

2020 Student Astronaut Challenge

Competition Events Overview

Teams

Teams shall consist of six members; however, a team may still participate in the competition as long as they have a minimum of five students. The sixth member will be the Mission Director in charge of Mission Control. All six members of the team will participate in all events of the competition.

Events (notes in red indicate changes from prior years)

1. Space Flight Simulation challenge

- a. A new simulator was introduced in the SAC 2019 competition and the layout of the cockpit has been slightly changed and the control panels have been slightly modified both in location and/or content.
- b. The cockpit Joystick has been upgraded to the Logitech/Saitek X-52 which allows for rudder control (twisting Z-axis) directly through the joystick.
- c. An additional pilot macro pad has been added which includes many of the same commands of the primary macro pad as well as wheel brakes. This macro pad also includes a small joystick.
- d. The flight checklist has been updated to accommodate the new control panels content and location.
- e. Mission Control now may have a third person acting as the Mission Director. An outline of the responsibilities of the Mission Director and Mission Control team will be provided.

2. Engineering challenge

- a. The engineering challenge is a hands on problem-solving simulation.
- b. Students will be separated into two groups, three in Mission Control and three in the Engineering Simulation station. The Mission Commander, Pilot and Flight Engineer from the Flight Simulation team **must** be assigned to Mission Control for this event. If the team has only five members then the Flight Engineer may be assigned to the Engineering Simulation station.
- c. A new Engineering Challenge simulator (Skylab) is currently being constructed which will hold both sides of the Engineering Challenge. It is our hope that all 6 team members plus 2 judges will fit in the new space, however, that is not certain at this time. We will do our best to include all 6 team members in this challenge but there is a chance that only 4 will be able to participate.

3. Design Challenge (formerly Lab challenge)

- a. The Lab challenge will no longer be conducted as a laboratory experiment proposal, but will be a physical design challenge to solve a specific space-related issue. **The teams will be given a specific space-related issue and they will need to submit a typed design proposal due approximately 2 weeks before the finals competition. At the competition, they will present the following information in their 15-20 minute PowerPoint presentation:**
 1. Design plan of their prototype
 2. Justification of the design prototype.

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3. List of materials that will actually be used for the design and approximate costs.
4. Demonstrate the use of the prototype by constructing a **model** using only the following materials:
 - i. Cardboard
 - ii. Tape
 - iii. Crafting foam (such as Creatology)
 - iv. Bubble wrap
 - v. Velcro
 - vi. Glue/hot glue
 - vii. Straws
 - viii. Hemp or nylon twine
 - ix. Packing 'peanuts'
 - x. Craft wire (no thicker than 28 gauge)
 - xi. fabric

4. Landing Simulation challenge

- a. All six (or five) team members will participate in the Landing Simulation Challenge. If your team only has five members, one of the Landing Simulation challenge mission commanders will be randomly selected to participate twice.
- b. The team will be divided into three pairs by a random selection with each pair performing a landing.
- c. The students who act as Mission Control during the Space Flight Simulation Challenge must act as Mission Commanders for the Landing Simulation Challenge. Likewise, the students who act as the Flight Crew will act as Mission Control.
- d. There will be three landings performed by the team, with each pair assigned one type of landing by random selection.
- e. The landings to be performed are:
 1. Two standard but different visual landings
 2. One full instrument (ILS, MFD and HUD) landing
- f. Finals**
 1. The finals will be held in the Space Flight Simulation simulator.
 2. A full landing simulation (similar to the Space Flight Simulation Challenge landing) will be performed.
 3. The landing may contain emergency situations.
 4. The team coach may assign the mission commander, pilot and flight engineer positions to the three Landing Simulation Mission Commanders.
 5. The team coach may assign the mission director, mission controller 1 and mission controller 2 positions to the three Landing Simulation Mission Controllers.