

CENTENNIAL CHALLENGES

Cube Quest Challenge

A \$5M Centennial Challenges competition

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ABSTRACT

The area of emphasis for this project is to develop products that support Centennial Challenges' technical development needs by creating a comprehensive communications strategy, maintaining a compelling web presence, and public engagement activities to recruit teams. This project will present a comprehensive approach to promoting the Cube Quest Challenge, including website improvements, technology development and transfer, commercial applications, social media, exhibits, public engagement, creating a new-competitor package, and post-challenge resources.

PROGRAM OVERVIEW

**DREAM IT.
MAKE IT.
WIN IT.**



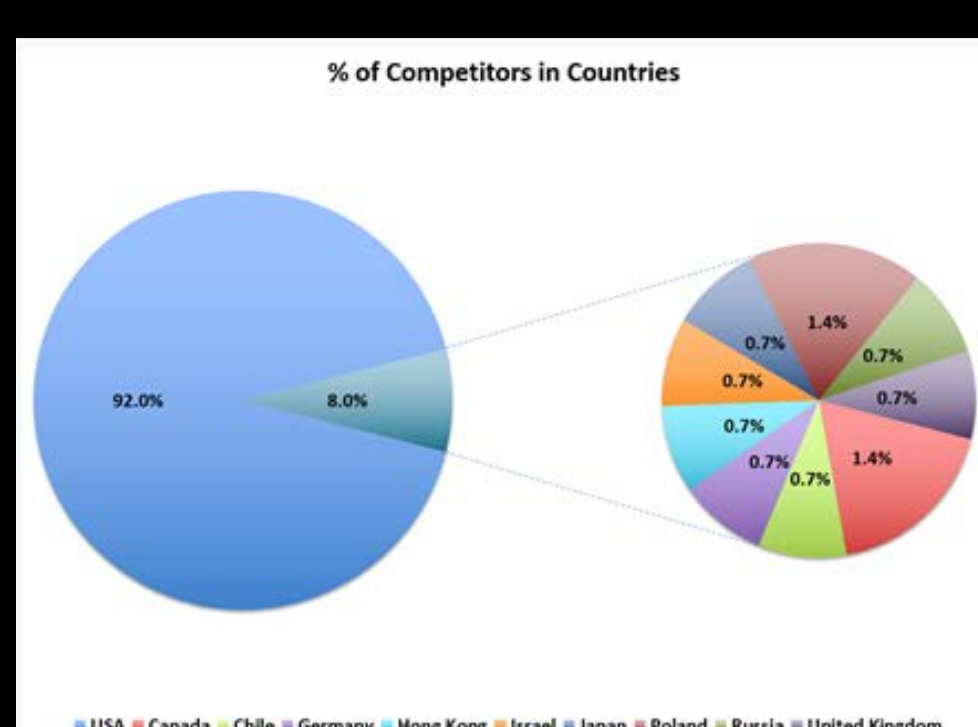
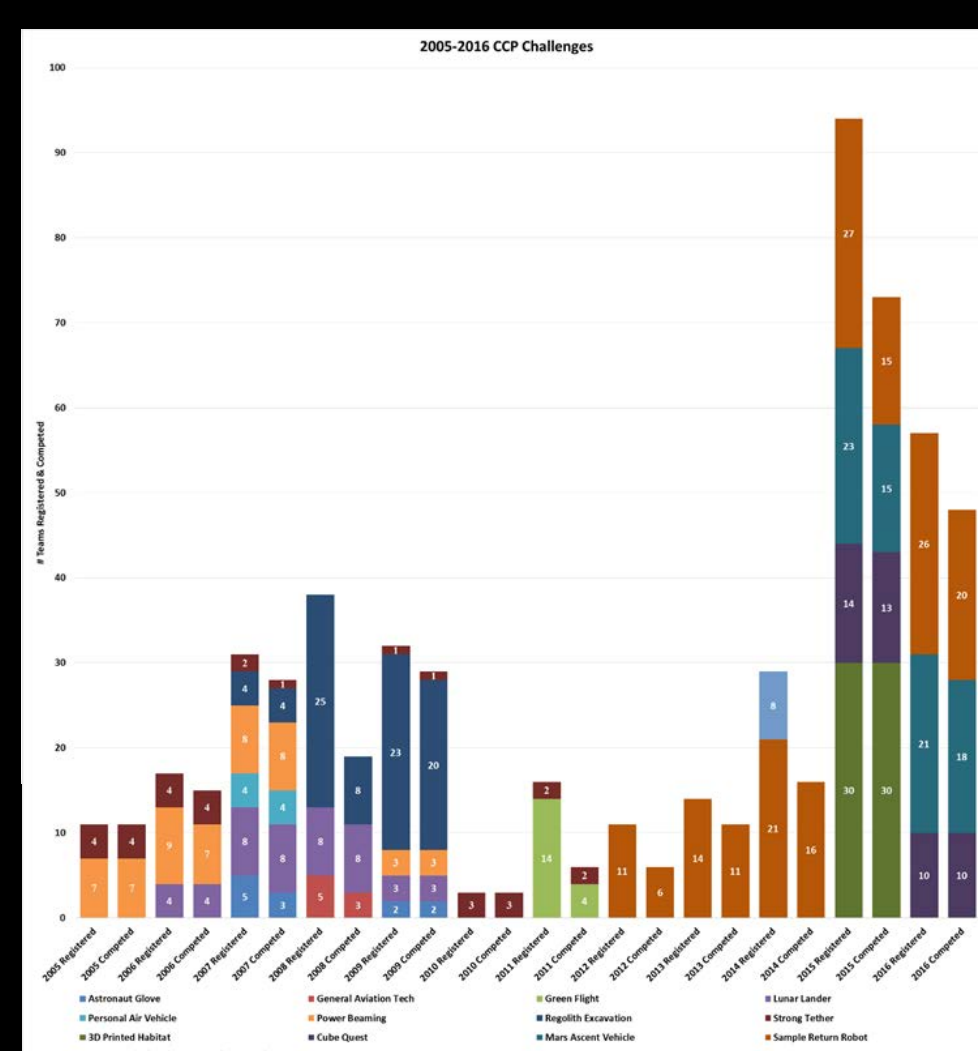
Centennial Challenges uses competitions to advance technologies for NASA and the nation. The program develops challenges that target technology needs in different areas as described by NASA's technology roadmaps, and allocates prize purses as incentives. The goal of the challenges is to attract competitors from diverse backgrounds to participate and introduce innovative approaches. Prizes provide winners with funds and public visibility to push their projects further, developing them into technologies NASA and the private sector can use.

THE CHALLENGE



NASA's CubeQuest Challenge (CQC) hopes to accelerate the technological capabilities of tiny satellites, known as CubeSats, that may help the space agency achieve future mission goals faster and more affordability. CQC reaches out to amateur inventors and technology enthusiasts to deliver CubeSats that can get to the moon and beyond. These objectives are concentrated into a series of stages: the Ground Tournaments, Deep Space Derby and Lunar Derby. A prize purse of \$5 million is being offered to teams that meet the challenge objectives.

TASK IMPLEMENTATION + DATA



Statistical Information

- Encompassing the impact the overall program has had with regard to percentage of competitors from US regions and countries, number of teams that have registered and competed, and affiliation of competed teams.

Researching State of the Art

- Current CubeSat technology has only been able to withstand Low Earth Orbit.
- Challenges preventing CubeSats from venturing through deep space include surviving in the radiation environment, generating power based on their distance from the sun and not relying on GPS or force magnetic field.

- Cubesats encounter constraints due to their size and weight, as there is not much room for solar panels and radiation shielding.
- If small sats are able to overcome these obstacles, CubeSats will be able to accomplish feats such as these 10 years from now:
 - Approach asteroids
 - Operate like small weather stations
 - Examine exterior of a manned spacecraft
 - Data communications relay

Website + New Documents

- Slideshow of challenges
- Create uniform structure for each challenge web page: Overview, Welcome Packet, How to Apply, Schedule, Challenge Phases, Rules, Prizes, "After Challenge" Packet, CubeSats and Journey to Mars.
- Past and Current News; follow up with alumni.
- Script for a video trailer in collaboration with NASA 360 to show how CQC aligns with the strategic plan.
- Document detailing the technology roadmap of CubeSats.

Exhibits

- Develop plans to create a 3D-printed CubeSat, the SLS Adapter Stage for Secondary Payloads and informative, collectable cards of past CQC winners.

STRATEGIC PLAN

Cube Quest aligns with Goal 1, Objective 1.7, of NASA's Strategic Plan, to expand the frontiers of knowledge, capability and opportunity in space, and transforming NASA missions and advancing the nation's capabilities by maturing crosscutting and innovative space technologies.

