Students Evaluate Prototype Course through conducting Technology Readiness Assessment for GMU RPRC

A Professional Readiness Experiential Program (PREP) Project Effort

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Interested in being an Industry Participant and or PREP Sponsor? Please reach out to bngac@gmu.edu, Thanks!

Introduction

George Mason University's proximity to Washington, D.C. creates a strong workforce pipeline into government contracting. To support this mission, the **Rapid Prototyping Research Center (RPRC)** offers experiential programs that expose students to real DoD contracting structures, capability development, and mission engineering frameworks used to evaluate emerging technologies.

The Assessment Methodology, Mission Engineering, and Mission Analysis course aligns student training with DoD innovation pathways, specifically the **T-REX campaign**, which addresses the "valley of death" between prototype creation and operational deployment. This course introduces the same analytical rigor used to determine whether a system is fieldable, scalable, and mission-aligned which are critical skills for government contract analysts.

To strengthen this new course, PREP students were tasked not only with **participating** but also **evaluating** instructional quality, pacing, content clarity, and hands-on value. The **DJI Mini 3 drone assessment** served as the applied testbed to translate methodology into operational practice.

Course Evaluation Objective

The objective of this project was not only to learn the course material, but also to actively assess the effectiveness of the course itself. Students were encouraged to think both as learners and as evaluators, identifying strengths in instruction as well as areas requiring refinement before the course can be fully deployed to future cohorts. Throughout the semester, students followed self-guided lecture materials and met weekly with the instructor for structured review. Working toward the same standards used in defense contracting assessments, they produced formal documentation including a COI Data Trace Crosswalk, an Assessment Execution Document, and performance evaluation notes tied to Measures of Effectiveness, Measures of Performance, and Technology Readiness Levels. During the length of this course, students:

1. Assessed whether the course effectively teaches federal assessment methodology
2. Identified instructional strengths and gaps before full deployment
3. Recommend improvements to boost engagement, real-world relevance, and course clarity
4. Evaluate their own confidence and skill development in mission engineering
5. Provided feedback on how well the course prepares students for DoD career roles

Business Challenge

To better train future assessors, the RPRC sought to refine its current **Assessment Methodology, Mission Engineering, and Mission Analysis** course. The course needed structured feedback, improved materials, and recommendations for scalability. The goal was to create a more polished and deployable training program that effectively teaches the T-REX process. Rob Brake and the RPRC tasked PREP students with:

- Completing the course while evaluating its effectiveness,
- Applying the methodology to a physical platform (DJI Mini 3),

- Recommending improvements for instruction, pacing, hands-on integration, and assessment structure.

Activities Done to Address the Business Challenge

In addition to the weekly discussions with Rob Brake and the self-guided slide decks, the course culminated in two field assessments of the DJI Mini 3, testing both the students' understanding and the drone's operational capability. These evaluations were supported by professionals from Parsons, who provided equipment, flight facilities, and practical testing guidance. The field exercises proved to be the most impactful component of the semester, as students were required to translate classroom theory into real outcomes such as developing test plans, executing operational procedures, collecting data, and providing informed analysis based on actual results. The drone assessment experience also created valuable opportunities to interact with industry partners, offering a realistic example of communication between assessors and technology operators, something that traditional exams cannot replicate.

To further reinforce conceptual understanding, students executed per-preparations and post analysis for the **field assessments of the DJI Mini 3** across multiple Technology Readiness Levels (TRLs). Activities included:

- Developing COIs, MOEs, and MOPs
- Completing an Assessment Execution Document (AED)
- Conducting post-flight debriefs and documenting findings

These applied exercises gave students the opportunity to transition from theory to hands-on mission engineering.

Results & The Positive Impact

The two field assessment sessions were conducted in late October and November due to the support from **Brian Ngac and Stephen Thomas of Parsons Technology**, who provided drones, flight space, safety support, and technical guidance. The flight assessments offered significant educational value:

- Students practiced the same documentation and evaluation processes used by defense contractors.
- They gained firsthand experience interacting with prototype operators and understanding constraints in real testing environments.
- The DJI Mini 3 provided an accessible, low-risk platform for learning imaging evaluation, airspace considerations, safety protocols, and usability metrics.
- All students reported in their course evaluations that the field assessment dramatically improved their understanding of T-REX methodology.

Overall, the hands-on drone evaluation proved more impactful than a traditional written exam because it required students to synthesize methodology, adapt to real conditions, and defend findings.

After completion of the course, the students put together a list of recommendations for its future improvement. The goal of the recommendations was to make the course more suited for newcomers to Assessment Methodology. They identified areas of friction, then gave examples of relevant solutions that would help future students. Rob Brake was appreciative of the students' findings and had already identified many of the same friction spots himself. As an impact on the course, he said that he hopes to work with PREP students in the future implementing the solutions for the next iteration of the course.

Conclusion

Overall, students on the course substantially improved students' understanding of DoD assessment methodology. They gained confidence in working with government-style documentation, learned the foundational structure of mission engineering, and saw firsthand how assessment frameworks support decision-making in defense acquisitions. At the same time, students identified opportunities to improve the course before it becomes a permanent part of the RPRC curriculum. Some instruction modules introduced advanced terminology without supporting examples, which made the learning curve steeper than necessary. Workload pacing within the self-guided format occasionally felt overwhelming, especially when deliverables like the AED were introduced without a clear early breakdown of expectations. Students also felt the hands-on component occurred too late in the semester and recommended integrating smaller field-related activities early on to reinforce concepts as they are introduced.

Despite these challenges, the course clearly achieved its primary goals. It enhanced technical communication skills, strengthened understanding of capability evaluation, and demonstrated how GMU contributes to real federal contracting efforts. Most importantly, it sparked student interest in pursuing more advanced work in mission engineering, aerospace technology, and defense assessments. As one student summarized in reflection, the course "made abstract contracting concepts tangible" by showing how operational results and mission needs shape whether a technology ultimately succeeds or fails.

In conclusion, this pilot version of the Assessment Methodology course delivered high educational value and aligns closely with the mission of the RPRC and the needs of the defense contracting workforce. With revisions to content clarity, pacing, and earlier hands-on integration, the course has strong potential to become a scalable foundational training program for PREP students and other engineering cohorts across George Mason University. The DJI Mini 3 assessment played a critical role in validating the course structure and demonstrated that experiential learning is essential in preparing students to support national security innovation.

PREP Student Reflection

Liam Patrick - This was one of my most interesting courses at GMU, and it was applicable to many of my other classes. Another one of my Fall 2025 classes was a Government Contracting elective, and these two courses built on each other in a way that helped me learn in both. In an area as dense with Federal contracts as Northern Virginia,

Tanuj Kunwar - This course felt incredibly valuable because it aligned closely with how assessments are really conducted in government contracting environments. Having experience in both contracting and supporting engineers, I recognized similar documentation, evaluation steps, and decision-making processes we used. It made the learning feel immediately relevant to the work I want to pursue.

Dylan Argandona - I never realized how much analysis goes into approving even a small system like a drone. Now I have a much better sense of how complex government acquisition actually is.