14th Five-Year Plan for Civil Aviation Development

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The period covered by the 14th Five-Year Plan will be the first five years during which China begins its march towards a modern socialist country, and Civil Aviation Administration of China (CAAC) starts the building of civil aviation strength in multiple fields. This Plan, compiled in accordance with *The Outline of the 14th Five-Year Plan for Economic and Social Development and Long-range Objectives through the Year 2035 of the People's Republic of China*, *the Outline Program for Building China's Strength in Transport*, *Outline of the National Comprehensive Three-Dimensional Transportation Network Plan*, *Outline for a Modern Comprehensive Transportation System during the 14th Five-Year Plan Period*, and *Action Program for Building Civil Aviation Strength in the New Era*, is a guiding document for civil aviation development that elaborates on the strategic intentions and priorities for civil aviation growth for some time in the future.

Part 1

Development Environment and Guidelines

Chapter 1

Foundation of Development

Since the 13th Five-Year period, under the correct leadership of the CPC Central Committee and State Council, the civil aviation industry in China has stuck to the general working philosophy for civil aviation in the new era, actively responded to the complex developments of environments at home and abroad and various risks and challenges, set new record in flight safety, realized dual goals of improvement in size and quality and obtained fruitful results in deepening reform. As such, the capabilities of China's civil aviation to meet people's expectation for a better life and to support China's national strategies have been significantly enhanced, which have well satisfied the need for socio-economic development and basically secured a historic leap from a country of air transportation of size to one of strength.

A new record has been ser for aviation safety performance. With 5.27 million hours of safe flight operations and a passenger turnover of 2.73 billion, both major accident rate per million hours and fatality rate per 100 million passenger-km of transport aviation standing at 0, and no major ground accident happened, aviation security has been safeguarded with the longest period of safe operations since the People's Republic of China first launched civil aviation activities, ranking in the top league globally in terms of aviation safety.

Service quality has achieved substantial improvement. By virtue of a fundamental

change in the quality of transport service as its core indicator, flight regularity has exceeded 80% for three consecutive years, and special campaigns on service quality being carried out in in-depth manner, air travel has become increasingly safer, more comfortable and more convenient.

Supporting capabilities have significantly improved. National comprehensive airport system has been improved with 241 certified transport airports and 41 newly constructed runways, covering 91.7% of prefecture-level cities; as such, forming of an airport-centered comprehensive transport hub is gaining speed. The number of registered general airports has reached 339. Capacity of air traffic management to support flight operations has steadily enhanced to over 11.6 million movements; and fleet size of civil aviation now stands at 6795, which has strongly contributed to the fast growth of the industry.

Operation quality and efficiency continued to increase. Passenger load factor, overall load factor and daily utilization rate of aircraft stay at relatively high levels. Share of passenger throughput from airports in central-western China has risen to 44.4%, demonstrating a more balanced development among regions. The development environment for general aviation is improving at faster speed with total flight operations (unmanned aircraft included) exceeding 2.8 million hours. China ranks among the world's top in terms of operation size and serving capabilities of its air transport enterprises and hub airports. Noticeable achievements have been achieved in the campaign to protect the blue sky and development of green civil aviation was accelerated.

Strategic position has become more prominent. The share of passenger throughput from civil aviation has increased to 33% among all means of transport, with 895 international routes that connect China to 62 countries positively serving national diplomatic exchanges, foreign trade activities and travel of the people. The domestically manufactured aircraft ARJ21 has been put into smooth operation, and C919 has successfully completed its debut flight. A development paradigm featuring positive cooperation with airport economy demonstration zones and pilot free trade zones has taken shape. In addition, civil aviation has lived up to its mission in fighting against the COVID-19; and it also made great achievements in industry-supported poverty alleviation, targeted poverty alleviation and paired-up assistance.

Forming of an innovation pattern is gaining speed. As cooperation between CAAC and local entities, enterprises and universities at multiple levels has achieved substantial effects with the Civil Aviation Science and Education Innovation Alliance for Key Breakthroughs being founded, and the first civil aviation technological innovation demonstration zone established. Civil aviation has successfully applied for 7 National Key Research and Development Plan projects, and has been awarded with 1 first prize of National Technological Innovation Award and 2 second prizes of National Scientific and Technological Progress Award. Transformation application has been accelerated for a series of self-innovation products, such as flight inspection platform, airport luggage system, large ATM automation system, global flight tracking and surveillance system

for civil passenger aircraft, EMAS and D-level simulator.

Governance capabilities have remarkably improved. With the positive implementation of the "1+10+N" overall working framework to deepen reform in civil aviation, significant achievements have been obtained in the industry. The regulation and standard system have been further refined, development planning been made systematic and coordinated, administration mechanism been better improved, public service functions been further optimized and industry governance has achieved greater efficiency.

In the meanwhile, the civil aviation industry still faces serious lack of capacity, dynamism, capability and efficiency, and the outstanding problem of imbalanced and insufficient civil aviation development. These are mainly reflected in the following aspects: first, insufficient key resources, causing bottlenecks for both capacity and efficiency of infrastructure supporting capabilities; second, clear weakness in air logistics, general aviation and coordination with domestic manufacturing; third, lack of capabilities in independent scientific and technological innovation, and green and low-carbon technologies to strongly support and lead civil aviation development; and fourth, civil aviation governance system and governance capability being yet to improve and systematic and predictive approach in response to major risks being yet to enhance.

Box 1 Civil Aviation Development Indicators during the 13th Five-Year Plan Period

Category	Development Indicators	2015	2019	2020	2015-2019 Annual Growth Rate
Size of the industry	Transport turnover (100 million ton-km)	852	1293	799	11.0
	Passenger traffic (100 million persons)	4.4	6.6	4.2	10.7
	Cargo and mail traffic (10 thousand tons)	629	753	677	4.6
	General aviation flight hours (10 thousand tons)	77.8	106.5	98.4	8.2
	% of air passengers in all means of transport	24.2	33.1	33	-
Development quality	Rate of major accident and beyond per million hours of transport flight	[0.00]	0	0	-
	Flight regularity (%)	67	81.7	88.5	-
	Average delay (min)	23	14	9	-
	Share of Chinese carriers in International market (%)	49	53.3	-	-
Supporting capability	Flight movements (10 thousand) supported	857	1166	905	8.0
	Civil transport airports	207	238	241	-
	Prefectural-level cities covered within 100km direct distance to transport airports	87.2	91.7	92	-
Green development	Fuel consumption per ton-km (kg)	[0.293]	[0.289]	[0.295]	-
	CO_2 Emissions per ton-km (kg)	[0.926]	[0.910]	[0.928]	-

Note: figures in [] are five-year annual average/accumulative results.

Chapter 2

Circumstances and Requirements

Against major changes unprecedented over a century, development of civil aviation is facing increasing complexity and uncertainty in the external environment. In particular, those profound and complex changes in front of China's civil aviation development include the power rivalry among major countries, counter force in economic globalization, the world being ushered in a period of unrest and transformation, largely shrinking international trade and investment, profound adjustments in global economic, technological, cultural, security and political landscape, accelerated implementation of carbon peak and carbon neutral strategies, far-reaching influence from the COVID-19, and the rapidly evolving competition.

To build a new development pattern requires civil aviation to better contribute its strategic support. Against the background of the organic combination between the strategy of expanding domestic demand and deepening of structural reform on the supply side, coordinated advance of developing a strong domestic market and building China into a country with strength in trade, comprehensive upgrade among all links of production, allocation, distribution, and consumption, and the accelerated building of a new development pattern where domestic and international circulation push each other forward, civil aviation is required to give full play to the comparative advantages of smooth domestic and international connectivity, develop airport economy and hub economy at faster pace and ensure that supply chain and industrial chain are safe and under control.

People's new demand for travel requires civil aviation to improve service quality in an all-round way. As China has moved to a stage of development with a focus on quality improvement with long-term sound economic fundamentals and increased number and proportion of the middle-income population, the air transport market has great potential yet civil aviation is still in growth. With the higher expectations from the people on the convenience, fairness, diversity and quality of air services, civil aviation is required to further strengthen supporting capabilities, expand coverage and improve service quality.

Standing at a new stage of building China into a country with strength in civil aviation, the industry is required to accelerate its transformation towards quality growth. At present, China's civil aviation is in the initial stage of building its strength in multiple fields, requiring it to use the strategic opportunity from the new round of scientific and technological revolution and industrial reform, strengthen scientific and technological self-reliance and capabilities to enable empowerment from innovation, deepen reform

of systems and mechanisms, actively respond to resource and environmental constraints, and accelerate the reform of quality, efficiency and driving force in civil aviation.

Based on comprehensive analysis, the principal contradictions between the imbalanced and inadequate development of civil aviation and people's growing demand for better aviation during the 14th Five-Year Plan period remain unchanged, and the industry still stands at a critical stage of strategic opportunities, but with new developments and changes in the opportunities and challenges. The current stage features characteristics of centralized infrastructure construction, accelerated forming of an innovation driven mode, comprehensive deepening of industrial reform and active response to major risks. As such, the whole industry needs to maintain strategic faith and development confidence, enhance the awareness of opportunities and risks, establish the mentality for bottom line scenarios, constantly improve comprehensive strength, and strive to create new opportunities in crisis, break new grounds in the changing situation, so as to march on the new journey of building China into a country with a strong civil aviation industry.

Chapter 3

Overarching Philosophy

Section 1 Guidelines

Under the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, the civil aviation industry needs to coordinate efforts to achieve economic, political, cultural, social, and ecological progress, and implement the strategy to make comprehensive efforts to build a great modern socialist country, deepen reform, advance law-based governance, and ensure full and strict governance over the Party; uphold the underlying principle of pursuing progress while ensuring stability; based on the new development stage, implement the new development philosophy in full, in both letter and spirit and in every stage and aspect of development, establish new development paradigm, and pursue development with a focus on quality improvement; promote supply-side structural reforms as the main task; and make reforms and innovation the primary driving force. With a closer look on civil aviation, the industry will aim at the strategic goal of building China into a country with a strong civil aviation industry in the new era; follow CAAC's overall work philosophy for the 14th Five-Year Plan period, i.e. "implementing people-oriented development concept, ensuring simultaneous development of transport aviation and general aviation, guarding the three bottom lines of flight safety, integrity and whole-hearted service, developing and improving the three systems of modernized national airport system, well-organized air transport network system and safe and efficient operation support system, and shoring up the four inadequacies in development coordination, intelligent civil aviation building, resource and support capacity, and industry governance system and

capabilities"; stick to safety as the bottom line and intelligent civil aviation building as the main task; march towards environmentally-friendly, globalized, market-oriented and law-based development, focusing more on innovation, quality and industry coordination, so as to accelerate the building of a modern civil aviation system of greater safety, quality, efficiency, fairness and sustainability, better serve national development strategies, satisfy people's needs for a better life and lay a solid foundation for China to transform from a country of air transportation of size only to one of strength in multiple fields

Section 2 Basic Principles

Insisting on safe development. We will further enrich the safety concept of the whole system and strike a good balance between safety and development, efficiency, regularity and service quality, in order to form an organic mechanism where they would be each other's support and driving force. Efforts will also be made to strengthen risk control capabilities and improve safety management for a solid foundation of safe development.

Upholding innovation as the driving force. We will emphasize the position of innovation as at the heart in the whole picture of civil aviation development, accelerate digital transformation to meet major demands, break technical bottlenecks and catch on the scientific and technological frontiers, promote the coordinated development and deep convergence among civil aviation operation service chain, innovation chain and industrial chain, and improve civil aviation innovation mechanism, so as to stimulate innovation initiative among enterprises and upgrade the driving forces for industry development.

Continuing reform and opening up. We will be fully committed to deepening reform and opening up wider, and plan in a balanced and coordinated integrated manner on reform measures of basic functions and those with major leading effect to make reform more holistic, systematic and coordinated, and opening up more forward-looking, active and controllable, so as to strengthen building of modern civil aviation governance system and governance capabilities and to activate new drivers for quality development.

Following systematic approach. We need to keep in mind the two pictures of internal and international situation, balance central and local entities, current and long-term perspectives, overall and particular considerations and development scale and quality, and promote synergetic development of civil aviation with comprehensive means of transport, relevant industries and regional socio-economic growth. In particular, efforts should be made to deepen integrated development of civil and military aviation, and to advance the smooth flow of productive factors, efficient sharing of resources and coordinated progress among multiple parties inside and outside the industry, so as to realize the dynamic supply/demand equilibrium of a higher level.

Committed to green development and humanistic care. Upon the overall national requirements on carbon peak and carbon neutrality, efforts will be intensified to

establish a green low-carbon recyclable development mode that covers all fields, subjects, elements and stages of civil aviation. The civil aviation industry will implement the concept of whole-hearted service, focus on the solution of the most fundamental and practical questions of the most concern by the people, and constantly improve people's sense of security, fulfillment and happiness.

Section 3 Development Philosophy

During the 14th Five-Year Plan, development of civil aviation will stand at a new historic position and face characteristics of the new phase. Against such background, the civil aviation industry will stick to and expand the overall working philosophy of "One Two Three Three Four", i.e. implementing people-oriented development concept, ensuring simultaneous development of transport aviation and general aviation, guarding the three bottom lines of flight safety, integrity and whole-hearted service, developing and improving the three systems of modernized national airport system, well-organized air transport network system and safe and efficient operation support system, and shoring up the four inadequacies in development coordination, intelligent civil aviation building, resource and support capacity, and industry governance system and capabilities.

Chapter 4

Development Goals

Section 1 Major Targets

Looking forward to 2035, civil aviation will realize the strategic goal of leaping from a country with big air transport size to one with strength in multiple fields. The comprehensive strength of civil aviation will be largely improved with world-leading airlines, broadly-radiating aviation hubs, world-class aviation services, developed general aviation functions, intelligent and efficient air traffic, economical and reliable safety support, and top-notch innovation capabilities. Civil aviation will play a more prominent and fundamental role in expanding opening-up, supporting industrial development, promoting regional coordination, safeguarding national security and meeting people's livelihood needs, which will effectively contribute to the national goal that China will basically achieve socialist modernization.

During the 14th Five-Year Plan period, the civil aviation industry will strive to build six systems and accelerate implementation of six projects, to achieve safer and more efficient aviation operation, more solid and reliable supporting capabilities, better and fairer aviation services, closer industrial integration, improved governance system and capabilities, significantly strengthened digitalization. A scientific and technological

innovation system will basically take shape, and drivers for civil aviation development will be shifted, to ensure steady growth in quantity and rapid improvement in quality.

— Aviation safety reaching a new level. We will have refined science-based safety theory, precise and reliable risk control, a safety culture that keeps up with the times and advanced and strong technical support. So that civil aviation will develop more confidently with outstanding safety performance, and break the record of 100 million continuous safe flight hours for transport aviation.

— Comprehensive supporting capabilities registering new improvement. We will form a modern comprehensive airport system with well-arranged layout, complete functions, strong support capabilities, intelligence and high efficiency. Also, the efficiency of air traffic management will be effectively improved, so that the supporting capabilities will meet development needs. With information sharing, maintenance industrialization and aviation oil marketization, the comprehensive supporting capabilities will be greatly improved.

— Aviation service capabilities rising up to a new high. As a super-size domestic civil aviation market will be cultivated, efforts will be made to build airlines with world-class safety performance, profitability, brand image and service quality, and to achieved a more developed air service system that is popular with the public, international in operation and of diversity. Domestic network will be efficient and accessible, international routes extensive and smooth, passenger transport network highly interconnected, air logistic network under control and general aviation with enriched and diversified services.

— Innovation-driven development recording new breakthroughs. The Civil Aviation Science and Education Innovation Alliance for Key Breakthroughs will play a more important role as the major force that drives development, contributing to an innovation system where enterprises serve as the main body while civil aviation science and education innovation parks and multiple industrial clusters serve as the support. The industry development will urgently need breakthroughs in core technologies of key areas, and the capability to apply scientific and technological innovation and achievements will be significantly enhanced.

— Building of a green civil aviation breaking new ground. We will have better policies, standards and evaluation systems, continuously improve and optimize efficiency and structure of energy utilization. Active efforts will be made to respond to climate change; comprehensive capabilities to manage environmental pollution will be continuously improved; airport noise prevention and control will be more science-based and effective; and relationship between civil aviation development and ecological environment will achieve greater harmony.

— Industry governance attaining greater efficacy. The civil aviation legal system and administrative management system will be improved; tangible results will be achieved in reform of key areas; administrative efficiency and credibility will be significantly improved, civil aviation credit system basically established, institutional

mechanism for preventing and resolving major risks more effective, and the capability to coordinate international competition and cooperation significantly enhanced.

Section 2 Development Indicators

To consolidate and expand the achievements in COVID-19 prevention and control and civil aviation development, civil aviation development during the 14th Five-Year Plan period will be considered by two stages. 2021-2022 will be the recovery and preparation period, during which the priority is to make solid efforts in ensuring stability in employment, financial operations, foreign trade, foreign investment, domestic investment, and expectations; to fully implement tasks of ensuring security in job, basic living needs, operations of market entities, food and energy security, stable industrial and supply chains, and the normal functioning of primary-level governments; to accelerate construction of major projects, step up reform, manage allocation of transport capacity, stabilize supporting policies, accumulate development momentum and promote industry recovery and growth. 2023-2025 will be a period of growth and potential unleashing, with the priority being to expand domestic market, restore international market, unleash the effectiveness of reform, improve the level of opening-up to the outside world, strive to enhance innovation as the driver of development, accelerate the improvement of capacity, scale, quality and efficiency, so as to promote quality development of civil aviation in an all-round way.

Box 2 Civil Aviation Development Indicator Expectations for the 14th Five-Year Plan Period

No.	Indicators		2020	2025	Annual Growth Rate (%)
I. Supporting capacity					
1	Number of civil airports		580	770	
	Of which:	Number of civil transport airports	241	270	
		Number of transport airport runways	265	305	
2	Flight movements (10 thousand) supported		905	1700	12.9 (6.5)
3	Prefectural-level cities covered with less than 60 minutes of transport between administrative center to transport airport		74.8	>80	-
2. Size of the industry					
4	Transport turnover (100 million ton-km)		799	1750	17.0 (5.2)
5	Passenger traffic (100 million persons)		4.2	9.3	17.2 (5.9)
6	Cargo and mail traffic （10 thousand tons）		677	950	7.0 (3.9)
7	Share of Chinese aviation enterprises in China's international freight market (%)		33.8	>=40	-
8	General aviation flight hours (10 thousand)		281	450	9.5
	Of which: cloud system unmanned aircraft flight hours (10 thousand)		183	250	10

3. Safety performance				
9	Rate of major and beyond accident per million transport flight hours (times/million hours)	0	<[0.11]	-
10	Transport aviation fatality per 100 million passenger-km (persons/100 million passenger-km)	0	<[0.0051]	-
4. Convenience and efficiency performance				
11	Flight regularity (%)	88.5	>80	-
12	Rate of flights using passenger boarding bridge at airports with over 10 million passenger throughput (%)	75	80	-
13	Rate of hub airports connected to rail transport (%)	68	80	-
14	Average daytime utilization rate of transport aircraft (hours)	6.5	9.4	
15	Number of states connected by air	62	>70	-
	Of which: number of those who joined the "Belt and Road" Initiative	42	>50	-
5. Innovation and intelligent technologies				
16	Digitalization rate of cargo transport sheets and bills (%)	-	80	-
17	Passenger whole-procedure paperless capability among airports with over 10 million passenger throughput (%)	-	100	-
18	Luggage whole-process tracking service (%)	-	90	-
19	Rate of domestically made major equipment in ATM system (%)	60	[80]	-
20	R&D input of major enterprises (%)	0.6	1	-
6. Green development				
21	CO2 emissions per ton-km for transport aviation (kg)	[0.928]	[0.886]	-
22	Airport unit energy consumption for passengers (kg ce)	[0.948]	[0.853]	-
Note: 1. Figures in [] are accumulative results. 2. Figures in () are 6-year annual growth rate with 2019 being the baseline.				

Part 2

Building First-class Civil Aviation Safety System

We will develop a systematic outlook of civil aviation on aviation safety and properly handle relations between safety and development. By focusing on safety links of civil aviation such as operation, aviation security, airworthiness and information etc., we will bolster the capabilities to advance theoretical innovation, to prevent and control risks, to supervise in accordance with the law, to support safety and offer scientific pillar in a systematic way so as to make constant progress in overall safety of civil aviation.

Chapter 5

Improving Safety Governance System

Enhancing political awareness and on the basis of the general norms of holistic law-based governance and according to the overall requirement of "zero tolerance for potential safety risks", we will improve laws and regulations, advance theoretical innovation, optimize mechanisms, strengthen accountability and promote capability to govern safety.

Section 1 Consolidating the Foundation of Safety Governance

Deepening law-based safety governance. We will make clearer the basic norms of safety by continuously improving laws and regulations of civil aviation safety, strengthening system of standards for civil aviation safety and enhancing the standardization work of social organizations. We will reinforce systematic coordination of regulations and standards covering various areas and consistency of safety requirements so as to rally governance synergy. In addition, we will establish an unimpeded feedback and communication channel between the primary level implementation of safety regulations and top-level decision to boost timeliness of development of regulations and their matching with actual conditions.

Strengthening researches on basic theory of safety. We will build a mature theoretical system for SMS with the characteristics of Chinese civil aviation, innovate safety management mechanisms and enhance research and development on safety management tools. We will step up research on safety supervision, which will be guided by an approach of paying close attention to organizations and systems and focusing on key persons and links, to promote scientific, standardized and effective management of industrial safety and support change of mode of safety supervision. We will research

into establishing a policy assessment method which will be capable of balancing safety and efficiency. In addition, we will encourage entities who are involved in civil aviation operation to carry forward innovation in safety management so as to provide support for researches on basic theory of safety. And we will encourage market entities involved in consultancy service concerning work safety to develop in a diversified way and increase provision of professional services on management of operation safety.

Section 2 Enhancing Safety Oversight

Optimizing the mechanism for safety oversight. By integrating and optimizing regulatory resources and tools, we will actively promote prioritized oversight and differentiated oversight on the basis of risk classification and grading and improve accuracy of oversight. We will adjust the regional mode of oversight, improve management of operation certificates and adapt to transfer of airlines' mode of operation to one of large-scale, group-based and network-based operation. We will establish an administrative examination system which is based on comprehensive safety assessment and features integration of onsite oversight and off-site oversight, coordination of industrial overall oversight and differentiated oversight as well as combination of statutory self-examination and industrial examination. We will advance innovation in safety oversight mechanism in the fields of plan approval for general aviation and UAS, support of facilities and equipment at small and medium airports and transport of dangerous goods, with a view to meeting the needs of the industrial development. We will establish a mechanism for assessment and management of major changes and related decision-making and response to enhance the capabilities to deal with major or unexpected events and key risks.

Boosting efficiency of safety oversight. We will push forward the combination of the dual prevention mechanism of management and control of safety risks according to their grades and hazard detection and response of potential risks with the safety management system, so as to prevent and mitigate major risks. We will carry out oversight on the basis of safety performance to strengthen prevention and treating the root causes. We will make full use of the existing safety oversight facilities and equipment and strengthen the allocation of law enforcement equipment and the application of technical oversight means to improve working efficiency and reduce oversight costs. We will explore inter-disciplinary training for inspectors and pilot inspection to further improve the efficiency of oversight. Additionally, we will uphold authority of law enforcement and enhance the confidence and strength of safety inspectors so as to enable them take more voluntary actions in performing their duties.

Section 3 Strengthening Enforcement of Safety Accountability

Improving the system of accountability for work safety. We will enhance political awareness of civil aviation safety, reinforce the role of Party groups (committees) as the core. We will research into and develop an assessment system for enforcement of

"four kinds of accountabilities" and improve specific measures for their implementation them. By combining strict management with lenient treatment, we will promote the mechanism for accountability and punishment for acts of discredit and constantly enhance the accountability system for principals responsible for safety accidents.

Strictly enforcing accountability for work safety. We will constantly push forward statutory self-examination of enterprises and management of safety performance in the industry, and step up the development of the industry's safety management system and reinforce its implementation. We will continuously implement the "Two Lists" of powers and responsibilities, intensify efforts to handle violations and carry out continuous oversight and approval of the effectiveness of the safety management system.

Section 4 Enhancing Prevention and Control of Safety Risks

Stepping up prevention and control of operational risks in high-risk areas. We will strengthen monitoring, analyzing and alerting of operational data related to core risks such as Controlled Flight Into Terrain (CFIT), runway safety, loss of control of flight, in-flight engine shutdown, collision over the air and transport of dangerous goods and traditional and derivative risks from operation at high plateau airports and newly established airlines which operate at new airports and employ new pilots-in-command and co-pilots. We will improve assessment and prevention and control of risks from important areas, major time periods and key links of air traffic management. We will make greater efforts in the oversight of operation activities of designated foreign carriers within the territory of China to prevent and mitigate major imported safety risks. We need to identify and prevent and control civil aviation safety risks in the midst of ongoing COVID-19 containment efforts.

Striving to ensure continuous safety of large-scale operation of new type aircraft. Considering the characteristics of operation and support requirements of such domestically made civil aircraft as ARJ21, we will intensify operational support provided by airports and air traffic management entities. We will strengthen coordination and data sharing among CAAC oversight, design and manufacturing and operation at market, build closed-loop management of information on operational safety of domestically made civil aircraft and improve comprehensive analytical capabilities. We will guide aircraft manufacturers to improve their capabilities of rapidly responses and support for safe operation to enhance the operational adaptability of domestically made civil aircraft and enhance their reliability of operation.

Prioritizing the prevention and control of safety risks related to operation of general aviation. We will strengthen the safety management in the fields including low altitude flight services, operation of general aviation airports and maintenance of general aviation, build a risk management and control system that meets the operation requirements so as to improve the safety of general aviation. We will study and improve the prevention and control means and measures for typical risks such as severe weather,

scraping and touching of high-voltage lines and loss of flight control in general aviation operation.

Reinforcing safety management of UAS operation. We will improve the flight management and control mechanism for UAS, which is characterized by multi-party coordination and cooperation among the military, local governments and civil aviation, build the collaborative oversight capabilities according to law to form a joint prevention and oversight pattern which can effectively prevent duplication and neglection and ensure that no UAS is left unsupervised. Focusing on key links such as registration of civil UAS, qualifications of personnel and operational requirements, we will further strengthen industry management and guide its safe, orderly and healthy development. We will guide the continuous improvement of technology related to UAS, enhance our oversight capabilities for UAS operation and improve the safety performance of UAS.

Chapter 6

Cementing the Foundation for Safety Support

With the focus on the primary levels, the foundation and development of basic skills, we will strengthen our style of work and input in safety and attach importance to application of advance and applicable technologies. We will reinforce the safety support system by coordinating resources, arranging reasonable distribution, shoring up weaknesses and keeping the foundation healthy and strong.

Section 1 Reinforcing Fundamental Capabilities

Bolstering the development of human resources. We will constantly carry out building work style of personnel involved in safety, with the “three reverences” being its core. We will work vigorously to improve qualifications and competency of personnel and enhance development of professionals who hold major posts. We will innovate the ways of training, strengthen practical training and enhance education and training of professionals and primary level managers to improve their fundamental skills and competency. We will also attach importance to health of professionals. We will give full play to role of industrial associations and promote their self-discipline.

Increasing investment in safety capabilities. We will actively push forward application of new technologies to such fields as monitoring and alerting of operational risks, protection of runways, transport of dangerous goods and efficient security screening. We will continuously improve capabilities of tracking and surveillance of aircraft. We need to increase input in safety at small and medium airports and develop safety standards for them in a reasonable way. By carrying out assessment of the safety support capacity of civil aviation airports and air traffic management and optimizing

the use management of funds and allocation of resources regarding capacity-building of safety, we will strengthen the support for key areas such as technical standards for safety and new safety technologies.

Section 2 Strengthening Technological Support

Pushing forward innovation of technologies and application demonstration in the field of civil aviation safety. We will build an intelligent monitoring system for safety risks of flight operation, develop preventative safety products based on big data, and improve means of controlling risks. We will encourage innovation in and application of technologies that can prevent runway invasion, foreign objects and bird strikes in a bid to improve airports' capabilities of safe operation. We will study impact of UAS on safety of transport flight and corresponding treatment programs. We will carry out validation of safety performance on the basis of platform for domestically made civil aircraft and facilitate R&D on supporting equipment for transport of dangerous goods and equipment for emergency response and relevant experimental validation. We will study and establish a mechanism for evaluation of new technologies and fault-tolerance of applications to promote the application of various kinds of new technologies.

Advancing capacity building of scientific research on civil aviation safety. Relying on the building of key civil aviation laboratories and research centers for engineering and technology, and motivating the enthusiasm of all entities inside and outside the industry, we will strengthen the research into technology on civil aviation safety and commercialization of research achievements. We will foster capabilities in terms of aviation safety experiments, validation of scientific researches and innovation in technical standards. We will promote the development of think tanks for civil aviation safety and cultivate experts in such fields as review of the safety management system, security audits, flight data analysis and accident investigation.

Section 3 Improving Emergency Management

Promoting emergency response in a holistic way. We will improve the emergency plan system and establish an operational mode that takes into account needs both on general occasions and on special occasions and a joint and coordinated emergency mechanism that features expertise. By enhancing the connectivity of information and coordination with the Ministry of Emergency Management and local governments, we will push forward the integration of airports' emergency response into the local emergency rescue systems. We will study and establish a reserve mechanism for civil aviation emergency equipment and materials and a mechanism for overseas emergency response, and explore the sharing of equipment and resources in various forms. Comprehensive drills will be strengthened and construction of simulated training bases for emergency rescue purposes at airports supported. We will improve the comprehensive support capacity of civil aviation emergency management by accelerating improvement of the technical system for emergency support of the civil

aviation and encouraging expansion of the supply of specialized emergency response and rescue services. We will establish a civil aviation emergency support system for serious and major emergencies, and accelerate improvement of management means and operational mechanism that are compatible with the normalization of COVID-19 containment.

Enhancing capabilities of incidents investigation. We will improve the system for incident investigation in the civil aviation industry. Simulated multi-scenario investigation will be built and regular investigation exercises conducted. We will establish a cooperative mechanism and normalized working procedures for engineering and technical analysis of civil aviation investigations to improve civil aviation's capabilities in incidents investigation. We will introduce more sophisticated investigation equipment. Last, we will effectively carry out work related to international cooperation, including strengthening incubation of international professionals, conducting international exchanges and cooperation and actively participating in the development of regulations and documents concerning international investigation of aircraft accidents.

Chapter 7

Consolidating Aviation Security System

Focusing on intelligent security and sticking to the legal, accountable, coordinated and smart direction, with the goal of promoting effectiveness of aviation security and operational efficiency, we will refine the management system and strengthen models and mechanisms to establish an aviation security system that is characterized by a scientific functions, clear mandates, smooth commanding and efficient operation.

Section 1 Advancing Fundamental Capabilities of Aviation Security

Advancing legislative development, improving aviation security laws and regulations and standards, and pushing forward implementation of legislative plans. We will meet the requirements of "streamlining administration and delegating power, improving regulation and upgrading services" and build positive aviation security culture. We will promote the standardized development of public security infrastructure of the civil aviation, improve the management system and operation mechanism of the aviation security, promote in-flight security personnel, and strengthen aviation security emergency response. By implementing accountability, we will promote the accurate management mode of aviation security in enterprises and public institutions, improve the management system of the aviation security, and implement the principal responsibilities of the enterprises and public institutions for aviation security. In

addition, we will strengthen analysis and study of security information and forecast of police work and improve effective security management of air cargo. We will create an overall governance model for building secure airports to continuously deepen building of civil aviation security.

Section 2 Boosting Synergy of Aviation Security System

Improving external synergy. We will promote the working system for aviation security at the national level, establish a security consultation and coordination mechanism for synergetic interaction and aviation security counter-terrorism with relevant ministries and commissions, the military and local governments in a bid to build a new pattern of aviation security governance. We will develop aviation security risks survey and assessment system, actively participate in global governance and international rule-making and build a cooperative platform for jointly building the national aviation security of the Belt and Road Initiative.

Improving internal cooperation. Strengthening communication of information with the entities within the industry, we will establish a coordinated working mechanism for aviation security that matches the high-quality development of civil aviation. We will promote coordination and integration of intelligence and command functions of civil aviation security organs at various levels and improve the close cooperation among various types of policemen to realize cross-regional and inter-agency joint consultation, sharing of airport videos, coordination of businesses and command and decision-making. We will cultivate high-quality aviation safety officers and safety inspectors, standardize the functions and responsibilities in terms of security, strengthen the overall coordination and cooperation of the crew and establish a coordinated training system for the crew's in-flight security.

Section 3 Advancing Intelligent Security of Civil Aviation

We will establish a coordination mechanism for intelligent application of big data on security, improve the administrative services of civil aviation’s security Internet to promote the construction and intelligent application of big data in civil aviation security. Led by data and information, we will establish a relevant working system for operation under combat conditions. We will optimize processes such as security screening, in-flight security, oversight and audit, firefighting at airports and prevention and control to improve national civil aviation security under the integrated and combat conditions. Research will be made to develop regulations and standards such as guidance on application of intelligent security system and new technologies at airports and push forward self-service and semi-self-service security screening.

Chapter 8

Improving the System of Airworthiness Certification and Operation Evaluation

With the orientation of online information services, standardization and risk management, we will uphold the combination of planning in a holistic way and making key breakthroughs, focusing on supporting research and development of domestically made civil aircraft and their operation. We will aim to promote capabilities of fundamental support, training and education, legislation and development of standards, certification of products and international cooperation and intensify examination and assessment of operation compliance in an effort to build a basic system for original airworthiness certification and evaluation of operational compliance and assessment that covers whole life cycle.

Section 1 Enhancing the System of Laws, Regulations and Standards

Improving laws, regulations and standards regarding airworthiness certification. Revision of laws and regulations including the Regulations on Management of Aircraft Airworthiness Certification of People's Republic of China will be carried forward. By improving capabilities in making laws and standards on the basis of practice, we will constantly push forward revision of normative documents and the airworthiness certification manual. We will develop advisory circulars that match airworthiness standards to form a complete set of guiding materials. In addition, we will step up study and development of regulations and standards and supporting management procedures for key areas such as UAS. Certification standards and policies for light and small aircraft will be promoted and optimized and extensive international exchanges on airworthiness standards carried out.

Improving regulations and standards for operation evaluation. Based on the reality of the manufacturing industry of domestic civil aircraft, and with the goal of ensuring safe and smooth operation, we will continue to improve the regulations and standards which are compatible with China's actual conditions for operation evaluation of such fields as operation support for manufacturing enterprises, after-sales service standards, qualifications and specifications for pilots and maintenance personnel, standards for deviation approval, planned maintenance requirements.

Driving civil aviation standardization. We will complete revision of the Rules on Management of Civil Aviation Standardization and its supporting documents. We will promote the construction of the national innovation base (civil aviation) for technical standards and improve standardization. Supported by products, projects and practice, we will guide development and issuance of standards so as to boost international adoption of civil aviation standards. We will enhance the industrial standardization, and promote the development of standards of social organizations.

Section 2 Improving Comprehensive Support Capabilities in an All-round Way

Strengthening basic support capabilities. By improving the organization system for airworthiness certification and operation evaluation, we will coordinate various resources from national, local governments and industrial entities and promote the construction of certification institutions to realize the in-depth and integrated development with the civil aviation manufacturing industry. Besides, we will promote the building of a standardization management system for airworthiness certification and a test flight system. We will improve the operation management system for airworthiness certification and keep efficient communication with aviation manufacturing enterprises.

Strengthening support for incubation of talents. Led by work of type certification and production oversight, we will strengthen the training of professional leading talents and technical experts to build a team of China's independent airworthiness certification talents which feature an appropriate scale, a complete range of specialties, a desired structure and a high level of competency. We will strengthen the training of professionals who are badly needed in the areas of certification of test pilots, cabin safety assessment and software evaluation of airborne systems and equipment certification. By making use of resources inside and outside the aviation industry, we will carry out training for professional airworthiness certification, innovate the training system and improve our capacity of training. We will encourage colleges and universities to set up airworthiness-related majors. We will improve competency of professionals engaging in evaluation and assessment of aircraft by innovating the management mechanism and organization mode and integrating resources of professional talents.

Reinforcing technical support. Driven by actual needs, we will improve the scientific research conditions of airworthiness certification and vigorously carry out researches on airworthiness certification technologies which are characterized by in-depth integration of production, learning, research and application. We will strengthen the basic research on airworthiness validation methods for UAS, the propulsion system of electric-powered aircraft, hydrogen fuel cells, 3D printing and new composite materials. We will reasonably plan scientific research projects and set relevant conditions and encourage the industrial entities to carry out the construction of national accreditation laboratories and flight test bases in the field of self-reliant airworthiness certification.

Section 3 Making Efforts to Improve Capabilities of Product Certification and Operation Evaluation

Ensuring certification of key types. We will constantly promote airworthiness certification of CR929, C919, MA700, CJ-1000A and EC175-Z-15. We will accelerate the airworthiness certification of domestic aviation parts and advanced communication and navigation equipment, and support industrial application of them. We will

accelerate the improvement of the airworthiness management mode of UAS system on the basis of operation risks. Besides, we will improve the self-reliant technologies used for certification of aviation fuel and aviation chemical products and promote their use in China.

Advancing safety management of whole life cycle. We will focus on strengthening oversight of the production of domestic civil aircraft such as ARJ21, C919, MA60/600 and Y12. We will strengthen management of the airworthiness certificates after their issuance, and urge their holders to earnestly honor their responsibilities. We will establish a collaborative working mechanism that involves R&D and manufacturing, operation and maintenance and safety oversight, and give full play to the role of Flight Technology Committee and the Maintenance Technology Committee. We will carry out compliance assessment of initial and continuous operation, guide domestic aviation manufacturing enterprises to refine the technical support and after-sale service system to constantly push forward upgrading and improvement of domestically made civil aircraft.

Boosting international cooperation in domestic products. By deepening bilateral cooperation, we will focus on promoting the airworthiness validation of China's aviation products and parts by Europe and the United States and support their export. We will provide airworthiness support for overseas operation of domestically made aircraft, exporting China's airworthiness certification concept and technical standards. In addition, we will deepen and build cooperation in bilateral airworthiness with the countries along the "Belt and Road", and support the "going global" of the domestic aviation products, technology, services and regulations and standards.

Chapter 9

Improving Cyber Security

Cyber security constitutes an important part of civil aviation safety and the basic guarantee of construction of intelligent civil aviation. With the focus on strengthening the cyber security management system and improving the supporting function of cyber security, we will actively respond to the new challenges of the diversification and complexity of threats from cyber security, ensuring the safety of infrastructure for key information, information systems for important businesses and major data resources of civil aviation.

Section 1 Improving Cyber Security Management System

Improving regulatory system for cyber security management. We will develop standards and specifications related to cyber security so that cyber security management

of civil aviation will be law-based. We will establish and improve methods of grading and classification management of civil aviation network, carry out data management according to sensitivity level and access scope of data security and develop a mechanism, use and control requirements for data sharing. We will intensify data protection, prevent disclosure, damage and illegal use of passengers' personal information.

Promoting supervision of cyber security. We will strictly implement the responsibility system for cyber security and formulate detailed rules for the implementation of the responsibility regime for cyber security of civil aviation. We will improve the supervision system for cyber security of civil aviation industry. We will fully implement the grade-based protection system of cyber security and the protective system for key information infrastructure, and improve the mechanism for information notification. Besides, we will build an online security monitoring and early warning platform for important industrial networks and information systems to strengthen real-time monitoring. We will implement the accountability system for cyber security in accordance with laws and regulations.

Section 2 Promoting Protection of Cyber Security

Strengthening security support for information network systems. We will build a holistic security situation awareness system and a mechanism for risk prediction of cyber security. We will support the construction, upgrading and renovation of security facilities to create a security defense system with flexible deployment, adaptive functions, accurate threat identification and collaboration among cloud computing, edge computing and terminals. We will also strengthen the management of personnel holding key positions related to cyber security and management of supply chains, and improve the safe operation of core network systems, the networks' capabilities to defend attacks and protection of important information from being disclosed. We will promote security, controllability and domestic substitution of key technologies and core equipment used in the important information systems of the civil aviation, and accelerate the adaptation to the new situation of building new-type infrastructure and intelligent civil aviation. Last, we will strengthen research and development on technologies concerning security of aviation information networks and industrial control networks.

Reinforcing response to emergencies in terms of cyber security. By improving the capabilities of dynamic response to, recovery from and handling of cyber security incidents and establishing an emergency command mechanism for major cyber security incidents, we will improve the prevention, ongoing monitoring and post-factum emergency support. Moreover, we will strengthen cooperation with security service entities to improve the collaborative response to cyber security incidents. We will also build a repository for knowledge on cyber security threats, establish a team of technicians responsible for emergency response and support the development of a simulation training platform for industrial emergency response and a shooting range for

cyber-attacks and defense, in an effort to improve the capability of defense under combat conditions and to trace back incidents. We will make full use of existing resources used for disaster recovery and strengthen disaster tolerance and backup of important information systems in the industry.

Part 3

Building First-rate Infrastructure System

Infrastructure represents an important support for building a civil aviation powerhouse. Focusing on breaking the bottlenecks of resource capacity, we will strive to improve the quality and efficiency, attach greater importance to development driven by innovation, and implement the potential tapping and improvement of capacity to accelerate the construction of a national modern comprehensive airport system and an air traffic management system and give play to the role of overall synergy, thereby laying a solid foundation for the high-quality development of civil aviation.

Chapter 10

Improving National Comprehensive Airport System

The national comprehensive airport system is an important foundation for supporting a civil aviation powerhouse. We will push the national comprehensive airport system toward higher quality development by continuing to increase investment in airport construction, increasing high-quality supply, breaking the bottlenecks of capacity at hub airports.

Section 1 Accelerating Construction of Airport Infrastructure

Accelerating efforts to build hub airports. We will accelerate the construction of international aviation hub airports in Beijing, Shanghai, Guangzhou, Chengdu, Shenzhen, Kunming, Xi'an, Chongqing, Urumqi and Harbin. Building of Chengdu Tianfu International Airport will be finished, and a hub airport (a new airport in Guangzhou) covering the Pearl River Delta planned. Capacity expansion and transformation of regional hub airports in Tianjin, Shenyang, Ji’nan, Lanzhou, Nanning, Guiyang and Lhasa will be advanced. Airports in Xiamen, Hohhot, Dalian, Nantong will be relocated. Ezhou Airport in Hubei Province as a dedicated cargo hub airport will be completed and put into operation, and the freight facilities at comprehensive hub airports in Beijing, Shanghai, Guangzhou, Shenzhen and Zhengzhou will be optimized. We will study and put forward the planning and layout of air cargo hubs composed of comprehensive hub airports and dedicated cargo hub airports after relevant researches.

Improving layout of non-hub airports. We will newly build a number of non-hub airports and put emphasis on the layout and increase of airports in the central and western areas and border areas. We will strengthen preliminary deliberation before a

new airport is built and make pipelines of projects. With the economically affordable principle in mind, we will reconstruct and expand a number of non-hub airports. Besides, we will strengthen support for general aviation at regional airports, installing corresponding facilities for the takeoff and landing of domestically made regional aircraft, and during this process we will meet national defense requirements. We will make prudent decisions on relocation of airports， carrying out research on preliminary work related to relocation of airports in Nanyang, Jingdezhen and Huangshan. Areas adjacent to each other are encouraged to cooperate in building facilities at planned airports in a joint venturing way to realize sharing of resources and mutual benefit.

Enhancing quality and performance of existing facilities. We will tap potentials of facilities by strengthening the research on the operation mode of multiple airports, multiple runways and multiple terminals, attaching importance to matching of air resources and ground ones, and exploring new operation standards and modes. We will support the airports that have conditions in optimizing and transforming the runways and taxiing systems to improve the operation efficiency of the movement area. We will push forward restructuring of terminals and redesign of processes of existing airports to adapt to the changes of passengers in travel modes and needs by resolving problems of low efficiency and bottlenecks of processes that exist in the systems of rapid transit, security screening and baggage.

Optimizing and improving aviation fuel support. Facilities for aviation fuel will be built in combination of airport building. Aviation fuel reserve bases will be planned in the Guangdong-Hong Kong-Macao Greater Bay Area and in the southwest region. Aviation fuel support for regional airports will be enhanced and the emergency support mechanism for distribution of aviation fuel improved to ensure safety of aviation fuel supply. Diversification of investors in the construction of aviation fuel supply facilities will be encouraged.

Box 3 Key Construction Projects of Transport Airports during the 14th Five-Year Plan Period

Status		Names of Airports
Ongoing construction project (34 airports)	New construction (16 airports)	Chengdu Tianfu, Ezhou, Xingtai, Suifenhe, Lishui, Wuxuan, Ruijin, Heze, Jingzhou, Chenzhou, Xiangxi, Shaoguan, Langzhong, Weining, Zhaosu and Tashkurgan
	Relocation (6 airports)	Hohhot, Qingdao, Zhanjiang, Lianyungang, Dazhou and Jining
	Reconstruction and expansion (12 airports)	Hangzhou, Fuzhou, Yantai, Guangzhou, Shenzhen, Zhuhai, Guiyang, Lijiang, Xi'an, Lanzhou, Xining and Urumqi
Projects newly started (39 airports)	New construction (23 airports)	Shuozhou, Jiaxing, Bozhou, Bengbu, Zaozhuang, Anyang, Shangqiu, Leshan, Qianbei (Dejiang), Panzhou, Honghe, Longzi, Dingri, Pulan, Fugu, Dingbian, Baoji, Gonghe, Zhundong (Qitai), Hejing (Bayinbuluk), Balikun, Alaer, and Alashan Left Banner
	Relocation	Xiamen, Yanji, Zhaotong, Tianshui

	(4 airports)	
	Reconstruction and expansion (12 airports)	Tianjin, Taiyuan, Harbin, Shenyang, Shanghai Pudong, Nanchang, Ji'nan, Changsha, Nanning, Chongqing, Kunming and Lhasa
Preparations (67 airports)	New construction (43 airports)	Pearl River Delta hub (new airport in Guangzhou), Zhenglanqi, Linxi, Dongwuqi, Siping, Hegang, Suihua, Suzhou, Liaocheng, Zhoukou, Lushan, Loudi, Fangchenggang, Suining, Huidong, Tianzhu, Nujiang, Xuanwei, Yuanyang, Qiubei, Yuxi, Chuxiong, Mengla, Pingliang, Wuwei, Linxia, Hebukesai'er, Wusu, Luntai, Qiemo (Corps), Pishan and Huashan Hengshui, Jincheng, Jinzhai, Zibo, Binzhou, Huangchuan, Jingmen, Guigang, Neijiang, Guang'an and Shangluo
	Relocation (15 airports)	Dalian, Mudanjiang, Nantong, Quzhou, Yiwu, Longyan, Wuyishan, Weihai, Weifang, Enshi, Yongzhou, Meixian, Sanya, Panzhihua and Pu'er
	Reconstruction and expansion (9 airports)	Shijiazhuang, Changchun, Nanjing, Ningbo, Wenzhou, Hefei, Zhengzhou, Wuhan and Yinchuan

Section 2 Building Airports as Comprehensive Transport Hubs

Advancing deep integration of airports with other modes of transport. By making full use of the opportunity period for centralized construction of transport facilities and focusing on hub airports, we will make every effort to strengthen the connectivity of airports with trunk railways, intercity railways, urban rail transit and express ways to optimize the collection and distribution system of freight airports, thereby forming a number of modern comprehensive transport hubs with airports as the core. By strengthening coordination and planning of hub stations and airports, we will boost the centralized layout, space sharing, information exchange and convenient transfer of various transport modes in accordance with the principles of unified planning, design, construction and collaborative management.

Building a standard system and a coordination mechanism for comprehensive transport. On the basis of the summarizing practical experience from Shanghai Hongqiao Airport, Beijing Daxing Airport and Chengdu Tianfu Airport, we will build a standard system for such fields as construction of airports comprehensive transport hubs and operation and management of the airports. In addition, we will establish a coordination mechanism for various transport modes; optimize interface design; ensure cooperation in construction and management; promote mutual recognition or unification of construction systems, norms and standards; and promote the exchange and sharing of transport services and information of products. We will encourage airports and airlines to invest and participate in the construction and operation of rail transit by giving full play to the concerted effect of multi-entities of comprehensive traffic. We will establish and improve the management system and mechanism for joint transport between civil aviation and other modes of transport. We will break the fragmentation among various industries, straighten out the rules on operation and promote service connection to meet the needs of convenient travel of passengers and

efficient transport of cargo and mail.

Section 3 Improving Construction and Operation of Airports

Advancing high-quality construction of airports. We will strengthen research on the strategic planning of the hub airports, and revise the overall plan for the hub airports according to the future-oriented principle and enhance the connection with the national land spatial planning. We will implement the requirements for construction of airports with four salient features, make innovations in planning and design concepts, technology and methods and evaluation indicators and strengthen the implementation in planning and design, project approval, construction, operation and maintenance so as to build quality projects. We will liberalize the market access to professional engineering design of the civil aviation to expand the supply of consultation and design of civil aviation projects.

Improving operational management of airports. We will promote the revision of the Regulations on Administration of Civil Airports to continuously improve the operation management system for airports. We will strengthen the attribute and positioning of airports as public infrastructure, guide local governments in adjusting the mechanism for performance evaluation to attach greater importance to the evaluation of social public indicators such as safety and service. At the same time, we will constantly promote the restoration of functions such as public security, firefighting, emergency rescue at non-hub airports. We will promote the transformation of airports from focusing on direct operation to focusing on management and straighten out the relationship between the airports' management institutions and the stationed entities in terms of operation. We will promote the management experience from the Committee of Operational Management in a bid to improve the efficiency of collaborative operation. We will strengthen the operational management of safety at high plateau airports and civil-military airports.

Chapter 11

Boosting ATM Support Service

Air Traffic Management (ATM) plays a vital role in ensuring safe and efficient operation of civil aviation. With "strengthening ATM in four aspects" as the overall goal, we will reinforce the support of basic resources, accelerate the digital transformation, improve the efficiency of operation services and enhance the role of ATM in guiding and supporting the development of the industry.

Section 1 Reinforcing the Support of ATM Resources

Optimizing layout of air traffic control system. We will improve the national holistic layout of "areas-terminals (approach)-towers" and optimize the structures of high space, medium space and lower space. In accordance with the overarching principle of deepening integration, matching operation, focusing on the big picture and taking emergency into account, we will promote the adaptive adjustment of civil aviation control areas, reduce the number of control areas for medium and low altitudes, push forward the construction of regional control centers in a coordinated way and establish a second regional control center in areas with saturated flights, a complex airspace structure and prominent operation contradictions. We will build an air traffic control emergency backup system in which the adjacent control areas are back each other up, the areas and terminals back each other up and the busy operation control areas of the same city back each other. Besides, we will accelerate research on layout of terminal (approach) control entities. We will establish and consolidate the working mechanism for supporting ATM development in Tibet and strengthen construction of ATM infrastructure in Tibet.

Increasing supply of air space resources. We will implement the reform of the national ATM system and actively participate in national airspace planning and airspace classification. Considering the needs of airport construction and route network development, we will constantly optimize the national route network and continue to promote the development of parallel routes, great air corridors and one-way routes combining multiple ones; implement the construction of trunk routes such as Beijing-Guangzhou, Shanghai-Guangzhou, Shanghai-Kunming and Shanghai-Chengdu, and optimize the great corridors such as Shanghai-Lanzhou and Beijing-Kunming. We will improve linking of the network of cross-border routes continue to increase entry-exit points and promote their flexible use. We will optimize the airspace structures of terminal areas of world-class airport clusters such as the Beijing-Tianjin-Hebei region, the Yangtze River Delta, Guangdong-Hong Kong-Macao Greater Bay Area and Chengdu-Chongqing region and the layout of inbound and outbound routes at the international hub airports in Kunming, Xi'an, Urumqi and Harbin. We will promote the separation of inbound and outbound routes in the main operation directions at regional hub airports; improve routes of non-hub airports; support increasing and optimization of route resources in border areas and boost their effective matching with the structure of existing route network.

Enhancing the efficiency of airspace utilization. We will build an independent assessment system for airspace operation efficiency, strengthen the researches on airspace capacity prediction, application of their results and optimize the allocation of airspace resources. We will improve the mechanism for flexible use of airspace, promote the normal use of temporary routes and their transfer to fixed ones, and implement the notification system for restrictions on the use of temporary routes. We will drive the transformation of civil aviation from "controlling the total volume and adjusting the structure" to "precise control and refined adjustment" and build regulation policy which is conducive to matching of the support capabilities and high-quality development. We will improve the technology and methods for slot and capacity

assessment at airports (airport clusters), refine the coordination parameters for slots to advance the scientific and reasonable capacity arrangement at airports.

Reinforcing construction of ATM infrastructure. Focusing on the construction of hub airports, we will promote the construction of ATM support facilities in combination with the layout of control centers and routes. We will improve the traditional communication, navigation, surveillance, meteorological and information facilities, promote the application of new technologies as needed and establish a system for ATM support facilities and equipment, featuring air-ground integration. We will advance the industrialization of domestic ATM technologies and equipment and push forward the self-support of ATM equipment. We will optimize the layout of stations and improve the efficiency of use of radio frequency. We will also improve the function and the layout of the flight inspection bases, accelerate the application of big data on flight and BeiDou Global Navigation Satellite System in the field of flight inspection services, enhance the capabilities of flight inspection of new technologies in an effort to comprehensively improve the efficiency and support of flight inspection. We will reinforce monitoring and forecasting of global aviation meteorology and work on aeronautic information and data.

Box 4 Major ATM Projects during the 14th Five-Year Plan Period	
Status	**Names of Projects**
Ongoing projects	Projects of building of Guangzhou Terminal Control Center and reconstruction of Zhuhai Terminal Control Center, project of Zhanjiang Terminal Control Center, project of Wuhan Terminal Control Center and project of capacity expansion and renovation of Regional Control Center of Beijing that support needs of the new airport. Project of building ATM facilities and equipment at ATM Sub-bureaus at Zhejiang, Anhui, Jiangxi, Jiangsu and Sanya. Project of meteorological information sharing and service system of civil aviation. Projects of supporting ATM facilities for airport construction at Chengdu Tianfu Airport, the new airport in Hohhot and airports in Hangzhou, Fuzhou, Guangzhou, Shenzhen, Guiyang, Xi'an, Lanzhou, Xining, Urumqi, Qingdao and Zhanjiang.
Projects newly started	Projects that improve regional control capabilities in the east, central and west of China (Hohhot, Hefei, Nanchang, Xiamen, Wuhan, Nanning, Kunming, Lanzhou and Harbin). Projects of supporting ATM facilities for airport construction at airports in Tianjin, Taiyuan, Shenyang, Pudong, Nanchang, Ji'nan, Changsha, Nanning, Kunming and Lhasa and the new airport in Xiamen. Projects of radar intensive coverage with no and blind zones at airports and routes at Dalian Jinwan and Hainan Dongfang.
Projects under preliminary research	Project that promotes ATM support capabilities in Tibet. Projects of supporting ATM facilities for airport construction at the new airports in Dalian and Sanya and other airports in Shijiazhuang, Changchun, Nanjing, Ningbo, Wenzhou, Hefei, Zhengzhou, Wuhan and Yinchuan. Project of Civil Aviation Cloud Data Center.

Section 2 Enhancing Efficiency of ATM Operation Service

Improving coordinated operation. We will strengthen the coordination between flight

plan management and such links as prediction and alerting of flight operation, development monitoring, flow management and analysis and assessment, and speed up the integration of traffic rights, slots and data on pre-flight plans and as well as one-stop network service. Giving full play to the roles of Operational Management Center, the Meteorological Center and the Information Center, we will focus on enhancing centralized decision making and coordinated management in the optimization and use of airspace, balance of capacity and flow, airport operation, information management, handling of emergencies and integrated operation.

Enhancing efficiency of control operation. We will continuously improve the actual operation separation of aircraft; fully implement the RECAT-CN; accelerate the normal operation of Point Merge System (PMS) and Continuous Descent Operation (CDO)/Continuous Climb Operation (CCO); improve the capability of accurate prediction of complex weather; carry our research on promoting the integration of automatic control system and meteorological information to improve the comprehensive operation efficiency. We will strengthen the management of arrival, departure and surface operation at airports and realize the function of AMAN at busy airports. We will promote the application of visual separation and visual approach in major hub airports. We will study and establish a civil-military joint operation mechanism to realize the exchange of operation information.

Pushing forward the reform of the system and mechanism of the ATM system. Guided by improvement of the overall efficiency of ATM operation, we will enhance establishment of the institutions' functions, bolster competence of personnel and give full play to the advantages of integrated management system; we will also formulate an incentive mechanism that matches the improvement of operation safety, efficiency and capacity so as to effectively support the "strengthening ATM in four aspects".

Box 5 Projects of Tapping the Capacity Potential

1. Plans for improving capacity at hub airports

Intensify optimization of operation models and application of new technologies and increase airports' hourly capacity; strengthen matching of air resources and ground ones, and enhance airport design with the focus on increasing runaway and taxiway efficiency and percentage of close stands; carry out expansion and reconstruction of 9 international hub airports and 26 regional hub airports; step up research on optimization of operation standards for airports with multiple runways.

2. Plans for expanding routes

Study and establish a quantitative assessment model for capacity and flow of national airspace system; build a high-altitude route network based on operation modes such as high-capacity corridors, parallel routes and one-way circulation to fully meet the flow requirements for flight among city clusters.

3. Refine management of flight plan development

Optimize and reduce the standard operation time used for flying a segment on the basis of actual time used for flying a segment, transit and ground taxiing; improve refined development of flight plans and pre-flight plans and conduct research into reduction of scheduling intervals at hub airports.

Section 3 Improving ATM Capabilities at Small and Medium-sized Airports

We will optimize approach and departure routes at small and medium-sized airports, set up approach control areas at airports which have complex airspace or a large number of flights, and steadily push forward the transformation of airport surveillance and control. We need to expedite the upgrade and renovation of airport ATC facilities and equipment. ATC operation at qualified airports will be integrated into the collaborative decision-making system. Remote towers and centralized meteorological forecasting at the airports located in remote areas will be carried out on pilot basis and promoted. Civil aviation universities will provide more training for personnel who worked at local airports, and a mechanism for the ATC staff exchange and the mutual targeted assistance among different air groups and regions will be established. In addition, we will take multiple measures to improve ATC capabilities at small and medium-sized airports to uplift airport operation safety.

Chapter 12

Accelerating the Development of New Types of Infrastructure

Development of new types of infrastructure serve as a necessary condition and a solid foundation for intelligent civil aviation. With the aim of enhancing the capabilities of digital sensing, data-based decision-making, refined management and sincere service, and supported by digital factors and digital technology, we will coordinate the construction of traditional infrastructure and new ones to lay a foundation for a modern air transport system, and foster new business formats, new services and new capabilities to improve quality of industrial development and boost the drivers for development.

Section 1 Targeted Measures to Develop Intelligent Civil Aviation

Embarking on a new journey of intelligent civil aviation in an all-round way. Following a development paradigm that is digital, smart and intelligent, we will coordinate efforts to utilize existing and incremental, and plan and construct traditional infrastructure and new ones, giving high priority to key areas, so as to give full play to the leveraging and magnifying role of new types of infrastructure. At the same time, by abandoning the chimney-type idea in system building and project development, focusing on the decentralization and the middle-ground strategies, and applying a new generation of service-oriented distributed architecture, we will promote basic structure design of air transport system, and improve data interconnection and connection among main entities in the industry. We will strengthen data sharing and functional reuse, so as to establish an open, intelligent civil aviation ecosystem featuring complementary

advantages, smooth sharing, and controllability.

Accelerating unleash of new momentum of high-quality development. Aiming at improving efficiency, expanding functions and increasing drivers, and adopting innovative concepts and advanced technologies, we will establish an action program for building new civil aviation infrastructure to define paths of implementation and improve supporting policies. In addition, we will carry out intelligent upgrade of work safety, operational services and supporting facilities by focusing on flight traffic flow, passenger flow, baggage flow, cargo flow, air traffic flow and energy flow. We will strengthen intelligent interconnection among passengers, baggage, cargo, aircraft and facilities to build an intelligent operation system for civil aviation infrastructure.

Section 2 Steadily Promote the Development of New Types of Infrastructure

Planning infrastructure development of information technology. We will provide strong support for developing new generation communication networks in order to deliver aeronautic communication services featuring low delay, high reliability and large bandwidth. We will increase intelligent sensing terminals to connect all facilities in the industry to the network. We need to open a batch of ground unmanned equipment test sites suited to various scenarios and risk levels to promote the innovation and application of new facilities and equipment. We will expand the BeiDou Global Navigation Satellite System (GNSS) to such areas as navigation, positioning and time service, and build information infrastructure including big data center available to serve industrial applications, so as to enhance support capabilities for digital processing, response and decision in the industry.

Reinforcing scenario applications of intelligent service. Focusing on reducing passengers' travel time and improving service quality, and placing particular emphasis on hub airports, we will take targeted measures that meet the needs of passengers, including full-process guidance for air travel, automatic customs clearance, differentiated security screening, and one-off process for customs and quarantine inspection, so as to make passengers' air travel more convenient via facial recognition. At the same time, with a focus on simplifying process, reducing transport time and lowering cost, we will improve automation of air cargo facilities to make the sorting, loading and storing of air cargo more intelligent. We need to popularize electronic waybill and online logistics services to establish a one-bill system for air cargo featuring shared information, unified standards and mutual-recognized security screening. We will develop coordinated services between air and ground transport with seamless connection, efficient transfer and mutual-recognized security screening in order to create an integrated air travel service chain. We will support to develop value-added services and integrated service products to accelerate the building of a new generation of passenger service system.

Enhancing intelligent operation across the industry. We will develop a platform of

collaborative operations in civil aviation, with a focus on aircraft operation, to build a digital operation environment and develop a plan for intelligent operation, thus improving operation support as a whole. We will accelerate the flight trajectory-based operation and expansion tests in key routes and important areas. We will explore the synergetic development of the military and civil aviation as well as the integrated operation of aircraft and UAV. We need to expedite the application of technology such as extra-early safety alerting and extra-quick emergency response to improve emergency response and flight recovery across the industry. In addition, we will strengthen application of intelligent technologies across airlines to enhance operational control flight, network planning and aircraft management, to meet the needs of super-large fleet operation. We will improve intelligent support for flight at airports and make such intelligent operations as global accurate monitoring, intelligent allocation of elements, and active security alerting available at key airports. We will apply more new technologies and materials to make the construction, operation and maintenance of civil aviation infrastructure more intelligent.

Fostering more new digital business formats in civil aviation. With intelligent technology, we will further integrate civil aviation with other sectors, including logistics, tourism, finance and trade, so as to enable the service chain in civil aviation to move towards upper links, and foster more and new business formats. Applying the technologies to customize and one-key-clicking air travel for passengers, and guiding and motivating the upstream and downstream of the industrial chains, we will explore new models of air passenger service, so as to vigorously develop digital economy and foster new digital business formats in the civil aviation.

Section 3 Refining Relevant Policies by Innovation

We will improve top-level design and deepen reform and innovation in key links to develop targeted policies and create innovative environment for the construction of new infrastructure. We need to strengthen market-oriented reform in civil aviation information services, and relax market access in competitive links in order to introduce more market competition mechanisms. Focusing on intelligent supervision of the industry and improving the efficiency and service quality, we will accelerate the building of a batch of pilot projects for new types of infrastructure to form repeatable and promotable experience.

At same time, we will render more support for projects organizing, develop more policies and provide more funds to establish mechanisms for the construction of new infrastructure. We need to innovate policies for investment and financing in order to foster a diversified investment and financing system. We will strengthen coordination between government and enterprises and carry out cooperation with other industries and fields to promote the organization and integrated applications of different projects. We will establish a mechanism that is dynamic, flexible, inclusive and prudent to conduct life-cycle assessment of new types of infrastructure, so as to iterate and form gradually a standard system that meets the need of promotion.

Part 4

Developing a First-class Aviation Service System

Improving aviation service capacity represents the foundation of civil aviation development. With the aim of serving national strategies and meeting the needs of the people, we will strive to tap potentials from the civil aviation industry and to coordinate with other sectors, strengthen supporting role of aviation hubs, expand service areas, and improve service quality, so as to build a comprehensive, diversified and efficient aviation service system by which transport aviation and general aviation will achieve balanced development.

Chapter 13

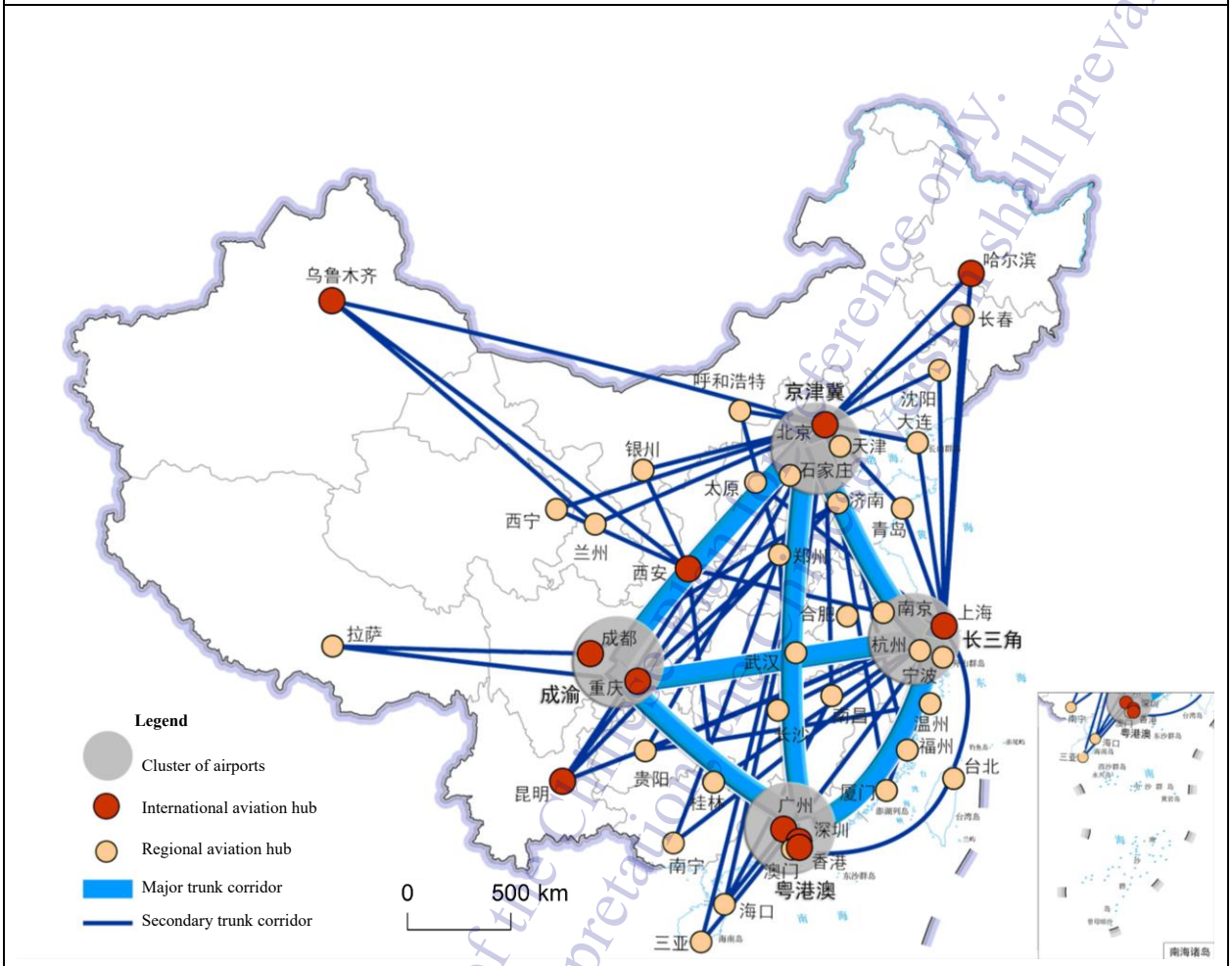
Building Networks for Passenger Air Transport with Smooth Connectivity

We will improve the policy system, effectively allocate resources, and implement the project of expands air route networks and enhancing efficiency, ensure smooth domestic connections and more international flights in a bid to build a smooth, interconnected, convenient and efficient route network for passenger transport.

Section 1 Improving Air Route Networks for Passenger Transport

Optimizing domestic air route networks. Domestic air route networks, consisting of trunk and basic networks, will be established. With improvement of the overall network efficiency as the guidance, we will expand capacity in major trunk corridors among the world-class airport clusters located in the Beijing-Tianjin-Hebei region, the Yangtze River Delta, Guangdong-Hong Kong-Macao Greater Bay Area, and the Chengdu-Chongqing region, smooth air connections in secondary trunk corridors among the above four world-class airport clusters, international aviation hubs and regional aviation hubs, and launch more express air routes, so as to create trunk networks with higher frequency and high quality, and to consolidate the base of air route networks. At the same time, in order to improve connectivity of non-hub airports and tap into potential market demands, we will encourage innovation in service products, establish basic networks with extensive coverage and equitable services, expand air route networks, so as to connect trunk air routes with regional ones, thus forming a comprehensive air routes network. In addition, we will drive forward basic air services in remote areas where ground transportation is bad.

Box 6 Major Domestic Air Route Networks for Passenger Transport



Optimizing international air route networks. To build a connectivity framework featuring "one circle, six corridors and five main channels", we will better explore aviation markets in Southeast Asia and Northeast Asia, expand steadily the markets in West Asia, Central Asia and South Asia, so as to establish an air transport circle that connects neighboring countries, thus enhancing supporting capability of international market. We will improve air connectivity among six economic corridors, which are the New Eurasian Land Bridge, China - Mongolia - Russia Economic Corridor, China - Central Asia - West Asia Economic Corridor, China - Indochina Peninsula Economic Corridor, China - Pakistan Economic Corridor, and Bangladesh - China - India - Myanmar Economic Corridor; and build five main air channels connecting Europe, North America, Latin America, the South Pacific, the Indian Ocean and Africa to expand air route network. In addition, we will strive to sign bilateral air service agreements with more countries participating in the Belt and Road Initiative, launch and increase flights, and improve transfer services to promote the building of the "Air Silk Road".

Improving functions of aviation hubs. We need to build an aviation hub paradigm featuring interactive development among the world-class airports, international aviation hubs and regional ones. We will expand radiation of air route networks of the world-class airport clusters, realized synergetic development of airports in the cluster, so as to enhance international competitiveness in an all-round way. We will strengthen the role of international aviation hubs by enhancing global service capacity of airports located in Beijing, Shanghai and Guangzhou and improving the development of international aviation hubs in such cities as Chengdu, Chongqing, Shenzhen, Kunming, Xi'an, Urumqi and Harbin. We need to enhance the supporting function of regional aviation hubs for air route networks and improve connectivity to neighboring non-hub airports to enable more passengers travel via international aviation hubs. At the same time, we will expand the service of domestic through flights, improve the service of domestic basic networks, pilot international through flights in order to shorten transfer time and improve the efficiency of joint inspection. We will expedite the building of high-speed transportation service networks featuring air transport + high-speed railway to extend air transport networks and its services.

Section 2 Optimizing Policy System

Strengthening policy coordination. A policy system for air route networks with aligned goals, integrated measures and same pace will be established to make relevant policies more systematic and coordinated. We will carry out dynamic monitoring and evaluation on air transport networks. We need to integrate air transport network system with the modern national airport system and the operational support system; strengthen information sharing among airlines, airports and ATM entities to enhance coordinated operation between air and ground. We need to strengthen support for airspace and policy coordination among airport ports with the aim of improving the capacity, efficiency and quality of air transport networks.

Making policies more flexible. Policy systems for air routes, flights and slots that match air transport networks will be developed. We will keep policies for trunk networks continuous, stable and sustainable and make policies for basic networks more innovative, flexible and inclusive. With the aim of improving the efficiency of airspace utilization, we will explore mechanisms for the flexible use of air routes, improving access to and withdrawal of air routes, developing better dynamic assessment of flight operation, and improving the grant and withdrawal of air traffic rights by relaxing restrictions on review and approval of air traffic rights. In addition, we will intensify efforts to match of slots in summer or winter season shifts, and to make flight management more flexible during each season in order to better meet market demands. We will establish a market-oriented slot allocation system to promote efficient circulation of existed slot resources.

Improving the efficiency of resource allocation. Aiming at improving air route networks and fostering large network airlines with international competitiveness, we will strive to make policies more systematic and optimize resources allocation. In order

to accelerate the building of a new traffic rights opening-up framework featuring optimized, diversified and hub-oriented structure, we will intensify efforts to get more air traffic rights resources in mainstream markets, such as Europe and North America; with a focus on promoting the opening-up of air traffic rights to the countries participating in the Belt and Road Initiative. We need to improve hub-oriented allocation of air traffic rights resources, with a focus on supporting hub operations and building main base airlines, to lead air traffic rights resources to concentrate at international aviation hubs. At the same time, we will improve policies to support international air routes to regulate market and reduce disorderly competition. We will ensure slots resources for domestic trunk networks, and allocate slots to basic air routes in line with the demands.

Chapter 14

Building an Efficient Air Logistics Network

By bolstering areas of weakness, making full use of advantages, optimizing operating environment and enhancing supply, we will establish a high-quality, efficient, independently controllable air logistics network, with the aim of supporting industrial chains and supply chains, a focus on reducing costs and improving efficiency and quality, and an emphasis on fostering highly competitive enterprises.

Section 1 Optimizing Air Logistics Network

Optimizing domestic air cargo transport networks. We will use more passenger aircraft belly to carry cargo, establish all-cargo air route networks connecting the cities in the Beijing-Tianjin-Hebei region, the Yangtze River Delta, Guangdong-Hong Kong-Macao Greater Bay Area, and the Chengdu-Chongqing City Group, other important cities and national airport logistics hubs, efficiently connect passenger flights which carry cargo in the belly and truck flights, and facilitate air cargo transport between places of origin and key consumption areas. Based on the specific needs, we will develop intermodal transport such as air-to-air and air-to-ground models to improve utilization of resources and improve the collection and distribution system. In addition, we will establish a general aviation logistics network for cargo transport in remote areas to enhance the capability of logistics collection and distribution in these areas, and encourage to innovative UAV logistics.

Improving international air cargo transport networks. We will strengthen air route networks connecting neighboring countries in Southeast Asia and Northeast Asia, stabilize and improve air route networks connecting countries in Europe and North America in support of local-for-local adjustments of industrial chains, and accelerate the building of air route networks connecting the countries participating in the Belt and

Road Initiative, so as to build up an air cargo network featuring global connectivity, adequate capacity, safety and reliability, and independently controllability. At the same time, we will ensure the development of networks for international air cargo routes to connect manufacturing industry to improve the global response to air logistics.

Enhancing the functions of air cargo hubs. We will make full use of existing cargo facilities at airports, improve air cargo services at comprehensive hub airports in Beijing, Shanghai, Guangzhou, Shenzhen and Zhengzhou, and at Ezhou airport, a specialized cargo hub, and make steady progress in building national airport logistics hubs, so as to create an air cargo network that connects neighboring countries and radiates other countries around the world. In addition, we will enhance cooperation between customs and inspection and quarantine to improve transfer efficiency of air cargo, and encourage air logistics enterprises to work with airports in building air cargo transport hubs and hub-and-spoke air route networks.

Section 2 Building a Supply Chain System for Air Logistics

Fostering more market entities. We will encourage air logistics enterprises to station at hub airports with advantages in air cargo transport to set up headquarters or distribution centers. We will promote the integrated development of large logistics enterprises and civil aviation enterprises, and improve end-to-end service networks, so as to foster air logistics enterprises with global competitiveness. In addition, we will support large air logistics enterprises to expand their international networks, and enable specialized and platform-type air logistics enterprises to provide diversified services.

Strengthening cooperation and coordination in logistics supply chains. We will promote informatization of air cargo transport to facilitate sharing of air logistics information. We will offer more support for the coordination between air logistics networks and manufacturing sector to create a development paradigm where the air logistics and manufacturing sector go globally by supporting each other. With a focus on improving the capabilities of transport of cold chain products and express mail, we will build a service system for coordinated development of industrial chains, supply chains and value chains.

Section 3 Improve Policy System

Improving regulations and standards. In terms of all-cargo transport, we will improve differentiated policies, promote the building of the credit system, and establish classified policies for cargo check base on their risks to enhance the efficiency of security screening. At the same time, we will establish intermodal logistics networks to coordinate and align standards between different modes of transportation. We will study and develop regulations and standards adapted to such new formats of business as UAV logistics.

Strengthening the support of resources. In order to be more competitive globally, we

will improve the efficiency of resources allocation, such as air traffic rights and slots. We will encourage cooperation among different industries and fields to promote the building of air cargo hubs overseas. With the aim of building of air cargo hubs, we will implement relevant policies for a new level of opening-up of air traffic rights. We will offer support for qualified cargo hub airports to establish slot pool for cargo flights, so that the daytime slots can be used for cargo flights to make slot allocation of air cargo more flexible.

Chapter 15

Expanding Pluralistic General Aviation Network

General aviation represents one of the two wings of civil aviation, playing a positive role in promoting the development of the industry. Maintaining strategic focus and deepening reform and innovation, we will enhance industrial guidance for general aviation, optimize provincial-level development platforms, strengthen resource allocation and policy coordination to improve operating environment and strive to upgrade traditional services and explore new ones, so as to expedite the development of general aviation.

Section 1 Continuously Enhancing Service and Support Capacity

Guiding the building of general airport networks. We will support the existing regional airports to equip general aviation supporting facilities. We will further standardize and streamline the process for examination and approval to establish a joint civil-military coordination mechanism for select sites of general airports. By giving full play to professional advantages of civil aviation, we will guide local governments to construct general airports, in order to accelerate the building of an airport cluster consisting of short-distance transport airports that coordinate regional airports and general airports. We will encourage the construction of large-scale comprehensive general airports in city clusters in the Beijing-Tianjin-Hebei region, the Yangtze River Delta, Guangdong-Hong Kong-Macao Greater Bay Area and the Chengdu-Chongqing region to divert functions not essential to aviation hubs from these areas. In addition, we will promote the construction of airstrips suitable to local conditions, such as grassland, water and soil, and support the building of test bases (test areas) for unmanned aviation that meet the needs of different scenarios, various entities and at different levels. We will support the emergency medical service bases for the flight operation on the high plateaus.

Improving service and support capacity for flight operation in low-altitude airspace. Making full use of existing ADS-B stations, the service platforms of dynamic flight information for Beidou and flight service centers (stations), we will provide guidance for the layout of provincial-level flight service stations and strengthen the

integration and sharing of data. In addition, we will optimize the support system for information service and improve products such as low-altitude meteorology and visual aerial charts.

Accelerating the improvement of ground handling services. We will promote to development of fuel service networks, offer support for the construction of maintenance facilities, accelerate sharing of aviation materials, and foster comprehensive service providers that is regional, brand-oriented and network-based in general aviation.

Pushing forward reform in low-altitude airspace. We will summarize the experience and promote the best practices of the reforms in low-altitude airspace in Sichuan, Hainan, Hunan and Jiangxi provinces, increase air routes in low-altitude airspace based on the needs, expand low-altitude airspace where aircraft can fly freely after reporting flight plan. We will simplify procedures for flight approval, and flight plan application and approval (filing), so as to make it smooth for the application and reporting and expand the types of business that will be approved after application.

Section 2 Focusing on Improving General Aviation Services

Actively developing short-distance transport. We will create a regional short-distance transport network with regional airport as the support and general airport the network node. We will strengthen the coordination between general aviation and transport aviation in such aspects as slot allocation, code sharing, sales billing and settlement, complaint acceptance and supervision, and dangerous goods management, and optimize transfer process so as to build an integrated, temperate and smooth system for general aviation services, thus improving the service quality of links of air travel.

Improving general aviation services for the public. We will strengthen the capacity emergency medical service for flight operation on the high plateaus, and establish a national network for aviation emergency service bases to improve the mechanism for joint support services. At the same time, we will encourage local governments to improve public services and emergency responses by purchasing services. We will support intelligent agriculture in Heilongjiang and Xinjiang, as well as strengthen the coordination between the operations of offshore oil and electricity and the development of industries.

Making efforts to develop services for mass consumption. We will combine the development of general aviation with tourism resources exploitation and public entertainment to provide diversified and distinctive tourism products in low-altitude airspace. We need to accelerate the layout and efficient expansion of flight training. We need to cultivate aviation culture to enable more entities participate in aviation activities, and optimize the training system for pilot license to help develop private flights.

Section 3 Guiding the Innovation and Development of UAV

Expanding fields of UAV services. We will encourage the application of UAV in such fields as postal and express delivery services, public services in urban areas, emergency rescue, and public health, and promote the development of UAV in urban, rural and remote areas to integrate it into the logistics systems at county, township and village levels, so as to advance the modernization of the agricultural sector and rural areas.

Improving laws and regulations. Placing equal emphasis on promoting development and preventing risks, we will establish related regulations, methods of classifications, comprehensive administration platforms, and guiding mechanisms to improve UAV administration across the industry. We will encourage the building of a market-based and social service system for UAV; as well as support the setting of UAV association standards and encourage qualified enterprises to participate in development of international standards.

Innovating UAV industrial ecosystems. We will promote the construction and operation of unmanned aviation test areas, and undertake research on operation theory, risk assessment and technical verification based on operation scenarios and risks, to explore the regulation and service models for unmanned aviation. With the aim of building UAV industrial ecosystems, we will promote the establishing of a batch of innovative platforms to support the construction of low-altitude economic area clusters, with focus on the development of the whole UAV industrial chain, so as to play the leading role of innovation agglomeration and enable the UAV industry to move towards high-end of the value chain.

Section 4 Optimizing Development Environment for General Aviation

Intensifying efforts to establish regulatory systems. We will continuously improve systems for regulations on general aviation, to accelerate the revision of laws and regulations with revision of regulations in urgent need as the priorities. In addition, we will sum up experiences of pilot projects in a timely manner and consolidate what we have achieved. We will deepen category-based management and guide industry self-discipline, in order to streamline administration and delegate power, improve regulation, and upgrade services. We will strengthen supervision on general aviation flights that carry passengers; and accelerate the establishment of statistical evaluation systems for high-quality development of general aviation and of mechanisms for releasing related comprehensive data.

Providing policy support and guidance. We will strengthen the development of financial services and insurance business in general aviation, encourage innovation of general aviation-related financial products, and promote the banking and the insurance company to offer more support for general aviation. In addition, we will optimize subsidy policy for general aviation to efficiently utilize the funds.

Promoting multi-party and collaborative governance. We will promote the establishing of credit system and improve the management of service quality; foster collaboration between relevant ministries in developing policies for emergency rescue,

medical treatment, and short-distance transport. We will guide the building of provincial-level platforms for the development of general aviation, give play to the role of research institutes and industry associations, and boost collaboration in infrastructure construction, low-altitude airspace reform, development of low-altitude economy and safety oversight; as well as provide the military veterans with more employment opportunities in general aviation.

Chapter 16

Improving the Quality of Civil Aviation Service

Service quality represents an embodiment of high-quality development of civil aviation. Applying the philosophy of whole-hearted service, attaching importance to flight regularity, focusing on full-process air travel service, and aiming to meet the needs of passenger, we will implement projects of air travel facilitation and promote the building of a new ecosystem that passengers enjoy more convenient air travel services, so as to continuously upgrade the quality of air travel service and significantly improve the competitiveness and influence of Chinese service brands in global civil aviation.

Section 1 Ensuring High Flight Regularity

Improving the collaborative and joint action mechanism for flight regularity. We will continuously improve collaborative mechanisms of Airport Operation Management Committees (AOMCs) to enable AOMCs at airports with an annual passenger traffic of over 10 million to carry out regular activities. Pilot regional collaborative operation among the AOMCs, with intelligent coordination among airport clusters as the breakthrough point will be carried out, to step up the establishing of a national s collaborative operation mechanisms of AOMCs. We will enhance data sharing and coordination to ensure coordinated operations among airlines, airports and ATC units.

Optimizing support for flight regularity. In order to balance air traffic demand and operation support capacity, we will build an evaluation system to keep balance between them and continuously promote the life-cycle refined management. We will establish mechanisms for coping with bad weathers to improve capability of resilience to external interference. We will summarize the experiences of integrated operation of Baoshan – Tengchong - Mangshi region to improve operational support among nearby airports.

Enhancing supervision over flight regularity. We will establish an index system to evaluate operation efficiency of such entities as airlines, airports and ATC units, and regularly publish monitoring reports on operation efficiency. At the same time, we will

optimize indicator setting and appropriately expand the scope of assessment to further improve evaluation indicators and adjustment measures for flight regularity, as well as develop unified basic indicators to standardize flight regularity assessment across the country.

Section 2 Building the Chinese Brands in Civil Aviation Services

Strengthening the building of Chinese brands in civil aviation services. Efforts will be made to build Chinese brands in civil aviation services. We will encourage civil aviation enterprises to conscientiously participate in creating brands, and to foster the culture of Chinese brands embedded in services, so as to build a batch of excellent service brands in various fields. In addition, we will develop the standards and rules to evaluate civil aviation services, promote the best practices and excellent services of outstanding enterprises, and give play to the role of enterprises' initiatives and promotion role of governments, thus enhancing the influence and competitiveness of Chinese brands in civil aviation services.

Establishing a system for high-quality service products. Efforts will be made to provide high-quality service products, such as increasing more basic aviation services, enriching air express services, developing customized products, and promoting the through flights with wide coverage and fast transfer. We will promote baggage interline and baggage transfer, and strengthen the integrated development of air transport and other modes transportation to develop c integrated transport services products throughout the journey. We will encourage enterprises to promote innovation of new forms of business by integrating of online and offline services to increase and upgrade services; as well as develop diversified and differentiated aviation services, implement special campaigns such as Civil Aviation + Culture and Tourism to unleash consumption potential, expand domestic demand resolutely, and further facilitate inbound tourism.

Developing brand new experience in civil aviation services. With a focus on the people's concerns, China's civil aviation will constantly improve its services. We will continuously improve the efficiency of security screening, fully implement whole-process baggage tracking, and roll out intelligent air travel services such as self-service, One ID clearance, biometric identification, intelligent guidance, and paperless air travel. We will also improve transport service systems for the elderly, and enhance barrier-free travel services, so as to meet the needs of special passengers including the elderly, the sick, the pregnant and the children. Priority will be given to protect the legitimate rights and interests of military servicemen. Efforts will be made to ensure care services for personnel in civil aviation to create a greater sense of happiness for them. In addition, the civil aviation entities should provide services for each other to make services more systematic and coordinated.

Section 3 Improving Service Quality Governance

Improving the rule system for service governance. China's civil aviation will intensify efforts in the rule of law in services, and with law-based administration to ensure fair and orderly competition in the market. Regulatory systems for civil aviation service will be improved to effectively protect the legitimate rights and interests of consumers. In addition, the allocation of resources such as slot and aircraft fleet will be enhanced to promote service quality. We will promote the unified integration of governance rules, complaints, investigation and handling, and law enforcement mechanisms to build a scientific, reasonable and systematic system for service quality governance. At the same time, we will improve contingency plans for major public health emergencies.

Innovating service quality governance modes. The industry will carry out dynamic monitoring and timely alerting of service quality to effectively prevent and deal with the public opinion and risks. In terms of supervision of service quality, we will clearly define its areas, target its tasks and optimize the methods to actively deal with the challenges brought forth by different transport service entities and complex service links in civil aviation, and solve the problems such as the lack of regulatory entities and the outdated regulatory means. In addition, all parties should play their roles in establishing a pluralistic co-governance paradigm featuring government regulation, industry self-discipline and social supervision.

Stimulating internal motivation for high-quality service. Market entities will be encouraged and guided to establish and improve systems for service quality management, develop standards for high-quality service, voluntarily make public service commitments, accept public supervision, to effectively implement responsibilities for quality management as market entities. We will regularly release information on civil aviation service quality to improve the transparency of service quality, and play to the role of mechanisms for supervision and feedback, in order to promote service quality.

Box 7 Projects for Air Transport Facilitation

1. Expanding air route networks and improving their efficiency

With the focus on increasing use efficiency of air route networks, we will strengthen support for trunk air routes and hub airports to promote "public transport" like operation of air transport among hub airports. With the aim of improving connectivity and convenience, we will promote "the connection between trunk air rotes and regional ones, thus forming a comprehensive air routes network ".

2. Reducing air travel time

We will optimize standards for airport ground handling services. With the focus on hub airports, we will reduce early suspension of flight check-in, check-in with long-queue, ground taxiing, baggage claim and passenger walking time, increase proportion of near-gate bridge use, and streamline transfers of multiple transport methods and of connecting flights to shorten the whole air travel time.

3. Building brands in civil aviation services

We will strengthen the building of brands in civil aviation services. We need to develop standards for evaluating service brands, promote the third-party entities to assess the brands, set a good example of service brands, and continuously enhance the influence and competitiveness of brands in civil aviation

services.

4. Strengthening the aviation logistics chain

We will foster air logistics enterprises with internationally competitive edges, develop air cargo hubs with efficient operation, promote intelligent air logistics, better standards for security screening, improve systems for multimodal transport, facilitate customs clearance and promote coordination of aviation logistics, the industrial chains and the supply chains

Part 5

Building an Eco-friendly and Green Development System

Green constitutes the grounding and the basic form of high-quality development. China has entered a critical stage of the green development of civil aviation. With the aim of fulfilling the goals of peak carbon dioxide emissions and carbon neutrality, and with a focus on strategic support for scientific and technological innovation, we will comprehensively promote the green development of the industry in terms of technology, operation and market mechanism, to accelerate the building of a green and low-carbon development paradigm, thus providing more opportunities for developing the civil aviation.

Chapter 17

Continuously Improving the Green Governance System for the Industry

Section 1 Improving Policy and Management of the Green Development of Civil Aviation

Improving support system of policy. Policies and standards for civil aviation that meet with the requirements of efficient utilization of resource, environmental governance and ecological security will be established and improved. The requirements of green development will be place in even more prominent places in the policies and standards for special fields. We will improve the pricing strategy for carbon emission in civil aviation and enhance the monitoring, reporting and verification, to guide various entities to increase input in green development. At the same time, we will offer more support for major projects and technical researches of the green development, and explore to implement green financing projects and promote demonstrative ones.

Speeding up the building of standard system. We will establish standards for low-carbon operation and management of airlines; improve standards for life-cycle management of green airport; and accelerate the establishment of standards for safe and efficient ATC operation. We will effectively participating in the development of international standards, and develop environmental standards for airworthiness of aircraft and engine in a gradual manner.

Building an assessment and evaluation system. We will improve a statistic system

for energy consumption and carbon emission across the industry, establish an assessment system for energy consumption and emission, strengthen index management of reducing pollution and carbon emissions, and improve the mechanism for implementing the responsibility at various levels. In addition, we will strengthen supervision and inspection, incorporate green indicators into the assessment system, set up an example of civil aviation enterprises in terms of green and low-carbon development, and encourage industry entities to actively establish an internal assessment system that is integrated and incentive. At the same time, we will improve the mechanism for publishing blue cover book on the green development of civil aviation and regularly release the efficiency of the energy and water consumed by airlines and airports to screen gaps against international standards. We will actively promote the third-party evaluation system and the building of institutional capacity.

Section 2 Enhancing Support for Green Development of Civil Aviation

Cementing the foundation for the green development of civil aviation. We will establish and improve a management system for the green development that integrates management, supervision and service, increase the number of staff in institutions, and improve management capabilities. We will set up an expert advisory committee for the green development of civil aviation, pool together experts from relevant fields inside and outside of the industry, and improve database of civil aviation experts. We will support universities in setting up green disciplines and developing relevant text books, and foster the reserve of interdisciplinary talents. We will encourage universities and research institutes to cooperate with industry associations and enterprises to establish and improve a system for training skills related to green civil aviation, and strengthen the awareness of the green development of all members in the industry and their competency.

Reinforcing research on the green development of civil aviation. We will support universities, research institutions and industry associations to carry out researches on major and forward-looking subject topics such as the strategy for low-carbon development in civil aviation, the improvement of operation efficiency, the monitoring and analysis of impact on environment, development and application of green equipment, and green competitiveness. Focusing on coordinated regulation on saving energy and reducing pollution and carbon emission, we will make efforts to establish 2-3 key laboratories in the green development of civil aviation (engineering and technology research centers) and to establish a comprehensive and innovation platform for green civil aviation as well as an innovation network that integrates the efforts of government, enterprises, universities, research institutes, and end-users. We will intensify joint and coordinated efforts to address key problems, and promote sharing and application of demonstrative projects, research results, data and information.

Promoting the development of green civil aviation industry. Efforts will be made to support the establishment of various factor markets that contribute to the building of green civil aviation, to strengthen information service on market supply and demand,

and to promote symmetry of information and proper flow of factors. The civil aviation industry will guide and cultivate specialized service providers for technical consultation, system design, operation management and energy-saving transformation that meet the needs of green development of civil aviation; vigorously promote the service modes of contract-based energy management and water conservation management, and energy and environment trusteeship service, and improve professionalism. The civil aviation industry will promote integrated development of civil aviation industry and manufacturing industries on green technology and equipment and clean and low-carbon energy, improve quality of domestic equipment, and actively promote the development of old aircraft disassembly, aviation material recycling and other related industries.

Chapter 18

Vigorously Promoting Economical and Intensive Utilization of Resources

Section 1 Improving Energy Efficiency of Airlines

Efforts will be made to promote airlines to integrate the concept of green development into the whole chain and process of operation, and to improve lean management. We will guide airlines to continuously optimize route network layout and fleet structure, and improve capacity accordingly. We will improve airlines' transport organization capabilities to increase passenger and cargo load factors and aircraft energy efficiency. The civil aviation industry will implement management and technical approaches such as optimized fuel policy, secondary clearance, precise fuel management, aircraft performance monitoring, fuel-saving modification and aircraft weight reduction to improve fleet fuel efficiency. We will promote building of a digital and intelligent maintenance system to ensure the safe, reliable and efficient operation of aircraft; and enhance pilots' awareness of energy conservation, increase their training on energy-saving driving methods and other related knowledge, and implement energy-saving operations on the premise of flight safety.

Section 2 Promoting Building of Green Airport

The civil aviation industry will further tighten standard-based control, revise and improve indicators on land use for transport airport construction, strictly control the approval, construction and acceptance of new and expanded airport projects, and enhance land saving, energy saving, water saving and material saving evaluation and promotion of such technical models. We will take airport ground service and operation efficiency as important target variables of airport planning and design, and fully

optimize the runway and taxiway configuration, apron stand design and aircraft ground operation process. We will promote the construction of integrated and intelligent airport resource and energy management system, implement energy-saving transformation of lighting, heating/cooling system and building envelope, and strengthen the application of new materials, new technologies and new products. We need to support the utilization of renewable energy such as solar energy and geothermal energy according to local conditions, and carry out pilot projects of comprehensive new energy utilization at airports; and steadily improve the utilization rate of rainwater, reclaimed water and recycling water, and promote the construction demonstration of water-saving airports.

Section 3 Expediting Environmentally-friendly Development of Air Traffic Management

The civil aviation industry will optimize the route structure with a target on energy conservation, continue to launch more temporary routes, reduce the non-linear coefficient of routes and shorten flight time. We need to strengthen operation coordination, improve aviation meteorological and information service capabilities, reduce flight delays, turn-arounds and alternate landing, and provide technical support for inflight fuel saving. We will speed up the energy-conserving transformation of air traffic control facilities and equipment; and enhance green awareness among controllers through training, study and formulate guidelines and evaluation methods for green air traffic control, and encourage controllers to actively use green methods in practice.

Section 4 Enhancing Multi-Party Operational Collaboration

Advancing the establishment of a systematic working mechanism for green civil aviation with joint participation of the government, enterprises and supporting entities. We will step up operational collaborative decision making and support by airlines, airports and air traffic management entities, by means of integrating flight arrival and departure management functions, sharing of operation information, optimizing flow management, flight scheduling, and runway allocation, realizing safe and efficient operation of aircraft and regulating energy consumption intensity of civil air transport. A special campaign to optimize fuel efficiency on aircraft ground taxiing will be launched to reduce aircraft ground waiting and taxiing time.

Chapter 19

Mitigation of Environmental Impact of the Civil Aviation Industry

Section 1 Reasonable Management and Control of Industry Carbon

Emissions

Improving the regulatory regime for reduction of aviation carbon emissions. We will rationally chart out civil aviation emission peak and carbon neutrality pathways and phased targets for emission reduction in accordance with the principles of domestic and international coordination, conformity of goals and measures, and integration of administrative resources. We will to promote the establishment of a market mechanism for the reduction of aviation carbon emissions in tandem with the national conditions and the development stage of the industry, and actively participate in the development of a national carbon market. Supports will be rendered to the formation of a management and evaluation mechanism of carbon emissions for Chinese airports, and qualified airports are encouraged to develop themselves into near-zero carbon airports and near-zero carbon terminals. We will carry forward pilot programs of regular application of sustainable aviation fuel, and speed up the capacity reserve on strategic fronts covering technology, talents, and standards.

Participating in the global regime for reduction of aviation carbon emissions. Adhering to the global governance concept of extensive consultation, joint contribution and shared benefits, and following the principles of fairness, common but differentiated responsibilities and respective capabilities, we will actively assume international obligations in line with China's basic national conditions, development stage and civil aviation industry capabilities. In-depth participation in the development of ICAO aviation emission reduction policies and technical standards, and constructive participation in international negotiations and consultations on reduction of aviation carbon emissions will be carried forward. We will support UN agencies to play an active role in promoting the sustainable development of global civil aviation, enhance the capability of international cooperation agenda design for aviation emission reduction and push for a global aviation carbon emission governance system that is fair and equitable, respective capabilities and mutual learning.

Section 2 Harmonious Coexistence between Airports and Surrounding Ecosystems

Intensifying efforts in airport air pollution prevention and control. We will accelerate the development of airport area environmental quality assessment system and strengthen the monitoring and management of ambient air quality in airports and surrounding areas. We will consolidate and strive for greater achievements made in the campaign to protect the blue sky by the civil aviation sector, boost efficient application of intelligent network-connected new energy equipment within the airport perimeter, promote the application of APUs for aircraft and the application of pure electric vehicle equipment at airports, press ahead with the construction of supporting facilities, and reinforce safe operation and emergency response management. We will continuously optimize the airport energy structure and increase the proportion of clean energy. The ecological, landscaping and humanistic value of airport greening

will be further advanced.

Enhancing comprehensive management capability of airport noise. In-depth assessment of aircraft noise impact in the airport neighborhood and researches on airport noise control system focusing on noise source management and land use compatibility management will be furthered. Automatic monitoring system for aircraft noise at airports with passenger traffic over 10 million will be accelerated, the construction of noise monitoring, prevention and control infrastructure for newly built and expanded airports will be strengthened, and noise pollution prevention and control measures endorsed by environmental impact assessment will be implemented. Efforts will be made to improve the ability to trace the source of noise events and support the advancement of meticulous noise control. Airports are encouraged to level up collaboration with air traffic management department and airlines, adjust management rules, optimize arrival and departure procedures, and innovate and upgrade flight noise reduction technology with the aim of mitigating aircraft noise. At airports in Beijing, Shanghai, and Guangzhou, researches will be carried forward on pilot programs for aircraft noise control.

Consolidating the treatment and disposal of airport sewage and solid wastes. The construction of rainwater (oil) sewage collection, treatment and reuse facilities and pipeline network will be strengthened, and the adoption of new sewage treatment technologies and rainwater and sewage separation technologies to reduce energy consumption for treatment will be encouraged. We will further standardize centralized harmless disposal and recycling of de-icing (snow) chemicals, encourage the use of environmentally friendly de-icing fluids and advanced and applicable de-icing technologies, and support airports in the northern region with an annual passenger throughput of over 2 million to accelerate the construction of centralized de-icing stands. We will build a sound wastes classification, harmless treatment and recycling system, and handle aviation wastes from epidemic areas in strict accordance with regulations. Plastic pollution disposal in the civil aviation industry will be further tightened.

Box 8 Civil Aviation Green and Low-Carbon Projects
1. Program for the building of carbon market mechanism We will improve relevant policy standards for civil aviation to participate in the carbon market, and design a market-based carbon emission reduction mechanism for transport aviation operation. **2. Actions for developing green civil aviation standards** We will formulate and improve standards, specifications and technical guidance documents for aviation carbon emission management, green infrastructure construction, green operation, aviation fuel sustainability certification, and airport pollutant emission control. **3. Key technology innovation plan for green civil aviation** We will carry out theoretical research and technological development on environmental impact traceability monitoring, civil aviation environmental impact database and assessment model

development, comprehensive application of clean energy, and green equipment design and manufacturing.

4. Green Benchmarking Program

We will encourage civil aviation enterprises to actively participate in the benchmarking programs to create a group of green flights, green routes, and green airports, and form a replicable, and promotable model.

Part 6

Solid and Forceful Strategy Support System

We will follow the notion of taking scientific and technological innovation as the primary driving force and talents as the fundamental resource, make breakthroughs to address the bottlenecks hindering development, insist on opening to the outside world, and promote regional coordination to bring about a new paradigm of synergetic development of civil aviation and industry, and support high-quality development of civil aviation.

Chapter 20

Implementation of the Strategy of Guidance of Scientific and Technological Innovation

By fully acting on self-reliance, openness and inclusiveness, we will focus on major industry needs, development bottlenecks and frontier technologies, intensify research and the application of independently innovated products with core technologies in key fields, build a high-level civil aviation technological innovation system, and forge core competitiveness of high-quality civil aviation development.

Section 1 Scientific and Technological Breakthroughs in Key Areas

Striving to break new grounds in core technologies in key fields. The civil aviation scientific and technological innovation strategy will be implemented to enhance basic research of applications and technology R&D in coordinated efforts in the civil aviation sector, with a focus on issues pertaining insufficient support capabilities and weak resistance to impact in key areas. Various parties will be mobilized to collectively carry out scientific and technological innovation and make breakthroughs in the domains of key technologies research and equipment development including safety and security, airworthiness certification, space application systems, intelligent airports, intelligent air traffic control, intelligent operations, passenger transportation and aviation logistics.

Boosting the application of major scientific and technological achievements. Following demand-oriented principle, efforts will be made to refine the roadmap for the application of scientific and technological achievements, and expand the applications of civil aviation technologies including 5G, big data, blockchain, artificial intelligence, and Beidou systems. We will seize the opportunity of large-scale infrastructure construction to realize deep integration of new technologies, new

products and infrastructure. We will endeavor to develop new technology application scenarios to improve operational efficiency and service quality.

Accelerating the application of domestic technologies and equipment. We will strengthen the collaboration between the government and enterprises, improve policy system for the application of domestic technologies and equipment, and establish a platform and mechanism to align supply and demand of civil aviation domestic equipment. We will improve the industry's first (set) system, and promote the demonstration and application of domestic equipment. Support will be provided to civil aviation enterprises to participate in the whole process of domestic equipment R&D and manufacturing, speed up product technology iteration, and improve product quality. The internationalization of China's civil aviation advanced technologies and standards will be enhanced to set the stage for domestically produced equipment to enter international mainstream market.

Box 9 Leading Projects in Scientific and Technological Innovation (2035)

1. Project of platform for scientific and technological innovation

We will consolidate scientific and technological innovation resources inside and outside the industry, coordinate and optimize the civil aviation scientific and technological innovation platform system, accelerate the planning and construction of civil aviation scientific and technological innovation demonstration zones and civil aviation science and education industrial parks, and plan to build national scientific and technological innovation bases in civil aviation. We will improve the aviation safety experiment bases, and enhance the scientific and technological innovation capabilities of aviation safety experiments and scientific research verification.

2. Civil aviation smart scenario development project

Focusing on operation scenarios including intelligent airports, intelligent air traffic management, intelligent airlines, and intelligent oversight, we will step up integrated civil aviation information system of air, space and ground, airport intelligent construction, maintenance and operation, air traffic four-dimensional trajectory operation, integrated operation of manned and unmanned aircraft, precise control of flight operation, aircraft maintenance automation, intelligent passenger services, intelligent aviation logistics, civil aviation safety big data and other technological R&D applications to improve the level of civil aviation intelligence.

3. Key technologies and equipment research and development projects

We will conduct research on basic theories and key technologies of aircraft airworthiness, focusing on breakthroughs in airworthiness certification technology of the Beidou system, large UAVs, engines and domestically produced core components. The research, development, promotion and application of domestically produced equipment on civil aviation safety, emergency support, and airports and air traffic management special equipment will be expedited.

Section 2 Civil Aviation Scientific and Technological Innovation Capacity

Enhancing the national team of scientific and technological innovation. We will optimize and upgrade the civil aviation scientific and technological innovation platform, and build a more efficient civil aviation scientific research platform system. We will give full play to the aggregation function and guiding role of the Civil Aviation Science and Education Innovation Alliance to accelerate major scientific and technological innovations in civil aviation and the training of leading talents in science and technology. We will expedite the development of civil aviation science and technology innovation demonstration zones and science and education industrial parks, and promote the formation of a world-class high-tech industry clusters in civil aviation. Supported by China Academy of Civil Aviation Science and Technology, Civil Aviation University of China, and members of the Civil Aviation Science and Education Innovation Alliance, we will pick up the pace in building high-level think tanks, and improve decision support capabilities for civil aviation safety management and macro governance. The roles of aviation colleges and universities will be further unleashed to consolidate applied basic theoretical research, with a focus on the application of core technologies covering big data, artificial intelligence, and basic software, as well as the research and development of key equipment and domestic alternate solutions. We will boost the construction of major experimentation platforms and simulation verification platforms, improve industry experiment testing and verification facilities and jointly build national science and technology innovation based in the civil aviation sector.

Expanding the main force undertaking scientific and technological innovation. The role of enterprises as main innovators will be strengthened by deploying the innovation chain centering on civil aviation operation and service chain, and building its corresponding industrial chain. Support will be extended to enterprises to take the lead in establishing innovation consortia and undertake major national science and technology projects. The establishment of industrial alliances will be encouraged to build a market-oriented innovation ecosystem with enterprises as the mainstay for deep integration of production, education, research and application. The support for independent innovation of transportation, navigation and support enterprises will be advanced, by leveraging the leading role of large enterprises in innovation, aiding small and medium-sized enterprises in faster application-oriented innovation, and increasing investment in scientific and development research.

Extending the circle of friends for technological innovation. We will fully leverage civil aviation science and technology awards, make overall use of innovation resources inside and outside the industry, expand the scope of awards for civil aviation scientific and technological projects, attract social science and technology innovation resources to participate in civil aviation, and shape a new paradigm of collaborative innovation. We will stay committed to being integrated into the global scientific and technological innovation network, participating in or leading the development of international civil aviation innovation platforms and R&D centers, and endeavoring to promote international scientific and technological cooperation projects.

Section 3 Support System for Scientific and Technological Innovation

Joining new forces for scientific and technological innovation. We will align with the scientific and technological plans made by national ministries and local governments, implement the medium and long-term scientific and technological development plan for civil aviation, and guide and support the technological innovation and development of the industry. By joining hands with the Ministry of Science and Technology, we will implement the joint action plan for independent innovation of the new generation of intelligent civil aviation. Forces of the society will be mobilized to make breakthroughs in core technologies in key fields of civil aviation.

Incentivizing the innovation vitality of talents. By respecting knowledge and talents, we will focus closely on the needs stemming from major scientific research directions in the industry, step up the development of scientific and technological innovation talent teams, and cultivate young talent reservoir of scientific and technological professionals with international competitiveness. We will enhance the evaluation system for scientific and technological talents, and grant greater autonomy to employers. We will carry forward the spirit of scientists in the new era, highlight support for high-caliber talents and teams, foster national-level civil aviation science and technology innovation leaders and teams, and provide high-quality scientific and technological talent support for the development of civil aviation.

Improving institutions and mechanisms for scientific and technological innovation. The scientific and technological innovation governance system will be enhanced to give full play to the role of the government, scientific research institutes, colleges and universities, and enterprises and public institutions. We will take major scientific research tasks as guidance to promote integrated allocation of projects, bases, talents and funds, and lay down institutions and mechanisms embodying multi-party common building, joint sharing and joint governance. We will improve scientific research evaluation methods oriented to solve practical problems, and establish and advance evaluation and assessment procedures for various innovation platforms. Progress will be made in improving organization management approaches, and the systems characterized by "open competition mechanism to select the best candidates to lead research projects" for scientific and technological projects will be implemented. We will implement relevant incentive policies formulated by the central government in the field of scientific research to stimulate the enthusiasm of scientific researchers, level up the introduction and cultivation of high-level scientific and technological talents, and expand at a faster pace the scale of talent pool through policy optimization and channel innovation. We will explore the implementation of the incentive mechanism for civil aviation independent innovation, and allow scientific research and development entities to exercise more autonomy in the application of their own achievements. We will leverage government investment, market financing and venture capital in a comprehensive manner to provide financial

support for scientific and technological innovation, and increase investment in on-site verification of new technologies and commercialization of research achievements.

Chapter 21

Civil Aviation Talent Team Building

Guided by the plan to build China into a civil aviation powerhouse, and with quality improvement as the underlying principle, we will adhere to the Party education guidelines and talent policy highlighting openness and inclusiveness, unleash the demonstrative and leading role of colleges and universities, make overall use of internal and external resources, and build a multi-channel and multi-tiered high-level civil aviation education and training system that will foster innovative, technically skilled and internationalized talent teams in civil aviation to bolster high-quality development of the industry.

Section 1 Talent Supply Capacity

Putting in place a diversified talent supply situation. We will comprehensively enhance the demonstration and benchmarking role of colleges and universities directly affiliated to CAAC in the training of professional talents in the industry, participate in the development and implementation of standardized systems for the training of civil aviation professionals, deepen school-enterprise cooperation to give play to the role of civil aviation enterprises in the joint training of professional talents. We will encourage and steer more social resources to carry out education and training in accordance with the civil aviation talent training standards, and continue to improve the civil aviation talent supply framework of "colleges and universities + enterprises + social training institutions", to provide strong talent impetus for the development of civil aviation.

Making headways in the core competitiveness of colleges and universities directly affiliated to CAAC. The Civil Aviation University of China aims to build itself into a world's double first-class university, and strives to become a world-class civil aviation university with Chinese characteristics. The Civil Aviation Flight University of China endeavors to develop into a world-class flight university. The Civil Aviation Management Institute of China strives to becomes a first-class industry Party school and a leader in high-quality training and education in the civil aviation industry. Guangzhou Civil Aviation College is committed to develop itself into a domestic first-class, high-level vocational college with international influence. Shanghai Civil Aviation College is dedicated to enter the national list of "High Level Higher Vocational Education and Academic Discipline Development" institutions. We will speed up the infrastructure construction projects in directly affiliated colleges and universities, build an intelligent education and lecturing platform, and modernize

educational facilities in civil aviation colleges and universities.

Uplifting the quality of civil aviation talent development and training. Teachers' morality and ethics will be further enhanced to cultivate a high quality and versatile competent staff team. We will build a high-level educational discipline system with distinctive characteristics, support directly affiliated colleges and universities to apply for the qualification to grant doctoral degrees in accordance with procedures, further promote the reform of new engineering and technical disciplines in civil aviation, introduce new disciplines such as big data, artificial intelligence, and the Internet of Things, and create first-class courses with civil aviation characteristic. We will step up the development of virtual simulation experiment courses, and promote the sharing of online teaching resources in the industry. With integration of production and education and school-enterprise cooperation, cooperation between vocational schools and enterprises in developing talent training or employee training programs is encouraged to forge further integration of talent training and industrial operation. We will strengthen industry guidance, support the setup of the Steering Committee of Civil Aviation Vocational Education and Teaching, and build a quality evaluation system for civil aviation talent education and training.

Section 2 Development of Key Talents

Building a competent scientific and technological innovation talent team. By continuing to implement the scientific and technological innovation talent development plan, advances will be made in the training and introduction of scientific and technological leading talents, top-notch talents and innovative teams in the civil aviation sector. Following the requirements of improving the capability of independent innovation, we will build a systematic training system for scientific and technological innovation talents. We will prioritize the needs in major scientific research areas in the industry, rely on major scientific research projects to cultivate and build multiple national-level scientific research innovation teams.

Building a contingent of professional and skilled talents. We will enhance the training of professionals in flight, air traffic management, maintenance, and general aviation and put in place the craftsman talent project to cultivate and select a team of civil aviation craftsman who are well-versed in technology and capable in innovation. We will reinforce the development of new technology talents for intelligent civil aviation, strengthen technical training on big data, 5G, artificial intelligence, and Internet of Things, enhance training on new aircraft models, new business formats, and new trends, improve employees' innovative thinking and job-wide mentality, and strengthen the management system of full life cycle of pilot skills. We will advance the development of talents in central and western regions and support the development of civil aviation in the central and western regions through local training, talent exchange, and serving in temporary posts.

Fostering an internationalized talent team. Through implementing the

internationalized talent training program, we will establish an internationalized talent training system including college education, on-the-job training, and practical skills training. Improvements will be made in building the internationalized talent pool in key areas of civil aviation for the entire industry covering government agencies, enterprises and public institutions. Focus will be placed on cultivating internationalized talents with integrity and competency, international vision, international rules familiarity, and negotiation proficiency in foreign setting. We will leverage the platform of the International Cooperation and Service Center of CAAC to support young talents to participate in overseas training, and increase funding for internationalized talents in reserve to participate in international activities.

Strengthening the civil servant team. By Implementing the plan to improve the quality and capability of Party and government management talents, and promoting the training system, the focus will be placed on enhancing the political competency, professional knowledge and comprehensive quality of civil servants. We will increase information knowledge and skills training for civil servants to meet the trends of digital transformation. We will further build a world-class national-level inspector training academy, reinforce inspector training capabilities, and improve the proficiency level of inspector teams.

Section 3 Talent Management Mechanism Innovation

Improving talent evaluation and incentive mechanism. A talent utilization mechanism featuring ethics and competency and fulfilling job requirements will be established to guide civil aviation entities in forming a positive talent management paradigm, and speeding up the favorable circumstance in which talents are selected and used not limited to one type of criteria. We will further shape and improve the talent evaluation system for professional technical and skilled talents, including professional title evaluation, occupational skill appraisal and skill grade accreditation. We will work to improve talent distribution, incentive and support systems, and build incentive and support mechanisms centered around talent value.

Improving talent factor flow mechanism. We will give full play to the role of market allocation and spur the dynamism in civil aviation talent market. International talent exchanges the in civil aviation sector will be deepened. We will explore the establishment of a talent flow mechanism among civil aviation colleges and universities, scientific research institutes, and enterprises and public institutions, and achieve market determination of factor pricing, voluntary and orderly flow, and efficient and fair allocation.

Box 10 Talent-Empowered Industry Project
1. Promotion plan of scientific and technological innovation talents Aiming at basic research of civil aviation application and international cutting-edge technology

and relying on such platforms as key laboratories and engineering technology research centers, we will build 50 first-class scientific research teams, and focus on supporting and cultivating 200 high-level civil aviation scientific and technologic innovation talents.

2. Training plan for industry craftsman talents

Relying on vocational colleges and enterprises, we will implement knowledge renewal projects, take actions to improve skills, strengthen the training of highly-skilled talents in the industry, and expand the team of highly-skilled talents. We will implement the One Thousand Talents Plan for Craftsmen, and select and train 1000 industry craftsmen talents including May 1st Labor Medalists, technical experts, outstanding employees, technicians and senior technicians.

3. Empowerment plan for digital talents

We will vigorously cultivate industry digital talents, support industry colleges and universities to introduce civil aviation informatization-related disciplines, and improve the digital proficiency of professional talents. We will leverage the main role of enterprises and colleges in training, improve digital curriculum training plan for in-service personnel, and step up digital capability training for talents in related fields of the industry.

4. Educational facilities improvement plan for colleges and universities directly affiliated to CAAC

We will accelerate the construction of new campus of Civil Aviation University of China, the Tianfu Campus of the Civil Aviation Flight Academy of China, the Pudong Campus of Shanghai Civil Aviation College, the Huadu Campus of Guangzhou Civil Aviation College, and comprehensive renovation and maintenance of the old campuses of Civil Aviation Management Institute of China (Huajiadi, Kunming and East Campus) and the construction of the East Campus. Research will be conducted to improve the teaching and scientific research conditions of the directly affiliated colleges and universities.

Chapter 22

Serving and Supporting Coordinated Regional Development

Guided by the objective of better serving national and regional major strategies and regional coordinated development strategies, we will give full play to the comparative advantages of civil aviation, and accelerate the formation of a new situation of integrated development in which civil aviation and regional economic and social development are mutually reinforcing and supportive.

Section 1 Vigorous Support for Major Regional Strategies

Expediting coordinated development of civil aviation in the Beijing-Tianjin-Hebei region. By focusing on the strategic goal of building a world-class airport cluster in the Beijing-Tianjin-Hebei region, we will work to build Beijing's dual hub system, improve the quality and efficiency of Beijing Capital Airport, enhance the international hub capacity of Beijing Daxing Airport, speed up the expansion project

of Tianjin Airport, and enhance the hub function of Shijiazhuang Airport. We will fully leverage the integrated management advantages of Capital Airports Holdings Company, strengthen strategic management and control, and take the lead in building a coordinated and efficient management system for regional airport groups and convenient and accessible aviation service system. Resources of relevant parties will be consolidated to improve the policy system, innovate the management mechanism, and explore a development model that can effectively enhance the international competitiveness and sustainable development capacity of dual hubs in Beijing.

Making progress in civil aviation development in the Guangdong-Hong Kong-Macao Greater Bay Area. Through consolidating and enhancing the status of Hong Kong as an international aviation hub, improving the service functions of Macao Airport and accelerating the construction of airports in Guangzhou, Shenzhen, and Zhuhai, airspace operation, connectivity and mutual recognition of customs inspections will be stepped up in building a world-class airport cluster with world-class infrastructure, service level and operational efficiency in the region. We will give full play to the international and market-oriented development advantages of the Greater Bay Area, improve the mutually beneficial cooperation mechanism, accelerate the application of new technologies, and take the lead in the transformation into intelligent civil aviation. Advances will be made in building a closer and more efficient multi-modal and cross-border intermodal cooperation to establish a professional, convenient and intelligent logistics system that leads the world. The steady development of cross-border helicopter services will be supported in building a world-class business jet operation and management centers. Research on the joint operation of air traffic management in the Guangdong-Hong Kong-Macao Greater Bay Area will be carried out.

Taking the initiative to accelerate high-quality development of civil aviation in the Yangtze River Delta. The strategic position of Shanghai as an international aviation hub will be further boosted, the regional hub functions of Hangzhou, Nanjing and Hefei airports will be optimized, and the development of a world-class airport cluster in the Yangtze River Delta with strong development momentum, high market vitality and strong international competitiveness will be expedited. Efforts will be made to improve coordinated development mechanism, comprehensive support capabilities, and parallel development of transport aviation and general aviation, and basically form a high-quality civil aviation development system with cross-border collaboration, clear tiers, and regional integration. Driven by domestically produced civil aircraft, a new paradigm of coordinated development of the civil aviation industry with a full chain, full elements and full cycle will pick up pace.

Enhancing the capabilities of civil aviation serving major strategies. By prioritizing ecological conservation, promoting green development, strengthening development coordination, we will accelerate the transformation of civil aviation into green and low-carbon development model, and facilitate the development of the Yangtze River Economic Belt and the ecological protection and high-quality development of the Yellow River Basin. We will optimize the functional layout of

airports, deepen the reform and innovation of policies and mechanisms, implement the highest level of opening-up policies in civil aviation, build Hainan into an aviation regional gateway hub facing the Pacific Ocean and the Indian Ocean, and render strong support for the construction of Hainan Free Trade Port.

Section 2 Supports for Regional Coordinated Development Strategies

Providing support to the Large-scale Development of the Western Region to reach a new height of wider opening-up. We will enhance the scope of radiation and competitiveness of international aviation hubs including Chengdu, Kunming, Chongqing, Xi'an and Urumqi towards Southeast Asia, South Asia and Central and West Asia, and support the west for a new height in opening-up. We will step up the coordinated development of a world-class airport cluster in Chengdu and Chongqing, and plan and research the construction of a new airport in Chongqing. We will accelerate the building of airport network and improve airports' comprehensive operational capabilities. We will vigorously develop regional aviation, implement basic aviation service projects, actively develop general aviation short-haul transportation, and create space for popularized development of civil aviation. We will increase financial and policy support for the construction and operation of airports in plateau and remote areas, innovate counterpart assistance model, and implement special plans for civil aviation talents in the west. We will level up the long-range influence and pertinence of special policy arrangements, support the steady development of civil aviation in border areas, and give full play to the unique role of civil aviation in implementing the central government's strategy of governing Tibet and Xinjiang.

Making new breakthroughs in pursuing comprehensive revitalization of the northeast region. We will improve the hub function of four major airports in Harbin, Shenyang, Dalian and Changchun to consolidate the strategic supporting role for the comprehensive revitalization of the northeast region. Research will be caried out to achieve a higher level of opening-up in air traffic rights with neighboring countries such as Japan, Republic of Korea and Russia. We will pilot airspace capacity assessment based on coordinated operation of major airports in the region, and build a broad channel of northbound international air routes. We will improve the level of short-haul transportation, accelerate the establishment of "trunk and feeder connections for the whole network", and build a regional aviation network with northeast characteristics. We will consolidate the advantages of general aviation in agriculture and forestry operations, and build a demonstration zone for the comprehensive development of general aviation in northeast China. We will take the lead to increase policy supply for market access, slot capacity, traffic rights management, and airport operation management, and allow the northeast region freedom and flexibility of resource allocation. Talent exchanges with the eastern region will be strengthened to speed up the mindset transformation and the implementation of advanced experience.

Opening up new prospects in the development of civil aviation in central China. We will bring the geographic advantage of central China into full play, accelerate the construction of major aviation hubs and channels, and create a strategic pivot for greater domestic circulation. We will improve Zhengzhou's international air cargo hub function to build the "Air Silk Road" at a high level. Airports in Hubei Province will be further established into both passenger and cargo hubs, and Ezhou will be built into an internationally competitive air cargo hub. We will speed up the construction of Changsha, Nanchang and other hub airports, and strengthen the service function that radiates to the central region. We will leverage the role of the civil aviation industry, stimulate new momentum for high-quality regional development, promote the reform of Hunan's low-altitude airspace management pilot project, accelerate Shanxi's general aviation development as a demonstration province, enhance the capability of the Jiangxi Airworthiness Certification Center, and promote the innovative demonstration and application of the UAV industry in the south of Jiangxi Province.

Encouraging civil aviation in the eastern region to take the lead in modernization. Taking the improvement of service quality, operational efficiency and intelligence level as the direction, we will deepen the strategic cooperation mechanism between airlines and hub airports, and accelerate the development of a world-class super carrier with international competitiveness. We will further promote intelligent civil aviation construction demonstration, enhance the capacity of originating innovation, step up cross-border cooperation, and accelerate the formation of a number of innovative achievements with independent intellectual property rights and international first-class standards. We will encourage civil aviation enterprises to actively participate in international competition and cooperation, and promote professional technical standards and service products to go global. We will launch pilot reforms in key areas of civil aviation and explore more replicable and promotable experience.

Taking steps to improve development conditions in areas special features. By fully unleashing the comparative advantages of civil aviation, we will boost the overall arrangement of infrastructure construction, innovate the supply of aviation service products, and strive to improve the level of air transport services in areas with special features. We are committed to deepen the integration of civil aviation industry and "red tourism". Airports in Tashkorgan, Pulan, Dingri, Longzi, Suifenhe, Zhaosu, Zhundong (Qitai) will be constructed as planned, Yanji Airport will be relocated, preliminary study of Baicheng, Aheqi, Qinghe, Jimunai and other airport projects will be launched in a timely manner, and reconstruction and expansion projects of major border airports will be advanced. We will innovate the mode of work in paired assistance and counterpart assistance between the eastern and western regions, and consolidate and expand the effective connection between poverty alleviation achievements and rural revitalization.

Section 3 Promoting Quality Development of Airport Economy

Actively supporting development of airport economic zones. We will enhance pooling of resource factors like human and logistics by aviation hubs and pulling power of industrial development, take adaptive measures in an intensive and efficient manner to bolster national demonstrative airport economic zones and realize interactive economic development for airports and adjoin regions. We will carry out evaluation for such demonstrative airport economic zones and summarize results to form promotable and replicable experience.

Developing an ecosystem for aviation industry. We will bring into play the advantageous scale of civil aviation transportation market, rely on the development of airport economic zones, give support and guidance for industrial upgrading in various sectors such as aviation research and development, aeronautical maintenance, air logistics, aviation finance and commercial services, extend aviation industrial chain to drive up relevant domestic sectors, and we will actively strive for policy combos including bonded area, opening up ports and pilot program of free trade zones in order to set up an ecosystem for aviation industry with well-rounded strong support.

Facilitating integrated development of airports, industries and cities. Enough space will be reserved for long-term development of airports by reasonable layout of airport industries and protection of airport environment and land resources, basing on strengthened unblocked interface between airport economic zone plans, airport master plans and urban development plans. Efforts will be made to complete infrastructures such as integrated transportation adjacent to airports and supportive urban services including public transportation, education and healthcare for establishing eco-friendly and habitable modern aerotropolis.

Box 11 Pilot Project for Industrial Synergy
1. Airport economy upgrading action About ten additional national pilot zones of airport economy will be put into place to integrate airports with regions. An evaluation indicators system for airport economic zones will be developed for summarizing and popularizing advanced experiences for airport economy upgrading in the future. **2. Aviation industry extension action** We will make aviation transportation development a driving factor to bring in relevant industry upgrading, give support and guidance to sectors like aeronautic equipment manufacturing, aircraft maintenance, finance and insurance, domestic chip-manufacturing for larger and stronger development, actively expand market at home and abroad, and promote establishment of aviation industrial clusters with boasting competitive edges. **3. Special action of civil aviation + cultural tourism** We will strengthen cooperation with cultural and tourism departments to innovate aviation service products, speed up low-cost carrier growth, promote Red-Tourism and tap market potentials. In light of tourism development of major tourist cities and destinations, we will

optimize domestic airline network and increase non-stop flights between large tourist-generating cities. Regarding demand and seasonal features of tourism market, we will lose no time in institutional innovation in slots and opening air routes in order to make a bigger cake out of domestic consumer market.

Chapter 23

A New Level of Opening Up to the Outside World

Staying forward-looking, proactive and in control while opening up, we will serve the new development pattern of a dual circulation in domestic and international markets for deeper and wider opening up in more areas, and we will spare no efforts to explore new space for international development of our civil aviation to be a stronger driving force for civil aviation of the world.

Section 1 Opening-up of Civil Aviation to a High Level

Opening up traffic rights on a larger scale. We will actively promote aviation transportation deregulation and facilitation among adjacent countries and districts in Southeast Asia and Northeast Asia, uplift connectivity between countries in regions like South Asia, Central Asia and so on, and we will drive regional comprehensive economic partnership development. We will increase our reserves in traffic rights with European and American markets. We will make overall plans for traffic rights, airline transport capacity and traffic management tools to support airlines exploration of markets.

Driving in-depth opening-up of civil aviation in key areas. More efforts will be made to improve hub-oriented traffic rights policy in order to bolster competitiveness of international aviation hubs. We will enhance Xiamen and Fuzhou as regional aviation hubs to facilitate development of the Economic Zone on the West Side of the Straits and the core area of 21st Century Maritime Silk Road. Responding to opening up requirements in some areas, we will further implement policies on opening up air transportation in key areas like Hainan Free Trade Port. We will optimize Qingdao functioning as a regional aviation hub to support development of local economic and trade demonstration area under China-Shanghai Cooperation Organization.

Promoting opening up on a larger scale for civil aviation. Scientifically responding to external changes, we will add and create new edges for international cooperation and competition. We will complete foreign exchange and cooperation mechanisms for civil aviation to carry out wide-range bilateral, multilateral and regional cooperation and research, based on international cooperation platforms. Advancing Free Trade Agreement negotiation for civil aviation and allowing greater market access, we will see to full play of pilot programs of free trade areas as reform and opening up

experiments, make overall plans for domestic and foreign resources to increase supply of quality service offerings by civil aviation. We will encourage civil aviation enterprises going global to achieve greater influence over civil aviation products, technologies, services and standards in the world. We will support airlines expanding international business via airline alliance, code sharing and equity investment etc. for a stronger competitive edge around the world.

Section 2 Support Capabilities for Opening-up to the Outside World

Consolidating system integration of policies on international aviation development. By scientific study and understanding of new realities in the international aviation market, we will enhance the overall design of policies on international development, develop and implement action plans for airlines to gain a global competitive edge. We will include pilot programs for sectoral comprehensive reform and level up our international development policies to be systematic and strategic enough to accommodate multi-party synergy and unified actions for quality development of Chinese international air transport.

Strengthening laws and regulations support for the opening-up to the outside world. We will deliberate and propel institutional opening up of civil aviation, improve laws and regulations in the sector, and initiate a globally favorable business environment for various market players. With a more internationalized civil aviation sector boasting better rule of law, we will make innovative supervisory measures and room for cooperation model innovation between different parties of international air transport. We will reinforce prevention and control system of investment risks and improve supervisory system in line with foreign investment rules of China. We will better track and study foreign affair related laws and regulations to guide civil aviation enterprises including airlines for heightened awareness of business compliance and for protection of their rights and interests.

Section 3 Participation in the Global Governance of Civil Aviation

Taking an active part in global civil aviation development. Adhering to the perspective of global governance, we will share Chinese experiences and take a lead in development of international aviation governance system in domains such as public health emergency etc. Pooling industrial resources, we will internationalize well-developed and advanced domestic standards based on their priorities in a phased manner through such platforms as ICAO. We will deeply get engaged in important decision-making in the international organization of civil aviation and coordinate and push forward the strategic dialogue mechanisms with relevant countries in fields of safety, security, air navigation and environment etc.

Deepening international cooperation of civil aviation. Serving the big picture of national diplomacy, we will take the unique role of civil aviation in diplomatic activities

and take part in economic and trade consultations, investment agreement and free trade agreement negotiations with foreign countries to gain more room for development. We will bring into play the Belt and Road Initiative cooperative platform of Chinese civil aviation to expand and intensify cooperation.

Part 7

A Modern Governance System of Civil Aviation

With correct handling of relation between the government and market, we will emphasize the use of reform and market-based approaches to decisively remove institutional obstacles hindering resources allocation capacity and improve legal system in civil aviation for better administrative efficacy. We will enhance cultural development to modernized the governance system and capacity of the sector.

Chapter 24

Complete Market Governance System

With market fully playing a decisive role in resources allocation, government will better play its role in macro-regulation and industrial supervision so that market players will stay motivated in the efficient and market-based resource allocation.

Section 1 Improvement of Market Operational Mechanism

Reinforcing governance rules. We will uphold rules of equal access, fair supervision, orderly opening up, integrity and law-abiding to develop a market system with higher standards. We will implement unified negative list for market access, continue to relax access restrictions and improve market exit system. We will improve, by category, market-oriented allocation of factors, actively and steadily promote differentiated and coordinated precision management of resources including traffic rights and flight slots, moderately expand autonomy of enterprises and find market-oriented ways of hub development with existing resources. A management mechanism of data resources inventory will be developed to stably proceed data opening and sharing. We will improve service quality management system to enhance protection of rights and interests of travelers and cargo owners.

Improving rules of pricing behavior and reinforcing supervision of charges. We will improve pricing mechanism of civil air transport and carry out research to promote differentiated reform of aviation service charges. We will strengthen pricing behavior rules in the market and regulate pricing behavior of civil air transport enterprises. We will intensify supervision of charges for monopolized business of supporting services in civil aviation.

Improving market supervision system. We will step up oversight of on-going events and post-factum oversight, shift regulatory focus from principal entities' qualifications to standardized behavior of the market players, normalize and institutionalize the

double-randomization and openness in one aspect in all areas of market regulation. We will thoroughly implement review system for fair competition. We will improve supervisory capabilities to better regulate natural monopoly business of the sector and cooperate with competent authorities to strengthen investigation over monopolistic behavior, fostering fair competition and market opening-up. We will improve mechanism of inclusive and prudent regulation over new forms of business. We will complete credit system development to create a new type of regulatory mechanism based on credit supervision and management.

Deepening reform of state-owned enterprises (SOEs) affiliated to CAAC. Upholding market-oriented reform of SOEs, we will further mixed ownership reform in an active and reliable manner, accelerate the pace of improving legal person governance structure and market-based operational mechanism in affiliated SOEs, and strengthen tenure system and contract-based control of the management to invigorate the SOEs. We will support and guide civil aviation enterprises in strategic restructuring and specialized integration, handle zombie enterprises and ineffective assets in an active and reliable manner so the enterprises will excel in their principal business with market playing its role. In line with requirements of separating functions of government from those of enterprises and spinning off business functions from institutions, we will straighten out relations between administrative bodies and institutions at all levels with their affiliated enterprises and we will explore the reform path of public good enterprises.

Section 2 Improving Macro-governance System

Stressing the underpinning role of sectoral development plan, we will improve a sectoral macro-governance system in the direction of the Plan braced with fiscal support, policy support and other coordinative measures. Emphasizing expectation management, we will improve regulation mechanism of financial and economic policies for better science-based work and inverse cycle adjustment. We will strengthen support mechanism of financial and economic policies in civil aviation to build an omni-bearing, full-process and all-coverage budget performance management system. We will improve policies on airport concession management to uplift quality of airport operations. We will scientifically manage total numbers of slots and pace of fleet introduction to keep overall supply and demand in dynamic equilibrium. We will complete database for civil aviation macro-governance, strengthen governance capability aided with modern technologies like big data, and speed up modernization reform of statistics. We will systematically promote theoretical research of civil aviation development based on the practices of China, regarding selected subjects as economic management in civil aviation and its coordination with integrated transportation, regional economy and relevant industries.

Chapter 25

Improving Administrative Efficacy of Government

We will transform government functions, uphold and improve legal system for civil aviation, make new administrative practice, further streamlining administration and delegating power, and build a governance system with clearly defined responsibilities for administration in accordance with the law.

Section 1 Strengthening Law-based Administrative Capabilities

Enhancing legal and regulatory system for civil aviation. Keeping our eyes on both quality and progress of legislation work, we will adapt legal and regulatory system to the new characteristics of civil aviation development in a timely fashion. We will promote revision of *Civil Aviation Law of the People's Republic of China*, actively participate in development of *Air Law*, and continue strengthening efforts in key areas of development of laws and regulations such as safety, security, service and emergency management etc. We will correctly deal with relations between reform and legislation in civil aviation for good legislative foresight so as to leave room for development in new field and business formats like short distance transport and drones, for new technology applications and for intelligent civil aviation.

Improving working mechanism for legislation. We will uphold legislation work that is science-based, democracy-based and law-based. We will keep polishing mechanism of opinion collection and management in legislation, step up opinion solicitation efforts among key groups and explore ways to build a focal point system for legislation work. We will make systematic plans for legislative projects, release and implement sectoral legislation plans, make science-based annual plans for legislation and we will do research to improve assessment mechanism of legislation in whole process such as rulemaking, enforcement and adjustment. We will explore and launch third-party assessment.

Deepening reform of administrative law enforcement system. Enhancing awareness of rule of law, we will strengthen oversight over safety, market and quality. By standardizing and improving mechanism of power operation and decision making, we will ensure that major decision-making and administrative law enforcement be in line with laws and regulations. We will complete law-enforcement oversight system in civil aviation and realize unified whole-process management in all aspects. We will bolster oversight and restraint to make administrative affairs transparency a norm and the opposite an exception. We will put strict requirements on law enforcement manners to be impartial and up t0 high standards, standardize the use of discretion and intensify enforcement in key areas of public concern and of vital interests. We will set up an auditing system to heighten discipline against law-violation and effectively restrain abuse of power.

Section 2 Deepening Administrative System Reform

Deepening reform of administrative organization mechanism. We will strengthen the Party's leadership system in major issues and complete mechanism of deliberation and coordination in major decision-making. Optimizing functional allocation and working process, we will develop and execute list of terms of references and responsibilities, accommodate inter-departmental, interdisciplinary and inter-regional task mode to advance the building of a smoothly-running and well managed administrative system with its authorities and responsibilities well-coordinated. By the principle of expediting separation of institutions from government and oversight from operation, we will further system reform of institutions. We will support in-depth involvement of trade associations in civil aviation industry governance.

Improving administrative system. We need to optimize administrative system in decision-making, execution, organization and oversight. We will enhance departmental coordination and cooperation, focus on main responsibilities and principal work, prioritize key issues and constitute a work pattern with aligned objectives, unified direction of action and resonating effects. We will improve incentive mechanism to bring matching positions and supports for people who are brave and undertake responsibilities, so that leaders in charge at all levels are willing to charge forward to polish their administrative competence. Proceeding with in-depth reform, we will focus on not only applying reform results to improve institutional system but also integrating efforts under unified planning to link up various reform measures.

Conscientiously strengthening supervisory capacity building at frontline entities. Requirements of Stricter Requirements, Less Burdens, Strong Support and Sufficient Training will be practiced thoroughly to further transformations of oversight concept, to complete administrative mechanism, to bolster institutional development, to optimize resources allocation and to build up capabilities, therefore working conditions and environment for front-line inspectors to fulfill their responsibilities will be improved with upgraded capabilities and effectiveness of oversight.

Section 3 Deeply Streamlining and Decentralizing Administration

Deepening the reform of administrative review and approval system. We will keep shortening approval procedures and delegating power, stick to both power delegation and tightening oversight for service optimization. We will improve list of administrative authorization and proceed with cancellation and delegation of authorization items on the list. We will explore ways to combine different certifications, widen the application of notification commitment system and simplify procedures for examination and approval. We will set up administrative approval hall to accept all applications to realize a single window handling. Making innovations in administrative and service methods, we will promote establishment of intelligent and convenient information system for administrative approval. We will improve acceptance and handling, and coordination mechanism for administrative approval items.

Chapter 26

Building Intelligent Supervisory System for Civil Aviation

Intelligent supervision, as an industry role model for new type of infrastructure development, is necessary for precision supervision and upgrading overall oversight efficiency. Aiming to advance governance system of the sector and modernization of governance capability, we will make concept innovations in supervision and services of the sector, build intelligent supervisory system through sharing with big platform and shared governance with big system, and intelligence with big data.

Section 1 Developing Intelligent Supervisory System for Civil Aviation

Innovating supervision mode. To raise supervisory efficacy, we will focus on pooling supervisory needs of CAAC and realizing data fusion, accelerate the development of whole-process and full-chain supervision system, promote an intelligent supervision shift from reactive administration toward proactive prediction based on software and modelling rather than hardware and experiences. By regulating administrative enforcement and unifying regulatory rules, we will drive data application and standardization of supervisory work, innovating supervisory modes. Oriented at encouraging industrial innovation, we will stick to the principle of inclusiveness and prudence while keeping innovation of regulatory standards.

Carrying out precision supervision. Targeting the problem of insufficient supervisory resources, we will promote connecting infrastructures of airports, airlines and air-traffic management with corresponding supervisory system of the sector so as to increase regulatory means and efficiency. Along with decentralization, fast iteration and highly reusable requirements, we will encourage industry entities to connect and share data in a safe manner, launch data governance and align data standards, and dynamically generate supervisory strategy via mining all sorts of regulatory data. Setting up risk warning model, we will strengthen study, prediction, early-warning and timely response against major risks. We will develop various scientific, objective analyzing tools for supervision audit to support precision supervision of the industry.

Section 2 Promoting Application of Intelligent Governance in Civil Aviation

Making efforts to build an intelligent government service platform of civil aviation. We will strengthen highly-efficient network for public service and extend the reform results of One Website, One Gate and One Time regarding administrative approval. Optimizing procedures and standards, we will provide standardized, convenient and platform-based public service to improve administrative efficiency by coordination across regions, departments and ranks. Based on public service cloud to better conduct online approval and mobile service, we will put more service items online, on mobile devices and on self-help platforms. We will use block chain technology to set up public

service credit system for the industry.

Speeding up intelligent officing platform development. We will drive intelligent upgrade of office equipment and conference facilities of the administrative organs, connect all terminals, and set up efficient, quick, collaborative and reliable intelligent officing platforms with extended service of mobile officing, instant messaging and video conference for a digital transformation in work.

Chapter 27

Strengthening Development of the Cultural Value System for the Industry

With the pursuance of core socialist values as the orientation, by taken into consideration of industrial realities, we will strive to build a Chinese cultural value system centering on modern civil aviation spirit, so as to enrich cultural soft power and provide strong cultural support and motivation for development of a civil aviation power in the new era.

Section 1 Enhancing Ideological and Theoretical Armament

Stay true to our political stand, we will deepen the study and implementation of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and the guiding principles of his series comments and instructions regarding civil aviation, and we will reinforce Four Consciousness, cement Four Confidence and uphold Two Maintains. We will keep reading original books and text to understand its principles, study well *Xi Jinping: The Governance of China,* and follow up latest important speeches of the General Secretary Xi Jinping. We will turn our study results into capabilities in implementing new thoughts on development, serving for establishment of new development pattern, preventing and mitigating all kinds of risk and challenges. We will turn our study results into lively practices of high-quality development and civil aviation power strategy.

Section 2 A Deep Rooted Cultural Value System of Civil Aviation

We will tap into the history and developmental practices of civil aviation looking for humanistic culture, values and moral standards to replenish and enrich the connotation and framework of a cultural value system in the sector. We will make innovative transformation and development, carry forward patriotism from Two Airlines' Uprising, promote practicing modern civil aviation spirit with its mainstays as the following: loyal and responsible political qualities, rigorous and scientific professionalism, cohesive and collaborative working style, and dedication and integrity in work, and we

will carry forward the heroic Chinese crew spirit in practice. We will proceed with normalization and institutionalization of communication and training work on themes of keeping reverence of life, regulations and responsibilities, so as to integrate the three reverences into systems and mechanisms at the grassroot and frontline level for deep cultivation of safety culture in civil aviation. To realize our purpose as airlines of the people and for the people, we will fulfill our responsibilities in all aspects and processes with heartfelt service and expand civil aviation service culture. Celebrating the spirit of model workers, hard-working and craftsmanship, we will foster an enabling environment of respecting science and talents and cultivate an open and inclusive innovation culture for civil aviation. Using education and guidance as well as disciplines and punishments alike, we will build a civil aviation culture that honors integrity and dishonors those losing credit. Following the main values of building a civil aviation power and fostering harmonious development of the industry in the world, we will actively promote awareness of community of shared future for global civil aviation with the core idea of extensive consultation, joint contribution and shared benefits.

Section 3 Improving Working Mechanism of Culture and Communication

With the Party's dominance over publicity and media as a principle, we will manage the press of civil aviation stringently, utilize well the internet platform and build an integrated work pattern for mainstream public voice across online-offline and internal-external domains. We will make improvement and innovations on direct publicity, refine news release mechanism, improve guiding mechanism over major public sentiment and public opinion on emergencies, so as to make proper responses. Through deep-mining and wide-publicizing typical deeds of outstanding figures, we will make a good storytelling about civil aviation of the new era to disseminate positive influence. Giving full play to the role of CAAC Publicity and Education Center, we will mobilize resources within and outside the sector and support launching more high-quality films, televisions and literary works on themes of history and reality of civil aviation. We will further cultural and ideological progress, drive Project to Develop a Cultural Gateway of China, and reinforce capacities in cultural publicity and teambuilding.

Part 8

Support Measures

Chapter 28

Reinforcing the Party's Leadership

We will hold to and strengthen the Party's leadership in all aspects of civil aviation and in the whole process of implementing the Plan so as to ensure our civil aviation always on the right direction. We will enhance political development of the Party to continuously improve political judgement, awareness and execution abilities of leading groups and CPC members and leaders at all levels. Standardizing and normalizing the development of the Party branches, we will see full play of grassroot-level branches as strongholds and CPC members as exemplary pioneers. We will further enhance professional quality and competence of CPC members, leaders and staff at large, step up their sense of urgency to make up the missed, heighten their awareness to catch up with the trend and strive to be experts in various fields. We will firmly advance stringent governance of the Party on all fronts, deeply improve Party conduct and clean governance, pursue holistic anti-corruption efforts so that people dare not to, cannot and will not be corrupted, in order to create a clean and upright political ecosystem of entrepreneurship. We will improve ideological and political work, step up efforts in various mass organizations led by the Party, gather people under unified thoughts to rally enormous forces driving high quality development and civil aviation power development.

Chapter 29

Strengthening the development Driven by Reform

With the Plan as the leading tasks and deep-level reform the fundamental driving force, we will create a work pattern propelled by the double engines of planning and reforming so that reform and development will be highly integrated and efficiently interlinked. We will make good use of reform in the same effect of blazing fresh paths and building bridges over hindering mountains and rivers, and we will systematically straighten out tasks of reform in all areas, attain results in key areas and make those tasks more related, systematic and precise. We will develop science-based reform schemes and task lists, set up clear division of responsibilities, increase overall coordination to gather enormous force driving reform and ensure practicing the working philosophy of One Two Three Three Four in work in the 14th Five Year Plan period.

Chapter 30

Increasing Funding Support

We need to advance reform in civil aviation investment and financing system, expand channels and reduce cost of financing. We will further innovate mechanism of investment and financing, attract social capital to join civil aviation infrastructure development, drive Public Private Partnership (PPP) in a regulated and orderly manner and use applications such as Real Estate Investment Trusts (REITs) to create an environment featuring flexibility, diversity and equality. We will actively explore to build industrial investment fund in support of innovative development of the sector. We will bolster funding for civil aviation infrastructure in special areas such as less-developed areas, borderline areas and old revolutionary bases. We will step up support in domains including new type of infrastructure, basic aviation service, air logistics and general aviation etc. We will strive to garner funds for civil aviation development in multiple ways to firmly support implementation of the Plan. Decisively practicing austerity as required, we will optimize structure of fiscal expenditure. Abiding by the principle as projects follows the Plan and resource factors follows projects, we will enhance coordination between fiscal budget and implementation of the Plan, prioritizing major missions and engineering projects. According to respective powers and spending responsibilities of the central and local government, we will give play to the initiative of local authorities in the cause of civil aviation development.

Chapter 31

Reinforcing Implementation of the Plan

The leading group of civil aviation planning will lead the efforts in a centralized manner, set up regular working mechanism and inter-departmental coordination mechanism, improve supervisory system for implementation, define work breakdown and complete institutional guarantee for leading departments to drive the implementation. We will make a yearly plan to build mechanisms of the development plan, set up accounts for major tasks and projects, carry out annual monitoring analysis, mid-term and completion evaluations, and we will improve applications of evaluation results and make mid-course adjustment accordingly. We will enhance development of planning talents, making effort to raise fundamental research capabilities and planning management capabilities of the industry. We will start work on interpretation, popularizing and implementing the Plan, maintain the correct orientation of public opinions, reasonably guide expectations of the public and fully mobilize all parties to jointly drive the smooth implementation of the Plan.