Decision of the Governing Board approving the consolidated Additional Activities Plan 2014-2018

THE GOVERNING BOARD OF THE CLEAN SKY 2 JOINT UNDERTAKING,

Having regard to the Council Regulation No 558/2014 of 6 May 2014 establishing the Clean Sky 2 Joint Undertaking and in particular Article 4(2);

Having regard to the Statutes of the Clean Sky 2 Joint Undertaking as annexed to Council Regulation No 558/2014 of 6 May 2014 ('the Statutes') and in particular Article 8.2 (i);

Having regard to the Decision of the Governing Board of 6 July 2017[1] approving the amended additional activities plan for the period 2014-2017;

Having regard to the Decision of the Governing Board of 15 December 2017[2] approving the additional activities plan for 2018;

WHEREAS:

1) The Statutes of the Clean Sky 2 Joint Undertaking confer on the Governing Board the powers to approve the Additional Activities Plan;

2) The private members of the Clean Sky 2 Joint Undertaking have submitted a proposal for an updated version of the additional activities plan related to the remainder of the year 2018;

3) The activities described in the additional activities plan are outside of the Work Plan of the Clean Sky 2 Joint Undertaking contributing to the objectives of the Clean Sky Joint Technology Initiative.

4) A consolidated additional activities plan is needed in order to assess the evolution of the planned activities compared with the overall obligation set out in Council Regulation No 558/2014.

[1] Doc. ref. CS-GB-2017-07-06 Decision Amended AAs Plan 2014-2017
[2] Doc. ref. CS-GB-2016-12-16 AA Plan 2017

HAS DECIDED:

Article 1

The consolidated additional activities plan 2014-2018 as annexed to this decision is approved.

This decision shall enter into force on the day following its adoption.

Done at Brussels, 29 June 2018

Ric Parker

Chairman of the Governing Board

Enclosures:

- Annex: Consolidated Additional Activities Plan 2014-2018 (ref. CS-GB-2018-06-29 Consolidated AAs Plan 2014-2018)

Annex - Consolidated Additional Activities Plan 2014- 2018
Clean Sky 2 Joint Undertaking
Governing Board Approval
- 29 June 2018 -

In accordance with Article 8.2 (i) of the Statues annexed to the Clean Sky 2 Joint Undertaking Council Regulation no.558/2014 of 6 May 2014, the Governing Board of Clean Sky 2 Joint Undertaking hereby approves the following Consolidated Additional Activities Plan for the period 2014 - 2018, as referred to in point (b) of Article 4(2) of this Regulation. The plan is approved on the basis of a proposal from the private members and the contribution and relevance to the objectives of the Clean Sky JTI has been assessed by the JU Programme Office.

MEMBER NAME	Year	Value of Additional activities (excluding Union funding)	Reference to CS2 Programme HLOs	Technology Streams / Demonstrator area in CS1/CS2 (if applicable)	Activity title and relevance
Airbus	2014	20,000,000.00 €	Reduction of CO2 emissions Competitiveness	Test aircraft will be required in LPA Platform 1, different demonstration Airframe ITD: Extended laminarity, LPA Platform 1	A) Placing a duly qualified A340 test aircraft at disposal for the perimeter of research activities, integration/modification, testing and demonstration. Ensuring the vehicle is available in operative, airworthy condition, and that the required infrastructure to support flight test (telemetry, etc.) is in available and certified to the appropriate standards. B) Accompanying activities as well as Research and Technology to develop manufacturing methods for laminar wings, not funded in Clean Sky / Clean Sky 2
Finmeccanica (Aircraft division) ex Alenia Aermacchi	2014	1,595,777.12 €	Reduction of CO2 emissions Competitiveness	R-IADP WP2.1 R-IADP WP 3.2 AIR TS WP B-4.3 AIR TS WP B-4.4	Innovative Aircraft Wing Structures • Development of technologies for the central wing box of regional a/c Fuselage and Tail Planes • New technologies for the Rear Fuselage and Tail Planes of regional a/c • New technologies for the cockpit of regional aircraft • Development of technologies for hybrid fuselage (metallic/composite) Advanced on-board systems for regional a/c • Aircraft integration requirements for pax seats, cabin lining panels and cargo linings focused on regional a/c

Dassault Aviation	2014	700,000.00 €	Reduction of CO2 emissions Competitiveness	• AIRFRAME ITD Concept design / optimisation processes: • AIRFRAME ITD structures: Eco Design Composite structures • AIRFRAME ID Novel Travel Experience Technology Stream	• Aircraft architecture design process • New manufacturing and assembly techniques Protection without chromates • Composite manufacturing processes • Technologies and concept for innovative passenger cabin
Airbus Defence & Space SAU	2014	9,500,000.00 €	Reduction of CO2 emissions Competitiveness	Lower fuel consumption & CO2 emission Test Platform preparation for Clean Sky 2 Flight Test Bed 2 Safety. Competitiveness, with lower operating and life cycle cost Competitiveness, with lower non-recurring operating and life cycle cost	Activities for efficiency and productivity increase in regional aircraft Centralized Monitoring and Health Monitoring Systems (Competitiveness, with lower operating and life cycle cost) Low consumption anti ice. (Competitiveness, with lower operating and life cycle cost) Miniaturization and Integration of Antennas. (Lower fuel consumption & CO2 emission) Test Platform preparation for Clean Sky 2 Flight Test Bed 2. Affordable FCS on tail New Turboprop Transport Family Configurations/Aircraft Configuration Optimization tools i-DMU Collaborative engineering. Competitiveness, with lower operating and life cycle cost Superplastic forming. Competitiveness, with lower operating and life cycle cost Innovative Materials for Noise Protection. Competitiveness, with lower operating and life cycle cost
Liebherr	2014	2,500,000.00 €	Competitiveness Reduction of CO2 emissions	Support of the following demonstrator development activities in the SYSTEMS ITD: • Smart integrated Wing • Electrical Nose Landing Gear • Rotorcraft Landing Gear System • Power Management Center • Next Generation Cooling Systems • Advanced electrothermal Wing Ice Protection System	Research and Technology development of architectures, technology bricks and other enablers Advanced Actuation Systems • Electro-Mechanical and Electro-Hydrostatic Actuators (EMA & EHA) • Landing Gear Systems • Vapour cycle System • Air Quality • Wing Ice Protection Systems • Control and Power Electronics
MTU	2014	5,805,105.22 €	Competitiveness	Economic and environmental benefits	Development of component technologies for efficiency improvement
Piaggio	2014	200,000.00 €	Reduction of noise emissions	Airframe ITD low noise small aircraft configuration	Development aero-acoustic model and test for low noise propeller pusher

Rolls-Royce	2014	20,000,000.00 €	Reduction of CO2 emissions Competitiveness	Provision of high technology components into engine demonstrator programme Manufacture of high technology components for engine demonstrator programme	Development and testing of advanced component technologies, modelling, control systems and materials systems Advanced manufacturing facilities and capital equipment
SAAB	2014	2,900,000.00 €	Competitiveness Reduction of CO2 emissions	Improve the environmental impact of an aircraft by reducing the drag and weight and thereby increase the aircraft fuel efficiency. Improve the global competitiveness of the aeronautical industry and the supply chain in Europe Internal and national technology development programs that lays the foundation for the technology development and demonstrators that will be developed in the Clean Sky 2 ITD Airframe, WP A3.1 and WP A3.3	Research and Technology development of architectures, technology bricks and other enablers for: • Technology development for Design for manufacturing and assembly. • Low cost manufacturing, highly integrated structures and multifunctional material
Thales	2014	1,500,000.00 €	Reduction of CO2 emissions Competitiveness	Cockpit and display activities in Systems ITD. Building blocks, technologies, functions. Availability of simulated environment for Integration of early developments targeting LPA and FRC needs in SYSTEMS ITD. Environment to support work on energy generation, conversion,distribution, motors, loads activities in Systems ITD	In-kind performed on ALICIA, FENICS & FUMSECK studies. Cockpit simulation environments for fixed wing and helicopters (PROTEUS) In-kind performed in GENOME for electrical test benches

AH-SAS - AIRBUS HELICOPTERS SAS	2014	1,204,327.82 €	Action IKAA-AH-F-2014-A001 - CO2 emission reduction; Competitiveness of helicopter industry Action IKAA-AH-F-2014-A003 - Reduction of gaseous emissions (CO2, NOx) and noise emissions	GRC 4.6 Power Plant GRC WP1 Innovative Rotor Blades GRC WP1.5.2 Flight Testing of Passive Optimized Blades GRC WP4 Integration of a (Diesel) High Compression Engine on a Light Helicopter	IKAA-AH-F-2014-A001 - (Diesel) High Compression Engine beyond Clean Sky: High Compression Engine, beyond Clean Sky - technology transfer from automotive to aircraft industry – very high power density piston engine. In parallel to and after Clean Sky Helicopter Demonstrator GRC4 and the related Partners' project HIPE-AE440 (engine demonstrator), this additional activity supports the engine manufacturers enabling them to pursue HCE engine development toward certification with the objective to deliver a serialisable, low consumption, light weight, and cost-efficient engine with broader potential market (range of light helicopters, general aviation aircraft, aircraft APU)High Compression Engine, beyond Clean Sky - technology transfer from automotive to aircraft industry – very high power density piston engine. Relevance to CS programmes: In parallel to- and after Clean Sky GRC, this additional activity supports the engine manufacturers enabling to pursue HCE engine development toward certification with the objective to deliver a serializable, low consumption, light weight, and cost-efficient engine with a broader potential market (range of light helicopters, general aviation aircraft, aircraft APU) IKAA-AH-F-2014-A003 - Drag and noise reduction: Drag and noise reduction: The Bluecopter demonstrator aircraft introduces several measures for reducing aircraft aerodynamic drag – including fairings for the main rotor hub and the landing skids, a newly developed aft-body concept and the use of a specially-designed empennage with a T-tail horizontal stabilizer. Relevance to CS programmes: Fully in line with GRC and ECO targets
AH-D - AIRBUS HELICOPTERS DE	2014	3,693,916.67 €	Reduction of gaseous emissions (CO2, NOx) and noise emissions	GRC1, GRC2, GRC6	Drag and noise reduction Relevance to CS programmes: Fully in line with GRC and ECO targets: The Bluecopter demonstrator aircraft has introduced several measures for reducing aircraft aerodynamic drag – including fairings for the main rotor hub and the landing skids, a newly developed aft-body concept and the use of a specially-designed empennage with a T-tail horizontal stabilizer.
FHG - FRAUNHOFER	2014	5,953,000.00 €	Regulation 558/2014 Art 2 a) and b) supporting smart and green Transport through the improvement of the manufacturing base of excellence and contributions to the supply chain technology	WP2 Clean and efficient technology development	Manufacture and Production Processes Dominant parts: CFRP, metals and tooling; assembly and joining System elements such as actuators

SAF - SAFRAN SA	2014	11,000,000.00 €	Competitiveness Reduction of CO2 emissions	CS1-SAGE WP2 CROR Ground Test Demonstrator CS2-Engine-WP2 UHPE Ground Test Demonstrator CS2-LPA-WP1.1 CROR Flight Test Demonstrator	Power Gear Box technologies maturation First studies and model test preparation to de-risk UHBR fan module Relevance to CS programmes: Open Air test facility adapted to CROR engine is needed to perform the program PCM is needed to run the CROR demo, in ground or flight condition, as well as the other studies and designs related to the CROR ground demonstrator. Maturation of Power Gear Box technology and fan module de-risk are needed prior to run the full UHPE Demo Engine Maturation of two innovative propulsion architectures able to procure fuel burn important reduction in 2025-2030+ period: Open Rotor and ducted Ultra High Bypass Ratio turbofan
Finmeccanica Ltd (Helicopter division) - ex AW-Ltd -	2014	16,375,000.00 €	Competitiveness Reduction of CO2 emissions Speeding up the development of cleaner air transport technologies for earliest possible deployment. Increasing aircraft fuel efficiency. Reducing aircraft NOx and noise emissions.	CS2 FRC - WP1.2 NGCTR Air Vehicle Design and Development CS1 GRC - WP1 Innovative Rotor Blades	Tiltrotor Aerodynamics: Optimisation of tiltrotor external aerodynamics: aeromechanics of tiltrotor to provide weight-to-drag ratio improvement Tiltrotor Proprotor: Development of advanced proprotor blades and flight control system for next generation tilrotor application Active Rotor Control: Development of active rotor control technology
Finmeccanica S.p.A (Helicopter division) - ex AW Spa	2014	61,086 €	Competitiveness Reduction of CO2 emissions	CS2 FRC - WP1.2 NGCTR Air Vehicle Design and Development	Tiltrotor Flight Control
AH-D - AIRBUS HELICOPTERS DE	2014	5,511,327 €	Reduction of gaseous emissions (CO2, NOx) and noise emissions	GRC1, GRC2, GRC6	Drag and noise reduction Relevance to CS programmes: Fully in line with GRC and ECO targets: The Bluecopter demonstrator aircraft has introduced several measures for reducing aircraft aerodynamic drag – including fairings for the main rotor hub and the landing skids, a newly developed aft-body concept and the use of a specially-designed empennage with a T-tail horizontal stabilizer.
Total 2014	**2014**	**108,499,540 €**			
Airbus	2015	20,000,000.00 €	Reduction of CO2 emissions Competitiveness	Test aircraft will be required in LPA Platform 1, different demonstration	A) Placing a duly qualified A340 test aircraft at disposal for the perimeter of research activities, integration/modification, testing and demonstration. Ensuring the vehicle is available in operative, airworthy condition, and that the required infrastructure to support flight test (telemetry, etc.) is in available and certified to the appropriate standards.

Finmeccanica (Aircraft division) ex Alenia Aermacchi	2015	6,864,635.85 €	Reduction of CO2 emissions Competitiveness	AIR TS B-4 - Advanced Fuselage REG WP2.1.1 - Innovative wing structures Design & Manufacturing REG WP3.2 - Fuselage / Cabin Integrated Ground Demonstrator REG WP2.3 - Energy Optimised Regional Aircraft	◘ Innovative Aircraft Wing Structures Continuation of activities focused on the development and optimisation of liquid infusion process for application on thick panels. ◘ Fuselage and Tail Planes Continuation of activities on rear fuselage & tail planes advanced structures, with specific focus on preliminary design allowables. Continuation of activities related to automated lay-up systems of dry preform for liquid infusion relative to Rear fuselage and tail planes structures, with realisation of demonstration items (about one by two meters panels). Activities on composite cockpit including production of composite panels, with continuation of comparison between lay-up/prepreg and liquid infusion solutions. Continuation of activities on technologies for assembly of hybrid (metal/composite) structures for fuselage. Studies on Scarfing Technique for composite repair, based on removal of the damaged ply followed by lay-up regeneration. ◘ Landing Gear Systems Definition of a preliminary architecture for a landing gear system of a regional turboprop aircraft. Electro-mechanical actuators for steering and uplock emergency release system (specification for). Trade-off analysis in terms of weight, complexity, efficiency, safety, reliability and maintainability. Definition of landing gear system requirements for a regional turboprop aircraft, including interface requirements between landing gear and aircraft (mechanical, hydraulic, electric, avionic), safety requirements for extension/retraction and steering systems, minimum reliability requirements for critical failure conditions (e.g.: jamming and runaway), aerodynamic loads on landing gear and door aircraft geometry and inertial data, MLG and NLG doors geometry, limit and fatigue load conditions. ◘ Pax Cabin equipment / furnishings Activities on lighter secondary structure for passenger economy seat and CFRP seat-back. Activities on cabin lining with bio-compatible/alternative materials (foam core and fiber sandwich plies). Developmenet of test rigs for Noise & Vibration harshness and environmental friendaly materials characterisation.

Dassault Aviation	2015	4,300,000.00 €	Reduction of CO2 emissions Competitiveness	• AIRFRAME ITD Concept design / optimisation processes: Flight Demonstration Wind Tunnel Tests Substantiation process & reference test cases for substantiation/validation IADP/ITD interface management: requirement elaboration, interface definition, progress measurement capability • AIRFRAME ITD structures: - Eco Design - Composite structures • AIRFRAME ID Novel Travel Experience Technology Stream	• Business Jet characteristics (aerodynamic, structural) data base • Multidisciplinary design lab • Aircraft architecture design process • Advanced models in aerodynamics, flight control & noise • New manufacturing and assembly techniques Protection without chromates • Composite wing box and composite structures • Composite manufacturing processes • Technologies and concept for innovative passenger cabin
Airbus Defence & Space SAU	2015	9,230,000.00 €	Reduction of CO2 emissions Competitiveness	AIR TS B - HVCE REG WP3.5 - Integrated Technologies Demonstrator LPA WP3.1.2 - Functions for efficient and easy systems management	Efficiency and productivity increase for Regional Aircraft: The project activities will mainly contribute to : Innovation in CFRP elementary parts manufacturing processes and new materials key to lower aero structures recurring cost Innovation in manufacturing processes to improve composite materials mechanical properties at high operation temperatures Innovation in Systems integration to lower operating and life cycle costs Innovation in Systems architecture to lower components weight. Innovation in Systems architecture to lower fuel consumption and CO2 emissions Cockpit technologies maturation FT4B Flight Turboprop Flight Test Bed infrastructure maturation.
Evektor	2015	30,000.00 €	Competitiveness	N.A.	Self-funded R&D activities EMC Simulations for on fields of - avionic systems HIRF protection - lightning effects on composite structures Passenger comfort activities in ITD Systems Rapid prototyping techniques – hybrid materials Effective production documentation

Liebherr	2015	4,500,000.00 €	Reduction of CO2 emissions Competitiveness	Support of the following demonstrator development activities in the SYSTEMS ITD: • Smart integrated Wing • Electrical Nose Landing Gear • Rotorcraft Landing Gear System • Power Management Center • Next Generation Cooling Systems • Advanced electrothermal Wing Ice Protection System	Research and Technology development of architectures, technology bricks and other enablers for: • Advanced Actuation Systems • Electro-Mechanical and Electro-Hydrostatic Actuators (EMA & EHA) • Landing Gear Systems • Vapour cycle System • Air Quality • Wing Ice Protection Systems • Control and Power Electronics
MTU	2015	9,206,987.98 €	Competitiveness	ENG WP4.2 - Integrated Compression System ENG WP4.3 - Compressor Rig Tests	Development of component technologies for efficiency improvement: Development of technologies to be inserted in compressor and engine demonstrator
Piaggio	2015	300,000.00 €	Reduction of CO2 emissions Competitiveness	System ITD FbW for small A/C Airframe ITD low cost composite manufacturing Airframe ITD small aircraft winglet configuration	Electro-Mechanical actuation for primary Flight Control Composite wing for next generation small aircraft Aerodynamic design methods
Rolls-Royce	2015	33,000,000.00 €	Reduction of CO2 emissions Competitiveness	Provision of high technology components into engine demonstrator programme Manufacture of high technology components for engine demonstrator programme	Development and testing of advanced component technologies, modelling, control systems and materials systems Advanced manufacturing facilities and capital equipment

Thales	2015	1,500,000.00 €	Reduction of CO2 emissions Competitiveness	Cockpit and display activities in Systems ITD. Building blocks, technologies, functions. Availability of simulated environment for Integration of early developments targeting LPA and FRC needs in SYS ITD. Environment to support work on energy generation, conversion, distribution, motors, loads activities in SYS ITD	In-kind performed on FENICS & FUMSECK studies. Cockpit simulation environments for fixed wing and helicopters (PROTEUS) In-kind performed in GENOME for electrical test benches
AH-SAS - AIRBUS HELICOPTERS SAS	2015	791,721.87 €	Action IKAA-AH-F-2015-A001 - CO2 emission reduction Competitiveness of helicopter industry Action IKAA-AH-F-2015-A003 - Reduction of gaseous emissions (CO2, NOx) and noise emissions	GRC WP1 - Drag and noise reduction GRC WP4.6 - (Diesel) High Compression Engine beyond Clean Sky	IKAA-AH-F-2015-A001 -(Diesel) High Compression Engine beyond Clean Sky: In parallel to and after Clean Sky Helicopter Demonstrator GRC4 and the related Partners' project HIPE-AE440 (engine demonstrator), this additional activity supports the engine manufacturers enabling them to pursue HCE engine development toward certification with the objective to deliver a serialisable, low consumption, light weight, and cost-efficient engine with broader potential market (range of light helicopters, general aviation aircraft, aircraft APU). IKAA-AH-F-2015-A003 - Drag and noise reduction: The Bluecopter demonstrator aircraft has introduced several measures for reducing aircraft aerodynamic drag – including fairings for the main rotor hub and the landing skids, a newly developed aft-body concept and the use of a specially-designed empennage with a T-tail horizontal stabilizer. Relevance to CS programmes: Fully in line with GRC and ECO targets.

FHG - FRAUNHOFER	2015	4,127,000.00 €	Council Regulation Art 2 a) and b) supporting smart and green Transport through the improvement of the manufacturing base of excellence and contributions to the supply chain technology	ECO WP2 Clean and efficient technology development	Manufacturing and Production processes: dominant parts: CFRP, metals and tooling; assembly and joining System elements such as actuators, resilient challenges in batteries Improvement of facilities to enable specific Performance Validation Examples: 1) Development of processes to recover rare earth elements from large volume waste streams and to recycle Magnesium production waste. The outcome is used to develop new Magnesium alloys with low proce and high Performance to be use amongst others in aviation industry. Demonstrator parts are enviromentally tested their production is analysed by LCA. In the first stage of eco-design it was shown (2012/3) that on the one hand even Mg for high performance Al-alloys is hard to get by, on the other hand all out Mg alloys had shown definite benefits in the IAI shelf demonstrators, in weight and expanded LCA impact. It is an interest of FhG to keep the hands on such research alive even if foreground CS WPs have elapsed. An obvious minimal value is the impact on the CS Materials Data Base, an achievement of CS1 a dream of CS2 (ref. JTP) 2) A similiar process for CFRP, microwave pyrolysis or elements for batteries. 3) Bolting, Technology variants to seamless joining of parts such as Clips, Frames to larger (panel...) structures. Involvement of CIT Technology, armatures and robotics etc. 4) Special Technology Studies and Installations for thermal, Vibration, Fluid and aeroacustics SHM and higher Level effects on user friendliness and comfort. 5) Management, Disseminations and Communication/ Support (only factored into "2014", end of 2012, 120kEu as preparatory support) Capabilities to support and carry further - CS fuselage structure and cabin development technologies; lifting surface technology - Secondary airframe structures and materials e.g. particle foam airducts, cargo lining modules.. - Exploitation routes SYSTEMS, Engine Interaction example a) large scale plasma device 2014-16: the investment aims at the treatment and coating of polymeric webs, foils and non-wovens. The plasma equipment is designed and assembled. A roll to roll process is adapted for the deposition for plasma-polymeric release coatings onto vacuum deep drawable polymeric films. By using the aspired release films, large scale CFRP components (VTP LPA) might be produced without using release agents. So, no cleaning prior to adhesive bonding or painting is necessary. This is one competitive/ ecoDESIGN building brick towards the envisaged NLF/ HLF ground and flight test aspired Airbus component. Future layers (2017-19) include complimentary work to NLF quality for the VTP, depending (IPR/ Demonstration part applicable PF 1) on transaction of leader budget to LPA PF1 - Relevance to CS programmes: Fully in line with GRC and ECO targets

SAF - SAFRAN SA	2015	29,000,000.00 €	Reduction of CO2 emissions Competitiveness	CS1 - SAGE WP2 CROR Ground Test Demonstrator CS2-Engine WP2 UHPE Ground Test Demonstrator CS2-LPA WP1.1 CROR Flight Test Demonstrator	Safran Additional Activities 2015: Engineering studies for an open air test facility and beginning of building & procurement Several studies, designs, manufacturing & procurements devoted to CROR demo: Pitch Control Mechanism (PCM), specific parts of the propeller module, tasks related to CROR control system, engineering tasks related to the demo final assembly Power Gear Box technologies maturation Relevance to CS programmes: Open Air test facility adapted to CROR engine is needed to perform the program PCM is needed to run the CROR demo, in ground or flight condition, as well as the other modules and parts of the CROR ground demonstrator. Maturation of Power Gear Box technology is needed prior to run the full UHPE Demo Engine Maturation of two innovative propulsion architectures able to procure fuel burn important reduction in 2025-2030+ period: Open Rotor and ducted Ultra High Bypass Ratio turbofan
GKN AERO AB - GKN Aerospace Sweden AB	2015	750,000.00 €	Contributes towards reducing aircraft fuel consumption and noise	ENG WP4 Advanced Geared Engine Configuration	Enoval: Development of innovative aerodynamic design of the turbine exhaust case. Validation in aerodynamic rig test. Results will be direct input to the higher TRL TEC demo in CS2 WP4. GKN own contribution.
Finmeccanica Ltd (Helicopter division) AW-Ltd -	2015	9,200,000.00 €	Competitiveness Reduction of CO2 emissions Speeding up the development of cleaner air transport technologies for earliest possible deployment. Increasing aircraft fuel efficiency. Reducing aircraft NOx and noise emissions.	CS1 GRC - WP1 Innovative Rotor Blades CS2 FRC - WP1.2 NGCTR Air Vehicle Design and Development	Tiltrotor Aerodynamics: Optimisation of tiltrotor external aerodynamics: aeromechanics of tiltrotor to provide weight-to-drag ratio improvement Tiltrotor Proprotor: Development of advanced proprotor blades and flight control system for next generation tilrotor application Active rotor control: Development of active rotor control technology
Finmeccanica S.p.A (Helicopter division) - ex AW Spa	2015	397,813.00 €	Competitiveness Reduction of CO2 emissions	CS2 FRC - WP1.2 NGCTR Air Vehicle Design and Development	Tiltrotor flight control: Cockpit flight control system to improve the handling qualities of a tiltrotor
MSSDK - Meggitt A/S	2015	72,100.88 €	Competitiveness Reduction of CO2 emissions	AIR TS A4-1.1.1 - GAINS	Development of piezoelectric ice detection including consideration of SLD discrimination strategies - MPC IKKA contribution from other Meggitt Aerospace SBU Diffusion Bonded Aero Heat Exchanger (DBAHx). The Diffusion Bonded Aero Heat Exchanger project will bring new technology to heat exchangers for aeronautical applications - MPC contribution from a Meggitt Aerospace Ltd Innovate UK activity Relevance to CS programmes: Alignment with the Engine ITD activties.

SAAB - SAAB AB	2015	6,596,881.00 €	Improve the environmental impact of an aircraft by reducing the drag and weight and thereby increase the aircraft fuel efficiency. Improve the global competitiveness of the aeronautical industry and the supply chain in Europe	AIR TS A-2 Advanced Laminarity - TS A 2.2 - NLF smart integrated wing AIR TS A-3 High Speed Airframe - TS A 3.1 - Multi Diciplinary wing for high and low speed - TS A 3.3 - Innovative shape and structure SYS WP S-1 - Extended Cockpit - WPS 1.3.4 - Vision and Awareness	Automation Research for increased productivity and manufacturability Manufactoring Research for advanced manufacturing and assembly processes Flight Management Systems HUD Systems, Vision and Awareness studies in rigs and simulators
CTA - Fundación Centro de Tecnologías Aeronáuticas	2015	80,000.00 €	Improve test technology for validation of new components and systems, in order to reduce time and cost. Improve the competitiveness.	AIR TS B4.1.3 - OUTCOME: Rotorless Tail for Fast R/C Detailed Design, Manufacturing & Testing AIR TS B2.2.1 - Thermoplastics	Development and improvement of test technologies in order to be more efficient, ant to have more information about the behavior of the component under conditions similar to operation.
AA - GE AVIO SRL	2015	291,000.00 €	Up to 15% Fuel Efficiency improvement Up to 10% of Total Operating Cost reduction Contribute to SRIA2060 NOx reduction target	ENG WP8.2 - Low Noise Propulsive System ENG WP8.4 - Advanced Combustor Technology	Technologies for advanced small turbo-prop combustor and Reduction Gear Box (RGB) validation. The additional activities are aimed to : 1. Low NOx combustor enhanced technologies development (FP7, LEMCOTEC Project – IKC only) 2. IT Tools and Support for preliminary and detailed design of combustor and RGB modules (Software Licence and Maintenance), such as Altium Designer, MATLAB&Simulink, Hyperworks, SCADE, ANSYS, TeamCenter&NX, IBM R. Syn. & C. Suit -ref. Internal document CS2_IKAA_ 2015/2016_2p
AH-D - AIRBUS HELICOPTERS DEUTSCHLAND GMBH	2015	7,600,000.00 €	Reduction of gaseous emissions (CO_2, NOx) and noise emissions. Improvement of competitivity.	GRC - continuation of activities	GRC - continuation of activities
Total 2015	**2015**	**147,838,141 €**			
A-CE - AIRBUS SAS	2016	20,000,000.00 €	Demonstration of technologies contributing to achieve H2020 HLO / targets with respect to environment & competitiveness	LPA Airbus AA 2016-02 - LPA work packages WP1.1, WP1.4, WP1.5 and WP1.6, Airframe WP 2.2	Aerodynamics and Aero-loads for large transport aircraft components in large scale demonstration under ; Aerodynamic performance of advanced large transport aircraft configurations in large scale demonstration under operational conditions; Integration and performance validation and demonstration with next generation engines. Relevance to CS programmes: links are in LPA and AIR ITDs at various levels; impact to CS and CS2 are found in the field of environmental benefits

Airbus Defence & Space SAU	2016	8,200,000.00 €	Increasing aircraft fuel efficiency, reducing CO2 emissions Competitiveness (lower life cycle costs, lower recurrent costs)	AIR TS B - HVCE REG WP3.5 - Integrated Technologies Demonstrator FTB2 LPA WP 3.1.2 - Functions for Efficient and Easy Systems Management LPA WP3.4 - Active Cockpit	Fligt Test Bed preparation and activities for innovative manufacturing and integration processes: Electrical Management Distribution Systems Centralized Monitoring and Health Monitoring Systems Electrical Ice Protection Systems Miniaturization and Integration of Antennas FTB4 Flight Turboprop Transport Technology Test Bed New Turbo Prop C2XX NTP Integrated Engine Display Systems Composite Material Fire Resistance Characterization COSSTA Superplastic forming APOLO Infusion process Additive Layer Manufacturing. The project activities will mainly contribute to : Innovation in CFRP elementary parts manufacturing processes key to lower aero structures recurring cost Innovation in manufacturing processes to improve composite materials mechanical properties at high operation temperatures Innovation in Systems integration to lower operating and life cycle costs Innovation in Systems architecture to lower fuel consumption and CO2 emissions Cockpit technologies maturation Test Platform preparation for CS2 Regional Test Bed
AEROMAC - Aeromac Mecanizados Aeronauticos, SA	2016	223,813.00 €	Industrial objectives to ensure future competitiveness	LPA WP 1.4 - Hibrid Laminar Flow Controlled Leading Edge for Horizontal Stabilizator (HLFC)	Manufacturing of LE_HLFC by Additive manufacturing. Relevance to CS programmes: Technological back-up and possible future alternative solution to that applied on demonstrator WP 1.4 (HLFC) of CS2. - Manufacturing solution for LE_HLFC in CS2: • CFRP internal structure joined to external microperfored titanium skin. - Manufacturing solution for LE_HLFC in ADDIFLY: • Titanium additive manufactured internal structure joined to external microperfored titanium skin. Even that these manufacturing technology is far from market due to the current available size of AM machines, the possibilities of weight reductions and system integration makes interesting the manufacturing of a first scale (3:1) demonstrator. TRL: 4 Future developments of additive technologies could allow in next years to manufacture a full scale flight demonstrator in CleanSky. A 100% metallic HLFC Leading Edge demonstrator will be designed and manufactured by Selective Laser Melting. This additive manufacturing technology will allow to integrate the maximum number of structures and systems by an optimized topologic design of the internal structure. • Vacuum systems for HLFC. • Anti-frozen systems • High lift systems • Supports for electrical systems..etc. • Static and dynamic support structures. • Innovative hail and bird Impact resistant lattice structures will be also developed. • Joining and exchangeability join solutions…. In addition welding technologies for joining of Titanium micro perforated sheet to internal additive manufactured structure will be developed.
Dassault Aviation	2016	3,000,000.00 €	To contribute to improving the environmental impact of aeronautical technologies as well as to developing a strong and globally competitive aeronautical industry and supply chain in Europe (increasing fuel efficiency).	Upstream activity enabling and/or underpinning CS2 actions	Multidisciplinary Aircraft design process Aeromechanics of aircraft concepts (advanced model in aerodynamics); Relevance to CS programmes: Impacts to CS2 are weight-to-drag ratio improvements (lift-to-drag ration, definition and evaluation of laminarity profiles (wing and nacelle), architecture optimisation.

ITP - Industria de Turbo Propulsores S.A.	2016	2,648,617.00 €	Reduction of CO2 emissions Competitiveness	ENG WP5.2.3 - IPT Material Evaluation & Development ENG WP6.1.1. - Multi-Stage IPT	Aerodynamic, thermo-mechanic and noise technologies for aircraft gas turbines. Aerodynamic, thermo-mechanic and noise technologies for the low pressure spool of VHBR engines Advanced manufacturing technologies for aircraft gas turbines Advanced manufacturing and repair technologies for the low pressure turbine section and low pressure compressor of aircraft gas turbines Advanced materials technology for low pressure section of aircraft gas turbines Development of new models and simulation tools for high temperature materials lifing, off-limits usage and critical manufacturing processes. Characterisation and modelling of materials for the LPC.
LLI - LIEBHERR AEROSPACE LINDENBERG GMBH	2016	6,480,000.00 €	Secure key technologies enabling the major demonstrations to reach their objectives. The systems developed will act as enablers for game changing aircraft configurations such as More Electric Aircraft and Bleedless Engines.	Upstream activity enabling and/or underpinning CS2 actions Parallel research activity focusing on non-CS / non-CS2 alternative areas of investigation and/or amplifying CS / CS2 actions Supporting infrastructure and capacities	Research and Technology development of architectures, technology bricks and other enablers for: - Advanced Actuation Systems - Electro-Mechanical Actuators (EMA) - Main Landing Gear Systems - Landing Gear Materials - Vapour cycle System - Air Quality - Wing Ice Protection Systems - Power Management - Electrical Environment Control System - Pressurization System - Control and Power Electronics - Innovative Manufacturing
MTU-D - MTU AERO ENGINES AG	2016	7,300,000.00 €	Competitiveness Reduction of CO2 emissions	ENG WP4.2 - Integrated Compression System ENG WP4.3 - Compressor Rig Tests	Development of component technologies for efficiency improvement Development of technologies to be inserted in compressor and engine demonstrator

Rolls Royce	2016	48,000,000.00 €	Competitiveness Reduction of CO2 emissions Up to 23% fuel burn and CO2 emission reduction relative to year 2000 baseline (consistent with 10% reduction relative to year 2014 baseline) Noise levels making a significant step towards to ACARE 2035 targets (- 11 EPNdB per operation relative to 2000 situation) Contribute to delivery of NOX emission reductions through reduced fuel burn and lean burn technology.	ENG WP 5 - VHBR Middle-of-Market Demonstrator ENG WP 6 - VHBR Large Turbofan Demonstrator	◘ Composite Fan development Enabling technologies such as the composite fan, journal bearing and variable area nozzle will be developed in parallel to the Clean Sky 2 programme. ◘ Power gearbox technology development and testing The power gearbox is a critical element of the UltraFan architecture and although some of the elements of this development is within the scope of Clean Sky 2, some design activities, and most of the testing and validation work, including the development of supporting (but critical) technologies such as the health monitoring of the power gearbox, will be developed outside the Clean Sky 2 programme and supported by national as well as private venture funding. ◘ Journal Bearings development Enabling technologies such as the composite fan, journal bearing and variable area nozzle will be developed in parallel to the Clean Sky 2 programme. ◘ Assembly and test resource, including hardware (e.g. tooling, instrumentation, etc.) Specifically for Advance3, the additional activities will be focused on the design and validation of the fan, compressor, turbine, power transmission and control systems that will ultimately be integrated and tested as part of the Clean Sky 2 programme. Relevance to CS programmes: Links are in the ENGINES ITD WP5 and WP6. Both the Advance3 and UltraFan programmes require the integration of a large number of complementary activities to deliver the necessary design, technologies and hardware in order for them to meet the performance targets envisaged. Overall, the integration of these technologies as a demonstrator under the Clean Sky 2 programme will deliver improved engine noise performance, reduction of NOx emissions and improved fuel efficiency.
SAF - SAFRAN SA	2016	16,000,000.00 €	Competitiveness Reduction of CO2 emissions Maturation of two innovative propulsion architectures able to procure fuel burn important reduction in 2025-2030+ period: Open Rotor and ducted Ultra High Bypass Ratio turbofan	ENG WP 2 - UHPE Ground Test Demonstrator LPA WP 1.1 - CROR Flight Test Demonstrator	Building an open air test facility Final manufacturing and check of Pitch Control Mechanism (PCM) for the CROR demo Power Gear Box technologies maturation Relevance to CS programmes: Open Air test facility adapted to CROR engine is needed to perform the program PCM is needed to run the CROR demo, in ground or flight Conditions Maturation of Power Gear Box technology is needed prior to run the full UHPE Demo Engine

FHG - FRAUNHOFER	2016	6,482,000.00 €	Regulation Art2 a) and b) supporting smart and green Transport through the improvement of the manufacturing base of excellence and contributions to the supply chain innovation along the whole Life Cycle of productivity competitiveness and reduction of frontline emissions(C02, NOx) as well as emissions connected and complimentary in the CS LCA Impacts[GWP, Eutrophication,….etc.] reduction of waste/ energy production reduction of resource extraction and reduction of mass not only in the product but also in the tools, workpiece systems Cooperating with SME Ensuring efficiency concept improvements in parallel to faster development needs	ECO WP2 Clean and efficient technology development	Manufacturing and Production processes: Dominant parts: CFRP, metals and tooling; assembly and joining System elements such as actuators, resilient challenges in batteries Improvement of facilities to enable specific Performance Validation Examples: 1) Development of processes to recover rare earth elements from large volume waste streams and to recycle Magnesium production waste. The outcome is used to develop new Magnesium alloys with low proce and high Performance to be use amongst others in aviation industry. Demonstrator parts are enviromentally tested their production is analysed by LCA. In the first stage of eco-design it was shown (2012/3) that on the one hand even Mg for high performance Al-alloys is hard to get by, on the other hand all out Mg alloys had shown definite benefits in the IAI shelf demonstrators, in weight and expanded LCA impact. It is an interest of FhG to keep the hands on such research alive even if foreground CS WPs have elapsed. An obvious minimal value is the impact on the CS Materials Data Base, an achievement of CS1 a dream of CS2 (ref. JTP) 2) A similiar process for CFRP, microwave pyrolysis or elements for batteries. 3) Bolting, Technology variants to seamless joining of parts such as Clips, Frames to larger (panel...) structures. Involvement of CIT Technology, armatures and robotics etc. 4) ENGINE COMPONENT IMPROVEMENTS: Support to WP9 Perimeter activity - advanced material and associated production solutions 5) Special Technology Studies and Installations for thermal, Vibration, Fluid and aeroacustics SHM and higher Level effects on user friendliness and comfort. 6) Management, Disseminations and Communication/ Support Capabilities to support and carry further - CS fuselage structure and cabin development technologies; lifting surface technology - Secondary airframe structures and materials e.g. particle foam airducts, cargo lining modules.. - Exploitation routes SYSTEMS, Engine Interaction example a) large scale plasma device 2014-16: the investment aims at the treatment and coating of polymeric webs, foils and non-wovens. The plasma equipment is designed and assembled. A roll to roll process is adapted for the deposition for plasma-polymeric release coatings onto vacuum deep drawable polymeric films. By using the aspired release films, large scale CFRP components (VTP LPA) might be produced without using release agents. So, no cleaning prior to adhesive bonding or painting is necessary. This is one competitive/ ecoDESIGN building brick towards the envisaged NLF/ HLF ground and flight test aspired Airbus component. Future layers (2017-19) include complimentary work to NLF quality for the VTP, depending (IPR/ Demonstration part applicable PF 1) on transaction of leader budget to LPA PF1

MSSDK - Meggitt A/S	2016	5,000.00 €	Competitiveness Reduction of CO2 emissions	AIR WP6 Breakthrough Ultra Low Power	Development of piezoelectric ice detection including consideration of SLD discrimination strategies: As a complementary activity to the topic, and in specific relation to GAINS WP6 (Ultra Low Power). An advantage of the inherent properties of piezoelectric devices will be taken to undertake innovative action in the field of ice detection. In respect of electro-thermal ice protection providing a system that can protect against requirements (B) & (C) above (see reference to CS2 programme), this would likely require electrical power beyond the maximum available. The concept therefore, is to develop a solution that supports an escape strategy defined by requirement (A). The intent for this additional R&T action is to develop an ice detection strategy that would support the IPS by: 1. Discriminating and detecting SLD conditions that would allow the aircraft to exit all icing conditions. - This would require distributed sensing aft of the protected area. 2. Supporting power optimisation and maximising performance of the de-ice system. This can potentially support GAINS WP3.2 (electro-thermal de-ice modelling): - This would be able to detect the presence of ice and also ice thickness; - This could allow optimisation of de-ice sequences to operate only when sufficient ice has accreted, and it will help to ensure that any inter-cycle ice limit specified for the protected surface is not exceeded; - This requires sensors integrated into the IPS (protected area), and would be able to shed ice for further ice accretion.
ACI - Aernnova Composites Illescas, SA	2016	50,000.00 €	Industrial objetives to ensure future competitiveness	AIR TS B-1.3 - More efficient Wing technologies AIR TS B-4.1 - Roto-less tail for Fast Rotorcraft	Out Of Autoclave Technology, High Integrated Composite Structures; Complex RTM pre-forms injections; Perform conformation: Aernnova will develop a high integrate composite structure manufacture by out of autoclave technology. In order to confirm the enough maturity of the technology, some trials will be done with different geometries and materials to set up the process. Activities developed under the scope of: - Project COMPPLEX - Retos Colaboracion 2014 - Project ComBoNDT - H2020 - Project APOLO - FEDER-INTERCONNECTA-2015 CDTI - Project E-Multidrill ESIF complementary activities - (pending presentation and approval) - Project FLEXAROCELL - CIEN-2016 CDTI (pending approval) - Project ROBISELL - FEDER-INTERCONNECTA-2016 CDTI (pending approval)
GKN AERO AB - GKN Aerospace Sweden AB	2016	1,400,000.00 €	Contributes towards reducing Aircraft CO2 emissions and noise. Strengthens the competitiveness of European aviation industry.	ENG WP4 - Advanced Geared Engine Configuration ENG WP2 - UHPE ground demo for SMR A/C ENG WP5 - VHBR – Middle of Market Technology ENG WP6 - VHBR – Large Turbofan Demonstrator UltrafanTM	Enoval Development of innovative aerodynamic design of the turbine exhaust case. Validation in aerodynamic rig test. Results will be direct input to the higher TRL TEC demo in CS2 WP4. GKN own contribution. Swe Demo Motor National Program SWE DEMO MOTOR. Development of competitive manufacturing technologies for engine structures and rotors. Validation of these novel technologies by manufacturing of GKNs demonstrator parts in Clean Sky-2

TEAMS - Testing and Engineering of Aeronautical Materials and Structures S.L.	2016	289,009.00 €	Contributes towards reducing Aircraft CO2 emissions. Strengthens the competitiveness of European aviation industry.	AIR TS B-4 Advanced Fuselage AIR TS B-4.3.6 - SHERLOC	State of the art and product needs study: The first work package is dedicated to the study of the state of the art and the identification of the specific needs of the system. Prototype Design & Manufacturing: Work package 2 is in charge of the design and manufacturing of the prototype. It will be divided in the following tasks: 2.1 Concep solution selection 2.2 3D Model, preliminary design 2.3 Final design, 3D model and drawings set 2.4 Bill of materials and purchase. 2.5 System assembly (continues in 2017) Management: The fourth work package is in charge of the management of project activities and outcomes
AED - Aernnova Engineering Division, SA	2016	205,414.00 €	Industrial objectives to ensure future competitiveness	LPA WP. 1.4 HLFC LPA WP. 1.2. Rear End	Design and Manufacturing of LE_HLFC by Additive manufacturing (WP 1.4.): Relevance to CS programmes: Technological back-up and possible future alternative solution to be applied on demonstrator WP 1.4 (HLFC) of CS2. Design solution for LE_HLFC in CS2: - Manufacturing solution for LE_HLFC in CS2: • CFRP internal structure joined to external microperfored titanium skin. - Manufacturing solution for LE_HLFC in ADDIFLY: • Titanium additive manufactured internal structure joined to external microperfored titanium skin. Even that these manufacturing technology is far from market due to the current available size of AM machines, the possibilities of weight reductions and system integration makes interesting the manufacturing of a first scale (3:1) demonstrator. TRL: 4 Future developments of additive technologies could allow in next years to manufacture a full scale flight demonstrator in CleanSky. A 100% metallic HLFC Leading Edge demonstrator will be designed and manufactured by Selective Laser Melting. This additive manufacturing technology will allow to integrate the maximum number of structures and systems by an optimized topologic design of the internal structure. • Vacuum systems for HLFC. • Anti-frozen systems • High lift systems • Supports for electrical systems..etc. • Static and dynamic support structures. • Innovative hail and bird Impact resistant lattice structures will be also developed. • Joining and exchangeability join solutions…. In addition welding technologies for joining of Titanium micro perforated sheet to internal additive manufactured structure will be developed. AED will take responsibility in the design of the proposed solution. Research for new materials and analysis methodology (WP 1.2.): Fatigue numerical models will be validated using simple specimens of composite materials. Experimental tests will be performed on coupon specimens. The new methodology for fatigue predictive models will be compared with experimental tests using aeronautical subcomponent scale structures of composite materials. Technological demonstrator will be tested experimentally under fatigue load. A numerical methodology to predict interlaminar and intralaminar damage and fatigue life will be developed. A methodology to predict the interlaminar and intralaminar damage through cohesive elements' technique incorporating fatigue damage model will be developed. S-N curves for design of aeronautical composite subcomponents will be obatained. Analyzing the subcomponents subjected to cyclic loading and integrating the developed tools in the project and allows the generation of recommended curves for design.

FIBERTECNIC - Fibertecnic, SA	2016	10,000.00 €	Industrial objective to ensure future competitiveness	AIR TS B-1.3 - More efficient Wing technologies AIR TS B-4.1 - Roto-less tail for Fast Rotorcraft	Out Of Autoclave Technology; High Integrated Composite Structures; Complex RTM pre-forms injections; Perform conformation: Aernnova will develop a high integrate composite structure manufacture by out of autoclave technology. In order to confirm the enough maturity of the technology, some trials will be done with different geometries and materials to set up the process. Activities developed under the scope of: - Project FLEXAROCELL - CIEN-2016 CDTI (pending approval)
COASAS - Componentes Aeronáuticos COASA, SA	2016	10,000.00 €	Industrial objectives to ensure future competitiveness	AIR TS B-1.3 - More efficient Wing technologies AIR TS B-4.1 - Roto-less tail for Fast Rotorcraft	Out Of Autoclave Technology; High Integrated Composite Structures; Complex RTM pre-forms injections; Perform conformation: Aernnova will develop a high integrate composite structure manufacture by out of autoclave technology. In order to confirm the enough maturity of the technology, some trials will be done with different geometries and materials to set up the process. Activities developed under the scope of: - Project FLEXAROCELL - CIEN-2016 CDTI (pending approval)
ICSA - Internacional de Composites, SA	2016	50,000.00 €	Industrial objectives to ensure future competitiveness	AIR TS B-1.3 - More efficient Wing technologies AIR TS B-4.1 - Roto-less tail for Fast Rotorcraft	Out Of Autoclave Technology; High Integrated Composite Structures; Complex RTM pre-forms injections;Perform conformation: Aernnova will develop a high integrate composite structure manufacture by out of autoclave technology. In order to confirm the enough maturity of the technology, some trials will be done with different geometries and materials to set up the process. Activities developed under the scope of: - Project SAVE – PID CDTI (pending approval) - Project E-Multidrill ESIF complementary activities - (pending presentation and approval) - Project Graphene – Graphene Flagship
ITI - ITI GESELLSCHAFT FUR INGENIEURTECHNISCHE INFORMATIONSVERARBEITUNG MBH	2016	302,018.00 €	Reduction of development and rework time, Optimization of designed products to reduce fuel burn and emissions	SYS WP1.1 - Requirements Architecture SYS WP1.4 - Avionics and Platforms SYS WP100.3 - Modelling and Simulation Tools SYS WP3.4 - Innovative electrical Wing Demonstration SYS WP5 - Electrical Chain SYS WP6.4 - Integrated Demonstration and Validation	Virtualisation and Integration of Design Processes: Reduction of development and rework time, Optimization of designed products to reduce fuel burn and emissions. Performance of numerical calculation of large heterogen system models, interoperability and model exchange, integration of product lifecycle management methods, fault augmentation to support novel, automated test methods (virtual test and certification); Relevance to CS programmes: links are in all IADPs and ITDs at various levels; impact to CS and CS2 are finally found in the field of environmental benefits (noise and CO2 reduction), in particular by efficiency and productivity increase
Finmeccanica Ltd (Helicopter division) AW-Ltd -	2016	6,000,000.00 €	Competitiveness Reduction of CO2 emissions Speeding up the development of cleaner air transport technologies for earliest possible deployment. Increasing aircraft fuel efficiency. Reducing aircraft NOx and noise emissions.	CS1 GRC - WP1 Innovative Rotor Blades CS2 FRC - WP1.2 NGCTR Air Vehicle Design and Development	TiltRotor Aerodynamics: Optimisation of tiltrotor external aerodynamics: Aeromechanics of tiltrotor to provide weight-to-drag ratio improvement TiltRotor Proprotor: Development of advanced proprotor blades and flight control system for next generation tilrotor application Active Rotor Control: Development of active rotor control technology

Finmeccanica S.p.A (Helicopter division) - ex AW Spa	2016	450,000.00 €	Speeding up the development of cleaner air transport technologies for earliest possible deployment	CS2 FRC - WP1.2 NGCTR Air Vehicle Design and Development	Tiltrotor Flight Control: Cockpit flight control system to improve the handling qualities of a tiltrotor
AKIRA - Akira Technologies SARL	2016	40,000.00 €	Competitiveness Enable a technological leap in the face of emerging competitors	ENG WP3 - Business aviation / short range Regional TP Demonstrator	Test rigs Power regulation and monitoring. Relevance to CS programmes: links are in ENGINE ITD at various levels; impact to CS2 is found in the field of environmental benefits, efficiency increase, integrated and large scale validation and demonstration activities.
GEDE - General Electric Deutschland Holding GmbH	2016	1,584,500.00 €	Reduction of CO2 emissions	ENG WP8 - Reliable and more efficient operation of small turbine engines ENG WP2 - WP2.4.1 – Turbine Vane Frame FRC Mobility Discovery	◘ ENG TURN: TVF aero design study The AA integrates what done in the WP2.4.1 through a more comprehensive investigation of TVF aero designs for the UHBR architecture w/o constraints given by the current UHPE layout (e.g. HPT outlet conditions). ◘ FRC MOBILITY DISCOVERY: HSIS and Prop GBX Module Development 1) A mechanical test rig and the associated measurement and control electronics has been updated, and comissioned. 2) Novel technology evaluation for improving the performance of the current technology standard were performed. Relevance to CS programmes: 1) The torque test rig serves the base for the future evaluation of the novel torque sensor for RotorCraft GBXs. 2) The results of the technology development outside of CS2 have greatly impacted the decided system design and the technology roadmap for the novel torque sensor for RotorCraft GBXs. This work helped to choose a robust design that can meet the demanind requirements of this application (with respect to accuracy, high operating temperatures, and high reliability). ◘ ENG MAESTRO: Compressor rig test facility HW upgrade The upgraded rig will serve to increase the test scope of the HPC aero design in WP8.3 from axial stage testing (as in the initial proposal) to the complete compressor (axial + radial). This will provide additional insights wrt performance, ax/rad aero & aero-mechanical matching, stability limits and applicable OPR range for the design.

UMBRA - Umbra Cuscinetti Spa	2016	581,423.30 €	Reduction of CO2 emissions	REG WP2 Technologies development - EMA (Electro-Mechanical Actuation) - WP2.4.2 REG WP3 Demonstrations - WP3.1 Air Vehicle Technologies – Flying Test Bed#1 (FTB1) - Highly Efficient Low Noise Wing Design for Regional Aircraft WP3.4 Iron Bird WP3.5 Integrated Technologies Demostrator for Turboprop Flying Test Bed #2 (FTB2) - Innovative Future Turboprop Technologies for Regional Aircraft - High Lift Advanced Turboprop	Technical and technological enhancement of UMBRA's EMAs for the improvement of their performance. Systems and equipment (actuation systems); Research for new materials and advanced manufacturing processes. The RTD projects under implementation by UMBRA Cuscinetti refer to the design, prototyping and test of new solutions for EMAs in order to increase their performance and reliability. The solutions experimented are in line with the achievement of goals such as the aircrafts' global decrease of weight, the reduction of the volume of their devices and - as a consequence - also the betterment of the operative costs and the improvement of environmental performance. The innovations to be tested in the EMAs refer to both the product features and the production process; among them, for instance: – the introduction of elliptical shafts, allowing to simplify the EMA structure and therefore to save space, to use a minor number of components and to reduce the production costs. – the automation of the production process through the introduction of robotized devices and machines, leading to the reduction of the production costs, together with a parallel increase in the products reliability (improved traceability, better integration between the personnel know-how and machine/robot precision). Power generation by the conversion of motion from linear to rotational, by using the ball-screw technology. Systems and equipment (actuation systems); Advanced energy management. A further RTD activity under implementation is aimed at generating power by converting linear motion into rotational. Also in this case, the technology for energy generation/conversion is based on Umbra's Ball Screws. Two main types of applications are being studied for the design of energy converters based on Ball Screws: 1) The energy recovery / regeneration from the automotive components (shock absorbers, breaks) 2) The power conversion from renewable energy sources, especially waves (wave energy converters) The gained knowledge on energy regeneration through EMA especially as for the first type of application – can be exploited also in the aeronautics sector, for instance by providing EMAs with the additional functionality of recovering energy during specific phases of EMA operation
AA - GE AVIO SRL	2016	1,998,000.00 €	Reduction of CO2 and NOX emiss	ENG WP8.2 - Low Noise Propulsive System ENG WP8.4 - Advanced Combustor Technology	Technologies for advanced small turbo-prop combustor and Reduction Gear Box (RGB) validation. Relevance to CS programmes: Links are in the ENGINE ITD WP8. Impact to CS2 are found in the field of environmental benefits (CO2 and NOx reduction), efficiency, integrated and module validation and demonstration activities.
DMP - Desarrollos Mecánicos de Precisión S.L	2016	75,000.00 €	Accelerate the progress towards the ACARE SRIA goals for 2020-2050; -Enable a technological leap in the face of emerging competitors; -Accelerate the adoption of new technology into the global fleet D211	ENG WP3 - Business aviation / short range Regional TP Demonstrator	Vibration Health & Reliability Monitoring (VHRM) This project aims to validate a new approach for VHM strategies by incorporating new failure modes (such as misalignment, assembly and manufacturing errors) into reliability models and new sensor technologies. Relevance to CS programmes: links are in ENGINE ITD and FAST ROTORCRAFT IADP at various levels; impact to CS2 is found in the field of environmental benefits (noise and CO2 reduction), efficiency increase, and Life Cycle Assessment and demonstration activities.

MAGNAGHI - Magnaghi Aeronautica Spa	2016	440,680.40 €	CO2 and Fuel Burn: -20% to -30% (2025 / 2035) Up to 15% of fuel efficiency improvement vs 2014 reference air vehicles Up to 10% of reduction of total operating costs vs 2014 reference air vehicles	REG WP2.3.2 - Electrical Landing Gear System (E-LGS)	Development of an advanced system of technologies for an innovative landing gear of a regional transport aircraft having the following objectives • Definition and validation of components and solutions cinematic and dynamic for the landing gear and its main subsystems; • Reduced weight and cost of the Landing Gear System systems and subsystems; • Implementation of electromechanical systems for the electrical actuation of the steering system and emergency up-lock of the landing gear; • Application of new materials (composite material, titanium alloys) to structures of the landing gear; • Sensing system for the automatic determination of Weight and Balance; • Definition of test methods and simulation (Virtual Testing) for data processing and qualification; Magnaghi Aeronautica IKAA activities present several links to CS and CS2 JTIs, with a special regard to the: • Maximize aircraft safety and performance; • Reduce costs of the aircraft; • Reduction of the weight of the aircraft through the application of new materials (composite material, titanium alloys) to structures of the landing gear; • Increase the reliability and reduce development and maintenance costs through the development of innovative sensing technologies ; • Use innovative materials and technologies; • Study the need to implement environmentally friendly technologies; • Reduction of the size of system and sub-system devices at all IADP levels (regional, rotorcraft), together with a more efficient energy management, through the performance improvement of Key System components such as EMAs
GEAC - GE Aviation Czech s.r.o	2016	513,000.00 €	Up to 15% Fuel Efficiency improvement	ENG WP8 - Reliable and more efficient operation of small turbine engines	Advanced Compressor Test Rig Hardware for advanced compressor test rig outside of MAESTRO budget.
CTA - Fundación Centro de Tecnologías Aeronáuticas	2016	188,000.00 €	Improve test technology for validation of new components and systems, in order to reduce time and cost. Improve the competitiveness.	AIR B4.1.3 - OUTCOME: Rotorless Tail for Fast R/C Detailed Design, Manufacturing & Testing AIR B2.1.1 - Thermoplastics	Development and improvement of test technologies in order to be more efficient, ant to have more information about the behavior of the component under conditions similar to operation. Development and improvement of test technologies in order to reduce time and cost, ant to have more information about the behavior of the component under conditions similar to operation. For example activities in: new load application systems, IR Testing and post-processed algorithms to detect defects, accelerated fatigue test, Tensional analysis with TI. DIEMETEN is a national project supported by Spanish Government in RETOS 2015 call (exp: RTC-2015-3938-4) focus in the improvement of the design of new aeronautical components taking into account new test technologies.

MPC - Meggitt Aerospace Limited	2016	154,097.00 €	Competitiveness. Application to next generation Ultra High Bypass Ratio (UHBR) engines targeted.	AIR TS A-4.1.1.0 - Project Management AIR TS A-4.1.1.1 - MIxed Thermal Ice Protection AIR TS A-4.1.1.2 - Mechanical Intergation	The Diffusion Bonded Aero Heat Exchanger project will bring new technology to heat exchangers for aeronautical applications. The project is being undertaken by Meggitt Aerospace Ltd. Current developments and research in aeronautics will result in significantly increased demand for both recuperation and rejection of thermal energy. The project objective is to design and manufacture an aluminium, chemically etched plate, diffusion bonded, aerospace heat exchanger. The project will research advances in both etching and diffusion bonding of aluminium, and produce a novel demonstrator heat exchanger meeting aerospace requirements. Key innovations relate to methods for diffusion bonding of aluminium; increased etch depth in aluminium plate; and heat exchanger design and design methods optimised to use the new technology. The potential benefits of this technology include enabling the heat exchanger to utilise the available engine space to greater effect, and meeting the pressure and heat rejection demands of next generation aero engines.
THA - THALES AVIONICS SAS	2016	12,000,000.00 €	Competitiveness "Developing a strong and globally competitive aeronautical industry and supply chain in Europe"	SYS WP1 - Extended Cockpit	Upstream R&T and complementary developements for Extended Cockpit demonstration: Large Tactile display 15'' development MEMS acceloremeter design Head-worn display development, Synthetic Vision System development
TECNALIA - Fundación Tecnalia Research and Innovation	2016	60,000.00 €	Competitiveness	AIR TS B - High Versatility Cost Efficient AIR TS B-2.2.1.2 - More efficient wing technologies- External Wing box- Ribs	Innovative materials and manufacturing processes - Light metallic alloys with enhanced characteristics (strength, fatigue) - Hot forming - Spring-back reduction - Weigh optimization
SAAB - SAAB AB	2016	3,511,437.00 €	Improve the environmental impact of an aircraft by reducing the drag and weight and thereby increase the aircraft fuel efficiency. Improve the global competitiveness of the aeronautical industry and the supply chain in Europe	SYS WP 1 - Avionics extended cockpit AIR D2-2 - Aileron demonstrator AIR D3-2 - Door demonstrator AIR WPA 2.2 - NLF Smart Integrated Wing AIR WPA 3.1 - Multidiciplinary wing for high and low speed AIR WPA 3.3 - Innovative shape and structure	Avionics: Vision and Awareness systems Systems and equipment : High lift and actuation systems Manufacturing and automation: Research for new materials, advanced manufacturing and assembly processes Links are in AIR ITD and SYS ITD at various levels; impact to CS2 are found in the field of environmental benefits by weight and drag improvements of structure, efficiency and productivity increase, integrated demonstration activities. Impact to CS are found mainly in the field of manufacturability and integrated demonstration activities.

INTEC - Intec-Air, SI	2016	223,813.00 €	Industrial objetive to ensure future competitiveness	LPA WP 1.4 - (HLFC) _ Hibrid Laminar Flow Controlled Leading Edge for Horizontal Stabilizator	Manufacturing of LE_HLFC by Additive manufacturing. Manufacturing solution for LE_HLFC in CS2: CFRP internal structure joined to external microperfored titanium skin.// - Manufacturing solution for LE_HLFC in ADDIFLY: Titanium additive manufactured internal structure joined to external microperfored titanium skin.// These manufacturing technologies are far from market due to the current available size of AM machines, the possibilities of weight reductions and system integration makes interesting the manufacturing of a first scale (3:1) demonstrator. TRL: 4.// Future developments of additive technologies could allow in next years to manufacture a full scale flight demonstrator in CleanSky. // A 100% metallic HLFC Leading Edge demonstrator will be designed and manufactured by Selective Laser Melting.// This additive manufacturing technology will allow to integrate the maximum number of structures and systems by an optimized topologic design of the internal structure. • Vacuum systems for HLFC. • Anti-frozen systems • High lift systems • Supports for electrical systems..etc. • Static and dynamic support structures. • Innovative hail and bird Impact resistant lattice structures will be also developed. • Joining and exchangeability join solutions….// In addition welding technologies for joining of Titanium micro perforated sheet to internal additive manufactured structure will be developed.
AH-D - AIRBUS HELICOPTERS DEUTSCHLAND GMBH	2016	8,900,000.00 €	Reduction of gaseous emissions (CO2, NOx) and noise emissions. Improvement of competitivity.	GRC - continuation of activities	GRC - continuation of activities
POLITO - Politecnico di Torino – DIMEAS	2016	462,482.66 €	ASTIB is focused to contributing to the advancement of a few critical aircraft system technologies aimed at reducing the power consumption, and hence the fuel burn, (wing load alleviation and electrical actuation) up to a point to achieve the permit-to-fly for the demo flight configuration of the R-IADP Flight Test Bed#1	REG WP 2 - TECHNOLOGIES DEVELOPMENT - EMA (Electro-Mechanical Actuation) - WP2.4.2 REG WP 3 - DEMONSTRATIONS - WP3.1 Air Vehicle Technologies – Flying Test Bed#1 (FTB1) - Highly Efficient Low Noise Wing Design for Regional Aircraft - WP3.5 Integrated Technologies Demostrator for Turboprop Flying Test Bed #2 (FTB2) - Innovative Future Turboprop Technologies for Regional Aircraft - High Lift Advanced Turboprop	Systems and equipment: actuation systems Relevance to CS programmes: Contribution to integrated and large scale validation and demonstration activities

UTRC - UNITED TECHNOLOGIES RESEARCH CENTRE IRELAND, LIMITED	2016	1,136,580.00 €	Reduction of CO2 emissions Competitiveness	SYS WP100.3 - MISSION SYS WP 6.0.2 - aECS	Centre of Excellence in Cyber-Physical Systems for Aerospace Centre of Excellence in Cyber-Physical Systems for Aerospace, partially funded by the Industrial Development Agency (IDA) Ireland . Encompasses topics that are parallel to, and amplify, those under development in CS2 SYS ITD, including electronics, diagnostics and data analytics, controls, aircraft systems engineering and embedded systems.
VIOLA - Viola Consulting Srl	2016	25,000.00 €	CO2 and Fuel Burn: -20% to -30% (2025 / 2035) Up to 15% of fuel efficiency improvement vs 2014 reference air vehicles Up to 10% of reduction of total operating costs vs 2014 reference air vehicles	REG WP2 Technologies Development - EMA (Electro-Mechanical Actuation) - WP2.4.2 REG WP3 Demonstrations - WP3.1 Air Vehicle Technologies – Flying Test Bed#1 (FTB1) - Highly Efficient Low Noise Wing Design for Regional Aircraft WP3.3 Flight Simulator WP3.5 Integrated Technologies Demostrator for Turboprop Flying Test Bed #2 (FTB2) - Innovative Future Turboprop Technologies for Regional Aircraft - High Lift Advanced Turboprop	Technical assistance for strategic planning, project management and exploitation: Viola Consulting counts with the technical assistance of highly skilled consultants with more than 20 years of experience in the fields of corporate strategic planning, project management and follow-up. Technical assistance provides support to the entity's staff for CS projects implementation. In addition, it will also establish potential connections with other relevant industrial fields (eg: renewable energies, automotive and transport, etc.), where the results achieved in the CS projects framework may be transferred and exploited. Equipment and IT infrastructure for projects implementation and dissemination: Viola consulting provides itself with the necessary IT tools and infrastructure for the appropriate project implementation. This includes the update and upgrade of its hardware equipment, together with the purchase of apposite tools for project management and follow-up. Among them, the new webpage will be used as a dissemination tool for CS projects and its linked results.

LDO VEL - Leonardo Spa (Aeronautic Sector - ex Alenia)	2016	1,700,000.00 €	COUNCIL REGULATION (EU) No 558/2014 Articles 2(a), 2(b)	AIR TS B-4.3 - More Affordable Composite Fuselage AIR TS B-4.4 - AFFORDABLE LOW WEIGHT, HUMAN CENTERED CABIN REG WP2.1 - Adaptive Electric Wing REG WP2.3 - Energy Optimized Regional Aircraft REG WP3.2 - Fuselage/Cabin Integrated Ground Demonstrator	1-Brake systems “brake by wire”: Main links are with REG IADP WP 2.3.2 “Electrical Landing Gear System”. Although this parallel research activity is for a different class of a/c, synergies with CS2 REG IADP activities are related to landing gear system architecture, control system. Impacts on CS2 is in the field of environmental benefits to be achieved with a more electric a/c in terms of hydraulic removal and maintenance. 2-Defect, damage and repair techniques in the manufacturing process of large composite structures: Impact to CS2 are found in the field of efficiency and competitiveness. 3-Innovative Aeronautic Primary Structures: Main links are with AIR ITD B-4.3 “More affordable composite fuselage” and it may also contribute to CS2 Demonstration within the REG IADP WP 3.2 “Fuselage/Cabin Integrated Demonstration”. Furthermore, it contributes to the REG IADP objectives with complementary activities in the field of empennages. Impact to CS2 are found in terms of weight, production process of environmental impact and manufacturing cost reduction. 4-Eco-compatible materials and technologies, drilling, cutting and robotized assembly processes development: Main links are with REG IADP WP 2.1.1 “Innovative wing structure design and manufacturing” and AIR ITD WP B-4.3 “More affordable composite fuselage”. It may contribute also to REG IADP WP 3.2 “Fuselage/Cabin Integrated Demonstration”. Impact to CS2 are found in terms of environmental impact and manufacturing cost reduction. 5-Innovative and Advanced Methods for Certification and Verification: Main links are with REG IADP WP 2.1.1 “Innovative wing structure design and manufacturing” and AIR ITD WP B-4.3 “More affordable composite fuselage”. It may contribute also to REG IADP WP 3.2 “Fuselage/Cabin Integrated Demonstration”. Impact to CS2 are found in the field of cost reduction and increasing of competitiveness.
Total 2016	**2016**	**160,699,884 €**			
A-CE - AIRBUS SAS	2017	20,000,000.00 €	Demonstration of technologies contributing to achieve H2020 HLO / targets with respect to environment & competitiveness	LPA Airbus AA 2017-02 - LPA work packages WP1.1, WP1.4, WP1.5 and WP1.6, Airframe WP 2.2	◘ R&T and development of laminar wing manufacturing technologies for large transport aircraft: Accompanying activities as well as Research and Technology to develop the required technologies and manufacturing methods for laminar wings, not funded in Clean Sky / Clean Sky 2 ◘ Aerodynamics and Aero-loads for large transport aircraft components in large scale demonstration under operational conditions: Provide facilities, instrumentation and skilled experts for large scale demonstration on aerodynamics and aeroloads ◘ Aerodynamic performance of advanced large transport aircraft configurations in large scale demonstration under operational conditions: Provide facilities, instrumentation and skilled experts for large scale demonstration on aircraft performance ◘ Integration and performance validation and demonstration with next generation engines: Provide flight test aircraft, facilities and skilled personnel for integration and testing

ITP - Industria de Turbo Propulsores S.A.	2017	3,924,400.00 €	To contribute to improving the environmental impact of aeronautical technologies, including those relating to small aviation, as well as to developing a strong and globally competitive aeronautical industry and supply chain in Europe. This can be realised through speeding up the development of cleaner air transport technologies for earliest possible deployment, and in particular the integration, demonstration and validation of technologies capable of: (i) increasing aircraft fuel efficiency, thus reducing CO 2 emissions by 20 to 30 % compared to 'state-of-the-art' aircraft entering into service as from 2014; (ii) reducing aircraft NO x and noise emissions by 20 to 30 % compared to 'state-of-the-art' aircraft entering into service as from 2014.	ENG WP5.2.3 - IPT Material Evaluation & Development ENG WP6.1.1 - Multi-Stage IPT	Aerodynamic, thermo-mechanic and noise technologies for aircraft gas turbines: Aerodynamic, thermo-mechanic and noise technologies for the low pressure spool of VHBR engines Advanced manufacturing technologies for aircraft gas turbines: Advanced manufacturing and repair technologies for the low pressure turbine section and low pressure compressor of aircraft gas turbines Advanced materials technology for low pressure section of aircraft gas turbines: Development of new models and simulation tools for high temperature materials lifing, off-limits usage and critical manufacturing processes. Characterisation and modelling of materials for the LPC. Relevance to the CS2 objectives: the proposed activities are included within the scope of the following R&T Projecs: * FP7: E-BREAK and ENOVAL * National projects: FUTURALVE; SCALITURB; BOOSTER-2 and COLD SPRAY. * VHBR engines low pressure spool: development and validation of aerodynamic and aeroacoustic technologies for low weight and noise and high efficiency LPT. * Development and validation of LPT sealing and cooling technologies. * High speed turbines: development of new design concepts, mechanical and materials technology. * Low pressure compressor: development and validation of aerodynamic, materials mechanical and manufacturing technology for advanced low pressure compressors. FOD analysis and simulation tools. * Hot structures: development of multi parameter design optimisation tools to integrate casting and other manufacturing processes, with thermo-mechanical analysis, weight and cost. * Hot structures: development of new design criteria, new repair processes for non-weldable alloys, and models for prediction and assessment of casting defects. * Advanced manufacturing technologies for LPC integrated bladed rotors. * High speed turbines: development of casting, additive manufacturing, machining, joining and other manufacturing processes. * Repair of high temperature alloys using cold spray technology. * New models for high temperature materials behavior under complex stress/temperature loads and off-limits usage. * Modelling and assessment of weldability and castability properties of high temperature materials used for hot section structures. * Compressor materials characterization, damage tolerance analysis and material behavior under different thermo-mechanic conditions.

UMBRA - Umbra Cuscinetti Spa	2017	267,426.70 €	CO2 and Fuel Burn: -20% to -30% (2025 / 2035) Up to 15% of fuel efficiency improvement vs 2014 reference air vehicles Up to 10% of reduction of total operating costs vs 2014 reference air vehicles	REG WP2 Technologies Development - EMA (Electro-Mechanical Actuation) - WP2.4.2 REG WP3 Demonstrations - WP3.1 Air Vehicle Technologies – Flying Test Bed#1 (FTB1) - Highly Efficient Low Noise Wing Design for Regional Aircraft WP3.4 Iron Bird WP3.5 Integrated Technologies Demostrator for Turboprop Flying Test Bed #2 (FTB2) - Innovative Future Turboprop Technologies for Regional Aircraft - High Lift Advanced Turboprop	◘ Technical and technological enhancement of UMBRA's EMAs for the improvement of their performance. Systems and equipment (actuation systems); Research for new materials and advanced manufacturing processes. ◘ Power generation by the conversion of motion from linear to rotational, by using the ball-screw technology. Systems and equipment (actuation systems); Advanced energy management. Relevance to CS programmes: Umbra IKAA activities present several links to CS and CS2 JTIs, with a special regard to the reduction of the weight of the aircraft and of the size of its devices at all IADP levels (regional, rotorcraft), together with a more efficient energy management, through the performance improvement of Key System components such as EMAs. Improvements in EMAs may also lead to innovative ways of supplying energy demand inside the vehicle, eg by regeneration power in specific phases of EMA operation. This in turn would potentially allow CO2 emissions reductions. Activities may have potential impact also in the eco-design of the aeronautics systems and mechanical components, by optimizing the EMAs production process and operative costs. Projects reference: Umbra IKAA contribution is linked to two projects currently under design / implementation, both of them co-financed by Umbria Region ERDF fund for Research and Technological Innovation - PRO-EMA (Innovazione di prodotto e processo per una radicale trasformazione dell'attuazione elettromeccanica) - WE-BACK (Wave Energy BAllscrews Converter Kinematics) In both cases only the direct private contribution by Umbra Cuscinetti has been taken into account for IKAA's amount calculation.
GKN SE - GKN Aerospace Sweden AB	2017	1,490,000.00 €	Contributes towards reducing Aircraft CO2 emissions and noise. Strengthens the competitiveness of European aviation industry.	ENG WP2 - WP2 – UHPE ground demo for SMR A/C ENG WP4 - Advanced Geared Engine Configuration ENG WP5 - VHBR – Middle of Market Technology ENG WP6 - VHBR – Large Turbofan Demonstrator UltrafanTM	◘ Enoval: Development of innovative aerodynamic design of the turbine exhaust case. Validation in aerodynamic rig test. Results will be direct input to the higher TRL TEC demo in CS2 WP4. GKN own contribution. ◘ SWE DEMO MOTOR: National Program SWE DEMO MOTOR. Development of competitive manufacturing technologies for engine structures and rotors. Validation of these novel technologies by manufacturing of GKNs demonstrator parts in Clean Sky-2
LEG - LIEBHERR ELEKTRONIK GMBH	2017	1,300,000.00 €	According to development plan.	SYS WP3 - Smart integrated Wing Demonstrator	Flight Control System Technologies: Activities on System aspects and electronics. Complementary to studies and demonstration performed in SYS ITD.
DMP - Desarrollos Mecánicos de Precisión S.L	2017	475,000.00 €	-Accelerate the progress towards the ACARE SRIA goals for 2020-2050; -Enable a technological leap in the face of emerging competitors; -Accelerate the adoption of new technology into the global fleet	ENG WP3 - Business aviation / short range Regional TP Demonstrator	Vibration Health & Reliability Monitoring (VHRM): This project aims to validate a new approach for VHM strategies by incorporating new failure modes (such as misalignment, assembly and manufacturing errors) into reliability models and new sensor technologies. Relevance to CS programmes: links are in ENGINE ITD and FAST ROTORCRAFT IADP at various levels; impact to CS2 is found in the field of environmental benefits (noise and CO2 reduction), efficiency increase, and Life Cycle Assessment and demonstration activities.

LTS - LIEBHERR AEROSPACE TOULOUSE SAS	2017	1,980,000.00 €	To secure key technologies enabling the major demonstrations to reach their objectives. The systems developed will act as enablers for game changing aircraft configurations such as More Electric Aircraft and Bleedless Engines. These configurations will significantly reduce the environmental impact and the operating costs of future aircrafts.	SYS WP5.3 - Power Management for Large A/C SYS WP6 - Major Loads SYS WP6.1 - Electrical air system and thermal management SYS WP6.2 - Ice protection system LPA WP1.5 - Applied technologies for enhanced aircraft performance	Pressurization System (CORAC AME – French national program): Architecture study for bizjet with IMA2G environment. Development of Pressurisation Demonstrator. Complementary activity to SYS ITD WP6 on Electrical system and thermal management Wing Ice Protection System (GENOME and CORICE French National program): Improvement of technological bricks for WIPS for large aircraft (heating mats, monitoring...) Lightning strike impact on electro-thermal WIPS Numerical simulation model development Complementary activity with SYS ITD WP6.2 ice protection system Air quality (AIRCLEAN – French national program): Development of technology for ozone and VOCs conversion for bleed less applications. Complementary activity with SYS ITD WP6.4 Cabin comfort Power management (POW'AIR, French national project): Optimization of thermal and electrical architectures with focus on coupling aspects. Finalisation of test on GETI platform, and adaptation of GETI platform for POWAIR Complementary activity with SYS ITD WP5 Power management Centre + WP 6.1 - Electrical air system and thermal management and 6.4 integrated demonstration and validation NOVA: High temperature Valve - complementaray activity with LPA Platform1 WP 1.5 Applied technologies for enhanced aircraft performance Relevance to the CS2 objectives : Research and Technology development of architectures, technology bricks and other enablers for: - Vapour cycle System - Air Quality - Wing Ice Protection Systems - Power Management - Electrical Environment Control System - Pressurization System - Control and Power Electronics - Innovative Manufacturing Liebherr will rely on Additional Activities content to secure key technologies enabling the major demonstrations to reach their objectives. The systems developped will act as enablers for game changing aircraft configurations such as More Electric Aircraft and Bleedless Engines. These configurations will significantly reduce the environmental impact and the operating costs of future aircrafts.
DAV - DASSAULT AVIATION	2017	4,500,000.00 €	To contribute to improving the environmental impact of aeronautical technologies as well as to developing a strong and globally competitive aeronautical industry and supply chain in Europe (increasing fuel efficiency)	AIR TS A-1 - Innovative Aircraft Architecture AIR TS A-2 - Advanced Laminarity AIR TS A-3 - High Speed Airframe AIR TS A-4 - Novel Control AIR TS A-5 - Novel Travel Experience	Multidisciplinary Aircraft design and aircraft certification process using numerical tools: Impacts to CS2 are weight-to-drag ratio improvements (lift-to-drag ratio, definition and evaluation of laminarity profiles (wing and nacelle), architecture optimisation Design criteria for innovative architecture using composite materials, aeroelasticity design and optimization tools: Impacts to CS2 are weight-to-drag ratio improvements (new materials, architecture optimisation) New manufacturing process: Weight to drag, ratio improvement, efficiency and productivity increase. Alternate ideas to CS2 development for eco design New cabin layouts concepts : Alternate ideas to CS2 concepts and technology for business Jet Cabin.

SAAB - SAAB AB	2017	2,677,000.00 €	Improving the environmentally impact of aeronautical technologies and improve the global competitiveness of the industry sector in Europe	SYS WP1 - Avionics extended cockpit AIR D2-2 - Aileron demonstrator AIR D3-2 - Door demonstrator	Automation: Research for increased productivity and manufacturability Manufactoring: Research for advanced manufacturing and assembly processes Flight Management Systems: HUD Systems, Vision and Awareness studies in rigs and simulators Actuation: Electrically powered Control & Actuation activities Relevance to the CS2 objectives : Links are in AIR ITD and SYS ITD at various levels; impact to CS2 are found in the field of environmental benefits by weight and drag improvements of structure, efficiency and productivity increase, and improved situational awareness for the pilot for safer and more environmentally-friendly air transports.
INTEC - Intec-Air, SI	2017	240,711.00 €	Industrial objective to ensure future competitiviness.	LPA WP 1.4 - (HLFC) _ Hibrid Laminar Flow Controlled Leading Edge for Horizontal Stabilizator	Manufacturing of LE_HLFC by Additive manufacturing. Technological back-up and possible future alternative solution to be applied on demonstrator WP 1.4 (HLFC) of CS2.
ACI - Aernnova Composites Illescas, SA	2017	60,000.00 €	Industrial objective to ensure future competitiveness. (ITD – AIRFRAME - B - High Versatility Cost Efficient)	AIR TS WP B-4.1.3 - OUTCOME – Rotorless Tail for Fast R/C Detailed Design, Manufacturing & Testing AIR TS WP B-1.3.1 - WP B-1.3.1 - More efficient Wing technologies	Out Of Autoclave Technology. High Integrated Composite Structures – cocured processes. Complex RTM pre-forms injections. Perform conformation. Automation manufacturing proceses.
ICSA - Internacional de Composites, SA	2017	40,000.00 €	Industrial objective to ensure future competitiveness. [ITD – AIRFRAME - B - High Versatility Cost Efficient]	AIR TS WP B-1.3.1 - More efficient Wing technologies AIR TS WP B-4.1.3 - Rotor-less tail for Fast Rotorcraft	Out Of Autoclave Technology. High Integrated Composite Structures. Complex RTM pre-forms injections. Perform conformation. Automation manufacturing proceses. Cocured processes. New materials implementation.
FIBERTECNIC - Fibertecnic, SA	2017	5,000.00 €	Industrial objective to ensure future competitiveness. [ITD – AIRFRAME - B - High Versatility Cost Efficient]	AIR TS WP B-1.3.1 - More efficient Wing technologies AIR TS WP B-4.1.3 - Rotor-less tail for Fast Rotorcraft	Out Of Autoclave Technology for High Integrated Composite Structures with Complex RTM pre-forms developing new automated technology for Perform conformation
COASAS - Componentes Aeronáuticos COASA, SA	2017	10,000.00 €	Industrial objective to ensure future competitiveness. [ITD – AIRFRAME - B - High Versatility Cost Efficient]	AIR TS WP B-1.3.1 - More efficient Wing technologies	Development of New Composite Manufacturing Process. Automatization Manufacturing Process. High Integrated Composite Structures. Cocured processes

AED - Aernnova Engineering Division, SA	2017	275,923.00 €	Industrial objectives to ensure future competitiveness	LPA WP 1.2 - Rear End LPA WP 1.4 - HLFC	◘ Design and Manufacturing of LE_HLFC by Additive manufacturing Relevance to CS programmes: Technological back-up and possible future alternative solution to be applied on demonstrator WP 1.4 (HLFC) of CS2. - Design solution for LE_HLFC in CS2: - Manufacturing solution for LE_HLFC in CS2: • CFRP internal structure joined to external microperfored titanium skin. - Manufacturing solution for LE_HLFC in ADDIFLY: • Titanium additive manufactured internal structure joined to external microperfored titanium skin. Even that these manufacturing technology is far from market due to the current available size of AM machines, the possibilities of weight reductions and system integration makes interesting the manufacturing of a first scale (3:1) demonstrator. TRL: 4 Future developments of additive technologies could allow in next years to manufacture a full scale flight demonstrator in CleanSky. A 100% metallic HLFC Leading Edge demonstrator will be designed and manufactured by Selective Laser Melting. This additive manufacturing technology will allow to integrate the maximum number of structures and systems by an optimized topologic design of the internal structure. • Vacuum systems for HLFC. • Anti-frozen systems • High lift systems • Supports for electrical systems..etc. • Static and dynamic support structures. • Innovative hail and bird Impact resistant lattice structures will be also developed. • Joining and exchangeability join solutions…. In addition welding technologies for joining of Titanium micro perforated sheet to internal additive manufactured structure will be developed. AED will take responsibility in the design of the proposed solution. ◘ Research for new materials and analysis methodology (WP 1.2.) Fatigue numerical models will be validated using simple specimens of composite materials. Experimental tests will be performed on coupon specimens. The new methodology for fatigue predictive models will be compared with experimental tests using aeronautical subcomponent scale structures of composite materials. Technological demonstrator will be tested experimentally under fatigue load. A numerical methodology to predict interlaminar and intralaminar damage and fatigue life will be developed. A methodology to predict the interlaminar and intralaminar damage through cohesive elements' technique incorporating fatigue damage model will be developed. S-N curves for design of aeronautical composite subcomponents will be obatained. Analyzing the subcomponents subjected to cyclic loading and integrating the developed tools in the project and allows the generation of recommended curves for design.
TECNALIA - Fundación Tecnalia Research and Innovation	2017	73,400.00 €	ITD – AIRFRAME - B - High Versatility Cost Efficient	AIR TS WP B-2.2.1.2 - EXTERNAL WING BOX. RIBS WP 4 RIBS AIR TS WP B-4.1.3 - OUTCOME – Rotorless Tail for Fast R/C Detailed Design, Manufacturing & Testing	Innovative materials and manufacturing processes: Innovative materials and manufacturing processes: - Light metallic alloys with enhanced characteristics (strength, fatigue) - Hot forming - Spring-back reduction - Weigh optimization - Out of autoclave manufacturing

CTA - Fundación Centro de Tecnologías Aeronáuticas	2017	112,000.00 €	Improve test technology for validation of new components and systems, in order to reduce time and cost. Improve the competitiveness.	AIR TS WP B-2.1.1 - Thermoplastics AIR TS WP B-4.1.3 - OUTCOME: Rotorless Tail for Fast R/C Detailed Design, Manufacturing & Testing	Development and improvement of test technologies in order to be more efficient, ant to have more information about the behavior of the component under conditions similar to operation. Development and improvement of test technologies in order to reduce time and cost, ant to have more information about the behavior of the real component under conditions similar to operation. To be applied in CS2.
LLI - LIEBHERR AEROSPACE LINDENBERG GMBH	2017	3,000,000.00 €	Acc. Development Plan.	SYS WP3 - Smart Integrated Wing Demonstrator	Landing Gear System: Activities complementary to SYS ITD WP4 and LPA IADP WP2.3 on System Architecture, Structure and Materials, and Optimisation of critical components. Flight Control System Technologies: Activities on System aspects and electronics. Complementary to studies and demonstration performed in SYS ITD.
AKIRA - Akira Technologies SARL	2017	120,000.00 €	Enable a technological leap in the face of emerging competitors;	ENG WP 3.3 - Business aviation / short range Regional TP Demonstrator	Test rigs Power regulation and monitoring. Relevance to CS programmes: links are in ENGINE ITD at various levels; impact to CS2 is found in the field of environmental benefits, efficiency increase, integrated and large scale validation and demonstration activities.
GEDE - General Electric Deutschland Holding GmbH	2017	850,000.00 €	ENG MAESTRO: Contribute to CO2 emission reductions through higher OPR. ENG TURN: Reduce CO2 emissions. FRC MOBILITY DISCOVERY: Aligns CS2 goals as given in: http://www.cleansky.eu/content/page/challenges-under-h2020	ENG WP2.4.1 – Turbine Vane Frame ENG WP8.3 - Compressor. Reliable and more efficient operation of small turbine engines FRC Mobility Discovery	◘ ENG TURN: TVF aero design study: The AA integrates what done in the WP2.4.1 through a more comprehensive investigation of TVF aero designs for the UHBR architecture w/o constraints given by the current UHPE layout (e.g. HPT outlet conditions). ◘ FRC MOBILITY DISCOVERY: HSIS AND PROP GBX MODULE DEVELOPMENT: 1) Mechanical test rig and the supporting infrastructure is being maintained, safety checked, and upgraded. 2) Novel technology evaluation for improving the performance of the current technology standard were performed. Relevance to CS programmes: 1) The torque test rig serves the base for the future evaluation of the novel torque sensor for RotorCraft GBXs. 2) The results of the technology development outside of CS2 will input relevant data for the torque sensor for RotorCraft GBXs, especially when it comes to understand reproducibility and accuracy at different operating conditions and shafts. ◘ ENG MAESTRO: COMPRESSOR RIG TEST FACILITY HW UPGRADE: The upgraded rig will serve to increase the test scope of the HPC aero design in WP8.3 from axial stage testing (as in the initial proposal) to the complete compressor (axial + radial). This will provide additional insights wrt performance, ax/rad aero & aero-mechanical matching, stability limits and applicable OPR range for the design.

CASA - AIRBUS DEFENCE & SPACE SAU	2017	8,620,715.00 €	- Increasing Aircraft Fuel Efficiency, reducing C02 emissions - Competitiveness (lower life cycle costs, lower recurrent costs)	AIR TS WP B-1 - Next Generation Optimized Wing AIR TS WP B-2 - Optimized High Lift Configurations AIR TS WP B-3 - Advanced Integrated Structures REG WP 3.5 - Integrated Technologies Demonstrator FTB2 LPA WP3.1.2 - Functions for Efficient and easy systems management LPA WP3.4 - Active Cockpit	Activities for innovative manufacturing and integration activities to reduce operating and lifecycle costs. The project activities will mainly contribute to : Innovation in CFRP elementary parts manufacturing processes key to lower aero structures recurring cost Innovation in manufacturing processes to improve composite materials mechanical properties at high operation temperatures Innovation in Systems integration to lower operating and life cycle costs Innovation in Systems architecture to lower fuel consumption and CO2 emissions Cockpit technologies maturation
ACIENG - ACITURRI ENGINEERING SL	2017	102,173.93 €	Activity aligned with the CS2 HLOS, focusing in particular in the C02 and NOx reduction via the reduction of weight in aircraft components. HAZITEK project would perform particular investigation in innovative adhesive joints concepts with the ultimate objective of eliminating the use of any kind of fasteners and thus reducing weight. This activity is closely linked (and would benefit from running in parallel) to the bonded joint innovation introduced by ACITURRI in EWIRA project but focusing on different CFRP manufacturing technologies (RTM instead of ATL/manual lay-up), and different metal part geometries (skins instead of fittings). Therefore the activity presented expands the overall bonded joint research done by EWIRA. Positive outcome of this activity would enable easier integration of other innovative technologies which improve aerodynamic performance.	REG WP3.5.1 - TECHNOLOGIES FOR FTB#2 WING INTEGRATION	HAZITEK: Innovative bonded joint solutions between metal and composite materials. This activity is complementary to the one developed at EWIRA as the metal part has a different geometry and the composite part produced under a different manufacturing technology. It is important to highlight that the success in the development of this particular kind of joint could enable the integration of further improvements for the a/c in the aerodynamic field such as the HLFC technology. This activity and it outputs should be considered as confidential due to potential commercial exploitation reasons. HAZITEK activity considers the following work packages: WP1: Definition of the hybrid joint between a titanium skin and a composite part manufactured under RTM technology. Would be used, as reference for exploitable application of this joint, in a leading edge structure of the vertical plane surface of a large airliner. This WP includes the definition of tests (at coupon level) to validate the adhesive joint properties, and the subsequent DFEM model of it. Support to manufacturing of the metal and composite parts and the surface treatment is also considered. WP2: Will be devoted to the manufacturing of the adhesive joint coupons. WP3: This package is devoted to the final assembly of the tests coupons and its actual testing. WP4: Considers the documentation of the project including test plan and reports and final DFEM adhesive model and GFEM leading edge model.

GEVEN - GEVEN SPA	2017	155,000.00 €	Intelligent sustainable and integrated transport system: developmemt of innovative multifunctional materials to be integrated in the thermo acustical blankets, subsequent CO2 reduction, and confortable acustic increase of the passengers.	AIR TS WP B-4.4.6 Cabin systems design toward passenger wellbeing	Thermo-acoustic solutions and materials for air transport R&D project under the Italian national programme "Fondo Crescita Sostenibile PON HORIZON 2020"
UNINA - Università degli Studi di Napoli Federico II	2017	35,000.00 €	This research project is dedicated to study advanced manufacturing process to apply at the thermoacoustic material devoted to reduce the CO2 emission.	AIR WP 2	ACT01: Manufacturing of the facilities and equipment to perform a campaign of tests dedicated to define the demonstrators in advanced material with the aim to reduce the CO2 emission.
RR - ROLLS ROYCE Plc	2017	57,000,000.00 €	Up to 23% fuel burn and CO2 emission reduction relative to year 2000 baseline (consistent with 10% reduction relative to year 2014 baseline) Noise levels making a significant step towards to ACARE 2035 targets (- 11 EPNdB per operation relative to 2000 situation) Contribute to delivery of NOX emission reductions through reduced fuel burn and lean burn technology.	ENG WP 5 - VHBR Middle-of-Market Demonstrator ENG WP 6 - VHBR Large Turbofan Demonstrator	Composite Fan development: Other enabling technologies such as the composite fan, journal bearing and variable area nozzle will be developed in parallel to the Clean Sky 2 programme. Power gearbox technology development and testing: The power gearbox is a critical element of the UltraFan architecture and although some of the elements of this development is within the scope of Clean Sky 2, some design activities, and most of the testing and validation work, including the development of supporting (but critical) technologies such as the health monitoring of the power gearbox, will be developed outside the Clean Sky 2 programme and supported by national as well as private venture funding. Journal Bearings development: Other enabling technologies such as the composite fan, journal bearing and variable area nozzle will be developed in parallel to the Clean Sky 2 programme. Assembly and test resource, including hardware (e.g. tooling, instrumentation, etc.): Specifically for Advance3, the additional activities will be focused on the design and validation of the fan, compressor, turbine, power transmission and control systems that will ultimately be integrated and tested as part of the Clean Sky 2 programme. Lean Burn combustion system: The Lean Burn combustion system is integral to the Advance3 core, which in turn, will be the core powering the UltraFan™ engine. The Lean Burn combustion system still requires a number of tests to be performed in order to achieve TRL 6. Links are in the ENGINES ITD WP5 and WP6. Both the Advance3 and UltraFan programmes require the integration of a large number of complimentary activities (including the Lean Burn combustion system) to deliver the necessary design, technologies and hardware in order for them to meet the performance targets envisaged. Overall, the integration of these technologies as a demonstrator under the Clean Sky 2 programme will deliver improved engine noise performance, reduction of NOx emissions and improved fuel efficiency.

THA - THALES AVIONICS SAS	2017	1,500,000.00 €	Environmental Benefits European Competitiveness	SYS WP1 - Extended Cockpit	FMS open architecture and Cockpit HMI interface: FMS : analysis, trade off and initial development of 'open core architecture' Flight Management System. HMI : analysis, trade off and initial development of new HMI concepts and interface protocole to core avionics functions. Relevance to CS Programme: FMS : analysis, trade off and initial development of 'open core architecture' Flight Management System. Rational : The acceleration of function introduction and the new capacities of open world tablets in the cockpit require a new capacity of FMS to receive request about flight/plan trajectory predcition and to accepts new inputs from external application - to provide pilots with a seamless experience between their open world tools and the avionics. Continued in 2018 - Complementary t oFMS functional upgrades developed in CS2 HMI : analysis, trade off and initial development of new HMI concepts and interface protocole to core avionics functions. Rational : new interaction concepts (including tactile), tend to provide crew with a 'task oriented' HMI, as opposed to today's 'system oriented', which is based on A661 standard. Typical new interfaces will provide on same object interfaces to elements managed by different functions, segregated by avionics constraints. This requires a new developement of HMI and new interface protocoles. Continued in 2018. Complementary to CS2 function developement and tactile displays prototypes
UNOTT - The University Of Nottingham	2017	2,000,000.00 €	Reduction of emissions - the rig will be used for testing aero-engine components that will contribute to lowering Co2 and NOx emmissions resulting from fuel burn efficientices gained due to novel bearing chamber and gearbox designs as an output from WP5.6 ENG ITD.	ENG UNOTT IKAA 2017 - Two shaft rig for aero-engine tests ENG WP5 - VHBR Middle of Market Demonstrator	Procurement of equipment: Equipment procured for the rig set up including jigs, fixtures, instrumentation and other supporting features. Relevance to CS Programme: UNOTT has secured funding from the Aerospace Technology Institute to establish a two shaft engine test facility for gas turbine transmission systems. Part of this facility will be used to perform the testing activities in WP5.6.3 and the rig that is central to this facility will be used to test real-engine parts should UNOTT's proposal for Complementary Activities submitted in the original proposal be endorsed by the Engines ITD and CSJU.

SAF - SAFRAN SA	2017	37,850,000.00 €	To contribute to improving the environmental impact of aeronautical technologies, including those relating to small aviation, as well as to developing a strong and globally competitive aeronautical industry and supply chain in Europe.	ENG WP 2 - UHPE ground test Demonstrator LPA WP 1.1.3 - CROR flight test demo	◘ Open Rotor & UHBR: Demo Open Rotor final acceptance and ground test Open rotor configuration aeroacoustics testing Compressor and Fan modules design with test campaign Combustor test campaign Cowling subsystems studies and novel integration for equipment integration Combustion modelling and studies Turbine combustor interaction activities Power Gear Box technologies maturation UHBR fan and nacelle reduced scale models for tests purpose Relevance to CS programmes: All the activities listed above are needed to support the CROR engine in order to have the right technologies available to be tested and in a second hand to mature the technologies for the UHBR target engine such Power Gearbox technology , Fan & Compressor , Combustor and Subsystems like cowling. ◘ Booster: High speed Booster aerodynamics New abradable for high speed booster Rotor and blades vibration Booster casing and radial clearances Anti-Ice and Ice crystals Booster ingestions High speed Booster specific technologies maturation: VSV technologies, bearing support,… Oil equipment maturation for UHBR (Oil tank, pump, vanes, heat exchangers) Relevance to CS programmes: All the activities listed above are needed to support in one hand the UHPE ground demonstrator in order to have the right technologies available to be tested and in a second hand to mature the technologies for the UHBR target engine.
ITI - ITI GESELLSCHAFT FUR INGENIEURTECHNISCHE INFORMATIONSVERARBEITUNG MBH	2017	405,000.00 €	Reduction of development and rework time, Optimization of designed products to reduce fuel burn and emissions	SYS WP1.1 - Requirements Architecture SYS WP1.4 - Avionics and Platforms SYS WP100.3 - Modeling and Simulation Tools SYS WP3.4 - Innovative electrical Wing Demonstration SYS WP5 - Electrical Chain SYS WP6.4 - Integrated Demonstration and Validation	Virtualisation and seamless Integration of Product Design Processes and Operations: interoperability and model exchange within a diversified tool landscape, integration of model based product lifecycle management methods, components fault and wear augmentation to support and enable novel, automated test methods (virtual test and certification) as well as model predicitive maintainance and health monitoring techniques. Relevance to CS programmes: links are in all IADPs and ITDs at various levels; impact to CS and CS2 is finally found in terms of environmental benefits (noise and CO2 reduction), in particular by increase of reliability, durability, efficiency and productivity

ELEMENT SEVILLE - ELEMENT MATERIAL TECHNOLOGY SEVILLE SL (ex TEAMS - Testing and Engineering of Aeronautical Materials and Structures S.L.)	2017	222,953.18 €	The main objective of the project is the development of a test system able to perform static and dynamic test son large fuselage curved panels under different loading modes combined between them (tension, compression, shear) and able to pressurize the interior of the curved panels while testing. The project contributes to the Core Partner, Clean Sky 2 project “SHERLOC”: Structural health monitoring, manufacturing and repair technologies for life management of composite fuselage. It adds its capacity to test the large curved panels of fuselage that are planned to be tested at SHERLOC project. The execution of this project contributes to the objectives of Clean Sky 2 JU applying its results to the components developed by AIRFRAME and adding useful knowledge for performing the TRL jump expected in the technologies that AIRFRAME is developing.	AIR TS B-4 - Advanced Fuselage	CURVED PANEL TEST MACHINE: PROTOTYPE DESIGN & MANUFACTURING This activity is in charge of the design and manufacturing of the real scale protoype. It started in 2016 with concept solution selection, preliminar and final design including drawings and continues in 2017 with: WP2.3 - Final design WP2.4 - Bill of materilas & purchase (continues in 2018) AUTOMATED INTERLAMINAR FRACTURE TOUGHNESS TEST SYSTEM This additional activity involves different tasks: 1. State of the art and development of test procedure. 2. Development of automated Digital Image Correlation System in order to perform the tracking of crack growth. 3. Test Set up. Incorporating design, manufacturing and assembly tasks needed for obtaining the custom the test rig. 4. Validation of automatic system developed including validation tests and analysis of results. 5. Management of activity and its outcomes.

POLITO - Politecnico di Torino – DIMEAS	2017	290,926.00 €	ASTIB is focused to contributing to the advancement of a few critical aircraft system technologies aimed at reducing the power consumption, and hence the fuel burn, (wing load alleviation and electrical actuation) up to a point to achieve the permit-to-fly for the demo flight configuration of the R-IADP Flight Test Bed#1	REG WP2 Technologies Development - EMA (Electro-Mechanical Actuation) - WP2.4.2 WP3 Demonstrations - WP3.1 Air Vehicle Technologies – Flying Test Bed#1 (FTB1) - Highly Efficient Low Noise Wing Design for Regional Aircraft WP3.5 Integrated Technologies Demostrator for Turboprop Flying Test Bed #2 (FTB2) - Innovative Future Turboprop Technologies for Regional Aircraft - High Lift Advanced Turboprop	Systems and equipment: actuation systems: Relevance to CS programmes: Contribution to integrated and large scale validation and demonstration activities
AH-D - AIRBUS HELICOPTERS DEUTSCHLAND GMBH	2017	21,700,000.00 €	Reduction of gaseous emissions (CO2, NOx) and noise emissions. Improvement of competitivity.	GRC - continuation of activities	GRC - continuation of activities
MTU-D - MTU AERO ENGINES AG	2017	6,895,008.30 €	NA	ENG WP4.2 - Integrated Compression System ENG WP4.3 - Compressor Rig Tests ENG WP4.4 - Integrated Expansion Systsem ENG WP4.5 - Engine Demonstrator Test	Development of component technologies for efficiency improvement: Development of technologies to be inserted in compressor and engine demonstrator

LDO VEL - Leonardo Spa (Aeronautic Sector - ex Alenia)	2017	2,800,000.00 €	COUNCIL REGULATION (EU) No 558/2014 Article 2(a) - COUNCIL REGULATION (EU) No 558/2014 Article 2(b), for the part related to competitiveness of aeronautical industry and supply chain in Europe.	AIR B-4.3 - More Affordable Composite Fuselage REG WP1 - High efficiency Regional Aircraft REG WP2.1.1 - Adaptive Electric Wing: Innovative Wing Structure D&M WP2.3.2 - Energy Optimized Regional Aircraft: Electrical Landing Gear System (E-LGS) WP3.1 - Adaptive Wing Integrated Demonstrator (FTB#1 and OWB). WP3.2 - Fuselage/Cabin Integrated Ground Demonstrator	1 - Composite materials with low cost (design and construction) Main links are with REG IADP WP 2.1.1" Innovative wing structure design and manufacturing" and AIR ITD WP B-4.3 "More affordable composite fuselage". Application of innovative materials and low-cost manufacturing and assembly process may contribute also to CS2 demonstration within REG IADP WP 3.2 "Fuselage/Cabin Integrated Demonstration" and WP 3.1 for the OWB ground demonstrator. Impact to CS2 are found in the field of efficiency and productivity increase. 2 - Brake systems "brake by wire" Main links are with REG IADP WP 2.3.2 "Electrical Landing Gear System". Although this parallel research activity is for a different class of a/c, synergies with CS2 REG IADP activities are related to landing gear system architecture, control system. Impacts on CS2 is in the field of environmental benefits to be achieved with a more electric a/c in terms of hydraulic removal and maintenance. 3 - Defect, damage and repair techniques in the manufacturing process of large composite structures Main links are with REG IADP WP 2.1.1" Innovative wing structure design and manufacturing" and AIR ITD WP B-4.3 "More affordable composite fuselage". Application of this manufacturing process may contribute also to CS2 demonstration within REG IADP WP 3.2 "Fuselage/Cabin Integrated Demonstration" and WP 3.1 for the OWB ground demonstrator. Impact to CS2 are found in the field of efficiency and competitiveness. 4 - Innovative Aeronautic Primary Structures Main links are with AIR ITD B-4.3 "More affordable composite fuselage" and it may also contribute to CS2 Demonstration within the REG IADP WP 3.2 "Fuselage/Cabin Integrated Demonstration". Furthermore, it contributes to the REG IADP objectives with complementary activities in the field of empennages. Impact to CS2 are found in terms of weight, production process of environmental impact and manufacturing cost reduction. 5 - Eco-compatible materials and technologies, drilling, cutting and robotized assembly processes development Main links are with REG IADP WP 2.1.1" Innovative wing structure design and manufacturing" and AIR ITD WP B-4.3 "More affordable composite fuselage". It may contribute also to REG IADP WP 3.2 "Fuselage/Cabin Integrated Demonstration" and to WP3.1 for OWB ground demonstrator. Impact to CS2 are found in terms of environmental impact and manufacturing cost reduction.

					6 - Innovative and Advanced Methods for Certification and Verification Main links are with AIR ITD WP B-4.3 “More affordable composite fuselage”. It may contribute also to REG IADP WP 3.2 “Fuselage/Cabin Integrated Demonstration”. Impact to CS2 are found in the field of cost reduction and increasing of competitiveness. 7 - Innovative Aeronautic Fuselage Structures Main links are with AIR ITD WP B-4.3 “More affordable composite fuselage”. It may contribute also to REG IADP WP 3.2 “Fuselage/Cabin Integrated Demonstration”. Impact to CS2 are found in the field of cost reduction and increasing of competitiveness. 8 - Regional A/C TurboProp Architecture Studies Links are with REG IADP WP1 High Efficiency Regional Aircraft as well as with WP2.1 Adaptive electric wing; impacts to CS2 are found in the field of environmental benefits (noise, CO2, NOx reduction). 9 - Integrated Turboprop Power Plant Links are with REG IADP WP1 High Efficiency Regional Aircraft; impact to CS2 are found in the field of environmental benefits (noise, CO2, NOx reduction) as well as maintenance cost reduction. Activities enable the comparison of several potential powerplant solutions for turboprop aircraft with the more advanced solutions under investigation in CS2 REG IADP. 10 - Pax floor integration for Regional Aircraft Main links are with REG IADP WP 3.2 ”Fuselage/Cabin Ground Demo”. Trade off on pax floor integration between different solution applying innovative assembly process. Impact to CS2 are found in the field of efficiency and productivity increase. 11 - Technological Development Plan for the manufacturing of Wing and Stabilizer panels in composite material Main links are with CS2 REG IADP WP2.1 “Adaptive Electric Wing”. it may also contribute to CS2 Demonstration. Furthermore, it contributes to the REG IADP objectives with complementary activities in the field of empennages. 12 - Wing planform optimization for Regional Aircraft Main links are with CS2 REG IADP WP2.1 “Adaptive Electric Wing”. it may also contribute to CS2 Demonstration. Impact to CS2 are found in the field of efficiency and productivity increase.
LDO-Ltd - Leonardo MW Ltd (ex-AGUSTA WESTLAND Ltd)	2017	7,852,214.00 €	SPEEDING UP THE DEVELOPMENT OF CLEANER AIR TRANSPORT TECHNOLOGIES FOR EARLIEST POSSIBLE DEPLOYMENT. INCREASING AIRCRAFT FUEL EFFICIENCY. REDUCING AIRCRAFT NOx AND NOISE EMISSIONS	FRC WP1.2 - NGCTR Air Vehicle Design and Development	Tiltrotor Aerodynamics Optimisation of tiltrotor external aerodynamics: Aeromechanics of tiltrotor to provide weight-to-drag ratio improvement Active Rotor Control The development of active rotor technology to increase rotor performance and reduce fuel consumption through the use of electric actuation to deploy aerodynamic devices on each rotor blade in forward flight (aligned to Clean Sky GRC 1 AGF) Tiltrotor Proprotor The development of tiltrotor proprotor technology for delivery as background IPR and application on the Clean Sky 2 demonstration air vehicle.

LDO Spa - Leonardo Spa (Helicopter division - ex AW Spa)	2017	5,000,000.00 €	SPEEDING UP THE DEVELOPMENT OF CLEANER AIR TRANSPORT TECHNOLOGIES FOR EARLIEST POSSIBLE DEPLOYMENT	FRC WP1.2 - NGCTR Air Vehicle Design and Development FRC - WP1.4 - Test and Evaluation GRC1 - Active Rotor Technology	Tiltrotor Air vehicle Overall tiltrotor air vehicle design integration and analysis, including design tool validation, in support of Civil certification. Tiltrotor Flight and Ground Test The ground and flight test of tiltrotor air vehicle and systems that will form the basis of the NGCTR demonstrator that will be utilised under FRC. Active Rotors The continued assessment of active rotor technology developed under Clean Sky - post contract
VIOLA - Viola Consulting Srl	2017	25,000.00 €	CO2 and Fuel Burn: -20% to -30% (2025 / 2035) Up to 15% of fuel efficiency improvement vs 2014 reference air vehicles Up to 10% of reduction of total operating costs vs 2014 reference air vehicles	REG WP2 Technologies Development - EMA (Electro-Mechanical Actuation) - WP2.4.2 REG WP3 Demonstrations - WP3.1 Air Vehicle Technologies – Flying Test Bed#1 (FTB1) - Highly Efficient Low Noise Wing Design for Regional Aircraft WP3.3 Flight Simulator WP3.5 Integrated Technologies Demostrator for Turboprop Flying Test Bed #2 (FTB2) - Innovative Future Turboprop Technologies for Regional Aircraft - High Lift Advanced Turboprop	Technical assistance for strategic planning, project management, exploitation and dissemination: Viola Consulting counts with the technical assistance of highly skilled consultants with more than 20 years of experience in the fields of corporate strategic planning, project management and follow-up, IP exploitation and results dissemination. Technical assistance provides support and advice to Viola Consulting's staff in order to achieve the necessary skills for sound project management and implementation (including that of Clean Sky). In addition, those consultants also establish connections with other potentially relevant industrial fields (eg: renewable energies, automotive and transport, etc.), where the results achieved in the CS projects framework may be transferred and exploited.
BRE - FRENI BREMBO Spa	2017	129,300.00 €	New brake disc material for aerospace applications	SYS WP4.3.5 - W/T/B & BCS	Development and application of new material: Development of light new brake disc with innovative material. National R&D project cofunded by italian ministery.

MPC - Meggitt Aerospace Limited	2017	191,061.63 €	Airframe ITD	AIR TS A-4.1.1.0 - Project Management	The Diffusion Bonded Aero Heat Exchanger project will bring new technology to heat exchangers for aeronautical applications. The project is being undertaken by Meggitt Aerospace Ltd. Current developments and research in aeronautics will result in significantly increased demand for both recuperation and rejection of thermal energy. Major drivers include the more electric aircraft, requiring significantly increased electronics cooling; and aero engine efficiency, resulting in more heat to manage (from hotter cores), with reduced space (due to fan diameter) and cooling medium (e.g. fuel flow rate reduced). Current aeronautic heat exchanger technologies are either shell & tube or plate & fin construction, which each impose constraints on the product form. Shell & tube heat exchangers tend to be cylindrical in shape, constrained by the requirement for the shell to withstand (typically oil) pressure in the low thousands p.s.i. at elevated temperature. Plate & fin heat exchangers tend to take the shape of a rectangular block, reflecting the manufacturing methods employed, with heat exchange fins separated by thin plates in a brazed assembly to provide the fluid chambers. Heat exchangers are installed in compartments with restricted volume, with shapes constrained by the compartment location (e.g. curved compartments in nacelles), in areas where other services such as pipework and cable bundles must be installed. This project will develop manufacturing methods (chemical etching and diffusion bonding of aluminium), new design methods, and novel designs for lightweight, high efficiency heat exchangers for aerospace use. The project objective is to design and manufacture an aluminium, chemically etched plate, diffusion bonded, aerospace heat exchanger. The project will research advances in both etching and diffusion bonding of aluminium, and produce a novel demonstrator heat exchanger meeting aerospace requirements. Key innovations relate to methods for diffusion bonding of aluminium; increased etch depth in aluminium plate; and heat exchanger design and design methods optimised to use the new technology. The potential benefits of this technology include enabling the heat exchanger to utilise the available engine space to greater effect, and meeting the pressure and heat rejection demands of next generation aero engines. A key target for this technology will be next generation Ultra High Bypass Ratio (UHBR) engines which are being developed by all engine manufacturers to power the next generation of aircraft, which will have reduced core size and increased fan size. The nacelle volume will reduce, however, due to aerolines constraints (aerodynamic drag) and ground clearance requirements.
GEAC - GE Aviation Czech s.r.o	2017	377,000.00 €	Up to 15% Fuel Efficiency improvement	ENG WP8 - Reliable and more efficient operation of small turbine engines ENG WP8.3 - Advanced Compressor Technology	Advanced Compressor Test Rig: Hardware for advanced compressor test rig outside of MAESTRO budget.

UTRC - UNITED TECHNOLOGIES RESEARCH CENTRE IRELAND, LIMITED	2017	2,166,474.76 €	Reduction of CO2 emissions Competitiveness	SYS WP100.3 - MISSION SYS WP6.0.2 - aECS	Centre of Excellence in Cyber-Physical Systems for Aerospace: Encompasses topics that are parallel to, and amplify, those under development in CS2 SYS ITD, including electronics, diagnostics and data analytics, controls, aircraft systems engineering and embedded systems.
Total 2017		**196,718,688 €**			
A-CE - AIRBUS SAS	2018	20,000,000.00 €	Development and demonstration of technologies contributing to achieve H2020 HLO / targets with respect to environment & competitiveness	LPA Airbus AA 2018-01 - LPA work packages WP1.4, WP1.5, WP1.6 and asscoiated activities in AIR Technology Stream A-WP2.2	◘ Define and develop concepts to integrate highly efficient Ultra High Bypass Ratio Engones (UHBR) to next generation Large Passenger Aircraft : Define Interface, specification, requirements and corresponding Solutions to integrate very large UHBR engines to future aircraft. The corresponding R&T activities are being done in close cooperation in particluar with engine manufactureres, and important potential suppliers for structure, systems and other equipment. The activities encompass the multidisciplinary design of concepts to all respects of ist performance and fucntionality, inlcuding all issues of operation, maintenance and repair ◘ Additional activities to define and develop features and enabling functionalities for a disruptive cockpit for future generation large passenger aircraft: The disruptive Cockpit R&T work in CS2 LPA are paralleled / extended by additional activities outside of CS2, partly Airbus self-funded , partly funded in national funded R&T Projects ◘ R&T and development of laminar wing manufacturing technologies for large transport aircraft: Accompanying activities as well as Research and Technology to develop the required technologies and manufacturing methods for laminar wings, not funded in Clean Sky / Clean Sky 2 ◘ Provide facilities, instrumentation and skilled experts for large scale demonstration on aerodynamics and aeroloads: Aerodynamics and Aero-loads for large transport aircraft components in large scale demonstration under operational conditions

AIRBUS DEFENCE & SPACE SAU	2018	4,738,000.00 €	Increasing aircraft fuel efficiency, reducing CO 2 emissions - Competitiveness (lower life cycle costs, lower recurrent costs)	AIR HVDC REG WP3.5 LPA WP3.1.2 - Functions for efficient and easy systems management	Airframe structural activites contributing to enhaced electrical system and alternative materials Regional landing Gear for enhanced capabilities Regional; enabling technologies for flight testing instrumentation Airframe; recurrent cost reduction through manufacturing engineering innovation in processes (digital mock up, positioning in assembly, equipment for testing....) Amplification of LPA conceptual studies for alternative propulsion configurations and Electrical A/C concepts Ground segment and Coms research for secure and multiplatform command and control CERTERIN Certification of structural insights AWIMASS Aeronautic Wiring Management System CsXX/NTP Disruptive Transports configurations (distributed propulsion) PLACOM Conceptual Design Modelling FPA - All Electric A/C C/C Concepts for Transport A/C Arc fault protection Arcs detection and protection LDG M-R Shock absorber with active control based on magnetorheological fluids High power Hish power conversion and distribution FTI FTI Wireless Databus Interfaces Integration of A/C Coms Integration with 4G/5G terrestrial networks WiFi Integration of on-board communications with WiFi Connection MiAA Mission Automation & Autonomy NG Safety Control GS Multi A/C and handover capabilities REACH Chromate and Cadmium free projects MAT Portfolio (AMNA, SENDA, Sensorization) AMMA - Additive Layer Manufacturing for Military Aircraft. Deploy ALM technology and investigate potential new applications SENDA - reduce machine break downs and product non conformances. Machine sensorization, Data analyses method validated, automated adjustment of machine settings
GEVEN - GEVEN SPA	2018	220,000.00 €	Direct Contributions to environmental objectives: perceived noise; Smart answer to market demand: increase of intrinsic performance to meet new aircraft needs without a corresponding increase in weight	AIR Technology Stream B-4.4.6 - Cabin Systems design toward passenger wellbeing	Thermo-acustic solutions and materials for air transport: R&D project related to the "Thermoacoustic solutions and materials for air transport". The research activities will focus on the study and preparation of innovative thermal insulation (blanket) solutions by electrospinning polymers in the form of nanofiber. The research will be aimed at reducing the noise and vibration levels of passengers and crew members through the use of new materials and methods that meet the requirements of national and European regulations but above all that they are easy to integrate in the airframe without impacting on the weight of the latter. The costs planned under IKAA regards the following research activities envisaged in the SOLLETICO project: • Thermocouple descriptor for aeronautical type of material • Identification of internal noise sources of a single / wide body and general aviation aircraft • Production of coupons with electrospinning and upscaling for complex components • Design and development of a multi-functional thermocouple insulation system. R&D project under the Italian National Programme "Fondo Crescita Sostenibile PON HORIZON 2020"

GKN SE - GKN Aerospace Sweden AB	2018	2,500,000.00 €	Contributes towards reducing aircraft CO2 emissions. Strengthens the competitiveness fo european aviation industry incl small to medum size companies	ENG WP2 - UHPE ground demo for SMR A/C ENG WP4 - Advanced Geared Engine Configuration ENG WP6 - VHBR- Large Turbofan Demonstrator UltrafanTM	SWE DEMO MOTOR: National Program SWE DEMO MOTOR. Development of competitive manufacturing technologies for engine structures and rotors. Validation of these novel technologies by manufacturing of GKNs demonstrator parts in Clean Sky-2
ITI - ITI GESELLSCHAFT FUR INGENIEURTECHNISCHE INFORMATIONSVERARBEITUNG MBH	2018	467,000.00 €	Reduction of development and rework time, Optimization of designed products to reduce fuel burn and emissions	SYS WP1.1 - Requirements Architecture SYS WP1.4 - Avionics and Platforms SYS WP100.3 - Modeling and Simulation Tools SYS WP3.4 - Innovative electrical Wing Demonstration SYS WP5 - Electrical Chain SYS WP6.4 - Integrated Demonstration and Validation	Virtualisation and seamless Integration of Product Design Processes and Operations: interoperability and model exchange within a diversified tool landscape, integration of model based product lifecycle management methods, components augmentation to support and enable novel, automated test methods (virtual test and certification) as well as model predicitive maintainance and health monitoring techniques (fault and wear); Relevance to CS programmes: links are in all IADPs and ITDs at various levels; impact to CS and CS2 is finally found in terms of environmental benefits (noise and CO2 reduction), in particular by increase of reliability, durability, efficiency and productivity. ESI ITI GmbH participates and contributes to the following projects with objectives relevant and well in line with the CS2 activities: ACOSAR -> ITEA3 project within EUREKA program, activities focus on development of a software architecture and the definition of an interface to interconnect (real-time) models with real test rig setups to improve virtual testing techniques and allow novel test and certification methods by the use of model based engineering Dynstart -> german, national funded project, activities focus on methodologies and technologies for coupling and parallelisation of partial aspects and processes in large, multiphysical models (power plants) within the Modelica language and simulation environment SimulationX to increase computational performance on distributed architectures ESI cloud -> internal ESI project to modify, improve, setup and adapt existing cloud architectures from previous projects (i.e. Cloudflow) to serve as an independent, scalable platform for seamless integration with modeling and simulation tools to allow a powerful experimentation and optimization capability desired within model based design processes SmartSensiAct -> german, national funded project, activities focus on mathematical methods for the approximation of multidimensional maps (look up tables) to improve the calculation performance of coupled or cosimulated complex system models Emphysis -> ITEA3 project within EUREKA program, activities focus on development and definition of a novel standard for embedding physical models into production code of electronic control units for model predictive control purposes to allow increasingly virtualized product design and performance lifecycles in future FAME -> internal ESI research project, activities focus on automatic augmentation of models to support and enable fault tree analysis, automatic test generation (Model in the Loop, Software in the Loop and Hardware in the Loop) or requirements validation and reliability analysis within the virtual/digital twin approach of future product lifecycles .

ITP - Industria de Turbo Propulsores S.A.	2018	2,633,740.00 €	To contribute to improving the environmental impact of aeronautical technologies, including those relating to small aviation, as well as to developing a strong and globally competitive aeronautical industry and supply chain in Europe. This can be realised through speeding up the development of cleaner air transport technologies for earliest possible deployment, and in particular the integration, demonstration and validation of technologies capable of: (i) increasing aircraft fuel efficiency, thus reducing CO 2 emissions by 20 to 30 % compared to 'state-of-the-art' aircraft entering into service as from 2014; (ii) reducing aircraft NO x and noise emissions by 20 to 30 % compared to 'state-of-the-art' aircraft entering into service as from 2014.	ENG WP5.2.3 - IPT Material Evaluation and Development ENG WP6.1.1 - Multi-Stage IPT	Aerodynamic, thermo-mechanic and noise technologies for aircraft gas turbines: Aerodynamic thermo-mechanic and noise technologies for the low pressure spool of VHBR engines. Mechanical technology for high speed intermediate pressure turbines. Advanced manufacturing technologies for aircraft gas turbines: Advanced manufacturing and repair technologies for the low pressure turbine section and low pressure compressor of aircraft gas turbines Advanced materials technology for low pressure section of aircraft gas turbines: Development of new material models and simulation tools for low weight and high temperature alloys lifing, off-limits usage and critical manufacturing processes. Characterisation and modelling of materials for the LPC The activities described herein are relevant to the CS2 objectives and they are included within the scope of the following R&T Projecs: * FP7: ENOVAL * National projects: FUTURALVE; SCALITURB; BOOSTER-2, COLD SPRAY and TALDEA The following activities relevant to CS2 overall objectives will be performed: * VHBR engines low pressure spool: development and validation of aerodynamic and aeroacoustic technologies for low weight and noise and high efficiency LPT. * High speed turbines: development of new design concepts, mechanical and materials technology. * Low pressure compressor: development and validation of aerodynamic, materials mechanical and manufacturing technology for advanced low pressure compressors. FOD analysis and simulation tools. * Hot structures: development of multi parameter design optimisation tools to integrate casting and other manufacturing processes, with thermo-mechanical analysis, weight and cost. * Hot structures: development of new design criteria, new repair processes for non-weldable alloys, and models for prediction and assessment of casting defects. * Advanced manufacturing technologies for LPC integrated bladed rotors. * High speed turbines: development of casting, additive manufacturing, machining, joining and other manufacturing processes for TiAl and high temperature alloys. Process simulation, monitoring and control, induding new measurement and NDI technologies. * Repair of high temperature alloys using cold spray technology. * New models for high temperature materials behavior under complex stress/temperature loads and off-limits usage. * Modelling and assessment of weldability and castability properties of high temperature materials used for hot section structures. * Compressor materials characterization, damage tolerance analysis and material behavior under different thermo-mechanic conditions.

MSSDK - Meggitt A/S	2018	10,000.00 €	To contribute to improve the environmental impact of aeronautical technologies, as well as safety.	AIR WPA-4.1.1.6 - Breakthrough Ultra Low Power	Development of piezoelectric ice detection including consideration of SLD discrimination strategies: As a complementary activity to the topic, and in specific relation to GAINS WP6 (Ultra Low Power). An advantage of the inherent properties of piezoelectric devices will be taken to undertake innovative action in the field of ice detection. In respect of electro-thermal ice protection providing a system that can protect against requirements (B) & (C) above (see reference to CS2 programme), this would likely require electrical power beyond the maximum available. The concept therefore, is to develop a solution that supports an escape strategy defined by requirement (A). The intent for this additional R&T action is to develop an ice detection strategy that would support the IPS by: 1. Discriminating and detecting SLD conditions that would allow the aircraft to exit all icing conditions. - This would require distributed sensing aft of the protected area. 2. Supporting power optimization and maximizing performance of the de-ice system. This can potentially support GAINS WP3.2 (electro-thermal de-ice modelling): - This would be able to detect the presence of ice and also ice thickness; - This could allow optimization of de-ice sequences to operate only when sufficient ice has accreted, and it will help to ensure that any inter-cycle ice limit specified for the protected surface is not exceeded; - This requires sensors integrated into the IPS (protected area), and would be able to shed ice for further ice accretion. As a continuation of previous activities undertaken in the area, a potential to use piezoelectric base Surface Acoustic Waves (SAW) devices will be further explored and evaluated. A possibility to integrate such detection system into the piezoelectric based IPS/IDS, which is currently under development in the frame of WP6 will be explored as well.
PROTOM - PROTOM Group S.p.A	2018	28,000.00 €	DEVELOPMENT OF INNOVATIVE ACTUATORS FOR RACER FAST ROTORCRAFT	FRC WP2.9 - ACTUATION SYSTEMS	ACTUATION SPECIFICATIONS: CIVIL USE UNMANNED - CAPTURE OF THE CONTROL SURFACES ACTUATION REQUIREMENTS AND WRITING OF THE RELATED ACTUATION SPECIFICATIONS. IN THE FRAME OF THE DEVELOPMENT OF AN UNMANNED AERIAL VEHICLE FOR CIVIL USE, PROTOM HAS TO PERFORM THE CAPTURE OF THE ACTUATION REQUIREMENTS RELATED TO CONTROL SURFACES OF THE DEFINED CLASS AND SIZE OF THE AIRCRAFT. THE ACTIVITY DELIVERABLE IS THE ISSUE OF THE ACTUATION SPECIFICATIONS TO BE USED BY THE OTHER PROJECT PARTNERS TO DEVELOP THE REQUIRED ELECTRO-MECHANICAL ACTUATORS.

RR - ROLLS ROYCE Plc	2018	53,155,500.00 €	Up to 23% fuel burn and CO2 emission reduction relative to year 2000 baseline (consitent with 10% reduction relative to year 2014). Noise levels making a significant step towards ACARE 2035 targets (-11 EPNdB per operation relative to 2000 situation). Contribute to delivery of NOX emission reduction through reduced fuel burn and lean burn technology.	ENG WP5 - VHBR Middle-of-Market Demonstrator ENG WP6 - VHBR Large Turbofan Demonstrator	Composite Fan system: The composite fan system is baseline for UltraFan(R) but is being researched outside of the CS2 programme. Lean Burn combustion system: The Lean Burn combustion System in integral to the Advance 3 core, which in turn, will be the core powering the UltraFan (R) engine. The Lean Burn combustion system still requires a number of tests to be performed in order to achieve TRL6. Advance3: The Advance3 core will be the core powering the UltraFan (R) engine. A number of key activities and tests are being done outside of the CS2 programme. These are essential to take the Advance3 core to the required technology level for the UltraFan(R) ground demonstrator. UltraFan(R) (non-CS2): A large part of the UltraFan(R) programme is being researched and developed outside of CS2. This activity, including areas such as turbines, combustion and gearbox, is managed beyond CS2 and is essential to ensure successful ground test (TRL5) within the CS2 programme and subsequent flight test (TRL6). Hybrid electric demonstrator: The Rolls-Royce programme for hybrid electric is being partially carried out in CS2 (LPA), however, the bulk of the work is not contained within the programme. The research into systems integration, core gas turbine integration, fan/nacelle/motor integration and hybrid system control is outside of the programme. This will conclude in a ground and flight test of a hybrid-electric system (TRL 6).
SAF - SAFRAN SA	2018	23,000,000.00 €	Reduction of CO2 emissions Competitiveness	ENG WP2 - UHPE ground test Demonstrator	UHBR technologies maturation: • High Speed Low Pressure Turbine maturation • Low speed fan maturation • Fan integration / full scale aeroacoustic testings • Advanced sealings and bearings technologies maturation • Power gearbox technologies maturation • Lifing prediction tools and modeling developments • Vibration behavior of engine parts and engine tools and modeling • New manufacturing processes such as additive manufacturing • New measurements for UHBR architectures All the activities listed above are needed to support the maturation of the technologies for the UHBR target engine. Regarding the ground test demo of UHPE, planned in the WP2 Engine ITD, we need to validate and de-risk, through partial tests, the most critical technologies which will be integrated. Indeed all critical technologies (Power Gearbox, Fan module, Turbine, advanced sealings and bearings) require to be maturate thanks to specific partial test. For these de-risking activities Safran is leading R&T activities out of Cleansky 2 from design to partial testings. Safran R&T is also covering other activities targeting new measurements, modelings and manufacturing processes for the new UHBR architecture.

AOA - APPARATEBAU GAUTING GMBH	2018	550,000.00 €	Reduction of fuel consumption and CO2 emissions	SYS WP 2.3 - Cargo Systems	LuFo V-3 Project: HUTAB: Efficient Manufacturing Processes and Technologies for Single Tank Waste-Water Systems
ACI - Aernnova Composites Illescas, SA	2018	25,000.00 €	ITD – AIRFRAME - B - High Versatility Cost Efficient	AIR WP B-1.3 - More efficient Wing technologies AIR WP B-4.1 - Roto-less tail for Fast Rotorcraft	High Integrated Composite Structures – cocured processes. Perform conformation Automation manufacturing proceses: Aernnova is working in R&T projects out of CS2 frame of work which activities are in liason with the activities that ACI is developing in CS2 - HVCE. Activities developed under the scope of: - Project ComBoNDT - H2020:The ComBoNDT project aims at developing ENDT technologies to be integrated into future adhesive bonding process chains of aeronautics manufacturing and repair. The technologies will allow the assessment of surface quality before bonding as well as the quality of the finished adhesive joint. - Project IRENE - CDTI-2017: Development of automated solution to drill hybrid structures based on the integration of a collaborative robot with an EDU (Electric Drilling Unit) which will carry out the operation by means of drilling templates. - Project FILLER - CDTI-2017: The main technological achievement of the project is to automate the production of filler from prepregs materials, passing from a completely manual process to a practically automated one, with the advantages of quality and costs that this entails.
AED - Aernnova Engineering Division, SA	2018	42,000.00 €	Industrial objectives to ensure future competitiveness	LPA WP. 1.2 - Rear End LPA WP. 1.4 - HLFC	TRANSFORM 3D: WAAM (Wire Arc Additive Manufacturing) technology development for titanium parts (Ti6Al4V): Within TRANSFORM3D AED is developing WAAM technology as an alternative of titanium forging for aeronautical structural parts
AH-D - AIRBUS HELICOPTERS DEUTSCHLAND GMBH	2018	28,000,000.00 €	Reduction of gaseous and noise emissions. Improvement of competitivity	FRC GRC - continuation of activities	Continuation of GRC activities: Implementation of GRC1, GRC2 and GRC6 as well as further technologies from bluecopter demonstrator together with National and own funded technology products to go beyond state of the art in greening and to finally prove commercial viability. Additional GRC activities on new platform to further validate performance of GRC technology products and to assess scalability to higher MTOW. R&D for exploitation.
AKIRA - Akira Technologies SARL	2018	40,000.00 €	Links are in ENGINE ITD at various levels; impact to CS2 is found in the field of environmental benefits, efficiency increase, integrated and large scale validation and demonstration activities.	ENG WP3.3 - Business aviation / short range Regional TP Demonstrator	Test rigs Power regulation and monitoring: links are in ENGINE ITD at various levels; impact to CS2 is found in the field of environmental benefits, efficiency increase, integrated and large scale validation and demonstration activities.

DAS - DIEHL AEROSPACE GMBH	2018	1,000,000.00 €	To contribute to developing a strong and globally competitive aeronautical industry and supply chain in Europe.	SYS WP2 - Cabin and Cargo Systems	iCABIN (LuFoV-3) Activities related to CMS/PHM : Complementary R&T activities related to CMS and on-board mechanisms and definitions of a cabin related Predicitive Health Management as well as enhanced crew support interface definition. OPs-TIMAL (LuFoV-3) Activities related to PHM: Complementary R&T activities related to definitions of air-ground data interfaces and processes regarding predictive Health Management (PHM) - Cabin.
DAV - DASSAULT AVIATION	2018	4,600,000.00 €	To contribute to improving the environmental impact of aeronautical technologies as well as to developing a strong and globally competitive aeronautical industry and supply chain in Europe (increasing fuel efficiency	AIR TS A-1.1 - Optimal engine integration on rear fuselage AIR TS A-1.3 - Novel High performance configurations AIR TS A-1.4 - Virtual Modelling for Certification AIR TS A-2.1 - Laminar nacelle AIR TS A-2.3 - Extended Laminarity AIR TS A-3.1 - Multidisciplinary wing for high and low speed AIR TS A-3.3 - Innovative shapes and structure AIR TS A-4.2 - Active load control AIR TS A-3.4 - Eco-Design AIR TS A-5.2 - Office Centered Cabin	Multidisciplinary Aircraft design and aircraft certification process using numerical tools: Impacts to CS2 are weight-to-drag ratio improvements (lift-to-drag ratio, definition and evaluation of laminarity profiles (wing and nacelle), architecture optimisation Design criteria for innovative architecture using composite materials, aeroelasticity design and optimization tools: Impacts to CS2 are weight-to-drag ratio improvements (new materials, architecture optimisation) New manufacturing process: weight to drag, ratio improvement, efficiency and productivity increase. Alternate ideas to CS2 development for eco design New cabin layouts concepts: Alternate ideas to CS2 concepts and technology for business Jet Cabin.
DLR - DEUTSCHES ZENTRUM FUER LUFT- UND RAUMFAHRT E.V.	2018	2,633,000.00 €	NA	ENG WP4 - Adv. Geared Engine Configuration (compression/expansion system) ENG WP5 - VHBR – Middle of Market Technology	M2VP: Update of Drive Electronics, Settling Chamber, Oil-System NGTurb: Full testbed bildup

DSPACE - DSPACE DIGITAL SIGNAL PROCESSING AND CONTROL ENGINEERING GMBH	2018	220,000.00 €	Building industrial leadership in Europe against a backdrop of significantly increased global competition: - Significant contribution to competitiveness by accelerating the introduction of new technologies through increased coherence, common tools and methods, and shared know-how in areas of common interest - Improvements for more efficient, faster and easier-to-certify development and implementation of features and functions - Introduction of mature processes and technologies with potential impact on all systems during development (e.g. development framework and tools, simulation, incremental certification, eco-design, etc.)	SYS WP 100.3 - MISSION	AGILE-VT: Next generation agile hybrid virtual testing: AGILE-VT focusses on delivering validation and verification processes of virtual hybrid test systems in order to fulfill the requirements of industrial design (MBSE) and for certification.
FHG - FRAUNHOFER	2018	2,900,000.00 €	Supporting Reg. 2a, increasing competiveness, reduction of primary energy demand, waste streams and costs, added e-learning and exploitation, circular economy, indirect reduction of CO2(Reg.2b)	ECO [A] [D] UP - Lifetime service, Identification and valuation ECO [C] - Efficient Manufacture and Production	Sustainable productivity: Introducing ecoDESIGN means and digital transformation to materials, processes and resources , technical and socio-economic added value

ICSA - Internacional de Composites, SA	2018	270,000.00 €	ITD – AIRFRAME - B - High Versatility Cost Efficient	AIR WP B-1.3 - - More efficient Wing technologies AIR WP B-4.1 - - Roto-less tail for Fast Rotorcraft	GRECO Project: GRECO Project is a technology development project related to the material cutting in composite Dry Fiber. The process to be developed in the GRECO Project could allow performing the cutting for several layers at the same time, saving materials and optimizing the cutting quality for the Dry Fiber. At the same time, will be able to work with continuous input material, compacting the different layers while feeding the cutting machine in an uninterrupted process. This project aims to reduce notably time and economic costs of Dry fiber preform manufacturing, while also dropping the amount of non-valid parts produced. Out Of Autoclave Technology: High Integrated Composite Structures. Complex RTM pre-forms injections. Perform conformation. Automation manufacturing proceses. Cocured processes. New materials implementation: Aernnova will develop a high integrate composite structure manufacture by out of autoclave technology. In order to confirm the enough maturity of the technology, some trials will be done with different geometries and materials to set up the process. Activities developed under the scope of: - Project SAVE – PID CDTI - Project Graphene – Graphene Flagship
LDO Spa - Leonardo Spa (Helicopter division - ex AW Spa)	2018	3,000,000.00 €	SPEEDING UP THE DEVELOPMENT OF CLEANER AIR TRANSPORT TECHNOLOGIES FOR EARLIEST POSSIBLE DEPLOYMENT	FRC - WP1.2 - NGCTR Air Vehicle Design and Development FRC - WP1.4 - Test and Evaluation	Tiltrotor Air vehicle: Overall tiltrotor air vehicle design integration and analysis, including design tool validation, in support of Civil certification. Tiltrotor Flight and Ground Test: The ground and flight test of tiltrotor air vehicle and systems that will form the basis of the NGCTR demonstrator that will be utilised under FRC. Active Rotors: The continued assessment of active rotor technology developed under Clean Sky - post contract

LDO VEL - Leonardo Spa (Aeronautic Sector - ex Alenia)	2018	1,800,000.00 €	COUNCIL REGULATION (EU) No 558/2014 Article 2(a) COUNCIL REGULATION (EU) No 558/2014 Article 2(b), for the part related to competitiveness of aeronautical industry and supply chain in Europe.	AIR TS B-4.3 - More affordable composite fuselage AIR TS B-4.4 - Affordable low weight, human centered cabin REG WP1 - High efficiency Regional Aircraft REG WP2.1 - Adaptive Electric Wing REG WP3.1 - Air Vehicle technologies demonstrator (Flying Test Bed#1) REG WP3.2 - Fuselage/Cabin Integrated Ground Demonstrator	1 - Composite materials with low cost (design and construction) Main links are with REG IADP WP 2.1.1 ”Innovative wing structure design and manufacturing” and AIR ITD WP B-4.3 “More affordable composite fuselage”. Application of innovative materials and low cost manufacturing and assembly process may contribute also to CS2 demonstration within REG IADP WP 3.2 “Fuselage/Cabin Integrated Demonstration” and WP 3.1 for the OWB ground demonstrator. Impact to CS2 are found in the field of efficiency and productivity increase. 2 - Innovative Aeronautic Fuselage Structures: Main links are with AIR ITD WP B-4.3 “More affordable composite fuselage”. It may contribute also to REG IADP WP 3.2 “Fuselage/Cabin Integrated Demonstration”. Impact to CS2 are found in the field of cost reduction and increasing of competitiveness. 3 - Regional A/C TurboProp Architecture Studies: Links are with REG IADP WP1 High Efficiency Regional Aircraft and WP2.1 Adaptive electric wing, as well as with WP3.2 Full scale passenger cabin demonstrator and its linked WPB-4.4 of AIR ITD. Impacts to CS2 are found in the field of environmental benefits (noise, CO2, NOx reduction) as well as in the field of cost reduction and increasing of competitiveness. 4 - Integrated Turboprop Power Plant: Links are with REG IADP WP1 High Efficiency Regional Aircraft; impact to CS2 are found in the field of environmental benefits (noise, CO2, NOx reduction) as well as maintenance cost reduction. Activities enable the comparison of several potential powerplant solutions for turboprop aircraft with the more advanced solutions under investigation in CS2 REG IADP. 5 - Technological Development Plan for the manufacturing of Wing and Stabilizer panels in composite material: Main links are with CS2 REG IADP WP2.1 “Adaptive Electric Wing”. it may also contribute to CS2 Demonstration. Furthermore, it contributes to the REG IADP objectives with complementary activities in the field of empennages. 6 - Wing planform optimization for Regional Aircraft: Main links are with CS2 REG IADP WP2.1 “Adaptive Electric Wing”. it may also contribute to CS2 Demonstration. Impact to CS2 are found in the field of efficiency and productivity increase.
					7 - Structural/Systems Provisions and Equipment for Installation and Operation of CfPs Hardware Deliverables to be used for REG IADP Demonstrators Manufacturing, Assembly, Inspection: Main links are with CS2 REG IADP WP3.1 for the part related to the Outer Wing Wing Demonstrator as well as with WP3.2 Fuselage/Pax Cabin Demonstrator Impact to CS2 are found in the field of efficiency and productivity increase.
LDO-Ltd - Leonardo MW Ltd (ex-AGUSTA WESTLAND Ltd)	2018	6,830,000.00 €	SPEEDING UP THE DEVELOPMENT OF CLEANER AIR TRANSPORT TECHNOLOGIES FOR EARLIEST POSSIBLE DEPLOYMENT	FRC WP1.2 - NGCTR Design and Development	Tiltrotor Proprotor: The development of tiltrotor proprotor technology for delivery as background IPR and application on the Clean Sky 2 demonstration air vehicle. Active Rotor Control: The development of active rotor technology to increase rotor performance and reduce fuel consumption through the use of electric actuation to deploy aerodynamic devices on each rotor blade in forward flight (aligned to Clean Sky GRC 1 AGF)

LEG - LIEBHERR ELEKTRONIK GMBH	2018	1,794,000.00 €	According to development plan	SYS WP3 - Smart integrated Wing Demonstrator	Flight Control System Technologies: Activities on System aspects and electronics. Complementary to studies and demonstration performed in SYS ITD
LLI - LIEBHERR AEROSPACE LINDENBERG GMBH	2018	2,500,000.00 €	acc. Dev. Plan.	LPA WP2.3 Next Gen Low Centre Fuselage - Landing Gear Topics SYS WP3 Systems - Smart Integrated Wing Demonstrator SYS WP4 Systems - Landing Gear Systems	Landing Gear Systems: Activities complementary to SYS ITD WP4 and LPA IADP WP2.3 on System Architecture, Structure and Materials, and Optimisation of critical components. Flight Control System Technologies: Activities on System aspects and electronics. Complementary to studies and demonstration performed in SYS ITD.
LTS - LIEBHERR AEROSPACE TOULOUSE SAS	2018	2,000,000.00 €	To secure key technologies enabling the major demonstrations to reach their objectives. The systems developed will act as enablers for game changing aircraft configurations such as More Electric Aircraft and Bleedless Engines. These configurations will significantly reduce the environmental impact and the operating costs of future aircrafts.	LPA WP1.5 - Applied technologies for enhanced aircraft performance SYS WP5.3 - Power management for Large Aircraft SYS WP6.1 - Electrical air system and thermal management SYS WP6.1.4 - Cabin Comfort SYS WP6.2 - Ice protection System SYS WP6.4 - Integrated demonstration and validation	Wing Ice protection system: Activities complementary to SYS ITD WP6.2 ice protection system Air quality: Activities complementary to SYS ITD WP6.1.4 Cabin comfort Power management: Activities complementary to SYS ITD WP5 Power management center + WP6.1 Electrical air system and thermal management and 6.4 integrated demonstration and validation Air system and thermal management: Activities complementary to SYS ITD WP6.1 Electrical air system and thermal management Harsh environment components (HX, Valves, etc): Activities complementary to LPA platform 1 WP1.5 Applied technologies for enhanced aircraft performance

MPC - Meggitt Aerospace Limited	2018	962,126.48 €	to contribute to improving the environmental impact of aeronautical technologies, including those relating to small aviation, as well as to developing a strong and globally competitive aeronautical industry and supply chain in Europe.	AIR WP A-4.1.1.0 - Project Management for IKAA	Meggitt Modular Modifiable Manufacturing (M4): MPC (Meggitt Aerospace Ltd) contribution to IKAA. Meggitt Modular Modifiable Manufacturing (M4) introduces Object Oriented Manufacturing to the manufacture of highly bespoke, complex, high performance products that characterise UK aerospace manufacturing today. Working with the AMRC and MTC Catapults, and IBM UK, Meggitt will research the application of new manufacturing technologies to provide unprecedented flexibility and utilisation in a next-generation factory environment. AMRC will combine its expertise in advanced manufacturing methods with MTC's expertise in factory automation and control, to develop next generation factory concepts, combining flexible, automated, interactive workstations with real-time optimisation of the overall factory and flow, with autonomous movement of products within the factory. IBM will provide the underlying manufacturing data architecture allowing new levels of process and product analytics, and supporting continuous optimisation of the manufacturing process, at product and factory levels
SAAB - SAAB AB	2018	4,121,000.00 €	Improving the environmentally impact of aeronautical technologies and improve the global competitiveness of the industry sector in Europe	AIR WP3 - TS A-2: Advanced Laminarity AIR WP4 - TS A-3: High Speed Airframe AIR WP5 - TS A-4: Novel Control LPA WP10 - WP2.1 - Next Generation Fuselage, Cabin and Systems Integration LPA WP15 - WP3.1 - Enhanced Flight Operations and Functions	Automation: Research for increased productivity and manufacturability Manufacturing: Research for advanced manufacturing and assembly processes Flight Management Systems Research and technology development for HUD-, Vision- and Awareness systems Actuation Research and technology development for electrical control and actuation systems
THA - THALES AVS France SAS (ex-THALES AVIONICS SAS)	2018	5,600,000.00 €	The planned additional activities contribute to the objectives of the Clean Sky Joint Technology Initiative and are complementary to the activities carried out by Thales in the WP1 (Extended Cockpit) of the SYSTEMS ITD, and in the WP3.5 (Disruptive Cockpit) of the LPA IADP.	LPA WP3.5 - DISRUPTIVE COCKPIT: D3 - Disruptive Cockpit Large Aircraft SYS WP1 - EXTENDED COCKPIT: D1 - Extended Cockpit Demonstrations; ET5 - Flight Management enhanced functions; ET6 - advanced CNS functions (modular IRS, Fly by traj, system management functions…)	◘ INERTIAL NAVIGATION: Thales internal R&T project : - work on new generation of Inertial Measurement Unit - work on innovative accelerometer & gyrometer solutions based on MEMS ◘ FMS: Thales internal R&T project : work on FMS innovations, in particular open core architectures ◘ Flight guidance: Thales internal R&T project : work on AFCS innovations for aircraft and helicopter segments ◘ Surveillance: Thales internal R&T project : work on AFCS innovations for aircraft and helicopter segments ◘ HMI: Thales internal R&T project : work on new HMI concepts and innovative interface protocole with core avionics functions

UTRC - UNITED TECHNOLOGIES RESEARCH CENTRE IRELAND, LIMITED	2018	2,000,000.00 €	Reduction of CO2 emissions Competitiveness	SYS WP 6.0.2 - aECS SYS WP 100.3 - MISSION	Centre of Excellence in Cyber-Physical Systems for Aerospace: Centre of Excellence in Cyber-Physical Systems for Aerospace, partially funded by the Industrial Development Agency (IDA), Ireland . Encompasses topics that are parallel to, and amplify, those under development in CS2 SYS ITD, including electronics, diagnostics and data analytics, controls, aircraft systems engineering and embedded systems.
ZEN - ZODIAC ENGINEERING	2018	200,000.00 €	Develop a strong and globally competitive aeronautical industry and supply chain in Europe	SYS NA	Materials: New materials and manufacturing processes
Total Planned 2018		**177,839,366 €**			
Total Planned 2014-2018 before amendment		**654,397,830 €**			
Total Planned 2014-2018 after amendment		**791,595,618 €**			
Difference		**137,197,788 €**			

	Approved by GB	GMT2
	Draft	Paper Copy only
	Submitted to CSJU	
	Submitted to GB	
	Under Review	
	NA - Paper Copy only	

Total	2014 PLAN	EUR 108,499,539.51
	2015 PLAN	EUR 140,238,140.58
	2016 PLAN	EUR 148,475,821.70
	2017 PLAN	EUR 149,068,749.63
	2014-2017 PLAN	**EUR 546,282,251.42**