**Table of Contents**

**Test Plan Instructions**

**1. Physical description and footprint of the equipment being brought to the Sandbox**

**2. Test objectives**

**3. Night testing**

**4. Daily test schedule**

**5. Requested Red Team target types and quantities**

**Annex A - Available Red Team flight scenarios**

**CUAS 2026 Test Plan instructions**

The purpose of the test plan is to ensure optimal use of the test time and resources made available to each participating company, and to align and coordinate the expectations and tasks between the participating company, the provided Red Team, range control, safety, etc.

It is used as a mandatory PASS/FAIL criterion to ensure that an applicant selected to attend the Sandbox has demonstrated the competency to build and propose a viable test plan to achieve optimal use of their time at the Sandbox.

**Points to note in building and submitting a test plan**:

* The test plan is to be built and submitted via the provided template. All sections must be completed as described.
* The submitted test plan will be evaluated as described below. If a viable plan is not evident a FAIL may be awarded and the applicant would not be selected.
* If portions of a proposed test plan are not acceptable to DND/CAF, the offer of acceptance to attend the Sandbox may impose changes to the test plan that the Participant must accept if they agree to attend the Sandbox.
* After an applicant is selected, there will be additional pre-Sandbox discussions to further refine the test plan and the Sandbox setup for each company.
* During the Sandbox, further adjustments to the test plan may also occur to account for such things as delays due to weather, target issues, equipment setup delays, changes based on previous test results, etc. The Sandbox is meant to be a learning and development opportunity. As the participants and trial staff learn throughout the event, the plan may be modified to explore interesting avenues or features of the CUAS system.
* Throughout, DND/CAF is the sole authority for final approval of the Participant’s test plans. If such final approval cannot be achieved, continuation in the Sandbox may be at risk.
* The Sandbox team will make all reasonable efforts to accommodate the desired test plan to the extent possible.

**Instructions: Review and complete the template tables in the sections that follow.**

|  |
| --- |
| **Blue areas contain instructional details in each section and must not be changed.** |
| **White areas are where you enter the details of your plan.** |

|  |  |
| --- | --- |
| **1. Physical description and footprint of the equipment being brought to the Sandbox** | |
| **Instructions:** The purpose of this section is to describe what you are bringing to the Sandbox so that we can determine if it is feasible to accommodate that type of equipment in the test range.  **Your Application Form already includes how the technology works, and health and safety information so do not duplicate that information here. Focus on describing the quantity and size of the major equipment you are bringing. A detailed item by item list is not required at this time.**   * **Be sure to include all weapons and ammunition details (i.e., calibre, configuration, NSN), and indicate whether they are provided by you, or you are requesting DND to supply them.** * **Note that unless it is small arms ballistic ammunition that CAF uses, we are most likely unable to assist in the provision of ammunition.**   **PASS: The described equipment can be reasonably accommodated within the Sandbox environment.**  **FAIL: The described equipment cannot be reasonably accommodated within the Sandbox environment.** | |
| **Example description.** | * Two co-located model X radars mounted on a wheeled trailer. * One model X optical and infrared camera system mounted on a tripod stand. * Four custom radiofrequency detectors mounted on 30ft masts (supplied by Sandbox) * User control station with monitors * Central processing computer * Ruggedized cabling and wiring to connect radar and camera sensors * Model X wireless routers connecting RF sensors to user control station * One vehicle-mounted remote weapons system, controlled from inside the vehicle, or optionally from the user control station. Canadian DND supplied 7.62mm machine gun and ammunition required. * One interceptor drone controlled from the user control station with optional manual pilot. |
| **Describe your major equipment items here.**  **You can insert a limited (<9) number of photos if desired.** |  |

|  |  |
| --- | --- |
| **2. Test objectives** | |
| **Instructions:** Provide a numbered short list of high-level test objectives that you intend to demonstrate/test the capabilities of the CUAS technology you are bringing to the Sandbox.  When you create your daily test schedule in the subsequent sections, each daily test item scheduled must refer to one or more of your numbered objectives here.  Example objectives (you need not use these):   1. *Initialize and calibrate CUAS system.* 2. *Characterize range of sensor X against micro rotorcraft drone* 3. *Characterize tracking accuracy of sensor X* 4. *Determine ability of system to destroy drones moving with X radial velocity to the weapon* 5. *Learn more about effect of effector X on drone types X and Y* 6. *Establish vulnerability of system to rapidly manoeuvring drones* 7. *Identify operator workload and situational awareness during multiple-drone attack*   **PASS: The objectives make reasonable use of the Sandbox time and resources provided to the applicant and would demonstrate the capabilities of the system to DND/CAF.**  **FAIL: The objectives do not make reasonable use of the Sandbox time and resources provided to the applicant, or do not demonstrate the capabilities of the system to DND/CAF.** | |
| **Obj #** | **Objective Description** |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |

|  |  |
| --- | --- |
| **3. Night testing** | |
| **Instructions:** Night testing is a new possibility for CUAS 2026. **Please read the details in the Applicant Guide in the section called *“******Can nighttime testing be done?”***  CUAS 2026 will be primarily conducted during daylight hours and that is the expectation with each company selected; however, once a company is selected we are open to considering portions of their Sandbox time at night within the post-selection process and considerations in the Applicant Guide.  **For the evaluating your test plan this is not a Pass/Fail item; however, to enable forward planning please indicate your level of requirement for nighttime testing below.** | |
| **3.1 Is your company requesting any night testing?** | Yes or No? |
| **3.2 If yes, please substantiate why night testing is essential, as opposed to daytime testing only. Why can’t the results of daytime testing be inferred to how your system would perform at night?** |  |
| **3.3 If your request for night testing cannot be accommodated, will you still accept an invitation to the Sandbox and do your testing in the daytime only?** | Yes or No? |

|  |
| --- |
| **4. Daily test schedule** |
| **Instructions:** The IDEaS CUAS Sandbox offers participants a variety of Red Team test scenarios listed in Annex A. These test scenarios indicate what flight profiles and target UAS will be flown by the Red Team and have been designed to be representative of UAS threats while also offering an increasing scale of difficulty. As not all profiles are applicable to all solutions, you may wish to focus your test time on certain profiles or repeat certain ones. Test Plans will be finalized with each Participant prior to the Sandbox commencing, but can evolve and be adapted during the sandbox as well rather than being rigidly adhered to.   * If you intend to request night tests, indicate on which days you plan to conduct them in the Activity Name (e.g., Night Detection). * The first day in the Sandbox will include approximately a half day of briefings, unpacking, and setup. * Your last day in the Sandbox must include pack up, administration, and departure to be completed no later than 1800 hrs on your final day. * If there are activities you wish to conduct that are not indicated in the Flight Profiles or Drone Types in Annex A, indicate “Custom Flight Profile” in column “Scenario Name” and then describe briefly in column “Activity Description”. If there are Target Types that are not listed, or you require a specific make/model or characteristic of drone, please indicate” Custom” in the “Target Type” column, and describe in the “Activity Description” column.   **PASS: A realistic test plan that clearly includes the following considerations:**   * It aligns with and viably achieves the stated Test Plan objectives listed in section 2. * 0800-0830 is reserved for the Daily Briefing and setup and is to be included each day. * a minimum of a ½ day initial preparation period at the start of the Sandbox (morning of Day 1) * a minimum of a ½ day pack-up period at the end of your Sandbox period. * a catered lunch is provided onsite each day as you cannot leave the test range. You do not need to show lunch or other breaks on your schedule. * The last flight must be completed by 1700 each day to allow for daily site cleanup and departure by 1800 (subject to confirmation). * The basic time planned for each flight must remain as shown in the Red Team flight profiles. * Total duration of the plan must be no longer than 5 days and can be shorter.   **FAIL: The test plan is not considered viable to achieve as it fails one or more of the above PASS requirements and rectification with the applicant is not considered sufficiently viable.** |

**Example of a daily schedule** (enter your schedule in the blank schedule on the next page):

| **Test Day** | **Day or Night?** | **Serial Flight Letter** | **Red Team scenario (from Annex A)** | | **Objective**  **number**  **(from table above)** | **Activity time (mins)** | **Target type** | **Target qty** | **Activity description** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario Number** | **Scenario Name** |
| 1 | Day |  |  | Initial In-Brief and Setup | N/A | Morning | N/A |  | Unpack and install equipment |
| 1 | Day | A |  | Static Hover | 1 | 30 | Micro rotorcraft | 1 | Initial tests of system functionality and adjust system parameters |
| 1 | Day | B |  | Straight Approach | 2 | 90 | Mini rotorcraft | 1 | Test maximum range of sensor X, repeat three times |
| 1 | Day | C |  | Straight Approach | 3 | 90 | Mini fixed-wing | 1 | Test maximum range of sensor X, repeat three times |
| 2 | Day |  |  | Daily Briefing and setup | N/A | 60 | N/A |  | Setup and calibrate equipment |
| 2 | Day | D |  | Diamond Pattern | 4 | 60 | Mini rotorcraft | 1 | Determine tracking accuracy of sensor X. Would like to fly at 400m altitude instead of standard 100m altitude. |
| 2 | Day | E |  | Custom Flight Pattern | 10 | 60 | Mini fixed-wing | 3 | Determine ability of sensor to track multiple drones flying simultaneously |
| 3 | Night |  |  | Daily Briefing and setup | N/A | 60 | N/A |  | Setup and calibrate equipment |
| 3 | Night | F |  | Diamond Pattern | 4 | 60 | Mini rotorcraft | 1 | Determine tracking accuracy of sensor X. Would like to fly at 400m altitude instead of standard 100m altitude. |
| 3 | Night | G |  | Custom Flight Pattern | 10 | 60 | Mini fixed-wing | 3 | Determine ability of sensor to track multiple drones flying simultaneously |
| 3 | Night |  |  | Packup and Outbrief | N/A | 3 hrs | N/A |  |  |

**Complete the following table for your proposed Daily Schedule, on an assumption that you are given the number of test days you requested (a maximum of 5 days).**

| **Test Day** | **Day or Night?** | **Serial Flight Letter** | **Red Team Scenario (from Annex A)** | | **Objective**  **Number**  **(from table above)** | **Activity Time (mins)** | **Target Type** | **Target Qty** | **Activity Description** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario Number** | **Scenario Name** |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5. Requested Red Team target types and quantities** This not part of the Pass/Fail evaluation. It is for Canada’s Red Team planning purposes.  The Red Team will be equipped with a selection of drone types for targets, notionally as shown in the table below but this may be adjusted at Canada’s sole discretion prior to and during the Sandbox. Such adjustments will be made to keep pace with threat evolution, availability, and other factors.   * Target sizes are according to the NATO UAS Classification system * For rapid trial execution, tests should be conducted with the smallest size of target possible for each test, at the discretion of Sandbox Red Team. * We expect to reuse target drones to the extent possible, other than those that are destroyed as part of an intentional kill demonstrations. * We are open to suggestions and requests to providing other types of drone targets not listed below, noting that Canada may or may not be able to meet such requests at Canada’s sole discretion.   **Instructions: In the table and in relation to your test plan above:**   1. Complete the two quantity columns for the provided list of targets. Do not include allowances for targets that malfunction. Canada will include a failure rate allowance separately. 2. Insert any additional target types and quantities you would like Canada to consider providing at the Sandbox. | | | | | |
| **Category Name** | **Size** | **Capabilities** | **Examples** | **Quantity requested, other than for intended kills** | **Quantity of Kills Requested** |
| Mini Rotocraft | 1kg/0.35m | Typical commercial quadcopter performance, speed up to 20m/s, manual pilot or waypoints. | * DJI Mavic 3 * Autel EVO II |  |  |
| Micro Rotocraft | 0.25kg/0.3m | Typical commercial quadcopter performance, speed up to 15m/s, manual pilot or waypoints. | * DJI Mini 4 Pro |  |  |
| Mini VTOL Fixed-Wing | 2kg/1.2m | Styrofoam VTOL fixed-wing, speeds up to 25m/s, manual pilot or waypoints. | * Heewing Cruza T2 VTO |  |  |
| Long-Endurance Mini Fixed-Wing | 8kg/2.5m | Larger fiberglass VTOL fixed-wing. Longer-range waypoint missions. | * Chaos Choppers Hornet VTOL |  |  |
| FPV | 0.5kg/0.25m | Fast and manoeuvrable piloted drone, speeds up to 35m/s. | * SpeedyBee Master 5 |  |  |
| **In the rows below, insert any additional target types and quantities you would like Canada to consider providing at the Sandbox:** | | | | | |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**Annex A: Available Red Team flight scenarios**

The flight shown here have been effective in CUAS 2019, 2022, and 2024.

**Explanation of columns in the Scenario Table**:

* **Planned Time Consumed**. This varies by scenario and includes the anticipated time for the setup, conduct, and completion of the scenario, even though the actual flight time of the target will be less. Back-to-back scenarios can thus be planned with no time between scenarios as that is already included. For planning purposes, the range times are fixed for each scenario. During the actual conduct of the scenario, planned schedules will be adjusted to accommodate the reality of the day.
* **Mandatory or Optional**. Some scenarios are mandatory for all solutions and must be included in the plan.
* **Mobile Test**. Optional. If the specific scenario is being done as a vehicle mounted test an additional 30 minutes of planned time is added due to the additional setup/conduct/cleanup complexity.
* **Target Destruction**. While target destruction is the overall aim of Defeat solutions it need not be part of each test flight. For example, it may be sufficient to detect, track, and target the UAS multiple times, and then complete the destruction of it once, as opposed to destroying it each time. To control the consumption of targets:
  + Innovators are expected to include target destruction as part of the scenario only when relevant and necessary, and categorized as:
    - **Hard Kill** – Innovators will defeat the UAS using ammunition, nets, entanglers, missiles, or other means to physically disable the UAS.
    - **Soft Kill** –Innovators will use other means such as radiofrequency means to deter, disable, take over, or otherwise mitigate the UAS.
  + DND/CAF retains the terminal kill go/no go decision on each flight to control the consumption of targets.

| **Ser** | **Scenario Name** | **Description / Flight Pattern** | **Planned Time consumed** | **Mandatory or Optional?** | **Mobile Demonstration**  **(add 30 mins to planned time)** | **Target Destruction included?**  **(add 30 mins to planned time)** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | **Basic Scenarios**. The basic scenarios are intended to provide the least challenging target to CUAS systems and will be appropriate for the lowest through highest TRL technologies. It is expected that these flights will be used to gather basic information about the performance of the system, including range and accuracy. | | | |  |  |
| 1.1 | Static hover | The Red Team UAS will be presented at an appropriate range in a hover at 100m altitude. | * 30 minutes | * **Mandatory** | * Optional | * No / Soft / Hard |
| 1.2 | Straight Approach | The UAS will approach the CUAS system directly at an altitude of 100m, at slow and moderate speeds (5 to 20m/s). | * 30 minutes | * **Mandatory** | * Optional | * No / Soft / Hard |
| 1.3 | Diamond Pattern | The UAS will execute a diamond pattern at an appropriate range at an altitude of approximately 100m, at moderate speeds (8 to 20m/s). | * 60 minutes | * Optional | * Optional | * No / Soft / Hard |
| 2 | **Intelligence, Surveillance and Reconnaissance Scenarios**. The ISR scenarios are intended to emulate flight patterns that enemy UAS might execute in an attempt to gather information about a friendly force. | | | |  |  |
| 2.1 | High Altitude Overwatch | The UAS will fly straight toward the target at as high as feasible altitude as possible (approx. 500m), at moderate speeds (10-20 m/s) | * 30 minutes | * Optional | * Optional | * No / Soft / Hard |
| 2.2 | Popup and Stare | The rotorcraft UAS will approach the CUAS system as discretely as possible, and then popup and hover at a low altitude, at a range appropriate for gathering ISR information about a target. | * 30 minutes | * Optional | * Optional | * No / Soft / Hard |
| 2.3 | Circular Observation | The fixed-wing UAS will execute a circular pattern around the CUAS system at an altitude of 250m at moderate speeds (10-15m/s), at a range appropriate for gathering ISR information about the target and within safety templates. | * 60 minutes | * Optional | * Optional | * No / Soft / Hard |
| 3 | **Direct Attack Scenarios** The Direct Attack scenarios are intended to emulate flight patterns that enemy UAS might execute in an attempt to either drop munitions on a target, or perhaps execute a kamikaze attack. | | | |  |  |
| 3.1 | High and Fast Attack | A fixed wing UAS will fly straight toward the target at as high a feasible altitude as possible (several hundred meters), at the highest speeds possible (estimated at 40-50 m/s), and then potentially execute a dive towards the target simulating a kamikaze attack. | * 30 minutes | * Optional | * Optional | * No / Soft / Hard |
| 3.2 | Low and Fast Attack | A fixed wing UAS will fly straight toward the target at as low a feasible altitude as possible (approx. 10-20m), at the highest speeds possible (estimated at up to 55m/s), simulating a kamikaze attack. | * 30 minutes | * Optional | * Optional | * No / Soft / Hard |
| 3.3 | Drop from Altitude | A rotorcraft UAS will fly straight toward the target at as high a feasible altitude as possible (several hundred meters), at the highest speeds possible (approx. 20m/s), and then hover over the target to simulate dropping a munition. | * 30 minutes | * Optional | * Optional | * No / Soft / Hard |
| 3.4 | Maneuvering Approach | Rotorcraft UAS approach the target while maneuvering and using obstacles to the greatest extent possible, simulating a kamikaze attack | * 60 minutes | * Optional | * Optional | * No / Soft / Hard |
| 4 | **Diverse Communications Scenarios**. Some CUAS systems make use of the target UAS’s communication system as part of their CUAS solution. Consequently, the test is not focused on flight patterns but rather how well the solution deals with different communication systems. This is done with a simple flight profile with different communication systems that may be in use on Class 1 Mini and Micro UAS. | | | |  |  |
| 4.1 | Communication Straight-In | All flights will be conducted using a straight-in approach to the target at a fixed altitude from an appropriate range. | * 30 minutes | * Optional | * Optional | * No / Soft / Hard |
| 5 | **Swarm UAS Scenarios**. The Swarm UAS scenarios will challenge the CUAS systems with multiple simultaneous targets. | | | |  |  |
| 5.1 | Straight Approach | (Horizontal or Vertical Spacing)– Rotorcraft UAS will approach the target in a straight fashion at moderate speeds, altitudes and horizontal/vertical separation. | * 90 minutes | * Optional | * Optional | * No / Soft / Hard |
| 5.2 | Undefined Approach | Rotorcraft UAS will approach the target with varying speeds, altitudes, and separations to challenge the CUAS system. | * 90 minutes | * Optional | * Optional | * No / Soft / Hard |