CALL FOR GRANT APPLICATIONS
(AE2023-0206)

INESC TEC is now accepting grant applications to award 1 Research Grant (BI) on the scope TALOS with reference 101119744 funded by the European Commission under the Horizon Europe program for the period 2021-2027.

1. GRANT DESCRIPTION

Type of grant: Research Grant (BI)

General scientific area: ENGINEERING

Scientific subarea: Electrical engineering

Grant duration: 12 months, starting on 2023-10-01, with the possibility of being renewed until the end of the project.

Scientific advisor: Louelson Costa

Workplace: INESC TEC, Porto, Portugal

Maintenance stipend: € 1199,64, 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:

TALOS will develop and demonstrate world-class robotics solutions for different photovoltaic (PV) energy operating scenarios - landbased, floating, and agriPV, promoting innovation in both the energy and agriculture sectors. TALOS will demonstrate the added value of robotics and their potential in reducing greenhouse gas (GHG) emissions (> 450ton/year), minimising wasted resources (up to 35% water saved), lowering operation and maintenance (O&M) costs (up to 5%), and optimising human-robot and robot-robot collaboration to reduce humans' exposure to risky environments. Dangerous, dull, or dirty tasks will be performed autonomously by the TALOS solutions - such as monitoring, inspection, cleaning, and vegetation management, where robust robotics solutions will be developed for all PV scenarios and demonstrated to show increasing PV plant performance ratio up to 10%, reducing the risk exposure of O&M workers by 90% or the human burden of monitoring crops by 90% in the demonstration scenarios, allowing feasible inspection periods to be 24/7. A multi-robot platform and recommendation system will demonstrate >30 robot-robot interactions, >30 inspections, and human-in-the-loop features and training sessions for end users and workers.
The main objectives of the Fellowship are:
1) Apply machine learning algorithms to diagnose faults and failures in PV power plants (PVPP) using SCADA data combined with digital twins (DT) synthetic data.
2) Develop and apply a recommender system that will support O&M staff providing insightful information about the current state of multiple equipment of the PVPP.

3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

● **INESC TEC**
Instituto de Engenharia de Sistemas e Computadores, Tecnologia e Ciência
Associação privada sem fins lucrativos declarada de utilidade pública
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1) Development of AI solutions to support O&M staff of PVPP.
2) Data analysis of SCADA and DT data for fault and failure diagnosis, and long-term simulation of different O&M strategies impact.
3) Digital modelling of emerging components/assets, such as battery storage and electrolysers, for O&M and business model evaluation.
4) Dissemination of the work in international journals and/or conferences.

4. REQUIRED PROFILE:

Admission requirements:

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 (or academic background) with PV systems, from low to high power. - Academic background in power electronics, mainly DC-AC converters and control. - Programming knowledge in Python and MATLAB Script. - Programming knowledge in OpenModelica and Simulink.

Minimum requirements:
Previous academic background in electrical engineering or similar

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, 50%), Scientific Publications (PC, 20%), Experience (EX, 20%) and Motivation Letter (CM, 10%).
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 (70%) and EI (30%).

The Selection Jury is composed of the following members:
President of the Jury: Ricardo Jorge Bessa
Full member: Rui Esteves Araujo
Full member: Louelson Costa
Substitute member: Justino Miguel Rodrigues

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 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 2023-06-07 to 2023-09-14

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

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