CALL FOR GRANT APPLICATIONS
(AE2023-0218)

INESC TEC is now accepting grant applications to award 1 Research Initiation Grant (BII) within the scope of the Produtech R3 funded by IAPMEI with reference 60 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 Initiation Grant (BII)

General scientific area: ENGINEERING

Scientific subarea: Electrical engineering

Grant duration: 6 months, starting on 2023-09-01, with the possibility of being renewed for a maximum term of one year.

Scientific advisor: Manuel Santos Silva

Workplace: INESC TEC, Porto, Portugal

Maintenance stipend: € 541,12, 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:

Develop the application for high-level teleoperation, monitoring and tasking of mobile robots in internal logistics applications.

3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

Full automation of internal logistics operations based on mobile robots is often a very difficult goal to achieve and, in certain cases, susceptible to frequent failures. Especially in extremely complex operations, such as loading truck containers with different objects of different geometries, it is a very complex problem and difficult to automate with a total absence of failures. On the other hand, the purely manual operation in cargo transport is associated with several problems, ranging from the fallibility of operators to the appearance of health problems caused by the constant acceleration/deceleration of forklifts or pallet trucks and very repetitive movements that create injuries to the hands and arms.
The idea of this work is to create a cockpit for the high-level tele-operation of a set of autonomous mobile robots (forklift trucks, pallet trucks, etc.) where, with the appropriate sensors (mainly cameras), the operator can be remotely get an overview of the workspace and another view similar to what you would have if you were sitting on the forklift. Through the global view, the operator can select on the image (by simply touching or clicking) loads that are in a given location, then select a forklift truck and then a destination for that load, thus assigning a sequence of tasks to it. The AGV, completely autonomously, will try to execute the tasks, automatically calculating the paths and actions to be taken and allowing the operator to switch to another AGV, which will also similarly assign other tasks. So a remote operator can supervise more than a single AGV/Forklift. When an AGV

detects a problem that it cannot solve on its own, such as the load being in an unexpected position, or it cannot decide where to place/stack the load at the destination, it will raise an alarm to the remote operator who can switch the forklift to a manual being tele-operated and thus the human operator will solve the problem as if he were sitting on the forklift.

4. REQUIRED PROFILE:

Admission requirements:

Enrollment in a degree course in Electrical and Computer Engineering, Computer Engineering, or related areas. The awarding of the fellowship is dependent on the applicants' enrolment in study cycle or non-award courses of Higher Education Institutions.

Preference factors:

Knowledge of robotics and ROS; Previous experience developing interfaces using Qt; Previous software development experience using the OpenGL API.

Minimum requirements:

- The candidate must be enrolled in a degree course;
- Experience in C/C++ programming;
- Previous work experience in mobile robotics for handling parts/containers.

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%).

The Selection Jury is composed of the following members:

President of the Jury: Manuel Santos Silva
Full member: Héber Miguel Sobreira
Full member: Pedro Gomes Costa
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 dully recognised in Portugal;
   - Documents proving the awarding of academic degrees and diplomas, or the according recognition - in cases of academic degrees or diplomas granted by a foreign higher education institution - can be dismissed in the application process, and replaced by the applicant's declaration of honour, with the verification of said condition taking place during the grant's hiring stage. The submission of the certificate is mandatory when signing the contract.
   - Academic degrees or diplomas awarded by a foreign higher education institution require an authentication by a Portuguese higher education institution, and the corresponding registration on the DGES platform, in conformity with Decree-Law no. 66/2018, of August 16, and Ordinance no. 33/2019, of January 25. More information available on the website https://www.dges.gov.pt/pt/pagina/reconhecimento?plid=374
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 not having benefited from any other research fellowship (Article 5, no. 5)
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 2023-07-03 to 2023-07-14

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