

NOTICE OF EXPRESSION OF INTEREST AND REQUEST FOR QUOTATION

**For “*Improvement and validation OPEN-CONCEPT preliminary design tool*”
CIG n°Z252FE814D - CUP n° I48F16000030006.**

1. Introduction

At present, the main challenge in the aeronautical community is to reduce environmental impact. One of the most promising solutions is to introduce electrical or hybrid electrical propulsion. One of the limitations of electrical propulsion is battery endurance. Thus, this solution is applicable for small general aviation aircraft, and several prototypes have been developed, but it is challenging for large passenger aircraft.

Nevertheless, to have a global benefit, it is necessary to address commercial transport aircraft. Therefore, the first step could be to evaluate the feasibility of electrical/hybrid propulsion on Regional Transportation Aircraft.

There is a need for preliminary design tools reliable and able to simulate hybrid electrical aircraft. Several companies have developed new preliminary design tools. The most promising is the Open-Concept tool [B. J. Brelje and J. R. R. A. Martins. Development of a Conceptual Design Model for Aircraft Electric Propulsion with Efficient Gradients. Electric Aircraft Technologies Symposium, 2018.]. CIRA is interested in evaluating and use the Open Concept tool since it has already performed a preliminary assessment and evaluation. Open-Concept is an Open source tool adapted explicitly for electrical/hybrid aircraft design, optimization, which includes modules to evaluate electrical component cooling.

Nevertheless, this tool is not user friendly and has been specifically designed for general aviation aircraft. Therefore, the applicant should modify the original OPEN-SOURCE code and adapt it for the preliminary design of hybrid-electrical aircraft with both fuel-cell or chemical batteries.

With this notice, economic operators, in possession of the necessary requirements, are asked to express their interest in to the negotiated procedure pursuant to Article 36. Comma 2 lett. a) of Legislative Decree 50/2016 and submit their best technical and economic proposal.

Therefore, this notice is intended for guaranteeing the largest possible number of potentially interested operators.

2. Scope of the Work

The applicant is requested to improve and validate the original Open-Concept preliminary design tool and to:

1. Improve and expand Regional Aircraft analysis and design tool based on Open-Concept
2. Study and improve thermal management software section
3. Modify the tool for the simulation of Hydrogen fuel-cell propelled aircraft
4. Together with CIRA, modify the tool to include simulation of non-conventional configurations such as distributed Propulsion Aircraft

3. Description of the requested supply



The work to be performed is described in CIRA-DTS-20-3356 (Attached 01). The applicant should first modify the OPEN-CONCEPT tool for the simulation of a classical regional aircraft. In a second phase, the capability to simulate hybrid electrical Regional aircraft based on classical chemical batteries should be added, and particular attention should be dedicated to the improvements of the software thermal management module. Finally, the possibility to simulate fuel cells should be added. It is planned that the applicant will provide CIRA support and training for the use and installation of the developed software.

Mainly four work-packages have been identified;

WP 1: Improvement of Regional aircraft design tool

WP 2: Study of Open Concept Thermal management module

WP 3: Introduction of Fuel Cells and Hydrogen propulsion models in Open Concept

WP 4: Impact of introduction of non-conventional solutions (DEP, Tip propellers ...)

WP 5: Open Concept training

4. Subject admitted to submitting the proposal

To the present procedure may participate operators that satisfy requirements describes in the following art. 5.

5. Requirements for the participation

The competitors must demonstrate to have the following requirements (mandatory capabilities):

1. Knowledge and capability to updated and modify Open-Concept preliminary design tool;
2. Knowledge and use of Python and MDAO based software;
3. Expertise in preliminary aircraft design;
4. Expertise in hybrid aircraft thermal management simulation;
5. Capability to implement and develop hydrogen and Fuel cell aircraft preliminary design tool based on OPEN-CONCEPT tool.

It is determined that all of the above requested may also be made by self-certification of the competitor's legal representative pursuant to the D.P.R. 445/2000 or the special prosecutor (in the latter case a copy of the power of attorney must be attached).

6. Methods for submitting proposals

The expression of interest in the initiative, drawn up on plain paper and in English, must be signed by the legal representative or his / her delegate with power of attorney (to be attached).

The required documentation relating to the ***“Improvement and validation OPEN-CONCEPT preliminary design tool” must be submitted to CIRA, by email to ufficioacquisticira@legalmail.it by January 22nd 2021 at 17:00 o’ clock p.m.*** (under penalty of exclusion. Applications received after the deadline will not be considered

The following documentation must be attached to the declaration of interest:

- ☐ Declaration of registration in the Register of Companies, if applicable, indicating the type of activity exercised duly completed, stamped and signed with an attached photocopy of the declarant's identity documents (for the companies);

- ☐ Deed of incorporation (for entities);
- ☐ Demonstrate possession of the technical mandatory capabilities (ref. paragraph 5.);
- ☐ A technical offer formulated in compliance with the paragraph 10 of the technical specification n°CIRA-DTS-20-3356 rev. 1 (Annex 01);
- ☐ An economical offer containing the proposed costs and elements useful for the price construction (planned number of man-hour and number of involved personnel, other costs, ...).

7. Procedure and methods of implementation

The supply assignment procedure is initiated pursuant to Article 36 of Legislative Decree 50/2016 paragraph 2 letter a), and the criterion of the most economically advantageous offer will be contemplated.

For the evaluation of the proposal, a maximum of 100 points will be assigned:

- ✓ 30 points for technical excellence based on evaluation of section 1 of the proposal (A section describing the activity to be performed.);
- ✓ 40 points for the background and expertise in the use and application of OPEN-CONCEPT (section 2 of the proposal: A section describing the company background);
- ✓ 30 points for the economical offer.

The supply will be awarded to the competitor who will obtain the highest total (technical + economic) score.

The auction base value will be € 20.000,00 (Twenty thousand euro) +VAT.

The delivery of the supply must be completed by 365 calendar and consecutive days from the date of issue of the CIRA order.

CIRA will carry out the procedure even in the presence of only one suitable participant.

CIRA will not accept economic offers with amounts exceeding the auction base value.

CIRA also reserves the right to:

- suspend, re-issue this notice of expression of interest;
- not to proceed with the start of the procedure for assigning the service in question at its sole discretion;
- cancel or revoke this procedure in self-defense.

No cost will be recognized to participants in the event of cancellation or suspension or re-call.

This notice, complete with attachments, is available on the web profile of the contracting authority www.cira.it (section Calls for tenders - Notices and Expressions of Interest).

Pursuant to the European regulation for data protection (EU 2016/679), it is specified that the processing of personal data will be based on lawfulness and correctness in full protection of the rights of competitors and their confidentiality; the processing of personal data in this phase of the tender has the purpose of allowing the assessment of the suitability of the competitors to participate in the procedure for the award of the contract in question.

The person in charge of the procedure for the assignment phase is Dr. Carlo Russo.

Capua, January 8th, 2021

C.I.R.A. S.c.p.A.
Managing Director
(dott. Carlo Russo)
Digitally signed