



POLITECNICO DI TORINO

Torino, 23.03.2016

INDAGINE DI MERCATO VOLTA ALL'INDIVIDUAZIONE DI OPERATORI ECONOMICI INTERESSATI A SVOLGERE ATTIVITA' DI SUBCONTRACTING NELL'AMBITO DEL PROGETTO EUROPEO CLEAN SKY 2 (WP 2.1.1 – Clean Sky 2 - Airgreen 2 Consortium)

1. PREMESSA

Il presente avviso, pubblicato nel sito istituzionale all'indirizzo

http://www.swas.polito.it/services/gare/Default.asp?id_documento_padre=125639

e nell'albo on line dell'Ateneo, in attuazione della determina dirigenziale n° 411 del 23.03.2016 è da intendersi finalizzato esclusivamente all'individuazione di operatori economici potenzialmente interessati a partecipare alla futura procedura di selezione.

Il Politecnico di Torino si riserva di non procedere all'indizione della successiva procedura di cottimo per l'affidamento del servizio, ovvero di avviare una procedura negoziata senza previa emissione di bando ex art. 57 del D. Lgs. 163/2006 nel caso in cui un unico operatore economico manifesti interesse all'affidamento dell'attività in titolo.

La parte tecnica del bando è redatta in lingua inglese in quanto si stima che partner internazionali possano essere fortemente interessati al servizio.

2. OBJECTIVES OF THE PROPOSED SUBCONTRACTING

Design of composite-metal joining using hybrid penetrative reinforcement (WP 2.1.1 – Clean Sky 2 - Airgreen 2 Consortium)

The activities performed in this subcontracting is under the European project Clean Sky 2 (Airgreen 2 Consortium). In particular, it will be conducted in the framework of the WP 2.1.1.

This project aims at exploring the feasibility of a new joining method to connect carbon to titanium structures without the use of fasteners and/or adhesive bonding. The objective is to investigate the use of permanently welded pins on titanium substrates via Direct Laser Metal Sintering process. The pins should be connected to carbon plates prior to the curing process for improved joint performance.

3. Detailed Workplan

To accomplish the proposed objectives, the project should be divided in four major tasks.

3.1. Requirements, Material Selection and Geometry Definition

This WP should be focused on the selection of the geometry of the joints and the definition of structural requirement for the 3D z-pinned titanium/composite plates. Carbon/epoxy material



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type and layup will be selected. In this task, inspection requirements and appropriate NDT will be identified. The results of this task should drive the design using nonlinear finite element simulations.

3.2. Optimisation of 3D Z-pinned plates

The objective of this task is to design permanently welded z-pinned plate, using additive layer manufacturing process, to be connected to carbon fiber laminates. Z-pin geometry should be optimised to satisfy the joint strength requirements. Single lap-joint conditions will be modelled and nonlinear finite element analysis simulations will be carried out to simulate failure of the interface and in the individual plies. An iterative process will be followed to optimise joint performance in terms of stiffness and strength.

3.3. Hybrid Joint Manufacturing

3D printed titanium samples will be manufactured to be characterised (stiffness and strength). This process should allow defining the material properties to be used for the material models needed for the design phase. The z-pinned plates will be then manufactured while optimizing the process to achieve the required shape. Finally full scale z-pinned plates will be joined to composite plates.

3.4. Static Testing and Validation

In this task, the manufactured joints should be tested under static conditions to evaluate the stiffness and strength of the proposed joining process. The joints will be tested with industry standards and failure modes and the variables (geometrical features) affecting the performance of such configurations will be assessed. To achieve this, the failed samples should be inspected with conventional non-destructive inspection (C-scan, CT-Scan, etc...).

The workplan of the proposed project should follow the following Gantt Chart based on a maximum duration of the activity of 8 months.

Task	Task name	M1	M2	M3	M4	M5	M6	M7	M8
1	Requirements, Material Selection and Geometry Definition								
2	Optimisation of 3D Z-pinned plates								
3	Hybrid Joint Manufacturing								
4	Static Testing and Validation								



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4. Special skills and capabilities expected from the Applicant(s)

The Applicant(s) shall satisfy the following requirements.

- Experience in aeronautical business sector is preferred.
- Competence in the management of research programmes and capability of technical conduction of complex projects.
- Proven experience in R&D projects cooperating with industrial partners, institutions, technology centres, universities.
- Proven experience in collaborating with reference aeronautical companies.
- Proven capability and experience in complex and composite material FE simulation.
- Proven capability and experience in structural, shape and topological optimization.
- Experience in design and manufacturing of structures in non-conventional and conventional composite materials (thermoset and thermoplastic) and innovative metallic components as well as hybrid structural concepts.
- Knowledge of analysis tools of the aeronautical industry (i.e. Abaqus, Ansys)
- Capacity to perform structural and functional tests of aeronautical components: test preparation and analysis of results.
- Experience in composites manufacturing.
- Knowledge of mechanical processes, in both composite material and metallic.
- Experience on hybrid joints (CFRP + Metal).
- Experience in design and sizing of structural components by means of ALM techniques.
- Proven capability and experience in manufacturing and testing of ALM components.
- Proven capability and experience in testing, developing and supporting the material characterization tests (static and fatigue.)
- Capacity and experience in tests definition and preparation: stress and strain predictions, deflection prediction and instrumentation definition.
- Experience in Non-Destructive inspection.

5. Research Output - Deliverables

The results of this activity will lead to 3 deliverables.

Deliverable 1 (due at the end of M2): Report on material selection and joint geometry definition. Definition of structural requirement, material type, layup and geometry of the joints will be identified. The report shall include a detailed description of the material properties and of the geometry of the joints.

Deliverable 2 (due at the end of M7): Report on the design and manufacturing of Z-pinned plates. Titanium z-pinned plates will be manufactured and joined to composite plates. The report shall include a detailed description of the nonlinear finite element analyses supporting the design and of the manufacturing process.

Deliverable 3 (due at the end of M8): Report on the static testing and validation. The manufactured joints will be tested and evaluated using industry standards. The report shall include a detailed description and discussion of the experimental campaign and draw conclusions on the validation procedure.



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6. Importo stimato dell'appalto

L'importo stimato che sarà posto a base d'asta della futura procedura di selezione del contraente è pari a € 90.000,00 + IVA.

7. Soggetti ammessi a partecipare alle procedure

Saranno ammessi a partecipare alla futura procedura di selezione del contraente gli operatori economici indicati negli articoli 34 e seguenti del D.lgs. n. 163/2006, i quali siano in possesso dei requisiti di ordine generale di cui all'art. 38 del medesimo decreto.

8. Domanda di partecipazione

Gli operatori economici che intendano manifestare interesse alla partecipazione alla futura procedura di selezione del contraente, dovranno compilare e trasmettere il modulo predisposto dalla Stazione Appaltante (ALL.1) e pubblicato sul sito del Politecnico di Torino all'indirizzo

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Il predetto modulo dovrà essere:

- Sottoscritto dal legale rappresentante dell'operatore economico
- Scansionato e trasmesso a mezzo mail all'indirizzo procurement.tecnici@polito.it entro e non oltre le ore 12,00 del giorno 06.04.2016, unitamente a scansione del documento d'identità del firmatario.

9. RICHIESTA DI CHIARIMENTI

Per i chiarimenti e per ulteriori informazioni tecniche necessarie gli operatori economici potranno inviare richieste esclusivamente via email all'indirizzo procurement.tecnici@polito.it.

10. TRATTAMENTO DEI DATI PERSONALI

I dati personali conferiti dai soggetti che abbiano manifestato interesse saranno trattati dall'Azienda nel rispetto di quanto previsto dal d.lgs. 163/2006 in modo lecito ed esclusivamente per le finalità connesse all'espletamento del predetto procedimento.

Titolare del trattamento è il Politecnico di Torino.

IL DIRIGENTE DELL'AREA

- arch. Gianpiero Biscant –

F.to Gianpiero Biscant