Qualification Guide
Workshop 2
November 28, 2024

Contents

1 Introduction

This document describes the Event Qualification guidelines and submission instructions for the DARPA Triage Challenge (DTC). Prospective teams are required to demonstrate track-appropriate performance capabilities to be eligible for event participation.

All teams in all three competitions (Systems, Virtual, and Data) are required to complete Team Qualification at the beginning of each Phase to officially participate in the DTC as a competitor. All teams are also required to complete Event Qualifications to participate in each workshop event and competition event.

This document will cover the Event Qualification requirements for the Workshop 2 Event (see Figure 1). Later revisions will include updated Event Qualification requirements for Phase 3.

Failing a previous qualification attempt does not preclude a team from resubmitting a qualification submission for later events. This document is subject to change and may be superseded by later versions. The latest official versions of all documents will be posted to the DTC website.

Significant revisions from past versions in this document are indicated by blue text. Teams are encouraged to closely review the entire document. To qualify for Workshop 2 teams that have participated in previous DTC events will be submitting updates to their team qualification rather than a completely new qualification.

2 Qualification Schedule

The three competitions each have a coordinated Workshop and Challenge Event in each phase. Qualification criteria are split into two parts; Team Qualification and Event Qualification. The Team Qualification window will take place at the start of each phase and the Event Qualification will occur prior to each event, approximately 6-8 months after Team Qualification.

Qualification submissions will be reviewed on a rolling basis and must be submitted no later than the listed deadlines to be eligible to participate in the events. DARPA will review the submissions and notify teams of qualification status within 10 business days after the qualification deadline. Teams are encouraged to submit their materials well in advance of the qualification deadlines. DARPA may request additional information or a teleconference with a team to discuss their submitted materials.
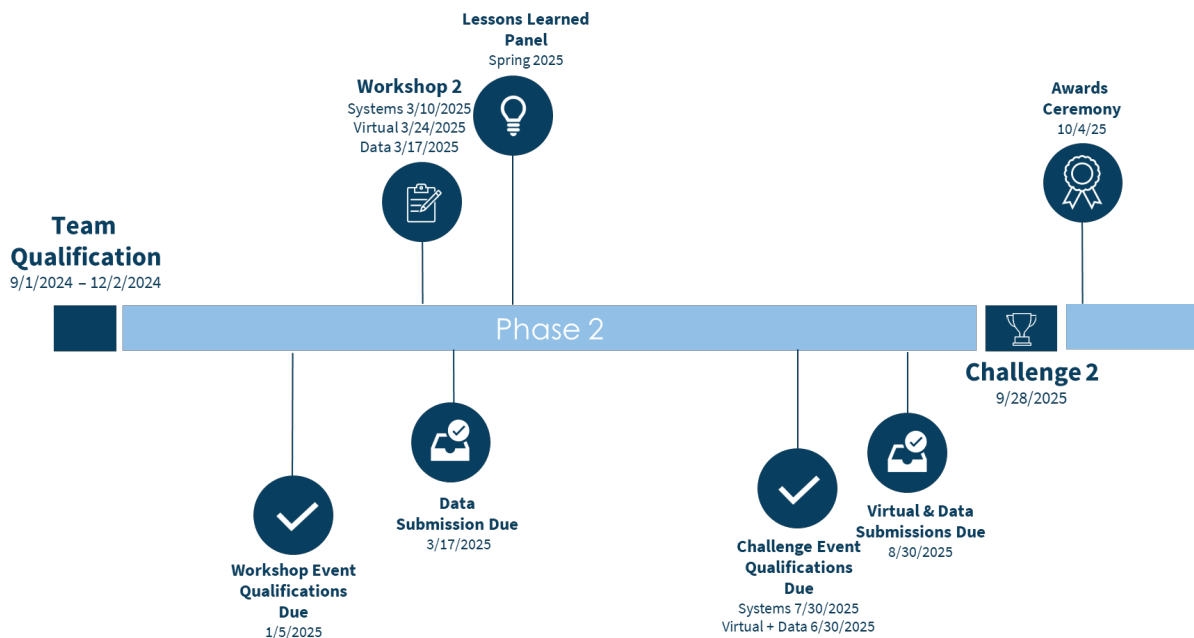

Figure 1: Competition Timeline. Dates for Phase 2 Event Qualification windows and Events. Phase 3 Qualification windows and Events will be released later.

2.1 Event Qualification Deadlines

Prior to each Workshop and Challenge Event, teams will be required to submit updated team narratives and demonstrations of successfully completing a series of qualification tasks to show

track-appropriate performance capabilities. All qualification materials must be submitted via the [DTC Team Portal](#).

Event	Event Qualification	Event Date
Workshop 1	3/5/2024 - 4/5/2024	6/3/2024 – 6/8/2024
Challenge 1	6/28/2024 – 7/30/2024	**Systems** 9/28/2024 – 10/5/2024 **DATA and Virtual** 8/30/24 - Submission 10/5/2024 - Awards
Workshop 2	12/5/2024-1/5/2025	3/9/2025-3/20/2025
Challenge 2	**Systems** 6/28/2025 – 7/30/2025 **Data and Virtual** 5/28/2025 – 6/30/2025	**Systems** 9/27/2025 – 10/4/2025 **Data and Virtual** 8/30/25 - Submission 10/4/2025 - Awards
Workshop 3	Winter 2025 /2026	Winter 2025/2026
Final Event	Summer 2026	Fall 2026

3   Human Subjects Research (HSR)

The use of data provided by DARPA for the DTC or collected by competitors at the Workshops and Challenge Events does not require HSR approval. However, any other use or collection of human subject data qualify as human subject research (HSR) and would require DARPA approval. Self-funded teams are not permitted to perform HSR as part of their involvement in the DTC because DoD supervision is not possible for teams not on contract. Self-funded teams should carefully consider this limitation and should take this into account when designing their technical approach, leveraging simulations as appropriate.

DoD Definition of Human Subjects Research

"Human use" protocols apply to all research that meets either of the following criteria:

1. Any research involving an intervention or an interaction with a living person that would not be occurring but for this research.

2. Any research involving data/information/specimens collected originally from a person(s) for whom his/her identity is known or can be ascertained from the collected data/information/specimens.

4   Systems Competition Event Qualification

To qualify for the Primary Triage System Competition, teams must complete a set of qualification tasks and submit an updated narrative description of their approach. Submissions will be reviewed for validity and qualifying competitors will be notified within 10 business days after the qualification deadline.

It is anticipated that **up to** 14 teams may successfully qualify for Workshop 2. DARPA will review all the materials submitted by the Event Qualification deadline before finalizing the number of qualified teams for the event.

4.1   Systems Narrative Description

DARPA will use the narrative description to evaluate the team's overall approach and potentially inform additional follow-up questions and/or tasks. The narrative description must include the following sections:

Part 1: Team Information

- Team Name
- Team Organization(s)
- Team Point-of-Contact (name, email, phone number)
- Team Roster, i.e., list of all team members, their affiliations and email
- Confirmation of addition to TATRC's research protocol
- Date of part 107 license or planned date of testing.

Part 2: Technical Approach (500 words max per subsection)

- **Experience:**
  - Note any relevant experience in autonomous operation of mobility platforms and/or stand-off sensing of physiological features
- **Mobility Platforms**
  - Platform types (UGV and/or **approved** NDAA-Compliant UAS) with specific models and components identified. Attach NDAA compliance tables for all UAS.
    - **NOTE**: the DARPA approval process takes several months and should be started as soon as possible
  - Number of platforms (teams may field up to 5 at a time)
  - Weight and size of platforms (maximum of 9kg and 1.5m per UAS)
  - Fuel or energy sources and expected continuous runtime
  - Details on FAA compliant lighting for nighttime operation
  - Names and Part 107 license status of all UAS pilots
- **Perception**
  - What stand-off sensors do you plan to use at Challenge 2; include the make and model (sensors onboard UAS are required to be NDAA 817 compliant)?
  - What features will the sensors be used to detect?
  - What is the minimum standoff distance capability (please see *DTC Competition Rules* for DARPA requirements for standoff distances)?
- **Autonomy** (1 human supervisor per platform type (i.e. UAVs and UGVs)
  - High-level software architecture for navigation and search

- Level of autonomy planned for workshop 2 and Challenge 2 (manual, semi-autonomous, fully autonomous).
- Part 107.35 and part 107.31 waivers you intend to apply for (if any). DARPA has obtained a 107.35 waiver for DTC events for 5 simultaneous UAVs, individual waivers within this scope are not necessary.
- Human operator interfaces
- **Data Transmission Method**
  - What networking solutions do you expect to use for communication between the platforms and the base station?
  - How will you keep the UGV network separate from the UAS network and maintain NDAA compliance of UAS?
- **Algorithms for Physiological Signature Detection**
  - Describe your plan for algorithms and list any existing software you will be building off of.
- **Algorithm Training Methods**
  - Discuss your intended training methods and what if any additional data you intend to use.
- **End User interface**
  - Hardware
  - Displayed features
- **Safety:** The course is expected to have a number of live actors and physical obstacles. Describe your approach and measures to ensure safety during your participation in the competition. Be sure to include descriptions of your approach to software emergency stops, hardware emergency stops, safety operators, and battery charging, monitoring, and storage.

4.2 Systems Qualification Tasks

4.2.1 Demonstration Videos
- Links to unlisted YouTube videos
- Short descriptions of each video (100 words max per video)

The demonstration videos must include at least the qualification tasks listed in Section 4.2.2 but may also include additional videos that the teams feel will support their submission. Demonstration videos are required for each different type of mobile platform. For platforms with multiple configurations (e.g., different payloads), teams may select a representative platform to use in all of the demonstration videos. Other variants of that platform type should be listed in the "Mobility" section of the narrative description. **If your teams' videos were accepted during Challenge Event 1, new videos only need to be uploaded for changes to hardware and software and night time flight.**

Based on the original submission, DARPA may choose to request additional demonstration videos, a follow-up teleconference, or in-person visit to a team's site. Teams should be prepared for possible visits, if needed. Only materials received by the qualification deadline will be considered.

Any significant changes in technical approach after initial qualification must be disclosed to DARPA and approved in advance of each event. Examples of significant changes could include different communications hardware, frequency bands, and/or platform hardware. DARPA may require additional demonstrations and/or safety inspections before a new platform type may be used in a competition event.

All qualification materials must be submitted via the DTC Team Portal. The narrative description should include links to any videos that are intended to be included as part of the submission. All videos should be posted to YouTube with the privacy setting set to "Unlisted." Narration of the videos is allowed.

4.2.2   Platform Tasks

4.2.2.1   UAS documentation and Lidar documentation

Teams must provide documentation of the country of origin of the selected UAS components and Lidar solutions for all systems. For each UAS provide photos or video documenting the components. These should include the sensors, gimbals, the ground control system, flight controller, radios, and motherboards. Angles should enable viewers to see the brand and the place of manufacture. If the place of manufacture is not visible on the components provide additional documentation for those components.

4.2.2.2   Emergency stop

Teams must demonstrate emergency stop capability for all mobile assets. All systems participating in the Systems Competition must utilize a complementary multi-tiered emergency stop system as described in the *DTC Competition Rules* document.

Tier 1 – Team Wireless E-Stop: All mobile platforms must have a remote emergency stop capability that can be activated through the team's base station and/or portable wireless transmitter. The Tier 1 E-stop transmitter must instruct mobile platforms within effective communication range to initiate a safe behavior.

Safety protocols dictate unique responses for Unmanned Ground Vehicles (UGVs) and Unmanned Aerial Vehicles (UAVs) upon activation of the E-stop signal. UGVs are mandated to immediately cease all movement and maintain a stationary position until manual control is resumed by the safety operator. UAVs are instructed to either execute a return-to-launch (RTL) procedure or sustain a hovering state until manual intervention from the safety operator is initiated, in either case they must come to rest by 60 seconds after the E-stop is triggered. UAVs are restricted from landing in their current location unless specifically directed by the safety operator. The emergency stop must include clear visual feedback of the mobile platform's safe, halted state (e.g., red LED). The emergency stop capability may be targeted to a specific platform but should also provide the functionality to rapidly render all platforms safe. A team must be able to render all platforms within communication range completely motionless within 60 seconds.

Tier 2 – Recovery Wireless E-Stop
The tier 2 E-Stop will be optional for UAVs but required for UGVs weighing more than 0.5kg. The module specifications and configuration guidelines for the Tier 2 E-Stop are detailed in the *Transponder and Emergency Stop Integration Guide*. DARPA will provide the module to teams.

Tier 3 – On-Platform E-Stop: Teams must integrate at least one physical emergency stop button on each platform that weighs more than 10 kg. The button must be a red mushroom-capped button at least 25 mm in diameter, with clear markings indicating that it is an emergency stop button. The buttons must latch when triggered and must require a twisting motion to release the latch. The buttons must be completely unobstructed and must be easily accessible by recovery personnel. The emergency stop procedures implemented on the mobile platforms must, upon receiving a Tier 3 E-Stop trigger, render all platforms completely motionless within 5 seconds.

Details and requirements for the three-tiered emergency stop system are provided in the *DTC Competition Rules* document.

The demonstration videos should show the successful integration of all tiers of the emergency stop system for each platform type. The wireless emergency stop videos must show a simultaneous view of both the platform and the emergency stop interface.

4.2.2.3   Mobility
Each type of mobile platform must demonstrate **autonomously** traversing a course with a distance of at least 15 meters. The demonstration video should show the platform traversing the course. The video can be from the platform's point-of-view, a third-person point-of-view, or both.

If relevant, teams are encouraged to include a second video that shows a simultaneous view of the supervisor interface. Teams are not required to show operation of multiple instances of the same platform type.

For ground systems, the movement must be over uneven terrain to include dirt, gravel, and grass. The course should include at least two 90-degree turns.

For aerial systems, the video must show takeoff and landing, inspection of a target (see figure 1 for an example from the NIST guide), and a 1m stand-off from a target sustained for 30s.
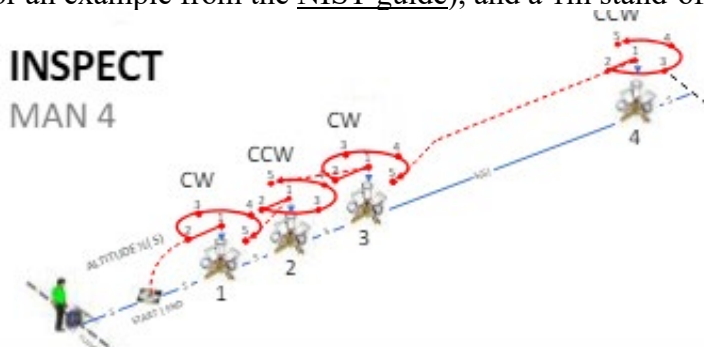

Figure 1: example of UAS inspection of a target. The UAS flies in closer proximity around objects to inspect detailed features on tap and all for sides. Maintains altitude on top of each targe with alternating leftward and rightward rotations to inspect all four sides of each object.

Demonstrations should be in the autonomy mode intended for the workshop.

For any special-case considerations (e.g., other mobility types, teleoperation-based deployment), teams may send inquiries to TriageChallenge@darpa.mil.

4.2.2.4 Night Operation
Teams must demonstrate nighttime takeoff and landing with use of anti-collision lighting

The demonstration video should show the platform traversing the course. The video can be from the platform's point-of-view, a third-person point-of-view, or both. If relevant, teams are encouraged to include a second video demonstrating the triage capabilities of the platform.

Supplemental Tasks: DARPA encourages submissions that also include video demonstrations of the following capabilities. It is anticipated that these capabilities may be necessary to be competitive.
- Multimodal sensing of objects
- Demonstration of object localization
- Demonstration of the user interface
- Demonstration of the triage capabilities of the platform

For any special-case considerations, teams may send inquiries to TriageChallenge@darpa.mil to ask for an appropriate sensor task.

4.3 Systems Competitor's Qualification Checklist
☐ STEP 1: Update your online qualification profile
☐ STEP 2: Complete NDAA compliance review
☐ STEP 4: Respond to any feedback/inquiries from the DTC team
☐ STEP 5: Wait to receive final notification from DARPA on your qualification status

5 Virtual Competition Event Qualification
To qualify for the Virtual Competition, teams must complete a set of qualification tasks and submit an updated narrative description of their approach. Submissions will be reviewed for validity and qualifying competitors will be notified within 10 business days after the qualification deadline.

Teams must pass the qualification scenario to be considered for competition scoring. The qualification scenarios will be a simple scenario to confirm the team's submitted software executes without error and produces the results required for scoring as defined in the Virtual Testbed ICD (to be released by February). The qualification scenario will also verify that the team's robot configuration(s) do not exceed the max payload for the robot platform being used.

5.1 Virtual Narrative Description

The description must include the following sections:

Part 1: Team Information
- Team Name
- Team Organization(s)
- Team Point-of-Contact (name, email, phone number)
- Team Roster, i.e., list of all team members, their affiliations and email

Part 2: Technical Approach (500 words max per subsection)
- **Experience:**
  - Note any relevant experience working in/with virtual environments
- **Perception:**
  - What sensors do you plan to use in your approach (RGB, IR, Audio, LiDAR, radar)?
  - How would you use those sensors to detect physiological features?
- **Autonomy**
  - High-level software architecture
- **Algorithms for Physiological Signature Detection**
  - Detail your plan for algorithms and list any existing software you will be building off of.
- **Algorithm Training Methods**
  - Discuss your intended training methods and what if any additional data you intend to use.
- **Workflow**
  - Software development workflow
  - Laboratory/computing resources

The narrative description must be submitted via the DTC Team Portal. Teams are welcome to attach a document with any diagrams, video clips, or images to support your narrative. Responses are expected to provide sufficient detail to differentiate your approach from other similar approaches.

At its discretion, DARPA may arrange follow-up teleconferences to discuss a team's submission and/or request additional information about the submission to aid the review. DARPA retains the right to approve or deny team qualification based on materials submitted.

5.2 Virtual Event Qualification Tasks

5.2.1 Demonstration Videos
- Links to unlisted YouTube videos

- Short descriptions of each video (100 words max per video)

The demonstration videos must include at least the qualification tasks listed in Section 5.2.2 but may also include additional videos that the teams feel will support their submission.

5.2.2 Software interface

To qualify, teams must demonstrate an ability to interface with the software. Teams will be provided with an API to test this ability. Teams will provide a short screen capture video demonstrating their system running through the latest version of the virtual testbed.

Required Tasks: In the video, teams must show:
- Ability to receive and reason upon multiple sensors (e.g. RGB and thermal)
o Reasoning does not have to be correct in the video
- Ability to gracefully shut down upon receipt of message on the simulator_stop topic (see the ICD)
o The stop message may be sent via command line – it does not have to come from the simulator or testbed
- Ability to emit a message on the competitor_ready topic (see latest ICDs on the DTC Website)
  - Ability to run their solution as a container on a Linux
  - Ability to submit a valid health report
    - o Health reports are validated against `schema.json` in `public/dtcvc/lib/dtcvc-scoring/triage_scorer/schemas` in the publicly released source code

These requirements may be met individually and do not have to be shown in a single clip. For instance, showing the solution running heedlessly in a container (terminal output) can be separate from showing the solution reasoning on multiple sensor modalities (visual).

Supplemental Tasks: DARPA encourages submissions that also include video demonstrations of the following capabilities
  - Multimodal sensing of casualties
  - Demonstration of standoff vitals detection

For any special-case considerations, teams may send inquiries to TriageChallenge@darpa.mil to ask for an appropriate sensor task.

5.3 Virtual Competitor's Qualification Checklist
  ❑ STEP 1: Update your online qualification profile
  ❑ STEP 2. Provide a demonstration video from the latest release
  ❑ STEP 3: Respond to any feedback/inquiries from the DTC team
  ❑ STEP 4: Wait to receive final notification from DARPA on your qualification status

6   Data Competition Event Qualification

6.1   Data Narrative Description

The narrative description must include the following sections:

Part 1: Team Information
- Team Name
- Team Organization(s)
- Team Point-of-Contact (name, email, phone number)
- Team Roster, i.e., list of all team members, their affiliations and email

Part 2: Technical Approach (500 words max per subsection)
- **Experience:**
  - Note any relevant experience working in/with medical datasets.

- **Workflow for handling large volumes of noisy multimodal data**
  - Data cleaning
  - Missing data
- **LSI predicting algorithms**
  - Describe your plan for algorithms and list any existing software you will be building off of.
- **Algorithm Training Methods**
  - Discuss your intended training methods and what if any additional data you intend to use. Keep in mind limitations on HSR by self-funded teams.

Part 3: Data Handling Agreement
- Competitors agree to not attempt to reidentify DARPA provided data
- Competitors agree to not attempt to download DARPA provided data
- Competitors agree to not attempt to share DARPA provided data

At its discretion, DARPA may arrange follow-up teleconferences to discuss a team's submission and/or request additional information about the submission to aid the review. DARPA retains the right to approve or deny team qualification based on materials submitted.

To qualify for the Data Competition, teams must demonstrate their ability to successfully run their algorithms through the scoring system hosted by JHUAPL. The scoring mechanism has changed since the Challenge 1 Event. Teams shall prepare their algorithms according to the Data Competition ICD document and test integration with JHUAPL. A successful scored run is required to qualify for the WS2 Event. We are not imposing a minimum score to qualify at this time.

At its discretion, DARPA may arrange follow-up teleconferences to discuss a team's submission and/or request additional information about the submission to aid the review. DARPA retains the right to approve or deny team qualification based on materials submitted.

6.2   Data Competitor's Qualification Checklist
❏ STEP 1: Update your online qualification profile
❏ STEP 2. Coordinate with the JHUAPL team for systems integration testing
❏ STEP 3: Successfully perform a scored run.
❏ STEP 4: Respond to any feedback/inquiries from the DTC team
❏ STEP 5: Wait to receive final notification from DARPA on your qualification status