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SOLCUS After-Action Report

From Good Idea to the Largest Ultrasound Training Program in the Department of Defense

by William N. Vasios III, APA-C, MPAS

The Special Operator Level Clinical Ultrasound (SOLCUS) program started as a good idea and developed into the largest ultrasound program in the Department of Defense (DoD). It is also the only ultrasound program dedicated to training enlisted medics within the DoD. This success did not happen by accident or without the efforts of many motivated people in a variety of situations and locations. What worked well, what needed to be improved, and what was the missing ingredient to keep it going? The answers to these and a few other questions are discussed in this long-overdue SOLCUS After-Action Review.

The SOLCUS program is at a transitional point in its existence. Reflecting on the past is the best way to understand its current status and the changes taking place. This article examines what we did correctly, what improvements were implemented, and what was the missing element that renewed interest in the program. It also highlights the major events of the last 5 years of the SOLCUS program.

Acceptance and Development

In response to the first *Journal of Special Operations Medicine* SOLCUS article in 2008,[1] a small group of innovators and leaders began to popularize the concept of training the Special Forces Medical Sergeant (SFMS/18D) in the use of ultrasound technology. Medical leadership from the 3rd Special Forces Group (Airborne) (3rd SFG), the US Army Special Forces Command[2] (USASFC), and the US Army Special Operations Command (USASOC), conveniently located at Fort Bragg, North Carolina, supported the concept. However, this consensus within the Special Operations Forces (SOF) medical community meant little without funding. Convincing the command leadership to spend money on ultrasound machines to improve the skillset of the 18D seemed simple compared with securing the funds to purchase more ultrasound machines. The USASFC and USASOC medical offices were co-located, streamlining the early interactions and conversations when issues arose. Funding came through for the additional ultrasound machines shortly after the second SOLCUS article was published in 2010,[3] which validated the proof of concept and outlined guidance for training objectives.

Prior to the SOLCUS concept, each Special Forces Battalion (BN) was authorized one ultrasound machine. It was rarely used and only if the BN surgeon had experience with bedside clinical ultrasound. Limited access to equipment was a significant issue. With a single ultrasound machine in the BN, the 18Ds had minimal opportunities for adequate training experience. The additional ultrasound machines allowed each BN to have up to five devices to use—not a monumental increase but enough to spark the interest of the medics who were early adopters of this technology. Simon Sinek discussed early adopters during his TEDx talk on 28 September 2009.[4] Simon referenced 13.5% as the typical percentage of early adopters. The concept of training every available 18D in the BNs and then selecting the most motivated and capable medics to deploy with their own ultrasound device aligned nicely with the number of new machines available to the 18Ds in each BN. Medics were selected based on their comfort level and ability to understand the training to that point combined with their mission during the next deployment. This plan worked well inside the 3rd SFG and provided the format for other SFGs to adapt to their environments.

Developing the SOLCUS program of instruction required many expert opinions, with the singular goal of educating the 18D on the use of ultrasound. The initial ultrasound training focused on the Focused Assessment with Sonography in Trauma (FAST) and expanded from there. The idea was to use trauma management, something the 18D was already very skilled at, and introduce the skill of ultrasound. This allowed them to quickly advance to the other core applications of emergency ultrasound,[5] such as limited vascular (abdominal aorta, lower-extremity deep vein thrombosis), biliary, thoracic, soft tissue, musculoskeletal, ocular, and procedural guidance.

From 2009 to early 2010, as part of the ultrasound purchase agreement, Sonosite (https://www.sonosite.com) sponsored the initial ultrasound training instruction. They hired Dr Rob Blankenship of EMsono (https://www.emsono.com) to travel with the USASFC training team to each of the SFGs. This level of individual instruction for the medics eventually led to the core

SOLCUS program curriculum. With the success within the 3rd SFG and exposure to the remaining SFGs, interest in the battlefield applications of this technology began to accelerate, and with it came a number of new challenges. How would the program expand beyond the initial training provided by the ultrasound purchase agreement? It was unclear whether the USASFC would have to contract for additional ultrasound training for the SFGs, and who would provide that training.

Casting a Wide Net

As the USASFC Surgeon's office expanded and delineated its duties and responsibilities outside of USASOC, ultrasound became a major beneficiary. The USASFC Surgeon, LTC Andrew Landers, MD, insisted on developing and expanding the ultrasound training to include every active and reserve SFG. I was brought on to lead that effort and I turned to the military's point-of-care ultrasound experts to gain experience and exposure, and to find solutions for program expansion.

The US Army has three Emergency Ultrasound Fellowship programs: Carl R. Darnall Army Medical Center at Fort Hood, Texas; Madigan Army Medical Center at Joint Base Lewis McCord, Washington; and San Antonio Uniformed Services Health Education Consortium at Joint Base San Antonio, Texas. Each program allowed me to attend their annual summer ultrasound training. Afterward, the Fellowship directors provided me with lecture and source materials to improve my knowledge and understanding of ultrasound.

As a former 18D, I had operational experience. As a physician assistant (PA) and a lifelong learner, I focused that experience on orienting the ultrasound education specifically for the 18D. I filtered relevant information from the Ultrasound Fellowship lectures and rearranged slides in an order that made more sense to me in presenting the material. The final step included a review by the Fellowship directors to ensure the material was not distorted by the changes. This sequence to review and modify the Fellowship material extended to every one of the core capabilities and eventually became the SOLCUS program of instruction in use today.

The solution to conquer the seemingly monumental task of training every SFG was actually quite simple and worked out well for each of the parties involved. USASFC did not have qualified instructors yet. However, they did have the money within the SFGs to support the training. The three Fellowship programs had the qualified instructors but no funding to support the temporary duty (TDY) to travel and conduct the training. An existing Memorandum of Agreement (MOA) between USASOC and Medical Command provided the foundation on which to base a new agreement between USASOC and each of the three Emergency Ultrasound Fellowships. In essence, the SOLCUS Ultrasound MOA stated that each SFG would pay the TDY costs for the instructor to teach the SOLCUS curriculum and the Fellowships agreed to provide enough qualified instructors. This MOA is still in effect and follows a regular review cycle to update as needed.

In addition to teaching in the SF BNs, the SOLCUS program was presented to the future medics in training. The Special Warfare Medical Group (SWMG), as part of the US Army John F. Kennedy Warfare Center and School, was responsible for training future medics. COL Robert Lutz, MD, was the medical director at the time. He was very receptive to the idea of training the future 18D in the use of ultrasound. COL Lutz, LTC Landers, and the USASOC Surgeon, COL Peter Benson, facilitated the inclusion of the SOLCUS program within the SWMG. The SOLCUS program was split to allow the Special Operations Combat Medic (SOCM) to learn the FAST examination, and the remainder was included in the SFMS course. The intent was to promote early exposure to ultrasound technology and stress it as a tool they should use early in their medical decision-making process. After a trial period of familiarization, ultrasound became a testable item the student medics had to pass to continue their training.

Train the Trainers

After much deliberation, and once the ultrasound training was included in the SOCM and SFMS courses, USASFC made it policy for the SF BN Surgeon or PA to become credentialed in the FAST examination with their local MTF. USASFC avoided this requirement for as long as possible while encouraging the BN Surgeon and PAs to become proficient enough in ultrasound to properly supervise their 18Ds. With the FAST examination becoming a required and testable skill to graduate, it made sense to have their future medical supervisors competent in that same skill.

In the spring of 2014, a separate training track was developed for the SF BN Surgeon and PAs to facilitate the credentialing process. Once again, the Ultrasound Fellowships provided the instructors. Each SFG coordinated to have their BN Surgeons and PAs attend the FAST examination training to meet the credentialing process outlined in the 2008 American College of Emergency Physicians Emergency Ultrasound Guidelines.[6] Once each provider reached a predetermined number of acceptable FAST examinations, the Fellowship Director addressed a Certificate of Training to their MTF. The memo stated that the provider was trained and skilled in the FAST examination and requested the additional skill be added to their credentials. I was the first provider to validate this process through Womack Army Medical

Center. The result was to have organic BN Surgeons and PAs who could instruct and supervise the 18Ds, with the fellowship cadre providing any additional or advanced training as required.

Conclusion

The SOLCUS program was created thanks to a number of highly motivated and influential people in the right place at the right time. This highly successful "good idea" is due for a review. Reviewing and learning from the past experiences increases the possibility of future successes. Table 1 summarizes the factors contributing to SOLCUS success. Table 2 shows the lessons learned and recommended solutions for improvement.

As the SOF medical community shifts from many years of working in a mature combat theater to more austere operating environments, prolonged field care is the renewed challenge. As we adapt training for this complexity, programs like SOLCUS better equip the medic for the realities and requirements of managing their patients. Ultrasound technology in the hands of a medic is now more relevant and impactful than ever. As additional ultrasound equipment becomes available and is fielded, let us discuss this challenge during the upcoming Special Operations Medical Scientific Assembly in Charlotte, North Carolina in May 2016.

Table 1 *Factors Contributing to SOLCUS Success*

The pros and cons of teaching ultrasound at the operator level were openly discussed. The second- and third-order effects were determined and a plan for expansion was developed before embarking on the project.
Expert source material and instructors were used to develop and implement to program.
The curriculum was specifically maintained and adapted for the 18D scope of practice and operational environment.
Immediate medic feedback was requested and received on gaps and improvements to presenting the material. Beneficial changes were made immediately and presented during the next course.
A process was planned and followed to incrementally increase the number of ultrasound devices within the units. The training and equipment progression was leapfrogged, ensuring the program was not saturated with devices and untrained medics.
The ultrasound education was coordinated with the lifecycle replacement of existing devices. This removed the financial burden from the unit and appropriately identified it as an enduring requirement supplied by the Army.

Table 2 *Factors That Can Be Improved to Enhance Future Success*

Lessons Learned	Recommendations
Keeping the lectures close hold ensured the information was consistently delivered across each SFG. However, it severely limited its exposure outside the classroom and prevented self-paced learning for individual medics motivated above the instruction we provided.	Present short audio/visual lessons of the material via social media. Have a central location that medics can trust and that can be updated regularly for viewing and downloading. This allows self-paced learning outside of the regular classroom, thereby increasing learning progress inside the classroom.
The initial quality assurance (QA) process was complex and quickly fell apart when the DoD banned universal serial bus (USB) access for Government computers. The backup plan was too complex and easily became overcome by all operational events for the medics.	Identify a simplified image-storage system that can be backed up regularly and accessed for archive and QA requirements. This can happen at regular intervals during the deployment or immediately afterwards.
Stress early in the training process the importance of identifying the patient and labeling images for QA and later review.	Develop standard operating procedures (SOPs) for the minimum set of patient identification and scanning indication requirements. Ensure the SOP is simple and user friendly.
Training the trainers/supervisors together with the learners can have adverse impact on the trainer's skill development. The pressure to progress faster than the medics became an obstacle for some providers.	Incorporating ultrasound exposure early in the provider training will significantly improve their confidence and proficiency when placed in a supervisory roll with the medics. Discussions with the provider consultants could improve this plan.

Disclosure

The author has no conflicts of interest to disclose.

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USASOC Division of Science & Technology

What It Means for Special Operations Medicine

by Chris Calvano, MD, PhD; Scott Forman; Travis Osborn, 18D; William Gothard

The US Army Special Operations Command Science and Technology Division (USASOC S&T) has the mission of maximizing the use of science and technology (S&T) resources from external organizations to extend USASOC warfighters' technological and knowledge dominance in support of special warfare and surgical strike operations. Within S&T are defined area gaps covering strategic, tactical, and scientific areas. These include core warfighter functional areas such as weapons, mobility, communication, and medical, which are organized as commodity areas to include Soldier Systems (including medical), Mobility, Human Domain, Aviation, Intelligence Surveillance Reconnaissance/Intelligence Support Squadron, Target Engagement, and C4. Each commodity is assigned an experienced Operator to chaperone the process. Interested scientists, clinicians, and engineers from private industry, academia, and government/military agencies all collaborate to meet these needs of the yearly gaps. The medical gaps (some of which may be classified) are codified, keeping good faith to the guidance provided by Army Special Operations Forces (ARSOF) 2022. The gaps are fluid such that, at any time, a critical gap may be identified in the field, resulting in expedited exploration of solutions.

S&T investment is required to ensure ARSOF Operators of the future have the most advanced capabilities to conduct surgical strike operations and special warfare campaigns. This editorial aims to familiarize the Special Operations medical community with the role of the USASOC S&T and to raise awareness and encourage continued Operator-driven identification of medical gaps and development/evaluation of solutions.

Discovery of the S&T gaps comes from three sources: top-down directive (strategic), bottom-up innovation (tactical), and technology discovery (scientific). Command directives define a given gap and, therefore, the solutions often follow. Operators may have no choice but to innovate in the field; indeed, this is expected and provides a valuable "tested" solution that can be translated to a modification of an existing product versus a completely new item. Occasionally a solution is identified via technology discovery as a commercial off-the-shelf product. Such instances will still be fully vetted within USASOC, but advantages may include standing US Food and Drug Administration approval or current use within sister services or branches.

Identification of many medical gaps and development of solutions ultimately depends on and is driven by Operator input and feedback. Always observing that Special Operations medicine is Operator/Medic centric facilitates this process. The S&T division has representatives