EuCAP 2027
The EurAAP conference

EurAAP

21ST EUROPEAN CONFERENCE ON ANTENNAS & PROPAGATION

DÜSSELDORF, GERMANY
18-23 APRIL 2027

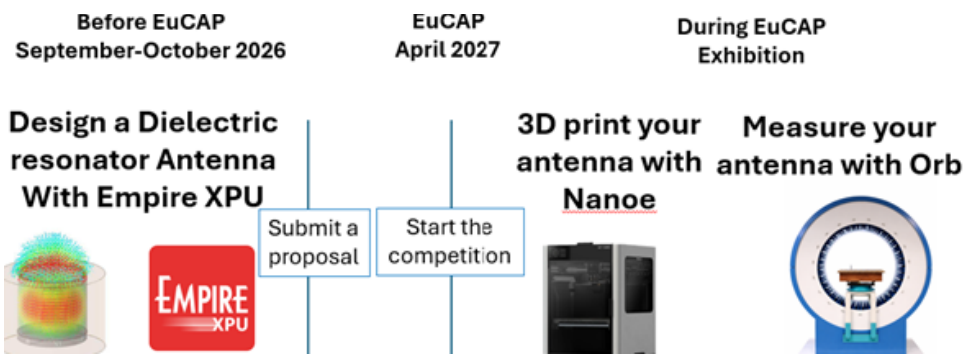


2027

STUDENT DESIGN CONTEST

EuCAP Student Design Contest

Antenna Design



The EuCAP 2027 edition is happy to announce its antenna system design competition. Tageting the freqeuncy range between 7.1 and 8.5 GHz, you have to deign a dielectric resonator antenna that can be manufactured by 3D printing using specific RF materials. All relevant supporting material to design the antennas will be provided by the organizers (see page 2).

General Rules and Eligibility

The competition consists of two phases. A qualification phase with submission deadline December 15, 2026. After this phase, the three best teams will be chosen to participate in the final competition. These teams will compete on site in Düsseldorf during EuCAP 2027 (18-23 April 2027) to select a winner. The winning teams will be recognized at the closing ceremony and will receive attractive prizes in the form of cash awards.

- A teams can consist of 1 to 5 people.
- All team members must be full-time PhD, Master, or Bachelor students during the whole duration of the competition. This condition must be certified.
- At least one team member of the qualified teams must register for EuCAP 2027 and attend the student competitions in person.

Important Dates

Submission deadline for the qualification Phase: **December 15, 2026**
Notification of the selection process results: **January 15, 2027**
Conference Registration of at least one member of the selected team: **January 30, 2027**
Final Competition during EuCAP 2027: **19 – 23 April 2027**

Organizers

EuCAP 2027 The EurAAP conference · IMST · Orb Instruments Catch the Wave · NANOE

Antenna Design

The Challenge

The objective is to design a high-performance dielectric resonator antenna (DRA) operating in the 7.1–8.5 GHz frequency range. Each team will use an identical PCB equipped with a 50Ω microstrip feed line. The contestants must design a dielectric resonator that is excited by the microstrip line and maximizes the realized gain in the boresight direction.

The complete antenna, including the dielectric resonator, must fit within a maximum volume of 2.5 × 2.5 × 2.5 cm^3. Several dielectric materials with relative permittivities between 3 and 9 can be realized with the given filament by varying its local density and may be used within this volume. The design should be optimized for maximum realized gain while maintaining effective excitation, good impedance matching, and stable radiation performance across the specified frequency range.

As a reference, a cylindrical dielectric resonator with a radius of 5 mm, a height of 11 mm, and a relative permittivity of 7 operates in the HEM11 mode at approximately 7.8 GHz. This reference structure will provide the initial design orientation, but contestants are encouraged to explore innovative geometries leveraging 3D printer capabilities, material combinations, and resonator configurations.

Design Tools and Reference Files

The organizers will provide a reference template containing the substrate, microstrip feed line, slot, and cylindrical dielectric resonator. The template will be available in STL and Empire simulation formats. To support the design process, each selected team may receive a three-month Empire XPU license for electromagnetic simulations prior to EuCAP 2027. Of course, the contestants are free to use other software of their choice.

Contestants are free to modify the resonator geometry and use different combinations of dielectric constants, provided that the final design remains within the defined volume and can be fabricated using the equipment provided at the conference. The three best teams will be chosen to participate in the final competition on site in Düsseldorf during EuCAP 2027.

Evaluation Criteria

The primary evaluation criterion is the maximum realized gain in the boresight direction within the operating frequency range from 7.1 to 8.5 GHz. Additional performance indicators may include:

- Impedance matching and bandwidth
- Stability of the radiation pattern
- Design originality and effective use of additive manufacturing

Final Contest

During the conference, a dedicated ceramic 3D printer supplied by Nanoe will be available for the contest. Selected participants may also have the opportunity to design and measure a DRA array during the conference. Each team may fabricate up to at least three antenna samples, allowing the design to be refined and optimized during the event.

The fabricated antennas will be measured using a Nano measurement system provided by Orb Instruments. The measurement results will be displayed live on a screen during the contest, allowing participants and visitors to follow the ranking and performance of the designs.

- The organizers, Nanoe, and Orb Instruments will provide the necessary equipment and technical support for the fabrication and measurement process. The final ranking will be then based taking into account the measured antenna performance.

Submission Requirements (Qualification Phase)

- Download the reference design at **www.eucap2027.org**, and if necessary Empire XPU: https://empire.de/free-demo.html
- Submit your design data in a common format (e.g.,Empire, STL). Submission must also include the submission form (part of this document) plus a description document. Submissions must be filed not later than **December 15, 2026** via email to **studentcontest@eucap2027.org**

Submission Form

Submission deadline: December 15, 2026

Please fill out the form for all participating students and an advisory member of the university

Team Member 1- main point of contact

Name:	
University:	
City, Country:	
Email:	

Team Member 2- optional

Name:	
University:	
City, Country:	
Email:	

Team Member 3- optional

Name:	
University:	
City, Country:	
Email:	

Team Member 4- optional

Name:	
University:	
City, Country:	
Email:	

Submission Form

Submission deadline: December 15, 2026

Please fill out the form for all participating students and an advisory member of the university

Team Member 5 - optional	
Name:	
University:	
City, Country:	
Email:	

Faculty member contact data for eglibility certification	
Name:	
University:	
City, Country:	
Email:	

Submission Form

Submission deadline: December 15, 2026

Solution Summary

Check list for submission:

Fill in contact data of all contestants	☐
Fill in the solution summary	☐
Attach detailed solution description incl. images if needed	☐
Attach Design Data / Matlab Code	☐
Send everything to studentcontest@eucap2027.org via email	☐

EuCAP 2027
The EurAAP conference