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## FEATURED SPOTLIGHT:

**TATRC experiments with Medicine Across the Continuum of Care at PC-C4**

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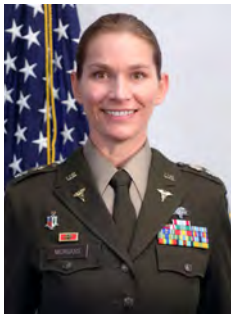

# Commander's Corner: A Message from COL Jeremy Pamplin

COL Jeremy C. Pamplin, TATRC Commander

Hello Friends and Colleagues! As we've marched through this year, Team TATRC continues to amaze me on a regular basis. There's been a palpable change over the last few months with the ability to get things done and I'm really proud of that. It's impressive to witness.

Since my last update in the early Spring, TATRC has completed its first official "Sprint" in our new mission oriented, programmatic research model. Each of TATRC's functional areas have been driving hard toward our mission to automate casualty care with laser beam focus on our first material product solution, "AutoDoc."

The Medical Modeling Simulation, Information, and Visualization (MMSIV) team wrapped up the first sprint of "AutoDoc" focused on establishing external partners to collaborate on data collection and worked hard to get all the necessary protocols and agreements into place so that we could scale data collection during our summary sprint. As part of that scale up, the MMSIV team has refined and validated our data collection processes and Standard Operating Procedures (SOPs) so that our partners could easily follow them.

MMSIV's focus for Sprint 2 is "filling the data bucket" and demonstrating value through value metrics (***Figure 1***). The team has successfully collected data with six partner locations (the Medical Center of Excellence, Defense Medical Readiness Training Institute, and 59th Medical Wing at Joint Base San Antonio, the Joint Special Operations Medical Training Center at Fort Liberty, 4/166 Regional Training Institute at Fort Indian Town Gap, and Ragged Edge Solutions) and performed weekly data collection within the TATRC NEXUS lab. We are well on our way to achieve this sprint's goal to collect 2,500 procedures (individual tasks) and 250 simulations (10-20 min casualty care scenarios) to baseline performance data and using the TATRC "AutoDoc" sensor suite (camera, microphone, and accelerometers).

Indeed, we've learned a lot about average time-on-task for individual procedures (like, it takes on average, less than a minute to place a tourniquet or perform a needle decompression, but nearly two minutes to pack a junctional wound, three minutes to start an IV, and nine minutes to place a good pressure dressing). Furthermore, with this data, we are able to provide medics feedback about their performance compared to the mean on various casualty care models (***Figures 2 & 3***), and our data-set continues to grow, increasing our ability to define expectations and determine expected performance on average, individual performance, and subsequently, more precise training requirements.

Meanwhile, the Medical Robotics and Autonomous Systems (MedRAS) team finished its first Sprint by identifying and delivering the TATRC AutoDoc prototype sensor suite! Data from this type of sensor suite is being used to create AI models that identify casualty status (injury patterns), caregiver actions (like a needle decompression or tourniquet placements), and resources consumed (like a needle or a tourniquet), and produce discrete data elements that can populate the appropriate sections of a Form DD 1380 (***Figure 4***). In the first sprint, development started on a tablet-based centralized point of aggregation to collect all incoming sensor data using a "PoTAg" (a Point of Treatment Aggregator) and also a web-based aggregation point to compile all sensor and related scenario metadata (the "IDA" or Intermediate Data Aggregator).

In Sprint 2, the MedRAS team is focused on two new important tasks: software development and algorithm maturation. Development has continued to further refine PoTAg and IDA to increase the useability of the data collected. Development has also focused on expanding the pipeline of data flow from the source of collection to a cloud-based storage solution, including a multi-directional connection between PoTAg, Medic CDSS, and BATDOK. The second focus is working with our intramural algorithm partners to expand existing algorithms and incorporate them into our sensor suite to provide DD 1380 outputs. By the end of sprint 2, MedRAS plans to deliver a proof-of-concept prototype showing a subsection of the inputs required for a DD 1380 automatically populated from algorithms processing sensor data in real-time!

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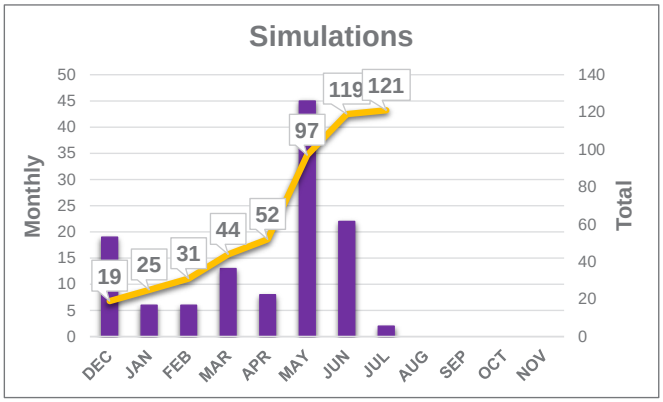
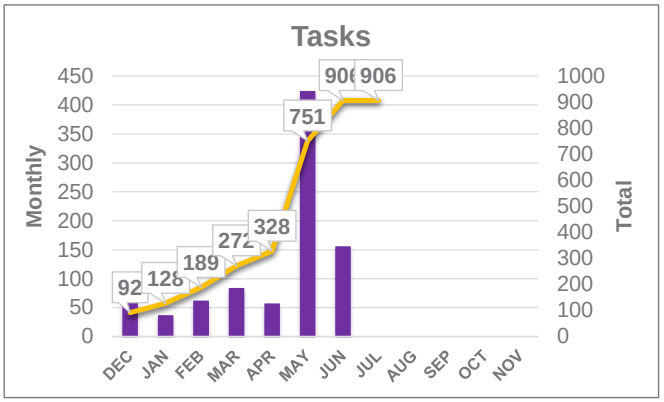
**Sensor Modalities: 3** **Total Data: 357.9 GBS** **Data Shared: 53.1 GBs**




| Data Type: | Distractibility Index | DD 1380 Completeness | Value |
|---|---|---|---|
| Baseline With No Sensor: | ~ | ~ | ~ |
| With Sensor Suite | 23.66% | 50.75% | 0.39 |
| With AutoDoc : | ~ | ~ | ~ |

| Data Type: | Ready to Use | Being Curated |
|---|---|---|
| Simulations | 66% | 34% |
| Procedures | 69% | 31% |
| GBs | 52% | 48% |

**Figure 1. TATRC AutoDoc Project Value Metrics. This image shows that we have collected nearly 360GB of data using 3 sensors worn by research participants. This represents 121 simulations (10-20 min casualty management scenarios), and 906 individual tasks (like tourniquet placement or IV placement). Finally, the bottom tables show the distractibility index (DI = time documenting + time using sensors divided by total scenario time) and the DD Form 1380 completeness (total accurate completed sections divided by expected sections). The "Value" metric is a summary of DI and DD 1380 completeness ((1-DI)*DD 1380 completeness). Finally, we show the percentage of data that has been collected (ready to use) vs. curated (labeled with task start and stop times). Finally, we have shared just over 50GB of data with TATRC research partners for initial data models.**

| Task | Mean Time on Task | Participant A ToT | Participant A (> 1 SD from Mean)* | Participant B ToT | Participant b (> 1 SD from Mean)* |
|---|---|---|---|---|---|
| Tourniquet Application | ~50 sec | 64 sec | True | 45 sec | False |
| Chest Needle Decompression | ~40 sec | 54 sec | True | 27 sec | False |
| Initiate an IV | ~3 min | 186 sec | False | 115 sec | True |
| Treat a Casualty with a Pelvic Fracture | ~90 sec | NA | NA | 67 sec | False |
| Manage a Minor Laceration | ~5 min | NA | NA | 49 sec | False |
| Placing a Nasopharyngeal Airway | ~20 sec | 20 sec | False | 15 sec | False |
| Uses Sensor to check vital signs | ~10 sec | 11 sec | False | 5 sec | False |
| Documentation (per event) | ~1 min | 41 sec | False | 11 sec | False |

* Green indicates faster performance and red indicates slower performance or absence of expected task; either can be problematic
IV, Intravenous Access, ToT, Time on Task; SD, Standard Deviation; sec, seconds; min, minutes; GTG, "Good to Go"; NA, Not Attempted

**Figure 2. Example showing performance characteristics across four (4) casualty models and individual participants' comparison to the mean.**

| Task | Mean Total Time-on-Task (% total) | Participant A Total ToT (% total) | Participant A (> 1 SD from Mean)* | Participant B Total ToT (% total) | Participant b (> 1 SD from Mean)* |
|---|---|---|---|---|---|
| Administer Medication **Total** | ~4 min (20%) | 105 sec (10%) | False | 51sec (0.5%) | False |
| Documentation **Total** | ~2 min (10%) | 121 sec (12%) | False | 122 sec (12.5%) | False |
| Simulation **Duration** | ~20 min | 16.75 min | True | 16.2 min | True |

min, minutes; sec, seconds

**Figure 3: Example showing Scenario 2 mean time spent delivering medications and documenting on average an individual participant's comparison to the mean.**

Finally, our Science & Technology, Innovation Management & Synchronization (STIMS) team completed Sprint 1 by facilitating agreements for MMSIV's six new data collection partners and Medical Technology Enterprise Consortium (MTEC) contract awards to Ragged Edge Solutions and MITRE, a federally funded research and development center (FFRDC) to continue managing the Device Interoperability and Autonomy Coordinating Center (DIACC), which you'll read more about inside this edition of our newsletter. STIMS finished strong by closing out three legacy projects (FOXTROT and two Monkeypox projects) and enabled a contract award to 3M for a CSI involving Network Enabled-Digital Wound Dressing (fascinating stuff!).

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**Figure 4. Example Video footage with TATRC partner Arete's machine vision model identifying a Right Arm Amputation and automatically placing an indicator on a DD Form 1380 (tactical combat casualty care card).**

The STIMS Sprint 2 aim is to identify a clinical partner(s) and prepare protocols with them to study TATRC technologies in clinical settings with real patients.

Not only have our teams made great strides in our research sprints, but collaborations with our external partners have also seen significant progress.

On 29 May, TATRC participated in the 3rd Quarterly Data Nexus symposium, a collaborative meeting that brings together stakeholders who are interested in a common data space across research, training, and real casualty care domains, a space we collectively called the "Data Nexus." This collaborative group seeks to build consensus amongst experts in the areas of data collection models and methods, storage, use, and priorities of work. The hybrid event hosted 79 participants both virtually and in person at the SFC Paul Ray Smith Simulation and Training Technology Center (STTC) in Orlando, FL. Key participants included the Program Executive Office (PEO) for Simulation, Training and Instrumentation, PEO Defense Healthcare Management Systems, Joint Trauma System, Combat Casualty Care Research Program, Combat Capabilities Development Command, DHA, United Kingdom SMO for Telemed Army, and our close partner, the MIT Lincoln Laboratory. The Data Nexus collaboration continues to grow and gain momentum. We look forward to seeing everyone at the 4th symposium that will occur at the conclusion of MHSRS '24 in Orlando.

A few other noteworthy events are worth highlighting since our last edition of the TATRC Times.

At the beginning of June, TATRC participated in the first of three DARPA Triage Challenge (DTC https://triagechallenge.darpa.mil/) workshops at the Guardian Centers Facility in Perry, GA. TATRC plays a key role in the DTC as an Independent Verification and Validation (IV&V) partner that creates opportunities for DTC performers to test their remote sensing solutions and inform their preliminary digital and AI triage models. This workshop was the culmination of over a year's worth of effort and included increasing realism for casualty simulations by utilizing live actors with more realistic moulage. The DTC collaboration is essential for advancing AI and robotic enabled triage solutions. We're pleased and appreciative to be a key partner for DARPA in this effort.

Not only did the MedRAS team participate in DTC, but they also held successful flight tests of the Remote Patient Management System (RPMS). In collaboration with our partners at the U.S. Army Aeromedical Research Laboratory (USAARL), the team flew the RPMS platform onboard a UH-60M helicopter at Frederick Municipal Airport. The RPMS is an integrated medical device platform that supports remote control and monitoring of the Thornhill MOVES SLC ventilator with physiological sensors, the NeuroWave Sciences infusion pump, and the DocBox data integrator and control software. The testing explored remote management capabilities and tactical network performance in a simulated air-MEDEVAC environment. This experimental data provided a tactical network characterization that will be

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TATRC Commander, COL Jeremy Pamplin and Science Director, Matt Quinn served as panelists at the inaugural meeting of the Massachusetts General Hospital Center for Smart and Autonomous Medical Systems (SaAMS), part of the Medical Device Plug and Play Program (MDPnP).


Two TATRC project: Project VISTA (Vision and Intelligence Systems for Medical Teaming Applications) and RPMS (Remote Patient Management System) were recognized at the Annual FORUM Innovation Awards.

used to optimize the RPMS system for future telemedicine applications, and, in the future, integration with autonomous controllers to facilitate fully autonomous casualty transport in low-bandwidth and contested environments.

In June, our Science Director, Matt Quinn, and I served as panelists at the inaugural meeting of the Massachusetts General Hospital Center for Smart and Autonomous Medical Systems (SaAMS), part of the Medical Device Plug and Play Program (MDPnP). The SaAMS is an FDA-endorsed, Joint Warfighter Sponsored Collaborative Community that focuses on advancing systems that securely connect heterogeneous medical devices, sensors, and algorithms into autonomous and semi-autonomous systems. Dr. Julian Goldman, the SaAMS Collaborative Community lead, was instrumental in TATRC's work on the Remote Patient Management System during COVID, Project Convergence Capstone, and the FDA's recent Guidance on Physiologic Closed Loop Control. (https://www.fda.gov/regulatory-information/search-fda-guidance-documents/technical-considerations-medical-devices-physiologic-closed-loop-control-technology). TATRC has a CRADA with the MDPnP Program and SaAMS Collaborative to advance autonomous systems.

Another proud moment from this past quarter included the recognition at the Annual FORUM Innovation Awards of two TATRC project: Project VISTA (Vision and Intelligence Systems for Medical Teaming Applications) and the aforementioned RPMS. These projects were nominated by Government and Industry professionals and selected by a committee of their peers, for showcasing breakthrough innovations that improve and advance each agency's mission. Mr. Matt Quinn, Ethan Quist, and Zack Buono were in attendance to accept the awards. Congratulations to the team and all the hard work you put in on each of these projects!

I would like to take this opportunity to express my gratitude to every one of the TATRC Staff for the tremendous support and hard work that they have provided. The dedication and effort that you have all put into your work are truly appreciated: we couldn't achieve these goals without your valuable contributions. Thank you for your commitment to excellence and for being an integral part of our team, your hard work and dedication does not go unnoticed.

As you can see, there's no rest for the weary… or innovators for that matter! I continue to be amazed by the work our team does every day and I'm incredibly proud to work alongside these dedicated professionals while they relentlessly pursue ways to enhance the care of our casualties. ***#FindAWay!***

# Two Key Research Support Contracts Awarded in Support of TATRC's Autonomous Documentation (AutoDoc) Project

June 2024 was a monumental and key month for the Telemedicine and Advanced Technology Research Center (TATRC), as two long-awaited research support contracts for the AutoDoc project were finally awarded.

The first contract award is with the Federally Funded Research and Development Center (FFRDC) contractor, The MITRE Corporation. This contract allows the MITRE team to spearhead the efforts to ensure there is data interoperability between the sensors, the data aggregation devices and algorithm developers so that passive documentation and the point of injury (POI) can be achieved in a plug and play fashion. This will ensure that the technologies leveraged for the AutoDoc project can leverage the best of breed technologies for the use case, and not be constrained by propriety data schemas and/or vendor specific application programming interfaces (API). The MITRE Corporation will lead the effort by providing Data Interoperability and Autonomy Coordinating Center (DIACC) Management and Coordination Support Services to TATRC. This three-year contract was awarded on 14 June 2024.

The second contract award is a research, Other Transaction Authority (OTA) contract through the Medical Technology Enterprise Consortium (MTEC) to Ragged Edge Solutions (RES), LLC. One critical aim of TATRC's AC2 research portfolio is to build a foundational repository of data generated from multimodal sensors passively and unobtrusively collecting data during casualty care that accurately reflects tactical combat casualty care (TCCC).

AutoDoc is the first project in TATRC's Automating Casualty Care (AC2) portfolio.

One environment to collect this type of data is a semi-controlled setting of hyper-realistic medical simulation training. This award allows TATRC to collect data in a controlled, hyper realistic battlefield venue that is routinely offered by the commercial sector by the North Carolina based RES team.

"Without a means to collect data reliably and passively from the POI through higher echelons of care, the Military Health Care system will continue to lack the necessary data to develop trustworthy artificial intelligence (AI) that supports future concepts that will modernize medical operations to address the challenges faced in Multi-Domain and Large-Scale Combat Operations. TATRC welcomes the opportunity to partner with Ragged Edge Solutions to help accomplish this goal by providing a hyper realistic medical training venue for TCCC data collection," said TATRC's Commander, COL Jeremy Pamplin.

The Ragged Edge Solutions team will commence their support of TATRC's AC2 research portfolio with the introduction of novel, hyper-realistic data collection scenarios and expert medical providers that will contribute to the foundational data repository. Their expertise in producing hyper-realistic medical scenarios will help expand existing TATRC data collection efforts within TATRC and at other research sites. Once the initial phase is completed, the RES team will commence routine data collection events for TATRC on a weekly basis. This research award has been structured for an initial 12-month period of performance, with an option to extend for an additional 12 months based on performance for a total value of $900K. This contract was formally awarded on 27 June 2024.

**For more information on these contracts, please contact Ms. Jeanette Little at: jeanette.r.little.civ@health.mil.**

# From the Desk of the Science Director: TATRC Teamwork

TATRC has always been a team. Across divisions and across science and staff, people in TATRC go out of their way to assist each other. It's the culture.

Mr. Matt Quinn, Science Director, TATRC

But it really hasn't been until a couple of "sprints" into our Automating Data Collection in Casualty Care or AutoDoc project, that we were really working as a single, interdependent team.

What does this mean, and how is it different than the past?

AutoDoc, as we've covered in past articles, seeks to automate documentation in tactical combat casualty care (TCCC) environments by applying algorithms to the output of multi-modal sensors (like cameras, audio devices, wearables and motion detectors). It is the first project in TATRC's Automating Casualty Care (AC2) portfolio.

In order to be successful, we need to identify and test a suite of sensors that Medics and patients would wear in casualty care. While TATRC's MEDRAS team might take the lead on development of one set (or "suite") of sensors, they rely on the MMSIV team to help them evaluate how well they will work. They also rely on the STIMS team to supplement the "intramural" sensor suite that the MEDRAS team has assembled with the best of what is available from industry, and the MMSIV team test and evaluate those as well.

Our people at TATRC go out of their way to assist each other. It's the culture.

A key component of the AutoDoc project is using sensor suites to build a data set that describes TCCC. This, like everything else in our project, cannot be done alone. While the MMSIV team is the lead for conducting data collection events at TATRC (in the NEXUS lab) and at other sites, like at MEDCoE in San Antonio, they need STIMS to assist with establishing and amending human subjects research (HSR) protocols and establishing data collection partnerships. STIMS was also instrumental in building a statement of work and using other transaction authority (OTA) to supplement military data collection sites with hyper-realistic private ones (like Ragged Edge, which recently was awarded an OTA to be a TC3 Simulation Ecosystem, which you'll read about in this edition).

The TATRC Data Science Division is also deeply involved in all aspects of the AutoDoc project. From data collection, interoperability and storage standards, to meta data, to assisting with OTAs for acquisition of algorithms, to priorities and roadmap of functions for AGENT RAPIDS, the MIT Lincoln Lab-hosted cloud-based-infrastructure, the Data Science Division has taken the lead in collaboration with all of the other teams.

Last but not least, is the integration of the TATRC staff, who are involved in every aspect of the project. From the TATRC Public Affairs Office (PAO), who hosts partners and shares and strategically communicates the critical importance and progress of AutoDoc to others in military medicine and to the world, to the S1 (HR), which has worked hand-in-hand with the science teams to fill contract and civilian positions in support of AutoDoc, to the S3 (Ops), who coordinates and gains approval to conduct a myriad of AutoDoc operations, to the S4 (LOG) who order components, TC3 supplies when and where they're needed, to the S6 (IT) to ensure that the teams can store and move data to AGENT RAPIDS per our protocols, and finally to our S8 (Resource Management (RM)) who balances budgets and ensures we have funds to execute, along with our AMLO who prepares acquisition packets. I could go on – I've barely scratched the surface.

While in the past, one TATRC division might have prototyped a technology and another team might have used it in their project, we're no longer working as independent divisions on independent projects. Everyone is working together on a combined set of 'Objectives and Key Results' (OKRs) and associated project plans. People from across science and staff teams are now working in harmony to anticipate each other's needs and to plan together. And that is what we will need to succeed in AutoDoc, our AC2 portfolio, and in medical modernization for Multi-Domain Operations (MDO).

# TATRC experiments with Medicine Across the Continuum of Care at PC-C4

A small unmanned aircraft system (s-UAS) component of the Vision and Intelligence Systems for Medical Teaming Applications (VISTA) hovers while gathering information from notional casualties during the medical experimentation portion of Project Convergence Capstone 4 (PC-C4), Fort Irwin, Calif., March 16, 2024.

In the U.S. Army's Telemedicine and Advanced Technology Research Center (TATRC) at Ft. Detrick, MD, teams of researchers, scientists, and engineers work to push the boundaries of military medicine and explore new ways to aid the warfighter.

Projects such as the Remote Patient Management System (RPMS) and Vision and Intelligent Systems for Medical Teaming Applications (VISTA) are iteratively tested, observed, and improved to be built into more capable technologies.

At TATRC, the laboratory environment provides a reliable, controlled environment to test initial concepts and rapidly develop new technologies. However, the true battlefield conditions in which theses future technologies will need to be deployed are not so hospitable, reliable, (or air conditioned). Therefore, TATRC strives to continuously bring early-stage technologies into the field and push them to their limits.

In February through March 2024, TATRC participated in the Project Convergence Capstone 4 (PC-C4) Experimentation at the U.S. Army's National Training Center at Ft. Irwin, CA. to experiment and put these technologies to the test 'in the dirt.' The purpose of this experiment was to research promising medical technology capabilities from across the military medical technology research and development ecosystem in replicated battlefield settings with Soldiers. The various technologies were integrated together and employed alongside one another in simulated patient care scenarios to conceptualize future military medical care.

Active-duty military medical personnel supported the event by utilizing the various technologies while providing simulated casualty care, and provided feedback about the functionality, usability, and overall impact on care. PC-C4 provided a rare and valuable opportunity to see these technologies perform first-hand. Not only does this showcase the successes of the

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## PC-C4 *continued from page 8*

technologies on hand, but, arguably and more importantly, highlights shortcomings and opportunities for technology improvement. At PC-C4, learning from our shortcomings is just as important as our successes. In the end, we want to put forward the best capability for our Service Members.

**TATRC was selected to support two technologies at this year's event: RPMS and VISTA.**

**RPMS** is an interoperable medical device platform that supports remote control and monitoring of life-sustaining care, such as ventilation and infusion delivery. This can improve the quality of care in forward environments, as well as serve as a force multiplier for highly skilled clinicians to assist local care providers in various locations across the operational landscape.

- At PC-C4, the system was connected to a tactical network. An ICU clinician was able to successfully assist a local medic in providing complex patient care by remotely controlling medical device settings. The system was deployed in various care scenarios, including in a Role II tent and onboard a CASEVAC ground ambulance.

- A high degree of user feedback and technical performance data was collected, which will be used to prioritize the development of certain technical capabilities and improve usability of the system.

**VISTA** is a computer vision software capable of stand-off casualty identification and physiological vitals signs assessment deployed on a standard Uncrewed Aerial System (UAS).

- The utility of this concept is to support medics in identifying the location and status of multiple casualties in battlefield environments. At PC-C4, this technology was utilized in various Point of Injury (POI) locations to assess performance of identifying simulated casualties in a realistic field environment.
- The system had originally been trained using image data from lab settings and available outdoor locations. PC-C4 provided the perfect opportunity to confirm that this system can perform as intended in different environments and with end users in non-ideal situations. Overall, the system was highly successful, and end users provided important feedback to improve the technology.

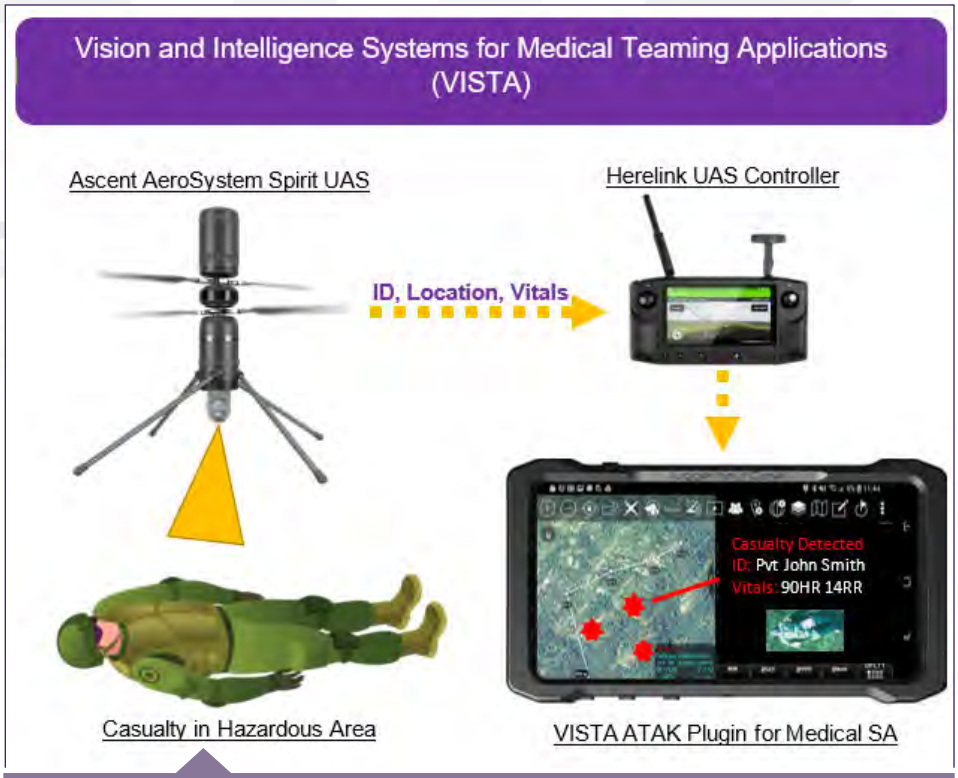


**Diagram of VISTA, a computer vision software capable of stand-off casualty identification and physiological vitals signs assessment deployed on a standard Uncrewed Aerial System (UAS).**

Both technologies alone have clear potential to improve battlefield medical care and modernize military capabilities. However, the truly revolutionary concept is the integration of these technologies and their data into a unified system across the continuum of care.

When **RPMS** and **VISTA**, along with the wide range of other emerging medical technologies are combined, their shared medical data can be used to track patient status, inform logistics operations, optimize care, and, eventually, automate entire portions of the medical care process. As an example of what these future concepts may look like, an injured casualty can be identified and initially triaged with VISTA, with the data initiating a patient record. Once a medic stabilizes the patient and recovers them to a Role II, the RPMS can access this patient record to identify key information such as injury profiles, changes in vital signs since initial identification, and time since injury. This information is then relayed to a remote expert who can optimize care delivery and track them throughout their evacuation from the field.

This vision of medicine is what TATRC aims to achieve. Experimentation at events such as PC-C4 provide a unique and valuable opportunity to glimpse the potential of these ideas in action.

**For more information on these initiatives, please contact Mr. Nate Fisher at: nathan.t.fisher3.civ@health.mil.**

# EMPLOYEE SPOTLIGHT

## TATRC Welcomes New Deputy Commander, LTC Morgans from the Army Medical Specialist Corps Office!

LTC Rachel E. Morgans has joined TATRC as its newest Deputy Commander! LTC Morgans hails from Reading, Pennsylvania. She began her career 19 years ago after graduating from the Pennsylvania State University with a Bachelor of Science in Nutrition. She commissioned as a second lieutenant in the Army Medical Specialist Corps in 2005 before making her way to Fort Sam Houston, TX to attend the Officer Basic Course. She then attended the U.S. Military Dietetic Internship Consortium at Walter Reed Army Medical Center (WRAMC), Washington D.C. (2005-2006) before earning the Registered Dietitian credential in 2006.


**LTC Rachel E Morgans, TATRC Deputy Commander**

During her career, LTC Morgans earned a Master of Science in Exercise Science and Human Performance Optimization from the California University of Pennsylvania, a Master of Business Administration and Master of Healthcare Administration from Baylor University. LTC Morgans is a board Certified Specialist in Sports Dietetics (CSSD) and has a passion for human performance optimization through sports nutrition education and fostering healthy environments.

After passing the Registered Dietitian examination in 2006, LTC Morgans served in the following assignments: Chief of Clinical Dietetics at Moncrief Army Community Hospital, Fort Jackson, SC (2006-2008); Clinical Dietitian at WRAMC (2008-2009); Chief of Nutrition Care, 212th Combat Support Hospital and Clinical Dietitian at Landstuhl Regional Medical Center, Germany (2009-2013); Brigade Dietitian and Chief of Operation Support for the 65th Medical Brigade, Republic of Korea (2013-2015); Hospital Executive Officer for the 121st Combat Support Hospital and Brian Allgood Army Community Hospital, Republic of Korea (2015-2016); Chief of Community and Outpatient Nutrition Branch, Brooke Army Medical Center, Joint Base San Antonio, TX (2016-2018); Graduate Student, U.S. Army-Baylor Program in Healthcare Administration, Joint Base San Antonio, TX (2018-2019); Chief, Clinical Nutrition Operations Division, Walter Reed National Military Medical Center (WRNMMC), Bethesda MD (2019-2020); Department Chief, Warrior and Family Coordination Cell, WRNMMC (2020-2022); Executive Officer, Army Medical Specialist Corps, Fort Sam Houston, TX (2022-2024).

***New Deputy Commander***

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# MMSIV Team Expands Its Expertise to San Antonio

TATRC's Medical Modeling Simulation, Information, and Visualization (MMSIV) group has added a new member to their team! Research Coordinator, Mr. Mark Spears, is the latest addition as part of the effort to expand data collection initiatives to the San Antonio area. Mr. Spears will be responsible for coordinating, conducting and overseeing data collection at Joint Base San Antonio. He will be collaborating with local command groups to maximize data collection opportunities while ensuring adherence with all applicable protocols and procedures.

Mark Spears is a recently retired United States Army First Sergeant, who served in various positions including the Senior Enlisted Advisor to the MEDCoE Graduate School Dean, Deputy Commander for Clinical Services NCOIC at Dwight D. Eisenhower Army Medical Center, and First Sergeant for HHC Company at Madigan Army Medical Center. His clinical training and experience includes a 20 year career as both a Cardiovascular Technologist and Combat Medic. His formal education includes a Master of Business Administration and Bachelor of Health Sciences from Excelsior College in Albany, NY. Mark is a Registered Cardiac Invasive Specialist (RCIS) and Registered Cardiac Sonographer (RCS).

Mark and his wife Rebecca have three children Caroline, Samuel and Henry Spears. When they aren't enjoying San Antonio's amenities, Mark and his family enjoy spending time at their Louisiana home hunting, fishing and playing golf in the Sportsman's Paradise!

**Mr. Mark Spears, Research Coordinator Medical Modeling Simulation, Information, and Visualization (MMSIV)**

We're thrilled to have Mark on the ground in Texas hill country to help further expand and advance MMSIV's initiatives! Welcome to the team!

## *New Deputy Commander* *continued to page 10*

Some of LTC Morgans' awards and decorations include the Defense Meritorious Service Medal, Meritorious Service Medal (4 OLC), Joint Service Achievement Medal, Army Commendation Medal, Army Achievement Medal (2OLC), Expert Field Medical Badge, German Sports Badge (bronze), and the Norwegian Foot March Badge. Her skill identifiers include Strategist (6Z), Capabilities Development (7Y), Health Systems Management Analyst (8S), Instructor (5K), Civil Operations Specialist (5Y). She is a member of the Academy of Nutrition and Dietetics, America College of Healthcare Executives, and Order of Military Medical Merit.

LTC Morgans is extremely excited to join TATRC. "I am honored, humbled, and thrilled to join the TATRC team of innovative and driven scientists, program managers, technicians, and administrative professionals. I am looking forward to learning from our experts, synergizing with external stakeholders, and sharing my unique background and perspective to bring about our mission of automating casualty care and deliver the Army of 2030."

Rachel is engaged to Michael (Mike) and looks forward to being a stepmother to his seven-year-old son, Alex. They enjoy traveling, hiking, skiing, RV trips, and obstacle course racing. Rachel has enjoyed showing Mike the joys and health benefits of cooking. In turn, Mike has introduced her to the world of ballroom dancing! Coincidentally, both of their families live only five miles apart, and they appreciate being able to visit with them together.

TATRC is excited to welcome such a diverse and open-minded leader to the Command team!

# Meet The Science and Technology Innovation Management and Synchronization (STIMS) Functional Team


**Functional Team Overview:**

The **Science and Technology Innovation Management and Synchronization (*STIMS*)** functional team at the Telemedicine and Advanced Technology Research Center (TATRC) possesses a unique blend of expertise, experience and access to accomplish the organizations singular mission: Automation of casualty care. The STIMS was established in May of 2023, during a major restructuring of the organization. The STIMS team provides coordination and management oversight for a wide range of critical functions and serves as a synchronizing resource to the remainder of the organization for all TATRC research activities. These functions include:

- Coordination and planning of operational exercise engagements
- Coordination of all organizational agreements (both intramural and extramural), to include: technology transfer (T2) considerations
- Design and development of extramural research awards
- Development, coordination, compliance tracking and reporting for all research regulatory actions
- Management of novel advanced technology and innovation projects
- Research project management

The STIMS team is comprised of experienced professionals who have spent decades conducting medical research, establishing research and development contracting mechanisms, developing, and fostering partnerships, and managing military medical research. In its first year, STIMS has developed and processed 44 specific regulatory actions, initiated 16 novel agreements, conducted the organizations first prize competition, developed 3 specific OTA solicitations, developed 2 federally funded research and development center (FFRDC) solicitations, and has supported 5 operational exercises. Each of these actions requires thoughtful collaboration with both internal and external stakeholders. The team is poised to support TATRC now and in the future on a wide array of relevant research opportunities thanks to outstanding team members and substantial research resources.

***STIMS* continued to page 13**

## *STIMS* *continued from page 12*

### Who We Are:

**Ms. Jeanette Little**, MS, serves as the Director of the TATRC South office at Fort Eisenhower, GA, as well as the Lead of the Science & Technology Innovation Management and Synchronization (STIMS) functional area within TATRC. She is central to all of TATRC's scientific, regulatory, and operational exercise activities and acts as SOTAR for TATRC managing OTAs in support of TATRC's AutoDoc Mission.

**Ms. Holly Pavliscsak**, BS, MHSA, is the Deputy of TATRC South at Fort Eisenhower, GA, as well as Deputy Lead of the Science & Technology Innovation Management and Synchronization (STIMS) functional area within TATRC. She also manages the Advanced Medical Technology Initiative (AMTI) program that provides intramural innovation technology demonstration funding to the facilities across the military heath system.

**Ms. Sharon Garlena**, Project Officer AMTI, assists with administrative support and management of the AMTI and other research initiatives.

**Ms. Ollie Gray**, MS, Senior Program Manager, is central to TATRC's organizational success by managing all the workload, documentation, schedules, and performance for all of TATRC's program managers and contract staff.

**Ms. Mike Reinemann**, BS, MPH, acts as the Operational Exercise Liaison, to facilitate programmatic communications between the government and external stakeholder teams.

**Ms. Triana Rivera-Nichols**, BS, Research Project Manager / Regulatory Affairs Compliance, provides project management and coordination for both TATRC research projects and information technology initiatives, and supports our regulatory compliance and scientific writing requirements.

**Ms. Kerri Virtz**, BA, is TATRC's Office of Research and Technology Applications (ORTA) and assists with creation and implementation of agreements. She also assists with program management for TATRC research activities.

In May of 2023, TATRC had a major restructuring in which the STIMS team was established to provide coordination and management oversight for a wide range of critical functions.

**Ms. Tiffany Williams**, MBA, Administrative Support Specialist, manages our TATRC South at Fort Eisenhower and ensures all logistics and administrative activities run smoothly.

**Mr. Chevas Yeoman**, BSA, MPH, Human Subject Research Regulatory Compliance Specialist, manages all aspects of research regulatory guidance for activities performed at TATRC.

**Dr. Stephanie Fonda**, PhD, Biostatistician, assists with study design planning, analysis of data, literature reviews and other tasks as needed.

### Future Engagements:

In the coming months, the STIMS team will take on an additional mission: the planning, development, and coordination of data collection from TATRC technologies at clinical sites. STIMS has a wealth of military medical advanced technology research expertise, which will be leveraged to take selected TATRC knowledge and material products into the military treatment facilities, operational units, and operational exercises for further evaluation.

**For more information on the STIMS Functional area, please contact Ms. Jeanette Little at: jeanette.r.little.civ@health.mil.**

# MMSIV's Mighty Match-Ups with External Partnerships

TATRC's Medical Modeling, Simulation, Information & Visualization (MMSIV) team commenced its first off-site data collection event at our partner site located at the U.S. Army Medical Center of Excellence (MEDCoE) this past May. This major MMSIV milestone marks the first time that data has been collected for the Autonomous Casualty Care Porfolio / AutoDoc since the project kicked off. This feat was accomplished through the persistent partnership with our MEDCoE champion – Mr. Mike Eldred. MMSIV lead, Dr. Ericka Stoor-Burning, along with Deputy, MAJ Carl Ducummon, and Mr. Mark Spears (our newest edition to the team and local TATRC liaison in San Antonio), traveled to MEDCoE and under the caring wing of Mr. Mike Eldred, who facilitated introductions to key instructors at the Tactical Combat Medical Care (TCMC) Course at MEDCoE. One key introduction included MAJ John Yi, Chief, Tactical Combat Medical Care who helped organize a demonstration of what AutoDoc is and how we can work together to make data collection happen.

After the presentation, we were invited to set up our first data collection in the vicinity of their training lanes occurring the next day. Thus, on a rainy morning between two conex storage containers in early May, we had our first volunteer and successfully collected non-PII data. Once we gathered data from additional volunteers, we uploaded it into our RAPIDS data repository. After some trial and error and hands-on aide from Dr. Kajal Claypool, our partner at MIT Lincoln Labs, we were able to successfully upload and transfer the data back to our homebase at Fort Detrick.

The ripple effect from this key collaboration has created a wave of interest in participating with TATRC in our data collection with multiple others joining the effort. The positive impact from this monumental day will allow TATRC to collect the diverse data sets needed to develop rich, reliable algorithms for the success of our mission which is to fuse data, humans, and machines into trustworthy solutions that optimize warfighter performance in casualty care. The additional partners who have joined the AutoDoc data collection effort include: MEDCoE, Defense Medical Readiness Training Institute (DMRTI), Joint Special Forces Medical Training Center (JSOMTC), Air Force 59th Medical Wing (59 MDW) and the 166th Regiment - Regional Training Institute (4th BN 166th RTI). With these and more partners to come, we are gaining momentum to see the benefits of collecting this information. Some of the future benefits will aid in the future fight and allow algorithms to move beyond Autonomous Documentation and create a foundational data set and to use it to automate aspects of casualty care such as expediting forward surgical team dispatches, logistics/supply chain, and evacuation needs. Thank you to all of our partners for their support! We can't wait to see how this effort will benefit military medicine in the future.


All the AutoDoc partners thus far – to include the Data Symposium Team and MTEC, helping us get our first external performer, Ragged Edge Solutions, get online and begin the AutoDoc data collection effort.


From Left to Right: (Bottom) Ericka Stoor-Burning, (Left Upper) MAJ Carl Ducummon, and (Right) Mr. Mark Spears – on location of our first off-site data collection at MEDCoE in the TCMC space.

**For more information on TATRC's Data Collection efforts, contact Dr. Ericka Stoor-Burning at: ericka.l.stoor-burning.civ@health.mil.**

BHSAI NEWS

# First DoD Medical Capability Developed Using Artificial Intelligence Receives FDA Clearance

Did you know that hemorrhage is the leading cause of preventable death on the battlefield, where more than 90% of combat casualties die before ever reaching a medical treatment facility? However, it is challenging to identify trauma casualties at risk for uncontrolled bleeding at the point of injury from those who are injured but may not be at risk for hemorrhage.

The U.S. Army Medical Research and Development Command's (MRDC) Biotechnology High Performance Computing Software Applications Institute (BHSAI) recently obtained FDA clearance of the Automated Processing of the Physiological Registry for Assessment of Injury Severity-Hemorrhage Risk Index (APPRAISE-HRI) software as a medical device.

APPRAISE-HRI is an artificial intelligence enabled decision-support mobile health application intended to help military health care providers screen U.S. Service Members for hemorrhage risk after a physically traumatic event and stratify casualties who might need immediate attention and emergency evacuation from those who are injured but may not be at risk for hemorrhage.

The APPRAISE-HRI consists of a commercial vital-sign monitor and an AI app running on an Android smartphone. The monitor continuously collects routine heart rate and blood pressure data from the casualty and wirelessly transmits the data to the smartphone, where the AI app analyzes patterns in the vital signs and provides a hemorrhage risk score.

To train the AI algorithm, MRDC scientists conducted three clinical studies to collect real-world vital-sign data from about 2,000 civilian trauma casualties either during ground- and air-ambulance transport from the point of injury to a receiving hospital or in the Emergency Department. To obtain the FDA 510(k) clearance, MRDC blindly and independently assessed the AI algorithm using vital-sign data collected from an additional 6,000 trauma patients at nine different sites. The independent assessment showed that the APPRAISE-HRI was highly effective in stratifying the likelihood that a trauma patient experienced hemorrhage within the first 10 minutes of patient monitoring. The DoD holds three U.S. patents on APPRAISE-HRI.

The APPRAISE-HRI offers the unique capability to automatically integrate and extract information from standard vital signs in a systematic and reproducible manner, to improve situational awareness and help medics identify the most severely injured casualties. The device's risk score is easy to interpret and the use of standard vital signs will minimize training and facilitate dissemination.


The APPRAISE-HRI consists of a commercial vital-sign monitor and an AI app running on an Android smartphone.

APPRAISE-HRI is not intended to diagnose or direct treatment. Rather, it is intended to serve as a risk assessment tool and to provide situational awareness and inform clinical management of potentially hemorrhagic casualties by identifying those at the greatest risk of hemorrhage.

This research effort was sponsored by the U.S. Army Combat Casualty Care Research Program, which funded the research, and the U.S. Army Medical Materiel Development Activity (USAMMDA), which provided funding for the regulatory activities with the FDA, with support from the Defense Health Program. This important milestone is the result of an interagency agreement sponsored by the Warfighter Expeditionary Medicine and Treatment Project Management Office, part of USAMMDA. The agreement was established in support of the Defense Health Agency's Advanced Medical Monitor Family of Systems program, which aims to provide far-forward medical monitoring capability to the joint services.

The MRDC Office of Regulated Activities provided support with the interactions between the FDA and the BHSAI. The Medical Technology Transfer Office is seeking to license this technology, for which the U.S. Army holds three U.S. patents, with interested commercial partners.

**For more information on this BHSAI initiative, please contact Dr. Jaques Reifman at: jaques.reifman.civ@health.mil.**

TATRC

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