Clean Sky Joint Undertaking
Call SP1-JTI-CS-2011-01

European Commission
Research Directorates

Call for Proposals:

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

Call Text

Call Identifier

SP1-JTI-CS-2011-01

Part C - SFWA

Index

Document track changes

Page/topic	Original	Correction or modification

Specialised and technical assistance:

CORDIS help desk http://cordis.europa.eu/guidance/helpdesk/home_en.html

EPSS Help desk support@epss-fp7.org

IPR help desk http://www.ipr-helpdesk.org

Introduction

Via the Calls for Proposal, Clean Sky aims to incorporate Partners to address very specific tasks which fit into the overall technical Work Programme and time schedule.

Due to the nature of these tasks, the Call is not set up using a set of themes, but it is conceived as a collection of very detailed Topics. The Call text therefore consists of a set of topic fiches, attached here.

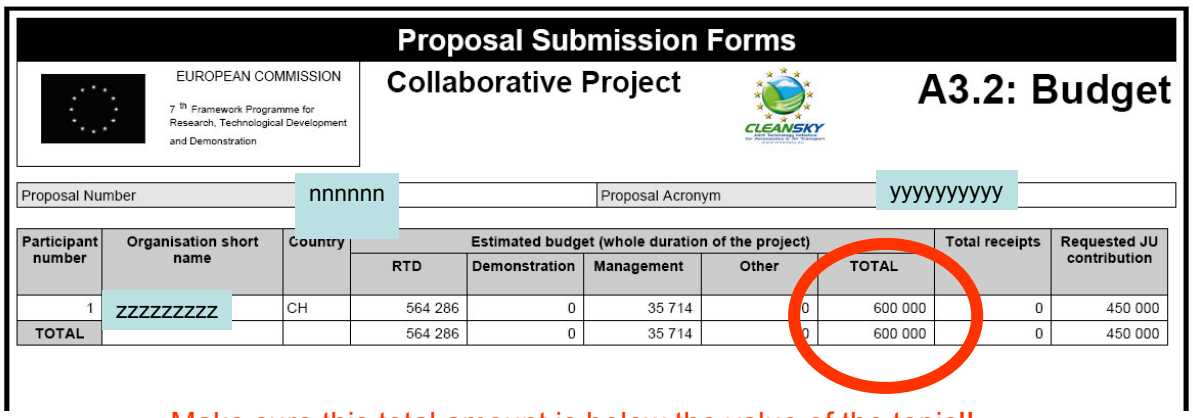
Each Topic fiche addresses the following points:

- Topic manager (not to be published)
- Indicative start and Indicative End Dates of the activity
- Description of the task
- Indicative length of the proposal (where applicable)
- Specific skills required from the applicant
- Major deliverables and schedule
- Maximum Topic Budget value
- Remarks (where applicable)

The maximum allowed Topic budget relates to the total scope of work. A Maximum funding is also indicated.

Depending on the nature of the participant, the funding will be between 50% and 75% of the Topic maximum budget indicated. It has to be noted that the Topic budget excludes VAT, as this is not eligible within the frame of Clean Sky.

Recommendation to applicants:



Proposal Submission Forms

EUROPEAN COMMISSION
7 th Framework Programme for Research, Technological Development and Demonstration

Collaborative Project

A3.2: Budget

Proposal Number	nnnnnn	Proposal Acronym	yyyyyyyyyy

Participant number	Organisation short name	Country	Estimated budget (whole duration of the project)					Total receipts	Requested JU contribution
			RTD	Demonstration	Management	Other	TOTAL		
1	zzzzzzzzz	CH	564 286	0	35 714	0	600 000	0	450 000
TOTAL			564 286	0	35 714	0	600 000	0	450 000

Make sure this total amount is below the value of the topic!!
Better, keep at least 5% margin.
Final amount is to be discussed in the negotiation.

Eligibility criteria

All applicants are requested to verify their actual status of "**affiliate**" with respect to the members of the relevant ITD for whose topic(s) they wish to submit a proposal.
Applicants who are affiliated to any leader or associate of an ITD will be declared not eligible for the topics of that ITD.
Refer to art.12 of the Statute (*Council Regulation (EC) No 71/2007 of 20 December 2007 setting up the Clean Sky Joint Undertaking*) and to page 8 of the Guidelines.

Thresholds:

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.

For a Proposal to be considered for funding, it needs to pass the following thresholds:

- **Minimum 3/5** score for each of the 6 criteria,
  AND
- **Minimum 20/30 total score**

Only one Grant Agreement (GA) shall be awarded per Topic.

Calendar of events:

- **Call Launch: 10 February 2011**
- **Call close: 3 May 2011, 17:00**

- Evaluations (indicative): 23-27 May 2011

- Start of negotiations (indicative): 01 July 2011
- Final date for signature of GA by Partner: 31 August 2011
- Final date for signature of GA by Clean Sky JU: 15 September 2011

Recommendation

The applicant is encouraged to apply for a PIC (Participant Identity Code) and to launch the process of validation as early as possible; this will speed up the process of negotiation in the event that your proposal is successful (see http://ec.europa.eu/research/participants/portal/appmanager/participants/portal)

Contacts:
All questions regarding the topics published in this Call can be addressed to:

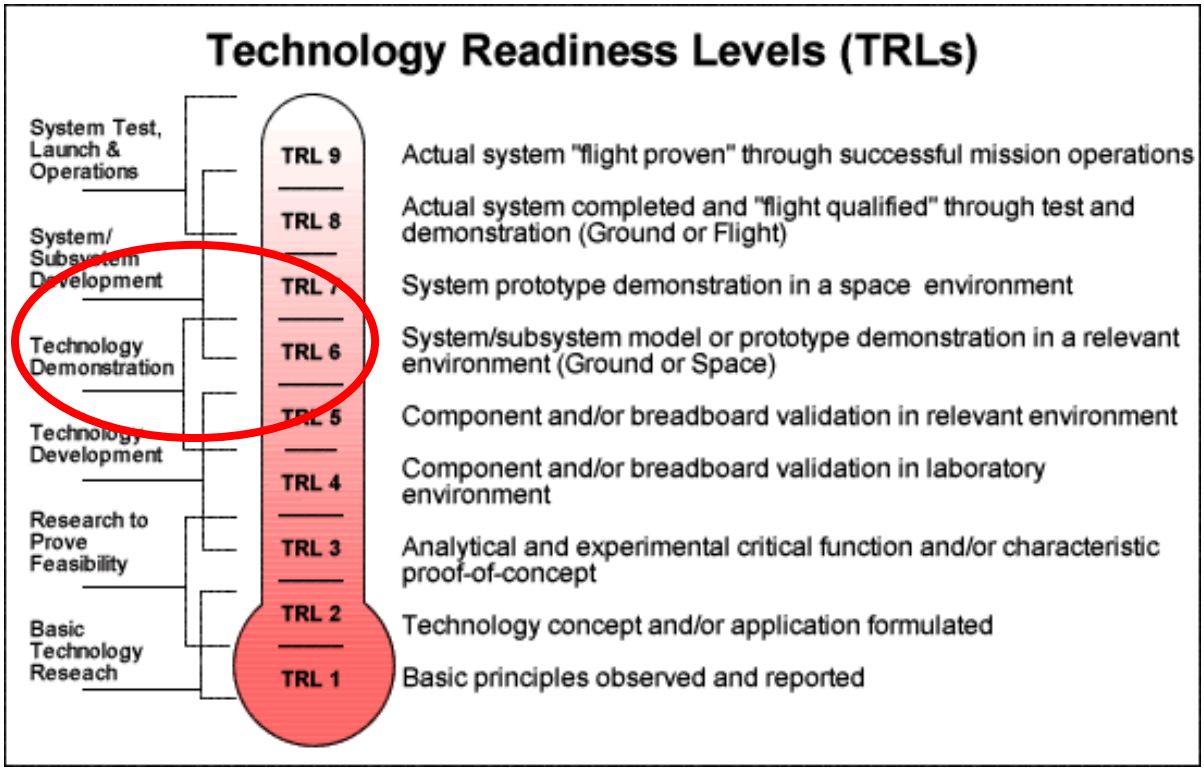
info-call-2011-01@cleansky.eu

Questions received until **25 March 2011** will be considered.

Questions having a general value, either on procedural aspects or specific technical clarifications concerning the call topics, when judged worth being disseminated, will be published in a specific section of the web site (www.cleansky.eu), together with the answers provided by the topic managers.

All interested applicants are suggested to consult periodically this section, to be updated on explanations being provided on the call content.

Reference to TRL:
When applicable or quoted in the text of topics, the applicants should be aware of the definition of Technology Readiness Levels, as per following chart, being TRL 6 the target for Clean Sky for all applicable technologies:



Identification	ITD - AREA - TOPIC	topics	VALUE	MAX FUND
JTI-CS-ECO	**Clean Sky - EcoDesign**	**12**	**6.410.000**	**4.807.500**
JTI-CS-ECO-01	*Area-01 - EDA (Eco-Design for Airframe)*		2.050.000	
JTI-CS-2011-1-ECO-01-018	Environmental Data Models and Interface development		720.000	
JTI-CS-2011-1-ECO-01-019	Borate-free cleaners used in anodizing processes		100.000	
JTI-CS-2011-1-ECO-01-020	Chromate-free sealing of TSA		100.000	
JTI-CS-2011-1-ECO-01-021	Industrialisation Set-Up of Thermoplastics «In situ » Consolidation Process		290.000	
JTI-CS-2011-1-ECO-01-022	Development of flexible inductive thin sheet heating device for FRP repair applications		200.000	
JTI-CS-2011-1-ECO-01-023	To develop recycling technologies of aeronautical composite materials through mechano-physical approaches		140.000	
JTI-CS-2011-1-ECO-01-024	Simplified LCA Tool development		250.000	
JTI-CS-2011-1-ECO-01-025	Production of yarns and fabrics based on recycled carbon fibres (CFs)		250.000	
JTI-CS-ECO-02	*Area-02 - EDS (Eco-Design for Systems)*		4.360.000	
JTI-CS-2011-1-ECO-02-008	Electrical Model of Generic Architecture Electrical Power Distribution		300.000	
JTI-CS-2011-1-ECO-02-009	Alternator with active power rectification and health monitoring		1.700.000	
JTI-CS-2011-1-ECO-02-010	Development, Construction and Integration of Systems for Ground Thermal Test Bench		2.000.000	
JTI-CS-2011-1-ECO-02-011	Heat pipe for critical applications		360.000	
JTI-CS-GRA	**Clean Sky - Green Regional Aircraft**	**6**	**1.330.000**	**997.500**
JTI-CS-GRA-01	*Area-01 - Low weight configurations*		770.000	
JTI-CS-2011-1-GRA-01-035	Smart maintenance technologies		220.000	
JTI-CS-2011-1-GRA-01-036	Development of methodology for selection and integration of sensors in fuselage stiffened panels. Testing scheme,		100.000	
JTI-CS-2011-1-GRA-01-037	Advanced fuselage and wing structure based on innovative alumiunium lithium alloy - numerical trade off study and		450.000	
JTI-CS-GRA-02	*Area-02 - Low noise configurations*		460.000	
JTI-CS-2011-1-GRA-02-015	Advanced concepts for trailing edge morphing wings - Design and Manufacturing of test rig and test samples - Test		210.000	
JTI-CS-2011-1-GRA-02-016	Novel nose wheel evolution for noise reduction		250.000	
JTI-CS-GRA-03	*Area-03 - All electric aircraft*			
JTI-CS-GRA-04	*Area-04 - Mission and trajectory Management*			
JTI-CS-GRA-05	*Area-05 - New configurations*		100.000	
JTI-CS-2011-1-GRA-05-006	Updated Regional traffic scenario to upgrade Requirements for "Future Regional Aircraft".		100.000	
JTI-CS-GRC	**Clean Sky - Green Rotorcraft**	**5**	**3.150.000**	**2.362.500**
JTI-CS-GRC-01	*Area-01 - Innovative Rotor Blades*			
JTI-CS-GRC-02	*Area-02 - Reduced Drag of rotorcraft*			
JTI-CS-GRC-03	*Area-03 - Integration of innovative electrical systems*		2.150.000	
JTI-CS-2011-1-GRC-03-006	EMA for utility consumer systems: EMA for Landing Gear		1.000.000	
JTI-CS-2011-1-GRC-03-007	Innovative Dynamic Rotor Brake		700.000	
JTI-CS-2011-1-GRC-03-008	Innovative High Voltage Energy Storage System for Advanced Rotorcraft Integration.		450.000	
JTI-CS-GRC-04	*Area-04 - Installation of diesel engines on light helicopters*			
JTI-CS-GRC-05	*Area-05 - Environmentally friendly flight paths*		800.000	
JTI-CS-2011-1-GRC-05-005	Integrated ATC/tiltrotor simulation of low-noise procedures and evaluation of the impact on operators		800.000	
JTI-CS-GRC-06	*Area-06 - Eco Design for Rotorcraft*		200.000	
JTI-CS-2011-1-GRC-06-003	Dismantling and recycling of ecodesigned helicopter demonstrators		200.000	
JTI-CS-SAGE	**Clean Sky - Sustainable and Green Engines**	**18**	**20.000.000**	**15.000.000**
JTI-CS-SAGE-01	*Area-01 - Geared Open Rotor*		1.000.000	
JTI-CS-2011-1-SAGE-01-001	Lean Burn Control System Verification Rig		1.000.000	
JTI-CS-SAGE-02	*Area-02 - Direct Drive Open Rotor*		4.500.000	
JTI-CS-2011-1-SAGE-02-006	Pitch Change Mechanism key technologies maturation		2.000.000	
JTI-CS-2011-1-SAGE-02-007	PCM kinematic demonstration		2.200.000	
JTI-CS-2011-1-SAGE-02-008	Propellers electrical de-icing system: reliability assessment of key technologies for high temperature electrical machines		300.000	
JTI-CS-SAGE-03	*Area-03 - Large 3-shaft turbofan*		6.900.000	
JTI-CS-2011-1-SAGE-03-007	Large 3-shaft Demonstrator – Core Turbomachinery – High Temperature Flexible PCB		600.000	
JTI-CS-2011-1-SAGE-03-009	Large 3-shaft Demonstrator – Aeroengine intake acoustic liner technology development		5.000.000	
JTI-CS-2011-1-SAGE-03-010	Steel casting process advancement		800.000	
JTI-CS-2011-1-SAGE-03-011	Advanced press forming and hardening of high strength steels		500.000	
JTI-CS-SAGE-04	*Area-04 - Geared Turbofan*		5.300.000	
JTI-CS-2011-1-SAGE-04-008	Casting process optimization and validation of hollow multivane clusters with thin walls and trailing edges		600.000	
JTI-CS-2011-1-SAGE-04-009	Integrating forging- and process-simulation into SAGE4 GTF LPT rotor design		400.000	
JTI-CS-2011-1-SAGE-04-010	Total Measurement System for Geometry and Surface Inspection of bladed Disks (TOMMI)		1.300.000	
JTI-CS-2011-1-SAGE-04-011	Implementation of Carbon-Nanotube Rein-forced Aluminum for Aerospace Heat Ex-changer Applications		1.000.000	
JTI-CS-2011-1-SAGE-04-012	Electric Smart Engine Actuator		1.000.000	
JTI-CS-2011-1-SAGE-04-013	High temperature Ni-based alloy forging process advancement		500.000	
JTI-CS-2011-1-SAGE-04-014	High temperature Ni-based super alloy casting process advancement		500.000	
JTI-CS-SAGE-05	*Area-05 - Turboshaft*		2.300.000	
JTI-CS-2011-1-SAGE-05-013	Feasibility study and prototypes manufacturing of oil tank in thermoplastic for Helicopter Engine		450.000	
JTI-CS-2011-1-SAGE-05-014	Hot environment unsteady pressure sensors		750.000	
JTI-CS-2011-1-SAGE-05-015	Development of Quiet exhaust noise attenuation technologies		1.100.000	
JTI-CS-SFWA	**Clean Sky - Smart Fixed Wing Aircraft**	**12**	**9.900.000**	**7.425.000**
JTI-CS-SFWA-01	*Area01 – Smart Wing Technology*		2.100.000	
JTI-CS-2011-01-SFWA-01-034	Analysis of sensitivity/robustness of distributed micron-sized roughness elements (MSR) for transition delay		500.000	
JTI-CS-2011-01-SFWA-01-035	Grooved paint surface manufacturing and aerodynamic testing		350.000	
JTI-CS-2011-01-SFWA-01-036	Automated riblet application on relevant aircraft parts		550.000	
JTI-CS-2011-01-SFWA-01-037	Basic wind tunnel investigation to explore the use of Active Flow Control technology for aerodynamic load control		250.000	
JTI-CS-2011-01-SFWA-01-038	High Voltage amplifier for MEMS-based Active Flow Control (AFC) actuators		450.000	
JTI-CS-SFWA-02	*Area02 – New Configuration*		3.150.000	
JTI-CS-2011-01-SFWA-02-012	Design and manufacturing of an innovative shield - A		70.000	
JTI-CS-2011-01-SFWA-02-013	Design and manufacturing of an innovative shield - B		90.000	
JTI-CS-2011-01-SFWA-02-014	Design and manufacturing of an innovative shield - C		90.000	
JTI-CS-2011-01-SFWA-02-015	Ground Based Structural and Systems Demonstrator Phase 3 – Component and sub-system manufacture		2.900.000	
JTI-CS-SFWA-03	*Area03 – Flight Demonstrators*		4.650.000	
JTI-CS-2011-1-SFWA-03-006	Outer wing assembly for tooling manufacturing		3.000.000	
JTI-CS-2011-1-SFWA-03-007	Low drag wing foam cover for flight test		900.000	
JTI-CS-2011-1-SFWA-03-008	Acoustic Inlet Lip panel large scale endurance demonstrator		750.000	
JTI-CS-SGO	**Clean Sky - Systems for Green Operations**	**5**	**1.700.000**	**1.275.000**
JTI-CS-SGO-01	*Area-01 - Definition of Aircraft Solutions and explotation strategies*			
JTI-CS-SGO-02	*Area-02 - Management of Aircraft Energy*		1.450.000	
JTI-CS-2011-1-SGO-02-014	Construction of evaluation Power Modules to a given design		250.000	
JTI-CS-2011-1-SGO-02-026	Modelica Model Library Development Part I		300.000	
JTI-CS-2011-1-SGO-02-032	Current return simulation (methodology & tool)		400.000	
JTI-CS-2011-1-SGO-02-033	Optimisation of coating for low pressure operation of power electronics and identification of pass and fail criteria for r		500.000	
JTI-CS-SGO-03	*Area-03 - Management of Trajectory and Mission*		250.000	
JTI-CS-2011-1-SGO-03-011	Flight operations for novel Continous Descent Operations		250.000	
JTI-CS-SGO-04	*Area-04 - Aircraft Demonstrators*			
JTI-CS-SGO-05	*Area-05 - Aircraft-level assessment and exploitation*			
JTI-CS-TEV	**Clean Sky - Technology Evaluator**	**0**		
		topics	VALUE	FUND
	totals (€)	**58**	**42.490.000**	**31.867.500**

Clean Sky - Smart Fixed Wing Aircraft

Identification	ITD - AREA - TOPIC	topics	VALUE	MAX FUND
JTI-CS-SFWA	**Clean Sky - Smart Fixed Wing Aircraft**	**12**	**9.900.000**	**7.425.000**
JTI-CS-SFWA-01	*Area01 – Smart Wing Technology*		**2.100.000**	
JTI-CS-2011-01-SFWA-01-034	Analysis of sensitivity/robustness of distributed micron-sized roughness elements (MSR) for transition delay		500.000	
JTI-CS-2011-01-SFWA-01-035	Grooved paint surface manufacturing and aerodynamic testing		350.000	
JTI-CS-2011-01-SFWA-01-036	Automated riblet application on relevant aircraft parts		550.000	
JTI-CS-2011-01-SFWA-01-037	Basic wind tunnel investigation to explore the use of Active Flow Control technology for aerodynamic load control		250.000	
JTI-CS-2011-01-SFWA-01-038	High Voltage amplifier for MEMS-based Active Flow Control (AFC) actuators		450.000	
JTI-CS-SFWA-02	*Area02 – New Configuration*		**3.150.000**	
JTI-CS-2011-01-SFWA-02-012	Design and manufacturing of an innovative shield - A		70.000	
JTI-CS-2011-01-SFWA-02-013	Design and manufacturing of an innovative shield - B		90.000	
JTI-CS-2011-01-SFWA-02-014	Design and manufacturing of an innovative shield - C		90.000	
JTI-CS-2011-01-SFWA-02-015	Ground Based Structural and Systems Demonstrator Phase 3 – Component and sub-system manufacture		2.900.000	
JTI-CS-SFWA-03	*Area03 – Flight Demonstrators*		**4.650.000**	
JTI-CS-2011-1-SFWA-03-006	Outer wing assembly for tooling manufacturing		3.000.000	
JTI-CS-2011-1-SFWA-03-007	Low drag wing foam cover for flight test		900.000	
JTI-CS-2011-1-SFWA-03-008	Acoustic Inlet Lip panel large scale endurance demonstrator		750.000	

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-01-034

Topic Description

CfP Topic Nr.	Title		
JTI-CS-2011-01-SFWA-01-034	Analysis of sensitivity/robustness of distributed micron-sized roughness elements (MSR) for transition delay	Start Date	01/09/2011
		End Date	31/12/2013

1. CfP Topic Description

1.1 Short description

The **Micron-Sized Roughness** (MSR) approach for transition control is based on the assumption that the dominating disturbances are stationary cross-flow perturbations. However, the operating environment may contain acoustic and free-stream vortices at amplitudes such that they may generate unsteady boundary-layer perturbations with significant amplitudes. The objective of this CfP topic is to investigate - experimentally and numerically - the sensitivity of MSR technique to level out acoustic and vortical free-stream perturbations. For reducing the complexity of the investigations they are performed at low speed.

1.2 Scope of work

Task 1: Numerical studies of flow physics

The numerical studies performed by the applicant are devoted to Direct Numerical Simulations (DNS) of a swept boundary-layer flow in presence of MSR. The studies have to cover the following topics:

1. Simulation of quiet environment (different MSR size)
2. Simulation with different level of free-stream turbulence
3. Simulation with different level of acoustic forcing

Part of the above cases may be investigated by simpler methods (e.g. nonlinear PSE) by including the non-stationary perturbations in the computations.

Task 2: Experimental studies of flow physics

The experiments have to be performed by the applicant in a wind tunnel of his choice, but with high flow quality (low acoustic and turbulence level) suitable for transition experiments. The investigation should include:

1. MSR experiments at quiet conditions (different MSR size)
2. MSR experiments in presence of controlled acoustic perturbations
3. MSR experiments with different level of free-stream turbulence (e.g. generated by different grids)

The flow and MSR parameters are to be chosen based on the stability analyses. If possible, the geometry from previous investigations can be used.

2. Special Skills, certification or equipment expected from the applicant

- Long term experience in DNS and boundary layer stability simulations.
- Experience in research on active and passive flow control, in particular receptivity studies related to MSR.
- Access to high performance computers.
- Availability of wind-tunnel facilities and adequate measurement techniques for fundamental experimental studies on MSR.

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description	Due date
D1.1.2 – 01 – 01	Note on the strategy taken in the numerical simulations	Report	31/12/2011
D1.1.2 – 01 – 02	Note on the strategy of the wind tunnel testing	Report	31/12/2011
D1.1.2 – 01 – 03	Midterm progress report on numerical and experimental studies of the flow physics related to MSR	Report	31/08/2012
D1.1.2 – 01 – 04	Final report on numerical and experimental results of the performed activities related to the flow physics of MSR	Report	31.08.2013

4. Value of CfP workpackage

The total value of biddings for this work package shall not exceed
€ 500.000,--
[five hundred thousand euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile [KEuro]

2009	2010	2011	2012	2013	2014	2015
0	0	100	200	200	0	0

6. Remarks

- All core activities have to be performed by the organisations(s) submitting the proposal. A consortium with more than one organisation with stated expertise may apply. Subtasks can be subcontracted. The subcontracted tasks have to be clearly indicated and justified. The expertise of the subcontractor has to be documented.
- The applicant(s) should have experience in participation of European research projects and shall prove their expertise in the field of shock control by a list of reviewed publications.
- The expected length of the technical proposal is between 15 and 20 pages

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-01-035

Topic Description

CfP Topic Number	Title		
JTI-CS-2011-01-SFWA-01-035	Grooved paint surface manufacturing and aerodynamic testing	Start Date	01/09/2011
		End Date	31/08/2012

1. CfP Topic Description

1.1 Short description

Longitudinal grooves (Riblets) on the aircraft surface can reduce the aerodynamic drag of the aircraft and hence save fuel. The sharpness and accuracy (geometry) of the Riblets are crucial criteria of the successful application of Riblets which were in the past primarily applied as adhesive sheets.

The main objectives of this proposal are to produce and test several samples of Riblets grooved in paint .While the final application would be on the aircraft surface, the samples produced by the applicant in this CfP topic would be applied onto a model that will be tested in an ONERA transonic wind tunnel facility in France during the 2nd semester of 2012. Parts of the model will be sent to the partner, which should then deliver the model parts covered with the new riblet paint-application samples on it, back to ONERA.

1.2 Scope of work

This proposal will comprise several complementary tasks:

- Task 1: Understand the wind tunnel tests environment under which the samples will be tested
- Task 2: Mechanical design and manufacturing of grooving tools for four different Riblet geometries
- Task 3: Production of grooved paint-application samples and application to four models
- Task 4: Quality control of the produced grooves (Riblets) on the model parts.
- Task 5: Delivery of the model parts covered with grooved paints

The final geometry of the four Riblet geometries will be provided by the SFWA-ITD consortium.

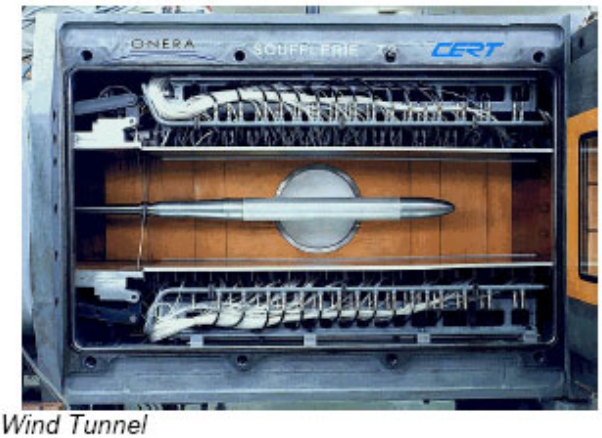
The applicant has to develop a suitable technology for application of the paint and the grooves. They have to develop, design and manufacture the complete tooling necessary for the application of the paint and the grooves to the models.

Task 1: Interaction of the applicant with wind tunnel tests environment.

This task will be devoted to the interaction of the selected partner with the wind tunnel operator and customer - ONERA - in order to:

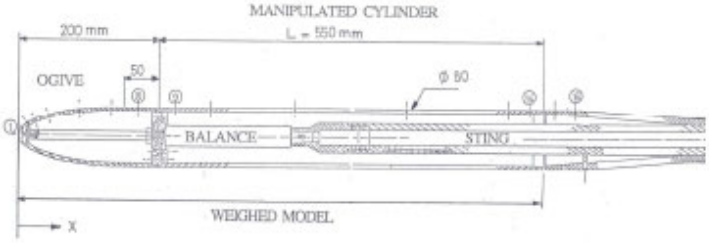
- ✓ understand the main test objectives,
- ✓ gain knowledge of the model on which the grooved samples will be applied,
- ✓ take into account the testing conditions for which the samples will be investigated.

The tests will be performed at the ONERA S3 Modane-Avrieux wind tunnel, with an existing model that was formerly used by ONERA for testing 3M vinyl film material. A view of the experimental set-up of the model in another Wind Tunnel facility is shown in Figure 1a, as well as a cross-section of the ogive-cylinder model (Fig. 1c) whch will be tested at ONERA S3 WT (Fig. 1b):



a) ONERA T2 Toulouse Wind Tunnel

b) ONERA S3 Modane-Avrieux Wind Tunnel



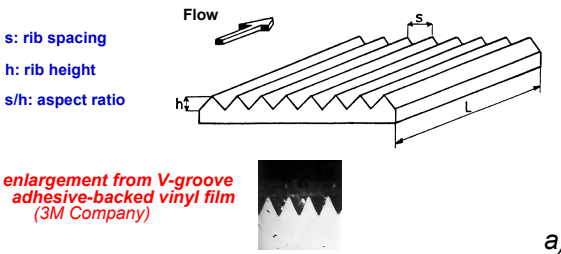
c) Cross-section of the ogive-cylinder model

Figure 1 – ONERA Wind Tunnels & Model Used for Aerodynamic Evaluation of Riblet Samples.

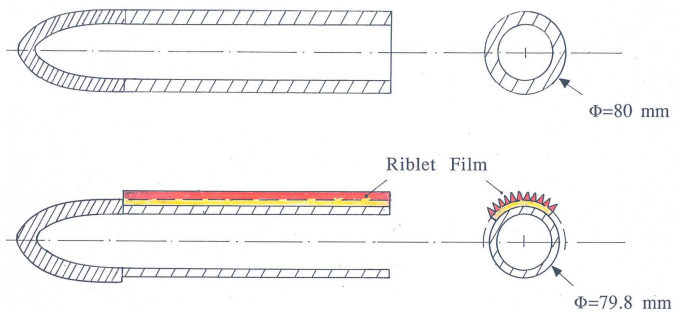
The test matrix is not frozen yet. However, investigations would be carried out at different Mach numbers from 0.3 to 0.8, different stagnation pressure from 1 to 2.5 bars and at ambient temperature. This later value might vary depending upon the season at which the tests are performed. Thus, the largest variations of the ambient temperature could be from 260K to 300K at the maximum.

The model temperature could endorse such maximal variations as the paint might encounter, knowing that such variations are similar to those obtained for aircraft applications.

The model geometry is schematized in Fig. 1c: it is a cylindrical body of 600mm length, 80mm diameter (ϕ) with an upstream elliptical nose of 150mm length. The last 550mm of the body cylindrical section will only be covered with riblet paint samples. The riblets or grooved surfaces are small narrow longitudinal striations, which are aligned in the free-stream direction (Fig. 2a); their cross-section could be triangular, trapezoidal… Therefore, the diameter of the cylindrical part on which the riblet paint will be applied is reduced to 79.8mm, such that the bottom of the valleys (for instance, for triangular cross-section) is mounted flush with the adjacent smooth ogive part (Fig. 2b), avoiding then any facing step effect knowing that for such test conditions the boundary layer which develops along the cylinder is very thin.



a) Grooved surfaces / Riblets



b) Cylinders equipped with riblet materials.

Figure 2 – Grooved surfaces and their applications to the model geometry.

Task 2: Development and realization of grooved matrices.

This task will be devoted to:

- ✓ Development of grooved matrices for several riblet cross-sections,
- ✓ Realization of such matrices.

Due to the rather thin boundary layer that would develop along the cylinder, the striations are of the size of several tenths of micrometers. The tests will be aiming at testing different riblet cross-sections: variations of rib spacing, *s*, and peak thickness, *t*.

The four grooved matrices should be produced for the following cross-sections of riblet samples, provided hereafter. There might be slight modifications of some parameters (h or t/s value), but the general trends will not be modified. The four geometries would be frozen by the SFWA consortium at the start of the work and discussed with the applicant during the Kick-Off meeting.

A) Saw-tooth "V-type" cross-section: s/h=1, h=50μm (cf. Fig. 2a)

B) "Trapezoidal-type" cross-section (cf. Fig. 3):
   - s/h=2, h=25μm, t/s=0.010
   - s/h=2, h=25μm, t/s=0.025

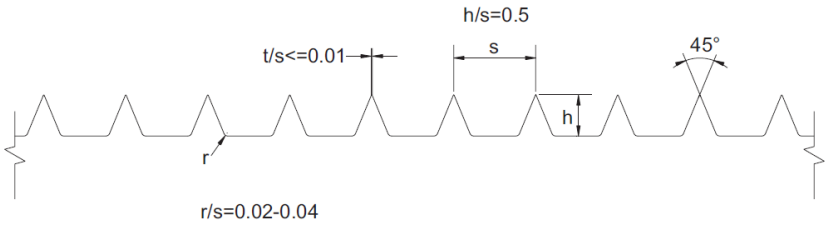


Figure 3 – Trapezoidal-type cross section..

C) "Trapezoidal-type cross section: s/h=2, h=25μm, t/s=0.010μm with imperfections to be defined in the frame of SFWA Consortium; imperfections could lead to misalignment of striations, overlap of samples, surface defect…

The main outcome of this Task will be the realization of the four grooved matrix for moulding paints that would be produced in Task 3.

Task 3: Production of grooved paint-application samples and application to models.

This task will deal mainly with:

- ✓ Development of a riblet process with paint, including conditions of applications,
- ✓ The production of several test cylindrical parts for grooved paint application samples for each of the defined cross-section materials (cf. Task 2),
- ✓ Their applications to the cylindrical parts (ϕ=79.8mm) of the existing ogive-cylinder model:
  - For each riblet cross-section, one cylinder would be covered with one and only one sample with the striations aligned with the cylinder axis, i.e. the free-stream direction for wind tunnel testing. That means that the sample width should be at least a little over 250mm,
  - For a given cross-section, one extra cylinder (tbc) could be covered with samples with some degradation (misalignment of striations, overlap of samples, surface defect….),
  - Assuming that once the matrix is made, production of several samples is not time and cost consuming.

Task 4: Test and control of the grooved paint application samples.

In this task, the following points will be tackled:

- Test and control of the delivery sheets of grooved paint application samples,
  - Exact geometry of the cross test section,
  - Thickness of the support of the paint application samples,
  - Uniformity along the streamwise position.
- Tests and control of the application process for the cylindrical parts covered with the several afore-mentioned samples,
- Protection of the grooved paint application samples from damage, dust… during the preparation of the tests outside of the wind tunnel test section or during the setting of the model set-up within the test section.

Task 5: Test and control of the grooved paint application samples.

This final task will correspond to the:

- Delivery of model parts covered with grooved paint application samples to ONERA,
- Completion of final report.

2. Special Skills, certification or equipment expected from the applicant

- Experience in realizing paints,
- Capacity to use technical paints already having performance certificates,
- Experience in paint application process and use of binding agents,
- Ability to qualify characteristics of grooved paint application samples (cross-section, groove height, groove spacing, peak thickness…) from optical or other appropriate measurements.

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
D 1.1.3-13-1	Kick-Off Meeting with Wind Tunnel Operator and Wind Tunnel Customer.	Minutes of the meeting	01.09.2011
D 1.1.3-13-2	1st Progress Review Meeting	Minutes of the meeting	15.12.2011
D 1.1.3-13-3	2nd Progress Review Meeting	Minutes of the meeting	31.03.2012
D 1.1.3-13-4	Riblet paint application samples: geometry test, control, exams of produced samples.	Meeting, Report	30.05.2012
D 1.1.3-13-5	Delivery of cylinders covered with riblet paint application samples.	Delivery of Model Parts and Final Report.	31.08.2012

4. Topic value

The total value of biddings for this work package shall not exceed
€ 350.000

[three hundred and fifty thousand euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
0	0	125	225	0		

6. Remarks

- All core activities have to be performed by the organisations(s) submitting the proposal.
- However, a consortium with more than one organisation with stated expertise may apply. Subtasks can be subcontracted. The subcontracted tasks have to be clearly indicated and justified. The expertise of the subcontractor has to be documented.
- The applicant(s) should have experience in participation of European research projects and shall prove their expertise in the paint application (process, patent, publications…..).
- The expected length of the technical proposal is between 15 and 20 pages.

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-01-036

Topic Description

CfP Topic Nr.	Title		
JTI-CS-2011-01-SFWA-01-036	Automated riblet application on aircraft parts	Start Date	01/01/2012
		End Date	31/12/2014

1. CfP Topic Description

Background :

Painted riblets, which are very small grooves of about hundred microns with sharp ridges embossed into the aircraft's painted surface, can reduce the surface drag significantly under turbulent flow conditions. In separate projects a production method in lab-scale was developed and an adaptation of this lab-method to smaller demonstrators will be carried out as part of a separate CfP topic. How to paint an aircraft structure remains an open issue, which will be tackled by this CfP topic.

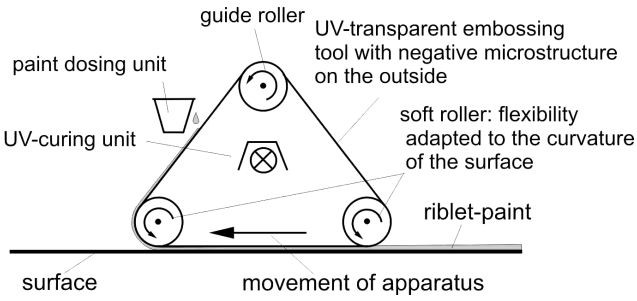
Scope of work :

The applicant has to design and manufacture a prototype device for the application of painted riblets on flat and curved, large aircraft parts (fuselage etc) including all relevant tools and software to operate the device.

Description of work :

Subject of this call for proposal topic is the development and construction of a device for the automated application of painted riblets on large aircraft parts (fuselage, wing, HTP). The expected outcome of the work is a prototype of the application device and painted aircraft parts (real aircraft if available or as alternative relevant mock-up).

The principle of riblet-paint application is shown in the following picture:



The principle set-up of the application device (picture) will be delivered by SFWA partners. The automated robot-device has to apply the paint to the aircraft surface while "rolling" the required micro-structured contour into the paint. The roller device will be provided by Fraunhofer IFAM (see sketch). The paint will be provided by either a commercial paint manufacturer or Fraunhofer IFAM.

The following technical specifications have to be fulfilled:

- Application speed at least 2m per minute
- Adjustment of contact pressure
- Track-to-Track deviation max. 1mm at a length of 10m
- Weight of application device up to 70 Kg
- Design aspects for easy maintenance

2. Special Skills, certification or equipment expected from the applicant

- The applicant has to have a sound background in automation technology
- The applicant has to have experience in robot-technology and the capability to construct and built prototypes
- The applicant has to have significant experience in the use and integration of optical and mechanical sensor-systems
- The applicant has to have experience in the design and construction of mechanical and electronic interfaces between robots and other devices (sensors etc.)

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
D1.1.3-12-01	Design of the device, tools and software	Report on the design approach including drawings, list of parts, etc.	**31.12.2012**
D1.1.3-12-02	Manufactured hardware, tools and software	The device has to be manufactured including control soft- and hardware	**30.04.2013**
D1.1.3-12-03	Application trial results	Completion of application trials on aircraft parts or relevant mock-up (report and test samples)	**30.06.2014**
D1.1.3-12-04	End report	End-report	**31.12.2014**

4. Topic value

The total value of biddings for this work package shall not exceed

€ 550.000,--

[five hundred and fifty thousand euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile [KEuro]

2009	2010	2011	2012	2013	2014	2015
0	**0**	**0**	**200**	**200**	**150**	**0**

6. Remarks

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-01-037

Topic Description

CfP Topic Number	Title		
JTI-CS-2011-01-SFWA-01-037	Basic wind tunnel investigation to explore the use of Active Flow Control technology for aerodynamic load control	Start Date	01/09/2011
		End Date	30/06/2014

1. CfP Topic Description

Flow and load control technologies are the focus of SFWA. Within this topic a basic study with some focus on wind tunnel experiments has to be performed. The objective is to check the usability of flow control actuation systems as developed in the past for load control purposes. It is very likely that flow control hardware needs to be modified in order to make it compatible with load control requirements in this CfP topic. The applicant has therefore to develop a concept on how to adapt flow control techniques for load control functionalities, and has to prove this in a basic wind tunnel campaign.

This proof of concept has to be done at the applicant's wind tunnel facility, at an operating range between M=0.10 to 0.20 if the model set up and configuration is typical enough to allow such a proof, e.g. a high angle of attack to simulate conditions for which load control is needed.

A detailed use and adaption of "active" flow control technologies for load control has not been done in the past. Therefore, this experimental study is a first basic step which optionally may be supported by numerical means, if the applicant is able to predict load control phenomena.

Two basic application challenges regarding how to adapt flow control techniques for load control are as follows:

1. **Active flow control (e.g. suction / blowing through suitably designed orifices) at the spoiler area:** this is an important area, where a significant amount of lift exists, and non-active means for load control have been tested in the past (spoiler deflection to reduce local lift). High loads exist at off design flight conditions at these outer wing areas.
2. **Active flow control at the wing or profile trailing edge**: this is a sensitive location, since the trailing edge dictates the circulation, thus the lift. To apply active flow control here might reduce the circulation in such a manner, that the load at off design conditions is reduced down to an acceptable level.

Concept 2 has the disadvantage that for the basic study of this CFP topic, installation challenges and space problems at the trailing edge might be too challenging for a first study into this direction (see remarks above).

It is therefore required that the applicant experimentally studies concept 1. However, if the applicant has a suitable model or concept to additionally study concept 2 within the given budget, that would be an advantage during the evaluation procedure.

It is required, that the applicant develops a flow control concept for the concept 1 above which allows to be experimentally verified in the applicant's own facility. The delta of lift and drag has to be measured at load relevant flow conditions. The low speed test has to be set up to allow a firm judgement on the principle suitability of active flow control for load control.

A numerical study is required for the basic flow configuration to identify the relevant positions for the active flow control actuation system in the spoiler area. These calculations can be done without flow control. A reference test without active flow control but using passive techniques, e.g. spoiler deflection, is desirable but not mandatory. As reference configuration a test without any flow control is required measuring lift and drag at load control relevant configurations (in a low speed test these conditions could be "artificially" created by suitable angle of attack settings). This reference configuration without flow control, but high model load conditions has to be predicted via CFD ahead of the wind tunnel test.

The model might be two-dimensional. However, if the applicant has the wind tunnel infrastructure and a suitable swept wing model it would be an advantage during the evaluation phase.

2. Special Skills, certification or equipment expected from the applicant

- The applicant should have a sound R&T background in design, testing and demonstration of flow control techniques in wind tunnel facilities. It is expected, that the applicant has a model, which can be modified for load control studies, this could be a 2D model, a swept model would be an additional benefit for this study.
- The applicant has to be able to integrate active flow control actuators in a wind tunnel model.
- The applicant should have active flow control systems available which were applied in the past for flow control purposes. Such system should be modified for load control experiments. The applicant has to demonstrate that his modified flow control devices are suitable for the intended experiments.
- All costs related to the modifications of the model and the flow control hardware has to be covered by the applicant as all other costs related to conducting the work of this CfP topic. Since a close collaboration with the current SFWA consortium is required, the applicant should make respective reservations for e.g. travel cost within Europe, etc.
- The applicant has to have sufficient expertise to perform CFD studies for the reference configuration (no flow control applied).

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
D01	State of the art report	Literature study to collect the state of the art of flow control for load control purposes, incl. Active flow control	M6
D02	Concept report	Deign of concept how to adapt flow control for load control functionalities	M12
D02	Wind tunnel model modifications	Description of model changes to adapt flow control systems for load control; freeze of concept	M16
D04	Wind tunnel model modified	Model has been modified, manufactured ; ready for test	M20
D05	CFD study and test matrix	CFD study of reference configuration, identification of load relevant testing points	M20
D06	Wind tunnel flow control tests	Test campaign without and with flow control to validate load control functionalities of adapted flow control system	M22
D07	Analysis of wind tunnel data	Analysis and comparison with CFD.	M30
D08	Final technical report and recommendations for the future	Final reporting.	M36

4. Topic value

The total value of biddings for this work package shall not exceed

€ 250.000,--

[two hundred and fifty thousand euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
		60	90	60	40	

6. Remarks

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-01-038

Topic Description

CfP Topic Number	Title		
JTI-CS-2011-01-SFWA-01-038	High Voltage amplifier for MEMS-based Active Flow Control (AFC) actuators	Start Date	01/07/2011
		End Date	15/12/2012

1. CfP Topic Description

Actuators for Active flow control (AFC) are systems with powered mechanical elements enabling an unsteady manipulation of the airfoil's boundary layer. Such actuators need a special design which, in the present case of a synthetic jet actuator and a pulsed jet actuator driven by piezoelectric transducers, will be miniaturized using MEMS technologies.

Due to their high driving frequencies, these systems have unfavourably high power consumptions. Adapting these systems to aircraft level application, the driving electronics need therefore to be very energy efficient and capable of being integrated into the actuation system itself, e.g. into, under or very close to the pressure chamber of a pulsed jet actuator.

The focus of this topic is on the development, manufacturing and test of a high voltage amplifier module for MEMS-based ACF actuators, such as Micro Synthetic Jet Actuators (µSJA) or MEMS-based Pulsed Jet Actuators (µPJA).

Activities to be performed by the applicant:

- Development of a system concept
- Development of a detailed design adapted to the space allocation of a pulsed jet actuation panel (30 x 20 x 3 cm³, panel includes 30 separate actuators (e.g. micro valves))
- Development of a demonstrator (hardware) and manufacturing of that demonstrator for system validation

Support provided by SFWA partners:

- Specifications of available actuators
- Specifications and details of space allocation

Further conditions:

The system should meet the following conditions:

- Capacitance of the piezoelectric transducer up to 20nF per single element
- Driving Voltage up to 300V
- Driving Frequency up to 20kHz
- Minimal space allocation – an integrated solution (ASIC based) should be preferred
- Minimal energy consumption or a concept to minimize the energy consumption of the system

The applicant shall provide the driving / amplification electronics hardware for a full panel of actuators including test protocol and detailed system datasheet. The number of actuators will be provided by SFWA partners,

The expected maximum length of the proposal is 20 pages.

2. Special Skills, certification or equipment expected from the applicant

- The applicant has to prove professional experience in development and manufacturing of integrated high voltage electronics.
- The applicant should have sound feedback in MEMS based actuators and their typical specifications and resulting requirements for integrated high voltage electronics
- The applicant should have the capability to manufacture an integrated high voltage amplifier module for MEMS based actuators and should have capabilities for testing the system.

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
D01	System Concept	System Concept	M3
D02	Detailed design	Detailed design	M8
D03	Annual Review	Annual Review	M12
D04	Demonstrator Concept	Demonstrator Concept	M12
D05	Demonstrator Hardware	Delivery of Demonstrator Hardware	M18
D05	Final report	Final report	M18

4. Topic value

The total value of biddings for this work package shall not exceed

€ 450.000,--

[four hundred and fifty thousand euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
		150	300			

6. Remarks

Background knowledge and intellectual property rights will be managed by individual implementation agreement, if needed.

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-02-012

Topic Description

CfP Topic Number	Title		
JTI-CS-2011-01-SFWA-02-012	Design and manufacturing of innovative shield (A)	Start Date	01/08/2011
		End Date	31/06/2013

1. Topic Description

The applicant has to design shielding concepts and to manufacture the associated test articles for the purpose of assessment of their ballistic performance and their aircraft integration constraints.
In SFWA framework, this topic and associated assessment constitute the core activity of a working group which currently involve the following SFWA partners: Airbus, EADS-CASA, Dassault Aviation, Rolls-Royce and Snecma. The ballistic performance assessment (impact test campaign) will be conducted by SFWA partners.

1- Shielding concept: application and specification

The shielding is intended as “stand alone” amour on aircraft for the protection of critical components against high-velocity shrapnels in case of engine burst.

The concerned technologies and designs shall present the following features:

- Protection against penetration of metallic projectile whose main features are as follows:
  - kinetic energies are between 1kJ and 10kJ
  - masses are approximately between 10g and 100g
  - velocity of approximately 500 m/s,
  - projected perimeter is approximately 50 mm
- Lightweight innovative features suitable for similar ballistic or shielding applications,
- A medium to high maturity of the used technology
- A used technology driven by low manufacturing costs
- Reasonable confidence in the fulfilment of A/C integration constraints. “Hot” temperature conditions (i.e. uncontrolled, environmental temperature) may be specifically addressed.

Typical acceptable candidates of concepts are those constituted of high-performance fibers (such as Aramid, Polyethylene, Polybenzoxazole, Carbon nano tubes reinforced fibers).
The assessed shielding test articles have overall dimensions of approximately 500 mm x 500 mm.

2- Information on the Series of Topics

This call for proposal corresponds to the “TOPIC 1 (A)” of a series of topics. Table 1 below shows an overview of the composition of all 3 topics which are offered as optional alternatively. See separate description sheets.

	Technology			Number of concepts	Supply of 5 metallic panels (standard reference)	Associated number of impact test shots
	Maturity Level LOW	Maturity Level MEDIUM to HIGH	Low manufacturing cost driven			
TOPIC 1	NO	**YES**	**YES**	1 or more	**YES**	40
TOPIC 2	NO	**YES**	NO	2 or more	NO	60
TOPIC 3	**YES**	NO	NO	2 or more	NO	60

Table1: Differences (except financial aspects) between Topics 1, 2 and 3

3- Content of the workpackage

The workpackage covers at least one concept and should include the following contributions for each of the concerned concept:

- general design of shielding test article,
- sizing of test articles possibly in collaboration with other partners, and according to consortium specified impact conditions,
- detailed design of test articles,
- manufacturing and supply of the test articles (a minimum of 15 samples),
- support for the assessment of concept types versus A/C integration functions.

The test samples should be supplied for several (a maximum of four) series of impact performance assessments.
The workpackage covers also the supply of five metallic test panels that will be used as a reference material in the assessment.

Depending on the concepts, up to 10% of the samples should be delivered in an aged/degraded status considering a standard environmental condition test that will be selected by the consortium in collaboration with the applicant.

4- Required data for the proposal & data provided by the consortium

In his proposal, the applicant should identify a list of proposed appropriate concepts, a general description, their expected and/or known performance versus highlighted features, as well as the total number of samples supplied.
For the ballistic performance assessment, a total of 40 impact test shots are currently foreseen for this topic.
The results of the ballistic tests will be made available to the provider of the respective test article.
Confidentiality will be granted in order to give assurance that the selected applicant will not have access to the technical data associated to the test articles of other topics “Design and manufacturing of innovative shield”.

2. Special Skills, certification or equipment expected from the applicant

- The applicant should have proven experience of supplying composite product to aeronautical field
- The applicant should have a sound industrial background in the supply and/or development and/or manufacture of shielding products for high velocity projectiles
- The applicant should have experience in the management of environmental conditions/ageing tests

3. Major deliverables and schedule

Ref. Nr.	Title	Description (if applicable)	Due date
A-01	Shield concepts description report	Description of the concepts that are proposed to be assessed including their expected lightweight performance against impact and the identification of proven concept features that could substantiate the performance versus specified A/C constraints	28.08.2011
A-02	Initial Sample summary list table	Initial version of a table identifying all shield concept test articles retained for assessment and, at least, associated main design features	31.09.2011
A-03	Report on the test article definition See remark (1)	For each sets of test sample supplies, report including definition dossier of the test articles including drawing (if applicable)	11.2011 to 12.2012
A-04	Supply of test articles See remark (1)	Test articles supply (including shipping) with manufacturing quality certificates	03.2012 to 03.2013
A-05	Environmental test report	Report of the environmental/aged conditions tests related to the concerned test articles.	31.04.2013

(1) These deliverables will be split in several deliverables which will be noted as -a, -b,-c,-d, depending on the number of series for impact performance assessments.

4. Topic value

The total value of biddings for this work package shall not exceed

€ 70.000,--

[seventy thousand euro]

Any proposal with a budget larger that the amount shown here-below will be automatically declared ineligible and will not participate in the evaluation.
Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
0	0	5	35	30	0	0

6. Remarks

As optional information regarding financial aspects, an extract of “Rules for Participation and Rules for Submission of Proposals and the related Evaluation, Selection and Award procedures” document is given here-below.

“For research and technological development activities, the JU financial contribution may reach a maximum of 50% of the total eligible costs of the beneficiaries. However, for beneficiaries that are non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, the rate may reach a maximum of 75% of the total eligible costs. If these beneficiaries change their status during the life of the project, this reimbursement rate shall be applicable up to the moment they lose their status.
For demonstration activities, the CSJU financial contribution may reach a maximum of 50% of the total eligible costs, irrespective of the beneficiaries' status.
For other activities, including management activities, training, coordination, networking and dissemination (including publications), the CSJU contribution may reach a maximum of 50% of the total eligible costs. However, for beneficiaries that are non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, the rate may reach a maximum of 75% of the total eligible costs. If these beneficiaries change their status during the life of the project, this reimbursement rate shall be applicable up to the moment they lose their status.”

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-02-013

Topic Description

CfP Topic Number	Title		
JTI-CS-2011-01-SFWA-02-013	Design and manufacturing of innovative shield (B)	Start Date	01/08/2011
		End Date	31/06/2013

1. Topic Description

The applicant has to design shielding concepts and to manufacture the associated test articles for the purpose of assessment of their ballistic performance and their aircraft integration constraints.
In SFWA framework, this topic and associated assessment constitute the core activity of a working group which currently involve the following SFWA partners: Airbus, EADS-CASA, Dassault Aviation, Rolls-Royce and Snecma. The ballistic performance assessment (impact test campaign) will be conducted by SFWA partners.

1- Shielding concept: application and specification

The shielding is intended as “stand alone” amour on aircraft for the protection of critical components against high-velocity shrapnels in case of engine burst.

The concerned technologies and designs shall present the following features:

- Protection against penetration of metallic projectile whose main features are as follows:
  - kinetic energies are between 1kJ and 10kJ
  - masses are approximately between 10g and 100g
  - velocity of approximately 500 m/s,
  - projected perimeter is approximately 50 mm
- Lightweight innovative features suitable for similar ballistic or shielding applications,
- A medium to high maturity of the used technology
- Reasonable confidence in the fulfilment of A/C integration constraints. “Hot” temperature conditions (i.e. uncontrolled, environmental temperature) may be specifically addressed.

Typical acceptable candidates of concepts are those constituted of high-performance fibers (such as Aramid, Polyethylene, Polybenzoxazole, Carbon nano tubes reinforced fibers).
The assessed shielding test articles have overall dimensions of approximately 500 mm x 500 mm.

2- Information on the Series of Topics

This call for proposal corresponds to the “TOPIC 2 (B)” of a series of topics. Table 1 below shows an overview of the composition of all 3 topics which are offered as optional alternatively. See separate description sheets.

	Technology			Number of concepts	Supply of 5 metallic panels (standard reference)	Associated number of impact test shots
	Maturity Level LOW	Maturity Level MEDIUM to HIGH	Low manufacturing cost driven			
TOPIC 1	NO	**YES**	**YES**	1 or more	**YES**	40
TOPIC 2	NO	**YES**	NO	2 or more	NO	60
TOPIC 3	**YES**	NO	NO	2 or more	NO	60

Table1: Differences (except financial aspects) between Topics 1, 2 and 3

3- Content of the workpackage

The workpackage covers at least two concepts and should include the following contributions for each of the concerned concept:

- general design of shielding test article,
- sizing of test articles possibly in collaboration with other partners, and according to consortium specified impact conditions,
- detailed design of test articles,
- manufacturing and supply of the test articles (a minimum of 15 samples),
- support for the assessment of concept types versus A/C integration functions.

The test samples should be supplied for several (a maximum of four) series of impact performance assessments.
Depending on the concepts, up to 10% of the samples should be delivered in an aged/degraded status considering a standard environmental condition test that will be selected by the consortium in collaboration with the applicant.

4- Required data for the proposal & data provided by the consortium

In his proposal, the applicant should identify a list of proposed appropriate concepts, a general description, their expected and/or known performance versus highlighted features, as well as the total number of samples supplied.
For the ballistic performance assessment, a total of 60 impact test shots are currently foreseen for this topic.
The results of the ballistic tests will be made available to the provider of the respective test article.
Confidentiality will be granted in order to give assurance that the selected applicant will not have access to the technical data associated to the test articles of other topics “Design and manufacturing of innovative shield”.

2. Special Skills, certification or equipment expected from the applicant

- The applicant should have proven experience of supplying composite product to aeronautical field
- The applicant should have a sound industrial background in the supply and/or development and/or manufacture of shielding products for high velocity projectiles
- The applicant should have experience in the management of environmental conditions/ageing tests

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
A-01	Shield concepts description report	Description of the concepts that are proposed to be assessed including their expected lightweight performance against impact and the identification of proven concept features that could substantiate the performance versus specified A/C constraints	28.08.2011
A-02	Initial Sample summary list table	Initial version of a table identifying all shield concept test articles retained for assessment and, at least, associated main design features	31.09.2011
A-03	Report on the test article definition See remark (1)	For each sets of test sample supplies, report including definition dossier of the test articles including drawing (if applicable)	11.2011 to 12.2012
A-04	Supply of test articles See remark (1)	Test articles supply (including shipping) with manufacturing quality certificates	03.2012 to 03.2013
A-05	Environmental test report	Report of the environmental/aged conditions tests related to the concerned test articles.	31.04.2013

(1) These deliverables will be split in several deliverables which will be noted as -a, -b,-c,-d, depending on the number of series for impact performance assessments.

4. Topic value

The total value of biddings for this work package shall not exceed

€ 90.000,--

[ninety thousand euro]

Any proposal with a budget larger that the amount shown here-below will be automatically declared ineligible and will not participate in the evaluation.
Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
0	0	5	45	40	0	0

6. Remarks

As optional information regarding financial aspects, an extract of “Rules for Participation and Rules for Submission of Proposals and the related Evaluation, Selection and Award procedures” document is given here-below.

“For research and technological development activities, the JU financial contribution may reach a maximum of 50% of the total eligible costs of the beneficiaries. However, for beneficiaries that are non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, the rate may reach a maximum of 75% of the total eligible costs. If these beneficiaries change their status during the life of the project, this reimbursement rate shall be applicable up to the moment they lose their status.
For demonstration activities, the CSJU financial contribution may reach a maximum of 50% of the total eligible costs, irrespective of the beneficiaries' status.
For other activities, including management activities, training, coordination, networking and dissemination (including publications), the CSJU contribution may reach a maximum of 50% of the total eligible costs. However, for beneficiaries that are non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, the rate may reach a maximum of 75% of the total eligible costs. If these beneficiaries change their status during the life of the project, this reimbursement rate shall be applicable up to the moment they lose their status.”

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-02-014

Topic Description

CfP Topic Number	Title		
JTI-CS-2011-01-SFWA-02-014	Design and manufacturing of innovative shield (C)	Start Date	01/08/2011
		End Date	31/06/2013

1. Topic Description

The applicant has to design shielding concepts and to manufacture the associated test articles for the purpose of assessment of their ballistic performance and their aircraft integration constraints.
In SFWA framework, this topic and associated assessment constitute the core activity of a working group which currently involve the following SFWA partners: Airbus, EADS-CASA, Dassault Aviation, Rolls-Royce and Snecma. The ballistic performance assessment (impact test campaign) will be conducted by SFWA partners.

1- Shielding concept: application and specification

The shielding is intended as “stand alone” amour on aircraft for the protection of critical components against high-velocity shrapnels in case of engine burst.

The concerned technologies and designs shall present the following features:

- Protection against penetration of metallic projectile whose main features are as follows:
  - kinetic energies are between 1kJ and 10kJ
  - masses are approximately between 10g and 100g
  - velocity of approximately 500 m/s,
  - projected perimeter is approximately 50 mm
- Lightweight innovative features suitable for similar ballistic or shielding applications,
- A low maturity of the used technology
- Reasonable confidence in the fulfilment of A/C integration constraints. “Hot” temperature conditions (i.e. uncontrolled, environmental temperature) may be specifically addressed.

Typical acceptable candidates of concepts are those constituted of high-performance fibers (such as Aramid, Polyethylene, Polybenzoxazole, Carbon nano tubes reinforced fibers).
The assessed shielding test articles have overall dimensions of approximately 500 mm x 500 mm.

2- Information on the Series of Topics

This call for proposal corresponds to the “TOPIC 3 (C)” of a series of topics. Table 1 below shows an overview of the composition of all 3 topics which are offered as optional alternatively. See separate description sheets.

	Technology			Number of concepts	Supply of 5 metallic panels (standard reference)	Associated number of impact test shots
	Maturity Level LOW	Maturity Level MEDIUM to HIGH	Low manufacturing cost driven			
TOPIC 1	NO	**YES**	**YES**	1 or more	**YES**	40
TOPIC 2	NO	**YES**	NO	2 or more	NO	60
TOPIC 3	**YES**	NO	NO	2 or more	NO	60

Table1: Differences (except financial aspects) between Topics 1, 2 and 3

3- Content of the workpackage

The workpackage covers at least two concepts and should include the following contributions for each of the concerned concept:

- general design of shielding test article,
- sizing of test articles possibly in collaboration with other partners, and according to consortium specified impact conditions,
- detailed design of test articles,
- manufacturing and supply of the test articles (a minimum of 15 samples),
- support for the assessment of concept types versus A/C integration functions.

The test samples should be supplied for several (a maximum of four) series of impact performance assessments.
Depending on the concepts, up to 10% of the samples should be delivered in an aged/degraded status considering a standard environmental condition test that will be selected by the consortium in collaboration with the applicant.

4- Required data for the proposal & data provided by the consortium

In his proposal, the applicant should identify a list of proposed appropriate concepts, a general description, their expected and/or known performance versus highlighted features, as well as the total number of samples supplied.
For the ballistic performance assessment, a total of 60 impact test shots are currently foreseen for this topic.
The results of the ballistic tests will be made available to the provider of the respective test article.
Confidentiality will be granted in order to give assurance that the selected applicant will not have access to the technical data associated to the test articles of other topics “Design and manufacturing of innovative shield”.

2. Special Skills, certification or equipment expected from the applicant

- The applicant should have proven experience of supplying composite product to aeronautical field
- The applicant should have a sound industrial background in the supply and/or development and/or manufacture of shielding products for high velocity projectiles
- The applicant should have experience in the management of environmental conditions/ageing tests

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
A-01	Shield concepts description report	Description of the concepts that are proposed to be assessed including their expected lightweight performance against impact and the identification of proven concept features that could substantiate the performance versus specified A/C constraints	28.08.2011
A-02	Initial Sample summary list table	Initial version of a table identifying all shield concept test articles retained for assessment and, at least, associated main design features	31.09.2011
A-03	Report on the test article definition See remark (1)	For each sets of test sample supplies, report including definition dossier of the test articles including drawing (if applicable)	11.2011 to 12.2012
A-04	Supply of test articles See remark (1)	Test articles supply (including shipping) with manufacturing quality certificates	03.2012 to 03.2013
A-05	Environmental test report	Report of the environmental/aged conditions tests related to the concerned test articles.	31.04.2013

(1) These deliverables will be split in several deliverables which will be noted as -a, -b,-c,-d, depending on the number of series for impact performance assessments.

4. Topic value

The total value of biddings for this work package shall not exceed

€ 90.000,--

[ninety thousand euro]

Any proposal with a budget larger that the amount shown here-below will be automatically declared ineligible and will not participate in the evaluation.
Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
0	0	5	45	40	0	0

6. Remarks

As optional information regarding financial aspects, an extract of “Rules for Participation and Rules for Submission of Proposals and the related Evaluation, Selection and Award procedures” document is given here-below.

“For research and technological development activities, the JU financial contribution may reach a maximum of 50% of the total eligible costs of the beneficiaries. However, for beneficiaries that are non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, the rate may reach a maximum of 75% of the total eligible costs. If these beneficiaries change their status during the life of the project, this reimbursement rate shall be applicable up to the moment they lose their status.
For demonstration activities, the CSJU financial contribution may reach a maximum of 50% of the total eligible costs, irrespective of the beneficiaries' status.
For other activities, including management activities, training, coordination, networking and dissemination (including publications), the CSJU contribution may reach a maximum of 50% of the total eligible costs. However, for beneficiaries that are non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, the rate may reach a maximum of 75% of the total eligible costs. If these beneficiaries change their status during the life of the project, this reimbursement rate shall be applicable up to the moment they lose their status.”

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-02-015

Topic Description

CfP Topic Number	Title		
JTI-CS-2011-01-SFWA-02-015	Ground Based Structural and Systems Demonstrator Phase 3 – Component and sub-system manufacture	Start Date	01/01/2012
		End Date	01/03/2013

1. CfP Topic Description

As part of the Smart Fixed Wing Aircraft programme to mature a Natural Laminar Flow (NLF) Technology Stream for a future short range transport aircraft it is intended to **support** the TRL process by the design, manufacture, test and demonstration of an integrated NLF wing leading edge as a Ground Based Demonstrator (GBD). Two previous CfP phases are considering the **development of spanwise joint techniques**, a **wing ice protection system** (WIPS) and the **detailed design of the fully integrated leading edge zone**.

A 'zone' demonstrator refers to a specific region of the wing with all integrated systems e.g. the leading edge assembly. A 'feature' demonstrator refers to a specific technology that contributes to the zone under study e.g. the leading edge joint.

The outcome of this CfP will be the **manufacture or procurement** of all the selected features, components and sub-systems to enable final assembly of the GBD. This will include but not be limited to the manufacture or procurement of:

1. **An innovative wing leading edge rib and leading edge cover solution from either CFRP or metal that may include a spanwise joint and an integral spar cap as will be specified. The leading edge panel to include a designated erosion protection strategy that may be either a surface treatment process or additional metallic layer**
2. **An appropriate length of front spar and short sections of dummy wing box cover panels to represent the leading edge attachment structure**
3. **Components for the selected Wing Ice Protection System (WIPS) including cables and insulation**
4. **Provision for Lightning Strike protection for the leading edge zone if appropriate**

The Short Range Aircraft Conceptual Design Team within the SFWA programme and the previous phases of this GBD activity will provide the successful applicant with specifications and constraints for each of these features, especially the demanding requirements on surface quality. The achievement of an improved level of surface quality in terms of waviness and roughness when compared to present standards for turbulent wings is expected. Precise targets for surface waviness, steps, gaps and roughness will be specified during the negotiation phase when any changes to the proposed programme can de discussed and agreed. The ability to exceed current levels of industry standard for these parameters will need to be addressed within any application.

It is anticipated that the GBD will be up to 4.5m in spanwise extent and the nose radius of the leading edge may be as small as 20mm. It is not intended that the GBD will be loaded to flight conditions but it is required that the components meet the requirements for flight so that detailed assessments of the surface quality on representative components can be performed. **Detailed Data for Manufacture has been identified as a key deliverable from Phase 2 of this activity and will be available to the successful applicant following contract award.**

In this Call for Proposal (CfP) topic for Phase 3 of the GBD we seek support to **manufacture** the innovative design solutions from Phases 1 and 2 for a number of different features, components and sub-systems that will enable the prime functions of the leading edge assembly to be demonstrated. The particular 'features' under the remit of this topic include the leading edge **structural components** e.g. skins, ribs and **contributing system technologies** e.g. ice protection systems. The WIPS is likely to be electro-thermal but will depend upon the final material chosen for the skin and will be designed in **Phase 2** to meet the demanding performance and surface quality targets.

In a subsequent phase, following assembly of the features into a zonal Ground Based Demonstrator within SFWA, the GBD will be used to demonstrate the required functionality and form to meet the operational requirements for an NLF wing.

2. Special Skills, certification or equipment expected from the applicant

The applicant should have a sound industrial background in manufacturing of both CFRP and metallic leading edge components and sub-systems in a civil aerospace environment.

The applicant should be capable of producing components up to the full span of the GBD i.e. 4.5m and that meet the specified surface quality requirements.

The applicant should have a full ISO14001 certification.

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
1		Conditions of Supply and Delivery Plan	January 2012
2		Provision/Procurement of components for selected WIPS including cables and insulation	December 2012
3		Provision/Procurement of parts required to build a robust lightning strike protection network for the LE zone, if appropriate	December 2012
4		Provision/Procurement of any additional parts required to build a robust bird strike protection system for a LE zone	December 2012
5		Manufactured/Procured parts of the LE zone including LE ribs, skins and other structural features detailed in the selected design solution coming from GBD Phase 2	December 2012
6		Supporting drawings/instructions to enable assembly process	March 2013
7		Quality Assurance Plan produced and agreed	March 2012
8		Quality Inspection/Test/Deviation reports	March 2013

4. Topic value

The total value of biddings for this work package shall not exceed

€ 2.900.000,00

[two million and nine hundred thousand euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
			2.200.000	700.000		

6. Remarks

The assembly of the GBD will be performed by Airbus in their facilities in Bristol, UK. The successful applicant will be expected to deliver all components to that location.
As a general guide, it is anticipated that the length of proposal will be approximately 40 pages. In this context, please note also the instructions on minimum font and margin sizes and other matters in the document “Rules for Participation and Rules for Submission of Proposals and the related Evaluation, Selection and Award Procedures”.

Where it is proposed to subcontract certain elements of the work to be carried out, the following conditions must be fulfilled:

- Proposed subcontracts may only cover the execution of a limited part of the proposal
- Recourse to the award of subcontracts must be duly justified in the proposal having regard to the nature of the project and what is necessary for its implementation
- The proposal should indicate the tasks to be subcontracted and an estimation of the costs

All proposals shall comply with “Rules for Participation” and “Rules for Submission of Proposals” and the related “Evaluation, Selection and Award Procedures” that are available from the CORDIS website.

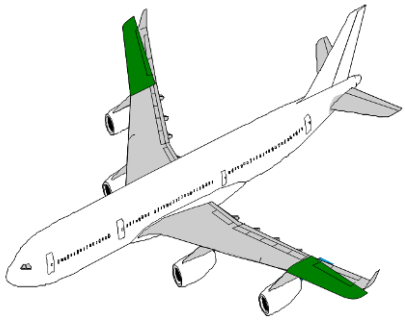
Topic Description

CfP Topic Number	Title		
JTI-CS-2011-01-SFWA-03-006	Manufacturing of outer wing assembly tooling	Start Date	01/09/2011
		End Date	31/12/2013

1. Topic Description

The applicant has to manufacture and setup the tooling for assembly of the port and starboard outer wing sections needed for flight tests of natural laminar flow on the SFWA flight test demonstrator.

Natural Laminar Flow is one of the key technologies to reduce Aircraft drag and fuel consumption. However, its application on commercial Aircraft requires achieving very good surface quality. Any defect (waviness, steps, gaps ...) could trigger the transition of the boundary layer to turbulent conditions.



The SFWA flight test demonstrator aims to validate that a specific wing profile can sustain laminar flow with an acceptable stability versus in flight deformation and contamination. Laminar flow requires very accurate profile and a high smoothness of the wing surface.
The quality of the assembly tooling of the outer wing is critical in order to achieve this surface quality.
The outer wings are designed as aeronautical box, composed by 2 spars, ribs, panels, leading edge and tip. It will be dry area (without fuel) and fully functional with extra data acquisition devices.

The main differences between LH and RH wings are:
The leading edge is integrated in the upper cover and entirely manufactured in composite material on the port wing whereas the starboard wing has a conventional metallic leading edge separately attached to the upper cover.

Key Requirements

- **Tolerance requirements**

The tooling manufacturing must take into account the requirements for tolerance ranges as indicated in the following table. These tolerances are considered in Maturity A (the defined target before Concurrent Engineering Phase), so they could be modified during the process to reach Maturity C (CDR milestone). Whilst not frozen it should be considered by applicants that the tolerance requirements will be considerably more stringent than for current wing build operations.

KEY AREAS (Overall profile tolerances in mm)	ASSY JIG
Upper side from Leading Edge to Front par: +/-h<0.4mm	+/-0.06
Upper side from Front Spar to Rear Spar: +/-h<0.6mm	+/-0.1
Upper side from Rear Spar to Trailing Edge: +/-h<0.6mm	+/-0.1
Lower side from Leading Edge to Front Spar: +/-h<0.4mm	+/-0.06
Lower side from Front Spar to Trailing Edge: +/-h<0.6mm	+/-0.1

Key input:

- Assembly tooling drawings finished (Aernnova Output) – DFM
- Tooling assembly drawings

The tooling assembly drawings are Aernnova´s responsibility and will be provided according to the product design phases.

Key deliverables description

- **Contribution to plateau phase (collocated workshop) for wing assembly design**

Whilst the design responsibility for the tooling rests with AERNNOVA a plateau phase will be completed to enhance input from the selected partner. This will enable the partner to strongly influence the tooling designs and ensure the best solution, culminating in C-Scheme and CDR reviews. During this period it is expected that engineers from the selected partner will be co-located with AERNNOVA in Vitoria-Alava, Spain.

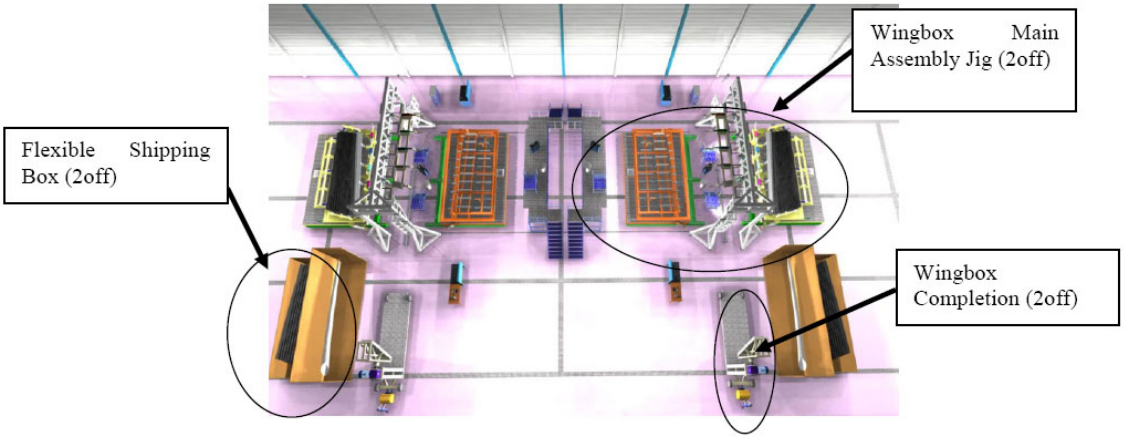
  - Plateau in Q4 2011 on tooling design
  - Preparation of C-Scheme and CDR

- **Toolings and jigs manufacturing**
  - **2 units: (1 drawing + 1 symmetrical except in leading edge/upper panel joint) Wing assembly jigs:** starboard and port side wing.
    The main tasks to develop in this stage will be typical aeronautical structure assembly operations: shimming, drilling, riveting and inspection.
    Approximate dimensions in meters: 13 x 4 x 7 (LxWxH).
    The main jig comprises of a frame structure with sufficient datum points to control the covers, spars and ribs. The covers themselves shall be held in cradles to preserve their shape.
    It could be necessary to install automation (hydraulic/electrical) to move cradles and locate to the main frame several times, depending on the process stage and final definition.
  - **1 unit: specific tooling for leading edge panels to upper cover sub-assembly**
    A jig will be required to be manufactured and installed at the GKN Facilities, Bristol, UK, for the completion of the LE to Upper Cover joint of the starboard wing. The jig shall use the outer surface of the parts as the datum and hold them whilst the assembly process is completed. The parts must remain held (this could be necessary to locate this part directly in the wing assembly jig by means of this sub-assembly jig, avoiding relocations and getting better accuracy in the profile of the wing assembly) throughout transit to AERNNOVA, Vitoria-Alava, Spain. It is therefore preferred that the assembly jig shall be designed so as to allow transport.
  - **2 units: Toolings for wing box completion.**
    The main tasks to complete in this stage of the build will be final assembly and inspection operations, system installation, surface preparation.
    Approximated dimensions in meters: 9 x 2 x 5 (LxWxH).
    The basic requirement is for a ‘dolly’ in which the product will be located by means of root attachment.
    It could be necessary to install automation (hydraulic/electrical) to rotate the wing in the spanwise axis.

Summary table listing the required tooling (not frozen):

ITEM	DESCRIPTION	QUANTITY
1	LH Wing box assembly	1
2	RH Wing box assembly (symmetric, except for the leading edge locator)	1
3	Slings for handling the parts and transport to the jig.	1
4	Leading edge panel to upper cover subassy	1
5	LH/RH Wing box completion	2
6	Slings for handling the product between assy stations and shipping box.	1
7	Flexible shipping box.	2

The tooling functionality must be equal (maximum level) for both wing sections. The next pictures illustrate the general layouts of the SFWA assembly tooling



Work to be performed by the applicant

1) Tool manufacturing following the manufacturing drawings, tolerances required and quality control gates defined in critical process with the dimensional reports, during machining, metrology, adjustment and preliminary set-up.
2) Transportation, setup and final adjustment of the manufactured high quality tooling at AERNNOVA facilities located in Vitoria-Alava (Spain)
3) For the Starboard LE to Upper Cover assembly jig the installation shall be at the GKN facilities, Bristol, UK. This fixture shall then be transported to AERNNOVA facilities, Vitoria-Alva, for final assembly.
4) Engineering support during the outer wing assembly process which will last at least 8 months.

At present the maturity level A (Maturity A) has been reached. However, the present design and concept are subjected to future modifications.

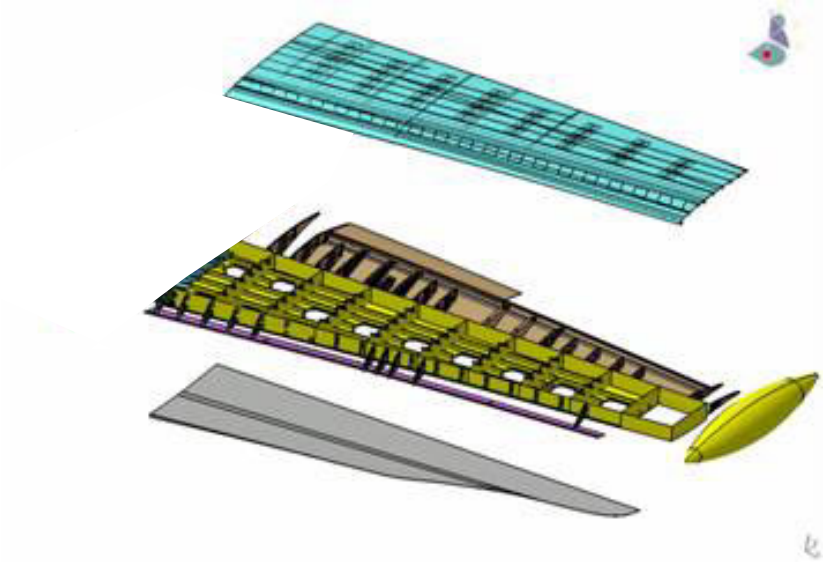
AERNNOVA Manufacturing Engineering will provide the necessary drawings, for tooling manufacturing when the Critical Design Review is reached. Nevertheless AERNNOVA will give the necessary information for material provision.

The main jig will be mounted and assembled in the AERNNOVA facilities in Vitoria-Alava (Spain). The future partner will be in charge for the transportation and installation of all necessary hardware to this location, measuring, handling devices, etc…

The future partner has to certify the conformity of the jigs with the reports and quality documentation.

The following drawings give an a idea about the semi wing design and dimensions:

Span length: 8.5 meters (approx.)
Chord length: 4.1 meters in roots (approx.)



2. Special Skills, certification or equipment expected from the applicant

- The applicant should have experience in aeronautical tooling: design and manufacturing.
- The applicant should have experience in the assembly of aeronautical hardware.(Torsion box: wing , horizontal stabilizer, etc)
- The applicant shall have good metrological skills and experience in order to deliver the required tolerances
- Fluent communication (in English) between AERNNOVA Manufacturing Engineering and the applicant will be required, a potential workshop will be required in AERNNOVA facilities

3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
1	Contribution to tooling design Mat C	Participation to plateau phase	December 2011
2	2 Assembly tooling Assembled		November 2012
3	1 Tooling for leading edge panels to upper cover sub-assembly		June 2012
4	2 Toolings for system installation.		November 2012
5	Delivery report	To ensure the Design is respected	November 2012
6	Support during wing assembly		Jan-July 2013

Key Milestones and Dates	
CDR	December 2011
Assembly tooling drawings finished (Aernnova Out put)	January 2012
Assembly tooling manufacturing start	January 2012

Assembly tooling Assembled	November 2012
Outer wing assembly, start	January 2013
Outer wing assembled	May 2013

Note that dates printed bold indicate the key milestones for the contractor.

4. Topic value

The total value of biddings for this work package shall not exceed
€ 3.000.000
[three million euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
		200.000	2.400.000	400.000		

6. Remarks

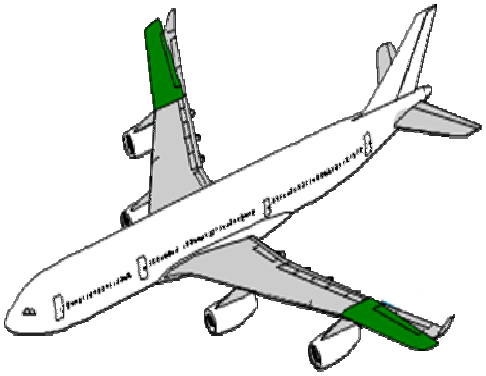
Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-03-007

Topic Description

CfP Nr.	Title		
JTI-CS-2011-01-SFWA-03-007	Low drag wing foam cover for flight test	Start Date	01/07/2011
		End Date	31/12/2014

1. Topic Description

Introduction
The applicant has to design and manufacture a lower wing cover made out of foam for the aerodynamic profiling of the outer wing section during flight tests.



Natural Laminar Flow is one of the key technologies to reduce Aircraft drag and fuel consumption. However, its application on commercial Aircraft requires achieving very good surface quality. Any defect (waviness, steps, gaps, and so on) could trigger the transition of the boundary layer to turbulent conditions.

The SFWA flight test demonstrator aims to validate that a specific wing profile can sustain laminar flow with an acceptable stability versus in flight deformation and contamination. Laminar flow requires very accurate profile and a high smoothness of the wing surface.

To ensure loads compatibility with A340 inner wing, the outer wing profile is made in 2 parts:

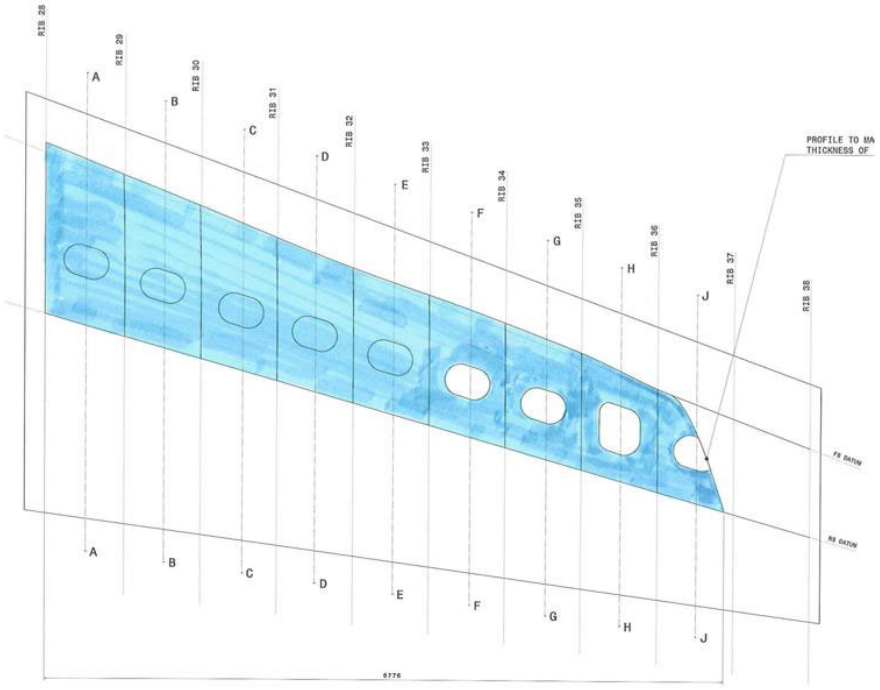
- Wing box (upper cover, ribs, spars, lower cover) with the same thickness as the inner wing that ensures good loads transfer
- **A lower wing foam cover (Plastron)** that creates the required aerodynamic profile.

The success of the flight test demonstration depends vitally on the plastron. It is a true technological challenge to put a foam component of this size on a wing. It has never been done before; only small plastrons have been fitted so far. If successful, this technology will represent a great step forward allowing fast, low-cost modifications of wing profiles for flight tests.

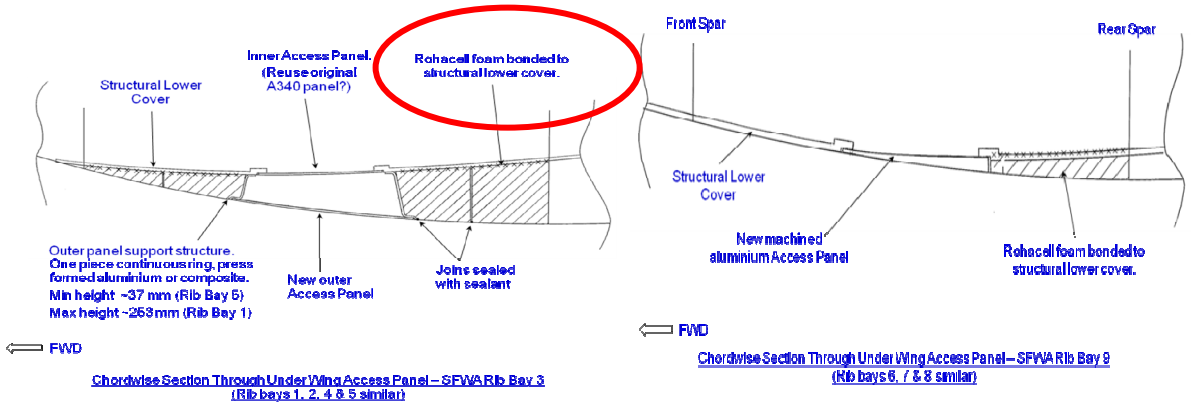
The plastron shall sustain aerodynamic pressure loads, while leaving access to the wing's structure and ensuring high surface quality.

Key requirements:

- Plastron will be manufactured from a rigid closed cell foam e.g Rohacell or similar. The foam is machined to final size/shape in manageable sections and each section bonded to the structural lower cover.
- Total span of the plastron is approximately 6.3 meters with a chord between 1 meter and 1.5 meters.
- It provides the non structural aerodynamic lower surface.
- It shall remain attached throughout the limited flight test campaign of approx 100-150 flight hours.
- It shall incorporate access to the under wing manhole doors in the structural lower cover.
- Bird impact must be addressed within the design – principally the foam plastron will not resist the impact and the debris released will be minimised (less than 0.5kg is the working value).
- Reparability shall be considered throughout the design/manufacture/assembly stages.
- Component transportation to the Aircraft Assembly site (Toulouse, France).
- The Plastron must meet the surface quality and tolerance requirements (to meet requirements an outer layer of a different material may be required e.g. glass fibre)
- Each Plastron section shall be sealed on all surfaces except the surface to be bonded



INVERTED PLAN VIEW OF SMART FIXED WING



Proposed Manufacture and Attachment to Wing

- Foam sheets rough cut to match rib bay sizes.
- Where plastron thickness exceeds available sheet thickness, sheets bonded together to create the required thickness.
- Foam machined to plastron final size/shape.
- Plastron pieces sealed on all surfaces except surface bonded to the lower cover. Sealed using a single glass fibre laminate wet laid onto the surface then painted or, dependant on Rohacell grade chosen, paint applied directly to foam.
- Plastron pieces bonded to lower cover using Araldite 2011 to ABP 5-1158. Positioned using adjacent structure as reference or via laser projection and temporarily held in place while adhesive cures using low tech solution e.g. double sided self adhesive foam tape or straps wrapped around wing.
- Joint lines sealed with sealant to ABP 4-5142.

Key input:

This information will be provided after the selection process:

- Design principles and stress methods requirements
- Material data
- FTI installation requirements
- Outer shape of plastron
- Frontier drawings
- Design drawings (maturity B)
- Surface quality requirements
- Tolerance requirements

Detailed deliverables to be provided by the applicant:

This CFP topic includes the detailed design from Maturity B to DFM and the manufacturing of the following parts:

- All foam parts comprising the plastron
- Aluminium panels above man-holes
- All brackets, bolts ensuring wing interface and adhesive.
- Access panels and support structure including fasteners

It also includes support during wing assembly and flight tests.

1- Design:
- Design (drawings and models) for Maturity C and for DFM
- Stress analysis and results.
- Inputs to DMU (.CATPart files + .CATProduct, CATIA V5 R18 format), to be delivered to Airbus Configuration Manager for integration in the overall outer wing and A/C DMU.
- Liaising with Partners in charge of components in interface.
- Liaising with Airbus for FTI integration
- Contribution to Flight Clearance dossier (inc. V&V applied to manufactured parts)

Note: Selected partner will be provided with B-scheme.

2- Manufacturing:
- Drawing sets to support DFM
- Purchase of material
- Manufacturing processes and tooling description
- Component manufacturing, including support to FTI installation (e.g.: pressures taps).
- Assembly of sub-components
- Verification of surface quality achievements.
- Contribution to Flight Clearance dossier (inc. V&V applied to manufactured parts)
- Final surface treatment.

3- Logistics and support:
- Choice of transportation mean(s)
- Any tooling needed for transportation (design/manufacturing/supply)
- Component transportation to assembly site, with, if needed, support from Airbus transportation expertise.
- Accompaniment in component delivery and handling
- Support during Wing Assembly and Flight test (including repairs)

2. Special Skills, certification or equipment expected from the applicant

- The applicant shall have a sound industrial background in upper cover and leading edge Design and Manufacturing.
- The applicant has to have a full ISO 14001 certification.
- Given the short time available, it is preferable that the applicant complies with Airbus procedures.
- The applicant shall have confidential agreement with Airbus

3. 3. Major deliverables and schedule

Del. Ref. Nr.	Title	Description (if applicable)	Due date
D3.1-14-01	C-Scheme drawings	.CATpart & .CATProduct & BOM & Frontier drawings	30/12/2011
D3.1-14-02	Stress dossier	Stress sheet	
D3.1-14-03	Components delivery	Delivery to assembly site	30/12/2012
D3.1-14-04	Flight clearance dossier		30/06/2013
D3.1-14-05	Support during Assembly and Flight Tests		30/06/2014

4. Value of CfP workpackage

The total value of biddings for this work package shall not exceed
€ 900.000,00
[nine hundred thousand euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile

2009	2010	2011	2012	2013	2014	2015
0	0k€	300k€	400k€	150k€	50k€	0

6. Remarks

None

Clean Sky Joint Undertaking
JTI-CS-2011-1-SFWA-03-008

Topic Description

CfP Nr.	Title		
JTI-CS-2011-01-SFWA-03-008	Acoustic Inlet Lip panel large scale endurance demonstrator	Start Date	01/06/2011
		End Date	30/06/2012

1. Topic Description

The applicant is required to design, manufacture and ground test an innovative acoustic panel located in a nacelle air intake. This panel is a key technology item for reducing the forward fan noise of a commercial Aircraft, without changing the length of the nacelle.

This panel shall integrate anti-icing systems, drainage function, and shall fulfil aerodynamic surface quality and shape requirements, while integrating acoustics cells. The integration of such a set of challenging requirements led to select a technology based on honeycomb titanium structure, exhibiting double curvature geometry.

One of the key points for clearing the ALEAP (Advanced Lip Extended Acoustic Panel) is the demonstration of the long term reliability of the panel with regard to fatigue issues and repair issues. This CfP topic will be the end of a complete set of intermediate trials, based on simpler demonstrators, and it will complete a flight test campaign already performed.

The CfP applicant will design, manufacture and test the large scale endurance demonstrator.

In order to ease the manufacturing and testing phase, the baseline design principle of the demonstrator will be made available to the applicant, but the remaining refinement of the design will be part of the CfP topic.

The test facilities to be used by the applicant shall enable thermal loading through hot air (around 250°C, around 1,5 atm, mass flow around 1kg/s), in parallel with mechanical loading (interface loading and skin loading).
The test facilities shall be able to simulate an engine vibratory environment, in order to perform vibration test.

The demonstrator shall allow the inspection of the panel during the endurance test.

The demonstrator shall allow testing repair solutions.

The overall dimensions of the circular panel can reach up to 300mm X 2000 mm .(see picture in box 5.), depending of the selected test strategy

2. Special Skills, certification or equipment expected from the applicant

- The applicant shall have a sound industrial background in upper cover and leading edge Design and Manufacturing.
- The applicant has to have a full ISO 14001 certification.
- Given the short time available, it is preferable that the applicant complies with Airbus procedures.
- The applicant shall have confidential agreement with Airbus.

3. Major deliverables and schedule

Deliverable	Title	Description (if applicable)	Due date
D3.6-01-01	C-Scheme drawings	.CATpart & .CATProduct & BOM	**31/07/2011**
D3.6-01-02	Testing sequence	Testing dossier	**31/07/2011**
D3.6-01-03	Model reception	Reception sheet and model hardware	**31/09/2011**
D3.6-01-04	**Mid-Test report**	Report about preliminary repair solution and intermediate results	31/12/2011
D3.6-01-04	**End of test report**	Report about consolidated repair solution and final results	30/06/2012

4. Topic value (€)

The total value of biddings for this work package shall not exceed
€ 750.000,--
[seven hundred and fifty thousand euro]

Please note that VAT is not applicable in the frame of the *CleanSky* program

5. Estimated spend profile [KEuro]

2009	2010	2011	2012	2013	2014	2015
		500	250			

====== End of Topic Descriptions for SFWA ======

Due to the large number of topics in this call and the inclusion of graphics in many topic descriptions, the topic descriptions for **SAGE, SFWA** and **SGO** have been moved into annexes of the Call Fiche. These annexes can be found in the additional documents section of the call web page. The main part of the Call Fiche contains the topic descriptions for **ECO, GRA** and **GRC.**