

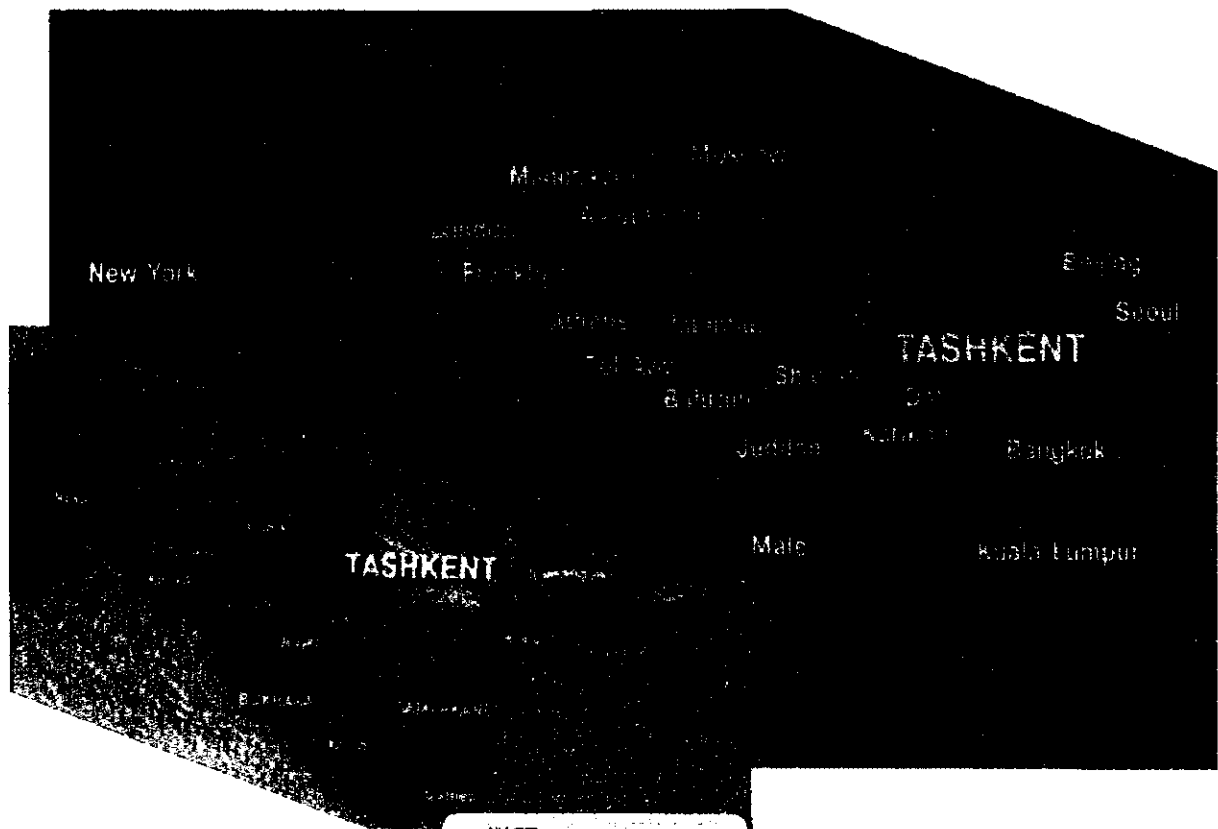
**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

**NATIONAL AIR COMPANY  
"UZBEKISTAN HAVO YULLARI"  
THE REPUBLIC OF UZBEKISTAN**

**THE STUDY  
FOR  
THE AIR TRANSPORTATION DEVELOPMENT  
IN THE REPUBLIC OF UZBEKISTAN**

**FINAL REPORT**

**SUMMARY**



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**AUGUST 1998**

**JAPAN AIRPORT CONSULTANTS, INC.**

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*JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)*

*NATIONAL AIR COMPANY*

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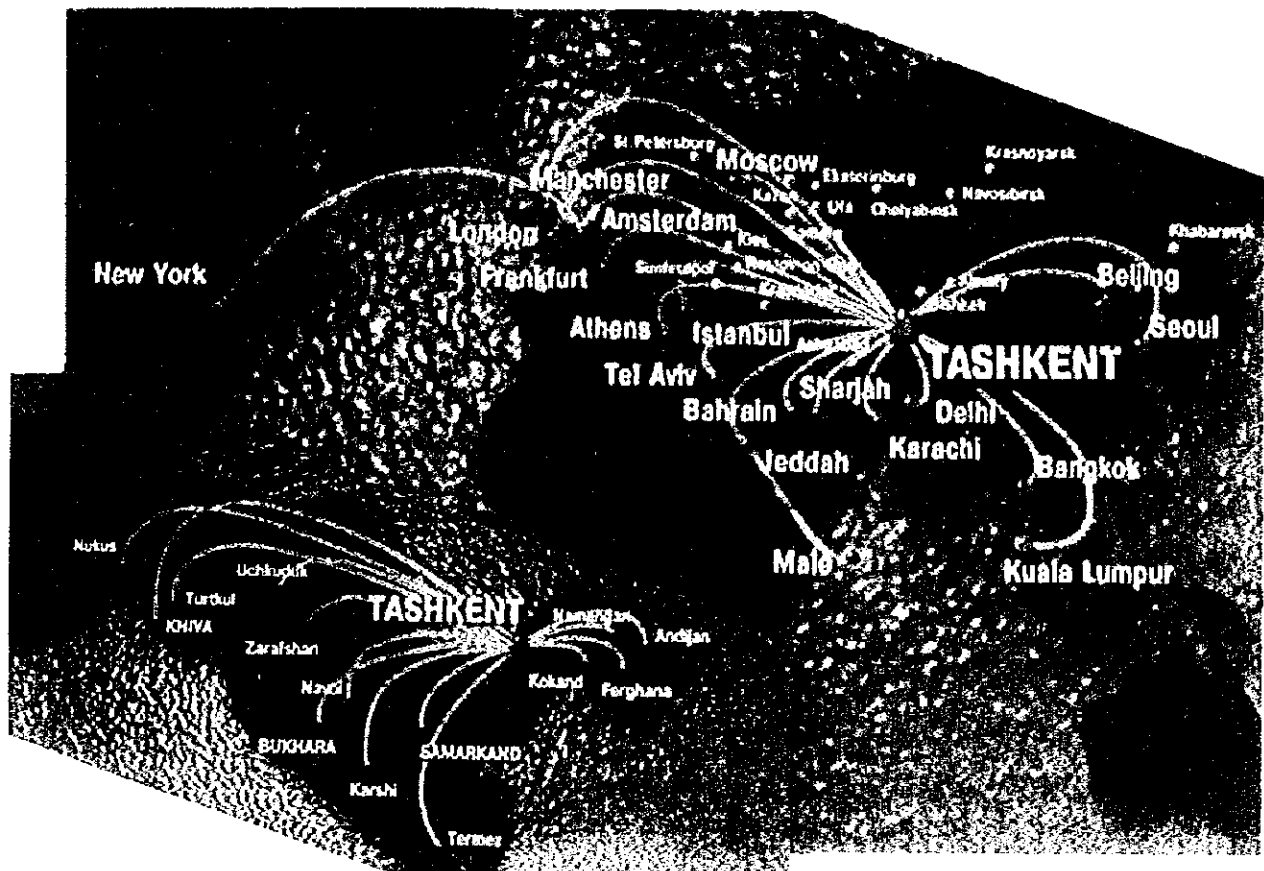
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**Exchange Rate of Currency**

**US\$ 1.00 = ¥ 120**

**US\$ 1.00 = Sum 100**

**Application Date : As of July 1997**

## PREFACE

In response to the request of the Government of the Republic of Uzbekistan, the Government of Japan agreed to conduct the Study for the Air Transport Development in the Republic of Uzbekistan, and entrusted the Study to Japan International Cooperation Agency (JICA).

JICA sent to Uzbekistan a study team headed by Mr. Kunio Saito, Japan Airport Consultants, Inc., three times between April 1997 and June 1998.

The team held discussions with the officials concerned of the Government of the Republic of Uzbekistan, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Uzbekistan for their close cooperation extended to the team.

August 1998



**Kimio Fujita**  
President  
Japan International Cooperation Agency

August 1998

Mr. Kimio Fujita  
President  
Japan International Cooperation Agency  
Tokyo, Japan

Dear Mr. Fujita

#### Letter of Transmittal

We are pleased to herewith submit to you the Final Report of the Study for the Air Transport Development in the Republic of Uzbekistan. The report contains the study results of the long-term master plan on air transportation development, the pre-feasibility study on high priority projects picked out from the said mater plan, and recommendations on improvements of operation and management under the National Air Company "Uzbekistan Havo Yullari".

The result of comparison and analyses of the long-term master plans up to the year 2020 for the selected 12 airports in Uzbekistan indicates that the existing or the proposed new Tashkent airport should be given high priority to be developed as the Metropolitan Airport, and also that development of three local airports, namely, Nanangan, Termez and Nukus should take priority over other local airports for their regional development potential. In addition, the development of Nationwide Air Navigation System should be considered to be given priority.

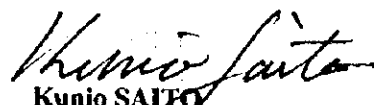
The result of the pre-feasibility study for the development up to the year 2005 of high priority projects thus selected shows that implementation of the New Tashkent Airport Project as the Metropolitan Airport is not viable at the moment, despite such strong desire as expressed by the Government of Uzbekistan, and should be carefully projected taking into account the future growth of air traffic demand.

Although development of each of the three local airports was not considered viable from the results of economic and financial analyses, implementation of the projects is recommended from the viewpoint of enhancement for regional development. Implementation of the development of Nationwide Air Navigation System is also recommended from the viewpoint of possible increasing overflying charges and the improvement of aviation safety.

For the improvement of operation and management under the National Air Company, recommendations are made for the clear segregation between the governmental functions and commercial business in the air transportation sector of Uzbekistan, and for the necessity to enhance efficiency and modernization of management of airport and air transportation business.

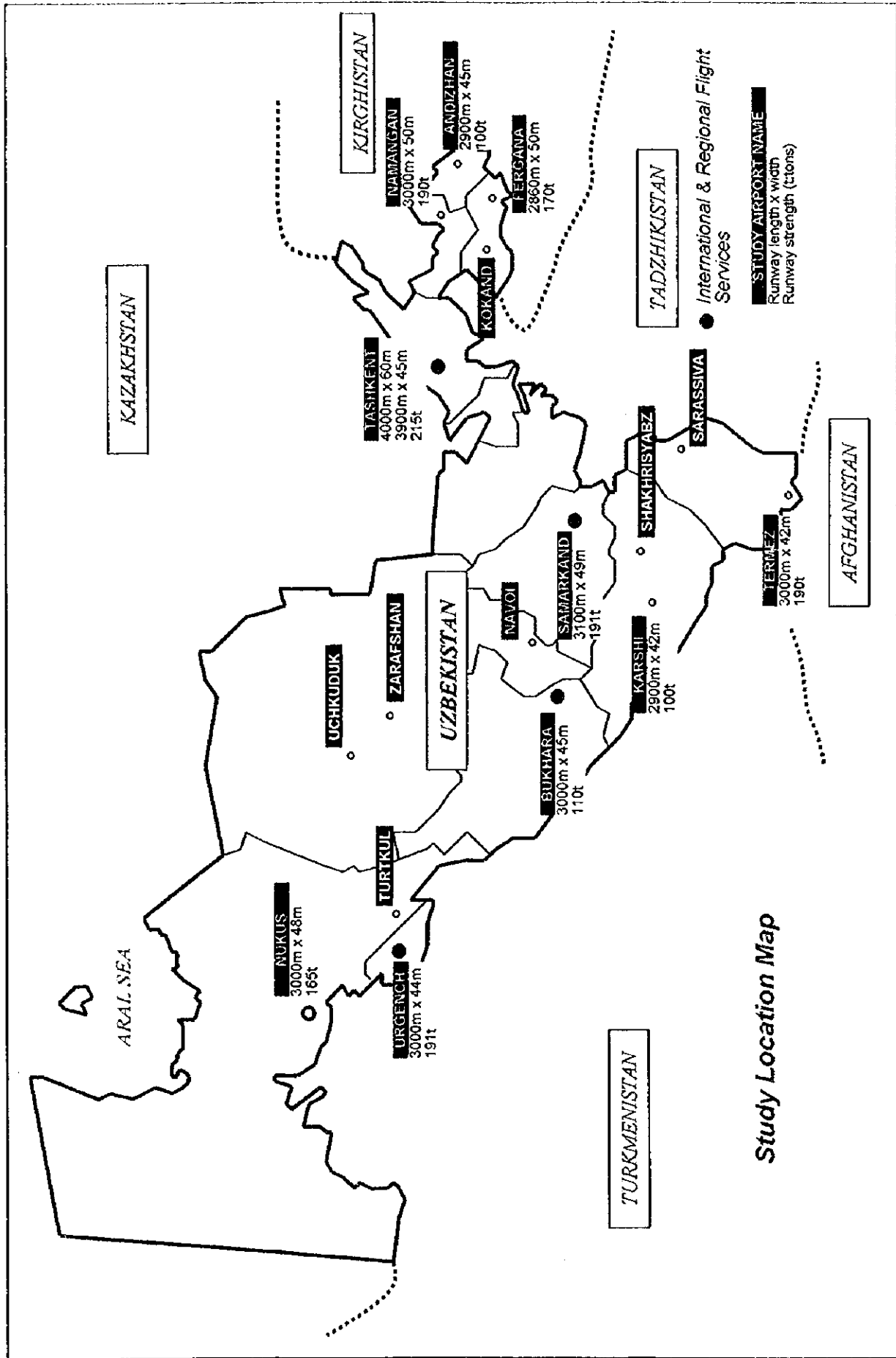
We wish to take this opportunity to express our sincere gratitude to your esteemed Agency, the Ministry of Foreign Affairs, the Ministry of Transport and the Overseas Economic Cooperation Fund in Japan. We are deeply grateful also to the National Air Company, "Uzbekistan Havo Yullari" and other authorities concerned of the Government of the Republic of Uzbekistan for their close cooperation and assistance extended to us during our investigation and study.

Very truly yours,



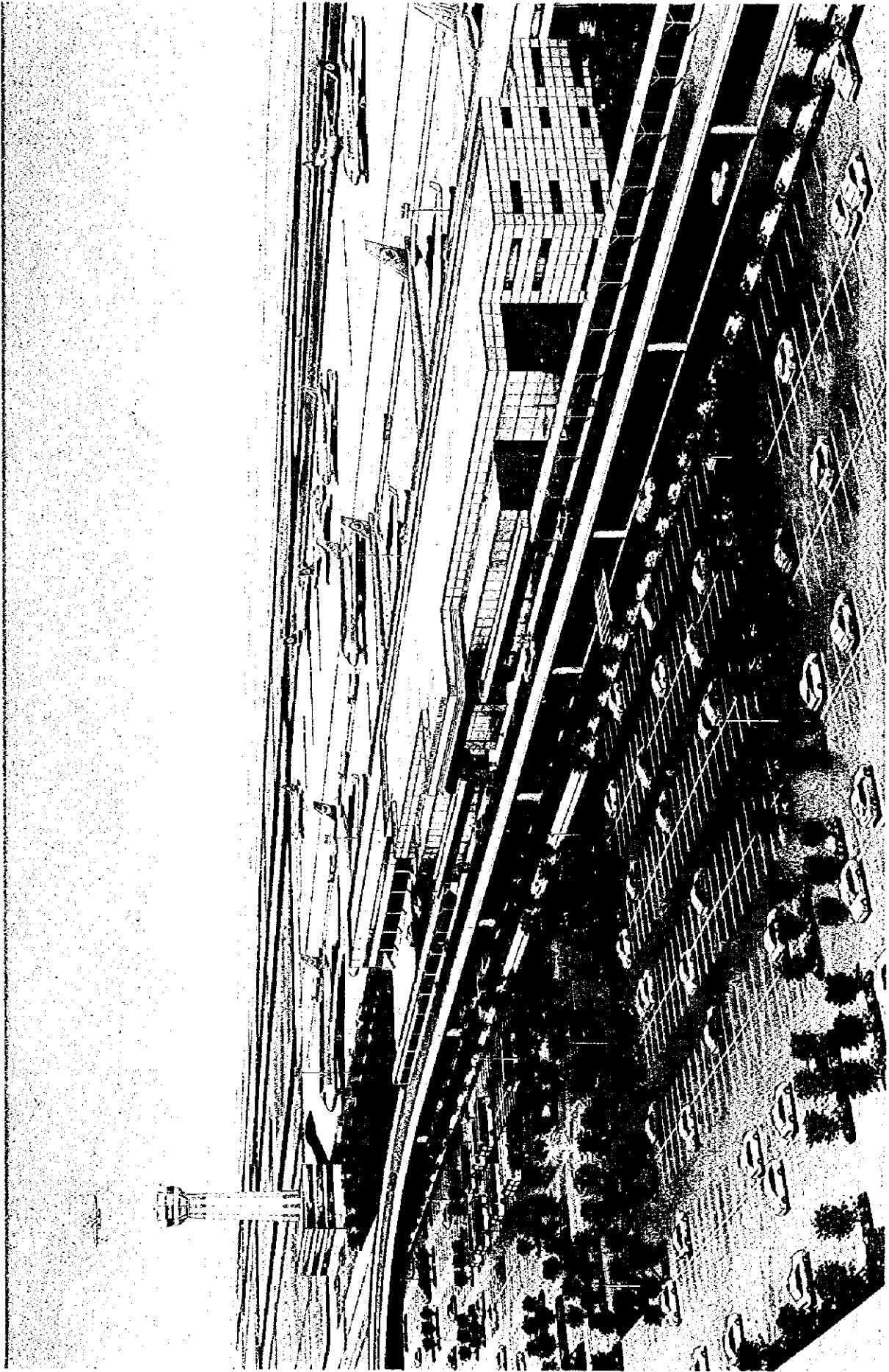
Kunio SAITO  
Team Leader, The Study for the Air  
Transport Development in Uzbekistan  
Japan Airport Consultants, Inc.







New Tashkent Airport Development  
ОБЩИЙ ВИД НОВОГО АЭРОПОРТА ТАШКЕНТ



New Tashkent Airport Development (International Passenger Building)  
АЭРОВОКЗАЛ МЕЖДУНАРОДНЫХ ЛИНИЙ НОВОГО АЭРОПОРТА ТАШКЕНТ



## CONCLUSION AND SUMMARY

### CONCLUSION AND RECOMMENDATIONS

1. The result of comparison and analyses of the long-term master plans made up to the year 2020 for the selected 12 airports in Uzbekistan indicates that the existing or the proposed new Tashkent airport should be given high priority to be developed as the Metropolitan Airport, and also that development of three local airports, namely, Namangan, Termez and Nukus should take priority over other local airports for their regional development potential. In addition, the development of the Nationwide Air Navigation System should be considered also a high priority.
2. The result of the pre-feasibility study for the development up to the year 2005 of high priority projects thus selected shows that implementation of the New Tashkent Airport Project as the Metropolitan Airport is not viable at the moment, despite such strong desire as expressed by the Government of Uzbekistan from the viewpoint of economic and financial aspects.
3. Although the development of the existing Tashkent Airport fundamentally interferes with the Tashkent City development, and cause possible aircraft noise pollution and risk of aircraft accident, considering the above results and situation, it is recommended that, at this moment in time, priority of the development for the capital airport should be put on the existing Tashkent airport.
4. Construction of a new capital airport after the development of the EBRD project would entail huge financial burden to the government as well as to NAC. Development of a new capital airport should be reconsidered and analyzed, taking into account future trend of air traffic demand and negative impact on the social environment by the existing Tashkent airport.
5. Furthermore, in the long-term development of the new Tashkent airport, it is important to promote possibility and realization of the project by taking a view that Tashkent has been historically the crossroads of European and Asian countries for a long time, and will be functioned as an air cargo distribution base and air transportation center in the CIS regions.
6. Although development of each of the three local airports was not considered viable from the results of economic and financial analyses, implementation of the projects is recommended only from the viewpoint of enhancement for future regional development. Implementation of the development of the Nationwide Air Navigation System is also recommended from the viewpoints of possible increasing overflying charges and the enhancement of aviation safety.
7. For the improvement of operation and management under the National Air Company, recommendations are made for the clear segregation between the governmental functions and commercial business in the air transportation sector of Uzbekistan, and for the necessity to enhance efficiency and modernization of management of airport and air transportation business.

## **SUMMARY OF THE STUDY**

### **1. OBJECTIVES AND BACKGROUND OF THE STUDY**

The objectives of the Study are to prepare the long-term master plans on air transportation development including priority airports and air navigational facilities in Uzbekistan; to conduct a pre-feasibility study on high priority project(s) to be selected through a study of the above long-term master plans; and to make recommendations for the organization, operation and management of air transport development in Uzbekistan.

Uzbekistan had been one of the centers of the aviation industry and traffic in the Soviet era. Tashkent Airport is expected to be an air transportation hub in the Central Asian region.

However, after independence in 1991, air traffic volume in Uzbekistan declined sharply. On the other hand, airports and air navigation facilities in Uzbekistan were constructed in the Soviet era before independence, and most of the facilities and equipment are obsolete and outmoded.

Under these circumstances, the Government of Uzbekistan recognized the necessity of modernization of its air transportation system, and the present study was conducted.

### **2. SOCIO-ECONOMIC CONDITIONS IN UZBEKISTAN**

The total population of Uzbekistan at the beginning of 1996 was 23 million, increasing at an average rate of about 2 % per annum. The Gross Domestic Product (GDP) after independence turned to positive growth in 1996 from a negative growth position up to 1995. The breakdown of GDP by sector is :38% for Services, 23% of Agriculture and 17% for Industry respectively. The volume of export and import has been increasing slightly year by year since independence, and is relatively well balanced. The official rate as of June 1997 is Sum 60.65/US\$. On the other hand, the unofficial rate as of June 1997 is Sum 100/US\$ with a gap of 165% between both rates.

After independence in 1991, the Government of Uzbekistan has been undertaking a gradual reform of the economic system from a centralized planned economy to a market-oriented economy, and is implementing such economic reform policies as privatization of state enterprises and promotion of foreign investment.

### **3. CURRENT CONDITIONS OF AIR TRANSPORTATION**

#### **(1) Historical Perspective**

In the former USSR era, air transportation activity had been managed and controlled under Aeroflot. It was promulgated to found a national air company at the beginning of 1992 integrating the Uzbekistan Civil Aviation Administration, Civil Aviation Factory No.243 and Aviaspetsmontajnalagka, in accordance with the Presidential Decree of 28 January 1992. Based on the Decree, the National Air Company "Uzbekistan Havo Yullari" was established by a Resolution of Cabinet Ministers dated 4 February 1992 as a self-supporting account company.

#### **(2) Air Traffic Statistic**

The air passenger traffic in Uzbekistan has been decreasing sharply since independence in 1991. The annual passengers traffic in 1995 decreased to a quarter of that in 1991.

#### **(3) Air Route Network**

According to the domestic summer schedule in 1997, all domestic air routes were being served

exclusively by NAC. Among 19 routes in total, 16 routes were pivoted at Tashkent. CIS route summer schedule in 1997 showed that among 32 routes (109 - frequency/week) in total 25 routes (60 - frequency/week) were being served by NAC from Tashkent, Samarkand, Nanangan, Fergana, Bukhara, Andizhan. Annual CIS departure passengers in 1996 were about 740,000.

There were 22 routes (58 - frequency/week) from Tashkent Airport. 18 routes (44 - frequency/week) among them were being served by NAC. Major airlines operating from/to Tashkent airport were Lufthansa, Pakistan International, Asiana Airlines, Turkish Airlines, Iran Air. International air routes from Tashkent consist of New York, Amsterdam, Athens, Bahrain, Beijing, Seoul served by A310 (180 seats), B767 (250 seats) and IL-62 (150 seats). Bilateral air agreements have been established with 35 countries as of May 1997.

#### (4) Airport Facilities

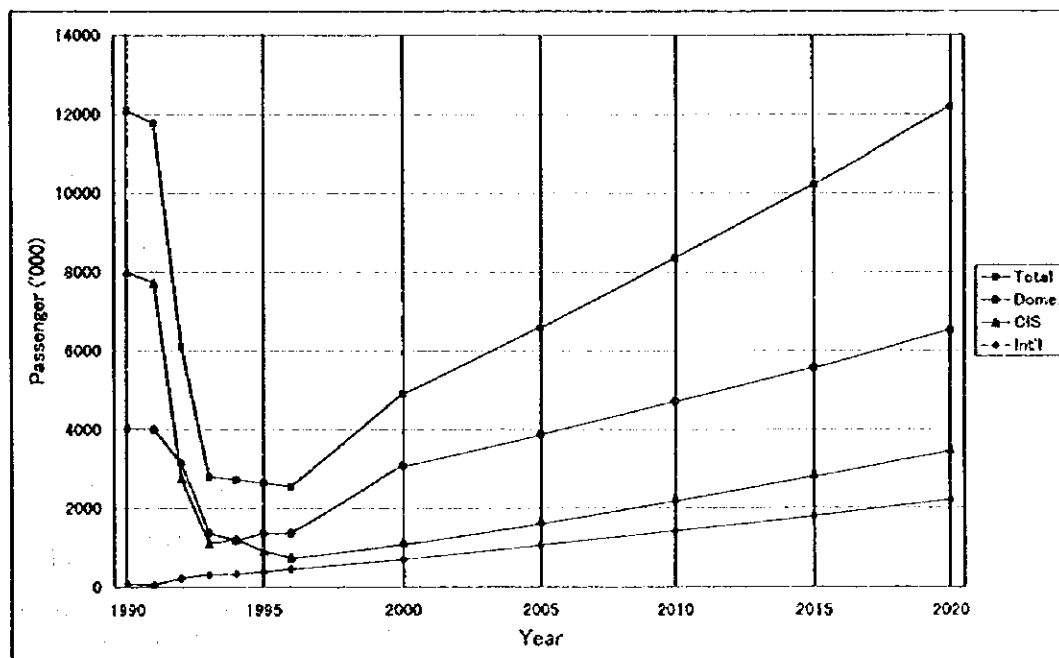
There are twenty (20) airports in Uzbekistan operated and managed by NAC, of which 16 airports are served by domestic air routes, and of which 10 airports are served by CIS air routes. International air routes are served at only Tashkent airport. 12 airports have a runway or runways more than 2,500 m-long. Study airports include Tashkent and 11 local airports.

### 4. LONG-TERM AIR TRANSPORTATION FACILITY DEVELOPMENT

#### (1) Air Traffic Demand Forecast

Air traffic demand forecast up to the year 2020 was made based on the correlation with Gross Domestic Product of Uzbekistan and the World. The results of air passenger traffic forecast of Uzbekistan is shown below.

**Air Traffic Demand Forecast**



## **(2) Development Plan**

### **① Basic Development Strategy**

Long-term development plans up to the year 2020 for airports and air navigation facilities were made adopting an airport classification made for the study purpose on the basis of functions and importance of the airports. Evaluation to select the high priority projects was conducted through project cost and preliminary economic analyses for each of the master plans.

### **② Metropolitan Airport Development Plan**

Expansion of the existing Tashkent airport involves the following problems: interference of development of Tashkent City due to expansion plan of the urban area; impact of aircraft noise and air pollution because the present approach and departure courses are crossing over the southern part of Tashkent city; and geographical difficulty due to the rivers on the both sides of the runway. Judging from the above circumstances, in the long-term development plan of airports for the Capital, construction of a new metropolitan airport is considered as an alternative solution. However, construction of a new metropolitan airport may require huge investment cost. Therefore, a long-term development plan for the metropolitan airport was studied in the following two cases, one is the development plan of the existing Tashkent airport, and the other is construction of a new airport.

### **③ Local Airports Development Plan**

Long-term master plan was made for 11 local airports based on the air traffic demand forecast up to the year 2020.

### **④ Nationwide Air Navigation Facility Development Plan**

Most of air navigation facilities for airport and air routes were installed in the 1970s-80s, and will be required to replace due to expiry of useful life by the year 2020. Development plan up to the year 2020 for Nationwide Air Navigation Facility was also prepared.

## **(3) Selection of High Priority Projects**

Evaluation was made for 14 projects including 10 air transportation facility developments and improvement projects for management and organization of NAC. Based on the evaluation of the air transportation facility development from viewpoints of the priority of national development plan, urgency of improvement and efficiency of investment, 6 projects, namely, existing Tashkent airport development project, new Tashkent airport development project, Namangan airport development project, Termez airport development project, Nukus airport development project and the Nationwide Air Navigation Facility Development project, were selected as high priority projects for the subsequent pre-feasibility study. In addition, 4 improvement projects of management and organization of NAC were also selected.

## **5. ENVIRONMENTAL STUDY**

Environmental management in Uzbekistan is conducted by the State Committee on Environment Protection based on the Nature Protection Law. The existing Tashkent airport is located about 5 km from the city, and surrounded by the urban and residential area. Emission level of CO (carbon monoxide) and NO<sub>2</sub> (nitrogen dioxide) monitored in 1994 at Tashkent airport exceeded the standard permissible concentrations. Furthermore, aircraft noise level observed during the field survey period was higher than the aircraft noise standard level of Uzbekistan.



## 6. PRE-FEASIBILITY STUDIES FOR HIGH PRIORITY PROJECTS

### (1) High Priority Projects

Scope of development plan for the selected High Priority Projects were summarized as follows:

<b>Projects</b>	<b>Major Scope of Development</b>
• Existing Tashkent Airport	Expansion of domestic passenger and cargo building, fire and rescue station, installation of ASDE
• New Tashkent Airport	Runway 4,300m, international passenger building, tower, ATC and air navigation facilities, utilities
• Namangan Airport	Runway extension, overlay of pavement, expansion of passenger building, tower, ATC and air navigation facilities.
• Termez Airport	Runway expansion, overlay of pavement, expansion of passenger building, tower, ATC and air navigation facilities.
• Nukus Airport	Runway extension, overlay of pavement, expansion of passenger building, tower, ATC and air navigation facilities.
• Nationwide Air Navigation Facilities	Replacement of NDB with VOR/DME,

### (2) Project Cost

Costs of each project were estimated as shown below.

#### Estimated Project Cost

(thousand US\$)

Cost Items	Existing Tashkent	New Tashkent	Namangan	Termez	Nukus	Nationwide Air Navigation Facility
A) Compensation	0	4,991	0	0	0	0
B) Airfield Facility	12,912	319,314	26,258	19,277	16,885	0
C) Terminal Area Facility	26,536	136,753	37,209	27,021	37,713	0
D) Air Navigation Facility	14,884	41,242	29,742	29,658	29,658	10,400
E) Airport Special Equipment	462	13,469	4,541	4,310	4,540	0
F) Utilities	30,036	81,836	12,071	8,682	13,588	0
<b>G) Total of Work</b>	<b>84,830</b>	<b>597,605</b>	<b>109,821</b>	<b>88,948</b>	<b>102,384</b>	<b>10,400</b>
If) Land Acquisition	0	39,000	1,966	355	0	0
J) Administration Expenses	848	6,976	1,098	889	1,024	104
K) Survey and Engineering	12,725	59,761	16,473	13,312	15,358	1,560
L) Contingency	9,755	65,736	12,629	10,229	11,774	1,196
<b>L) Total</b>	<b>108,158</b>	<b>768,078</b>	<b>141,987</b>	<b>113,763</b>	<b>130,540</b>	<b>13,260</b>

### (3) Construction Plan

Total required period for the development of the existing Tashkent airport was estimated to be 6 years, including 1 and half years for survey and design, 1 year for tendering, and 3 and half years for construction.

Total required period for the development of a new Tashkent airport was estimated to be 9 years, including 2 years for survey and design, 1 year for tendering, and 6 years for construction.

### (4) Environment Impact Assessment (EIA)

Based on the Guideline for Environment Impact Assessment of JICA, Environment Impact Assessment (EIA) for the High Priority Projects was conducted in respect to aircraft noise, air

pollution and water pollution identified through Initial Environmental Evaluation (IEE) as the expected items which may cause impact on the surrounding area of the airports.

As the development projects except for the new Tashkent airport project is to be conducted within the existing airport area, impact by implementation of the project to the environment may not be serious.

The New Tashkent airport is planned in the cotton field zone. As aircraft noise impact to the surrounding area of the new airport will become larger compared with the present condition, adequate mitigation measures will be required based on the further basic environment study and monitoring survey.

#### (5) Economic and Financial Analyses

Economic and financial analysis were made for the High Priority Project except for the Nationwide Air Navigation Facility Development Project due to the difficulty of quantification of economic and financial benefits. The results of the analyses are as shown below.

**Results of Economic and Financial Analyses**

Airport	Project	EIRR (%)			FIRR (%)	
		Case A Base Case	Case B Demand 20% Increase	Case C Demand 20% decrease	Case 1 Present Airport Charge	Case 2 200% Higher Airport Charge
Existing Tashkent	Domestic Area Only	Invalid	Invalid	Invalid	-0.66%	10.38%
New Tashkent	a) International	1.93%	2.97%	0.65%	-5.19%	-0.75%
	b) Int. + Dom.	7.01%	7.58%	6.39%	4.07%	5.44%
Namangan	a) All Facilities	8.20%	10.44%	5.60%	-10.00%	-1.26%
	b) Without Nav.	12.46%	15.02%	9.50%	-9.40%	0.72%
Termez	a) All Facilities	6.13%	8.21%	3.70%	-5.43%	2.07%
	b) Without Nav.	11.61%	14.09%	8.73%	-3.20%	5.45%
Nukus	a) All Facilities	7.60%	9.93%	4.85%	-11.15%	-1.54%
	b) Without Nav.	12.25%	15.05%	9.04%	-11.60%	0.13%

#### (6) Overall Evaluation and Recommendation

##### • Implementation of the Capital Airport Development

The existing Tashkent airport has sufficient capacity except for the domestic passenger and cargo facilities, to accommodate the demand up to the year 2020. Furthermore, international passenger terminal building and apron are being improved with EBDR finance, amounting to 48 million US Dollars. Hence, these facilities will help to upgrade passenger comfort and convenience.

On the other hand, a new airport with a 4,300 m-long runway and international traffic facilities was planned 40 km south west of Tashkent, to be a new gateway airport in Uzbekistan substituting for the existing Tashkent Airport.

However, from the results of economic and financial analysis, it was concluded that the implementation of the new airport development project would not be feasible for the national benefit of Uzbekistan. Although the development of the existing Tashkent Airport fundamentally interferes with the Tashkent City development, and cause possible aircraft noise pollution and the risk of aircraft accident, considering the above results and situation, it is recommended that, at this moment in time, priority of the development for the capital airport should be put on the existing Tashkent airport.

Thereafter, development of a new capital airport should be reconsidered and analyzed, taking into account tendency for air traffic demand to increase and the social environment.

In the long-term development of the new Tashkent airport, it is important to promote possibility and realization of the project by taking a view of that Tashkent has been historically the crossroads of

European and Asian countries for a long time, and will be functioned as air cargo distribution base and air transportation center in CIS regions.

- **Implementation of Local Airport Development**

Development of each of the three local airports, namely, the Namangan, Termez and Nukus airports was viewed not viable financially, but economically viable subject to reduction of scope of project and a higher airport charge level. However, each of the three airports is located in the capital city of Province, which is a center of social, economic and political activities in the area, and no other transportation to connect Tashkent is well developed. Therefore, implementation of development of the three local airports is desirable from the viewpoint of helping regional development.

- **Implementation of Nationwide Air Navigation System Development**

Implementation of the development of Nationwide Air Navigation System should be executed from the viewpoint of encouraging revenue increases from overfly charges and contributing to the improvement of aviation safety.

## **7. REVIEW OF ORGANIZATION AND MANAGEMENT PROCEDURES OF NAC**

National Air Company (NAC) covers all activities relating to civil aviation from policy making and administration of civil aviation, airport operation and management, air transportation services and license of airlines, having more than 16 thousand staff. Major problems identified are as follows:

- Profitability of NAC had been in positive side up to 1994, but has been in deficit since 1995. Amount of loss in 1996 was approximately 20 million US dollars;
- Ratio of equity to total assets (Stability) has been decreasing since 1994, and Liquidity of assets has worsen. Current financial status and funding conditions of NAC are not in good condition;
- No clear separation between governmental functions and commercial business activities;
- Redundancy of employment in each unit of NAC;
- Unclear transferring of responsibility and decision making under self-supporting account system
- Low service level for passenger comfort of facilities and services;
- No clear separation of present account system in accordance with activity of each unit of NAC;
- Differences of corporate planning for airline business between NAC and international practice;
- Necessity of enhancement of safe operation due to introduction of western-made aircraft;
- Low productivity of Russian-made aircraft;
- Low level of sales and customer satisfaction;
- Necessity of enhancement of training of cabin crew.

## **8. MODERNIZATION PLAN OF NAC AND RECOMMENDATIONS**

Present National Air Company (NAC) is too large an organization to be able to attend detailed services under one management unit, especially in the area of commercial business operation. NAC requires considerable modernization in airport facilities and aircraft and a restructuring of its organization in the functional and financial sides of management towards the market-oriented economy.

In functional areas, a clear division between the governmental functions and commercial business in aviation sector in Uzbekistan will be required in order to enhance efficiency of air transportation of the country.

In the financial areas, current financial balance of NAC as a whole is negative due to the increase of

cost for the introduction of western-made aircraft and the steep decrease of air traffic demand.

As a summary of review of organization, management and operation of NAC, the following points are recommended in order to promote modernization of air transportation in NAC ranging from the state civil aviation management to air carrier services.

- It is recommendable for NAC and the Government of Uzbekistan to take first steps toward the revitalization of the aviation sector, by transforming the existing units of NAC into some independent organizations, and to establish a "Department of Civil Aviation" as the governmental administration bodies;
- Reform of revenue sources in accordance with the restructuring plan of NAC organization, taking into account a clear separation of activities between government, airline and airport services;
- Upgrade of the quality level of facilities, and promotion for improvement of attendance performance for passenger and customer;
- Introduction of route profitability analysis, selection of essential routes of airline and "Middle-size Group" of routes in accordance with international practice, in order to develop corporate planning procedure of the NAC
- Improvement of attractiveness of the airline to customers and offering customer satisfaction with the airlines services;
- Efficient training and technical transfer with instructors, specialists and consultants, who can instruct personnel on an "On the Job Training" basis in order to strengthen aircraft operation planning and maintenance control planning for western-made aircraft.

THE STUDY  
FOR  
THE AIR TRANSPORTATION DEVELOPMENT  
IN THE REPUBLIC OF UZBEKISTAN

**FINAL REPORT**

**SUMMARY**

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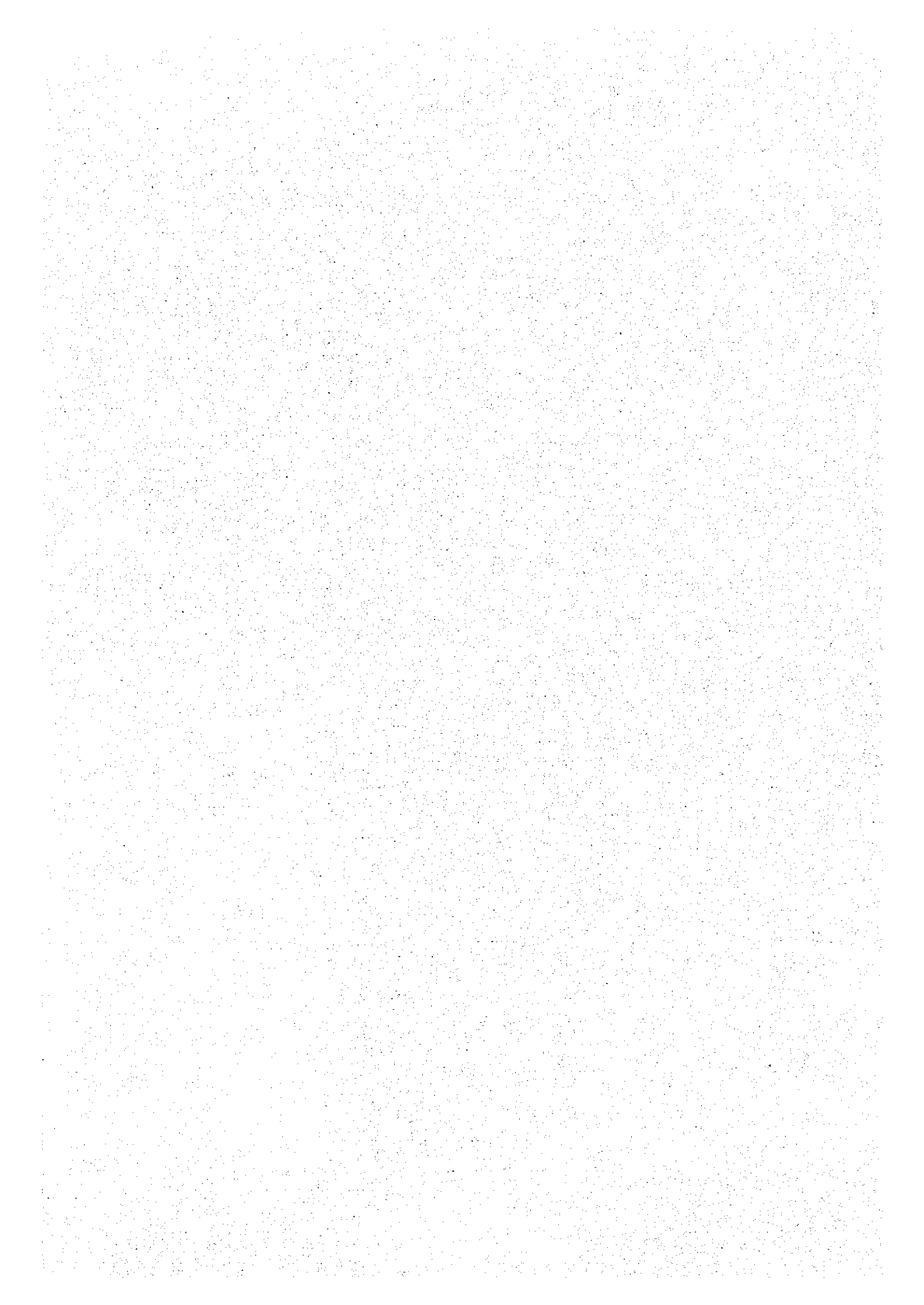
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# **CHAPTER 1**

## **INTRODUCTION**





# CHAPTER 1 INTRODUCTION

## 1.1 General

In response to the request from the Government of the Republic of Uzbekistan (hereinafter referred to as "the Government of Uzbekistan"), the Government of Japan decided to conduct the Study for Air Transportation Development in the Republic of Uzbekistan (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

The Japanese Preparatory Study Team organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), was dispatched to Uzbekistan from 27th November to 14th December 1996 to discuss the scope of work and all matters relevant to the Study.

Thereafter, JICA organized a Team to carry out the Study based on the Minutes of Meetings concerning the Scope of Work dated 13th December 1996 between the National Air Company "Uzbekistan Havoyullari" (hereinafter referred to as "NAC") and JICA.

This report presents the summary of the Study conducted from March 1997 to August 1998.

## 1.2 Background of the Study

Uzbekistan is the most populated country in the Central Asian region with a total population of more than 23 million and an area of about 447,000 square kilometers. It borders on Kirgizstan on the east, on Kazakhstan on the north and northwest, on Turkmenistan on the southwest, on Tajikistan on the southeast and on Afghanistan on the south.

The civil aviation system in Uzbekistan had been operated and managed under the control of Aeroflot of the former Soviet Union. After independence in 1991, NAC was founded in 1992 as a state company to manage and operate civil aviation activities in Uzbekistan including airport operation, air traffic control and civil aviation transport.

Air traffic volume in Uzbekistan declined sharply after independence. Uzbekistan had been one of the centers of the aviation industry and traffic in the Soviet era. It has recorded a steady expansion of international relation between Uzbekistan and the CIS including tourism activities. Tashkent Airport is expected to be an air transportation hub in the Central Asian region.

On the other hand, as airports and air navigation facilities in Uzbekistan were constructed in the Soviet era before independence, most of the facilities and equipment are obsolete and outmoded. Furthermore, technical standards and system are different from the international requirements.

Under these circumstances, the Government of Uzbekistan recognized the necessity of modernization of its air transportation system, and requested the Japanese Government to conduct a study to prepare a master plan for the long term development for the modernization of air transportation, including recommendations for a reform plan on the organization, operational and management system of airport operation, air traffic control services and air carrier sector.

## 1.3 Objectives of the Study

The objectives of the Study were agreed as follows:

- (1) To prepare long term master plans up to the year 2020 on air transportation development including priority airports and air navigational facilities in Uzbekistan;
- (2) To conduct a pre-feasibility study up to the year 2005 on high priority project(s) to be selected

through a study of the above long term master plan; and

- (3) To make recommendations for the organization, operation and management of air transport development in Uzbekistan.

#### **1.4 Scope and Schedule of the Study**

##### **1.4.1 Scope of Study**

The Study was divided into the four (4) Phases; namely Preparatory Work, Phase I, Phase II and Phase III, with the task items as listed below;

##### **(1) Preparatory Work in Japan**

- a) Confirmation of Study Philosophy
- b) Review and analysis of existing study reports and data related to the Study
- c) Planning of study schedule and methodology
- d) Preparation of Inception Report and questionnaire

##### **(2) Phase I Field Work in Uzbekistan**

- a) Explanation and Coordination on Schedule and Methodology of the Study
- b) Data Collection and Supplementary Survey on Air Transportation Facilities
- c) Survey on Organization and Operation and Management System
- d) Discussion and Confirmation on Criteria for Selection of High Priority Project(s)
- e) Preparation and Explanation of Progress Report
- f) Workshop (1)

##### **(3) Phase I Home Work in Japan**

- a) Projection and Formulation of Air Transportation Development
- b) Study and Planning of Airport Facility Development
- c) Analysis and Planning on Organization and Operation and Management System
- d) Master Planning of Priority Project(s)
- e) Evaluation and Selection of Project(s) for Pre-feasibility Study
- f) Preparation of Interim Report

##### **(4) Phase II Field Work in Uzbekistan**

- a) Confirmation of Requirements for Pre-feasibility Study
- b) Survey of Physical Conditions of High Priority Project(s)
- c) Environmental Survey of the High Priority Project(s)
- d) Planning of Land Use in the Vicinity of Project Site(s)
- e) Planning of Airport Facilities
- f) Study and Analysis of Organization and Operation and Management System
- g) Holding of Workshop (2)

##### **(5) Phase II Home Work in Japan**

- a) Preliminary Design of Airport and Other Relevant Facilities
- b) Environmental Impact Analysis (EIA) for High Priority Project(s)
- c) Preparation of Construction Plan
- d) Estimation of Project Costs
- e) Pre-feasibility Study
- f) Recommendation for Development and/or Modernization of Air Transportation in Uzbekistan

g) Preparation of Draft Final Report and Summary

**(6) Phase III Field Work in Uzbekistan**

- a) Explanation and Discussion on the Draft Final Report
- b) Holding of Seminar

**(7) Phase III Home Work in Japan**

Correction and additions to the Draft Final Report based on NAC's comments.

**1.4.2 Schedule and Reports**

**(1) Schedule of the Study**

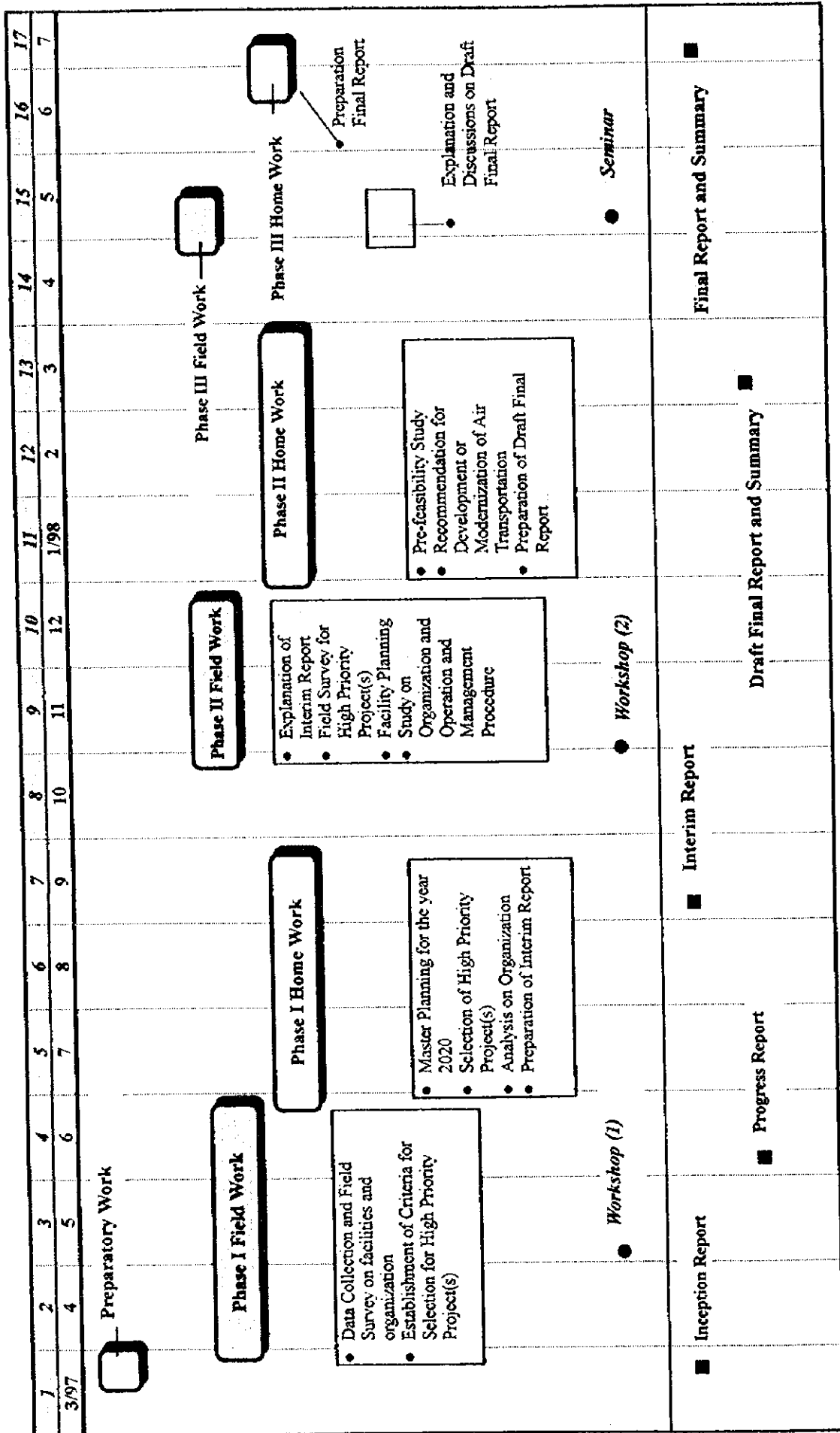
The Study was carried out over an 17-month period, as shown in **Figure 1.4.1**.

**(2) Reports**

The following reports both in English and Russian languages were prepared during the course of the Study and submitted to the Government of Uzbekistan.

- a) Inception Report
- b) Progress Report
- c) Interim Report
- d) Draft Final Report and Summary
- e) Final Report and Summary

Figure 1.4.1 Schedule of Study



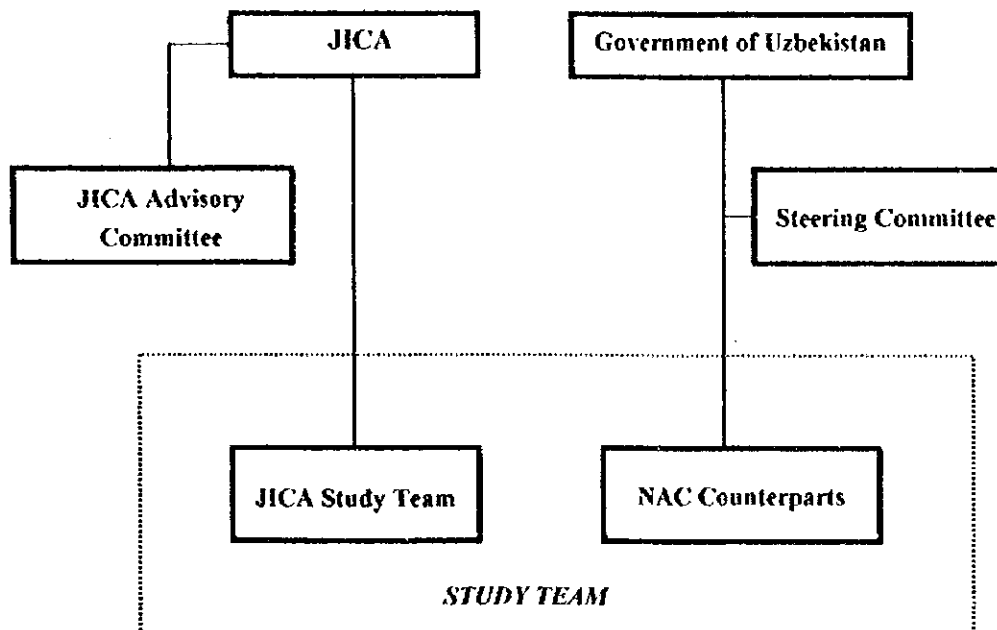
## 1.5 Organization for the Study

The Study was carried out by the Study Team duly organized by the Japan International Cooperation Agency. The Japanese side also appointed the Advisory Committee to monitor the study and give advice to the Study Team.

NAC was the counterpart organization and had assigned the counterpart personnel for the Study Team. The Uzbekistan side also established a Steering Committee

Organizations concerned in implementation of the Study are as shown in Fig. 1.5.1

Figure 1.5.1 Study Implementation Organization



### (I) Japanese Side

#### a) Study Team

A Study team consisted of the following engineers and specialists to cope with the various aspects of the Study.

Mr. Kunio SAITO	Team Leader
Mr. Toshiki ASANO	Airport Facility Planning/Relevant Facility Planning
Mr. Atsushi YAMANE	Air Traffic Control/Air Space Use Planning
Mr. Shintaro YAMAMOTO	Operation Planning/ Maintenance Planning
Mr. Kazuo OKUNO	Facility Planning and Design (Airfield Facilities)

Mr. Kenzi TANAKA	Facility Planning and Design (Building and Equipment)
Mr. Yukimi TAJIMA	Facility Planning and Design (Air Navigation Facilities)
Mr. Mitsuo OMACHI	Construction Planning and Cost Estimate
Mr. Azuma FURUSE	Demand Forecast/Economic and Financial Analysis
Mr. Kunihiro TAKANO	Airport Operation and Management
Mr. Ryoza KOYAMA	Operation and Management of Airline
Mr. Yuri PLOTNIKOV	Physical Condition Survey
Miss. Kanae MATSUZAKI	Environmental Impact Assessment
Mr. Kazuo OSANAI	Interpreter

b) Advisory Committee

Advisory Committee was organized as an advisory body to the president of JICA consisting of the following members in order to supervise the present Study.

Mr. Kazuhito ARAO	Director of Airfield Department Tokyo Civil Aviation Bureau Ministry of Transport (Successor of Mr. Umeki)
Mr. Yuji UMEKI	Director of Airfield Department Osaka Civil Aviation Bureau Ministry of Transport
Mr. Nobuo GUNJI	Deputy Director of Planning Division Civil Aviation Bureau, Ministry of Transport (Successor of Mr. Watanabe)
Mr. Masami WATANABE	Deputy Director of Planning Division Civil Aviation Bureau, Ministry of Transport
Mr. Shigeki TERASHIMA	Deputy Director of Construction Division Civil Aviation Bureau, Ministry of Transport (Successor of Mr. Terashima)
Mr. Yoshiaki KAWABE	Deputy Director of Construction Division Civil Aviation Bureau, Ministry of Transport
Mr. Ken YOSHIDA	Deputy Director of 4th Division Operation Department II (Successor of Mr. M Yoshida)
Mr. Minoru YOSHIDA	Deputy Director of 4th Division Operation Department II The Overseas Economic Cooperation Fund

(2) Uzbekistan Side

a) Steering Committee

Mr. Ruzmetov A.G.	Director General of NAC
Mr. Tyan V.N.	First Deputy-Director General of NAC
Mr. Gordiyenko V.G.	Deputy-Director General of NAC
Mr. Karimullin K.A.	Senior expert of Transport and Communication Department in the Cabinet of Ministers
Mr. Belyalov N.M.	Chief of department of expertise of registration and monitoring of execution of loan agreements MFER

**Mrs. Koroleva N.V.**

**Chief ecologist of Main ecological expertise of the  
State Committee for Nature of the Republic of  
Uzbekistan**

**b) Counterpart Group**

**Mr. Vakhobov M.V.**

**Chief of the Working Group, Chief of Capital  
Construction Department at NAC**

**Mr. Davidov D.S.**

**Deputy-chief of financial department**

**Mr. Gusev V.V.**

**Deputy-director of Uzaeronavigation on ATC**

**Mr. Kalabaev A.A.**

**Chief of ecology and on-ground facilities department**

**Mrs. Ruban E.P.**

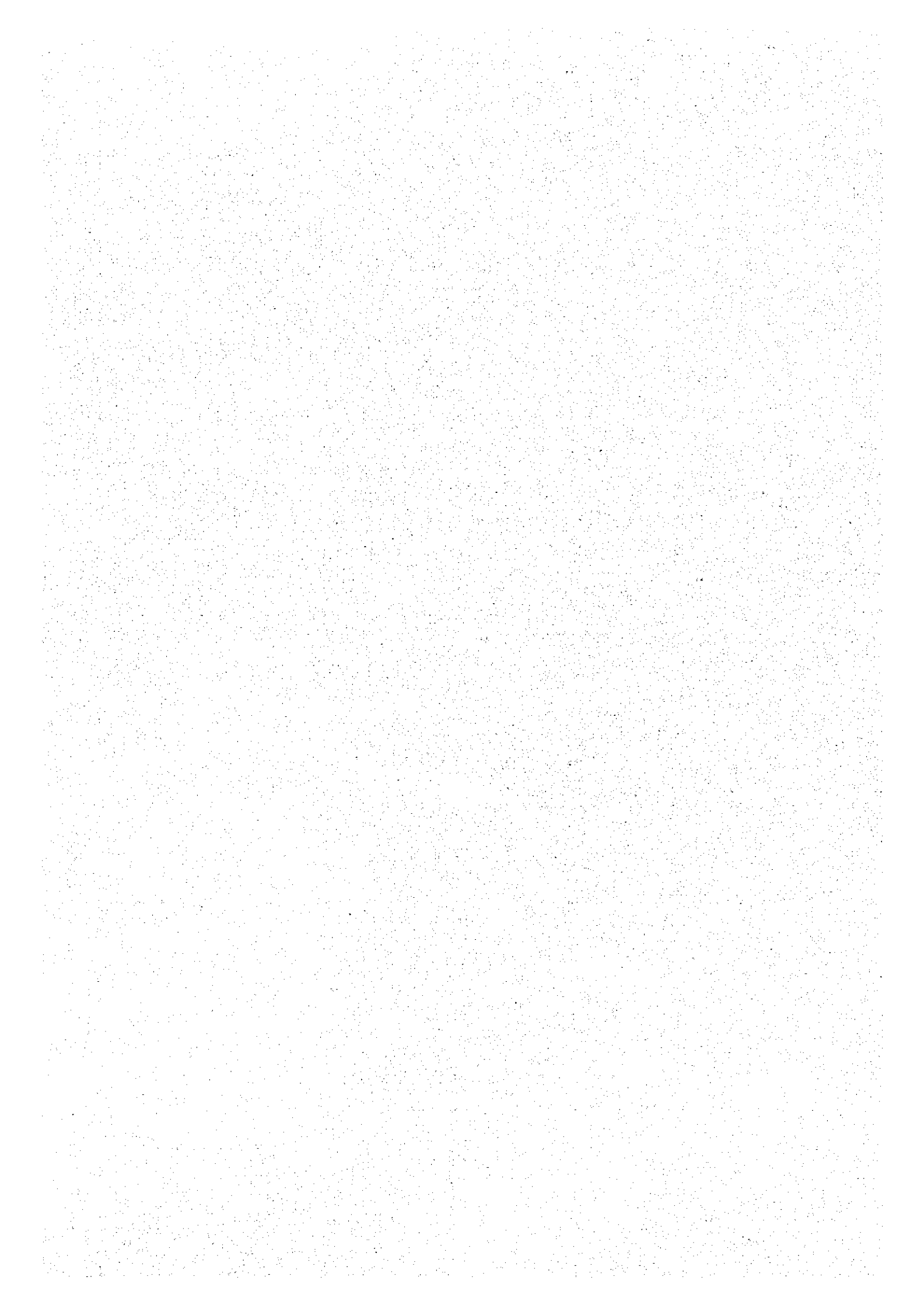
**Chief of Operation-economy Department of NAC**





## **CHAPTER 2**

# **SOCIO-ECONOMIC CONDITIONS IN UZBEKISTAN**



## CHAPTER 2 SOCIO-ECONOMIC CONDITIONS IN UZBEKISTAN

### 2.1 Socio-Economic Situation of Uzbekistan

#### 2.1.1 General

Uzbekistan is the most populous country in the Central Asian region with a total population of more than 23 million, and the second largest country in terms of physical size with an area of about 447,400 square kilometers. It borders on Kyrgyzstan on the east, on Kazakhstan on the north and northwest, on Turkmenistan on the south-west, on Tajikistan on the south-east. On the south it borders on Afghanistan.

Uzbekistan has a continental climate, with a long dry and hot summer, with temperatures averaging 32 °C in July, and often rising above 40 °C. Winter lasts in the south of Uzbekistan for about 1.5-2 months and in the far north of the country (Usturt) for about 5 months. The average air temperature in January is below - 10 °C in the north (Usturt) and + 3°C in the south (Termez).

The Republic of Uzbekistan proclaimed independence on August 31, 1991 and a new constitution was adopted on December 1992. The former Communist Party became the People's Democratic Party (SDP). President Islom Karimov who is the leader of the (SDP) was elected for a five-year term under the first democratic elections after the collapse of the USSR in December 1991.

President Karimov governs the country according to his motto of an "Eastern Democracy" and stresses the importance of political stability as being more important than a western-style democracy under the following "Five Principles".

- a) Internal and external economic relations should be free of ideology, with the economy taking precedence over politics.
- b) Central and local authorities are responsible for the success of market-oriented measures and for creating conditions favorable to entrepreneurship.
- c) The new constitutions and laws passed in conformity with international law apply to all citizens, without exception.
- d) A free market is not an end in itself. The ultimate objective is to achieve economic prosperity and raise living standards.
- e) The goal of reforms is to ensure the gradual changeover to a full-scale market economy.

#### 2.1.2 Population

##### (1) Total Population

The total population of Uzbekistan at the beginning of 1996 was 23 million, increasing at an average rate of about 2 % per annum as shown in **Table 2.1.1**. Major ethnic groups in Uzbekistan as of January 1996 consist of Uzbeks of 76%, Russian of 6%, Tajiks of 5% and Kazakhs of 4%.

**Table 2.1.1 Population in Uzbekistan**

(at the beginning of the year)

Year	Population ( '000 )			Share (%)		Growth Rate ( %/year )		
	Total	Urban	Rural	Urban	Rural	Total	Urban	Rural
1980	15,757.6	6,471.3	9,286.3	41.1	58.9	---	---	---
1985	17,925.7	7,293.2	10,632.5	40.7	59.3	2.66	2.42	2.74
1990	20,322.3	8,304.0	12,018.3	40.9	59.1	2.22	2.63	2.48
1991	20,708.2	8,366.1	12,342.1	40.4	59.6	1.90	0.75	2.69
1992	21,206.8	8,506.0	12,700.8	40.1	59.9	2.41	1.67	2.91
1993	21,702.7	8,582.2	13,120.5	39.5	60.5	2.34	0.90	3.30
1994	22,192.5	8,677.0	13,515.5	39.1	60.9	2.26	1.10	3.01
1995	22,562.4	8,732.6	13,829.8	38.7	61.3	1.67	0.64	2.33
1996	23,007.2	8,831.0	14,176.2	38.4	61.6	1.97	1.13	2.50

Source : The State Committee for Forecasting and Statistics

## (2) Regional Population

Administrative division of the country comprises 12 provinces (Wiloyatlar), 1 autonomous republic (Republikasi) and 1 city (Shari: city of Tashkent).

The regional population pattern as of 1996 shows that Fergana Province is the most populated in Uzbekistan followed by Samarkand Province, Tashkent Province, the city of Tashkent and Andizhan Province, with a population of more than 2 million. On the other hand, the total population of Tashkent Province and the city of Tashkent is 4,378 thousand and is equal to 19% of Uzbekistan's total population .

## 2.1.3 Economy and Industry

### (1) Current Situation of the Uzbekistan Economy

The main role of Uzbekistan in the former USSR was to supply raw materials, mainly oil, gas and cotton. After the declaration of independence, Uzbekistan introduced a new currency, the "Sum" in November 1993.

### (2) Gross Domestic Products

The Gross Domestic Product (GDP) after the independence turned to positive growth in 1996 from a negative growth position up to 1995.

### (3) Economic Structure

The breakdown of GDP by sector for 1996 is: 38% for Services, 23% for Agriculture and 17% for Industry respectively. From the records since 1991, the share of the industry and agricultural sectors in 1996 decreased at 9% and 15% respectively, while the Service Sector revealed a dramatic increase.

The current industrial output structure comprises principally fuel and energy, light metallurgy, mechanical engineering and metal-working.

**Table 2.1.8 Trend of Gross Domestic Product (GDP)**

Year	Gross Domestic Product (GDP) (bl. Sums)	% to previous year in comparable prices
1991	0.06	99.5
1992	0.44	88.9
1993	5.10	97.6
1994	64.88	95.8
1995	298.53	98.8
1996	3 months	84.30
	6 months	180.40
	9 months	350.30
	12 months	560.10

Note : GDP at current prices

Source : The State Committee for Forecasting and Statistics

**Table 2.1.10 Breakdown of GDP by Sector**

Breakdown	1991	1992	1993	1994	1995	1996
Total	100.0	100.0	100.0	100.0	100.0	100.0
Industry	26.3	26.6	22.4	17.0	16.4	17.4
Construction	10.4	9.5	9.0	7.2	7.8	8.1
Agriculture	37.2	35.4	27.9	34.5	28.5	22.5
Services	n.c.	n.c.	n.c.	n.c.	33.8	38.3
Net Taxes	n.c.	n.c.	n.c.	n.c.	13.5	13.7
Other	26.0	28.5	40.8	41.3	0.0	0.0

Note : n.c.= not classified

Source : The State Committee for Forecasting and Statistics

**(4) Export and Import**

The volume of export and import has been increasing slightly year by year since independence, and is relatively well balanced.

Cotton fiber had been one of the major export items in Uzbekistan, but after 1992, its share in exports has gradually decreased. Currently, food products and machines and equipment are major import items and energy carriers, which had previously been one of the major import items up to 1994, have decreased after 1995.

The share of external trade with CIS countries was 28%, while and 72% with non-CIS countries. After 1993, share in both import and export trade with non-CIS countries has increased.

**(5) Employment Situation**

The structure of employment by sector in 1996 that 41% are employed in agriculture, forestry and fishery, 34% in the service sector and 13% in industry.

The number of unemployed in 1996 was 34 thousand, with an unemployment rate of 0.5%. Although the number of unemployed has increased since 1993, the rate of unemployment has leveled off.

The average monthly wage as of 1996 is about 3,600 Sum. The average wage for all sectors rose by 260% in the 12 month period from January to December 1996.

#### (6) Exchange Rate Trend

The official rate as of January 1997 is Sum 60.65/US\$. On the other hand, the unofficial rate as of January 1997 is Sum 100/US\$, with a gap of 165% between both rates.

## 2.2 Current Status of Transportation

### 2.2.1 Transportation Situation in Uzbekistan

#### (1) Passenger Transportation

As shown in Table 2.2.1, share of the passenger traffic by public transportation in 1996 are 85% by bus, 14% by urban electrical, 0.5% by railway and 0.1% by air respectively. After independence, passenger traffic has shown a slight decreasing trend for every type of public transport.

**Table 2.2.1 Passenger Traffic by General Transport**

	(ml. persons (%))						
Mode	1990	1991	1992	1993	1994	1995	1996
Total	2,865.5 (100.0)	2,870.6 (100.0)	2,758.9 (100.0)	2,866.1 (100.0)	n.a. (100.0)	2,690.6 (100.0)	2,673.4 (100.0)
Rail	14.6 (0.5)	15.6 (0.5)	17.3 (0.6)	18.6 (0.6)	n.a. (n.a.)	14.4 (0.5)	14.0 (0.5)
Bus	2,351.1 (82.1)	2,377.0 (82.8)	2,242.2 (81.3)	2,347.4 (81.9)	n.a. (n.a.)	2,286.9 (85.0)	2,278.6 (85.2)
Air	6.3 (0.2)	6.1 (0.2)	3.0 (0.1)	1.4 (0.1)	n.a. (n.a.)	1.3 (0.1)	1.3 (0.1)
Urban Tram	493.5 (17.2)	471.9 (16.5)	496.4 (18.0)	498.7 (17.4)	n.a. (n.a.)	388.0 (14.4)	379.5 (14.2)

Note : n.a.= not available

Source : The State Committee for Forecasting and Statistics

#### (2) Cargo Transportation

As shown in Table 2.2.4, cargo traffic by public transport breaks down as follows: 83% by road, 15% by railway and 0.01% by air respectively. After independence, as seen in the passenger traffic, cargo traffic shows also a slight decreasing trend for every mode of public transport.

**Table 2.2.4 Cargo Traffic by Common Use Transport**

Mode	(ml. tons (%))						
	1990	1991	1992	1993	1994	1995	1996
Total	366.0 (100.0)	371.9 (100.0)	295.2 (100.0)	277.0 (100.0)	269.4 (100.0)	266.7 (100.0)	n.a. (100.0)
Rail	82.9 (22.7)	88.1 (23.7)	63.8 (21.6)	59.8 (21.6)	40.1 (14.9)	46.1 (17.3)	n.a. (n.a.)
Road	283.0 (77.3)	283.8 (76.3)	231.4 (78.4)	217.2 (78.4)	229.3 (85.1)	220.6 (82.7)	n.a. (n.a.)
Air (thou. Ton)	69.8 (0.01)	49.1 (0.01)	22.6 (0.01)	16.8 (0.01)	12.0 (0.01)	10.6 (0.01)	n.a. (n.a.)

Note : n.a. = not available

Source : The State Committee for Forecasting and Statistics

### (3) Railway Transportation

Railway transportation is managed and operated by the National Railway Company, "Uzbekistan Temir Yullari". The railway system is relatively well-developed, with a total rail net of 3,655 km (double track line : 680 km, electrified line : 489 km). However, it faces on competitive edge against road transportation due to the low speed of the trains and the poor obsolete facilities of the railway system.

A study for a maintenance shop is being conducted by the Japan International Cooperation Agency. A long-term development plan related to the railway transportation system includes establishment of transportation center for the Central Asian countries, and a principal cross point for the Trans-Asian Railway between Istanbul and Peking, offering access to the Indian Ocean, Persian Gulf and China.

### (4) Road Transportation

The road network in Uzbekistan is relatively well-developed for a Central Asian Country. Most parts of the country are connected by road. The road density is relatively good in the cities.

The total length of the road network in Uzbekistan is about 84,000 km (paved roads : 71,100 km), including 3,243 km of international roads, 18,582 km of state roads and 21,492 km of

A long-term development plan related to the road network at the national level does not exist. Main roads are gradually being rehabilitated. At present, major roads, including tunnels between Tashkent and Fergana are being constructed, and after completion, road travel time from Tashkent to Fergana Valley is expected to be within about 2 hours.

## 2.3 National Macroeconomic Policy and Development Plan

### 2.3.1 National Macroeconomic Policy

After independence in 1991, the Government of Uzbekistan has been undertaking a gradual reform of the economic system from a centralized planned economy to a market-oriented

economy and is implementing the policies as described below.

**(1) Policy on Economic Reforms**

Since the collapse of the former Soviet Union, Uzbekistan has suffered from an economic contraction and a decline in industrial production. In the middle of 1994, several Presidential Decrees and Resolutions of the Government were promulgated to step up the pace of its reform plan.

**(2) Trade Policy**

As an important policy of Uzbekistan's national development, trade policy emphasizes the promotion of foreign investments for export-oriented industries, in particular, the textile industries, targeting a change from free export of raw and semi-processed goods type to finished products.

**(3) Privatization Policy**

Since independence in 1991, the initial program has given priority to the privatization of small firms. In a recent declaration, the government announced its intention to extend privatization to the medium and large enterprises in the more strategic sectors, including more than one thousand enterprises in the ferrous, non-ferrous, rare and precious metal sub-sectors, as well as more than four hundred agricultural businesses.

**(4) Private Sector Development Policy**

A fund for the Support of Entrepreneurship was established in 1991 through the Union of Entrepreneurs to finance newly established private businesses with government financial support.

Some assistance for private sector development has been provided by the Uzbekistan Business Union, a non-governmental organization working to promote local entrepreneurship.

**(5) Policy on Foreign Investment**

Uzbekistan's foreign investment policy formulated by the Ministry of Foreign Economic Relations in cooperation with the Ministry of Finance aims to promote the influx of foreign direct investment for the development of natural resources, modernization of existing industries, establishment of new industries, electronics production, automobile assembly, infrastructure development, with priority given to the telecommunications sector and the development of access route to foreign ports.

**2.3.2 Development Plan for the Air Transportation Sector**

In the air transport area, various studies and plans have been conducted including a Feasibility Study for construction of the New International Airport of Tashkent in 1993, Feasibility Study for the modernization of Tashkent airport in 1995 and a Feasibility Study for Modernization of Three Local Airports in 1996. At present, a modernization project for three local airports (Samarkand, Bukhara and Urgench) is being carried out with Japanese financial assistance, but a long-term development plan related to air transportation at national level is not yet prepared. The following outline sketches the future options that are being contemplated at present by NAC.



**(1) Introduction of Western Aircraft and Equipment**

Since the commissioning of A310-300 in 1993, NAC has contemplated measures to strengthen and up-grade its operational capability through the further introduction of western aircraft such as the B-767-300ER and B-757-200 (VIP outfit) into its international air routes in order to reverse the decline in air traffic volume.

In addition, air traffic control equipment by Thomson-CSF was installed in the operation building newly constructed at Tashkent Airport in 1995.

**(2) Air Transportation Center in Central Asia**

NAC currently operates more than 75 international flights a week as well as at least 30 round flights a day to 16 destinations in Uzbekistan. NAC also flies to about 30 airports throughout Russia and other Central Asian countries. NAC is anxious to increase its flights to London, Frankfurt, and Beijing. A new route to Jakarta started in the summer of 1997.

NAC feels that Uzbekistan will be an air transportation center in the Central Asian region and the above expansion of international air service routes is contemplated, aiming its increasing revenue from highly profitable air routes.

Geographically, Uzbekistan is located at the cross point between Europe and Southeast Asia. Currently about 80 passenger flights per day are overflying Uzbekistan airspace. Increasing the passenger overflight charge is expected to be a major source of income for NAC.

**(3) Airport Development in Tashkent**

It is an ambition for Uzbekistan to achieve the status of an Air Transportation Center in Central Asia, NAC attaches high priority to the modernization of Tashkent Airport and the rehabilitation of runways, the installation of air traffic control equipment and air navigation facilities.

The existing Tashkent Airport located 5 km from the Tashkent City center is already surrounded by residential settlement. At present, aircraft noise pollution is not a serious problem around the airport.

In view of such factors as aircraft noise pollution due to future increased air traffic demand, constraint on Tashkent City development due to the location of the airport, and the difficulty of expansion of the existing facilities, the relocation of the existing airport to a new possible site was decided by Decree N 114, on April 30, 1991. A master plan and feasibility studies were conducted by various consultants, but implementation is not yet in sight.

**(4) Local Airports Development**

There are 20 airports in Uzbekistan, of which 17 local airports are served by inter-regional and domestic scheduled flights.

Samarkand, Bukhara and Urgench airport modernization projects are being implemented with Japanese financial assistance.

Local airports were constructed mostly in the 1970s and 1980s and some rehabilitation work has been carried out since 1992. Due to budgetary shortages, however, there has

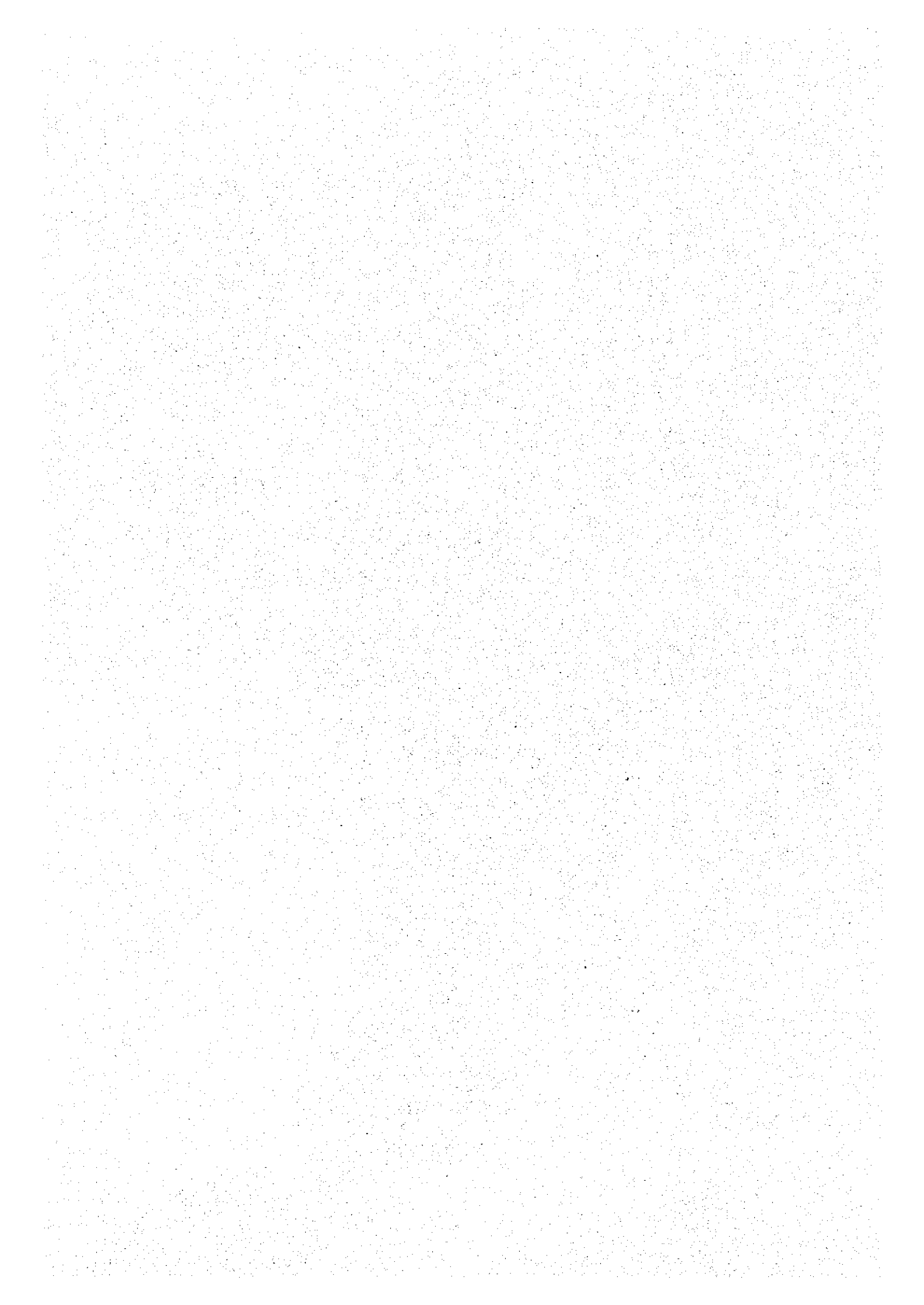
been little or no progress. There are some airports intending to modernize their facilities with the financial backing of the province or city authorities.

**(5) Promotion of Maintenance Sector**

NAC has a four-bay maintenance factory which was one of the largest maintenance centers in the former Soviet Union. It is one of the only IL-62 overhaul facilities in the world and it also specializes in IL-76, IL-86 and Tu-154 maintenance.

In parallel with the shift to Western transport, NAC intends to establish a maintenance base within the above maintenance center, specializing in the service of Western-built jets.

**CHAPTER 3**  
**CURRENT CONDITIONS OF AIR TRANSPORTATION**



## CHAPTER 3 CURRENT CONDITIONS OF AIR TRANSPORTATION

### 3.1 Historical Perspective

On May 12, 1924, the first passenger flight started between Tashkent and Alam-Ata after experimental flights by "Dobrolet", this date was then considered to be a memorial day for the birth of civil aviation in Uzbekistan.

In 1932, the territorial management bureau was organized for operation and management of civil aviation activities in Central Asia. In the middle of the 1930s, the Uzbeku management bureau operated independently, and regional national pilot schools, flight crew and technical specialists for aircraft maintenance were also established.

After the World War II, new aircraft such as , Li-2, and An-2 started operation on new routes and since the 1950s impetuous activity in civil aviation started.

In the 1960s, following the to introduction of new types of aircraft such as An-24, Yak-40, IL-62 and Tu-154, Tashkent was connected by new direct air routes with Leningrad, Novosibirsk, major cities of Baltic Sea, Caucasus and Far East.

From 1970s to 80s, airports with air navigation and communication equipment were constructed in major cities in Uzbekistan, and new terminal complex in Tashkent Airport was completed and put into operation in 1976. In the former USSR era, air transportation activity had been managed and controlled under Aeroflot, and Tashkent Airport was functioned as one of international gateways in the USSR territory.

After the independence of Uzbekistan, Uzbekistan Airways was founded at the beginning of 1992 as the National Air Company (NAC) inheriting and component parts from Aeroflot. NAC is one of largest aeronautical companies in the former USSR region and the first company in Central Asia operating Western aircraft of A-310 and B-767.

However, similar to as other countries in the CIS region, Uzbekistan is also facing a big transition and confusion after the independence in 1991

One of the phenomenon seen after independence is the remarkable decline of air traffic demand.

During the former Soviet Union era, not only air transportation but also other forms of transportation and communication infrastructures were well developed from 1970s to 1980s. However, after the breakdown of the former Soviet Union, these infrastructures were operated and managed without sufficient improvement and maintenance due to insufficient budget.

NAC has actively introduced western-built aircraft and equipment with western financial support, but, discrepancies between Uzbekistan and international standards being revealed these days. This means that new trouble and confusion may be brought into future aircraft safe operation.

### 3.2 Air Traffic Statistic

Air traffic statistics data used herein cover only the departure base from each airport. However, to facilitate airport planning and management plan of air transportation system, more detailed statistic data will be needed. Therefore, establishment of systematic and well organized statistic database will be required.

### **3.2.1 Aircraft Movement**

Number of aircraft movement (take-off only) has been decreasing sharply since 1991. Tashkent airport handled more than 50% of the total aircraft movements in Uzbekistan.

### **3.2.2 Air Passenger Traffic**

The air passenger traffic in Uzbekistan has been decreasing sharply since independence in 1991. The annual total departure passengers at 13 airports have decreased to 1,350 thousand from 6,330 thousand in 1991. This decrease in passengers was caused mainly by the domestic and CIS routes passengers, but international passengers traffic shows slightly upwards demand since 1992.

Tashkent airport handled 65% of total passengers in Uzbekistan, having approx. 880 thousand departure passengers in 1995. There is no other airports which handled more than 100 thousand departure passengers other than Tashkent airport.

### **3.2.3 Air Cargo Traffic**

The air cargo traffic in Uzbekistan also has been decreasing sharply since independence in 1991. The annual outgoing cargo at 13 airports has decreased to 10 thousand tons in 1995 from 39 thousand tons in 1991. This decrease of cargo was also caused mainly by the domestic and CIS routes cargo demand, but international cargo traffic demand remains steadily.

Tashkent airport handled about 7 thousand tons of cargo in 1995. Fergana airport handled about 1,900 tons cargo next to the Tashkent airport.

### **3.2.4 Air Mail Traffic**

The air mail traffic in Uzbekistan also has been decreasing sharply since independence in 1991. Tashkent airport handled only 600 tons of mail, and there is few mail handled at the other airports.

## **3.3 Air Route Network**

### **3.3.1 Domestic Air Route**

According to the domestic summer schedule in 1997, all domestic air routes are being served by NAC. Among 19 routes in total, 16 routes are pivoted at Tashkent.

### **3.3.2 CIS Air Route**

CIS route summer schedule in 1997 shows that among 32 routes (109 - frequency/week) in total 25 routes (60 - frequency/week) are being served by NAC. 18 routes are served by both NAC and other CIS airlines. 26 routes (97 - frequency/week) are pivoted at Tashkent. Samarkand, Namangan, Fergana, Bukhara, Andizhan are linked with Domodedovo (Moscow).

### **3.3.3 International Air Route**

According to the international summer schedule in 1997, among 22 routes (58 -

frequency/week), 18 routes (44 - frequency/week) are being served by NAC, of which 5 routes are being served by both NAC and other international airlines. All international routes originate at Tashkent.

Bilateral air agreements have been established with 35 countries as of May 1997. NAC has the intention to open new routes to Tokyo and Brussels.

#### **3.4 Selection of Study Airports**

There are twenty (20) airports in Uzbekistan both for civil aviation and military use. One of the objectives of the Study is to prepare a long-term Master Plan of airports and air navigation facilities to modernize air transportation in Uzbekistan.

Through preliminary review and discussion between NAC and JICA Preparatory Team, twelve (12) airports were selected.

Of the twelve (12) airports, the Study Team actually conducted a survey of nine (9) airports in April and May 1997 in order to grasp the current situation of each airport's facilities. Regarding the other three airports, the modernization project is being carried out, in which data and information are utilized to the maximum extent.

#### **3.5 ~ 3.16 Current Condition of Airports**

Current condition of the twelve (12) airports were summarized in the following Tables 3.4.1 through 3.4.4.

Table 3.4.1 Airport Facilities (1)

Airport	General	Air Traffic Volume	Air Field Facility	Terminal Facility	Air Navigation Facility
<p><b>3.5</b> <b>TASHKENT</b></p>	<p>Tashkent airport inaugurated in 1932 is located about 6 km south of the center of Tashkent city, and is serving as a main gateway to Uzbekistan as well as hub airport of the domestic air network.</p> <p>The international passenger building was completed in 1976, and new domestic passenger terminal building in 1997. New control tower with new ATC equipment was installed in 1996.</p>	<p>Flight routes in Uzbekistan are served concentrically from Tashkent Airport. The airport handled 60-70% of passengers and cargo traffic in Uzbekistan.</p> <p>Since 1993, air traffic of both passengers and cargo has been gradually decreasing, but international passenger traffic has been growing at 13% in average for the past three years.</p>	<p>The surface of the two runways, taxiway and apron were recently overlaid by bituminous concrete and appears to be in good condition, although there are a number of cracks along the longitudinal construction joints of the upper overlaid layer of the pavement.</p>	<p>Two passenger terminal buildings were used with classification of passenger nationality.</p> <p>The new building with departure lounge was under construction, but currently the work was in suspension due to a delay of financial arrangements.</p> <p>There are no domestic arrival facilities. Construction of a new cargo building is planned at the south part of the area.</p>	<p>A new Air Traffic Control (ATC) Center was installed with finance of French bank.</p> <p>The Center has been functioning since March 1997.</p> <p>New ILS system of ALCAITEL was installed for RWY 08L and 26R in 1997.</p> <p>New airfield lighting system, manufactured by SIEMENS was installed in 1997.</p> <p>Meteorological observation system in Tashkent Airport is in conformity with the ICAO standard.</p>
<p><b>3.6</b> <b>NAMANGAN</b></p>	<p>The Namangan airport is located at 8 km south-west of the city center and has a 3,270 m-long runway and functions as one of the alternative airports for Tashkent airport.</p>	<p>At present, there are two (2) daily flights with Yak-40 between Tashkent, and one (1) weekly flight with Tu-154 with Moscow, Novosibirsk and Volgograd. Passenger volume declined to 27 thousand in 1996 since 1991.</p>	<p>The surface of the original runway appears to be in poor condition. Surface of the taxiway and apron appears to be in poor condition.</p> <p>The mean longitudinal slope of the runway is 1.58% and does not comply with ICAO standards.</p>	<p>There is no building for arrival passengers nor facilities.</p> <p>Construction of a new cargo building with refrigerating storage was suspended after completion of its structure works due to lack of appropriate fund.</p>	<p>Most of the radio telecommunication equipment was manufactured more than 10 years ago. There is a shortage of spare parts. Airfield lighting and power supply system was installed 13 years ago and there is a problem of shortage of spare parts, but operational function is normal.</p>



Table 3.4.2 Airport Facilities (2)

Airport	General	Air Traffic Volume	Air Field Facility	Terminal Facility	Air Navigation Facility
<p><b>3.7</b> <b>ANDIZHAN</b></p>	<p>Andizhan airport is located about 7 kilometers southwest of the center of Andizhan. The airport was constructed in 1980, and is administrated and operated by the military.</p>	<p>At present, there are scheduled flights with Domodedovo (Moscow) and Tashkent. Recent departure passengers are slightly increasing.</p>	<p>Andizhan airport has a plan to construct a new parallel runway being 3,500 m long and 50 m width for civil aviation use with 150 m separation to the existing runway.</p>	<p>The existing passenger terminal building is located in the center of the civil aviation area and there is enough space for future expansion around the building, which is used for flower gardens.</p>	<p>Aeronautical nav aids (LMM, LOM) and part of air traffic control facilities were installed by the military section. According to the airport staff, they are planning to install new nav aids and ATC facilities by the province budget.</p>
<p><b>3.8</b> <b>FERGANA</b></p>	<p>Fergana airport is located about 3 km west of the center of Fergana.</p>	<p>At present, there is daily scheduled flight with Tashkent, and one weekly scheduled flight to Moscow. The airport handled the second largest volume of cargo next to the Tashkent Airport.</p>	<p>Mean longitudinal slope of the runway is 1.4% according to AIP information and does not comply with ICAO standards.</p>	<p>Arrival passengers walk through a passage without a ceiling after disembarking to the curbside. International arrival space is under rehabilitation.</p>	<p>Radio Nav aids and radio telecommunication were mainly installed and managed by the military.</p>
<p><b>3.9</b> <b>KOKAND</b></p>	<p>Kokand airport is located about 4 km south of the center of Kokand city.</p>	<p>At present, there is only one daily flight between Tashkent. Air passenger traffic in 1996 was 11 thousand. Passenger and cargo traffic has been decreasing to 14% and 1% of the same in 1991.</p>	<p>The surface of the runway appears to be in poor condition. The surface of the taxiways and apron appears to be in poor condition.</p>	<p>There are two (2) passenger buildings in the area, namely, main terminal building and departure lounge building. Facilities and space for arrival passengers are not provided in the terminal building.</p>	<p>Most of the equipment for radio nav aids and air traffic control was installed more than 15 years ago. Shortages of spare parts is currently a serious problem to maintain the equipment.</p>

Table 3.4.3 Airport Facilities (3)

Airport	General	Air Traffic Volume	Air Field Facility	Terminal Facility	Air Navigation Facility
<p><b>3.10</b> <b>SAMARKAND</b></p>	<p>Samarkand airport is located about 8 km north of the city center. Now a modernization project is ongoing with the financial assistance of Japan.</p>	<p>At present, there are scheduled flights with Moscow and Tashkent. Departure passenger traffic at Samarkand has been decreasing from 60 thousands to 40 thousands for the past three years.</p>	<p>Modernization project includes the following improvement plans: • Overlay of runway, taxiway and apron • Construction of runway shoulders; • Widening of the existing taxiways;</p>	<p>Modernization project includes the following building works: • Construction of international arrival building • Renovation of existing passenger terminal building • Renovation of cargo building</p>	<p>Modernization Project includes the following items: • Installation of ILS conforming to the ICAO standards • Installation of airfield lighting • Installation of NDB, VDF and ASR/SSR</p>
<p><b>3.11</b> <b>TERMEZ</b></p>	<p>The airport is located 9 km north of the city center and has a 3,000 m-long runway. Initially, the airport was opened in 1952</p>	<p>At present, there are daily flights with Tashkent and weekly flight with Moscow Compared to the traffic volume in 1991, passenger traffic decreased to 39.13 percent.</p>	<p>Surface of the runway appears to be in rather good condition. Surface of the main apron appears to be in rather good condition.</p>	<p>The departure lounge is provided separately to the passenger building. The building and lounge is in poor condition. Facilities and space for arrival passengers is not provided in the terminal building.</p>	<p>Most of the equipment for radio navigaids and air traffic control was installed more than 10 years ago, and there's a problem of shortage of spare parts</p>
<p><b>3.12</b> <b>KARSHI</b></p>	<p>Karshi airport is located 5 km north of the city center.</p>	<p>There are daily flights with Tashkent and weekly flights with Moscow. Since 1993 passenger traffic has increased slightly.</p>	<p>Surface of the re-paved portion of the runway appears to be in rather good condition. However, the surface of the remaining portion of the runway appears to be in very poor condition</p>	<p>Terminal buildings were reconstructed three times, and the latest building was built in 1988. Only one passenger building is provided for departure, arrival and cargo handling.</p>	<p>Existing equipment for radio navigaids and air traffic control facilities were installed more than 10 years ago. There is a problem of shortages of spare parts.</p>

Table 3.4.4 Airport Facilities (4)

Airport	General	Air Traffic Volume	Air Field Facility	Terminal Facility	Air Navigation Facility
<p><b>3.13</b> <b>BUKHARA</b></p>	<p>Bukhara has become a major industrial, culture and tourism center of Uzbekistan.</p>	<p>At present, there are scheduled flight to Moscow and Tashkent. Recent traffic tendency is stable at a level having approx. 40-50 thousands</p>	<p>Modernization program is ongoing to meet with ICAO standards.</p>	<p>Modernization project includes the following building works:</p> <ul style="list-style-type: none"> <li>• Construction of international arrival building</li> <li>• Renovation of existing passenger terminal building</li> </ul>	<p>Modernization program is ongoing meet ICAO standards.</p>
<p><b>3.14</b> <b>NAVOI</b></p>	<p>The airport is located in desert area, 25 km southwest of the city center.</p>	<p>At present, there are daily flights with Tashkent. Formerly, there were more than thirty-four flights per day.</p>	<p>Runway extension work is in suspension due to lack of budget. Surface of the remaining portion of the runway appears to be in poor condition</p>	<p>The number of facilities in the terminal area is rather less compared to other airport, and they are well laidout.</p>	<p>Existing equipment for radio nav aids and air traffic control facilities were installed more than 10 years ago. There is a problem of shortages of spare parts.</p>
<p><b>3.15</b> <b>URGENCH</b></p>	<p>Urgench airport is located about 5 km east of the city center.</p>	<p>At present, there are scheduled flights with Moscow and Tashkent. For the past three years, departure passengers have slightly increased.</p>	<p>Modernization program is ongoing to meet ICAO standards.</p>	<p>Modernization project includes the following building works:</p> <ul style="list-style-type: none"> <li>• Construction of international arrival building</li> <li>• Renovation of existing passenger terminal building</li> </ul>	<p>Modernization program is ongoing to meet ICAO standards.</p>
<p><b>3.16</b> <b>NUKUS</b></p>	<p>Nukus is the capital of Republic of Karakalpakstan, Nukes airport is located 7 km north-west of the city.</p>	<p>At present, there are daily flights with Tashkent and weekly flight with Moscow. Total passengers have increased at the growth rate of 15%</p>	<p>The surface of the runway appears to be in poor condition. The surface of the taxiways and apron appears to be in poor condition.</p>	<p>The existing building was built about 30 years ago. Construction of a new passenger terminal building started but, work was suspended due to lack of budget.</p>	<p>Existing equipment for radio nav aids and air traffic control facilities were installed more than 10 years ago. There is a problem of shortages of spare parts.</p>

### **3.17 New Tashkent Airport Project**

#### **3.17.1 Historical Background**

The Tashkent Airport had acted as one of the international gateways within the former Soviet Union, but it is located only about 5 km from Tashkent city, hampering expansion plans of Tashkent city, and environmental impact such as aircraft noise pollution and radiation by radio nav aids and other equipment have caused damages to the habitants around the airport.

By Decree No.114 dated April 30, 1991, removal of the existing Tashkent Airport by 2000 was authorized. March 2,1992, an ad-hoc committee was organized in order to select the best site for the new airport construction, from eight (8) possible sites, paying attention to minimal alienation of the irrigated area, possibilities of simultaneous operation of both the new airport and the existing airport and minimal disturbances of cities by aircraft noise. A site situated 45 km from Tashkent cities and near border to Kazakhstan was recommended by the Committee to the Cabinet of Ministers for approval.

In 1993, three feasibility studies for the new airport project were conducted by distinct groups. Thereafter, the site firstly selected for a new airport was canceled due to its close location to the border with Kazakhstan. A site was newly selected between State Road M-39 and Railway lines.

#### **3.17.2 Outlined Scope of the Project**

Demand forecast of air traffic for the New Tashkent Airport was made based on the traffic tend during 20 years from 1970 to 1991.

Two runways of 4,730 m and 4,300 m long with cement concrete pavement, international and domestic terminal buildings and cargo building were are estimated necessary to meet demand of the target years, 2005 and 2015. ILS, ASR/SSR, airfield lighting, Meteorological facilities, ATC facilities, and tower were to be provided. Number of airport staff was estimated to be 340-440.

Estimated project cost d for implementation of the Project at the former site was 780.44 million Rubles.

#### **3.17.3 Characteristics of the Site**

After the cancellation of the former site for the new airport construction, further studies and investigations were not conducted, therefore, information related to the new site is very limited.

The required area is estimated at 1,500 ha, in which area there are approx. 500 habitants.

##### **(1) Topography**

The new site is located at the elevation between approx. 330 m and 360 m above sea level, and is inclined gradually from north to southeast with rather flat topography.

##### **(2) Land Use**

Land around the site is mainly used for agricultural farm, and five settlements and village are scattered.

**(3) Weather**

Prevailing wind direction is northeast. Then it is recommended to install meteorological observation facilities at the site to collect weather data.

**(4) Airspace**

Above the site, SID and STAR air routes of the existing Tashkent airport are established. Considering the possibility of simultaneous operation of two airports, the runway direction of the new airport is desirable to be same as the existing runway (08/26) at Tashkent Airport in order to minimize intersection of both flight courses and overlap of airspace.

**(5) Obstacles**

The area around the site is mainly covered by a cotton farm, and there is no high structures or projected topography except the microwave tower located to the north of the site.

**3.18 Air Traffic Control System in Uzbekistan**

**3.18.1 General**

**(1) Air Navigation System in Uzbekistan**

The air navigation system in Uzbekistan mainly comprises two (2) sets of VOR/DME, twenty (20) sets of NDB. ASR./SSRs are also installed at several airports including Tashkent Airport for approach and en-route control.

**(2) Authority of Air Traffic Control**

Air Traffic Control (ATC) services of the civil aviation sector in Uzbekistan is being provided by "Uzaeronavigation"(UZAERO) under NAC organization. UZAERO has approx. 1,450 staffs including 450 controllers and 200 engineers at Tashkent airport and local airports.

**(3) Regulations**

ATC services is made based on the code of ATC("П У К О В О Д С Т В О"), which was approved by Directorate of NAC and meets ICAO documents of Annex 2 Rules of the Air, Annex 11 Air Traffic Services and others.

**(4) Type of Services**

The types of air traffic control services, except military airports, provided in Uzbekistan are as follows:

- a) Flight Information Service (FIS) and Alerting Service (ALRS)
- b) Area Control Center (ACC)
- c) Radar
- d) Aerodrome Control(TWR)
- e) Aerodrome Flight Information Service(AFIS)
- f) Automatic Terminal Information Service (ATIS) at certain aerodroms.

**(5) Controlled Airspace and Area**

**a) Flight Information Region (FIR)**

There are three (3) Flight Information Regions designated in Uzbekistan in accordance with ICAO regulations, consisting of Tashkent FIR, Samarkand FIR and Nukus FIR

**b) Control Area and Control Zones**

Terminal Control Areas and Control Zones are designated at important civil airports in Uzbekistan. The shape of Terminal Control Area (TMA) or Control zone (CTR) is not uniform, and the altitude of TMA or CTR is different depending on conditions.

**(6) Classification of ATC Specialists**

- Minimum age of 18 years
- Health status in conformity with established requirements
- Availability of diplomas (certificates) on graduation of education institutions, training centers and special courses of civil aviation on program of professional training for ATC specialists.
- Availability of the effective certificate(license) of the ATC controller

**(7) Structure of Civil Aviation Services**

Structure of civil aviation services consists of the following two levels:

- State "Uzaeronavigation" center
- Territorial level - territorial divisions of center on ACC

"Uzaeronavigation" center defines general guidance of ATC authorities, approve activities on rational and efficient air space use with interested institutions and ministries, formulates principles and methods of ATC, provision, functioning, development and upgrading of the integral ATC system.

**3.18.2 Air Space Structure**

**(1) Area of Air Traffic Control Service**

- along airways(AWY)
- in terminal control areas(TMA)
- in aerodrome control zone(CTR)

**(2) Air space organization**

Air space of Uzbekistan is divided into ACC, aerodrome area and aero-junctions:

- Air routes and special zones for aircraft flights
- Area of non-monitored flights
- Prohibited areas and restricted areas, polygon areas, areas of explosive activities and others.

- These can be divided into sectors both in the plane and in the height. Borders of ATC areas (zones) are set by the commander of navy of the Republic of Uzbekistan.

(3) Border Level of dividing air space in vertical

Air space in vertical reckoning is divided into lower and upper ones. Border between those two is primarily set at 4,500m from the level of respective atmosphere pressure of 760mm of mercury column (1013.2mmb)

### 3.18.3 Air Route Structure

Air routes of the Republic of Uzbekistan and order of using them are developed by the headquarters of Air Navy in cooperation with "Uzaeronavigation" center with due consideration of interests of any one involved. List of air routes is made effective by the Order of the commander in chief of the Air Navy of the Republic of Uzbekistan.

Flights by foreign aircraft are carried out on international air routes. List of international air routes(ATS routes), as well as data, required for execution of flights on those routes are published in compliments on aeronautical information(AIP).

Use of the air space in the Republic of Uzbekistan can be restricted or fully prohibited by the establishment of restriction and prohibition zones. Type of restrictions, their expiring periods and categories of ranked officials authorized to set restrictions are regulated by the Posture on air space use in the Republic of Uzbekistan. For ATC areas that have intensive air traffic and large number of intersections of air routes it will be reasonable to set up routes with one-side traffic.

Longitudinal and side layering for flights on routes is carried out according to Requirement Flight Rules-95. Regulations for longitudinal and side layering will depend on availability or lack of radar monitoring, characteristics of pilotage-navigation complex of the aircraft, aircraft speed, applicable flight rules and other factors.

### 3.18.4 Air Traffic Control Services

(1) Kind of Service in ATC

- En-route Control Service(ACC)
- Approach Control Service(Aerodrome)
- Aerodrome Control Service(Aerodrome)
- Radar Control Service(ACC and Aerodrome)
- PAR Approach Control Service(Aerodrome)

(2) Composition of ATC Authorities at Aerodrome

- Supervisor of airport flights(RPA)
- Circle controller(DPK)
- Landing controller(PDP)
- Starter controller(SDP)
- Taxiing controller(DPR)

### (3) Minimum Vertical Obstacle Clearances

The minimum vertical obstacle clearance for IFR is provided by 300m in CTZ, 600m in plain area and 900m in mountainous area.

### (4) Width of Air Route

The width of an air route is determined as 10km – 25km on each side of the center line of the route to calculate the minimum obstacle clearance for IFR flight above the highest natural and man-made obstacle.

#### 3.18.5 Radar Service

Radar service is provided to aircraft in order to meet operational requirement. The providing bodies of Radar service with using call sign are follows:

- ACC(area control centers)“CONTROL”
- APP(approach control offices)“APPROACH”
- TWR(circuit control offices)“KRUG”
- TWR(landing control offices)“TOWER”

Coordinates and coverage of radar stations are not published. It seems that Aerodrome radar and En-route radar are set together at some of the civil airports. Radar control service is provided only along airways and in TMAs and CTRs, so air space for radar control service is limited. Services include radar monitoring of arriving, departing and en-route traffic to provide information on any significant deviation from normal flight path and others as follows;

- radar vectoring(if necessary)
- assistance to aircraft in emergency
- warning and presentation of information on location of other aircraft considered to constitute a hazard
- information to assist navigation of aircraft
- information on observed weather and hazardous phenomena

Horizontal radar separation is applicable both IFR and VFR flight and defined as either longitudinal or lateral value as well as ICAO standards.

#### 3.18.6 Air Traffic Flow Management and Air Traffic Planing

Air space planning is divided into the following kinds:

- Preliminary
- Daily(for the next 24 hours)
- Current

Preliminary air space planning is conducted during period of compiling timetables of aircraft and making amendments to those by the NAC aircraft traffic planning authorities. Daily air space use planning for traffic will take place on the eve of flights and its essence is making a note on load on air space elements, ATC sectors and airports. Current air space use planning will be done by ATC authorities during the process of execution of flights with the aim to



amend program of aircraft in ATC areas(zones).

The services of an air traffic control management unit (ATFMU) are provided by the Center for Co-ordination of the Airspace Usage in Tashkent, which is governed by ICAO regulations and Co-ordinates the international flights along the ATS routes of the Republic of Uzbekistan.

### **3.18.7 Personnel**

The number of traffic service specialists for different controller points will be defined by Regulation of "Uzaeronavigation" for territorial departments, taking into consideration the need of keeping 10% of additional stand-by controllers.

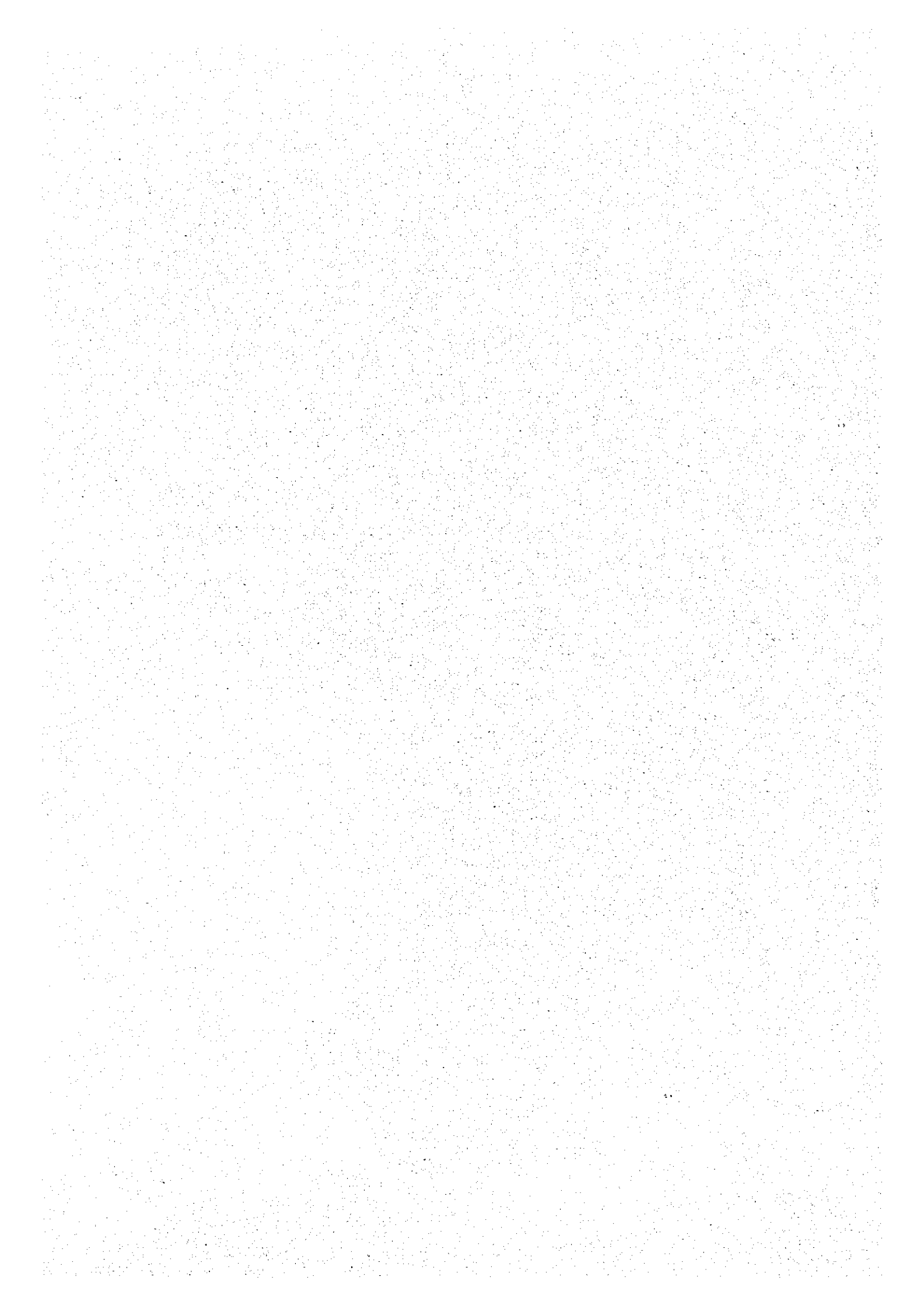
Organization of labor and recreation of ATC personnel is regulated by general postures of the Legislation of the Republic of Uzbekistan on labor as well as by special regulations' acts by "Uzaeronavigation" center.

In civil aviation traffic service, at ATC controller points activities are conducted in shifts. Schedule of shifts' operational hours are determined based on local condition upon agreement with local trade union organization.



## **CHAPTER 4**

# **MASTER PLAN FOR AIR TRANSPORTATION FACILITY DEVELOPMENT**



## CHAPTER 4 MASTER PLAN FOR AIR TRANSPORTATION FACILITY DEVELOPMENT

### 4.1 Socio-Economic Framework

#### 4.1.1 General

The socio-economic framework of Uzbekistan is the fundamental element to consider in forecasting the air traffic demand in Uzbekistan. In general, there are many factors, which affect the air traffic demand. A simple procedure is preferable for the extended long-term forecasting of air traffic demand. Among the various factors, the GDP (Gross Domestic Product) is singled out as the index for air traffic demand forecast, because GDP covers the entire spectrum of the national and regional economic activities.

#### 4.1.2 Population

The future population is predicted, using the "World Population Projections '94/95" estimated by the World Bank from a worldwide macro-scope viewpoint.

**Table 4.1.2 Forecast of Population on Uzbekistan**

	Year	Population ('000)	Growth Rate (%/year)	Decrease Ratio of Growth Ratio
Actual	1991	20,708	--	--
	1996	23,007	2.13	--
Forecast	2000	24,821	1.92	0.90
	2005	27,035	1.72	0.90
	2010	29,198	1.55	0.90
	2015	31,294	1.40	0.90
	2020	33,310	1.26	0.90

**Table 4.1.3 Forecast of Provincial Population**

Province	Actual ('000)		Forecast ('000)					Remarks (Forecasting Model)
	1991	1996	2000	2005	2010	2015	2020	
Karakalpakstan	1,273.8	1,418.1	1,550.5	1,700.7	1,847.5	1,990.0	2,127.3	Population = 31.19 * Year -60824.4
Andizhan	1,795.1	2,040.3	2,176.1	2,371.9	2,563.2	2,748.6	2,927.0	Population = 40.77 * Year -79364.4
Bukhara	1,199.6	1,339.9	1,448.5	1,584.6	1,717.6	1,846.6	1,970.9	Population = 28.3 * Year -55137.5
Djizhak	780.0	891.1	987.4	1,100.8	1,212.0	1,320.2	1,424.8	Population = 23.45 * Year -45909.4
Kashkadarya	1,697.7	1,975.2	2,163.4	2,412.6	2,656.8	2,894.4	3,124.0	Population = 51.5 * Year -100828.1
Navoi	684.9	748.2	816.9	889.6	960.6	1,029.3	1,095.5	Population = 15.14 * Year -29451
Namangan	1,557.8	1,786.4	1,928.3	2,124.6	2,316.6	2,503.1	2,683.0	Population = 40.7 * Year -79467.9
Samarkand	2,209.7	2,488.6	2,660.4	2,898.1	3,130.3	3,355.4	3,571.8	Population = 49.51 * Year -96343.2
Surkhandarya	1,335.9	1,582.4	1,718.4	1,918.8	2,115.2	2,306.3	2,491.0	Population = 41.4 * Year -81067.2
Sirdarya	580.3	633.9	679.7	732.0	783.1	832.4	879.7	Population = 10.97 * Year -21251.5
Tashkent (*)	4,298.5	4,377.7	4,698.2	4,943.0	5,179.7	5,406.1	5,620.4	Population = 52.22 * Year -99730.7
Fergana	2,226.4	2,499.5	2,664.2	2,891.7	3,113.8	3,328.9	3,535.6	Population = 47.46 * Year -92252.2
Khorezm	1,068.5	1,225.9	1,328.9	1,466.6	1,601.5	1,732.4	1,858.8	Population = 28.55 * Year -55770.7
Total	20,708.2	23,007.2	24,820.9	27,035.0	29,197.9	31,293.8	33,309.8	Control Total

(\*) : including City of Tashkent

**Table 4.1.4 Estimate of World Population by World Bank**

Year	Population ('000)	Growth Rate (%/year)
1990	5,281,551	..
1995	5,690,783	1.50
2000	6,113,680	1.44
2005	6,527,767	1.32
2010	6,944,433	1.25
2015	7,348,279	1.14
2020	7,742,124	1.05

source : World Bank

#### 4.1.3 Gross Domestic Product (GDP)

The future GDP of Uzbekistan is projected in three cases through regression model analysis.

**Table 4.1.6 Forecast of Gross Domestic Product (GDP)**

( 1987 converted real price )

Year	Case 1		Case 2		Case 3	
	GDP (bil. Sums)	Growth Rate (%/year)	GDP (bil. Sums)	Growth Rate (%/year)	GDP (bil. Sums)	Growth Rate (%/year)
2000	656.9	4.06	680.1	4.97	615.3	2.38
2005	787.1	3.68	858.7	4.78	684.2	2.15
2010	927.5	3.34	1,075.2	4.60	753.1	1.94
2015	1,077.0	3.03	1,335.9	4.44	822.1	1.77
2020	1,234.6	2.77	1,648.4	4.29	891.0	1.62

**Table 4.1.8 Forecast of World GDP**

( 1987 real price )

Year	Case A		Case B		Case C	
	GDP (mil. US\$)	Growth Rate (%/year)	GDP (bil. Sums)	Growth Rate (%/year)	GDP (bil. Sums)	Growth Rate (%/year)
2000	22,362,730	3.00	22,691,364	3.38	21,503,067	2.00
2005	25,008,769	2.26	25,641,375	2.47	23,545,705	1.83
2010	27,808,673	2.15	28,869,031	2.40	25,588,344	1.68
2015	30,699,451	2.00	32,329,562	2.29	27,630,983	1.55
2020	33,686,701	1.87	36,048,987	2.20	29,673,621	1.44

## 4.2 Air Traffic Demand Forecast

### 4.2.1 Premises of Air Traffic Demand Forecast

#### (1) Target Year

The years 2005 and 2020 are the target years for master planning. However, the demand forecast is to be made from 2000 to 2020 at five-year intervals, considering the construction phasing.

#### (2) Forecasting Cases

The following three cases are examined for air traffic demand forecasting.

a) Case - 1

The air traffic demand is forecast from the future GDP calculated as Case - 1. This demand is called "Medium Case".

The GDP values for the world in Case - A is adopted as a Medium Case for the demand forecast of the international service.

b) Case - 2

The air traffic demand is forecast from the future GDP calculated as Case - 2. This demand is called "High Case".

The GDP of the world in Case - B is adopted as a High Case for the demand forecast of the international services.

c) Case - 3

The air traffic demand is forecast from the future GDP calculated as Case - 3. This demand is called "Low Case".

The GDP of the world in Case - C is adopted as Low Case for the demand forecast of the international services.

(3) Zoning of Uzbekistan and Foreign Countries

a) Domestic Services

For the purpose of the air traffic demand, Uzbekistan is divided into eleven zones.

b) Inter-CIS Services

The zoning of CIS and Baltic States is made, considering the location and mutual distance from Uzbekistan. Central Asia is divided into four individual zones, and two combined zones for the other CIS and Baltic States.

c) International Services

The zoning of foreign countries is made, considering the directions of the air routes and referring to ICAO zoning.

#### 4.2.2 Domestic Air Passenger Traffic

(1) Methodology

The domestic air passenger traffic demand is forecasted based on the future GDP with the regression model which is established from actual statistical data for domestic passengers and from GDP values, explaining the domestic air passenger demand by GDP values as a variable.

The domestic air passengers are distributed to each air route respectively using composition rates obtained from the actual origin and destination data. They are, then, analyzed to prepare the forecasting model explained by the populations surrounding the respective airports and the road distance to mother-towns of the respective airports.

(2) Forecast of Domestic Air Passenger Demand Total in Uzbekistan

The results of the total domestic air passenger demand forecast in Uzbekistan are shown in Table 4.2.1.

**Table 4.2.1 Forecast of Domestic Air Passenger Total in Uzbekistan**

Year		1996	2000	2005	2010	2015	2020
Passenger ('000)	Case - 1		786.0	927.0	1,078.9	1,240.7	1,411.3
	Case - 2	680.9	810.4	1,003.6	1,237.6	1,519.5	1,857.5
	Case - 3		741.2	815.9	890.5	965.2	1,039.8

Note: These figures are embarking and disembarking passengers.

### 4.2.3 Inter-CIS Air Passenger Traffic

#### (1) Methodology

Inter-CIS air traffic demand is forecasted based on the future GDP with a regression model explaining the inter-CIS air passenger demand by GDP values as the variable.

The total inter-CIS air passenger demand is distributed to the respective zones, using the ratio of actual passenger flow between zones and the socio-economic indices of Uzbekistan. The demand figures are then finally determined by comparing the minimum requirements for scheduled flight operation.

#### (2) Forecast of Inter-CIS Air Passenger Demand

The results of the above forecasting are shown in Table 4.2.8.

**Table 4.2.8 Forecast of Inter-CIS Air Passenger in Uzbekistan**

Year		1996	2000	2005	2010	2015	2020
Passenger ('000)	Case - 1		1,134.4	1,662.9	2,232.5	2,839.3	3,479.2
	Case - 2	736.2	1,226.9	1,950.9	2,828.1	3,884.7	5,151.4
	Case - 3		965.1	1,244.8	1,524.5	1,804.2	2,083.9

Note: These figures are embarking and disembarking passengers.

### 4.2.4 International Air Passenger Traffic

#### (1) Methodology

The international air passenger traffic demand is forecasted based on a regression model established by analysis of the projected future GDP of both Uzbekistan and the World.

The total demands of the international air passengers are distributed into the respective zones of the World, using the past passenger flow and the socio-economic indices of Uzbekistan. Then, the demands are finalized through checking the minimum requirements for the scheduled flight operation.

#### (2) International Air Passenger Demand

The results of the above forecast are shown in Table 4.2.14.

**Table 4.2.14 Forecast of International Air Passengers in Uzbekistan**

Year		1996	2000	2005	2010	2015	2020
Passengers ('000)	Case - 1		698.7	1,045.5	1,413.7	1,795.8	2,192.0
	Case - 2	440.8	716.9	1,103.3	1,534.8	2,009.7	2,533.7
	Case - 3		682.3	977.8	1,273.2	1,568.7	1,864.7

Note: These figures are embarking and disembarking passengers.



#### 4.2.5 Domestic Air Cargo Traffic

##### (1) Methodology

The demand for the domestic air cargo traffic is forecasted with a regression model explaining the domestic air cargo demand by GDP as the variable.

As the air cargo is mainly transported in the belly of passenger aircraft, the total demands for the domestic air cargo are distributed into the respective air route using the composition rates of the projected domestic air passenger by air route.

##### (2) Nationwide Air Cargo Demand

The results of the above forecasting are shown in Table 4.2.20.

**Table 4.2.20 Forecast of Domestic Air Cargo in Uzbekistan**

Year		1996	2000	2005	2010	2015	2020
Cargo (tons)	Case - 1		904	1,753	2,668	3,642	4,669
	Case - 2	302	1,008	2,119	3,466	5,088	7,032
	Case - 3		691	1,182	1,673	2,164	2,654

Note: These figures are inbound and outbound cargo.

#### 4.2.6 Inter-CIS Air Cargo Traffic

##### (1) Methodology

The Inter-CIS air cargo traffic demand is forecasted, by analysis a regression model established on the basis of the past statistical data for the total air cargo for the Inter-CIS states and the past records of GDP value after the independence.

The total Inter-CIS air cargo demand is distributed to the respective air routes, in accordance with the composition rates for the passenger demand for the Inter-CIS routes.

##### (2) Air Cargo Demand for Inter-CIS

The results of the above forecast are shown in Table 4.2.24.

**Table 4.2.24 Forecast of Inter-CIS Air Cargo in Uzbekistan**

Year		1996	2000	2005	2010	2015	2020
Cargo (tons)	Case - 1		10,904	17,503	24,575	32,108	40,052
	Case - 2	6,034	12,039	20,988	31,830	44,890	60,546
	Case - 3		8,894	12,388	15,881	19,375	22,869

Note: These figures are inbound and outbound cargo.

#### 4.2.7 International Air Cargo Traffic

##### (1) Methodology

The international air cargo demand is forecasted by establishing a regression model established from the actual statistical data of total international air cargo and the past records of GDP value after independence.

The total international cargo demand is distributed to the respective air routes using the composition rates for the projected international air passenger flow by air routes.

(2) International Air Cargo Demand

The results of the above forecasting are shown in Table 4.2.28.

**Table 4.2.28 Forecast of International Air Cargo in Uzbekistan**

Year		1996	2000	2005	2010	2015	2020
Cargo (tons)	Case - 1		23,138	35,772	49,153	62,987	77,298
	Case - 2	13,787	23,511	37,039	51,929	68,015	85,441
	Case - 3		23,403	35,220	47,038	58,855	70,672

Note: These figures are inbound and outbound cargo.

**4.2.8 Air Traffic Demand by Airport**

Table 4.2.55 summarizes the results of the air traffic demand forecast by airports and air route.

Among the three cases of air traffic demand forecasts, the forecast demand of Case 1, the medium Case, is to be adopted for the master planning.

**Table 4.2.55 Annual Air Traffic Passenger and Weekly Aircraft Movement (Case 1)**

Airport	Category	Annual Air Passenger Traffic (Dep. & Arr.) (000)					Weekly Aircraft Movements (Departure and Arrival)				
		2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
Tashkent	Domestic	786	927	1,079	1,241	1,411	326	334	342	346	370
	Inter-CIS	556	809	1,069	1,360	1,654	102	140	176	212	258
	International	512	734	963	1,194	1,410	66	94	124	150	182
	Total	1,854	2,470	3,111	3,795	4,475	494	568	642	708	810
Namangan	Domestic	211	288	349	416	489	116	158	172	200	208
	Inter-CIS	58	85	115	146	182	10	14	20	26	30
	International	0	16	21	27	33	0	2	2	4	4
	Total	269	389	485	589	704	126	174	194	230	242
Andizhan	Domestic	396	508	609	719	837	194	220	228	230	230
	Inter-CIS	68	100	135	175	214	12	16	24	30	38
	International	0	17	22	28	35	0	2	2	4	4
	Total	464	625	766	922	1,086	206	238	254	264	272
Fergana	Domestic	377	458	573	674	783	181	200	218	232	216
	Inter-CIS	75	117	158	197	241	14	22	30	34	42
	International	71	73	114	145	192	10	10	14	18	24
	Total	523	648	845	1,016	1,216	208	232	262	284	282
Kokand	Domestic	14	17	19	47	54	8	10	10	26	30
	Inter-CIS	0	0	0	0	0	0	0	0	0	0
	International	0	0	0	0	0	0	0	0	0	0
	Total	14	17	19	47	54	8	10	10	26	30
Samarkand	Domestic	199	267	318	373	460	110	126	132	146	166
	Inter-CIS	84	119	168	214	258	16	20	32	40	46
	International	77	102	139	191	233	10	14	16	24	30
	Total	360	488	625	778	951	136	160	180	210	242
Termez	Domestic	217	268	351	418	491	106	112	130	148	138
	Inter-CIS	35	55	74	94	115	4	10	12	16	20
	International	0	0	15	18	22	0	0	2	2	2
	Total	252	323	440	530	628	110	122	144	166	160
Karshi	Domestic	123	179	217	259	304	68	100	110	106	120
	Inter-CIS	56	81	109	139	174	10	14	18	24	30
	International	0	14	19	24	30	0	2	2	4	4
	Total	179	274	345	422	508	78	116	130	134	154
Bukhara	Domestic	197	238	282	331	383	96	116	108	124	108
	Inter-CIS	65	91	126	161	205	12	16	22	30	38
	International	25	69	93	102	140	4	8	10	14	18
	Total	287	398	501	594	728	112	140	140	168	164
Navoi	Domestic	25	55	90	105	121	14	30	48	56	68
	Inter-CIS	45	72	96	122	149	8	12	16	20	26
	International	0	0	0	15	19	0	0	0	2	2
	Total	70	127	186	242	289	22	42	64	78	96
Urgench	Domestic	296	387	489	603	703	112	126	144	174	182
	Inter-CIS	34	50	71	90	107	6	10	14	16	18
	International	14	21	13	32	56	2	2	2	4	6
	Total	344	458	573	725	866	120	138	160	194	206
Nukus	Domestic	176	212	252	296	379	84	100	110	112	128
	Inter-CIS	57	83	112	142	178	10	14	18	24	30
	International	0	0	15	20	24	0	0	2	2	4
	Total	233	295	379	458	572	94	114	130	138	162
others	Domestic	57	68	79	91	103	30	36	41	48	56
	Inter-CIS	0	0	0	0	0	0	0	0	0	0
	International	0	0	0	0	0	0	0	0	0	0
	Total	57	68	79	91	103	30	36	41	48	56
Total	Domestic	3,073	3,871	4,708	5,573	6,508	1,448	1,668	1,796	1,948	2,020
	Inter-CIS	1,134	1,663	2,232	2,839	3,478	204	288	382	472	576
	International	699	1,045	1,414	1,796	2,192	92	134	176	228	280
	Total	4,906	6,579	8,354	10,208	12,178	1,744	2,090	2,354	2,648	2,876

### 4.3 Basic Development Strategy for Air Transport Facilities

Taking into account the results of demand forecast described in the previous sub chapter, the basic philosophy for the air route network, airport classification and planning criteria are established as follows.

#### 4.3.1 Air Route Network

##### (1) Domestic Air Route Networks

Presently, air route network of domestic flights consists of 19 routes, 16 routes of which are connected with Tashkent airport. In the air route network planning, it is assumed that one round flight by small type aircraft should occur every day as a minimum requirement for creating an air route between Tashkent and local airports. It is expected that domestic air routes will increase to 36 routes in 2020 from the existing 19 routes.

##### (2) CIS and International Air Route Network

Currently, there are 32 CIS routes, 26 routes of which are provided to/from Tashkent airport and 22 international routes originate at Tashkent airport. In 1996, 12% of the CIS and international passengers were handled at local airports. However, in 2020, it is expected that CIS and international passenger traffic from local airports will increase to 46% of the total CIS and international passenger traffic in Uzbekistan.

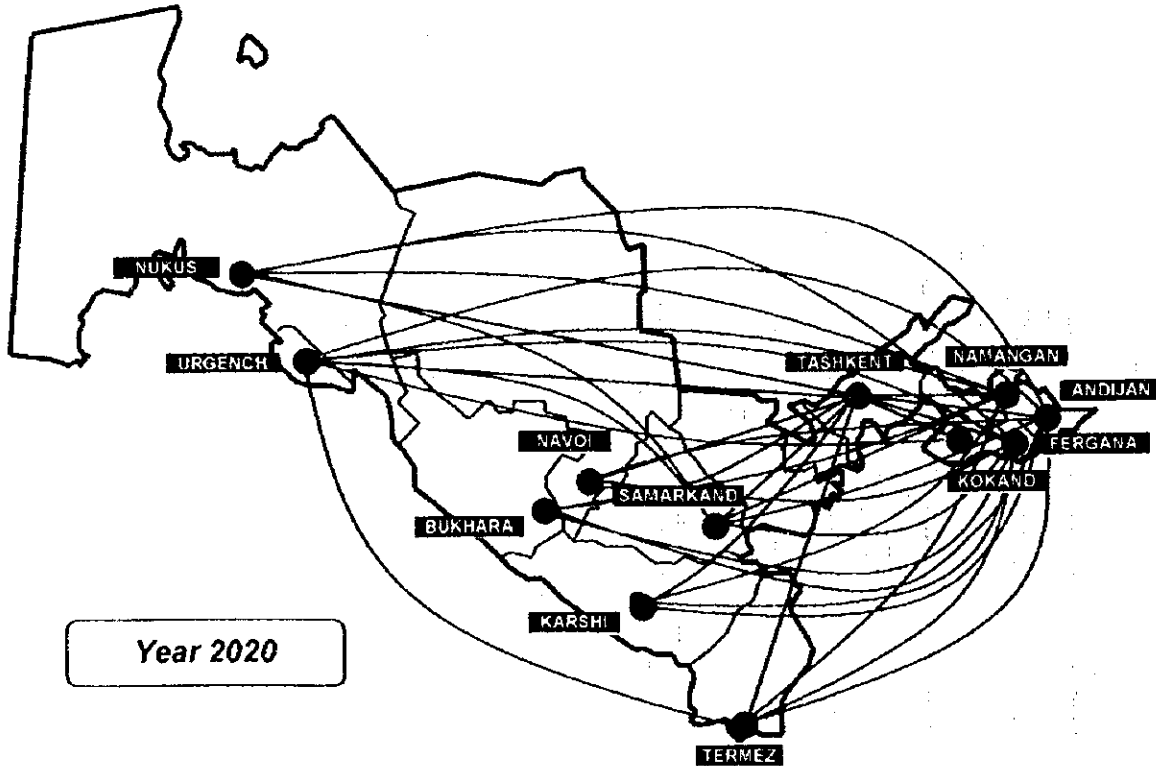


Fig. 4.3.1 Domestic Air Routes (2020)

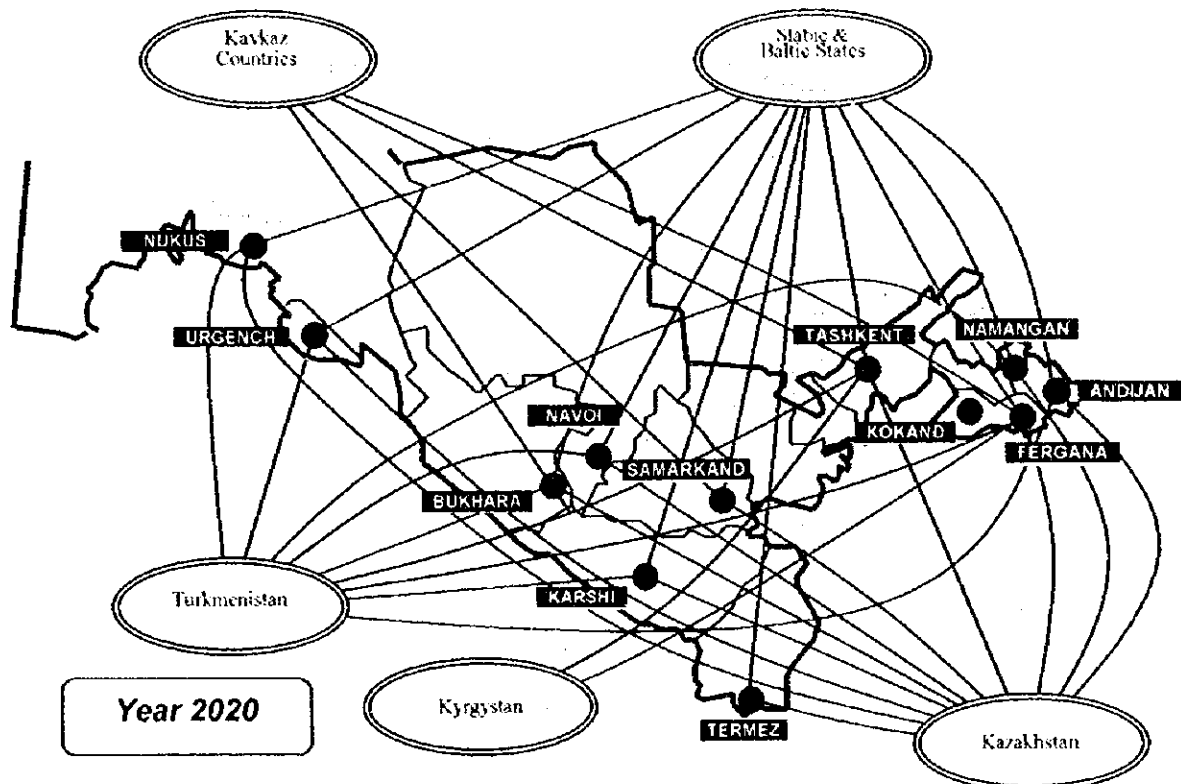


Fig. 4.3.2 CIS Air Routes (2020)

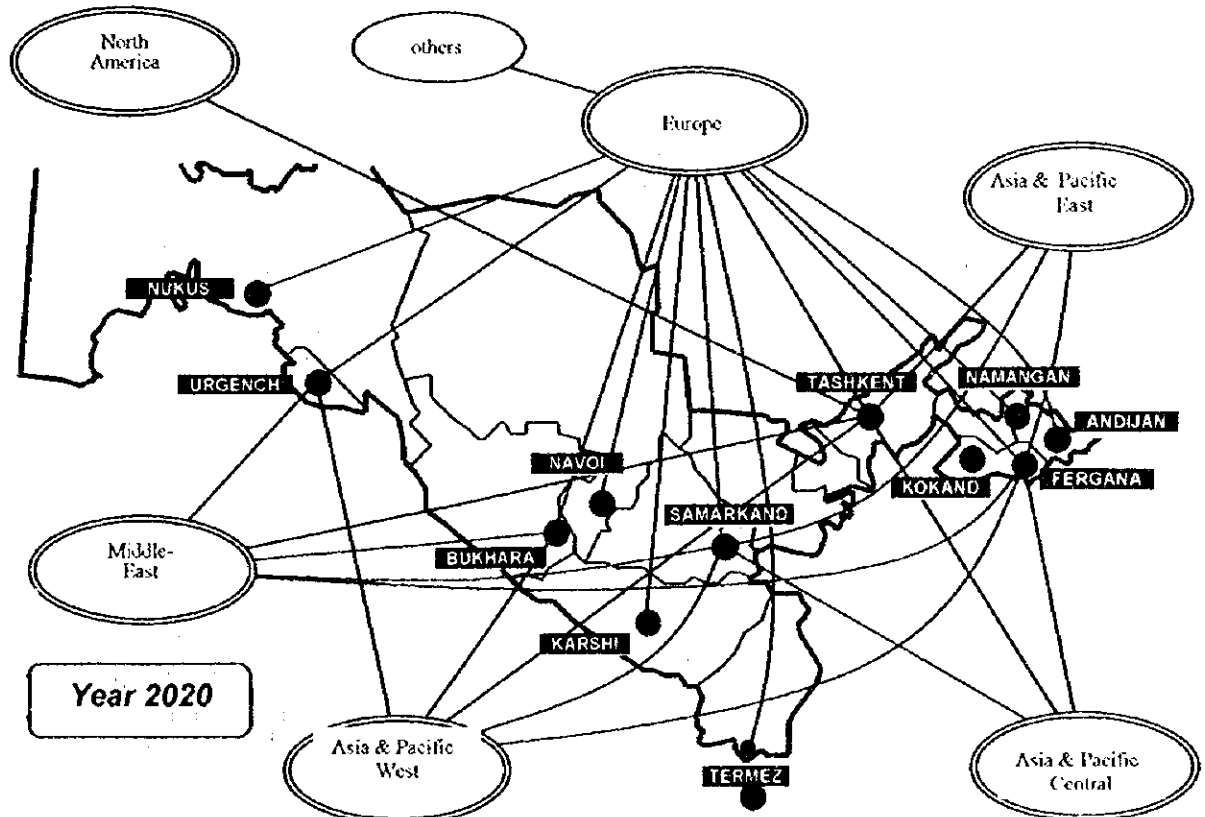


Fig. 4.3.3 International Air Routes (2020)

### 4.3.2 Category of Airport

For the purpose of the Master Planning and selecting the high priority projects, the airports in Uzbekistan are classified into the following three categories, taking into account the socio-economic situation of airport hinterland and role of airport.

**Table 4.3.2 Classification of Airports**

Category	Major Function	Name of Airport
Class I	Hub airports mainly for international and domestic air transportation in Uzbekistan, serving national economic development.	Tashkent (New Tashkent)
Class II	Core airports mainly for CIS and domestic air transportation in the area, serving regional economic development.	Fergana, Namangan, Samarkand, Termez, Bukhara, Urgench, Nukus
Class III	Airports mainly for domestic air transportation serving smaller area than Class II Airports.	Andizhan, Kokand, Karshi, Navoi

### 4.3.3 Development Strategy by Stage

To implement improvement works of air transportation facilities in Uzbekistan including the development of the capital hub airport in Tashkent, a huge amount of financial investment will be required. In addition, it is considered that modernization of the air navigation systems to the level of FANS, strengthening of the air carrier sector, including aircraft maintenance, as well as training of flight crews and mechanics, will also need considerable investment.

Therefore, in the course of preparation of the Master plan up to 2020, due consideration is paid to points such as a realistic upgrade planning and appropriate investment allocation, by dividing development of air transport facilities into the following stages:

#### (1) First Stage (~2005)

Firstly, facilities which contribute to completing the priority domestic projects and obtain early retrieval of economic activities shall be developed in this stage.

Secondly, some local airports in the Class II category, which are a core of the region, having broad air traffic demand and being able to enjoy the merits from aviation activities, shall also be developed at this stage.

#### (2) Second Stage (2006~2010)

At this stage, activated economic and domestic demand is expected to bring an increase in air traffic demand. Facilities shall therefore be improved taking into account safety, amenity and convenience for users.

#### (3) Third Stage (2011~2015)

The latent air traffic demand will gradually increase with facility development and system improvement completed before 2010. As the aviation industries of Uzbekistan will be strengthened by international competition, local trunk-line airports shall be improved according to international standards.

#### (4) Fourth Stage (2016~2020)

The long-term master plan shall be completed at this stage, and facilities shall be

developed for balanced national and regional development.

#### **4.3.4 Planning Criteria**

##### **(1) Applicable Standards of Airport Planning**

Since the priority airports will play a role as core airports in the country, as well as the respective region, and since they are also expected to be used for international flights, their facilities should be upgraded to meet with ICAO standards. Where ICAO regulations are not sufficient, regulations of the Civil Aviation Bureau of Japan (JCAB), or the Federal Aviation Administration (FAA) of the United States of America should be applied.

##### **(2) Perspective of Future Aircraft**

Presently, the main fleet for domestic flights consists of Yak-40 and An-24. They are more than 20 years old and will be replaced by IL-114 and RJ-85, having a seat capacity of between 60 – 90 passengers.

Current CIS routes are served mainly by Tu-154. In future, it is anticipated that the RJ-85 and B737 class aircraft will operate the short distance routes between neighboring CIS countries. Medium distance routes and large demand routes such as Moscow will be served by western-made aircraft such as A310, in addition to the present fleet of Tu-154 and IL-86.

Flights on international routes are presently served by A310, B-767, IL-92 and Tu-154. Western-made aircraft such as A-310 and B-767 introduced are expected to be the main fleet on future international routes. Moreover, B-747, at present, one of the principal aircraft for international routes in western countries, is expected to operate between Tashkent airport and certain European countries.