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Commander's Corner: A Message from COL Jeremy Pamplin

Revolutionizing Combat Casualty Care: The Power of Digital Twins in Optimizing Casualty Care through Passive Data Collection

COL Jeremy C. Pamplin,
TATRC Commander

In the ever-evolving landscape of healthcare, technology continues to play a pivotal role in transforming casualty outcomes and optimizing medical practices. One such groundbreaking concept is the idea of digital twinning. Digital twinning involves creating a sophisticated digital replica of a real-world entity, and it holds immense potential in healthcare, particularly when applied to casualties. By harnessing the capabilities of digital twins and integrating passive data collection methods related to casualty status, caregiver actions, and real-time resource use, the Military Health System (MHS) can revolutionize casualty care, optimize system capability and capacity, and significantly improve casualty outcomes.

As part of its new mission to ***Automate Casualty Care***, Team TATRC is starting a journey to summit 'Mount Autonomy' (**Figure 1**). To successfully summit (achieve our goal), requires foundational efforts in planning a route, obtaining the necessary resources, and partnering with those who can help along the way. In this quarters' installment of the Commander's Corner, I'll try to de-mystify some of our plans by highlighting the paths that others, specifically the automotive industry, have taken to the summit.

First, digital twinning. Digital twinning provides healthcare systems with a unique opportunity to bridge the gap between the physical and digital worlds. By creating a digital replica of casualties, clinicians gain access to the understanding of a casualty's projected (future) condition and needs (**Figure 2**). This virtual representation, infused with information about resource availability at echelon and operational considerations for evacuation that impact time, can form the basis for personalized, data-driven decisions that can optimize our trauma system's capability and capacity to manage large volumes of casualties.

This concept, however, is not possible without data. GEN Milley writes "*The next conflict will be characterized by ubiquitous sensors with* ***mass data collection and processing ability****…*" (JFQ, Vol. 3, 2023). The MHS is not prepared for this. Passive data collection, involving the unobtrusive monitoring of casualty status, clinician actions, and real-time resource utilization, is fundamental to the success of digital twinning in combat casualty care. Through wearable devices, cameras, microphones, accelerometers, and other novel sensors, we can collect vast amounts of data non-invasively and, most importantly, without hindering casualty care activities. These data sets encompass diverse parameters like casualty injury patterns and physiology; caregiver interventions like tourniquet placement, medication administration, and essential communications; real-time resource use like the placement of two tourniquets to achieve the desired effect of one, or the consumption of multiple IVs before successfully placing an intraosseous needle; and other factors such as environmental considerations, including temperature and location, that affect decisions about casualty management.

This approach enables digital twinning that in turn leads to decision support tools and automation algorithms that facilitate faster, more accurate decisions and interventions tailored to an individual casualty's needs and those of other casualties in the system. Ultimately, this produces an optimized survival chain (**Figure 3**) that assesses situations, makes faster decisions, and gives more appropriate treatments within the context of the resource availability across the care continuum and achieve best outcomes.

Commander's Corner
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Commander's Corner *continued from page 2*

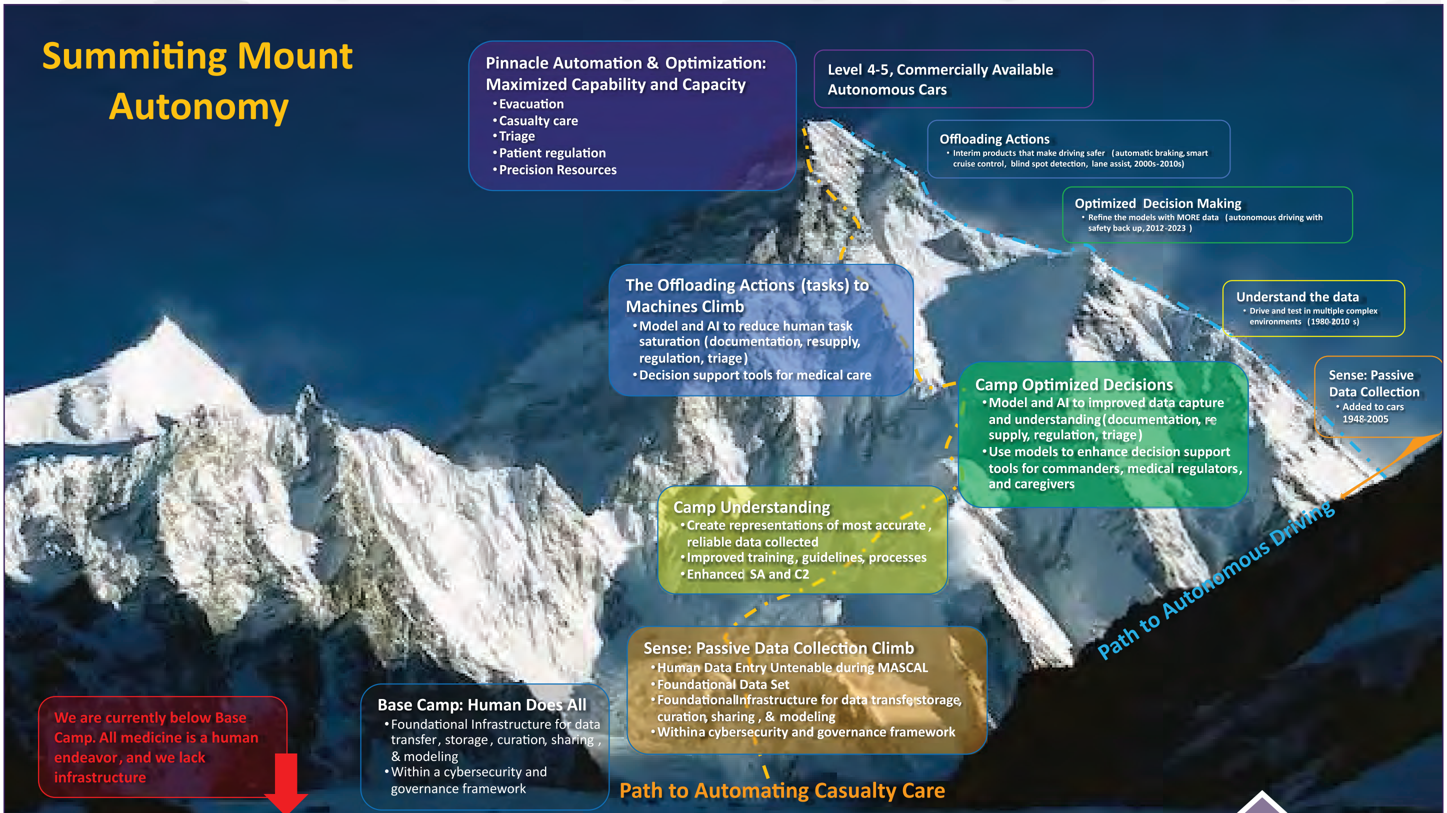

Figure 1. Summiting Mount Autonomy: We are at the base of the mountain. To make a basecamp, we need foundational infrastructure including data collection, transfer, storage, annotation, curation, analysis, sharing, and modeling capabilities all within a cybersecurity and governance framework. The first climb is creating a foundational data set using passive sensors that *describes* what casualty care looks like in terms of injury patterns and physiologic changes, caregiver actions while managing casualties, and resource use over time. We pause at Camp Understanding to reflect, review, and understand what data we have obtained is accurate and reliable in all working conditions. We use this data to improve our guidelines and training, our processes for managing casualties across the continuum of care, and to enhance our situational awareness and command and control. As we refine our data collection with better sensors and methods, we can rest at Camp Optimized Decision where we now use data to create models that enhance our decision making with better accuracy, efficiency, and reliability. We begin to automate some tasks like documentation, patient regulation, and requesting re-supply. Finally, we are ready to make the last effort towards the summit by refining these models and taking humans out of the loop, offloading tasks like documentation, casualty and resource triage, evacuation prioritization, etc. We promote optimized evacuation and re-supply pathways, and we can push decision support to edge devices. At last, we reach the pinnacle of automation and optimization where some decision about evacuation, resuscitation and re-supply are made autonomously. These automated processes help optimize the entire system's capability and capacity to manage large volumes of casualties by predicating where and when casualties and resources must be matched to achieve desired outcomes, and when impossible to achieve, recommending more appropriate casualty triage categories. Along the way we have identified other interesting mountain paths, like the one that leads to robotic casualty assistance and another for autonomous casualty extraction, that we will need to further explore in the future.

Learning from Autonomous Driving: A Blueprint for Casualty Care Transformation

The automotive industry's journey toward autonomous driving serves as a compelling model for the Military Trauma System striving to implement autonomous casualty care through digital twinning. In the automotive sector, the gradual progression from basic driver-assistance features to advanced autonomous capabilities, mirrors the evolutionary stages necessary for digital twinning of casualties and automating aspects of casualty care (**Figure 4**). Just as sensors, cameras, and algorithms enable cars to perceive and respond to their surroundings, we can employ sensors, wearables, and data analytics to create digital twins that capture vital casualty information and predict the need for treatments, resources to give those treatments, and the anticipated (or even optimal) time to match them to a casualty's trajectory.

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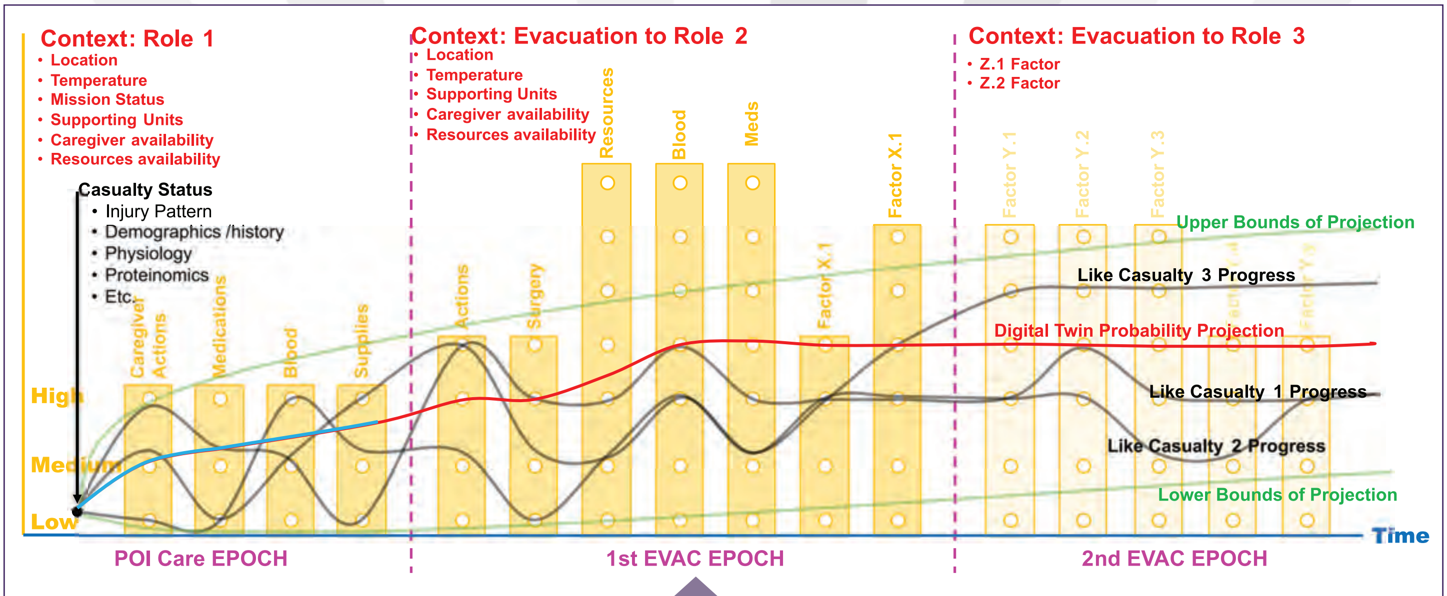


Figure 2. **CONCEPT** Casualty Digital Twinning: A casualty's progress over time can be described by data that reflects the casualty's starting point with respect to baseline demographics and medical history, injury pattern, initial physiologic condition and how those change over time and are affected by caregiver actions, resource availability, and resource consumption. Each yellow bar reflects a layer of a neural network with nodes that reflect different measurements for that layer. For example, the first layer of the neural network that could impact a casualty's future outcome might be the first responder's knowledge, skills, and abilities (high, medium, or low), and the next might be resource availability (high, medium, or low), and the next might be the availability of blood (high, medium, or low). These nodes may have more nuanced options as casualties move from one role of care to another and each layer of the network would have significant impact on a casualty's ultimate outcome. Recording information about these aspects of care: casualty status, caregiver actions (the dependent variable), and resource use within the context of care defined by available resources of supplies, blood, medications, and clinical expertise will enable AI models to predict optimal care pathways through the continuum of care and, if unable to achieve a pathway that predicts a favorable outcome (return to duty, survival after evacuation, etc.), could provide enhanced triage for the casualty or resource utilization. Black lines represent individual patients and how their condition (wounds, physiology) change according to resources and interventions applied at each point in time. The blue line represents the current casualty, and the red line, her "digital twin," that predicts the most probable future state for the casualty and resources needed to produce it. Green lines represent the upper and lower limits of the digital twins model. Making different choices (i.e. triaging resources) can alter the casualty's outcome and produce better results.

The foundation of autonomous systems, whether in the automotive or healthcare sector, lies in data-driven decision making and advancing technologies synergistically to achieve increasing levels of autonomy. For cars, these levels are categorized by the SAE International and the National Highway, Transportation and Safety Administration's (NHTSA) six levels that describe the extent to which a vehicle can operate autonomously:

Figure 3. The survival chain continuously and passively assesses casualty status (injuries, physiology, etc.) and context of care including immediate resource availability for casualty care (caregivers, supplies, medications, etc.), uses this information to make more accurate and reliable decisions, implements these interventions more efficiently, and ultimately achieves better outcomes for all within the system.

1. Level 0 - No Automation: The driver is in full control of the vehicle. There is no automation, although some driver assistance systems may be present.

2. Level 1 - Driver Assistance: The vehicle can assist the driver with specific tasks, such as steering or acceleration, but the driver must remain engaged and monitor the driving environment at all times.

3. Level 2 - Partial Automation: The vehicle can control both steering and acceleration/deceleration simultaneously under certain conditions. The driver is still required to monitor the driving

Commander's Corner *continued to page 5*

Commander's Corner *continued from page 4*

environment and be prepared to intervene if necessary.

4. Level 3 - Conditional Automation: The vehicle can perform most driving tasks autonomously in specific situations, such as highway driving. The driver can disengage from active control, but must be ready to take over when prompted by the system.

5. Level 4 - High Automation: The vehicle is capable of performing all driving tasks autonomously in specific conditions or geographic areas (geo-fencing). The driver may not need to intervene, but the system has limitations, such as operating only in certain weather conditions or on specific roads.

6. Level 5 - Full Automation: The vehicle is fully autonomous and capable of performing all driving tasks under all conditions without human intervention. There is no steering wheel or driver's seat in a Level 5 autonomous vehicle.

Importantly, transitioning between these levels safely is a complex challenge that involves not only technological advancements, but also regulatory considerations and cultural acceptance. Waymo and Cruise, both pioneers in autonomous driving technology, have undertaken extensive mapping and testing efforts to develop and refine their self-driving systems.

For example, Waymo began its autonomous vehicle mapping efforts in San Francisco in 2009 when it was still a part of Google. Between 2009 and 2012, when Waymo was granted the first license in a U.S. State to drive an autonomous car (with a safety driver behind the wheel) they employed drivers to map 1,000,000 miles of roads in various cities and contexts, collecting 3 GB[1] of data every minute from 25 sensors. That's 7.2 PB of data! Perhaps more importantly, is that Waymo uses computer modeling of the data collected from these sensors to drive millions of miles daily within synthetic environments, "teaching" cars about complex and dynamic situations through thousands of repetitions. Ultimately, these efforts facilitated their license to drive taxis without human drivers in them through the streets of San Francisco in 2023.

Unfortunately, obtaining these amounts of data is presently untenable in military medicine or combat casualty care. We simply lack the intention and thus the infrastructure in terms of sensors for data collection, the network approvals for software that can transfer this data, a storage solution for this amount of data, and the processes to annotate, curate, analyze, model, and share it with partners that can produce viable solutions from it. Importantly, this data must be managed within appropriate cyber security, ethical, and governance frameworks written into policy to ensure it is appropriately used and not made available to our adversaries.

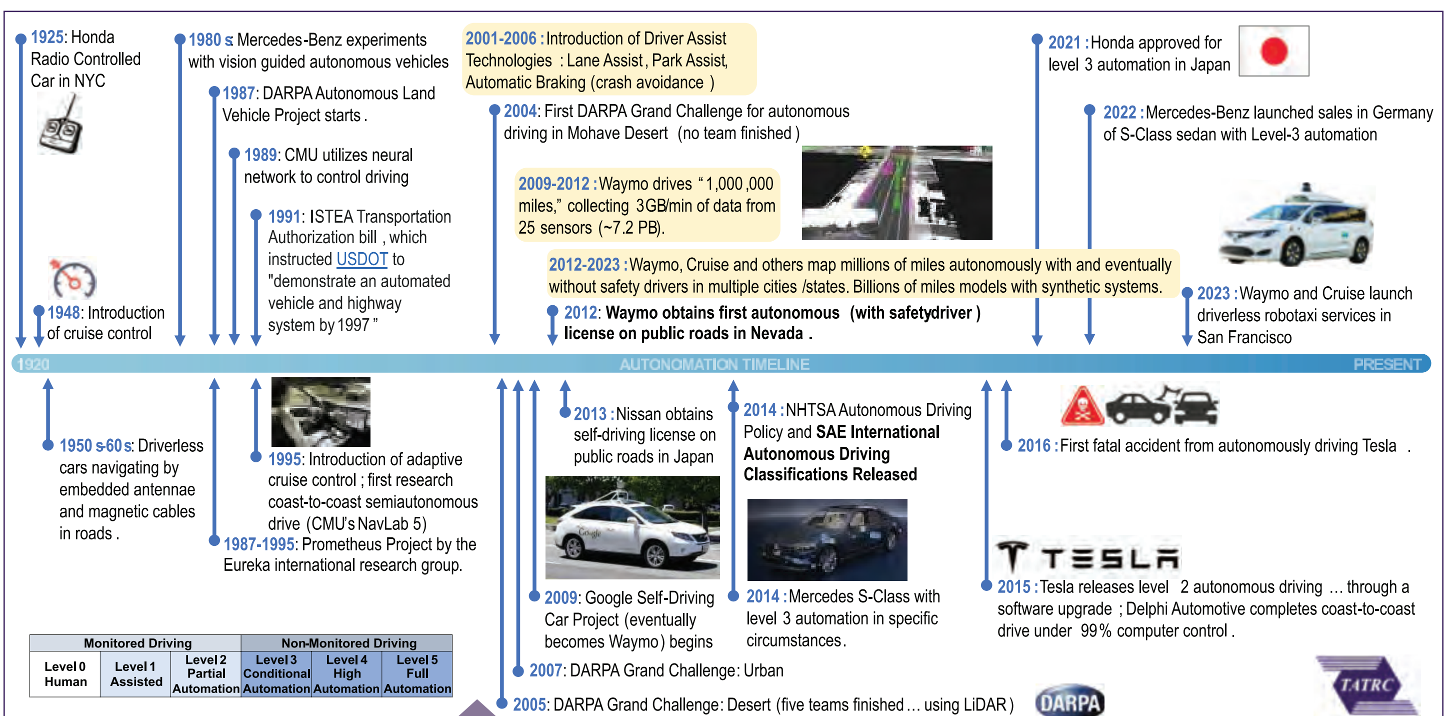


Figure 4. Timeline for driverless cars.

[1] 1 Kilobyte (KB) = 1,000 Bytes; 1 Megabyte (MB) = 1,000 KB; 1 Gigabyte (GB) = 1,000 MB; Terabyte (TB) = 1,000 GB; 1 Pentabyte (PB) = 1,000 TB; 1 Exabyte (EB) = 1,000 TB; 1 Zettabyte (ZB) = 1,000 EB; and 1 Yottabyte (YB) = 1,000 ZB

Commander's Corner *continued to page 6*

Commander's Corner continued from page 5

Looking Ahead: Shaping Modernization of Casualty Care

As the automotive industry continues to push the boundaries of autonomous mobility, military trauma care can harness a similar spirit of innovation to shape the future of casualty care. By embracing the principles that have propelled autonomous driving technology – iterative improvements made using massive data *unobtrusively* collected from multiple, varied sensors during casualty care and rigorously tested in simulation and real-world contexts – we can transform how we deliver casualty care in a future conflict. The 'fusion' of passive data collection and modeling with artificial intelligence, robotics, and human activities will optimize our capability and capacity across the continuum of care, improve casualty outcomes, and redefine the standard of care delivery.

TATRC cannot do this alone. It is important to recognize that if accurate, reliable data about casualty care is essential for producing the AI, robotics, and autonomous systems necessary to manage large casualty volumes in the future, we cannot collect it at a sufficient scale to achieve these objectives in our current environment. We simply do not have enough real-world casualty care to measure. Furthermore, we do not have an acceptable sensor suite fielded for collecting the necessary data.

Instead, we propose to collaborate across the RDTE, training, and real-world contexts to collect this type of data. We intend to collect data from highly realistic casualty care simulation scenarios in the TATRC Nexus lab and at partner training locations like the Army's Medical Simulation Training Centers (MSTCs) and the 68W school, the Air Force's Critical Care Air Transport research facility at the 59th Medical Wing, the Navy's training at Strategic Operations, and the Joint forces premier prolonged field care training environment at Ragged Edge Solutions. As we evolve our sensor suites and data infrastructure, we expect to partner with the Joint Trauma System, the Directorate of Simulation, and the Program Executive Office, Simulation, Training, and Instrumentation to develop meaningful training databases that incorporate the passively collected data and the algorithms that identify caregiver actions into an improved understanding of how we train and how that training translates into effective casualty care. With this knowledge, we hope to accelerate guideline development or revision and improve the processes we use to track training and improve the trauma system at echelon.

Importantly, once the prototype sensor suites are hardened, and data collected is producing meaningful knowledge and decision support systems, we must test these solutions in the context of real-casualty care to validate that models developed produce accurate and valuable digital twins. This necessitates that the sensors we field produce data according to the *SAME standards* that were used to produce the algorithms from data collected in the lab and training environments. *Indeed, data and interoperability standards (that allow us to swap old sensors for newer ones without changing the system), are key enabling efforts within our project space*.

Ultimately, the integration passive data collection and the modeling of it to produce digital twins for combat casualties that can be used to optimize the trauma system represents a paradigm shift in how we deliver casualty care on tomorrow's battlefield. By creating detailed digital replicas of casualties and leveraging passive data collection methods, we hope to achieve unprecedented levels of personalization, efficiency, and effectiveness across the care continuum. The insights derived from real-time data analysis will empower us to make timely, informed decisions, enhance resource allocation, and ultimately optimize casualty outcomes despite the numerous challenges posed by peer adversaries and large casualty numbers. As we embrace this innovative approach, it is essential to navigate the associated challenges thoughtfully, ensuring that the future of healthcare is not only technologically advanced, but also ethical, inclusive, and casualty centered.

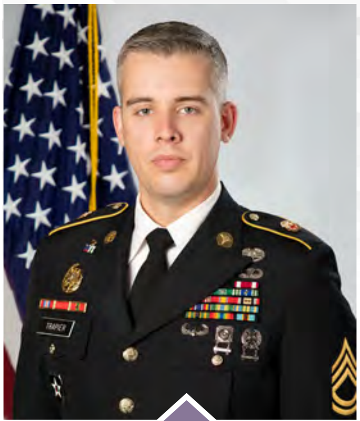
Team TATRC and our partners are poised to start our journey up the mountain. We must start making basecamp from which we can start the journey and from which others may start their experience. Basecamp will improve over time with efforts from all the expeditions. Along our journey, we will make wrong turns, but we will refine our path and map our experience so that others may learn to avoid our mistakes. We will find opportunities to make smaller camps up the mountain that others can use to make their journeys easier. And, like other mountains, some will make different paths up the mountain all with different levels of difficulty to the top.

I am extremely proud of Team TATRC and our efforts thus far. Transitioning the organization to Measuring What Matters using the OKR system (Objectives and Key Results) has led to remarkable changes in how we do work. We are more synergistic in our efforts, which in turn has made the entire organization more efficient. Knowing what everyone is working on allows us to effectively help each other to be successful.

Fuse the Team! Find a Way! Change the world!

COL Pamplin

From the Desk of Our Senior Enlisted Advisor



SFC Jeremy D. Trapier, TATRC, Senior Enlisted Advisor

Our Enlisted Soldiers have been quite busy over the past quarter, and a bit of well-deserved recognition is in order. As many of you already know, SSG Jesse Hylton, from our MMSIV Functional Area, represented team TATRC and MRDC HQ exceptionally well while he competed in various high visibility competitions over the past year. These competitions culminated earlier this month in the Department of the Army's Best Squad Competition, where SSG Hylton served as squad leader for the Army Futures Command Team. Throughout nearly two weeks of grueling activities, the AFC team placed well out of 12 Teams. Additionally, the Army Non-Commissioned Officer of The Year was selected from this group of competitors, and SSG Hylton was among the candidates. This achievement cannot be overstated. The teams and NCO's that SSG Hylton competed against were the best in the Army, and represented every major Command to include FORSCOM, USASOC, MEDCOM, TRADOC, and others.

Newlywed and newly promoted SPC Dustin C. Turner, Army Combat Medic 68W

TATRC's SSG Jesse Hylton (center) led Team 3 for the Army Futures Command in the Army Best Squad Competition earlier this month.

SSG Lam Bui set the stage & delivered the "Mission Brief" to BG Bailey at the CG's Incoming Commander's Briefing.

Next up, is SSG Lam Bui, another one of our outstanding medics in the MMSIV Functional Area! With a never-ending list of requirements to support, SSG Bui has made it clear that he deserves his new rocker over the past few months. As SSG Hylton prepares to PCS onto his next assignment, SSG Bui is stepping up and assuming his duties as well as learning to fill in as the acting SEL when I am out of the office. Along that line, SSG Bui stepped up in a big way to fill the TATRC SEL role for our first, initial incoming Commander's Brief to MRDC's new CG, BG Edward "Ned" Bailey. SSG Bui delivered the "Mission Brief" prior to the simulated scenario at point of injury. His performance during this brief was exceptional, with praise coming from the MRDC CSM, COL Pamplin, COL Rosser and many others. Good job, SSG Bui!

Last but not least, is newly promoted SPECIALIST Dustin Turner. Never one to seek recognition, our bashful PFC was promoted to SPC by his new wife Hope, during a small ceremony in TATRC's main conference room. This promotion was well deserved and long overdue!

Our Soldiers are making an impact each day here at TATRC as we forge the future toward automating casualty care!

TATRC Science Director Recaps the Highlights from MHSRS 2023

Team TATRC gathered together for a team building dinner at the annual MHSRS Conference held in Florida this past August!

The Military Health System Research Symposium (MHSRS) represents the premier event for scientists and researchers from across the Department of Defense, including TATRC, to share, present, and learn about new scientific knowledge resulting from military-unique research and development. The event, held annually in August in Kissimmee, FL, focused on "Medical Readiness for the Future Fight."

Team TATRC played a role and made an impact at MHSRS in a variety of ways throughout the four days of the conference. Some organizational highlights included:

• Our MedRAS presentation delivered by Deputy, Mr. Ethan Quist on "Surgery from a Safe Distance: Enabling Telerobotic Surgical Assistance in High-Latency, Low-Bandwidth Conditions" made clear to the audience that tele-surgical robotics is possible in austere environments. Even to the moon. Twice!

• The opening session on "Casualty Care Across the Continuum" brought home the current and future challenges of delivering prolonged care to mass numbers of casualties in Multi-Domain Operations (MDO). The frank talk about the challenges of MDO and the need for science & technology (S&T) to be better aligned with the needs of the field was a wake-up call for many.

• "TATRC Street!" Well done to the team for the long row of poster presentations by TATRC researchers on everything from "Evaluating the Impact and Effectiveness of Physiological Closed Loop Control and Remote Management for Enhanced Casualty Care" to, "Leveraging Interpretable Machine Learning Algorithms to Reveal Determinant Proposal Characteristics in Support of Medical Readiness, Disease Prevention and Return to Duty." TATRC had great representation in this year's poster hall.

• Hats off to our partners at the U.S. Army Aeromedical Research Laboratory's (USAARL)! Their booth demonstration of TATRC's remote-controlled ventilator that combines a Thornhill evacuation ventilator and the DocBox Apiary interoperability and app platform was an exciting success. USAARL and TATRC are collaborating on air worthiness testing of this "remote patient management system" and we appreciate partnering with our MRDC colleagues.

• Countless networking opportunities throughout the week with people from across multiple organizations on important topics such as interoperability, innovation and enabling data infrastructure proved to be insightful and informative. We took advantage of every opportunity to share and learn with researchers across the Military Health System.

Until next year!

TATRC MedRAS Team Supports Northern Strike Exercise

TATRC worked alongside partners Arete Associates and Ascent AeroSystems to demonstrate the capabilities of Project VISTA at the Northern Strike National Guard Field Exercise at Camp Grayling.

MedRAS Deputy Lead, Mr. Ethan Quist, actively participated in the Northern Strike National Guard Field Exercise in August that took place at Camp Grayling in Grayling, Michigan. Mr. Quist attended alongside our industry partners, Arete Associates and the UAS manufacturer, Ascent AeroSystems to demonstrate the capabilities of the Vision and Intelligence Systems for Medical Teaming Applications, better known as Project VISTA.

At the exercise, TATRC showcased our VISTA UAS-based casualty detection and casualty vitals assessment technology to numerous general officers in attendance during medic training exercises for casualty extraction and care. Some of those notable officers included: LTG Erik C. Peterson, Deputy Chief of Staff, G-8 and General Daniel R. Hokanson, Chief of the National Guard Bureau.

Our VISTA system was integrated into combat medic training lanes to provide them additional technologies for spotting casualties, triage and planning for care and evacuation. The system flew over a casualty site and streamed back live video of the casualty, as well as the output from advanced on-board algorithms to determine a heart rate and respiration rate. Once detected and vitals confirmed, the medics executed an extraction plan and continued their care lanes. In after action reviews with the medics who interfaced with the technology, there was a unanimous “yes!” to the question of whether this technology would benefit their ability to provide care in the field.

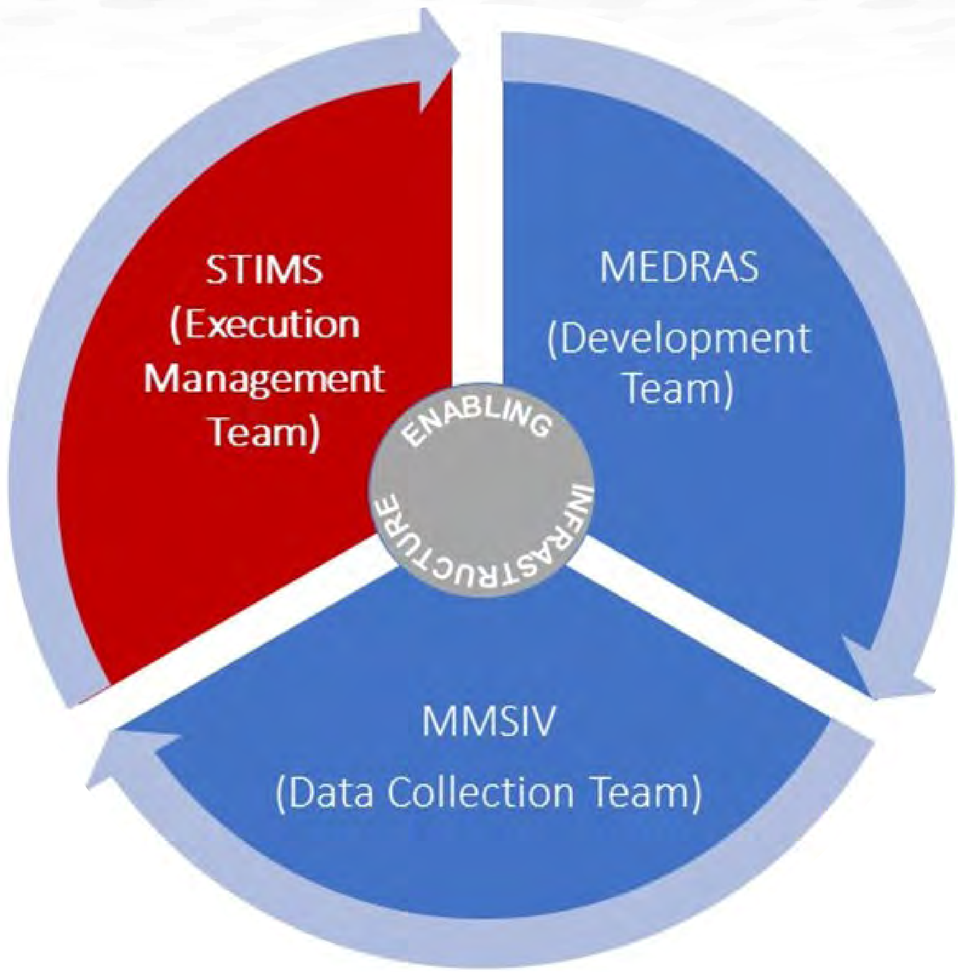
“This was a very good opportunity for us to demonstrate our capabilities showing our solutions. The specific goal is to get feedback from the medics. We are looking to improve the system for their capabilities. We were happy to be here at Northern Strike and to work directly with the medics to see the potential that this capability has to keep our Soldiers and medics safe," said Mr. Ethan Quist.

Demonstrating the system at Northern Strike provided a valuable step in the process of maturing the VISTA technology by putting it into the hands of the end user and operating it in realistic field environments. Feedback not only validated milestones for the technology’s development, but provided new insights into additional features that would benefit the medic, such as more situational awareness being provided by the UAS.

While currently piloted by a remote operator, technologies such as VISTA can soon be integrated into autonomous flight control aircraft that will be able to scan casualty scenes and report back important casualty information to the medical care providers as soon as incidents occur. The computer vision technologies developed for standoff vital signs monitoring are also applicable in other settings such as ground vehicles, inside patient transports, and even fixed care settings. VISTA stands as a valuable step in TATRC’s goals of automating casualty care.

STIMS: TATRC's Newest Functional Area to Enable & Empower The Autonomous Casualty Care Research Portfolio

In the spring of 2023, TATRC executed a significant structural reorganization to make way for the new Autonomous Casualty Care (AC2) research portfolio mission assignment and the Passive Data Collection using Autonomous Documentation (AutoDoc) research project. This internal realignment was necessary to ensure that the entire organization could work in a more cohesive, unified, and cross-matrixed manner to embark on this new singular mission and objective. TATRC team members from our TATRC HQ office, along with staff from our TATRC South office in Fort Eisenhower, GA, were grouped by skill set and experience and reassigned to one of the four new functional areas: Enabling Infrastructure, Medical Robotics and Autonomous Systems (MEDRAS), Medical Modeling Simulation Information & Visualization (MMSIV), and Science and Technology Innovation Management & Synchronization (STIMS).



The STIMS team is the most geographically dispersed functional area in TATRC, which accommodates personnel from TATRC HQ (Ft. Detrick, MD), TATRC South (Ft. Eisenhower, GA), and full-time remote workers from New Mexico and Pennsylvania. The STIMS team is focused on empowering TATRC to accomplish its mission by leading the development and execution of solution delivery plans and coordinating the activities of intramural and extramural partners.

On a more practical level, this means that the multi-disciplinary team of full-time staff members assigned to the STIMS team work specifically to ensure that our counterparts in the MEDRAS and MMSIV functional areas have everything they need from a research execution perspective to be successful. STIMS responsibilities include, but are not limited to: project management, planning, agreement and protocol development, Objective and Key Result (OKR) process and progress management, and statistical support.

The STIMS team is focused on several key enabling functions that are mission-critical to the success of the AC2 research portfolio:

Research Agreements: One of the key enabling functions of the STIMS team is to develop, execute, and manage all intramural and extramural agreements for the AC2 research portfolio.   This includes, but is not limited to, Cooperative Research and

***STIMS** continued to page 11*

STIMS *continued from page 10*

Development Agreements (CRADAs), Material Transfer Agreements (MTAs), Memorandums of Agreements (MOAs), Memorandums of Understanding (MOUs), Interagency Agreements (IAAs), Non-Disclosure Agreements (NDAs) and other technology transfer transactions. Ms. Loreen Tupper is a full-time certified representative to the Office of Research and Technology Applications (ORTA), focused on ensuring that all these agreements are properly reviewed, staffed, and signed in a timely fashion.

Regulatory Protocols and Processes: Another core enabling function that the STIMS team provides to the rest of TATRC is to develop, refine, and submit new Human Subject Research (HSR) protocols, and provide oversight and management of all AC2 research data collection efforts. Mr. Chevas Yeoman is the representative dedicated to this mission on a full-time basis, with ad hoc support from Ms. Triana Rivera-Nichols.

Project Management and Planning: The STIMS team also provides coordination between all the functional areas to ensure that the AC2 research portfolio and TATRC's larger autonomous ecosystem of projects are managed, planned, and executed to accomplish all of the key steps for completion, from a leadership and grassroots perspective. Ms. Ollie Gray leads these efforts, with support from Ms. Triana Rivera-Nichols, and collaboration with the other functional areas.

Objectives and Key Results (OKRs): The STIMS team also guides the organization with 6-month sprint cycles to define OKRs for the AC2 Research Portfolio. Leveraging OKRs is new for TATRC; our first sprint cycle (Sprint 0) began in May 2023 and ended in September. We are currently finalizing our OKRs for Sprint 1, which will cover October 2023 – March 2024.

Operational Exercises: The STIMS team also provides behind the scenes support to ensure that TATRC can showcase their autonomous ecosystem material products in test and evaluation (T&E) events year-round. These include Project Convergence (PC)/Capstone, Army Expeditionary Warrior Experiment (AEWE), Cyber Quest (CQ), and many others. Ensuring that TATRC's research portfolio is designed to function across all echelons of care, and specifically, in the tactical environment of operational exercises, is critical to TATRC's mission requirements. Mr. Mike Reinemann is dedicated to this mission on a full-time basis, coordinating with all internal and external stakeholders, and provides situational awareness to TATRC Leadership.

Biostatistical Consulting: Dr. Stephanie Fonda is a part-time consultant on the STIMS team. As an epidemiologist and biostatistician, Dr. Fonda focuses her time on assisting the TATRC team in making data-driven decisions about our research outcomes. She is also a major contributor to authoring peer review publications for the organization. Her knowledge base in human-centered research outcomes is a value added to the entire TATRC team.

Clinical Subject Matter Expertise: COL Jason Cohen is a physician and a military reservist assigned to TATRC who provides support in the form of clinical consultation, including reviews for the Advanced Medical Technology Initiative (AMTI).

Special Research and Development Contracts: The STIMS team is also responsible for the development and execution of special research contracting arrangements, including prototype Other Transaction Authorities (OTAs) and Federally Funded Research and Development Center (FFRDC) vehicles to meet the AC2 research portfolio objectives. Ms. Jeanette Little, who heads up the STIMS team serves as the COR and/or SOTR for these special research and development contracting mechanisms that align the TATRC intramural team with extramural subject matter experts and AC2 research performers.

Advanced Medical Technology Initiative (AMTI): Additionally, the STIMS team manages and executes all aspects of the Advanced Medical Technology Initiative (AMTI) program. Ms. Holly Pavliscsak, the Deputy Functional Lead for STIMS, and Ms. Sharon Garlena lead these AMTI efforts.

TATRC Special Projects: Finally, the STIMS teams manages all TATRC special projects, which includes Congressional Special Interest (CSI) efforts under the AC2 research portfolio.

This newest functional area is key in providing the necessary support for TATRC to succeed in its new mission of automating casualty care.

MMSIV Team Leads TATRC's First, Initial Evaluation of Sensor Suites

TATRC's MMSIV team, in conjunction with staff from our MedRAS and STIMS areas, held two Sensor Suite Evaluation Dry Runs within the NEXUS Lab this past quarter to wrap up our first sprint in the Passive Data Collection using Autonomous Documentation (AutoDoc) research project.

The first week-long sprint was held 28 August - 1 September, and the second evaluation took place 27 September - 4 October. To align with the mission of Autonomous Casualty Care (AC2) and the AutoDoc project, current processes needed to be evaluated and enhanced in order to improve the efficacy and accuracy of data collections. These dry runs were done as an iterative process, where they would perform the evaluation process, identify gaps that need to be addressed, implement changes, and repeat the evaluation process.

After the first Dry Run in August, the Data Team, along with the Simulation Team within MMSIV, identified knowledge gaps (i.e. ways to improve training on the sensor suite; ways to expedite the process; and ways to collect richer, higher quality data) which needed to be addressed. During the final Dry Run at the end of September, the evaluation and sensor suite down-select process were verified as the best course of action as TATRC prepares to engage with external performers and partners. In total, 107.5 GB of data was collected, transferred, analyzed, and annotated to compile two Assessment Reports for Stakeholders.

TATRC medics, SSG Hylton and SPC Turner participate in the simulated evaluation Dry Runs to wrap up TATRC's first sprint in the AutoDoc research project.

SSG Hylton caring for a simulated casualty during TATRC's Dry Run evaluations.

***Sensor Suites Evaluation** continued to page 13*

EMPLOYEE SPOTLIGHT

TATRC Hires First S-6, Mr. Will Marshall

Mr. Will Marshall is the latest staff member to join the TATRC team! Mr. Marshall, a civilian, has been brought on to serve as our much needed and long awaited, first ever S-6. He is TATRC's Subject Matter Expert and point of contact for our Data Infrastructure & Ecosystem. Since his arrival in late August, he has jumped in headfirst and has solved many IT issues in his short time on the ground. He graduated from the University of Maryland Global Campus, majoring in Computer Networks and Cybersecurity.

Additionally, Will is a 12-year Air Force Veteran, and his primary experience was in Client Support and Project Management. During his service, Will spent time overseas in Italy, The United Arab Emirates, Turkey, Germany, and back home in Louisiana. Will has received commendations for direct support to several contingency operations and led teams of 10-30 personnel in delivering reliable and secure communications in contested environments.

Born in the sunshine state, Will grew up in Pensacola, Florida. He recently relocated to Maryland, and he and his family enjoy exploring their new home. His favorite sports teams are the Jacksonville Jaguars, Florida Gators, Atlanta Braves, and Atlanta Hawks. Will enjoys spending time outside with his family, hiking, kayaking, and traveling in his free time.

Mr. Will Marshall, IT Specialist

Welcome to the team, Will! We're thrilled that you're here to support our organization!

Sensor Suites Evaluation continued from page 12

Combat Medic, SPC Dustin Turner capturing data on a simulated casualty during TATRC's evaluation process of various sensor suites for the AutoDoc Project.

This evaluation was critical and important to TATRC because in order to be prepared and successful within the sensor suite evaluation process, there needed to be standardization and thorough understanding of the process. By dissecting their current methods and processes, this allowed the team to create a standardized evaluation process that will be utilized moving forward as we work with external partners and performers.

Dr. Ericka Stoor-Burning, MMSIV Lead, stated, "These two evaluation events have assisted MMSIV with having a better understanding of the AutoDoc evaluation plan, and the steps needed to scale the process to include external resources. Seeing our three teams joining forces and coordinating our efforts to achieve a shared goal was both inspiring and motivating to be a part of."

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