AIAA
Student Branch at the
University of California, Los Angeles

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THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS

2017-2018 Sponsorship Proposal

Letter From Our President

Dear Prospective Sponsor,

The American Institute of Aeronautics and Astronautics Student Branch at the University of California, Los Angeles (AIAA at UCLA) is a professional organization that connects students, industry representatives, and academics dedicated to the advancement of aeronautics and astronautics. Through career development, mentorship, and hands-on project involvement, we aim to cultivate the next generation of great engineers and scientists, thus enhancing our college education through hard work outside the classroom.

Throughout the school year, our chapter collaborates with various aerospace companies to provide events that facilitate networking and promote professional development skills for our members. We host info-sessions, resume and interview workshops, a career fair, and facility tours to expose our students to the post-college world. We also emphasize the importance of mentorship and peer networking, hosting social events that connect AIAA at UCLA alumni with our current members.

In addition to these opportunities, the backbone of our organization are the three student projects: Design/Build/Fly (DBF), the Rocket Project at UCLA (URP), and Unmanned Aerial Systems (UAS). The majority of our membership actively participates in at least one of these projects. This involvement expands the educational experience of AIAA members, allowing them to advance their technical abilities and apply the concepts they learn in the classroom to real engineering missions, and problems. Our students experience working in an engineering team, and develop problem solving, leadership, and interpersonal skills.

AIAA at UCLA boasts a diverse active membership that consists of almost every technical major, including aerospace, mechanical, electrical, chemical, and computer engineering, physics and astrophysics in both undergraduate and graduate programs. We are all united by our passion for aerospace.

By contributing to the AIAA chapter at UCLA, your company helps young engineers acquire vast technical skills, teamwork and leadership traits, and a true enthusiasm for their work. Our students are grateful for the opportunities afforded to them by your sponsorship and enrichment of their college education.

As an entirely student-run organization supporting three of UCLA's most accomplished student projects, we humbly ask for your patronage as we soar to new heights.

Thank you very much for your time and consideration.

Sincerely,

Amanpreet Kaur
President, AIAA at UCLA

Professional Development and Mentorship

Events

AIAA at UCLA is proud to work with aerospace companies to host events that promote networking between our students and industry professionals. These events, in addition to career workshops, allow students to develop their professional skills before they enter the workforce as well as enable companies to recruit enthusiastic new talent. AIAA at UCLA also attempts to create lasting bonds between members as well as alumni by hosting social and mentorship events. Below is a summary of our events as well as their approximate costs.

AIAA General Fund Budget

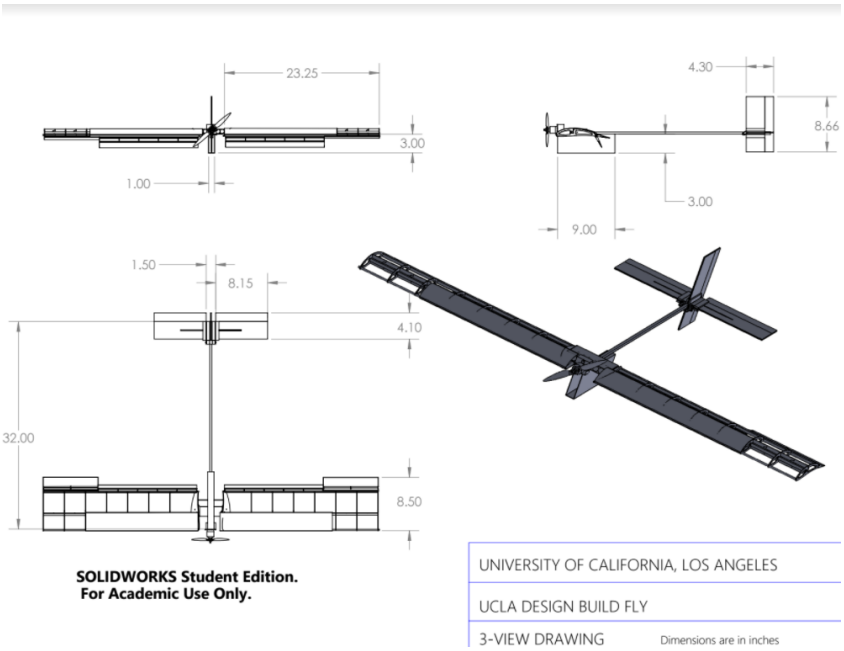
Category	Amount
Fall Kickoff Meeting	$700.00
Resume/Career Workshops	$220.00
Alumni Panels	$120.00
Facility Tours	$300.00
Social Events	$600.00
Leadership Workshops/Retreat	$280.00
End of Year Banquet	$1000.00
Winter and Spring General Meetings	$500.00
Publicity Events/Showcases	$150.00
Info-sessions	$900.00
AIAA Shirts	$400.00
Projected Operating Cost	**$5,170.00**

Student Projects: Futures Taking Flight

AIAA at UCLA also serves as the umbrella organization for three competitive student projects: Design/Build/Fly, the Rocket Project, and Unmanned Aerial Systems. These teams give students the opportunity to design and gain hands-on experience by placing them in a fast-paced, broadly disciplined, team-oriented work environment that resembles the atmosphere of industry.

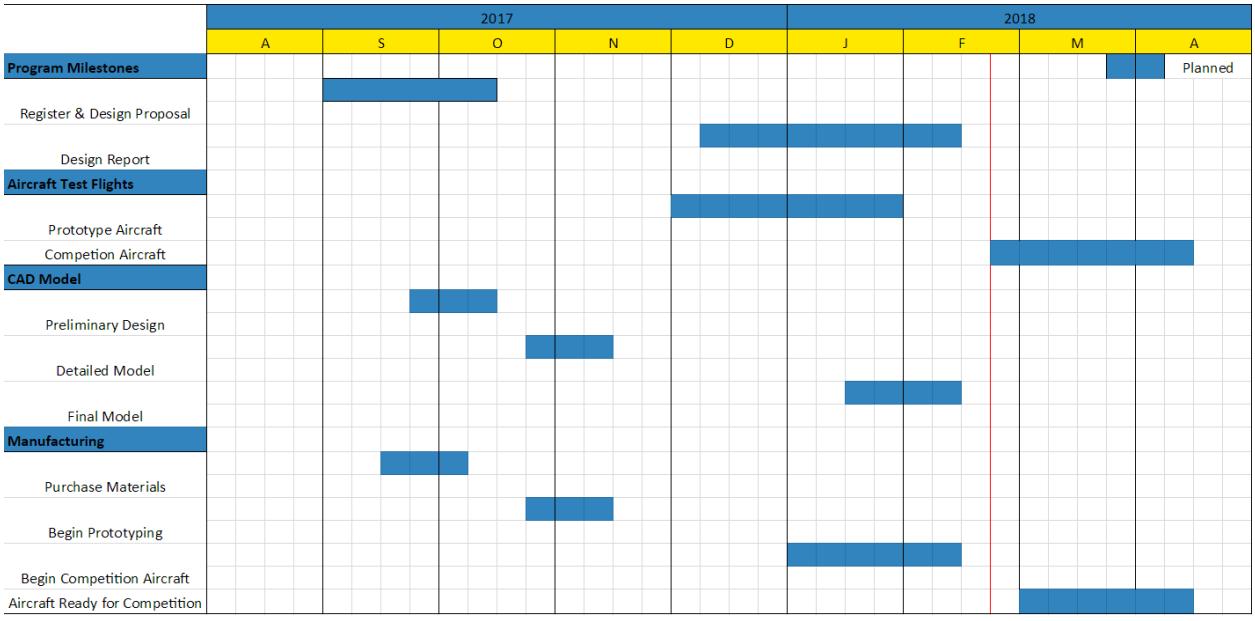
Design/Build/Fly

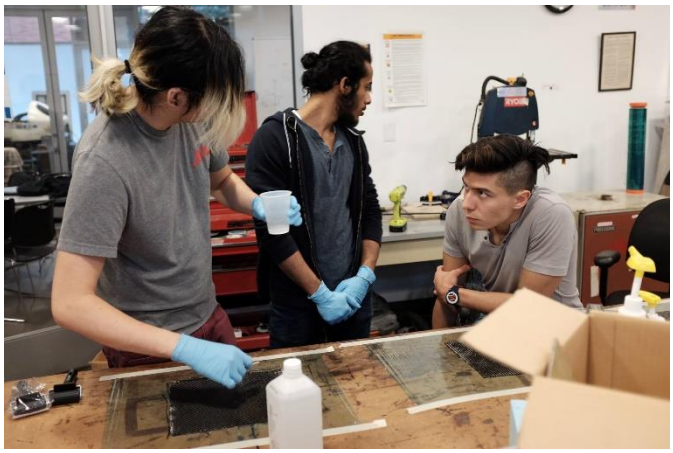
Background



For this competition season, the UCLA chapter of Design/Build/Fly will fully design and build an unmanned, radio-controlled aircraft for the 2017-18 AIAA competition. The competition is hosted by Raytheon and Cessna, and will take place at the Cessna Field in Wichita, Kansas. Each year AIAA releases a unique set of design rules and specifications for the aircraft, which typically include payload and speed requirements as well as ground mission. These challenges provide an opportunity for students to use their theoretical knowledge gained in the classroom to produce a physical product. The design phase of the project spans from September to mid-October, with manufacturing and testing taking place until competition in mid-April. The competition draws from universities across the globe, and usually accepts over eighty schools' design proposals. UCLA DBF provides a platform for students to enhance their technical engineering skills and leadership abilities through an extensive, hands-on project.

Current Developments and Plans





This year the team will create a regional and business aircraft, capable of carrying "passengers" and cargo blocks. The aircraft will be scored based on its speed, weight, size, number of passengers carried, number of cargo blocks carried, and the accompanying detailed design report. Preliminary analysis demonstrates a score advantage to carry minimal passengers and cargo to allow for a smaller aircraft, so we are aiming to manufacture a plane under 1.5 pounds. The competition contains three missions: one emphasizing speed, one endurance, and a unique ground mission. The ground mission requires any major aircraft component, including batteries, landing gear, control surfaces, and propeller, to be removed and a replacement installed within a five-minute window.

Our current schedule targets the first prototype to be developed in December, with the first test flights taking place before the new year. Ideally, we will produce at least three prototypes before competition in April, as the historically competitive teams normally manufacture four or more throughout the year. Unfortunately, last year's team had trouble following its manufacturing plan, as production was stalled for weeks after an official rule change. A rule clarification was released roughly three weeks before the final design report was due, which placed the design in a grey area. Ultimately, the team was unable to physically produce the new design of the plane, resulting in the decision to not attend competition. The team then focused on rebuilding and transferring knowledge from the graduating seniors to the new leadership team. The 2017-18 team is dedicated to using this knowledge and training to attend competition with a fully functioning plane, and hopes to place in the top 50 teams.

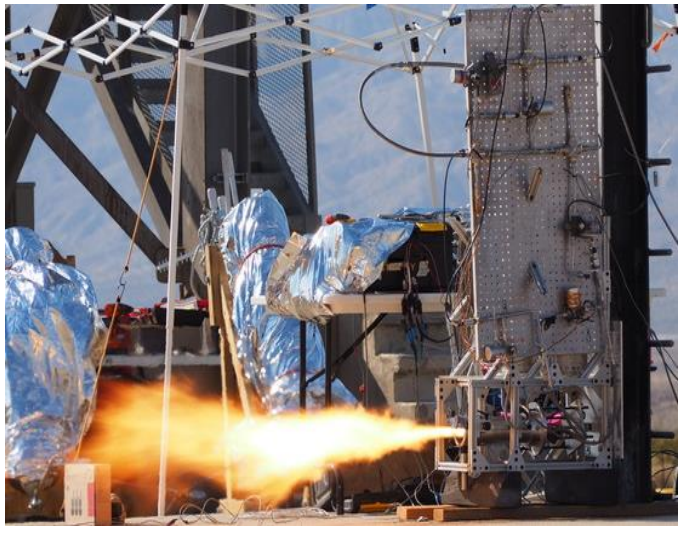
Budget

Category	Amount
Raw Materials	$4,000
Electronics	$1,000
Travel	$2,500
Competition Costs	$2,000
Total Project Cost	**$9,500**

Rocket Project at UCLA

Background

Our team is known for building hybrid rockets. Not satisfied with using solid motors, the first rocket ever constructed by our team was a student-built hybrid that competed in the first IREC, a competition we won. From there, we have continuously iterated and explored unique designs for each IREC competition. While winning was always a goal, our team was more concerned with unique and innovative designs that took the best out of our students. Indeed, in the 2016 IREC competition, we won the Dr. Gil Moore Award for Innovation for a simulation that determined the rocket's trajectory when one of its boosters failed. This thread of innovation is woven into the DNA of our team. One will be hard-pressed to find a more motivated, passionate, and diverse group of engineers that can tackle our next big innovation: UCLA's first student-built liquid bi-propellant rocket.



Current Developments and Plans

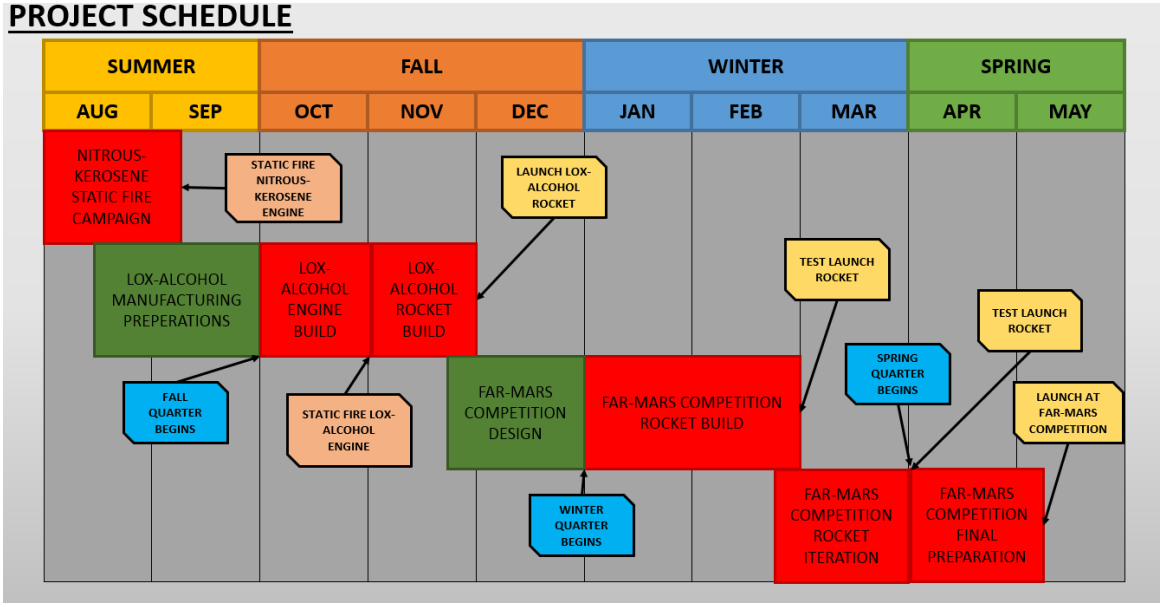
Our rocket for the upcoming school year is quite different from the previous engineering projects. The liquid rocket project includes the following design parameters, all of which are firsts for the team:

- a target apogee of 45,000 feet
- a LOX/Kerosene engine
- flight in the supersonic regime
- pneumatically actuated propellant and venting valves

The liquid rocket is by far the most expensive endeavor undertaken by the UCLA Rocket Project. The cost of materials and manufacturing our engines and plumbing is the most substantial portion of our budget. However, as the budget details above, we have also allocated substantial money for two more key cogs of our

organization: the Education and Foundry programs. Our Education program is all about fostering a healthy, sustainable organization by training incoming freshman in the basics of rocketry. These freshmen will design, build, and launch an L1 certification rocket in the time span of a quarter, thus teaching them the fundamentals they will need to contribute to the liquid rocket effort. The Foundry is our eye to the future. Our organization's story is one of ceaseless innovation. The Foundry is our innovation team. They will build, test, and launch our first multi-staged rocket. This experience will be invaluable in the years to come, such as potential high-altitude rocket programs.

As the 2017-2018 school year begins, we are excited to begin the construction of the most ambitious projects ever undertaken by Rocket Project at UCLA.



Budget

Category	Amount
Liquid Bi-Propellant Team	$36,000
PPE	$1,500
Education	$6,700
Travel	$2,000
Administrative	$2,100
Spaceport America Team	$5,000
Research & Development Team	$2,500
Total Project Cost	**$55,800**

ROCKET PROJECT AT UCLA

Unmanned Aerial Systems

Background

Unmanned Aerial Systems at UCLA is a team of students working together to design, manufacture, and test an autonomous drone for competition in a mock search-and-rescue mission. Last year, UAS at UCLA designed and built a fixed-winged drone capable of autonomous flight and simple onboard vision processing. This drone placed 14th place at the AUVSI competition held in Maryland after the team successfully demoed its capabilities in front of a team of judges. Scores and rankings are also influenced by the quality of technical documentation manuals and video presentations sent to judges for review.

Current Developments

Our team is fixated on expanding this year, both in terms of student membership and resources available to construct our 2018 drone. This year's build season will be dedicated towards addressing the lessons learned at last year's competition while also exploring new ideas that we did not see other teams attempt in their mission attempts. In addition, we have already had a major business revamp over the summer of 2017. We moved all of our engineering development to Trello, Slack, and Google Groups, and drafted a slate outlining these communication methods to older members and new members.

In addition, we have been hard at work reworking the design of the drone itself. From our talks with teams at competition last year, we concluded that a multicopter design could provide significantly more flexibility for almost every aspect of the competition. For instance, multicopters are capable of hovering over any vision targets that our drone may encounter on its search and rescue mission, which allows for significantly more accurate images for analysis since motion blur is mitigated. However, multicopters also require more power storage to have the same flight times as fixed-winged aircraft. To address this issue, our team has already drafted up plans that use a combination of large propellers (for efficiency) and large banks of batteries (for longevity) that could function as very competitive designs for the 2018 competition. However, these plans also require a larger budget to accomplish in practice, along with the extra complexity involved in designing the control system for a multicopter. Ultimate, our

success this season will be determined by our sponsorship successes and ability to scale this multicopter design to meet the budgets that we are constrained to.

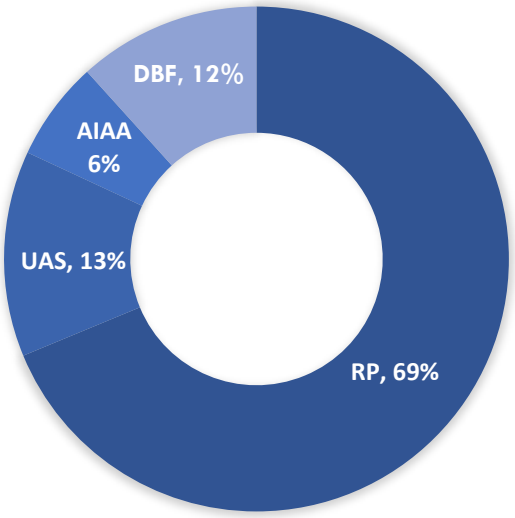
Budget

Category (flight)	**Amount**	**Category (vision + comms)**	**Amount**
Frame (hexacopter)	$500	On-board Camera + Gimbal	$700
Powertrain (65 lbs. max thrust)	$4,500	Ground station + vision processing	$500
Electronics and Actuators	$500	Communications link	$500
Category (competition)	**Amount**	**Category (testing)**	**Amount**
SUAS Competition Fee	$1,000	Second multicopter (for testing controls)	$500
Flights + hotels	$2,000		
Total Project Cost			**$10,700**

Unmanned Aerial Systems at UCLA

The Numbers

AIAA at UCLA General Fund	$5,170.00
Design/Build/Fly (DBF)	$9,500.00
Rocket Project (RP)	$55,800.00
Unmanned Aerial Systems (UAS)	$10,700.00
Total AIAA Projected	**$81,170.00**
Operating Cost	



Sponsorship Opportunities

	Gold	Silver	Bronze
Amount	**$5,000+**	**$2,000-$5,000**	**$0-$2,000**
Company Logo Placement	– All competition posters and presentations – Competition rocket (URP) and planes (DBF, UAS) – Annual industry board presentations, project presentation slides, and design review slides – -Project T-shirts – AIAA at UCLA website and project websites – Sponsorship proposal	– Competition posters – Competition rocket (URP) and planes (DBF, UAS) – Project presentation slides and design review session slides – Project T-shirts – AIAA at UCLA website and project websites – Sponsorship proposal	– Project presentation slides and design review sessions slides – Project T-shirts – AIAA at UCLA website and project websites
Perks	– Free company information session with AIAA at UCLA student chapter – Meet and Greet with the project teams and AIAA board – Quarterly update newsletter – Access to research produced – -Invitation to End of Year Banquet for donors and students	– Meet and Greet with the project teams and AIAA board – Quarterly update newsletter – Access to research produced – -Invitation to End of Year Banquet for donors and students	– Quarterly update newsletter – Access to research produced

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AIAA at UCLA Sponsorship Form

Company Name: _____

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- ☐ Yes! We would like the _____ package by generously donating a total amount of $_____. We would like this to be distributed as follows (please specific amounts in lines below):
  - ☐ AIAA at UCLA General Fund
  - ☐ Design/Build/Fly
  - ☐ The Rocket Project at UCLA
  - ☐ Unmanned Aerial Systems

- ☐ Yes! We would like to donate the following products/supplies with a value of $_____:

_____

Thank you for supporting AIAA at UCLA!

Please email this (completed) form, along with any question or concerns you may have, to Deb Lin of the UCLA Engineering Office of External Affairs: **dlin@support.ucla.edu** and Amanpreet Kaur, AIAA at UCLA President: **aiaaucla@gmail.com**.

Contact us today!

For any questions regarding AIAA at UCLA, please contact:

AIAA at UCLA President
Amanpreet Kaur
aiaaucla@gmail.com

For questions, more information about the AIAA student projects, or planning a lab tour, please contact:

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