

## CALL FOR GRANT APPLICATIONS (AE2024-0409)

INESC TEC is now accepting grant applications to award 1 Research Grant (BI) within the scope of the GreenAuto funded by IAPMEI with reference 54 Co-financed by Component 5 - Capitalization and Business Innovation, integrated in the Resilience Dimension of the Recovery and Resilience Plan within the scope of the Recovery and Resilience Mechanism (MRR) of the European Union (EU), framed in the Next Generation EU, for the period 2021 - 2026.

### 1. GRANT DESCRIPTION

**Type of grant:** Research Grant (BI)

**General scientific area:** ENGINEERING

**Scientific subarea:** Electrical engineering

**Area of Work:** Mobile Robotics

**Grant duration:** 6 months, starting on 2024-11-01, with the possibility of being renewed until the end of the project.

**Scientific advisor:** Héber Miguel Sobreira

**Workplace:** INESC TEC, Porto, Portugal

**Maintenance stipend:** € 990,98, [according to the table of monthly maintenance stipend for FCT grants](#), paid via bank transfer. Grant holders may be awarded potential supplements, according to a quarterly evaluation process (Articles 19, 21 and 22 of the [Regulations for Grants of INESC TEC](#) and Annex II), up to a maximum limit of 50% of the monthly maintenance stipend.

INESC TEC supports costs with registration, enrolment or tuition fees, during the grant duration, under the terms established in the internal document: "[Payment of Tuition fees to grant holders](#)".

The grant holder will benefit from health insurance, supported by INESC TEC.

### 2. OBJECTIVES:

- Analysis and integration of various 3D location and mapping solutions;
- Development of an AI-based location solution.

### 3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

Literature Review:

- Review of previous work on localization using 3D sensors;
- Analysis of current technologies, identifying their limitations and areas for improvement.

Data Acquisition:

- Selection of the most suitable 3D sensors (e.g. LiDAR, stereo cameras);
- Planning data collection in different environments;
- Identification of relevant public datasets.

Resource Engineering:

- Feature Extraction: Identification of the most relevant features, such as curvature, normals and distances;
- Feature Selection: Choose the most important features using techniques such as:
  - o Correlation analysis;
  - o Importance of features (feature importance);
  - o Dimensionality reduction.

Algorithm Development and Training:

- Defining the model architecture, choosing the algorithm and carrying out tests with different configurations and

hyperparameters;

- Training: Division of collected data into training, validation and test sets. Experimenting with various optimization techniques such as gradient descent and stochastic descent.

Performance Analysis and Refinement:

- Assessment of model performance on the validation set, using relevant metrics (e.g., precision, accuracy, recall, F1-score);
- Model Refinement: Adjusting the model by modifying hyperparameters, adding or removing features, or exploring different architectures;
- Consideration of techniques such as transfer learning or ensemble methods.

Compilation of Results and Final Report:

- Compilation of results obtained throughout the project;
- Writing of the final report, detailing the work carried out and the conclusions drawn

#### 4. REQUIRED PROFILE:

##### Admission requirements:

Bachelor's degree in engineering or related field;

The awarding of the fellowship is dependent on the applicants' enrolment in study cycle or non-award courses of Higher Education Institutions.

##### Preference factors:

Experience in Artificial Vision, Artificial Intelligence, ROS;

##### Minimum requirements:

Enrollment in a Master's degree in Electrical and Computer Engineering, Computer Engineering, or related areas;

#### 5. EVALUATION OF APPLICATIONS AND SELECTION PROCESS:

**Selection criteria and corresponding valuation:** the first phase comprises the Academic Evaluation (AC), based on the criteria referred to in Article 12 of the [Regulations for Grants of INESC TEC](#), while the second phase comprehends the Individual Interview (EI). All factors are evaluated on a scale of 0 to 100, taking into account the applicants' merit, suitability and conformity with the preference factors.

The weight of the AC factors are as follows: Academic Qualifications (FA, 45%), Scientific Publications (PC, 5%), Experience (EX, 45%) and Motivation Letter (CM, 5%).

Candidates who score less than 50 points in the AC average will be considered excluded on absolute merit. The top five candidates approved on absolute merit will be qualified for the individual interview. The Final Grade (CF) is obtained by the weighted average of AC (80%) and EI (20%).

#### DISABILITY INCENTIVE

Candidates who present a degree of disability equal to or greater than 90% will benefit from an incentive (20) in the score of the CV Assessment.

Candidates who present a degree of disability equal to or greater than 60% and less than 90% will also benefit from an incentive (10) in the score of the CV Assessment.

Said score may, in these cases, exceed 100 points.

Candidates must demonstrate the degree of disability during the application, namely through the submission of the Multi-Purpose Medical Certificate of Disability, issued in accordance with Decree-Law no. 202/96, of October 23 - currently in effect.

Candidates must declare, in the application form, the type of disability used throughout the selection process, in order to proceed with the required adaptations.

#### The Selection Jury is composed of the following members:

President of the Jury: Manuel Santos Silva

Full member: Héber Miguel Sobreira

Full member: Armando Sousa

Substitute member:

**Release of results and prior hearing:** the results of the selection process, as well as the terms and procedures for prior hearing, will be released to the applicants by email, under the terms referred to in Article 13 of the Regulations

for Studentships and Fellowships of INESC TEC.

## 6. FORMALISATION OF APPLICATIONS:

### Application Documents:

1. Motivation letter;
2. Curriculum Vitae (must include the list of previous fellowships, their type, beginning and end dates, funding entities and host institutions);
3. Certificate or diploma degree;
4. Proof of enrollment in a degree awarding study cycle or in a non degree awarding Higher Education program.
  - The proof of enrollment may be presented just during the grant hiring stage.
5. Signed declaration stating the infringement of the grant holder's duties (article 14, no. 4)
6. Documental evidence to support the country of residence, residence permit or other legally equivalent document, in cases where the applicant is a foreigner or non-resident in Portugal - valid until the beginning of the grant.
7. Other supporting documents relevant to the final assessment.

Failure to deliver the required documents within the 90-day period after the date of the notice of the conditional awarding of the grant implies its cancellation.

**Application period:** From 2024-09-26 to 2024-10-09

**Submission of applications:** the application will be formalised by submitting the form available in the *Work With Us* section of INESC TEC website.

## 7. BINDING LEGISLATION AND REGULATION

The hiring process shall comply with the current legislation regarding the Research Grant Holder Statute, approved by Law no. 40/2004 of August 18, in its current wording, as well as by the [Regulations for Grants of INESC TEC](#) and for [FCT Grants Regulation in force](#).

For more information, please check the [Regulations for Grants of INESC TEC](#) and relevant annexes at [www.inesctec.pt/bolsas](http://www.inesctec.pt/bolsas)

