

Clean Sky 2 and Synergies with PT2020 Information Day

3 February 2017, Lisbon

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Regional dimension of Clean Sky



High level Scenarios for Synergies with ESIF

- ✓ Upstream support (*Swedish Regions*)
- ✓ Parallel funding (*Swedish Regions, Cataluna, CZ*)
- ✓ Sequential funding / downstream support (*Cataluna, Midi Pyrenee*)
- ✓ Thematic approach/calls (*Midi Pyrenee, Campania..*)
- ✓ “Seal of Excellence” type – “CSJU synergy label” (*Andalucia, Castilla*)



Certificate delivered by the Clean Sky 2 Joint Undertaking



ESIF action plan up to date

55 MS/Regions
with CSJU linked
priorities in RIS3



12
MoU

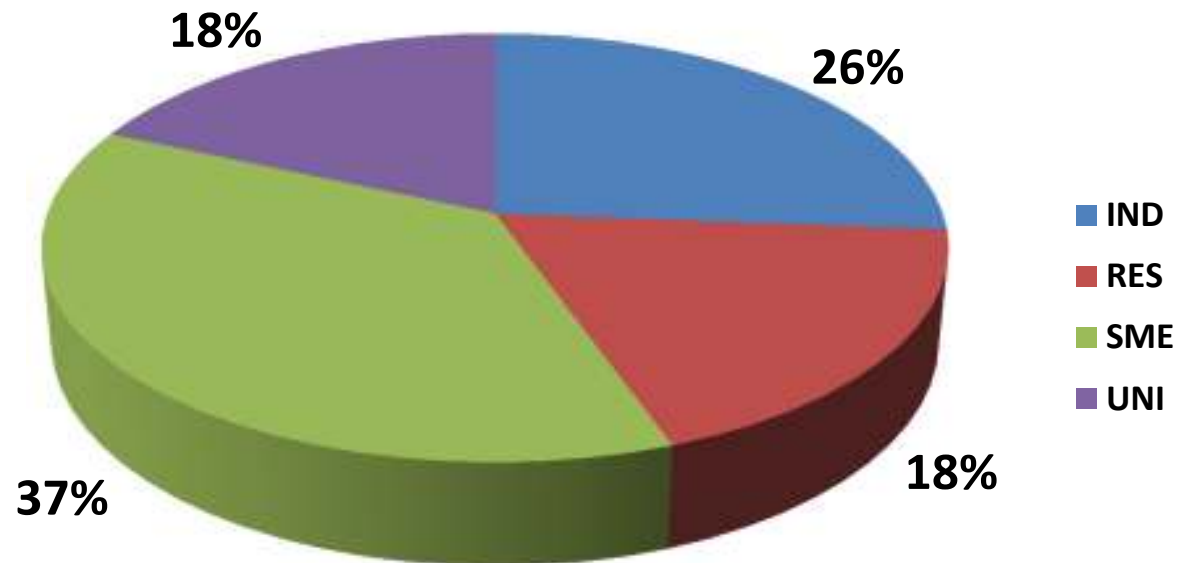


7
Pilot
Projects

4
Synergy
Labels

CfP Participants: Breakdown – CfP01 - 04

CfP04 data subject to GB adoption



109 SMEs via first 4 CfP

CfPs Funding breakdown =180.39 M*

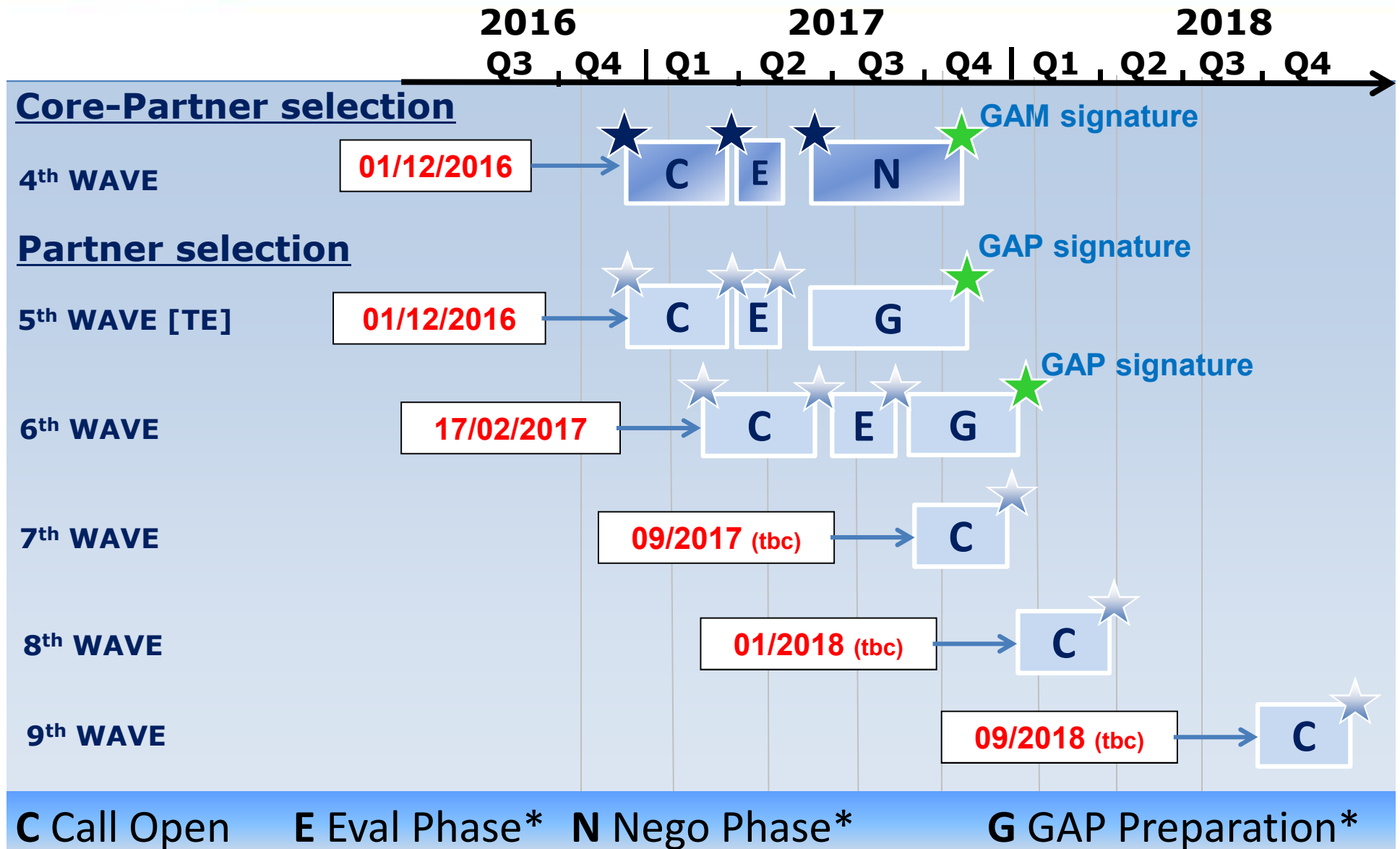
- IND: 24%
- RES: 32%
- SME: 24%
- UNI: 20%

Status after 4 CfPs and 3 Core Partners calls

- ✓ **294** Partners (!)
- ✓ **133** Core Partners (!)

*Final figure subject to negotiation outcome

Overall High-level Call Planning for 2017-18 (planned)

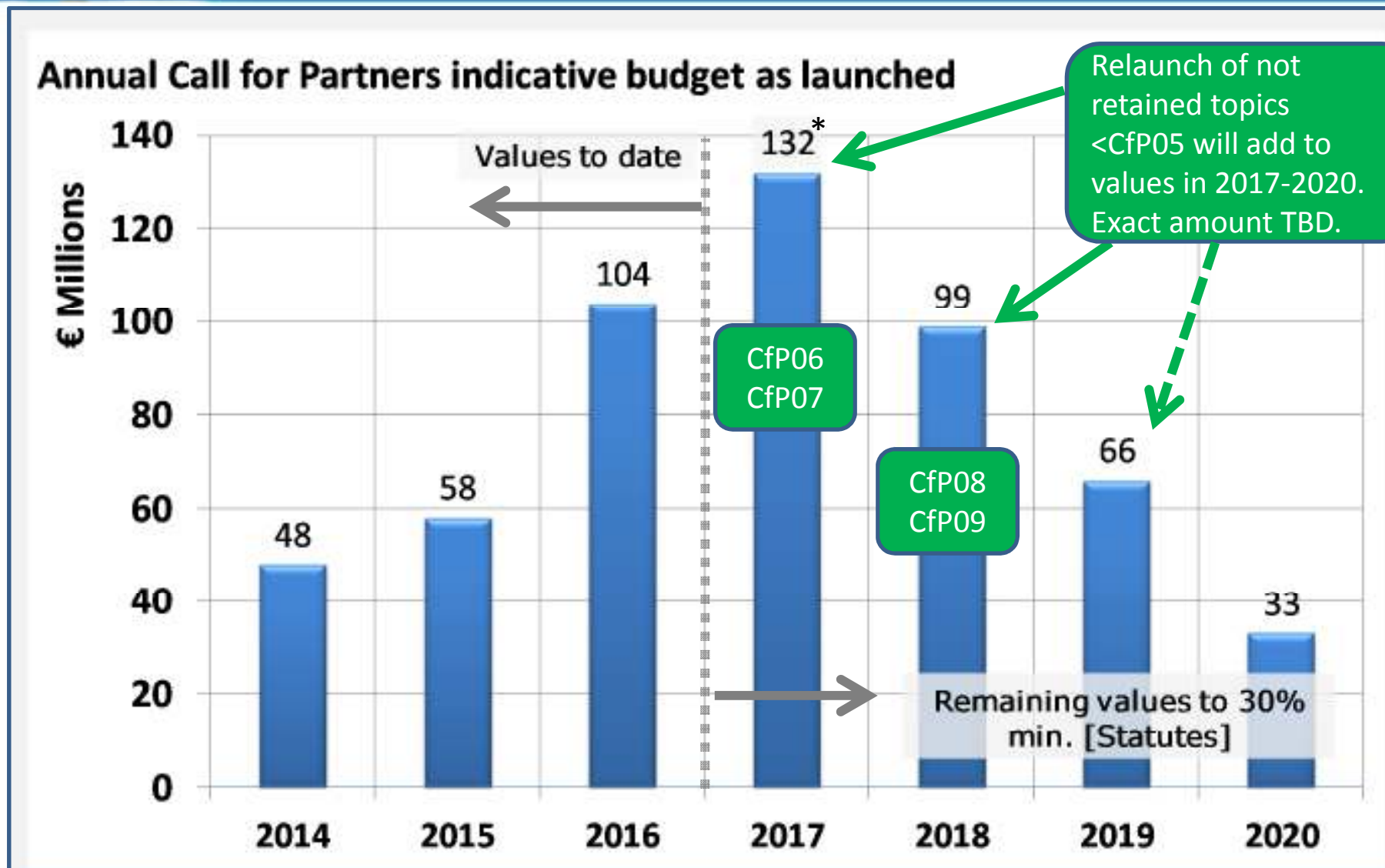


*These phases includes the GB Approval Period

CFP call funding 2014 – 2020

Current assumption:

- 2 CfP 2017 & 2018
- 1 CfP 2019 & 2020

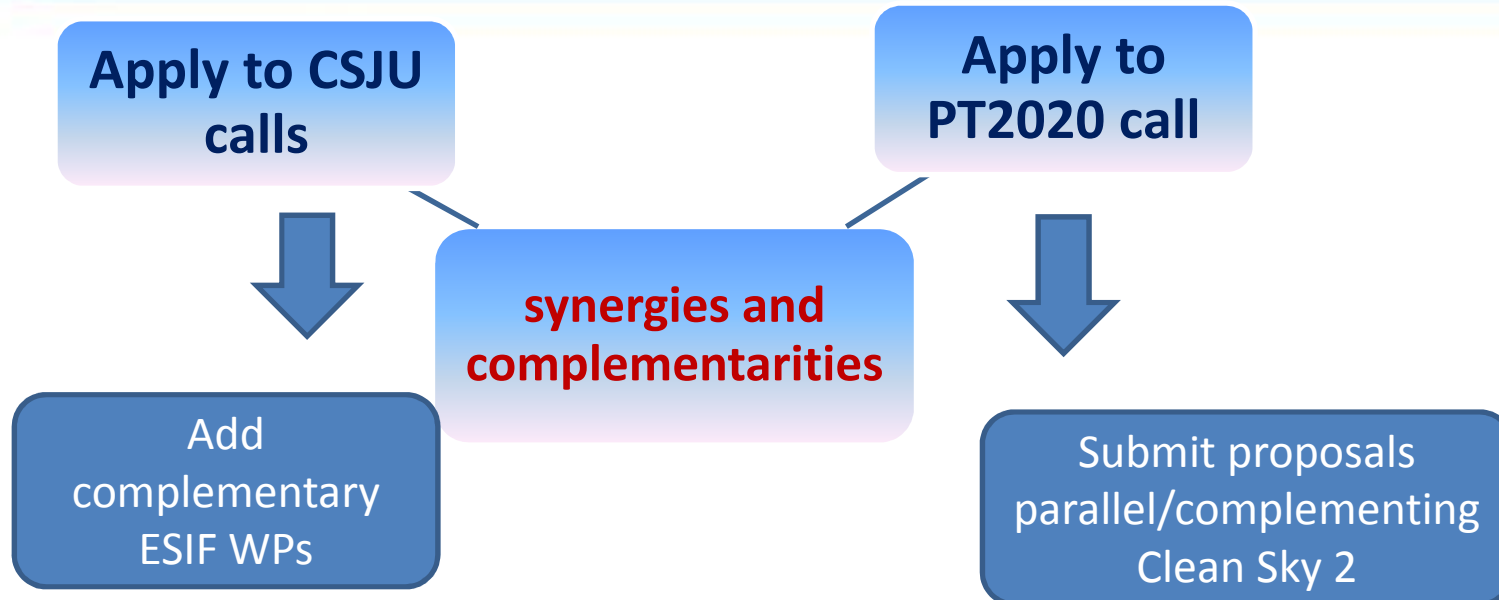


* Value as supplied in Financing Decision and WP, i.e. excluding carry-forward

A shared vision for implementing the MoU action plan

- ✓ **Dedicated action towards stakeholders:**
 - explain MoU strategy (benefits and how PT2020 calls will be linked to CSJU)
 - encourage application to CSJU calls and build up of complementary proposals
- ✓ **Ensure involvement of stakeholders to identify strategic areas linked to CS2 technology roadmap and also looking at Clean Sky 3 build up.....**
- ✓ **Keep MoU at strategic and programmatic level , also a political tool to support the aeronautical sector by a better integration of EU and National/ESI funds**
- ✓ **Foster synergies and leverage effect in PT2020 :**
 - ✓ **at upstream level - RIS3 priorities fit very well with CS2 :**
 - link RIS3 priorities and CS2 in the ESIF Operational Programmes
 - use R&I National call and Aero thematic calls for 2017-2018 like other MoU (Midi Pyrenees, Campania etc)
 - ✓ **at parallel/sequential level support complementarities identified by CSJU beneficiaries**
 - support use under national calls of the “CSJU synergy labels”
 - for activities not labelled yet , involve CSJU in the national evaluation procedure

Opportunities are there Action is now with PT Stakeholders



- More coordinated/integrated approach between PT2020 and H2020 to meet high R&D challenges in aeronautics
- More European level and targeted R&I projects linked to CS2 demos and the strategic roadmaps of its European Leaders
- Play a more strategic role in the Programme via ESIF support also looking at Clean Sky 3 build up.....
- Integration of ESIF activities in Clean Sky 2, more impact and market uptake



Events to participate

- Clean Sky Forum **21-22 March 2017** an occasion for a general update on the Programme
- Joint EC- CSJU workshop in May-June (tbc) at the Committee of the Regions on synergies and the possible launch of a Platform or Network of “Aviation/Aeronautics Regions”
- All Regions/MS under MoU will be invited to exchange on best practices , all other Regions with RIS3 priorities in the field will be invited to participate

LPA: Multi-annual overview and planning for 2018-2019 (extract)

Platform 1: “Advanced Engine and Aircraft Configurations”:

- Integration of the most fuel efficient propulsion concepts into compatible airframe configurations and concepts targeting next generation short and medium range aircraft - considered propulsion concepts range from the CROR engine architecture over advanced Ultra-High Bypass Ratio (UHBR) turbofan to hybrid propulsion concepts.
- Development of integrated flow control techniques for advanced aircraft performance for the whole operational envelope

Platform 2: “Innovative Physical Integration Cabin – System – Structure”:

- Concept of a next generation multifunctional fuselage, but also paying attention to potential spin-offs for current concept upgrades, aircraft cabin&cargo systems, associated modules and major components shall be developed and integrated into one single full scale cabin & cargo demonstrator platform.
- Activities will be framed by research activities to provide technologies for automated manufacturing and assembly in particular also including virtual tools and testing means, tailored to the needs of a factory of the future.



LPA: Multi-annual overview and planning for 2018-2019 (extract)

Platform 3: “Next Generation Aircraft Systems, Cockpit and Avionics” incl. advanced systems maintenance activities.

- Development, integration and tests of the functions and technologies developed by the several Core partners in Platform 3 and in the SYS ITD, within the large aircraft disruptive cockpit, regional aircraft active cockpit and business jet ground demonstrators.
- Flight tests for selected functions and technologies will be prepared and executed on Large Aircraft and on business jet.
- Definition and design of the overall integrated system for pilot workload reduction, roadmap for certification analysis and delivery of HW prototypes for individual integration into the demonstrator will be matured.
- The Active Cockpit Demonstrator enhancement plan will be fulfilled and the final test plan for on Ground Workload Reduction Assessment will be delivered.
- Development and integration of the large Aircraft Disruptive Cockpit demonstrator will be launched, and operational test scenarios will be defined for the demonstration phase 1.
- The Development and integration of major demonstrators for ADVANCE enabling Technologies (Health Monitoring, Collaborative Environment and line maintenance mobile tool applications)

REG : Multi-annual overview and planning for 2018-2019 (extract)

Technical activities will cover further development of technologies, detailed definition of technologies integration into each demonstrator, design of demonstrators, laboratory testing and Wing Tunnel Tests (WTTs).

For several demonstrators, the manufacturing phase will also start in this period. Core Partners (CPs) will provide key contributions towards the maturation of relevant technologies as well as for the design and manufacturing of the full scale integrated demonstrators.

The main high-level objectives pursued in this timeframe are:

- design loops (2&3) through preliminary a/c design activities for both a/c config's;
- completion of the detailed design phase for the Demonstrators;
- achievement of Demonstrators Critical Design Reviews (CDRs);
- manufacturing of parts and components to be integrated into the demonstrators;
- qualification of items for safety of flight;
- deliver of Aircraft Simulation Model (ASM) to TE (2nd and 3rd loops);
- deliver of inputs to ECO TA for LCA evaluations;

In WP2.2 (Regional Avionics)

Leader (LNM VEL) will continue activities related to the Integrated Vehicle Health Management (IVHM) focusing on the definition of maintenance application SW requirements; the maintenance application SW development will be started.



FRC: Multi-annual overview and planning for 2018-2019 (extract)

Activities relevant to the NextGenCTR demonstrator:

- Overall aircraft level PDR will be performed; along with sub-system PDR for technologies related to the wing, airframe structure, transmission, avionic and flight control systems. Design and manufacture of tooling and tests rigs will commence.
- Low speed WT testing started in 2017 will continue, Interactional aerodynamic and high speed wind tunnel testing will be started.
- Design activities will progress throughout 2019 with increasing maturity to support CDR in 2020. Tool design and industrialisation for manufacture will continue along with test rig manufacture.

Activities relevant to the LifeRCraft demonstrator:

- CDR at LifeRCraft level should be attained in Dec 2018, supported by a CDR in 2017. Both milestones will be supported by sub-systems PDR and CDR for technologies related to the wing, canopy, fuselage, tail-boom, rear-parts, rotor, propeller, landing gear, cowlings, and electrical system.
- Design and manufacture of tooling and tests rigs will continue.
- After CDR at LifeRCraft level in Dec 2018, detailed design activity will continue in 2019. Manufacturing, started in 2018, will continue in 2019. Demonstrator assembly will start mid-2019.

AIR: Multi-annual overview and planning for 2018-2019 (extract)

Technology Stream A-1: Innovative Aircraft Architecture:

WP A-1.2 (UHBR and CROR configuration): evolution of UHBR technologies will be performed with a target to achieve TRL4 by mid-2018 before transfer to LPA for integration. After the economic viability gate mid-2017 for the CROR, technologies will be matured up to TRL $\frac{3}{4}$ by end 2019 before the transfer to LPA (AIB).

Technology Stream B-3: Advanced integrated structures:

WP B-3.3 (Advanced integrated cockpit): it is planned to have all the CDR for the technologies of Structural Health Monitoring System (SHMS), Ergonomic interior lay-up, Multifunctional materials for Acoustic and impact protections, and completion of all the ground tests

WP B-3.6 (New materials and manufacturing): technologies related to eco-efficient factories, assisted composite manufacturing, future leakage identification systems, integration of testing systems on iDMU and automated testing technologies will be demonstrated on ground after final selection of the concepts and processes (CASA, PASSARO, partners COBOMEGA, TAMI and partners selected in call for proposal wave06).

ENG: Multi-annual overview and planning for 2018-2019 (extract)

WP 2 – UHPE Demonstrator for SR/MR aircraft (Safran Aircraft Engines):

In 2018 the Critical Design Review (CDR) of UHPE demonstrator shall be performed. Based on CDR conclusions, the manufacturing parts shall be launched (parts on critical path shall be launched before CDR to ensure the TTF in Oct. 2019). Engine Assembly shall start end of 2018/beginning of 2019. The engine tests shall start in October 2019.

WP 3 – Business Aviation / SR Regional TP Demonstrator (Safran Helicopter Engines):

Sub-modules of the demonstrator are expected to be delivered during 2018. In particular, the power & accessory gear box (PAGB) should be delivered and the tests should start on the PAGB partial test rig whose delivery is also planned in 2018. Following delivery of the propeller, nacelle and engine parts, the engine demonstrator will be built. It is planned to light the demonstrator in 2019. In parallel, partial tests for an upgraded compressor test module will be prepared.

WP 5 – VHBR – Middle of Market Technology (Rolls-Royce):

2018 will focus on continued maturity of the UltraFan™ demonstrator design with the technical solution development iterated between sub-system/product system and whole engine culminating in a preliminary design review (PDR). In parallel the supply chain definition will continue such that on completion of the PDR detailed component design and make can commence.

WP 6 – VHBR – Large Turbofan Demonstrator (Rolls-Royce):

2018 will focus on detailed HW design and delivery to support the engine demonstrator programme. Long lead time items will be monitored and progressed, including specific infrastructure modifications and rig tests to support ground test in 2019 and flight test in 2021. Significant progress will be made towards realisation of the engine ground and flight testing (in conjunction with the LPA IADP) culminating in delivery of first parts to stores for engine ground test 1 in January 2019 and a “pass to test” in May 2019.

SYS: Multi-annual overview and planning for 2018-2019 (extract)

WP1 Extended Cockpit

Building blocks of the cockpit in the domains of large tactile displays, new control devices, Communication, Navigation and Surveillance functions, Flight Management, Enhanced Vision will reach a maturity level of TRL4 to TRL5 depending on the technologies. A first instance of system level demonstrator will be available, with an initial scope.

WP2 Cabin & Cargo Systems:

This WP will be kicked-off early 2018 after selection of the Core-Partner. Until end 2019 work will focus on definition and initial implementation until Preliminary Design Review of building blocks in the field of connected cabin devices (trolleys, galleys, etc.), lightweight water and waste management system and innovative cargo systems.

WP3 Innovative Electrical Wing:

Set-up and testing of Smart Integrated Wing Demonstrator will continue through several phases for the entire period. Technology bricks for hydraulic power pack will be made ready for a component demonstration in LPA IADP. After assembly of flight control components for regional A/C in 2018, integration and safety tests will be conducted to allow a first flight test in 2019. Detail design of investigated Smart Active Inceptors will be performed and concluded to allow production and assembly of a first and a second test unit type in 2019.

WP4 Landing Gear System:

For electrical Main Landing Gear component demonstrations will be performed in 2018 to enable system demonstration in 2019. A composite structure component will be safety tested and made available for flight test in LPA IADP. Verification tests for electro-mechanical retraction actuator will be completed to prove TRL5 while production of electrical brake will well progress until end of 2019. The landing gear advanced sensing and monitoring system will be ground and flight tested.

WP5 Electrical Chain:

Concerning Power generation and conversion and storage, all technologies will reach TRL4 in the period 2018/19. A first version of Innovative –distributed- Electrical network demonstration will be delivered and reach TRL6 end 2019. The building blocks for High-Voltage DC Power Center will be under development (particularly commutation matrix and Power Electronics Module), before delivery to WP6 for demonstration in the next period.



SYS: Multi-annual overview and planning for 2018-2019 (extract)

WP6 Major Loads:

Building blocks for the electrical Environmental Control System will pass TRL4 and 5, while the Vapor Cycle System will reach a Critical Design Review, on the way to TRL5 in 2020.

A new architecture of electrical Wing Ice protection will reach TRL5. The Icing condition detection function will reach TRL5, while the specific function providing an Ice accretion rate will pass TRL6.

WP7 Small Air Transport Activities:

Technologies for small air transport aircraft systems will in general reach TRL4 in the period, for instance concerning Electro Mechanical actuation for flight control surfaces, for landing gear actuation, braking, electrical generation and distribution, de-icing, SESAR compatible cockpit, and lightweight, crashworthy passenger seats.

In the field of passenger comfort, technologies of acoustic and thermal insulation and acclimatisation comfort will reach TRL6.

WP 100.1 Power Electronics and Electrical Drives:

The EMINEO project will continue to work on the portfolio of topics about power electronics, network architectures, electrical drives and machines. Eight topics will be completed and five other topics will be started during the 2018/2019 period.

WP 100.2 Product Life Cycle Optimization: ECO Design:

conclusion of several topics on Chromium-6-free coatings and composite material applications while the work on SLM technologies and end of life processes will continue. Further partner calls on ECO topics will be launched.

WP 100.3 Model Tools and Simulation:

Build-up of tools chain for simulation and virtual testing will continue. The final core of the simulation environment will be finished and Health monitoring algorithms will be introduced. In 2019 Hardware-in-the-loop tests for virtual testing applications will be started.

