AAM National Strategic Plan (2021-2030)

for the development of Advanced Air Mobility in Italy

ENAC

ENTE NAZIONALE PER L'AVIAZIONE CIVILE

Introduction

The pandemic experience and the resulting severe economic crisis have taught us how necessary it is to speed up technological and innovative processes in sectors that can bring about change in the society in which we live. In particular, the transport of goods and people, especially in emergency situations, plays a fundamental role in guaranteeing the right to mobility, which is a key element of civil, political and state society. The country needs more than ever at this time scalable national capabilities for the implementation, operation, and support of the aviation and aerospace community. The crisis has highlighted the importance of social, health and economic costs when the free movement of people, goods and services is severely hampered or even curtailed. The ambition of the European Civil Aviation Authorities is to lead the Union's new generations through the third dimension of mobility, to build a new paradigm for air mobility. The great challenge of the third millennium will be to direct innovation and the dissemination of related digital tools towards solving the major problems facing contemporary societies, such as urbanisation, pollution, climate change and inequality. The sector of urban mobility of goods and people and its allied industries is going through an epochal upheaval that will lead to the gradual implementation of new integrated and intermodal models of intelligent mobility, both by air and by land, such as to develop innovative and eco-sustainable solutions from which new business scenarios can emerge for the implementation of mobility as a service. All in all, it is necessary to change the current mentality focused on small changes in favour of a radical transformation. The right way forward is to put the greening of air mobility at the centre of the sector's growth, its digitisation for the modernisation of the entire system. In order for Italy to achieve global leadership in this area as well, it is essential that there be significant coordination and agreement between government action, the aviation regulator, the territories, and industrial development that takes into account European guidelines for the creation of a system that is resilient to future changes. The vision is to hand over to the new generations an urban, integrated and intermodal air mobility that combines imagination, planning capacity and concreteness, within a more modern country in an increasingly European context.

Pierluigi Di Palma
President ENAC

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The third dimension to connect Italy

Executive Summary

Technological innovation and, in particular, electrification and digitalisation are also radically changing the world of aviation, making possible new aeronautical paradigms and new ways of moving goods and people in urban areas and beyond. These new forms of transport, grouped under the name of Advanced Air Mobility (AAM), are projected towards the third dimension and digitalisation and are made possible thanks to the development of a series of innovative, safe, silent, sustainable and economical means of transport, which are better suited to operating in populated areas and to being integrated into the local transport system in a multimodal perspective and to improving overall accessibility.

Advanced Air Mobility is set to have a significant impact on the urban mobility sector for goods and people and its supply chain. In this scenario, countries and companies that remain focused on more traditional technology models will be unprepared to cope with new types of demand, and will deny their economies and populations important opportunities for growth and development.

However, seizing these opportunities is not easy. It is necessary to align and synchronise a significant number of heterogeneous elements that go beyond the technological sphere and extend to the infrastructural, regulatory and economic spheres. All this must be done by rationalising the resources made available, maximising the result and exploiting possible synergies.

In this context, ENAC, as the National Authority for Civil Aviation, has identified the need to promote a strategy for the creation of the national ecosystem for Advanced Air Mobility, aligning and pooling the components that will allow the goal of seizing the opportunities that the future may hold.

Advanced Air Mobility

Advanced Air Mobility means the set of innovative transport services carried out in an intermodal perspective with electric air systems, mainly vertical take-off and landing (VTOL - vertical take-off and landing), with or without an onboard pilot (UAS - Unmanned Aerial System, including drones) or autonomous - together with the relevant infrastructures - able to improve the accessibility and mobility of cities, metropolitan areas and territories, the quality of the environment, life and safety of citizens.

Globally, AAM has attracted the attention of both the private and governmental sectors. In several countries, public support for the development of national ecosystems is very strong, which is essential to encourage the proliferation of companies, both established and start-ups, and to strengthen the dynamism of territories.

The project

Following the signing of the Memorandum of Understanding between the Ente Nazionale per l'Aviazione Civile (ENAC) and the Ministry for Technological Innovation and Digitisation (now the Ministry for Technological Innovation and Digital Transition MITD) in December 2019, the project "Creation of the Italian Ecosystem for Advanced Air Mobility" was launched.

The sharing of the strategic vision of AAM between ENAC and the structures of the Ministry of Infrastructure and Sustainable Mobility (MIMS) and MITD, has led to entrusting ENAC with the development of the new operational concepts of AAM taking into account the needs of the territories, regulatory requirements, sustainability objectives and new technologies for the creation of a favourable ecosystem.

ENAC, thanks to the activation of the main national stakeholders in the sector (industrial sector, research centres, universities, municipalities, regulators and ministries), has adopted a strategy open to technological innovation aimed at creating an ecosystem capable of integrating new types of services for territories and citizens. This is fully consistent with the European 'Strategy for Sustainable and Intelligent Mobility' and, at the national level, with the Government's strategy for technological, digital development and environmental sustainability set out in the PNRR - National Recovery and Resilience Plan. This creation will allow the country to play a leading role at international level not only in the deployment of AAM services, but also in the development of a chain of innovative products and services.

The project to create the Italian Advanced Air Mobility ecosystem is divided into several phases:

- definition of a National AAM Roadmap aimed at bridging the regulatory, technological and infrastructural gaps identified with respect to the creation of the ecosystem;
- drafting of this Strategic Plan, as a tool for guiding and implementing public and private initiatives for the creation of the national ecosystem for AAM.
- Recognition and allocation of public and private resources necessary to enable the implementation of the Roadmap.

The National Roadmap

The definition of the national Roadmap identifies applications, i.e. concepts of use (CONUSE), of relevance to public institutions, practitioners, stakeholders and communities, starting from an initial list of more than possible40 applications. The Roadmap is a continuously evolving document, as it can and should be enriched with additional activities in line with technological and regulatory developments.

Target applications

The four selected target applications around which the Roadmap was built are:

1. passenger transport in urban and suburban areas (air-taxi);
2. transport of general goods and biomedical material (medical & goods delivery);
3. inspection and mapping of areas and infrastructures;
4. agricultural support.

The implementation of these first applications will pave the way for all the others, bridging the technological, regulatory, infrastructural and other gaps needed to allow the ecosystem to develop, with results to be expected in the short, medium and long term.

59 Roadmap activities

Fifty-nine activities have been identified, characterised by objectives, duration and type of stakeholders involved, organised along three waves, corresponding to the periods 2021-2023, 2024-2026, 2027-2030, through the completion of which it will be possible to reach increasing levels of maturity (AML, Advanced Air Mobility Maturity Level) capable of enabling increasingly complex AAM services, in urban and non-urban environments.

The Plan

This document is a Plan-Programme that outlines the new model of Advanced Air Mobility, the Country's Vision with respect to the implementation of services in the long term together with the Mission and Strategic Objectives to make the Vision a reality. The Strategic Plan contains as an integral part the AAM technological, regulatory and infrastructural Roadmap, together with the Business Plan.

Next steps

The next steps, foreshadowing a participatory approach, require the adoption of the Strategic Plan according to the political guidelines and its implementation and integration with the other mobility plans, also through the start-up of specific projects (so-called "vertical") to be implemented on the territory, aimed at allowing the effective start-up of the four main types of applications foreseen in the identified operational environments, in a coordinated way at national level and in coherence with the short, medium and long term vision.

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1. Foreword

The technological revolution is generating opportunities that were unthinkable just a few years ago, but without a positive social impact it risks going down in history as a missed revolution. From environmental pollution to an ageing population and sustainable urban development, the real challenge is to direct innovation towards solving the major problems facing contemporary societies.

Technological innovation is changing our lives as never before, opening up unprecedented scenarios for solving complex social problems such as climate change, health inequalities, energy scarcity, urban development and industrial growth. It is therefore through the good governance of this revolution that we have the opportunity to build a fair, prosperous, safe and sustainable world around man in which he can express himself to the full. And it is precisely on this challenge that the paradigm of the ideal society of the Third Millennium is based.

The new paradigm is based on the need for economic development fuelled by technological and digital innovation to have social development as its top priority. It is no coincidence that we talk about Social Innovation, as the use of technology and new business models to bring about a truly positive change in the lives of people and societies, offering shared value"[1]. The construction of a 'super-intelligent' society involves the exploitation of digital technologies with a view to improving the quality of life, regardless of age, gender, language or other factors. The integration of the real and digital worlds should therefore never lose sight of the human being, to whom technology should offer the opportunity to reduce stress, increase safety, preserve the environment in which he or she lives and, above all, achieve happiness: in short, to live a better life.

The2030 UN Sustainability Agenda calls on all states, public and private actors to play a key role, if only because the future of our society depends on their ability to propose solutions to the major contemporary challenges (from the development of cities to environmental protection) in the field of mobility and social infrastructure, as well as in the fields of energy and water, health and IT, in order to improve people's lives and create value not only on an economic level, but also on a social and environmental level.

The challenges we face today require complex, effective and cost-efficient solutions. The only way we can achieve this is to create an

1 Hitachi - Frost&Sullivan White Paper on Social Innovation

strong collaboration with all stakeholders involved and local institutions and innovating business models with a view to cascading benefits from business to society with an open and social innovation approach

In November 2018, the 'Amsterdam Drone Declaration' was released by EASA and the Dutch Ministry of Infrastructure through which the need to embark on an innovation path aimed at the development of innovative drone-based air mobility systems and passenger vehicles that are accessible to all was outlined. This objective brings with it support for the development of cutting-edge technologies and innovative services supported by a regulatory framework and U-Space.

The International Civil Aviation Organisation (ICAO) 2019,40^{ma}Assembly, held in Montreal, highlighted the urgent need to address and drive innovation in civil aviation (Ref. 40ma ICAO Assembly, Item 26 Other high level policy issues - Executive Committee Innovation in Aviation) at global, regional and national level by taking timely measures to monitor and assess the developments of emerging technologies so that they can realise their potential benefits without leaving any Contracting State behind. In this context, the Civil Aviation Authorities are called upon to develop and adopt policies to facilitate technological development appropriate to the safety levels required by the sector, in cooperation with the stakeholders involved.

In December, 2020,Heads of State and Government confirmed at the European Council their commitment to achieving the objective of a climate-neutral European Union by 2030 in 2050line with the goals of the Paris Agreement and set a further binding EU target of a net internal reduction of at least 55% of greenhouse gas emissions by 2030 compared to 2030. 1990.

The transport sector plays a key role in creating growth and jobs and is the backbone of many other sectors of the EU economy. However, at the same time, it currently accounts for around a quarter of total EU greenhouse gas emissions and this share of total emissions has continued to increase over time.

In this context, the EU's transport and mobility system and all its modes must be seen not only as a contribution to the climate change problem, but also as a central part of the solution.

EASA conducted a study on public acceptance in Europe of Urban Air Mobility applications in six European countries, including Italy. The results, presented at a hearing in the European Parliament on 16 June 2021, record a favourable attitude of European citizens towards the prospect of public services that improve the quality of life in Europe.

life such as air taxis, air ambulances and deliveries by manned or unmanned electric vehicles - UAS.

The study, conducted in six selected European cities, including Milan, shows that the public is increasingly ready to embrace cutting-edge services and technologies that can improve liveability in the urban environment and reduce local emissions.

Advanced Air Mobility will benefit not only urban but also suburban and rural areas. This evolution should not leave anyone behind: it is essential that mobility is available and accessible to all, that rural and remote regions can be better connected and more accessible also for people with reduced mobility. The AAM will be able to offer services that can help improve the rural connections of territories by providing innovative services that are accessible to all (e.g. delivery of goods in rural or hard-to-reach areas). The "European Pillar of Social Rights" defined by the European Commission is the compass to follow to ensure that green and digital transitions are socially equitable and shared.

Within this context is the need for ENAC, as the only Civil Aviation Authority, to play an active role in defining a strategic framework at a country system level so that Italy can develop the necessary skills internally and create the ecosystem necessary to regulate and launch Advanced Air Mobility services.

This document is therefore a Plan-Programme outlining the new model of Advanced Air Mobility with a close look at regulation, technology and financial aspects.

In order to position itself internationally as a country at the forefront of the Advanced Air Mobility sector, developing competitive technologies and skills, it is necessary that the effort towards this goal is coordinated and supported at a national level, benefiting the entire country system. This Strategic Plan therefore has three main[2] aims:

1) Define and communicate the vision, mission and strategic objectives underlying the development of Advanced Air Mobility in Italy;
2) To establish the approach for the integration of Advanced Air Mobility in the Italian context, enhancing the current national scenario and taking into account the international one;
3) Identify the correct governance to be adopted for the implementation of this Plan.

[2]The documents supporting the national strategic plan (e.g. the national Roadmap) were developed in English in order to ensure that the results could be shared with as wide an audience as possible, transferring the experience gained at national level to an international level. We would like to take this opportunity to thank all the stakeholders in the working group (to be found in chapter 7) and the PwC Strategy& PMO who supported the drafting of the National Roadmap, Strategic Plan and Business Plan document during the phases and 12 of the Advanced Air Mobility project.

2. Advanced Air Mobility

Advanced Air Mobility refers to the set of innovative transport services carried out in an intermodal perspective with electrically-powered aircraft systems mainly with vertical take-off and landing (VTOL - vertical take-off and landing), with or without an onboard pilot (UAS - Unmanned Aerial System, including so-called drones) or autonomous - together with the related infrastructures - capable of improving the accessibility and mobility of cities, metropolitan areas and territories, the quality of the environment, life and safety of citizens (fig.1 - Perimeter of action of Advanced Aerial Mobility).

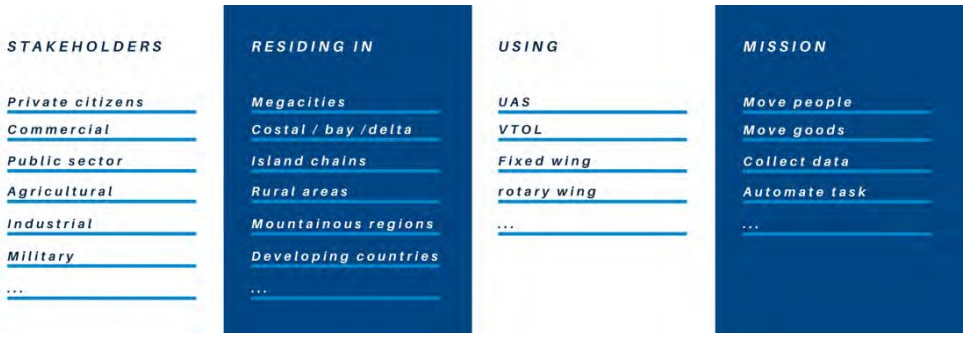

Figure 1: Action perimeter of Advanced Air Mobility

The potential applications of Advanced Air Mobility are manifold. During the drafting of the National Strategic Plan, in fact, more than 40 possible applications of AAM were identified, which can be divided into the following 4:

- **Transport of people**: Applications involving the use of different types of aircraft, mainly eVTOLs (with and without pilot on board) to transport passengers for services and missions (e.g. air taxi, airport shuttle, medical or police vehicle and tourist air tours);
- **Transport of general cargo and biomedical material**: use of different types of UAS for transporting loads of different sizes and for different purposes (e.g. transport of biomedical material, parcel transport, cargo transport);
- **Inspection and mapping** of **areas and infrastructures**: solutions for acquiring different types of data and information by means of UAS in different areas (e.g. inspection of infrastructures and buildings, soil monitoring, mapping of areas and infrastructures and inspections in emergency situations);
- **Agricultural support**: applications involving physical interaction between the UAS in flight and an object to perform a task (e.g. release of substances into the air, release of substances in agriculture, maintenance of infrastructure and buildings and collection of objects).

Transport of persons	Transport of goods and medical equipment	Inspection and mapping	Supporting agriculture
 Air taxis	 Medical and goods delivery	 Inspections and mapping	 Agricultural support

Figure 2: Advanced Air Mobility Applications

AAM has the potential to digitise mobility and help reduce travel times within urban and interurban areas, expand intermodal options, contain pollution levels through the use of innovative propulsion systems, and reduce traffic congestion due to the steady growth of urbanisation and new business models (e.g. e-commerce). Moreover, AAM solutions can be scaled up with less investment than other transport alternatives, such as road mobility.

For these reasons, the AAM market has experienced strong growth in recent years, partly due to substantial investment from both the public and private sectors. Consequently, the number of industrial players interested in providing AAM solutions has increased considerably. Today, the AAM landscape has become quite competitive and includes both large players such as Airbus, Boeing, Bell and Amazon as well as smaller but highly innovative companies such as E-Hang, Joby Aviation, Volocopter and Lilium.

The Italian context, more specifically, can also boast the presence of a wide variety of companies that are entering and operating in the sector, ranging from more structured realities such as Leonardo or Telespazio to emerging ones such as Flying Basket, Italdron or Walle. The growth of the AAM market is also expected to continue at a sustained pace until 2030, which is expected to contribute to the strengthening of existing players and encourage new players to enter the market.

Although the world of AAM is receiving increasing interest from investors and industrial players, it is fair to point out that, to date, existing technologies and systems are not yet ready to be deployed on a large scale in urban and sub-urban environments and represent a viable transport option on a regular basis. A strong joint effort of the entire industrial value chain and public institutions is therefore needed to develop an advanced ecosystem that is able to help address the crucial issues related to climate change and urban quality of life.

3. Analysis of the global, European and national context

In order to fully understand the potential behind Advanced Air Mobility applications, it is essential to understand what kind of applications are possible, the expected market perspectives and how these elements are already driving several countries and companies to undertake actions aimed at developing this sector. We will now provide an overview of the market and the initiatives underway at a global, European and Italian level in order to underline the importance of coordinated action at a national level to ensure that Italy not only accelerates the development of the ecosystem but can also make up the gap that has been created with the nations that were the first to move into the sector.

3.1 Market overview, support for start-ups and international initiatives

The current market already sees some solutions and services implemented with a low level of technological complexity, especially when these involve operations in limited and low-risk environments; however, the potential of these technologies is not yet fully exploited. This is also demonstrated by the perspectives that various analysts have on the market potential for this sector (fig. 3 - Expected global market for Advanced Air Mobility (2020-2030, billion dollars))[3]. The expected global 2023,market will be close to USD 10 billion, driven by the various applications of image and data collection by means of low-complexity drones. During the 2021-2030 period, the Advanced Air Mobility market is expected to grow at a rate of around 20-25%, reaching an estimated value of around USD 38-55 billion per year. A 20304,5.strong impetus will be given by the implementation of passenger transport services expected by the middle of the decade, when technologies and regulatory frameworks will be ready to enable this type of higher complexity operations.

The excellent market prospects have prompted the interest of various companies and investors in financially supporting the innovation activities of start-ups engaged in the development of aircraft and drones for Advanced Air Mobility applications (Fig. 4 - Financing activities for start-ups in the sector (number of financing contracts, financing provided in millions of dollars))[6]. Evidence of this is the significant increase in the number of start-ups funded, from 2 in 2010 to 13 in 2020, and in the sums invested in support, rising from $3 million in 2010 to over $1.1 billion in 2020[7]. 2021 will be another year of growth, as more than USD 2.5 billion has been announced.

3 Re-elaboration PwC Strategy&
Source4: PwC Strategy&
5 Data in line with the estimates shared in the document released by
EASA Re-processing6 PwC Strategy&
7 Source: "Are air taxis ready for prime time?" (Lufthansa Innovation Hub)

of dollars to support three leading international start-ups (Lilium, Joby Aviation, Archer).

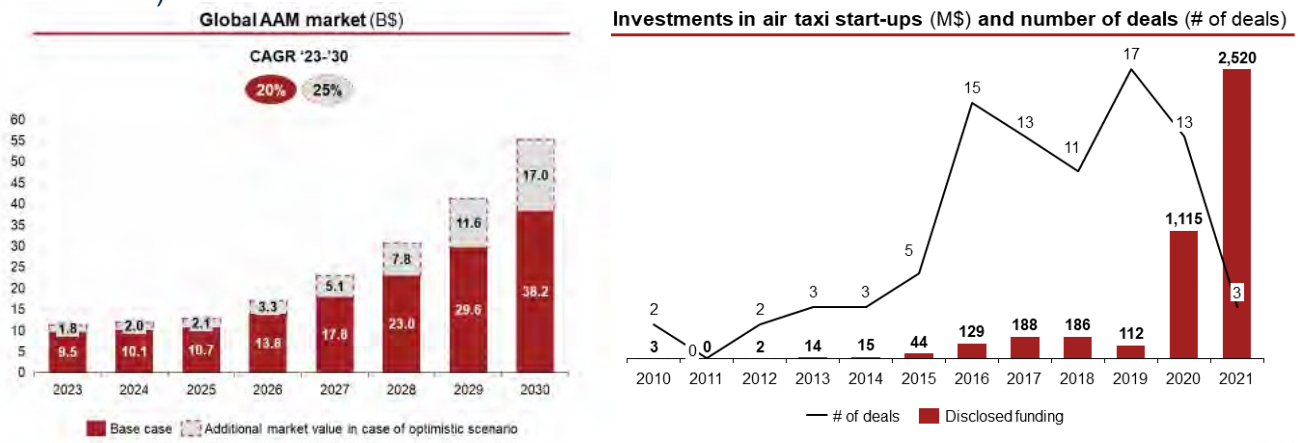

Figure 3: Expected global market for Advanced Air Mobility (2020-2030, USD billion)

Figure 4: Funding activity to start-ups in the sector (number of funding agreements, funding provided in millions of dollars)

Further confirmation of the wide international interest in the development of Advanced Air Mobility is provided by the large number of initiatives, programmes and projects underway at international level involving private companies and public bodies such as ministries, national civil aviation authorities, research centres and universities, all committed to fostering the maturation of national ecosystems that favour the creation of skills and the development of technologies capable of bringing urban mobility into the third dimension. Currently, there are more than a few active global initiatives 140and projects [8](Fig. - Active Global 5Initiatives on Advanced Air Mobility), with major commitments from countries such as the United States, Canada, the United Kingdom, European Union Member States, New Zealand and the United Arab Emirates.

Figure 5: Active global initiatives on Advanced Air Mobility

8 Source: PwC Strategy&

Each country is developing different topics and has reached different levels of maturity in each of them (Fig. 6 - Maturity of the main countries on Advanced Air Mobility topics).

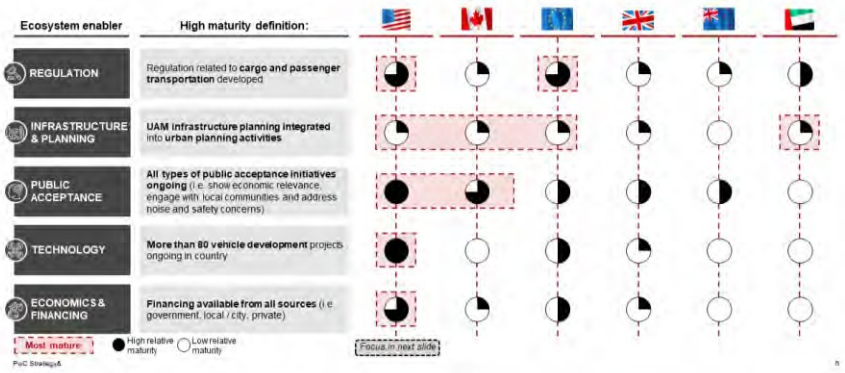

Figure 6: Maturity of the main countries on Advanced Air Mobility issues

These are the countries that are developing the most initiatives in this sector. Specifically, the United States and Europe are the most mature in terms of developing the enabling elements of the Advanced Air Mobility ecosystem.

On the other hand, the United States is the nation that has been best able to develop its own ecosystem through the involvement of a large number of national and international stakeholders that together have allowed the creation of a network of competencies with the objective of accelerating the development of Advanced Air Mobility in the country[9] (fig. - 7Ecosystem for Advanced Air Mobility activated in the United States). This was done both through a centralised approach through the activation of the Grand Challenge project and the Integration/UTM Pilot Program, and through local initiatives linked to the activities of individual cities.

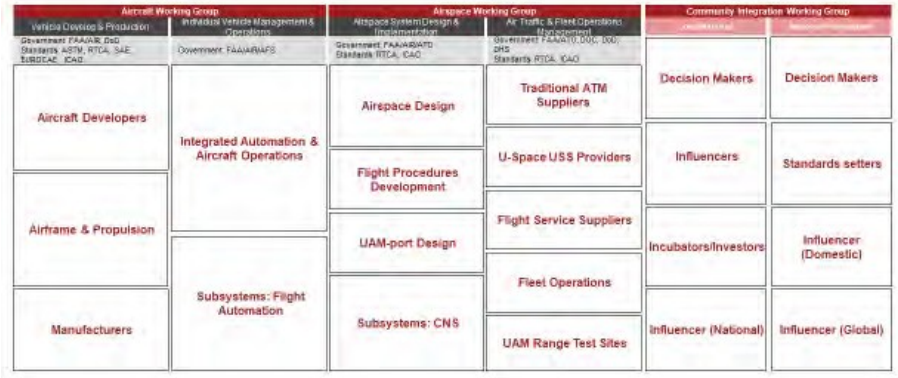

Figure 7: Ecosystem for Advanced Air Mobility activated in the US

9 Source: NASA, Working Groups

3.2 The European context

Many projects are underway and planned at European level, with the aim of developing the necessary technologies and regulations to allow European countries to play a leading role in the future by developing skills that can benefit not only the Advanced Air Mobility sector but also all those sectors that could benefit from technological innovations related to mobility, ensuring the development of multi-domain solutions (e.g. air, land and water solutions) thanks to investments in AAM.

In this perspective, the study carried out by EASA on the subject of public acceptance was fundamental. It investigated in detail the perception that European citizens have towards these new forms of mobility, the main concerns linked to the main applications and identified the main cities in which Advanced Air Mobility could be successfully developed (Paris, Barcelona, Hamburg, Budapest, Milan and the Oresund region that includes Copenhagen, Hillerod, Helsingor, Malmo and Lund). From this study, Italy emerges as one of the main centres that will be able to host new services in the near future, with Rome, Milan and Bologna identified as some of the cities most ready for these new technologies.

Of particular note is the Urban Air Mobility initiative promoted by the European Commission as part of the Smart Cities Marketplace project, which involves numerous European stakeholders involved in the development of the Advanced Air Mobility ecosystem and technologies. There are several initiatives active throughout Europe that are part of the Smart Cities Marketplace project, with an important role for municipalities and regions that are increasingly called upon to design future AAM applications in collaboration with regulators, operators and industrial players.

3.3 The current Italian scenario

In the wake of experiences at international level, the need has emerged for the involvement of a wide variety of figures in order to make the development of a mature and all-encompassing national ecosystem effective. Hence the need, through the National Strategic Plan, to involve all possible stakeholders that are part of the Italian ecosystem in order to gather all those competences that are fundamental to its development. In order to better understand which types of stakeholders can be involved, it is possible to define eight categories (fig. - 8Stakeholders needed to activate the Italian ecosystem):

- **Legislator and regulator**: national and local legislators and regulators, as far as they are competent, will be asked to create a coordinated regulatory framework.

national coherent with the European one, able to favour the local development of as many applications and services as possible;

- **National institutions**: Ministries and other national bodies will need to be involved to ensure coordination at central level in terms of policy and supervision as well as public investment, in conjunction with local/territorial authorities;
- **Local institutions**: regions, metropolitan areas and cities should be supported in the identification of their needs and the definition of their mobility policies and local plans, in coherence with the national strategy, in order to better integrate Advanced Air Mobility services;
- **Communities and associations**: Representatives of different communities and associations protecting different groups will be crucial in protecting the interests of the different stakeholders involved and impacted by future applications, in facilitating public acceptance, including through open public consultation processes;
- Universities and research centres: universities and research centres will be called upon to support the development of new technologies through the creation and provision of specific skills that can then be applied in various sectors and that foster the country's competitiveness abroad;
- **Companies and start-ups**: the national excellences that make up the Italian productive fabric will be able to play a key role in the development of specific Advanced Air Mobility solutions. Major investments will have to be made to encourage their involvement and the creation of the necessary skills;
- **Service and infrastructure operators**: in order to be able to launch Advanced Air Mobility applications, it is necessary that potential operators of services, operations, logistic networks and infrastructures are involved in their definition, in order to outline and define services to make them accessible to all.
- **End-users**: companies, institutions and consumers who are going to use AAM services should be willing to cooperate with the developers of the services to ensure that they meet real needs.

Figure 8: Stakeholders needed to activate the Italian ecosystem

For each of these categories, a series of stakeholders representative of the Italian landscape have been preliminarily identified, which to varying degrees will be able to respond to the implementation of the Roadmap as envisaged by the strategic plan (Fig. 9 - Illustration of the main stakeholders to be activated/active in the Italian scenario). This landscape is constantly evolving and it is expected that the number of stakeholders will continue to increase as the ecosystem matures.

Figure 9: Illustration of the main stakeholders to be activated/active in the Italian scenario

On the Italian scene, several companies are already distinguishing themselves for the development and application of innovative drone-based solutions with the aim of integrating them into their processes or launching new services. From a national mapping it is possible to mention[10] (fig. 10 - Selection of the main Italian actors active in the experimentation of Advanced Air Mobility applications)[11]

- **Italian player in the hydrocarbons sector**: a process is underway to integrate the use of UAS within their inspection and maintenance activities of infrastructure (e.g. chimneys and flares) and equipment (e.g. cranes);
- **Italian player in the energy sector**: several types of UAS are currently being tested to perfect applications related to the monitoring and inspection of critical infrastructures (e.g. dams, solar panels and wind turbines);
- **Italian player in the energy sector**: trials are underway on the use of UAS for inspection activities of its energy transmission infrastructure network, in order to support the planning of maintenance activities;
- **Players in the aviation sector**: several operators, including in the HEMS (Helicopter Emergency Medical Service) sector, are investing in solutions

10 Source: Interviews with industry experts, company presentations PwC Strategy& analysis11 based on public information

cutting-edge technologies ranging from monitoring and inspection to the transport of biomedical material;

- **Start-ups**: there is a growing number of innovative start-ups that are developing vehicles and services for freight transport, monitoring activities, cable routing and other applications. At the national level, one start-up has achieved significant results, including authorisation to operate in other European countries and has started the certification process with EASA;
- **Player in the rail transport sector**: several projects are underway to develop mobile infrastructure for the use of drones to inspect sensitive areas;
- **Players in the infrastructure sector**: several stakeholders have launched projects to accelerate the development of Advanced Air Mobility solutions with a focus on passenger transport applications. In addition, there are plans to build vertiports in the Rome, Milan, Turin and Venice areas;
- **Players in the air mobility sector and manufacturers of aerial systems**: the national ecosystem is increasingly attracting the interest of domestic and foreign stakeholders to launch passenger and freight transport services with eVTOL vehicles in the main Italian cities in the coming years.

Figure 10: Selection of the main Italian players active in testing Advanced Air Mobility applications

In addition to the development activities carried out by individual entities, there are also a series of projects and initiatives born over the years from the collaboration of various entities that are carrying out studies and experiments for the launch of Advanced Air Mobility solutions in the coming years. The main applications developed at Italian level concern inspection and monitoring activities, the transport of goods and in particular biomedical material, and finally the development of passenger transport applications (fig. - 11Areas of development of Italian projects).

Figure 11: Development areas of Italian projects

The main initiatives and projects include [12][13](fig. 12-13 Main initiatives activated at Italian level):

- For the development of inspection and maintenance applications: "Skypersonic-Torino", "F2V" (Full Flight View), "DGAP", "RPASinAir" and "Sapere";

	Projects				
	Skypersonic-Torino	F2V (Full Flight View)	DGAP	RPASinAir	Sapere
Description	The project aims at using Skycopter drones, which will be provided free of charge to the city of Turin, in indoor BVLOS mode to inspect and sanitize closed spaces	Drones will be tested in the Dora city park with the aim of carrying out asset management (viaducts) and urban security monitoring activities	The project aims to perform a periodic evaluation of the advancements of the construction site thanks to the use of drone technologies	The aim is to collect data through BVLOS aerial operations with UAVs to develop an air traffic management system capable of identifying risks and soliciting appropriate procedures for emergency management (e.g. floods, earthquakes, etc.)	The project aims at developing innovative solutions based on the exploitation of images captured by UAVs for the acquisition of information on the territory such as stability of infrastructures, quality of waters, soil sealing and thermal micro-zoning
Actors involved	Skypersonic Torino CityLab	TIM ENAC E-geos DBW Telespazio ADPM Drones	Peopletrust Nais AI View group Italferr	ENAV Telespazio Planetek Vitrociset Leonardo Università degli Studi di Bari "Aldo Moro"	Leonardo Comune di Bari ENAC Planetek
Location	Turin	Turin	N/A	Airport of Grottaglie in Taranto	Bari
Period	Presented in May 2020	2019	Started in October 2020, expected duration of 15 months	Kick-off meeting held in November 2018	N/A

Figure 12: Main initiatives activated at Italian level (inspection and maintenance)

- For the development of applications for the transport of goods and biomedical samples: tests conducted for the Bambin Gesù Hospital in Rome, "Sumeri: Si Salpa!" and "Philotea";
- For the development of passenger transport applications: 'SkyGate'.

12 Source: PwC Strategy& Not
13exhaustive

	Projects			
	Bambino Gesù Children's Hospital	Sumeri: Si Salpa!	Philolea	SkySafe
Description	**Test of biomedical products delivery** between two sites of the hospital "Bambino Gesù" **32 km** away from each other, using an automatic control mode beyond the operator's visual line of sight (BVLOS)	First demonstration of a cargo **drone weighing 130kg** and powered by an electric propulsion system transporting heavy goods (25 Kg) in Italy	The trial saw the **movement of highly perishable biological material** (urine, blood, plasma) through the use of a drone piloted in VLOS modality between the Monaldi and Cotugno hospitals	First **testing of electric air taxis** supplied by Joby Aviation in collaboration with Always and DigiSky in the Aeritalia airport in Turin
Actors involved	Leonardo, Ospedale Bambin Gesù, ENAC, Telespazio	Leonardo, ENAC, Torino CityLab, D-Flight	ENAC, Drone Group, WIP Lab, Ordine nazionale dei biologi, PRISMA	Always, DigiSky, Joby Aviation
Location	Rome	Turin	Naples	Turin
Period	October 2020	February 2021	May 2019	2021-2024

Figure 13: Main initiatives at Italian level (freight and passenger transport)

These initiatives now involve a wide variety of companies (including: Leonardo, Telespazio, ENAV, D-Flight, Joby, DigiSky, Always, Tim, Planetek) and public bodies (including: ENAC, Torino CityLab, Municipality of Bari, Bambin Gesù Hospital, University of Bari Aldo Moro) that together work together to bring to the table the expertise needed to develop these technologies.

4. Pathway to the construction of the National Strategic Plan

The path that led to the construction of the AAM National Strategic Plan by ENAC was shared with the MIMS and MITD structures and involved a large number of stakeholders from different categories who all together formed the working group of the Advanced Air Mobility project:

- Industrial
actors Ministries
- Town halls
- Agencies, clusters and research centres
- Consulting company with experience in the field of Advanced Air Mobility
Airport entities

Involving different categories of stakeholders in the process of elaborating the Roadmap and the strategic plan was crucial to its success. Each category of stakeholders brought a different vision, expertise and approach, which together allowed the development of a Roadmap that was wide-ranging, innovative and based on solid expertise in each of the aspects addressed.

The project was launched in December, when2019 the Italian Civil Aviation Authority and the Ministry for Technological Innovation and Digital Transition signed a memorandum of understanding with the aim of launching a process to develop the Italian ecosystem for Advanced Air Mobility. The emergent health crisis did not prevent the Authority from starting a preparatory phase of the project, and in July to begin2020 the operational activities for the development of the Roadmap. More specifically, a first step of fundamental importance consisted in the selection of the applications, concepts of use - CONUSE, targets considered to be most relevant for the development of AAM in the Italian context. The actors involved in the elaboration of the Roadmap, in fact, identified 4 main applications (air taxi, transport of goods and biomedical material, inspection and mapping, support to agriculture) starting from an initial list of more than 40 possible AAM applications (the process followed is described in detail in chapter 7).

The identification of the main applications was followed by an international ecosystem benchmarking activity that consisted of carrying out an in-depth analysis of how the main foreign countries, which are dedicating themselves to the development of AAM, are working to make progress on issues such as regulation, infrastructure network development, public acceptance, technology development and raising the necessary finance to develop an advanced AAM system (results will be described in Chapter 5). Benchmarking activities have thus made it possible to identify "best practices" that characterise

the international scene and to draw valuable ideas on how to accelerate the development of the Italian ecosystem in an effective and incisive manner.

Subsequently, an analysis framework was developed based on fundamental pillars6, namely: community integration, business model, air traffic and fleet operations, vehicle operations management, vehicle development and production, and airspace system design and management. Working groups were organised for each of the framework's areas of analysis, each of which identified the main gaps and challenges to be addressed in order to develop a thriving Italian AAM system.

Working groups were also tasked with identifying the activities, responsible parties and timeframes needed to fill the identified gaps and thus overcome the obstacles to the implementation of the AAM.

Based on these premises and within a context characterised by maximum openness to dialogue, confrontation and innovation, the activities59 envisaged in the National Roadmap (reported in detail in chapter 6 "Implementation Roadmap") were therefore identified for the period January-March 2021.

The development of the National Roadmap for Advanced Air Mobility marked the end of phase I of the Advanced Air Mobility project. Phase I laid the foundations for the development of the next phase, which began in April 2021 and led to the drafting of the following National Strategic Plan to support the implementation of the Roadmap and the related Business Plan, which estimated the investments necessary for each of the Roadmap activities59 and all the additional investments required to bring Advanced Air Mobility to Italy, with a preliminary reconnaissance of the possible sources of funding.

The definition phase of the Roadmap was also possible thanks to a provisional governance structure that allowed for the correct coordination of all the stakeholders involved, with a central role played by the Ministries and ENAC (fig. 14 - Governance structure adopted for the definition of the National Strategic Plan).

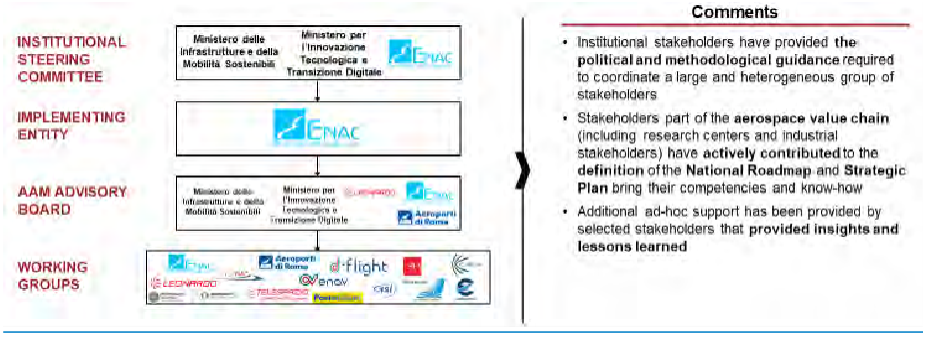

Figure 14: Governance structure for the elaboration of the project's National AAM Roadmap

Chapter 8 "Governance" outlines the implementation governance proposed to guide the implementation activities of the strategic plan. In fact, the continuation of the project foresees implementing the activities foreseen by the National Roadmap, launching tests and demonstrations of the selected applications in some target Italian cities, in anticipation of major attractive events (such as the 2024 Jubilee and the 2026 Winter Olympics) and keeping a constantly active process of analysis of the work aimed at identifying criticalities and areas for improvement, gathering feedback and thus being able to establish a mechanism of continuous improvement of the actions carried out and aimed at the development of the AAM.

5. National Strategy

5.1 Vision

The vision for Advanced Air Mobility can be summarised with the following statement:

To make available to the country a model of urban, integrated and intermodal air mobility, able to provide advanced services to citizens, businesses and institutions and to respond to the needs of territorial systems in the framework of the digital and ecological transition, setting itself as a reference in the international context.

Accelerate the growth of a national industrial and technological fabric, seizing the opportunities offered by AAM at global level with the aim of implementing the country's competitiveness, also through the creation and enhancement of new professionalism in the STEM field.

The diffusion of digital technologies and technological innovation will radically change the urban mobility of goods and people and its related industries, through the introduction of new concepts and models of intelligent and sustainable urban mobility based on the capacity for autonomous flight and the concept of integrating different airspace users through U-Space services.

Similar to other European initiatives, Italy can play a leadership role in this sector starting from the technological, social and industrial issues related to Advanced Air Mobility.

Therefore, the strategic vision at the basis of the plan envisages making available to the country a model of Advanced Air Mobility capable of providing sustainable and advanced services to all citizens, enterprises and institutions, and which responds to the needs of territorial systems in the framework of the digital and ecological transition, setting itself as a reference in the international context. In addition, it is fundamental that Advanced Air Mobility be integrated into the territory, capable of evolving by involving all the players in the ecosystem, who will be involved in the creation of an integrated network of infrastructures, also making the most of existing ones, and in the development of vehicles and technologies. The strategic vision therefore indicates the objective to be achieved by the end of the year, with2030 the involvement of public and private stakeholders.

Achieving this objective will also contribute to improving the quality of life of citizens by reducing local emissions and traffic levels in urban and suburban environments,

increasing the efficiency of services and introducing new modes of transport by promoting accessibility from remote and disadvantaged areas of the territories.
All this will favour the creation of value for the country with positive impacts in terms of employment and Gross Domestic Product.

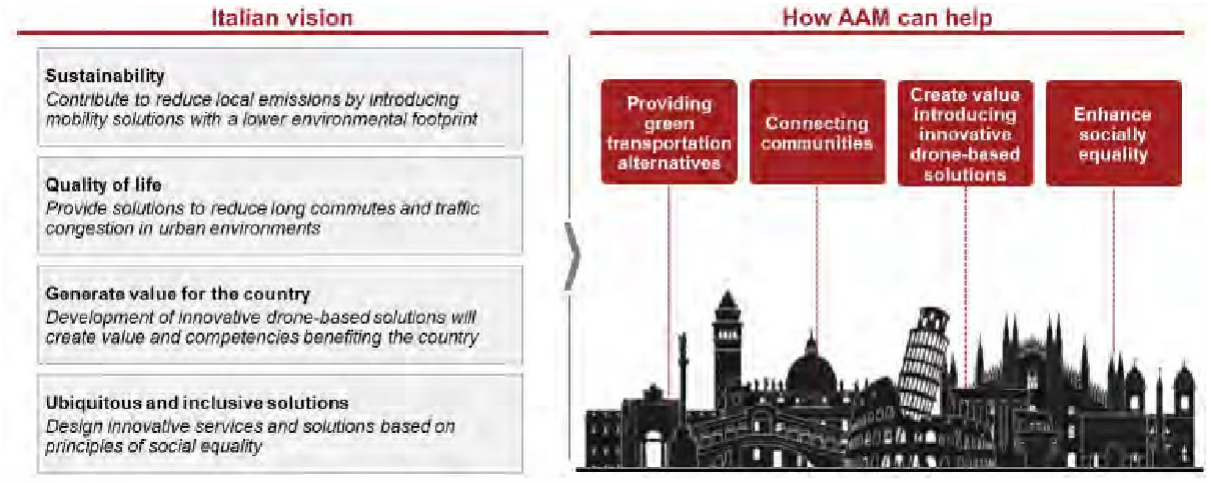

Figure 15: Italian vision for Advanced Air Mobility

5.2 Mission

Like the vision, the mission was also summarised in a statement:

> **The project intends to achieve the objectives of the Vision through the creation of a national ecosystem enabling technological development and the gradual implementation of services in the context of a reformed national regulatory framework and a participatory funding programme, adequate to meet the new European challenges for advanced, sustainable and intelligent air mobility.**

In order to pursue the 2030 vision, the mission for Advanced Air Mobility has been defined, through which it is possible to understand how the strategic vision will be achieved. In fact, our mission foresees that the long-term strategic vision will be achieved through the implementation of the national roadmap supported by the strategic plan, which will fill the gaps identified and the creation of an ecosystem that includes institutional, industrial, research and regulatory stakeholders. In doing so, it will develop a

integrated, multi-domain and intermodal mobility (air, land, water) that will benefit citizens and institutions, with complex, swarm-enabled applications.

5.3 Strategic objectives

In order to implement the Mission, the following strategic objectives are defined as necessary for the achievement of the Vision objective:

- **Objective 1** - Definition and implementation of the reform of the national regulatory framework for the AAM, including both aeronautical and urban and territorial aspects, in accordance with European policies, including the digitalisation of PA services and the creation of an Integrated One-stop shop for institutions, operators and users.
- **Objective 2** - Definition of a public-private partnership (PPP) model for financing the AAM plan, also with a view to implementing the Roadmap projects.
- **Objective 3** - Overcoming the technological and regulatory gaps identified in the Roadmap according to the three *waves* of Roadmap activities indicated, together with the identification of the implementing entity to launch and supervise the relevant detailed projects to be funded.

The **first strategic objective** is to create a national regulatory framework that is harmonised with European regulations, in particular with local planning tools, in order to allow the development of advanced air mobility applications that are as widespread as possible and easy to use by the public, with a view to integration and intermodality. The digitalisation of PA processes and services, and their integration, will also be a fundamental aspect to be addressed in the regulatory framework and in investment planning.

Target

T1 < 2026 - Development of a regulatory framework to enable the first services in certain areas of the country during major events, such as the Jubilee and2025 the Milan-Cortina Winter Olympics, with 2026,development of coordination models with the Aviation Authority and other bodies involved.

T2 < 2030 - Development of an integrated and highly digitalised national regulatory framework to enable the implementation of AAM services in major cities, metropolitan areas and regions.

The **second strategic objective** is the definition of Public-Private Partnership models aimed at implementing and financing the AAM Roadmap and, more generally, at fostering the development of a national AAM ecosystem in the long term. Participatory public-private support for AAM development is in fact one of the key elements through which the interests of these two types of stakeholders can be aligned, thus bringing together a broader base of skills and abilities towards an ultimate goal set out in the vision.

To support the creation of the public-private model for the financing of a national AAM ecosystem some potential sources of funding are:

- European funds (such as Horizon Europe, the PNRR and ReactEu) with a time horizon covering the period 2021-2027
- Public funds (Ministries, Public Bodies and Agencies) such as the Development and Cohesion Fund, the Fund for Financing Investments and Infrastructure Development of the State and the Funds for Investments by Administrations and the State.
- Private funds from, for example, private equity funds with a strong focus on the infrastructure and technology sector.

The **third strategic objective** intends to fill the main gaps that have been identified and reported in the AAM Roadmap (annex to 1this document) through the implementation of activities identified in three successive waves:

Please refer to the chapter "Implementation Roadmap" for more information on the waves of activity.

wave in the 1period 2021-2023

wave in the 2period and2024 the 2026

wave in the 3period 2026-2030

6. Roadmap

6.1 Roadmap features

First of all, to enable the development of the Roadmap the Advanced Air Mobility framework [14](fig. 16 - Analysis Framework for Advanced Air Mobility) was developed in order to conduct the gap and challenge analysis by the working groups. The six elements of the framework identified and their respective points of analysis are:

- Integration in the community, developing issues of: perception of safety, privacy, impact on the world of work, environment, noise and visual pollution;
- Airspace design and implementation, which develops topics of: airspace integration, definition of flight zones, restriction of certain flight altitudes, infrastructure requirements, ground risk assessment;
- Vehicle development and production, which develops topics such as: vehicle certification, fitness for flight, technological challenges;
- Vehicle Management, which develops topics of: risk classes, pilot licensing, flight over people, operations in BVLOS (Beyond Visual Line of Sight), autonomous flight, response to different weather conditions, maintenance requirements;
- Air Traffic Management, which develops topics of: registration and identification, operator certification and licensing, U-Space requirements;
- Business model, which develops issues of: identification of the target market, definition of costs and revenues, risk allocation, impact on the value chain.

The definition of regulation forms the background to each of these elements as it is the key element in enabling these services.

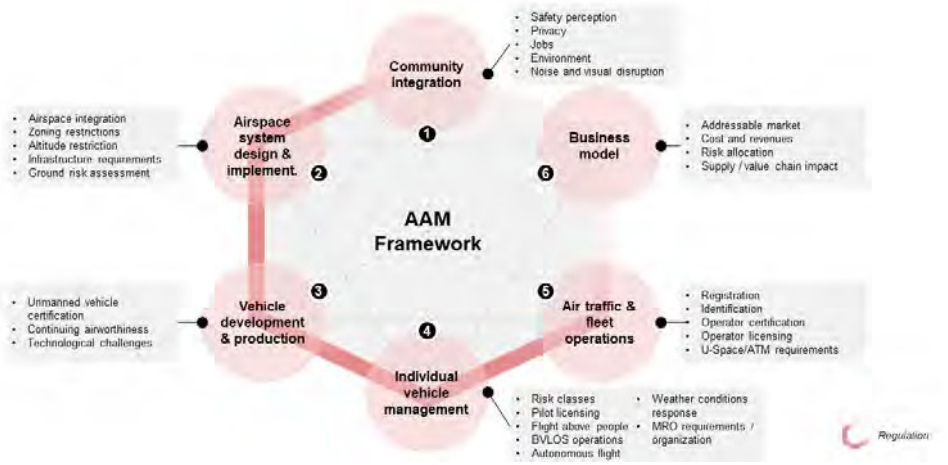

Figure 16: Analysis framework for Advanced Air Mobility

14 Revised by PwC Strategy& on the basis of the NASA framework 'Advanced Air Mobility National Campaign'.

Furthermore, the Roadmap was constructed with four principles in mind that guided its definition throughout the process. These principles guided the drafting of the Roadmap in order to pursue the strategic vision that guides the National Strategic Plan. The four principles are listed below (Fig. 17 - Key principles underlying the development of the Roadmap for Advanced Air Mobility):

- Development of technologies, regulations and systems that reduce the complexities of the ecosystem to allow less complex applications to develop;
- Develop activities in waves that reconcile short, medium and long-term objectives;
- Enable all possible applications in the long term; Develop key competencies for the introduction of strategic services for the country

Figure 17: Key principles underlying the development of the Advanced Air Mobility Roadmap

6.2 Applications and target maturity levels

Two fundamental elements underlying the definition of the Roadmap were the identification of the strategic target applications for Italy and the maturity levels to be reached at the end of each wave of activities, and both these elements were identified on the basis of the principles listed above.

First, the target applications to be developed with the Roadmap were identified. This was possible through a selection process involving different stakeholders in different phases. From a list of more than forty possible applications, belonging to the four macro-categories identified above, ten main applications were selected by means of selection criteria based on the strategic and

complexity of the application defined on the basis of a survey of stakeholders in the working group, its market potential and the level of maturity of that application in other countries based on a benchmarking of major countries and markets globally (Fig. - Prioritisation 18process of target applications 1/2).

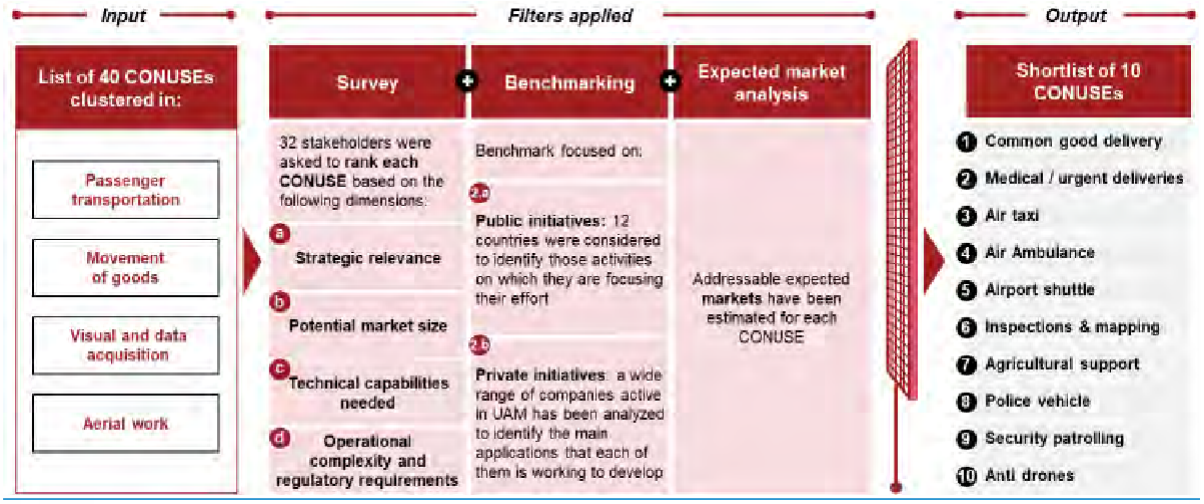

Figure 18: Application prioritisation process - CONUSE target (1/2)

From this list of ten applications, the final four were then prioritised according to their relevance and relevance to the four principles. These four selected applications are: air taxi, transport of goods and biomedical material, inspection and monitoring and support for agriculture (fig. - Prioritisation 19process of target applications 2/2).

Figure 19: Prioritisation process of target applications (2/2)

Based on these four applications, models were then built, which, once fed with inputs corrected for the geographical area being estimated (such as traffic data, average income and available mobility solutions), are able to

defining the potential fleet of UAS, in general eVTOL vehicles and market entities. These models will be fundamental in supporting decision-making processes, in assessing the impact of the value chain at the Italian level and in defining the needs for the infrastructure network supporting these services (Fig. - 20Objectives of business model development for target applications).

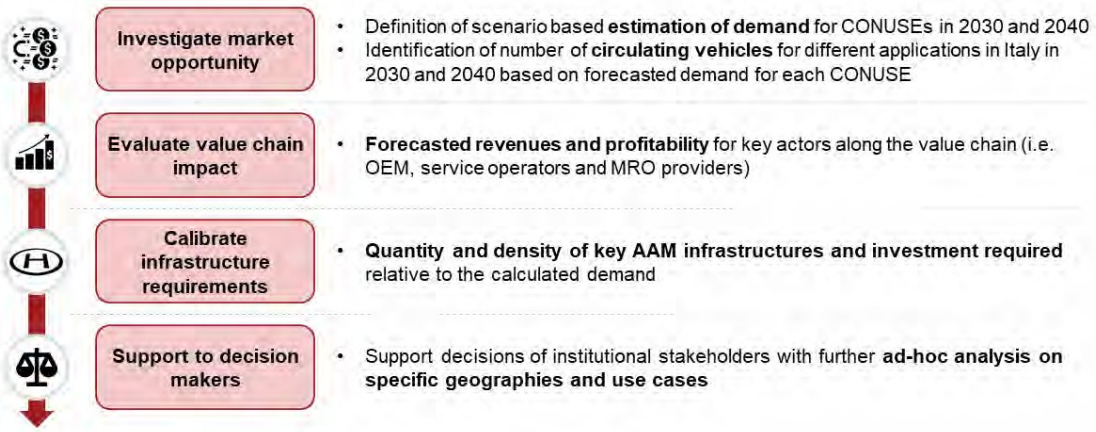

Figure 20: Objectives of business model development for target applications

In a second stage, three maturity levels (called AML, Advanced Air Mobility Maturity Level) have been defined, which will have to be reached at the end of the different development waves in order to enable more and more applications in terms of complexity and number. The three waves, covering the periods 2021-2023, 2024-2026 and 2027-2030, will provide for the implementation of the activities identified in the Roadmap with a continuous approach, thus envisaging the iteration of activities based on the innovations, lessons learned and results obtained in the previous wave. These maturity levels are structured as shown below (Fig. 21 - Target maturity levels for the Italian ecosystem):

- AML-0: current stage of conducting tests in controlled environment
- AML-1: conducting demonstrations for applications in controlled spaces (e.g. the DoraLab in Turin and the Grottaglie airport in Italy) introduction in different urban and extra-urban environments of the simplest applications;
- AML-2: Preliminary commercial testing and deployment of several applications, full integration of national U-Space to enable multiple simultaneous and swarming operations;
- AML-3: complete commercialisation of all applications, with moderate density for more complex ones.

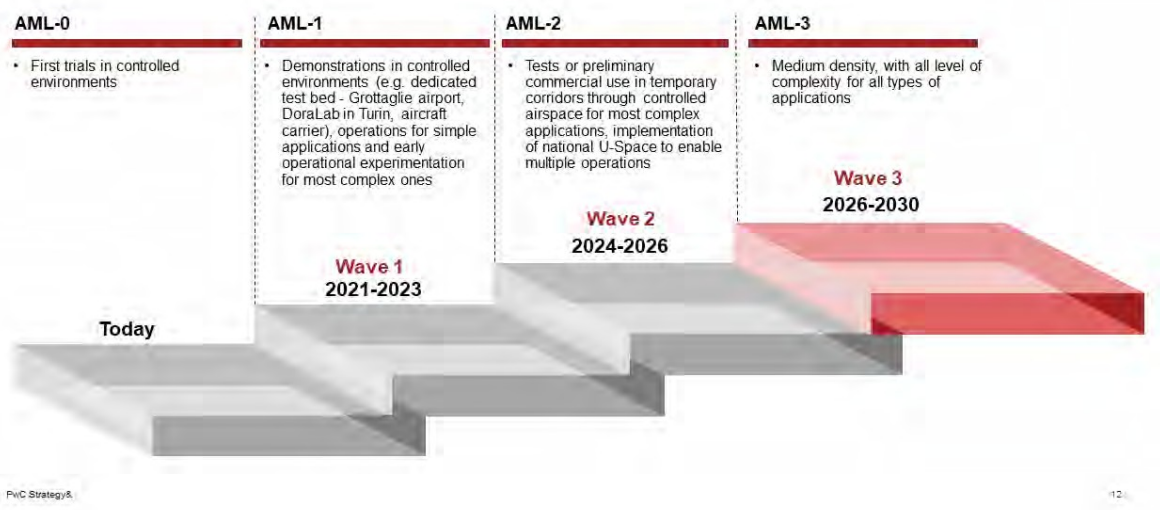

Figure 21: Target maturity levels for the Italian ecosystem

These maturity levels will serve as a guide for future commercial implementations of different services and technologies.

As mentioned above, it was possible to take all these steps thanks to the joint work of a large number of stakeholders who participated in the working group for the development of the National Roadmap (Fig. 22 - Working group supporting the development of the National Roadmap).

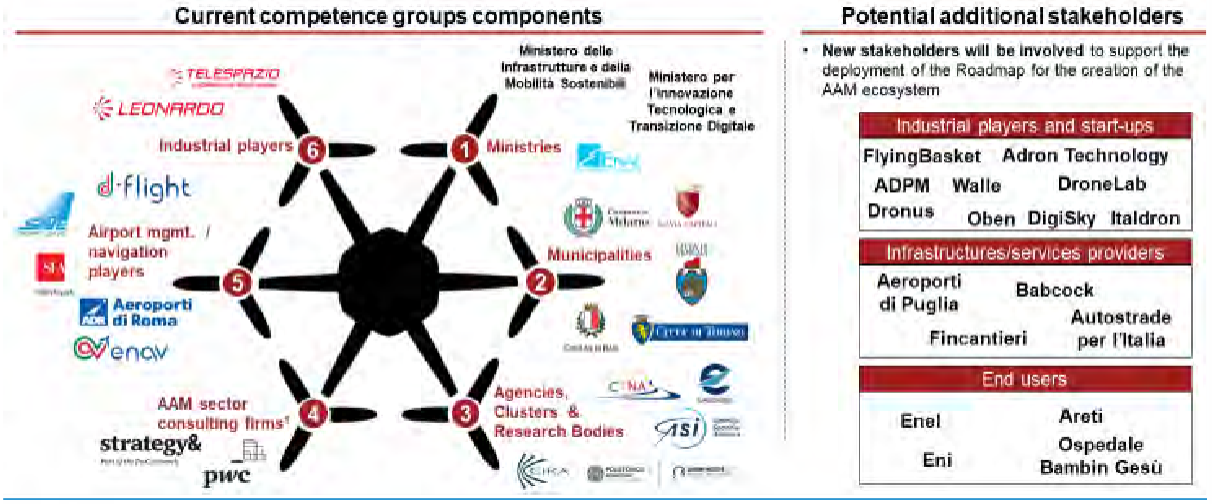

Figure 22: Working group supporting the development of the National Roadmap

In spite of the wide variety of stakeholders present, it is vital that for the implementation phase, in which institutional actors will play the leading role, the following are involved

additional participants from different fields, encouraging their participation in the calls launched to take forward the identified activities. The response of start-ups and small industries, service and infrastructure operators, end users and all possible stakeholders able to actively contribute to the creation of a complete and mature ecosystem is crucial.

Definition of concrete actions

In order to pursue the objectives outlined, it is vital to define concrete actions that the entire ecosystem is called upon to take in the future to ensure that all the applications necessary to achieve the country's strategic objectives are implemented. The Roadmap, as mentioned above, has had precisely this purpose, outlining a series of activities that stakeholders will be called upon to carry out over the years. This programmatic element ensures that there is a sharing of intentions and of the necessary work.

Once the characterisation of the applications (CONUSE) and the definition of the target maturity levels to be achieved had been completed, it was possible to define the concrete actions to be carried out over time with the right planning by the stakeholders in the ecosystem. This was done on the basis of the framework introduced earlier, firstly identifying the gaps and challenges that characterise this sector, and then constructing the activities with the ultimate aim of bridging these gaps and fostering the development of the ecosystem. Activities were characterised in terms of timing, actions to be carried out and the type of stakeholders that should carry them out. A total of 59 activities were defined and allocated over time in the 2021-2030 planning period in line with the three waves and target maturity levels defined above (fig. 23-24 - Graphical representation of the National Advanced Air Mobility Roadmap).

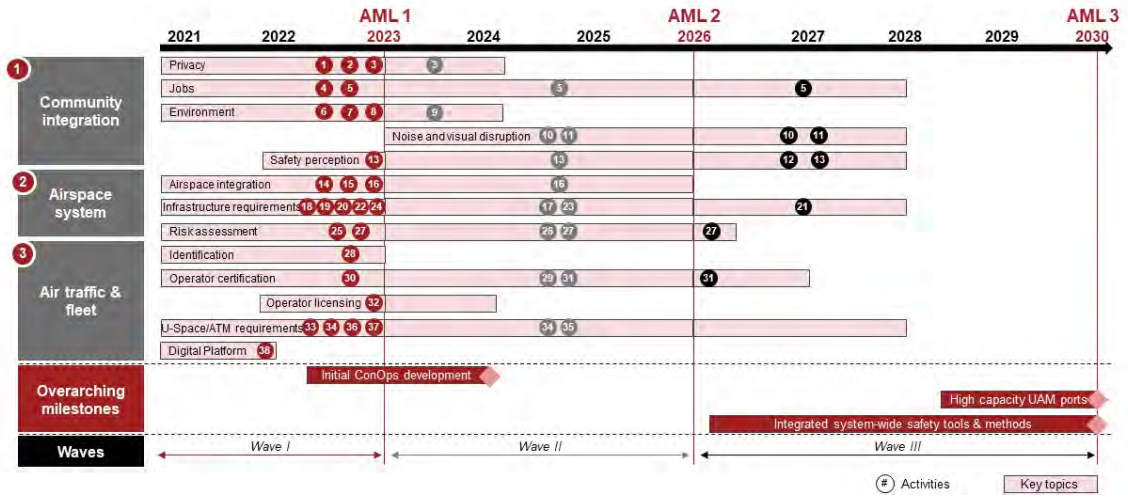

Figure 23: Graphical representation of the national Advanced Air Mobility Roadmap (1/2)

The activities, as can be seen, are thus allocated both on the reference time horizon and along the relevant topics for each area of the framework.

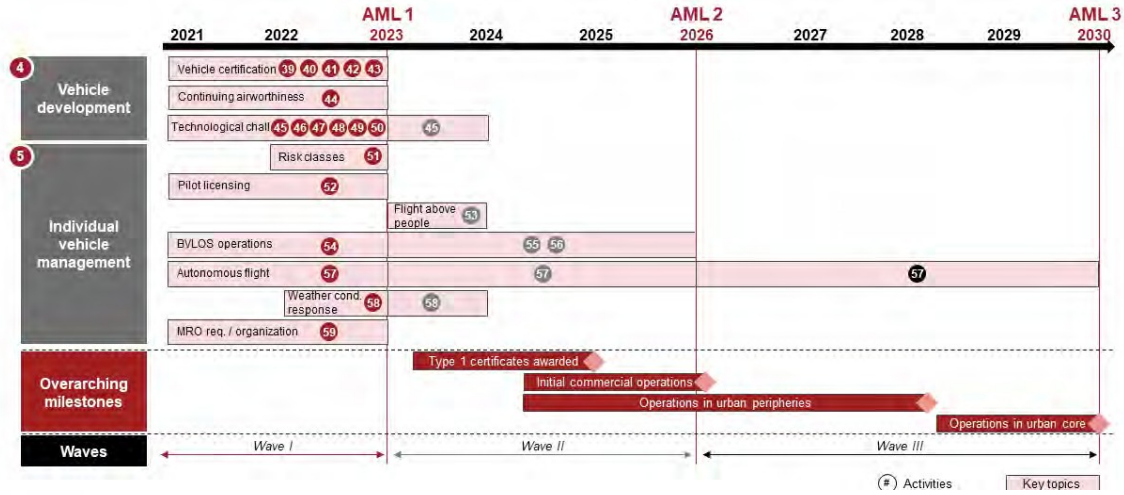

Figure 24: Graphical representation of the national Advanced Air Mobility Roadmap (2/2)

The 59 activities identified within the National Roadmap are listed in the appendix, indicating: the type of applications addressed, the timing, the reference wave and the criticality (the detail of each activity can be found in the National Roadmap Annex 1 document).

On the basis of the Roadmap developed, it is then possible to identify for the target applications the types of operations enabled over time on the basis of five parameters (Fig. 25 - Achievable targets per application):

- Density of operations in the air, defining the number of air systems that will be expected to fly in the airspace in certain environments;
- Population density on the ground indicating the type of areas that will be flown over based on population density (urban, suburban, rural environment);
- Type of operations, defining whether operations will be enabled in VLOS (Visual Line of Sight) or BVLOS (Beyond Visual Line of Sight);
- Weather resistance, on the basis of which it will be possible to define operational limits according to the present and expected weather conditions for the flight;
- Availability of take-off and landing facilities in different environments.

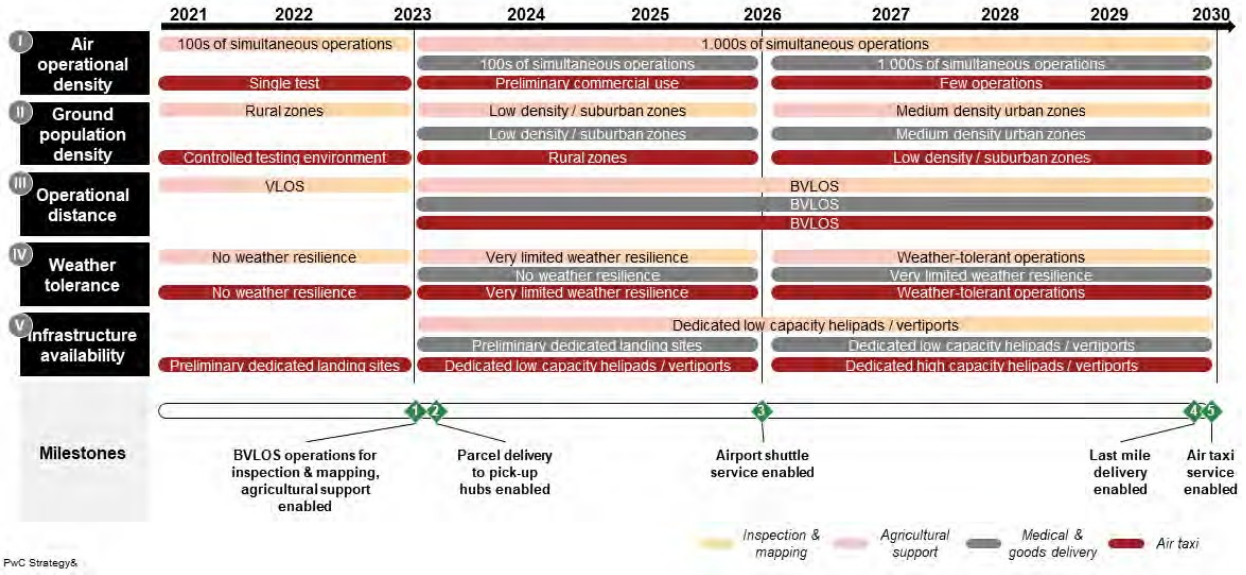

Figure 25: Achievable targets per application

The 59 activities identified to fill the technological and regulatory gaps in the Roadmap were then categorised into four different clusters in order to fully understand the type of activities that will be carried out, the aims and the type of stakeholders potentially to be involved (Fig. - 26Categorisation of activities by type and aim).

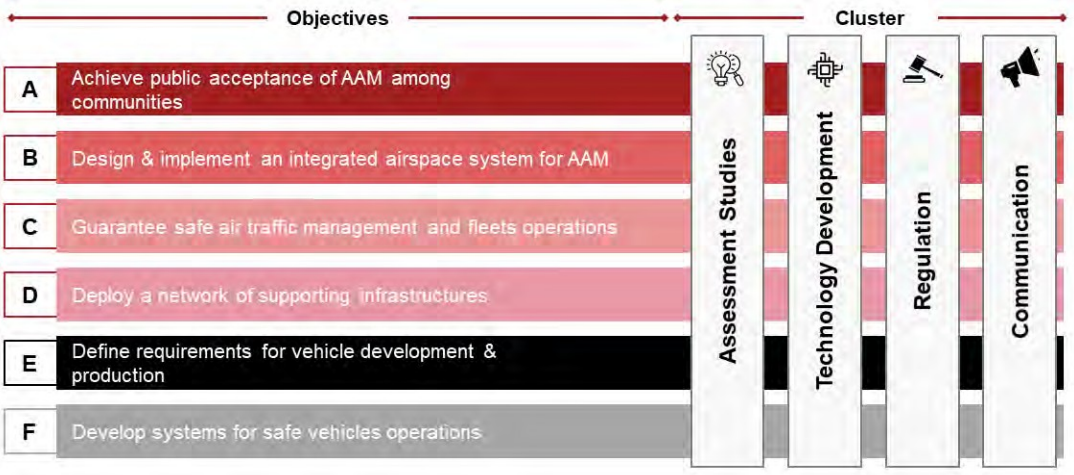

Figure 26: Categorisation of Roadmap activities by type and their objective

For each cluster it is possible to define a level of detail to better understand the differences that exist (fig. - 27Cluster of activity types):

- **Evaluation studies**: this cluster includes all activities in which it is required to carry out studies and research activities aimed at defining the way in which certain systems and infrastructures should be designed, built, maintained, operated and

commissioned, and operations should ensure maximum security and sustainability in all environments throughout the life cycle of the system or infrastructure. This type of activity will mainly involve research centres and companies in the sector;

- **Research and development for technologies**: this type of action is aimed at developing technologies necessary for the implementation of Advanced Air Mobility applications. Companies in the sector will have to develop vehicles, platforms and systems capable of enabling increasingly complex and autonomous operations, including through testing and demonstration of the prototypes and technologies developed;
- **Regulatory**: a series of activities is aimed at contributing to the creation of a national regulatory framework consistent with European legislation for Advanced Air Mobility necessary to authorise in a safe and sustainable manner the development of infrastructures, services and operations in all envisaged operational environments. These activities will see the direct involvement of national authorities and local institutions;
- **Communication**: Finally, the Roadmap includes a series of activities dedicated to communicating the benefits that Advanced Air Mobility will bring and to promoting a positive community perception of this type of application. These actions are therefore designed to foster social acceptance by the communities involved.

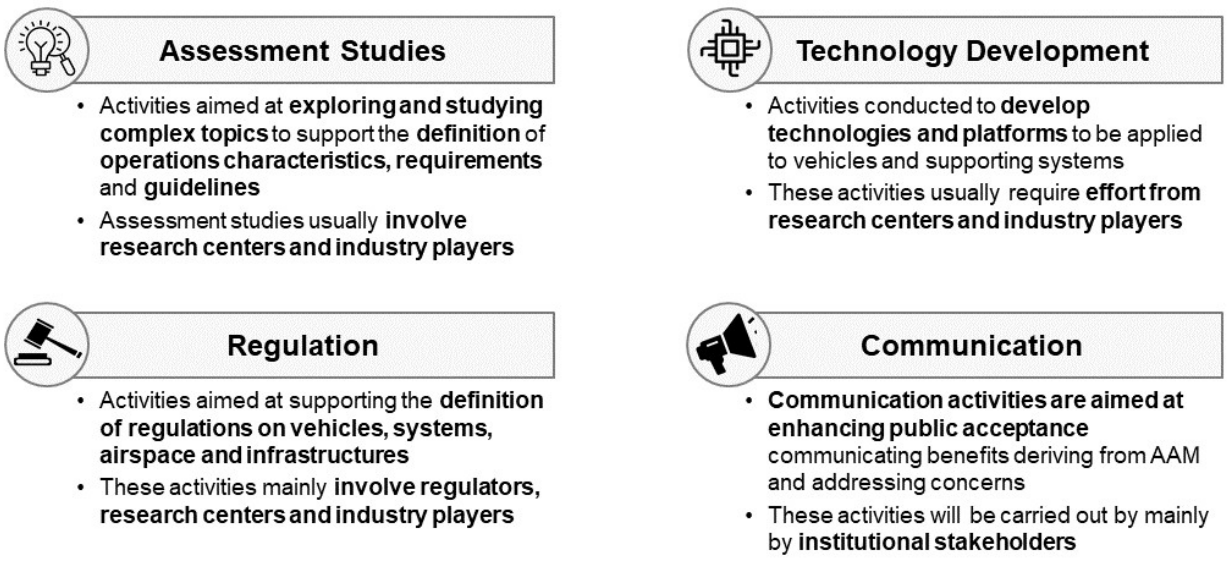

Figure 27: Cluster of activity types

The key actions that will have to be implemented to realise the strategic vision (Fig. 28 - Concrete actions to implement the National Strategic Plan):

1. Initiate reform of the national regulatory framework for AAM;
2. Acquire the commitment and interest of public institutions in the issue of Advanced Air Mobility, giving a central role to cities, metropolitan areas and regions, in particular to the territorial authorities that will be called upon to lead the integration of these new mobility services into existing and future urban plans;
3. Set up a proper communication strategy by the institutions involved, aimed not only at public but also at private actors, capable of communicating the objectives and benefits that this Strategic Plan intends to pursue;
4. Broaden the number and types of stakeholders to be involved in the implementation phase of the Roadmap activities. The different stakeholders will have to participate in the "vertical" calls and tenders that will be opened to carry out all the activities necessary to achieve the country's strategic vision;
5. Bridging the technological and regulatory gaps identified in the Roadmap in accordance with the Roadmap's three waves of activity through proper financial planning on the part of the public institutions involved, the identification of the necessary investments and the resources with which to support them in order to guarantee the effective achievement of the plan's objectives. In support of this, a Business Plan is attached to this plan, detailing the investments to be supported, and identifying the benefits and impacts that the creation of the Italian ecosystem will bring by the 2030,end of the year, in order to have a clear planning of the necessary resources.

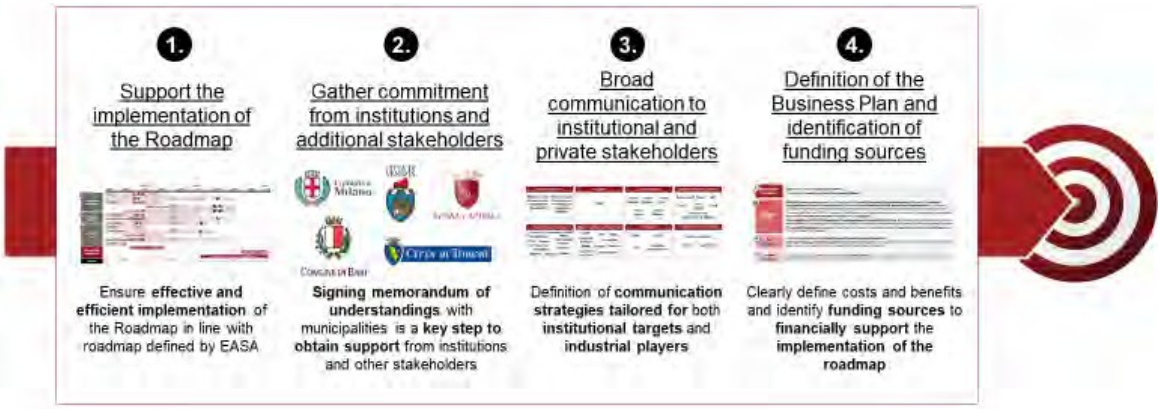

Figure 28: Concrete actions to implement the National Strategic Plan

As mentioned above, cities, metropolitan areas and regions will have a major role to play in implementing new mobility solutions by supporting the development of an adequate infrastructure network (Figure - 29Approach for the involvement of cities

implementation of the National Strategic Plan). To do so, regions and municipalities will have to:

- Contribute to the selection of the most interesting applications in line with citizens' needs;
- Contribute to the definition of the types of operations in their territories;
- Support in defining the areas in which they can operate;
- Identify places to build the necessary infrastructure for operations inside and outside cities;
- Establish penalties for infringing the rules related to flight area restrictions in accordance with the framework defined by the regulator.

International experience, with particular attention to what is already happening in Europe, shows that cities are already being involved in order to ensure full cooperation in defining issues of particular relevance and in finding solutions that are in the interest of citizens.

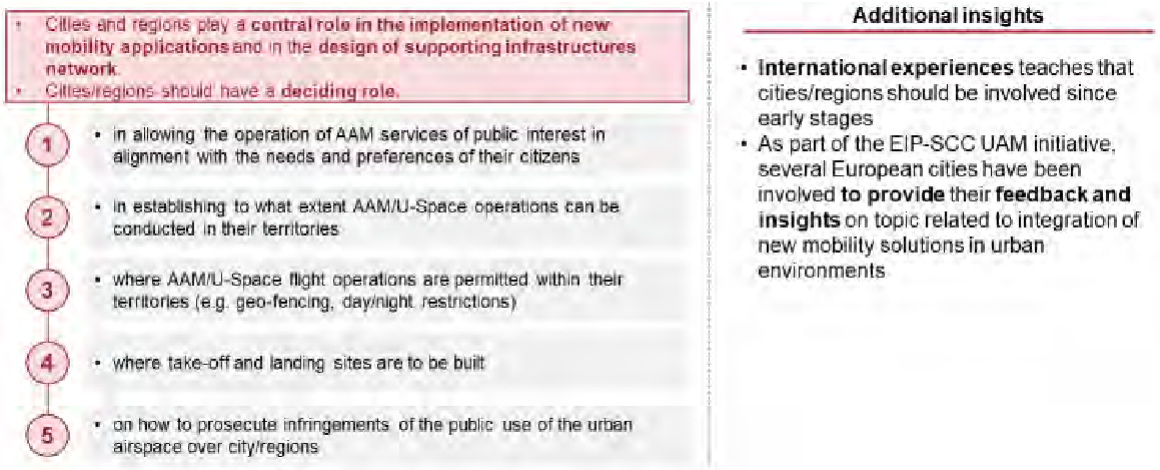

Figure 29: Approach for involving cities in the implementation of the National Strategic Plan

7. Business Plan

As mentioned above, a business plan was developed to support the Strategic Plan document, which led to two fundamental results in order to be able to plan the activities to be carried out from a financial point of view:

- Definition of the investments needed to implement the national strategic plan: more than 1.8 billion euros are estimated to be needed to implement all the investments identified from 2021 to 2030, including the implementation of the 59 activities identified, testing and demonstration activities, the development of vehicles and technologies by the Italian industrial sector, and finally the creation of an infrastructure network sufficient to implement Advanced Air Mobility services in the main Italian cities.
- Identification of the benefits obtained thanks to the investments made: starting from the defined investments, it was possible to estimate the positive impacts obtained at national level, both in terms of additional added value generated (about €2.8 billion; additional added value compared to the absence of identified investments) and in terms of additional jobs supported (about 50,000 jobs; additional jobs compared to the option of no identified investments).

In Annex 2 - Business Plan for Advanced Air Mobility it is possible to obtain a level of detail related to: the annualisation of the estimated costs and benefits year by year, the types of investments made with relative assumptions and estimates, the possible split between public and private funds for the identified investments. Please refer to Annex 2 - Business Plan for Advanced Air Mobility for details on the estimates made.

8. Governance

The innovativeness of the Advanced Air Mobility sector requires that each initiative be as coordinated and structured as possible to ensure maximum efficiency in accelerating its development. Hence the need to define a clear and solid governance structure that can encourage the involvement of all the necessary institutional levels and figures by establishing well-defined roles and responsibilities.

ENAC is the natural implementer of this project as the single authority for Civil Aviation in Italy, in coordination with the competent Ministries and in compliance with governmental guidelines. In this role, the implementing body is called upon in particular to implement the activities of the AAM Roadmap, to involve the potential stakeholders and in general to act as the pivot of the ecosystem. The response of interested stakeholders can be individual or consortial with respect to the various vertical projects to be financed, according to the modalities that will be identified by the institutional governance, in accordance with current regulations.

The structure (fig. 30 - Governance structure and roles for the implementation of the National Strategic Plan) will foresee an institutional Steering Committee made up of the MIMS, the MITD and ENAC, with the possibility of being extended to further Ministries competent for specific issues.

The task of the Steering Committee is:

- ensure institutional coordination, foster cooperation,
- monitor the achievement of strategic objectives.

The implementing entity, as mentioned above, will have the task of defining the implementation solutions for the Roadmap, defining the guidelines and the direction to be followed for the implementation of the 59already identified activities. The Implementing Party will then be supported by a committee of independent experts belonging to institutional subjects, able to provide their contribution in the definition of the calls for project implementation. An Advisory Board, composed of representatives of excellence from research centres, academic institutions and associations, will also be set up to assist the Steering Committee in monitoring the results and implementation of the Strategic Plan. This governance structure, with all its components, will contribute to the creation of the ecosystem also through the sharing of the results obtained with the actors involved in the thematic tables that will channel everyone's contribution.

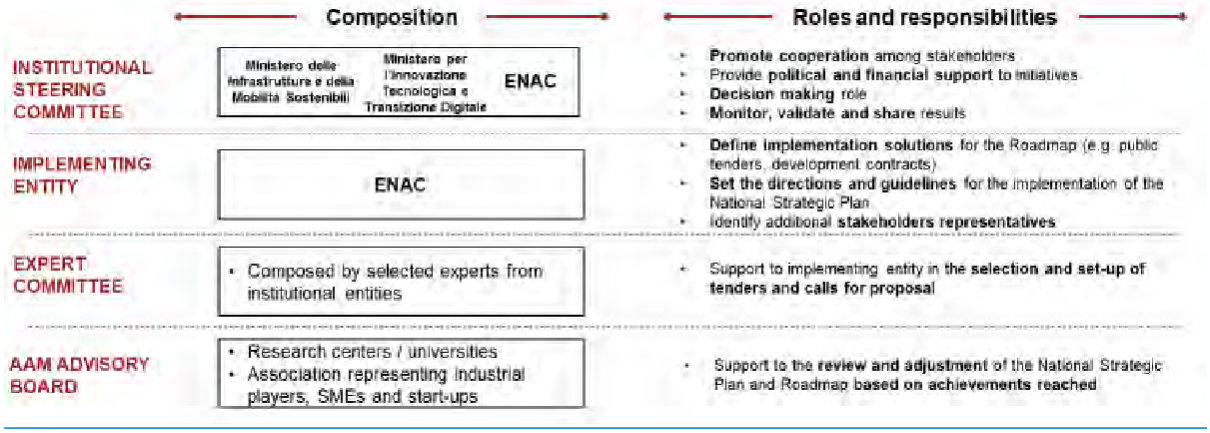

Figure 30: Governance structure and roles for the implementation of the National Strategic Plan

After defining the requirements for participation in individual projects, it is desirable for stakeholders to be able to be part of this structure (Fig. 31 - Criteria for selecting new stakeholders):

- make a technical and know-how contribution along the dimensions of the AAM ecosystem development framework;
- make use of past experience in development and experimentation activities similar to those of the project in which they intend to participate;
- be potential users or providers of Advanced Air Mobility technologies and services

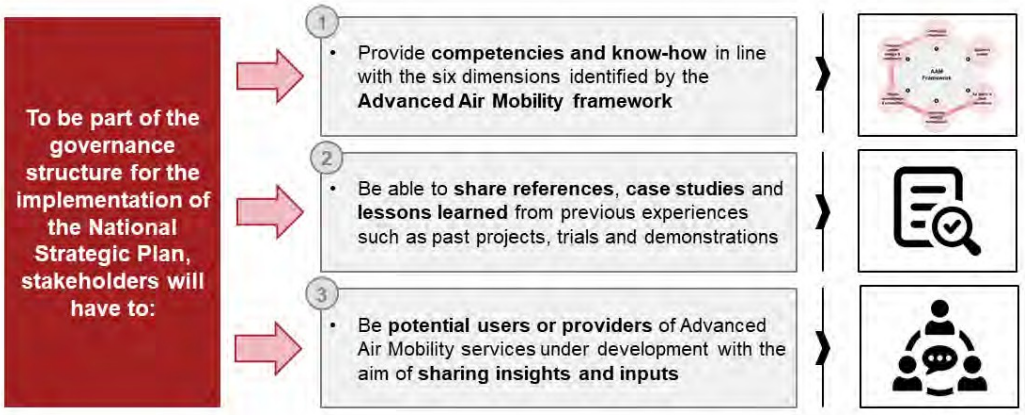

Figure 31: Criteria for the selection of new stakeholders

The definition of the governance of the Strategic Plan is indispensable for the achievement of the strategic objectives together with the need to adopt a participatory approach aimed at broadening the audience and the size of the stakeholders to be involved in order to ensure the full effectiveness of the Roadmap and a balanced return on investment.

In this context, the aviation regulator will play a fundamental role as a guarantor of the safe development of the Italian Air Mobility ecosystem.

Advanced and consistent with the Union's sector regulations. The EASA study "Study on the societal acceptance of Urban Air Mobility in Europe" showed that the regulator has many tasks and prerogatives, including the following:

- ensure that AAM applications have a level of safety equivalent to that of current air operations for passengers and people on the ground; ensure respect for the local
- environment and wildlife;
- ensure that the noise emitted is kept within acceptable levels in all environments in which they will be working;
- prevent cybersecurity risks by addressing cybersecurity issues; create
- favourable conditions for the emergence of AAM experiments; ensure
- coordination between the various players;

and finally that the AAM services introduced on Italian territory pursue the public interest as defined by the strategic vision.

It is important to emphasise how important it is for regulators at different levels (EASA, National and Local Authorities) to cooperate and coordinate with each other on the development of Advanced Air Mobility in synergy with the national government for an increasingly integrated and comprehensive reform. It is only through a joint effort that it is possible to develop AAM services that are in harmony with each other and to achieve this goal through a path that is as clear, linear and efficient as possible.

The creation of Advanced Air Mobility services is a goal to be pursued in a unified manner for the country, leveraging the excellence that the world of industry and research can offer. However, it is essential that there be full coordination at national and local institutional level and full sharing of intent, to ensure that the implementation of the National Strategic Plan is successful and achieves the objectives that have been set, bringing to fruition the vision that has been defined for the future of the country. To support this, a Business Plan has been drawn up, attached to this Plan, which outlines the commitment that will have to be sustained and at the same time identifies the important benefits that the introduction of Advanced Air Mobility services and solutions can bring to the community in terms of improving the quality of life of citizens and the services offered.

9. Glossary

AAM	Advanced Air Mobility
AML	Advanced Air Mobility Maturity Level
ATM	Air Traffic Management
BVLOS	Beyond Visual Line of Sight
CAA	Civil Aviation Authority
CNS	Communications, Navigation, Surveillance
COAU	Unified Air Operations Centre
CONOPS	Concept of Operations
CONUSE	Concept of Use
CORUS XUAM	European project with the aim of carrying out demonstrations for the definition of Advanced Air Mobility operations
DAA	Detect and Avoid
EASA	European Aviation Safety Agency
ENAC	National Civil Aviation Authority
eVTOL	Electrical vertical take-off and landing
FAA	Federal Aviation Administration
GA	General Aviation
GNSS	Global Navigation Satellite Systems
HEMS	Helicopter Emergency Medical Service
ICAO	International Civil Aviation Organization
JARUS	Joint Authorities for Rulemaking on Unmanned Systems
MRO	Maintenance, Repair and Overhaul
NASA	National Aeronautics and Space Administration
OEM	Original Equipment Manufacturer
UAS	Unmanned Aircraft Systems

sUAS	Small Unmanned Aircraft Systems
UAM	Urban Air Mobility
UAV	Unmanned Aerial Vehicle
UAS	Unmanned Aircraft Systems
USSP	U-space Service Provider
U-Space	Set of highly digitised and automated services to support drone operations in airspace to ensure maximum safety and efficiency
UTM	Unmanned aerial systems traffic management
Vertiporti	Infrastructure equipped with charging stations allowing eVTOL aircraft to land and take off

10. Appendix

#	Framework area	Gaps addressed	Activities	Description
1	Community Integration	Privacy protection	Definition of an approach to collect, store and manage passenger data and captured images	Developing specific guidelines for the AAM on the use of passenger data to protect the privacy of citizens while gathering valuable information to improve the quality of AAM services
2	Community Integration	Privacy protection	Defining an approach for collecting consent and informing third parties about data collection	Developing a standardised procedure that provides third parties with clear and precise information on how personal data will be collected and used
3	Community Integration	Lack of a risk assessment methodology for critical infrastructure overflights	Definition of rules for the overflight of critical infrastructures	Identify a methodology for defining the risks of operations on critical infrastructures and how to proceed
4	Community Integration	Lack of a strategy to manage the consequences of the revolution in the working environment expected with the arrival of Advanced Air Mobility services	Identification of actors involved along the value chain	Reallocate professionals whose work will be replaced by the new AAM services and identify new professional profiles needed to develop AAM services

#	Framework area	Gaps addressed	Activities	Description
5	Community Integration	Lack of a strategy to mitigate the reduction in employment levels in traditional services following the advent of the AAM	Design and definition of staff training needs to enable new services and meet new infrastructure requirements	Identify training programmes to enable the existing workforce to develop the skills needed to provide AAM services
6	Community Integration	Lack of communication of the positive impact of the AAM	Development of a study to estimate the environmental impact of new transport methods	Estimating the impact of the AAM on air and noise pollution
7	Community Integration	Lack of precise forecasts on the impact of the arrival of the AAM on the current urban system	Definition of a tool for simulations concerning the impact of the new transport system	Developing a tool that provides data on the impact of air taxis on the urban environment by analysing demand patterns, geographical and spatial coverage, energy consumption, time constraints, interfaces between different transport modes and environmental impact

#	Framework area	Gaps addressed	Activities	Description
8	Community Integration	Lack of communication of the positive impact of the AAM	Developing communication campaigns on the positive environmental impact of the new transport system	Define the key issues related to AAM that you want to address (such as 5G, power generation, battery decommissioning), the messages you want to convey and how to adapt the use of media to the target audience
9	Community Integration	Quantifying the environmental impact of new modes of transport on the entire ecosystem and throughout their life cycle	Development and application of LCA (life-cycle assessment) tools	Apply the LCA methodology to vehicle life cycle (raw material extraction, production, logistics, use and final disposal), batteries (production, use, charging systems and disposal), infrastructure and special packaging for goods transport
10	Community Integration	Lack of verification of the feasibility of creating AAM infrastructure in compliance with noise regulations	Develop a study to estimate the visual and acoustic impact of expected traffic scenarios	Identify any critical issues to be addressed in order to fully implement AAM in urban environments in accordance with the city's plans

#	Framework area	Gaps addressed	Activities	Description
11	Community Integration	Lack of data on eVTOL performance in different scenarios	Designing a numerical and experimental framework to assess the acoustic and visual impact of fleets	Implement an experimental phase for CONUSE to obtain data to support research and form the basis for future regulations
12	Community Integration	Addressing concerns about perceptions of safety and minimising damage to people and property in the event of an accident	Define guidelines to properly inform people on the ground and passengers about safety issues	Identify the measures needed to reduce risks and increase the perception of safety for all stakeholders through risk assessment, communication strategies, staff training, development of a remote assistance system in case of emergency and monitoring of the results
13	Community Integration	Lack of a communication strategy to address audience concerns specific to each geography and community	Define communication strategies to increase public acceptance	Identify, according to the particularities of each geography, concerns and barriers that may limit the acceptance of AAM applications and address them through communication activities that will aim to highlight the benefits of AAM

#	Framework area	Gaps addressed	Activities	Description
14	Airspace design	Lack of identification of requirements and conditions necessary to enable safe VLOS/BVLOS operations for UAS services	Designing rules for U-Space to enable biomedical and freight transport, inspection and mapping and agricultural support applications	Define a balanced, risk-based regulatory framework combining prescriptive and performance-based rules that establish requirements and conditions for UAS operations related to cargo transport, inspection and mapping, and agricultural support services. The regulatory framework should allow VLOS/BVLOS operations of UAS in specific scenarios
15	Airspace design	Addressing the need for managed integration of UAS in the airspace	Conducting ad hoc airspace assessments for adequate airspace design	Obtain a complete picture of the airspace by identifying restrictions, operations, air and ground hazards and collecting sufficient data to determine what requirements are necessary to allow safe operations and which areas of airspace should be assigned to which classes of airspace

#	Framework area	Gaps addressed	Activities	Description
16	Airspace design	Preventing autonomous vehicle operations from being relegated to segregated volumes of airspace and close to rural areas	Redesign of national airspace for UAS integration	Design of the airspace concerned based on the concept of dynamic corridor allocation and supporting traffic management capabilities
17	Airspace design	Modernisation of a regulation that currently shows a substantial separation between manned and unmanned vehicles	Evolution of current strategic conflict resolution services (compared to manned traffic)	Defining how to evolve from a basic strategic separation management service to a more advanced and complex tactical separation management service
18	Airspace design	ATM coordination - U-Space	Definition of instruments for basic services for U-Space and ground infrastructures according to the type of airspace and operations	Define a controlled airspace to enable UAM operations, exploring new CORUS XUAM architectures, the interrelation with manned aviation and other drone operations with a focus on ATM-U-Space services

#	Framework area	Gaps addressed	Activities	Description
19	Airspace design	Addressing navigation and APNT needs, scalable surveillance, situational awareness and CNS integration	Mapping CNS technology solutions (communication, navigation and surveillance)	Define communications, navigation, surveillance (CNS) and technology solution requirements to develop an appropriate ATM/U-Space architecture that supports AAM integration in the reference airspace
20	Airspace design	Lack of a tactical separation algorithm and common conspicuity technology	Defining services for separation management / conflict resolution tactics	Meet DAA provisioning requirements for AAM solutions operating in high-density or mixed traffic areas and implement the necessary investigations to develop robust and scalable separation management services
21	Airspace design	Lack of a national-level cybersecurity system	Identification of cybersecurity solutions for U-Space and ATM	Define an operational security risk assessment approach, cybersecurity-based architectures and an intrusion detection system, launch a cybersecurity observatory and promote a cybersecurity culture among stakeholders

#	Framework area	Gaps addressed	Activities	Description
22	Airspace design	Lack of a technical approach adapted to national needs	Clarification of technical specifications for vertiports	Establish technical reference criteria for adapting/designing ground infrastructures by revising the international approach and defining a national approach to technical specifications
23	Airspace design	Identification of EASA technical specifications for vertiports	Monitoring of technical specifications for vertiports defined by EASA	Identify the EASA rulemaking task (RMT) dedicated to vertiport technical specifications and structure the participation of Italian stakeholders in the RMT. The activity can be divided into three main tasks: identifying the EASA Rulemaking Task, structuring national participation in the EASA Rulemaking Task and ensuring participation in EASA RMT working groups.

#	Framework area	Gaps addressed	Activities	Description
24	Airspace design	Harmonisation of technical specifications for verti-ports with the existing national legal framework on urban, landscape and mobility planning	Definition of an approach to analyse the compatibility of verti-ports with the existing legal framework	Propose a modification of the national legal framework on urban, landscape and mobility planning considering compatibility with the technical specifications for the verti-ports and potential obstacles to the development of verti-ports
25	Airspace design	Managing the risk associated with drone operations in the urban environment	Integration of vertiport operations into urban structures to mitigate risk	Define an approach for classifying vertiports and operating corridors according to the type of goods delivered, the type of operations and the number of operations allowed
26	Airspace design	Lack of a national strategy for vertiports and airports	Integration of vertiport operations with airport operations	Ensuring the safe and effective coexistence of vertiport and airport operations

#	Framework area	Gaps addressed	Activities	Description
27	Airspace design	Lack of integration of U-Space and C-UAS services in complex U-Space ecosystems	Integration of U-Space systems with counter-UAS systems	Perform a study to assess the level of interoperability needed between the U-Space ecosystem and the C-UAS1 capabilities provided by a typical C-UAS1 system. The level of interoperability and service integration depends on the required security levels of the different areas that can be permanent (e.g. ports or airports) or temporary (e.g. stadiums, temporary crisis management locations, etc.) according to the different CONUSE.
28	Air traffic and fleet operations	Lack of specific technical and operational requirements adapted to the Italian ecosystem for interoperability between ATM and U-Space systems and services	Feasibility study to understand U-Space/ATM integration levels	Identify the domain data to be exchanged, the operations to be performed, the interfaces to be implemented and the functional and non-functional requirements to be met involving all necessary stakeholders, including end users

#	Framework area	Gaps addressed	Activities	Description
29	Air traffic and fleet operations	Definition of a list of performance requirements for UAS for each type of CONUSE	Developing a list of performance requirements for UAS1	Define minimum performance requirements to enable safe UAS operations, especially in urban areas
30	Air traffic and fleet operations	Lack of specific regulations defining performance requirements for UAS operators	Developing a list of performance requirements for UAS operators	Develop a list of performance requirements for UAS operators to ensure safe and reliable urban air services
31	Air traffic and fleet operations	Identification of standard special conditions for UAS and issuance of EASA certification specifications	Actively contribute to EASA working groups to address the lack of manned UAS type certification	Define requirements for implementing manned UAS operations by informing EASA of the strategic importance of special conditions for UAS taxi and adapting current ENAC procedures for issuing a UAS operating authorisation
32	Air traffic and fleet operations	Definition of the relevance of the requirements currently included in Regulation 1008/2008 in in relation to air services provided by UAVs	Verify the applicability of Regulation 1008- 2008 to passenger transport operations by means of drones	Defining requirements for the operation of air services within the European Union

#	Framework area	Gaps addressed	Activities	Description
33	Air traffic and fleet operations	Lack of economic regulation for UAV services not yet provided	Define a protocol to deal with organisation, rules, procedures and fees for the required services	Prepare a national economic regulation for those U-Space services that are not subject to market competition
34	Air traffic and fleet operations	Lack of interoperability with other UAS and of a certification process for products available on the market	Create situation awareness systems (e.g. Detect and Avoid) for tactical UAS separation	Study, validate and implement the Detect and Avoid function for RPAS/drones applied to AAM (Certified class) in class D- G airspace where there are very different airspace users ranging from other drones, to general aviation flights operating VFR
35	Air traffic and fleet operations	Improving the coverage of airspace where traffic information services (TIS) can be provided	Define conspicuity requirements for manned vehicles	Supporting safe mixed UAS/manned operations without strict airspace segregation through Traffic Information Services (TIS)

#	Framework area	Gaps addressed	Activities	Description
36	Air traffic and fleet operations	Identification of regulatory requirements and technology gaps	Structuring innovative standards for the implementation of "one-to-many" control dynamics	Enable a scalable, secure, cost-effective and efficient fleet operations management service that ensures safe navigation and efficiently manages aviation operations through the definition of ConOps based on market needs, safety and security requirements, requirements for operational procedures describing stakeholders and their roles in the ConOps, business constraints that enable large-scale adoption, a technology roadmap based on system management through progressively maturing levels of automation
37	Air traffic and fleet operations	Lack of regulations concerning emergency services in the AAM area	Defining a system for coordinating emergency services for temporary segregation	Define a system for coordinating the emergency services (118, COAU, Civil Protection) for the temporary segregation of airspace for the purpose of intervening in critical situations

#	Area of framework	Gaps	addressedActivityDescription	
38	Air traffic and operations fleet	Complexity of combined regulations concerning basic AAM applications	Creation of a national digital platform to simplify authorisation procedures	Digitising the procedures of the public administrations involved in order to have a single point of access to enable drone-based services and the creation of innovative u-space services to enable operations
39	Development and production of vehicles	Need to identify all potential aviation standards, starting with the Air Taxi application, which represent the most complex design and define standards for the "sense and avoid" system	Definition of acceptable means of compliance for subsystems and equipment provided by third parties	Define acceptable means of compliance for sub-systems and third-party supplied equipment to support the transition from aeronautical standard to industry by moving towards an objective-based, operations-focused and proportional approach to UAS certification
40	Development and production of vehicles	Lack of regulations addressing the process for SW certification based on Artificial Intelligence Machine Learning	Definition of qualification standards to support AI applications	Developing a new software certification process that supports AI techniques (machine learning)

#	Framework area	Gaps addressed	Activities	Description
41	Vehicle development and production	Lack of AAM-specific safety standards	Development of a structural study on impact resistance, high-energy fragment risks and management	Evaluate AAM management qualities on the basis of specific AAM missions and control modes (manned, remote, automatic, etc.) to reinforce crashworthiness requirements and ensure passenger safety in the event of accidents
42	Vehicle development and production	Need to develop effective methods to tackle the problems posed by the transport of sensitive goods	Protection of goods in the event of an accident and guarantee of integrity in the case of dangerous goods	Apply technical standards to maintain the quality of goods and the safety of operations: temperature, pressure, vibration levels, biochemical contamination (active and passive), corrosion, crash-proof containment, ease of installation on board (docking or suspension mechanism), digital interface with ground stations and air vehicle for cargo control and monitoring

#	Framework area	Gaps addressed	Activities	Description
43	Vehicle development and production	Need to amend the current Article 13 of DL 150/2012 and Article 9 of 2009/128/EC prohibiting aerial spraying systems on the basis of the potential risk to human health and the environment	Update of Article 13 of DL No. 150	Update the current law to allow and promote the use of UAS multicopters for crop spraying by leveraging the recent availability of high-precision systems using drones
44	Vehicle development and production	Lack of flexible AAM maintenance systems that should take advantage of predictive maintenance based on advanced monitoring systems	Updating of continuing airworthiness regulations	The introduction of electrically-powered aircraft and AAM vehicles may introduce new maintenance challenges in relation to high-speed bearings, winding wear and contamination, thermal damage to insulating components and the management of high-power batteries. AAM operating models can change the way aircraft maintenance is conducted and the standards to which maintenance technicians are trained.

#	Framework area	Gaps addressed	Activities	Description
45	Vehicle development and production	Improve the reliability of new technologies towards safety and airworthiness requirements and address the complexity of the AAM ecosystem with a holistic safety assessment that is not strictly focused on the aircraft, but influences vehicle development	Development of subsystems	Enable the integration of new technologies into the aircraft safety system framework, considering the proper assignment of functional assurance levels to all subsystems, airborne and ground-based
46	Vehicle development and production	Lack of standardisation of the production process and incompleteness of key engineering parameters	Fuselage additive manufacturing process	Identifying the challenges associated with innovative manufacturing processes such as additive manufacturing, in terms of reliable production of solid and repeatable structures
47	Vehicle development and production	The backwardness of current electric propulsion systems is a limiting factor for widespread deployment of AAM services.	Reserve energy management and planning	Developing propulsion systems based on high-efficiency electric motors and highly reliable battery level monitoring to address the technology gap related to reserve energy management and planning

#	Framework area	Gaps addressed	Activities	Description
48	Vehicle development and production	Lack of a fast, cost-effective and safe service for close inspection of large structures under both routine and non-routine conditions	Contact inspection	Develop inspection services based on the use of drones. Inspection operations can be autonomous or tele-operated and involve physical contact between the drone and the infrastructure to be inspected.
49	Vehicle development and production	Lack of specific requirements and standards available for AAM flight simulators for use in training	Training with flight simulators	Extend the EASA regulation on flight simulators to AAM services as well
50	Vehicle development and production	Lack of specific noise emission regulation for AAM services	Propose noise certification requirements to facilitate the OEM vehicle development process	Develop specific noise certification standards for AAM/VTOL vehicles that have specific characteristics and operational aspects that differ from existing aircraft/helicopters

#	Framework area	Gaps addressed	Activities	Description
51	Individual vehicle management	Lack of application of SORA methodology for complex long-range BVLOS scenarios	Modify and improve the existing risk classes to include the expected characteristics of CONUSE	Identify implementation standards for SORA risk classes also in airspace and ground areas with non-homogeneous properties and gaps in relation to ConOp involving long-range BVLOS flight operations in intra-urban and urban scenarios
52	Individual vehicle management	Harmonising the role of AAM service pilots with existing standards	Establishing definitions, standards and training criteria for pilot licences	Analysing and defining what the role of the pilot is in potential future developments of the AAM, what are the differences with existing pilot licences, the training needed and the expected role
53	Individual vehicle management	Lack of structured guidelines for the protection of people on the ground and passengers	Define the approach to ensure the safety of people in the vicinity of the vehicle and the vehicle's occupants	Define a sound methodological approach combining aircraft technology, certification standards and operational analysis to ensure both the safety of citizens on the ground and passengers in the air

#	Framework area	Gaps addressed	Activities	Description
54	Individual vehicle management	Lack of performance-based requirements for BVLOS navigation, of enabling technologies for BVLOS navigation and cybersecurity	Defining and activating BVLOS scenarios in an urban environment	Identify performance requirements and technical solutions for real-time BVLOS navigation in accordance with the regulatory framework for AAM
55	Individual vehicle management	Controlling the risk to third parties on the ground in relation to emergency procedures in an urban environment and defining the sharing of autonomy between the vehicle and external support systems	Enabling BVLOS scenarios in urban environment for air taxi operations type #3 - manned	Define from a regulatory point of view the role of the safety pilot on board in relation to the PIC and/or the level of automation of the system and U-Space and from a technical point of view it will be important to define the level of autonomy shared between the vehicle and the external support systems in relation to the tasks of the safety pilot on board
56	Individual vehicle management	Lack of air, ground and space services and technologies for real-time autonomous BVLOS navigation in urban environments	Enabling BVLOS scenarios in urban environment for type #2 unmanned air taxi operations	Developing an innovative real-time BVLOS navigation service that can be ground-, air- and space-based, enabling navigation in urban environments by leveraging GIS and GNSS technologies

#	Framework area	Gaps addressed	Activities	Description
57	Individual vehicle management	Availability of Reference Scenarios and ConOps for UAM/AAM with UAS with HCS and AI, PBR and ADS regulation developed and adopted/recognised by EASA, integration of UAS level of autonomy, functions and related ORs within the UAM/AAM ecosystem	Set up the definition of autonomous levels with associated objectives/requirements	Harmonise the EASA level of autonomy, Artificial Intelligence (AI) and PBR (Jarus) requirements to ensure that the framework, definitions, requirements, functional and operational objectives are consistent
58	Individual vehicle management	Lack of regulation addressing weather conditions in relation to AAM services	Definition of weather conditions affecting AAM in different application scenarios	Define how to deal with weather conditions for AAM operations and how and when adverse weather conditions may prevent the provision of AAM services

#	Framework area	Gaps addressed	Activities	Description
59	Individual vehicle management	ConOps focusing on low costs, low charges, operational flexibility and security	Assessing how to conduct MRO to achieve low cost/complexity	Adapt the existing aviation MRO framework to the specific needs of AAM with the aim of achieving a "low cost/complexity" MRO approach/tools for "less critical" CONUSE (e.g. agriculture) and a "high level" MRO for others (e.g. pax transport)

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