ICAO

NATIONAL AVIATION PLANNING FRAMEWORK

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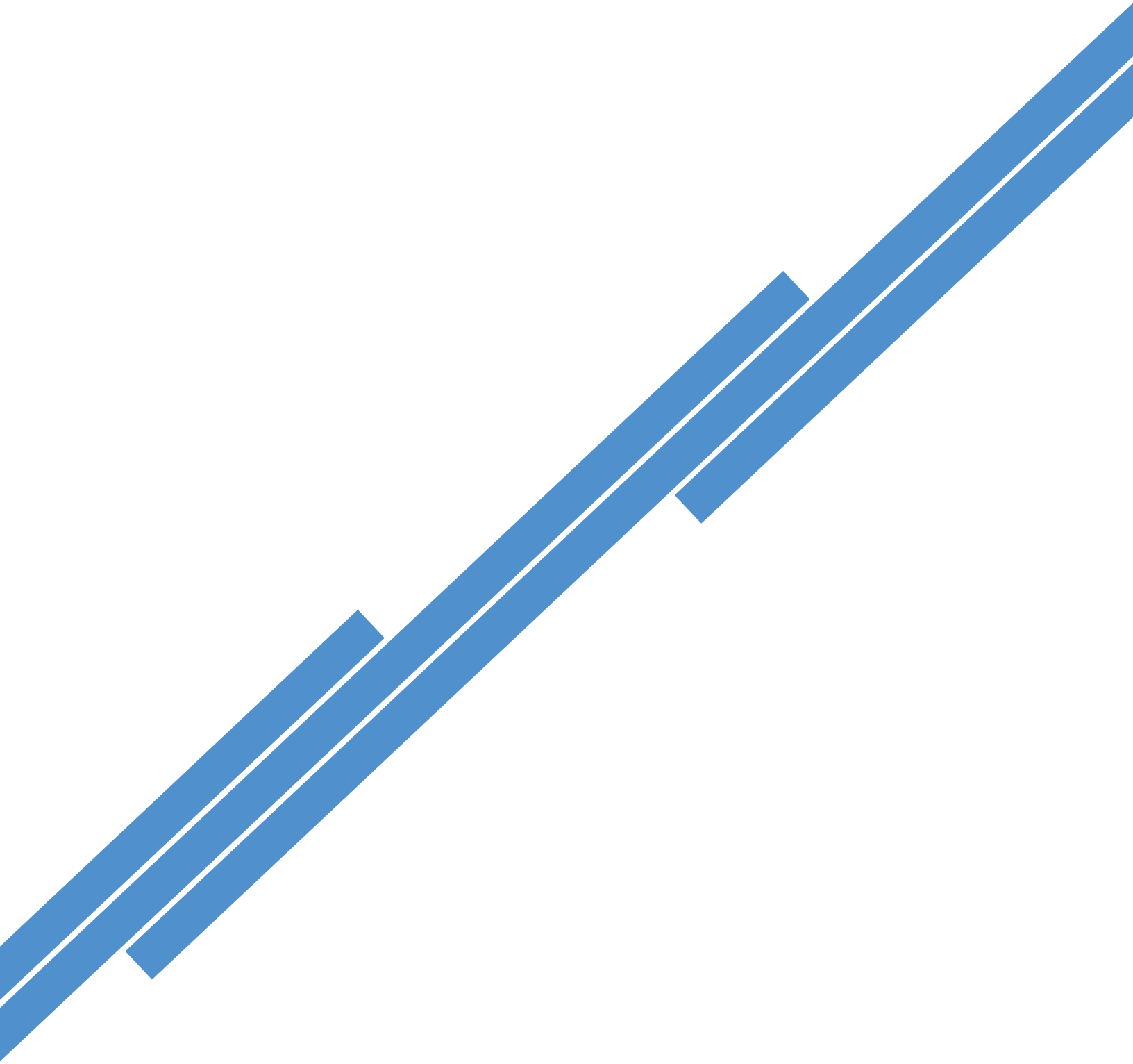
INTERNATIONAL CIVIL AVIATION ORGANIZATION



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Foreword

This document is intended to support Member States in the establishment and implementation of a comprehensive National Aviation Planning Framework. A National Aviation Planning Framework is comprised of multiple policies, plans and programmes that, together, support the continued development of a sustainable national air transport system. The Framework serves to effectively prioritize and execute initiatives that improve aviation safety, security, environmental protection, capacity and efficiency.

The document is divided into the following chapters:

- Chapter 1 introduces the concepts and content contained within this document;
- Chapter 2 identifies National Aviation Planning Framework linkages. Such linkages exist at multiple levels: between plans and programmes contained within the National Aviation Planning Framework; with the State's national economic and social development objectives; as well as with aviation plans at the global and regional levels;
- Chapter 3 discusses the economic development of air transport, which is critical to determine aviation's current and potential impact on the State's economy; and
- Chapter 4 includes recommendations regarding the content and structure of a State's Civil Aviation Master Plan.

The intent is to provide those responsible for sustainable development within a Civil Aviation Authority and other governmental entities with the context required to ensure that all relevant aspects of aviation are included in the strategic planning processes. Due to the broad spectrum of activities that comprise a State's aviation system, this document incorporates references from multiple ICAO Annexes, documents and other publications.

In particular, excerpts from the ICAO Global Aviation Safety Plan (GASP), Global Air Navigation Plan (GANP) and Global Aviation Security Plan (GASeP) are included to show how a National Planning Framework should consider the interactions between each of these areas. Readers should refer to the cited documents and publications for detailed information on specific topics.

This manual also uses a case study to provide a practical perspective on the benefits for a State when it prioritizes aviation in its development and strategic plans. The case study and other examples provided in this document are intended to demonstrate methodologies and should be tailored to the specific context and needs of the State rather than utilized as presented.

Comments on this document are appreciated from all States, international organizations and ICAO technical cooperation field missions. These will be taken into consideration in the preparation of subsequent editions. Comments should be addressed to:

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1. Introduction

Consistent with Article 44 of the Convention on International Civil Aviation, an objective of the International Civil Aviation Organization (ICAO) is to foster the planning and development of the international air transport system. In support of this objective, ICAO had developed in the past guidance material on Airport Planning (Doc 9184, Part 1), Air Traffic Services Planning (Doc 9426) and Airport Emergency Planning (Doc 9137). This document provides guidance for ICAO Member States to establish a National Aviation Planning Framework that ensures sustainable development of air transport by prioritizing and coordinating the implementation of initiatives to improve the safety, security, facilitation, capacity and efficiency of their air transport systems. This approach will enable sustainable growth of air transport at the State, regional and global levels, resulting in significant socio-economic benefits.

The National Aviation Planning Framework is comprised of multiple policies, plans and programmes that, together, support the continued development of a State's national air transport system. It provides a means for coordinating, prioritizing and managing the development of a State's air transport system in a consistent and sustainable manner. A National Aviation Planning Framework provides a clear and comprehensive approach for future development of the civil aviation sector. It establishes a guide for public and private investments in the State's aviation infrastructure as well as its safety and security oversight capabilities, by providing an implementation roadmap for long-term initiatives.

The Framework includes a civil aviation master plan (CAMP), which addresses the interaction of various aspects of aviation at the State level including capacity and efficiency, safety, security, air transport facilitation as well as environmental protection. These aspects are covered at a high level in the CAMP, providing a point of reference for underlying plans associated with specific areas of aviation activity. The guidance therefore includes a discussion of linkages between the Framework and other planning processes at the state, regional and global levels. The guidance also includes recommendations regarding the State's CAMP structure as well as the tools to ensure implementation consistent with the State's overall development goals.

Funding for the sustainable development of air transport requires adequate planning and brokering at the national level. All national economies are built upon several sectors that generate wealth and require resources to produce outcomes. The National Development Plan reflects the country's goals and priorities with respect to all sectors in response to a vision that includes well-identified national needs. A well-researched and reasoned plan is of immense value to a country in the allocation of its resources. It relates the scope and timetable of projects across sectors based upon the resources available and the benefits anticipated to accrue. Therefore, the CAMP should be linked to the State's National Development Plan to enable realistic and achievable decision-making.

The National Aviation Planning Framework serves to coordinate the State's aviation policies, plans and programmes. In addition, the Framework provides a means to link aviation's contributions to the State's economic and social development goals, including attainment of the United Nations Sustainable Development Goals (UN SDGs).

National Development Plans provide international development banks, donors and investors the necessary long-term strategic visibility needed to issue loans or provide technical assistance to selected national projects. A National Development Plan should be one of the pillars which donors and investors rely on to make informed decisions. Without a robust planning mechanism, projects lack a clear understanding of the benefits and assurance of the governments' wholehearted commitment. The National Development Plan can also be used by these donors and investors to coordinate their respective programs across sectors and avoid wasteful overlap and competition. As such, it is essential for aviation to be included in the National Development Plan as this will improve availability of funding for initiatives contained within the State's CAMP.

2. The State National Aviation Planning Framework

2.1 Overview

Strategic planning for aviation is an inclusive process that should consider overall national planning objectives as well as those external to the State. Accordingly, the State's National Aviation Planning Framework should be linked to planning processes at the global, regional and State levels.

The National Planning Framework comprises the CAMP, its underlying safety and air navigation plans, security planning requirements as well as the State's national aviation policy. Through the national aviation policy, the Framework may be linked to the State's national transportation policy, which covers all relevant modes of transportation (e.g. air, road, rail and water). In turn, the transportation policy is linked to the State's National Development Plan.

The components of the aviation system must be aligned to ensure sustainable improvements in air transport services. Therefore, the CAMP consolidates into a coherent plan the various disparate plans intended to improve, among other key performance areas, the safety, security, facilitation, capacity and efficiency of the State's air transport system. The ICAO Global Aviation Safety Plan (GASP), Global Air Navigation Plan (GANP)and Global Aviation Security Plan (GASeP) establish structures for global, regional and state planning processes within their respective disciplines.

As a State's National Civil Aviation Security Programme (NCASP) may contain highly-sensitive information, the NCASP itself may not be included as an element of the CAMP. Nonetheless, the planning process used to ensure the availability of necessary funds and resources to implement the NCASP should be included as part of the master planning process in all cases.

The purpose of a National Air Transport Facilitation Programme (NATFP) is to provide a framework to guide the improvement and optimization of aircraft, crew, passenger and cargo flows through airports and to improve customer service, while maintaining appropriate border management and border security requirements. While committed to facilitating efficient clearance for arriving and departing aircraft, high-quality security, effective law enforcement and proficient customer service should also be maintained.

Figure 1 illustrates the linkages between the National Aviation Planning Framework, the national transportation policy and the national development plan.

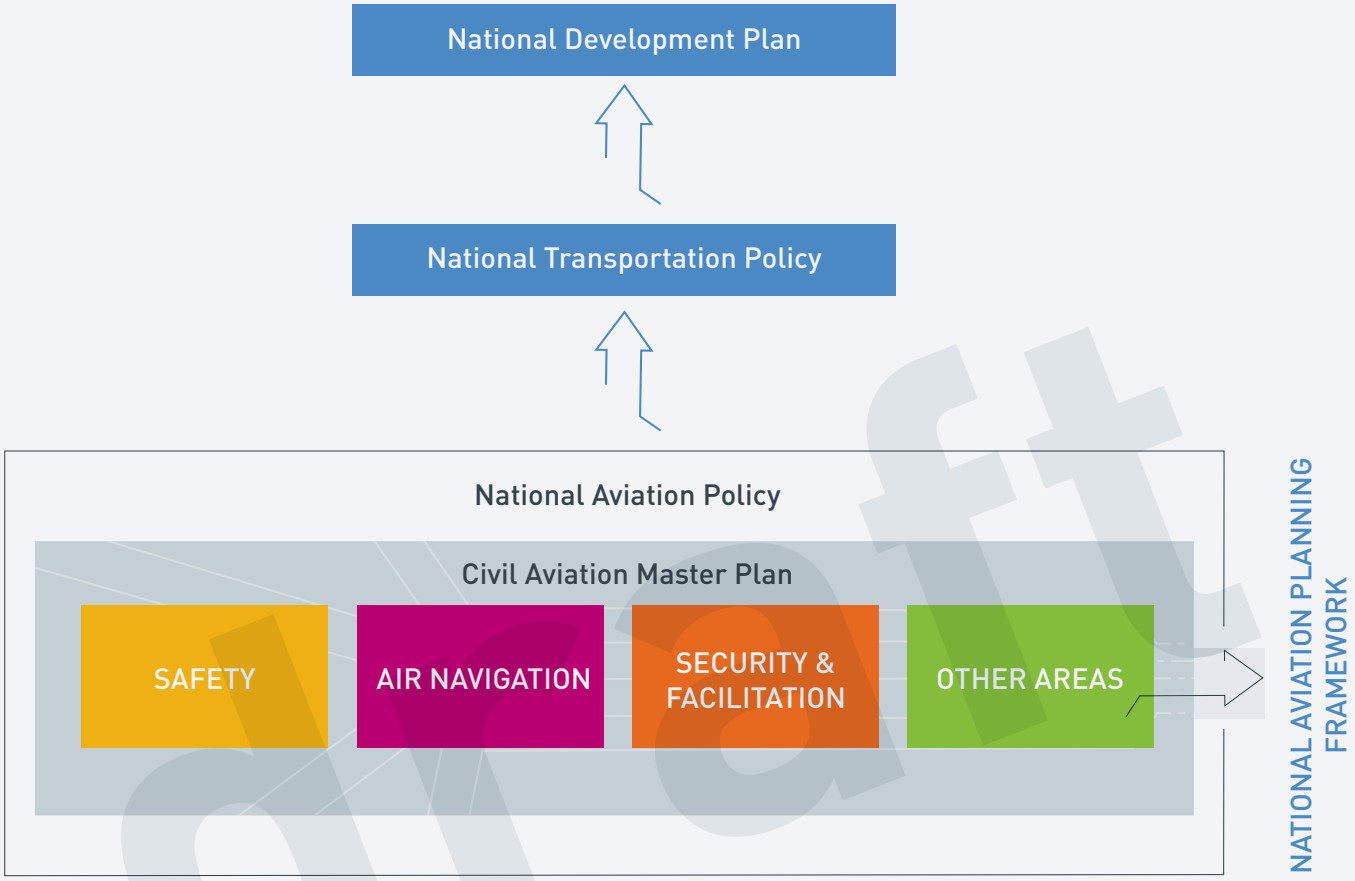

Figure 1 – National Aviation Planning Framework Linkages

The CAMP is aligned with the State's national aviation policy, which provides high-level goals for investment in all areas of the aviation system. As transport is crucial for economic and social development, a comprehensive policy is required to ensure that transport investments produce desired outcomes and to effectively prioritize the allocation of funds and resources to aviation projects that will yield desired economic and social benefits. Combined, the CAMP and national aviation policy comprise the National Aviation Planning Framework.

It is important for the Framework to be included as a component of the State's national development plan. Aviation itself is inextricably linked to other industries by generating economic growth, creating jobs, and facilitating trade. Aviation is therefore a vital enabler of economic activity that generates wealth, employment and numerous socio-spin-offs through its own activities, supply chains and a wide spectrum of other economic activities, especially trade and tourism.

The level of economic activity of air transport industries is closely linked to the level of economic activity in markets and economies that the industries serve. In turn, aviation acts as an economic catalyst for local/regional and national economies around the globe. Higher levels of economic activity go hand in hand with a growing demand for air transport, benefiting not only from expansion of industries and trade but also from generally higher income and consumer spending. Air transport accommodates the needs of millions of passengers and of business communities requiring that goods be transported by air. Consequently, by having a solid civil aviation master plan, States can leverage greater investments in their aviation industries in a strategic and structured manner. In turn, these investments will improve the aviation's operations and act as a catalyst for broader economic growth. Prioritizing projects and investment in aviation have the potential to help fuel growth and start a virtuous cycle for a given State or region's overall economy.

Aviation also provides significant social benefits. The availability of reliable air transport services provides people with access to: decent livelihoods; food; healthcare; education; safe communities and spaces. As the world's safest and most efficient mode of long-range mass transportation, aviation supports the provision of health care services to many remote communities and is the fastest and most reliable way to deliver urgent humanitarian aid during emergencies caused by natural disasters, famine or war.

At the global level, aviation also contributes directly and indirectly to many of the United Nations Sustainable Development Goals (UN SDGs). Attainment of the UN SDGs relies on advances in air transport, which is a driver of sustainable development. Therefore, the future growth of air transport holds tremendous economic potential, which will support all States in achieving the United Nations 2030 Agenda for Sustainable Development.

It is also necessary for National Aviation Planning Frameworks to align with the current ICAO Strategic Objectives, which have been developed in close collaboration with the entire aviation community. The five ICAO Strategic Objectives are:

a) Safety;

b) Air Navigation Capacity and Efficiency;

c) Security and Facilitation;

d) Economic Development of Air Transport; and

e) Environmental Protection

The ICAO Strategic Objectives can serve to inform a State's National Aviation Planning Framework in developing capabilities to meet demand while ensuring the safety, security and sustainability of the system. The National Planning Framework provides a means for States to prioritize initiatives that address each of these Objectives, to achieve improvements most relevant to their air transport systems. The ICAO Strategic Objectives are also linked to the UN SDGs, as progress towards the achievement of the ICAO's Strategic Objectives also impact the advancement of the UN Sustainable Development Goals.

2.2 UN Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development was adopted on 25 September 2015 by Heads of State and government officials at the United Nations Sustainable Development Summit. The Agenda includes 17 Sustainable Development Goals and 169 targets to eradicate poverty and achieve sustainable development by 2030. The UN SDGs create a shared global vision towards sustainable development for all States and are consistent with the ICAO No Country Left Behind initiative, which serves to assist Member States in achieving the socio-economic benefits of a safe and reliable air transport system through the implementation of Standards and Recommended Practices (SARPs).

As air transport has proven to be a catalyst for sustainable development, achieving many of the SDG objectives will depend on further development of air transport systems that are safe, secure, efficient, economically durable and environmentally responsible. (Resolution A39-25 – Aviation's contribution towards the United Nations 2030 Agenda for Sustainable Development, refers). Therefore, States should ensure that clear references to the UN SDGs are included in their national air navigation and aviation safety plans, consistent with their national transportation policies and national development plans.

A specific SDG has not been established for air transport. Nonetheless, one or more of the ICAO Strategic Objectives are linked to 15 of the 17 UN SDGs. Table 2.1 provides a detailed summary of these linkages, depicting aviation's contributions to attainment of the Sustainable Development Goals. The shaded areas indicate where each of ICAO's Strategic Objectives is linked to the UN SDGs. The total linkages between individual ICAO Strategic Objectives and UN SDGs are indicated at the bottom of **Table 2.1**.

		ICAO STRATEGIC OBJECTIVE				
UN SDG		Safety	Capacity & Efficiency	Security & Facilitation	Economic Dev	Env Protection
1	End Poverty in all its forms everywhere				■	
2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	■	■			■
3	Ensure healthy lives and promote well-being for all at all ages	■		■	■	■
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	■	■	■	■	■
5	Achieve gender equality and empower all women and girls	■	■	■	■	■
6	Ensure availability and sustainable management of water and sanitation for all					
7	Ensure access to affordable, reliable, sustainable and modern energy for all		■		■	■
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	■	■	■	■	■
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	■	■	■	■	■
10	Reduce inequality within and among countries	■	■	■	■	■
11	Make cities and human settlements inclusive, safe, resilient and sustainable	■	■	■	■	■
12	Ensure sustainable consumption and production patterns				■	■
13	Take urgent action to combat climate change and its impacts	■	■		■	■
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development					
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss					■
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	■	■	■	■	■
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	■	■	■	■	■
TOTALS		11	11	9	13	14

Table 2.1 – ICAO Strategic Objective / UN SDG Linkages

Aviation represents an essential enabler for economic growth in least developed countries (LDCs), landlocked developing countries (LLDCs) and Small Island developing States (SIDS). Therefore, it is important for States, especially LDCs, LLDCs and SIDS to reference the UN SDGs in their national aviation planning processes. This will serve to secure resources required for the development and improvement of their air transport systems. It is also important to establish partnerships among members of the UN system and other stakeholders to support air transport development.

The Thirteenth Air Navigation Conference (AN-Conf/13) recognized the importance of global, regional and national plan alignment with the United Nations 2030 Sustainable Development Goals. The Conference also concluded that including aviation in a State's national planning framework will facilitate and increase the possibility of aid and the flow of funding into the air transport sector.

Considerable investments such as the acquisition of civil aviation equipment, research and innovation to support more efficient and sustainable air transport, building of new or upgrades to existing infrastructure, as well as training of aviation experts will be required to support the achievement of the SDGs. This places increased pressure on existing aviation infrastructure and human resources, particularly in LDCs, LLDCs and SIDS. The UN SDG Target 9.1, with its objective to "develop quality, reliable, sustainable and resilient infrastructure with a focus on affordable and equitable access for all," is also directly pertinent to aviation and the economies that it serves around the globe. ICAO also serves as a custody agency for this target.

The High-level Political Forum (HLPF) on Sustainable Development (HLPF) is the United Nations' central platform for the follow-up and review of the 2030 Agenda. The HLPF provides opportunities for countries to share how implementation of various SDGs have been integrated in their national policies, strategies, and development plans. The 2030 Agenda encourages member states to conduct Voluntary National Reviews (VNRs) to facilitate the sharing of information related to implementation of the 2030 Agenda. The VNRs also seek to strengthen policies and institutions of governments and to mobilize multi-stakeholder support and partnerships for the implementation of the UN SDGs. An analysis of VNRs submitted to date indicates opportunities to better identify linkages between aviation and attainment of the UN SDGs. Comprehensive and coordinated planning processes, as contained in the State's CAMP, will serve to identify these linkages by documenting the benefits derived from future aviation development.

2.3 National Development Plans

A national development plan (NDP) is the document that guides strategic development and infrastructure investment at national level. The NDP facilitates the interaction between the State and financial development institutions, which can assist in the financing of large-scale projects (e.g. construction of a new international airport). The national development plan provides assistance to mobilize public and private resources and partnerships for implementation of detailed projects required to modernize or strengthen the civil aviation system.

A national development plan reflects the country's objectives and priorities with respect to all the different sectors in response to a vision that includes well-identified needs for the nation. A well-researched and reasoned plan is of great value to a country in the allocation of its resources. It relates the scope and timetable of its projects across sectors to the resources available and the benefits it will bring. It enables realistic and achievable decision-making.

National Development Plans provide international development banks, donors and investors with the necessary long-term strategic visibility needed to issue loans or provide technical assistance to selected national projects. A National Development Plan should be one of the pillars which donors and investors rely on to make informed decisions. Without a robust planning mechanism, projects might not sufficiently reflect the benefits and assurance of the governments' wholehearted commitment. The National Development Plan can also be used by these donors and investors to coordinate their respective programs across sectors and avoid wasteful overlap and competition. As such, it is essential for aviation to be included in the National Development Plan as this will improve availability of funding for initiatives contained within the State's Civil Aviation Master Plan .

Recognizing that aviation yields significant economic and social benefits, the National Aviation Planning Framework supports the State's high-level goals by establishing the importance of air transport to the State's development objectives as contained in the national development plan. Accordingly, the civil aviation master plan should include an assessment of economic and social impacts associated with investments to the State's air transport system.

Inclusion of aviation in the national development plan will serve to gain donor support for the implementation of the CAMP, as well as the projects and initiatives required to enhance individual sectors of the air transport system. A clearly-defined relationship between the national development plan, the national transportation policy, the CAMP as well as its underlying plans and programmes is essential to enable the prioritization and optimum allocation of resources for projects across all areas of aviation activity.

Investment in aviation infrastructure, as contained in the national air navigation plan, should therefore be directly linked to the State's national development objectives. States also have an obligation to invest in initiatives that ensure the safety, security and facilitation of their air transport systems. These are foundational functions that enable the growth in aviation and thereby contribute to the State's national development efforts.

2.4 National Aviation Policy

The State's national aviation policy provides a comprehensive, long-term strategy for the development of a State's aviation system. National aviation policies include provisions related to the economic development of air transport including liberalization of air transport services as well as the privatization or corporatization of aviation service providers. Additionally, the policy creates a vision by establishing goals for future improvements in air navigation systems, infrastructure, safety, security, facilitation and other areas of the State's aviation system. The policy statement is an important component of a National Aviation Planning Framework as it establishes the link between future benefits to be derived from air transport and the State's economic and social development objectives.

The national aviation policy creates strategic goals for specific areas of the aviation system. In contrast, the CAMP provides a detailed plan for initiatives aligned with the policy goals. Therefore, the national aviation policy defines desired outcomes while the CAMP provides a plan to achieve them. While the national aviation policy and CAMP may be separate documents, national aviation policy goals should be incorporated directly into the CAMP or cross-referenced electronically through hyperlinks to ensure alignment whenever changes to the policy are made.

The national aviation policy should also address externalities that create consequences for society and other sectors of the economy. Externalities include impacts such as those related to the environment. As indicated in Table 1, ICAO's Environmental Protection Strategic Objective is linked to 14 UN SDGs. It has been estimated that civil aviation accounts for approximately 2 per cent of global carbon dioxide (CO_2) emissions. Aircraft have become increasingly fuel-efficient and other efficiencies have been realized through improvements in air traffic management systems. Nonetheless, the growth in air traffic has historically outpaced the efficiencies realized. As a result, aviation's carbon footprint has been growing at a rate 3 per cent per year. In addition, ICAO has developed the balanced approach to noise management, which identifies noise issues at an airport and analyzes various measures available to reduce noise through the exploration of four principal elements: reduction at source; land-use planning and management; noise abatement operational procedures and operating restrictions.

2.5 Areas of Aviation Activities

2.5.1 Overview

A State's National Aviation Planning Framework comprises multiple plans developed for specific air transport disciplines. The ICAO Global Aviation Safety Plan (GASP), Global Air Navigation Plan (GANP) and the Global Aviation Security Plan (GASeP) provide strategies for three specific areas of aviation activity, which are updated regularly.

Investments in infrastructure that improve the capacity and efficiency of the air transport system can directly support the State's national development objectives. Investments that ensure the safety and security of the air transport system are not directly linked to development initiatives, they are necessary to enable air transport growth. The following sections provide an overview of each of these plans as well as their related responsibilities and functions.

2.5.2 Capacity and Efficiency

Investment in improvements to aviation infrastructure directly support the State's overall development objectives by increasing the capacity and efficiency of the air transport system. The Global Air Navigation Plan (GANP) provides the strategy to achieve a globally interoperable air navigation system for all users during all phases of flight that meets agreed levels of safety, provides for optimum economic operations, is environmentally sustainable and meets national security requirements.

The GANP comprises a multi-layered structure, which includes the following levels:

a) Level 1: Global Strategic
b) Level 2: Global Technical
c) Level 3: Regional
d) Level 4: National

The Global Strategic level provides high-level strategic direction for decision makers to drive the evolution of the global air navigation system. To this end, the global strategic level includes a common vision, global performance ambitions and a conceptual roadmap.

The Global Technical level supports technical managers in planning implementation of basic services and new operational improvements in a cost-effective manner and according to specific needs, while ensuring interoperability of systems and harmonization of procedures. The Global Technical level contains:

a) two global frameworks:

- the Basic Building Blocks (BBB) framework includes the basic services to be provided for international civil aviation including: meteorological services; aeronautical information services; search and rescue services; air traffic management services and aerodrome operations.
- the ASBU framework outlines the performance benefits expected from specific air navigation operational improvements under certain operational conditions.

b) a performance-based method for implementation planning of air navigation operational improvements, including a catalogue of performance objectives and indicators.

The Regional level addresses regional and sub-regional needs aligned with the global objectives. As such, it contains the ICAO Regional Air Navigation Plans (ANPs) and considers other regional initiatives. The Regional level comprises Air Navigation Plans for the following seven regions: AFI; APAC; EUR; MID; NAM; NAT and CARSAM.

The National level focuses on the States' air navigation planning processes. The development of States' air navigation plans, in coordination with relevant stakeholders, is a strategic part of their civil aviation master plans that should be aligned with regional and global plans to achieve the common vision being developed in the GANP. These air navigation plans should serve as reference documents for national investment in air navigation infrastructure.

The State's air navigation plan provides a strategy for the safe and efficient management of its airspace and air navigation system over a defined timeframe. The air navigation plan is intended to provide the industry with a clear indication of the approach to be taken, including an account of necessary investments, to maintain and modernize the aviation infrastructure. It also provides timelines for key implementation milestones as well as related policy and regulatory decisions.

The national air navigation plan should include initiatives to be undertaken by all relevant stakeholders to assure effective management of the State's airspace as well as the introduction of new technologies to accommodate forecast increases in air traffic. The national air navigation plan should be linked to a national policy that articulates desired outcomes related to the design and use of the State's airspace and air navigation system.

At a minimum, the national air navigation plan should consider the need for development of the basic air navigation services comprising the Basic Building Blocks:

a) Meteorology;

b) Aeronautical Information;

c) Search and Rescue;

d) Air Traffic Management, including Air Traffic Services (ATS) and airspace management; and

e) Aerodromes and Aerodrome Operations

2.5.2.1 Aviation System Block Upgrades (ASBUs)

The ICAO Aviation System Block Upgrades (ASBUs) provide a strategy for the implementation of air navigation performance improvements over specific timeframes. While the traditional air navigation planning approach addresses only ANSP needs, the ASBU framework calls for addressing regulatory as well as user requirements. The ultimate goal is to achieve an interoperable global system whereby each State has adopted (approved and deployed) those technologies and procedures corresponding to its operational requirements.

The ASBUs are a group of operational improvements organized in key feature areas of the air navigation system (ASBU threads) and scheduled in time of availability (ASBU blocks). As a framework, it does not define a particular process to be followed for implementation; however, the performance benefits associated with the outlined operational improvements (ASBU elements) support the adoption of a performance management process.

The ASBUs are arranged according to modules that are groups of elements that, if implemented, will bring necessary operational improvements to the air navigation system. Subsets of ASBU modules are considered as being specific to particular operating environments, depending upon the attributes of a State's aviation system. The ASBUs are therefore used by States to develop investment and implementation strategies by selecting and implementing the elements appropriate to the operational needs of their specific air navigation systems. The ASBUs therefore provide the structure to establish future requirements and support cost-benefit analyses that create the business case for system upgrades and justify the necessary funding.

The ASBUs are a list of operational improvements structured in a way that highlights, for a given shortfall, what is available and what is under development. Based on its demand, an implementer can choose with confidence an existing capability or with a clear sense of the future choose to defer implementation until a capability has been proven useful for its particular operational environment.

Following the underlying philosophy of "Think global, act local", the ASBUs framework does not set an expectation for everyone to implement everything everywhere; but to deliver seamless quality of air navigation services by defining regional and national performance objectives to pursue defined performance ambitions. To achieve this seamlessness while ensuring optimum use and allocation of resources, each State can analyse their operating environment and find opportunities to make consistent choices for increasing modernization.

2.5.2.2 Airport Master Planning

With increasing airspace capacity, there is an urgent need to increase airport capacity. Airports face numerous significant challenges such as unpredictable growth and conflicting demands of the multitude of stakeholders. A lack of strategic planning can lead to the development of objectives that fail to consider how airport projects contribute to the longer-term sustainable development strategy. Without a coherent strategy, projects may not address basic functional requirements and intrinsic needs for the future. In many cases, inadequate planning processes have resulted in budget overruns, delays, quality issues, and lack of stakeholder engagement and acceptance.

The result can create a disconnect with stakeholders and an inability to effectively manage the scope of projects as operational, political and budgetary changes occur. While these issues have become increasingly problematic in dynamic operating environments, most airport companies have failed to recognize the need to improve their strategic planning processes.

Consequently, the need for a coordinated airport master plan recognizes the importance placed on a systematic and consultative process for long-term development of airports, thereby enhancing safety and efficiency of aircraft operations while increasing capacity. As a result, airports are now successfully shifting to a new approach on airport development. Positive elements of this new approach include focusing on actual needs, developing airports as holistic systems focused

on functionality, preparing for changes, creating a 'top-down' strategic fit of projects and engaging stakeholders while aligning business strategies and expertise.

The importance of a strategic airport planning process has led to the development of a proposal to amend Annex 14, Volume 1, to support the provision of airport capacity enhancements in a timely manner. Among other provisions, the proposed Annex 14 amendment includes a Recommended Practice for Member States to establish a master plan for the development of airport infrastructure. In conjunction, a revision to *Doc 9184 Airport Planning Manual*, Part 1 — *Master Planning* is being developed to provide updated guidance that supports airport development according to the following principles:

a) utilizing needs-driven rather than design-driven processes;

b) embracing flexibility and accommodating change rather than attempting to ignore or negate change;

c) focusing on holistic integrated and capacity balanced systems rather than specific technical decisions that exclude stakeholder engagement;

d) ensuring alignment of expertise rather than the silo mentality; and

e) employing a top-down rather than bottom-up development strategy.

Airport master plans are therefore essential components to the CAMP and, in turn, to the National Aviation Planning Framework. As such, these plans should consider how investments in airport infrastructure support the State's national development goals as well as synergies and impacts on other forms of transportation.

2.5.3 Safety

Safety is a top priority in aviation. A safe aviation system contributes to the economic development of States and their industries. In Resolution A39-12: ICAO Global planning for safety and air navigation, the Assembly recognized the importance of a global framework to support the Safety Strategic Objective of ICAO. In addition, the Assembly resolved that the GASP, along with the Global Air Navigation Plan (GANP, Doc 9750), shall provide the framework from which regional and national aviation safety plans should be developed and implemented, thus ensuring harmonization and coordination of efforts aimed at improving international civil aviation safety, capacity and efficiency.

The purpose of the GASP is to continually reduce fatalities, and the risk of fatalities, associated with accidents by guiding the harmonized development and implementation of regional and national aviation safety plans. States, regions and industry facilitate the implementation of the GASP through coordinated SEIs. The GASP assists States, regions and industry in their respective safety planning and implementation by:

a) establishing safety goals, targets and indicators;

b) providing a framework for planning and implementation of safety enhancement initiatives (SEIs);

c) presenting the global aviation safety roadmap, which can be used to achieve the GASP goals and to set specific targets at both national and regional levels as well as for industry partners; and

d) providing a methodology to guide States in the identification of hazards and emerging issues, and the management of safety risks.

A State's safety responsibilities comprise both safety oversight and safety management functions, collectively implemented through the State safety programme (SSP). Safety oversight is a function whereby States ensure effective implementation of the safety-related SARPs and associated procedures contained in the Annexes to the Convention on International Civil Aviation and related ICAO documents. Safety oversight also ensures that the national aviation industry provides a safety level equal to, or better than, that defined by the SARPs.

The eight critical elements (CEs) of a safety oversight system are presented in **Figure 2**. The GASP prioritizes the implementation of CE-1 through CE-5. It then turns to the implementation of CE-6 through CE-8 to provide further enhanced effective safety oversight and safety management. Each individual State's responsibility for safety oversight is the foundation upon which a safe global air transport system is built. States that experience difficulties in carrying out safety oversight functions can impact the safety of the entire of international civil aviation system.

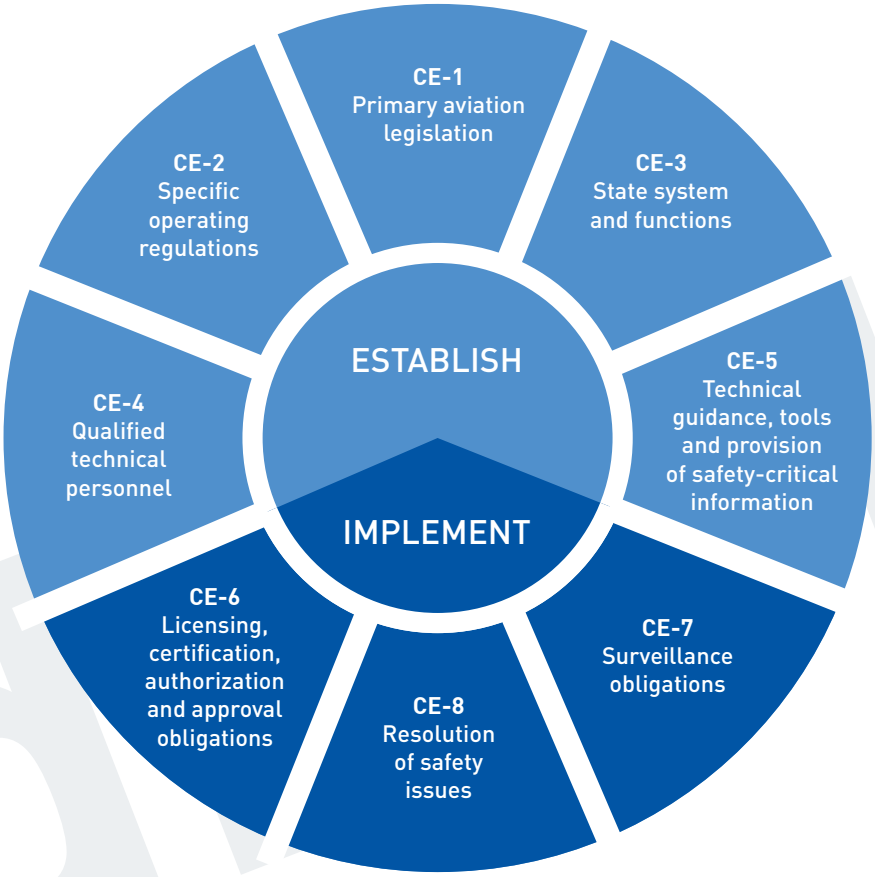

Figure 2 – Critical Elements of a Safety Oversight System

Full SSP implementation requires States to build upon fundamental safety oversight systems by establishing safety management functions. Establishing such safety management functions in turn requires additional capabilities and resources. The State safety programme is essentially the implementation of risk-based approach to achieve an acceptable level of safety performance (ALoSP). As part of its SSP, States must require applicable aviation service providers under their authority to implement safety management systems (SMS). The SMS enables service providers to capture and transmit safety information to manage operational risks. In this context, the role of the State evolves to include the establishment and achievement of safety performance targets as well as effective oversight of its service providers' SMS. Individual States should provide safety information derived from their SSPs to their respective Regional Aviation Safety Groups (RASGs) to contribute to regional safety risk management activities.

SSP implementation is a multi-year process, that requires a specific implementation plan with buy-in from all organizations and entities involved in a particular State. As an initial step, a gap analysis should be conducted to gain a detailed understanding of the gap between the existing State structures and processes, and those required for an effective SSP implementation in the State. An SSP implementation plan guides the State's effective implementation of its SSP, and continuous improvement of safety performance. The ICAO Safety Management Manual (Doc 9859) Fourth Edition provides detailed guidance on the development of an SSP implementation plan, which includes the State's national aviation safety plan.

2.5.4 Security

Development objectives are also enabled through policies and measures that ensure aviation security. Annex 17 requires that Contracting States establish and implement a written national civil aviation security programme (NCASP) to safeguard civil aviation operations against acts of unlawful interference, through regulations, practices and procedures which take into account the safety, regularity and efficiency of flights. In addition, the ICAO Standards require States to ensure that the necessary resources and facilities be available to implement security measures in accordance with the NCASP.

The Aviation Security Manual (Doc 8973 — Restricted) provides detailed procedures and guidance on aspects of aviation security and is intended to assist States in the implementation of their respective national civil aviation security programmes. Given the sensitive nature of security matters, detailed procedures related to the NCASP are beyond the scope of this document.

It is important to note that updates to a State's NCASP may be necessary due to multiple factors, including, but not limited to, amendments to the ICAO Standards and Recommended Practices (SARPs), changes to the level and nature of threat to civil aviation within the State's territory and the airspace above it, aviation traffic growth or other changes to the operating environment. Implementation of the State's NCASP, including the need to fund additional security-related requirements, should therefore be included as an element of the State's National Aviation Planning Framework to ensure the availability of necessary funding and other resources. Nonetheless, access to security-related procedures and processes should be restricted to appropriate entities and personnel.

In September 2016, delegates at the 39th Session of the ICAO Assembly agreed that there was a need for the accelerated development of a Global Aviation Security Plan (GASeP) as a future aviation security policy and programming framework. The GASeP, which replaces the ICAO Comprehensive Aviation Security Strategy (ICASS), addresses the needs of States and industry in guiding all aviation security enhancement efforts through a set of internationally agreed priority actions, tasks and targets.

a) The GASeP provides the foundation for States, industry, stakeholders and ICAO to work together with the shared and common goal of enhancing aviation security worldwide and achieving five key priority outcomes:Enhance risk awareness and response;

b) Develop security culture and human capability in Aviation Security;

c) Improve technological resources and foster innovation;

d) Improve oversight and quality assurance; and

e) Increase regional cooperation and support.

Central to the Plan is a Roadmap that outlines 94 tasks, accompanying 32 actions under 5 key priority outcomes. A set of indicators and target dates accompanies each individual task. The Roadmap also identifies aspirational global targets for the effective implementation of Annex 17 - *Security* and the security-related components of Annex 9 – *Facilitation*, as documented by ICAO's Universal Security Audit Programme – Continuous Monitoring Approach (USAP-CMA).

Concurrent with final drafting and ICAO Council approval of the GASeP, a series of conferences were held to develop Regional Roadmaps that tailor the overarching global Roadmap milestones and priorities to reflect unique regional strengths and challenges. The Roadmaps are "living" documents aligned with the GASeP and take into consideration relevant ICAO Regulatory body decisions and directions.

The main objective of the Regional Roadmaps is to assist and encourage all aviation stakeholders to work collaboratively towards effective implementation of agreed actions/tasks to achieve the objectives of the GASeP, compliance with Annex 17 and sustainability of the global and regional aviation security system (in coordination with all relevant entities/bodies/groups/fora) to foster information sharing amongst all stakeholders.

With ICAO, all States, regional organizations and stakeholders fulfilling their responsibilities in implementing the Roadmap, the sustained level of secure and safe civil aviation operations will contribute towards preventing human, economic, financial and other losses. A strengthened aviation system provides for a conducive environment for economic growth and development in States.

States should determine and implement the relevant actions/tasks in a prioritized manner considering their greatest areas of risk in compliance with Annex 17 (Security) Standards and Annex 9 (Facilitation) Standards that support both border management and border security objectives.In order to assist with this prioritization, States may obtain information from the ICAO Aviation Security Global Risk Context Statement, ICAO Universal Security Audit Programme (USAP) audit results, and feedback from the Regional Offices.

The appropriate national authorities responsible for aviation security should ensure that the actions/tasks of the Roadmap implemented in all States are in accordance with the detailed action plans to be developed by the States:

a) Enhance risk awareness and response. Understanding risk is essential for policies and measures that are effective, proportionate and sustainable. Undertaking risk assessments will help to identify gaps and vulnerabilities, which can then be urgently addressed in the most practical way possible, and with optimal use of resources.

b) Develop security culture and human capability in aviation security. The promotion of effective security culture is critical to achieve good security outcomes. A strong security culture must be developed from the top management across and within every organization. The existence of a well-trained, motivated and professional work force is a critical prerequisite for effective aviation security.

c) Improve technological resources and encourage innovation. Promoting and applying better technological solutions and innovative techniques can provide the tools for enhancing security effectiveness while ensuring operational efficiency.

d) Improve oversight and quality assurance. Effective quality control and oversight processes globally, nationally, and locally are critical in delivering sustained effective aviation security.

e) Increase regional cooperation and support. Increasing collaboration between the ICAO Regional Offices and amongst and within States, regional organizations and stakeholders will enable the key security objectives to be achieved more quickly and efficiently.

2.5.5 Air Transport Facilitation

Air transport facilitation may be defined as a combination of measures and human and material resources intended to improve and optimize aircraft, crew, passenger, cargo, baggage, mail and stores flows through airports while ensuring compliance with relevant international and national legislation. It is recalled that Annex 9 — *Facilitation* to the Convention on International Civil Aviation sets out the international framework of Standards, Recommended Practices (SARPs), and technical specifications incorporated by reference, in travel document matters.

The General Principles of Annex 9 require Contracting States to take necessary measures to minimize the time required for the accomplishment of border controls, minimize the inconvenience caused by the application of administrative and control requirements, foster and promote the exchange of relevant information between Contracting States, and develop effective information technology to increase the efficiency and effectiveness of their procedures at airports.

ICAO's leadership and activities in travel documentation policy and operational matters have made a significant contribution to enhancing facilitation and aviation security , notably through uniform and progressive travel document standards and specifications, assistance to States in implementing effective and efficient travel document systems, and, by means of the ICAO Public Key Directory (PKD), the provision to States of a single automated ePassport validation service on a cost-recovery basis, thereby helping to further streamline and secure border clearance processes.

Machine Readable Travel Documents (MRTDs), of course, serve the broad transport sector by assuring border integrity and efficiency in maritime and land transport settings as well. These important benefits extend the contribution of ICAO travel document-related activities beyond border integrity at airports. In consideration of this, the travel document field is rapidly evolving into the broader sphere of identification management. The ICAO Traveller Identification Programme (ICAO TRIP) Strategy has been established to reinforce traveller identification management and to lead a global approach at State, regional and international levels.

A dedicated ICAO TRIP roadmap (revised in January 2019, in light notably of Amendment 26 of Annex 9) was developed by the Secretariat to assist States in their implementation of the ICAO TRIP Strategy, with the understanding that the roadmap should impose no obligation on States beyond the Annex 9 SARPs related to the ICAO TRIP Strategy and the corresponding international specifications for MRTDs contained in Doc 9303, *Machine Readable Travel Documents*.

Therefore, States should determine and implement the relevant actions/tasks in a prioritized manner considering their greatest areas of risk in compliance with the Annex 9 Standards audited under USAP and related to ICAO TRIP implementation. The appropriate national authorities responsible for air transport facilitation should ensure that the actions/tasks of the Roadmap implemented in all States are in accordance with the implementation action detailed in the Roadmap and audited under USAP:

a) Establish National Air Transport Facilitation Programme (NATFP)

b) Establish National Air Transport Facilitation Committee (NATFC)

c) Completion of Machine Readable Passports implementation

d) Implementation of Machine Readable Convention Travel Documents (CTDs)

e) Application of processes and protocols for document issuance and controls to prevent theft of their blank travel documents and the misappropriation of newly issued travel documents

f) Use of globally interoperable applications and protocols linking MRTD holders to available watch lists and databases

g) Use of globally interoperable applications and protocols linking MRTD holders to available watch lists and databases

h) Ensure linkage of MRTDs and their holders to relevant data in the course of travel and inspection operations such as Advance Passenger Information (API) and Passenger Name Record (PNR) with watch lists, information sharing etc.

i) Implementation of an Advance Passenger Information (API) System

One of the most important identified risks is linked to the first element of the TRIP Strategy, Evidence of Identity, aiming at ensuring credible evidence of identity, involving the tracing, linkage and verification of identity against breeder documents to ensure the authenticity of identity. This element, crucial for a robust traveller identification management, is under the umbrella agencies responsible for Civil Registries and hence cannot be monitored as it is out of the scope covered by Annex 9 provisions.

Therefore, it is recommended to implement rigorous processes and tools to safeguard the integrity and security of breeder documentation by notably applying evidence of identity principles such as, ensuring that identity exists and is living through the verification against two different data sources, the applicant links to identity and is unique to the system through the provision of confidence of the applicant's "social footprint" meaning how a person interacts with society's stakeholders during the life cycle and the check against agency record or by associating the record with one or more biometrics.

2.6 Regional Alignment

The National Aviation Planning Framework should be aligned with regional planning initiatives, such as regional components to the GANP, GASP and GASeP. The GANP and GASP establish structures that include regional air navigation plans and regional safety plans, respectively.

Regional aviation safety plans present the strategic direction for the management of aviation safety at the regional level for a set timeframe. These plans outline to all stakeholders where the different regional entities involved in the management of aviation safety should target resources over the coming years. The RASGs are considered the main drivers behind the planning and implementation of SEIs at the regional level. They are the regional entity responsible for the development and implementation of the regional aviation safety plan.

The development of regional plans for air navigation systems including communications, navigation and surveillance (CNS)/ air traffic management (ATM) systems is undertaken by ICAO's PIRGs, with the assistance of ICAO Regional Offices. The coordination of activities between the RASGs and the PIRGs are key to the successful implementation of the GASP and the GANP.

From the perspective of aviation security, the GASeP calls on Member States to collaborate in areas including:

a) development of regional targets on the levels of effective implementation of security measures;

b) development of regional Universal Security Audit Programme (USAP) targets on the levels of effective implementation of security measures;

c) development of regional plans for delivery of support to priority States; and

d) conduct of regional training needs analyses and promotion of regional cooperation in the field of AVSEC training.

Long before the GASeP was drafted and implemented, ICAO recognized the need to establish security and facilitation support mechanisms in several regions. These efforts, known as SECFAL Plans, now align with the GASeP Regional Roadmaps. Periodic updates are led by ICAO Regional Offices in partnership with States across each region.

3. Economic Development of Air Transport

3.1 Overview

Factors related to the economic development of air transport are essential to the sustainable development of a viable civil aviation system. Civil aviation encompasses a wide range of activities that either use aircraft to produce services or to produce goods or services that support the use of aircraft. Aviation also consumes an uninterrupted supply of other goods and services, such as aviation fuel, food and beverage and all the supporting facilities and services. Therefore, economic development of air transport is an essential component of the CAMP.

Sustainable transport has proven to be a catalyst for sustainable development and is therefore an essential enabler for the achievement of the United Nations Sustainable Development Goals (UN SDGs). Investment in air transport, per initiatives contained in the CAMP, can reduce transactional costs, leading to increased productivity that can have a significant impact on economic growth. Reductions in transport costs can stimulate trade and increase access to markets. ICAO strives, in close collaboration with the entire aviation community, to increase capacity and efficiency to meet demands while ensuring that safety performance is maintained or further improved. More information on ICAO and the UN SDGs may be found at https://www.icao.int/about-icao/aviation-development/Pages/SDG.aspx.

As stated in the Global Mobility Report 2017 developed by the Sustainable Mobility for All (SUM4all) initiative of the World Bank, "it is no longer enough that transport", including air transport, "provides access" to jobs, markets and opportunities... it should be equitable, efficient, safe and climate responsive. Achieving these four objectives will ensure that mobility needs of the current generation will not be met at the expense of future generations." The Global Mobility Report 2017 and Country-by-country data (a database of indicators consolidated by SuM4All) may be found at http://sum4all.org/publications/global-mobility-report-2017.

Predictable funding for sustainable aviation projects requires adequate planning and organizing at the national level. National economies are built upon several sectors that generate and require resources to produce outcomes.

Therefore, linkages between the State's CAMP and its national development plan and budget process will facilitate access to funding to make the necessary enhancements to air transport systems including ensuring the system is supplied with the human capital it needs.

3.2 National Aviation Policy

The National Aviation Policy established by the State can affect air traffic growth and the development of the air transport industry in that State, as well as surrounding States. Access to markets may be controlled by bilateral air services agreements that regulate traffic flows between States. These agreements control specific routes to be flown, in addition to setting out capacity and frequency restrictions as well as outlining the fares.

The liberalization of the rules and regulations of the international aviation industry, commonly known as "Open Skies" policies or agreements have been implemented over the last 30 years to reduce government control related to access and fares in international aviation markets. Open Skies agreements allow air carriers greater flexibility regarding routes, capacity, and pricing, resulting in more affordable, convenient, and efficient air services. As a result, Open Skies agreements have the capability to expand international passenger and cargo flights, promoting increased travel and trade, enhancing efficiency, creating job opportunities and economic growth.

Article 83 of the Chicago Convention and Assembly Resolution 38-40 refers to the obligation of States to register with the Council of ICAO any cooperative agreement and arrangement relating to international civil aviation.

Assembly Resolution A39-15 contains a Consolidated statement of continuing ICAO policies in the air transport field to ensure that international air transport services are developed in an orderly, regular, efficient, economical, harmonious and sustainable manner. The policies are categorized according to the following:

a) Economic regulation of international air transport;

b) Taxation;

c) Airports and air navigation services;

d) Aviation data and statistics and

e) Forecasting, planning and economic analyses

Accordingly, the ICAO policies encourage States "...to pursue liberalization of market access at a pace and in a manner appropriate to needs and circumstances, giving due regard to the interests of all stakeholders, the changing business environment and infrastructure requirements, as well as to the principles pertaining to safeguard measures designed to ensure the sustained and effective participation of all States, including the principle of giving special consideration to the interests and needs of developing countries." (A39-15 refers).

Resolution A39-15 also encourages Member States to ensure that user charges implemented to recover the costs of security measures as well as airport and air navigation services functions are reasonable and cost-effective.

Detailed guidance on air transport polices can be found in the following ICAO Documents:

a) Policy Guidance on the Economic Regulation of International Air Transport (Doc 9587)

b) Manual on the Regulation of International Air Transport (Doc 9626)

c) ICAO's Policies on Taxation in the Field of International Air Transport (Doc 8632)

d) Template Air Services Agreements (TASAs)

3.3 Development of the Aviation Satellite Account (ASA) methodological framework

Notwithstanding the benefits of civil aviation to socio-economic development, its importance to national economies appears not to be fully understood due to a shortage of reliable economic information related to civil aviation. This is attributable to the lack of systematic and consistent global standard to measure civil aviation as an industry. Accordingly, ICAO has developed a means to measure an economic impact of civil aviation on national economy in line with the System of National Accounts (SNA).

The SNA is the internationally-agreed standard set of recommendations on how to compile measures of economic activity of nations for over 50 years. It describes a coherent, consistent and integrated set of macroeconomic accounts in the context of a set of internationally agreed concepts, definitions, classifications and accounting rules for measuring such items as gross domestic product (GDP), the most frequently quoted indicator of economic performance. The 2008 SNA adopted by the United Nations Statistical Commission (UNSC) is available at: https://unstats.un.org/unsd/nationalaccount/sna.asp.

In addition, the SNA provides an overview of economic processes, recording how production is distributed among consumers, businesses, government and foreign nations. It shows how income originating in production, modified by taxes and transfers, flows to these groups and how they allocate these flows to consumption, saving and investment. Consequently, the national accounts are one of the building blocks of macroeconomic statistics forming a basis for economic analysis and policy formulation.

Since the 2008 SNA does not list an industry of aviation per se, a global standard has been created to measure the economic activities of aviation in a manner that international comparison would be possible and feasible, while maintaining compliance with the SNA. ICAO has developed a methodological framework of the Aviation Satellite Account (ASA), which allows policy makers to assess the total monetary value from the civil aviation segment of the national accounts. This is accomplished by adding together the values from each defined component of civil aviation activity thus deriving a single measure of the value of the entire civil aviation industry. This data can then be used by itself or combined with other data to analyze changes in aviation services themselves and their relationships to other industries.

With the Aviation Satellite Account, policymakers have a globally-accepted common measurement of the aviation industry, in terms of value-added, relative contribution to GDP and employment. These data facilitate policymakers, investors, and lenders to estimate return on investment of the government budgets, taxpayers funding or their private investment in the aviation sectors. Some nations may have higher dependence on aviation services for the growth of other industrial activities, such as business, trade and tourism. With better data on the aviation industry, investors will have better information on their decision making to finance aviation industry and related infrastructure.

The complete Aviation Satellite Account provides:

a) Macroeconomic aggregates that describe the size and the direct economic contribution of aviation, such as aviation direct GVA and aviation direct GDP, consistent with similar aggregates for the total economy and for other economic activities and functional areas of interest;

b) detailed civil aviation consumption of products supplied by other industries as intermediate input to provide civil aviation products;

c) imports and exports, compensation to employees, taxes raised by aviation and subsidies received by aviation;

d) gross capital formation, including fixed assets such as aircraft and airport facilities; and

e) non-monetary information on aviation, such as the number of jobs created by aviation, air traffic generated, and the number of aviation users.

States can use the above economic information to improve understanding and raise awareness of aviation's importance relative to an overall economic activity, as well as inter-dependencies of aviation with other economic sectors that involve in the production of goods and services consumed by aviation.

The Aviation Satellite Account enables States to make data-driven policy-making and evaluation for aviation development planning that is linked with national and/or regional development frameworks and strategies. Furthermore, financial institutions and investors will be able to use these data to estimate, for example, the GVA of the government budgets (taxpayers funding) and private investment in the aviation sector.

3.4 Aviation Trends (traffic and personnel)

According to the latest ICAO's forecasts, global passenger traffic will grow at 4.4 per cent annually for the twenty-year period ending 2037. All route groups involving Central Southwest Asia are among the Top 10 fastest growing ones, and Central South West Asia – North Asia is estimated to have the highest growth rate at 7.1 per cent annually up to 2037. Route groups in and between Africa, Central America/Caribbean and the Middle East are expected to grow around the global pace. Lower growth rates are estimated for route groups in and between mature markets, including Europe, North America, and North Asia.

Global freight traffic is expected to grow at 3.7 per cent annually for the twenty-year period ending 2037. Three regions, the Middle East, Africa, and Asia/Pacific, will exceed the global growth, with Middle East having the highest annual growth outpacing global estimate by about 2.5 percentage points. North America and Europe will grow at a slightly slower pace than the global estimate while Latin America/Caribbean has the lowest annual growth rate of less than 2 per cent.

Traffic forecasts are essential to the State's planning process and should therefore be validated by independent sources to ensure accuracy. The iCADS platform provides States with an application to generate traffic forecasts based on ICAO's data.

3.5 The ICAO iCADS platform

The ICAO Civil Aviation Data Solutions (iCADS) portal was built with the needs of the aviation industry in mind, integrating the entirety of data, business intelligence products as well as a selection of curated ICAO reports and documents.

The iCADS portal represents an immersive and holistic experience into ICAO's portfolio of applications; allowing users unified to access to the multitude of data sets as well as business intelligence solutions provided by ICAO.

ICAO aviation tools and analytics products available on iCADS have been designed to assist States, industry and other stakeholders to inform policy-making decisions and strategic planning processes.

The Global Air Transport Optimisation (GATO) provides intelligence to Member States and stakeholders to determine the linkages between connectivity and competition at a granular level thus enabling them to take decisions to identify factors and take necessary policy measures to optimize the air transport network.

In addition, the Aero Tariffs platform considers the standard, unique airport charges and special conditions to: generate a real-time cost estimate/ benchmarking results; provide the up-to-date Airport Charges and Air Navigation Service Charges information in pdf format; generate a GIS/FIR map for calculating Air Navigation Service Charges based on a selected flight route and provide the capacities to export the results in .xlsx or .pdf format.

3.6 Dominican Republic case study

ICAO has collaborated with the State and the Inter-American Development Bank to conduct a study for the Dominican Republic. This case study objective is to quantify the economic and social benefits from civil aviation to Dominican Republic, including data and analysis of the past two decades, seeking to demonstrate the direct empirical data (before and after) and the effects of aviation when a State chooses to make aviation a priority in its development and strategic plans as well as when a State does not provide the political will or commitment to its aviation.

The incremental net benefits to the economy of the State from the investments in air navigation infrastructure, in improving effective implementation of safety audit scores and other activities in the civil aviation domain were quantified. The Case Study provides a more relevant and accurate description of the impact of improvements in civil aviation on the economies and sustainable developments of Small Developing Island States (SIDS) as well as other small developing economies, including meaningful insight to civil aviation planners and to line ministries (tourism, finance, transport) on the returns on

investments generated by the civil aviation sector. It is also expected to further investments and financing in the air transport sector, considering the forecasted growth in traffic of the State and to provide a template to civil aviation authorities in the region and to other SIDS, with which they can communicate the benefits from investments and financing in civil aviation activities in their respective States.

The study demonstrated strong evidence that the reforms generated benefits to the economy of the Dominican Republic. The study also highlighted the positive impact on GDP of the group of reforms in the aviation sector. The models used showed that aviation reforms during 2006-2012 had a net effect on the State GDP of USD 5.5 million over the same period.

The study also provides ICAO, Directors General, Ministers, Heads of State, the industry, NGOs as well as developing States and SIDS in all parts of the world with a true and relatable representation of the impact and need of political will and commitment as a fundamental and required base for any true development and sustainability of the air transport system that would allow the countries to reap the socio-economic benefits and sustainable growth of economy within each Member State. Lastly, and most importantly, it provides a very real and relatable validation to many of the member States that due to their size, or economic development, think that such socio-economic benefits obtained through air transport do not apply to them. Additional information can be found in the Appendix to this document or at: https://www.icao.int/Newsroom/Pages/New-Dominican-Republic-aviation-connectivity-case-study-to-shine-spotlight-on-economic-planning-and-growth-benefits.aspx

4. Civil Aviation Master Plan Components

4.1 Overview

This chapter provides guidance on Civil Aviation Master Plan content and structure to ensure that States include all components required to plan and execute long-term aviation development projects. The CAMP provides States with a strategic plan for comprehensive and sustainable development of its civil aviation system in a manner that is in alignment with its overall economic and social development objectives. To meet this objective, the CAMP should consider factors discussed in previous sections of this document including:

a) UN SDGs (economic, social impact);
b) The State's national development objectives;
c) ICAO Global and Regional Plans and supporting entities;
    i. GASP and RASGs;
    ii. GASeP and AVSEC regional plans;
    iii. GANP and PIRGs;
    iv. ICAO air transport policies (User Charges, Taxes etc.); and
d) State-level plans associated with the ICAO Strategic Objectives for civil aviation

There are many variables to be considered in developing a long-term plan for aviation development, including, but not limited to:

a) the size and complexity of the State's international and domestic aviation system;
b) historic and anticipated rates of growth in air traffic;
c) existing infrastructure;
d) human resources capacity;
e) safety and security oversight capabilities;
f) security threats within the State and region; and
g) the State's economic planning processes and stakeholders.

Therefore, the suggested CAMP structure included in this guidance material is not prescriptive. Nonetheless, the guidance includes topics to be considered to create a comprehensive planning process for all relevant areas of aviation activity, consistent with a State's overall development objectives. The following sections provide a description of recommended CAMP components.

4.2 Strategic Aviation Planning Processes

The Civil Aviation Authority (CAA) is responsible for establishment and overall implementation of the CAMP. Therefore, the CAMP should include a description of CAA organizational structure and the strategic planning processes to be followed to implement aviation development initiatives. Strategic planning processes include the following:

a) Vision and Mission Statements;

b) Objectives;

c) Strategies to achieve the objectives;

d) Action Plans; and

e) Results based management.

At the highest level, strategic planning is driven by the Civil Aviation Authority's vision and mission statements. Vision statements are normally articulated in a single sentence that describe the long-term desired outcome(s) resulting from supporting aviation initiatives. Vision statements should be inspirational and concise. In contrast, mission statements define the organization's objectives and its approach to attain those objectives. Elements of the vision and mission statements may be combined, provided the desired outcomes and related objectives are included.

The State may use different strategies to achieve the objectives contained within the mission statement. Examples include amendments to: the aviation regulatory framework; bilateral or Open Skies agreements that control market access; policies related to foreign ownership and control of air carriers certificated by the State and privatization of State-owned operators and air navigation services providers (ANSPs).

Once the strategies have been established, specific action plans are developed to achieve the stated objectives. In the context of aviation strategic planning, action plans generally relate to multi-year projects to improve the infrastructure, to build CAA capacity and to further enhance the State's aviation safety and security capabilities.

Results based management refers to the measurement of progress toward specific objectives. Key performance indicators (KPIs) should be used to determine whether aviation development projects are being delivered according to planned budget and timelines. In addition, KPIs should be established to determine whether completed projects are providing the desired outcomes.

4.3 State Context

4.3.1 Overview

The CAMP should include an overview of the aviation system and how it relates to activities in other sectors of the economy. Items included in the State Context component provide an "as-is" assessment of the aviation system. This creates a baseline that can be used to identify any gaps between the current situation and the objectives listed in the mission statement. This overview should include:

a) economic factors including GDP growth, classification as a landlocked developing country (LLDC), least developed country (LDC) or small island developing state (SIDS);

b) current traffic and forecasts indicating supply and demand for air transport services;

c) a description of the CAA and other institutions responsible for the State's economic regulation, aviation safety and security oversight;

d) an overview of the regulatory framework;

e) other modes of transport within the State;

f) stakeholders; and

g) factors that may affect CAMP implementation.

4.3.2 Economic Factors

An overview of the State's economy, including aviation's impact to the economy, is essential to understand the impact of investments in aviation infrastructure, human resources, safety and security capabilities.

The overview may include references to the State's gross domestic product or other macro-economic indicators. In addition, aviation's contributions to existing or emerging industries within the State should be cited.

The overview should provide an assessment of aviation-related economic policies including, but not limited to: the liberalization of access to air transport markets; privatization of aviation service providers; foreign ownership of air operators; user charges; taxes and subsidization of air services.

Least Developed Countries, Landlocked Developing Countries and Small Island Developing States face specific challenges. According to the Industry High Level Group (IHLG), an initiative under the ICAO Secretary General, most airports in LDCs, LLDCs and SIDS receive only a limited number of flights a week, and costs of air travel are disproportionally high. While air traffic in these countries has tended to grow faster than the world average, total traffic volume represents a small fraction of the global share. the volume of passenger traffic in LLDCs rose by 58 per cent between 2010 and 2016, compared to the world average of 44 per cent during the same period. Nonetheless, passenger traffic in LLDCs represents only a 0.83 per cent share of the world's passenger volume. The trend related to cargo is similar as LLDCs accounted for only 1.23 per cent of global freight volume in 2016.

4.3.3 Traffic Forecasts and Trends

The availability of accurate, credible air traffic forecasts is the basis for the State's aviation planning activities. Accurate forecasts are critical to effectively implement strategic planning initiatives by estimating aviation's future contributions to the State's development objectives. Such forecasts allow the State to develop sound business cases and conduct gap analyses between forecasted demand and current capacity based on existing infrastructure and human resources. The CAMP should contain traffic forecast scenarios to support various investment or policy strategies. Additional forecasts can be used to determine fleet and personnel requirements associated with each strategy.

It may be necessary to forecast trends in multiple areas to define the scope of initiatives and related financing requirements needed to attain the State's aviation objectives. The following are examples of forecasts that may be used in the context of strategic planning:

a) number of departures or available seat kilometers;

b) traffic in terms of total passengers, revenue passenger kilometers or load factors according to specific routes, regions or country pairs;

c) cargo traffic;

d) aircraft fleet requirements; and

e) personnel requirements to staff pilot, air traffic controller, maintenance and other essential positions.

Forecasts developed by the State should be validated by independent sources to ensure accuracy. ICAO's Long-term Forecast tool, which can be found on the iCADS platform, is an online resource that can be used for this purpose. The updated ICAO traffic forecasts have been integrated into a newly-developed electronic interface, allowing States and other users to generate customized traffic and departure forecasts at different levels of granularity (for example, by route, country-pair, city-pair, fleet type and for each country of departure). One important facet of this application is the ability to view the total personnel forecasts by Country as well as the new personnel that will need to be inducted over the forecast period. Member States with the application can take informed planning measures and that personnel training and infrastructure capacity gaps are addressed and keeps pace with the forecasted growth of traffic. (https://www4.icao.int/icads/Product/View/26)

4.3.4 Institutional Factors

The CAMP should provide an overview of the relevant institutions that includes, at a minimum:

a) the CAA's mandate as well as accountabilities for the Director General of Civil Aviation;

b) the CAA organizational structure, accountabilities and resource requirements;

c) State entities having accountabilities related to economic regulation, aviation safety, security as well as the development and maintenance of aviation infrastructure;

d) State entities responsible for implementing facilitation-related issues nationally, such as immigration, customs, health, quarantine, tourism, passport, visa and other travel document-issuing authorities, police and other law-enforcement authorities, foreign affairs, agriculture/environment, narcotics control, and so on;

e) entities responsible for finance, planning and development functions; and

f) relevant regional aviation entities such as Regional Safety Oversight Organizations (RSOOs), Regional Accident and Incident Investigation Organizations (RAIOs).

4.3.5 Legal, Policy and Regulatory Factors

The CAMP should provide an overview of legal, policy and regulatory factors that includes:

a) the State's civil aviation act, or equivalent legislation providing the CAA with its mandate;

b) the State's national aviation policy;

c) the State's national policies on Facilitation matters specific to all agencies listed in paragraph 4.3.4 above;

d) the State's civil aviation regulations (CARs), as well as any gaps between the CARs and ICAO requirements;

e) any regional and international regulatory requirements, agreements or protocols relevant to the State's civil air transport operations.

4.3.6 Other Transport Modes

The CAMP should consider how aviation relates to other modes of transportation within the State. The purpose is two-fold: (1) to identify all available means to transport people and goods in the most effective and efficient manner and (2) to determine impacts between aviation development and other forms to transportation.

Other modes of transport to be considered in this context typically include:

a) road;

b) rail;

c) water (maritime and river).

Business cases for initiatives contained within the CAMP should include comparative analyses of other types of transport available to identify the optimal solutions to attain the State's national development goals. Criteria may include: safety, speed, efficiency, capacity and environmental impact. In addition, the CAMP should identify impacts between the development of aviation and other forms of transport. For example, the need for improved road or rail infrastructure to improve accessibility to airports.

4.3.7 Stakeholders

As discussed in the chapter on State National Aviation Planning Framework, alignment of the CAMP with policies and plans at the state, regional and global levels is essential to ensure that investments in aviation yield the desired benefits. Therefore, engagement with relevant stakeholders is important to CAMP development and implementation.

The Ministry of Transport, or equivalent governmental entity, is a key stakeholder as the CAA must compete for limited resources available for investments in the State's transport infrastructure and oversight capabilities. Coordination with other Ministries and governmental organizations responsible aviation-related functions is also essential to ensure alignment of CAMP initiatives. While the specific entities will vary in each State, Ministries or Agencies responsible for the following functions are typically considered key stakeholders:

a) Defence;

b) Environment;

c) Security;

d) Finance;

e) Infrastructure;

f) Facilitation for all agencies listed in 4.3.4; and

g) Development planning.

In addition, engagement with industry stakeholders is required to ensure that the CAMP initiatives are viable and consistent with operational needs and capabilities. Domestic industry stakeholders may include: airlines; airport authorities; air navigation service providers; aviation training organizations; maintenance organizations; as well as organizations representing pilots, air traffic controllers and other groups of operational personnel.

The list of international industry stakeholder organizations includes, but is not limited to, the following: Airports Council International; the Civil Air Navigation Services Organisation; the Flight Safety Foundation; the International Air Transport Association; the International Coordinating Council of Aerospace Industries Associations and the International Federation of Air Line Pilots' Associations.

In addition, there are multiple stakeholder organizations at the international, regional and continental levels. International stakeholders include multiple UN organizations such as ICAO, the World Trade Organization and World Bank. Regional civil aviation commissions include the: Arab Civil Aviation Organization (ACAO); African Civil Aviation Commission (AFCAC); European Civil Aviation Conference (ECAC); and Latin-American Civil Aviation Commission (LACAC).

4.4 Plans for Specific Areas of Aviation Activity

4.4.1 Overview

ICAO provisions as well as the GANP, GASP and GASeP require States to develop and implement plans or programmes specific to specific areas of aviation activity. As a result, CAMP components include the national air navigation plan, the national aviation safety plan, the national civil aviation security plan as well as the Facilitation National Plan and the Environment State Plan of Action.

The State's National Aviation Planning Framework serves to create a strategic approach to properly prioritize and implement all air navigation, safety and security, facilitation and environmental protection initiatives contained in these plans. As such, the Framework is intended to facilitate collaboration among all stakeholders to ensure that the State's aviation development program is consistent with its transport policy as well as its overall economic and social development goals, as discussed in Chapter 2.

An overview of contents contained in each of these plans is provided in the following sections.

4.4.2 Aviation Infrastructure

The State's aviation infrastructure should be assessed according to requirements to provide the necessary services to the aviation community. The ICAO Global Air Navigation Plan provides options for improvements that are translated into the relevant regional and national air navigation plans, as necessary. Therefore, the State's aviation infrastructure requirements should consider the ASBU prioritization criteria as well as its future aviation development objectives, which are linked to the State's overall economic and social development goals.

The ICAO Aviation System Block Upgrade framework is flexible by nature, allowing for development of air navigation systems based on the State's needs. The ASBUs contribute to improved performance of an air navigation system. The CAMP should assess the actual performance of the system to identify the objectives to be met in key performance areas such as capacity, efficiency, safety or environment. This will also allow a measure of the real benefits after deployment.

Deployment of the ASBUs will need to be adapted depending on the State's context. Scenarios should be developed, taking into account specific elements as they relate to the needs and constraints of the National Aviation Planning Framework. A collaborative multidisciplinary approach to engage stakeholders from the outset and obtain their buy-in and determine relative priorities of performance objectives is key to the success of the investment.

Harmonization and interoperability at the national, regional and global levels are objectives that require consideration of ASBU implementation by neighboring States or regions. Economies of scale when working together with multiple stakeholders and States (route structure improvement at regional scale for instance) have a direct impact on the costs for procurement, training, maintenance, operation but also on the benefits of the investment.

Finally, all parties involved should check in advance if additional technical specifications, regulations or regulatory approvals would be required from or beyond the ICAO provisions and include their development in the project.

The following generic steps guide and support implementation of the relevant ASBU elements to improve the performance of a State's air navigation system:

a) define the needs and goals for improvements to the air navigation system to address immediate problems or to cope with future demand;

b) develop Scenarios to meet needs and goals;

c) determine operational improvements through the analysis of ASBU elements;

d) develop the economic impact assessment, business case and cost-benefit analysis;

e) examine financing scenarios;

f) determine the need for incentives to obtain financing or stakeholder support; and

g) develop deployment scenarios

Some measures may have safety benefits or present unintended consequences. States and Organizations should use their SSP and SMS to conduct safety risk assessments to determine the potential impact to safety as part of the determination of the priorities and trade-offs and to support the management of the change to their aviation system.

Plans for the development of aviation infrastructure include a broad range of topics including airspace design, air navigation systems and airport facilities. Therefore, States may choose to publish separate plans for air navigation and airport development. In such cases, both plans should be included in the CAMP to provide a comprehensive account of aviation infrastructure development programs.

4.4.2.1 Air Navigation Plan

The CAMP includes the State's air navigation plan, which provides a strategy for the safe and efficient management of its airspace and air navigation system over a defined timeframe. The State air navigation plan should contain an analysis of the current communications, navigation and surveillance infrastructure as well as the following:

a) Meteorology;

b) Aeronautical Information;

c) Search and Rescue;

d) Air Traffic Management, including Air Traffic Services (ATS) and airspace management; and

e) Aerodromes and Aerodrome Operations

The air navigation plan should also contain an analysis of the State's airspace that includes: current operations conducted; identification of congested areas and critical flows associated with traffic demand; and an assessment of short-term solutions available with the existing infrastructure.

The airspace analysis should include descriptions of the: airways system; prohibited, restricted and danger areas; flexible use of airspace; flight information region(s) (FIR) within the State's national boundaries; as well as adjacent FIRs and defined coordination points.

In addition, the analysis should include the location and capabilities of all air traffic services (ATS) facilities within the State. Additional considerations include: Reduced Vertical Separation Minimum (RVSM) airspace; air traffic flow management (ATFM) procedures and standard separation criteria.

The national air navigation plan should include a strategy to implement the ICAO Aviation System Block Upgrades, as discussed in Chapter 2. Details on the content and structure of a national air navigation plan can be found on the ICAO GANP Portal at: https://www4.icao.int/ganpportal.

4.4.2.2 Airport Master Plan

An airport master plan guides future infrastructure development in a logical, cost-efficient and affordable manner. Master plans are developed to support expansion and development of existing airports, as well as the construction of new airports. The plan provides a vision for long-term capital investments required to ensure that all airside, landside and support elements are developed in an adequate, timely and successful manner in order to prevent a global capacity crisis from occurring in which infrastructure development lags behind growing passenger demand.

Airside development includes: runways; taxiways; heliports; aprons as well as navigation and air traffic control aids. Landside development includes: passenger terminals as well as cargo, ground transport and parking facilities. Airport support elements include administration and maintenance facilities, ground vehicle fuel stations, as well as water and sanitation. Additional areas of consideration when developing an airport master plan include sustainability, surface transportation providing airport access and civil / military joint operations.

Airport master planning is essential to ensure that capital-intensive projects are effective and consistent with development requirements. The airport master plan should consider impact on the following:

a) air traffic type and demand;

b) economic factors;

c) environmental factors;

d) investment requirements; and

e) financial implications.

The airport master plan serves to support development by enhancing operational capacity and efficiency over defined periods of time. Due to the nature of airport improvement projects, an airport master plan may typically be segmented according to the following intervals: short-term (10 years); medium-term (10 to 20 years) and long-term (20+ years). The airport master plan should contain a schedule of priorities including a phased implementation plan and be reviewed at appropriate intervals so as to meet demands arising from current and future airport traffic density. Airports experiencing significant and continuous traffic growth should consider regular reviews and updates, normally every 5 years, to ensure that the strategy is consistent with changing air transport requirements.

The planning process should be tailored to the size and complexity of the airport's operations as well as the availability of funds. Nonetheless, the fundamental steps in the planning process include:

a) Forecasting;

b) Data analysis;

c) Option development;

d) Identification of the preferred option;

e) Financial analysis; and phasing.

Project phasing is determined by development triggers that are defined by agreed-upon levels of throughput related to quantifiable criteria such as the number of aircraft movements and passengers. Triggers are therefore not based on specific timelines. This allows for a phased development program that responds to variations in air traffic growth and enables delivery of "just in time" infrastructure.

ICAO is in the process of formulating SARPS that require master plans be developed for certain categories of airports in order to support safety, efficiency and capacity enhancement. Guidance on airport master planning can be found in the ICAO *Doc 9184 Airport Planning Manual*, Part 1 — *Master Planning*.

4.4.3 National Aviation Safety Plan

The State's national aviation safety plan includes goals, targets and indicators to improve or maintain the safety of the air transport system. At a minimum, the national aviation safety plan should include the following:

a) introduction;

b) purpose of the national plan, including links to the regional aviation safety plan and the GASP;

c) the State's strategic approach to managing safety in civil aviation, including national safety goals, targets and indicators;

d) a description of national operational safety risks and initiatives planned to address them;

e) a description of other safety issues, such as challenges related to SSP implementation, and initiatives planned to address them; and

f) a description of how the State will measure safety performance to monitor implementation for the plan.

Requirements to further State safety programme (SSP) implementation and other safety programmes comprise a critical component of the State's strategic planning processes. SSP implementation, including the foundation of an effective safety oversight system is essential to ensure the safe operation and expansion of air transport systems Therefore, the CAMP should include initiatives that facilitate implementation in these areas.

The 37th session of the Assembly (September – October 2010) adopted Resolution A37-5 regarding the evolution of Universal Safety Oversight Audit Programme (USOAP) to the Continuous Monitoring Approach (CMA) as a mechanism for ICAO to monitor the safety oversight capabilities of Member States on a continuous basis. The CMA was officially launched in January 2013.

USOAP CMA audits involve on-site activities during which ICAO determines a State's capability for safety oversight by assessing the State's effective implementation of the critical elements (CEs) of a safety oversight system. The level of effective implementation of the CEs is an indication of a State's capability for safety oversight. The CEs of a safety oversight system are:

- CE 1: Primary aviation legislation
- CE 2: Specific operating regulations;
- CE 3: State system and functions:
- CE 4: Qualified technical personnel;
- CE 5: Technical guidance, tools and provision of safety-critical information;
- CE 6: Licensing, certification, authorization and/or approval obligations;
- CE 7: Surveillance obligations; and
- CE 8: Resolution of safety issues.

Each Member State should address all CEs in its effort to establish and implement an effective safety oversight system that reflects the shared responsibility of the State and the aviation community.

In addition, USOAP protocol questions are categorized into the following audit areas:

a) primary legislation and civil aviation regulations;
b) civil aviation organization;
c) personnel licensing and training;
d) aircraft operations;
e) airworthiness of aircraft;
f) aircraft accident and incident investigation;
g) air navigation services; and
h) aerodromes.

Full technical details of the ICAO findings are made available to the State's Civil Aviation Authority to guide rectification, as well as to all ICAO Member States to facilitate any actions that they may consider necessary to ensure safety.

During an audit, ICAO may identify a Significant Safety Concern (SSC) with respect to the ability of the audited State to properly oversee its airlines (air operators); airports; aircraft; and/or air navigation services provider under its jurisdiction. This does not necessarily indicate a safety deficiency but, rather, indicates that the State is not providing sufficient safety oversight to ensure the effective implementation of all applicable ICAO Standards. States having SSCs are obligated to regularly report to ICAO progress on the correction of the safety concern.

An ICVM is an on-site activity during which an ICAO team of subject matter experts collects and assesses evidence provided by the State demonstrating that the State has implemented corrective actions or mitigating measures for SSCs to address previously identified findings. ICAO validates the collected evidence and information. Simply put, an ICVM is not an audit, but rather a follow up on-site activity to validate progress made by member States in resolving safety oversight deficiencies identified during a previous audit.

The USOAP CMA continues to evolve to support States' efforts in implementing their SSPs. A subset of the USOAP PQs have been identified as fundamental and are considered as prerequisites for sustainable implementation of the full SSP. These are referred to as "SSP foundational PQs" that are grouped in nineteen subject areas derived from Annex 19 and the Safety Management Manual (SMM). States can prioritize and address these PQs when conducting the SSP gap analysis or while defining the SSP implementation/action plan. The concept of "foundation of an SSP" replaces the 60 per cent Effective Implementation (EI) score previously used in the GASP as a threshold to progress into full implementation of the SSP. The intent is that these PQs be included in the SSP implementation planning to ensure sustainability. The full list of SSP foundational PQs can be found using the SSP Foundation tool available via the ICAO integrated Safety Trend Analysis and Reporting System (iSTARS) at www.icao.int/safety/iStars.

The national aviation safety plan presents the strategic direction for the management of aviation safety at the national level, for a set time period (e.g. over the next five years). It outlines to all stakeholders where the Civil Aviation Authority and other entities involved in the management of aviation safety should allocate resources over the coming years.

The national aviation safety plan is a critical component of the State's National Aviation Planning Framework and should be linked to other national plans, where appropriate. While the national aviation safety plan should be developed in alignment with the GASP, priority should be given to national safety issues, particularly those addressing Significant Safety Concerns (SSCs).

Each State's national aviation safety plan should be aligned with the applicable regional aviation safety plan, which provides a mechanism for the coordination of initiatives aimed at improving safety in the region. The regional aviation safety plan can be useful for a State to validate its hazard identification and safety risk management activities. Regional Aviation Safety Groups (RASGs) coordinate the planning process based on the GASP SEIs. The RASGs play a critical role in the implementation

of the GASP by conducting in regional risk assessment exercises, identifying resource requirements and facilitating collaboration.

The national aviation safety plan should include national safety goals, targets and indicators in line with the GASP, the regional aviation safety plan, as well as a series of SEIs that will be carried out to address national operational safety risks identified through the State and industry's safety risk management processes. The plan should address the identification and prioritization of safety issues across the various types of aviation activity (e.g. commercial air transport, general aviation, helicopter operations). The State should implement the SEIs contained in the plan through its existing safety management activities.

Detailed descriptions of national aviation safety plan content can be found in the GASP (Doc 10004).

4.4.4 National Civil Aviation Security Plan

As with safety, ensuring security is fundamental to enable sustainable development of air transport systems. The State national civil aviation security programme (NCASP) includes regulations and procedures to guard against acts of unlawful interference. The NCASP may be a public document, in which case it may be included as a CAMP component. If the NCASP is restricted, the CAMP should reference requirements for implementation of the State's aviation security oversight functions.

Aviation security oversight is a function which enables States to ensure the effective implementation of security-related Standards and Recommended Practices (SARPs) contained in the Annexes to the Chicago Convention and related ICAO documents. Therefore, Member States should assess their levels of implementation and include security in their planning processes to support future aviation development efforts, ensuring that the appropriate authority has sufficient financial resources to meet its national and international obligations being able to attract, recruit and retain sufficiently qualified/ experienced technical personnel within its administration to accomplish all regulatory and oversight activities.

The level of protection derived from the implementation of security Standards is only as strong as the weakest link in the global aviation network. Lack of aviation security oversight in one State threatens the security of international civil aviation operations. Action plans should therefore be developed and funded to achieve continual improvements in security performance, as required to ensure the viability of the State's security oversight capabilities.

The ICAO Universal Security Audit Programme Continuous Monitoring Approach (USAP-CMA) promotes global aviation security through continuous auditing and monitoring of Member States' aviation security performance, to enhance their aviation security compliance and oversight capabilities, by:

a) regularly and continuously obtaining and analysing data on Member States' aviation security performance, including the level of implementation of the critical elements of an aviation security oversight system and the degree of compliance of with Standards of Annex 17 — Security and the relevant security-related Standards of Annex 9 — Facilitation, as well as associated procedures, guidance material and security-related practices;

b) identifying deficiencies in the overall aviation security performance of Member States and assessing the risks associated with such deficiencies;

c) providing prioritized recommendations to assist Member States in addressing identified deficiencies;

d) evaluating and validating corrective actions taken by Member States; and

e) re-assessing the overall levels of Member States' aviation security performance achieved, aimed at continuously enhancing Member States' aviation security compliance and oversight capabilities.

There are eight critical elements to an effective State aviation security oversight system. These encompass the whole spectrum of civil aviation security activities. The critical elements and their associated components are:

- CE 1: Aviation Security Legislation;
- CE 2: Aviation Security Programmes and Regulations;
- CE 3: State Appropriate Authority for Aviation Security and its Responsibilities;
- CE 4: Personnel Qualifications and Training;
- CE 5: Provision of Technical Guidance, Tools and Security Critical Information;
- CE 6: Certification and Approval Obligations;
- CE 7: Quality Control Obligations; and
- CE 8: Resolution of Security Concerns.

Each Member State should address all CEs in its effort to establish and implement an effective security oversight system that reflects the shared responsibility of the State and the aviation community.

In addition, USAP protocol questions are categorized into the following audit areas:

a) regulatory framework and the national civil aviation security system;
b) training of aviation security personnel;
c) quality control functions;
d) airport operations;
e) aircraft and in-flight security;
f) passenger and baggage security;
g) cargo, catering and mail security;
h) response to acts of unlawful interference; and
i) security aspects of facilitation.

Full technical details of the ICAO findings and associated recommendations are made available to the State's appropriate authority for aviation security to guide rectification, while an indication of the level of effective implementation of the critical elements of the audited States' aviation security oversight system is shared with all ICAO Member States.

During an audit, ICAO may identify a Significant Security Concern (SSeC) when the appropriate authority responsible for aviation security in the State permits aviation activities to continue, despite lack of effective implementation of the minimum security requirements established by the State and by the provisions set forth in Annex 17 related to critical aviation security controls resulting in an immediate security risk to international civil aviation. Such SSeCs relate to specific operational deficiencies identified during the audit that could allow for the perpetration of an act of unlawful interference without any likelihood of such an act being detected and prevented. States with one or more SSeCs are obligated to regularly report to ICAO progress on the correction of the security concern(s) and other States are advised of the existence such SSeCs, although specifics are not provided.

As with the safety plan, the State's planning process for aviation security should provide strategic direction for the management of aviation security at the national level, for a set time period (e.g. over the next five years). It outlines to all stakeholders where the appropriate authority for aviation security, and other entities involved in the management of aviation security, should allocate resources over the coming years.

The national aviation security plan is a critical component of the State's National Aviation Planning Framework and should be linked to other national plans, where appropriate. While the national aviation security plan should be developed in alignment with the GASeP, priority should be given to national security issues, particularly those addressing Significant Security Concerns (SSCs) where these have been identified under a USAP-CMA audit.

The national aviation security plan should include national security goals, targets and indicators in line with the GASeP and regional aviation security plans. USAP results can help identify gaps in the State's security oversight capabilities that need to be addressed through initiatives included in the National Aviation Planning Framework.

Additional information on the critical elements can be found in ICAO Document 10047 – *Aviation Security Oversight Manual*.

Related guidance on the implementation of security measures can be found in the Aviation Security Manual (Doc 8973 – Restricted).

4.4.5 National Air Transport Facilitation Programme

Annex 9 Standards 8.17, 8.18 and 8.19 require that Contracting States establish and implement a written National Air Transport Facilitation Programme (NATFP) as well as a National Air Transport Facilitation Committee and an Airport Facilitation Committee. The objective of both the committee and the NATFP is to maintain a safe, secure civil aviation environment in which services are delivered in a reliable and efficient manner. The NATFP should define the roles, functions and responsibilities of all entities involved in air transport facilitation activities. The committee provides a forum for consultation and information-sharing about facilitation matters amongst government stakeholders, government representatives of other air transport-related communities and the private sector.

The model NATFP (Doc 10042) which was developed by the Facilitation (FAL) Panel contains guidance on how States may comply with Standards 8.17, 8.18 and 8.19 of Annex 9 Ð Facilitation. In this regard, explanatory notes are appended to relevant portions of the model NATFP as guidance.

The NATFP aims to address and harmonize the interests of all entities involved in facilitation, e.g. public authorities, aircraft operators, commercial air transport users and airports, etc., to promote the growth of a safe, reliable and viable air transport industry. The potential benefits it hopes to achieve are:

a) to maintain or increase the quality of aircraft, crew, passenger and cargo flow;

b) to maintain or increase the level of passenger service and the cost-effectiveness and efficiency of processes and procedures;

c) to facilitate, accommodate and encourage the growth of air transport; and

d) to contribute to a positive experience meeting the needs of the travelling public.

The NATFP of each State is implemented through the activities of the National FAL Committee. A designated authority within a State' s administration is responsible for the development, implementation and maintenance of the NATFP and for the establishment of a National FAL Committee. This document should be regularly updated, for example when national or international regulations (e.g. ICAO Annex 9 Standards and Recommended Practices) make this necessary.

4.4.6 National Aviation Plan in Preparation for an Outbreak of Communicable Disease

A Contracting State is also required to establish a national aviation plan in preparation for an outbreak of a communicable disease posing a public health risk or public health emergency of international concern. Guidance in developing a national aviation plan may be found in the Manual of Civil Aviation Medicine and on the ICAO website on the Aviation Medicine Public Health page, which also provides a link to the Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA) programme. Annex 11 — Air Traffic Services and Annex 14 — Aerodromes, Volume I — Aerodrome Design and Operations require air traffic services and aerodromes to establish contingency planning or aerodrome emergency plans, respectively, for public health emergencies of international concern. Detailed technical Standards, Recommended Practices and guidance material on preventing the spread of communicable disease through international aviation are provided in Annex 9 – Facilitation (entry of aircraft, disinsection and disinfection of aircraft, airport facilities, implementation of the International Health Regulations, the aircraft "Declaration of Health" and "Public Health Locator Card"); Annex 6 – Aerodromes ("on-board" medical supplies), Annex 18 – The Safe Transport of Dangerous Goods by Air (medical samples, supplies and equipment) and the Air Traffic Management (Doc 4444)(PANS-ATM) detailing the procedures to be followed by the pilot-in-command in communication with air traffic control. The International Health Regulations (2005) and the World Health Organization (WHO) website and relevant aviation-related publications should also be consulted.

4.4.7 Human Resource and Training Requirements

The CAMP should identify the need to recruit and retain well-trained and competent personnel to meet each of the CAMP objectives. There may be challenges in attracting sufficient numbers of qualified personnel as the aviation industry continues to grow. Therefore, the State's aviation development strategy should include plans to recruit, train and retain the required resources. Such plans may be contained within individual CAMP components, such as the national aviation safety plan, national air navigation plan, national civil aviation security plan, national aviation plan in preparation for an outbreak of a communicable disease and national air transport facilitation programme. Alternatively, the CAMP may include a comprehensive strategy to meet the workforce required to implement its aviation development plans.

At a minimum, the human resource planning process should include the following:

a) Developing forecasts of human resource requirements to implement planned aviation initiatives. The forecasts should include: the types and numbers of positions required in all operational, technical and managerial disciplines; specific skillsets required to ensure competence; workforce availability; as well as any external factors that may necessitate changes to the current forecasts.

b) Assessing current human resources capacities in each area of aviation activity. The assessment should include an account of the qualifications and experience of the current workforce to determine whether current personnel may be well-suited to fill future positions.

c) Conducting a gap analysis, which compares the existing human resource capacity against forecast requirements. The gap analysis serves to identify requirements for new positions and skillsets as well as any need to modify human resource strategies to fill the gaps.

d) Developing a human resource action plan(s) to address identified gaps. Such strategies may include: recruitment; training and career development; outsourcing; and the sharing of resources through secondments or other cooperative arrangements among State entities.

e) Monitoring and updating the human resource action plan(s). Implementation of the human resource action plans should be monitored to ensure attainment of the desired results. The action plans may need to be revised to reflect changes in human resource capabilities as well as any amendments to CAMP objectives.

4.4.8 Integration of New Technologies

The CAMP should include plans for the development and integration of new technologies into the existing aviation system, including remotely piloted aircraft systems (RPAS) and commercial space operations.

In such cases, the CAMP provides a holistic and coordinated approach to address impacts in all areas of the State's aviation system brought about by the introduction of new technologies to existing or new modes of air transportation.

RPAS provide new capabilities that have the potential to yield economic, social and humanitarian benefits. Current uses include: applications used to support the agriculture, rail and extractive industries; enabling internet connectivity in remote areas; and the transport of light-weight payloads.

Nonetheless, the integration of RPAS into a State's existing aviation system will require a strategic approach to manage any potential air navigation, safety and security impacts including cyber resilience. Integration will require the development of a regulatory framework specific to UAS operations, as well as a means for their approval and oversight, in accordance with ICAO provisions. Therefore, inclusion of new technologies into the State's National Aviation Planning Framework is essential to ensure the integration does not disrupt existing air transport services.

4.5 Financing Mechanisms

4.5.1 Overview

The CAMP should identify funding mechanisms required to support each aviation development project. Sustainable development of the air transport sector is dependent on financing to support development of a State's airport and air navigation infrastructure as well as to fund activities related to its aviation safety, security and air transport facilitation obligations. In addition, aircraft financing is essential to acquire and maintain fleets that are safe, efficient and reliable. Funding for aviation development projects may be allocated within the State's budgeting process. In other cases, external funding sources will be required.

For LDCs, LLDCs and SIDs, there are typically challenges in funding critical aviation development projects. Traffic volume in these countries is generally insufficient to generate the income required to support aviation infrastructure investments. As a result, LDCs, LLDCs and SIDs may be unable to obtain loans for this purpose.

The World Bank Group (WBG) is a vital source of financial and technical assistance to developing countries around the world through the provision of low-interest loans, grants, credits, and advisory services. The WBG consists of five organizations:

a) the International Development Association (IDA);

b) the International Bank of Reconstruction and Development (IBRD)

c) the International Finance Corporation (IFC);

d) the Multilateral Investment Guarantee Agency (MIGA); and

e) the International Centre for Settlement of Investment Disputes (ICSID).

IDA provides interest-free loans - called credits - and grants to governments of the poorest countries. IBRD lends to governments of middle-income and creditworthy low-income countries. IFC, focused exclusively on the private sector, helps developing countries achieve sustainable growth by financing investment, mobilizing capital in international financial markets, and providing advisory services to businesses and governments. MIGA promotes foreign direct investment into developing countries by offering political risk insurance (guarantees) to investors and lenders. ICSID provides international facilities for conciliation and arbitration of investment disputes.

Additional sources of financing include: direct government investment; regional development banks; national and supra-national development agencies; commercial lending institutions as well as industry partner organizations.

Despite the economic benefits of air transport, development banks typically allocate a small portion of financial flows for aviation development. For example, the WGB Air Transport segment comprised approximately 3% of its US$45 billion Transport portfolio in Fiscal Year 2015 (FY15). Aviation has also received limited Official Development Assistance (ODA), receiving only 4.2 per cent of the total ODA provided by all donors for economic infrastructure and services during the period from 2003-2013. In comparison, road transport was allocated a share of 54.7 per cent.

The availability of funding can therefore be increased through development of a comprehensive National Aviation Planning Framework that is appropriately linked to national development objectives that are, in turn, aligned with the UN SDGs.

Financing mechanisms are briefly described below. Additional information can be found in the ICAO Issue Brief on Financing for Aviation Infrastructure to the UN Inter-Agency Task Force on Financing for Development.

The following sections discuss examples of financing mechanisms typically used to support aviation development projects. Additional Material for funding airport and air navigation services projects can be found in the ICAO Airport Economics Manual (Doc 9562) and the Manual on Air Navigation Services Economics (Doc 9161).

4.5.2 Debt Financing

Debt financing involves borrowing money from an outside source with the promise to return the principal, in addition to an agreed-upon level of interest. Borrowing from commercial banks has been the most common method of financing for medium- to long-term financing requirements. Most self-financing stakeholders like airspace users, airports, and ANSPs revert to this form of financing where retained earnings or their own revenues cannot be used to finance large projects. Where clear ownership of the assets can be demonstrated, Commercial Institutions lend against the asset value as collateral. Development Agencies, Banks and Institutions are other examples of lending sources. Such institutions have provisions to lend with specialized terms, conditions and rates. Financial institutions like European Investment Bank (EIB), European Bank for Reconstruction and Development, Hermes of Germany, EXIM Bank of USA often lend for well-constructed capital projects, with interest rates comparable to commercial banks.

4.5.3 Bond Financing

Bonds are commonly referred to as fixed-income securities and are one of the three main asset classes, along with stocks and cash equivalents. The indebted entity (issuer) issues a bond that states the interest rate (coupon) that will be paid and when the loaned funds (bond principal) are to be returned (maturity date). Interest on bonds is usually paid every six months (semi-annually).

Bond proceeds are the largest sources of funds for airport capital needs, accounting for approximately 54% of the total funds historically. Airport operators have utilized numerous types of municipal bonds to finance airport capital projects including:

a) general obligation bonds supported by the overall tax base of the issuing entity (the airport sponsor);

b) general airport revenue bonds secured by the revenues of the airport and other revenues as defined in the bond indenture;

c) bonds either backed solely by PFC revenues or by PFC revenues and airport revenues generated by rentals, fees and charges; and

d) special facility bonds backed solely by revenues from a facility constructed with proceeds of those bonds.

4.5.4 Equity Financing

Equity financing essentially refers to the sale of an ownership interest in an enterprise to raise funds for business purposes. Equity financing is distinct from debt financing, which refers to funds borrowed by a business. Equity financing involves not just the sale of common equity, but also the sale of other equity or quasi-equity instruments such as preferred stock, convertible preferred stock and equity units that include common shares and warrants. While the term is generally associated with financings by public companies listed on an exchange, it includes financings by private companies as well.

The ICAO Manual on Privatization in the Provision of Airports and Air Navigation Services (Doc 9980) refers to privatization as the *transfer of full or majority ownership of facilities and services from the public sector to the private sector.* Doc 9980 further indicates that privatization is the word most commonly used in connection with the changes taking place in ownership and management in the provision of airports and air navigation services. Privatization connotes either full ownership or majority ownership of facilities and services. Privatization may be full or partial. Under partial privatization, for example, national governments creating corporatized ANSPs float a percentage (less than 50% or more with a blocking majority) of the holdings to private corporations, airlines, airports or banks to bring in investments in the form of equity. Alternatively, corporatized ANSPs could be fully privatized through placements or public offerings with strict supervisory controls imposed by the Ministry of Transport or by an independent regulator. The financing requirements under such circumstances will be shifted fully to the private sector.

4.5.5 Public-Private Partnerships (PPP)

The term "public-private partnership" ("PPP") has been in general use since the 1990s. ICAO's definition in Doc 9980 indicates PPP as an ownership and management structure in which the private and the public sectors both participate. PPPs refer to arrangements where the private sector supplies infrastructure assets and services that traditionally have been provided by the government. This technique provides private financing for infrastructure investment without immediately adding to government borrowing and debt and can be a source of government revenue. PPPs also present business opportunities for the private sector in areas from which it was in many cases previously excluded. The key contrast between PPPs and traditional procurement is that with PPPs the private sector returns are linked to service outcomes and performance of the asset over the contract life. The private sector service provider is responsible not just for asset delivery, but for overall project management and implementation, and successful operation for several years thereafter.

4.5.6 Use of Non-aeronautical Revenues

Revenues from non-aeronautical activities have been used primarily in the airport domain to offset costs associated with aviation infrastructure projects. Sources of non-aeronautical revenue used by airports include:

a) airport parking revenues;

b) rental car revenues;

c) terminal concessions;

d) advertising programs; and

e) commercial development and land used for purposes other than airport operations.

Some ANSPs that have recovered costs through sales of publications (including aero-nautical publications) while other ANSPs have identified operational training as a source of additional revenue. Nonetheless, ANSPs have been slower to identify opportunities for use of non-aeronautical revenues in comparison to the airport community.

4.5.7 Leasing

Assets requiring large financial outlays (e.g. aircraft and radar systems) are often leased. Under this arrangement, ownership remains with the leasing company, or lessor. The lessor is responsible for financing costs but recovers them through principal and interest charges to the lessee throughout the life of the assets. The assets may be purchased by the lessee at the end of a defined period of time.

The ICAO Manual on the Regulation of International Air Transport (Doc 9626), which contains detailed information on this topic, indicates the practice of aircraft leasing has been growing steadily in the last two decades. In a liberalized regulatory environment, leasing of aircraft facilitates the entry of new carriers into the market. ICAO Doc 9626 also acknowledges that there are various types of aircraft leases, including: operating leases; leveraged leases; and sale / lease-back arrangements.

4.6 CAMP Action Plans and Priorities

4.6.1 Overview

The CAMP establishes and prioritizes long-term initiatives based on an assessment of multiple factors including: the safety, security, facilitation and capacity and efficiency of the State's aviation system, its national development goals; aviation's potential contributions to those goals; and projected traffic growth. Individual aviation development initiatives are typically documented in action plans addressing:

a) airport development;
b) airspace enhancements;
c) air navigation infrastructure and services;
d) SSP development, implementation and continual improvement;
e) NCASP implementation; and
f) human resource planning including recruitment, training and retention of qualified staff.

These initiatives may be documented in each of the national plans related to air navigation, safety, security and air transport facilitation. Alternatively, the CAMP may contain a high-level summary of aviation development initiatives in each of these categories providing a comprehensive account of funding allocated, initiation and expected completion dates.

CAMPs are typically applicable over five- to ten-year periods. Nonetheless, the timeframe can be adjusted depending on the types of projects to be undertaken or to coincide with other relevant timelines such as those associated with the State's national development goals. Intermediate revisions to the CAMP should follow a defined process to ensure continuity and attainment of the desired objectives. Upon reaching the end of its term, a new CAMP should be developed to reassess and address new aviation development requirements.

Each plan should include the following:

a) an analysis of the needs to be addressed;
b) the desired outcome(s) and options available to achieve them;
c) the option chosen; and
d) implementation timelines, milestones, costs and funding mechanisms.

4.6.2 Prioritization Processes

The State's aviation priorities, as reflected in the CAMP, will depend upon factors directly related to the provision of air transport services as well as national development goals. ICAO Member States have an obligation to ensure the safety and security of their aviation systems. In addition, it is recognized that safety, security and air transport facilitation enable air transport development. Therefore, initiatives that address significant safety concerns, significant security concerns or to implement the SSP or NCASP should be of the utmost priority.

Prioritization of aviation infrastructure projects may be determined through the following methodology to support implementation of the relevant ASBU modules to improve the performance of a State's air traffic management (ATM) system:

a) define the needs and goals for improved ATM in a given airspace (may include airports) to address immediate problems or to cope with future demand;

b) determine ATM improvements through the application of ASBU Modules;

c) develop Scenarios to meet needs and goals;

d) develop the economic impact assessment, business case and cost-benefit analysis;

e) examine financing scenarios;

f) determine the need for incentives to obtain financing or stakeholder support; and

g) develop deployment scenarios

The economic impact assessment, business case and cost-benefit analysis are tools that generate different, yet complementary, information.

An economic impact assessment (EIA) measures the effect that an aviation development project has on economic activity in a specific area (e.g. reduced transport costs that create jobs and related tax revenues). An economic impact analysis considers: direct impacts, which follow «directly» from transport cost savings or other consequences of the investment; indirect impacts, which occur when directly affected industries purchase additional goods and services; and induced impacts, which occur from increased spending due to higher wages.

A cost-benefit analysis (CBA) considers costs related to the project and weighs them against the expected benefits. It examines all costs and benefits related to the production and consumption of an output, whether the costs and benefits are borne by the producer, the consumer or a third party. As the CBA takes into account both public and private benefits and costs of a project, it tends to be more appropriate in cases where projects are publicly funded. In contrast to the economic impact assessment, the cost-benefit analysis only considers direct impact. Indirect and induced benefits are excluded from the cost-benefit analysis.

A business case describes the business justification for undertaking a programme (or group of projects). It sets out the context, identifies the issue(s) to be addressed and provides a detailed description of the proposal selected as well as the rationale for its selection from among other options. Typical assessments in a business case include financial analysis, strategic drivers, organizational performance factors, cost-benefit analysis (covered in more detail below), risk assessment and stakeholder impact.The business case considers benefits beyond those directly related to the economy. For example, aviation infrastructure projects may improve the reliability, safety and security of the system in addition to generating economic benefits considered in the EIA or CBA.

The ICAO Multi-disciplinary Working Group on the Economic Challenges Linked to the Implementation of the Aviation System Block Upgrades (MDWG-ASBUs) has developed guidance material on how to set up implementation, considering economic impact assessment, business cases, cost-benefit analyses, financial instruments, incentives and the relation with ICAO policy documents, to assist States, stakeholders and regions in implementing the ASBU.

It should be noted that changes in capacity and efficiency may have safety implications or present unintended consequences. States and Organizations should use their SSP and SMS to conduct safety risk assessments to determine the potential impact to safety as part of the determination of the priorities and trade-offs and to support the management of the change to their aviation system.

Additional information may be found in the Global Air Navigation Plan (Doc 9750) or on the ICAO GANP website.

4.6.3 Managing CAMP Amendments

Adherence to the CAMP is essential to ensure attainment of the State's long-term aviation objectives. Nonetheless, the time required to complete strategic aviation initiatives combined with the complexities and dynamic nature of the air transport industry, may create the need for changes to the CAMP components once they are established. Changes may occur for a number of reasons including, but not limited to: amendments to national development goals; the introduction of new technologies; unanticipated changes in the demand for air transport services; unforeseen issues affecting CAMP implementation; as well as revisions to regional and global aviation planning initiatives.

Therefore, the CAMP should include a process to initiate, review and approve amendments. Before such amendments are considered, an assessment should be made to determine consistency with the State's long-term aviation objectives, as reflected in the CAMP vision and mission statements. Otherwise, changes to the long-term aviation objectives themselves may require updates throughout the National Aviation Planning Framework including the CAMP, its component plans as well as the national aviation policy.

A responsible authority should be identified, having the mandate to approve CAMP amendments. Depending upon the nature of the proposed amendment, as well as the State institutions involved, a process may be required to approve the initiation of studies required to validate or justify the type of change being considered. In these cases, expenditures and timelines associated with additional economic impact assessments, business cases and cost-benefit analyses should be planned and budgeted accordingly.

Once the necessary data and information have been collected and analyzed, a consultation process should be established to inform stakeholders of the proposed amendment and provide an opportunity for comment.

As aviation comprises multiple interrelated systems, the proposed amendment should also be evaluated to determine whether it will result in any unintended consequences or impacts on other areas of aviation activity. Examples of such impacts include:

a) additional requirements to recruit, educate and retain qualified personnel required to implement or oversee the introduction of new technologies;

b) resulting changes in traffic volume or traffic flows that affect airspace density as well as airport congestion; and

c) procedural changes required to mitigate emerging safety and security risks.

APPENDIX

CASE STUDY ON THE ECONOMIC CONTRIBUTION OF AIR TRANSPORT IN DOMINICAN REPUBLIC

5. Background Information

5.1 In September 2015, Heads of State and Government adopted Transforming our World: the 2030 Agenda for Sustainable Development, including its 17 Sustainable Development Goals (SDGs) and 169 targets. The Agenda is a commitment to eradicate poverty and achieve sustainable development by 2030 worldwide, ensuring that no one is left behind. The adoption of the 2030 Agenda was a landmark achievement, providing for a shared global vision toward sustainable development for all. The 2030 Agenda for Sustainable Development called for special attention to Small Island Developing States (SIDS), as they face unique vulnerabilities in their sustainable development.

5.2 Achieving the 2030 Agenda's SDGs will rely on advances in mobility, including air transport that is safe, secure, efficient, economically sustainable and environmentally responsible. While sustainable transport and aviation do not have a specific SDG, it has been widely recognized that both are essential enablers in the achievement of the 2030 Agenda for Sustainable Development. In 2017, the International Civil Aviation Organization (ICAO) completed a thorough analysis of how its 2017-2019 Business Plan supports the 2030 Agenda for Sustainable Development. Through this analysis, the Organization mapped direct linkages with 15 of the 17 SDGs.

5.3 CAO's No Country Left Behind (NCLB) initiative focusses the efforts of the Organization to assist States in implementing ICAO Standards and Recommended Practices (SARPs). The main goal of this work is to help ensure that SARPs implementation is harmonized globally so that all States have access to the significant socio-economic benefits of safe and reliable air transport.

5.4 The Dominican Republic, due to its close and uninterrupted work with ICAO, serves as a model to the SIDS, since they share same characteristics, such as the reliance on tourism and the air transport as the main mean of transportation. In the past 12 years, the State has stood out as one of safest and most reliable State to fly to, due to a group of reforms in the aviation sector, with the objective of conforming to the ICAO international standards. These reforms, coupled to other policies to foster tourism in the State, increased the number of passengers who fly to Dominican Republic, thus impacting greatly in the State's economy.

5.5 The main reforms can be summarized as: modernization of the institutional framework, defining and separating functions between autonomous institutions for each group of activities; liberalization of the aviation market, fostering an free competitive market and signing air services agreements with more than 60 States; capacity-building to public officers in order to deliver better services; modernization of the international airports and of the air navigation system; incorporation of ICAO international standards in the internal legal framework; Action Plan for the Mitigation of CO2 emissions in the aviation sector with goals and measures.

5.6 The objective of the case study was to describe these reforms from 2006 onwards and to measure, through rigorous econometric models, the impact of these reforms to the passenger flows to the State and the Dominican Republic economy. ICAO worked in close coordination with the Inter-American Development Bank to develop a case study that highlights the importance of policy initiatives in civil air transport to boost traffic and bring benefits to the national economy.

6. Scope, Purpose and Methodology

6.1 The study included a two-day air transport workshop on aviation data analysis and economic regulatory framework and a one day meeting on the case study activities. The objective of the meeting, which was organized by the North American, Central American and Caribbean (NACC) Office, was to bring together all stakeholders (Representatives of Dominican Republic Authorities (IDAC, JAC, Tourism Ministry, Transport Minister, UNPHU, ACI/LAC, IATA, Inter-American Development Bank) and experts from the ICAO Air Transport Bureau to work on a case study on the Dominican Republic. The Case Study will show the effects of when a State has political will and commitment in establishing aviation as a national priority versus when it does not.

6.2 The two-day workshop served as a basis for common understanding and included presentations on the latest applications in data and analytics, air transport economic policies and regulations that are used for efficient decision making by different aviation stakeholders. The workshop included presentations on the latest applications in data and analytics that are used for efficient decision making by different aviation stakeholders, including the latest sophisticated ICAO applications for connectivity and traffic forecasts.

6.3 Considering that previous studies tend to concentrate on aviation's contributions to States as represented over a continuous period, this case study had the objective to quantify the economic and social benefits from civil aviation to Dominican Republic, including data and analysis of the past two decades, seeking to demonstrate the direct empirical data (before and after) and the effects of aviation when a State chooses to make aviation a priority in its development and strategic plans as well as when a State does not provide the political will or commitment to its aviation. The incremental net benefits to the economy of the State from the investments in air navigation infrastructure, in improving effective implementation of safety audit scores and other activities in the civil aviation domain were quantified.

6.4 The case study seeked to provide a more relevant and accurate representation of the "before" and "after" effects on the economies and sustainable developments of SIDS as well as other small developing economies, including meaningful insight to civil aviation planners and to line ministries (tourism, finance, transport) on the returns on investments generated by the civil aviation sector. It is also expected to further investments and financing in the air transport sector, considering the forecasted growth in traffic of the State and to provide a template to civil aviation authorities in the region and to other SIDS, with which they can communicate the benefits from investments and financing in civil aviation activities in their respective States.

6.5 The study also provided ICAO, Directors General, Ministers, Heads of State, the industry, NGOs as well as developing States and SIDS in all parts of the world with a true and relatable representation of the impact and need of political will and commitment as a fundamental and required base for any true development and sustainability of the air transport system that would allow the States to reap the socio-economic benefits and sustainable growth of economy within each Member State. Lastly, and most critically important, it would provide a very real and relatable validation to many of the States that due to their size, or economic development, think that such socio-economic benefits obtained through air transport do not apply to them.

6.6 The methodology applied used a quantitative modelling technique called difference-in-difference (DID) estimators using a pool of 20 other comparable States. This technique is typically used when some groups, like States, experience a treatment, such as a policy change, while others do not. The groups are observed before and after the treatment. One of the most prominent methods of DID is the synthetic control approach. In the DID estimator, a simple average between units (cities, States) in the control group is used while in the synthetic control approach, there is a weighted average that is applied to each unit. The composite control group reproduces better the behaviour of the treatment unit before and after the policy treatment. The control group chosen for this case study is a mix of Latin American and Caribbean States and some tourist destinations around the world.

6.7 The model estimated Gross Domestic Product (GDP) per capita using a panel data estimation with growth rates. This model is simple and was estimated only to selected correlates. The variables assigned to the model selection are inflation using the Consumer Price Index (CPI), exchange rate, added value of industry and services, share of tourism expenditures in the GDP, tourism expenditures and population,. Moreover, there is a relationship between the exchange rate, inflation and interest rate. Inflation and exchange rate were also included as explanatory variables for the GDP per capita along added-value of services and industry.

6.8 The synthetic control group is estimated using added-value of services per capita, the added-value of industry per capita, inflation, and exchange rate. The estimation of the synthetic control DID was applied using a nested maximum likelihood routine to guarantee robustness when estimating the weights to the control group. From 20 States in the control group, the optimization method selected four, which is the standard result for the synthetic control approach. The comparison of the pretreatment characteristics of the actual Dominican Republic with that of the synthetic Dominican Republic shows that the pre-treatment averages are well reproduced by the control group.

7. Conclusion

7.1 The study demonstrated strong evidence that the reforms generated benefits to the economy of the Dominican Republic. The study also highlighted the positive impact on GDP per capita of the group of reforms in the aviation sector. The models showed aviation reforms during 2006-2012 had the following positive impact on the State's economy:

- net effect was a 15.5% increase in GDP per capita over 2006-2012 (increase of USD 607 per capita of income);
- net effect on the GDP was USD 5.5 billion in 7 years (2006-2012); and,
- net increase between 23% and 27% of the passenger traffic between the United States and Dominican Republic.