CSU California Unmanned Aerial System Competition (C-UASC)

MOJAVE AIR & SPACE PORT at RUTAN FIELD

Mojave, California

Friday, June 5 through Sunday, June 7, 2026

Organized by:

Cal State University – Los Angeles

and

Mojave Air & Space Port at Rutan Field

Competition Rules

2026 Competition Rev. 3.

Contents

About this document

This document contains the official rules for the 2026 C-UASC competition. The chief author of the document is Michael Thorburn. The rules are established by the organization partners at the California State University and the Mojave Air & Space Port at Rutan Field with consultation from our technical advisors. Updates to the rules will be published periodically to clarify items or make necessary corrections.

- Rev 0 of the 2026 C-UASC Competition Rules. Dated 2025-09-27. The initial draft of the rules. We have highlighted some updates from the 2025 rules and welcome feedback. We intend to publish Rev 1 before the competition registration opens on November 1.
- Rev 1. Dated 2025-11-10. The first release of the rules including definitions of missions for 2026 and including some corrections. Changes are highlighted.
- Rev 2. Dated 2025-11-10. Included small corrections. Added link to Discord community.
- Rev 3. Dated 2026-02-17. The third release of the rules includes updates for the dates of the event (adding a third day) and the location of the event at the Mojave Air & Space Port. It also includes updates and clarifications for the mission definitions and scoring. Changes are highlighted.

About the Competition

The competition is organized by California State University and by Mojave Air & Space Port at Rutan Field. It is a student competition, open broadly to teams of students from universities, colleges, and community colleges. All entrants will be required to comply with rules imposed by Mojave Air & Space Port at Rutan Field and by the California State University.

Purpose and Tasks

The competition requires students to design, integrate, and demonstrate a small Unmanned Aerial System (sUAS) capable of safe flight and the execution of a set of tasks.

The mission tasks are:

- Waypoint Navigation
- Circuit Time Trials
- Package Drop, (a package is dropped to a target at a prescribed location)
- Package Delivery, (a package is delivered to a target at a prescribed location with requirements on the impact force)
- Target Identification and Localization. (Various targets on the ground are identified, classified, and localized in a prescribed field)
- Package Recovery (a package in the field is picked up and returned to the operators)

The UAS aircraft configuration can be a:

- Rotocopter,
- Fixed-Wing Vehicle, or
- VTOL (Vertical Takeoff and Landing) Vehicle

The UAS must include a Ground Control System (GCS). The GCS are the sets of ground-based hardware and software that allow UAS operators to communicate with and control the UAV and its payloads.

Community Forum

Beginning this year, Cal State LA is creating an online space for both the C-UASC and C-3DPAC competitions on Discord! The space will serve as a means to communicate directly with teams and members, to discuss potential rule changes and clarify any questions teams may have. You can join the space through this link: https://discord.gg/6txvXNzfWq, or through the link on the C-UASC webpage.

Introduction to Rules

Use of Mojave Air & Space Port

Teams shall comply with all operational requirements of the Mojave Air & Space Port. These requirements will be posted separately on the competition website. They will include:

- Operation within FAA Part 107 guidelines
- Operation at or below 400 feet above ground level (AGL)
- Always Remaining within Line of Sight (LOS) of the UAS Pilot
- No photos or video taken of personnel or property belonging to entities that are non-participating in this competition.

The agreement with Mojave Air & Space Port at Rutan Field, describing the rules of operation, will be posted on the competition website.

Requirements Imposed by the CSU

Registration

Teams will be required to register for the event on the webpage (https://www.calstatela.edu/ecst/uav-competitions . Each team will be required to provide all the information requested in the application prior to the competition. This will include information about, but not limited to:

- Insurance and Indemnification
- UAS FAA registration
- Team Members and Pilots

Safety and Emergency Operations

All UAS must be operated in accordance with safety rules imposed by the CSU and those by the Mojave Air & Space Port at Rutan Field.

Standard Operations Plan

Each team must submit a plan that defines standard operations and complies with the safety rules. This plan should include:

- Operations checklists
- Pilot roles and responsibilities

Emergency Operations Plan

Each team must submit a plan for emergency operations. This plan must include a plan for lost link, loss of control, or loss of communication with the UAS during flight!

Preflight Checklist

A preflight checklist will be prepared combining the team's operations plans and those from the competition and Mojave Air & Space Port Operations. Each team must complete and submit this preflight checklist the competition management before their first flight on each day of the competition.

Demonstration of Readiness for Safe Flight

Teams will be required to prove that their UAS is capable of autonomously recognizing a breach of geofence bounds and initiate an autonomous return to home. Teams will have two options for demonstrating this ability:

- A video submission by May 5th accompanied by black box data log recording (dataflash or similar)
- A shakedown flight replacing your first flight slot on the day of competition

Teams must also demonstrate the safety of their UAS to competition staff before any flight may take place at the competition. Items to be examined will include:

- Correct behavior of all motors, flaps, deployment devices, and other actuators
- Strong and reliable command & control link that will not drop out over the course of a flight and can be used to initiate flight termination (RTL) if needed at any time.

Team Description and Composition of Teams

Teams are composed of students from colleges or universities.

Teams will be organized into three categories:

- Development Team
- Competition Team
- Competition Guests

Development Team

The development team must consist of ~~undergraduate~~ students who attend school for at least one semester during the academic year~~. The team may have at most two graduate students participate during the academic year.~~ The team must have at least one student from the school being represented and may have students from other schools. A school may have multiple teams, but a student may only be on one team. There are no limits to the number of students on the Development Team.

Competition Team

The team of students which participate in the Mission Flight Demonstration. ~~The competition team must be at most a 12-person subset of the development team.~~ Members of the competition team may participate onsite or participate remotely (e.g. over the internet), but remote members cannot hold safety-critical roles or perform safety-critical functions.

Key Competition Team Members

Team Captain

One member of the competition team will fill the role of team captain during the competition year. This student will be the primary point of contact for the judges. All questions, comments, statements, and deliverables must be submitted by the team captain. The judges must be immediately notified of any team captain change.

Advisor

Each team must have a school faculty member/advisor or official point of contact (POC) from the team's school or sponsoring organization. Teams whose entire team is of the age 18 years or above are not required to have the advisor or school official travel with the team, otherwise at least two adults shall travel with the team and shall take full responsibility for the students. The advisor will be permitted to observe the team at the flight line but is forbidden from communicating or otherwise assisting the team during setup, mission, or tear down. While the advisor may teach concepts, answer questions, provide high-level guidance, and review deliverables before submission, the students must design, manufacture, and operate the system on their own and must produce all deliverables on their own.

Team Pilots

Any member of the team that will control a portion of a UAS flight, for test or for competition, at the competition site will be deemed a UAS pilot.

- UAS pilots must have completed the FAA Trust Course and have a Certificate (or be a Certificated Remote Pilot and have a Part 107 certificate).
    - The Recreational UAS Safety Test (TRUST) | Federal Aviation Administration (faa.gov).
    - https://www.faa.gov/uas/commercial_operators

Pilots must submit a copy of their TRUST (or Part 107) certificates, or Part 107 certificate, and be prepared to show them at a safety inspection or at the flight line.

Nominal Pilot Team

The nominal Pilot Team will have a Safety Pilot, a GCS Operator, and, as required, one or more Payload Operators. Exceptions must be approved by the competition organizers.

Safety Pilot

The Safety Pilot is focused on safety-related functions and communications as defined in the Team's operational and emergency operations plans. The Safety Pilot used during the year can be a student, the advisor, or non-student. While the UAS occupies the runway or airspace, the Safety Pilot must not have any other roles and must maintain continuous unaided visual line of sight with the vehicle (no FPV). If the Safety Pilot performs any other tasks during mission time, the mission will be terminated. The Safety Pilot counts as one of the members of the competition team. If the pilot is not a member of the development team, then the pilot is limited to safety related functions and communication and must not advise or participate in other roles.

GCS Operator

The Ground Control Station (GCS) operator is responsible for operating the autopilot including setting parameters, uploading mission objectives like waypoints, monitoring for performance and compliance, and intervening as necessary. While the UAS occupies the runway or airspace, the GCS Operator must

not have any other roles and must maintain situational awareness of the UAS, the autopilot subsystem, and the ground control station. For example, the GCS Operator cannot operate payloads. If the GCS Operator performs any other tasks during mission time, the mission will be terminated. The GCS Operator counts as one of the members of the competition team and is classified as a Team Pilot.

Payload Operators

The Payload Operator is a member of the team who is responsible for operating the UAS payloads, such as:

- A package drop, delivery or recovery mechanism
- A camera and any camera gimbal

Pilot-In-Charge (PIC)

Each flight must have a Pilot-In-Charge (PIC). Every PIC must have a valid FAA Remote Pilot Certificate so that the competition can operate under Part 107 rules. The PIC would nominally be the GCS Operator. If a team does not have a certified PIC, then the competition will provide a PIC to supervise the Pilot Team during the flight under Part 107 rules.

Competition Guests

Each team will be allowed to bring additional guests to the competition. If desired, these guests may be development team members, but they cannot assist with the mission demonstration.

Flight Competition and Demonstration

UAS Vehicles Type and Weight

UAS Types

The UAS may be:

- Rotocopters,
- VTOL (Vertical Takeoff and Landing) Vehicles, or
- Fixed-Wing Vehicles

UAS Weight

The UAS weight limits are:

- The fully-loaded UAS must weigh less than 55 pounds (25 kg) as the competition operates under FAA Part 107 rules (14 CFR Part 107 -- Small Unmanned Aircraft Systems).
- The fully-loaded weight includes the weight of the UAS and any package it is carrying as part of a mission task (e.g. the Delivery Package.)

Minimum UAS Capability

The UAS must have the ability to:

- Complete any one of the missions within a single flight (batteries may be changed between flights).
- Turn in a radius not larger than 150 ft (46 m).
- Detect and respond accordingly to breaches of geo-fence or loss of pilot control (RTL or land).

- Be remotely commanded by a pilot on the ground, in the case of any situations requiring intervention.

Visual Line-of-Sight and Location of the Pilot and Ground Control Station

Location during the UAS mission flights:

- The Pilot-in-Charge (PIC), GCS Operator, Safety Pilot, and Payload Pilots will be located in the Flight Area throughout the flight. The Pilot-In-Charge (PIC) GCS Operator and Safety Pilot must always maintain visual line-of-sight of the UAS.
- The GCS Operator must have continuous uninterrupted access to the GCS display throughout the Mission Demonstration.
- The number of students on the Pilot Team allowed on the Flight Area may be limited by the competition organizers or the Mojave Air & Space Port Operations.

GCS Display Requirements

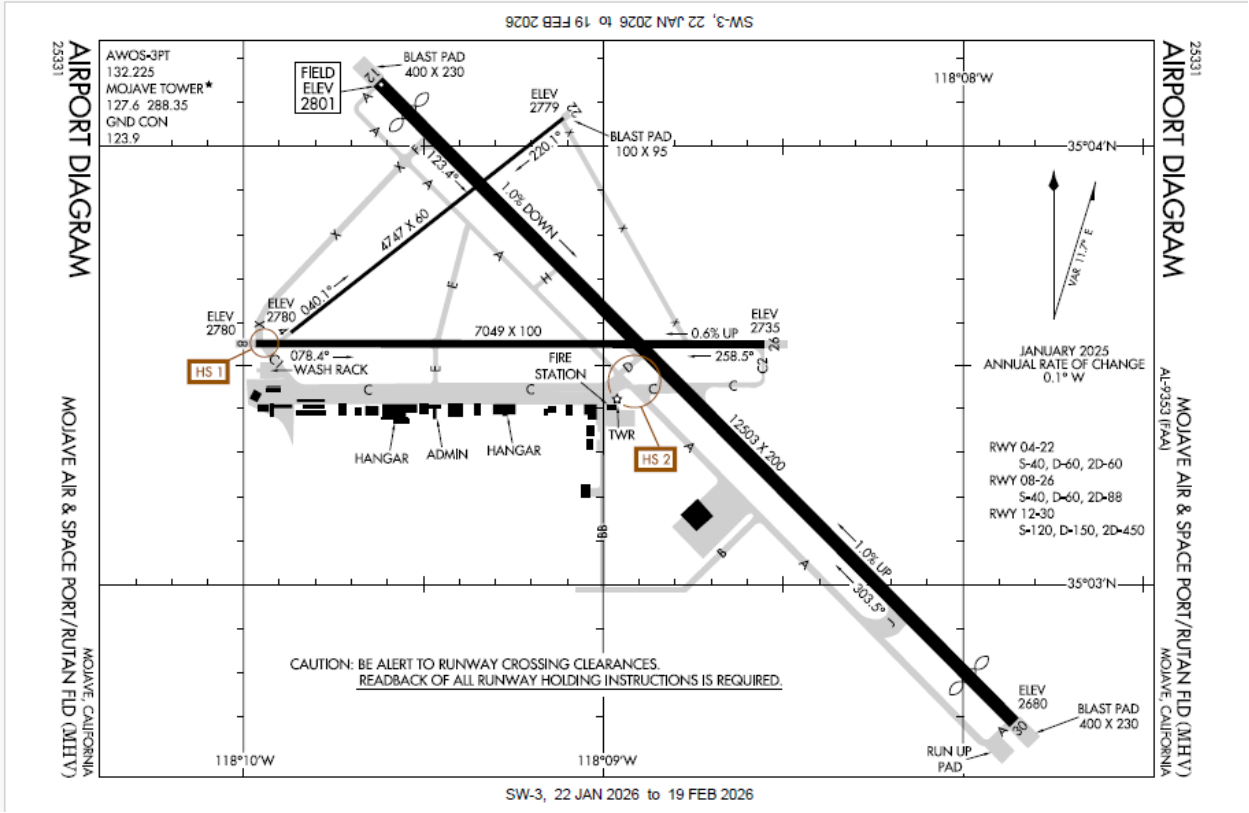
- The GCS Display must
    - Show a map showing the flight boundaries and the UAS position.
    - Indicate the UAS speed and altitude.

Facilities Infrastructure, Flight Boundaries and Environment

Course Map

The course is at the Mojave Air & Space Port at Rutan Field in Mojave, California.

The KMHV Airport Diagram



The flight area is in proximity to the intersection of Taxiway B and Taxiway BB as shown in the next figure.

The C-UASC Competition Flight Area Diagram (Yellow Polygon Space)

Flight Area and Geofence

- All flights are limited to the area defined by the yellow polygon shown in the picture above, in the region of Taxiway B and Taxiway BB in the southeast part of the Mojave Air & Space Port complex.
- UAS must stay within the Geofence Boundary.
- The latitude and longitude of the points precisely defining the Geofence and Flight Area are found in the Appendix.

Waypoints

- All Waypoints are contained within the geofence. They will be provided the day of the competition.

Mission Target Areas

- The location of the targets for the Package Delivery, Package Drop, Package Recovery and Target Identification and Localization missions will all located within the geofence.

Location of Beginning of Flights and Available Runway

- The location of the start of the mission for Rotocopters will close to the intersection of Taxiway B and Taxiway BB. The exact location will be determined at the competition.
- Competitors that require runway (i.e. fixed-wing planes) will be able to use a taxiway for that purpose. Taxiways B and BB are available. Teams must coordinate with the competition organizers in advance to clarify their preference.

Radio Frequency (RF)

- The competition management will not provide any RF Spectrum Management
- Each team should expect other teams to be using similar equipment (e.g. same autopilot) and teams must ensure that they don't allow invalid connections (e.g. connecting to another team's autopilot).
- Teams found intentionally jamming or interfering with another team's communications will be eliminated from the competition.

Flight Demonstration

Competition Setup and Mission Planning

Each team will be given 3 flight slots over the course of their two flying days. Each flight slot will be 15 minutes long and consist of 5 minutes for setup and 10 minutes for flight measured from takeoff to landing. Teams will clear out of the flight area during the next team's 5 minute setup time and must vacate the taxiways immediately.

Missions are split into two categories, aerial and ground. The categories are as follows:

- Aerial Missons
  - Waypoint Navigation
  - Time Trial
  - Object Localization
- Delivery/Recovery (Ground Missions)
  - Package Delivery
  - Payload Drop
  - Package Recovery

Teams are allowed to attempt one aerial mission and one ground mission per flight slot. Missions may be re-attempted in later flight slots if desired. A higher score, if achieved, will overwrite the earlier score. A team's final score will be calculated by summing their four highest scoring missions.

Autonomous Flight Scoring

Teams will be given a 25% score bonus on certain missions which are completed autonomously.

"Completed autonomously" means that no human operation of any kind is permitted besides beginning the autonomous operation and ending it. If a human operator makes any input to any part of the UAS while attempting a mission, it will be scored as if it was not completed autonomously.

The following missions will receive autonomous score boosts if completed autonomously:

- Object Localization
- Package Delivery
- Payload Drop
- Package Recovery

Mission Time and Order of Flights

- Order of flights will be established by the Field Event Manager.
- Teams must be ready for transportation to the flight starting location at their appointed time.
    - If a team is not ready, they may lose their turn for that flight.

Target for Package Drop and Package Delivery Missions

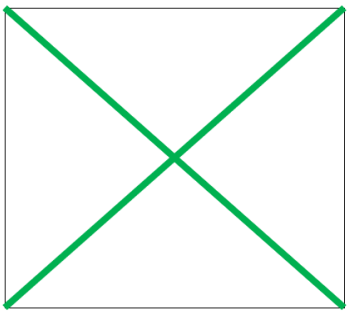
The target will be approximately 5 m in diameter. The target will be identified by a large red bullseye.

- Example:

Target for Package Recovery Mission

The target for the package-recovery mission will be approximately 5 m in diameter. It will have a white background a green X. The package will be placed on a at the center of the green X.

- Example (Target Location Identifier for Package Recovery Mission):



Flight/Mission Timing

Flight Start

Once the teams have assembled in the Flight Area, the Judge will announce the order of flights for the day. Teams are expected to be waiting at the flight area ready to begin setup at the start of their flight slots. If a team arrives later than the posted start time, judges may at their own discretion disallow the team from flying, should there be insufficient time for setup, flight, and recovery. Your UAS should be fully configured in advance. Judges may allow some time to attach packages or change batteries between flights.

Flight Finish/Landing

The UAS will be required to land safely. Judges will determine the time of the completion of the flight, and the UAS should be removed from the runway as quickly as possible.

Flight/Mission Definitions and Scoring

Waypoint Navigation Flight

- A set of 7 waypoints will be established and provided to teams on the morning of competition. Teams will plot a course of their own determination through the waypoints and fly the course, aiming for accuracy.
- The waypoints will be positioned in such a way that a course through them without violating the minimum turn radius of 150 feet (46 meters) will be possible.
- Minimum distance from each waypoint will be recorded by a small competition-provided GPS tracker, currently being finalized.
- A maximum of 10 points will be awarded if the UAS flight path passes within a 1 meter radius of each waypoint.
- Points will be deducted for any meter of distance over 1 meter from each waypoint.
- Example. If a team hits 4 waypoints within 1 meter but only reaches 1.5 meters on the remaining three, a total of 0.5+0.5+0.5=1.5 points will be deducted for a final score of 8.5.

Circuit Time Trial

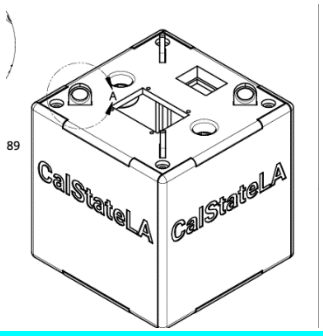
- Using the same waypoints as the Waypoint Navigation mission, teams will fly another course of their own determination, focusing on speed. A chosen start and end waypoint must be provided to the judges.
- Time will start when the UAS passes within 4 meters of the start waypoint, and end when it passes within 4 meters of the end.
- Each waypoint must be passed within a maximum distance of 4 meters or the run will be invalidated.
- Score will be calculated based on all teams' fastest valid runs according to a linear slope which will award the quickest team 12 points, the slowest team 8 points, and all other teams points proportional to their time between the two.

Package Drop

- Teams will deliver a small beanbag payload to the same bullseye as is used for Package Delivery. The UAS must drop the beanbag from a minimum altitude of 6 feet. The beanbag weighs approximately 130g and is 6.4cm in diameter. An example may be found at https://www.amazon.com/dp/B07YSYLXR4?ref=ppx_pop_dt_b_product_details&th=1.
- Teams are allowed to secure the beanbag with a bag, harness, or other method as desired. No adhesives or sharp/pointy protrusions of any kind may be used on the outside of the beanbag + mounting.
- A maximum of 14 points is possible for this task if the beanbag comes to rest such that any part of it is covering the bullseye center. 1 point will be deducted for every meter of distance between the bullseye center and the beanbag.
- If the UAS descends below 6 feet, 6 points will be deducted from the calculated score.

Package Delivery

The UAS will be required to deliver a package to a well-marked target.



- Teams will deliver a competition-provided payload to the center of a bullseye target positioned within the competition course. A set of rough coordinates which will be on the bullseye but not at the center will be provided.
- If the total recorded impulse on the package over the course of flight and delivery exceeds certain axis-specific limits, points will be deducted. Limits are being worked on and will be announced soon. Teams may not cover the bottom of the package in any way.
- A maximum of 13 points is possible for this task if the package is delivered such that any part of it is covering the bullseye center. 1 point will be deducted for every meter of distance between the bullseye center and the closest part of the delivered package.
- If the package impulse limits are exceeded, 6 points will be deducted from the calculated score. If the package is dropped from more than 6 feet above the target without a parachute, a flat score of 0 will be awarded.
- 0.25 points bonus will be awarded for every 500g of additional weight added to the cube.

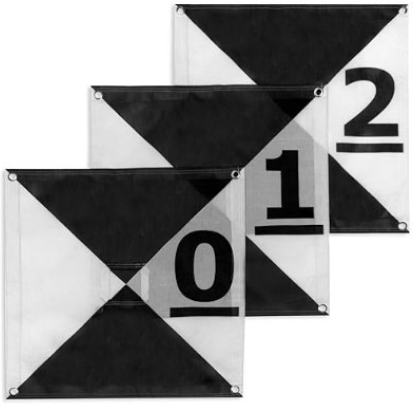
Target Localization

- 5-10 objects will be distributed within a predefined area of the competition course.
- A very rough set of bounding GPS coordinates will be provided, and four larger objects will define a tighter area which contains all identification objects.
- Teams must localize and identify the targets, providing a list of their locations and identifying number no later than 30 minutes after the end of their flight slot. The UAS must not descent below 25 feet (7.62 meters) while searching for objects.
- If all objects are correctly identified and localized, a total of 14 points will be awarded.
- 0.5 points will be deduced for each object that is either not correctly identified or not correctly localized, and 1 point if both are true.
- If the UAS descends below 25 feet but not below 20 feet, 3 points will be deducted from the calculated score. If the UAS descends below 20 feet, a flat score of 0 will be awarded.
- You can see examples of the targets on Amazon.com

  https://www.amazon.com/dp/B07PHPFPJ3?ref_=pe_84950070_737224720&th=1

1.2 meter GCP

0.6m GCP



Package Recovery

The UAS shall fly to the package location, pick up the package and return it to the compass rose.

- A weighted bucket will be placed at the center of a large green X positioned within the competition course. Coordinates for the exact center of the target will be provided, but remember that GPS may not always be trustworthy.
- The UAS must fly to the target, pick up the bucket, and return it to the takeoff point.
- The handle of the bucket will be fastened upwards to facilitate easier grabbing.
- 16 points will be awarded to teams that successfully recover and return with the package.
- If the package is dropped from an altitude greater than 6 feet at any point during recovery or the return flight, no points will be awarded.
- The UAS may release the package before landing or may land with the package.

- The package will be a small bucket (approximately 3 liters) with a handle. (see: Amazon.com: Jumbo Beach Sand Bucket Toy for Kids, 3L Collapsible Sandbox Pail, Easter Buckets, 3 Pack Multi Use Tool for Garden, Planting, Camping, Storage Fishing, Washing, Summer Holiday Travel Birthday Gifts : Toys & Games) .
- The package will be loaded with material and will weigh between 1 and 2 kg.

Score for Flight Evaluation

The score for the flight evaluation event will be composed of the top 4 scores of the completed missions.

Caution: Impact of Heat and Wind

It can be hot and windy at Mojave Air & Space Port. In 2024 the density altitude at the time of the competition was 6500 ft (1980m) and there were winds at times gusting to 14 kts. The teams need to design their UAS to accommodate the environment.

Design Competition

In addition to the documentation required from each to for purposes of demonstrating flight qualification, teams are encouraged to submit more design documentation to demonstrate the quality and creativity of the work they have performed. There will be a design and innovation prize awarded based on this documentation.

Rules Governing Design Team and Design Competition Entries

- All Design Team Members shall be members of the Development Team.
- All design competition entries must also be entries in the Flight Competition.
- All design, analysis, and fabrication of the competition entry is the sole responsibility of the student team members.
- All design work must be performed by undergraduate or graduate students enrolled during at least one of the preceding Fall, Spring, or Summer terms at an accredited college or university.

- Designs may include commercial off-the-shelf parts but the integration of these parts and the design of the overall system, including hardware and software, must be done by the design team.
- Students may only participate on a single team. Faculty advisors may advise more than one team.

Score for Design Competition

The score for the Design Competition will be based on several factors and evaluated by a panel of judges from industrial and academic partners.

Judges will evaluate:

- Well formulated engineering processes, analysis, and methodology
- Well described engineering design features
- Well described manufacturing processes
- Innovation in processes or materials
- Innovation in aircraft configuration, aerodynamics or structure
- Innovation in control systems, autonomy or computer vision
- Innovation in package-delivery system

Appendix

Geofence

Below are the locations of the vertices of the geofence:

Name	Latitude	Longitude	Altitude (m)
Geofence Point 1	35°03'11.60"N	118°09'06.84"W	833.87
Geofence Point 2	35°03'00.83"N	118°09'07.13"W	831.11
Geofence Point 3	35°03'00.95"N	118°09'12.54"W	831.94
Geofence Point 4	35°02'49.58"N	118°09'12.75"W	829.7
Geofence Point 5	35°02'49.53"N	118°09'01.91"W	828.59
Geofence Point 6	35°02'56.45"N	118°09'01.94"W	830.14
Geofence Point 7	35°02'56.44"N	118°08'54.90"W	828.62
Geofence Point 8	35°03'11.52"N	118°08'54.75"W	831.09

Waypoints and Mission Target.

The waypoints and mission targets, including package delivery target, package drop target, package recovery target, and target-identification and -geolocation targets will be provided to all competitors at the competition. They will all be within the geofence.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Mojave Fitness Center