

Demystifying Space:

How to Perform Better in the Space Domain

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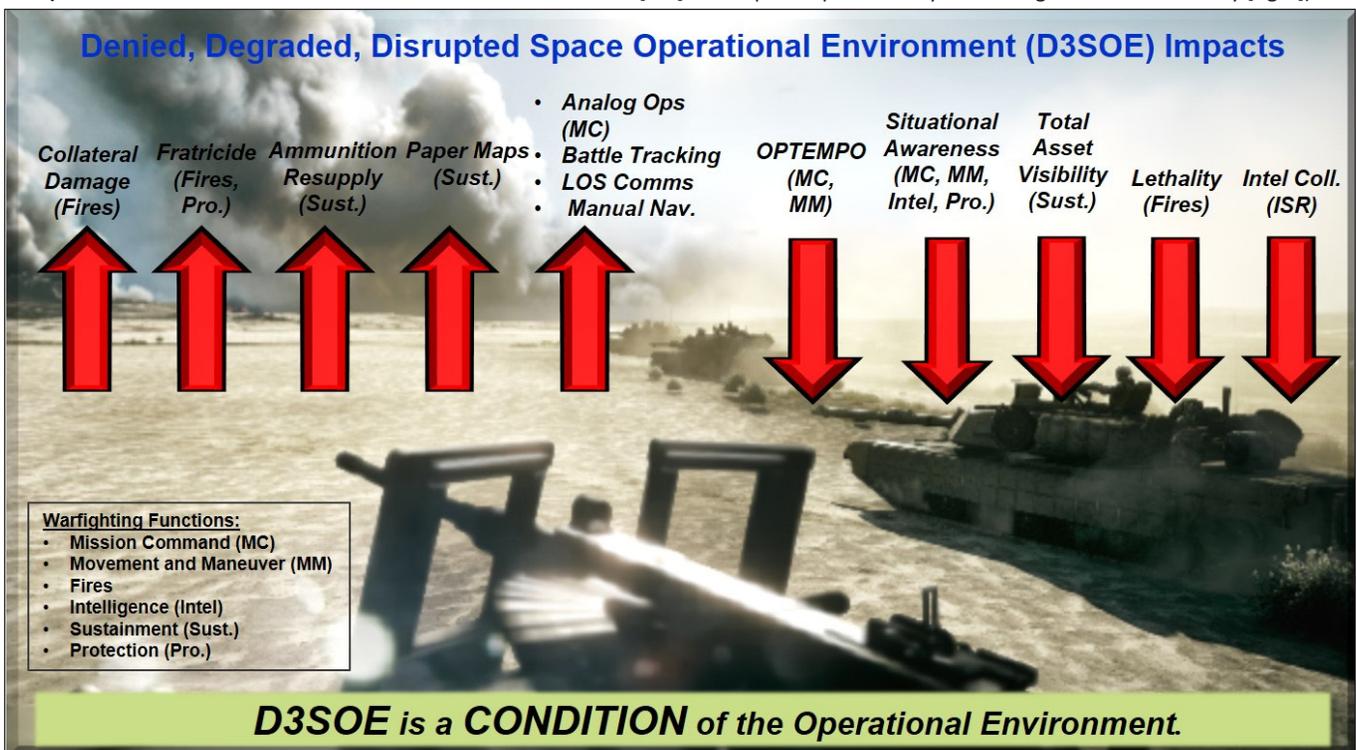
In a previous article, I introduced the role and importance of the space domain for maneuver professionals.¹ That article laid a foundation for what the space domain looks like at lower echelons to increase awareness of space implications and ask for greater involvement in shaping future space support to maneuver formations. The intent of this article is bridging the gap between the space domain, the operational environment, future force modernization, and current maneuver formations that require a higher level of space skills. The reality is that our Soldiers and formations cannot wait for the next big space program of record to provide overmatch against peer and near-peer adversaries. Being able to “fight tonight” requires addressing the problems of a denied, degraded, and disrupted space operational environment (D3SOE) in a contested, multi-domain extended battlefield environment against today’s threat (see Figure 1).

Space capabilities have no doubt greatly enhanced U.S. Army warfighting formations. However, over time, the U.S. Army has become critically dependent (as an example) upon positioning-, navigation-, and timing (PNT)-enabled equipment. Over-reliance on these enhanced capabilities is often to the detriment of alternative methods of conducting navigation. U.S. Army Soldiers and formations must execute missions within the commander’s intent to achieve the desired end state from large-scale combat operations to counterinsurgency/counterterrorism and along the full spectrum of a D3SOE (from fully enabled to completely denied). Units must train at both ends of the spectrum, rapidly transition from one end to the other, and have different portions of the formation operating at different points simultaneously.

A great place to start understanding the strengths and weaknesses of space-based capabilities (not only friendly and adversary, but also allied, neutral, and commercial) are two short reads available from the Maneuver Center

Figure 1 — D3SOE as a Condition of the Operational Environment²

(D3SOE increases the occurrence of or need for certain events [left] and impacts operations by decreasing formation efficiency [right])



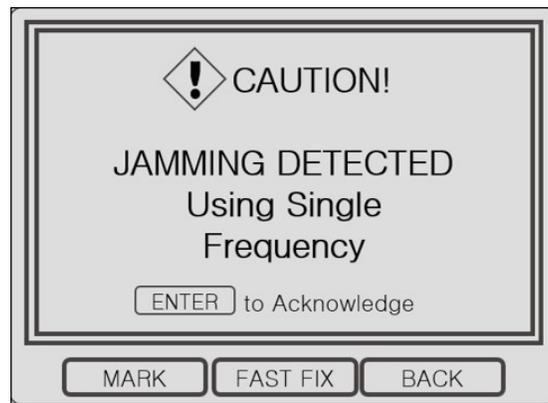


Figure 2 — Example Defense Advanced GPS Receiver (DAGR) Screen

of Excellence (MCoE) and the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT). The “Space Support to the Brigade Combat Team (BCT)” tri-fold and Graphic Training Aide (GTA) 40-01-001, *Army Space Training Strategy Home Station Training Reference Guide*, describe space support to operations, how to request space support, and D3SOE mitigation approaches.

The easiest gap to close in maintaining space overmatch with peer and near-peer adversaries is the knowledge gap. Leaders cannot underestimate the importance of formations skilled in all domains on the future battlefield. A solid foundation of how space-based capabilities affect warfighting formations is the first step to developing a space domain skill set.

With this knowledge, operators and leaders can then assess and appreciate their equipment’s space linkages. This is no small undertaking, but space enhancement is an ever-increasing equipment attribute that must be common knowledge to maximize effects while conducting cross-domain maneuver in a contested environment during large-scale combat operations. A typical BCT has more than 3,200 pieces of equipment enabled by PNT from space and more than 300 pieces of satellite communication-enabled equipment. What are the impacts to warfighting efficiency when an adversary targets one, more, or all of these systems in a D3SOE? Are commanders confident that their Soldiers and equipment will perform in a contested GPS environment? This is the environment of the future.

As an example, if a unit takes the time to encrypt their Defense Advanced GPS Receiver (DAGR), it will indicate when it is being jammed (see Figure 2). In the “Jammer Finder” mode, the DAGR will indicate the jamming signal strength. If a company commander intersected the reported jamming line of bearing of three platoons, the commander could determine a jammer location and take appropriate action. Platoons familiar with D3SOE and skilled in mitigation techniques would continue to operate in an analog mode (without turning off their DAGRs) until they regained the GPS signal. This course of action is not possible without completely understanding space support to multi-domain operations and individual equipment reliance on space capabilities. However, with that understanding, leaders could determine training and performance deficiencies as they relate to the accomplishment of the unit mission-essential tasks. Leaders can then address these deficiencies in their unit training plans.

The following training options developed by USASMDC/ARSTRAT are available to units to address the D3SOE problem set:

1) The **Army Space Training Strategy (ASTS)** incorporates D3SOE instruction into the education systems for officers, warrant officers, and NCOs. The idea that formations receive knowledgeable and better-educated leaders from the beginning facilitates a decreased learning curve so leaders can spend more time focused on training Soldiers and their units.

2) There are space electives taught at the Command and General Staff College that lead to the 3Y-Army Space Cadre skill identifier. These courses are **A537 Space Orientation (Term 1)** and **A543 Space Operations (Term 2)**. This skill set in field grade officers, many of whom will directly influence training when they arrive on a staff, will serve a unit well for developing internal and external options to improve the space domain skill set. An additional option is sending Soldiers to the **Army Space Cadre Basic Course (ASCBC)** Phases 1 and 2. ASCBC is an Army Training Requirements

and Resources System (ATRRS) course (<https://www.atrrs.army.mil>) that is offered all around the globe via mobile training teams. The course code is 2G-SI/ASI3Y/043-ASI3Y (MC) and the school code is 129.

ASCBC is a space fundamentals course focused on understanding space-based capabilities for planning, preparing, and executing unified land operations. Graduates of this course can request the 3Y skill identifier. This course does not entail Soldiers taking on additional obligations, but the education received will help them better perform their already assigned duties and responsibilities and understand the impacts of peer and near-peer adversaries in a D3SOE.

The previous opportunities support the institutional line of effort (LOE) of the ASTS in order “to increase space knowledge... through institutional training and education.”³ Leaders can also develop formations with multi-domain skill sets through the ASTS operational LOE by home-station training and combat training center (CTC) rotations “to exploit space capabilities and fight in contested environments.”⁴ The operational LOE is a two-part concept. (Home-station training is provided by USASMDC/ARSTRAT G37 Training, Readiness and Exercise, Army Space Integration Branch, and consists of crawl and walk phases. USASMDC/ARSTRAT provides the training at no cost to units 90-180 days prior to a CTC rotation or deployment.) Units conduct train-the-trainer sessions, classroom instruction, and field-training exercises complete with space kit training. Space Kit 3 replicates GPS jamming on handheld DAGRs, and Space Kit 4 replicates threat interference on satellite communication. The branch supports the run phase at CTC rotations by creating a contested space operational environment, providing space-experienced observer-controller-trainers and opposing forces or “Army space aggressors.” You can find lessons learned from the National Training Center at <https://www.milsuite.mil/book/groups/ntc-operations-group>. Search “D3SOE” or “space” in the search box.

Leveraging ASTS institutional and operational LOE support, unit leaders can greatly decrease the space knowledge gap and better prepare their formations to operate in a D3SOE. Much like with fire or air support, space considerations will become second nature while conducting the military decision-making process, and planning can succeed across the full spectrum of a D3SOE. The U.S. Army School of Advanced Military Studies is currently experimenting with a visualization tool depicted in Figure 3. The intent is to aid in operationalizing space effects in a staff’s conceptual approach for better shared understanding in relation to operational art and the achievement of “strategic objectives, in whole or in part, through the arrangement of tactical actions in time, space, and purpose.” Rows 9 through 13 depict fluctuations or changes in space capability support based upon multiple factors such as weather, terrain, and enemy actions. Access to or support received from different space capabilities can increase or decrease throughout an operation, hence the rise and fall of space force enhancement indicator lines over time. In due course, the staff will address these considerations in their detailed planning.



A paratrooper assigned to the 173rd Airborne Brigade uses a Defense Advanced GPS Receiver (DAGR) during an exercise in Grafenwoehr, Germany, on 28 March 2014. (Photo by Markus Rauchenberger)

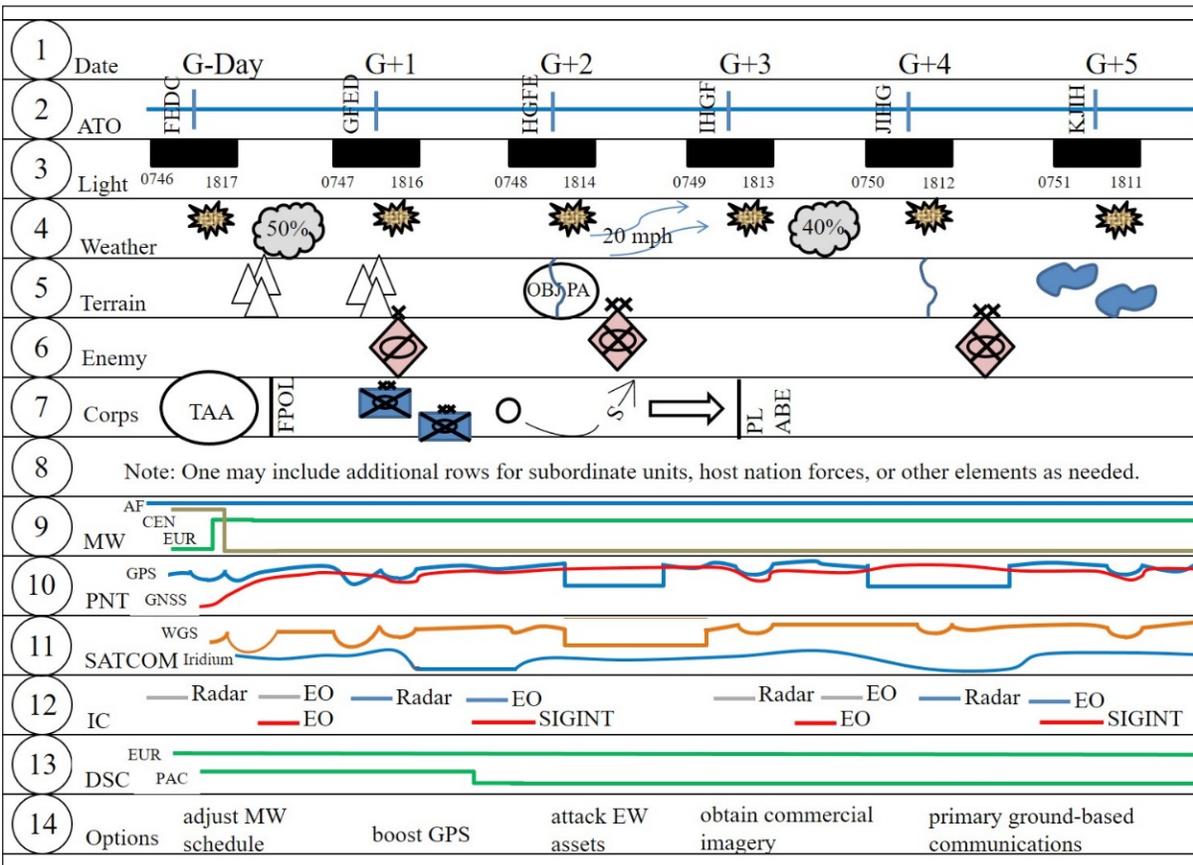


Figure 3 — Space Visualization Tool⁵

(Note: Intelligence community [IC] in this example is synonymous with Intelligence, Surveillance, and Reconnaissance)

One of many possible examples could be to include a well-thought-out and comprehensive PACER (primary, alternate, contingency, emergency, and runner) plan in the command and signal paragraph from the standard U.S. Army operation order format. A good case study to look at here is the conflict in the Ukraine. As emphasized by both the U.S. Army Training and Doctrine Command and MCoE commanding generals at the 2017 Maneuver Warfighter Conference, leaders must always be thinking about and planning for operations in all domains (Cross-Domain Maneuver — one of the components of the solution in the Army Functional Concept for Movement and Maneuver).

Ultimately, there is nothing new in this article with respect to traditional or enduring ways of war, but we must reassess for the changing environment of waging war. One of the evolving areas is the increased acceptance of affecting the space domain during conflict with resulting impacts in other domains. There is nothing mysterious about space. In essence, what was old is new again in terms of how the Army will shoot, move, and communicate in the spectrum of large-scale combat operations to counterinsurgency/counterterrorism operations. Obviously, what to do is not hard to figure out, but the how to do it is a pretty serious endeavor. The bottom line is there is no escaping the problem of a D3SOE. It will remain a fixture of having to “fight tonight” and of the future battlefield.

The first option is to assume that formations will operate in an uncontested environment, which all indicators and warnings show will prove disastrous in almost all cases. A second option is to plan to fight contested and prepare U.S. Army Soldiers and formations for what is to come even if it does not happen on the current watch. Peer and near-peer adversaries are watching and studying every move. Adversaries are actively seeking ways to degrade space capabilities and level the playing field. The U.S. Army is only as strong as its weakest link. The challenge is not be the leader who weakens the team due to a failure to train for what lies ahead in a D3SOE.

For additional space professional reading, the Army Space and Missile Defense School and Doctrine Center maintains a repository of useful material (online access, DVDs, and hardcopy), which they provide to Maneuver Pre-Command Course (MPCC) students. This is a valuable addition to any leader’s “kit bag” from the platoon to brigade level. To request material, contact the MCoE space integration officer or the Army Space Training and Integration Branch.

Notes

¹ LTC Coley D. Tyler, "Leveraging Space: An Examination of the Ultimate High Ground at Echelons Brigade and Below, *Infantry Magazine*, July-September 2017, [http://www.benning.army.mil/infantry/magazine/issues/2017/JUL-SEP/pdf/3\)PF1-Tyler-Space.pdf](http://www.benning.army.mil/infantry/magazine/issues/2017/JUL-SEP/pdf/3)PF1-Tyler-Space.pdf).

² Denied, degraded, and disrupted space operational environment (D3SOE) Maneuver Pre-Command Course brief.

³ 2013 Army Space Training Strategy.

⁴ Ibid.

⁵ Space Visualization Tool was developed by MAJ Jerry V. Drew II, U.S. Army Space Operations Officer, School of Advanced Military Studies.

LTC Coley D. Tyler currently serves as the space integration officer for the Maneuver Center of Excellence, Fort Benning, GA. He has served in multiple space and combat arms positions. These include serving as the chief of plans for United States Forces-Afghanistan/NATO Information Operations; space operations chief and special activities planner for Eighth Army-United States Forces Korea; physical education instructor at the U.S. Military Academy at West Point, NY; commander of Headquarters and Headquarters Company, 3rd Brigade Special Troops Battalion, 3rd Brigade, 1st Cavalry Division, Fort Hood, TX; assistant S3 and battalion S2 for the 2nd Battalion, 82nd Field Artillery Regiment; battalion fire support officer for the 2nd Battalion, 7th Cavalry; and fire support officer for D Company, 3rd Battalion, 8th Cavalry Regiment. He earned master's degrees in Kinesiology from Indiana University and operational art and science from the U.S. Army School of Advanced Military Studies (SAMS).