Decision of the Governing Board approving the Amended Additional Activities Plan 2014 - 2016

THE GOVERNING BOARD OF THE CLEAN SKY 2 JOINT UNDERTAKING,

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

WHEREAS:

1) The Statutes of the Clean Sky 2 Joint Undertaking confer on the Governing Board the powers to approve the Additional Activities Plan 2014-2016 as referred to in point (b) of Article 4(2) of the Council Regulation;
2) The plans are approved on the basis of a proposal from the private members and the link to the High level objectives (HLOs) of the JTI has been established by the JU programme office.
3) It was deemed necessary to update some of the Leaders previous summited plans and to allow the new entries from the recently joined Core Partners of the CSJU;

HAS DECIDED:

Article 1

The amended Additional Activities Plan 2014 - 2016 set out in the Annex is approved.

Article 2

This decision shall enter into force on the date of its adoption.

Brussels, 21 October 2016

Ric Parker

Chairman of the Governing Board

Enclosures:
- Additional Activities Plan 2014-2016; (ref. CS-GB-2016-10-21 Amended AAs Plans 2014-2016)

Amended Additional Activities Plans 2014-2016

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MEMBER NAME	Planning Period	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 €	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	1,400,000 €	Reduction of CO2 emissions Competitiveness	R-IADP WP2.1 R-IADP W 3.2, AIRFR. ITD WP B-4.3 AIRFR. ITD WP B-4.4, R-IADP WP 3.2	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 €	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
DLR	2014	0 €	N/A	N/A	No activity planned.
Airbus Defence and Space SAU	2014	11,630,000 €	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	Electrical Management Distribution Systems Centralized Monitoring and Health Monitoring Systems Electrical Ice Protection Systems Miniaturization and Integration of Antennas CFRP new manufacturing processes FOREST - Additive Layer Manufacturing FT4B Flight Turboprop Transport Technology Test Bed New Turboprop Transport Family Configurations/Aircraft Configuration Optimization tools IEDS Integrated Engine Display Systems Composite Material Fire Resistance Characterization EOLO (Design and Manufacturing Processes- Virtual reality) GEOLIA (i-DMU Collaborative engineering) COSSTA (Superplastic forming) SILENCIO (Innovative Materials for Noise Protection) HW/SW validation (Systems V&V) COMDUCT (Composite Technologies for Systems installation) LUS (Laser Ultrasound inspection NDT)
Evektor	2014	0 €	N.A.	N.A.	No activity planned.
Liebherr	2014	2,500,000 €	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	2,000,000 €	Competitiveness	Supporting Compression System Technology Development	Development and testing of HPC technologies for efficiency and structures improvements
Piaggio	2014	200,000 €	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 €	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

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SAAB	2014	2,900,000 €	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 €	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	1,204,328 €	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	IKAA-AH-F-2014-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)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)
				GRC WP1 Innovative Rotor Blades	IKAA-AH-F-2014-A003 - Drag and noise reduction
				GRC WP1.5.2 Flight Testing of Passive Optimized Blades	Drag and noise reduction Relevance to CS programmes: Fully in line with GRC and ECO targets: 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
				GRC WP1.5.2 Flight Testing of Passive Optimized Blades	
				GRC WP4 Integration of a (Diesel) High Compression Engine on a Light Helicopter	
AH-D - AIRBUS HELICOPTERS DE	2014	3,693,917 €	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 €	Regulation 558/2014 Art 2 a) and b) supporting smart and green Transport through the improvement of the manufacturing base of	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 €	Competitiveness Reduction of CO2 emissions	CS1-SAGE WP2 CROR Ground 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
				CS2-Engine-WP2 UHPE Ground Test Demonstrator	
				CS2-LPA-WP1.1 CROR Flight Test Demonstrator	
Finmeccanica Ltd (Helicopter division) - ex AW-Ltd -	2014	16,375,000 €	Competitiveness Reduction of CO2 emissions Speeding up the development of cleaner air transport technologies for earliest possible deployment. Increasing aircraft fuel efficiency.	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
				CS1 GRC - WP1 Innovative Rotor Blades	Active Rotor Control Development of active rotor control technology
AgustaWestland S.p.A	2014	61,086 €	Competitiveness	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
Total 2014		**101,117,330 €**			
Airbus	2015	20,000,000 €	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	5,600,000 €	Reduction of CO2 emissions Competitiveness	R-IADP WP2.1 R-IADP W 3.2, AIRFR. ITD WP B-4.3 R-IADP WP 2.3, AIRFR. ITD WP B-4.4, R-IADP WP 3.2 R-IADP WP 2.1, AIRFR. ITD WP B-4.3	Innovative Aircraft Wing Structures • Further development of technologies for the central wing box of regional a/c Fuselage and Tail Planes • Further development of new technologies for the Rear Fuselage and Tail Planes of regional a/c • Further development of technologies for the cockpit of regional aircraft • Further development of technologies for hybrid fuselage (metallic/composite) • Repair techniques for composite structures Advanced on-board systems for regional a/c • Definition and analysis of regional turboprop landing gear architecture. Landing gear A/C integration requirements definition, with focus on electrical actuation of L/G functionalities. • Finalization of Aircraft integration requirements for interiors Value of infrastructures and test facilities Manufacturing and research development facilities

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Dassault Aviation	2015	4,300,000 €	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
DLR	2015	0 €	N/A	N/A	No activity planned.
Airbus Defence and Space SAU	2015	14,755,000 €	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	Electrical Management Distribution Systems Centralized Monitoring and Health Monitoring Systems Electrical Ice Protection Systems Miniaturization and Integration of Antennas CFRP new manufacturing processes FOREST - Additive Layer Manufacturing FT4B Flight Turboprop Transport Technology Test Bed Test Platform preparation for Clean Sky 2 Flight Test Bed New Turboprop Transport Family Configuration Optimization tools IEDS Integrated Engine Display Systems Composite Material Fire Resistance Characterization EOLO (Design and Manufacturing Processes- Virtual reality) GEOLIA (i-DMU Collaborative engineering) COSSTA (Superplastic forming) SILENCIO (Innovative Materials for Noise Protection) CIEN Superficies cuasiplanas - LRI Technologies CIEN Termoplásticos - CFRP New Manufacturing Processes CIEN Sistemas - Development of Fluid Systems Modelling Tools HW/SW validation (Systems V&V) LUS (Laser Ultrasound inspection NDT)
Evektor	2015	30,000 €	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 €	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	4,000,000 €	Competitiveness	Supporting Compression System Technology Development	Development and testing of HPC technologies for efficiency and structures improvements
Piaggio	2015	300,000 €	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 €	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 €	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 FENICS & FUMSECK studies. Cockpit simulation environments for fixed wing and helicopters (PROTEUS) In-kind performed in GENOME for electrical test benches

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AH-SAS - AIRBUS HELICOPTERS SAS	2015	791,722 €	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 WP 4.6 – Power Plant	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)
				GRC WP1 Drag and noise reduction	IKAA-AH-F-2015-A003 - Drag and noise reduction
				GRC WP4.6 (Diesel) High Compression Engine beyond Clean Sky	Drag and noise reduction Relevance to CS programmes: Fully in line with GRC and ECO targets: 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.
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.
FHG - FRAUNHOFER	2015	4,127,000 €	Council Regulation Art 2 a) and b) supporting smart and green Transport through the	WP2 Clean and efficient technology development	Relevance to CS programmes: Fully in line with GRC and ECO targets
SAF - SAFRAN SA	2015	29,000,000 €	Reduction of CO2 emissions Competitiveness	CS1 - SAGE WP2 CROR Ground Test Demonstrator	Safran Additional Activities 2015 Engineering studies for an open air test facility and beginning of building & procurement
				CS2-Engine WP2 UHPE Ground Test Demonstrator	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
				CS2-LPA WP1.1 CROR Flight Test Demonstrator	Power Gear Box technologies maturation Relevance to CS programmes: Open Air test facility adapted to CROR engine is needed to perform the program
INTEC - Intec-Air, SI	2015	117,253 €	Industrial objectives to ensure future competitiveness	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 be 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 Clean Sky. 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.
GKN AERO AB - GKN Aerospace Sweden AB	2015	750,000 €	Contributes towards reducing aircraft fuel consumption and noise	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.
AgustaWestland Ltd	2015	9,200,000 €	Competitiveness Reduction of CO2 emissions Speeding up the development of cleaner air transport technologies for earliest possible	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
				CS2 FRC - WP1.2 NGCTR Air Vehicle Design and Development	Active rotor contro Development of active rotor control technology
AgustaWestland S.p.A	2015	397,813 €	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	72,101 €	Competitiveness Reduction of CO2 emissions	Meggitt Aerospace Ltd operates within CS2 Airframe ITD WPA.4.1.1	Development of piezoelectric ice detection including consideration of SLD discrimination strategies Diffusion Bonded Aero Heat Exchanger (DBAHx). The Diffusion Bonded Aero Heat Exchanger project will bring new technology to heat exchangers for aeronautical applications. Relevance to CS programmes: Alignment with the Engine ITD activties.
SAAB - SAAB AB	2015	6,596,881 €	Competitiveness Reduction of CO2 emissions	WP A-2 Advanced Laminarity Improve the environmental impact of an aircraft by reducing the drag and weight	Automation Research for increased productivity and manufacturability
				WP A-3 High Speed Airframe	Manufactoring Research for advanced manufacturing and assembly processes
					Flight Management Systems HUD Systems, Vision and Awareness studies in rigs and simulators
Total 2015		**144,549,096 €**			

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Airbus	2016	20,000,000 €	Demonstration of technologies contributing to achieve H2020 HLO / targets with respect to environment & competitiveness	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.	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 €	Increasing aircraft fuel efficiency, reducing CO 2 emissions Competitiveness (lower life cycle costs, lower recurrent costs)	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 [e.g. use of a/c]	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 Relevance to CS programmes: Links with demonstrator in WP3.5 in CS2 Regional IADP, HVCE CS2 Airframe ITD for efficiency and productivity increase and with WP3.2.2 in CS2 LPA for technologies linked to the Enhanced Cabin demonstration.
Dassault Aviation	2016	3,000,000 €	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	2016	4,900,000 €	Links are in ENG ITD at various levels; impact to CS and CS2 are found in the field of environmental benefits (noise and CO2 reduction), efficiency and productivity increase, integrated and large scale validation and demonstration activities.	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	Development and validation of aerothermal, mechanical, materials and manufacturing technologies for the LPT of a new generation of large VHBR engines. Manufacturing processes optimisation for high temperature alloys. Advanced materials technology: models for lifing, off-limits usage, and critical processes (welding, casting etc.) Noise reduction technologies
Liebherr	2016	4,800,000 €	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	2016	2,000,000 €	Competitiveness Reduction of CO2 emissions	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 Downstream innovation activity [going beyond CS / CS2 actions towards exploitation]	Development and testing of compressor technologies for efficiency, structural, economic and environmental improvements Development and testing of turbine technologies for efficiency, structural, economic and environmental improvements Research for new materials and advanced manufacturing processes These configurations will significantly reduce the environmental impact and the operating costs of future aircrafts.
Rolls Royce	2016	48,000,000 €	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.	Upstream activity enabling and underpinning CS2 actions Parallel research activity focusing on non-CS2 alternative areas of investigation and amplifying CS2 actions Supporting infrastructure and capacities	Composite Fan development Power gearbox technology development and testing Journal Bearings development Assembly and test resource, including hardware (e.g. tooling, instrumentation, etc.) 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.

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Safran	2016	16,000,000 €	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	Upstream activity enabling and underpinning CS2 actions Supporting infrastructure and capacities	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 €	Council Regulation 558/2017 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	Manufacturing and Production processes Development of processes to recover
MSSDK - Meggitt A/S	2016	5,000 €	Competitiveness Reduction of CO2 emissions	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
ACI - Aernnova Composites Illescas, SA	2016	50,000 €	Industrial objetives to ensure future competitiveness	WP B-1.3 - More efficient Wing technologies WP 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
GKN AERO AB - GKN Aerospace Sweden AB	2016	1,400,000 €	Contributes towards reducing Aircraft CO2 emissions and noise. Strengthens the competitiveness of European aviation industry.	WP4 Advanced Geared Engine Configuration WP2 UHPE ground demo for SMR A/C WP5 VHBR – Middle of Market Technology 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 €	Contributes towards reducing Aircraft CO2 emissions. Strengthens the competitiveness of European aviation industry.	TS B-4 Advanced Fuselage WP 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 Management The fourth work package is in charge of the management of project activities and outcomes 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.
INTEC - Intec-Air, SI	2016	223,813 €	Industrial objectives to ensure future competitiveness	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.

Amended Additional Activities Plans 2014-2016

Clean Sky 2 Joint Undertaking

Governing Board Approval

- 21 October 2016 -

AED - Aernnova Engineering Division, SA	2016	205,414 €	Industrial objectives to ensure future competitiveness	WP. 1.4 HLFC	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:
				WP. 1.2. Rear End	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 €	Industrial objective to ensure future competitiveness	WP B-1.3 - More efficient Wing technologies	Out Of Autoclave Technology; High Integrated Composite Structures; Complex RTM pre-forms injections; Perform conformation
				WP B-4.1 - Roto-less tail for Fast Rotorcraft	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 €	Industrial objectives to ensure future competitiveness	WP B-1.3 - More efficient Wing technologies	Out Of Autoclave Technology; High Integrated Composite Structures; Complex RTM pre-forms injections; and Perform conformation
				WP B-4.1 - Roto-less tail for Fast Rotorcraft	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 €	Industrial objectives to ensure future competitiveness	WP B-1.3 - More efficient Wing technologies	Out Of Autoclave Technology; High Integrated Composite Structures; Complex RTM pre-forms injections;Perform conformation
				WP B-4.1 - Roto-less tail for Fast Rotorcraft	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 €	Competitiveness Reduction of CO2 emissions	WP1.1 Requirements Architecture	Virtualisation and Integration of Design Processes
				WP1.4 Avionics and Platforms	Reduction of development and rework time, Optimization of designed products to reduce fuel burn and emissions. P erformance 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
				WP100.3 Modelling and Simulation Tools	
				WP3.4 Innovative electrical Wing Demonstration	
				WP5 Electrical Chain	
				WP6.4 Integrated Demonstration and Validation	
Finmeccanica Ltd (Helicopter division) AW-Ltd -	2016	6,000,000 €	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	TiltRotor Aerodynamics
				CS2 FRC - WP1.2 NGCTR Air Vehicle Design and Development	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 €	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

Total 2016	**122,377,254 €**
Total Planned 2014-2016 before amendment	**316,220,000 €**
Total Planned 2014-2016 after amendment	**368,043,680 €**
Difference	***51,823,680 €***