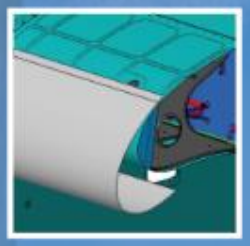
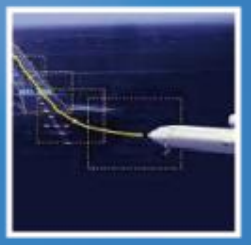










Innovation Takes Off

www.cleansky.eu

Clean Sky 2
Information Day dedicated to the 9th Call for Proposal Partners (CfP09)

LPA – IADP

Presented by
Marc Maurel, Airbus
Jens Koenig ; Airbus

Toulouse / France, 26th October 2018

Innovation Takes Off

www.cleansky.eu

Clean Sky 2

From Clean Sky towards Clean Sky 2

CS1 Smart Fixed Wing Aircraft -ITD (SFWA)

- Is a unique environment for high TRL integrated Research and Development
- Provides the frame for well aligned objective driven R&T covering development and maturation through numerical simulation, rig demonstrators, wind tunnel testing, large scale and flight testing under conditions relevant for operation

SFWA key technologies

- NLF – wing for large transport aircraft and bizjets
- CROR engine integration
- Innovative empennage for next generation bizjets
- Innovative control surfaces
- Buffet Control Technologies
- Advanced load control architectures and function
- Advanced Flight Test instrumentation

CS2 Large Passenger Aircraft IADP (LPA)

- Will provide a platform for even more focussed large scale, highly integrated demonstrators with core partners and partners
- Build on down best candidate technologies emerging from CleanSky 1 other national and EU R&T programs and additional technologies developed in CS2 ITDs

Contribute to TRL - Scale

1	2	3	4	5	6

Clean Sky

Setup and Implementation

„Mature and validate disruptive technologies for next generation Large Passenger Aircraft through large scale integrated demonstration“

Platform 1
Advanced Engine and Aircraft Configuration

Platform 2
Innovative Physical Integration Cabin-System-Structure

Platform 3
Next Gen. A/C Systems, Cockpit Systems & Avionics

LPA-IADP WBS – “Platform 1”

Airbus with SAAB, Dassault, SNECMA and Partners

Large Passenger Aircraft Platform – integration topics

„Platform 1 - OAD“

Advanced Engine and Aircraft Configurations

„Platform 2 - OPD“

Innovative Physical Integration Cabin-System-Structure

„Platform 3 - OSD“

Next Gen. A/C Systems, Cockpit Systems & Avionics

TRL 4-6
Aircraft Level

Platform 1 Advanced Engine and Aircraft Configurations

WP 1.1 Advanced engine demonstrators (BLI, UHPE, Open Rotor)

WP 1.2 Advanced engine integration driven rear fuselage

WP 1.3 Validation of scaled flight testing

WP 1.4 Hybrid laminar flow control large scale demonstration

- HLFC applied on fin in long-term flight operation
- HLFC wing pre-flight demonstrator

WP 1.5 Applied technologies for enhanced aircraft performance

WP 1.6 Demonstration of radical aircraft configurations

Estimated Volume of Activities ~560M€

LPA-IADP WBS – “Platform 2”

Airbus with, Liebherr, Fraunhofer and Partners

Large Passenger Aircraft Platform – integration topics

„Platform 1 - OAD“

Advanced Engine and Aircraft Configurations

„Platform 2 - OPD“

Innovative Physical Integration Cabin-System-Structur

„Platform 3 - OSD“

Next Gen. A/C Systems, Cockpit Systems & Avionics

TRL 4-6
Aircraft Level

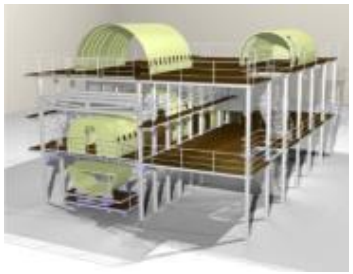
Platform 2 Innovative Physical Integration Cabin-System-Structure

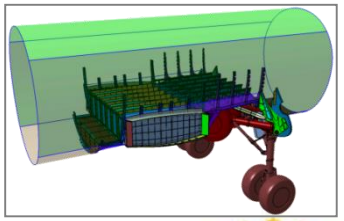
WP 2.1 Next generation fuselage, cabin and systems integration

WP 2.2 Next generation cabin & cargo functions

WP 2.3 Next generation lower centre fuselage

WP 2.4 Non-specific cross function





Estimated Volume of Activities ~290M€

LPA-IADP WBS – “Platform 3”

TRL 4-6
Aircraft Level

Airbus with Thales, Liebherr, SAFRAN and Partners

Large Passenger Aircraft Platform – integration topics

„Platform 1 - OAD“

Advanced Engine and Aircraft Configurations

„Platform 2 - OPD“

Innovative Physical Integration Cabin-System-Structure

„Platform 3 - OSD“

Next Gen. A/C Systems, Cockpit Systems & Avionics

Platform 3 Next Gen. Aircraft A/C Systems, Cockpits & Avionics

WP 3.1 Enhanced flight operations and functions — Light Weight Eye Visor system / system failures…

WP 3.2 Innovative enabling Technologies — Communication / Avionics components / A/C monitoring for grd support / IMAP

WP 3.3 Next generation cockpit functions flight demonstration

WP 3.4 Enhanced cockpit demonstration — LPA & regional A/C

WP 3.5 Disruptive Cockpit demonstration — V&V/ Test means, virtual platforms

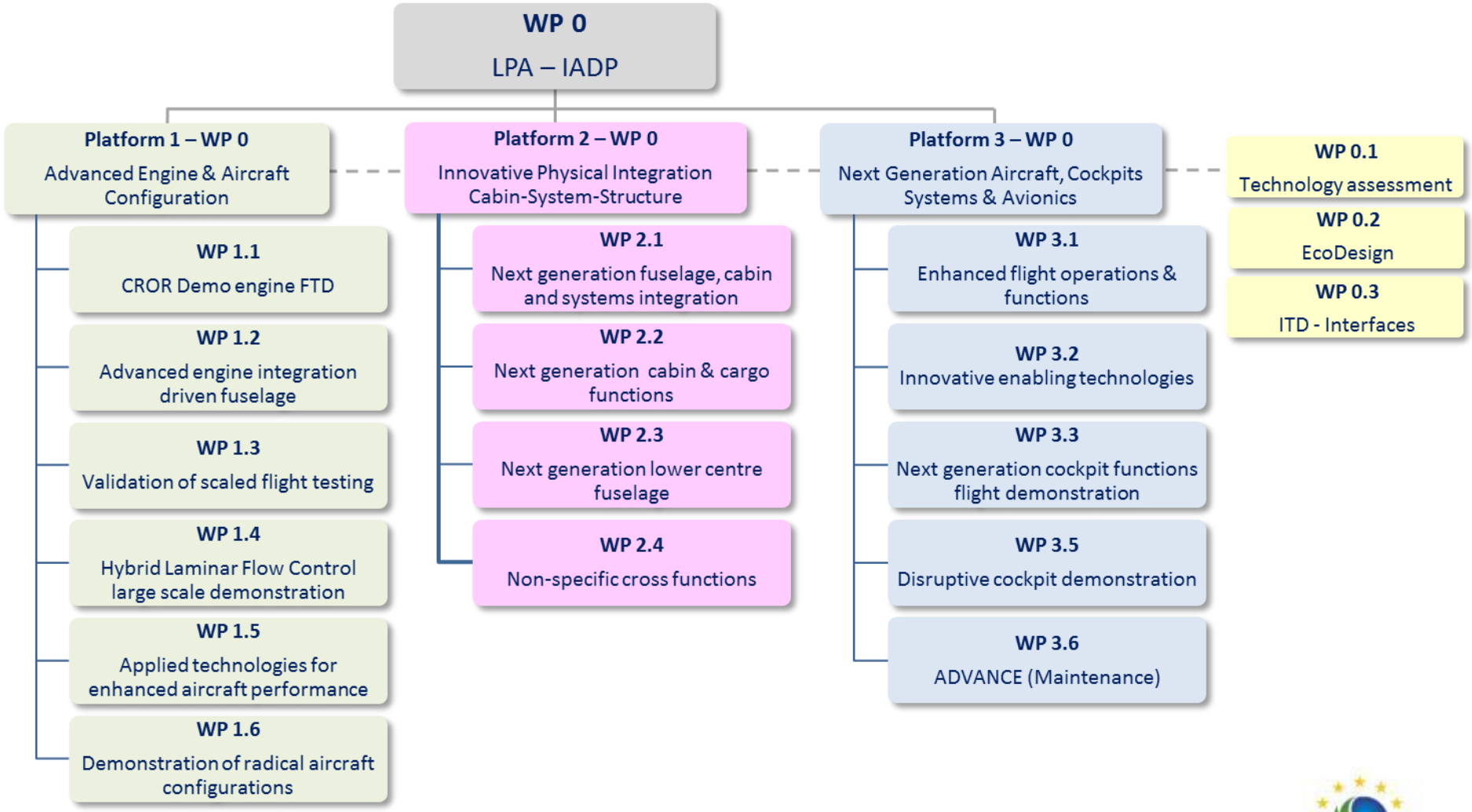
WP 3.6 **ADVANCE** Maintenance — Prognostic / conditions-based maintenance / fleet data management & execution

Cockpit of the future (Fenics)

Estimated Volume of Activities ~220M€

Clean Sky
JOINT UNDERTAKING

LPA-IADP Work Breakdown Structure



Overview of the LPA-CfP09 topics

Platform 1

14 topics / 21,30M€ ind. funding

Identification Code	Title	Type of Action	Value (Funding in M€)	Topic Leader
JTI-CS2-2018-CfP09-LPA-01-58	BLI configurations of classical tube and wing aircraft architecture - Wind tunnel tests insight into propulsor inlet distortion and power saving	RIA	3.50	Safran Tech
JTI-CS2-2018-CfP09-LPA-01-59	Fan inlet advanced distortion simulator	IA	2.20	Safran
JTI-CS2-2018-CfP09-LPA-01-60	Innovative low noise fan stator technologies for 2030+ powerplants	RIA	2.50	Safran
JTI-CS2-2018-CfP09-LPA-01-61	Fatigue life prediction on Inco 718 part subject to service induced damages	IA	0.65	GKN Aerospace Sweden
JTI-CS2-2018-CfP09-LPA-01-62	Rear End Structural Test Program – Component & Subcomponent tests	IA	1.10	Airbus
JTI-CS2-2018-CfP09-LPA-01-63	Rear End Aerodynamic and Aeroelastic Studies	RIA	1.25	Airbus
JTI-CS2-2018-CfP09-LPA-01-64	Rear End Structural Test Program - Low level tests	IA	0.70	Airbus
JTI-CS2-2018-CfP09-LPA-01-65	Development of System pipework and Tooling for Sub-Assembly, Final-Assembly of the HLFC-wing Prototype	IA	0.70	Aernnova
JTI-CS2-2018-CfP09-LPA-01-66	Shielding/High-lift composite thermoplastic flap manufacturing, tool design and manufacturing & process definition	IA	0.90	SONACA
JTI-CS2-2018-CfP09-LPA-01-67	UHBR Installed Advanced Nacelle Optimisation and Evaluation Close Coupled to Wing	RIA	3.40	Rolls-Royce
JTI-CS2-2018-CfP09-LPA-01-68	Non-Intrusive Flow Field Measurement within a UHBR Intake	RIA	2.25	Rolls-Royce
JTI-CS2-2018-CfP09-LPA-01-69	Insulation Monitoring for IT Grounded (Isolation Terra) Aerospace Electrical Systems	IA	0.70	Rolls-Royce
JTI-CS2-2018-CfP09-LPA-01-70	Assessment of arc tracking hazards in high voltage aerospace systems	IA	0.75	Rolls-Royce
JTI-CS2-2018-CfP09-LPA-01-71	Innovative Nacelle cowl opening system	IA	0.70	Airbus

Overview of the LPA-CfP09 topics

Platform 2

3 topics / 2,70M€ ind. funding

Identification Code	Title	Type of Action	Value (Funding in M€)	Topic Leader
JTI-CS2-2018-CFP09-LPA-02-27	Innovative mould for thermoplastic skin of the lower fuselage demonstrator	IA	0.95	NLR
JTI-CS2-2018-CFP09-LPA-02-28	Innovative tooling, end-effector development and industrialisation for welding of thermoplastic components	IA	1.05	Fokker
JTI-CS2-2018-CFP09-LPA-02-29	High performance gas expansion system for halon-free cargo hold fire suppression system.	IA	0.70	Airbus

Platform 3

3 topics / 2,50M€ ind. funding

Identification Code	Title	Type of Action	Value (Funding in M€)	Topic Leader
JTI-CS2-2018-CFP09-LPA-03-16	Automated data collection and semi-supervised processing framework for deep learning	IA	0.80	Honeywell
JTI-CS2-2018-CFP09-LPA-03-17	Audio Communication Manager for Disruptive Cockpit demonstrator	IA	0.70	Airbus
JTI-CS2-2018-CFP09-LPA-03-18	Safe emergency trajectory generator	IA	1.00	Thales Avionics

LPA total number of topics in CfP#09: 20 / total indicative funding 26,5M€

Overview of the LPA-CfP09 topics

Platform 2

3 topics / 2,70M€ ind. funding

Identification Code	Title	Type of Action	Value (Funding in M€)	Topic Leader
JTI-CS2-2018-CFP09-LPA-02-27	Innovative mould for thermoplastic skin of the lower fuselage demonstrator	IA	0.95	NLR
JTI-CS2-2018-CFP09-LPA-	Innovative tooling, end-effector development and	IA	1.05	Fokker

Important for Partner-Applicants to note:

Cooperation between the GAP Partners and LPA members acting in the „hosting“ work packages shall be done by means of an Implementation Agreement (IA) for all CfP#09 topics.

The IA shall be used as published with the CfP#09 Call documents.

Platform 3

3 topic / 2,50M€ ind. funding

		Action in M€)		
JTI-CS2-2018-CFP09-LPA-03-16	Automated data collection and semi-supervised processing framework for deep learning	IA	0.80	Honeywell
JTI-CS2-2018-CFP09-LPA-03-17	Audio Communication Manager for Disruptive Cockpit demonstrator	IA	0.70	Airbus
JTI-CS2-2018-CFP09-LPA-03-18	Safe emergency trajectory generator	IA	1.00	Thales Avionics

LPA total number of topics in CfP#09: 20 / total indicative funding 26,5M€

LPA-IADP WBS – “Platform 1”

Airbus with SAAB, Dassault, SNECMA and Partners

Large Passenger Aircraft Platform – integration topics

„Platform 1 - OAD“

Advanced Engine and Aircraft Configurations

„Platform 2 - OPD“

Innovative Physical Integration Cabin-System-Structure

„Platform 3 - OSD“

Next Gen. A/C Systems, Cockpit Systems & Avionics

TRL 4-6
Aircraft Level

Platform 1 Advanced Engine and Aircraft Configurations

WP 1.1 Advanced engine demonstrators (BLI, UHPE, Open Rotor)

WP 1.2 Advanced engine integration driven rear fuselage

WP 1.3 Validation of scaled flight testing

WP 1.4 Hybrid laminar flow control large scale demonstration

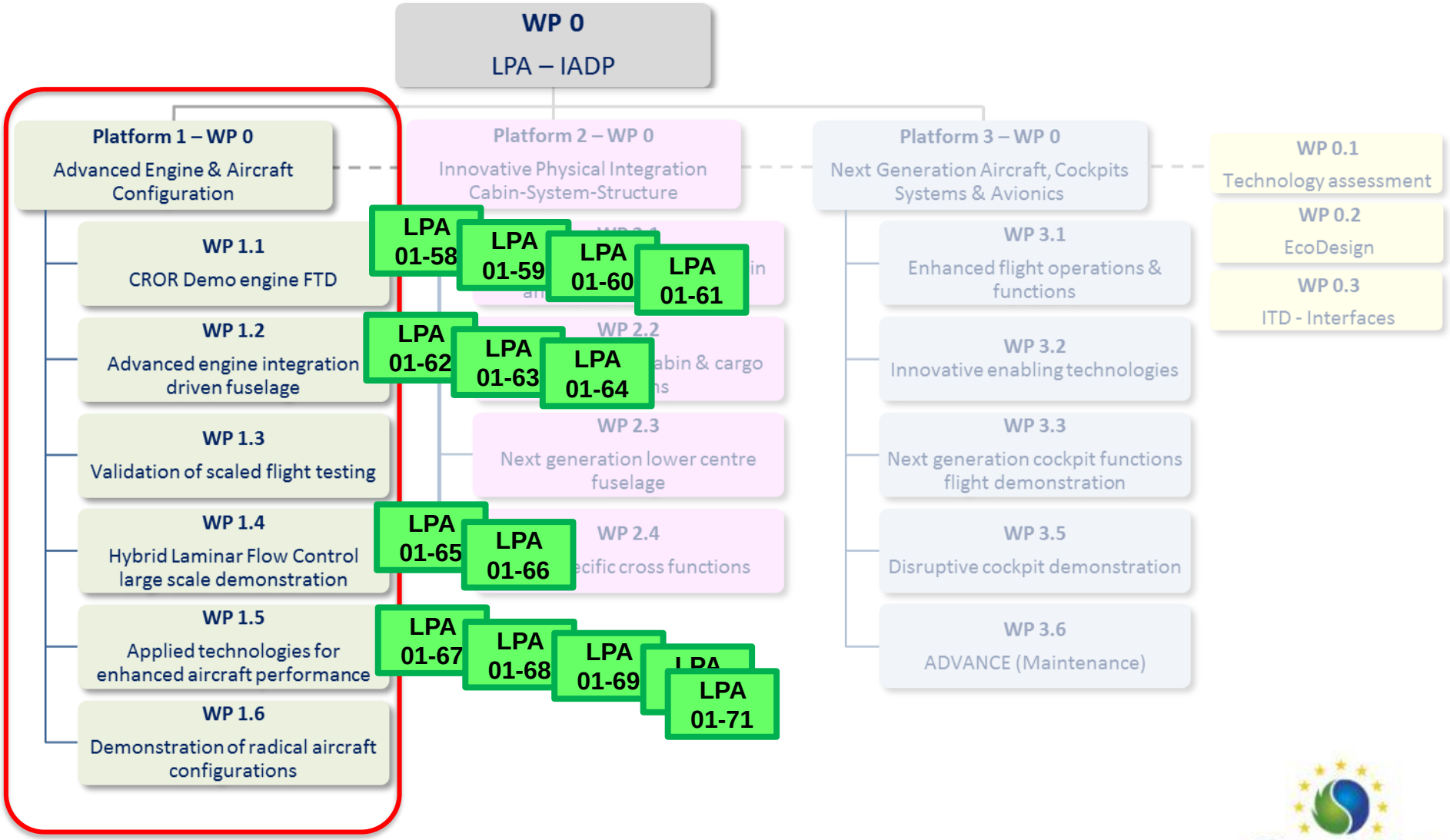
- HLFC applied on fin in long-term flight operation
- HLFC wing pre-flight demonstrator

WP 1.5 Applied technologies for enhanced aircraft performance

WP 1.6 Demonstration of radical aircraft configurations

Estimated Volume of Activities ~560M€

LPA-IADP WBS – “Platform 1”



JTI-CS2-2018-CfP09-LPA-01-58

BLI configuration of tube and wing aircraft architecture - Wind tunnel tests insight into propulsor inlet distortion and power saving

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-01-58

- **JTI-CS2-2018-CFP09-LPA-01-01**
- **WP1.1.3.6**
- **Demonstration area :** Boundary Layer Ingestion
- **Topic Leader : Safran SA**

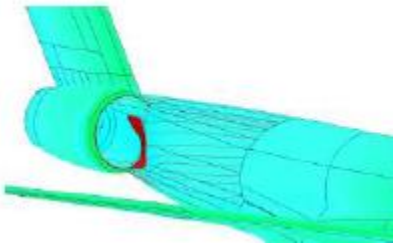
- **Title:** *BLI configuration of tube and wing aircraft architecture - Wind tunnel tests insight into propulsor inlet distortion and power saving*

- **Objective:** The objective of this project is an insight into the distortion in front of the propulsor inlet, the power saving coefficient estimation and the impact on the aircraft aerodynamics, depending on the BLI configuration, the propulsor characteristics, the aircraft configuration and the flight conditions (free stream, and operating conditions). The objective should be fulfill using manly relevant wind tunnel tests and complementary CFD computations.

- **Type of action : RIA**

- **Volume:** 3.5 M€ funding

Aft tail configuration (DISPURSAL, 2018)



rear fuselage part with a BLI180° propulsor architecture

JTI-CS2-2018-CfP09-LPA-01-58

- **Schedule/Milestones**

Milestones (when appropriate)			
Ref. No.	***Title - Description***	***Type****	***Due Date***
MS_00	Specification Review	R	T0+4
MS_01	Scale Models, Test Bench and ADS COR	R	T0+5
MS_02	Scale Models, Test Bench and ADS PDR	R	T0+7
MS_03	Scale Models, Test Bench and ADS CDR	R	T0+12
MS_04	Manufacturing Review	R	T0+23
MS_05	Component Testing Review	R	T0+24
MS_06	Testing Preparation Review	R	T0+27
MS_07	Wind Tunnel Test Review	R	T0+30
MS_08	Final wind tunnel test data delivery Review	R	T0+34
MS_09	Synthesis Review	R	T0+36

**Type: R=Report, D=Data, HW=Hardware*

Deliverables			
Ref. No.	***Title - Description***	***Type****	***Due Date***
Del_00	Specification and Risk analysis Review Presentation Specification and Risk analysis Report and CFD results	R & D	T0+4
Del_01	Concept Design Review Presentation Concept Design Report	R	T0+5
Del_02	Preliminary Design Review Presentation Preliminary Design Report	R	T0+7
Del_03	Critical Design Review Presentation Critical Design Report	R	T0+12
Del_04	Manufacturing Review Presentation Manufacturing Report	R	T0+23
Del_05	Component Testing Review Presentation Component Testing Report CAD of the scales models and the test bench	R & D	T0+24
Del_06	Testing Preparation Review Presentation Testing Preparation Report and pre-tests CFD results	R & D	T0+27
Del_07	Wind Tunnel Test Review Presentation Wind Tunnel Test Report - Wind Tunnel Test Raw Data	R & D	T0+30
Del_08	Results Post-Processing Review Presentation Results Post-Processing Report - Final wind tunnel test data	R & D	T0+34
Del_09	Synthesis Review Presentation Synthesis Review Report	R	T0+36

- **Targeted applicant & Required skills:**

- Wind tunnels allowing low speed and high speed freestream conditions. It seems more confortable to have facilities allowing **a Reynolds number around 5 million with the fuselage length of the scale model as reference, and a fuselage length around 1.5 meters.**
- Wind tunnel tests execution and postprocessing capabilities
- Advanced aerodynamics measurement capabilites and skills
- Advanced skills in Computational Fluid Dynamics
- CFD software with a relevant validation and scientific acknowledgement in the field of aircraft and turbomachinery aerodynamics
- Advanced skills in numerics
- Advanced skills in numerical results analysis
- High-performance computation ressources access
- CFD capabilities
- Mechanical design
- Aerodynamic design
- Manufacturing and assembly: provisionning (raw material, components like sensors); machining; controlling of scale models, test bench and sub assembly.
- Testing and inspecting: subcomponent, sensors, …

JTI-CS2-2018-CFP09-LPA-01-59

Fan inlet advanced distortion simulator

Innovation Takes Off

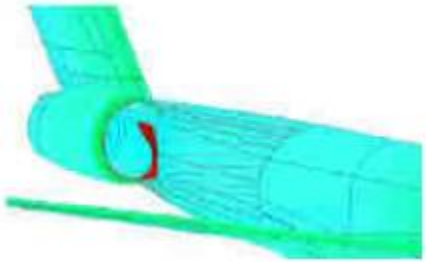
http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-01-59

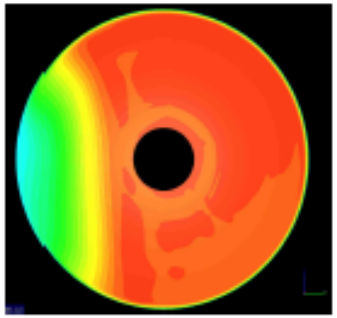
- **JTI-CS2-2018-CFP09-LPA-01-02**
- **WP1.1.3.6 : 2030+ Engine Techno Bricks**
  - **Topic Leader : Safran Aircraft Engines**

- **Title:** Fan inlet advanced distortion simulator
- **Objective:** The project intends first to develop a software aimed at finding out a design of a proper distortion device that would generate a pre-defined distortion map. Then, a second part will be devoted to the software validation, by performing wind tunnel tests (without any engines) onto various configurations to survey the real distortion charts obtained. This process will be first applied on steady distortion patterns and then on unsteady ones.
- **Volume:** 2200k€ funding



BLI schematic illustration

BLI distortion pattern



JTI-CS2-2018-CFP09-LPA-01-59

- **Schedule/Milestones**

Duration	41 months
Start	Q4/2019

WP1

Deliverables

Ref. No.	Title - Description	Type*	Due Date
D1.1	Preliminary software demonstrator - A preliminary software version will be issued, including a documentation (user & developer)	SW +R	T0+8
D1.2	Updated software demonstrator - Distortion simulator calibrated on academic cases: a new software version will be released, including a documentation (user & developer)	SW +R	T0+14
D1.3	3D geometries – (CAD files) corresponding to the 4 real distortion patterns will be released, including the final CFD check report	D+ R	T0+20
D1.4	Wind Tunnel Tests report – Will compile all experimental data acquired during the WT tests, and environment information useful to perform a rig-scale assessment (T1.5)	D +R	T0+31
D1.5	Final software- this final version will integrate all lessons learned and design rules issued from T1.5, including an updated documentation (user & developer)	SW +R	T0+34

Milestones (when appropriate)

Ref. No.	Title - Description	Type*	Due Date
M1.1	Methodology Review- Validation of methodology down selection based on existing know-how and bibliography survey → **WP1 Go-No Go**	R	T0+5
M1.2	Update software review	SW +R	T0+14
M1.3	Test Distortion devices Critical Design Review (CDR)	D + R	T0+20
M1.4	WT Tests Readiness Review (TRR)	R	T0+26
M1.5	WT Post Tests Review and final software validation	R +D+ SW	T0+34

WP2

Deliverables

Ref. No.	Title - Description	Type*	Due Date
D2.1	3D geometries – (CAD files) corresponding to the 2 real unsteady distortion patterns will be released, including the final CFD check report	D+R	T0+24
D2.2	Wind Tunnel Tests report – Will compile all experimental data acquired during the WT tests, and environment information useful to perform a rig-scale assessment (T2.4)	D+R	T0+35
D2.3	Final report- this report will summarize the work performed in T2.1 to T2.3, and will integrate all lessons learned during design and testing phases. Design rules issued from T2.4, including an updated documentation (user & developer) will be included in this report.	R	T0+41

Milestones (when appropriate)

Ref. No.	Title - Description	Type*	Due Date
M2.1	Methodology Review- Validation of methodology down selection based on existing know-how and bibliography survey → **WP2 Go-No Go**	R	T0+12
M2.2	Test Distortion devices Critical Design Review (CDR)	D + R	T0+24
M2.3	WT Tests Readiness Review (TRR)	R	T0+35
M2.4	WT Post Tests Review and final conclusions	R +D+ SW	T0+41

** Type: R=Report, D=Data, SW=Software*

- **Targeted applicant**: Partner will have advanced aerodynamics skills. Expertise in terms of software developments, mechanical design as well as wind tunnel tests capabilities (incl. machining, inspecting & post-processing) will also be required.
- **Detailed required skills**:
  - Software development,
  - Advanced aerodynamics skills,
  - Mechanical design: static; dynamic,
  - Advanced aerodynamics measurement capabilities and skills,
  - Wind tunnel tests facilities representative in Mach and Reynolds numbers requirement,
  - Wind tunnel tests execution and post-processing capabilities,
  - Manufacturing and assembly: provisioning (raw material, components like sensors);
  - Machining; controlling of scale models, test bench and sub assembly,
  - Testing and inspecting: subcomponent, sensors

JTI-CS2-2018-CfP09-LPA-01-60

Innovative Low noise fan stator technologies for 2030+ powerplants

Innovation Takes Off

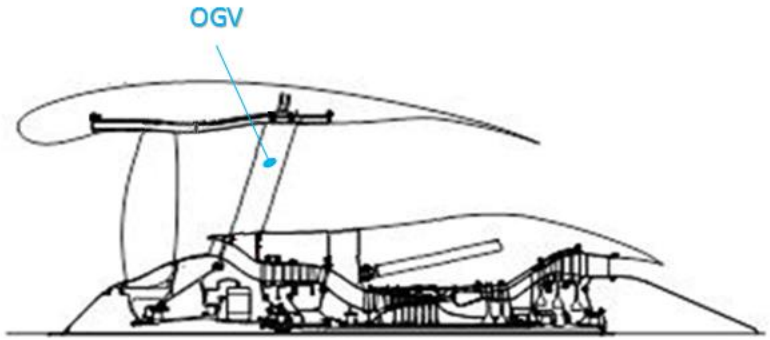
http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CfP09-LPA-01-60

- **JTI-CS2-2018-CfP09-LPA-01-03**
- **WP1.1.3.6 :**
  - **Leader : Safran Aircraft Engines**

- **Title:** Innovative low noise fan stator technologies for 2030+ powerplants
- **Objective:** The aim is to mature innovative approaches such as passive flow control OGV design as well as soft (treated) stator options to overcome challenging UHBR fan module specificities (reduced rotor – stator spacing, reduced OGV count). Efficient stator concepts are to be designed. Experimental validation of most promising solutions will be performed on a large scale aero and acoustic fan rig while exploring in parallel new manufacturing processes to address engine integration constraints.
- **Volume:** 2500 k€ funding



JTI-CS2-2018-CfP09-LPA-01-60

- **Scope of work and schedule :** Advanced Low noise OGV maturation work plan is typically spread 4 years in order to achieve **TRL4** demonstration

Tasks		
Ref. No.	***Title – Description***	***Due Date***
Task 1	Risk reduction plan	T0+39 months
Task 2	Requirements	T0+15 months
Task 3	Concepts review & screening	T0+39 months
Task 4	OGV prototypes detailed design for concept selection of test bench demo	T0 +15 months
Task 5	OGV prototypes manufacturing for concept selection of test bench demo	T0 +18 months
Task 6	OGV prototypes of test bench demonstration and performance analysis	T0 +24 months
Task 7	Advance modelling and simulations	T0 +48 months
Task 8	Stator prototypes detailed design for large scale demo	T0+36 months
Task 9	Stator prototypes manufacturing for large scale demo	T0+42 months
Task 10	Stator performance evaluation and analysis on large scale demo	T0+45 months
Task 11	Smart components and technologies integration demonstrator	T0+48 months

TRL2/3 aeroacoustic demo

TRL4 aeroacoustic demo

TRL3 mechanical demo.

JTI-CS2-2018-CfP09-LPA-01-60

- **Targeted applicant**:

  The applicant will be able to challenge the specifications and standard guidelines regarding aeroacoustics OGV blade design in order to develop innovative low noise OGVs. Multi-disciplinary knowledge to develop advanced OGV solutions allowing to reach targeted noise performance while satisfying high aerodynamic efficiency and good mechanical properties. Abilities to manufacture advanced OGVs prototypes and conduct test demonstration at relevant TRL are required.

- **Required skills**
  - High level experience in design, manufacturing, testing of low noise OGV concepts including aeroacoustics aspects and absorbing material aspects
  - Capacities to specify / identify / develop advance low noise OGV solutions for aeroacoustics (1), soft passive (2) and active (3) leading edge concepts
  - Experience in noise interaction tests & aeroacoustics characterization (TRL2/3@1/3 scale)
  - Experience in large scale fan rig tests & acoustic/aerodynamic characterization (TRL4@1/3)
  - Expertise in High fidelity simulations to modelise aeroacoustics interaction noise, damping structure and complete Fan module aeroacoustics
  - Expertise in advance composite, specific material/shape and blade manufacturing. Innovative manufacturing technics (Additive,…) to produce advantageously the OGVs concepts
  - Experience in mechanics, composite, hybrid design, system and structure integration for Aircraft components (TRL3@full scale)

JTI-CS2-2018-CfP09-LPA01-61

Fatigue life prediction on Inco 718 part subject to service induced damages

GKN AEROSPACE

Clean Sky 2

JTI-CS2-2018-CfP09-LPA-01-61

Type of action (RIA/IA/CSA):		IA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 1.1.3	
Indicative Funding Topic Value (in k€):		650	
Topic Leader:	GKN Aerospace Sweden	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	36	**Indicative Start Date (at the earliest)[12]:**	Q3 2019

- Models for calculating fatigue life of surface damaged safety critical rotating parts subjected to primary engine flows and service induced damages are to be developed.
- The surface damage may be classified as "nicks, dents and scratches" originating either from the manufacturing and assembly process or service induced.
- The project aims to investigate the impact on fatigue on forged alloy 718 from a variety of damages.
- The goal of the project is to develop a methodology for life analysis from surface damages. The main variables affecting the life predictions needs to be identified and included in the life model.
- Finally a procedure to predict safe life (failure rate less than 0.1%) is to be developed.

JTI-CS2-2018-CfP09-LPA-01-61

The application is the complex rotating frames of the Counter Rotating Open Rotor (CROR) engine

A rotating frame

Open Rotor engine test in Cleansky 1

JTI-CS2-2018-CfP09-LPA-01-62

Rear End Structural Test Program
Component & Subcomponent tests

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CfP09-LPA-01-62

V. **JTI-CS2-2018-CfP09-LPA-01-62: Rear End Structural Test Program – Component & Subcomponent tests**

Type of action (RIA/IA/CSA):		IA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 1.2	
Indicative Funding Topic Value (in k€):		1100	
Topic Leader:	Airbus	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	34	**Indicative Start Date (at the earliest)[14]:**	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CfP09-LPA-01-62	**Rear End Structural Test Program – Component & Subcomponent tests**
Short description	
In the frame of the Advanced Rear End, this topic deals with the Component & Subcomponent tests of the test pyramid (from level 2 to 3) to demonstrate the feasibility of novel design concepts, materials & processes.	

Links to the Clean Sky 2 Programme High-level Objectives[15]	
This topic is located in the demonstration area:	Advanced Engine/Airframe Architectures
The outcome of the project will mainly contribute to the following conceptual aircraft/air transport type as presented in the scene setter:	Advanced Short/Medium-range

With expected impacts related to the Programme high-level objectives:

Reducing CO_2 emissions	Reducing NO_x emissions	Reducing Noise emissions	Improving EU Competitiveness	Improving Mobility
☒	☐	☐	☐	☐

JTI-CS2-2018-CfP09-LPA-01-62

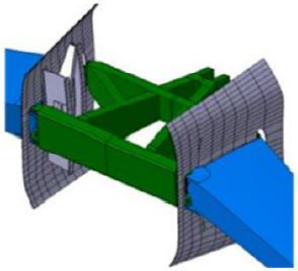
- **JTI-CS2-2018-CfP09-LPA-01-62**
- **Title:** Rear End Structural Test Program – Component & Subcomponent tests
- **Objectives:**

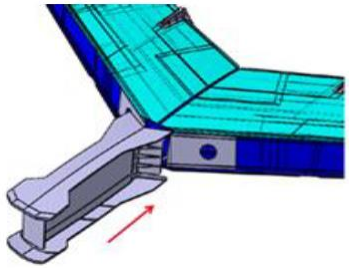
In the frame of the Advanced Rear End, this topic deals with the Component & Subcomponent tests of the test pyramid (from level 2 to 3) to demonstrate the feasibility of novel design concepts, materials & processes.

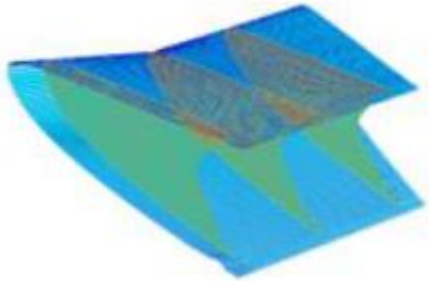
The objective of this topic is to design and manufacture the test benches and to complete the test program for the Component & Subcomponent tests (from level 2 to 3) of the test pyramid.

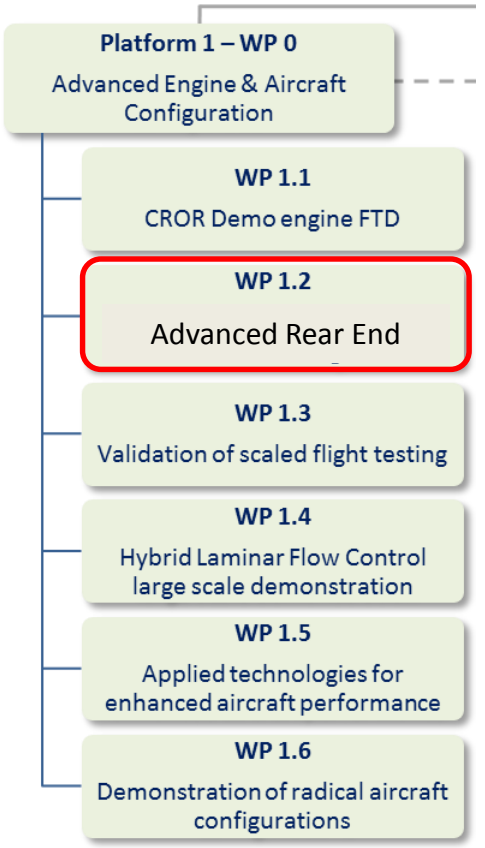
This topic is commentary to the topic “Rear End Structural Test Program - Low level tests”(-64), being also part of the same call for proposal.

- **Volume:** 1100 k€ funding
- **Type of action**: IA







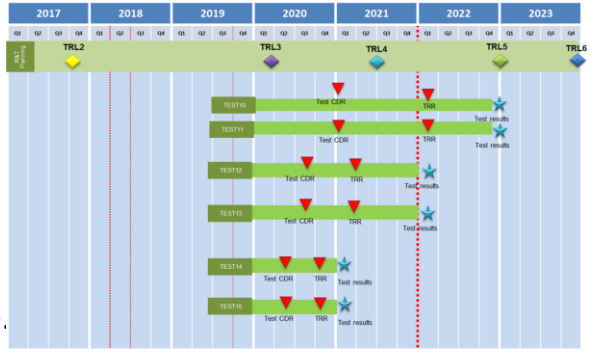


JTI-CS2-2018-CfP09-LPA-01-62

Targeted applicant:

Partner(s) with research background and experience in aerospace R&TD programs.

Proposed Schedule



Required skills:

The applicant shall be able to demonstrate sound and widely recognized technical knowledge in the field of Structural Test:

- Extensive experience in the development of structural test benches and the completion of tests for Aeronautical Structures: Static, Fatigue and DT capabilities.
- Experience in Structural Test Processes, managing and leading Major Structure.
- Quality and Accreditation's as ISO9001 and 9100, NADCAP for Composite Test, NADCAP Non Destructive Testing and DOA with Aircraft Manufacturing Companies.
- Experience performing multi-axis tests (>15 jacks), experimental techniques availability: stereo-correlation, high speed video cameras, photoelastic coatings.
- Acquisition System with at least 100 channels & Hydraulic & Control Sys to manage at least 10 Jacks
- Control and Data acquisition systems fully compliant with Aerostructures Tests specifications (synchronization, tolerance bands, hard and soft shutdown, etc.).
- Photelasticity, Digital Image Correlation measurement system to displacement control in real time full field strain tracking and Remote Test Control Monitoring system to follow up tests in real time.
- Expertise and tools to correlate results from virtual and experimental tests.
- In house, NDT Inspection technics for CFRP and Metal parts (with the appropiate qualification NDT Level2 or similar)

Special Skills:

- Key of this proposal is to find an applicant combining the skills /certification required as it is explained above with an Innovation mindset/capabilities in testing methods and Setup Design i.e. virtual testing, remote test monitoring system, automatec testing systems as well as test methods to be specially developed for each type of loading.

JTI-CS2-2018-CfP09-LPA-01-63

Rear End Aerodynamic and Aeroelastic Studies

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CfP09-LPA-01-63

VI. JTI-CS2-2018-CfP09-LPA-01-63: Rear End Aerodynamic and Aeroelastic Studies

Type of action (RIA/IA/CSA):		RIA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 1.2	
Indicative Funding Topic Value (in k€):		1250	
Topic Leader:	Airbus	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	36	**Indicative Start Date (at the earliest)[16]:**	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CfP09-LPA-01-63	**Rear End Aerodynamic and Aeroelastic Studies**
Short description	
Exploration of innovative aerodynamic and aeroelastic devices, technologies and concepts of tail surfaces by means of CFD and validation by Wind Tunnel Testing aimed at improving the stability and control function of the empennage and thus reducing the size of the tails. Development, analysis, design and testing of specific aerodynamic devices and concepts to address identified physical phenomena in order to enable a significant increase in the aerodynamic and aeroelastic performance of tail surfaces.	

Links to the Clean Sky 2 Programme High-level Objectives[17]	
This topic is located in the demonstration area:	Enabling Technologies
The outcome of the project will mainly contribute to the following conceptual aircraft/air transport type as presented in the scene setter:	Advanced Long-range Ultra-advanced Long-range Advanced Short/Medium-range Ultra-advanced Short/Medium-range
With expected impacts related to the Programme high-level objectives:	

Reducing CO_2 emissions	**Reducing NO_x emissions**	**Reducing Noise emissions**	**Improving EU Competitiveness**	**Improving Mobility**
☒	☐	☐	☐	☐

JTI-CS2-2018-CfP09-LPA-01-63

- **JTI-CS2-2018-CfP09-LPA-01-63**
- **Title:** Rear End Aerodynamic and Aeroelastic Studies
- **Objectives**

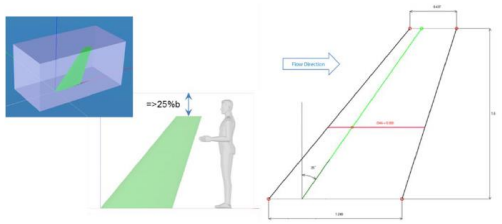
The purpose of this research proposal is to identify, investigate and quantify aerodynamic and aeroelastic enablers to allow the size reduction of the empennage of a classical configuration and/or facilitate the consideration of alternative configurations driven by non-aerodynamic considerations (e.g. V-Tail and the family of Cross-tails). Several elementary technology bricks are proposed for study, including experimental testing, each with particular focus on the key aerodynamic design drivers of an empennage, stemming from its required functions.

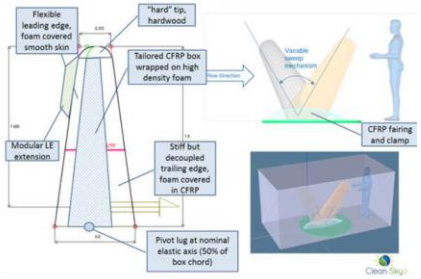
Exploration of innovative aerodynamic and aeroelastic devices, technologies and concepts of tail surfaces by means of CFD and validation by Wind Tunnel Testing aimed at improving the stability and control function of the empennage and thus reducing the size of the tails. Development, analysis, design and testing of specific aerodynamic devices and concepts to address identified physical phenomena in order to enable a significant increase in the aerodynamic and aeroelastic performance of tail surfaces.

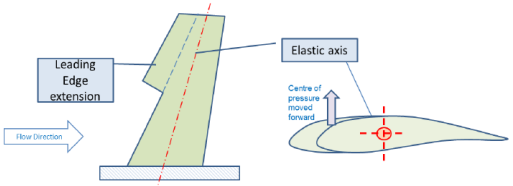
- **Volume:** 1250 k€ funding
- **Type of action**: IA

Platform 1 – WP 0
Advanced Engine & Aircraft Configuration

- **WP 1.1** CROR Demo engine FTD
- **WP 1.2** Advanced Rear End
- **WP 1.3** Validation of scaled flight testing
- **WP 1.4** Hybrid Laminar Flow Control large scale demonstration
- **WP 1.5** Applied technologies for enhanced aircraft performance
- **WP 1.6** Demonstration of radical aircraft configurations





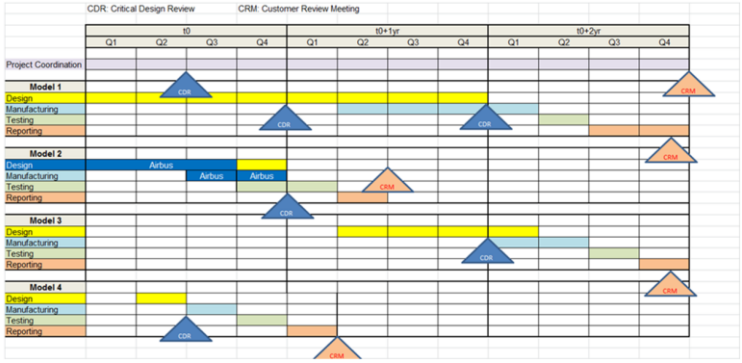


JTI-CS2-2018-CfP09-LPA-01-63

- **Targeted applicant:**

Partner(s) with research background and experience in aerospace R&TD programs.

- **Proposed Schedule**



- **Required skills:**

The applicant shall, as minimum requirements, use the following equipment for aerodynamic and aeroelastic design and testing:
High Performance Computing (HPC) and state of the art CFD solvers.
Low speed wind tunnel with the following characteristics:
- minimum test section height of 2m,
- minimum test speed 50 m/s,
- Reynolds number at MAC (0.9m) must be greater than 2.5Million
- Wind Tunnel model used by applicant shall have a turbulence level <0.5% and uniformity > 99%
- Gap between model tip and wind tunnel top wall must be equal or greater than 25% of model height
- force balance for lift, drag, pitching and yawing moment (at least)
- surface flow visualisation
- infra-red thermographic cameras

Aeroelastic wind tunnel with the following characteristics:
- minimum test section height of 2m,
- nominal test dynamic pressure > 1500Pa
- force balance for lateral force and drag
- stereoscopic camera or equivalent (to determine deformed shape)
- mechanical testing capabilities to characterise model stiffness including couplings

Icing wind tunnel for a model with plasma DBD of a minimum chord of 300mm

- **Special Skills:**

The applicant(s) shall be able to demonstrate sound and widely recognized technical knowledge in the following areas:

- Wind Tunnel Testing: low speed and aeroelastic applications
- Wind Tunnel Model design and build. In-house model manufacturing capability including installation of plasma DBDs and high quality 3D printing including metal and ceramic components
- Demonstrated experience with DBD plasma actuation including knowledge of safety procedures and systems design aspects

JTI-CS2-2018-CfP09-LPA-01-64

Rear End Structural Test Program
Low level tests

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CfP09-LPA-01-64

VII. JTI-CS2-2018-CfP09-LPA-01-64: Rear End Structural Test Program - Low level tests

Type of action (RIA/IA/CSA):		IA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 1.2	
Indicative Funding Topic Value (in k€):		700	
Topic Leader:	Airbus	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	34	**Indicative Start Date (at the earliest)[18]:**	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CfP09-LPA-01-64	**Rear End Structural Test Program - Low level tests**
Short description	
In the frame of the Advanced Rear End, this topic deals with the low level tests of the test pyramid (from level 4 to 6) to demonstrate the feasibility of novel design concepts, materials & processes.	

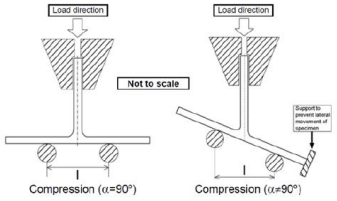
Links to the Clean Sky 2 Programme High-level Objectives[19]	
This topic is located in the demonstration area:	Advanced Engine/Airframe Architectures
The outcome of the project will mainly contribute to the following conceptual aircraft/air transport type as presented in the scene setter:	Advanced Short/Medium-range Ultra-advanced Short/Medium-range

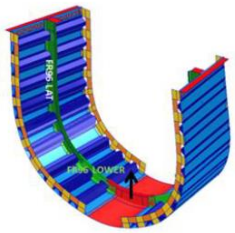
With expected impacts related to the Programme high-level objectives:

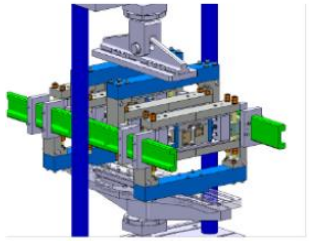
Reducing CO_2 emissions	Reducing NO_x emissions	Reducing Noise emissions	Improving EU Competitiveness	Improving Mobility
☒	☐	☐	☐	☐

JTI-CS2-2018-CfP09-LPA-01-64

- **JTI-CS2-2018-CfP09-LPA-01-64**
- **Title:** Rear End Structural Test Program - Low level tests
- **Objectives:**
- The objective of this topic is to design and manufacture the test benches and to complete the test program for the Coupons test (Level 4-6) of the test pyramid.
- The Applicant(s) will be reponsible to design the setup and processes to be developed to complete test performance phase. The proposed approach will have to rely on innovative solutions/ methodologies/ approaches that will be implemented on a series of tests defined in this topic.
- This topic is complentary to the topic “Rear End Structural Test Program – Component & Subcomponent tests”, being also part of the same call for proposal.
- The manufacturing and delivery of the Specimens are under the Topic Manager responsibility for all the tests, except for T01 where the manufacturing and delivery of the specimens is under the Applicant(s) Responsibility, with the support of the Topic manager materials and processes and manufacturing departments.
- The applicant is expected to test the representative Structural Parts of the Advanced Rear End with the clear objective to validate by test the Structural Concepts, technologies, materials and manufacturing processes developed in the WP12.
- **Volume:** 750 k€ funding
- **Type of action**: IA







Platform 1 – WP 0
Advanced Engine & Aircraft Configuration

- **WP 1.1** CROR Demo engine FTD
- **WP 1.2** Advanced Rear End
- **WP 1.3** Validation of scaled flight testing
- **WP 1.4** Hybrid Laminar Flow Control large scale demonstration
- **WP 1.5** Applied technologies for enhanced aircraft performance
- **WP 1.6** Demonstration of radical aircraft configurations

JTI-CS2-2018-CfP09-LPA-01-64

- **Targeted applicant:**

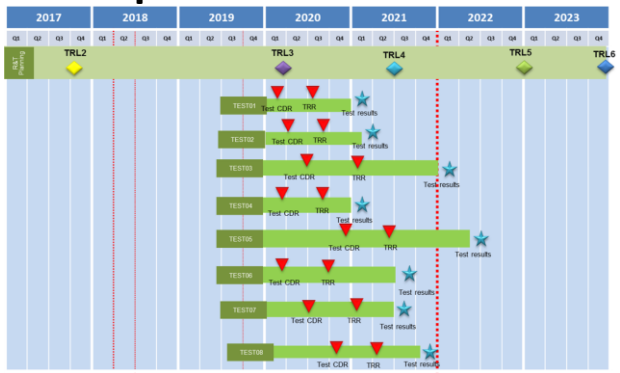
Partner(s) with research background and experience in aerospace R&TD programs.

- **Required skills:**

The applicant shall be able to demonstrate sound and widely recognized technical knowledge in the field of Structural Test:

- Extensive experience in the development of structural test benches and the completion of Tests for Aeronautical Structures: Static, Fatigue and Damage Tolerance capabilities.
- Quality and Accreditations as ISO9001 and 9100, NADCAP for Composite Test,
- NADCAP Non Destructive Testing and DOA with Aircraft Manufacturing Companies.
- Experience performing multi-axis tests, Experimental techniques availability: stereo-correlation, high speed video cameras, photoelastic coatings.
- Acquisition System with at least 100 channels & Hydraulic & Control Sys to manage at least 10 Jacks
- Control and Data acquisition systems fully compliant with Aerostructures Tests specifications (synchronization, tolerance bands, hard and soft shutdown, etc.).
- Photelasticity, Digital Image Correlation measurement system to displacement control in real time full field strain tracking and Remote Test Control Monitoring system to follow up tests in real time.
- Expertise and tools to correlate results from virtual and experimental tests.
- In house, NDT Inspection technics for CFRP and Metal parts (with the appropriate qualification NDT Level2 or similar)

Proposed Schedule



- **Special Skills:**

The applicant selected for this proposal, will be the result of the combination between the skills/facilities required above and the Innovation in testing Methods and Setup Design presented in its proposal. All these technologies are addititional to the ones tackled directly by Airbus (based on New Materials and New Manufacturing Processes for this WP12 Advanced Rear End) as resulting of the synergies will be established along the technology development project .

JTI-CS2-2018-CFP09-LPA-01-65

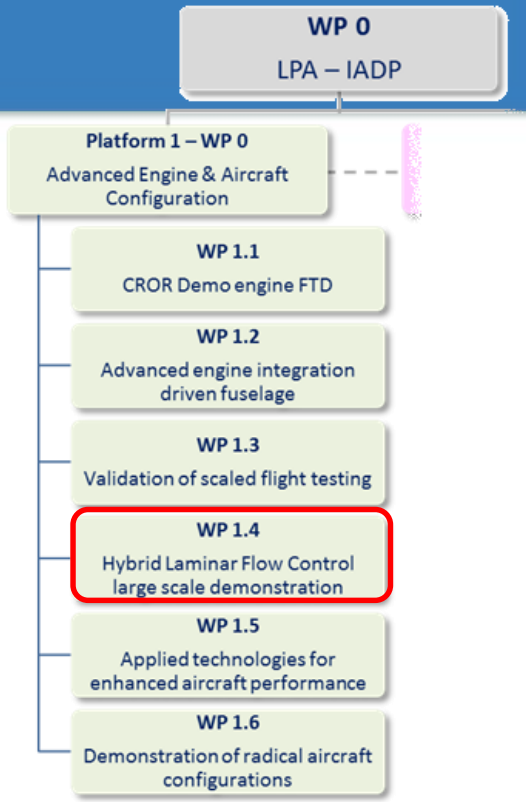
Development of System pipework and Tooling for Sub-Assembly, Final-Assembly of the HLFC-wing Prototype.

Innovation Takes Off

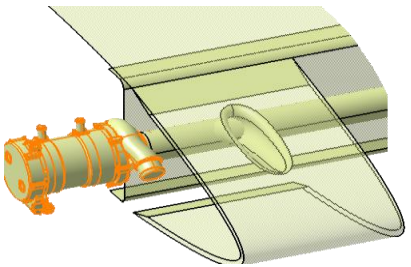
http://www.cleansky.eu/content/homepage/about-clean-sky-2

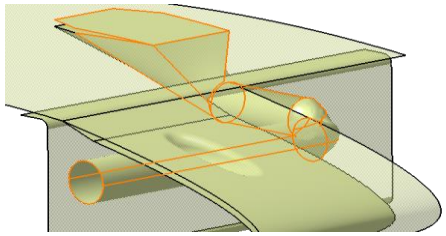
Clean Sky 2

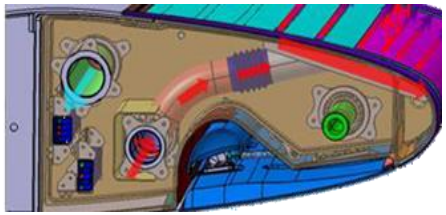
JTI-CS2-2018-CFP09-LPA-01-65

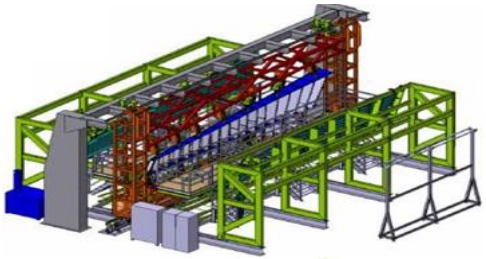


- **JTI-CS2-2018-CFP09-LPA-01-07**
- **Title:** *Development of System pipework and Tooling for Sub-Assembly, Final-Assembly of the HLFC-wing Prototype.*
- **Objective:** Development of innovative Tooling set for the HLFC-wing Prototype Specimen (calibrated with Functional Checks, Drilling templates, Handling, Sub-Assemblies, Final Assembly and Transportation), with integrated System pipework (HLFC Suction System & sub-systems, valves, standards, secondary structures, integrated design & hardware, manufacturing/procurement/installation & pre-test)
- Demonstrator: LPA-01-D06
- **Volume:** 0.7 M€ funding









JTI-CS2-2018-CFP09-LPA-01-65

- **Schedule/Milestones**

Milestones			
Ref. No.	*Title - Description*	*Type**	*Due Date*
M1	Technology screening, materials and tradeoffs	R	T0+9M
M2	Assembly tools and suction system definition dossiers	R	T0+12M
M3	Manufacturing processes / Product Structure defined	R	T0+16M
M4	CDR	R	T0+18M
M5	Manufacturing and validation documents	R	T0+24M
M6	Assembly tool delivery	HW	T0+24M
M7	Piping product delivery and installation	HW	T0+28M
M8	Final reports, Lessons learnt and project closure	R	T0+30M

*Type: R=Report, RM=Review Meeting, D=Data, HW=Hardware

- **Targeted applicant/Required Skills:**

The consortium should have proven experience in air systems piping; Experience in aeronautic tools design, manufacturing and quality.

- Experience in former European collaborative programs, in particular, will be a plus, if previous HLFC EU projects is provided. (A)
- Internal management of the project (with single focal-point) (M).
- CAD-CAM software license compatible with project DMU: CatiaV5R21 (M).
- An international standard quality management system (i.e. EN 9100:2009/ ISO 9001:2008/ ISO 14001:2004). (M)
- ALM technology knowledge. (A).
- Capacity to repair or modify “in-shop” the prototype manufacturing tooling for components due to manufacturing deviations. (A).
- Qualification as strategic supplier of manufacturing tooling on aeronautical elements. (A).
- Into the eco design field, the Partner shall have the capability to monitor and decrease the use of hazardous substances regarding REACH regulation (M).
- The above mentioned requirements will be fixed in more details during the partner agreement phase-Negotiation Phase. This will also include the IP-process.

(M) – Mandatory; (A) – Appreciated

JTI-CS2-2018-CFP09-LPA-01-66

Shielding/High-lift composite thermoplastic flap manufacturing, tool design and manufacturing & process definition

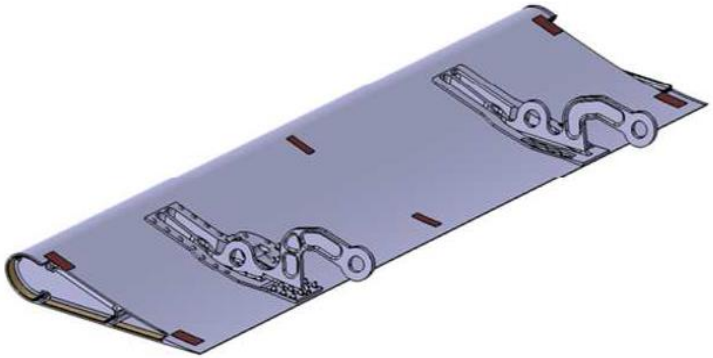
Innovation Takes Off

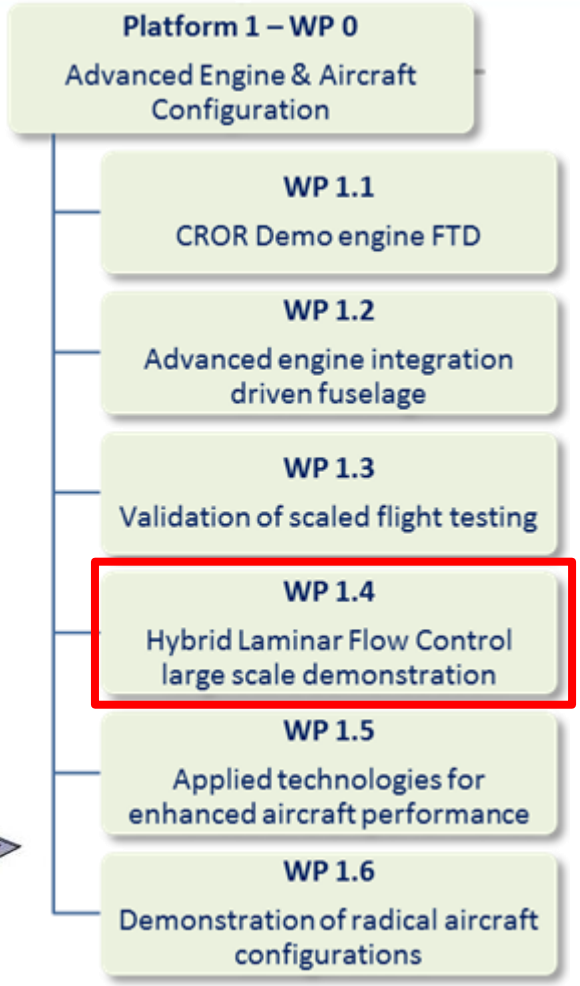
http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-01-66

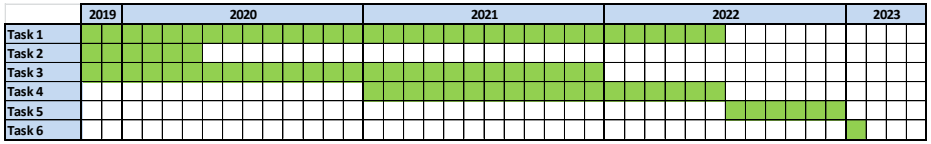
- **JTI-CS2-2019-CFP09-LPA-01-08**
- **Title:** *Shielding/High-lift composite thermoplastic flap manufacturing, tool design and manufacturing & process definition*
- **Company managing the topic:** SONACA SA
- **Objective:** The scope of this topic is to develop and manufacture a carbon fiber based composite thermoplastic shielding/high-lift panel(s) for a HLFC wing leading edge of a long range aircraft and to design and manufacture the different associated tools.





JTI-CS2-2018-CFP09-LPA-01-66

- **Volume:** 900 k€ funding
- **Type of action:** IA
- **Schedule (39 months action):**



Milestones (when appropriate)			
Ref. No.	***Title - Description***	***Type****	***Due Date***
M1	Kick-off meeting	RM	T0
M2	Process validation report and final choice	R/RM	T0 + 6M
M3	Composite thermoplastic flap concept selection	RM	T0 + 10M
M4	Shielding/High-lift panel(s) tools PDR	RM	T0 + 17M
M5	Assembly tools PDR	RM	T0 + 17M
M6	Lifting and auxiliary tools PDR	RM	T0 + 17M
M7	Composite thermoplastic flap PDR	RM	T0 + 18M
M8	Long Lead Item procurement gate	RM	T0 + 18M
M9	Shielding/High-lift panel(s) tools CDR	RM	T0 + 24M
M10	Assembly tools CDR	RM	T0 + 24M
M11	Lifting and auxiliary tools CDR	RM	T0 + 24M
M12	Composite thermoplastic flap CDR	RM	T0 + 26M
M13	Manufacturing Readiness Review	RM	T0 + 30M
M14	Shielding/High-lift panel(s) tools Delivery	RM	T0 + 32M
M15	Assembly tools Delivery	RM	T0 + 32M
M16	Lifting and auxiliary tools Delivery	RM	T0 + 32M
M17	Final composite thermoplastic flap delivery	RM	T0 + 39M

*Type: R=Report, RM=Review Meeting, D=Data, HW=Hardware

- **Targeted applicant/Required skills** :
  - The Applicant(s) must have proven experience in composite thermoplastic processes and parts development and specifically in in-situ consolidation process but also in welding.
  - The Applicant(s) must have proven experience in tools design and manufacturing for composite thermoplastic process and for assembly process.
  - The Applicant(s) must have experience in inspections and testing.
  - Experience in aeronautic tools design, manufacturing and quality would be appreciated.
  - Experience in former HLFC European or collaborative programs would be highly appreciated.
  - An international standard quality management system would be appreciated.

JTI-CS2-2018-CFP09-LPA-01-67

CFP Topic Title :-
UHBR Installed Advanced Nacelle Optimisation and Evaluation Close Coupled to Wing

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-01-67

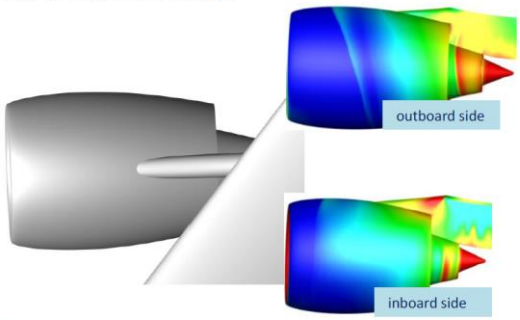
Type of action (RIA/IA/CSA):		RIA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 1.5.2	
Indicative Funding Topic Value (in k€):		3400	
Topic Leader:	Rolls-Royce	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	36	**Indicative Start Date (at the earliest)[24]:**	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CfP09-LPA-01-67	**UHBR Installed Advanced Nacelle Optimisation and Evaluation Close Coupled to Wing**
Short description	
UHBR engines require novel advanced nacelles, close coupled to the wing, for an optimum installed low drag powerplant, outside the current design experience. The Project objective is to apply multi-objective optimisation techniques to advanced 3-D nacelle systems in combination with the installed flow field. This requires utilising of the latest CFD techniques to predict installed nacelle thrust & drag enhancements, to define novel nacelle candidate designs for test. Wind Tunnel Testing of installed UHBR cycle powered nacelles featuring a low pressure ratio fan and novel power systems to accurately simulate representative exhaust jets is required; - validating the predicted benefit(s), using novel measurement techniques.	

JTI-CS2-2018-CFP09-LPA-01-67

Timeplan -milestones

Milestones (when appropriate)			
Ref. No.	**Title - Description**	**Type***	**Due Date**
M1	Work Plan agreed	R	T0 + 2 months
M2	Novel nacelle study matrix agreed	Rw	T0 + 6 months
M3	Novel nacelle installation geometry down select	Rw	T0 + 18 months
M4	Model and instrumentation definition for manufacture. Simulator and instrumention de-risk tetsing complete.	Rw	T0 + 20 months
M5	Wind tunnel test model manufacture complete	HW	T0 + 24 months
M6	Wind tunnel test complete	D	T0 + 30 months
M7	Post test CFD validation complete	R	T0 + 36 months



Influence of 3-D Flow Field on Installed Aft Nacelle

Targeted Applicant:

- Academic partner with proven track record of installed UHBR nacelle multi-objective optimisation and performance evaluation.
- Research partner with proven industry standard capability on installed nacelle wind tunnel testing

Required Skills:

- Demonstrated expertise in multi point multi objective nacelle optimisation for underwing applications.
- Proven ability to conduct installed nacelle CFD analysis validated vs industry test case.
- Demonstrated ability to apply robust thrust drag book keeping from CFD and test.
- Proven ability to conduct engine cycle modelling
- Proven capability to conduct 'industry standard' Transonic wind tunnel test of power ½ aircraft model
- Experience in applying novel wind tunnel measurement techniques (e.g. PSP and Optical techniques.)

JTI-CS2-2018-CFP09-LPA-01-68

CFP Topic Title :-
Non-Intrusive Flow Field Measurement within a UHBR Intake

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-01-68

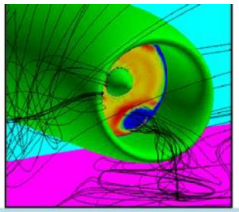
Type of action (RIA/IA/CSA):		RIA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 1.5.2	
Indicative Funding Topic Value (in k€):		2250	
Topic Leader:	Rolls-Royce	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	36	**Indicative Start Date (at the earliest)[26]:**	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CfP09-LPA-01-68	**Non-Intrusive Flow Field Measurement within a UHBR Intake**
Short description	
Development and experimental verification of non-intrusive measuring techniques suitable for measuring complex flow field(s), both temporally and spatially within a model scale turbofan intake system, for use in large low speed wind tunnels. This capability is required to enable detail understanding of intake fan aerodynamic, aero mechanical and acoustic physics within a future UHBR engine with a short intake. The Project objective is to demonstrate the capability of such a measurement system to map the intake flow field just upstream of the fan; and to post process the data, to rapidly derive intake compatibility metrics.	

JTI-CS2-2018-CFP09-LPA-01-68

Milestones (when appropriate)			
Ref. No.	***Title - Description***	***Type****	***Due Date***
M1	Work Plan agreed	Report	T0 + 2 months
M2	Novel measurement, analysis and wind tunnel verification agreed.	Review	T0 + 12 months
M3	Wind tunnel test model manufacture complete	Hardware	T0 + 14 months
M4	CFD results summary report	Report	T0 + 18 months
M5	Optical future test check out summary report	Report	T0 + 22 months
M5	Validation Test results and data summary report	Data + Report	T0 + 24 months
M6	Measurement and analysis final verification	Report	T0 + 30 months

Typical intake measurement rake system
- Intrusive
- Low spatial fidelity



Requirement to map highly complex flow behaviour
- High resolution
- Non - intrusive

Project objective – enable non intrusive high fidelity intake flow field measurement ahead of fan rotor

Targeted Applicant:

- Research partner with proven ability to deploy/develop PIV on high productivity wind tunnel test
- Academic partner with proven ability to conduct CFD and advanced PIV post processing on intake flows

Required Skills:

- Established track record in developing novel optical measurement techniques for high productivity wind tunnels
- Ability to design, manufacture and test proof of concept in wind tunnel of appropriate size.
- Established PIV measurement experience of jet engine intake flows
- Proven ability to rapidly process complex intake flow data using high order analysis methods.
- Validated CFD capability to predict complex time variant intake flows

JTI-CS2-2018-CFP09-LPA-01-69

Insulation Monitoring for IT Grounded (Isolation Terra) Aerospace Electrical Systems

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-01-69

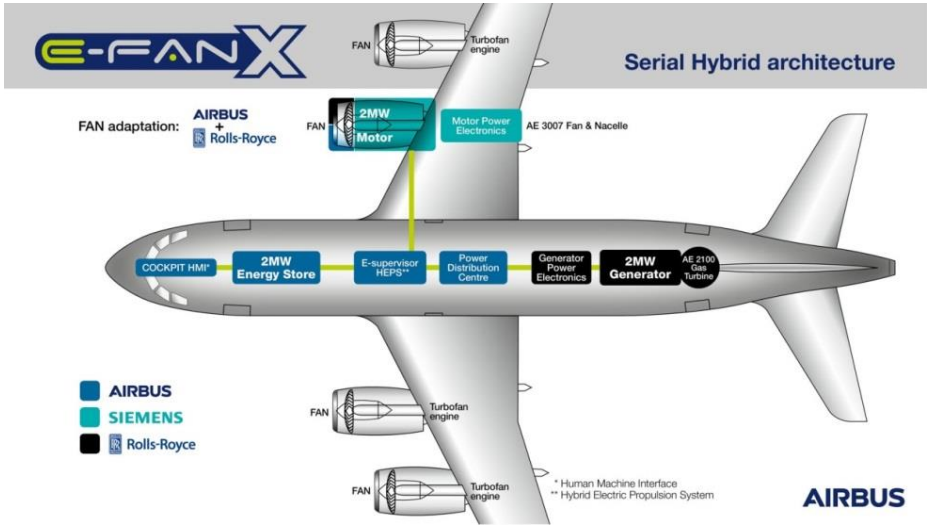
Type of action (RIA/IA/CSA):		IA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 1.6.1	
Indicative Funding Topic Value (in k€):		700	
Topic Leader:	Rolls-Royce	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	24	**Indicative Start Date (at the earliest)[28]:**	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CfP09-LPA-01-69	**Insulation Monitoring for IT Grounded (Isolation Terra) Aerospace Electrical Systems**
Short description	
With an increase in the predicted demand for high voltage electrical power in large passenger aircraft, new electrical distribution systems will be required to enable safe, light, highly efficient electrical propulsion systems. Insulation monitoring technology is a crucial safety system on high integrity power distribution in land and marine systems, however they have not been optimised and made commercially available for aerospace. A functionally representative insulation monitoring system for aerospace is required, incorporating all the lessons and experience of established markets, but tailored to the specialised aerospace environment and its safety processes.	

JTI-CS2-2018-CFP09-LPA-01-69

Planned milestones

Ref. No.	*Title - Description*	*Type **	*Due Date*
M1.3	Research requirements and gap analysis completed.	D	T0 + 5
M2.1	Summary of technology developments and future roadmap.	R	T0 + 17
M3.3	Verification of proposed product with the Topic Manager.	R	T0 + 23



Required skills and expertise:

- Understanding of state of the art in insulation monitoring systems
- Ability to produce insulation monitoring hardware - this project aims to get working hardware at TRL 6, to do this production arrangements are necessary
- Aerospace supplier potential – investment and capability growth commitment to provide aerospace standard product

High level requirements for hardware:

- System to be suitable for use on systems with representative capacitance to earth
- System to be tested in representative environmental conditions, likely a low pressure (0.7atm) environment. External facilities may be required to prove this validation
- Suitable for 4MW systems, high voltage distribution systems over 1000Vac rms and 1500V dc, development to TRL6

JTI-CS2-2018-CFP09-LPA-01-70

Assessment of arc tracking hazards in high voltage aerospace systems

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-01-70

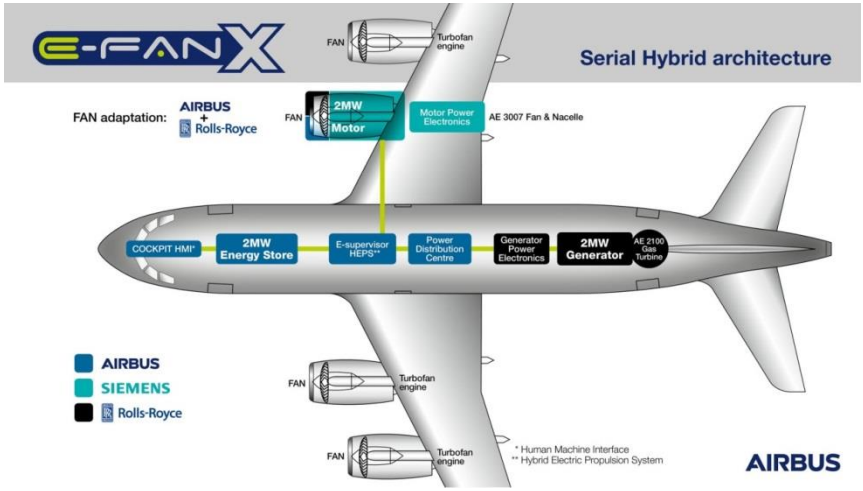
Type of action (RIA/IA/CSA):		IA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 1.6.1	
Indicative Funding Topic Value (in k€):		750	
Topic Leader:	Rolls-Royce	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	30	**Indicative Start Date (at the earliest)[30]:**	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CfP09-LPA-01-70	**Assessment of arc tracking hazards in high voltage aerospace systems**
Short description	
Arc tracking is already a significant issue in existing aerospace electrical systems operating at 115VAC and 230VAC and can cause significant damage to wiring. Moreover the impact of arc tracking on future systems operating at higher voltages, such as series hybrid electric systems, has not been assessed. This project should quantify the risk of arc tracking in megawatt scale aircraft electrical systems operating at high voltages (>1.5kV DC). The project should develop the fundamental understanding and consider what measures should be taken to safeguard the aircraft electrical system from resultant damage. The project should consider the configurations of cable likely to be used in higher voltage applications and the different voltage types (DC, AC, converter fed).	

JTI-CS2-2018-CFP09-LPA-01-70

Planned milestones

Ref. No.	*Title - Description*	*Type**	*Due Date*
M1.1	Modelling of the arc tracking process complete	D	T0 + 6
M2.1	Procedures defined for arc tracking tests	R	T0 + 9
M2.2	Experimental testing complete	HW	T0 + 17
M2.3	Validation of models complete	D	T0 + 19
M3.1	Measures to mitigate arc tracking risks captured	R	T0 + 23



Required skills and expertise:

- Theory behind arc tracking and the ability to perform modelling of the wider system at a level appropriate to the phenomena
- Capability to provide test samples representative of those in existing aircraft and future High Voltage systems
- Understanding of environmental conditions and certification requirements for aerospace applications
- Experimental facilities relevant for arc tracking testing

High level requirements for modelling & testing:

- Modelling of arc, material response, power system topology & impact of protection at system level
- Experimental techniques representative of environmental conditions including safe separation
- > 1MW, high voltages (>1.5kV DC), development up to TRL3

JTI-CS2-2018-CfP09-LPA-01-71

Innovative Nacelle cowl opening system

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CfP09-LPA-01-71

- **JTI-CS2-2018-CfP09-LPA-01-71**
- Topic Leader: Airbus Operations SAS

Title: « Innovative Nacelle cowl opening system »

Objective: The project intends to develop a new actuation solution for new « C-Duct » type nacelle core cowl architecture which is a key enabler for Ultra High Bypass Ratio engines close coupled integration under wing.

Known legacy solutions are no more relevant with the new constrains brought like reduce space enveloppe and harsh environment

Volume: 700K€ funding

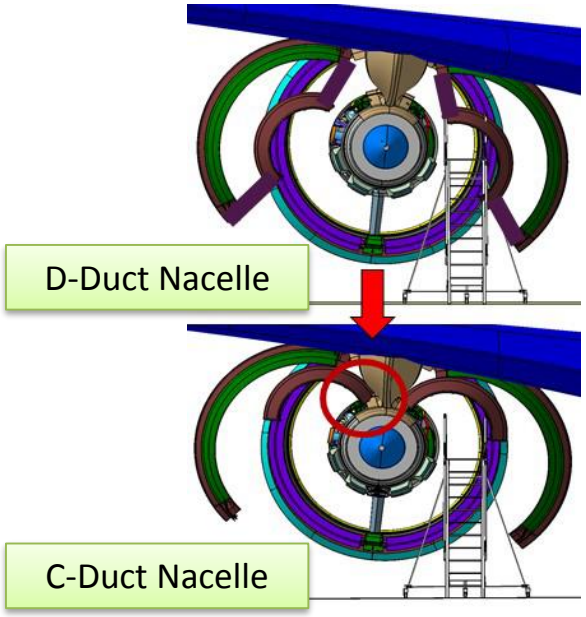
At stake:

Reduced space allocation and smaller lever arms

- More compact with higher loads

Harsh environment (High Temperature and vibration)

- Robustness of kinematic joints and power chain



JTI-CS2-2018-CfP09-LPA-01-71

Schedule/Milestones:
Duration: 38 Months / Start Q4/2019
Priority can be put on TRL4 (Design and prototyping) rather than TRL5/6 pending budget constrains

Tasks		
Ref. No.	***Title - Description***	***Due Date***
T_1	Analysis of the specification – transformation of high level requirements into detailed requirements	T0+2months
T_2	Identification of state of the art for similar components	T0+3months
T_3	Preliminary concepts proposals & pre-sizing – down-selection (TRL3)	T0+9months
T_4	Definition of selected concept and first performance test (prototype in a non-representative environment, demonstration of feasibility (TRL4)	T0+16months
T_5	Detailed definition of a product representative prototype & performance test at component level (TRL5)	T0+28months
T_6	Integration test of the prototype on a scale 1 half-nacelle (TRL6 part 1)	T0+30months
T_7	Environmental & endurance qualification to demonstrate compliance to products requirements (TRL6 part2)	T0+38months

Milestones (when appropriate)			
Ref. No.	***Title - Description***	***Type****	***Due Date***
M_1	Kick of Meeting	R	T0
M_2	TRL3	R	T0+9months
M_3	TRL4	R	T0+16 months
M_4	TRL5	R	T0+28months
M_5	Product representative prototype acceptance review (before HW delivery to integration test bench)	R	T0+26months
M_6	TRL6	R	T0+38months

*Type: R=Report, D=Data, HW=Hardware

Deliverables			
Ref. No.	***Title - Description***	***Type****	***Due Date***
D_1	Development plan (including technology readiness roadmap)	R	T0
D_2	Specification compliance Matrix & derived component requirements	R	T0+2months
D_3	State of Art analysis	R	T0+3months
D_4	TRL3 dossier (preliminary concept definition, pre-sizing, down selection criteria, concept DMU, interface loads)	R + D	T0+9months
D_5	Concept Prototype test report	R	T0+15months
D_6	TRL4 dossier (Concept pre-sizing, test report, compliance, Behavioural model)	R	T0+16 months
D_7	Product representative definition dossier (sizing, compliance to spec, DMU, Behavioural model)	R + D	T0+20 months
D_8	Product representative prototype	HW	T0+26months
D_9	Product representative prototype performance test & report (TRL5)	R + D	T0+28months
D_10	Product representative prototype Integration test & report	R + D	T0+30months
D_11	Product representative prototype environmental test & endurance report	R + D	T0+36months

Deliverables			
Ref. No.	***Title - Description***	***Type****	***Due Date***
D_12	Final review (Maturity & compliance demonstration – TRL6)	R	T0+38months

*Type: R=Report, D=Data, HW=Hardware

Targeted applicant: Partner will electromechanical and hydomechanical actuation design, manufacturing and qualification skills, expertise in selecting adequate power chain and kinematic joints devices in harsh environment

Detailed required skills:

- Aeronautics equipment design & maunfacturing for civil A/C application (CS25 knowledge)
- Electromechanical and hydromechanical acuation systems for flight controls, doors opening systems
- Electrical or hydraulical torque motors, geatrains, locking features, brakes specific design
- Thermal analysis / Stress analysis / Dynamic analysis (vibrations) / System dynamic simulation
- Sub-components test (vibration & high temperature cycles)
- Power electronics and actuation control systems (open or closed loops)
- System engineering, systems performance test and qualification tests (DO160)
- Airbus systems requirements knowledge (ABD0100)

LPA-IADP WBS – “Platform 2”

Airbus with, Liebherr, Fraunhofer and Partners

Large Passenger Aircraft Platform – integration topics

„Platform 1 - OAD“

Advanced Engine and Aircraft Configurations

„Platform 2 - OPD“

Innovative Physical Integration Cabin-System-Structur

„Platform 3 - OSD“

Next Gen. A/C Systems, Cockpit Systems & Avionics

TRL 4-6
Aircraft Level

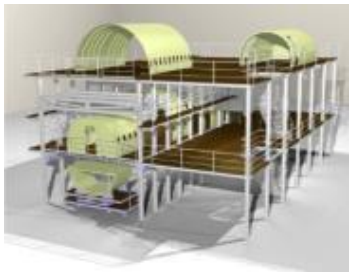
Platform 2 Innovative Physical Integration Cabin-System-Structure

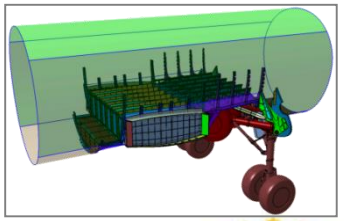
WP 2.1 Next generation fuselage, cabin and systems integration

WP 2.2 Next generation cabin & cargo functions

WP 2.3 Next generation lower centre fuselage

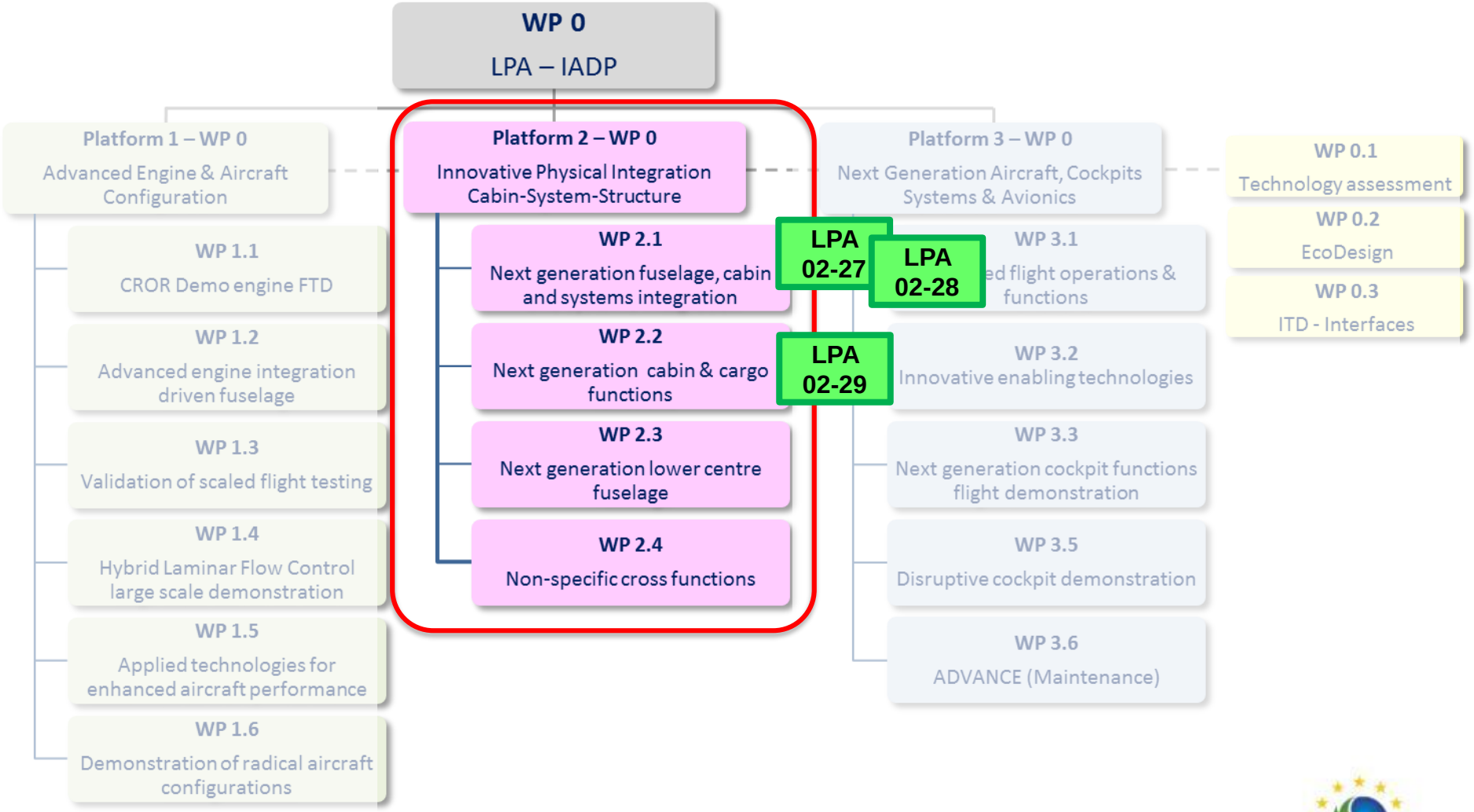
WP 2.4 Non-specific cross function





Estimated Volume of Activities ~290M€

LPA-IADP WBS – “Platform 2”



JTI-CS2-2018-CfP08-LPA-02-27

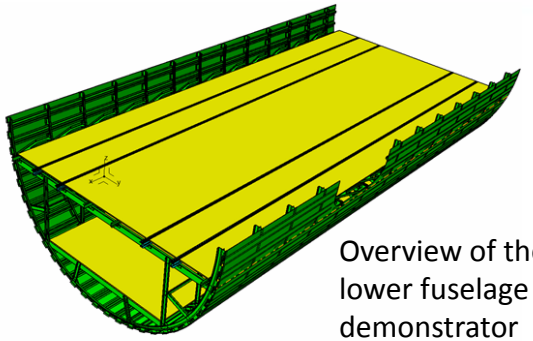
Innovative mould for thermoplastic skin of the lower fuselage demonstrator

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-02-27



Overview of the lower fuselage demonstrator

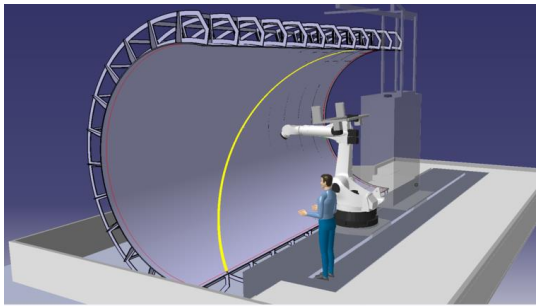
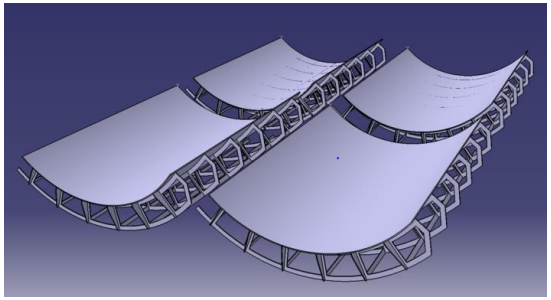


Illustration of a potential use case for the mould as developed in phases 1 and 2



Separability of the mould, and the enhanced mould as developed in phases 1 and 3.

Topic Leader: **Fokker**
Indicative Funding: **950k€**
Indicative Start Date: **Q4/ 2019**
Duration: **30 months**

Short Description

Research for an innovative mould is needed for efficient high volume production of the thermoplastic fuselage skin. Such mould is to be developed for skin consolidation in autoclave (up to 400 ^{o}C) incl. automated lay-up, assembly, and transport for the large lower fuselage demonstrator. The heated and cooled mould is aimed to be used as well for smaller demonstrators, including out-of-autoclave consolidation (e.g. in-situ).

- Phase 1: concept for new female (OML) mould concepts (innovation: a.o. separable; low cost, long-life; efficient heating, controlled cooling; first ply solution; positioning system for multiple pre-forms, ...)
- Phase 2: design, manufacture, delivery of mould for lower part of the multi-functional fuselage demonstrator
- Phase 3: design, manufacture, delivery enhanced mould for smaller demonstrators

JTI-CS2-2018-CFP09-LPA-02-27

	2019	2020				2021				
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
T1: Mould concept designs and selection										
T2: Mould design for lower fuselage demonstrator										
T3: Mould manufacturing for lower fuselage demonstrator										
T4: Mould test, verification, delivery, and demonstration for lower fuselage demonstrator										
T5: Design of the enhanced mould for smaller demonstrators										
T6: Manufacturing of the enhanced mould for smaller demonstrators										
T7: Test, verification, delivery, and demonstration of the enhanced mould for smaller demonstrators. Final reporting.										

Special skills / Capabilities (selection, see call text for complete list):

- Proven experience in moulds and proposed mould materials for automated lay-up and consolidation in autoclave of thermoplastic products suitable for high volume series production
- Experience in the proposed innovative solutions for high volume production, mould heating/cooling, connection of thermoplastic product layers to the mould, and positioning system
- Proven capability to manufacture the mould of the require size

JTI-CS2-2018-CfP08-LPA-02-28

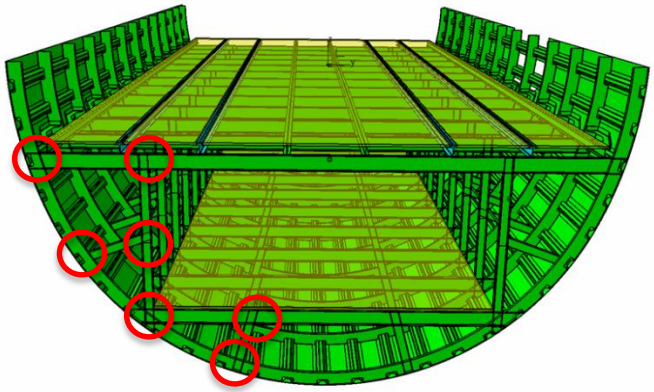
Innovative tooling, end-effector development and industrialisation for welding of thermoplastic components

Innovation Takes Off

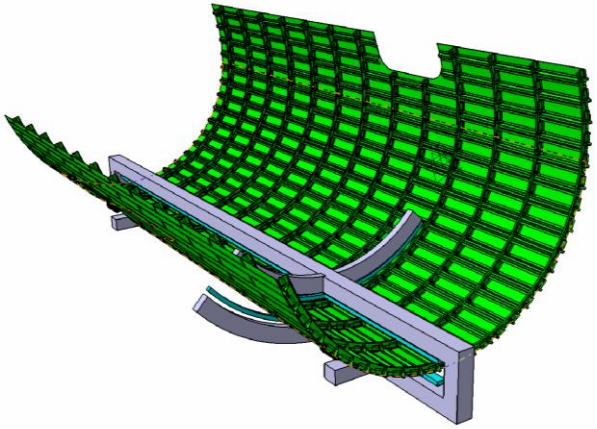
http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-02-28



Typical welded joints



Indicative assembly tool
for frames and stringers

Topic Leader: **Fokker**
Indicative Funding: **1050k€**
Indicative Start Date: **Q4/ 2019**
Duration: **24 months**

Short Description

Automatic assembly of the fuselage demonstrator made of C/PEKK is a solution to achieve a high production rate at relatively low cost. This topic involves the development of:

- Several robotic end-effectors to be used for jig-less assembly of the lower fuselage demonstrator
- An innovative adaptive assembly tool to weld stringers and frames to the fuselage skin
- 3D manufacturing simulations and dynamic workflow optimisation as part of Industry 4.0 aspects

In addition a more transversal activity is necessary to study how to utilize the equipment in the most efficient manner and to contribute to a near “zero-defect” assembly process.

JTI-CS2-2018-CFP09-LPA-02-28

Lower shell fuselage demonstrator - timeline

	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3
1. End-effector dev. Pick & Place								
2. End-effector Welding								
3. Assembly tool, welding stringers & frames								
4. Manufacturing Simulations								

Special skills / Capabilities:

- Industrial experience with tooling development
- Work-shop facilities in line with the proposed deliverables and associated activities
- Proven capabilities to do manufacturing simulations, and tooling design

JTI-CS2-2018-CfP08-LPA-02-29

High performance gas expansion system for halon-free cargo hold fire supression system

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-02-29

High performance gas expansion system for halon-free cargo hold fire supression system

Type of action (RIA/IA/CSA):		IA	
Programme Area:		LPA	
(CS2 JTP 2015) WP Ref.:		WP 2.2.3.1	
Indicative Funding Topic Value (in k€):		700	
Topic Leader:	Airbus	**Type of Agreement:**	Implementation Agreement
Duration of the action (in Months):	24	**Indicative Start Date (at the earliest)[38]:**	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CfP09-LPA-02-29	**High performance gas expansion system for halon-free cargo hold fire suppression system**
Short description	
Design, develop, test, characterize, provide and operate a high performance inert gas expansion system demonstrator for halon-free cargo hold fire suppression system. The demonstrator shall store inert gas in a temperature range from -55°C to +85°C and expand the inert gas in a temperature range from -40°C to +70°C. The demonstrator shall discharge a constant high rate inert gas flow and a subsequent constant low rate gas flow for building up and maintaining an inert gas design concentration inside an airtight enclosure.	

Links to the Clean Sky 2 Programme High-level Objectives[39]	
This topic is located in the demonstration area:	Cabin & Fuselage
The outcome of the project will mainly contribute to the following conceptual aircraft/air transport type as presented in the scene setter:	Advanced Long-range Ultra-advanced Long-range Advanced Short/Medium-range

With expected impacts related to the Programme high-level objectives:				
Reducing CO_2 emissions	**Reducing NO_x emissions**	**Reducing Noise emissions**	**Improving EU Competitiveness**	**Improving Mobility**
☐	☐	☐	☒	☐

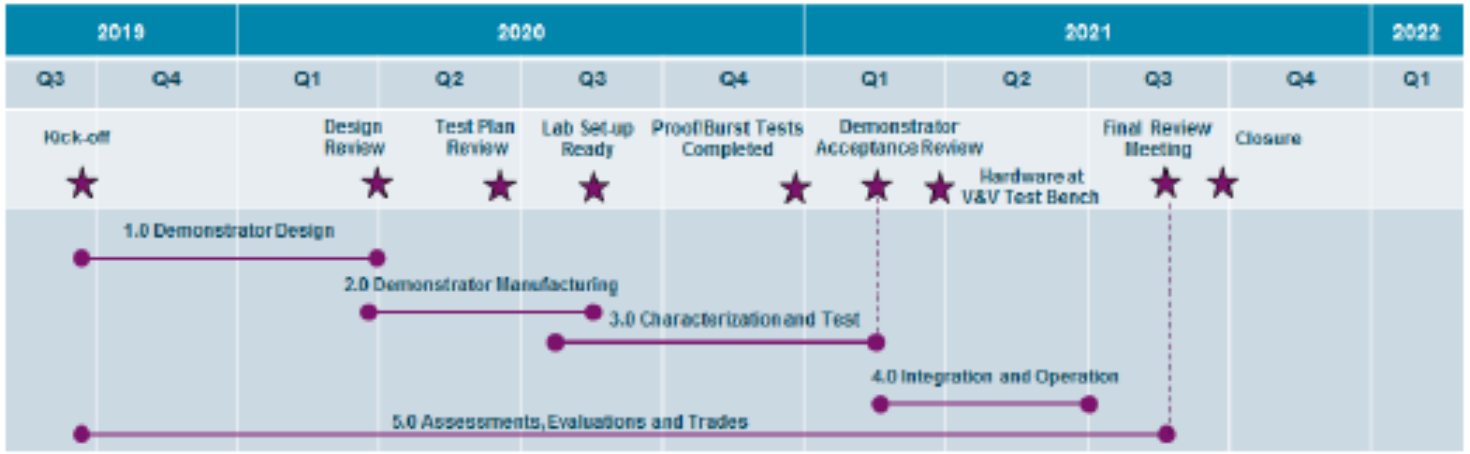
JTI-CS2-2018-CFP09-LPA-02-29

High level requirements and boundary conditions are

- The design of the demonstrator shall consider lightweight high pressure vessels
- Commercial off-the-shelf (COTS) lightweight high pressure vessels shall be considered for the design of the storage system for cost efficiency reasons.
- The design of the demonstrator shall consider the highest operational pressures allowable for the storage system according to standards accepted by the airworthiness authorities
- The demonstrator shall provide a constant high flow of inert gas during the high-rate gas discharge phase taking into account the specific operational temperature envelope in which a later system must operate
- The demonstrator shall provide a constant low flow of inert gas during low-rate gas discharge phase taking into account the specific operational temperature envelope in which a later system must operate
- The constant high flow of inert gas shall be in a range of 230g/s to 350g/s – the constant low flow of inert gas shall be in a range of 10g/s to 30g/s. The exact values will be specified and agreed within the scope of the requirements capture phase.
- The demonstrator design shall prevent pressure peaks during the high-rate gas discharge phase
- The demonstrator design shall include safety features allowing a safe operation of the demonstrator
- The demonstrator design shall include instrumentation allowing to monitor, measure and characterize the static and transient conditions of the entire demonstrator unit(e.g bottle pressure,pipe pressure, gas discharge behavior over the specified temperature range, etc.)
- The demonstrator design shall include features allowing to recharge the gas storage system at the test premises

JTI-CS2-2018-CFP09-LPA-02-29

Tentative High Level Roadmap



Deliverables			
Ref. No.	**Title - Description**	**Type***	**Due Date**
D1	Requirements Collection Document	R	Q4-2019
D2	System Description Document – Demonstrator Design	R	Q1-2020
D3	Preliminary Safety and Reliability Assessment	R	Q2-2020
D4	Hydraulic Calculations	R	Q3-2020
D5	Discharge Characteristics	R	Q4-2020
D6	Proof- and Burst Pressure Test Results	R	Q4-2020
D7	Demonstrator	HW	Q1-2021
D8	Final Project Report	R	Q3-2021

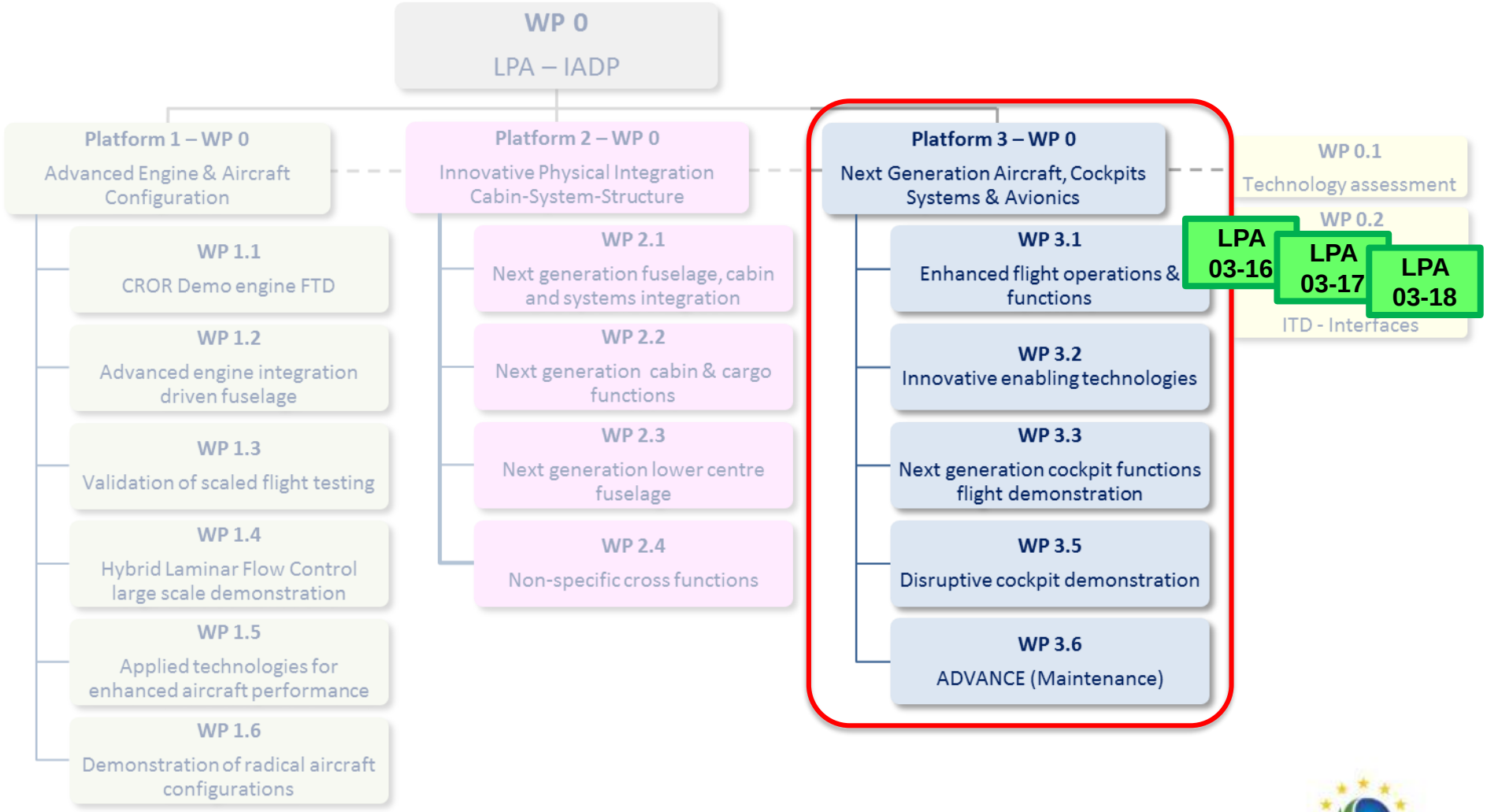
*Types: R=Report, D-Data, HW=Hardware

JTI-CS2-2018-CFP09-LPA-02-29

Special skills, Capabilities, Certification expected from the applicant(s)

- The applicant shall demonstrate its capability to design, manufacture, test and operate high pressure gas systems
- The applicant shall have capabilities or shall have access to facilities allowing to perform tests
- The applicant shall have capabilities or shall have access to facilities allowing to perform proof pressure tests and burst pressure that will be required to demonstrate a safe system operation under operational conditions.
- The applicant shall have an aerospace industry background, experiences and capabilities in:
  - Aircraft fire suppression systems
  - Pneumatic systems, regulators and valves
  - High pressure vessels design and associated standards accepted by the airworthiness autorities
  - Shipping regulations, maintenance standards and MRO processes for high pressure vessels
  - Test benches & procedures
  - Safety Engineering (PSSA/FMEA)
  - Airworthiness requirements
  - Industrialization capability

LPA-IADP WBS – “Platform 3”



JTI-CS2-2018-CfP08-LPA-03-16

Automated data collection and semi-supervised processing framework for deep learning

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFPW09-LPA-03-16

Type of action (RIA or IA)	IA		
Programme Area	LPA		
Joint Technical Programme (JTP) Ref.	WP 3.1.4.7		
Indicative Funding Topic Value (in k€)	800 k€		
Duration of the action (in Months)	24 months	**Start Date***	Q4 2019

Identification	**Title**
JTI-CS2-2018-CFP09-LPA-03-05 **[ID Code for JU to complete]**	Automated data collection and semi-supervised processing framework for deep learning
Short description (3 lines)	
The aim is to develop infrastructure for automated collection of big data and implement a framework that allows efficient processing, segmentation and annotation of this data for deep learning methods. The primary use case is VHF (very high frequency) radio communication and transcription,annotation and processing?? of recorded data.	

JTI-CS2-2018-CFPW09-LPA-03-16

- **Objective:** The applicant shall develop an infrastructure for automated collection of big data and implement a framework that allows efficient (semi-supervised and partially automated) processing, segmentation and annotation of this data for deep learning methods.
- The primary use case for this call is transcription and annotation of recorded VHF radio communication from various geographical regions where distinct English accents of non-native English speakers can be expected (for example Roman, Slavic and Anglo-Saxon countries). However, the framework is expected to be configurable and support also the annotation of other kinds of data like biophysiological data, 3D spatial data or weather data that can be used for the use case of pilot state classification, object detection or aircraft trajectory optimization and fuel burn reduction.

- **Tasks and schedule**
  - Expected start date: Q4/2019

Tasks		
Ref. No.	**Title - Description**	**Due Date**
Task 1	Data collection and classification community setup	T0+24
Task 2	Framework for data collection and annotation	T0+18
Task 3	Toolset for innovative data annotation and processing	T0+15
Task 4	Application for data annotation and processing	T0+15
Task 5	Legislative framework study	T0+15

JTI-CS2-2018-CFPW09-LPA-03-16

- **Targeted applicant:** partner with broader portfolio of activities or a small consortium of partners providing the expertize in research (machine learning, speech recognition), development (software, network frameworks, databases) and confidential data acquisitions (legislation, regulation, GDPR, etc.)

- **Desired skills:**
  - Expertise in automatic speech recognition, machine learning and artificial intelligence. This partner is expected to develop the innovative toolset for more effective and efficient data processing and annotation.
  - Experience in data acquisition and storing, strong in legal aspects, personal data processing and regulations.
  - Excellent project management and leadership skills for building and managing the community of contributors.
  - Solid big data expertise, excellent skills in software development and implementation of robust network solutions.

JTI-CS2-2018-CfP09-LPA-03-17

Audio Communication Manager for Disruptive Cockpit demonstrator

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFPW09-LPA-03-17

Audio Communication Manager for Disruptive Cockpit demonstrator

Type of action (RIA/IA/CSA)	IA		
Programme Area	IADP Large Passenger Aircraft		
(CS2 JTP 2015) WP Ref.	LPA IADP - Platform 3, Innovative enabling technologies" (WP3.2)		
Indicative Funding Topic Value (in k€)	700 k€		
Topic Leader* **full name, no abbreviation*	Airbus	**Type of Agreement**	Implementation Agreement
Duration of the action (in Months)	48 months	**Indicative Start Date**1	Q1 2020

This topic is located in the demonstration area:
Next generation cockpit systems and operations

Topic Identification Code	**Title**
JTI-CS2-2018-CFP09-LPA-03-17	Audio Communication Manager for Disruptive Cockpit demonstrator

Short description

In the frame of Disruptive Cockpit concept, the goal is to develop an IMA application to manage the voice and data communications between the flight crew in the Airbus Disruptive Cockpit demonstrator and the Ground via communication means (Legacy and/or Software Defined Radio based).
The purpose is to alleviate the crew workload, when addressing simultaneously different ground operators, by removing the need of RMP (Radio Management Panel) and AMU (Audio Management Panel) and interfacing with innovative flight crew interface.
This application will be hosted on Airbus Platform on the Large Aircraft disruptive Cockpit systems demonstrator.

The outcome of the project will mainly contribute to the following conceptual aircraft/air transport type as presented in the scene setter2

- Advanced Long-range
- Ultra-advanced Long-range
- Advanced Short/Medium-range
- Ultra-advanced Short/Medium-range

with expected impacts related to the Programme high-level objectives *[tick relevant box(es)]*:

Reducing **CO2** emissions	Reducing **NOx** emissions	Reducing **Noise** emissions	Improving EU **Competitiveness**	[Improving **Mobility**]
			[X]	[X]

JTI-CS2-2018-CFPW09-LPA-03-17

Objective: The objective of this Call for Partner is to develop an application hosted on avionic platform to be used to manage Communications means in future Aircraft Operational needs.

- Innovative functions:
  - Possible autonomous frequency selection
    - Dynamic and contextual frequency selection
    - Interface with Speech To Text function
  - Digital audio management
  - Compatibility with multi modal Human Machine Interface
- 2 steps need to be considered for the Call:
  - Phase 1 for TRL 5 in 2021
  - Phase 2 upon decision gate for TRL6 maturity by end of the project in 2023.
- **Tasks and schedule**
  - Expected start date: Q1 2020

Tasks		
Ref. No.	Title – Description	Due Date
Task 1	Definition of requirements -	T0+6Mo
Task 2	Audio Concept definition – System and components concept shall be defined to support the defined requirements	T0+7Mo
Task 3	Prototype modelling through MBSE agreed tool	T0+7Mo
Task 4	Application prototyping, Verification test and analysis of the selected solution in partner facility	TO+12Mo
Task 5	Prototype Integration on Airbus Disruptive cockpit System	TO+13Mo
Task 6	Support to Airbus during the tests and validation of the Airbus Disco concept	--
Task 7	Final Phase 1 Report showing TRL5 maturity and Phase 2 Decision Gate support	T0+24Mo
Task 8	If relevant for TRL6 definition: - Requirements and MBSE update at System and equipment level	T0+27Mo
Task 9	If relevant for TRL6 definition: - Prototype definition and integration on disruptive cockpit system bench	T0+32Mo
Task 10	TRL6 Maturity demonstration	T0+48Mo

JTI-CS2-2018-CFPW09-LPA-03-17

- **Targeted skills:**
  - Long experience and high skills in the design and manufacture of audio systems for the aerospace industry.
  - Knowledge and experience of ARINC 653 development.
  - Knowledge and experience in Communications means that are interfaced to Audio Communication means
  - Capacity to develop Software Build using Aeronautics standards
  - Knowledge and experience in Aircraft bench integration

JTI-CS2-2018-CFP09-LPA-03-18

Safe emergency trajectory generator

Innovation Takes Off

http://www.cleansky.eu/content/homepage/about-clean-sky-2

Clean Sky 2

JTI-CS2-2018-CFP09-LPA-03-18

Type of action (RIA/IA/CSA)	IA		
Programme Area	LPA		
(CS2 JTP 2015) WP Ref.	WP 3.5		
Indicative Funding Topic Value (in k€)	1000		
Topic Leader* **full name, no abbreviation*	Thales AVS France	**Type of Agreement**	Implementation Agreement
Duration of the action (in Months)	36	**Indicative Start Date**[1]	Q3 2019

Topic Identification Code	**Title**
JTI-CS2-2018-CFP09-LPA-03-02	Safe emergency trajectory generator

Short description

The objective is to assess the feasibility of a new on-board function for flight management. More precisely, the aim of the project is to design an emergency landing site and trajectory generating function for commercial aircraft allowing a safer return to ground when normal operation is interrupted, in the context of future automated operations with reduced crew.

JTI-CS2-2018-CFP09-LPA-03-18

- **<u>Final objective</u>: Improve safety in emergency landing situations (reduced crew operations)**

  ➔ **Abnormal situations** or **important failures** with **partial failure of flight systems** requiring urgent landing, although unprepared

- **<u>Target</u>: Disruptive Cockpit concept TRL5 in 2021**

- **<u>The Applicant should be able to offer</u>**:

  1- **Analysis of operational/technical problem to solve**

  - ✓ **Use cases**: degraded cases considered, flight scenarios
    - ➔ at least aviary hazard (ingestion of birds in engines) & fire on board
  - ✓ **Input data for degraded cases** : characteristics of situation and flight capabilities impairment
  - ✓ **Database** for possible landing sites; terrain, cultural data and demographic data
  - ✓ **Technics** for **landing selection** and **trajectory generation**

  2- **Integrated software prototype** with following capabilities :

  - ✓ **Identification, ranking & selection of reachable & safe landing site**
  - ✓ **Generation of emergency trajectory to the selected landing site**

- **<u>Performance objective</u>: short real time constraint**
  - **Landing site selection** : within **2 s**
  - **Trajectory generation** : within **5 s**

JTI-CS2-2018-CFP09-LPA-03-02

❑ Skills & Capabilities expected from the Applicant

➢ Landing site selection

Advanced Research Institutes with a strong background / experience on site classification

➔ Research/artificial intelligence for multi-criteria selection

➢ Trajectory generation

Advanced Research Institutes with a strong background / experience on trajectory generation

➔ Research/artificial intelligence, fast dynamic optimization, including probabilistic approaches

➢ Degraded cases leading to aircraft emergency landings

Institutions with background / experience on actual past degraded cases

❑ Major milestones

- M1: month 13 ➔ Dev. Readiness Review (landing site selection)
- M2 : month 13 ➔ Dev. Readiness Review (trajectory generation)
- M3 : month 27 ➔ Result review (v1)
- M4: month 36 ➔ Final acceptance

Questions?

Any questions on the 9th Call for Proposals can be addressed to the following mailbox:

Info-Call-CFP-2018-02@cleansky.eu

Last deadline to submit questions – check CS2 website

Thank you !

Thank You

Disclaimer

- The content of this presentation is **not legally binding and subject to modifications and evolution over the info days on Clean Sky 2** until the adoption of the Regulation on *Clean Sky 2 JU*. **Any updated version will be regularly advertised on the website of the Clean Sky JU.**
- The selection of Partners will be based on Horizon 2020 Rules for Participation **(already in force)**, the rules for submission of proposals, evaluation and selection of Partners as adopted by the Governing Board of Clean Sky 2 JU .
- The proposed content/approach is based on the consultation with the "National States Representative Group" and the "Task Force " of the *Clean Sky 2* Programme
- A dedicated functional mailbox is available to any interested applicants for any further questions related to this Call: XXXX to be inserted.