



**POLITÉCNICA**

**VUELA, VUELA, VUELA 2011  
POLYTECHNIC UNIVERSITY OF MADRID**

## **Bases of the competition**

### **General description**

The objective of the competition is to design, manufacture, and test an aerodynamic profile. The winning team will be the team that achieve the highest aerodynamic efficiency ( $l/d$ ), for a given lift coefficient ( $c_l = 0,9$ ) and Reynolds number ( $Re = 500.000$ ).

The development of the competition consists of the following phases:

- Call: 15/05/2011
- Registration: 01/06/2011-15/10/2011
- Presentation of the project: 31/12/2011
- Evaluation of projects: 01/01/2012 to 31/01/2012
- Proclamation of finalists: 31/01/2012
- Preliminary trials in tunnel: 01/02/2012 to 30/06/2012
- Competition: 05/07/2012

### **Requirements of the participants**

1. The competition is open to all university students, from third year, in degrees of five or more years, and from second year in those of three to four years.
2. Teams will consist of 4 students.
3. In order to enhance the participation of students from universities other than UPM, positions in the final stage will be reserved to teams from other universities.
4. In addition to the above finalists, the Organizing Committee reserves the right to invite a maximum of 4 teams from non-Spanish universities, who will directly be incorporated into the final stage.

### **Technical requirements of the project**

1. For the design of the profiles, the aerodynamic cord is fixed at 400 mm and the wingspan at 790 mm, equal for all teams.



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2. The Organization will provide to all participants a workshop with materials and tools to manufacture and assemble the profile, for the purpose of testing the evaluation.
3. The shape of the profiles can be both original and any published in the literature.
4. The report must be submitted in digital format and will consist of:
  - Word file or PDF to cover in detail the theoretical calculations and background.
  - Excel file containing the coordinates of the profile.
  - Bibliography.
5. The wind tunnel test conditions are:
  - Reynolds number (Re) around 0,5E6.
  - Turbulence level, more than 2%
  - Dimensions of the profile to be tested: span 790 mm, cord 400 mm.
6. In the Final Stage, all teams will have 5 minutes to carry out measures of the aerodynamic forces at 5 angles of attack, the efficiency for every angle will be calculated, and the curve  $c_l/c_d$  vs  $c_l$  will be drawn through a parabolic fitting. The efficiency value for  $c_l = 0,9$  in the fitting curve will be the result to be considered in the competition.

### **Criteria of evaluation of projects**

The evaluation of the project consists in the following points:

- Degree of documentation of the developed profile.
- Correction of the theoretical approach and development of calculations.
- Documentation and ability of selection, in the case of an existing profile.

### **Organizing Committee**

- The contest Director: Dr. M. a. González Hernández
- Deputy Director of ETSIA: Dra. V. Lapuerta González
- Deputy Director of EUITA: DRA. E. Palma Villalón

### **Technical Committee**



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- President: Dr. J. M. Perales Perales, UPM Vice-Chancellor
- Vocal: Dr. A. Laverón Simavilla, E-USOC Managing Director
- A Member representative of each partner company

### **Awards**

Final prizes of the competition:

- First Prize: 3.000,00 € for the team.
- Second Prize: 2.000,00 € for the team.
- Third Prize: 1.000,00 € for the team.

### **Disqualifications**

The Organization reserves the right to take appropriate measures and/or to disqualify those participants and/or projects that fail to meet with some point of the bases during the course of the competition.

### **Collaborating companies**

### **Intellectual property**

The intellectual property of the project presented will be shared between the team and the organizing entities of the contest. The organizers reserve the right to use them for educational purposes.

### **Legal aspects**

1. The Organization reserves the right to complete and modify the contest at any time, giving prior notice to all registered participants.
2. Submitting the registration to the contest, implies acceptance of these rules in their entirety.
3. Students who do not belong to the Polytechnic University of Madrid, must provide accreditation through the University of origin that guarantees its civil responsibility in this test.