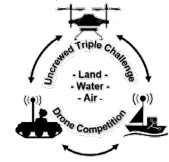


Uncrewed Triple Challenge

Competition Rules

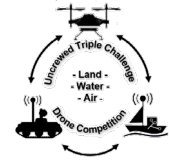
Version 1.0

14 August 2024

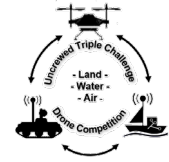


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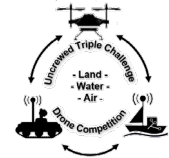
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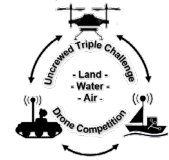
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Version History

Version	Date	Description
1.0	14 AUG 24	First Released Version

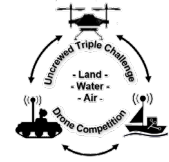


Rules for the competition are subject to change. Make sure to check the official competition website for any updates. All clarifications and FAQs will be announced on the competitor portal. All communication regarding clarifications of rules and other competition RFIs must be via the competitor portal or the official competition email: **<Placeholder Email >**



Acronyms and Abbreviations

AGL	Above Ground Level
ALTZ	Air/Land Transfer Zone
BVLOS	Beyond Visual Line of Sight
C2	Command and Control
CACTF	Combined Arms Collective Training Facility
ELZ	Emergency Landing Zone
FAA	Federal Aviation Administration
FCC	Federal Communication Commission
GCS	Ground Control Station
GPS	Global Positioning System
HQ	Headquarters
MATZ	Maritime/Air Transfer Zone
MSDS	Material Safety Data Sheets
PPE	Personal Protective Equipment
ReCON	Realtime Coastal Observation Network
RF	Radio Frequency
RPIC	Remote Pilot in Command
UAS	Uncrewed Aerial System
UGV	Uncrewed Ground Vehicle
USV	Uncrewed Surface Vessel
UTC	Uncrewed Triple Challenge
UUV	Uncrewed Underwater Vessel
VFR	Visual Flight Rules



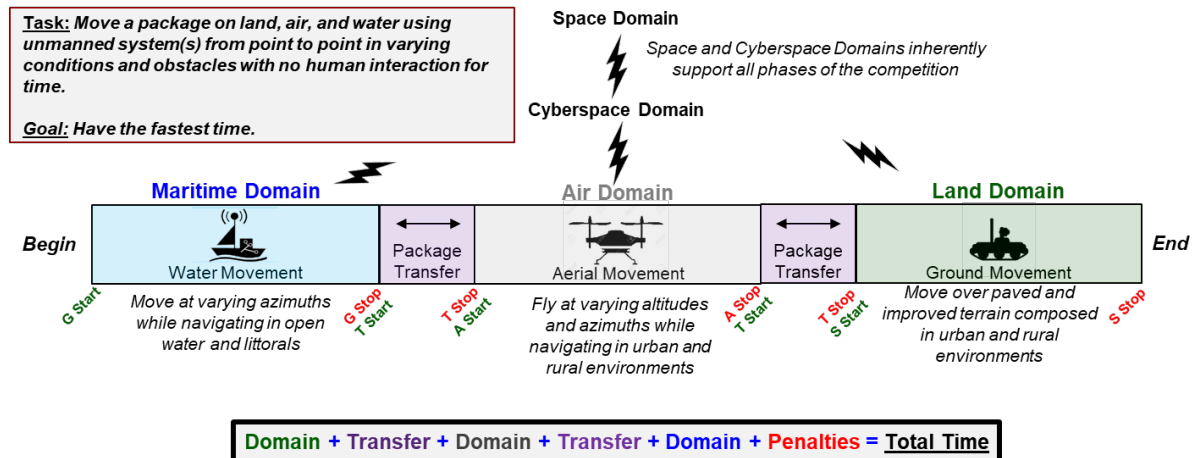
1. Purpose

1.1 Introduction

On April 25th, 2024, at the Michigan Defense Expo (MDEX), Governor Gretchen Whitmer announced the Uncrewed Triple Challenge (UTC), a state-sponsored competition to drive innovation in autonomous drone technology. Entrants will be tasked with using uncrewed, autonomous drones to seamlessly transport a package across Michigan traversing air, land, and water. The Michigan National Guard, the Michigan Department of Transportation, and the Michigan Economic Development Corporation are partnering on the competition.

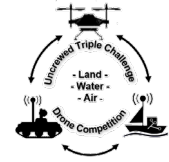
1.2 Competition Format

The competition will take place over a three-day period. Competitors will be assigned a designated start time and date and will complete the course from start to finish. Competitors will be separated by time and should not expect to encounter another vehicle along the course.



1.3 Spirit of the Competition

Teams are expected to compete in a fair and professional manner. Cheating will not be tolerated. Failure to follow the rules may lead to disqualification and removal from the competition.



1.4 Rules Subject to Change

The competition administration tries to provide the best possible rules and competition experience. Sometimes errors are made, and situations change. Please reach out to the competition administration team if you believe that a rule unnecessarily restricts your ability to compete or fails to clarify something that could lead to an issue. The competition administration reserves the right to make changes at any time.

2. Competition Entry and Teams

Details on registration can be found at:

<https://medc.cventevents.com/event/UncrewedTripleChallenge/summary>

2.1 Registration Schedule

15 JUN 24	Registration Opens
10 JUL 24	Competition Webinar
09 AUG 24	Competitor Day
04 SEP 24	Virtual Competition Overview and Q&A Session
16 SEP 24	Registration Closes

2.2 Teams

A team must compete in a minimum of one leg of the UTC to be eligible to win. While completing the course with the best time is the goal, that may not be possible given the difficulty of the UTC course.

2.2.1 Team Composition

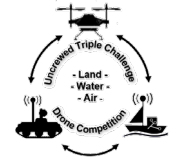
This is an open competition with no restriction on Team composition.

2.2.2 Team Alliances

Teams may be comprised of multiple organizations. Few organizations have the expertise to successfully compete across the multiple domains and package transfer without partnering. Contact the UTC competition team if you need assistance with finding additional organizations to partner with based on your area of expertise.

2.2.3 Organizations entering more than one team

There is no limit to the number of teams that an organization can submit.



2.3 Communication

Official communication for the competition will be through the UTC Competitor Portal. Teams are encouraged to monitor the portal for the latest news and updates.

2.4 Personnel

2.4.1 Team Lead

Each team is required to identify one, and only one, team lead for the purposes of facilitating communication, decision making, and to handle all official business between the team and the competition administration.

2.4.2 Domain Lead (Maritime/Air/Land)

Each team will identify a lead for each of the three competition phases: maritime, air, and land. The purpose is to facilitate direct communication for each of the phases of the competition. One individual can be the lead for multiple domains. Although not recommended, the team lead can also serve as a domain lead for one or more domains.

2.4.3 Limits on Team Size at Select Events

There are limits on the number of competitor team personnel that can be present in confined areas such as Alpena Harbor, CACTF Transfer Zone, and Competition C2/HQs. Competitors will be badged with appropriate access to the confined areas in order to facilitate safe and fair conduct of the competition.

2.5 Insurance

Each competitor shall carry an insurance policy to cover their system(s).

3. Competition Schedule and Deliverables

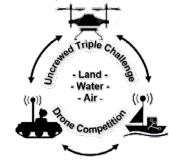
3.1 Key Events and Deliverables Schedule

01 OCT 24 – Team Personnel Registration (Deliverable)

Identify key positions and keep updated to facilitate regular communication

09-10 OCT 24 – Initial Planning Conference (In-Person Event – Camp Grayling, MI)

The initial planning conference will provide competitors an opportunity to review the course, discuss questions for competition rules and logistics, and start working on the FAA



authorization process. More details about the event will be provided to registered competitors closer to the event.

01 NOV 24 – Concept Paper (Deliverable)

Teams submit a concept paper that details how their systems will operate during the competition. Details for requirements are outlined in [C.1 Concept Paper](#).

01 JAN 25 – FAA Authorization Submission (Deliverable)

Teams submit required paperwork needed for the competition Public COA FAA submission. Details for required paperwork are outlined in [C.2 FAA Authorization Submission](#).

29 JAN 25 – Middle Planning Conference (Virtual Event)

Virtual meeting with competitors and competition administration to review updates, discuss communications requirements, and answer questions.

01 MAR 25 – Technical Submission (Deliverable)

System details to include performance characteristics, communication frequencies, safety procedures, and other technical details for each system. Details for required paperwork are outlined in [C.3 Technical Submission](#).

02 APR 25 – Final Planning Conference (Virtual Event)

Virtual meeting with competitors and competition administration to finalize details, conduct a review of all competitor requirements, and discuss competition schedule.

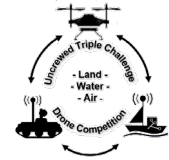
02 APR 25 - Battery/Fuel MSDS (Deliverable)

Teams submit battery specifications, Material Safety Data Sheets (MSDS), and proper disposal procedures, sourced from the battery manufacturer for all batteries. More information detailed in [B. Battery/Fuel Guidelines](#).

3.2 Competition Schedule

The competition is scheduled from Monday, May 19th, 2025 to Thursday, May 22nd, 2025, referred to as Day 0 – Day 3. A more detailed schedule to include times will be published closer to the event. The outline below should serve as a planning tool only to get a sense of how the competition schedule will generally flow.

Teams are strongly encouraged to arrive prior to Day 0. Failing to arrive on time at any event may be cause for disqualification. Teams are responsible for their own travel and lodging.



Day 0 - Reception, Staging, Rehearsal, and Communications Exercise (19 May)

Activity	Location
Check-in	Camp Grayling
Team Orientation and In-Brief	Camp Grayling
Course Orientation	Various Locations
Safety Inspections / Communications Check	
Maritime Vehicles	Alpena Harbor
Aerial Vehicles	TBD
Ground Vehicles	CACTF Soccer Field

Day 1 – Competition Kickoff (20 May)

Activity	Location
Staging	Alpena Harbor
Opening Ceremony	Alpena Harbor
Competition	Various Locations

Day 2 – Competition (21 May)

Activity	Location
Staging	Alpena Harbor
Competition	Various Locations

Day 3 – Competition and Awards (22 May)

Activity	Location
Staging	Alpena Harbor
Competition (if needed)	Various Locations
Awards Ceremony	Camp Grayling

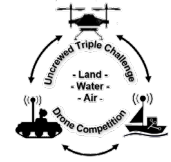
4. Course

The competition has three distinct courses and two transfer zones.

4.1 Maritime

The maritime course is located at the City of Alpena harbor, runs out to a boat at 5NM from shore in Thunder Bay, and returns to the Maritime Transfer Zone to transition the payload to the air course.

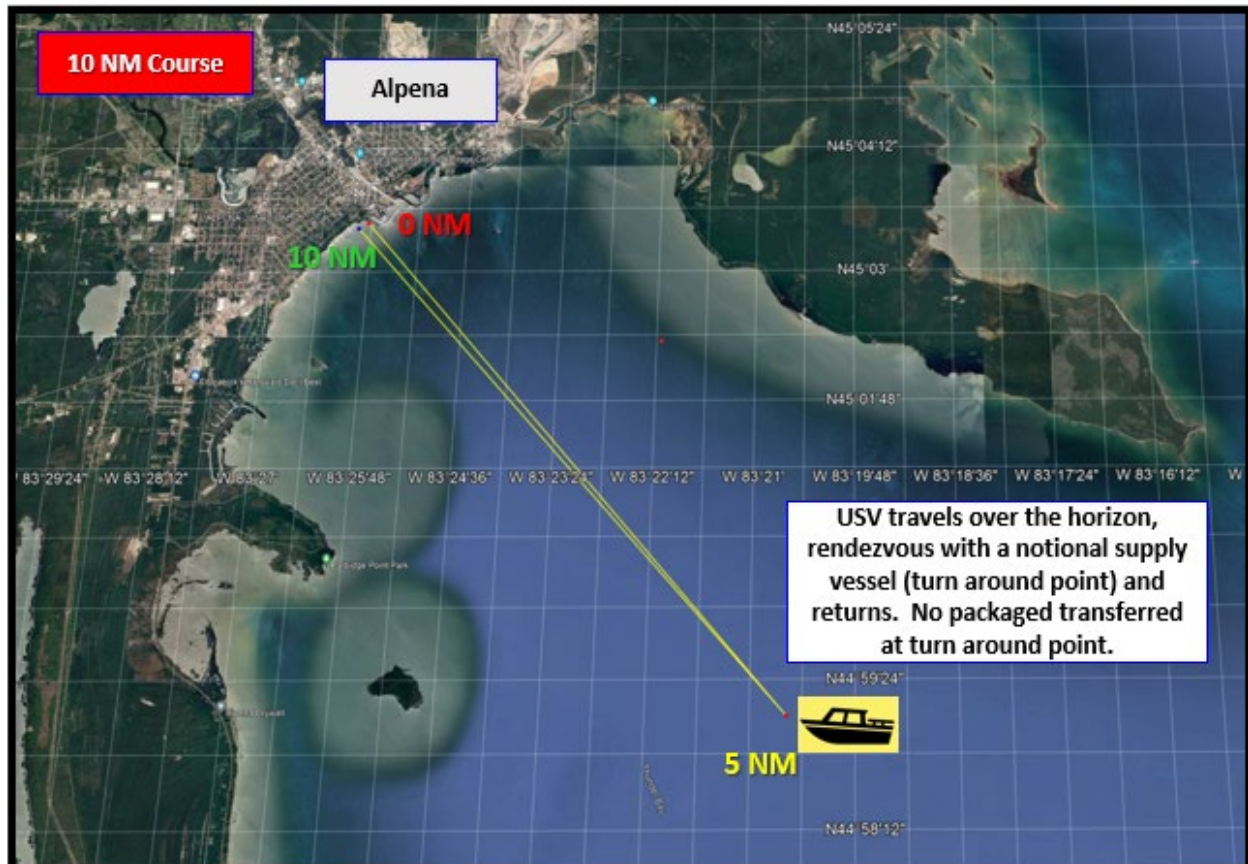
Start: City of Alpena Harbor



End: Maritime/Air Transfer Zone (MATZ)

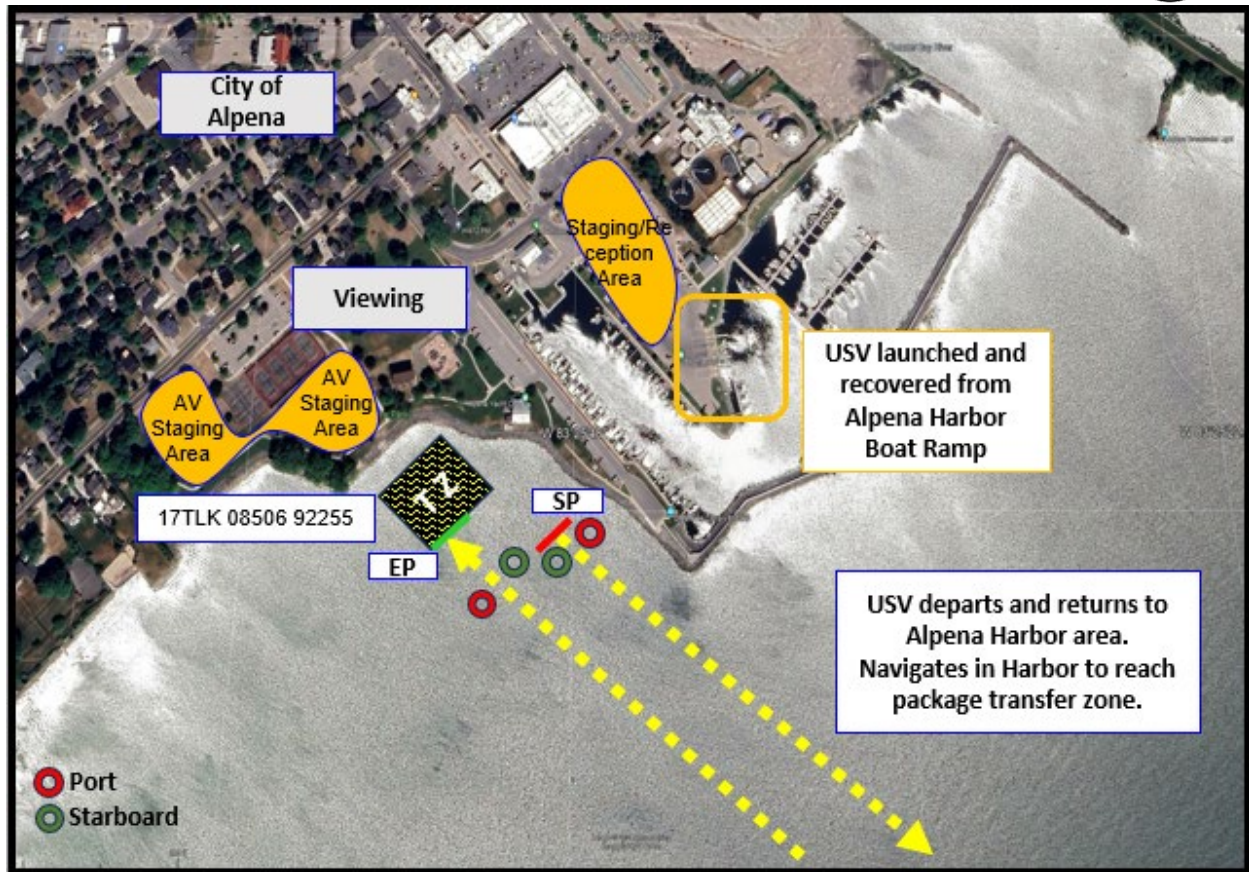
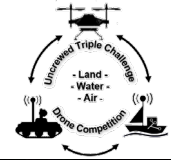
Distance: 10 NM

Weather information from the Realtime Coastal Observation Network (ReCON) Station – Thunder Bay can be accessed here: <https://www.glerl.noaa.gov/res/recon/station-apn.html>



4.2 Maritime/Air Transfer Zone (MATZ)

Detailed map of the City of Alpena Harbor transfer zone.



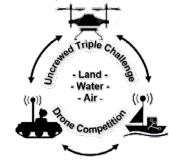
4.3 Air

Start: Maritime/Air Transfer Zone (MATZ)

End: Air/Land Transfer Zone (ALTZ)

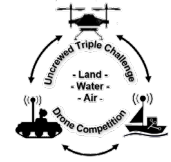
Distance: 58.5 NM

Altitude: Based on FAA Authorization. To be provided at a later date.



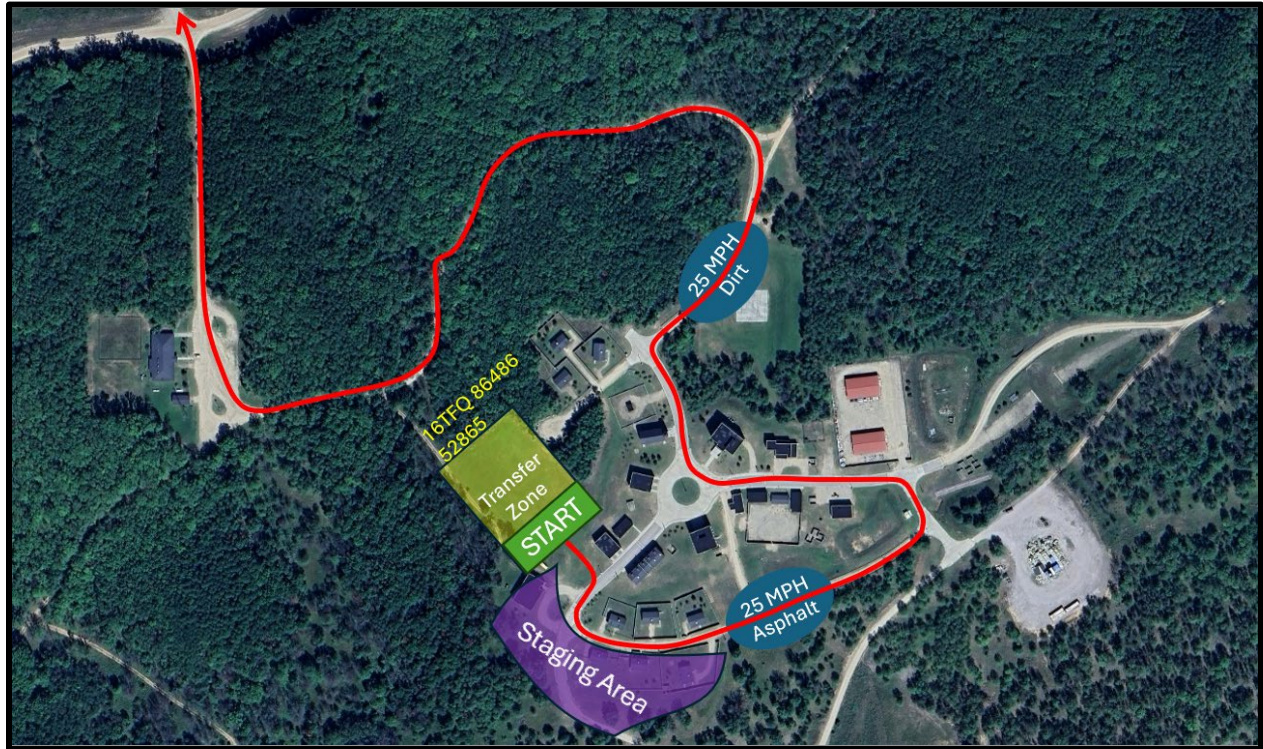
4.3.1 Emergency Landing Zones (ELZ)

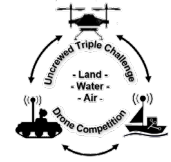
Two ELZs will be identified along the air course to be used for emergencies, precautionary landings, and to support uncrewed system recharge, refuel, or battery exchange operations. The ELZs will be located roughly at the 1/3rd and 2/3rd point along the route. Locations, details for operation, and other information will be published in a future revision of the competition rules.



4.4 Air/Land Transfer Zone (ALTZ)

Detailed map of the CACTF Soccer Field transfer zone.





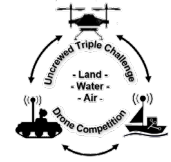
4.5 Land

Start: Air/Land Transfer Zone

End: Camp Grayling Parade Field

Distance: 23.5 M





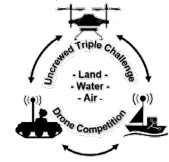
5. Rules

Rules, requirements, procedures and other considerations for operating in the BVLOS system will be covered by the system documentation (To be published at a later date).

5.1 General

5.1.1 Single Design and Backup

Each team can have up to three system designs compete in the UTC. The team must use exactly one system per competition course (Maritime, Air, and Land). Teams are authorized to transfer the payload between systems only at the designated transfer zones. Teams are locked into the specific designs upon finalizing their technical submission. Each team may bring one backup system per design which will need to go through all safety and communication checks on Day 0 to be eligible to compete.



5.1.2 Command and Control

An operator/pilot must have control of their systems at all times. Systems may be put in a semi-autonomous or fully autonomous mode throughout the entire competition course, but an operator must be able to immediately override and take control. Systems that lose link with the operator/pilot control station must execute lost link procedures as defined in [6. Technical Details](#).

5.1.3 Video Recording

Each system must have a video recording device active throughout the competition and rehearsals. Footage will be used to adjudicate rule violations, scoring, and safety issues. Picture quality will be at least 720p or higher. Each device must have enough storage to record the full duration of system operation. Video from all systems used in the competition must be made available to competition administration by request.

5.1.4 Payload

Each team will be provided one payload to be transported by their system(s) from the start to finish lines of the competition. Details for the payload are located in [A. Payload Information](#).

5.2 Regulatory and Licensure

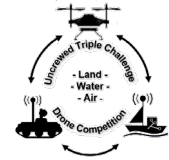
5.2.1 Compliance with Federal, State, and Local Laws

All teams must comply with all applicable Federal, State, and Local laws throughout the entire competition.

5.2.2 Allowed RF Bands and Management

All RF communications must comply with FCC regulations. Any bands allowed by FCC regulations may be used during competition.

The UTC will not provide any RF spectrum management for the competition. This means that any device can be used in any of the allowed bands at any time. This includes both the competition course and the staging areas. Teams are encouraged to use hardwired connections when possible. Where possible, teams should use encryption, directional antennas, and RF filters. Each team should expect other teams to be using similar equipment (e.g. same autopilot), and teams must ensure they don't allow invalid connections (e.g. connecting to another team's autopilot). Where possible, teams should use frequency hopping or dynamic channel selection. The competition administration



reserves the right to institute RF management, if necessary, but teams may not rely on such.

Teams found intentionally jamming or interfering with another team's communications will be considered cheating and disqualified.

5.2.3 Operator Licensing

Operators for each system must be licensed as follows:

- Maritime – Systems with fixed on-board propulsion will be registered as boats in the State of Michigan or another state.
- Air – The Remote Pilot in Command (RPIC) will have the appropriate FAA license for the type of UAS that they are flying.
- Land – Current valid driver's license from any State or Territory in the United States.

5.3 Termination and Disqualification

Rule violations and endangering the safety of nearby personnel may cause disqualification.

6. Technical Details

6.1 General

6.1.1 Uncrewed System Configurations

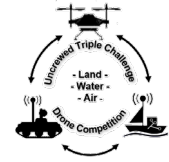
Any system configuration that follows the rules is permissible.

6.1.2 Marking and Identification

All uncrewed systems will be appropriately labeled with the team name in plain sight. Each system will be equipped with at least one safety strobe light for visual identification by human observers. Air systems will also require navigation lights in accordance with FAA regulations.

6.1.3 Fuel and Batteries

Exotic hazardous fuel and batteries will not be allowed. Examples are radioactive fuel or hydrazine. Any option deemed by the competition administration as high risk to competitors, or the general public will be denied. All batteries must be brightly colored for identification in a crash, and it is preferred if they are wrapped in bright colored tape. More information detailed in [Appendix B. Battery/Fuel Guidelines](#).



6.1.4 Safety Material

Teams must have available personal protective equipment (PPE) (tools, gloves, eye protection, hearing protection, etc.), safety risk mitigation (training, checklists, radios, etc.) and equipment to support rapid response to accidents (first aid kit, fire extinguisher, etc.) as needed.

6.1.5 Weather and Environmental Factors

The competition administration will temporarily suspend the competition if environmental conditions are deemed unsafe. Teams must be able to secure equipment against sudden weather like wind and rain.

Weather hold conditions:

- Maritime – Wave conditions of 1.5+ meters or limited visibility of 500m or less.
- Air – Visual Flight Rules (VFR) conditions and surface winds of 20+ knots or a gust spread of 10+ knots.
- Land – Conditions limiting ground visibility to 100m or less.

The competition will not be placed in weather hold due to precipitation unless it impacts visibility as previously listed. In the event of lightning, teams will be asked to return to their vehicles or covered area until the lightning has passed.

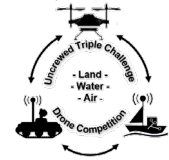
Competition weather will be obtained from automatic surface observation stations at Alpena Combat Readiness Training Center (KAPN) and Grayling Army Airfield (KGOV).

6.1.6 Mid-Competition Recharging/Refueling

Recharging/refueling is permitted along the competition route. Automated recharging/refueling operations will be permitted with no penalty assessed. Penalties assessed for human interaction are detailed in the penalties section of the rules. Ground based recharging/refueling operations for the air course will only be conducted at the designed emergency landing zones. Competitors must disclose their intent to use these prior to the competition.

6.1.7 Provisions

The competition sponsor will provide laydown areas with nearby latrines for competitors at the Alpena Harbor, CACTF, and Camp Grayling to help facilitate uncrewed system loading/unloading, maintenance, and GCS operations. No other equipment, utilities, or



support will be provided by the competition. Competitors should develop a plan to support their requirements along the competition course.

6.1.8 Remote Emergency Stop

Every system is required to have remote emergency stop capability from the operator control station. The activation of the emergency stop should cease all system movement and turn off all propulsion devices to include rotors, propellers, impellers, motors, and other moving components of the system.

6.2 Maritime

This section details all technical details for the maritime portion of the competition.

6.2.1 Traversal

Systems must traverse on/in the water during the maritime course (no flying just above the water).

6.2.2 Emergency Stop Button

Each maritime system will have at least one emergency stop button located on the exterior of the system that ceases any movement and disables all moving components such as motors, engines, impellers, and propellers. The button should be clearly visible and located in location that could reasonably be reached in an emergency.

6.2.3 Lost Link

Each system must execute lost link procedures as defined below:

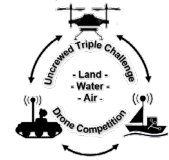
1. All Stop after 6 seconds.
2. Reestablish link remotely.
3. Manually recover vehicle.

6.2.4 System Sinking

Competitors are responsible for recovering maritime systems that have sunken in accordance with local, state, and federal laws and regulations.

6.2.5 Harbor System Launch and Recovery Operations

Competitors are responsible for the launch and recovery of their maritime systems at the City of Alpena Harbor. Specialty services required for system launch and recovery such as a crane or trailer are at competitor expense. Additionally, any specialty service used must



not interfere with another competitors ability to launch and recover withing any designated time period.

6.3 Air

This section details all technical details for the air portion of the competition.

6.3.1 Traversal

Systems must traverse through the air on the air course (no rolling taxi on the ground).

6.3.2 Minimum Performance Characteristics

Requirements of the UAS (if any):

Altitude: 0 – 4000’ AGL.

Distance: Minimum of 30 NM on one charge/tank of fuel.

6.3.3 FAA Remote ID

All aerial systems must comply with FAA Remote Identification of Unmanned Aircraft rules ([14 CFR Part 89](#)).

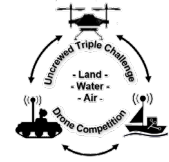
6.3.4 Mission Flight Boundary

The following are a series of GPS points which form a polygon that is the mission flight boundary (MATZ, Air Course, and ALTZ). The UAS must remain within this polygon and the altitude restrictions of the air course. The UAS is out of bounds if it’s outside of the polygon or the altitude restrictions, at which point the mission will be terminated. Please refer to [4.3 Air](#) for details on the air course.

Air Course Boundary	
Latitude	Longitude
45.0593174	-083.4225773
44.9604084	-083.4045126
44.6978551	-084.6431139
44.7117300	-084.6489007
44.9694727	-083.4245473
45.0572114	-083.4428346

6.4 Land

This section details all technical details for the land portion of the competition.



6.4.1 Traversal

Systems must traverse on land during the land course (no flying just above the ground).

6.4.2 Rules of the Road

Must comply with localized speed limits for the course. Speed limits will be posted on course.

6.4.3 Emergency Stop Button

Each land system will have at least one emergency stop button located on the exterior of the system that ceases any movement and disables all moving components such as motors and engines. The button should be clearly visible and located in location that could reasonably be reached in an emergency.

6.4.4 Lost Link

Each system must execute lost link procedures as defined below:

1. All stop after 3 seconds.
2. Reestablish link remotely.
3. Manually recover vehicle.

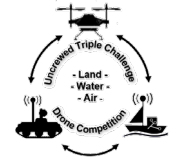
7. Scoring

The primary method of scoring and determining placement is time. The team with the fastest overall time through the entire competition will win prize. Time penalties will be assessed to teams and added to the time for the respective portion of the course that the infraction occurred.

7.1 Timing

The competition begins when a team's first system with the payload crosses the start line at the City of Alpena harbor and ends when the system with the payload crosses the finish line at the Camp Grayling Parade Field. Timing will be broken out based on the course breakdown detailed in [4. Course](#). There are 4 distinct time segments for the competition. Below is the breakdown of the events that delineate the time segments:

1. Cross Maritime Starting Line
Maritime
2. Enter MATZ



Transfer Zone (Split 1)

3. Exit MATZ

Aerial

4. Enter ALTZ

Transfer Zone (Split 2)

5. Exit ALTZ

Land

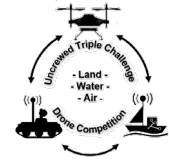
6. Cross Land Finish Line

The primary means of determining a team's time for the competition will be a GPS device contained in the competition payload. A separate time keeping system will be employed by the competition administration as a backup.

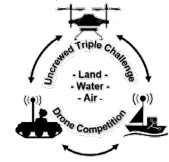
7.2 Penalties

All penalties will be assessed as time added to the team's overall competition completion time. Penalties will be assessed to the respective course split time. For example, a penalty for human interaction while the team's system(s) are in the ALTZ will be added to their overall transfer time.

Judges will be stationed at transfer zones, system control station(s), and will accompany the system during the land portion of the course. Rule violations will be recorded and reported to the head competition judge to be consolidated at the end of the competitor's run. Time, location, and specifics of the rule infraction will be captured to provide relevant information for any adjudication.



Domain	#	Penalty	Penalty in Minutes	Maximum Penalty
Maritime	1	Contact with another maritime system	60	600
	2	Does not navigate turn around point	120	
	3	Navigates into harbor outside of markers	60	
	4	Human interaction with system (Per Instance)	120	
	5	Contact with physical structure	120	
	6	Does not complete course (Per 0.5 Nm not completed)	30	
Package Transfer	7	No Package is not transferred	480	480
	8	Transfer occurs outside of transfer zone	180	
	9	Human interaction with system	180	
	10	Package is not in positive contact with uncrewed system (dropped package)	120	
Air	11	Deviates from flight plan	180	600
	12	Contact with another air system	60	
	13	Human interaction with system (Per Instance)	120	
	14	Contact with physical structure	120	
	15	Does not complete course (Per 1 Nm not completed)	11	
Package Transfer	16	Package is not transferred	480	480
	17	Transfer occurs outside of transfer zone	180	
	18	Human interaction with transfer	180	
	19	Package is not in positive contact with uncrewed system (dropped package)	120	
Land	20	Deviates from designated route	180	600
	21	Contact with another ground system	60	
	22	Human interaction with system (Per Instance)	120	
	23	Contact with physical structure	120	
	24	Does not complete course (per 0.5 Mile not completed)	20	
Finish	25	Package is damaged	180	480
	26	Package is lost	480	
Total Maximum Penalties				3,240



7.2.1 Human Physical Interaction

Any contact with an uncrewed system will result in a penalty regardless of if the interaction is planned or in response to an issue.

7.2.2 Payload Damage/Loss

Any damage to the exterior of the payload will be assessed at the end of the competition.

7.3 Process

At the conclusion of each competitor's scheduled events, their time will be finalized. Competition judges will validate any penalties assessed during the competition and compile the draft score. Once competitors are notified of their score, they will have the opportunity to request a review of any discrepancies with the competition judges. After score reviews are completed, the final scores will be posted.

7.4 Adjudication

Competitors will provide video recordings for the judge team to help resolve any issues. The adjudication process will be published closer to the competition dates.

8. Awards

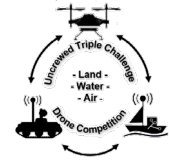
This section describes the awards given to teams at the competition. Teams must be present to collect their awards, and award money will be issued within 4-6 weeks after the competition.

8.1 Overall Ranking

The top three fastest overall times for the course will place on the competition podium.

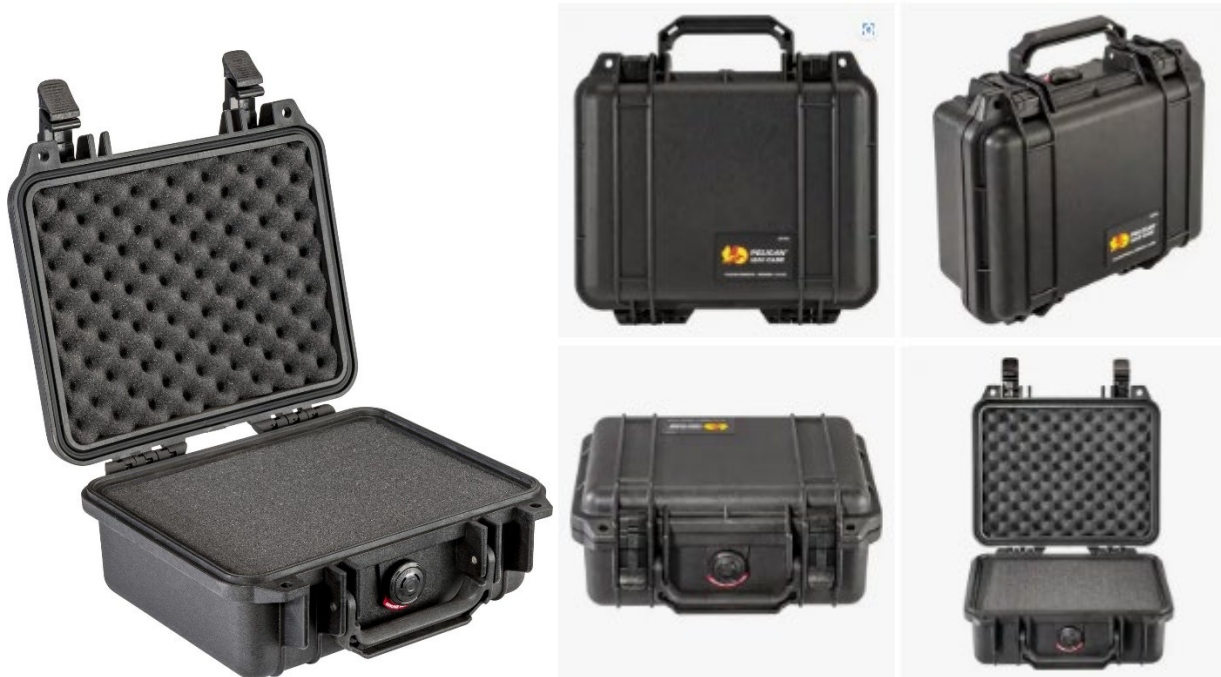
8.2 Best in Class

There are four awards for best in class: Best in Maritime, Best in Air, Best on Land, and Best at Payload Transfer.



Appendices

A. Payload Information



A.1 Specifications

Make/Model: Pelican 1200 Protector Case -

<https://www.pelican.com/us/en/product/cases/protector/1200/>

Exterior Dimensions 10.67" x 9.75" x 4.86" (L x W x D)

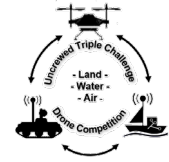
Weight: Minimum of 10 lbs.

A.2 Contents

Contents: The payload will contain a number of sensors and tracking devices to aid in the competition scoring. The tracking device will be used to locate any payloads that become inadvertently separated from the competitor's system. Competition payload contents details will be provided to competitors closer to the competition start.

A.3 Modifications

The payload may be modified to accommodate uncrewed system design and payload transfer considerations. Modifications will be limited to the exterior and not compromise the payload's ability to remain an air-tight seal and transport that volume of space.



B. Battery/Fuel Guidelines

B.1 Batteries

All batteries can become a hazard if not handled properly. Lithium-ion chemistry batteries may become damaged and create a hazard if misused/abused, representing the greatest risk to people, facilities, and the environment. The following safety rules and requirements must be followed:

1. Teams must submit battery specifications, Material Safety Data Sheets (MSDS), and proper disposal procedures, sourced from the battery manufacturer for all batteries.
2. Teams must keep a hard copy of the battery safety documentation for all batteries on-site at all times.
3. All batteries must be stored, used, and maintained in accordance with manufacturer guidelines.
4. Failed or failing Lithium-ion batteries must be handled in accordance with manufacturer's safety and disposal guidelines. In the absence of specific guidelines, batteries must be placed in a LiPo safe bag, which must then be placed in a bucket, covered with sand, and placed in a designated safety zone.

B.2 Fuel

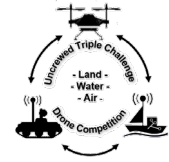
1. Only use approved containers for fuel storage and handling.
2. Store flammable liquids in well-ventilated areas and away from heat.
3. Always power off equipment while refueling.
4. Teams must provide their own fuel specific spill kit in the event of a fuel spill.
5. Ensure that fuel caps remain properly closed whenever not actively refueling.
6. No smoking is allowed

C. Deliverable Item Requirements

This annex covers the mandatory requirements and guidance on the structure and content of the deliverable documents. Documents must be submitted as a .pdf.

Each submitted document must have a cover page with the following information:

- Team name
- Deliverable name
- Date of submission
- Dates of revisions (if applicable)



C.1 Concept Paper

The Concept Paper is a short description of your chosen concept to address the requirements of the Uncrewed Triple Challenge. It takes the form of a report of no more than 5 pages of text and 1 page of drawings/sketches. You should also highlight any aspect of your concept or design process that you think is novel. Your drawings or sketches should show the major features of the design and be clearly labeled.

C.2 FAA Authorization Submission

TBP

C.3 Technical Submission

TBP

D. Example Scoring

TBP