Decision of the Governing Board approving the additional activities plan 2019

THE GOVERNING BOARD OF THE CLEAN SKY 2 JOINT UNDERTAKING,

Having regard to the Council Regulation (EU) No 558/2014 of 6 May 2014 establishing the Clean Sky 2 Joint Undertaking[1] and in particular Article 4(2);

Having regard to the Statutes of the Clean Sky 2 Joint Undertaking as annexed to Council Regulation (EU) 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;

2. The private members of the Clean Sky 2 Joint Undertaking have submitted a proposal for the additional activities plan 2019 which contributes to the objectives of the Clean Sky Joint Technology Initiative (JTI);

HAS DECIDED:

Article 1

The additional activities plan 2019 set out in the Annex is approved.

Article 2

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

Done at Brussels, 29 March 2019

On behalf of the Governing Board, through written procedure No. 2019 –02

Axel Krein
Executive Director

Annex - Additional Activities Plan 2019; (ref. CS-GB-Writ proc 2019-02 Annex AAs Plan 2019)

[1] OJ L 169/77, 7.6.2014

Additional Activities Plan 2019
Clean Sky 2 Joint Undertaking

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
ACI - Aernnova Composites Bascas, SA	2019	25.000,00 €	ITD – AIRFRAME - B - High Versatility Cost Efficient	AIR WP B-1.3 - More efficient Wing technologies AIR WP B-4.1 - Rohi-less tail for Fast Rotorcraft	High Integrated Composite Structures : 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. Activities developed under the scope of: - Project AVANW INGLET - H2020 - Project IRENE – CDTI-2017 - Project FILLER - CDTI-2017 High Integrated Composite Structures – cocured processes. Perform conformation Automation manufacturing process R&T project expenditure
ACIENG - ACITURRI ENGINEERING SL	2019	350.000,00 €	This activity is completely aligned with the CS2 HLOS, focusing in particular in the CO2 and NOx reduction via the reduction of weight in aircraft components. Furthermore, this project will provide potential advantages in terms of manufacturing where, besides cost reduction impact, there is also a clear potential CO2 reduction in the manufacturing process itself (due to out of autoclave process). This thermoplastic spoiler, together with the intensive implementation of thermoplastic welding, aims to eliminate the use of fastener in elementary parts joints saving weight and simplifying overall manufacturing process. This activity can be considered as a spin-off project of the main EWIRA project expanding its outputs via a one to one comparison between two components with the same requirements, providing sounding results to validate a more intense application of thermoplastic processes in aerospace. Other clear advantages of the technology is its reparability potential which also contributes to an overall life cycle CO2 reduction enlarging component service life.	REG WP3.5.1 - TECHNOLOGIES FOR FTB#2 WING INTEGRATION	Thermoplastic Spoiler Demonstrator: From the EWIRA composite spoiler component, it has been identified as very useful the definition, manufacturing and testing of a thermoplastic version of it. This variation would consider both thermoplastic materials and processes (in particular thermoplastic welding) in order to obtain a highly integrated structure. Taking the advantage of the "flyable" EWIRA spoiler component as reference; the outcome of this project would deliver a demonstrator providing robust KPI to assess the benefits expected in terms: of weight, manufacturing environmental footprint (including reparability impact) and time savings of this alternate configuration. Although thermoplastic materials and manufacturing process have been evaluated since years challenges (between others) of material qualification, manufacturing conditions, and the already available infrastructure for thermoset manufacturing have prevented from a faster development. This project aims to ease this challenges and provide a robust comparison to a thermoset process to highlight the real benefits of the technology enhancing its use. The project is divided in 6 WP which will be devoted to the following activities: WP1: Joint product-manufacturing process specifications; with specific focus in manufacturing rate and including also specification of welding processes, tooling and reparability. WP2: Concept design of the spoiler, will cover the spoiler adaptation to the thermoplastic manufacturing and consider material characterization and selection. WP3: Thermoplastic transformation process analysis. Dealing with the detailed definition of the manufacturing parameters, tooling behaviour and identification of influence factors in it. Important simulation activity is considered in this WP. WP4. Thermoplastic welding process definition, including joint characterization and reparability conditions. WP5: Design and simulation of tooling and moulds; providing as outputs guidelines on thermoplastic tooling. WP6: Tooling manufacturing and validation; which comprises also a spoiler demonstrator manufacturing and testing (component characterization), and would also include conclusions on the reparability potential of the solution. Close relationship between WP with activities parallelization is considered to facilitate iteration. Contributions of ACITURRI in this project would be R&T expenditure: personnel costs, materials, tooling and testing. Testing and tooling manufacturing would be subcontracted(tooling design is internal). Support from Research Institutions is also considered in terms of access to particular infrastructure.
AED - Aernnova Engineering Division, SA	2019	283.081,00 €	Industrial objectives to ensure future competitiveness	AIR WP B-1.3 - More efficient Wing technologies LPA WP 1.2 - REAR END LPA WP 1.4 - HLFC HTP LPA WP 1.4.4 - HLFC WIN	With the aim of improving aeronautical structural parts: -Development of WAAM technology as an alternative of titanium forging. -New fire resistance Thermoplastic materials for interiors. - New materials for low cost tooling for autoclave curing composite structural parts. + TRANSFORM 3D. Relevance to CS programmes: WAAM (Wire Arc Additive Manufacturing) - Within TRANSFORM3D AED is developing WAAM technology as an alternative of titanium forging for aeronautical structural parts + ADVANCED RESEARCH IN FIRE RESISTANCE MATERIALS FOR INTERIORS - New fire resistance Thermoplastic materials for interiors. FENIX Programme + RESEARCH IN ADVANCED MANUFACTURING TECHNOLOGIES FOR FLEXIBLE AND EFFICIENT PRODUCTION OF WINGLETS OF COMPOSITE MATERIAL: "AVANW INGLET" - New materials for low cost tooling for autoclave curing composite structural parts R&T project expenditure
CASA - AIRBUS DEFENCE & SPACE SAU	2019	5.625,000.00 €	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	Eco efficient manufacturing and materials (structural insights, low cost thermosets, Al Alloys, reach compliance projects.) Competitive Design Processes and tools for future A/C configurations (New Conceptual design methods, simulation for improved performances, acoustic propagation predictions in early stages., low-noise aeroacoustics) Platform systems/ systems research and innovation (arcs detection and protection, active control for landing gear, primary distribution units, power systems minimum losses) CERTERIN: Certification of structural Insights MALTA2020: Manufacturing and Automation of Low Cost Termosets FLY3D: Additive Technologies for Al alloys PLATCOM: Platform conceptual design methods Icing R+I: Icing prediction and accretion simulation FINESSE : prediction of acoustic propagation Quite Transport A/C: Noise prediction in early stages INTONE : Aeroacoustics design processes for future A/C configurations Arc Fault Detection: Arcs detection and protection for DRCO LDG MR: Shock absorber with active control based on magnetorheological fluids High Power Conversion and Distribution : Distribution based on smart contactors in high voltage network LDG-DB: Landing Gear Differential Braking PwrOptiDesign: Capability to optimize power systems via multi-objective optimization Wifi Connection: Integration of on-board communication with WIFI connection Mission Automation and Autonomy: Automatic trajectory planning, A/C flightpath optimization REACH: Chromate and Cadmium free projects
A-CE - AIRBUS SAS	2019	23.000.000,00 €	Demonstration of technologies contributing to achieve H2020 HLO / targets with respect to environment & competitiveness	LPA Airbus AA 2019-01 - Integration of advanced propulsion systems and engines, innovative technologies such as more electric power generation, to reduce aerodynamic drag and weight of main airframe components. Reduction of crew operations in cruise, cabin and cargo cost of operations and maintenance and flight crew cost. Improvement of data processing and communication	Additional activities to define and develop key technologies for next generation large passenger aircraft adding resources and means as well as expanding the scope of activities done in CS2 LPA and Airframe. Additional Activities are in particular addressing R&T on targeted demonstrations for laminar flow technologies, the integration of highly efficient UHBR-engines and the disruptive cockpit for a next generation large passenger aircraft. • Define and develop concepts to integrate highly efficient Ultra High Bypass Ratio Engines (UHBR) to future large passenger aircraft: Define interfaces, 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 particular with engine manufacturers, and important potential suppliers for structure, systems and other equipment. The activities encompass the multidisciplinary design of concepts to all respects of isl performance and functionality, including all issues of operation, maintenance and repair. The activities in 2018 will also address the definition and preparation of tests and Demonstration of an integrated engine solution. • 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 respectively extended by additional activities outside of CS2, partly Airbus self-funded , partly funded in national funded R&T projects • Provide facilities, instrumentation and skilled experts for large scale demonstration on aerodynamics, structure and operational use of laminar wings and laminar surfaces. Facilities, equipment and resources for R&T activities on aerodynamic, aero-loads and structural features and behaviour for large transport aircraft components designed in laminar flow technology for large scale demonstration under operational conditions. • R&T and development of laminar wing manufacturing maintenance and repair technologies for large transport aircraft: Accompanying research and technology work to develop the required Technologies and manufacturing methods for laminar wings for potential application on large passenger aircraft, not funded in Clean Sky / Clean Sky 2 partially with test and Demonstrator items developed in CS and CS2 • New data processing communication platform. Enable Services creation at both, aircraft and fleet Level based on an advanced digital platform, on-board processing and storage, efficient customization at Airbus and Airlines, full connectivity • development and validation of more electric technologies for on-board power generation, storage and management: Reduce Mission fuel burn by implementing technically and economically optimized sytem architectures and corresponding Non Propulsive Energy (NPE) extraction impact on engines (operability and cost)

ITI - ESI ITI GmbH (ex-ITI GESELLSCHAFT FUR INGENIEURTECHNISCHE INFORMATIONSVERARBEITUNG MBH)	2019	207,521.00 €	Reduction of development and rework time, Optimization of designed products to reduce fuel burn and emissions	SYS WP 1.1 - 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 predictive 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 in 2019 with objectives relevant and well in line with the CS2 activities: 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 FMMBM – german, national funded project, activities focus on definition and implementation of physical ports on functional mockup units (FMU) as tool independant way of behavioural model exchange in collaborative workflows. R&T project expenditure, Internal development project expenditure
ITP - Industria de Turbo Propulsores S.A.	2019	1,991,000.00 €	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. 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 CO2 emissions by 20 to 30% compared to "state-of-the-art" aircraft entering into service as from 2014; (ii) reducing aircraft NOx 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	The activities described herein are relevant to the CS2 objectives and they are included within the scope of the following R&T Projects: * FP7: None * National projects: FUTURALVE, BOOSTER-2, COLD SPRAY, TALDEA and ENVIDIA The following activities relevant to CS2 overall objectives will be performed: * Development of high fidelity CFD and mechanical models for high speed turbines design * Simulation models and tools for design automation and multi-parameter optimisation * Manufacturing simulation: simulation models for additive manufacturing, casting, finishing processes and laser/EBW/CMT welding. Advanced micro-structure high temperature material model. Technologies for manufacturing process data capture, analysis and machine monitoring. * Additive Manufacturing: analysis of the influence of the powder in the manufactured material. * TiAl casting process: optimisation of the melting and casting process. Analysis of chemical composition impact in the microstructure and mechanical characteristics of the casted material. * Advanced machining for material integrity and high throughput: development of high speed broaching process and advanced cutting tools, grinding process for TiAl blades, high productivity EDM and automated finishing processes for castings, forgings and sheet metal. * New tooling concepts for high speed turbines: new tooling concepts for improved machining productivity and process automation. * Development of welding technologies for high speed turbine components: automation and sensitivity analysis to process parameters for arc welding, TIG-PAW and EBW. Repair of Ni-based alloys. Feasibility analysis for the implementation of new welding processes with low thermal impact as laser welding (LWB), and cold metal transfer (CMT) * Modeling, monitoring and control of machining and inspection processes modeling and monitoring: turning, milling, broaching, FPI, high isostatic pressure sintering and tooling integration in process monitoring. Part scanning and 3D measurement and in-process measurement of the part and cutting tool. * Low pressure compressor: development and validation of aerodynamic, materials mechanical and manufacturing technology for advanced low pressure compressors. FOD analysis and simulation tools. * Repair of high temperature alloys using cold spray technology. 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 intermediate low pressure spool 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 High performance simulation: Simulation models and tools for the aero-thermo-mechanical simulation of the intermediate pressure turbine and low pressure compressor; for the automation and multi-parameter optimisation of the design process and for the simulation of manufacturing processes.
LDO-Ltd - Leonardo MW Ltd (ex-AGUSTA WESTLAND Ltd)	2019	6,000,000.00 €	Speeding up the development of cleaner air transport technologies for earliest possible deployment	FRC WP1.2 - NGCTR Air Vehicle Design and Development	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) R&T Expenditure
LDO VEL - Leonardo Spa (Aeronautic Sector - ex Alenia)	2019	3,389,000.00 €	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-3.1 - Advanced integrated empennages for regional aircraft AIR B-4.3 - More affordable composite fuselage REG WP1 - High efficiency Regional Aircraft REG WP2.1.1 - Innovative wing structure design and manufacturing REG WP2.3 - Energy optimized regional aircraft REG WP2.3.1 - Low Power wing ice protection system **REG WP3.1 - Adaptive Wing Integrated Demonstrator (FTB#1 and OWB)** **REG WP3.2 - Fuselage/Cabin Integrated Demonstration**	1 - Low cost composite materials (design and construction): R&T activities on low-cost composites materials that allow to reduce the cost of application to the case aeronautical while respecting the certification requirements and quality required for that use. Two different technologies development lines are considered: the first is on new (proprietary) thermoplastic matrix composite materials, the second on low cost thermo-settings and adhesives. 2 - Hybrid Propulsion and Innovative Systems for a Regional A/C: the objective is to identify critical areas of the design of an electric/hybrid regional aircraft regarding enabling technologies (more electric aircraft), aircraft configuration, propulsion architectures and electrical equipment. 3 - Ice Detection Sensors for Regional A/C: research activities aimed at increasing the flight safety in icing conditions especially for the SLD icing conditions. Contribute to filling the current knowledge gaps on the conditions at the border of the current specification for App. O conditions (Specs, ice detection, flight tests, evaluation of sensors technologies). 4 - Validation of new generation 3D icing engineering tools: the top-level objective is to validate new generation 3D icing engineering tools (numerical simulation and test capabilities) addressing App.C, O and snow conditions, for safe, efficient and cost effective design and certification for future regional aircraft and rotorcraft. 5 - Technological Development for the manufacturing of Vertical Stabilizer panels in composite material: continuation of research activity to improve innovative structural solutions (both from design and manufacturing point of view) to be implemented on empennages of a regional aircraft. 6 - Advanced Technological Studies for optimization of regional aircraft production: to perform studies and preliminary implementation of innovative solutions for quality improvement and costs reduction of regional aircraft manufacturing and assembly. 7 – Regional aircraft maintenance costs reduction: identification of the regional aircraft major areas, considering also innovative technologies, to maintenance costs reduction and study of selected items. 8 - Structural/Systems Provisions and Equipment for Installation and Operation of CFs Hardware Deliverables to be used for REG IADP Demonstrators Manufacturing, Assembly, Inspection: Completion of building provisions to install and operate hardware deliverables of CfP Projects to be used for REG IADP Full-scale Demonstrators. 1 - Low cost composite materials (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 "Adaptive Wing Integrated Demonstrator (FTB#1 and OWB)" for the OWB ground demonstrator. Impact to CS2 are found in the field of environmental benefits as well as of competitiveness in terms of efficiency and productivity increase. 2 - Hybrid Propulsion and Innovative Systems for a Regional A/C: Main links are with REG IADP WP1 "High efficiency regional aircraft" and WP 2.3 "Energy optimized regional aircraft"; Impact to CS2 are found in the field of environmental benefits (noise, CO2, NOx reduction) 3 - Ice Detection Sensors for Regional A/C: Links are with REG IADP WP 2.3.1 "Low Power wing ice protection system". Impacts to CS2 are found in the synergy with this WP to obtain both environmental and competitiveness benefits 4 - Validation of new generation 3D icing engineering tools: Links are with REG IADP WP 2.3.1 "Low Power wing ice protection system". Impacts to CS2 are found in the synergy with this WP to obtain both environmental and competitiveness benefits. 5 - Technological Development for the manufacturing of Vertical Stabilizer panels in composite material: Main links are with CS2 REG IADP WP 2.1 "Adaptive Electric Wing" and AIRFRAME ITD WP B-3.1 "Advanced Integrated Empennages for Regional Aircraft". Impact to CS2 are found in the field of environmental benefits (noise, CO2, NOx reduction) as well as of competitiveness in terms of efficiency and productivity increase. 6 – Advanced Technological Studies for optimization of regional aircraft production: Main links are with CS2 REG IADP WP 3.2 "Fuselage/Cabin Integrated demonstrator". In particular for the fuselage structural demonstrator, Impact to CS2 are found in the field of competitiveness in terms of efficiency and productivity increase. 7 – Regional aircraft maintenance costs reduction: Main links are with CS2 REG IADP WP 2.2.3 "Performance and Health Monitoring". Impact to CS2 are found in the field of competitiveness in terms of maintenance cost reduction. 8 - 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 "Adaptive Wing Integrated Demonstrator (FTB#1 and OWB)" for the part related to the Outer Wing Wing Demonstrator as well as with WP 3.2 "Fuselage/Cabin Demonstrator". Impact to CS2 are found in the field of competitiveness in terms of efficiency and productivity increase. R&T project expenditure (National Research Project – LDO VEL in-kind contribution) - R&T project expenditure (European Research Project – LDO VEL In-kind contribution) - Research project expenditure (LDO VEL Internal activity) - Expenditure for infrastructures
LDO Spa - Leonardo Spa (Helicopter division - ex AW Spa)	2019	3,500,000.00 €	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. R&T Expenditure
LEG - LIEBHERR ELEKTRONIK GMBH	2019	60,000.00 €	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	2019	2,300,000.00 €	Industrial Leadership.	SYS WP3 - Smart Electrical Wing SYS WP4 - Landing gear systems	Flight Control System Technologies: Activities on System aspects and electronics. Complementary to studies and demonstrator set up supporting SYS ITD Demonstration. Landing Gear Systems: Activities complementary to SYS ITD WP4 on System Architecture, Structure and Materials, and Optimisation of critical components. Nat. funded project on: Landing gear system design aspects, health monitoring solutions, tests of new components. Nat. funded project on: Innovative flight control solutions partly being physically integrated into CS2 Demonstrator. Upstream projects, studies, testing of demonstration components.
LTS - LIEBHERR AEROSPACE TOULOUSE SAS	2019	2,800,000.00 €	Liebherr Aerospace Toulouse SAS complementary R&T activities are contributing to the CS2 programme high level objectives: • To secure key technologies enabling some of CS2 major demonstrators To reach their objectives, - To develop systems that will act as key enablers for game changing aircraft configurations such as More Electric aircraft and Bleedless Engines. - To support the development of configurations that will significantly reduce the environmental impact and the operating costs of future aircrafts.	SYS WP5 - Power management center 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 LPA WP1.5 - Applied technologies for enhanced aircraft performance LPA WP 2.3.7 - System and Component Installation	Liebherr Aerospace Toulouse SAS complementary R&T activities are related to the development of architectures and the design & manufacturing of associated key technology bricks for the following systems or items: - Vapour cycle System - Cabin Air Quality - Wing Ice Protection Systems - Power Management - Electrical & Hybrid Environment Control System - Pressurization System - Control and Power Electronics - Innovative Manufacturing & Eco Design Liebherr Aerospace Toulouse SAS complementary R&T activities are essential to support and to secure the development of key technologies to reach some of CS2 major demonstrators objectives (Cf. list). Especially, the systems developed are key enablers for the 'More Electrical Aircraft' (MEA) vision and will contribute to enable & optimize future aircraft system architectures for Bleedless engines aircraft. These innovative configurations will significantly contribute to reduce the environmental impact (especially in operations) and the operating costs of future aircrafts. • Wing ice protection system: Activities complementary with : - SYS ITD WP6.2 Ice protection system - SYSTEM D14 Advanced Electrothermal Wing Ice Protection Demonstrator • Air quality: Activities complementary with : - SYS ITD WP6.1.4 Cabin comfort - SYSTEM D 11 & D12 - Next Generation ECS for large A/C & Regional A/C • Power management: Activities complementary with : - SYS ITD WP5 Power management center - SYS ITD WP6.1 Electrical air system and thermal management - SYS ITD WP6.4 integrated demonstration and validation - SYSTEM D10 - HVDC Power Management Centre Demonstrator on PROVEN test rig - SYSTEM D11 - Next generation EECS Demonstrator for large A/C - SYSTEM D13 - Next generation cooling systems demonstrators • Air system and thermal management: Activities complementary with : - SYS ITD WP6.1 Electrical air system and thermal management - SYSTEM D11 - Next generation EECS Demonstrator for Large A/C - SYSTEM D13 - Next generation cooling systems demonstrators - SYSTEM D10 - Thermal Management demonstration on AVANT Test rig - LPA Platform 2 WP 2.3.7 System and Component Installation - LPA Platform 2 - D2 Next Generation Fuselage and System Integration Demonstrator • Harsh environment components (HX, Valves,...): Activities complementary with : - SYS ITD WP6.1 Electrical air system and thermal management - SYSTEM D11 Next generation EECS Demonstrator for large A/C - LPA platform 1 WP1.5 Applied technologies for enhanced aircraft performance - LPA Platform 1 - D11 Active Flow Control Flight Test Demonstration - LPA Platform 1 - D10 Ultra Fan flight Test Demonstration. Complementary R&T projects.

UTRC - UNITED TECHNOLOGIES RESEARCH CENTRE IRELAND, LIMITED	2019	1,000,000.00 €	Reduction of CO2 emissions Competitiveness	SYS WP100 3 - MISSION SYS WP6 0 2 - eECS	The IDA-funded Centre of Excellence for Cyber Physical Systems in Aerospace project commenced in July 2015, with an expected duration of 4 years. This research program is enabling United Technologies Research Centre, Ireland (UTRCI) to develop new technologies and capabilities in Ireland to directly support a new generation of energy efficient, environmentally friendly, commercial aircraft systems, through research activities in model-based design and certification, advanced life-extending controls and prognostics and health management. The program consists of 5 research themes as follows: The Aircraft System-level Modelling research theme is developing a hierarchical approach to aircraft system integration, providing the capability to rapidly generate architecture trade-off studies incorporating multiple mission, operational, and regulatory profiles. The Distributed Aircraft Electrical Systems research theme is developing relevant architectures and control paradigms for future more-electric commercial aircraft through the investigation of optimal power system architectures, control methods, advanced communications, and power electronics converter design. The Prognostics & Health Management (PHM) theme is developing data analytics tools that detect, diagnose and predict faults or maintenance issues in aircraft components over varying time scales of operation. The Model-based Design for Cyber-physical Systems theme is derive a consolidated model based design (MBD) methodology using advanced tools and techniques for the simulation, validation, and verification of cyber-physical systems. The Model-based Certification for Aerospace theme is developing validation techniques based on model-based certification (MBC) and virtual testing principles, in order to support compositional "design-for-certification" methods for safety- and mission-critical aerospace systems. Centre of Excellence in Cyber-Physical Systems for Aerospace: The Centre of Excellence in Cyber-Physical Systems for Aerospace is partially funded by the Industrial Development Agency (IDA) Ireland . This centre 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. 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.
ZAET - ZODIAC AEROTECHNICS SAS	2019	330,096.00 €	Product maturation and validation (WP6 2 2 2 PFIDS & WP6 2 2 3 AIIS)	SYS WP6 2 2 2 - PFIDS development SYS WP6 2 2 3 - AIIS development	Environmental tests for PFIDS allowing validation of the IAR (ice accretion rate) and IX (ice crystal detetection) functions. Functions optimization for AIIS to provide accurate droppiets analysis. Environmental tests for PFIDS: Ice Wind Tunnel Tests for PFIDS Functions optimization for AIIS: Software development and algorithm optimization Tests and development

Total Planned 2019 subject to GB decision CS-GB-Writ proc 2019-02 AA Plan 2019	193,709,263 €

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