September 1, 2019

Competition Announcement: Unique NASA Opportunity to Design, Build, and Launch High-Power Rockets

The Minnesota Space Grant Consortium (MnSGC) announces its intention to run a **Space Grant Midwest High-Power Rocket Competition**, held in the Midwest but open to college/university student teams from across the nation, during the 2019-2020 academic year. This competition is an opportunity for students to design and construct high-power rockets to be launched in May of 2020 from a Tripoli MN launch site near Minneapolis, MN.

No previous experience in high-power rocketry is necessary to compete!

Up to 30 college/university teams sponsored by their state's Space Grants will be accepted into this competition. Interested teams from any state, not just those in the Space Grant Midwest Region, are required to garner local Space Grant "sponsorship" (this might or might not involve financial support, depending on the state) then submit a non-binding "Notice of Intent to Compete" to the MnSGC by October 1, 2019, in which they list their team members, team name, and a committed faculty adviser. (Note – institutions not planning to assemble a student team until spring 2020 still should submit a Notice of Intent to Compete by Oct. 1, 2019, at least naming a faculty adviser so we know who to send updates to.) Teams are also required to consult with a non-student mentor with high-power rocketry experience, Level 2 certified (or higher). Competition organizers can help teams find mentors, if need be.

A kick-off/informational telecon will be held from 7 to 8 p.m. CST on Tuesday, Sept. 24, 2019 (for teams planning to spend a full academic year on this project). This kick-off/informational telecon will be repeated on Thursday, Jan. 16, 2020 (for teams working just during the winter/spring semester). A registration fee of $400 per team, due by Jan. 31, 2020, will be charged to cover competition costs, including up to $100 applied toward the purchase of two competition motors per team. States sponsoring two or three teams will be expected to provide one judge for written reports and the (in-person) competition. States fielding four or more teams may be asked to provide two judges.

2019-2020: "Photography/Altitude Challenge": *Student teams will design and construct a single stage (dual-deploy-optional) high-power rocket that will fly twice in the competition. The target altitude for the first flight will be 2345 ft above ground level and the target altitude for the second flight will be 3456 feet above ground level. The flights can be on any Cesaroni or AeroTech I-class or J-class motor. The rocket must carry two low-cost cameras that interface with a non-commercial sensor suite described below (see handbook for cost limits on cameras). The cameras are to be mounted on parts of the rocket that separate from one another in flight. Photography points during ascent (post-burnout) will be awarded for quality of footage and minimum rotation. (Active roll-control mechanisms encouraged, but not required.) Photography points during recovery will be for having each camera keep the other part of the rocket in view, especially during separation and during landing. Photography points post-landing will be awarded for the best 360 horizon panorama (video or a set of still photo(s)) from just one camera from an elevation as far off the ground as possible. The rocket must also carry a non-commercial data-logging sensor suite to characterize flight performance including (at least) axial acceleration, roll rate about vertical axis, av-bay ambient pressure plus forward-facing (stagnation) pressure (from which velocity can be deduced). Sensor values must be logged at 10 Hz (minimum) and also text-overlaid on one video in real time (not post-processing). Computer/camera system likely to be Raspberry-Pi-based with Pi cameras, or something similar.*

The competition will include two written reports about the design, analysis, simulation, build, and test flight results of the rocket, an oral presentation, plus a written assessment of competition flight data/results. These will be scored by a panel of professional engineers from both academia and industry. Scoring of the pre-competition reports and the post-flight report will focus on the system design and its performance. More details about the competition motor, reports, deadlines, etc. will be in the handbook – to be posted and discussed in the informational telecons.

A detailed competition handbook will be posted no later than the kick-off telecon on 9/24/19 at
http://dept.aem.umn.edu/mnsgc/Space_Grant_Midwest_Rocketry_Competition_2019_2020/

Logistical questions may be directed to James Flaten, MN Space Grant, U of MN, flate001@umn.edu. Technical questions may be directed to Gary Stroick, Tripoli MN, president@offwegorocketry.com.

IMPORTANT DATES:

- **Kick-off/informational telecon: Tuesday, Sept. 24, 2019 (repeated Thursday, Jan. 16, 2020) from 7 to 8 p.m. CST** *(contact James Flaten, MN Space Grant, for call-in information)*
- **Garner your state's Space Grant sponsorship and submit a (Non-binding) "Notice of Intent to Compete" by Oct. 1, 2019**
- **$400 Registration Fee is due by Jan. 31, 2020, of which up to $100 will be applied toward purchase of two competition motors**
- **In-person Competition dates: Presentations & Safety Checks on Saturday, 5/16/20** (mid-afternoon & evening) then flights on Sunday, 5/17/20** (all day, plus an evening banquet)**
- **Alternate (Weather-delay) flight date: Monday, 5/18/20** (as long as needed)**

**** If Minnesota has a particularly wet spring, the competition dates might shift – see handbook.**