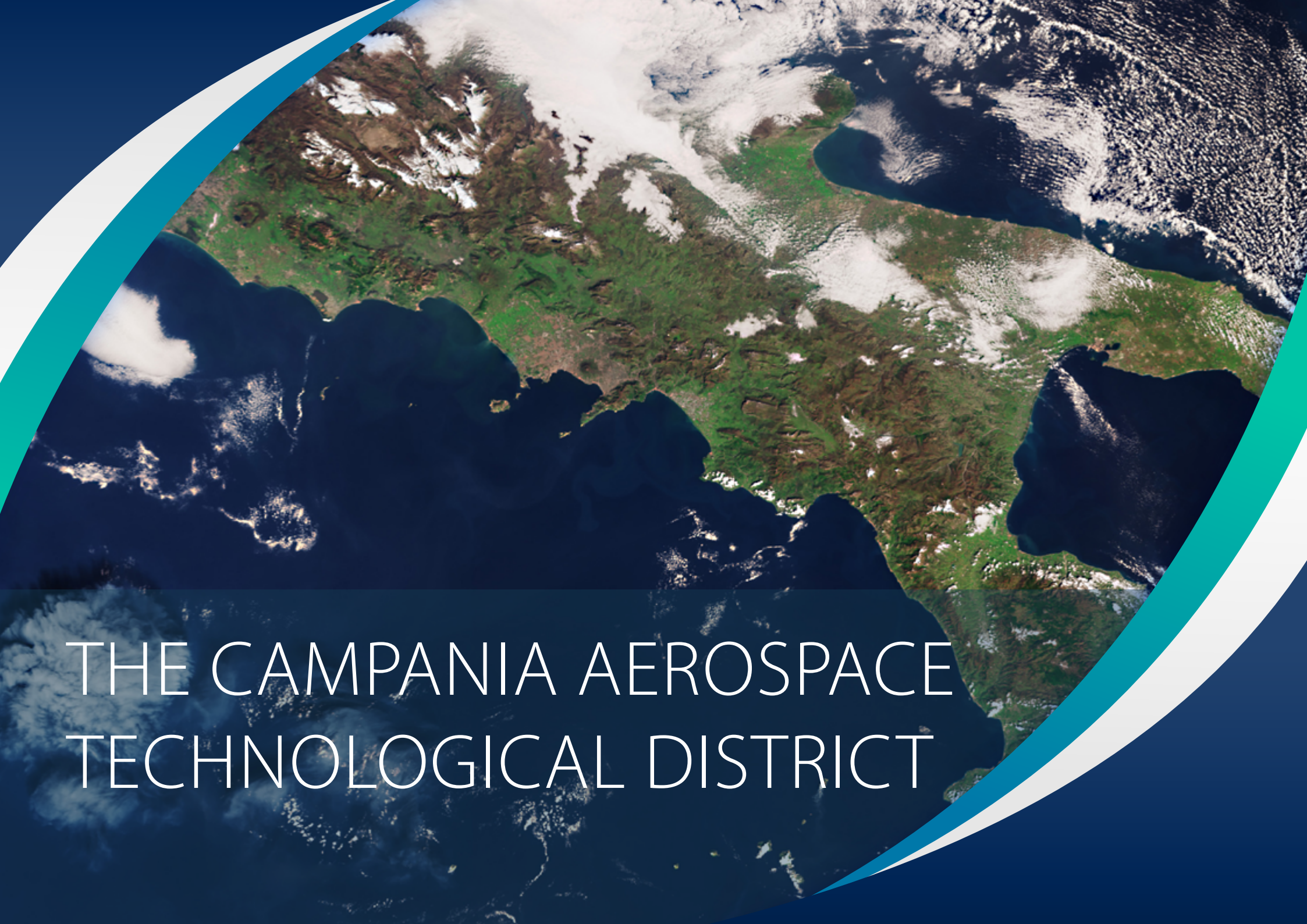
DAC

Campania

Aerospace District

FLYNG TOWARDS THE FUTURE

DAC Campania Aerospace District



THE CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

ABOUT US

DAC took its first steps some years before 2012, the year when it was formally founded in the Campania Region.

Thanks to its great scientific and industrial story in both the aviation and aerospace sectors, the Region gathered public and private organisations (universities, companies, research institutes) – branded as Campania Aerospace Technology Network – to write a white paper on the Campania aerospace sector, that is, the first report on the regional vision regarding the aerospace supply chain.

Following to this, the Campania Region decided to form the Committee for the setting up of the Aerospace District, and put together the interests of the business and work system, research institutes and universities. The paper does not only describe the state-of-the-art of the sector, but lays the foundations of how the players involved imagine the future of the aerospace sector in Campania.

In 2012, the Italian Ministry of Education, Universities and Research issued a call for the creation of new technological clusters and new hi-tech districts in the regions of the EU Convergence objective. The Campania aerospace district applied and ranked first in Italy where it was the first one to set up as a company – counting 30 partners at the beginning and about 400 thousand Euros of share capital.

DAC started its activity and nominated some projects to be financed with National and Regional calls to support the need of technology innovation in all regional aerospace sectors. In this context DAC put itself in the most advanced position of the value chain, that is, in the segment that aims at transforming the research outcomes into opportunities for companies, to increase competitiveness, create jobs and market opportunities.

To date DAC has managed reaearch projects on regional, national, and European calls – global funding of about 150 millions distributed among all those who contributed to designing, and developed highly innovative technology.

The success rate under approval amounted to nearly 85% (one of the highest) with 95% ratified reporting.

DAC currently represents the vast majority of revenue and number of employees in the aerospace sector, which is the second largest in Italy after Lombardy in terms of revenue and first in Italy in terms of workforce.

WEB SITE
THE DISTRICT
PROJECTS

DAC

THE MISSION

Established in May 2012 within the frame of the National Operational Program "Research and Competitiveness", the Aerospace District of Campania (DAC) is a network that brings together the protagonists of the aerospace sector present in the region.

It includes the main industrial and scientific players in the sector which in Campania plays a leading role in terms of technological content, scientific skills, know-how, industrial tradition and turnover, as well as for export capacity and number of employees.

The priority mission is to foster synergies amongst the technological and production excellences of the network in the perspective of an enlarged supply chain and a compact industrial ecosystem to promote greater commercial penetration capacity.

An additional objective: to support associated SMEs in their renovation path, to facilitate their accessibility to new business opportunities, to promote collaborative processes and exchange of experiences and best practices, to activate structural synergies.

DAC is participated by 24 Large Enterprises, 19 Research Organization, 145 SMEs and other entities, mostly associated in 13 Consortia.

DAC is a founding partner of the European Aerospace Cluster Partnership (EACP), a network of 45 Aerospace Clusters distributed within 18 European countries. It is a founding member of the National Technological Aerospace Cluster (CTNA) and a member of the Global Spaceport Alliance (GSA), ACARE-It, the Italian Cluster for acircular bio-economy (SPRING) and the Italian Space Platform SPIN-it.

Its development model aims to face the future new scenarios and competitive challenges by leveraging on the consolidation of the skill patrimony and on the integration of regional excellences in the sector. It stimulates industry collaboration with research centres and universities to create concrete business opportunities, conditions of continuous growth and innovation through the sharing of technological assets.

WEB SITE
THE DISTRICT
PROJECTS

DAC

TECHNOLOGICAL OFFER OF THE CAMPANIA AEROSPACE SECTOR

In the economic system of the Campania Region, the aerospace production chain plays a leading role, representing an element of development of the Campania territory both in terms of industrial presence and for the high content of its scientific and technological knowledge.

A collaborative research system was introduced thanks to the integration and coordination action carried out by the District between its industrial and scientific partners, with an effective impact on industrial products.

The industry membership of the District includes the major national and international companies present in the Campania Region with design and production activities. It is complemented by a large number of SME members present in the value chain, capable of operating with technologies and production processes according to quality and precision standards typical of the aerospace industry.

The actors of the Innovation represented by the Universities and by the public and private Research Centres present in the area (and members of the District) have been active since the launch of aeronautical and space activities in Italy. They play a role of significant value in terms of development of knowledge in all disciplines underlying the progress of the aerospace sector.

The Campania enterprises mainly operate in the areas of the design, fabrication and integration of complex aerospace products (structures, functional systems and equipment), as well as services such as maintenance or traffic management. These products are allocated in the three areas of Aeronautics, Space and Defense.

A description of the technological offer of the Campania aerospace sector is given below. Since it opens up to a global market, it was chosen to give a description that for each of the aforementioned areas refers to a taxonomy accepted and understandable on an international scale and more precisely:

- Advisory Council for Aviation Research and Innovation (ACARE for Aeronautics);
- European Space Agency (ESA) for Space;
- European Defense Agency (EDA) for Defense, by the Western European Armament Group (WEAG).

WEB SITE
THE DISTRICT
PROJECTS

ACARE Taxonomy

ESA Taxonomy

EDA / WEAG Taxonomy

DAC

COMMERCIAL AVIATION

Specialization area aimed at the development of methodologies and enabling technologies for the design and construction of new civil transport aircraft, with a view to digital and sustainable transformation of the value chain, including the recycling of materials.

COMMERCIAL AVIATION
PROJECT INDEX

ABOVE
CAPRI
CERVIA
DEAL
DRAGOON
EDIHAS
FUSIMCO
FLIGHT STRESS
GRACE
INNOFACTORY
IMM
ISAF
NERA
PETRA
REVAIA
SCAVIR
SIMULAB
SIPROP
SIVOLA
STREAM
STEPFAR
TOP

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

WEB SITE
THE DISTRICT
PROJECTS

DAC

ABOVE ENHANCED URBAN AIR MOBILITY SERVICES

The ABOVE project aims to define a new concept of operation for safely managing Urban Air Mobility operations and evaluate its impact in terms of safety, security, environmental sustainability and public acceptance by performing validation activities. In order to achieve the project goals, a wide approach will be followed considering a framework built by means of some pillars listed in the followings:

1. Designing systems for UAM services fruition.
2. Ensuring safe and secure UAM operations.
3. Validating the proposed framework by using known scenarios.
4. Introducing innovative urban air transport vehicles concepts.

The target is to design and develop an eco-system for the safe fruition of UAM services.

The ABOVE eco-system is well connected will all existent ATM/UTM system and able to provide end-users with the easily accessible Air-by-Air services.

ABOVE integrates external services and registers to implement the UAM planner functionalities.

- Air Freight – A supplier register makes available an inventory of the goods to be ordered through the web portal. Furthermore, the supplier register provides availability, terms and constraints defined by the supplier for the delivery of the goods. Airports Handlers Services, instead, allows to schedule the shipping of the goods within the airport.
- Air Taxi – A Pick-up and Drop Off register allows the final customer to book his/her air taxi towards the destination. Not necessarily the FATO will be located in proximity of the Pick-Up or of the Drop-Off point, for this reason ABOVE integrates also Ground Transportation Services.
- Pooling Air-by-Air airport pair – ABOVE integrates flight schedules from ANSPs to plan the connections and services by Airports Handlers to schedule the transportation within the airport.

ABOVE ENHANCED URBAN AIR MOBILITY SERVICES

In addition to the abovementioned systems, a twofold approach will be applied to design and ensure safe and secure UAM operations within the ABOVE project. On the one hand, a strategic trajectory planning tool (i.e. Optimal Route Planner) will be implemented to take into account safety-related constraints jointly with detailed assessment activities both for safety analysis and (cyber-)security vulnerability analysis. On the other hand, safety-by-design and security-by-design approaches will be experimented for the safety and security assurance of highly-automated UAM services. Safety will be examined in depth by producing a second version of the Optimal Route Planner in terms of a proof of concept, whereas security will be faced by means of the design of an Intrusion Detection System (IDS) for UAM services.

The basic idea is to design a strategic planning algorithm to safely and efficiently manage the operator's vehicles, including coordination between air and ground transportation. The final outcome provided by the planner is intended as the set of route plans for the involved air vehicles that satisfy a given end-user request about an Air-by-Air service. Such plans will be negotiated with UTM/ATM systems during all the planning cycle to take into account possible UTM/ATM constraints.

In the framework of the ABOVE Project, the feasibility of the project concept will be evaluated considering different Use Cases. Two European cities (i.e. Naples and Porto) have been chosen for evaluating this new concept due to their high population density and the complex orography that makes difficult the implementation of traditional mobility services (road networks, railways, etc.) but also to the favourable climate and weather, and in particular the analysis will focus on three most challenging (and different) UAM Use Cases:

- Personal/small group Air Taxi
- Pooling Air-by-Air APTs pair
- Air freight

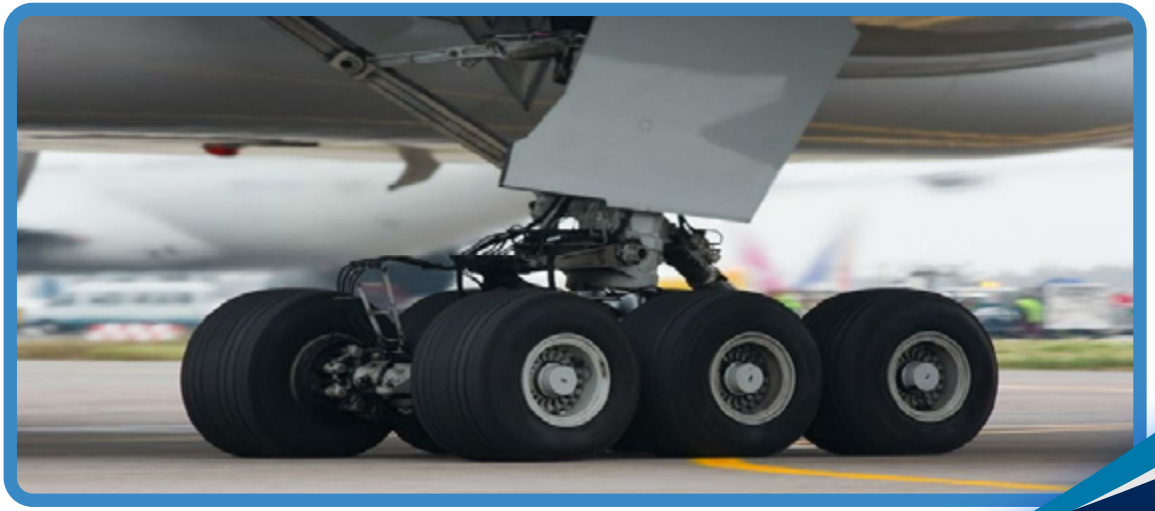
CAPRI

The target is to develop integrated solutions for an innovative landing gear system for civil aircraft, mainly for the regional transport.

The CAPRI project aims to develop innovative technologies for the main components and subsystems of the landing gear of a commercial aircraft, in order to improve the "mission effectiveness" in terms of performance, reliability, maintenance, flight safety, and to develop a strategy for the qualification and certification that makes extensive use of simulation models of elementary parts each duly validated by laboratory tests at full scale or dedicate mock-up. Furthermore, will be carried out a study of the machining technology with low environmental impact in the field of green technologies.

The expected results can be as listed below:

- Definition and validation of components and solutions cinematic and dynamic for the landing gear and its main subsystems;
- Reduced weight and cost of the systems and subsystems;
- Implementation of electromechanical systems for the electrical actuation of the steering system and emergency uplock of the landing gear;
- Application of new materials (composite material, titanium alloys) to structures of the landing gear;
- Sensing system for the automatic determination of Weight and Balance;
- Definition of test methods and simulation (Virtual Testing) for data processing and qualification.



WEB SITE
THE DISTRICT
PROJECTS

DAC

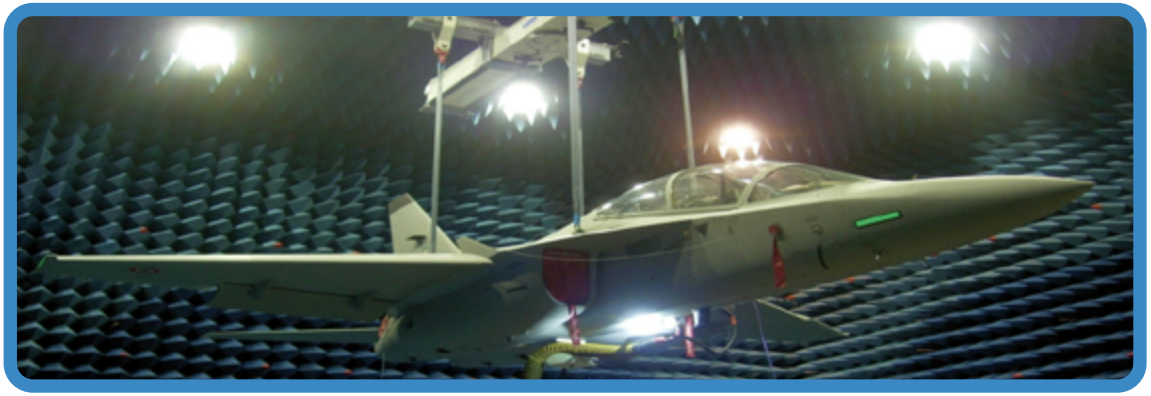
CERVIA INNOVATIVE AND ADVANCED METHODS FOR DESIGN AND CERTIFICATION

The CERVIA research project (CERVIA, Innovative and Advanced Methods for Certification and Verification metodi di CERtificazione e Verifica Innovativi ed Avanzati), relates to advanced aeronautical structures and, specifically, to composite structures for regional airliners. The use of innovative methods means, there will be a significant improvement in the design and certification phases.

These methods should solve composite material design issues, not adequately studied to date and will be validated by an appropriate experimental programme considering sample, component details, and sub-components.

They will incorporate resilience properties, for the performance in dynamic situations (with special reference to crashworthiness). They will include aspects of environmental aging, non destructive testing together with health monitoring. The procedural aspects will be considered too and studied with simulation models, including the effect of faults on the performance of aeronautical structures.

A specific in-depth analysis will be dedicated to lean manufacturing engineering techniques and, in this context, project optimisation issues will be investigated from an environmental point of view (green engineering). This will permit the capitalisation opportunity given by the enhancement of Hardware and Software capabilities and by the new technology that makes HPC (High Performance Computing) techniques possible at accessible costs.



DEAL **D**IGITAL **E**NTERPRISE **A**ERONAUTICAL **L**ABORATORY

The Campania aerospace sector is one of the most important in the country (Italy) (the second largest after Lombardy in terms of workforce and revenue) which is why the DEAL 4.0 project is based here. All business and aerospace sectors are present (multi nationals, small and medium enterprises (SMEs), research centres and universities) and from civil aviation (Airbus, Boeing, ATR, …), general aviation (Tecnam - world leader for Light Sport Aircraft), maintenance and reconfiguration (Atitech), and space and launchers (Telespazio, MBDA, ALI, Federico II University).

On the basis of what some stakeholders have already started, and in line with the spirit of the Campania Aerospace District, that supports 154 members with a special focus on the over 130 SMEs, the project aim is to create an experimental and virtual laboratory for learning, experiments and the development of a series of typical business processes.

The "centralised" control unit will be connected via a broadband network with distributed components, in order to configure the process that we want to study and experience, on a case-by-case basis. The outcome will be the proof of the potential that Industry 4.0 technology applied to that process can offer, thus allowing entrepreneurs to decide after a trial that has had the least impact on their company.

The proposal already has 4 case studies, selected from among the many proposed by DAC members and they will be investigated during the project. Other specific cases selected within OR1 (Obiettivo Realizzativo, Work Package) will be added to them. The re-engineering of these industrial processes with a view to identifying all potential application of Industry 4.0 technology will allow the definition of the expected improvements. The laboratory needs will also come from this analysis (OR2); the virtual laboratory will actually be able to simulate each of these cases and then, given their representativeness, together with a fairly large number of industrial processes. This outcome will be achieved within OR10. Starting from the requirements as per OR2, the following will be studied: virtual simulators of the Cyber Physical System (OR3); simulation and virtualization technology (OR4); technology related to sensor networks, distributed intelligence, processing of huge amount of false data (OR5). An important element of the project is OR11 regarding the outcome dissemination and communication. A significant goal is the dissemination of the Industry 4.0 concepts in the aerospace sector, obviously starting from the one in Campania.

WEB SITE
THE DISTRICT
PROJECTS

DAC

DRAGOON INTEGRATED TRAJECTORY MANAGEMENT FOR AIR OPERATION EFFICIENCY

The Airspace Architecture Study (AAS) - handed to the European Commission last March 2019 - has highlighted that without an acceleration of ATM modernisation and complementary changes, the situation of air traffic delays will continue to deteriorate to an unprecedented level, proposing a progressive transition strategy towards the Single European Airspace System in three 5-years periods. In order to handle the increased air traffic and future airspace, this transition aims to enable additional airspace capacity while maintaining safety, improving efficiency and reducing environmental impact. More in detail, the transition plan identifies three key operational and technical measures that need to be implemented in the very short term (2020-2025).

These 3 Measures are:

- Measure 1: Launch an airspace re-configuration programme supported by an operational excellence programme to achieve quick wins;
- Measure 2: Realise the planned roll-out related to mature SESAR Solutions supporting the implementation of cross-border free route, and air-ground and ground-ground connectivity;
- Measure 3: Accelerate market uptake of the next generation SESAR technologies and services in order to prepare the de-fragmentation of Europe's skies through virtualisation and the free flow of data among trusted users across borders.

More in detail, the demonstration activities proposed by the Very Large Scale Demonstration (VLD) initiative aims to evaluate the integrated trajectory management in a free routing operation and in cross-border environments through continuous exchange of up-to-date and consistent trajectory information between different ANSPs.

In order to reach the VLD main goals, the following smart objectives to be achieved within the Project have been identified:

- To provide a state-of-the-art analysis of work performed in the different SESAR Solutions focussed on the following key elements of AAS Measure 2: i) ECAC-wide cross-border Free Route Airspace and Advanced FUA; ii) Air/Ground and Ground/Ground connectivity through exchange of digital information.

WEB SITE
THE DISTRICT
PROJECTS

DRAGOON INTEGRATED TRAJECTORY MANAGEMENT FOR AIR OPERATION EFFICIENCY

- To detail, from selected SESAR Solutions, a concept of operations (ConOps) for the real time synchronisation of trajectory information between all involved stakeholders, in free route cross-border environments to consolidate and integrate air operations in the view of improved traffic efficiency and smoothness.
- To survey and select tools already available in the consortium that are best suited for the ConOps implementation in a real environment.
- To define a series of use cases, KPAs and KPIs relevant for the ConOps demonstration and assessment.
- To finalise and prototype in the perspective of real operations, the concept of an aircraft (tail) centric performance database
- To develop explainable intelligent methods (XAI) throughout the trajectory optimisation process to provide transparency and traceability to its design intention, and its robustness to data uncertainty and errors. This methodology will allow to collect metrics/indicators to measure the impact of the demonstrations, and finally to collect the needed evidence for standardisation and/or regulation recommendations.
- To integrate selected know-how, state of the art research results and technological assets available from consortium members to achieve the complete technological infrastructure finally enabling demonstration activities in a real environment.
- To plan, prepare, and execute flight trials in a real environment to gather reliable and meaningful data for the assessment of selected SESAR Solutions, within the defined Use Cases.
- To derive recommendations for the standardization and regulatory process recommendations to foster the full deployment of demonstrated SESAR Solutions.

EDIHAS EUROPEAN DIGITAL INNOVATION HUB FOR AEROSPACE

The European Digital Innovation Hub for AeroSpace (EDIHAS) Centre has put itself forward as the digital innovation hub for aerospace for the Apulian Aerospace Technological District (DTA, Distretto Tecnologico Aerospaziale) and the Campania Aerospace District (DAC, Distretto Aerospaziale Campano). Together with their partners, they are promoters, creators, and facilitators of several national and European projects for research and development, training and technological transfer in the aerospace industry, in Apulia and Campania. DTA and DAC, both non-profit consortium companies, with strategic operational models, implement a multi-partner regional cooperation model. Over the years, they have worked together on creating and consolidating a regional, national and international network, in consideration of opportunities to strengthen the aerospace system with the participation in extensive networks and the collaboration with national and European institutions and other national and European districts. All partners of both Districts will actively take part in strategy planning and initiatives of EDIHAS; particularly in this preliminary stage. Public and Private shareholders who are representative in terms of experience, infrastructure, and technology expertise in the sectors of Artificial Intelligence (AI), High Performance Computing (HCS), and Computer Science (CS), have expressed their interest in actively contributing to the activities of the Centre. Thanks to their contribution, a first set of services has been prepared, which can be further integrated at the executive planning stage of the Centre. Furthermore, DAC has collected letters of interest from Sviluppo Campania, Ambrosetti, IBM, MSC Hexagon, UNAVIA keen to participate as external partners.

EDIHAS is applying to be the Digital Innovation Centre specialising in the three advanced technologies as per the European Programme: Artificial Intelligence, High Performance Computing and IT Security, to address the needs of digital innovation in the aerospace system of Apulia and Campania.

The two regional systems have a consolidated history of cooperation and collaboration driven not only by their geographic proximity, but because both systems predominantly specialise in aircraft design, building, and maintenance – see their participation in major international programmes for example B787 – B767 – ATR42-72, A321, A380, A220, Typhoon, F35…, that involves the entire interregional supply chain and relevant ecosystems. Industrial collaboration is accompanied by scientific collaboration. This includes numerous joint programmes, including R&D projects, continuous training, advanced training, and orientation, participation in missions abroad and Animation for Territorial Development.

The strategy of the two districts is based on strong cooperation and increasing integration of the two areas until a so-called mega-district is created.

WEB SITE

THE DISTRICT

PROJECTS

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

DAC

FUSIMCO **FUS**OLIERA **I**BRIBA **M**ETALLO **CO**MPOSITO

The FUSIMCO proposal is developing an innovative fuselage in hybrid (metal / composite) configuration in order to significantly reduce the structural weight.

It will be considered the manufacturing technologies that can increase the competitive advantage resulting from the use of composite materials (monolithic components, infusion processes, out of the autoclave process) or hybrid metal/composite components.

It will be evaluated manufacturing technologies for the use of low-weight, low-impact, low-impact materials for secondary structures for major systems and interiors installations.

Test campaigns will be developed to validate selected technologies.

The configuration and manufacturing process of the fuselage and its components will be developed and validated by defining demonstration elements in order to validate manufacturing processes.

The development of assembly processes for large aeronautical components will be based on the definition, development and validation of a combination of auto-adaptive and end-effector new-generation drilling systems capable of optimizing process parameters based on diameters and Stack-up drilling, ensuring the required accuracy in the aeronautical field, and no damage to the structure.

For assembly of metal components, laser assembly processes will be defined and developed.

WEB SITE
THE DISTRICT
PROJECTS

DAC

FLIGHT STRESS INTER-REALITY FOR IN FLIGHT PSYCHOLOGICAL STRESS RISK: MONITORING AND PREVENTION

An aspect of central importance in civil aviation, to ensure increased flight safety, is psychological stress management and prevention of these aspects of the work of pilots, crew and travelling personnel. It is a priority to develop methodologies for prevention, monitoring and risk management related to stress and cognitive overload in an operational context.

The aim of the FLIGHT-STRESS project is to develop a device, a method and an experimental programme for preventing, monitoring and managing pilot, crew and cabin crew stress, to improve their and passengers' health, wellbeing and quality of life thanks to the "INTER-REALITY" strategy that involves the use of simulation technology in virtual reality, minimally invasive biosensors and machine learning techniques. The project pursues four goals: (i) development and effective assessment of stress, automatic detection instruments to monitor stress in an operational context by means of minimally invasive wearable biosensors and classification methods based on artificial intelligence; (ii) development and effective assessment of stress prevention and management intervention based on the use of virtual reality to simulate potentially stressful operational situations ("stress-inoculation training") and structural changes to the ergonomics of the aircraft interior and cockpit, aimed at relieving stress; (iii) development and effective assessment of a remote, ergonomic, vital parameter monitoring station, for travelling personnel and passengers in critical health situations; (iv) validation of assessment technology by means of stress biomarkers.

The mobile detection system will be made by integrating three technological modules: a) portable device with adequate computational and memory capabilities; b) wireless biosensor platform capable of measuring the heart rate (HR), the skin conductance (GSR, Galvanic Skin Response) and the physical activity (micromovements) by means of a triaxial accelerometer, at the same time; c) mobile processing unit for the extraction of the characteristics of bio-signals and the automatic classification of stress levels.

The platform will then be tested in a longitudinal study aimed at validating the experimental methodology in ecological conditions. The study will involve a representative sample of pilots, crew and cabin crew who will be monitored while carrying out their activities.

GRACE GREEN AIRCRAFT CONFIGURATION FOR GHG-EMISSION REDUCTION

Aviation is one of the fastest growing sources of GHG (Green House Gas) emissions and the most climate-intensive form of transport. Its CO2 and non-CO2 impacts are responsible for some 4.9% of environmental impact . According to the Environmental Trends in Aviation to 2050 , international aviation fuel efficiency, expressed in terms of volume of fuel per RTK (revenue tonne kilometres), is expected to improve at an average rate of 1.29% per annum to 2045, and at 1.37% per annum, if extrapolated to 2050. This indicates that improvements from technology and improved ATM infrastructure used should be compatible with operational procedures and aligned with a potential inclusion of non-CO2 emissions. In this respect, GRACE (GReen Aircraft Configuration for GHG-Emission reduction) Project aims to deliver new enabling technologies and to bridge the aviation climate neutrality gap towards 2050.

For the sustainability of aviation and the continued growth of air traffic, leading to a demand for reduction in short time frame of Non-CO2 GHG (Green House Gas and particles water vapor, nitrogen oxides, sulphur oxides, aerosols, contrails and contrail cirrus) and marginally long-term CO2, reduction is afforded under a multidisciplinary approach. Although new technologies, such as battery-electric propulsion systems have the potential to minimize in-flight emissions and noise, environmental burdens are possibly shifted to other stages of the aircraft configuration and life cycle, and new socio-economic challenges may arise. GRACE aims to address these challenges by achieving the following objectives:

Objective 1: Multi-objective optimization of all electric aircraft design for emission and cost reduction, to Aircraft GAG Cycle GHG emission reduction by 100% of COx, NOx, SOx and other (OHC), for all technologies proposed; Water Vapor Emission Reduction by 30%.

Objective 2: Development of new aircraft management mission profile tool, to optimize recharge time of future aircraft and achieve recharge time comparable to standard refueling and (about 30 min), safer and faster compared to contemporary battery charge.

Objective 3: Validating proposed ATM operational changes in order to reduce ATM environmental impact, where through numerical simulation and Fast Time Simulation estimations will be enabled for aircraft emissions analyzing flight profile data.

WEB SITE
THE DISTRICT
PROJECTS

DAC

GRACE GREEN AIRCRAFT CONFIGURATION FOR GHG-EMISSION REDUCTION

Objective 4: Enabling technologies finalized to create an environment that allow the GHG reduction also via new energy source harvesting and distribution, leading to Powertrain Energy consumption reduction about 35%, of propellers and aircraft efficiency that having 5% additional impact and noise reduction by 40%.

The focus of GRACE project is on small commuters up to regional aircrafts, having selected these categories for a relevant impact in local mobility by number of passenger, enabling connection of a large number remote areas each other or to major HUBs; as the matter of fact short range connection may not appear relevant compared to large airliners GHG emission, but in short/mid-terms, the selected all electric aircraft technologies, based on propellers, are more promising in terms of measurable and significant emission reduction up to 100% in flight operation. In addition to this commuter and regional aircraft will be directly linked also to urban mobility under same philosophy, providing very large environmental and social benefits.

INNOFACTORY

DELIVERY OF INNOVATION AND SUSTAINABILITY SUPPORT SERVICES FOR TRANSFORMATION TOWARDS SUSTAINABLE PRODUCTION

Overall strategic objective of the project is to support European SMEs in their transition to more sustainable business models, resource-efficient and circular processes and infrastructures. This will be achieved by targeted advisory and financial support to at least 250 European SMEs by internal and external advisors, peer-to-peer learning and onsite demonstrations (test-before-invest).

Direct objectives of the project are:

- to prepare service delivery for SMEs by creating the delivery pipeline: Mobilized current network of Advisors/Experts, two open calls for Advisors/Experts (WP1) with a target of 250 business and technology advisors; Mobilized current network of SMEs through industry clusters, Enterprise Europe Network and I4MS; INNOFACTORY Matchmaking Platform and Assessment Model ready to be implemented.
- to recruit SMEs into the support program and to compile the first assessment of transformation readiness of SMEs: Attracted SMEs through 2 OPEN CALLS FOR SMEs (WP2) with the KPI of 2x500 (1000 SMEs in total); Completed Basic Transformation Masterclass for 1000 SMEs; 30 Matchmaking Events for SMEs/Advisors
- to provide targeted advisory services and financial support to SMEs following their transformation goals: provided support services (WP3) in value of €2,5 mln through 37 Common Challenge Camps, Peer-to-Peer Learning Events, 16 test-before-invest demonstrations, and direct financial support
- to enforce the investments into advanced and sustainable technologies, employees reskilling and creation of new value chains: number of participating SMEs engage with personal transformation plans including improved business models, uptake of advanced technologies, employee re-training and development plans, preparedness for investments into sustainability.

INNOFACTORY

DELIVERY OF INNOVATION AND SUSTAINABILITY SUPPORT SERVICES FOR TRANSFORMATION TOWARDS SUSTAINABLE PRODUCTION

Overall strategic objective of the project is to support European SMEs in their transition to more sustainable business models, resource-efficient and circular processes and infrastructures. This will be achieved by targeted advisory and financial support to at least 250 European SMEs by internal and external advisors, peer-to-peer learning and onsite demonstrations (test-before-invest).

Direct objectives of the project are:

- to prepare service delivery for SMEs by creating the delivery pipeline: Mobilized current network of Advisors/Experts, two open calls for Advisors/Experts (WP1) with a target of 250 business and technology advisors; Mobilized current network of SMEs through industry clusters, Enterprise Europe Network and I4MS; INNOFACTORY Matchmaking Platform and Assessment Model ready to be implemented.
- to recruit SMEs into the support program and to compile the first assessment of transformation readiness of SMEs: Attracted SMEs through 2 OPEN CALLS FOR SMEs (WP2) with the KPI of 2x500 (1000 SMEs in total); Completed Basic Transformation Masterclass for 1000 SMEs; 30 Matchmaking Events for SMEs/Advisors
- to provide targeted advisory services and financial support to SMEs following their transformation goals: provided support services (WP3) in value of €2,5 mln through 37 Common Challenge Camps, Peer-to-Peer Learning Events, 16 test-before-invest demonstrations, and direct financial support
- to enforce the investments into advanced and sustainable technologies, employees reskilling and creation of new value chains: number of participating SMEs engage with personal transformation plans including improved business models, uptake of advanced technologies, employee re-training and development plans, preparedness for investments into sustainability.

IMM MULTIFUNCTIONAL MATERIALS INTERIORS

The IMM (Multifunctional Materials Interiors) Research Project is based on a well-established tradition in the building of aeronautical products connected to the cabin interiors, namely seats and monuments

The reasons of such a research project in this field are based on an increasing need to guarantee same standards in terms of safety and comfort as commercial and VIP/VVIP aircraft.

The project aims at studying solutions in order to meet the recently changed air transport requirements. The main subject of study for this project will be the Commercial Aviation with special focus on Regional Aviation aircraft. Target to be achieved is to let benefit Regional Aviation aircraft of new material application solutions already implemented in the Commercial Aviation without compromising (or impacting) weight and performance.

Therefore, the ideal situation would be to enable installation of crashworthy seats and lining panels of cabin and cargo compartments which have high vibroacoustic and thermic performances and fire penetration resistance but without jeopardizing the advantage of lightweight solution.

By making this project real the actual knowledge will be improved and there will be new solutions promising a sure relapse in the general aviation field, but which could bring interesting applications in other fields of air transport as well.

WEB SITE
THE DISTRICT
PROJECTS

DAC

ISAF INTEGRATED SMART ASSEMBLY FACTORY

The ISAF–Integrated Smart Assembly Factory project was born in order to fix the joint problem between two or more parts/structures of big dimensions in composite material and for this reason affected by the natural variability of the fabrication process. The variability creates empty space between joint parts ("gap"). The usage of connection joint (fasteners) in proximity of gap induces tensions reducing the structure capability to resist to static and fatigue loads; for this reason, it is necessary to use local fillers with adequate thickness, shape and materials. Today this problem requires the gap measurements with manual method, the shim manufacturing and adjustment in situ and makes the manual assembly activity, already considered with no high added value, less efficient in terms of quality, time and cost. In addition, the big number of possible combinations, makes very difficult the process automation, increasing further the associated costs. In order to reduce or eliminate this problem and to give an impulse toward an advanced technological level, the ISAF project proposes to study :

- the problem in order to understand and drive the parameters generating the variability and to know the constraints to guide the choices
- an automatized and integrated solution to measure and eliminate the gap, operating adjusting the fabrication tools of parts
- Study different solution to build automatized and integrated filler with traditional or innovative material using additive/ subtractive technologies.

ISAF has the intent to formulate a new factory model, an "Integrated Smart Assembly Factory", in which will be realized a new sustainable production process, combining new (additive) and consolidate (subtractive) technologies, using as much as possible the potentiality of the acquisition and the real time numerical analysis of big data coming from "field" (geometry and Key Process Parameters). In this way will be fixed also the actual problems linked to safety because of composite and non-composite shim sanding and bonding. The project is an important opportunity for partners to increase the competiveness level by means of study and solutions and technologies. Additive solutions offer a huge possibility to develop the technological sector. In terms of occupational impact on the reference area the project places the condition to get stronger the innovation path.

WEB SITE
THE DISTRICT
PROJECTS

DAC

NERA A NEW ERA FOR THE AVIATION INDUSTRY

The aim of NERA (New Era for the Aviation Industry) project is to develop technology, systems and control devices in order to interconnect each manufacturing phase, while improving efficiency, processes and products by on-line monitoring. It should also be possible to mitigate the spread of faults throughout the production line. Closure of the cycle from integrated design to production will be possible by creating a system that meets Smart Factory goals and, on a more general level Industry 4.0 principals.

By applying an advanced approach to production process modelling, whether classic or innovative, the project aims to create and integrate the architecture and communication layers between the production plants and a central control system (Manufacturing Execution System – MES). Such an approach will be carried out at a multi-stage level, thanks to a connection between the key parameter of each process, monitored by the sensors/systems developed during the project i.e., already implemented in the plant, and the Data Mining System. Both prognosis and diagnosis of the single production elements will be carried out on-line, guaranteeing the reduction of defects and their proliferation.

All information produced by the manufacturing operations between the various processes will be saved in real time in the MES (Manufacturing Execution System) system/software, while introducing the following main innovative features:

- Allow exchange of information between the software systems, other systems, and users. The quality control systems/sensors, will inform the central system of the levels and current situation, thus receiving help in the improvement of manufacturing operations by sending further draft documents, information on maintenance, etc.;
- Speed up project follow-up checks. Software will verify in real time whether work orders and the operations of each cycle are going as projected or if there are delays due to quality, failures and/or safety issues (for example the blocking of the plant due to a sudden malfunction).

The multi-stage architecture will be validated via representative case studies, with more emphasis on the aviation industry, relating to production and assembly processes, including additional technology.

PETRA ECO-FRIENDLY MATERIALS AND TRANSFORMATION IN THE TRANSPORT SECTOR

The idea behind this project is to improve waste treatment of manufactured goods post consumption, in order to make new eco-friendly products based on the reuse of materials like reinforced carbon fibre. Given the reduced requirements of the sectors using them, and the need of semi-structural products like natural fibres/fabrics (flax/hemp), new eco-sustainable recycling methods will be developed and validated for manufactured products made by other units related to the project (CNR, Consiglio Nazionale delle Ricerche, Italian National Research Council). The sample will largely be made by the Department of Chemical, Materials and Industrial Production Engineering (DICMAPI, Dipartimento di Ingegneria Chimica, dei Materiali e della Produzione Industriale) of the University of Naples "Federico II" and the Institute of Polymers, Composites and Biomaterials of CNR (IPCB-CNR Istituto per i Polimeri, Compositi e Biomateriali) based on preliminary studies, to obtain adequately sensitive material for the analysis of impact damage. Given the type of application we are addressing, technology like manual infusion and layering will be considered and the choice will be what works best for the specific product. Short or particle form waste fibres will be considered for carbon, while natural fibres will be used in the form of textiles.

In this context, IPCB-CNR proposes the use of an innovative technology, already tested in other decontamination processes, based on a patented process (Avella M. et al. (2007) "Process and plant for the production of composite thermoplastics and materials thus obtained", International Patent Application IT 2007 07871A39). In particular, industrial waste or end-of-life products – based on thermoplastics resins or thermosets containing carbon fibres – will be granulated into different sizes and emulsified in a thermoplastic matrix to make sheets or granules. The emulsion process is made at room temperature – thus, it is convenient from an economic point of view – and by using expanded polystyrene as thermoplastic matrix.

In parallel, since the field of application has moved from the aviation sector to higher production volume sectors like the automotive sector, attention is being focussed on their sustainability and eco-effectiveness, with products deriving from biodegradable plastics and natural polymers derived from renewable crops that use biomass as a raw material, creating a new portfolio of sustainable products that are eco–effective and competitive on the international market.

Another goal of the project is the development of composite structures made of cellulose fibres derived from hemp and resins obtained from natural raw materials, and the development of an innovative process that covers the whole composite value chain: fibres, matrices, and nuclei deriving from natural materials. The innovative materials, treated and developed in an eco-sustainable way, will be used in various applications related to the transport sector.

WEB SITE
THE DISTRICT
PROJECTS

DAC

REVAIA REINVENT INTERSECTORAL VALUE CHAINS IN AN INDUSTRY 4.0 ATTITUDE

In the current dynamic and challenging context, the REVAIA-2 Project aims at developing an Open-Space to support SMEs, who take the central stage as main project beneficiaries, in creating new cross-sectoral and cross-border value chains based on Industry 4.0 innovation.

The objective is to sustain the identification of new business models for sectors such as aerospace, automotive, ICT, food and agriculture that share the Industry 4.0 innovation challenge. The specific needs linked to the fourth industrial revolution will thus exploit their complementarity and mutually reinforce their strengths. The involved clusters' core competences will favour this process, widening up over emerging industries (SMEs in particular) such as those of the digital and environmental sectors. The project-involved sectors of aerospace, automotive, ICT, food and agriculture have different characteristics such as the production volume or product-life-cycles, but also many similarities. Synergy potential is relevant and expanding, while common interests are growing around a number of technologies that could make respective products more competitive at a worldwide level. In particular, ICT sector is playing a paramount role in the development of industry since years, representing today a fundamental element in maturing Industry 4.0 revolution, with specific regard to processes digitalization and virtualization. Since the project focuses on the horizontal approach of process innovation and interconnection in terms of Industry 4.0 logic and implementation, the sectors represented by the REVAIA-2 clusters clearly share many cutting edge, key enabling technologies for advanced manufacturing within the regional Smart Specialization Strategies (S3) of the consortium partners. These aspects make such sectors strongly connected or connectable, both from technological and economic points of view. In this context, SMEs from the mentioned sectors play a key role to achieve Europe's objectives and vision for economic growth, environmental protection, security and quality of life, being therefore strategical to strengthen their competitive position in the global marketplace.

Specifically, the final goal of that is pursued by the REVAIA-2 project and can be subdivided into the following intermediate and operation objectives:

Objective 1: Mapping the innovation demand and supply in the transport and agrifood sectors with specific reference to Industry 4.0 and ICT/digital technology adoption, to sustain competitiveness in the global market

Objective 2: Creating a favourable "open space" for cross-fertilization to foster cross-border and cross-sectoral innovation towards new value chains and stimulate new SME-driven project ideas within the areas previously mapped, including large scale demonstration

REVAIA REINVENT INTERSECTORAL VALUE CHAINS IN AN INDUSTRY 4.0 ATTITUDE

Objective 3: Supporting and validating the SME-driven innovation project ideas by the combination of the following sustaining measures:

- direct involvement of 5 SMEs as linked third parties, to further develop specific industrial processes (see below) already identified and launched on their own. These SMEs are tagged Pioneers
- selection, through an Open Call, of 20 multi-SME projects ideas including either feasibility study or preliminary test. The involved SMEs are named Explorers. Cross-sectoral and cross-border conditions will be a must, while connection with Pioneers activities will be incentivized
- assistance vouchers dedicated to Pioneers and Explorers (up to 50 SMEs), for specific and complementary support. They are of two typologies:

  FAV: Financial-economic Assistance Voucher, including economic aspects into the new business model, market analysis, business plan, identification of national and European calls for funding, and administrative support

  TAV: Technical-technological Assistance Voucher, including customer requirements and preferences, system and process engineering, support for large scale demonstration
- 200 overall coaching days to Explorer SMEs, to spread and support innovation actions in Europe
- Supporting the preparation of 8 proposals involving SMEs born under the REVAIA-2 umbrella to be submitted to EU funding calls (if available)

Objective 4: Raising awareness on the potential advantages deriving from the Industry 4.0 innovation among the involved SMEs large communities in the transport and agrifood sectors by financially supporting the continuous participation of 60 SMEs to the REVAIA-2 events and workshops. These SMEs are named Followers and will be selected after another Open Call.

SCAVIR STUDY OF ADVANCED CONFIGURATIONS FOR THE DEVELOPMENT OF AN INNOVATIVE REGIONAL AIRCRAFT

The research project SCAVIR aims, starting from a Top-Level Aircraft Requirements definition, to size an innovative regional aircraft configuration, in terms of cost, performance, airworthiness and safety related to the specific market segment. Initial trade-off studies, under design and technological point of views, will be performed in order to identify and develop innovative architectural and engineering/support processes solutions, to achieve a future aircraft performance increase and, at the same time, a engineering, management and in service costs reduction and, last but not least, to match a environmental impact life cycle reduction (production included) with respect to the same current aircraft class.

A main objective is the aerodynamic model optimization by using both analytical (CFD) and WTT campaign to ensure high aerodynamic efficiency in both cruise and low speed conditions, for instance:

- Cruise emissions and cost reduction;
- Short take-off and landing distances to ensure maximum market capture;
- Significant Emissions and Noise impact reduction at Airport level;

The project also aims to define the future advanced ATM systems requirements (SESAR / NextGen) in order to be able to operate in the future market scenario; the future Turboprop aircraft will be supplied also by an advanced customer logistics support system.

The Aircraft Life Cycle Cost improvement/reduction will also be achieved through the tuning of a series of modules, based on RFId technology, for the unambiguous identification of information related to objects and processes in the advanced aircraft production phase. This will allow the complete logistics and production flows management.

WEB SITE
THE DISTRICT
PROJECTS

DAC

SIMULAB SIMULATION LABORATORY
FOR THE DEVELOPMENT OF AVIATION PROGRAMMES

As part of the feasibility study carried out during the creation of the Campania Aerospace Technological District and to define the relevant research programmes, the following results were achieved:

- Definition of a collaborative district model for the aerospace supply chain, with reference to research and development activities and to the stages of industrialisation, aimed at increasing competitiveness in the international scenario.
- Identification of the needs shared by the multiple players of the supply chain to manage and develop engineering analysis activities within aviation programmes.
- Identification of the needs for sharing technical data and standardising methods and tools.
- Definition of the project cooperative management model and configuration of a supporting IT solution.
- Identification of technological streams of common interest for the creation of a virtual laboratory.
- Identification of methods and procedures for the analysis and engineering simulation activities in each area.
- Selection and validation of CAE tools to support activities for each discipline.

The industrialisation of the final results aims at creating an integrated simulation laboratory that:

- Allows the management and development of engineering analysis activities while assessing the influence of the different design choices, in order to reduce test and physical validation costs and enhance the quality of the final product by anticipating the detection of anomalies from the earliest stages of the design.
- Is the place of sharing a re-use of technical data, best practice of methods and standard procedures, supporting technology, knowledge and experience;
- Enables a real synergy of all resources involved, allowing a more complete engineering contribution from the partner SMEs;
- Enables a constant correlation between the engineering analysis activities and their management, by integrating the first ones into the project management and planning and reporting and controlling their outcome in the management system.

The laboratory will then permit the delivery of an integrated service for the management and development of engineering activities, positioned to support aviation programmes, and extendable to other types of industrial programmes where a high degree of cooperation between multiple partners is required.

WEB SITE
THE DISTRICT
PROJECTS

DAC

SIPROP

The project is included in the context of the studies for the development of regional aircraft within highly innovative technologies, in order to gain competitive advantages from both the point of view of the product and the industrial processes.

In particular, the project is placed in the field of studies for design and integration of advanced on-board systems of innovative regional aircrafts. The project will find its natural application in the development of a new aircraft family.

This initiative will allow to create favourable conditions to capture significant regional aircraft market portions by the development and the launch of new products

The project will be developed in a complementary and synergistic way with respect to other research projects, already presented in the districts of Campania and Puglia, covering both the methodology - engineering frames and the pre-industrialization frames, aiming to promote the development and realization in Campania of design and integration capabilities for the advanced on-board systems of a new family of regional aircrafts.

This set of projects is structured in an organic way as a cluster with strategic goals and technological objectives convergence, to support the development and the production of new regional aircrafts being the successors of the ATR family.

WEB SITE
THE DISTRICT
PROJECTS

DAC

SIVOLA ITALIAN SEAT FOR HIGH QUOTATION AIRCRAFT

SIVOLA project is part of the development of aeronautical "Interiors", focusing its attention on one of the fundamental elements such as the Economy Class.

Specifically, the reference target will be Civil Aviation compared to "Long Range" Aircraft (e.g. A330 / A340 / B767 / B777).

SIVOLA project is based on a consolidated tradition of aeronautical product construction linked to fuselage interiors, i.e. passenger seats. The motivations of a research project in this area are based on the growing need to ensure safety and comfort standards that are typical of commercial aviation.

The research will focus primarily on the choice of materials to be used for both the structural part of the seat and, in particular, for the leather upholstery of passenger seats. Aiming towards a more boosted market position, Italian styling solutions will be developed, taking into account also studies and experiments on ergonomics and comfort of the cabin seat.

The features of the final output of the project are those relating to the design of a "lightweight" seat that combines the requirements of certification with those of cost-effectiveness and simplicity of the product, taking into account the weight-related aspects that are of utmost importance as they result in strategic economic and competitiveness returns as well as greater respect for the environment due to lower fuel consumption for the aircraft and a strictly "Made in Italy" style dictated by the need to ensure the required appeal from an increasingly demanding clientele as well as important for marketing purposes.

Styling that will be determined by an important Italian style center and coordinated by Geven will be the "driver" to develop innovative seats with a "Made in Italy" print. This latter approach is also the primary objective of the SIVOLA project.

STREAM INTELLIGENT AND FUNCTIONALIZED STRUCTURES FOR THE IMPROVEMENT OF AEROSTRUCTURAL PERFORMANCES

The continuous growth of global air traffic, the limited availability of oil reserves and the need to reduce the environmental impact of using fossil fuels demand innovative technological solutions to guarantee economic and environmental sustainability of air transport. Sustainability requires, among others endeavours, designing more and more efficient aircrafts, through either a weight reduction (which allows the induced drag to be reduced) or a reduction of the skin-friction drag (the viscous drag that generates when a solid body is in relative motion with a viscous fluid). STREAM intends to attack the problem from both sides, in view of a general reduction of the operating costs for a better environmental and economical sustainability, by improving upon some of the available technological solutions and aiming towards their integration into a functionalized aerodynamic surface.

STREAM it will address the reduction of friction resistance with innovative technologies: it is known that microstructures surfaces equipped with riblets are an effective technological solution, which to date still is not used mainly for technological reasons. In fact, riblets have a problem with durability of the surface, related to the impact of small particles and dust floating in the atmosphere mainly in the take-off and landing phases. This implies frequent maintenance actions which render the economic budget negative. As far as weight and operating cost are concerned, STREAM targets the two problems of ice formation and accretion on the outer structure of the airplane, and the monitoring of structural health. Ice formation is a critical aspect which carries implications on the aerodynamic efficiency of the external surfaces. Available solutions to address this problem are based on devices and technologies which not always correspond to the best efficiency in terms of weight, complexity and need for power and energy. Innovative solutions are available in this case too, but technical barriers still prevent their application. Last, monitoring of structural health (SHM) is a further opportunity for improved performance, as it positively impacts on weight and operating costs. Recently proposed technological solutions [REF5] require further study before reaching application level, and novel technologies could be adopted.

WEB SITE
THE DISTRICT
PROJECTS

DAC

STEPFAR DEVELOPMENT OF ECO-FRIENDLY MATERIALS AND TECHNOLOGY, DRILLING, CUTTING PROCESSES AND ROBOTISED ASSEMBLY

In the aviation sector aircraft weight reduction is becoming increasingly important, both because of environmental requirements (lower emissions) and because of the need to control management costs (lower consumption). This is why new structural component and system design are being developed using innovative materials and technology.

The innovation in this project is the drilling and cutting by aluminium alloy laser and drilling by material removal, using cooperative anthropomorphic robots, hybrid aluminium/composite stack-ups and relevant assembly.

There will be a conceptual phase, both static and dynamic. In addition, low environmental impact materials and processes will be selected and developed for surface protection treatment of aeronautical components (elimination/reduction of dangerous substances in the painting and protection processes; reduction of energy; and reduction of water use) to guarantee a level of protection from aggressive factors equal or higher to those currently in use, in compliance with the certification requirements for the aeronautical sector.

Moreover, aircraft painting processes and surface protection treatments will be studied so that, in addition to being eco-friendly, they are innovative, reducing consumption and environmental impact of the aircraft in operation, by means of aerodynamic coatings, layer optimisation and the weight of the coatings applied.

Assembly techniques will eventually be developed for composite/aluminium hybrid aeronautical parts in order to facilitate coupling without shims, by reading the coupling surfaces and with the right geometric correction techniques.

TOP ONE PIECE TECHNOLOGY

The TOP project aims at developing "one piece" technology through the definition and application of innovative processes for manufacturing and assembling composite material aero-structures.

This is pursued within the most modern Smart Factory and Industry 4.0 paradigms, in order to make innovation have positive industrial effects, thus enhancing skills and competitiveness of the entire supply chain. A technology demonstrator for the aviation sector will be created as a testing tool, but also as a validation tool of the outcomes, in order to cover the entire life cycle of both product and process. The initiative thus combines the product and process innovation through design and realization following the modern aviation industry guidelines: "one piece" technology, composite materials and Smart Factory within Industry 4.0.

The project is intended to develop the technology and industrial processes related to aero-structures in an extremely promising trend related to the One Piece composite solutions as an evolution of the One Piece barrel development – the Boeing 787 already features this technology – thanks to the industrial process innovations given by Smart Factory within Industry 4.0. In this programme Leonardo S.p.A. plays a primary role with an equity investment equal to 27%, and is involved in every version of the product, as well as in the platform future developments. This programme is already a success, but it is still growing with more than 1,400 orders in March 2019 and a portfolio of about 600 deliveries, making a forecast that exceeds 2,000 units. The initiative is then part of a framework that already has the characteristics of an industrial product, but where innovation is strongly active and has an extremely remarkable room for further progress.

The project thus has an important value for sustainability, allowing the entire industrial context to progress in an already mature enough scenario from an industrial point of view, though requiring a continuous evolution to assure the competitiveness needed. The use of composite materials, in addition to conferring competitive advantages to the aircraft in terms of weight, opens scenarios of industrial optimisation where the One Piece application allows making complete assemblies in a single product cycle for the benefit of final product costs and quality. The historical trend actually proves a continuous growth in the use of composite materials in both civil and military aviation sectors.

WEB SITE
THE DISTRICT
PROJECTS

DAC

GENERAL AND BUSINESS AVIATION

Specialization area aimed at the development of technologies for the design, manufacture and assembly of light tourism aircraft, aircraft for business aviation, including high-range and high-speed aircraft, and systems for urban air transport. In this context, the District operates for the identification and development of Urban Air Mobility services and related operations integrated within traditional air traffic (Air Traffic Management/ Air Traffic Control) and with new operational concepts (U- space).

GENERAL AND BUSINESS AVIATION

PROJECT INDEX

AUTOTECH

ENDOR

S4W

SIRIMAP

TABASCO

TRASE

WINSIC4AP

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

WEB SITE

THE DISTRICT

PROJECTS

DAC

AUTOTECH

The AUTOTECH project provides a complete analysis and realization program based upon advanced cognitive technologies for UAV's storm flight within ISR mission's framework, with the objective to obtain either civil as for military support to operations.

The expected results will demonstrate, through the definition of scenarios (military and military/civil) the process innovation in reconnaissance, modeling and interpretation of an environment where a UAV swarm cooperate to manage an emergency situation introducing optimization and automation within the decision support techniques nevertheless within the electronic technologies applied to the command and control for unmanned flights.

The AUTOTECH project aims to satisfy the requirements related to the industrialization of an integrated system for rapid reaction able to operate 24h/24h for localization and detection of potential threat source by sending, on the spot, unmanned vehicle able to observe, evaluate and deliver an efficient support to deterrence actions.

In order to achieve an adequate deterrence action, it is necessary to consider basic points as: risk source rapid localization, quick reaction in reconnaissance and high capacity in track and tracing the anomalies found in order to intervene either directly or sending special units on the site. These considerations are valid as well as for preventive actions caused by suspicious activities.

At the moment it is seen highly inefficient to use a single UAV in operative framework for limited detecting and locating capacity and an insufficient communication infrastructure. AUTOTECH ambition want to overcome these technological limits in harmony with an emerging and growing market.

WEB SITE
THE DISTRICT
PROJECTS

DAC

ENDOR ENABLING TECHNOLOGY FOR THE DEFENCE AND MONITORING OF FORESTS

The intention of this project is to develop and test an integrated system of ground infrastructure and a platform for remotely piloted aircraft, for wide-range monitoring and protection of forests and woodlands. Software and advanced vision sensors will be developed for the analysis of images and data acquired by the airborne systems. These tools will be able to monitor plant and soil health, and detect any dangerous presence in the area. Furthermore, fire prevention monitoring units will be developed for both intentional and spontaneous wildfires and hydrogeological risk assessment, connected with forests and woodlands.

The project aims to support, with high-tech devices, forest and woodland management that would otherwise require a huge – though not always effective – involvement of human resources, because of logistical, structural or organisational difficulties.

The proposed hybrid architecture is based on the use of a Command & Control (C&C) ground platform to process and manage data acquired by the airborne sensors. It aims firstly at addressing the issue of highly destructive wildfires, which are more and more frequent in the Mediterranean region and not just there (for example also in California). These events cause climate change in addition to damaging the forests. Within our national border, the fight against intentional wildfires and the bad management of woodlands represents a priority in order to preserve the habitats typical of the Mediterranean scrub. Wildfires are the main damaging element of wooded areas since they alter the biomass, the structure and the composition of the plant species.

The use of drones equipped with sensors, integrated into an intelligent network, permits exploration of the area. The identification of potential threats through mapping the condition of vegetation, while considering complex effects such as wind direction, climate assessment and other factors, in order to mitigate the potentially devastating effects of the flames. In the worst case, to drop water from fire-fighting systems in a targeted manner, safeguarding human lives and allowing better decisions from the command and control centre.

WEB SITE
THE DISTRICT
PROJECTS

DAC

S4W SUSTAINABLE SILENT SUPERSONIC AVIATION FOR A SMALLER WORLD

The aviation industry has always brought enormous social and economic benefits to the whole world, allowing people to connect and travel, grow business and make countries prosper.

There is a move today that brings the reintroduction to civil supersonic flight closer to reality that will boost these positives effects. However, these benefits may have side effects on the environment and on people that leave in the proximity of airports. Despite aviation is accountable for only 2% of the total human-caused greenhouse gas emissions, the sector has decided to take responsibility and lead the way for a greener aviation.

Let us remember that Concorde was the last supersonic commercial aircraft and its programme ended in 2003 also because of its impact on environment larger than other types of aircraft. Therefore, it is required to understand the effects that the introduction of new and greener supersonic aircraft would have on the ATM and, in general, on safety.

It is within this wide context that the present project "Sustainable Silent Supersonic aviation for a Smaller World" (S4W) addresses the action "safer and greener aviation in a smaller world", inspired by the following targets of the European Commission's Space Strategy for Europe and Aviation Vision :

A) Maximise the benefits of space for society and the EU economy, by promoting the exploitation of altitudes between Flight Level 600 (= 18 km) and 150 km which currently are underused;

B) Contribute to a more competitive EU European aerospace sector, though the development of a very innovative concept for commercial aerospace transportation;

C) Reinforce Europe's competitiveness and autonomy in accessing high altitudes in a safe and environmentally friendly manner, by making aircraft cleaner and quieter to minimise transport's systems' impact on climate and the environment;

D) Make Europe the safest air space in the world, and provide the best products and associated services in air transport taking travellers and their baggage from door-to-door, safely, affordably and quickly.

WEB SITE
THE DISTRICT
PROJECTS

DAC

S4W SUSTAINABLE SILENT SUPERSONIC AVIATION FOR A SMALLER WORLD

Inspired by the "worldwide mood" and expanding the above approach, the S4W project intends to support the above mentioned targets of the EC through the achievement of the following specific objectives:

OBJ. 1 Demonstrate the mature feasibility of integrating small high-supersonic aircraft into the airspace scenario (ATM)

OBJ. 2 Optimize the impact related to the environment: sonic boom, noise, emissions and social acceptance of this class of aircraft.

OBJ. 3 Improve analysis and design methods to support the application of upcoming new standards dedicated to supersonic aircraft certification.

There have been several projects of large hypersonic aircraft that would eventually transport a large number of passengers anywhere on earth in a few hours. It is clear that the eventual development of a large hypersonic aircraft will have to be preceded by a smaller and simpler project addressing the issues of (i) efficient design, (ii) environmental friendliness and (iii) safe operations.

SIRIMAP

The SIRIMAP project aims to develop new remote and proximity detection systems to monitor marine pollution due to macro, meso and microplastics, methodologies for their in-situ and at lab scale analyses, and appropriate strategies for recovery and recycling.The objectives of SIRIMAP are particularly relevant for the protection of the Mediterranean Sea, recently identified as a great accumulation region of plastic debris. In this scenario, SIRIMAP represents a strategic proposal for the "Blue Growth" topic, in agreement with international, European and national guidelines.The objectives of the project are: development of satellite data analysis methodologies and strategies for remote mapping of macroplastics, development of detection platform (drone) for proximity mapping of meso/microplastics; sampling and in-situ analyses, characterization of meso-microplastics and recovery/recycling strategy assessment; experimental development and demonstrators. The expected results are the development, design and implementation of: new algorithms for detecting plastics using satellite data; a new flying configuration with detachable and recoverable payload, a new hyperspectral analysis for mapping by drone; innovative methodologies for in situ analysis through a microfluidic system and an innovative microplastic analysis system. The obtained results will allow the realization of high-level demonstrators such as: a mock at real-scale with payload, a compact opto/mechanical system for in-situ analysis, innovative plant solutions for waste separation; prototyping of composites.In any activities partners with specialist skills are involved: remote mapping (DAC-Uniparthenope, DAC-MAPSAT), proximity mapping (DAC-OMI, DAC-ISASI, DAC-ICAR, DAC-IAMC), in-situ analysis (DAC-ISASI, DAC-IAMC), lab-scale analysis (DAC-ISASI, DAC-IPCB, UNIBS, UNIMOL), recovery/recycling (DAC-IAMC, IREOS, UNIBS, DAC-IPCB), demonstretors (DAC-OMI, DAC-ISASI, IREOS, DAC-IPCB), verification activity (DAC). The participation of qualified research centers will ensure a great economic and employment impact for SMEs, particularly for convergence and transition regions.

WEB SITE

THE DISTRICT

PROJECTS

DAC

TABASCO

TABASCO research program focus is on low technologies and manufacturing processes for General Aviation (GA) airframe structures. TABASCO partnership is composed by aircraft manufacturers, SME and Consortium Companies operating in General Aviation. This can be helpful also in regional aircraft category structure development due to several common issues with Commuter Aircraft category belonging to General Aviation itself. Recently commercial appeal for composite airframe structures moves market of very light aircraft, CS23 aircraft (up to commuters) and airliners too. Small airline companies, pilot school, public companies a private users appreciate aerodynamic shapes and features of new composite aircrafts. But in this scenario new certification and operational problems arise due to composites, so that an analytic and experimental study is the unique approach needed to sustain and point out the effective role of low-cost composite processing. Airworthiness and composite manufacturing cost impact can be very important starting from storage up to final inspection; in General Aviation market, the final customer usually assign specific requirements that can add further certification complexity, for example in case of specific electronic equipment, IRF requirements compliance need to be shown. Maintenance features are strictly linked to manufacturing and inspection processes to be studied in the present research program: thinking about corrosion features, composites can be considered useful in theory, but repair issues, thermal behavior and inspection features play a determining role in the commercial success of a composite aircraft. For this reason, the study here performed is based on a concurrent engineering approach defining material characteristics, processing and inspection technologies to be set up in an iterative loop to support structural design form the beginning of aircraft development.

The program is referred to carbon fiber reinforced composites for main airframe structures, otherwise specifically indicated, considering fiberglass as support material for interfaces and secondary aerodynamic shape parts or system installation.

WEB SITE
THE DISTRICT
PROJECTS

DAC

TRASE TRANSPORTATION SYSTEM SECURITY AND MONITORING

The overall goal of this project is the development of an integrated platform in support of the entire transport sector (mobility of people, vehicles, and goods), applying new technology and leading on to the protection of communication networks and transport hubs.

The proposal is to define an integrated solution for the day-to-day monitoring of an entire logistical system within intermodal hubs, to optimise management of the different mobility processes (of people, luggage, transport units) and commercial structures inside the critical area. A new approach to mobility that understands the transport of goods and people and finds solutions that are both more sustainable and more effective, while enhancing quality of life.

Specifically, this research will address Internet of Things (IoT) enabling methods of "smart" mobility, by developing devices that implement Artificial Intelligence techniques (Deep Learning) in maritime and road transport logistics.

The project addresses the development, implementation, and testing of the following control technology:

- Video analysis based on computer vision and deep learning technology for crowd management, people counting, detection of perimeter or protected area intrusion, anomaly detection, face recognition in the wild. It supports innovative hard ware (HW) solutions, also embedded.
- Access control and monitoring systems: an intelligent gate to reduce check-in time; analysis of pedestrians and vehicles in the pre-boarding areas, to enhance the infrastructure management; monitoring in the security sector (presence of people, vehicles in restricted areas).
- Safe communication systems and portable applications
- UAV (Unmanned Aerial Vehicle)
- Intrusion detection systems
- Operation centre

The integration of these enabling technologies will allow a more effective management of queues, spaces, and loading times by monitoring the flows in real time, thus optimising resources (people, means of transport, and infrastructure components). The design of new scenarios and/or new services for storage and handling, as required by new safety and operational standards. Evaluation of new processes, and critical issue identification allowing immediate detection and evaluation of the changes made. As a result, operational capabilities of the existing hubs will be strengthened, making them more attractive within the distribution chain. This will allow for an increase in flows, with a significant impact on employment in the reference areas, while creating a basis for future B2B o B2C applications.

WEB SITE
THE DISTRICT
PROJECTS

DAC

WINSIC4AP WIDE BAND GAP INNOVATIVE SIC FOR ADVANCED POWER

WInSiC4AP core objective is to contribute in developing reliable technology bricks for efficient and cost-effective applications addressing social challenges and market segments where Europe is a recognized global leader as well as automotive, avionics, railway and defence. WInSiC4AP approach is to rely on the strength of vertical integration allowing optimization, technologies fitting application requirements, developing the full ecosystem and approach relevant issues as reliability in the full scope. That enhances the competitiveness of EU- Industries as well as TIER1 and TIER2 down to the value chain in a market context where other countries today, such as the USA or Japan, are advancing and new players accessing SiC enter in the market. New topologies and architecture will be developed for targeted application simulating operational environment, at laboratory level, driving the needed and still missed technologies, components and demonstrators to fill the gap between current state of the art and the very high demanding specifications. WInSiC4AP framework has been built so that companies working in different domains (i.e. automotive car maker and TIER1-2 and avionics, railway and defence TIER1-TIER2) and in the vertical value chain (semiconductor suppliers, companies manufacturing inductors and capacitors) as well as academic entities and laboratories will collaborate to codesign solutions, solve problems and exchange know-how, such that unforeseen results may also emerge. WInSiC4AP will be supported with synergy between ECSEL JU and ESI funding enabling complementary activities with relevant economic and social impact envisage in a less development region of Union.

Silicon Carbide (SiC) technology is recognized worldwide by industry and academics as one of the most promising microelectronic technologies in the "more than moore" axes. It is tailored for high power applications as well as electric traction, power conversion and power distribution.

Compared to silicon, it offers significant advantages for application operating at high voltages and high temperature, allowing higher frequency switching as well as lower power losses.

WEB SITE

THE DISTRICT

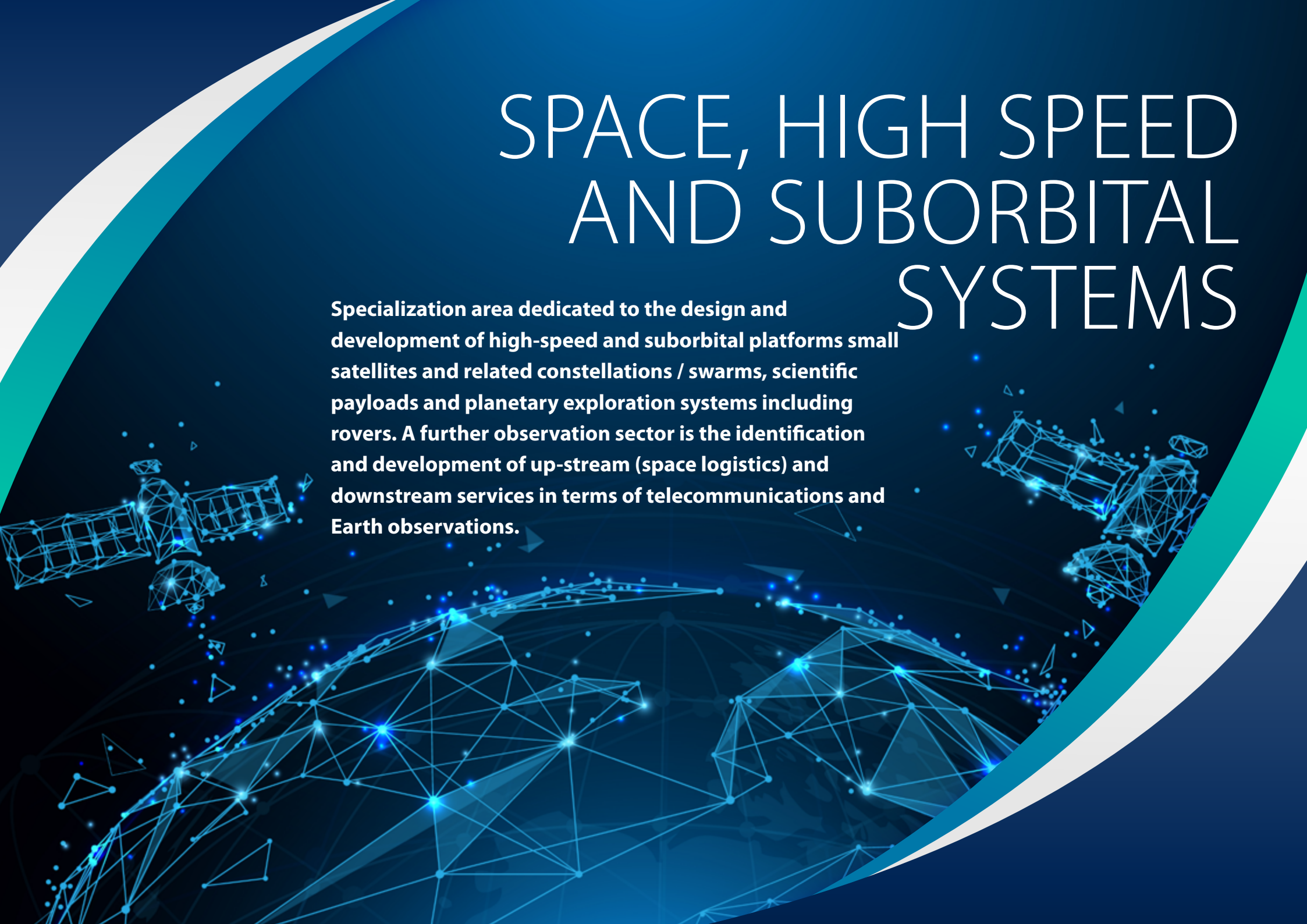
PROJECTS

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

DAC

SPACE, HIGH SPEED AND SUBORBITAL SYSTEMS

Specialization area dedicated to the design and development of high-speed and suborbital platforms small satellites and related constellations / swarms, scientific payloads and planetary exploration systems including rovers. A further observation sector is the identification and development of up-stream (space logistics) and downstream services in terms of telecommunications and Earth observations.



SPACE, HIGH SPEED AND SUBORBITAL SYSEMS

PROJECT INDEX

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

WEB SITE

THE DISTRICT

PROJECTS

DAC

APEA 4.0

The project aims at creating an integrated platform to manage the environmental performance indicator monitoring of ecologically equipped productive areas (Aree Produttive Ecologicamente Attrezzate, APEA) mainly based on space technology.

The project proposes a technological approach based on a three level monitoring.

The first level involves the use of satellite data related to Earth observation, coming from different platforms with different spatial, spectral and time resolution features. The main database will be set on the European Space Agency's Sentinel constellation, which currently is the satellite constellation with greater information value available in full free mode. Data fusion with other high resolution data like those ones from Eros B satellite – as received by MAPSAT, the exclusive receiving station for Italy (in particular for Campania Region) – is highly innovated and enhanced by the combined use of images acquired by nano-satellites (a recently introduced technology and not well known yet on the national scene - new Space Economy). In particular SAR (Synthetic Aperture Radar) data will be used to define the environmental indicators related to soil pollution, by means of algorithms for data fusion with data of different origin. They will also be defined based on previous scientific research outcomes and projects carried out by the proposing team regarding the "Land of Fires" ("terra dei fuochi") issue and, in general, the landfill control and the related pollution.

The second level involves the integration of the above mentioned multi-source satellite platform with a proximity survey system, characterised by the prevalent use of SAPRs (Sistema Aereo a Pilotaggio remoto, remotely piloted aircraft system). A SAPR use framework for acquisition purposes – in proximal sensing – will also be defined on soil, air, and water matrix. For the first time, innovative approaches based on the combined use of satellite remote sensing and SAPR data regarding the so called APEAs will be proposed in a systemic and continuous way, in order to strengthen the current analysis tools – on a progressively lower/higher resolution scale – according to a process logic. As for APEA 4.0 project, SAPRs will be equipped with an innovative multisensory node compatible for applications both fixed and drone transported.

The third level will be made of ground sensor networks dedicate to water and air matrix measurements integrated with IoT (Internet of Things) and/or DSS (Decision Support System) data.

WEB SITE
THE DISTRICT
PROJECTS

DAC

HIPENSAT HIGH PERFORMANCE NANO-SATELLITE

Earth observation activities are typically carried out by radar payloads or electro-optical payloads (Imagers) flying on medium to large size satellite platforms, and detecting different spectral band signals.

Today electronic technological evolution – particularly the image resolution increase and the more and more effective performances of the attitude control sub-systems ensured by the increased computing power made available by latest generation FPGAs (Field-Programmable Gate Array) and by innovative con-trol strategies based on the fusion of data coming from sensors of a different nature – permits to achieve remarkable performances also with small satellite platforms. The space available on board can actually be dedicated almost entirely to the payload (we talk about "all payload" platforms) since the miniaturization of electronics, with reduced volumes, weights and powers, allows the implementation of all necessary onboard functions, as well as optical data handling. In addition to this, the cost containment of small plat-forms compared to large platforms encourages us to think of constellation solutions (by sending a plethora of small satellites instead of a single large satellite with payload) that can give us two more great benefits: increase in reliability assured by redundancy, and increase in the revisit time (i.e. the time elapsed be-tween two successive observations of the same ground point on the surface of the Earth).

The constellation strategy allows achieving two more benefits, one related to ground resolution and the other related to the cost of the usable components. Many low cost easily launchable satellites permit low altitude operations (300/400 Km, thus reducing the lifespan of a single satellite) while remarkably increas-ing ground resolution achievable – optics being equal. They also permit the use of non full space-grade components on satellites, since at lower altitude radiations have a lower impact and the risk of a lower level of reliability can be acceptable thanks to redundancy and ease of replacement.

The project includes the design of an integrated small platform for Earth observation, including a carrier composed by a Cubesat type 12U satellite (2U x 2U x 3U, 20 x 20 x 30 cm altogether, and a mass of about 15 kg) and a hyper-spectral panchromatic optical payload.

The platform will be designed, developed, made, tested, launched, put into orbit at an altitude lower than 500 km and validated in orbit also thanks to a ground station that will receive and analyse the col-lected data to verify its compliance with the functional, performance, and operational requirements

WEB SITE
THE DISTRICT
PROJECTS

DAC

HYPERBUS DEVELOPMENT OF A PAYLOAD MICRO SATELLITE PLATFORM FOR EARTH OBSERVATION

The HyperBUS research project aims at developing a satellite platform for radar/optical and IOD (In-Orbit Demonstration) multi-mission applications with low manufacturing and in-orbit costs – developed up to TRL 8 (Technology Readiness Level) – having the following general characteristics:

- Platform for Earth's orbit with weight lower than 50 Kg (micro-satellite class)
- Optical/wireless technology bus
- Able to accommodate P/L (PayLoad) for Earth observation (P/L optical and/or radar)
- Able to provide low cost IOD, with rapid development and TRL raising of enabling technology, encouraging the rapid transfer to the manufacturing sector
- Equipped with a low power electric propulsion system. A breadboard by Thruster Unit (anode unit + cathode) will also be developed and characterised, and integrated with other COTS (Commercial Off-The-Shelf) sub-systems like PPU (Power Processing Unit) and FCU (Flow Control Unit). Fundamental characteristics of the entire propulsion system will be a reduced mass and a significant total momentum compatible with the project and platform requirements
- Ground control segment to monitor and control the satellite, its flight dynamic and data acquisition activity planning, based on automated operations by means of Artificial Intelligence algorithms.

The platform will first of all be sized to accommodate hyper-spectral radar and/or optical payloads.

The developed platform (QM, Qualification Model) will represent a flight model in terms of performance and COTS equipments excepted the P/L since its development and procurement are outside the project scope.

The project will include a promotional activity in order to obtain – following the conclusion of the research project and outside the scope of its costs – a business agreement for the purchase of the payload, the satellite integration and launches activities and in orbit operations.

The aims of the HyperBUS project are manifold:

- Development of enabling technology useful for the creation of new products, with innovative features for the commercial market;
- Enhancement of regional, industrial, and academic technological skills, even in synergy with the Italian "Space Economy" National Strategic Plan;
- Specialization of the regional industrial chain;
- Strengthening of the technological competitiveness within the regional scientific excellence.

WEB SITE
THE DISTRICT
PROJECTS

DAC

HYPERION SUBORBITAL HYPERSONIC SPACEPLANE CAPABLE TO SUPPORT PAYLOAD IN ORBIT INSERTION

Air Force believes that "Space is a controversial and congested domain" and therefore Access to Space and Space Services are fundamental. Thanks to them it is actually possible to immediately expand military capabilities as for surveillance and interception of threats coming from space at much higher speed and altitude than in the past.

Today the Air Defence is limited to the air space, up to 20 km of altitude. The start of the development of hyper-fast weapon systems flying at higher altitudes and its expected exponential development require the identification and the implementation of adequate countermeasures. Thus the need arises to develop systems capable of reaching each point in the "extended" air space, i.e. up to 100 km of altitude, in an extremely reduced time.

The air defence scenario in the near future will be characterised by the massive use of new hyper-fast weapon systems: gliding aircrafts and hyper-sonic cruise missiles. The new defence system shall be characterised by: Speed; Maneuverability; Quick response; Survival; Range; Penetration; Destructive power; Low human risk.

being the primary goal the reduction of current response time from 23 to 6 minutes. It is therefore fundamental for air defence to fill the gap of the anti-hyper-sonic defence systems, where time is tactical/ strategic key.

What is needed is the availability of an aircraft capable of reaching high speeds and high altitudes, taking off and landing horizontally, from short runways without the help of launch platform or mother planes. Given the limited dimension of the surface to be protected (the Italian territory), the benefits for AF are clear: their needs can be addressed by a sub-orbital system able to rapidly be operative and reach the Karman line at 100 km of altitude => expand the space and aerospace operative domain by sub-orbital flight.

Such a system can also provide the possibility of air launching – by a spendable rocket – surveillance and defence payloads into Low Earth Orbit (LEO) starting from altitudes (40-50km) far higher than those usable with fighter aircrafts available today like the Typhoon. This way also the mass put into orbit will be higher, estimated at ≤100kg. This can be achieved from any point of the national territory without the need of specific launch areas – even outside our territory in case => gain access to space resources through air-launching as a possible solution for small satellites, while responding to the need of efficiency, autonomy, and flexibility.

WEB SITE
THE DISTRICT
PROJECTS

DAC

LUNAR ANTS LUNAR ANTS SWARM - LAS

In 2018 and 2020, the major Space Agencies in the world published the Global Exploration Roadmap (GER), where they shared the common intent to expand the human presence into the Solar System with the surface of Mars as a driving goal and the Moon as a necessary intermediate step. Around 30 robotic and 4 crewed space missions to the Moon (from 13 Countries and from both Space Agencies and Private Companies) have been already approved to be launched in the 2021 - 2028 timeframe, while other ~ 20 missions are under evaluation. The goal of this space effort is to establish a sustainable human presence on the Moon and, in the future, also on Mars, laying the foundation for private companies to build a lunar economy. Ambitious plans are under study for the establishment of long-term foothold Lunar and Martian base camps, which will importantly contribute to the development of an expected thousands-billion space economy in next decades.

The settlement of humans in extra-terrestrial hostile environments requires the wide use of robotic systems to carry out even those activities that are conventional on Earth such as:

a) Settlement - scouting of the sites and scientific investigation of the hitches and resources.

b) Routine - continuous exploration; monitoring of the territory; scientific missions in situ

c) Services - maintenance of the base camps and its equipment

Unfortunately, "traditional" space robotic systems, such as those operating on Mars, (e.g. Curiosity or Perseverance rovers), are characterized by considerable development times and huge costs. They are also limited in performing certain tasks due to their technological characteristics and the high risk of losing their functionality during dangerous/critical missions. Finally, they are too human-dependent being tele-operated by a mission team on the Earth who carefully craft plans for subsequent execution by an onboard sequencer with consequent problems, especially in case of unforeseen events, due to time delays and signal losses.

Moreover, they lack the capabilities that make human activities more efficient, faster, cheaper and safer: cooperation, collaboration and the flexibility to adapt to changing situations in which autonomous decisions must intervene.

The vision of the LUNAR ANTS Swarm (LAS) technology is to transfer these peculiarities to an advanced robotic system able to support settlement, routines and services operations in future inhabited and uninhabited planetary bases (Moon, Mars and even asteroids) with the efficiency of a SWARM OF ANTS.

The high-risk challenge of the LAS project lies in finding solutions integrating differentiated disciplines so to concurrently merge frontier scientific needs such as:

- Distributed rather than punctual investigation – exploiting sensors and/or multi-sensor scientific equipment and analysis methodologies of aggregate data.
- Pioneering missions – Facing the challenging mission in craters, non-illuminated and high-risk areas.

and technologies not yet developed for the space sector:

- Collaborative and cooperative systems – always focusing on the ultimate target of the mission.
- Autonomous decision-making capabilities – pursuing high-level goals with the utmost autonomy limiting or avoiding human intervention.

WEB SITE
THE DISTRICT
PROJECTS

DAC

MHRG ON BOARD HW & SW

The project involves the definition and development of a complete test system (EGSE, Electrical Ground Support Equipment) for communication satellites.

The test system will be defined and developed within the main ItalGovSatCom project – its requirements and interfaces will be the reference for developing the EGSE.

Two dedicated EGSEs are expected to test both satellite and payload.

For both EGSEs, the architecture provides a Central Supervisor unit (CCS, Central Checkout System) to coordinate the activities of each specific equipment (SCOE, Special Check-Out Equipment) via an Ethernet link and a number of workstations.

The CCS centralises all control activities and coordinates the intervention of the various SCOEs, according to what the AIT (Assembly, Integration and Test) staff has decided. In particular, the CCS archives the DataBase of each SCOE, maintains the control sequences of all SCOEs, and manages the test outcomes.

The development of the CCS unit is part of this proposal, though only a significant SCOE sub-system will be developed.

The development of the various SCOEs includes some activities like the definition of the requirements, the detail design and prototype development of critical elements that will be carried out in the first 24 months of the ItalGovSatCom project (Stage 1). The subsequent activities related to creation, integration and testing will develop in the following 12 months (Stage 2), depending on the approval of goal 2 of ItalGovSatCom project.

MISENO MULTIPURPOSE ITAL-GOVSATCOM APPLICATION SERVICES FOR EMERGING USER NEEDS AND OBJECTIVES

The project is part of the "Space Economy" strategic plan and, particularly, the "Mirror GovSatCom" programme aimed at creating a geostationary satellite telecommunication system for institutional purposes, though extended to civil use. Its main innovative characteristics are:

- Safe and reliable communication
- High availability and scalability (pooling and sharing)
- Reconfigurable spot coverage, with particular focus on the Mediterranean See
- Users characterised by:
  - Fixed location (Fixed Communication/VSAT)
  - Mobility (Communication on The Move - COTM)
  - Relocability (Communication on The Pause - COTP)

By leveraging these guidelines and the Ital-GovSatCom system characteristics described in the introduction, the "MISENO" sub-system aims at creating a Multi-purpose Application Services Platform.

The proposal arises from the need (as underlined in the EU document "Satellite Communication to support EU Security Policies and Infrastructures - Final report") to increase the collaborations between the different user communities when they intervene at the same time (Civil Protection, humanitarian aid, security and defence forces, ONGs) in emergency situations.

The function of civil protection services is rapidly evolving, accompanied by a growing demand for high speed guaranteed by satellite communication (e.g. between fire-fighters, security, police, …) and a growing inter-operability between first rescuers.

Being able to operate anywhere at any time has become crucial, together with the need to rely upon communication systems that are more and more resilient and reliable.

WEB SITE
THE DISTRICT
PROJECTS

DAC

MISENO MULTIPURPOSE ITAL-GOVSATCOM APPLICATION SERVICES FOR EMERGING USER NEEDS AND OBJECTIVES

The project proposal aims at carrying out Industrial Research and Sustainable Development activities to design and develop an integrated, sustainable, and smart Application Platform able to guarantee – in a permanent and rapid way – an effective solution to territory emergency management in case of inadequate coverage, for communications, and data and information exchange purposes.

As a Pilot System it will start from "fire fighting", "Civil Protection" and "rescue" services within the Region, thanks to the experiences already carried out in Campania and considering the needed integrations with services and facilities already available on the territory – regional emergency centres, DSSs (Decision Support System), regional agro-meteorological, and fire-fighting networks, Fire Brigade's CAP (Common Alerting Protocol) system.

The Pilot System Demo activities are expected to involve a large group of interested parts like the Civil Protection, the Fire Brigade, as well as medical staff and other local authorities.

In July 2013 DAC introduces the MISTRAL project to MIUR, the Italian Ministry of Education, University and Research. The project aims at developing a multi-role air-launching micro-space platform, equipped with a small re-entry capsule for payload recovery.

In the future this system will have to be able to provide institutional bodies or other commercial customers with an access to Space and recovery capability with reduced times and costs.

Activities started in October 2015 and the project focuses on the most critical and peculiar aspects:

- Processing of functional and technical system requirements as well as definition of a system capable of fulfilling the mission analysis, while considering the technical constraints identified by the technical responsible and the partners
- Project preliminary design processing until stage A/B completion
- Identification of all resources and activities needed to develop the project ground and space segments
- Initial estimate of the technical and programmatic risk
- A schedule that shows readiness for the development activities (stage C/D)
- The development of a demo platform for the system most critical elements to demonstrate both functionality and performance

DAC

The innovative concepts proposed and the technological challenges that the project is expecting to face are as follows:

1. *Aerodynamic Deorbiting*

   Strengths: low cost, simple, dual function airbrake/heat shield

   Weaknesses: non-traditional thermal protection, flexible fabrics, return times

2. *Autonomy in the Guidance*

   Strengths: a system capable to adapt to the environmental characteristics encountered

   Weaknesses: very sophisticated GNCS (GPS + Propagator + Guide + dedicated GS)

3. *Airbrake Modulated Opening*

   Strengths: possibility of trajectory control

   Weaknesses: sophisticated low consumption kinematics, resistance to thermal/dynamic loads

4. *Distributed Ground Segment*

   Strengths: "almost" continuous monitoring

   Weaknesses: high number of ground network stations connected

5. *Recoverable Module*

   Strengths: mission versatility, no debris, medium heat flows

   Weaknesses: limited thermal protection materials, reliability

One of the prominent aspects of the MISTRAL project is certainly represented by the satellite autonomy in the guidance during the re-entry phase. Indeed, the variables involved and the characteristics of a satellite in LEO (Low Earth Orbit), that remains in contact with a ground station for only a few minutes, due to its low altitude (500-150 km), do not allow to ground control the satellite in its deorbiting phase before re-entry.

MOVES PROJECT

MICRO ROVER FOR SWARM-BASED MOON EXPLORATION

Moon exploration is a highly topical issue again. In 2018, ISECG (International Space Exploration Coordination Group), composed by the 14 main world space agencies (including ASI, Agenzia Spaziale Italiana, Italian Space Agency), published the "Global Exploration Roadmap", to define the exploration strategies for the years to come – based on mutual interests. Such a Roadmap sees a combined effort of the agencies leading to a shared final goal: the human exploration of Mars.

The short term goals then are the constitution of the Gateway, a space station in lunar orbit, and human exploration of the Moon (starting in 2024). Such a programme involves the essential role of the private sector as far as load transport operations are concerned for both the Gateway and the base on the lunar surface. The long term goal is to establish a sustainable presence on the Moon, to lay the foundations for private companies to build a lunar economy and finally send astronauts to Mars.

In the space exploration sector, the use of small and autonomous rovers has already suggested the introduction of the swarm concept widely developed in drone technology for Earth – just think of the NASA's MArsBee project or the ZEBRO project of Delft University (TU Delft), as well as many others in the world. The loss of an equivalent "lunar drone" (a micro-rover) would have a very low impact on the success of the whole mission. The idea of a swarm of several micro-rovers managed by a single central "brain" would actually reduce the chance of mission failure since if one were to break down it could be replaced.

The projects aims at creating a lunar micro-rover prototype, intended as the first demonstrator in a future perspective of swarm logic use, that is, a micro-robot swarm operating in a coordinated way and in unison to meet a predetermined scientific and technological goal.

The micro-rover will be equipped with a navigation camera to allow scientific measurements too, a sensor for measuring the cumulative mass and the electrical characteristics of the lunar exosphere dust, in the thin atmosphere surrounding the lunar surface.

The micro-rover will be designed with physical characteristics so as to be accommodated like a payload on satellite micro-platforms on its way to the Moon. It will also be able to operate on the lunar soil during the day, and move independently.

The project prototype will be tested in simulated lunar environment (in terms of both temperature and pressure) and will be assessed for space qualification in terms of vibration and thermal-vacuum tests.

WEB SITE
THE DISTRICT
PROJECTS

DAC

PM3

MODULAR MULTI-MISSION PLATFORM

This project includes the development of Enabling Innovative Technologies for the implementation of an advanced modular and multi-mission Satellite Platform, in 50-kg micro-satellite class, with possible housing of multiple interoperable Payloads (P/L). The project value derives from the possible use of technologies developed to the implementation of a double-use system: as a matter of fact, if on the one hand such a platform may enable a hosting service in orbit for Payloads of a different type and nature, it allows on the other hand to supply - to a wide range of possible players in the Space branch – a dedicated service of in-orbit validation and demonstration (IOD/IOV). This kind of service, exclusive prerogative of Big Industries sofar, inevitably leads to allow to Businesses interested in the validation of their own technologies in an operating environment, to access to a service matching these needs, customizable and at a low cost, so as to generate a positive trend concerning these technologies availability on both the National and International market.

4 main innovation areas are affected by the presented study:

- Advanced propelling systems;
- Innovative approach and docking systems;
- Technologies and processes to the implementation of advanced smart structures through Additive Manufacturing and innovative materials;
- New-generation processing technologies and systems.

The submitted project shall allow to develop technologies and processes necessary to the implementation of a demonstrator prototype for the described systems, with a Technological Ripeness Level (TRL) between 4 and 6. The initiative multidisciplinary quality, involving a number of Companies of the branch is perfectly suited to a widespread distribution objective of the expertise acquired during the project implementation. An industrial and research partner co-operating during the whole study phase stands for a direct channel to transfer technologies to the Industrial world, generating a major impact for the results that can be directly exploited by the private sector.

WEB SITE

THE DISTRICT

PROJECTS

DAC

S4W SUSTAINABLE SILENT SUPERSONIC AVIATION FOR A SMALLER WORLD

The aviation industry has always brought enormous social and economic benefits to the whole world, allowing people to connect and travel, grow business and make countries prosper.

There is a move today that brings the reintroduction to civil supersonic flight closer to reality that will boost these positives effects. However, these benefits may have side effects on the environment and on people that leave in the proximity of airports. Despite aviation is accountable for only 2% of the total human-caused greenhouse gas emissions, the sector has decided to take responsibility and lead the way for a greener aviation.

Let us remember that Concorde was the last supersonic commercial aircraft and its programme ended in 2003 also because of its impact on environment larger than other types of aircraft. Therefore, it is required to understand the effects that the introduction of new and greener supersonic aircraft would have on the ATM and, in general, on safety.

It is within this wide context that the present project "Sustainable Silent Supersonic aviation for a Smaller World" (S4W) addresses the action "safer and greener aviation in a smaller world", inspired by the following targets of the European Commission's Space Strategy for Europe and Aviation Vision :

A) Maximise the benefits of space for society and the EU economy, by promoting the exploitation of altitudes between Flight Level 600 (= 18 km) and 150 km which currently are underused;

B) Contribute to a more competitive EU European aerospace sector, though the development of a very innovative concept for commercial aerospace transportation;

C) Reinforce Europe's competitiveness and autonomy in accessing high altitudes in a safe and environmentally friendly manner, by making aircraft cleaner and quieter to minimise transport's systems' impact on climate and the environment;

D) Make Europe the safest air space in the world, and provide the best products and associated services in air transport taking travellers and their baggage from door-to-door, safely, affordably and quickly.

WEB SITE
THE DISTRICT
PROJECTS

DAC

S4W SUSTAINABLE SILENT SUPERSONIC AVIATION FOR A SMALLER WORLD

Inspired by the "worldwide mood" and expanding the above approach, the S4W project intends to support the above mentioned targets of the EC through the achievement of the following specific objectives:

OBJ. 1 Demonstrate the mature feasibility of integrating small high-supersonic aircraft into the airspace scenario (ATM)

OBJ. 2 Optimize the impact related to the environment: sonic boom, noise, emissions and social acceptance of this class of aircraft.

OBJ. 3 Improve analysis and design methods to support the application of upcoming new standards dedicated to supersonic aircraft certification.

There have been several projects of large hypersonic aircraft that would eventually transport a large number of passengers anywhere on earth in a few hours. It is clear that the eventual development of a large hypersonic aircraft will have to be preceded by a smaller and simpler project addressing the issues of (i) efficient design, (ii) environmental friendliness and (iii) safe operations.

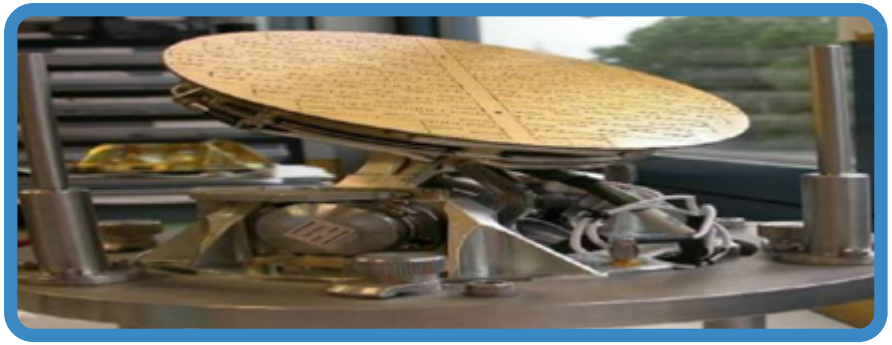
SPACE ECONOMY STRUCTURES

The main goal of the project is to develop both the primary and secondary structures of the Commer-cial Government Satellite of interest – Thales – according to a strong and reliable configuration based on a conventional manufacturing model for materials and methods around which alternative and in-novative solutions will be developed. In particular, once the structural and functional requirements of the satellite primary unit are established, firstly the baseline solution will be defined, composed by simple components in shape and assembled in a built-up structure. The baseline solution will be im-plemented by using the material qualified as Thales and through mainstream manufacturing processes for the aerospace sector and thus robust. Alternative processes related to different materials will be defined and compared related to the base solution, while assessing the applicability of "more afforda-ble" pre-impregnated materials qualified for the aviation sector, or for structural architecture. Already mature techniques will then be transferred to alternative sectors, to assess the capacity of those ma-terials to meet the requirements of stiffness typical of space environment. Finally, highly innovative solutions will also be evaluated to strengthen the base functionalities, and based on unconventional volte technology.

Today parts are manufactured by mainly using Honeycomb, a material capable of providing high bend-ing stiffness and compressive strength with a low weight. A first possible alternative could involve the use of prepregs – certified for the aviation sector – to make the skins, after an appropriate qualifica-tion that guarantees the material suitability for the purposes of this project. We can imagine instead to use parts entirely in composite (evaluating materials or solutions that encourage the thermal con-duction processes) in a smart solution of an innovative type, imagining an architecture where the ge-ometry of the parts collaborates with the definition of the correct inertia, to assure those stiffness characteristics Honeycomb can provide in the baseline solution.

Tertiary structures exclusively made by aluminium machined parts will also been assessed. They are critical in terms of Buy-to-Flying value that, is estimated equal to 11.5, according to the current con-figuration. For these components, alternative configurations and techniques will be analysed in order to reduce the overall cost, by acting on the raw material factor and the recurrent processing times. In the perspective adopted for the primary and secondary structures, the results of the feasibility analy-sis – although determining an adequate manufacturing model – could involve the construction of the tertiary structures according to mainstream baseline processes in order to respect the project sched-ule, while postponing the innovative development to a later stage.

TELEMACO



The project aims at developing enabling technology for an innovative radar system aboard an aircraft, with an advanced territory monitoring function during the flight. This system can provide a much greater amount of information than a classical SAR (Synthetic Aperture Radar) system, thanks to the electronic scanning of the beam transversal to the direction of motion. Moreover, unlike the classical SAR systems, it will be able to monitor the territory around the aircraft, thus providing information that can be used in guiding the aircraft itself.

The system can find dual-use applications both for territory control to identify objects (buildings, means of transport, infrastructures) – for defence purposes – and Civil Protection applications to detect wildfires, soil deformations. The system impacts on the everyday life since it could also be applied to a landing aid system for the aircraft.

The system is based on extremely advanced and innovative technology and in particular on a new and more advanced SAR system with the beam pointed in the direction of motion – Forward Looking SAR (FLoSAR) – and on beam electronic scanning antennas, providing the information requested by the system.

The programme involves study and research activities on the innovative SAR systems, their industrial applications and the technology and architecture of the beam electronic scanning radiant systems.

The study and the development of the single innovative radar system components and the relevant software are also provided, until a system demonstrator/simulator is made and tested.

The project proposes to start a continuous Research & Development (R&D) activity over time on new systems for beam electronic scanning in millimetre, centimetre and – in the long term – sub-millimetre band, too.

The technology and systems involved fall into a field of considerable scientific, technological and industrial interest, with a high technological and innovation content. They mainly affect the "Aerospace/Aeronautics" sector, but with significant synergies and effects in other sectors like ICT (Information & Communication Technology) and "Safety and Environment".

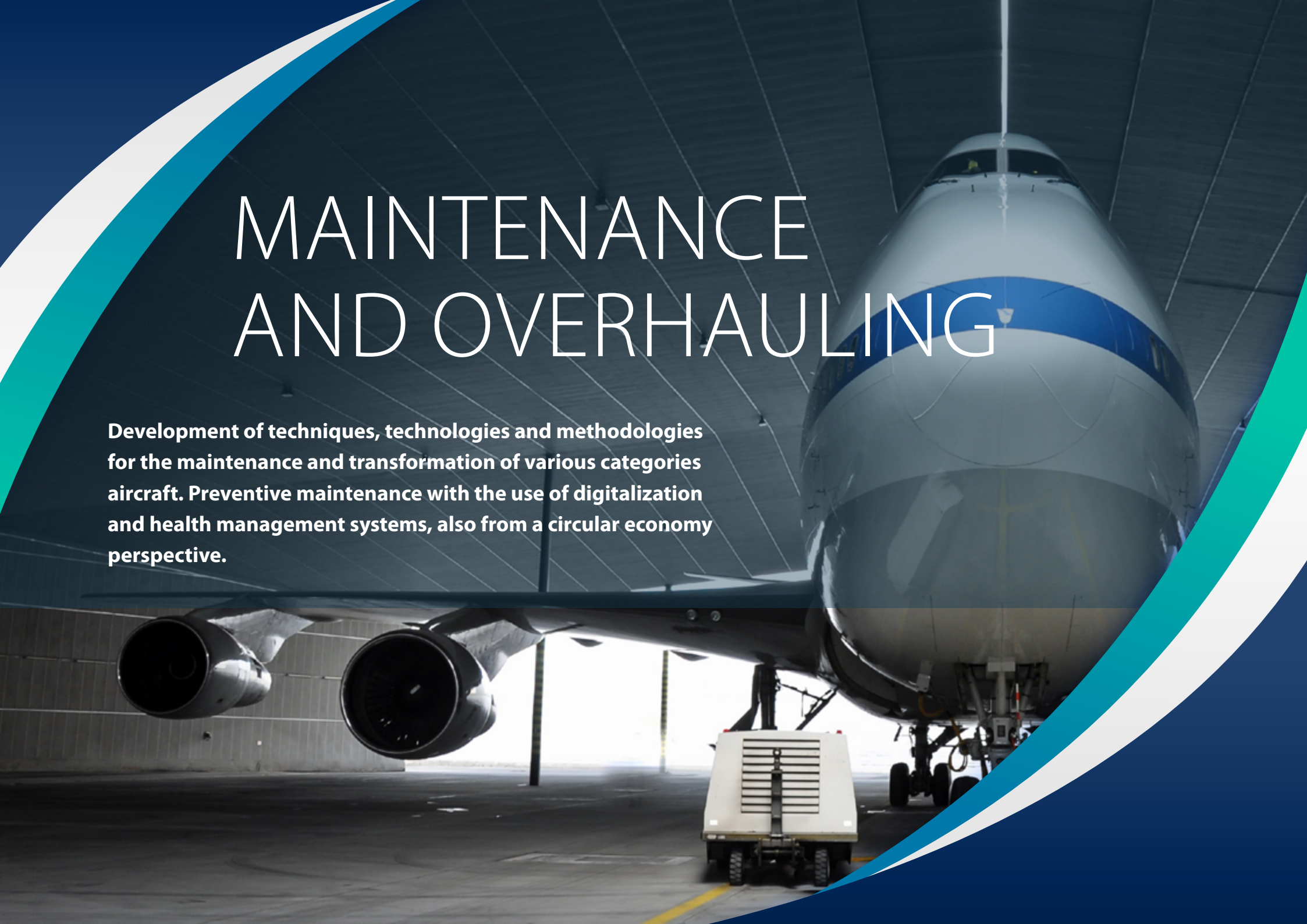
Knowledge, technology, and demonstrators to be developed can enable and support the growth of Campania and national manufacturing systems, through a new competitive advantage based on Know-How and product innovation in strategic sectors of the Knowledge Society and, more specifically, the Information Society.

WEB SITE
THE DISTRICT
PROJECTS

DAC

MAINTENANCE AND OVERHAULING

Development of techniques, technologies and methodologies for the maintenance and transformation of various categories aircraft. Preventive maintenance with the use of digitalization and health management systems, also from a circular economy perspective.



MAINTENANCE AND OVERHAULING

PROJECT INDEX

AVAMAN

MAVER

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

WEB SITE

THE DISTRICT

PROJECTS

DAC

AVAMAN ADVANCED MAINTENANCE

Modern information and communications technology (ICT) supports diagnostics and prognostics and on field operations (field maintenance). If used effectively it may improve aeronautical safety maintenance and therefore increase the quality and cost-effectiveness of operations. Additionally, the reputation and competitiveness of the company servicing the airlines are likely to improve too. The project also aims to categorize technological progress from Artificial Intelligence (AI) to develop smart systems for aeronautical maintenance, leading to radical innovation in work processes.

Indirect advantages for a MRO (Maintenance, Repair & Overhaul) company can also be seen on the planning side (supply, human resources); that is the knowledge that comes from the day to day routine of the workers who can flag up unexpected failures as a result of their in-depth training and the support of a detailed handbook. Another integral part of the project is the development of machine learning algorithms available to a multimedia Virtual Agent (bot), exploiting the increase in connectivity to collect data that will then be analysed to support the MRO's decision processes.

The natural language is the de facto interface of these bots, since it allows a significant increase in the amount of data acquired and a decrease in the cost from other methods. The project thus adds an innovative element of ICT in an MRO by introducing a new tool to produce information, new knowledge and new contents and a radical change in the IT function in a manufacturing environment.

The MRO development of a smart cart and a rover helps the project as they are on field maintenance data acquisition systems, giving support to specialised personnel.

The smart cart is a cart equipped with a series of specialised devices, a data acquisition system from PLC (Programmable Logic Controllers) and a user interface to control and check the necessary maintenance protocol, together with the traceability record.

The rover is a controlled handling system that collects data to support on field operations (field maintenance), and it is equipped with interchangeable sensors to operate in cramped areas thus reducing the need for specialised personnel.

WEB SITE
THE DISTRICT
PROJECTS

DAC

MAVER

MAVER Project aim to develop an innovative set up for a very flexible Maintenance Organization (MRO) able to switch operations quickly from regional to wide bodies aircraft and vice versa. The project plan analyzes in a real environment how to implement a new Lean model while stating its performance and economics compensations without accounting on scale economies and aircraft standardization. The new model relies on original applications of emerging technologies in various applicable fields and exercises the leverage on a multitude of cost-effective applications identified throughout the maintenance processes.

The new model well adapts to independent MRO, antithetic of big one-stop facilities, and the research project is used itself to study the integration into the MRO business of new readiness and sustainment services in order to enlarge market opportunities. Specific test studies, treated as stand-alone micro-project, are carried out and applied in a manner consistent with the overall purpose.

In detail, this scientific research is pursued addressing different study paths along mutual MRO targets. The first project activity is referred to a special MRO LEAN model, a modern and advanced Total Productive Maintenance Organization, based on both innovative technological application and peculiar e-Maintenance aids that will help to reduce costs and Maintenance Visit Grounding. This path, in addition, analyzes and takes into account how to obtain a rapid infrastructure deployment when using a Hangar Bay for different aircraft classes, with a multipurpose set-up obtained by using advanced inflatable structures to adapt the required lay-out.

The second path of this research is split in several feasibility studies and two of which, integrated as new MRO functions and carried out with a business design approach, are finalized to develop innovative services with a strong environmental impact (Green Aircraft).

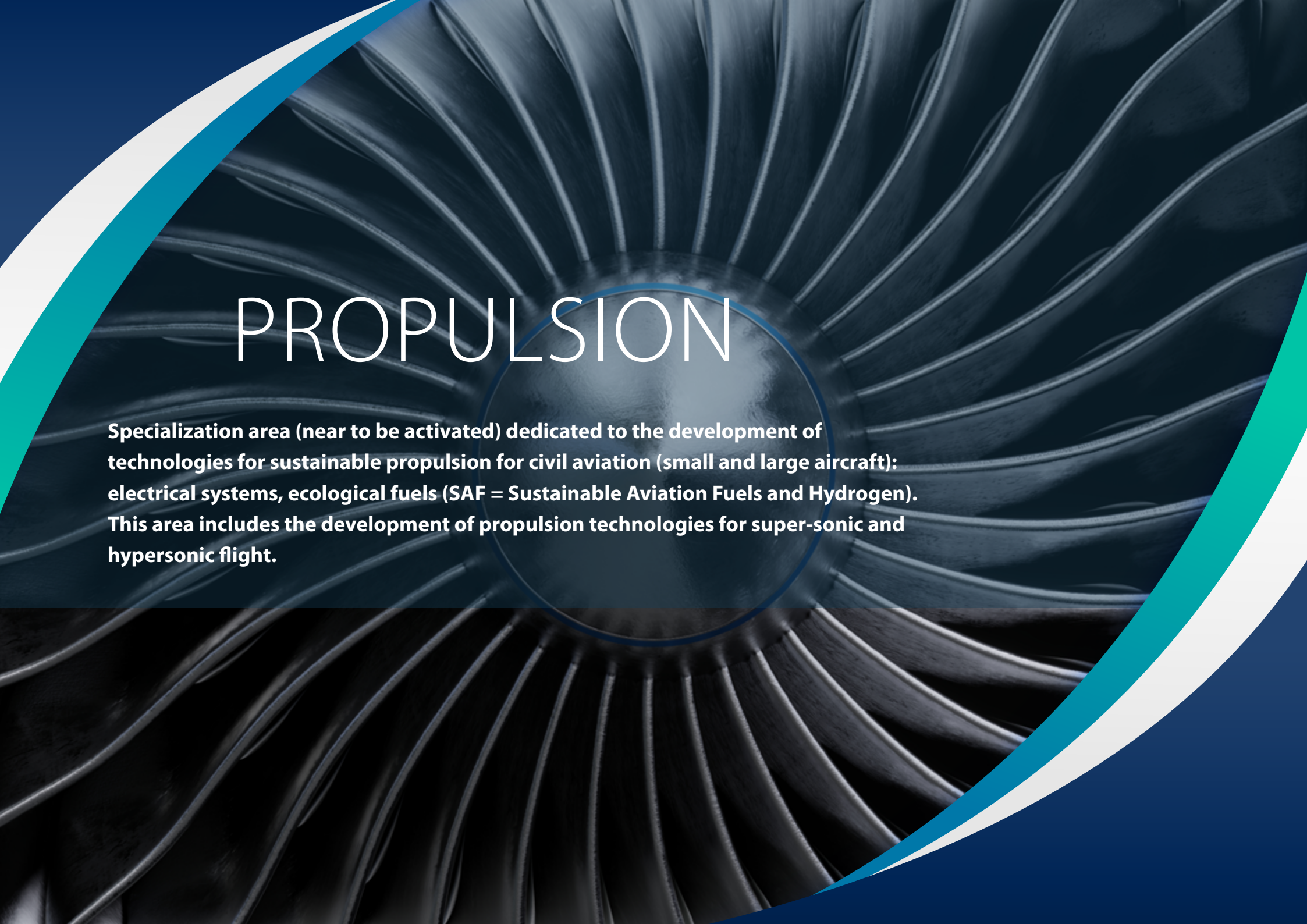
WEB SITE
THE DISTRICT
PROJECTS

MAVER

Both initiatives are formulated with an environmental benefit while eco effort is spread also throughout the entire MRO Maintenance processes.

The program also covers the engineering capability build-up process, starting from the relevant technological state of the art, in order to sustain the superior knowledge and new technologies required to implement the new MRO supposing it will operate also as a Completion Center for the next-gen regional aircraft program.

To evaluate the designed benefits an assessment at system level will be performed ranging all aspects of maintenance operation in a real situation. These major features will need to be supported by large-scale technology demonstrators that will involve a final test, based on a real maintenance event carried out in a SMART bay.



PROPULSION

Specialization area (near to be activated) dedicated to the development of technologies for sustainable propulsion for civil aviation (small and large aircraft): electrical systems, ecological fuels (SAF = Sustainable Aviation Fuels and Hydrogen). This area includes the development of propulsion technologies for super-sonic and hypersonic flight.

TECHNOLOGICAL PLATFORMS

TECHNOLOGICAL PLATFORMS
PROJECT INDEX

HYPERSONIC FLIGHT

URBAN AIR MOBILITY (UAM)

NANO AND MICROSATELLITE CONSTELLATIONS

DIGITALIZATION OF INDUSTRIAL PROCESSES

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

WEB SITE

THE DISTRICT

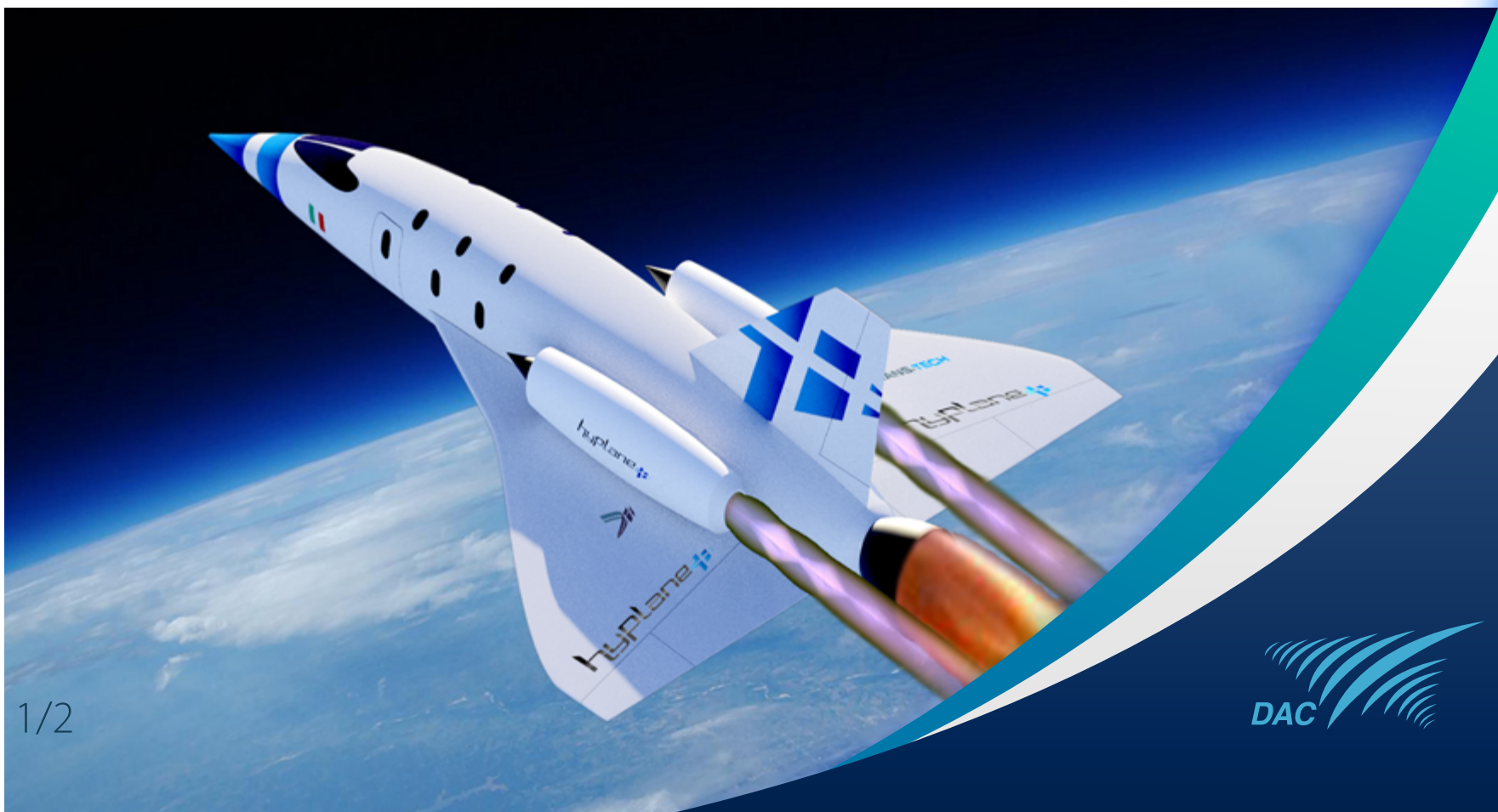
PROJECTS

DAC

HYPERSONIC FLIGHT

The first reference technological platform is hypersonic flight, a sector in which the Campania Aerospace District is tense to define a technological "vision" aimed at developing and introducing a hypersonic business jet aircraft into the aerospace world.

Leveraging on the strategy of smart specialization in the field of research and technological innovation of the Campania Region (RIS3), DAC aims to define the logic and motivations for looking at a Mach 4-5 flight of a business class vehicle. To that purpose DAC has set up a working group amongst interested members with the mandate to identify possible industrial applications, i.e. products achievable in a relatively short time, in continuity with the on-going scientific-technological activities on the Mach 7-8 flight which target longer-term horizons. The goal is to propose an airborne technology demonstrator, jointly with lower level laboratory demonstrators, on which to validate the enabling technologies.



WEB SITE
THE DISTRICT
PROJECTS

HYPERSONIC FLIGHT

The activities of the Working Group are divided into the following phases:

- Constitution of the Working Group. Definition of the Terms of Reference. Identification of reference scenarios of greatest interest. Available and needed competences. Next stage definition;
- Technological road map and collaborations: Insights into competences and interests. Insights into system and technology level feasibility studies. Definition of the priority technological road maps. Identification of the framework of national and international agreements. Identification of the technological demonstrator/s and confirmation of its/their feasibility. Search for funding. Next stage definition;
- Demonstrator/s design: Deepening and expansion of feasibility studies and the design of the demonstrator/s. Definition and launch of priority technological development projects. Search for funding. Next stage definition;
- Continuous monitoring of activities: Monitoring of the system, demonstrator and technology projects initiated in the previous phases.

Top level requirements:

a. Business jet for passenger / cargo transportion, 6-10 equivalent pax payload, 19 pax maximun, with high speed not exceeding Mach 4-5, certified to CS25 or to a specific norm;

b. Vehicle for suborbital flights, for experiments at low gravity, space tourism and access to space, speed > Mach 3, 6-10 pax payload or alternatively air launch of small satellites towards LEO, and for the expansion of air defence (surveillance and interception), not certified as a transport aircraft but in accordance with specific rules;

c. Hypersonic tactical missile,medium-range trajectory at very high speed up to Mach 8;

d. Commercial vehicle for passenger / cargo transportation, with at least 50 equivalent pax payload, with very high speeds up to Mach 8.

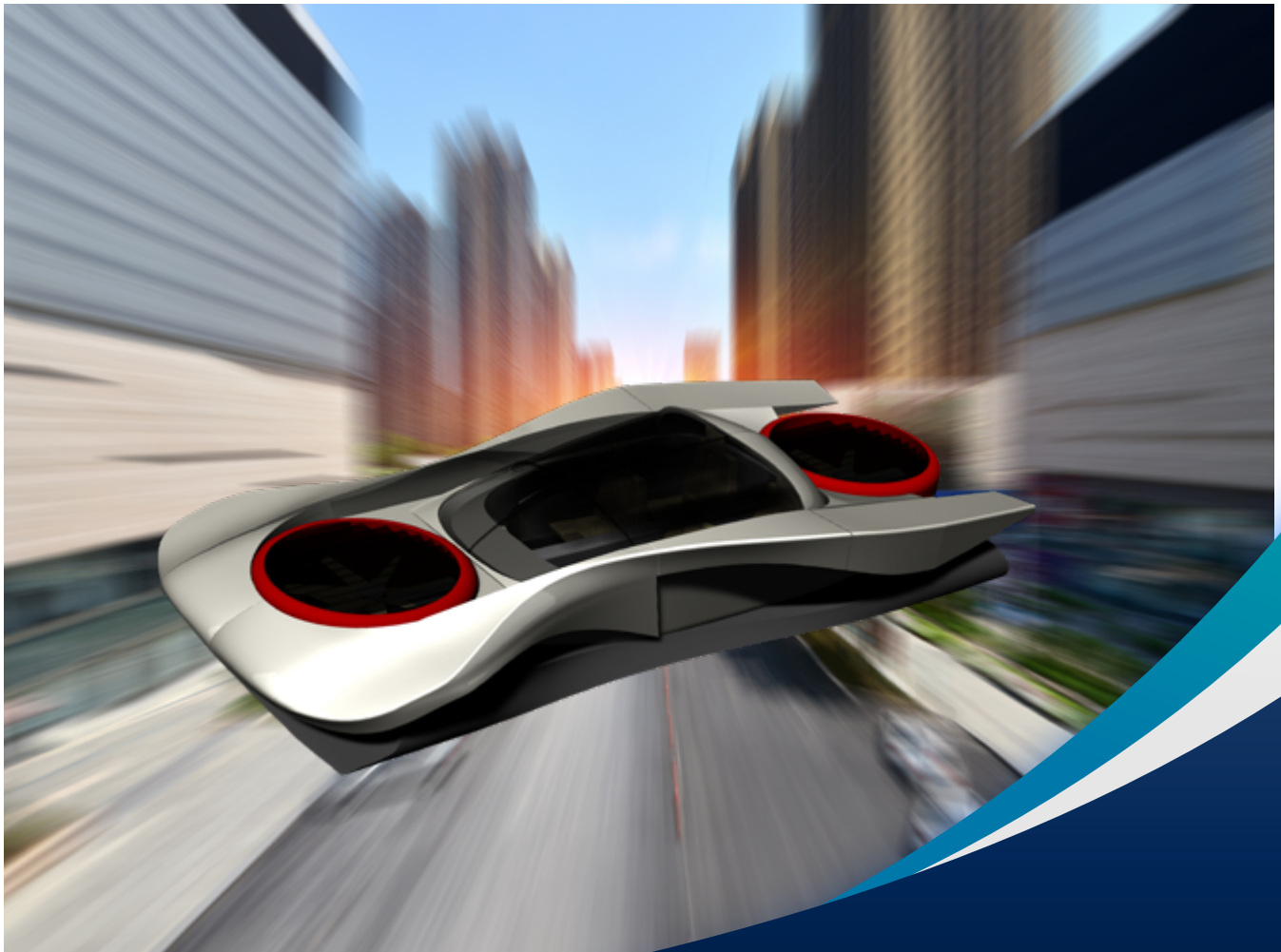
WEB SITE
THE DISTRICT
PROJECTS

DAC

URBAN AIR MOBILITY (UAM)

A Working Group has been constituted around this topic with the objective to define a technological "vision" finalised to the introduction of the urban and periurban transport of people and goods in the context of the Urban Air Mobility.

RIS3 of the Campania Region indicates the need to redefine the competences and product strategies of the sector with an increased attention towards highly innovative content programs in order to revitalize their competitiveness on the global market. This document identifies among the priority technological trajectories: remotely piloted, UAVs, hybrid and electric propulsion systems, integration into ATM, sense and avoid, swarming, management of cooperative behaviour, interoperability and intermodularity of air traffic management systems.



URBAN AIR MOBILITY (UAM)

The working group therefore aims to identify and consolidate some possible "target products and services" compatible with market scenarios and with regional skills and abilities, identifying possible integrations with those of other regions, favouring the creation of a regional and national supply chain towards these target products. A process of analysis is put in place to look for opportunities to strengthen competences and skills acquired in the context of the technological development initiatives already promoted by the District. This is accomplished in a systemic vision, aimed at the realization and commissioning of target products and services, which can also be developed on different time scales, which see as distinctive elements:

1. Innovative eVTOL platforms for the transportation of people or goods between remote areas and the city center (Air Taxi);
2. Innovative business models around shared mobility and integrated logistics services in the territory;
3. Regional air mobility infrastructures compliant with the EU's Zero-Carbon strategy.

The identified operational scenario foresees advanced mobility services in a framework of environmental and social sustainability, as is the following:

1. Urban public transport (Naples-Capri or Fuorigrotta-Porto connections) [up to 15 km] and suburban ones (Capodichino-Pontecagnano or Naples-Caserta connections) [from 15 to 100 km]. Initially on demand (air taxi), later on schedule (air shuttle);
2. Private transport for urban or peri-urban mobility;
3. Distributed peri-urban logistics of products and semi-finished products (supply chain by air);
4. Special services through drones (transport of medical material between distant pavilions of the same hospital or different hospitals, management of emergencies, etc.).

WEB SITE
THE DISTRICT
PROJECTS

DAC

NANO AND MICROSATELLITE CONSTELLATIONS

The working group established in the technological field of nano and microsatellites has defined a technological "vision" aimed at the implementation of satellite products / services in the domain of the new space economy.

Within this frame the working group has identified a network of microsatellites in LEO orbit as an infrastructure to provide services of near real time downlinking.The RIS3 document underlines the need for a redefinition of the competence and product strategies of the sector and the need to increase the attention towards highly innovative content programs to revitalize its competitiveness on the global market.

In the Space sector, technologies for nano, micro and minisatellites and technologies for earth observation and land monitoring remain priority and relevant focuses. Therefore, the objective of the working group is the elaboration of a picture which, starting from systemic macro-requirements and taking into account the mapping of the available competences, leads to the definition of a technological "vision" and to the formulation of a "Strategic proposal" aimed at creating and putting into operation satellite products / services with high added value, which meet the needs of the market and operate in the domain of the New Space Economy.

NANO AND MICROSATELLITE CONSTELLATIONS

Furthermore, the working group will identify and consolidate some possible "target products and services" compatible with market scenarios and with regional skills / capabilities, identifying possible integrations with those of other regions, favoring the creation of a regional and national supply chain towards such target products.

The process of opportunities analysis will have as its objective the strengthening of the competences achieved in the context of the technological development initiatives already promoted by the District, in a systemic vision, aimed at the creation and commissioning of target products and services, which can also be developed on different time scales. The distinctive elements are:

- Distributed Satellite Systems (Constellations, Flight in formation, Swarms) based on standardized platforms belonging to the class of nano and micro satellites (1-50kg);
- Innovative "Space-enabled", "downstream" products and services (telecommunications, navigation and positioning services, environmental monitoring, etc.);
- Products and production processes of subsystems and components of larger satellite systems, both for the upstream and downstream application.

DIGITALIZATION OF INDUSTRIAL PROCESSES

In order to support and sustain the innovation of enterprises in the aerospace sector, the Aerospace District of Campania believes that a decisive role is played by the digitization of essential functions within the vertical and horizontal value chain of production according to the logic of "Industry 4.0 ".

DAC intends to take companies on a path aimed at digitizing and integrating the entire value chain vertically and horizontally, experimenting with representative and priority technologies for the aerospace sector. DAC aims to raise awareness within SMEs of the need for automation and digitization of their processes, to respond with a different approach to the future market.

The working group dedicated to the Digitization of industrial processes tends to offer opportunities for learning, experimenting and developing state-of-the-art technologies and methodologies, instrumental to an effective and structured transformation of industrial processes in a 4.0 perspective.

DIGITALIZATION OF INDUSTRIAL PROCESSES

Here are the objectives:

- optimization and digital management of processes;
- simulation and virtualization of processes;
- digitization of production plants and their integration;
- advanced design;
- innovation of production processes;

Aero Spazio Digitale is therefore a place where entrepreneurs will be offered the opportunity to verify in a real context the potential that 4.0 technologies can offer, if applied to their industrial processes. In fact they would be provided with objective data to support their decision-making process, with the minimum possible impact on the company's activities.

The key features are:

- EXPERIMENTAL: instrumental to the development of innovative processes to be included in the production line;
- FLEXIBLE: with personalized digital transformation paths, built around the real needs of the enterprises;
- CONNECTED AND DIFFUSED IN THE TERRITORY: with a central physical hub connected to a large number of process components that already exist or are going to be acquired by companies;
- INNOVATIVE: thanks to the updating of technologies and the involvement in partnerships of multinational companies active in the digitization sector.

WEB SITE
THE DISTRICT
PROJECTS

DAC

INTERNATIONALIZATION

Collaboration care and management
and international know-how exchange

INTERNATIONALIZATION

PROJECT INDEX

RUE AERO

EUROSME

ESCA

EACP-SAVE

E-CHAIN

WOMENIN

ASPIN4BETTER

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

WEB SITE

THE DISTRICT

PROJECTS

DAC

RUE AERO

REACHING UP TO EXCELLENCE IN AEROSPACE CLUSTER MANAGEMENT

RUE AERO (Reaching Up to Excellence in Aerospace Cluster Management) stemmed from one of the Expressions of Interest for a European Strategic Cluster Partnership and pursued to bring about the means to give continuity to the according ECCP call. The project was meant to provide means, a future road-map and the drum-beat to improve the partners' quality of cluster management and to support at least 5 partners of the consortium achieving the next (higher) level of their corresponding label. At the end the project, partners could even achieve 6 new labelled clusters.

The project intended to support the further collaboration between the multiple aerospace clusters within Europe. Therefore, it strengthened the inter-cluster collaboration within the European Aerospace Cluster Partnership (EACP). Within the time frame of the project, this networking organization grew from 35 aerospace clusters of 15 countries to 42 clusters from 17 countries. It became more and more important to establish structures to keep up the good spirit of teaming up to become stronger together. They exchanged about best practices and tried to help their members with a pan-European network. Therefore, the partner organizations exchanged information about their current menu of services to SMEs as an additional step in the best practice exchange. This collection of practices provides a pool of ideas to the project partners and all EACP members. This pool of ideas helps the partners to further their cluster management excellence by allowing them to pick the most transferable and best actions for individual (common if possible) implementation.

The project aimed to foster excellence in regional cluster managements and to strengthen the European strategic partnership EACP as a whole. The exchange of content and management practices has led to a larger- but most important - better partnership infrastructure and activity level to the benefit of ALL partners. Supported by this project and led by the project consortium, the EACP has grown to a stronger and highly visible network, even beyond the European borders.

The project had two main threads: The first was to increase the excellence of the cluster managements, and the second was to professionalize the cooperation on multilateral level of many clusters of the same sector cooperating, although competitors. Therefore, the first half of the project was dedicated to specific trainings that supported the cluster managers by sharing concrete theories or examples of cluster excellence. In the next step this was proven by the benchmarking and finalized by the labelling process, when 6 project partners received a new label. The learnings of trainings and labelling were shared within the large EACP network and practical mechanism discussed how to share findings among all European aerospace clusters.

WEB SITE
THE DISTRICT
PROJECTS

DAC

RUE AERO

REACHING UP TO EXCELLENCE IN AEROSPACE CLUSTER MANAGEMENT

In the second half of the project, the consortium visited specific cluster groups to explore best practices onsite and prove the theory learnt in the first half of the project by reality. Thereby topics like financing of cluster activities, internationalisation of SMEs and support on fairs were under examination as well as cross-sectoral cooperation.

Besides the improvement of cluster excellence, the project intended to enhance possibilities for clusters to learn from each other and cooperate. Therefore, this project also supported a few technical devices that help the European aerospace cluster to cooperate easier. The knowledge platform will support cluster cooperation and exchange through closed chat rooms where discussions can be followed and findings dropped to allow EACP members to follow a discussion even if only of later interest. Also project proposals can be written together without having the problem of a being flooded by mails, which always holds the risk to understand the current status.

Another tool that has been initiated by the consortium can easily show all cluster members and their capabilities. This data crawler is specialized on the aerospace sector and it was not necessary to feed it with data manually, but it only took all relevant data from the cluster websites and categorized them under the same system, which provides a great overview and could be a mayor help to identify perfect business or project partners.

EUROSME

COMPETITIVENESS IN THE CIRCULAR ECONOMY APPROACH

The EUROSME project - aErospace inter-clUster smaRt specialization actiOns for SMEs, officially launched in October 2018, aimed at accelerate the creation of innovation projects between European clusters in the aerospace sector with relevant focus on the Circular Economy. A special focus was set on the participation of SMEs with the objective to achieve at least 4 technological innovation projects for an overall value of € 20M, ready to be financed by public funding or private investment.

The project has evolved regularly up to the spreading of the COVID-19 pandemic. The impact on the project has been consistent with an essential break in most of the activities. Thanks to the already developed attitude to use smart working technologies among the clusters, it was possible to establish a new way to proceed keeping the overall project planning with a diffused utilization of webinars and remote meetings.

The strong difficulty to get the attention of local authorities in this crisis period was analysed with the aim to understand if an eventual delay or suspension of the project could have provided the possibility to develop EUROSME fully as initially planned. It was soon clear that there was no signal suggesting a full recovery of local authorities' attention in any foreseeable near future. It was thus decided to keep the initial schedule of the project, surrogating the planned meetings by remote events, inviting a wider number of representatives with the hope to have at least few of them participating. As a result, the partnership strategy provided a solid basis to continue with the definition of common interest areas by the opportunity map, strategic goals, roadmap, C2C and B2B activities, the strategy.

Such process was very challenging since RIS3s have a very different level of definition, and revealed that the highest-ranked common RIS3 topics were "Aircraft of the future", "Industry 4.0", "Observation Technologies" and "UAV".

The EUROSME has created a pipeline of SMEs' project proposals in the 4 mentioned highest-ranked areas, with 15 partnerships and project ideas. At the end, 7 projects have gone through partnership consolidation and proposal preparation, for a total value of €32.5M, with a foreseen private investment of €3.7M € (i.e., 11.4%). The seven projects are: CONDOR Small UAV for ESA-BIC, S4W for H2020 MG-1-15-2020, HYPERION for the Italian PNRM 2020, ABOVE for H2020 MG-3-6-2020, CONSCIOUS and INNOWINGS for INNOSUP-01-2018-2020, HEALTHINESS 4.0 for H2020-DTICT-12-2020. Two of them, namely CONDOR and HYPERION, have been already accepted before the end of EUROSME for a secured total value of €3.8M, with a private investment of €1.9M (i.e., 50.3%). CONDOR is led by the SME Mobisone and deals with the proof of concept of a small UAV.

EUROSME

COMPETITIVENESS IN THE CIRCULAR ECONOMY APPROACH

During the incubation time at the ESA-BIC, SMEs will develop and build a scaled-down model of the drone to validate the technology. HYPERION is led by DAC and includes 5 SMEs and 3 research organizations. It is aimed at consolidating the feasibility and preliminary design of a suborbital aircraft for the extension of the air defense capability and capable of launching a microsatellite in LEO.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far (For the final period please include an overview of the results and their exploitation and dissemination) The joint cluster partnership strategy was designed stepwise on a two-year cycle. The first iteration was implemented during the project, and planned to be repeated after the end of EUROSME. The clusters represent about 1000 SMEs; 100 of them were assessed for their Business Innovation capability and potentiality, and related Action Plans were proposed. An SMEs innovation project pipeline was created, together with an inventory of regional Innovation Hubs. Four Competence Centres were identified in terms of technical focus, possible governance, funding, training, technology transfer, IPR and personnel mobility; they are: (i) Future propulsion systems, (ii) Virtual part & component design and testing, (iii) Observation technologies design and development for territory and urban areas monitoring, (iv) Technologies and management systems for UAV swarms.

Toward reconfiguration of Aerospace value chains with respect to circular economy, the following activities have been carried out: value chain map in a Circular Economy Perspective; monthly newsletter published via the EACP-network; dedicated webinar on 6 July 2020 in cooperation with Valdelia (French circular economy cluster).

On Innovation Hubs, an inventory was established mapping science parks, technology centres, universities and research centres. It was shared among EuroSME partners, their stakeholders and the entire EACP network. Webinars were organized to assist the selected local SMEs to identify potential partners. Points of contact were identified in each geographical area in order to facilitate the connection with local innovation hubs.

WEB SITE
THE DISTRICT
PROJECTS

DAC

EUROSME

COMPETITIVENESS IN THE CIRCULAR ECONOMY APPROACH

The new thematic area under the Smart Specialization Platform for Industrial Modernization has been proposed: "NEW AEROSPACE BUSINESS AND MORE RESILIENT SUPPLY CHAINS WITHIN THE CIRCULAR ECONOMY".

To identify the above-mentioned Common Competence Centres, a survey of scientific competences capabilities was realized, assessing areas of relative strengths and weaknesses. Each Virtual Competence Centre is an entity grouping specific expertise available in the represented European regions to support the selected high priority strategic areas, with characteristics and working modalities depending on various factors.

The consortium clusters have arranged an agreement with the European Aerospace Cluster Partnership to continue the strategic activities and take benefit of EUROSME results, by means of a handover of the project to the EACP Working Group Technology.

EUROSME leaflet

LOCAL INNOVATION HUBS INVENTORY

PRESS RELEASE

DAC

ESCA

EUROPEAN SATELLITE CONSTELLATION ALLIANCE

The surge of constellations of small satellites, which differ from traditional approach towards large satellites by their low cost for access to space and hence to space products, is driven by the increasing demand for satellite based commercial applications.

Over the next 10 years, an average of 990 satellites will be launched every year for the next ten years [Euroconsult report SATELLITES TO BE BUILT & LAUNCHED BY 2028], regardless of their mass. The demand is experiencing a x4 increase with 9,900 satellites to be launched by 2028 compared to the to 2,300 satellites launched during the last decade

Commercial satellite operators are experiencing significant changes from GEO com-sat broadcasting business to more data centric use cases. Smallsat broadband mega-constellations are becoming a reality. In the next ten years 55 commercial constellations projects (of more than 5 satellites each) will launch 6,600 satellites, 20 of these constellations refer to earth observation applications and the other ones are dominated by telecommunication applications.

In this frame, the paradigm change and the following transformation of the entire value chain appear clearly. Thanks to the democratization of access to space, the satellite value chain is opening to other technological sectors in a global context.

Therefore, it is necessary support European SMEs to enter into this wide and complex value chain, no longer dominated only by large players, but populated by industrial players able to provide technological solutions applicable on a large scale and at low costs.

The purpose of ESCA project is to foster cross-border and cross-sectoral cooperation amongst the European clusters in the participant partnership and their SME members, as well as to support their SME members in going international and positioning them in the advanced Small Satellite Constellation Value Chain. This will be done through the establishment of a European Strategic Cluster Partnerships-ESCP formed by 5 European clusters, which bring together different competences in the aerospace value chain.

Four out of five participant clusters (DAC, AAero, NAE and ASB) are already members of the European Aerospace Cluster Partnership (EACP) and ESCA represents a further step in the EACP joint internationalisation strategy, with the aim to establish, on a long-term view, an international aerospace cluster network, to better interconnect actors and activities within the global aerospace industry network and across sectoral borders, especially now that the aerospace industry is experiencing profound changes.

WEB SITE
THE DISTRICT
PROJECTS

DAC

ESCA

EUROPEAN SATELLITE CONSTELLATION ALLIANCE

With new players originating mainly from aerospace regions outside of Europe and entering into the market, global competition is steadily increasing. Whilst long-term growth predictions are generally positive, continued success can only be achieved by those who excel at developing and implementing innovative product and service concepts, providing a complete and attractive supply capacity for emerging economies.

Differently than the larger global powers, most emerging Space nations do not have the resources to develop the full range of space capabilities, including satellite manufacturing, launch, operations, services and downstream applications. Often in these countries, there is a modest level of indigenous technology and even less private productive capacity.

Space activities have traditionally been driven by governments to meet national needs with high focus on self-reliance and security. There has not been much emphasis on enhancing commercial activities in the space sector and, as a result, the participation of the private sector has been minimal in space activities.

In the last few years, there have been initiatives to help private industry build capacity in system-level integration; however, they still lack end-to-end manufacturing capabilities ranging from design to testing and launch.

At the same time, there is a strong need for their domestic industry to grow, which implies that they are open to R&D collaborations. This is why EU-SMEs cannot focus solely on established markets, but must look at emerging space nations to seize new opportunities for their business expansion.

One of the main clusters' mission is to create conditions for fostering competences and capabilities of their SME members. ESCA embraces the EACP long-term vision, "to run a global partnership of cluster connections, covering all major aerospace OEMs and their supply chain and put Europe in the gravity centre of collaboration amongst aerospace clusters".

But achieving these goals at European level only will not be sufficient to compete successfully on a global level. In order to serve the global market and sell highly specialised technological products, cooperation between companies as well as entire regions, even in non-EU countries, is essential. Pivoting on weaknesses and catching opportunities of emerging markets is a goal difficult to achieve by a single SME. Participating Clusters have the responsibility to pave the way to SMEs and, as EACP strategy suggests, to create the tools to leverage the national interests of other countries, which are just emerging in the Space sector to foster their economy.

WEB SITE
THE DISTRICT
PROJECTS

DAC

ESCA

EUROPEAN SATELLITE CONSTELLATION ALLIANCE

There is then a third way to think about, dealing with partnering and even merging SMEs from Europe and international countries to become stronger on the global market.

The partnership clusters aim to cooperate in order to implement their joint internationalisation strategy towards defined target Space sector emerging countries (India, South Korea, Australia, Singapore and Canada) and support ESCA SME members in establishing cooperation with relevant counterparts in the target countries.

ESCA will support SMEs by providing them guidance to confront worldwide competition from developed and emerging Space economies, seize the market opportunities in these countries and take a leading position globally.

The possibility to enter the game for other clusters and related SMEs from EACP members will also contribute to reinforce the action and guarantee continuation of the action even after the completion of the ESCA project.

In this context, the ambition of ESCA is:

- to sustain and support the European cluster cooperation dynamics
  - to use internationalisation to reinforce growth, enhance competitiveness and support the long-term sustainability of member companies;
  - to foster cooperation amongst the Partnership SME members; thus, contributing to decrease boundaries among them;
- to support SMEs to find easier access to global value chains by:
  - preparing ESCA SMEs to go international through training and knowledge sharing actions
  - supporting the establishment of business partnership agreements to develop joint collaborative projects between the Partnership SME members and business and other relevant stakeholders from emerging Space countries
- to plug into the new market opportunities from developed and emerging economies
  - to establish cooperation agreements with international business and research intermediaries in each target country
  - to develop a long-term exit strategy that ensures the sustainability of the internationalisation support services after the end of the ESCA project

The way intended to be pursued by the partnership cluster is the establishment of C2C relations with the negotiation and final signature of specific MOUs.

EACP-SAVE STRATEGIC ALLIANCES FOR THE UPTAKE OF ADVANCED TECHNOLOGIES BY SMES ON THE ECONOMIC RECOVERY

The project aims to contribute to the post-pandemic economic recovery of the European aerospace sector and related industries by facilitating European SMEs adoption to changed value chains through the uptake of advanced, ICT-based (eg. AI) and green technologies leading to improved competitiveness and resilience to sustainable objectives.

To achieve the objective the strategy of the project is to:

1) create alliances among traditional SMEs with similar technology uptake needs and support their collaboration with tech-savvy SMEs that can provide them with technological solutions;
2) increase the market opportunities and visibility of the tech-savvy SMEs through collaboration with technology centres;
3) bridge aerospace clusters with ICT/AI and Green Technologies clusters, technology centres and tech-savvy SMEs from and beyond the consortium as well as creating cross-sectoral cooperation with other sectors as Space, Technical Ceramics, etc.

Specific objectives of the action are:

- to provide analytical support to the project implementation by identifying the greatest challenges, bottlenecks and needs in enabling wider adoption of advanced technologies in aerospace sector and related industries particularly during the recovery phase of the COVID-19 pandemic (WP1);
- to start building strategic alliances among traditional SMEs facing similar challenges for the uptake of advanced technologies and connect them with tech-savvy which include critical technological companies, both within the participating clusters and outside them, that have been selected to provide technology adoption in this project (WP2).
- to support the establishment of strategic alliances among SMEs (coming from WP2) by bridging the traditional SMEs with tech-savvy SMEs via hackathons boosting the uptake of advanced technologies. This will include methodology development, organisation of Open Calls, pre- and post-hackathon matchmakings (WP3).
- to develop a more tech savvy and competitive SME eco-system by supporting established strategic alliances with the expertise of Technology Centres and Universities for the uptake of the selected technologies by the traditional SMEs benefiting from the project (WP4).
- to maximise the impact of the project by disseminating the results, first by mobilising EU traditional and tech-savvy SMEs, and then sharing best practices with other cluster organisations and technology centres with particular attention to those regions with strong industrial transition needs or that have been heavily affected by the COVID-19 pandemic and need further support for their recovery (WP5).

EACP-SAVE STRATEGIC ALLIANCES FOR THE UPTAKE OF ADVANCED TECHNOLOGIES BY SMES ON THE ECONOMIC RECOVERY

Since its foundation in 2009, the European Aerospace Cluster Partnership (EACP) has always seen as its mission to strengthen the position of small and medium-sized enterprises (SMEs) on the European stage. According to the latest survey carried out with the participation of 45 aerospace clusters all over Europe, there are 4599 SMEs throughout Europe which are represented by EACP-clusters. Thus, SMEs are backbone of the European aerospace Industry.

The current crisis provides an opportunity to make the sector more resilient, more sustainable and more competitive. This is why the European Commission launched aerospace recovery round table initiative. As a result, in November, 2020, over 20 associations collectively representing the entire European aerospace ecosystem announced a joint commitment to work with policy makers to achieve net zero CO2 emissions by 2050, part of a comprehensive collaborative analysis released today detailing ways aerospace can recover sustainably and more resiliently from the COVID-19 crisis whilst supporting the European Union's Green Deal objectives.

- Recognising the vital socio-economic role played by the whole aerospace value chain with inter-related industries (ICT/AI, cleantech, electronics, machinery etc) in Europe and around the World;
- Recalling that the EU aerospace sector supports almost 10 million jobs and €672 billion in European Union economic activity, including 4.2% of all EU jobs and 4.2% of the EU's Gross Domestic Product;
- Stressing that aerospace is a key economic sector which has been hit first and hit hardest by
- the COVID-19 crisis;
- Recognising that the aerospace sector shall embrace advanced technologies

HEREBY, we propose the EACP-SAVE project as part of the bold strategy for a sustainable recovery of European aerospace. It will only materialise if SMEs are properly supported by adequate actions to adapt to changed value-chains and demand. Those necessary adaptations should be exploited as an opportunity to improve their environmental footprint and their economic resilience, among others through the uptake of advanced technologies.

Amongst technologies digitalization, automation and artificial intelligence will dominate the new normal of the future air connectivity and passenger experience. Technology and innovation will also play a key role in fleet renewal in Europe. New aircraft models consume on average 20% to 25% less than previous generations and are today the biggest single measure to reduce emissions in the short-term to support the EU's climate ambition for 2030. Hence involvement of critical technological companies, both within the participating clusters and outside them will be essential throughout the EACP-SAVE Project.

E-CHAIN EUROPEAN - CLUSTER EXCELLENCE HIGH-TEC AEROSPACE INNOVATION NETWORK

Digital transformation has deeply impacted the aerospace sector. It has brought an array of new technologies such as Internet of Things, Blockchain, Big Data and Artificial Intelligence that are leading to an evolution and the emergence of new and more connected flexible global value chains. As an example, the industry 4.0 has modified not only production infrastructures leading to an increase in efficiency through the analysis of manufacturing data and the offer of new tools (e.g., 3D printing and augmented reality) for precision manufacturing. It has also led to the offer of connected products and the emergence of new services (e.g., remote control and monitoring applications offering security analysis through an enhanced traceability). While this radical transformation offers up new opportunities to the aerospace sector, it also entails a series of requirements and challenges, particularly for SMEs and the cluster managers who are providing the necessary support services to them:

Challenges and needs analysis for SMEs and cluster managers

If Europe is to sustain its leading position in the aerospace sector, it is crucial to adopt a European approach that allows for a fast diffusion of knowledge, uptake of innovations and access to a highly skilled workforce. In this sense, to fully take advantage of this transformation, it is crucial that every actor, including SMEs, are integrated in the global value chain.

SMEs need to be able to tap into the knowledge, have access to innovations and a highly skilled workforce in order to adapt accordingly. Due to limited human and financial resources, however, SMEs usually face obstacles in accessing these assets. Their specific needs are:

- Become aware of new technologies and services brought by the digital transformation that can increase their competitiveness.
- Understand both the opportunities but also the challenges and high-quality standards that this transformation entails (e.g., security).
- Be able to better access (tacit) knowledge and innovations across Europe.
- Receive support in identifying new global market opportunities and accessing these markets.
- Support in the identification and access to strategic stakeholders of the global value chains across the aerospace and linked sectors.
- Lever access to funding to exploit these (market) opportunities.

This, in return, requires also cluster managers to update their knowledge and skills and create new strategic collaborations in order to be able to provide the corresponding specific support to their members.

WEB SITE
THE DISTRICT
PROJECTS

DAC

E-CHAIN EUROPEAN - CLUSTER EXCELLENCE HIGH-TEC AEROSPACE INNOVATION NETWORK

The following specific needs have been identified for Cluster managers:

- Deepen the knowledge about the specific new opportunities and requirements that the digital transformation offers to SMEs in their clusters.
- Better understand the new value chain to analyse missing profiles to be incorporated through strategic collaborations across Europe or through the integration of new cluster members.
- Exchange and adopt effective proven support mechanisms and services to support their SMEs' digitalisation and strategic partnering for competitiveness.

Clusters play a crucial role in supporting their members and act as a lever to help them exploit their full potential. The project E-CHAIN therefore pursues the following specific objectives:

Specific objective		Link to proposed ac-tions	Means of Verification and KPI
SO1	Exploit existing knowledge of cluster excellence in COSME countries that the consortium partners can build on to design and update their own com-prehensive cluster strategies.	WP2 Cluster strategy building	3 new and 3 updated cluster strategies.
SO2	Train cluster managers to provide them with the necessary skills, tools and knowledge to offer professional and personalized cluster excellence services that adjust to the needs of their cluster members.	WP3 Cluster excel-lence capacity build-ing	6 cluster managers trained. 6 clusters with improved cluster excellence quality label.
SO3	Disseminate lessons learnt and con-tribute to strengthening of cluster management excellence throughout COSME participating countries.	WP3 Cluster excel-lence capacity build-ing	12 cluster managers coached. 12 cluster managers men-tored.
SO4	Enable the identification and strate-gic partnering or collaboration of clusters with stakeholders across the COSME participating countries that allow to strengthen the regional in-novation ecosystems and advance towards cluster management excel-lence.	WP4 ClusterXchange Scheme	90 completed exchanges.

E-CHAIN EUROPEAN - CLUSTER EXCELLENCE HIGH-TEC AEROSPACE INNOVATION NETWORK

Specific objective		Link to proposed ac-tions	Means of Verification and KPI
SO5	Support cluster members, particularly SMEs, in exploiting their growth po-tential linked to adaptations in the digital transformation and their inte-gration into the global value chains.	WP4 ClusterXchange Scheme	50 SME participated in ex-changes under the ClusterX-change.
SO6	Create concrete links and synergies with strategic stakeholders and initia-tives that support and contribute to the sustainability of the proposed ac-tions.	WP1 Coordination and Management WP5 Outreach and awareness raising	12 meetings with political stakeholders in charge of cluster policy, and contacts with complementary EU funded projects. 12 follow-up reports with concrete action points and collaboration opportunities to be explored.

The experience and lessons learnt by DAC through its participation in the projects funded under COSME RUE AERO, ABROAD and EUROSME will feed into the activities related with strategy development and capacity building, connecting them with EU policy priorities and key action lines. ABROAD essentially identified and produced an Internationalization strategy, while RUE AERO identified common actions to combine regional Smart Specialization Strategies (S3), identified 4 strategic specific areas (Aircraft of the Future, Industry 4.0, UAV, Observation Technologies), identified roadmap to involve SMEs on the development of projects mature enough to be proposed for public as well as private funding/investment. Therefore:

- RUE AERO will serve as a link to EU Industrial Policy Strategy, SME Strategy for a Sustainable Europe, Resource efficiency, Strategic collaborations.
- ABROAD will serve as a link to EU Industrial Policy Strategy, Strategic collaborations.
- EUROSME links to EU Industrial Policy Strategy (industrial green and digital transformation), Interregional Innovative Investments, Resource efficiency, circular economy and also to Strategic collaborations, European Green Deal, COVID-19 impact: new needs.

WOMENIN

WOMEN INTEGRATION IN THE AERONAUTICS INDUSTRY

Research has shown a consistent underrepresentation of women and minority students earning degrees in engineering fields (NSB, 2012). Actually, most women prefer to be involved in careers in the social sciences, arts and health fields. Regarding the various aeronautics' courses throughout European universities, the proportion of women in studies in the areas of science and engineering is low (around 25%). This disparity contributes to discrepancies in opportunity, income, and social mobility for women. Therefore, some action has to take place in order to increase this numbers, including the promotion of women's motivation and opportunities to pursue careers in these fields (particularly, in aeronautics).

In 2015, the project Erasmus IN2SAI (Increasing young women's participation in Science Studies in the Aeronautic Industry) project has presented recommendations to promote gender balance in the sciences and careers in the Aeronautical Industry. Consequently, the objective of the new project is to create and implement specific tools and methods for each of the following recommendations:

- improve the attractiveness of science courses to young women;
- encourage gender balance and leadership skills through team development activities;
- identify and develop the vocation;
- develop and promote activities with "role models";
- achieve the target groups using various media channels;
- educate families to change stereotypes and ideas about gender;
- encourage the enterprises to guarantee child care structures in their own installations,
- to contribute to the work/family balance;
- educate educators;
- increase collaboration between the industry and universities through stages and, finally,
- disclose gender equality initiatives and promote contacts and contacts.

ASPIN4BETTER

AGRI-FOOD AND AEROSPACE AS AN INSTRUMENT FOR BETTER FUTURE

The objective of the ASPIN4BETTER project is to address gaps in green skills within the aerospace ecosystem and gaps in digital skills within agri-food ecosystems by designing innovative, multidisciplinary training programs that utilize products from the other ecosystem.

Among the 14 industrial ecosystems identified by the 2020 EU Industrial Strategy, aerospace has the workforce with the highest competency and the products with the highest demand for digital skills. The same observation can be made for the agri-food ecosystem and the green skills. The key deliverable of our consortium will be a sustainable VET platform, using which organizations from one ecosystem can deliver cross-sectoral trainings whose outcomes will be competencies that put digital or green skills in use to create value using a product of that organization. This presents an opportunity on the supply side to pitch products, and the demand side to meet training needs on smart specialization areas. Orienting skills trainings around specific products will allow new business models. Encouraged by the large set of clusters from both sectors on board in our consortium, our goal is to reach 3600 trainees and 100 trainers in our piloting activities.

The platform will provide editorial support to create, store, use and exchange knowledge resources in video format that envelope product footage. It will include training design templates that are evidence-centered; complemented by easy to grow repositories of competency statements, related evidence & feedback descriptions and linked activities. Initially, the repositories will be populated, based on a novel training needs analysis methodology that focuses on smart specialization areas within industry ecosystems.

Ultimately industry-specific blueprints will be made available that can be trusted for precision upskilling, achieving competency goals and developing the talent pool for a better future in the EU and candidate countries.

The primary intention is to provide concise and clear guidelines and approaches to achieve the project overall objective of upskilling and reskilling of digital skills in agri-food industry and upskilling and reskilling of green skills in aerospace industry by enabling the cross-sectoral skill transfer and by creating a cross-sectoral alliance between two industries.

During the project a two-pillar approach will be represented. One pillar will be the agri-food industry and the other will be the aerospace industry. Project aims to enable the skill transfer between these two industries. While enabling skill transfer between two industries, an experience learning design will be used. This design is product-oriented experience learning.

WEB SITE

THE DISTRICT

PROJECTS

DAC

ASPIN4BETTER

AGRI-FOOD AND AEROSPACE AS AN INSTRUMENT FOR BETTER FUTURE

Products of one industry will be used while training the other industry. Usage of the products have 2 outcomes. First one is enabling learners by experiencing it. The other one is enabling the cross-sectoral showcase of products which creates an opportunity for product positioning in the cross sector. The differentiator of the project from similar platforms will be the available repositories that will be created during the project. 3 repositories will be created. First one is the competency definitions. For digital skills and green skills that are identified during the foresight process, competency definitions will be identified. Second one is the evidence pool which enables the identification of the progress of the learner. For every competency a link to evidences of achievement and relevant feedback will be determined. Evidences will be described in an integrated manner with the feedback. The third one is the training design templates which support the trainers. The learners can be guided according to their personalised progress. However, activity design templates enable further recycling of the trainings. The platform will be open to every organisation who are willing to position their product in the cross-sectoral trainings. By using these activity templates organisation who are not experienced in the development of trainings could easily develop high quality content.

ASPIN4BETTER consortium intends to support and facilitate the transnational and international cooperation between organisations in the fields of education and training which are essential to empowering people with more digital and green key competences, reducing potential unemployment, and promoting leaving no-one behind approach. ASPIN4BETTER project facilitates the circulation of ideas and the transmission of best practices and expertise and the development of digital and green capabilities; thus, contributing to a high-quality education and training while strengthening social inclusion and cohesion. ASPIN4BETTER project proposes a VET process which is supported by repository of evidence and feedback, product-oriented and experience-oriented. The training process will create an opportunity for cross-sectoral cooperation. The main idea behind this cooperation is product positioning. By presenting their products, industrial actors will find an opportunity to position their product in the cross-sector. The aim of this idea is to create a win-win situation in the cross-sectoral field. During these training, one sector will find a chance to propose their products while the other sector will find a chance of experience-oriented learning.

PROFESSIONAL TRAINING

Key assumption in the strategic program of the DAC

PROFESSIONAL TRAINING

PROJECT INDEX

IMM

CAPRI

MAVER

SIPROP

AUTOTECH

OPHELIA

ASSETS+

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

WEB SITE

THE DISTRICT

PROJECTS

DAC

IMM

INTERIORS CON MATERIALI MULTIFUNZIONALI

The IMM (Multifunctional Materials Interiors) Research Project is based on a well-established tradition in the building of aeronautical products connected to the cabin interiors, namely seats and monuments

The reasons of such a research project in this field are based on an increasing need to guarantee same standards in terms of safety and comfort as commercial and VIP/VVIP aircraft.

The project aims at studying solutions in order to meet the recently changed air transport requirements. The main subject of study for this project will be the Commercial Aviation with special focus on Regional Aviation aircraft. Target to be achieved is to let benefit Regional Aviation aircraft of new material application solutions already implemented in the Commercial Aviation without compromising (or impacting) weight and performance.

Therefore, the ideal situation would be to enable installation of crashworthy seats and lining panels of cabin and cargo compartments which have high vibroacoustic and thermic performances and fire penetration resistance but without jeopardizing the advantage of lightweight solution.

By making this project real the actual knowledge will be improved and there will be new solutions promising a sure relapse in the general aviation field, but which could bring interesting applications in other fields of air transport as well.

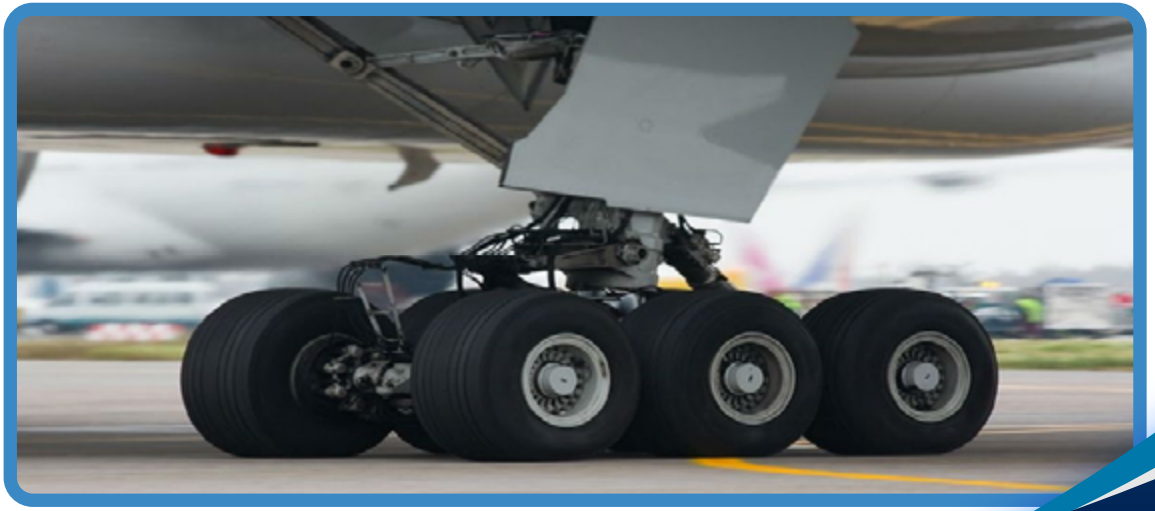
CAPRI

The target is to develop integrated solutions for an innovative landing gear system for civil aircraft, mainly for the regional transport.

The CAPRI project aims to develop innovative technologies for the main components and subsystems of the landing gear of a commercial aircraft, in order to improve the "mission effectiveness" in terms of performance, reliability, maintenance, flight safety, and to develop a strategy for the qualification and certification that makes extensive use of simulation models of elementary parts each duly validated by laboratory tests at full scale or dedicate mock-up. Furthermore, will be carried out a study of the machining technology with low environmental impact in the field of green technologies.

The expected results can be as listed below:

- Definition and validation of components and solutions cinematic and dynamic for the landing gear and its main subsystems;
- Reduced weight and cost of the systems and subsystems;
- Implementation of electromechanical systems for the electrical actuation of the steering system and emergency uplock of the landing gear;
- Application of new materials (composite material, titanium alloys) to structures of the landing gear;
- Sensing system for the automatic determination of Weight and Balance;
- Definition of test methods and simulation (Virtual Testing) for data processing and qualification.



MAVER

MAVER Project aim to develop an innovative set up for a very flexible Maintenance Organization (MRO) able to switch operations quickly from regional to wide bodies aircraft and vice versa. The project plan analyzes in a real environment how to implement a new Lean model while stating its performance and economics compensations without accounting on scale economies and aircraft standardization. The new model relies on original applications of emerging technologies in various applicable fields and exercises the leverage on a multitude of cost-effective applications identified throughout the maintenance processes.

The new model well adapts to independent MRO, antithetic of big one-stop facilities, and the research project is used itself to study the integration into the MRO business of new readiness and sustainment services in order to enlarge market opportunities. Specific test studies, treated as stand-alone micro-project, are carried out and applied in a manner consistent with the overall purpose.

In detail, this scientific research is pursued addressing different study paths along mutual MRO targets. The first project activity is referred to a special MRO LEAN model, a modern and advanced Total Productive Maintenance Organization, based on both innovative technological application and peculiar e-Maintenance aids that will help to reduce costs and Maintenance Visit Grounding. This path, in addition, analyzes and takes into account how to obtain a rapid infrastructure deployment when using a Hangar Bay for different aircraft classes, with a multipurpose set-up obtained by using advanced inflatable structures to adapt the required lay-out.

The second path of this research is split in several feasibility studies and two of which, integrated as new MRO functions and carried out with a business design approach, are finalized to develop innovative services with a strong environmental impact (Green Aircraft).

WEB SITE
THE DISTRICT
PROJECTS

MAVER

Both initiatives are formulated with an environmental benefit while eco effort is spread also throughout the entire MRO Maintenance processes.

The program also covers the engineering capability build-up process, starting from the relevant technological state of the art, in order to sustain the superior knowledge and new technologies required to implement the new MRO supposing it will operate also as a Completion Center for the next-gen regional aircraft program.

To evaluate the designed benefits an assessment at system level will be performed ranging all aspects of maintenance operation in a real situation. These major features will need to be supported by large-scale technology demonstrators that will involve a final test, based on a real maintenance event carried out in a SMART bay.

SIPROP

The project is included in the context of the studies for the development of regional aircraft within highly innovative technologies, in order to gain competitive advantages from both the point of view of the product and the industrial processes.

In particular, the project is placed in the field of studies for design and integration of advanced on-board systems of innovative regional aircrafts. The project will find its natural application in the development of a new aircraft family.

This initiative will allow to create favourable conditions to capture significant regional aircraft market portions by the development and the launch of new products

The project will be developed in a complementary and synergistic way with respect to other research projects, already presented in the districts of Campania and Puglia, covering both the methodology - engineering frames and the pre-industrialization frames, aiming to promote the development and realization in Campania of design and integration capabilities for the advanced on-board systems of a new family of regional aircrafts.

This set of projects is structured in an organic way as a cluster with strategic goals and technological objectives convergence, to support the development and the production of new regional aircrafts being the successors of the ATR family.

WEB SITE
THE DISTRICT
PROJECTS

DAC

AUTOTECH

The AUTOTECH project provides a complete analysis and realization program based upon advanced cognitive technologies for UAV's storm flight within ISR mission's framework, with the objective to obtain either civil as for military support to operations.

The expected results will demonstrate, through the definition of scenarios (military and military/civil) the process innovation in reconnaissance, modeling and interpretation of an environment where a UAV swarm cooperate to manage an emergency situation introducing optimization and automation within the decision support techniques nevertheless within the electronic technologies applied to the command and control for unmanned flights.

The AUTOTECH project aims to satisfy the requirements related to the industrialization of an integrated system for rapid reaction able to operate 24h/24h for localization and detection of potential threat source by sending, on the spot, unmanned vehicle able to observe, evaluate and deliver an efficient support to deterrence actions.

In order to achieve an adequate deterrence action, it is necessary to consider basic points as: risk source rapid localization, quick reaction in reconnaissance and high capacity in track and tracing the anomalies found in order to intervene either directly or sending special units on the site. These considerations are valid as well as for preventive actions caused by suspicious activities.

At the moment it is seen highly inefficient to use a single UAV in operative framework for limited detecting and locating capacity and an insufficient communication infrastructure. AUTOTECH ambition want to overcome these technological limits in harmony with an emerging and growing market.

WEB SITE
THE DISTRICT
PROJECTS

DAC

OPHELIA OUTREACHING THE SPACE, HUMANKIND FOURTH ENVIRONMENT, AS LIVABLE HABITAT

The OPHELIA objectives are:

I. Establish a format of a wide European outreach and education program, which involve students as well as teachers and student's parents on space technologies and space exploration challenges.

II. Attract next generations to the "Fourth Environment" and increase the number of learners directing their educational path towards future space related careers not only for engineering and technological issues but also for scientific, humanistic and philosophical ones.

…by making them playing.

The aims of OPHELIA project can be synthetically declined in the following specific objectives, whose effectiveness on final results will be measured by adequate qualitative and quantitative parameters:

- Identification of representative aerospace technologies and means, present and future space scenarios related to the expansion of humankind in its Fourth Environment, space histories, etc.
- Identification and classification of audience groups. Young students from primary to high school, of different types with specific attention to female and under-privileged communities, related teaching team as well as parents
- Development of some immersive video-games based on the above-mentioned scenarios and dedicated to the different audience groups
- Dissemination and implementation of the education plan and format

There are solid foundations and even activities at a mature TRL which guarantees the successful achievement of these measurable OPHELIA objectives (see §1.3).

In order to focus the matter of the messages intended to be given to the young generations, ii it interesting to report here and compare what is the Space segment today and how it will be in the future.

WEB SITE
THE DISTRICT
PROJECTS

DAC

OPHELIA OUTREACHING THE SPACE, HUMANKIND FOURTH ENVIRONMENT, AS LIVABLE HABITAT

THE SPACE SECTOR AT PRESENT

The space industry contributes to the objectives of the EU's Europe 2020 Strategy for smart, sustainable, and inclusive growth. In more than 60 years of Space Era, space technologies have developed and produced a large amount of knowledge with clear and relevant returns on common daily life on Earth, revealing their huge but still unexplored potential. It drives scientific progress and boosts growth and employment in many other areas such as telecommunications, navigation, and Earth observation. The satellites create every day enormous amounts of signals and data that now can be transformed into information in answer to various societal challenges and benefit of economic domains such as agriculture, energy, environmental and civil protection, public health, tourism, urban planning and transport. Space technologies and applications will continue producing innovative solutions to various societal and business challenges.

During the last decades, space industry has expanded the limits of humanity, allowing man-made creations to travel beyond the Earth and Moon. Satellites orbiting the Earth can observe every single point of our planet, bring connectivity to the most isolated areas, and locate all objects all over the globe. These technologies are at the heart of a strong European leadership for many years, through the impulsion of the European Commission and the European Space Agency. Nowadays, a major acceleration of the penetration of these technologies into the European societies is observed, due to the miniaturisation of technologies, the use of smartphones and the big data paradigm among others, allowing huge amounts of data to be collected and processed.

The participation of SMEs is essential to the competitiveness of the European space manufacturing industry. SMEs are also key in the development of many downstream services and applications. Currently, the European satellite navigation and Earth observation service industry are mainly made up of SMEs and start-ups.

This is way today we talk of Space Economy. No longer just research and public investments, but the beginning of an open commercial sector.

Today, summing up all space activities in all countries, the world gross space product is about 300B€/yr. It is not evidently a big budget compared with many other markets or sectors, but produced returns on our Earth daily life 8-9 time in value. Apart from too clear and knows benefit from space investments such as telecommunications, meteorology, Earth observation, positioning systems, or satellite TV, there are very many common equipment and objects deriving from space technology. Examples are cellular phone, non-stick pan, Gore-Tex, microprocessor, fluorine chewing-gum, car parking sensors, homogenization and lyophilisation processes, Kevlar, Mylar, and so forth.

WEB SITE
THE DISTRICT
PROJECTS

DAC

OPHELIA OUTREACHING THE SPACE, HUMANKIND FOURTH ENVIRONMENT, AS LIVABLE HABITAT

THE FUTURE OF THE SPACE SECTOR

Apart from the further development of the commercialization of satellite data for downstream applications, main space actors, advocates, scientists, philosophers and even simple people clearly see of the next Expansion of Humankind in Space. The first signals in this sense are the long-term programs of NASA to go to Mars, of ESA to set up a Moon surface base, of China and India to reach the Moon orbit and surface.

The most structured scenario, coherent with an integrated overall strategic view, foresees in the second half of this century the cis-lunar space crowded by a community of a

thousand individuals distributed in various sites both in Earth and lunar orbit and on the surface of the Moon: a true Cis-lunar City!

Hundred years after the start of the Space Age and the First Step of Humankind out of the Earth, we could have a number of space infrastructures that could be called districts, as we do for our terrestrial cities:

- service stations and resorts in Low Earth Orbits (LEO),
- space hub nodes in high LEO or at Lagrangian point L1, from where missions to Mars will leave,
- research laboratories around the Earth, the Moon and on its surface,
- large manufacturing facilities and capabilities,
- maintenance and refuelling stations for spaceship on the route to Mars,
- transportation system with timetable,
- a political and administrative set up very similar of those existing in many parts of the World,
- spacecrafts for asteroid mining, and Moon stations for regolith mining.

Experts estimate that the gross space product could reach at that time a value around 2.5T€/yr., which means eight time the present business.

ASSETs+ ALLIANCE FOR STRATEGIC SKILLS ADDRESSING EMERGING TECHNOLOGIES IN DEFENCE

Industry 4.0, business digitalisation, artificial intelligence and KETs are increasingly taking centre stage, not as buzzwords but as pillars for innovation in all business sectors at a global level. The defence sector is no exception.

Accordingly, all players involved in this field are experiencing evolution in both business processes and human resources: the former in regard to technological advancements; the latter regarding the skills needed to exploit such technologies in the proper way.

In particular, human resources need to possess or develop new knowledge, abilities, and competences to help companies complete the quantum leap which is expected from the "fourth industrial revolution".

The problem facing the European defence industry is twofold: (i) it is experiencing difficulty in finding the necessary skills in order to sustain its leadership, competitiveness and sustainability in the medium- to long-term; (ii) aging staff and difficulties in engaging and keeping young professionals are preventing the sector from reshaping company capabilities and creating new, attractive job opportunities for talented workers of any age.

ASSETs+ project aspires to build a sustainable human resources supply chain which allows defence sector companies to innovate by both attracting highly-skilled young workers and upskilling their employees thanks to customised, complementary education & training programmes addressing three main technologies: Robotics, C4ISTAR and Cybersecurity aspects related to the first two.

The project will focus on 4 main activities:

1. Skill Strategy to translate the selected technologies into actionable sets of relevant fine-grained skills to be (potentially) transformed into new job profiles;
2. Design of three training programmes to address high-school students, university students, employees;
3. E&T programme realisation and improvement;
4. Development of community of practice (i) and body of knowledge (ii) to promote new skills acquisition, development and retention.

WEB SITE

THE DISTRICT

PROJECTS

ASSETs+

CAMPANIA AEROSPACE TECHNOLOGICAL DISTRICT

DAC

TTM & COMMUNICATION

Promotion of partnerships between the business world, institutions, universities and research centers, which favor cross-fertilization processes to support the creation of new knowledge / technologies, their dissemination and their transfer

RESPIRA PRODUCTION OF INNOVATIVE RESPIRATORS FOR THE HEALTH EMERGENCY

The Campania Region has organised an important scientific and pharmacological research to address the COVID 19 health emergency.

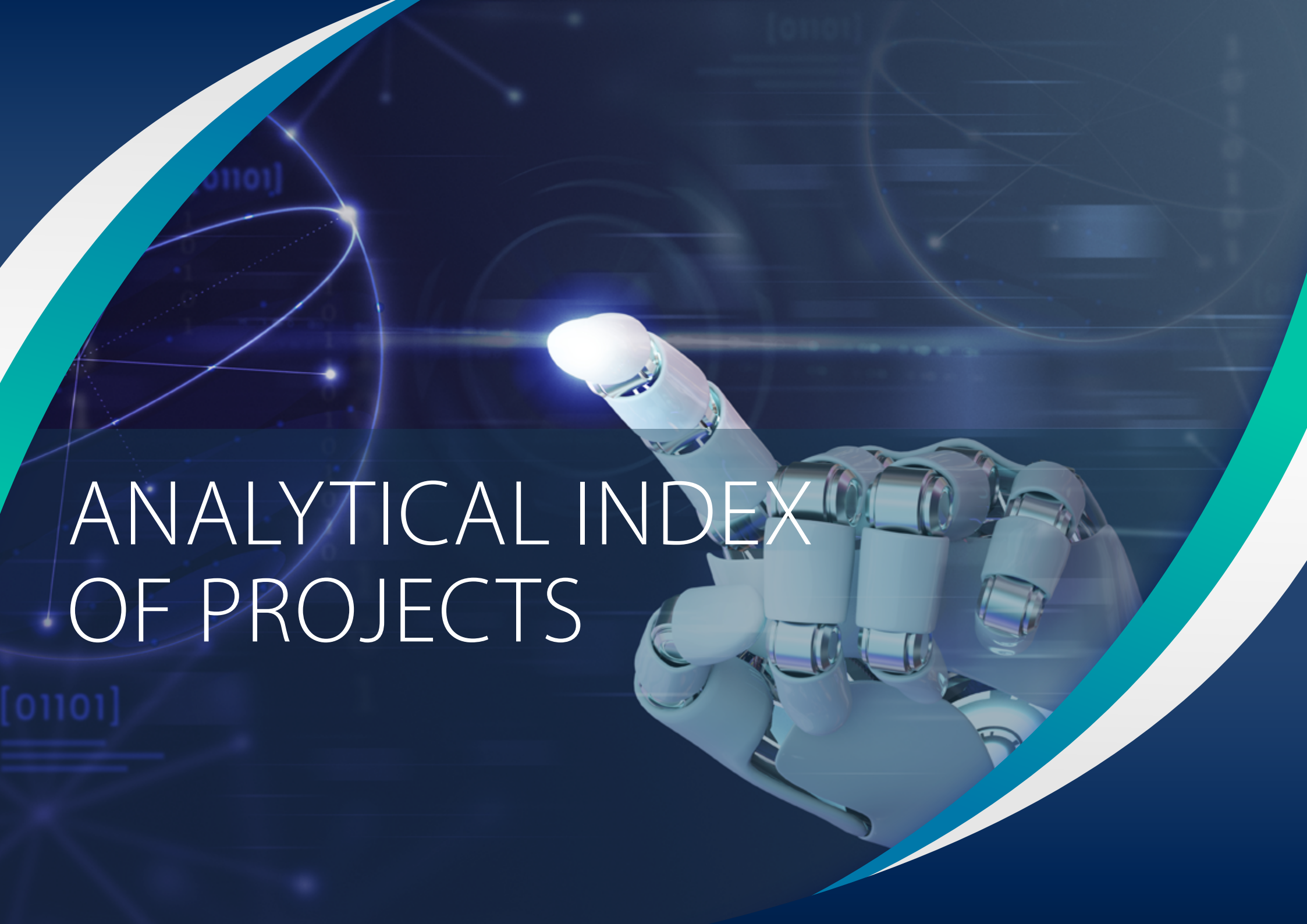
The Region has supported the RESPIRA project given the high number of requests for lung ventilators for intensive care units. The emergency has determined the need for a re-balancing of supply and demand, related to the supply of respirators dedicated to pre-intensive and intensive care units.

This project has developed a lung ventilator, suitable for intensive care applications in all high emergency situations where fielding a large number of workstations is necessary.

The goal is to be able to elaborate, in a technological demo mode, the technical and functional design, both mechanic and electronic, of a lung respirator, as well as carrying out the prototyping, testing and engineering stages of the manufacturing process. The lung ventilator prototype, named HOPE, is designed to be suitable for therapeutic use on adults to neonatal patients.

Thanks to this DAC (Campania Aerospace District DAC, Distretto Aerospaziale Campano) project, the Campania Region has been able to integrate crosscutting production skills from the aerospace and healthcare sectors, proving to be a driving force for other industrial sectors. A product of such importance and social interest has been made exclusively by drawing on the skills and human resources of Campania. Equipping the Campania industrial system with the skills necessary to support the manufacturing of life-saving medical devices, and making the region independent in the case of health crisis or emergency situations.

DAC



ANALYTICAL INDEX OF PROJECTS

ANALYTICAL INDEX OF PROJECTS

WEB SITE
THE DISTRICT
PROJECTS

DAC

ANALYTICAL INDEX OF PROJECTS

WEB SITE
THE DISTRICT
PROJECTS

DAC

ANALYTICAL INDEX OF PROJECTS

DAC

CONTACTS

DAC - Campania Aerospace Technological District

Via Coroglio 57 (Città della Scienza) - 80124 Napoli - Italy

+39 081 7352710

segreteria@daccampania.com

daccampania.com

KNOWLEDGE for BUSINESS

Produced with the contribution of the POR Campania ERDF 2014-2020 Action 3.4.2