixels, a smaller pixel pitch means there is less empty space between pixels. This equates to higher pixel density and improved screen resolution.

Key Takeaways:

- Pixel pitch refers to the density of pixels.
- Smaller pixel pitch higher density and higher resolution.
- Pixel pitch influences viewing distance.
- The smaller the pixel pitch, the closer the viewing distance
- The optimal viewing distance of your screen informs the pixel pitch value





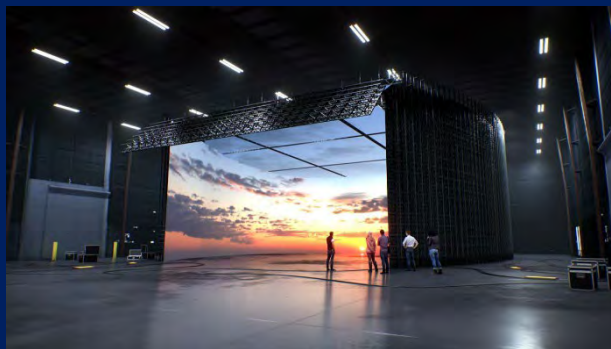
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Why is pixel pitch important?

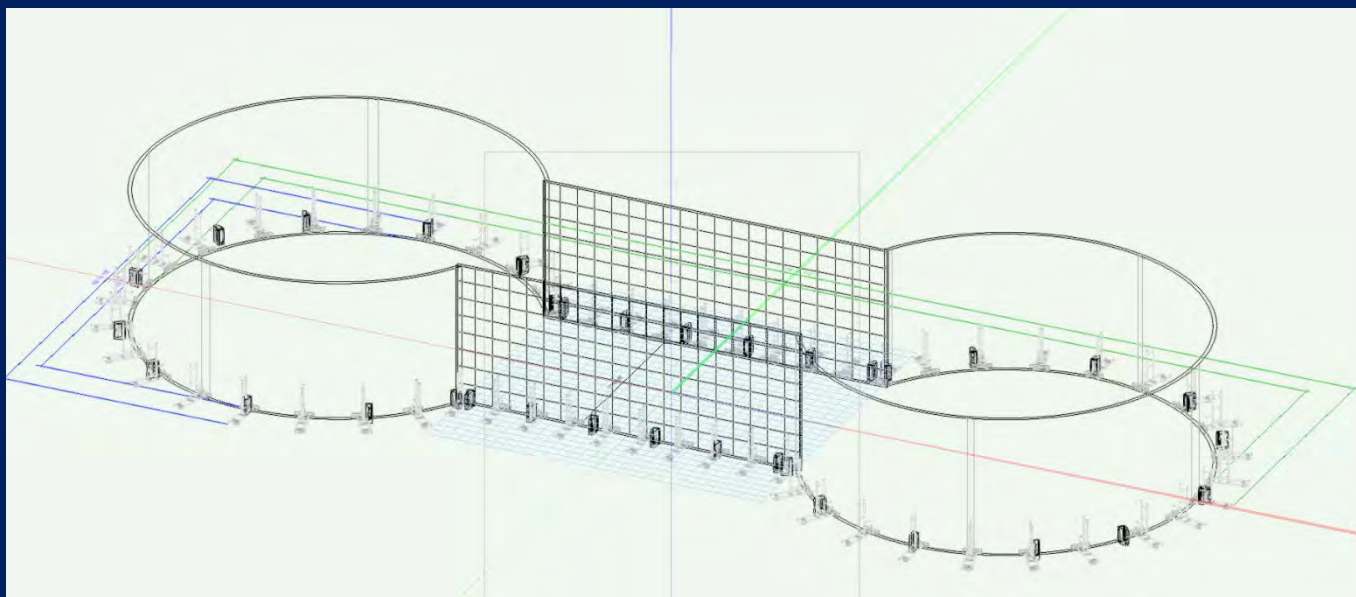
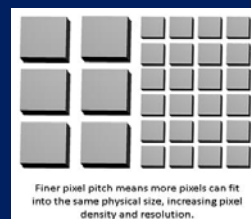
Pixel pitch is important because it influences the optimal viewing distance for your display. An image achieves smoother borders and finer detail with lower pixel pitch values. This allows the viewer to stand closer to the screen and enjoy a clear image without the distraction of discerning individual pixels. When determining viewing distance and pixel pitch, the rule of thumb is that a smaller pixel pitch allows for a closer viewing distance. Conversely, a higher pixel pitch elongates the minimum viewing distance.



While higher pixel density delivers improved visual quality, it is not the ideal option for every situation. Additional pixel density is intended for a closer viewing distance. At a greater viewing distance, higher pixel density loses its visual advantages and simply increases the cost of the display.

What is the right pixel pitch for my needs?

Smaller pixel pitch universally provides greater resolution but is more expensive. Materials and production costs are higher for smaller pixel pitch since more LED clusters are required to create a higher pixel density. Consumers can get the best value for their LED screen by determining the optimal viewing distance of their screen. The optimal viewing distance is the point where image fidelity is retained, but if the observer moved much closer, the image quality would decrease, or the screen would appear pixelated.





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Raed Al Tikriti, Chief Product Officer of disguise



"Although there are similar platforms on the market, disguise's technology is the most reliable end-to-end solution that allows our users to make changes in their production on-the-fly and maintain ultimate control of all elements. Our history in live events means we have built our technology to be used in an environment where there is no room for error. We also enable our users to perfectly previsualize their projects using our Designer software, while our proprietary RenderStream infrastructure seamlessly manages the rendering, tracking and synchronization of content - thereby significantly simplifying system deployment and operations. We also have a close relationship with the creators of Unreal Engine - Epic Games - and have integrated our software with the latest version of Unreal Engine from day one - whereas other tools may need additional configuration. These factors give our software and hardware a competitive edge and are the reason why many of our customers see us as leaders in the field. "



IITSEC 2022 TRL7 Demonstration 51 seconds

Extended Reality (XR) is highly versatile - it refers to anything that blends the real and the virtual worlds together. It encompasses Augmented Reality (AR), which is a widely used term to describe the addition of 3D-generated content composited over a live background view that provides the appearance of content sitting in (or augmenting) the real world. The metaverse will be a digital "twin" of the world today. Together with Epic Games' Unreal Engine, disguiseXR can be used to create hybrid agile combat environments on demand.

Joint Warfighter Cloud Capable Simulation Centers of Excellence could experience both live and extended reality. Unlocking a whole new omni-universe for amazing training experiences. For the past two years, disguise and Epic Games have been partnering to democratize the delivery of 3D graphics across all types of industries including virtual production, broadcast, corporate events, and beyond.

[Marcofederal.com](https://marcofederal.com)



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UNREAL ENGINE 5

Where Unreal Engine continues to push the boundaries in photorealistic 3D graphics, disguise offers a seamless way to deliver this real-time generated content into LED (Light Emitting Diode) volumes, projection setups, and any physical display configuration – at any scale.

“Unreal Engine 5 unlocks the most photorealistic real-time content we have ever seen, and, with the help of disguise, users can implement it into the **Medical Simulation Joint Trauma and Education Training Delivery Platform** productions with minimal setup requirements so they can focus on delivering their best creations,” disguise Technical Solutions Director Peter Kirkup said in a statement. disguise is the platform to imagine, create and deliver spectacular visual experiences. Its award-winning extended reality (XR) solution has powered over 400 immersive real-time productions in the past year, for enterprise businesses like SAP and Siemens, educational institutions like the University of Michigan, broadcast TV shows, commercial brands, US Government, and on-set virtual productions in more than 40 countries. **Working alongside the most talented visual designers and technical teams partnered with MARCO Federal Services Special Project Gemini, disguise is building the next generation of collaborative tools.**

- Unreal Engine 5 is a game engine and real-time 3D creation platform. It allows developers to create high-quality, interactive 3D content for video games, virtual and augmented reality experiences, and other applications.
- LED panels are a display technology that uses light-emitting diodes to create an image, used for large scale LED Volumes.
- When comparing the two, **Unreal Engine 5 and LED panels offer more versatility and interactivity for creating and displaying 3D content, while DLP projectors and 3D image generators are more limited in terms of interactivity** but can still deliver high-quality images. The choice between the two will depend on the specific application and the desired outcome.
- 2.5 LED panels are a type of LED display screen with a pixel pitch of 2.5mm, meaning the distance between the center of one pixel to the center of the next is 2.5mm. 2.5 LED panels are often used for indoor LED displays, such as for advertising, live events, and digital signage, due to their high resolution and small form factor. The high resolution of 2.5 LED panels provides clear, sharp images and text, making them suitable for close-up viewing.

With virtual production, your visual effects are no longer applied only in post-production. Rather, the technology empowers pre-planning and real-time changes on virtual sets. It pushed teams to adjust their creative workflow and work with new tools and pipelines. Virtual production is more than just connecting people virtually. Globally, there are various companies delivering excellent virtual production solutions, but disguise stands out as being the most reliable. **disguise is the platform for creative and technical professionals to imagine, create and deliver the world’s most spectacular visual experiences.** The disguise software-on-hardware solution creates a powerful, collaborative environment where artists and technologists can take control of their production, from concept development to showtime, bringing shared vision to life.



*Ben Danielowski VP
Special Projects*



*Matt LeLand VP
Special Projects*





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Users have trusted disguise's Designer software for over two decades to visualize, design, and sequence video content for projects across live entertainment, broadcast, fixed installations, and, more recently, virtual production. Users can rely on disguise's Designer software to win pitches, develop storyboards, create camera flythroughs, validate content, test their technical setups, and design entire shows.

Coupled with this, the company's powerful media server range offers leading graphics processing, content rendering, and content compositing capabilities for these projects. This allows disguise's users to put the content they develop in Designer to action. They can render content at unlimited scale and complexity and compose it seamlessly with disguise hardware's superior networking capabilities which ensure the highest level of frame accuracy. *This content can be anything imaginable, including real-time graphics developed in Unreal Engine for virtual sets, video playback content played at unlimited scale in live shows, projection-mapped installations, or even content that can move and respond to the world around it.* disguise also offers support and training.

At the end of 2020, the company launched its free eLearning platform, allowing its community of users to upskill and get acquainted with workflows. disguise has a Community platform with over 3,000 users with whom it works together to overcome common challenges in productions.



*Anthony Sullivan
Team Leader
Special Project Gemini*

MARCO FEDERAL SERVICES

MARCO Federal Services LLC, a leading provider of government and commercial engineering and technology services. MARCO Federal Services is an 8(a) certified small business.

USASMA FT. BLISS, TX (Period: June 2019 –Current) MARCO Federal Services provides analysis, design, development and implementation of non-commissioned officer education and training programs for the United States Army Sergeants Major Academy [NCOLCoE](#). The United States Army Sergeant Major Academy ([USASMA](#)) is the U.S. Army's senior enlisted professional military education institution. The Academy provides comprehensive training and education to Army non-commissioned officers (NCOs), including both basic and advanced courses. The Academy is responsible for developing the leadership skills of NCOs and providing them with the knowledge and abilities they need to lead soldiers and support the Army's mission.

FT. BLISS, TX (Period 2020 - Current) Cultural Role Players The US Army uses cultural role players (CRPs) as part of its training programs to simulate cultural scenarios and help prepare soldiers for deployment to different regions around the world. CRPs are hired individuals who are knowledgeable about specific cultures and can act as locals in simulated scenarios. The goal is to provide soldiers with a realistic and immersive cultural experience to help them understand the customs, beliefs, values, and attitudes of the people they may encounter while deployed. This training helps soldiers to develop cultural awareness and cross-cultural communication skills, which are important in building positive relationships with local populations and promoting stability and security in foreign countries.

- **PETERSON AFB and CHEYENNE MOUNTAIN AFS, CO** (Period: March 2020-2025) Solid Waste Management
- **US COAST GUARD AIR STATION CLEARWATER FL.** (Period: June 2019 –Sept 2019) Repair Storm Drainage System
- **AIR FORCE BASE LANGLEY-EUSTIS, VA** (Period: March 2019-2022) Solid Waste and Recycling Services.
- **ARMY FORT MCCOY, WI** (Period: March 2018 – Current) Solid Waste and Recycle Program Services.
- **U.S. ARMY WESTPOINT, NY** (Period: March 2018 – Current) Solid Waste and Recycle Program Services.
- **GSA MIAMI, FL** (Period: August 2019 – Current) Solid Waste and Recycle Program Services.
- **U.S. ARMY, FT. LEE, VA** (Period: November 2019 –Current) Repair, maintain real property, waste, and recycling.

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MARCO FEDERAL SERVICES TRANSFORMATIONAL ECOSYSTEM

CLICK LOGOS AND TEXT BELOW





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COLE ENGINEERING SERVICES INC

Vendor Information

Vendor Name	Vendor Industry
Cole Engineering Services, Inc.	Modeling and Simulation; Software Development, Integration, and Interoperability (I&I); Cyber Operations and Training Environments; Serious Gaming and Virtual Worlds; Technical Services & Training

Date updated: February 1, 2023,

Company Description

Cole Engineering Services, Inc. (CESI), a By Light company, is recognized as a premier provider of state-of-the-art modeling and simulation training solutions to the Federal Government and industry. Since 2004, we have been at the forefront of developing, maintaining, and integrating simulation-based training, serious gaming, technical services, training, and other support in live, virtual, constructive, and gaming (LVCG) domains. CESI’s serious games are designed to enhance the training and development of personnel by providing a safe and engaging environment for practicing skills and tactics. Our services cover the full spectrum of serious game development, from conceptualization to delivery and support. CESI is the prime contractor for the U.S. Army Synthetic Training Environment (STE). CESI also designs, builds and runs infrastructure, platforms, applications and processes that enable cyber training for the integrated multi-domain force. We designed, developed, and operate the largest cyber training range in the world for the U.S. Joint Cyber community!

Contact information

Primary point of contact	Phone	Email
Michael Chandler	(407) 601-9389	Michael.Chandler@cesicorp.com



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We bring innovation and expertise to better serve our nation's armed forces and Veterans.



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Background and experience

Where are you located?

Orlando, FL

Business background

CESI began in 2004. In 2019, CESI was acquired by, By Light IT Professional Services and now operates as a wholly owned subsidiary of By Light.

Notable experience or awards

CESI is proud to be named a Top 100 company in Orlando and a "Best Companies to Work for in Florida" awardee for the last 11 consecutive years. CESI has received special recognition for community engagement emphasizing veteran's causes.

Product or service details

- ✓ **Agnostic Systems Integration Services, MR-DNA Distributed Infrastructure, FHIR Standard** – CESI is recognized in the simulation industry for our Modeling and Simulation (M&S) systems integration expertise with a history of priming large complex DoD programs since our founding in 2004. The Mixed Reality-Distributed Network Architecture ([MR-DNA, AR rapid prototyping video.](#)) is an example systems integration technology built by CESI providing a synthetic environment allowing web, desktop, AR/VR, and mobile users to be in the same virtual classroom simultaneously. CESI's parent company ByLight is an expert on the FHIR (Fast Healthcare Interoperability Resources) specification; this knowledge is useful in coming up with lessons and in systems engineering tasks to training DOTMLPF filling out representative forms and data fields and in integrated immersive virtual environment.

Product (or service) details

- ✓ **AR/VR Experience to build custom solutions** – CESI offers immersive commercial solutions like the ([CAART](#)) Commercial Aviation Augmented Reality Toolkit to train pilots and crew on a variety of flight and maintenance tasks. U.S. AF Virtual Environment Training Launch Facility (VET-LF) is a Minuteman III missile silo maintenance trainer that allows users to conduct maintenance tasks within a virtual missile silo in a distributed training environment. The Department of Energy (DOE) National Energy Technology laboratory (NETL) Center for Artificial Intelligence and Machine Learning (CAML) is a virtual lab allowing seven NETL labs to conduct research and analysis of high-fidelity salt cavern gas propagation models. We build custom solutions like the HoloRange AR wargaming sandtable to meet specific unique performance/collaboration and security requirements.



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Capabilities

Serious Gaming Design and Development



CESI is recognized by Epic Games to be a unique high-quality Unreal gaming engine developer in the DoD and Homeland Security space. Epic grants CESI special access to developer support as needed when modifying the Unreal game engine components for simulation and training due to our unique customer requirements. CESI also has advanced Unity game engine capabilities to rapidly build AR/VR technologies such as **CAART**, **VET-LF**, **NETL CAML**, and the **HoloRange**.

Build Systems and Train to Meet Requirements for DOTMLPF

– CESI supports the DOTMLPF process by developing unique simulation capabilities and providing services to customers to build and staff solutions to meet training needs.

- **Part Task and Collective Training Expertise** – CESI's core competencies reside in systems of systems architecture, systems engineering and hardware/software development enabling distributed interoperability of training system's needs, spanning complex collective training systems through part task training solutions. We substantiate this claim through our successful past performance as prime contractor for the U.S. Army's **Live, Virtual, Constructive – Integrating Architecture (LVC-IA)**, **Maneuver Collective Training System (MCTS)** programs and developer of the **CESI Mixed Reality Distributed Network Architecture (MR-DNA)** immersive environment capability. For the LVC-IA program, CESI designed, developed and fielded a multi security enclave network architecture which enables distributed interoperability of legacy simulators and simulations spanning live, virtual and constructive training capabilities never designed to work together. For the MCTS program CESI fulfilled post deployment software support, technical refreshes for obsolescence and concurrence upgrades to match training device capability of the training devices with that of operations systems. Examples of upgrades include new/enhanced sensors, weapons and manned-unmanned training. The CESI built MR-DNA product leverages the lessons learned from these and other experiences to enable distributed individual and collective training using modern mixed reality immersive environments.
- **Software factory** – CESI develops a repeatable process to construct gaming and simulation optimized **DevSecOps** environments across the company and for our customers which use a combination of on-premises and device-based project-based tools to build, secure, test, and deploy software.
- **Cyber Competencies** – CESI developed the **Repeatable Risk Management Framework (RMF)** process for our **Army PEO-STRI** customer product line so that there is consistency across solutions which saves the customer millions of dollars annually. We are also the **prime contractor on the Cyber Trident Persistent Cyber Training Environment** which is the world's largest cyber training range. PCTE trains all warfighters in basic cyber hygiene up through **Cyber Mission Forces (CMF)** to conduct advanced **Offensive and Defensive Cyber Operations (OCO/DCO)** via a robust training catalog through a custom portal and on-premises cloud solution hosted by CESI and its customers soon to be across the globe.



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What are your
primary
differentiators?

Delivery
timeline

- **Rapid Prototype medical AR/VR and MR-DNA browser, device, and desktop solutions** – The MR-DNA framework is an innovative framework that works across a variety of disparate use cases. We plan to extend this capability data model to support distributed and performant training in the DHITS environment between systems that support commercial and industry standard protocols such as Maestro, MoHSES, and FHIR.
- **Rapid Prototyping using 3D Additive Manufacturing** – CESI designs and fabricates 3D printed objects, such as rifle, stinger, shoulder launched munitions, aircraft flight panels and mortar parts, to augment simulated and live training applications.
- **Systems integration and interoperability touching disparate training systems in legacy and modern environments.** CESI specializes in military and Department of Homeland Security simulation and systems integration. For example, we build and maintain the Joint BUS (JBUS) open source simulation gateway for the US Army on the LVC-IA. JBUS translates a variety of simulation and tactical protocols so that each “come as you are” simulator connected does not have to specialize in those translating those protocols.
- **Tailorable Agile Software Development Process** - As a software shop, CESI has company processes to use *Agile software development* approaches to not only deliver timely software to our customers, but to adjust software as it is built to meet changing customer direction as the capabilities are discovered when fleshed out. This approach alleviates the customer from documenting perfect requirements since the software may be changed after demoing. *We typically tailor our Agile process for each project since many customers still use a waterfall Software Development Life cycle (SDLC) approach.* This allows us to accelerate the software development process while meeting typical DoD systems engineering artefact and documentation deadlines (i.e., SSS, SSDD, etc.).



Every great solution starts with hard work.

Our cross-functional engineering teams consistently work to ensure we deliver our customers the quality products and solutions they have come to expect from CESI.



[Cole Engineering awarded \\$957M Cyber Training Contract](#)
January 5, 2022 by [highlightadmin](#) in [Press Releases](#)
Cole Engineering awarded \$957M Cyber Training Contract
Team CESI Chosen to Lead the Execution of the
DoD's Persistent Cyber Training Environment

[Cole Engineering awarded \\$179M OTA by U.S. Army](#)
June 23, 2021 by [highlightadmin](#) in [Press Releases](#)
Cole Engineering awarded \$179M OTA by U.S. Army
Team CESI Chosen as Software Enabler for the
Synthetic Training Environment





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MR-DNA – Using the MR-DNA framework's CAART program, Embry Riddle Aeronautical University's (ERAU) Daytona Beach campus flight program achieved a 34% reduction in the days to complete the program. ERAU Daytona requires all student pilots to go through a 2-week immersive program using CAART to learn and memorize all flight checklists prior to moving into the physical aircraft. This allows student pilots to have a solid foundation prior to engaging instructor pilots in the cockpit of real aircraft and provides significant cost savings to the student by not paying flight hours to learn the foundational elements of the aircraft.

Customer
success
resources

- Using the MR-DNA framework, CESI developed the **Virtual Environment Trainer Launch Facility (VET-LF) Minuteman III missile silo maintenance trainer prototype**. The VET-LF prototype system has been demonstrated by the Air Force at numerous AF missile wings with the most recent being the 91st Missile Wing at Minot AFB where the commanding general stated "we need this to train our airmen".
- **Collective Training STE** - CESI is the current prime contractor tasked with developing the U.S. Army's next generation collective training capabilities, the **Synthetic Training Environment (STE)**. As prime contractor for both the STE Information System (STE-IS) and Reconfigurable Vehicle Collective Training (RVCT) systems, CESI is developing and producing the overarching training capability interoperability information systems architecture and the reconfigurable ground and air training devices which include both physical and missed reality technologies.
- **USMC Wargaming HoloRange AR Sandtable** – CESI was the prime contractor in the USMC Wargaming Phases 1 and 2 Other Transaction (OT) Prototypes in 2019-2021. A task on the effort including building a prototype AR wargaming sandtable. This required CESI to derive requirements, design a secure capability that works in a SCIF, and implement complex integrations with terrain and simulation capabilities to present to wargamers in an immersive easy to use environment. CESI created novel ways to represent battlefield systems, special effects, and human factors for drawing in 3D, customized networking to share common views and controls, and collaborating with participants that may or may not have AR devices.
- **Specialize in Private/On-Premises Virtualized Infrastructure for 3D gaming, training applications** – CESI builds, maintains, and staffs customized performant simulation and gaming 3D on-premise virtualized environments for development, integration, and deployment. We develop and fine-tune commercial technologies such as VMware ESXi, vCenter, and Horizon and nVidia GRID, and home-grown technologies like the MR-DNA AR/VR backbone, to deliver immersive AR/VR capability in near real-time by distributing loads between virtualized and bare metal solutions as needed. Our CAART and wargaming virtualized environments support 3D graphics and a host of web services for development and deployment. Our PCTE cyber training environment supports the scale thousands of users with up to 100,000 VMs to expand in the future to 400,000 VMs across security enclaves.

Service delivery
technology

- **Deliver GPR and ITAR compliant solutions** – CESI develops government and commercial solutions to include open source GPR licensing. CESI is leads co-development programs for PEO-STRI on the OneSAF and LVC-IA to integrate and test disparate software changes internally and from government customers and contractors into an open-source baseline. OneSAF is distributed to domestic and international partners. CESI developed an automated ITAR scrubbing process to comb through 15 million-plus lines of code and data in the OneSAF baseline to ensure non-releasable code and data does not exist in internationally releasable versions of OneSAF which versioning may differ by nation.
- **CESI generally protects customer data applying Cybersecurity Maturity Model (CMMC) Level 2 best practices**. CESI ranks very high on self and externally assessed CMMC scores. CESI was recognized in the top tier of the DoD CMMC early adopters as our standard operating procedures to protect customer data were easily adaptable to the CMMC standard. CMMC is how we protect customer Controlled Unclassified Information (CUI); CESI has extensive policies and auditing to protect and identify the integrity of customer and internal data from misuse or exfiltration.

How do you
protect customer
data?

- We have **Capability Maturity Model Integrated Maturity Level 3 (CMMI-ML3)** tailorable processes in place to certify solutions to Risk Management Framework (RMF) standards up to Top Secret environments. We are near the end of a process of building an accredited SCIF at the CESI Orlando facility on Discovery Drive.



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APPLIED RESEARCH ASSOCIATES

Health Solutions

Vendor information

Vendor name	Vendor industry
<u>Applied Research Associates (ARA/</u>	Research and development
<u>Virtual Heroes Division</u>	Design and development of immersive serious games and simulation applications
Date updated: 1/30/2023	
Company description	<p>ARA - We have a broad range of technical expertise in defense technologies, civil engineering, computer software and simulation, systems analysis, environmental technologies, and blast testing and measurement. We provide sophisticated technical products and solutions within a diverse range of business areas.</p> <p>VHD - designs, develops, and deploys high-fidelity simulations that blend the best of training development, advanced modeling, and serious gaming technology to create fully immersive experiences.</p>

Contact information

Primary point of contact	Phone	Email
Jeff Lyons	Desk: (919) 747-7600	jlyons@ara.com

Background and experience

Where are you located?	<p>ARA Corporate Headquarters 4300 San Mateo Blvd., Suite A-220 Albuquerque, NM 87110-1229 United States Tel: 505-881-8074</p> <p>Virtual Heroes – Raleigh (we also have an office in Orlando, FL) 8537 Six Forks Road, Suite 600 Raleigh, NC 27615-6545 United States Tel: 919-582-3300</p>
Business background	<p>Virtual Heroes For almost two decades, Virtual Heroes has made a name for itself by developing and deploying objective-based immersive training experiences tied to measurable performance outcomes — and delivering unmatched results for organizations ranging from medical centers and nuclear plants to government agencies and national defense organizations. We’ve made it possible to train surgeons, soldiers, first responders, plant inspectors, and hundreds of other types of essential workers using scenarios that replicate the real world as closely as possible. Operating rooms? Disaster zones? Front lines? We’ve been there, and we’ve done that.</p> <div><p>VIRTUALHEROES® A DIVISION OF APPLIED RESEARCH ASSOCIATES, INC.</p></div>



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Notable experience or awards

Virtual Heroes has been recognized for training and simulation excellence by some of the most authoritative names in the business.

- 2022 – Unreal Engine Authorized Service Partner
- 2022, 2021, 2018 Largest Technology Company - Orlando Business Journal
- 2021, Best AR/VR Simulated 3D Environ. Dev. Company - Corporate Vision
- 2019, 2016-2018 Gamification Top 20 Company - Training Industry
- 2017 Innovation Award - MS&T Magazine
- 2015 – 2021 Largest Mod/Sim Companies - Orlando Business Journal
- 2016 Best Business Game - I/ITSEC Serious Games Showcase & Challenge
- 2015 International SERIOUS PLAY Conference Awards - Serious Games Association
- 2015 Best Places to Work - Orlando Business Journal
- 2011-2017, 2005-2007 Military Training Technology Top Simulation & Training Companies
- 2011, 2013-2017 Top Game Developer - Triangle Business Journal
- 2011 International SERIOUS PLAY Conference Awards - Serious Games Association
- 2011 Group Achievement Award - NASA
- 2010 Best Government Game - I/ITSEC, Serious Games Showcase & Challenge
- 2009 Business Excellence Award - The Global Business Coalition on HIV/AIDS, Tuberculosis and Malaria

Product or service details

SUSTAIN – Prolonged Field CARE

Customer: U.S. Army Medical Research Acquisition Activity (USAMRAA)

Description: SUSTAIN is a modular, extensible, Point-of-Demand modelling and simulation prototype system for use in military medical education and training for care in the field that extends beyond initial trauma care (PFC). SUSTAIN aims to:

- Provide a platform able to support an advanced curriculum that can teach a variety of treatments that address complications of cascading insults and interventions.
- Be extensible to non-medical personnel to promote cross-training.
- Take advantage of modelling and simulation to replicate challenges of prolongation in a condensed way.
- Incorporate existing and standardize new CPGs that can evolve dynamically as new competency requirements and best practices arise.
- Produce data that will be interoperable with JPC-1's future learning management system (LMS) to track performance metrics/force readiness (i.e., POINTS)

Product (or service) details

The SUSTAIN open framework includes four key technical components that, when combined, provide an extensible end-to-end PFC training. We delivered two TRL-5 PFC training prototypes that include a virtual training system, integrated hardware, dynamic physiology, and an underlying software framework to enable: 1) POD accessibility, 2) extensibility to future systems, 3) easy scenario creation and distribution, 4) individual and aggregated assessments.

The two training prototypes were SME-tested simulations delivered at TRL 5. The prototypes acted as reference implementations, proving SUSTAIN can be a foundational framework to lower the barrier and cost to build PFC training.



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The SUSTAIN Program consisted of four main tasks:

- **Task 1: Simulation Framework**

We delivered a modular/open-source architecture for managing/executing PFC training: creating scenarios from resource libraries, publishing HW/SW content, and collecting assessment data. The open standard derived from High Level Architecture (HLA) standards.

- **Task 2: Scenario Builder**

The scenario builder is an XML schema that allows non-technical users to create, edit, and reuse patient, substance, drug, medical equipment, and physiology configuration input parameters in a standard format. This UI will allow clinicians and medical educators to create and publish training content.

- **Task 3: Virtual Training Module**

We delivered two Role 1 training scenarios: gunshot wound and burn injury. The learner is guided into a medical tent on the makeshift base camp where a comrade with a gunshot wound is lying. From here, the player is free to treat the patient. Some actions the learner can take include:

- Visual and cognitive assessment of the patient
- Vitals monitor.
- Cover Patient With Blanket / Remove Blanket
- Place / remove tourniquet.
- Ask the assistant to supply blood for the patient
- Gather Blood Transfusion Supplies
- Administer Blood Transfusion
- Offer Food / water: Offer the patient water.
- Apply / remove wound pack
- Help Patient Urinate
- Insert / remove arm
- Prepare IV Bag with Saline and/or RingersLactate
- Administer IV Drip / push
- Modify Flow Rate
- Attach Oxygen Mask
- Attach Nasal Cannula



Both modules integrate with the BioGears physiology engine (<https://biogearsengine.com/>). The BioGears team developed five model extensions needed to support the PFC training scenarios. The identified models include Antibiotics, Oral Fentanyl Delivery, Full Whole Blood, Sleep, and TXADrug. Working with the BioGears open source community and our PFC SME, we identified the priority of additions to BioGears to be as follows

- TXA Drug
 - Oral Fentanyl
 - Antibiotics Model
 - Whole Blood Model
 - Sleep Mode
- **Task 4: Learning Assessment Tools**

We used xAPI to build a web-based tool that assesses trainee performance over time and across multiple scenarios/mediums/PFC core competencies. At completion, data will be displayed in an easy-to-understand UI for medical educators.



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Capabilities

PFC: The virtual training system contains realistic patient scenarios, integrated medical hardware task trainers, and an underlying software framework. These components enable extensibility to future systems, artificial-intelligence-based scalable difficulty, and individual and aggregated assessments.

PFC is an extensible platform that integrates disparate training tools and standardizes data to lower the barrier to create training content.

Hardware integration
Physiology engine integration
LMS integration
Scenario creation tool

Capabilities

Virtual Heroes:

Design, implementation, deployment immersive serious games
Individual, self-paced training (single player)
Instructor-lead, or not, team training (multiplayer)
24/7/365 open virtual worlds
Standalone PC and Mac applications
Mobile devices (Android and iOS)
AR & VR systems (HoloLens, VIVE, Oculus, Index...)
Cloud-based platforms

As demonstrated by our several projects listed above, ARA's Virtual Heroes division are experts in the serious game's domain. We take best-in-class gaming technologies, like the Unreal Engine, and deliver it to the Warfighter. We work closely with military and other Subject Matter Experts (SMEs) to ensure our immersive training simulations meet training objectives. Our focus is on improving learning outcomes, not immersion for immersion's sake.

What are your primary differentiators?

ARA is an employee-owned company. Our employees exhibit our core values: Passion, Freedom, Service, and Growth. We give our employees the freedom to pursue their passions, and they are passionate about how we serve our customers.

While ARA serves both government and commercial customers, VHD's focus is to deliver immersive training to the DoD, achieving improved training outcomes.

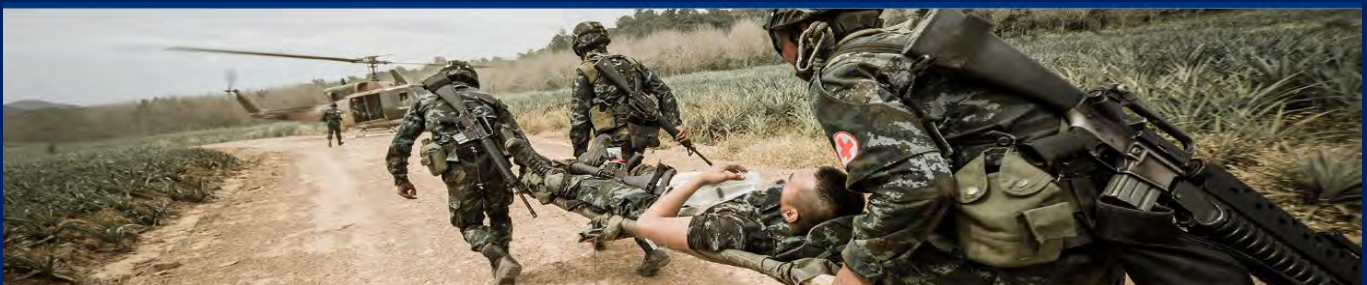
Delivery timeline

Six to twelve months depending on scope

Technical and security information

How do you protect customer data?

We follow all DOD data security requirements





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SIMCENTRIC

Vendor information

Vendor name	Vendor industry
	<i>Virtual Simulation Software</i>
	SimCentric is focused on enabling the warfighter through innovation. We strive to be thought leaders and innovators in the areas of:
	<ul style="list-style-type: none">• Virtual Reality Training Environments• Self-Paced Virtual Reality Learning Systems with Autonomous Instruction• Portable, on-demand, point of need Training.• Accredited Joint Fires Training• Digitised Range Safety and Live Fire Fratricide Risk Mitigation
Date updated: 04 Feb 2023	We work closely with our military and industry partners to ensure that our technology can be seamlessly used as part of their broader training infrastructure.
Company description	SimCentric is focused on enabling the warfighter through innovation. We strive to be thought leaders and innovators in the areas of:
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	We work closely with our military and industry partners to ensure that our technology can be seamlessly used as part of their broader training infrastructure.

Contact information

Primary point of contact +44 7768975676 Email Mr. Simon Leng

Background and experience

SimCentric is headquartered in the United Kingdom, with subsidiaries in USA, Australia and Sri Lanka. SimCentric has worked in the military simulation field for over 10 years and is a leader in the field of Virtual Reality military training and simulation applications. The major drivers for our success are our depth of experience, technical expertise, and an effective customer support program. SimCentric employs highly skilled software engineers and also subject matter experts who have significant military experience. These extra skills ensure that SimCentric is well placed to understand detailed customer requirements and context, enabling our talented project teams to build capabilities into the product line which matches end customer needs.

Where are you located?

SimCentric is a veteran-run company and the senior management team includes ex-military personnel who individually have commando, infantry, artillery and signal backgrounds. SimCentric has experience working directly with armed forces, in particular introducing advanced VR simulation and training systems to tri-service military units who have no previous experience using VR based applications, and enabling them to be proficient and achieve training objectives during the first day of use.

SimCentric has engaged in significant projects and programmes direct with military end customers around the globe. Examples of these are the Australian Defence Forces, US Marine Corps, British Army, Netherlands Defence and Swedish Armed forces. In all cases SimCentric has delivered fully tested applications direct to end users and completed trials and acceptance processes with satisfaction.

Business background



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Product or service details

Notable experience or awards

SimCentric has provided its SAF-TAC simulation software to the Australian, Land Simulation Core 2.0 Tranche 1. Program.

- This Program provides a common simulation software for use across Australian Army synthetic training activities.
- SAF-TAC was a finalist in the Modelling and Simulation Technology Magazine Awards for most Innovative MR/VR/XR Application in 2022.
- SimCentric has also provided its SAF-TAC software to multiple users across the UK MoD.



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SAF-TAC: SAF-TAC is an UE5 (commercial gaming) based synthetic platform optimized for Virtual Reality. Utilizing ubiquitous COTS hardware components, it is designed to support a low-overhead, simple, stable, flexible, and portable Virtual Reality and Desktop based learning platform that enables instructor and individual lead tactical collective training in order to drive

efficiencies and engagement at all levels. SAF-TAC as the collective training platform utilizes a combination of gaming specification PCs1, Virtual Reality headsets, and networked participants (BLUFOR and OPFOR) to enable high frequency tactical training instances with rapid iteration and learning inculcation. SAF-TAC also utilizes the extensive Unreal Engine supply chain of content, models and environments, allowing rapid, low-cost, low-risk evolution and development of scenarios and concepts. SAF-TAC has been adopted by the Australian Defense Force as part of their Land Simulation Core 2.0 program.

Product (or service) details

SAF-TAC SOLO: SAF-TAC SOLO utilizes the same code base and content/model library as SAF-TAC, however, is optimized for use as an individual training platform employing a standalone COTS Virtual Reality (VR) Headset, without a requirement for a supporting PC. The user may utilize just the headset in a free roam capacity to undertake structured individual training of any learning outcome or proficiency, employing customized synthetic emulated equipment, materiel sub-systems and components. Integration with the Moodle Learning Management System (LMS) enables this learning to be aligned with Course and Module Learning outcomes. (CLO and MLO), and Formative / Summative Assessments, with ease of content upload and access the ability to centrally baseline content including automation of instructor learning points. results in a high degree of doctrinally correct procedural repeatability, whilst supporting point of need, on-demand, flexible and self-paced training events.





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What are your primary differentiators?

SAF-TAC is the first 'virtual reality first' synthetic environment. It has been designed specifically to support virtual and mixed reality training in the military context. It provides a common simulation software platform which can be customised for a wide variety of use cases, while maintaining core functionality across these use cases including:



- Drag and drop scenario editing.
- Runtime scenario editing and Instructor tools.
- After Action Review for full playback
- Integration with Learning Management System to allow seamless integration with learning/training continuum.
- Virtual Reality interactions for trainees in dismounted or mounted scenarios.

Delivery timeline

SAF-TAC and SAF-TAC SOLO are both available as Commercial-Off-The-Shelf products and are available immediately. SimCentric has a history of also conducting software customisation or content development for the SAF-TAC family of products. These are generally performed on a 4-to-6-month delivery timeline. SimCentric is also comfortable working in a spiral development agile methodology with customers, allowing continual user feedback during the development process.

Customer experience

SAF-TAC has a diverse and growing user-base.

Australian Defence Force VR Training Suites

SAF-TAC has been deployed across Australia in a series of Virtual Reality training suites, allowing users to train in section (or by combining suites, up to Platoon level). This has been used in officer training, infantry training and specialist corps training. In the words of LTCOL Christopher Johnson, Commanding Officer of 3rd Battalion, The Royal Australian Regiment: "This is a game-changer. Within about 10 minutes, the soldiers were already compatible with the technology and exploring different ways to use it.... This system is now being used daily to complement our training."

Customer success resources

UK Training with Commandos

SAF-TAC was trailed across the UK MoD by the Defence and Security Accelerator and Defence Science and Technology Laboratory. This activity included tri-service user touchpoints, the largest being a week-long training event with 40 Commando Regiment. Details of this training event are shown below: <https://www.youtube.com/watch?v=GAwLb1ATMeU>

UK RAF Regiment Phase 2 Training

The RAF Regiment has been using SAF-TAC for several years in their Phase 2 training course in the UK. This usage was covered by the technology news program BBC Click. The segment shown in the link below: <https://youtu.be/ofCcyHdVccg>

Service delivery technology SAF-TAC



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We Scan, Investigate and Inform

Allied Command Transformation analyses the trends that shape our security environment, assesses the inherent risks, threats, and opportunities, and investigates alternatives. By doing that, we improve the awareness, understanding and unity of effort among the members of the Alliance in order to strengthen NATO's capabilities to address the challenges of today and tomorrow.



We Innovate and Challenge



SimCentric explores and implements new and/or different ideas, methods or solutions that achieve value for the Alliance. By reaching out for new concepts and solutions, generating ideas, bringing them to life, harnessing new technologies and experimenting, we generate solutions to the challenges faced by the Alliance. Allied Command Transformation leverages its creative, experienced and diverse military and civilian staff, empowering them to explore better, faster and more creative solutions to address the most difficult problems.

We Connect

SimCentric harnesses the largest defense and security network in the world to tackle the challenges facing the Alliance. We draw ideas and intellect from Allied and Partner nations (military, civilian, industry and academia), Centers of Excellence, Partnership Training and Education Centers, the United Nations, the European Union, the Science and Technology Organization, the Conference of National Armaments Directors and a wide network of subject matter experts. By doing this we ensure the maximum exchange of ideas in order to enhance Alliance military capability.



We Deliver Capabilities

SimCentric defines and manages new programs to modernize NATO's capabilities, from Command and Control to logistics and enablers, providing the connective tissue that enables 30 nations to operate as a single force. Allied Command Transformation leads the execution of the Capability Management Function across the Alliance and is the Capability Requirement Authority - ensuring the challenges of the future are met by the right capabilities.

We Educate and Train

SimCentric educates and trains thousands of Army, Navy, Air Force and civilian men and women each year. We deliver Article 5-level joint exercises, small scale exercises and pre- deployment training. By doing this, we homogenize the Alliance's military culture, develop necessary competences and skills, and ensure interoperability in the cognitive dimension of Alliance capability.

