Clean Sky Joint Undertaking

European Commission
Research Directorates

Call for Proposals:

CLEAN SKY
RESEARCH and TECHNOLOGY DEVELOPMENT PROJECTS
(CS-RTD Projects):

Questions and Answers
Release 3
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Call Identifier

SP1-JTI-CS-2009-02

This document contains a list of questions and answers concerning the Clean Sky call for Proposals SP1-JTI-CS-2009-02. This call was published on 25th November 2009 and will close on 23rd February 2010.

As stated in the call fiche published on 25th November, potential applicants have the possibility to send questions concerning the call to the Clean Sky Joint Undertaking via a special mailbox **info-2ndcall-2009@cleansky.eu**.

All questions received before the end of January 2010 will be answered.

Interested parties also had an opportunity to ask questions during the Information Day which was held in Brussels on 15th December 2009.

The above mentioned mailbox and the Information Day are the only permitted channels for asking questions concerning this call.

All questions and answers having a general value, either on procedural aspects or on specific technical clarifications concerning the call topics, when judged worth being disseminated, are published in this document.

As stated in the call fiche, all interested parties are recommended to consult periodically the Clean Sky web site for updates to this document and any corresponding updates to the call fiche.

#	*Question / answer*
1	*The call refers to **a funding** between 50 and 75%.* *Could you clarify how a value not exactly 50 or 75 can be obtained?*
	The single entity applying is eligible for either 50% or 75% depending on the legal status (for example industry or SME); in case of a consortium, both funding criteria will apply and the resulting funding will be an average of the two percentages, weighted by the actual contributions of each partner. Example: A topic worth 100 k€ is proposed by a consortium formed by an industrial partner, developing activities for 80 k€, and by an SME providing 20 k€ effort; the resulting funding will be 55 k€ (80 * 50% + 20 * 75%), i.e. 55%
2	*When applying to one topic, must the applicant fulfil all the special skills, certifications and equipment listed in section 2 of the topic description? If one applicant cannot fulfil all the requirements, can a consortium be built so that the **consortium** meets all the requirements?*
	Of course you can build a consortium if needed. With respect to usual Collaborative Research Calls, Clean Sky does not require a consortium as a constraint; even a single entity can apply. Of course, a consortium is also accepted.
3	*What is the meaning of the **number of pages** for the proposal document, quoted in section Remarks in some topics?*
	In some cases the ITD Topic manager has also estimated the expected size of the proposal document. This must be considered an indication only, with no value of selection criteria. The applicant must assure a thorough description of the capabilities and the way to fulfil the topic requirement, in the suitable number of pages as necessary.
4	Clarification about title of topic **JTI-CS-2009-02-005**
	Call title at pages 4 & 20 for the topic JTI-CS-2009-GRA-02-005: Correct title is: **3D design of flap side edge flow control**, instead of *3D design of flap side edge active flow control*.
5	*Topic **JTI-CS-2009-2-GRA-02-006** shows as "Instrumentation-electronic (Optical assembly & Thermal and mechanical strain measurement)" on the topic identification tables (pg 4 and 20). Nevertheless, the topic description (pp 26-28) relates to "LE coupon based technology derivation". Could you please clarify this point?*
	Call title at pages 4 and 20 for the topic JTI-CS-2009-GRA-02-006: Correct title is: **LE coupon based technology derivation** instead of *Instrumentation-electronic (Optical assembly & Thermal and mechanical strain measurement*
6	***JTI-CS-2009-2-GRC-02-001** "Contribution to the study of the air intake and exhaust integration into a tiltrotor nacelle".* *For the task 2 is written (page 36 of the enclosed file): "this task must be accomplished at the leading industry site".* *Considering that, in order to evaluate the feasibility of a proposal, we strictly need to know which is the "leading industry" and where is the location in which this task is required to be developed.*
	You'll find in the revised Call Text the following sentence added to the Remarks: *With respect to the SITE where the task must be performed, the applicant is requested to quote a conservative estimate for travel and staying at the most distant plant of the helicopter industry leaders, among France and Germany (Eurocopter) and Italy and UK (AgustaWestland); during the negotiation phase with the selected applicant the final location will be agreed.*

7	Clarification on **JTI-CS–2009-2-GRC-02-002**, *Contribution to analysis of rotor hub drag reduction*
	The Special Skill section quotes: A **wind tunnel** is required. The maximum speed should reach at least 50 m/s. The test section size should be, at least, 3m diameter for a circular cross section or 2.5mx2.5m for a rectangular one. Aerodynamic forces and wake measurement devices are necessary. *The values for both wind tunnel speed and test section dimensions quoted are based on experience with similar kind of testing using large scale partial models; it is up to the applicant to justify, based on direct experience, that testing can be conducted with alternative test conditions but producing representative and significant results.*
8	Clarification on **JTI-CS–2009-2-GRA-01-025**, *Fatigue test of sensor integrated CFRP aircraft panels with stiffeners*
	Specimen Manufacturing *Coupon manufacturing by vacuum bagging with autoclave assistance* *- Vacuum bagging technology with pressure sheet* *- At least 1 Flat panel* *- Standard prepreg materials* *- Maximum of 20 plies* *- Manual lay-up with 0/90/+45/-45° orientation* *- Dimension ca. 760 x 800 mm, tolerances • 2 mm mechanical machined* *- Standard heating cycles for 180°C* *- Autoclave pressure 7 bar* *- Vacuum pressure > 850 mbar trough curing* *- Life Data Sheet (LDS)* *- The necessary prepreg material is provided by the customer* *- Documentation* *- Report* ***Specimen Test*** *The fatigue testing is based upon our experience in conducting different coupon tests for various aerospace programs. It may change if the project specification contains specific demands regarding load introduction devices.* *- Preparation test machine* *- Mounting and adjustment of test setup* *- Test of specimen with a maximum width of 760 mm* *- Static tension or pressure* *- Fatigue test cycle limit 100.000* *- Load ration > 0* *- Load max 100 kN (higher load upon request)* *- Frequency < 10 Hz* *- 15 NDI including base and final inspection* *- Dismounting* *- Failure inspection* *- Expendable material* *- Documentation*

9	Among the six **evaluation criteria** there is none which specifically mentions "**value for money**" or "costs". Is this element considered in the evaluation and if so, how?
	The Call Text quotes: *As indicated in section 4.6 of the "Rules for Participation and Rules for Submission of Proposals and the related Evaluation, Selection and Award Procedures", each proposal will be evaluated on 6 criteria.* The Rules for Participation quote: *The proposal will be evaluated against six pre-determined evaluation criteria:* *- C1: Technical excellence,* *- C2: Innovative character,* *- C3: Compliance with the Call for Proposals specification and timetable (relevance),* *- C4: Adequacy and quality of respondent's resources, management and implementation capabilities and track record,* ***- C5: Appropriateness and efficient allocation of the resources to be committed (budget, staff, equipment),*** *- C6: Contribution to European competitiveness.* It is apparent that criterion n. 5 refers to the efficient usage of resources; so, by comparing two proposals, if both fulfil the topic requirements, but one at a lower total cost or with a more appropriate distribution of cost elements (as judged by the evaluators), it will receive a higher score in this criterion. So, although not specifically mentioned, criterion 5 is used to evaluate the proposal from the point of view of "value for money".
10	How should the cost of software for equipment needed during the development of the project be considered and are there any guidelines for the **costing of** such **elements after the end of the partner contract**, if they are still needed by the ITD?
	Basically all items required to perform the intended activity must be identified and quoted in the proposal; it is assumed that any costs for renting facilities, equipment or software, will be declared in the proposals as eligible costs. *After the end of the contract, is the same facilities, equipment or software become items to be purchased or rented by the final user (the ITD), it is advised the applicant indicates the future potential costs so that both the evaluators and the ITD topic manager are aware of all implications of a proposal, both in terms of actual direct costs and future induced costs.*
11	SMEs applicants are affected by the rule of the **20% Flat Rate for overheads**; it used to be 60%. Could you explain and justify the change and whether the previous value could be used again?
	The Clean Sky Financial Regulations only allow for either 20% flat rate without justification or real overheads, there is nothing in between. *This was a choice made by all the JTI's considering that:* ** the 60% flat rate is a transitional rate, and will be phased out in due course* ** establishing an accounting system to allow tracking of the indirect costs is feasible for each partner* ** the available budget for each of the JTI's should be spent on real and demonstrated costs* *The **adoption of (simple) accounting tools to allow tracking of real indirect costs is encouraged**, which is underlined by the term "transitional" flat rate.*

12	**JTI-CS-2009-2-GRC-02-002**

Describe the **model manufacturing details** such as;
The design descriptions of components and the assembly
the components to be used, approximate dimensions, manufacturing tolerances, mechanisms and kinematics of the mechanisms if there is some,

- Rotor hub model, only one (1) rotor hub, with five (5) truncated blades (The blades will be cut at the first third of span). Geometry, Mechanism and kinematics of articulated rotor like. The flapping and lead-lag hinges can be suppressed. Collective and cyclic will be adjustable.
- Simplified helicopter fuselage realistically shaped in the vicinity of the rotor hub, and in the wake of it. The rest will be only aerodynamically smoothed.
- Several rotor caps. Five (5) different caps shape, that will be tested rotating or not, whenever the rotor is fixed or not
- The scale will be adapted to fit the wind tunnel size, but the diameter of the smaller cap cannot be smaller than 40mm. The length of the shortened blades not bellow 1/3rd of span
- Manufacturing state of the art tolerance, in accordance with above points to deal with.

The maximum possible static and dynamic forces and moments during tunnel testing for a tunnel with the following test section dimensions:

Width: 300cm
Height: 240cm
Length: 600cm

To be evaluated by partner with respect to requirements and Wind Tunnel Speed

It is indicated in the document that 5 rotor caps and 5 rotor fairings will be built and 10 possible rotor configurations will be tested. Could you please give more information about how the 10 rotor configurations are composed?

The 10 configurations to be tested will be combinations of the 5 rotor caps and 5 rotor fairings.

It is indicated in the document that "A sizing file in terms of loads will have to be provided by the manufacturer to the CfP-leader before model manufacturing". Could you please give more information about "sizing file in terms of loads"?

Loads justification documents and loads limitations

Could you please provide information about Rotor head type (fully articulated, hingeless or bearingless) and in which detail the wind tunnel test model simulates the actual rotor head?

See answer to question 1

It is indicated in the document that the flapping and lead-lag hinges can be suppressed. Could you please provide information about the need of Lead-lag dampers?

Lead Lag dampers must be "geometrically" represented. Lead lag adaptation and stability will have to carefully be studied (couplings with test bench, loads etc …)

Could you please provide information about the limits of collective and cyclic pitch angles?

Collective 0° to 15°, Cyclic -15° to +15°

Could you please provide information about the limit of rotor rpm (or the value of advance ratio)?

Advance ration must be based on full size reference rotor. (Typically 0.3 for helicopter cruise flight, 0.15 for climbing conditions). three (3) rpm value: 80% 100% 120%

Could you please describe the test matrix in the following details:

Velocity limits. Angle of attack limits and increment value. Side slip angle limits and increment value. Planned number of test polar for each configuration.

Advance ration must be based on full size reference rotor. (Typically 0.3 for helicopter cruise flight, 0.15 for climbing conditions)

The angle of attack (-8° / +10°) and sideslip ranges (-5° / +5°) 1° of increment

Could you please explain if a rotary type balance measurement is expected or not?

a) Cap (Rotary frame balance – Static and dynamic forces and moments) (not only drag) ('Caps will be either fixed or rotating).
b) Rotor head (Fixed frame balance – Static forces & moments)
c) Fairing drag (No balance)
d) Overall model drag - (Fixed frame balance – Static forces & moments)

	Could you please describe the PIV measurement test matrix? Is there a possibility that another fluid visualization technique to be used in the experiments? PIV at least 2D or other similar techniques 4 planes in the wake of the hub / fairing (limited by the rear blade length) Size to be adapted to the model scale. Each configuration tested will be analyzed with wake measurement
13	**JTI-CS-2009-2-GRC-01-002**
	Q1: According to the background topic, rotor blades for helicopters, we're expecting to be in the case of transonic flow field at least at the blade tip. However the scope of the work refers always to incompressible flow hypothesis. Can you confirm the requirement of incompressible flow? *Yes we require an incompressible unsteady boundary layer and stability code designed to be extended in the near future to 3D compressible flow* Q2: In order to perform stability analysis and to apply the eN method, the call refers to the multiscale method of Luchini & al. and to the ray-theory. Are the multiscale approach and the "ray-theory" mandatory? *Yes we think that this approach based on our previous experience (development of a steady 3D stability codes for 3D compressible flows) represents the most effective way to perform the stability analysis and it allows us to easily extend (in the future) the code in order to take into account non parallel effects* Q3: According to our experience, we would like to propose the classical local modal linear stability analysis that has been developed for incompressible and compressible flow to compute the amplification rates (e.g. Arnal, AGARD report No. 793, 1993). Moreover, we propose to apply the e^N method following integration path that are tangent to the local group velocity, which is physically sound (Ferrier & al., Journal of Spacecraft and Rockets, Vol.46, No.1, 2009). All programming and validations have already been done. Is this alternative method acceptable? *The path of integration, using the ray theory, is automatically the ray along which the disturbance propagates.* Q4: In the scope of the work, no specifications are given for the following features of the code: programming language, detailed output format, human interface. Can you provide more specifications on that? *It is preferred as language C or Fortran 90; other choices have to be motivated; no GUI is required.* *The input and output will be through ASCII files whose format will be provided to the contractor. Any way, it can be anticipated that flow field data output and related info will be required following some standard or widely accepted format such plot3D or tecplot format.*
14	**JTI-CS-2009-2-GRC-03-001 Electric Tail Drive - Modelling, Simulation and Rig Prototype Development**
	Question: Generic activity description and to some extend phase 2 description indicate that call is covering trades and potential design and demonstration of an Electric Tail Rotor (ETR) system. Answer: This is taken as an observation on the activity description. Question: But the only detail activity description or detailed expectations that can be found in the call are addressing Electrical Motor / Machine only. We are thus unsure of what the actual technical scope is Answer: The Cfp text states: "*The principal focus of the design activity should be targeted on the ETR electrical machine since this is expected to require the most development and hence carry the greatest technical risk"* The GRC3.6 partners believe that the available funding will not be sufficient to develop all aspects of the system to the desired TRL – hence the focus on the electrical machine development. A feasible way forward will only be found if a technically sound and economically viable solution to the electrical machine is developed. The GRC3.6 partners welcome credible proposals which aim to go further in respect of the development of the rest of the system elements. Question: Why is there no call for trade off and design on motor electronic drive / amplifier: electronic drive

	architecture and losses depend on motor type / should be part of system trade. Answer: It is expected that the Phase 2 activities will encompass the entire system including generation, distribution/control as well as the electrical machine itself. The focus will be the electrical machine as stated above, but clearly, the work needs to mature the overall understanding of workable system architecture and the associated system component issues. The Cfp asks for a detailed proposal for Phase 1 with a deliverable from Phase 1 being a detailed plan for the Phase 2 activities. Nothing is being excluded at this point in time but it should be clear that it is expected that the work will be conducted cognisant of the critical issues which could stand in the way of successful exploitation. Please also take into account the parallel system/platform level studies which will be undertaken by the GRC3.6 partners where platform level requirements and overall system architecture issues will be addressed. The findings from this work will feed into the Cfp activities and there is expected to be close co-operation between the Cfp programme and the GRC3.6 partner programme of activities. Question: Why there is no call for gearing / transmission trade off and design: gear / no gear should be part of system trade. Answer: The preliminary analysis undertaken to date favours a direct drive solution mainly because of the impact on system reliability/safety and through life cost. Evidenced benefit for a system architecture employing a transmission element would be very welcome. Question: Please refine / confirm technical scope to be assumed for this proposal. Answer: It is anticipated that the question relating to technical scope has been answered above. Question: A baseline system block diagram would help. Answer: The Cfp asks the proposer to provide a system architecture diagram for a candidate solution: "*the proposal should include a system architecture diagram for a candidate solution"* The GRC3.6 Team are seeking innovative approaches and want to encourage new ideas unconstrained by the current thoughts of the platform providers. For this reason, a baseline architecture description has deliberately not been included in the Cfp description.
15	**Topic JTI-CS-2009-2-SGO-04-001**
	Questions: 1. The property (both as intellectual property and as possibility to use it for commercial-trading purposes) of the demonstrator will be held either by the proponents or by Clean Sky JU? *The physical property of the demonstrator belongs to the applicant, unless other agreement during the negotiation report. The intellectual property rules are defined either in the Implementation agreement (§8) or the SGO Consortium Agreement (§8) available for download along with the call fiche.* 2. The demonstrator will either have to be physically delivered at the end of the project or if it will be sufficient to keep it among the sites of one of the partners and keep it available for any kind of audit or verification by Clean Sky JU partners? *The purpose of Clean Sky is to evaluate and validate the performances of this demonstrator in a real operational use case. Hence the demonstrator will have to be physically delivered for some validation tests to the JU member site and the selected partners shall offer support during a 6 weeks trial period.*
16	**JTI-CS-2009-2-GRC-01-003**
	Q) Could you confirm as to whether a decision has been made on the technology selection (i.e. mechanical device or flow control technology device)? A) *The system will be an Active Gurney Flap*

17	**JTI-CS-2009-2-SAGE-05-009 CASING IN COMPOSITE**
	Question#1: What are the general working conditions of the IGV casing? *The IGV casing is in contact with engine air path, close to the air intake. This part can be in contact with water (rain, sea water, water with detergent,) and during engine overhaul: oil (except Skydrol) and fuel.* What are the max temperature requirements? *Between -50°C and 100°C (continuous).* What are the dimension stability requirements? *CTE < 21.10-6 m/m/°C Dimensional change after 50% of moisture absorption < 0.01%* Will there be specifications for vibration: acceleration factor, PSD, damping requirement...? *No specification. The aim of this project is to prove the feasibility of the concept. Only lab tests will be performed.* Question#2: Geometry Can you provide general dimensions and shape of the casing? *The casing is like a crown which external diameter is less than 250 mm, the inner diameter is under 170 mm and the length is under 50 mm.* Question#3: Characterization Can you specify which type of physical or chemical or mechanical parameters will have to characterize? *Dimensional change after moisture absorption, CTE, Yield strength, Elongation, Tension modulus* Question#4: Manufacturing How many prototypes should be manufactured? *Five (5)* Is there any requirement for the tooling regarding number of parts being able to be manufacture with the same set of tools? *No, not for the prototypes. But we must keep in mind that if the prototypes meet all the requirement and if we decide to use this technology on our future engine, then the production process should be able to manufacture about 300 casing per year.*