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The mission of the RQ-7B has changed radically since 2003, when unmanned aircraft system (UAS) ownership shifted from Military Intelligence (MI) to Army Aviation. Instead of passive observation, RQ-7B operators must now acquire active scout-reconnaissance skills. Initial training takes place at Ft. Huachuca, AZ, the Army's main MI installation. Operators then report to their unit, usually a Brigade Combat Team (BCT). This research focused on (a) type training received at the schoolhouse (MI/scout-reconnaissance), (b) training received at the BCT, and (c) opportunities for training. It was found that schoolhouse training still was primarily MI, (e.g., image analysis and vehicle identification). Interviews with BCT staff officers identified 10 critical scout-reconnaissance skills not trained in the schoolhouse. These required additional training, mostly on the job in the unit, because opportunities for scout-reconnaissance training at home station were limited. The research concluded that more scout-reconnaissance training should take place at the schoolhouse.

The RQ-7B configuration of the Shadow is a 380 lb aircraft, with a 14 ft wingspan. It is powered by a 38 hp Wankel rotary engine, can operate at altitudes up to 14,000 ft., has a range of over 200 mi, and an endurance exceeding 5 hr. As part of the shift of its mission to aviation, RQ-7Bs are being retrofitted with laser target designators to supplement the electro-optical and thermal vision devices that comprise the mission payload (U.S Army Roadmap for UAS, 2010-2035, p. 76). Shadow currently is a Brigade level asset and located within the Special Troops Support Battalion, Military Intelligence (MI) Company of both light and heavy Brigade Combat Teams (BCT).

The original mission of the RQ-7B Shadow UAS was intelligence, surveillance, and reconnaissance, (ISR), in which the air vehicle operator (AO) and mission payload operator (PO) proceed to predetermined coordinates, observe and report on activities within this area, and await instructions to proceed to another location or return to base. Since 2003, the mission has changed considerably to one of scout-reconnaissance more similar to missions flown by manned Army scout helicopters, such as the OH-58D. The scout-reconnaissance mission differs from ISR in that the AO and PO play a more active role in its execution, for example, they may be directed to actively search on either side of a roadway to determine if a convoy's route is free of potential threats. If threats are detected, they are reported to the Tactical Operations Center (TOC), which relays the information to a ground commander or the crew of an OH-58D armed helicopter. For manned-unmanned operations, the RQ-7B operators could report the target coordinates directly to the crew of the OH-58D. In short, the RQ-7B is no longer a data collection platform, but a pilotless scout aircraft.

The current research effort was initiated at the request of the Training and Doctrine Command (TRADOC) Capabilities Manager-UAS (TCM-UAS). That is, it was unclear at the outset to what degree RQ-7B aircrews were trained to execute scout and reconnaissance missions. With the emerging scout-reconnaissance role of RQ-7B, TCM-UAS was convinced that UAS operators must now be trained to think and act like scouts, whose role is active observation, interpretation, and reporting of potentially hostile activities in contrast to collecting ISR data for later imagery analysis. Given the apparent gap between the skills required to execute scout-reconnaissance missions and RQ-7B training, the current research effort was conducted to determine what aspects of the scout-reconnaissance mission could be performed by RQ-7B aircrews, and to identify how and where RQ-7B operators could be trained on the identified scout-reconnaissance skills. Little is known about the efficacy of scout-reconnaissance training for UAS aircrews. The bulk of the research literature has addressed training in the context of aircrew errors and their contribution to UAS mishaps (e.g., Thompson, Tvaryanas, & Constable, 2005), rather than tactical skills training.

A preliminary assessment of RQ-7B aircrew collective training, at the Joint Readiness Training Center (JRTC) at Ft. Polk, LA (i.e., Stewart Barker, & Bink, 2010) provided an inkling that collective training needs existed for the RQ-7B. The aggregate perspective of senior training personnel was that there were few opportunities for RQ-7B teams to train for scout-reconnaissance missions, with most missions at JRTC tending to be ISR. That research also underscored the need for a closer and more detailed look at both schoolhouse training and the actual employment of the RQ-7B in the BCT, while in theatre, and at home station.

Method

Identification of Scout-reconnaissance Skills for Cavalry Scout and OH-58D Pilot

The first step was to identify possible scout-reconnaissance skills for RQ-7B operators. To do so, programs of instruction (POI) for two Army career specialties (i.e., Cavalry ground scout and OH-58D Common Core and aircraft qualification Track Course) primarily engaged in the scout-reconnaissance role were analyzed. The skill sets in these three POIs were vetted by three subject-matter experts (SME), retired Army aviators familiar with scout and reconnaissance operations, for relevance to tactical employment of the RQ-7B .

Determining Relevance of Scout-reconnaissance Skills for RQ-7B Operators

The second step was to define the training-critical scout-reconnaissance skills for RQ-7B operators from the skills identified in the first step. A list of 25 critical scout-reconnaissance skills derived from analyses of the POIs were determined by SMEs to be relevant to RQ-7B missions. These were incorporated into an interview protocol in which they were to be rated for criticality by respondents, from command positions within a BCT, and in leadership positions within an RQ-7B platoon.

Determining the Most Critical Scout-Reconnaissance Skills for RQ-7B Mission

Assessment of these two dimensions of criticality (i.e., skill importance and operator preparedness) came from structured interviews with nine operational unit primary staff officers

(Lieutenant Colonel though Captain) at three BCTs located at their home stations, and six principal members of two RQ-7B platoons from two of these BCTs (Warrant Officer 2 /Sergeant First Class/Specialist 4). BCT officers' and platoon members' input was used to identify and rank order the most critical scout-reconnaissance skills for RQ-7B aircrews. In each structured interview, two researchers presented each set of 25 skills to respondents and recorded their verbal responses. In general, there were few disagreements in the records of each researcher. In those instances of disagreement, the first author resolved the discrepancy after reviewing the audio record. In particular, responses to the interview question for, "What additional training do (aircrews) receive at the unit to support this skill?" were used to indicate training gaps, and responses to the interview question for, "What additional training is required (beyond current) to prepare (aircrews) for this skill?" were used to indicate how the critical scout-reconnaissance skills might be trained. **"**Training critical" skills were defined as those skills deemed by respondents to be of high importance and for which UAS aircrews were perceived as being poorly prepared to perform (requiring additional training) when reporting to the unit (BCT).

Determining How Scout-Reconnaissance Skills are Trained in the Schoolhouse

The final step was to determine (a) if the identified critical scout-reconnaissance skills, ascertained from the scout POIs and structured interviews, were trained in the schoolhouse (b) if they were, then how these critical skills were trained, and (c) if not, what scout-reconnaissance skills actually were trained. To accomplish this, a qualitative analysis of schoolhouse training POIs (UAS Common Core and [RQ-7] Shadow Operator) was conducted. The training program was also examined to determine the training environment (i.e., classroom, simulator or aircraft, or field exercises).

Results and Discussion

Relevance of Cavalry Scout and OH-58D Pilot Skills to RQ-7B

The Ground Cavalry Scout and IERW OH-58D(R) Track Courses include not only target detection and recognition, but also practical hands-on training and application in reconnaissance techniques for area and route reconnaissance missions. These missions resemble those that RQ-7B aircrews would execute. Skills trained for these missions were further analyzed for application to RQ-7B. Importantly, one of the 25 mission-relevant skills was not included in any of the reviewed POIs but was mentioned as important by TCM-UAS and SMEs, as well as most of those BCT officers interviewed. This non-POI skill was Tactical Operations Center (TOC) operations.

Ten Most Training-Critical Scout-Reconnaissance Skills for RQ-7B

Of the total 25 scout-reconnaissance skills previously identified, 10 were distinguished as most critical in terms of being ranked high in importance and low in preparedness across all respondents. These critical scout-reconnaissance skills appear in Table 1 below.

Table 1

Scout-Reconnaissance Skills Rated as Most Critical by Respondents

Skill Areas
Tactical Operations Center (TOC) operations.
SPOT and SALUTE reports (size, activity, location, uniform, time and equipment).
Actions on contact.
Target handover (visual/non laser).
Fundamentals of security.
Fundamentals of reconnaissance
Aerial observation
Downed aircraft recovery operations
UAS integration into the BCT
Laser target handoff to the ground.

Respondents were also asked what additional scout-reconnaissance training supporting these critical skills RQ-7B operators received when reporting to the unit. A glance at Table 2 shows that the bulk of the responses concerned training at the Combat Training Center (e.g., JRTC), formal training drills in the unit, and on the job training at the unit level, most while deployed in theatre. Two mentioned schoolhouse, even though the question was about unit training. When asked what additional training is required beyond that currently available, the modal responses, as evidenced in Table 3, are formal unit training and training in the schoolhouse. It appears that respondents believed that the schoolhouse should incorporate a greater share of the burden for scout-reconnaissance training. In brief, it seems that Table 2 reflects the *current* status of RQ-7B training, whereas Table 3 implies the *preferred* status of this training.

Table 2

Response Frequencies for Additional Types of Training Currently Received on Ten Critical Skills

Type of Training			
On the Job	Formal Unit	Combat Training Center	Schoolhouse
19	22	27	2

Table 3

Response Frequencies for Additional Types of Training Required Beyond Current Training on Ten Critical Skills

Type of Training			
On the Job	Formal Unit	Combat Training Center	Schoolhouse
4	10	2	10

How Critical Scout-Reconnaissance Skills are Trained in the Schoolhouse

The UAS Common Core POI included instruction in a classroom environment on the principles of Reconnaissance, Surveillance and Target Acquisition (RSTA) which comprised lessons in map reading, operational terms and graphics, UAS employment in military operations, introduction to tactical imagery intelligence, intelligence preparation of the battlefield, and associated exams. These tasks cannot be defined as scout-reconnaissance, in the context of Army Aviation RSTA operations, in which aircrews must play an active role in developing the situation once a target has been identified.

Common Core also included instruction, in a classroom environment on skills and knowledge needed to interpret UAS electro-optical and infrared video to provide detailed and rapid feedback on the status of enemy targets, significant activities, and areas of interest. The module also contains lessons on imagery identification techniques, positive battle damage assessment, and positive identification of a variety of Soviet era military equipment.

The Shadow UAS Operator Course is focused on RQ-7B-specific training, which includes overviews of unmanned aircraft operator/payload operator systems, simulator and air vehicle flight, and a field capstone exercise. Scout-reconnaissance training is not documented in the POI for this course. According to the Common Core and Shadow Operator POIs, none of the five primary scout-reconnaissance skills (i.e., TOC operations, SPOT and SALUTE reports, Actions on Contact, Target Handover, and Fundamentals of Security) were consistently trained in any systematic way in the schoolhouse, and it was difficult to discern exactly which of these skills were taught in the simulator.

Conclusions and Recommendations

Training at the UAS Training Battalion (UASTB) at Fort Huachuca, AZ still maintains a heavy MI orientation even though it has been eight years since Proponency for UAS passed from MI to the Army Aviation Branch. As a consequence, some skills required by the scout-reconnaissance deployment of the RQ-7B were not included in the schoolhouse training of RQ-7B aircrews. Of the 25 scout-reconnaissance skills identified as relevant to RQ-7B aircrews, ten were determined to be critical to the training of aircrews. In the absence of schoolhouse training, it was the task of the unit to train aircrews on the identified scout-reconnaissance skills. The absence of schoolhouse training on critical scout-reconnaissance skills imposed the onus on the RQ-7B platoon because opportunities for unit-level training often did not present themselves prior to deployment to theatre or to live exercises, such as JRTC.

One statement by interview respondents (i.e., BCT staff officers) and supported by POI analyses summarized one issue with schoolhouse training as it now exists. The RQ-7B aircrews are trained as image analysts, not as scout-reconnaissance aircrews. This perception was evidenced by the extensive classroom training on map reading, tactical military intelligence, identification of Soviet era combat vehicles, and the analysis of electro-optical imagery. The lag in organizational cultures in which an MI climate still persists in the schoolhouse phase of RQ-7B training was documented by this research effort. A qualitative analysis of the schoolhouse program showed that little of the current training is optimized for the current scout-reconnaissance role of the Shadow UAS operators. There was widespread consensus among

BCT and RQ-7B platoon respondents that a portion of the scout-reconnaissance training burden that currently rests with the unit can be trained successfully in the schoolhouse.

Beyond the current research, additional issues need to be addressed, one of which is the increasing importance of manned-unmanned missions. In manned-unmanned missions, both manned and unmanned aircrews will have to coordinate and communicate for the scout-reconnaissance training topics covered in this report. This type of teaming will involve the acquisition of new skill sets by both UAS and manned aircraft communities. Aircrews will not only have to become proficient at scout-reconnaissance tasks, but each type of aircrew must understand their respective roles, capabilities, and limitations.

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