Please be sure to let us know if the 72 MHz frequency band is available for our use at the competition site. It is the last item we need to confirm before finalizing our RC design.

Intern Request and/or Senior Design Project Request Form

Project Title:	Near Earth Object (NEO) Scout Senior Design Project
Project Description:	Design of micro/nano spacecraft to support exploration of the Near Earth Object (NEO) population
Choose most appropriate area of research:	☐ Lunar & Planetary Surface Systems ☐ Ground Operations ☐ Propulsion ☒ Spacecraft
Program Applicability	☐ ISS CEV/SLS ☐ Commercial Crew ☒ Asteroid ☒ Adv. Technology
Choose one project:	**Roles and Responsibilities of Senior Design POC/Mentor**
☒Senior Design	I have coordinated with my management and I am able to support at least three (3) teleconferences (kick-off, mid-term, and final) with a Senior Design Project Team at a university that chooses my project. I understand that I shall not provide and sensitive or classified information to the Senior Design Project students of faculty. I will feedback to project team if requested.
☐Internship	I have coordinated with my management and I am able to support an intern. I understand that this internship may be funded by their state's Space Grant Consortium and, as such, an internship offer can only be made by that entity. If an intern is selected for my project, I will provide an environment where an intern can grow and we may have a mutually beneficial and successful internship. My project will be able to provide a desk space, work area, and computer for an intern. I will review any final report or presentation that the intern generates during his/her internship and submit it to my Center's Export Control Officer for approval. I will complete mentor profile and feedback as requested.
Check desired Timeframe for Internship:	☒ Anytime ☐ Summer Only ☐ Fall Only ☐ Spring Only
Check desired Major/Minor(s) for Internship:	☒Aerospace Engineering ☐ Aeronautical Engineering ☒ Astronautical Engineering ☐ Biomedical Engineering ☐ Chemical Engineering ☐ Civil Environmental ☐ Health Engineering ☒ Electrical, Electronic Engineering ☐ Computer Engineering ☒ Engineering Physics ☐ Industrial Manufacturing Engineering ☐ Materials, Metallurgical Engineering ☒ Mechanical Engineering, Mechanics ☐ Nuclear Engineering ☒ Astronomy, Astrophysics ☐ Chemistry ☐ Optics ☐ Physics ☐ Atmospheric Sciences ☐ Geography ☒ Geosciences ☐ Oceanography ☐ Natural Resource Management ☐ Mathematics, Applied Mathematics ☐ Computer Science ☐ Astrobiology ☐ Biology ☐ Biochemistry/Biophysics ☐ Microbiology Bacteriology ☐ Chemical Engineering ☐Other, please specify:

Mentor Name:	Dr. Steve Koontz	Mentor's E-mail:	steven.l.koontz@nasa.gov
Title & Organization:	ISS System Manager for Space Environments/ Materials Engineer/ES4	Phone #:281-483-8860	281-483-8860
Alternate POC/Mentor Name:	Dr. John Alred	Alternate's E-mail:	john.w.alred@nasa.gov
Education Office Signature and Date:		Intern Mentor's Signature & Date:	8/19/13
As supervisor/manager, I approve of the above named individual as Senior Design Project POC of Intern Mentor.		Supervisor/Manager's Signature & Date	08/19/13
(For Intern Request Only) As Administrative Officer, I am aware that the above named Intern Mentor has submitted a request for an Intern.		Administrative Officer's Signature & Date:	

1. Near Earth Object (NEO) Scout Senior Design Project – Top Level Requirements
2. Mission Architecture
    i. NEO Scout spacecraft to be launched as secondary payloads from GTO/GEO or cis-Lunar primary spacecraft carriers. NEO Scout spacecraft may be launched from a multi-NEO Scout carrier prepositioned at GEO, a manned space habitat at EM L1/L2 or in high lunar orbit.
    ii. Launch from LEO is not an attractive option at this time.
    iii. NEO Scout spacecraft Delta V capability will be less than or equal to 10 km/sec and will be tailored to the specific NEO intercept/rendezvous mission.
3. NEO Scout Spacecraft will intercept and rendezvous with target NEOs when the NEO is in close proximity with Earth (<0.3 AU) and will be capable of a soft landing on the target NEO.
    i. The maximum telemetry range of the spacecraft will be 0.3 AU or less and will be accomplished without recourse to the NASA Deep Space Tracking Network (DSN) if at all possible
    ii. The NEO Scout spacecraft will have a beacon transmitter and an on-demand high rate telemetry capability like Deep Space-1 (DS-1)
    iii. GN&C will not depend on GPS (most of the flight will be outside GPS useful range in any case).
4. Mission duration from launch (from GTO, GEO or cis-lunar space) to intercept will be less than 360 days.
5. Primary propulsion will be solar electric (ion or Hall Effect engines).
6. Cold gas jets and reaction control wheels shall be used to control attitude and conduct proximity operations at the target NEO.
7. NEO scout spacecraft avionics and payloads instrument systems shall be constructed of COTS parts if at all possible with the additional requirements that:
    i. NEO Scout spacecraft thermal performance will, by design, maintain avionics packages within vendor thermal limits.
    ii. NEO Scout spacecraft will survive at least one major solar particle event.
    iii. The overall probability of loss of spacecraft from ionization radiation total ionizing dose (TID) and single event effects (SEE) shall be less than 1/1000 if at all possible, during the 360 day maximum mission time.
8. The mass of the NEO scout spacecraft will be less than 20 kg (wet) in all cases.
    i. Payload mass fraction to be optimized within the constraints set by maximum spacecraft mass, mission duration, delta V requirement, and the resulting thrust to weight ratio.
9. For the purposes of the student design project this semester, I recommend that you focus on core spacecraft systems and functionality and leave payload mass fraction as a free variable that you report. We can begin to look at what instruments we can pack into various payload mass fractions later. If this seems like too much, select key subsystems.