The Dragon Cave: A Central Repository for Dynamic CBRN Planning

By Sergeant First Class Jesus Ambrocio

The U.S. Army Chemical Corps must gain an edge in multidomain operations through a data-centric, decentralized, and doctrinally sound mission planning hub. As the Army and the Department of Defense (DoD) continue to adopt the mission command software known as the Tactical Assault Kit (TAK)—which supports cross-platform tools across various (including mobile) operating systems and devices—the Chemical Corps could lead the chemical, biological, radiological, and nuclear (CBRN) mission-planning fight on Android Tactical Assault Kit (ATAK) devices through a central repository of approved mission templates.

An ATAK in use in the field

Mission planning for CBRN missions currently involves pen and paper; dismounted reconnaissance sets, kits, and outfits; laptops; and other government-furnished equipment. The process for achieving continuous improvements in dismounted reconnaissance sets, kits, and outfits and other government-furnished equipment could be more robust. The dynamic nature of real-world multidomain operations necessitates proactive solutions that enable a flexible and continuous iterative process of systems to support CBRN missions.

The Chemical Corps could create a repository of mission templates that the force could field through the ATAK ecosystem. Mission results could be reported back to the Corps, and the Corps could learn from and iterate those results. This would create a continuous, iterative loop process decentralized to the unique mission context of each unit and doctrinally sound mission planning at scale.

Mission Planning Today

The Chemical Corps stands to gain an edge during the transition to multidomain operations in the large-scale combat operations of tomorrow. As focus shifts and doctrine is updated, current systems and processes must be able to adapt to the rapid changes of the battlefield. Efforts to address any shortfalls must include bridging gaps, enhancing readiness, and providing input for modernization efforts. The U.S. Army Combat Capabilities Development Command Chemical Biological Center, Aberdeen Proving Ground, Maryland, and the Defense Threat Reduction Agency, Fort Belvoir, Virginia, have published ATAK plugins for weather, navigation, and sensor support in CBRN environments.[2] While these efforts support the advancement and distribution of technology and tactics, techniques, and procedures, we can and must complete iterations at a faster pace.

The feedback loop for redesigning missions for hazard assessment platoons and other CBRN mission-focused entities is time-consuming and costly. Inefficiencies in adapting to change could have detrimental effects on our force. More quickly bridging the feedback loop could potentially result in more qualitative and quantitative data.

Failure to rapidly adapt doctrine and tactics, techniques, and procedures can be illustrated by the recent conflict of the second Nagorno-Karabakh War. Zhirayr Amirkhanyan's paper on the conflict highlights the devastating effect that Azerbaijan's integration of drone warfare technology had in both the air and ground domains of the conflict,[3] as Armenian forces failed to adapt to the new drone tactics, costing them crucial resources.

The Dragon Cave Solution

The concept of a "Dragon Cave" repository for CBRN mission planning is modeled after software package repositories. Units could access doctrinally sound mission templates that they adapted and executed, and then they could send the results back to the repository, where they would be reviewed and data would be adjusted to improve the templates. This

repository would ideally be maintained by the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS). As the U.S. Army continues to move toward data-centric operations, the Chemical Corps could leverage this emerging technology to gain a tactical edge from the field and deliver it to the wider Army.

For this concept to be successful, ATAK devices must be distributed to CBRN units. This would result in easy access for adapting doctrinal mission planning templates to their specific mission context. Features envisioned in this approach include the ability to track Soldier vital signs, Internet of Things-enabled self-contained breathing apparatuses, and CBRN equipment to enable real-time tracking and logging of mission metrics. Soldiers could connect to the broader Internet and send the mission metrics to a central source for review.

An artificial intelligence (AI) machine-learning model could be trained to review mission metrics and develop various performance optimizations and predictions. For example, based on a Soldier's fitness score, vital signs, distance walked, equipment carried, and stress indicators, an AI model could predict how long Soldiers of similar builds could function in self-contained breathing apparatuses and determine what equipment they could carry. For mission planning purposes, this data could help USACBRNS and other key stakeholders determine which devices to employ for what mission sets, how the devices operate, and the success rates of equipment down the line. From a logistical point of view, depending on upcoming missions and projected unit support for decontamination, the amount of fuel, water, and other resource support that a CBRN unit may need could be predicted.

The Dragon Cave could summarily unlock the future of CBRN mission planning and operations through data, which would then be distributed across units, commands, and USACBRNS to inform, support, and enable mission success. Continuous iteration and feedback would result in better products, which would directly impact Dragon Soldiers across all components.

Adaptive Mission Planning

Not all missions are the same across all contexts. One key Army concept involves empowering junior leaders, allowing them to adapt to changing conditions. While a central repository would provide a sound building block, Dragon leaders must still make command decisions that best suit mission requirements; conditions and situations vary across components and unit types.

Adaptability hinges on the critical thinking of officers, warrant officers, and enlisted Soldiers across the force. These Soldiers can be further enabled through possible suggestions (based on their current mission requirements) and AI learning models (based on historical data, including terrain, mission type, and Soldier information). A key feature of ATAK and its decentralized nature is that units could continue to function if they found themselves in a denied, degraded, or disrupted operational environment.

As mission data is returned to the Dragon Cave, a team could set up a pipeline to extract and transform data and train an AI model to improve templates and predicted mission success. These new mission templates would then be reviewed and approved by USACBRNS. Following the review stage, a new pipeline could be initiated and the mission templates could be uploaded, where they would then become available to all units.

Challenges and Considerations

Potential challenges and limitations abound with emerging technology. Some challenges associated with the concept of a central repository for CBRN mission planning include designating a central organization to maintain software, designating the approval authority for doctrinally sound mission templates, and managing the costs of devices to units. These challenges are not the sole responsibility of any one echelon; together, organizations are beginning to address the challenges across the Army and, more importantly, the DoD.

TAK implementation across the force is currently limited. The building blocks of the ecosystem continue to evolve and become prepared for wider distribution. Implementation of the Dragon Cave concept would also require that Soldiers be trained on the use of ATAK devices.

Designation of the appropriate organization for creating and maintaining the software is another challenge. With the help of organizations such as the U.S. Army Futures Command, possible solutions can be prototyped. These prototypes could then be used to help develop a longer-term solution. The current sensor suite upgrade package for the Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV)[4] is an excellent example of how the acquisition process can evolve to quickly and efficiently meet new requirements.

Another challenge is the central authority approval of doctrinally sound CBRN mission templates. USACBRNS recently opened a professional forum in which leaders and Soldiers across the force can ask subject matter experts questions on various CBRN-focused topics. USACBRNS stands to lead the way in data-centric mission planning, with a continuous feedback loop to improve and iterate doctrine.

Lastly, implementation costs money and time. Deciding how many devices are required and purchasing them for each unit necessitates further study of the most cost-effective means for these purchases. Training on the use and maintenance of the equipment and mission templates requires time. These challenges are not unique to the CBRN community.

Conclusion

The possibility of a Dragon Cave repository of mission templates could be an incredible win for the Chemical Corps. Leaning forward with regard to emerging technology in the face of the transition to large-scale combat and multidomain operations enables the Chemical Corps to lead a data-centric approach that aligns its strategies and unit

missions with operational data. With a central authority of doctrinal truth and coordination, future CBRN leaders will be able to more quickly adapt to missions with more understanding and, ultimately, with more lethality. The Chemical Corps must start and complete this innovative initiative to overmatch and win tomorrow's fight.

Endnotes:

[1]Christopher Kiley, "ATAK in the Field: Forging a Tactical Edge," Defense Visual Information Distribution Service (DVIDS), 15 April 2024, <https://www.dvidshub.net/news/367459/atak-field-forging-tactical-edge>, accessed on 20 March 2024.

[2]Ibid.

[3]Zhirayr Amirkhanyan, *A Failure to Innovate: The Second Nagorno-Karabakh War*, 2022, <https://press.armywarcollege.edu/cgi/viewcontent.cgi?article=3133&context=parameters>, accessed on 20 March 2024.

[4]Shawn Nesaw, "NBCRV Sensor Suite Upgrades Draw Praise from CBRN Stakeholders," U.S. Army Combat Capabilities Development Command Chemical Biological Center, <https://www.cbc.devcom.army.mil/solutions-newsletter/nbcrv-sensor-suite-upgrades-draw-praise-from-cbrn-stakeholders/>, accessed on 20 March 2024.

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