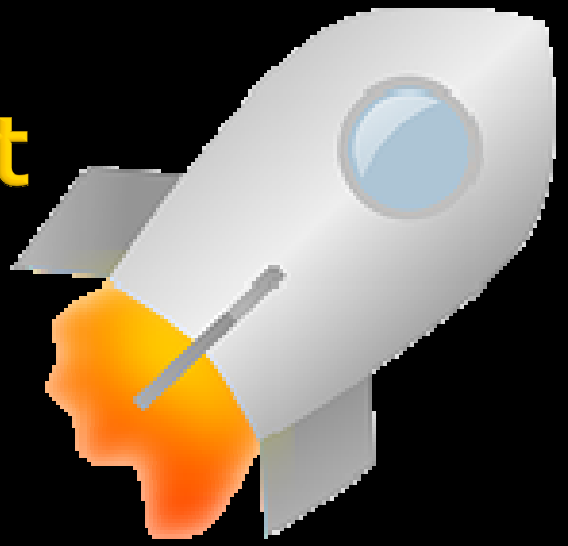
Aerospace Engineering at Mechanical Engineering Department of the University of Costa Rica (Begining with Rocketry)



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2016

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INGENIERÍA MECÁNICA 50 AÑOS

grupo de ingeniería aeroespacial

Topics

- Background and justification
- Project 1: Construction and launch of a rocket
- Project 2: Designing a test bench for rocket motor propulsion
- Expected impacts
- Aerospace Camp

Background

- For humanity, space has always been a mystery and a constant challenge to try to conquer it and understand it
- In Costa Rica we have a special sensitivity to this issue of aerospace engineering thanks mainly to the work of Dr. Franklin Chang Diaz and other Costa Rican that have placed this issue on the national agenda
- The existence of ACAE and all its contributions in this field as we saw on Monday at the presentation of Carlos Alvarado

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Background

- The presence in our country of the company Ad Astra Rocket, also happens to be a catalyst for this enthusiasm and above all a country's position in the global aerospace industry

- Has generated a productive sector related to this issue, most recently gathered in the aerospace cluster includes companies in sectors such as:
  - Metalworking
  - Electronics
  - Manufacture
  - Control
  - Telecommunications, etc.

Justification

- In our country it is necessary to develop and apply knowledge in aerospace engineering and complement the development carried out by the national industry, mainly SMEs
- EIM should look strengthening the scientific and pioneer in aerospace engineering
- Aerospace Engineering is multidisciplinary: engineers, chemists, physicists, programmers, etc.

Justification

- For the above reasons we think that at this moment the country needs the contribution of all universities.
- So we decided to start with projects that were attractive to our students, with projects that could infect them with enthusiasm

Rockets are perfect for that

¿Why we want to launch rockets?

People always ask me this: why rockets? and my answer could be only because we are engineers and we are excited only to push the ignition button and see the rocket fly but I must say that besides that:

- Academic reasons
- Strengthen knowledge and skills of our professionals
- We contribute to the development of the country: New Model
- Think big … Sometime we could place satellites in space

Construction and launch of a chemical rocket that allows multidisciplinary interaction and generate interest in aerospace engineering at UCR students as well as high school students to study related careers

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Design, Construction, Implementation and Validation of a test bench for chemical propulsion engines for rockets

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Potencial Impacts

- Promote in a more systematic and structured way , the area of aerospace engineering at the EIM.
- Engaging small industries in the metalworking sector, TIC's and software development, financial institutions, electronics industries development and control, among others
- The possibility of turning the country into a site for satellite launches.

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Campamento aeroespacial

(Aerospace Camp)

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Aerospace Camp 2015

What were we looking for?

- To develop an activity that get close to the participants in the desing and construction process of solid fuel rockets
- That participants know basic tools for design, manufacture and construction of the mechanical and electronical elements used in aerospace engineering
- To get stronger the Aerospace Engineering Group of the UCR with an activity that includes rocket launches
- To involve Costa Rican aerospace industry with the academy in this important area for the development of the country and to generate R&D projects

How we did it?

- With an interactive activity in which the participants acquired knowledge from experts, and they could apply this knowledge with the construction and launch of a short range solid fuel rocket.
- We included:
  - Experts talks
  - Astronomic Observation
  - Technical visit (Ad Astra Rocket)
  - Construction and instrumentation of rockets
  - Rockets launches

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Experts Talks

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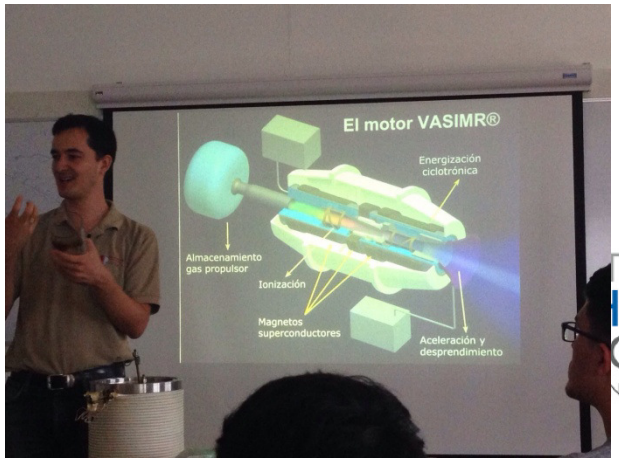
Ad Astra Rocket visit



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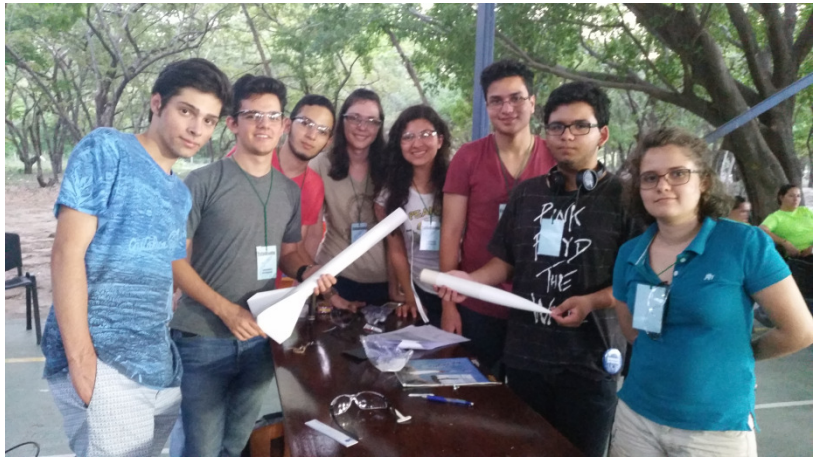
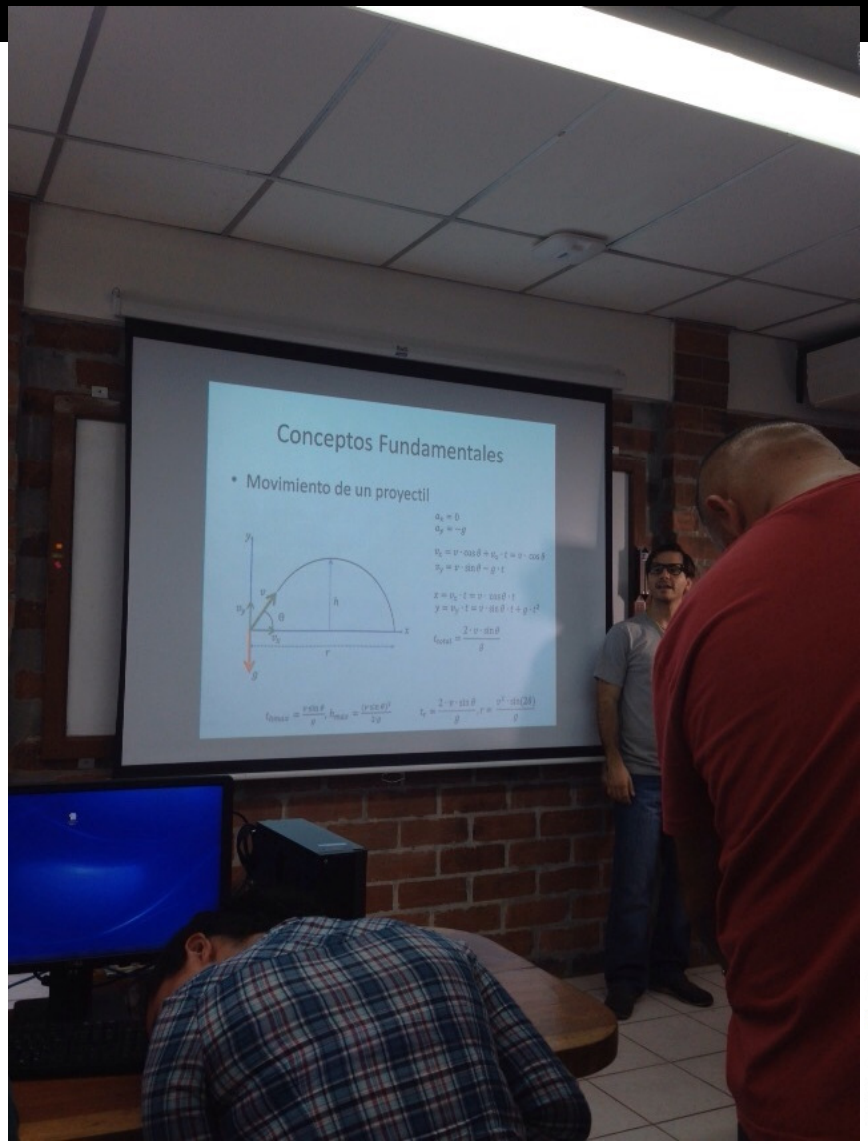
Astronomic Observation

Rockets Construction



- Difacom Rocket made of carbon fiber

Theory and Simulation



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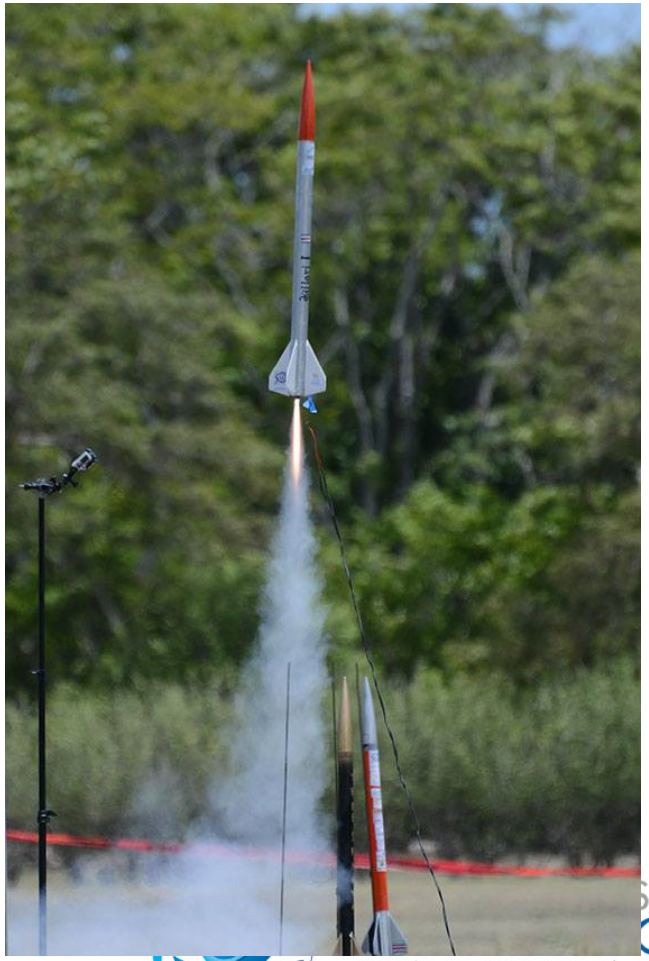
Launch time!!



Staff

Community participation

¿Cómo y dónde fue?

- 3 días de campamento en julio de 2015
- Por ser campamento, y para tener más espacio disponible para hacer los lanzamientos de los cohetes, el lugar ideal es la Sede de Guanacaste de la UCR
- Dirigida a estudiantes de ingeniería y de los dos últimos años de colegio apasionados en la ingeniería aeroespacial

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How and where it was?

- On july 20, 21 y 22, 2015
- At Guanacaste UCR Campus
- For engineering students and high school with passion for aerospeace engineering

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Video

Campamento aeroespacial 2016

..... Coming soon...

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Thank you!

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