



DAPRA Surgical Competition
FAQ
October 20, 2026
Version 1.0



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1. Glossary of Terms

Term	Definition
DSC	DARPA Surgical Competition
GFE	Government Furnished Equipment
GFI	Government Furnished Information
IV&V	Independent Verification and Validation
NDAA	National Defense Authorization Act
PPE	Personal Protective Equipment

2. Frequently Asked Questions

Question: Can the system demonstrated for qualification differ from the one used in the January competition, and can our whitepaper describe the future system?

Answer: Yes, this is permissible, provided the changes involve acquiring new systems rather than developing entirely new ones. The system shown in the qualification videos must be similar and representative of the intended platform. If you plan a significant pivot to a completely different system, you must first request permission from the DSC Team.

Question: Are demonstrations of the Component Gates required for the qualification process?

Answer: No, demonstrations of the Component Gates are not required for qualification. The Gates are assessments conducted during the workshop and competition events in January and March. The qualification process requires the submission of a whitepaper and short videos demonstrating your robotic system's capabilities. For precise guidance, please consult the official qualification guidelines.

Question: What are the design requirements for the surgical robotic system?

Answer: There are no specific restrictions on the underlying design, architecture, or mechanical approach of the system. However, all systems must adhere to the size, power, and safety constraints detailed in the "Technical Requirements" section of the Official Rules Document.

Question: Will survivability or medical outcomes be assessed?

Answer: Medical outcomes are assessed to a limited extent. For example, tissue damage is a scored metric. The surgical phantoms can simulate bleeding that must be controlled, but they do not have vital signs, so physiological outcomes are not measured. The assessment focuses primarily on surgical skills, procedural completion, and minimizing tissue damage.

Question: Is passing a tool a minimum requirement for the Component Gates?

Answer: Each Component Gate and Lane has a distinct set of minimum requirements. Please refer to the Official Rules Document for detailed criteria for each specific Gate.

Question: How many surgeon proctors will be involved in the assessments?

Answer: Multiple surgeon proctors will assess the systems during the Gate and Lane evaluations. We are dedicated to reducing scoring subjectivity through scripted procedures and outcome-based scoring.

Question: Will the assessment procedures be based on the provided data, or will they contain unknown elements?

Answer: The purpose of the Component Gates is to build proficiency for the full Procedure Lanes. The tasks in the Gates are directly related to the skills needed for damage control surgery. The procedures in the Lanes will be composed of injury patterns shown in the GFI datasets. The only unknown element will be the specific skill that must be mastered in the Rapid Learning Gate 3A.

Question: Is there an expectation for robotic systems to match the designs shown in the briefing slides?

Answer: No. The images used in presentations are for illustrative purposes only and are meant to convey the concept of an autonomous robotic trauma surgeon. There are no design requirements for a specific type of robotic system, and we welcome novel and unique solutions.

Question: Can a team revise and resubmit its qualification package after a rejection?

Answer: Yes, but any resubmission following a rejection must contain substantial changes to be considered for re-evaluation.

Question: How realistic will the surgical assessment scenarios be?

Answer: The assessments will be conducted in a simulated operating room environment. This includes standard surgical lighting, sterile drapes, and the use of Personal Protective Equipment (PPE). The procedures will involve relevant open trauma surgeries on a patient phantom with realistic battlefield injury patterns.

Question: Will a list of possible surgeries and standardized instruments be provided?

Answer: Yes. The Government Furnished Information (GFI) datasets will detail the possible surgical procedures you will be asked to learn. A standardized list of surgical instruments will also be provided to all teams.

Question: Are robotic systems developed outside of the United States eligible to compete?

Answer: Yes, non-U.S. based teams are allowed to participate. However, hardware and components from Chinese companies listed in Section 1260H of the National Defense Authorization Act (NDAA) are strictly prohibited. Please review the Official Rules Document for further guidance on this matter.

Question: What types of injuries will be featured in the assessments?

Answer: The injury patterns used in the assessment lanes will be representative of battlefield trauma.

Question: How will teams know if they are packing the abdomen correctly?

Answer: The assessment phantoms are high-fidelity models that simulate blood flow and realistic injury patterns. During the Collaborative Lane, a human lead surgeon will direct the surgical flow and determine if a task is completed correctly. In the Independent Lane, the robotic system will need to make its own clinical decisions based on feedback from the phantom, such as stopping simulated bleeding, to determine if a procedure has been performed successfully.

Question: Will medical support staff be present during the scenarios?

Answer: During the Collaborative Lane procedure, a surgical technician will be present to provide back-table support to the human lead surgeon. The evaluation will focus on the collaboration between the robot acting as the first assistant and the human lead surgeon. The robotic system will not be expected to perform the duties of a scrub nurse or back-table technician.

Question: Will the robot be controlled by verbal or non-verbal commands?

Answer: Each evaluated step in the Collaborative Lane will be initiated by a verbal command from the lead surgeon to the robotic system.

Question: How will Lane 1 (Collaborative) and Lane 2 (Independent) differ from each other?

Answer: Both lanes will use the same surgical phantom, take place in the same simulated operating room, and involve a full damage control surgery procedure based on a battlefield injury. The primary difference is the robot's role. In the Collaborative Lane, the robot will function as a first assistant to a human surgeon. In the Independent Lane, the robot will execute the procedure autonomously. During the Independent Lane, a human surgeon proctor will be available to intervene and advance the procedure if requested, though no points will be awarded for any step completed by the proctor.

Question: Will different tasks be scored or weighted differently?

Answer: A detailed scoring rubric, including the weights for all required tasks, will be provided to teams before the assessments.

Question: Can teams attempt a task autonomously and then switch to teleoperation if the autonomous attempt fails?

Answer: For the physical capability gate (Gate 2A), teams may attempt tasks multiple times within the time limit, and only the highest scores will be recorded. This allows for both autonomous and teleoperated attempts. For the full procedure lanes, teams may attempt a task autonomously first and then revert to teleoperation, provided no tissue damage has occurred that would make another attempt impossible. All procedural steps must be completed in a linear sequence; it is not possible to go back to a previous step to re-attempt it.

Question: Will the assessments focus on clinical outcomes or mechanical capabilities?

Answer: The assessments will primarily evaluate the capabilities of the robotic systems, including their ability to assist a surgeon and complete surgical tasks. Because the phantoms do not have vital signs, the patient's physiological response is not measured. However, clinical factors are considered through metrics such as monitoring tissue damage and controlling the simulated bleeding system.

Question: Will a Government Furnished Equipment (GFE) robotic platform be provided for the competition?

Answer: No, the government will not provide a robotic platform. We are seeking novel solutions and do not wish to constrain design innovation.

Question: What is the maximum footprint allowed for each system?

Answer: Teams will be allocated a 12×12 foot square area on one side of the operating table. Additionally, systems in their packed configuration must be able to fit through standard-sized doorways and hallways to access the assessment areas. Teams will be given a full day prior to the assessments for installation and setup. Please refer to the diagrams in the Official Rules Document for a visual depiction of the allowed space.

Question: May teams use their own custom surgical end-effectors instead of manipulating conventional surgical instruments?

Answer: Yes, we are not restrictive on design choices and welcome novel solutions. Systems that have surgical tools integrated directly into their end-effectors are an allowable design choice. There is no requirement to use general-purpose grippers to manipulate conventional tools.

Question: Are teams required to use instruments provided by the IV&V team, or can they use their own custom end-effectors?

Answer: To complete surgical tasks, teams may use either their integrated surgical end-effectors or the provided conventional surgical instruments. Both methods are permissible for attempting a task.

Question: For the Gate 2A task described as “tool grasping and passing,” does this specifically require the manipulation of a separate surgical instrument?

Answer: Yes, for Gate 2A, the task of “tool grasping and passing” refers to the manipulation of a separate, human-used surgical instrument. An example scenario is a lead surgeon asking the robotic assistant to hold a tool while they perform another action. Please note that “tool grasping and passing” is one of several surgical primitives in Gate 2A and is scored equally with the others.

Question: What is the policy regarding internet access during the competition?

Answer: All systems will be required to operate on a closed competition network. Teams are permitted to have workstations to connect to their robot, but these must be located locally within the 12×12 foot footprint inside the operating room. All control and computation for both teleoperation and autonomy must originate from resources within this local setup and on the closed network.

Question: Is there a penalty for system latency?

Answer: Speed is a scored metric for every Gate and Lane. Trauma surgery is inherently time-sensitive, so speed is a critical factor for a successful robotic trauma care system.

Question: How should we document planned hardware changes that may occur after the qualification deadline?

Answer: Please include all potential or planned hardware changes in your whitepaper submission. If these alterations are not yet finalized, describe them as such and explain any risks associated with the potential pivot.

Question: What is the approval process for hardware design changes made after the October 30th qualification deadline?

Answer: Please communicate with the DSC team about any hardware changes made after October 30th by contacting us at the official program email address. We will likely schedule a video conference to discuss the impact and reasoning behind the changes. Our primary goals are to ensure your new design remains compliant with safety guidelines and rules, and to verify that your development timeline remains realistic for the competition schedule.

Question: Does the qualification packet need to demonstrate the system's medical knowledge, as assessed in Gate 1?

Answer: No, a demonstration of medical knowledge is not required for the qualification submission. All component-level tests, including Medical Knowledge Gate 1, will only be assessed at the workshop and competition events in January and March. However, the "Autonomy" section of your whitepaper would be an appropriate place to describe your plans for assessments that require autonomy. Please follow the detailed instructions in the Qualification Guide posted on the competition website.

Question: Can a team manually interact with their robot to exchange tools / end-effectors during an assessment?

Answer: Yes, teams may manually interact with their robot to exchange / swap tools and end-effectors during an assessment. Teams will need to clearly communicate to the proctor they are performing a manual exchange. Please note that manually exchanging tools does deduct points from the maximum possible for autonomous control.