

# REGULATIONS

## HUAWEI TECHARENA 2025

### 1. The Organizer

The Huawei Tech Arena 2025 is designed and organized by Huawei Technologies Italia S.r.l. (hereafter "Organizer" or "Huawei").

### 2. Means of Participation

The competition announcement will be published on the following website: <https://techarena-italy.it>

In order to participate in the Huawei Tech Arena 2025, it is necessary to register online following the instructions of the Platform. Incomplete, irregular registrations or registrations made differently from the above or submitted after the deadline will not be accepted. The Organizer reserves the right to verify the identity of the participant, as well as the authenticity and correctness of the data provided at the moment of registration. Failure to provide the documents that allow for the identification of the participant, or any non-conformity of the information entered or the reasonable assumption that such information is false, incorrect, out of date or incomplete, will result in the exclusion of the participant from the competition in addition to any legal actions that the Organizer may decide to undertake.

The data provided by the participant will be included in the database of the Organizer and its supplier agency Tree S.r.l. according to the rules related to the protection of personal data.

### 3. Duration

The outputs and related documentation can be presented until 10th November 2025  
The Organizer reserves the right to change the closing date of the competition.

### 4. Participants

The Huawei Tech Arena 2025 competition is open to all top students from Italian and European Universities.

Rules:

- Participants must be at least 18 years of age.
- The participation of legal entities is excluded.
- It is possible to participate as individuals or as a team of up to 3 people.
- Each participant can join only one team.
- Each team must identify itself with a denomination.

## 5. Type of competition and registration procedure

The main objective of the 2025 Huawei Tech Arena is to boost the attraction of young talented university students.

### a) Type of competition

Prizes will be announced for the best projects presented in the following thematic areas:

#### GENERAL TOPIC: NEXT-GENERATION RF TECHNOLOGY FOR WIRELESS COMMUNICATION

##### Sub TOPIC 1: Electromagnetic Sensing Solutions and Technological Innovations for Low-Altitude Economy

###### Proposition: Low-altitude sensing: Multidimensional Signal Processing and High-precision Target Detection

- Dynamic Clutter Suppression and Target Separation:
- Utilizing Doppler frequency analysis, space-time adaptive processing (STAP), and clutter modeling techniques to effectively distinguish dynamic clutter from target signals in complex environments. Address coupling issues between clutter and targets in the time-frequency domain.
- Multi-target Tracking in Dense Scenarios:
- To counteract strong clutter interference caused by ground reflections, integrate multi-target collaborative tracking algorithms and Nyquist lobe trajectory optimization. In scenarios with vehicle density exceeding 6 vehicles/km, achieve:
  - $\geq 80\%$  detection rate for stationary/slow-moving targets.
  - $\geq 90\%$  trajectory detection rate for high-speed targets

###### Innovation Proposals:

- Introduce the latest AI technologies.
- Consider the integration of measurement and recognition strategies and technologies.
- Provide the most cost-effective solutions through multi-base station collaboration or the collaboration between radar equipment and sensing-communication base stations.
- Utilize environmental information and prior knowledge from business scenarios.
- Combine hardware innovation with algorithmic innovation.
- Achieve deep integration between RF-based and other sensing technologies.

##### Sub TOPIC 2: Technological innovation of low orbit satellite communication network

###### Proposition: Fast Algorithm for Multi-beam Weights Generation

- Task A: Consider a  $100 \times 100$  array (spacing  $0.5\lambda$ ), design the phase weights for all beams according to the beam position and beam width coverage. The optimization time for the average single beam weight is less than 1 minute.
- Task B: Use the weights and beams generated in Task A as the baseline. By deactivating a portion of the array elements, achieve a condition where the directional gain loss of each beam in the main lobe is less than 1 dB, with the array sparsity reaching 70% (i.e., 30% of the array elements can be deactivated).

###### Innovation Proposals:

- Seamless switching between satellite and ground: A new switching architecture can be proposed by combining user location, ephemeris information, and intelligent methods to achieve seamless switching between satellite and ground, with service interruption time during switching  $< 100\text{ms}$ .
- Interference elimination: Explore solutions for spectrum reuse and interference elimination between satellites and the ground, achieving efficient spectrum reuse between satellites and the ground with minimal or zero spectrum isolation, or achieving semi-dynamic spectrum sharing.

##### Sub TOPIC 3: AI-based RF and antenna design

###### Proposition: Design of Metalens Antenna with Low Sidelobe Based on AI

- Metalens antenna with a Dimensions of  $13\lambda \times 13\lambda @ 10\text{GHz}$  is used as an example. The gain is required to be greater than 26.5dB, and the side lobes on the E and H planes must be lower than -30dB.
- The metamaterial unit design and combination of large arrays require a large amount of computing resources. AI-assisted design is recommended to greatly improve design efficiency and simplify design.

###### Innovation Proposals:

- In RF/Microwave structure design, one of the major problems in developing AI/ML models is model selection. Model selection is an automated tools that can recommend or select the most appropriate model architecture based on problem characteristics and data characteristics.
- AI-based RF and antenna design should be grounded in electromagnetic theory and existing domain knowledge, with AI serving as complementary tool for electromagnetic modelling, data extraction and in-depth integrated design optimization.

## b) b) Registration procedure

To register, the participants must complete the following flow:

### 1st phase: Expression of interest

Expressions of interest should be sent through the application form via the following link: <https://techarena-italy.it>, making sure to include the necessary data to be contacted and to elaborate on the main requirement for access to the project.

### 2nd phase: General Information

Participants must complete all sections of the template on the provided form and upload the relevant information.

Teams that register will need to provide the following information:

- Team name; Number of team members; E-mail Address; Phone number; Topic and specification about the reason what participating in the specific area;
- For each team member: Name and surname; CV.

### 3rd phase: Project Submission

Upload your presentation via the provided submission form using the previously registered e-mail address.

All projects must be submitted following the PPTX template provided and indicate if the project results from a team collaboration or individual work.

## 6. Rules of participation

To participate in Huawei Tech Arena 2025 each participant must entirely and unconditionally accept these Regulations, register as indicated, and read and accept the Privacy Policy.

Accepting these Regulations, each participant declares that he or she is aware of the civil and criminal responsibilities deriving from any false declarations provided at the time of registration and therefore declares that the personal information provided at the time of registration is true. Each participant and each team also declare that any decision made by the jury nominated by the Organizer regarding the event will be accepted unconditionally.

Every communication about the challenge and the student workshops will be sent by e-mail to the address indicated on the registration form. It is possible to change the composition of the Team until the closing date of applications. If the e-mail address is incorrect, or in any case it is not possible to deliver the e-mail, the participant will be automatically excluded. If the information provided at the time of registration is incomplete or false, the candidate will be excluded from the competition. By accepting these Regulations and participating in the challenge, each participant undertakes, for the duration of the event, to use the digital space with respect, strictly defined below Code of Conduct.

Each participant acknowledges and agrees that participation is free of charge and that it does not determine the right to receive any compensation upon any title, and/or any reimbursement of expenses.

The Organizer and its partners will not be responsible in case of failure or incomplete receipt of the electronic registration and/or the Documentation for any reason. In this regard, participants are reminded that the Internet, servers, the Site and the Platform may be subject to technical difficulties, maintenance works or malfunction which may cause network slow-downs or make access and any other connection to the Platform, to the Site, to the online registration form and/or to the upload form impossible.

In addition, the Organizer does not take charge of any connection malfunctions of the individual participants that prevent the participation of the same or the team in all or part of the competition. Each participant is exclusively responsible for his/her own internet access and for the connection costs of the same. Each participant accepts this limit of functionality and takes on the test the good functionality of the connection method of the IT system and of the Internet resources that he/she intends to use from time to time to register, insert the Documentation and participate in the competition.

Each participant takes part in Huawei Tech Arena 2025 at their own risk and is responsible for their design, documentation, equipment and IT supply.

Therefore, each Participant undertakes, as of now, to release the Organizer from any and all liabilities related to the Huawei Tech Arena 2025 and to indemnify and hold harmless the Organizer and its partners from any request or claim, also for damages, which may be presented, for any reason, in relation to the Huawei Tech Arena 2025, the Documentation or in any case may derive from his or her participation in the event.



## 7. Code of conduct

Huawei Tech Arena 2025 is intended as an ethical event; therefore, participants are required to respect this principle and to comply with the following Code of Conduct at each stage of the competition and to:

- respect the Regulations, the Brief, the calendar and the Path by accepting the decisions taken by the Organizer, the collaborating partners and / or the jury composed by Huawei R&D Experts;
- show respect towards the other participants, the staff and the other members and / or delegated subjects of the Organizer, by the collaborating partners and / or by the host structure;
- the following actions will be considered as infringements, based on the unquestionable judgment of the Organizer and the collaborating partners:
  - i. use of language or expressions that are deemed offensive or defamatory or incite violence and / or discrimination, which invades privacy, which are illegal, or which contain advertising, political / ideological contents or religious statements;
  - ii. the publication, transmission or diffusion, in any way, of illegal, harmful, violent, threatening, abusive, harassing, defamatory images, materials and / or contents and / or which can be considered harmful to the personal dignity or that are offensive, vulgar, obscene, detrimental to the privacy of others, racist, classist, blasphemous, contrary to good behavior or public order or otherwise reprehensible or which suggest an inappropriate use of the activities that take place according to the Huawei Tech Arena 2025;
  - iii. the presentation or the use, in any way, of documentation, contents and / or materials that are not original, that involve the violation of industrial and / or intellectual property rights - including those of use and use of third parties;
  - iv. the publication, transmission or diffusion, in any way, intentionally or unintentionally, of any material that contains viruses or other codes, files or programs created to intervene, to destroy or to limit the functioning of software, hardware or telecommunications systems of third parties, included the website/systems where Huawei Tech Arena 2025 is supported;
  - v. the alteration of data entered by others;
  - vi. the carrying out of operations, intentional or not, which influence or compromise the regular functionality or which limit the use for other users of the Platform, the Site, the services, servers, networks connected, even indirectly, by the Platform, from the Site, from the hosting structure and / or from the Organizer and the collaborating partners;
  - vii. violation, intentional or otherwise, of any applicable law or regulation;
  - viii. cheating or attempting to cheat;
  - ix. any other conduct, fraudulent or unauthorized that may even negatively affect the other Participants or the competition or, in any case, compromise the successful outcome and / or image of the Competition, of the Organizer and of the collaborating partners and / or, in general, of Huawei and its partners.

Any violation of the Regulation and / or the Code of Conduct or conduct from which it may be alleged an unlawful and / or violating behavior of these Regulation as well as any irregularities committed during the registration phase or during the competition will involve, as appropriate and on the basis of the unquestionable decision of the Organizer, failure to participate, expulsion or disqualification of the participant and / or withdrawal of the prize already awarded and the removal of any material and / or content possibly already sent or published.

## 8. Evaluation Criteria

The participants' submissions will be evaluated separately based on below criteria:

### a) Timeliness, novelty and originality

Does the proposed activity address a relevant topic within its area of research? Does it focus on subjects that have not been thoroughly investigated by mainstream research trends? Is it aimed at filling a knowledge gap in the reference area? Is the research proposal based on the use of innovative techniques or tools?

### b) Technical quality

Is the proposed analysis or study thoroughly explained? Is the overall research activity solid in terms of the key theoretical assumptions and the adopted or envisioned methodologies?

### c) Potential research or industrial impact

What is the envisioned impact of the proposed activity on the currently available theoretical or industrial solutions? What are the key improvements that can be achieved by the successful implementation of the proposed idea?



#### d) Presentation and communication effectiveness

Are existing State of The Art solutions and background information clearly introduced? Is the activity flow well organized? Are the overall value and the main application scenarios unambiguously explained? Are all the figures and the submitted material effective in conveying and stressing the key messages?

Effectiveness in delivering a good presentation from a communication point of view represents an additional criteria in case of ex aequo.

The projects submitted will be evaluated by a jury nominated by the Organizer. The jury shall nominate three (3) winners, respectively in 1st, 2nd and 3rd place.

## 9. Prizes

The following prizes will be awarded to the winners of the Huawei Tech Arena 2025:

**1st place**, 3500€ monetary award;

**2nd place**, 2000€ monetary award;

**3rd place**, 1000€ monetary award

and possible **internship opportunities** in Huawei to the winners (1st place, 2nd place and 3rd place).

#### Method of disbursement of the Award

In case of Team participation, the above monetary prize and any other prizes will be awarded to the individual Participants composing the Winning Team. The prize will be equally distributed among the members of the Team.

The prize in the form of money will be paid by Tree S.r.l. by means of bank transfer within 30 days from the nomination of the Winner(s); to this end, each Winner and/or the members of each winning Team undertakes to notify Tree S.r.l., the details of the bank account(s) to which to make the credit, within 7 days of the award, as well as, within the same period, the personal details and tax identification number of the persons.

It is understood that, should the Prize consist of monetary amounts paid by Tree S.r.l. to the Winner, it shall remain the Winner's responsibility to fulfill all tax and fiscal obligations that may be related to the receipt of such income such as, but not limited to, the payment of taxes and/or fees and/or levies. The Participant, by accepting these Regulations, agrees to indemnify and hold Huawei, Tree S.r.l. and Partners harmless for any damages or prejudicial consequences it may incur as a result of fulfilling its tax obligations related to the Prize.

Pursuant to Article 6, paragraph 1, letter a) of Presidential Decree No. 430/2001, the "Huawei Tech Arena 2025" does not constitute a competition or a prize operation and is excluded from the application of the relevant regulations, as it is aimed at the presentation of projects or studies in the commercial or industrial field, with the awarding of prizes that represent recognition of the personal merit of the winners, as well as encouragement in the interest of the community.

## 10. Warranties

By participating and accepting these Regulations, each participant:

- a. expressly declares and warrants that the output and the related documentation is made by the same person, is original and does not in any way, in whole or in part, infringe the intellectual or industrial property rights of third parties
- b. shall fully defend and hold Huawei harmless from any and all liability, claims for damages and / or compensation, expenses, including legal expenses and costs that may be advanced by any other participant or third party related to the title to or violation in any form of the proprietary rights by the output or its connected Documentation.

In case of violation of the provisions of this Article, the participant may be excluded from this competition.

Except in cases of willful misconduct or gross negligence attributable to the Organizer, the Organizer itself does not undertake any liability or responsibility for any use or abuse by any third party of the output, the documentation, of the idea or work of the participant or the development and / or realization of the same and / or of the project related to them by anyone who came to know about it. Likewise, the Organizer does not undertake any responsibility for potential adverse consequences that the pre-disclosure could in the abstract determine with reference to the inventive and / or original aspects of the elaboration and related documentation.

## 11. Data Protection

The processing of personal data collected during the Huawei Tech Arena 2025 will be carried out in accordance with current legislation on privacy, with full respect of the EU General Data Protection Regulation 679/2016 (GDPR) and Legislative Decree 196/2003 and its subsequent modifications.

By participating and accepting these Regulations, each participant authorizes the Organizer and its partner Tree S.r.l. involved in the Huawei Tech Arena 2025:

- to record their image and voice on video, audio, photographic, digital, electronic, or any other medium
- to use their image, the photos, audio/video registrations of his or her person, the environment, objects and personal data, documents recordings - even in a partial, modified or adapted way -, without any limitation, in any and all of their publications related to the Huawei Tech Arena 2025, including web-based publications, without payment or other consideration.

The authorization specified above implies the granting of a non-exclusive, transferable license to Huawei and to third parties, for the use of the above listed for cultural and educational purposes as well as for activities of disclosure and communication of the Organizer for advertising and promotional purposes, including streaming, publication on the Platform and on the Site and / or on any other websites and in the press, distribution and broadcast on public and private televisions and includes, by way of example and without limitation, copyright and other rights related to its exercise as well as the rights of publication, reproduction, multiplication in copies and storage of the same also in electronic form, translation, transcription, transfer to other formats, editing, adaptation, elaboration and reduction, communication and distribution to the public, projection, transmission and diffusion and all the above also in summary version and / or reduced, in any way or form, with any procedure and on any support, by any known technological means for the purposes and within the limits defined above. Please refer to the Privacy Information Notice attached relating to the processing of the participants' personal data.

## 12. Intellectual property and industrial property rights

### The rights of the Organizer

Participants acknowledge that the Platform, the Site and its contents are owned by Tree S.r.l. its content providers and are protected as such by the relevant rules of copyright, intellectual and / or industrial property and database rights according to the Civil Code, the Industrial Property Code, the Law on the Protection of Copyright and Neighboring Rights and the Criminal Code.

### Data provided by the Organizer

The Brief, all data and information of any nature, nothing excluded or excepted, made available to participants by any means (off and online) from the Organizer remain in the exclusive property and availability of the Organizer that provided them.

The authorization granted to participants to use the Briefs and/or other information provided by the Organizer is limited to the Huawei Tech Arena 2025. Any use of the data in question outside the purpose for which they have been disclosed among the participants is subject to a separate agreement concluded between the Organizer and each of the participants.

### Intellectual property/Industrial property rights vested in the output and the in the documentation, rights of use

Huawei recognizes the ownership of the participants of the documents and documentation relating to them (including the ownership of any intellectual and / or industrial property rights on any element of which these are composed, including but not limited to the idea, the business model, the format, the concepts developed, the proposals and solutions presented and / or the results obtained, nothing excluded or excepted) produced by the participants.

Each participant therefore remains fully responsible for the protection of any innovative and / or original element, which may be discerned in its elaborate and / or in its documentation through the means provided for by the law and will have to bear the expenses in this regard. Huawei shall have the right to use the documents and related documentation free of charge for three (3) months from the conclusion of the Huawei Tech Arena 2025 for the exclusive purpose of analysis, testing, processing and / or demonstration of what has been done by participants.

The possibility remains for Huawei to develop independently or acquire equivalent products and / or in competition with the output and related documents and which do not violate any intellectual property right on them.

## 13. Confidentiality

Participants in the Huawei Tech Arena 2025 agree to maintain total confidentiality with respect to the Confidential Information they will receive from the moment they register for the competition.

"Confidential information" means all information acquired by the participant, in particular but not limited to information on services, data, information collected, the Brief, the Regulations, communication materials, programming languages, software, know-how, design disclosed in any form. Participants in the competition also agree not to disclose Confidential Information to third parties without the prior written consent from the discloser of the Confidential Information; participants accept to strictly comply with the current legislation on privacy and the protection of personal data with regard to the acquired Confidential Information, and accept not to advance any rights, claims or licensing or other rights to use any present and future patents, trademarks, models or other intellectual or industrial property rights with respect to Confidential Information.

## 14. Miscellaneous

These rules are governed by Italian law. Except in cases where jurisdiction is necessarily established by law, for all disputes arising from the interpretation or execution of these Regulations, the court of Milan will have exclusive jurisdiction, with the express waiver of the participants to any exception with respect to this forum.

If any of the provisions contained in these Regulations were declared invalid or not applicable, this provision will not be considered, and all other provisions will remain fully valid and effective.

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