

### 6.3 Construction Planning

#### 6.3.1 Construction Conditions

Uzbekistan belongs to a continental climate, having a long dry and hot summer, and in winter it is below -10 °C in the north area. There is a small amount of precipitation in the whole area of Uzbekistan. Normally, it is not recommendable to carry out pavement work during winter season from November to April due to the low temperature. Possible work seasons at outdoor are limited so that a precise program getting construction materials, manpower, construction equipment and machinery is very important for smooth execution of work.

At present, there are no private construction companies in Uzbekistan. Construction works in Uzbekistan are usually carried out by the state companies. It is difficult to obtain reasonable price data of construction work and materials due to the lack of market system in construction filed. Asphalt and concrete plants in Tashkent and other cities are owed by subsidiaries of state companies, but maintenance condition of the plants is generally not in good conditions. It will be needed to procure major construction equipment and plants into the project sites from outside of Uzbekistan.

#### 6.3.2 Construction Plan

Construction work at the existing airports that will remain operational should be executed, completed without causing interruption, inconvenience or danger to the airport operation throughout the period of construction. Therefore, special attention should be given for securing safety of aircraft operation.

Construction schedule for implementation of the project is planned based on the following manner.

##### (1) Tashkent Airport

**Table 6.3.1 Implementation Schedule of Tashkent Airport Development**

Items	1 1999	2 2000	3 2001	4 2002	5 2003	6 2004	7 2005
Financial Arrangement	[Horizontal bar spanning 1999-2000]						
Design Works	[Horizontal bar spanning 2000-2001]						
Tender Procedure	[Horizontal bar spanning 2001-2002]						
Construction Works	[Horizontal bar spanning 2002-2005]						
- Airfield Facilities	[Horizontal bar spanning 2002-2004]						
- Terminal Facilities	[Horizontal bar spanning 2002-2005]						
- Air Nav. Facilities	[Horizontal bar spanning 2004-2005]						
- Other Facilities	[Horizontal bar spanning 2003-2005]						

(2) New Tashkent Airport

**Table 6.3.2 Implementation Schedule of New Tashkent Airport Development**

Items	1 2000	2 2001	3 2002	4 2003	5 2004	6 2005	7 2006	8 2007	9 2008	10 2009
Financial Arrangement	[Bar spanning 2000-2001]									
Design Works	[Bar spanning 2001-2002]									
Tender Procedure	[Bar spanning 2002-2003]									
Construction Works	[Bar spanning 2003-2004]									
- Airfield Facilities	[Bar spanning 2004-2007]									
- Terminal Facilities	[Bar spanning 2007-2009]									
- Air Nav. Facilities	[Bar spanning 2008-2009]									
- Utilities	[Bar spanning 2009-2010]									

(3) Namangan Airport

**Table 6.3.3 Implementation Schedule of Namangan Airport Development**

Items	1 1999	2 2000	3 2001	4 2002	5 2003	6 2004	7 2005
Financial Arrangement	[Bar spanning 1999-2000]						
Design Works	[Bar spanning 2000-2001]						
Tender Procedure	[Bar spanning 2001-2002]						
Construction Works	[Bar spanning 2002-2003]						
- Airfield Facilities	[Bar spanning 2003-2004]						
- Terminal Facilities	[Bar spanning 2004-2005]						
- Air Nav. Facilities	[Bar spanning 2005-2006]						
- Utilities	[Bar spanning 2006-2007]						

(4) Termez Airport

**Table 6.3.4 Implementation Schedule of Termez Airport Development**

Items	1 1999	2 2000	3 2001	4 2002	5 2003	6 2004	7 2005
Financial Arrangement	[Bar from 1999 to 2000]						
Design Works	[Bar from 2000 to 2001]						
Tender Procedure	[Bar from 2001 to 2002]						
Construction Works	[Bar from 2002 to 2005]						
- Airfield Facilities	[Bar from 2002 to 2004]						
- Terminal Facilities	[Bar from 2003 to 2005]						
- Air Nav. Facilities	[Bar from 2004 to 2005]						
- Utilities	[Bar from 2004 to 2005]						

(5) Nukus Airport

**Table 6.3.5 Implementation Schedule of Nukus Airport Development**

Items	1 1999	2 2000	3 2001	4 2002	5 2003	6 2004	7 2005
Financial Arrangement	[Bar from 1999 to 2000]						
Design Works	[Bar from 2000 to 2001]						
Tender Procedure	[Bar from 2001 to 2002]						
Construction Works	[Bar from 2002 to 2005]						
- Airfield Facilities	[Bar from 2002 to 2004]						
- Terminal Facilities	[Bar from 2003 to 2005]						
- Air Nav. Facilities	[Bar from 2004 to 2005]						
- Utilities	[Bar from 2004 to 2005]						

(6) Nationwide Air Navigation System

**Table 6.3.6 Implementation Schedule of Nationwide Air Navigation System Development**

Items	1 1999	2 2000	3 2001	4 2002	5 2003	6 2004	7 2005
Financial Arrangement	[Bar from 1999 to 2000]						
Design Works	[Bar from 2000 to 2001]						
Tender Procedure	[Bar from 2001 to 2002]						
Manufacturing	[Bar from 2002 to 2003]						
Installation	[Bar from 2003 to 2005]						

## 6.4 Land Use Plan

### 6.4.1 General

In this pre-feasibility study, guideline land use plans for the High Priority Airports have been presented based on the forecast aircraft noise contours around airports as well as obstacle restriction requirements to be established surrounding the airports.

### 6.4.2 Obstacle Limitation Surfaces

Obstacle limitation surfaces that are necessary to be established for safe aircraft takeoff/landing need to be taken into account when preparing land use plans of airport neighboring area. In this pre-feasibility study, obstacle limitation requirement specified in ICAO Annex 14 as the international standards and recommended practices has been employed.

### 6.4.2 Aircraft Noise

There are many internationally accepted indices of noise level among which following are adopted in Uzbekistan:

- Equivalent Continuous A-weight sound pressure level (LAeq dB),
- Maximum noise A-weighted sound pressure level (LAm<sub>ax</sub> dB).

In this pre-feasibility study, a noise level of Weighted Equivalent Continuous Perceived Noise Level (WECPNL) which is adopted in Japan has been used in order to clarify relationship between noise level and appropriate land use shown below:

**Table 6.4.3 WECPNL and Land Use Criteria**

WECPNL	Land Use to be Restricted	Appropriate Land Use	Mitigating Measures Employed in Japan
70~75	Housing	Commercial and Industrial activities, green belt	Sound-proofing
75~90	Housing, Commercial and Industrial activities	Green belt for production and recreation	Sound-proofing
90~	Housing, Commercial and Industrial activities	Green belt as buffer zone	Relocation

### 6.4.3 Land Use Plan

Land use plan for the High Priority Airports has been prepared as shown in Figs. 6.4.7 through 6.4.11 taking into account the height limitation and aircraft noise level.

Zoning of airport neighboring area has been made as follows:

- Zone A ; not less than WECPNL 90, or within 1 km from precision approach end of a runway under the approach surface where strict height limitation is imposed and higher risk of aircraft accident is expected, to be utilized as buffer zone between airport and neighboring area, planted with trees for sound-proofing purpose,
- Zone B ; WECPNL 75 to 90 where housing and commercial activities should be restricted, and preferably utilized for green belt or park,

- Zone C ; WECPNL 70 to 75 where public facilities such as hospital and school should not be permitted and housing should be restricted as far as practicable, preferably utilized for agricultural farm, park, commercial and industrial purpose. Existing houses seriously influenced by aircraft noise may require sound-proofing.

The New Tashkent Airport will require the second runway in the long-term, and it has been proposed that the expansion area for the second close parallel runway as well as the area within 1 km from the end of future runway should be deemed as the zone A in preparing the land use plan.

#### **6.4.4 Height Restriction Plan**

For easy understanding by the public and control by authorities, it has been proposed to establish height restriction plans showing permissible height of buildings and structures.

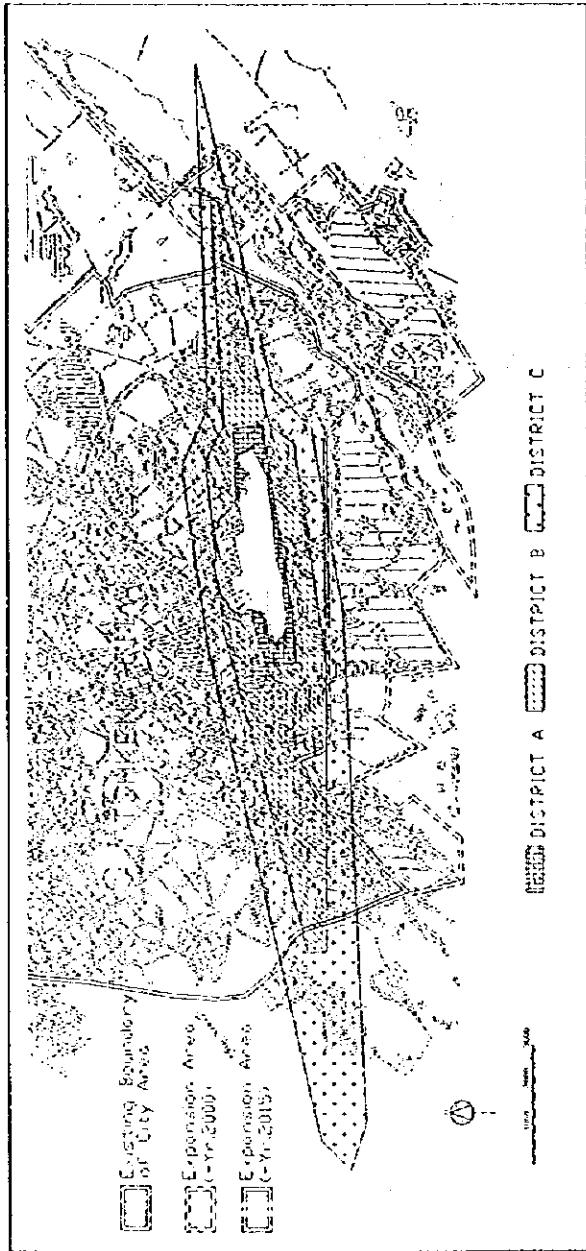


Fig. 6.4.7 Land Use Plan in the Vicinity of Tashkent Airport

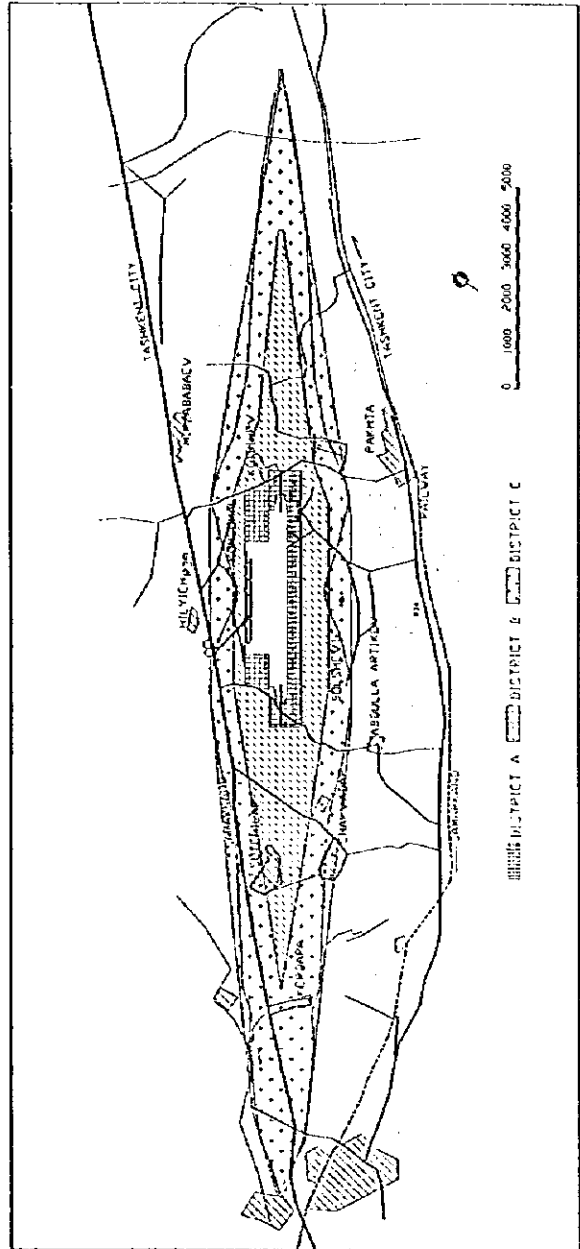
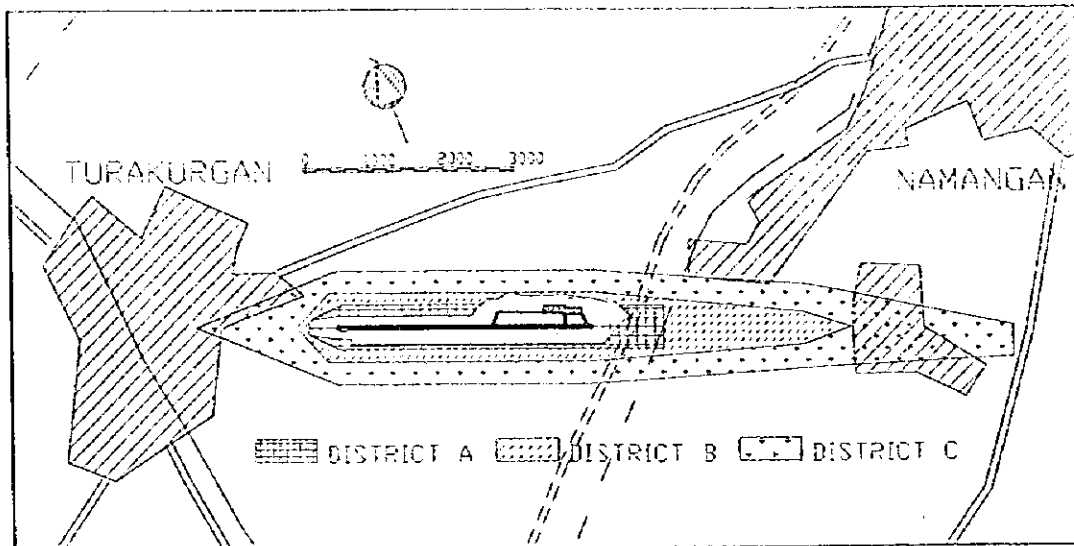
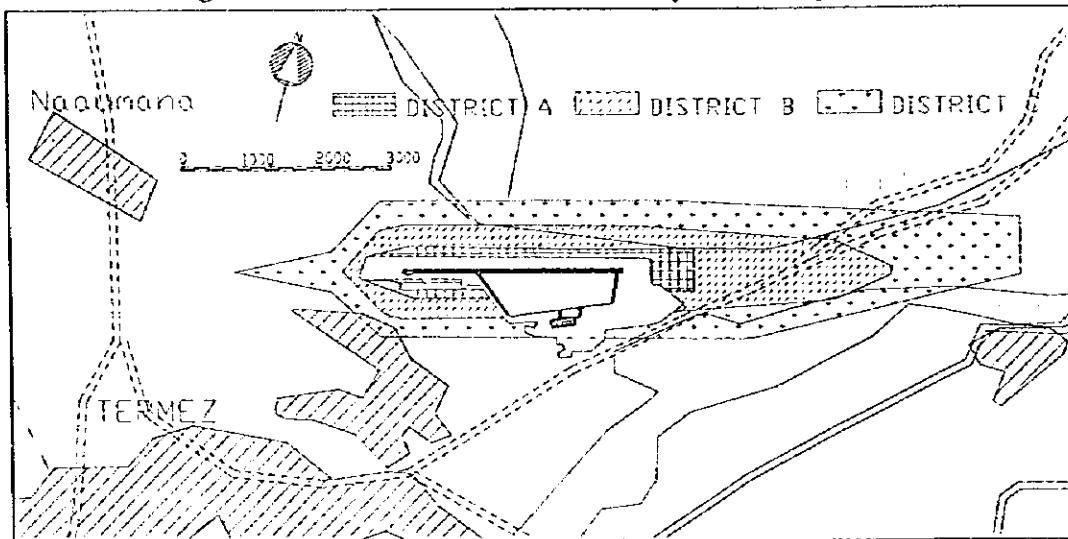


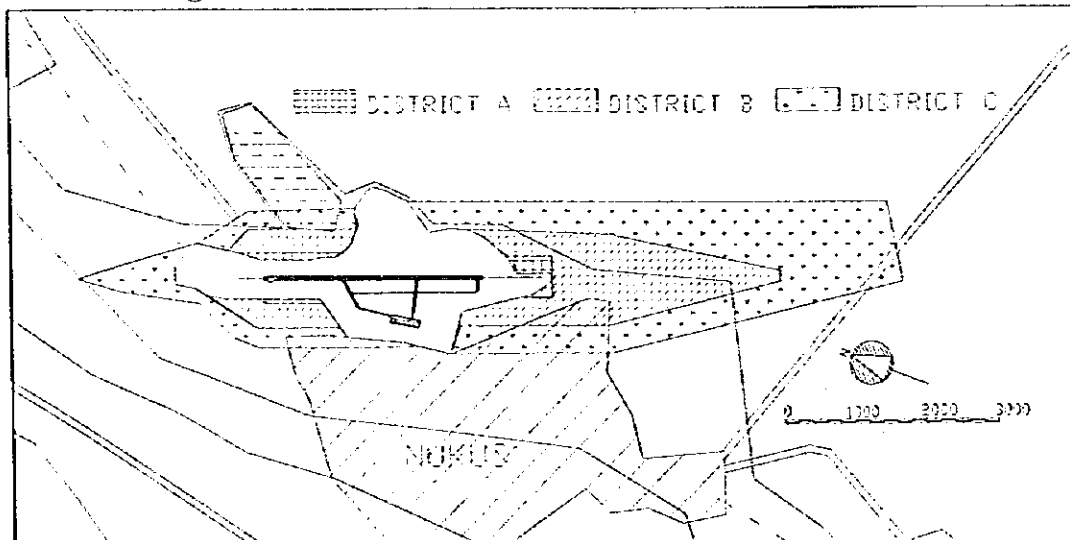
Fig. 6.4.8 Land Use Plan in the Vicinity of New Tashkent Airport



**Fig 6.4.9 Land Use Plan in the Vicinity of Namangan Airport**



**Fig 6.4.10 Land Use Plan in the Vicinity of Termez Airport**



**Fig 6.4.11 Land Use Plan in the Vicinity of Nukus Airport**

## 6.5 Cost Estimates of Projects

### 6.5.1 Premise of Cost Estimates

Construction cost estimate is made based on data of Three Local Airports Modernization Project now being implemented. Comparison of unit prices of major materials and works between similar project in CIS country and Three Local Airport Projects is shown in Table 6.5.1.

Conversion between US Dollar, Japanese Yen, and Uzbekistan Sum is based on the average exchange rates during the first field survey from April to June 1997 of US\$1.0 = Yen 120 = Sum 100.

**Table 6.5.1 Prices of Major Materials and Works**

Price Items	Unit	Three Local Airport Project (US\$)	Similar Project (US\$)	Adopted Price (US\$)
Cement	Ton	37		
Asphalt (Kazakhstan)	Ton	162		
Asphalt (Iranian)	Ton	250 - 300		
Steel bar	Ton	300		
Local Labour	Day	2		
Crusher run	m <sup>3</sup>	9.3		
Sand	m <sup>3</sup>	9.3		
Striping	m <sup>2</sup>		2.0	2.0
Excavation	m <sup>3</sup>	8.1	11.15	10.0
Embankment	m <sup>3</sup>	6.9	4.4	5.0
Sodding	m <sup>2</sup>		4.9	3.0
Granular subbase (t = 20 cm)	m <sup>2</sup>	8.7 - 20.3		12.0
Bituminous surface (t = 4 cm)	m <sup>2</sup>	9.7 - 19.1		12.0
Bituminous surface (t = 5 cm)	m <sup>2</sup>	11.7 - 20.2		15.0
Asphalt mixture	m <sup>3</sup>			300
Tack coat	m <sup>2</sup>	0.30 - 0.40		0.5
Prime coat	m <sup>2</sup>	0.60 - 0.70		0.6
Marking	m <sup>2</sup>	7.1 - 15.0		12.0
Passenger terminal building	m <sup>2</sup>	2,125	2,000	2,200
Cargo building	m <sup>2</sup>		1,500	1,500
Tower	m <sup>2</sup>	2,390	4,000	3,200
Fire station	m <sup>2</sup>	1,380	1,500	1,400
Power station	m <sup>2</sup>	1,380	1,500	1,400

### 6.5.2 Project Cost

Project costs of each airport estimated based on the above conditions are shown in Tables 6.5.3.

Project costs were estimated in the following cases to facilitate economic and financial analysis.



**Table 6.5.2 Cases of Project Cost**

<b>Project</b>	<b>Case</b>	<b>Description of Development</b>
<b>Existing Tashkent</b>		Domestic passenger and cargo facilities
<b>New Tashkent</b>	<b>Case-1</b>	International facilities only
	<b>Case-2</b>	International + Domestic facilities
<b>Namangan</b>	<b>Case-1</b>	All facilities
	<b>Case-2</b>	(Case-1) – (Air Navigation Facilities)
<b>Termez</b>	<b>Case-1</b>	All facilities
	<b>Case-2</b>	(Case-1) – (Air Navigation Facilities)
<b>Nukus</b>	<b>Case-1</b>	All facilities
	<b>Case-2</b>	(Case-1) – (Air Navigation Facilities)
<b>Nationwide Air Navigation Facilities</b>	<b>Case-1</b>	Air route navigation facilities only
	<b>Case-2</b>	Air route navigation facilities only + Air navigation facilities of Namangan, Termez and Nukus

Table 6.5.3 Project Costs of Airports and Nationwide Air Navigation Facility (2005)

(US\$ 1,000)

Cost Items	Tashkent	New Tashkent				Namangan				Termez				Nukus				Nationwide Air Navigation			
		Case-1		Case-2		Case-1		Case-2		Case-1		Case-2		Case-1		Case-2		Case-1		Case-2	
		International	All Facilities	All Facilities	Without Airmav.	All Facilities	Without Airmav.	All Facilities	Without Airmav.	All Facilities	Without Airmav.	All Facilities	Without Airmav.	All Facilities	Without Airmav.	All Facilities	Without Airmav.	All Facilities	Without Airmav.	Air Route Only	Air Route + 5-Airports
A) Compensation Work	0	4,991	4,991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B) Airfield Facility	12,912	319,314	337,300	26,258	19,277	19,277	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	0	0	0
C) Terminal Area Facility	26,556	156,753	172,777	37,209	27,021	27,021	16,381	16,381	16,381	16,381	16,381	16,381	16,381	16,381	16,381	16,381	16,381	16,381	0	0	31,920
D) Air Navigation Facility	14,884	41,242	41,242	29,742	0	29,658	0	29,658	0	29,658	0	29,658	0	29,658	0	29,658	0	29,658	0	10,400	99,458
E) Airport Special Equipment	462	13,469	13,931	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	0	0	0
F) Utilities	30,036	81,836	81,836	12,071	8,682	8,682	8,682	8,682	8,682	8,682	8,682	8,682	8,682	8,682	8,682	8,682	8,682	8,682	0	0	7,500
G) Total of Work	84,830	597,605	652,077	109,821	88,948	88,948	48,650	48,650	48,650	48,650	48,650	48,650	48,650	48,650	48,650	48,650	48,650	48,650	10,400	10,400	138,878
H) Land Acquisition	0	39,000	39,000	1,966	1,966	1,966	355	355	355	355	355	355	355	355	355	355	355	355	0	0	0
I) Administration Expenses	848	5,976	6,521	1,098	889	889	486	486	486	486	486	486	486	486	486	486	486	486	104	104	1,389
J) Survey and Engineering	12,725	59,761	65,208	16,473	13,342	13,342	7,297	7,297	7,297	7,297	7,297	7,297	7,297	7,297	7,297	7,297	7,297	7,297	1,560	1,560	20,832
K) Contingency	9,755	65,736	71,728	12,629	7,985	7,985	5,595	5,595	5,595	5,595	5,595	5,595	5,595	5,595	5,595	5,595	5,595	5,595	1,196	1,196	15,970
L) Total	108,158	768,078	834,534	141,987	113,763	113,763	62,383	62,383	62,383	62,383	62,383	62,383	62,383	62,383	62,383	62,383	62,383	62,383	13,260	13,260	177,069

Note: Administration Expenses = (Total of Works) x 1%

Survey and Engineering = (Total of Works) x 15% (All cases except New Tashkent)

= (Total of Works) x 12% (New Tashkent)

Contingency = (Total of Works + Survey and Engineering) x 10%

C) Terminal Area Facility of Case-2 in Nationwide Air Navigation includes only control tower & operation building and substation.

## 6.6 Environmental Impact Assessment (EIA)

### 6.6.1 General

Environmental impact assessments were conducted for five airports. Four (Tashkent, Namangan, Termez, and Nukus Airport) of these are planned for improvement and expansion of the existing airports and one (New Tashkent Airport) is planned for new construction.

### 6.6.2 EIA of Existing Tashkent Airport Development

#### (1) Current Condition

##### a) Air Quality

Air quality at Tashkent Airport was monitored by NAC in 1994 for five air pollutants: inorganic dust, nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), and phenol. Some substances affecting air quality at Tashkent Airport including inorganic dust, nitrogen dioxide, and carbon monoxide exceeded the standard permissible concentration.

##### b) Air Pollutant Emission

Gas emission levels of carbon oxide (CO) and nitrogen oxides (NO<sub>x</sub>) emitted from airport area were estimated. Gas emission levels in 1996 are one order lower than these of 1994, for both pollutants.

##### c) Aircraft Noise

Aircraft noise (WECPNL) and ambient noise levels ( $L_{Aeq}$  and  $L_{Amax}$ ) were measured continuously for three days at the six stations of the sensitive receptors around the airport.

The  $L_{Aeq}$  at the six stations ranged from 54.3 to 78.1 dB during daytime and from 49.8 to 77.8 dB during nighttime. The maximum  $L_{Aeq}$  level was observed at the station located at the eastern side of the runway under take-off flight course.

The  $L_{Amax}$  at the six stations ranged from 75.6 to 106.4 dB during daytime and from 65.1 to 106.4 dB during nighttime. The maximum  $L_{Amax}$  level was observed at the station located at the eastern side of the runway under take-off flight course. The value was 106.4 dB for day and night time.

#### (2) Prediction and Evaluation

##### a) Air Pollution

The US EPA approved model ISC-LT3 (Industrial Source Complex - Long Term) was used to predict the ground level concentrations from emission sources at the site.

The predicted result indicates that the maximum annual average ground level concentrations of NO<sub>2</sub> is 8.86 μg/m<sup>3</sup>. The maximum values found within the airport area and annual average ground level concentrations within the airport are lower than the EPA ambient air criteria 100 μg/m<sup>3</sup>. Therefore, the effects of emission gas from airplanes on ambient air quality are considered to be low.

b) Water Pollution

The total volume of wastewater generated from Tashkent airport in the year 2020 is estimated to be about 1,230 ton/day. All the airport wastewater will be discharged into the wastewater facility in Tashkent City through the sewerage system. Therefore, it is expected that wastewater generated from Tashkent airport area will not affect the environment.

c) Aircraft Noise

According to the future plan, most aircraft will be converted to be low-noise level type in the year 2020. It is expected that aircraft noise would be similar to the present condition. However, the present noise level is not lower so that a mitigation measures for aircraft noise should be required.

d) Environmental Impact during Construction Phase

It is expected that the impact on the environment during construction phase will be negative, because the construction work will be conducted within the existing airport area. However, the mitigation plan for decreasing the impact on the surrounding environment should be adopted.

(3) Mitigation Measures

Aircraft noise and air pollution are the major impact factors.

**6.6.3 EIA of Namangan Airport Development**

(1) Current Condition

a) Air Pollution

Ambient air quality was measured for two air pollutants in 1994, 1995, and 1996: carbon oxide (CO) and nitrogen oxides (NO<sub>x</sub>). The highest value of CO emission amount was observed in 1994 and the lowest value was observed in 1995. NO<sub>x</sub> had a tendency to decrease year by year.

(2) Prediction and Evaluation

a) Air Pollution

The US EPA approved model ISCLT3 was used to predict the ground level concentrations from emission sources at the site.

The predicted result indicates that the maximum annual average ground level concentrations of NO<sub>2</sub> is 2.88µg/m<sup>3</sup>. The maximum values found within the airport area and annual average ground level concentrations within the airport are lower than the EPA ambient air criteria 100µg/m<sup>3</sup>. Therefore, the effects of emission gas from airplanes on ambient air quality are considered to be low.

b) Water Pollution

Wastewater at Namangan Airport in the year 2020 will be estimated to be about 310 ton/day. The wastewater will be treated at the wastewater facility in Namangan City through the sewerage system. Therefore, it is expected that wastewater generated from Namangan Airport area will not affect the environment.

c) Aircraft Noise

According to future aircraft movement plan, most aircraft were assumed to be converted to low-noise type in the year 2020. It is expected that noise impact from aircraft will be small because urban area is far from the airport and there is no sensitive receptor near the site. However, it is desirable to monitor aircraft noise and to take mitigation measures for aircraft noise.

d) Environmental Impact during Construction Phase

It is expected that the impact on environment during construction phase will be negative, because the construction work will be conducted within the existing airport area. However, the mitigation plan for decreasing the impact on the surrounding environment should be adopted.

(3) Mitigation Measures

Aircraft noise and air pollution is the major impact factors.

**6.6.4 EIA of Termez Airport**

(1) Current Condition

• Air Pollution

Two air pollutants were measured in 1994, 1995, and 1996: carbon oxide (CO) and nitrogen oxides (NO<sub>x</sub>). The lowest value of CO amount was observed in 1994. There is no difference in the CO values between 1995 and 1996. The highest emission of NO<sub>x</sub> was observed in 1994. There is no large annual fluctuation in NO<sub>x</sub> concentrations. However, the NO<sub>x</sub> emission from Termez and Nukes airports is 10 times values of the other three airports.

(2) Prediction and Evaluation

a) Air Pollution

The US EPA approved model ISCLT3 was used to predict the ground level concentrations from emission sources of the site.

The predicted result indicates that the maximum annual average ground level concentrations of NO<sub>2</sub> is 2.14µg/m<sup>3</sup>. Therefore, the effects of emission gas from airplanes on ambient air quality are considered to be low.

b) Water Pollution

Wastewater generated from Termez Airport in the year 2020 will be estimated to be about 370 ton/day. The airport wastewater will be discharged into the wastewater facility in Termez City. Therefore, it is expected that wastewater generated from Termez airport area will not cause the environmental problem.

c) Aircraft Noise

It is expected that noise impact from aircraft will be small because urban area is far from the airport and there is no sensitive receptor near the site. However, it is desirable to monitor aircraft noise and to take the mitigation measures for aircraft noise.

d) Environmental Impact during Construction Phase

It is expected that the impact on environment during construction phase will be negative, because the construction work will be conducted within the existing airport area. However, the mitigation plan for decreasing the impact on the surrounding environment should be adopted.

(3) Mitigation Measures

Aircraft noise and air pollution are the major impact factors.

**6.6.5 EIA of Nukus Airport**

(1) Current Condition

a) Air Quality

Dust concentration in the air at Nukus Airport was observed to be about  $0.2 \text{ mg/m}^3$  on average and  $1.0 \text{ mg/m}^3$  in maximum. It exceeded the permissible levels.

b) Air Pollutant Emission

Two air pollutants were measured in 1994, 1995, and 1996: carbon oxide (CO) and nitrogen oxides ( $\text{NO}_x$ ). The highest value of CO emission was observed in 1995 and the lowest in 1994. The highest value of  $\text{NO}_x$  was observed in 1995 and the lowest value in 1994.

(2) Prediction and Evaluation

a) Air Pollution

The US EPA approved model ISCLT3 was used to predict the ground level concentrations from emission sources of the site. The predicted result indicates that the maximum annual average ground level concentrations of  $\text{NO}_2$  is  $2.30 \text{ } \mu\text{g/m}^3$ . Therefore, the effects of emission gas from airplanes on ambient air quality are considered to be low.

b) Water Pollution

Wastewater at Nukus airport in the year 2020 will be estimated to be about 350 ton/day. The wastewater will be treated at the wastewater facility in Nukus City through the sewerage system. Therefore, it is expected that wastewater generated from Nukus airport area will not occur the environmental problem.

c) Aircraft Noise

According to future aircraft movement plan, most aircraft were assumed to be converted to low-noise type in the year 2020. It is expected that noise impact from aircraft would be small because urban area is far from the airport and there is no sensitive receptor near the site. However, it is desirable to monitor aircraft noise and to take the mitigation measures for aircraft noise.

d) Environmental Impact during Construction Phase

It is expected that the impact on environment during the construction phase will be negative, because the construction work will be conducted within the existing airport area. However, the mitigation plan for decreasing the impact on the surrounding

environment should be adopted.

### (3) Mitigation Measures

Aircraft noise and air pollution is the major impact factors.

## 6.6.6 EIA of New Tashkent Airport Development

### (1) Current Condition

#### a) Air Quality

Air quality at Chinaz town was monitored by GlavHydroMet in 1997. The monitoring was conducted for seven air pollutants: inorganic dust, sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), nitrogen monoxide (NO), ozone (O<sub>3</sub>), and hydrocarbon (HC). Within the period of the survey, dust concentrations varied from 0 to 0.24 mg/m<sup>3</sup>. Concentrations of sulfur dioxide, carbon monoxide, nitrogen dioxide and monoxide, and ozone were sufficiently lower than the permissible levels.

#### b) Water Quality

Chemical analysis for surface water and precision analysis were conducted by GlavHydroMet in 1997. Oxygen, pH, BOD and COD levels met with the water quality standard in Uzbekistan.

Heavy metals, chloride HCs and Chloro-organic pesticides met with the water quality standard in Uzbekistan. Content of other substance was sufficiently lower than PDK, excepted nitrite nitrogen (NO<sub>2</sub>-N). The water quality at the site was relatively good.

#### c) Noise

Ambient noise-levels (L<sub>Aeq</sub> and L<sub>Amax</sub>) around New Tashkent Airport construction site were measured at three stations on April 26, 1997. The recorded ambient noise levels were low level compared with the noise surrounding Tashkent Airport area.

#### d) Traffic Noise

The traffic noise level monitoring was conducted in November 5, 1997. Noise levels were relatively high compared with the noise standard of each country.

#### e) Survey of Road Traffic

A survey of road traffic was conducted in November 5, 1997. The traffic volume of cars on Road M39 was the highest among the surveyed vehicles. The volume of traffic toward Samarkand was higher than that in the direction of Tashkent.

### (2) Prediction and Evaluation

#### a) Air Pollution

The US EPA approved model ISCLT3 was used to predict the ground level concentrations from emission sources of the site. The predicted result indicates that the maximum annual average ground level concentrations of NO<sub>2</sub> is 8.86 µg/m<sup>3</sup>. The maximum values appeared within the airport area and annual average ground level concentrations within airport are lower than EPA ambient air criteria 100 µg/m<sup>3</sup>. Therefore, the effects of gas emission from airplanes on ambient air quality are

considered to be low.

**b) Water Pollution**

The total volume of wastewater generated from New Tashkent Airport in the year 2020 is estimated to be about 1,230 ton/day.

The wastewater treatment system will be constructed according to this project plan. As the treatment efficiency of the system is generally about 92% on BOD, 48% on T-N, and 38% on T-P in Japan. It is expected that the wastewater concentration discharged from the treatment system will be estimated to be 16 mg/l on BOD, 18.8 mg/l on T-N, and 3.4 mg/l on T-P. The effect of the wastewater on the river water quality will be small, because the discharge volume from the system is far smaller than the flow of the river. However, some chemical substances such as the toxic substances should be monitored carefully.

**c) Noise**

• Aircraft Noise

According to the future aircraft movement plan, most aircraft will be converted to low-noise type in the year 2020. However, it is expected that aircraft noise will be large compared with the present condition. Therefore, mitigation measures for aircraft noise should be required.

• Traffic Noise

Traffic noise may increase near the M39 road. The increased noise level cannot be estimated exactly at present. Mitigation measures for traffic noise should be adopted to avoid problems in the future.

**d) Environmental Impact during Construction Phase**

As the impacts on environment including air water quality, and noise during construction phase will be large, the mitigation plan should be adopted.

**(3) Mitigation Measures**

As the impact generated from the construction and operation of new airport on the environment will be considered to be large, an adequate mitigation plan will be required based on the characteristics of the natural and social environment around the construction site.

Air pollution and noise and vibration are the major impacts on the environment under operation. Hence mitigation planning for above two impacts will be important to for the new airport construction project.



## **6.7 Economic Analysis**

### **6.7.1 General**

The purpose of the economic analysis is to make a comprehensive evaluation of the economic effects brought into the Republic of Uzbekistan by the implementation of the high priority projects.

#### **(1) High Priority Projects**

Among the six (6) high priority projects selected in Chapter 5, the Nationwide Air Navigation System Development Project has been excluded from the scope of this economic evaluation because of the difficulty of quantification of the expected economic benefit.

With regard to the Capital Airport Project, it has been assumed that the development of the international terminal and related facilities financed by the EBRD would be implemented regardless of the development of the new airport.

For the purpose of the economic appraisal of the New Tashkent Airport Project, two alternative development scenarios have been prepared, namely, with/without domestic and cargo facilities for the new airport.

As for the three local airports project, the economic evaluation has been carried out for cases of both with/without the cost of navigation aids modernization in order to examine economic viability of small-scale low-income airport projects.

Consequently the economic evaluation has been carried out for the following nine (9) projects.

- a) Existing Tashkent Airport Extension Project
- b) New Tashkent Airport Construction Project (Alternative 1)
- c) New Tashkent Airport Construction Project (Alternative 2)
- d) Namangan Airport Extension Project (with the cost of navigation aids)
- e) Namangan Airport Extension Project (without the cost of navigation aids)
- f) Termez Airport Extension Project (with the cost of navigation aids)
- g) Termez Airport Extension Project (without the cost of navigation aids)
- h) Nukus Airport Extension Project (with the cost of navigation aids)
- i) Nukus Airport Extension Project (without the cost of navigation aids)

#### **(2) Period of Analysis**

The project life has been assumed to be 20 years following the inauguration of the planned facilities. The costs and benefits of the with and without cases which are both calculated in US\$ on the basis of actual prices prevailing in 1997 have been measured for the projects.

### **6.7.2 Estimate of Economic Benefits**

The economic benefits, considered attributable to the project from the viewpoint of the national economy of the Republic of Uzbekistan, comprise the direct and indirect benefits, each consisting of the tangible and intangible benefits.

**(1) Direct Benefits**

**a) Net Increase of Tourism Income**

The average tourism expenditure per capita, according to the market research conducted by Uzbek Tourism, is US\$ 500 in 1996.

**b) Airport Revenue Increments**

The incremental airport revenue to be paid by foreign passengers and foreign airlines if the Project is implemented are considered to be the economic benefits of the Project in terms of foreign exchange earnings, along with the expected increase in international passenger charges etc.

**c) Travel Time saving**

The average time value of Uzbek was applied based on average monthly wage and working hours of workers and employees.

Average Time Value ----- US\$ 0.25 per each passenger per hour

**d) Utilization of Existing Airport Property**

Rental charge payable by foreign enterprises annually has been set at US\$ 33 million as described in Chapter 6.8.

**e) Increase of Comfort and Convenience**

Increase of comfort and convenience may be termed direct benefits enjoyed by the airport users, but are not counted in the present study because of the difficulty in their quantification.

**(2) Indirect Benefits**

**a) Employment Effect**

These benefits are quantifiable, but have been treated as indirect benefits as is generally practiced, and consequently no calculation thereof is made in the present study.

**b) Multiplier Economic Effect**

These effects could be quantitatively identified through the input-output analysis, which, however, is considered outside the scope of the present study.

**6.7.3 Estimate of Economic Cost**

The economic costs of the Project comprise the project cost, maintenance cost and operation cost.

**(1) Project Cost**

Cost estimate for the Projects has been carried out based on the facility planning and unit price of the work as described in Chapter 6.5.

(1) Maintenance and Operation Cost

Maintenance and operation costs of each project have been estimated based on the TAE data on present maintenance and operation costs.

(2) Environmental Compensation Cost

In order to quantify social negative cost in monetary term for environmental compensation, it has been assumed that the Republic of Uzbekistan would incur environmental compensation cost of US\$ 400 per resident in the aircraft noise affected area of both the existing and new Tashkent airports by the year 2020.

6.7.2 Economic Evaluation

The Economic Internal Rates of Return (EIRR) of the Projects have been calculated based on the cash flow of the economic cost and quantified economic benefits as shown in Table 6.7.3.

Table 6.7.3 The Economic International Rates of Return (EIRR)

Project	Case of Project	EIRR
Existing Tashkent Airport	a) Domestic only	invalid
	b) Alternative 1	1.93%
New Tashkent Airport	c) Alternative 2	7.01%
	d) With nav aids	8.20%
Namangan Airport	e) Without nav aids	12.46%
	f) With nav aids	6.13%
Termez Airport	g) Without nav aids	11.61%
	h) With nav aids	7.60%
Nukus Airport	i) Without nav aids	12.25%

6.7.3 Sensitivity Analysis

For reference, sensitivity analysis of the EIRR has been carried out for the following cases, and the results are shown in Table 6.7.4.

Case A: EIRR calculated for the forecast traffic demand used in the analysis,

Case B: EIRR calculated for the 20% higher traffic demand than Case A,

Case C: EIRR calculated for the 20% lower traffic demand than Case A,

Table 6.7.4 EIRR in Sensitivity Analysis

Projects	Case of Project	Case A	Case B (20% up)	Case C (20% down)
Tashkent Airport	a) Domestic only	invalid	invalid	invalid
	b) Alternative 1	1.93%	2.97%	0.65%
New Tashkent Airport	c) Alternative 2	7.01%	7.58%	6.39%
	d) With nav aids	8.20%	10.44%	5.60%
Namangan Airport	e) Without nav aids	12.46%	15.02%	9.50%
	f) With nav aids	6.13%	8.21%	3.70%
Termez Airport	g) Without nav aids	11.61%	14.09%	8.73%
	h) With nav aids	7.60%	9.93%	4.85%
Nukus Airport	i) Without nav aids	12.25%	15.00%	9.04%

## **6.8 Financial Analysis**

### **6.8.1 General**

The financial analysis has been carried out on the nine (9) projects examined in Chapter 6.8 as shown below:

- a) Tashkent Airport Extension Project
- b) New Tashkent Airport Construction Project (Alternative 1)
- c) New Tashkent Airport Construction Project (Alternative 2)
- d) Namangan Airport Extension Project with Navigation Aids
- e) Namangan Airport Extension Project without Navigation Aids
- f) Termez Airport Extension Project with Navigation Aids
- g) Termez Airport Extension Project without Navigation Aids
- h) Nukus Airport Extension with Navigation Aids
- i) Nukus Airport Extension without Navigation Aids

### **6.8.2 Estimate of Financial Benefit**

The financial benefits have been quantified based on the current tariff system as shown below:

#### **(1) Airport Charges**

##### **a) Landing Charge**

The charge depends on maximum take-off weight (MTOW) of the aircraft.

Daytime ( 6:00 - 16:00): US\$ 13.0/ton (including US\$3.5 as air navigation charge)

Night (16:00 - 6:00): US\$ 15.6/ton (including US\$4.2 as air navigation charge)

##### **b) Parking Charge**

Ten (10) % of the landing charge (parking for more than 3 hours)

##### **c) Technical and Commercial Service Charge**

Passenger service charge: US\$ 16.0/ departing passenger

Cargo service charge: US\$ 160/ ton of loading and unloading cargo

##### **d) Airport Passenger Charge**

International: US\$ 10.0/departing passenger

Domestic: Free

##### **e) Others**

Ten (10) % of the airport charges and passenger service charge are contend as miscellaneous income of the airport.

#### **(2) Rental Charge of Existing Airport Property**

In case of c) New Tashkent Airport Construction Project (Alternative 2), rental charge

of the existing airport property (except the runway and maintenance area) to local and foreign enterprises has been counted as financial benefit based on the followings:

- property available for rent (current terminal area); 110 ha,
- percentage of renting out; 50 %,
- annual rental charge to local enterprises ; US\$ 300 /ha,
- annual rental charge to foreign enterprises ; US\$ 1,200 /ha,
- percentage of foreign enterprises; 50%.

### 6.8.3 Estimate of Financial Cost

The financial cost has been estimated in the same manner as described in 6.7.3.

### 6.8.4 Financial Evaluation

Financial cost/benefit analysis has been made on the basis of the cash flow of the financial costs and benefits obtained through comparison between the Base Case and the Project Case in the same manner as the economic analysis as shown in Table 6.8.1.

**Table 6.8.1 Financial Internal Rate of Return (FIRR)**

Project	Case of Project	FIRR
Existing Tashkent Airport	a) Domestic only	- 0.66%
New Tashkent Airport	b) Alternative 1	-5.19%
	c) Alternative 2	4.07%
Namangan Airport	d) With nav aids	-10.00%
	e) Without nav aids	-9.40%
Termez Airport	f) With nav aids	-5.43%
	g) Without nav aids	-3.20%
Nukus Airport	h) With nav aids	-11.15%
	i) Without nav aids	-11.60%

### 6.8.5 Sensitivity Analysis

Financial sensitivity analysis has also been made for the Case 2 shown below and comparison between the base case (Case 1) and the Case 2 is made as shown in Table 6.8.2.

**Case 1:** Current tariff system

**Case 2:** Doubling landing charge, airport passenger charge, as well as technical and commercial charge plus levying US\$ 5.0 airport passenger charge to domestic passengers.

**Table 6.8.2 FIRR in Sensitivity Analysis**

Project	Case of Project	Case 1	Case 2
Existing Tashkent Airport	a) Domestic only	-0.66%	19.84%
New Tashkent Airport	b) Alternative 1	-5.19%	11.28%
	c) Alternative 2	4.07%	14.16%
Namangan Airport	d) With navaids	-10.00%	5.55%
	e) Without navaids	-9.40%	8.31%
Termez Airport	f) With navaids	-5.43%	6.83%
	g) Without navaids	-3.20%	11.26%
Nukus Airport	h) With navaids	-11.15%	3.17%
	i) Without navaids	-11.60%	5.72%

## 6.9 Implementation Plan of the Projects

### 6.9.1 Projects

Through the Master Planning for the development of 12 airports and Nationwide Air Navigation Facilities, implementation plans have been prepared for the following six (6) development projects.

- Existing Tashkent Airport Development
- New Tashkent Airport Development
- Namangan Airport Development
- Termez Airport Development
- Nukus Airport Development
- Nationwide Air Navigation Facility Development

### 6.9.2 Executing Agency for Project Implementation

It is desirable to establish an executing agency responsible for management of project implementation under TAE or local airport unit.

### 6.9.3 Principal Events in Implementation Schedule

In general, implementation schedule of the projects can be largely classified into the four (4) stages, i.e. Project Formation/Financial Arrangement Stage, Procurement of Consulting Firms and Engineering Design Stage, Tender Procedure Stage, and Construction Works Stage.

#### (1) Project Formation/Financial Arrangement Stage

In this stage, at first an executing agency for the project implementation should be established based on appropriate governmental procedures. The executing agency should be responsible body for project implementation, and should manage and administrate all tasks related to the project execution covering from fund procurement, application to financing organization to management of construction work.

#### (2) Procurement of Consulting Firms and Engineering Design Stage

After evaluation of prequalification documents submitted by consulting firms, the executing agency will prepare a short list consisting of not less than three (3) firms.

Selection of consulting firms is made through competition with two package proposals,

i.e. technical proposal and price proposal.

**(3) Tender Procedure Stage**

Normally, International Competitive Bidding (ICB) is adopted to select contractor for works required for project, with advantages of the economical and efficient achievement for procurement of the goods and services.

**(4) Construction Works Stage**

During construction stage of project, the executing agency should be responsible for managing the construction contract and execution of works, with assistance of consulting firm.

**6.9.4 Funding and Repayment Plan of Project**

Funding and repayment plans required for implementing project were prepared based on the assumption that funds required for project is to be procured from soft loan of international financing agency.

## **6.10 Overall Evaluation and Recommendation**

### **6.10.1 Conclusion**

#### **(1) Tashkent Airport Development**

##### **a) Technical Aspect**

Major objectives of the development project are to improve the domestic passenger apron and expansion of the passenger building so as to meet the demand in 2010. As the existing passenger building will be saturated by the year 2000, implementation of the project is necessary from the technical viewpoint, to cater for the demand, and to install an arrival facility, which is presently not provided.

Technically, the project does not include particular difficulty in the construction works. However, it is desirable that phasing for expansion work of the existing domestic passenger terminal building should be planned so as not to cause inconvenience to domestic passenger handling during the construction.

##### **b) Environmental Aspect**

As the work for the development project will be conducted within the existing airport area, future environmental condition would be similar to the present condition. It is estimated that the impact on the environment including air and water quality, and noise will not be serious during both the construction phase and the operation period up to the year 2020.

However, it is recommendable to consider and establish the mitigation plan to decrease the impact from airport operation onto the surrounding environment of the airport, according to the increasing demand in the future.

##### **c) Economic and Financial Aspect**

From the results of both economic and financial analysis, it is concluded that the implementation of the existing Tashkent Airport Development Project is not feasible, showing a negative value for EIRR and a minus 0.66% for FIRR.

However, the result of the preliminary economic evaluation which includes both international and domestic development has shown an EIRR of about 20 % as shown in Chapter 4, and the overall development of the existing Tashkent airport can therefore be deemed as almost economically feasible.

Because the development of the domestic passenger and cargo facilities at the existing airport should be considered supplementary to the ongoing EBRD-financed project necessary to function as the capital airport, the Existing Tashkent Airport Extension Project has been viewed as justifiable.

#### **(2) New Tashkent Airport Development**

##### **a) Technical Aspect**

The project is to construct a new capital airport at the site about 40-km southwest of Tashkent City. The site is mostly used for cotton fields. There are several irrigation channels and electric power lines. It is necessary to divert those channels and power lines so as not to interrupt their functions.



Geologically the area is filled with alluvial middle Quaternary deposits of the Tashkent Complex, represented by silty and clayey soils with a thickness of 52-70m over a gravel stratum. It is estimated that there is no particular technical difficulty to prepare the runway and base for pavement from the geotechnical viewpoint.

National Road, M39 will be one of the main access roads from Tashkent. However, presently a part of the road (along a bazaar near the horse racetrack) is always saturated with the bazaar traffic. Access time to the new airport will largely depend on the traffic conditions of this part. Therefore, appropriate measure such as construction of by-pass road would be required if the new airport would be constructed.

The project is designed to develop a new gateway airport in the capital area, having adequate facilities in accordance with international standards and level to allow its functioning as a hub airport of air transportation network in the CIS region and cross point between Europe and Southeast Asia.

There is no technical construction difficulty to deny the feasibility of new airport construction. However, as the huge earthwork is required to construct the airport land, execution of the detailed comparative site selection study for the new airport including the presently proposed site is recommended for the purpose of reduction of the construction cost.

Furthermore, it is recommended to install the meteorological observation station in the airport area to obtain sufficient meteorological data for determination of runway orientation, operational serviceability of runway and decrease of visibility by fog, prior to decision on implementation of the project.

#### b) Environmental Aspect

A new airport is to be constructed in the cotton field zone surrounded by several kolkhozes.

Since the environmental impact on air pollution and noise and vibration generated from the aircraft operation will be considered large, an adequate mitigation plan will be required based on the characteristics of the natural and social environment around the construction site. Furthermore, as several houses are located in the airport construction area, it will be necessary to move such houses from the area.

#### c) Economic and Financial Aspect

EIRRs for new airport development are lower than the assumed social discount rate of 12 %, because, the development of the new airport has been assumed to be made together with the EBRD-financed project at the existing Tashkent Airport, which alone would produce adequate capacity to cater for the demand up to the year around, resulting in a double investment for accommodating limited international demand.

The need for the new capital airport arises, not in order to balance demand/capacity viewpoint, but to alleviate noise problems and risk of aircraft accident on the surrounding area by transferring traffic from the existing to the new airport. It is therefore very difficult to achieve economic viability in monetary terms.

However, if both the international and domestic activities were transferred to the new airport and the existing airport property were utilized to yield commercial and social benefits as assumed in case of the Alternative 2, construction of the new airport could

become economically feasible from the national economic viewpoint, depending on the acceptability of higher tariff system by foreign airlines.

**(3) Namangan Airport**

**a) Technical Aspect**

The project is to improve the pavement of the existing runway and taxiways, widen the existing apron and terminal building, and install air navigation facilities. It is not anticipated to present technical difficulties and problems in execution of the project. Implementation of the Project is considered necessary in order to meet the future demand and to renew the existing outmoded facilities.

**b) Environmental Aspect**

The expansion work will be conducted within the existing airport area, as the urban area is far from the airport. There are no sensitive receptors near the site. It is estimated, therefore, that the impact on the environment, including air and water quality, and noise will not be serious during both the construction phase and the operation period up to the year 2020. However, a mitigation plan to decrease the impact on the surrounding environment should be adopted.

**c) Economic and Financial Aspect**

The EIRRs of development of Namangan airport with navigation aids are lower than the social discount rate of Uzbekistan. However, if the modernization of navigation aids were made under a separate project such as in the Nationwide Navigation System Modernization Project, the Project could be economically feasible because EIRRs of equal to or more than 12 % are achievable.

**(4) Termez Airport**

**a) Technical Aspect**

The project is to improve the pavement of the existing runway and taxiways, widen the existing apron and terminal building, and install air navigation facilities. It is not anticipated to have technical difficulty and problem in execution of the project. Implementation of the Project is considered necessary in order to meet the future demand and to renew the existing outmoded facilities.

**b) Environmental Aspect**

The expansion work will be conducted within the existing airport area, as the urban area is far from the airport. There are no sensitive receptors near the site. It is evaluated, therefore, that the impact on environment including air and water quality, and noise will be not serious during both the construction phase and the operation period up to the year 2020.

However, a mitigation plan to decrease the impact on the surrounding environment should be adopted.

**c) Economic and Financial Aspect**

The EIRRs of development of Termez airport with navigation aids are also lower than the social discount rate of Uzbekistan. However if the modernization of navigation aids were made under separate project such as in the Nationwide Navigation System

Modernization Project, the Project could be economically feasible because EIRRs of equal to or more than 12 % are achievable.

**(5) Nukus Airport**

**a) Technical Aspect**

The project is to improve the pavement of the existing runway and taxiways, widen the existing apron and terminal building, and install air navigation facilities. It is not anticipated to present technical difficulties and problems in execution of the project. Implementation of the Project is considered necessary in order to meet the future demand and to renew the existing outmoded facilities.

However, the design and construction method for overlay work on the existing concrete slab by bituminous materials should be carefully studied, because the Nukus Airport is located in a zone with steep temperature gradient between the maximum and minimum, so that the occurrence of thermal cracks can be expected.

**b) Environmental Aspect**

The expansion work will be conducted within the existing airport area. It is estimated, therefore, that the impact on the environment including air and water quality, and noise will not be serious during both the construction phase and the operation period up to the year 2020. However, a mitigation plan to decrease the impact on the surrounding environment should be adopted.

**c) Economic and Financial Aspect**

The EIRRs of development of Nukus airport with navigation aids are also lower than the social discount rate of Uzbekistan. However if the modernization of navigation facility were made under a separate project such as the Nationwide Navigation System Modernization Project, the Project could be economically feasible because EIRRs of equal to or more than 12 % are achievable.

**(6) Nationwide Air Navigation System**

**a) Technical Aspect**

There is no technical difficulty and problem in execution of the project.

**b) Environmental Aspect**

As the project is to install small equipment and houses for VOR/DME, it is not anticipated to cause a negative impact on the environment around the VOR/DME site. Negative impact by radio wave is not anticipated.

**c) Economic and Financial Aspect**

Economic and financial analysis for development of Nationwide Air Navigation System was excluded due to the difficulty of quantification of the expected economic benefits. However, development of Nationwide Air Navigation System would contribute to the improvement for safety of air route navigation, and national economic development if international overflying would be increased by enjoying the geographical advantage of Uzbekistan as a cross point between Europe and Asia.

## 6.10.2 Recommendations

As a result of the study of the technical, environmental, financial and economic feasibility for the high priority project, the following recommendations are presented:

### (1) Implementation of the Capital Airport Development

In the present Study, from the technical, environmental, and economic and financial points of view, evaluation was made for two alternatives of the capital airport development, one is to develop the existing Tashkent Airport; the other is to construct a new airport at the proposed area near Chinaz district.

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 US Dollars 48 million. Hence, these facilities will help to upgrade passenger comfort and convenience.

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

Construction of a new capital airport after the development of EBDR project would entail huge financial burden to NAC as well as to the government.

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 future trend of air traffic demand and negative impact on the social environment.

In the long-term development of the new Tashkent airport, it is important to promote to raise feasibility and realization of the project by promoting status of Tashkent as the crossroads of European and Asian countries for long time, and to be functioned as air cargo distribution base and air transportation center in CIS regions.

### (2) Implementation of Local Airports 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 high 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.

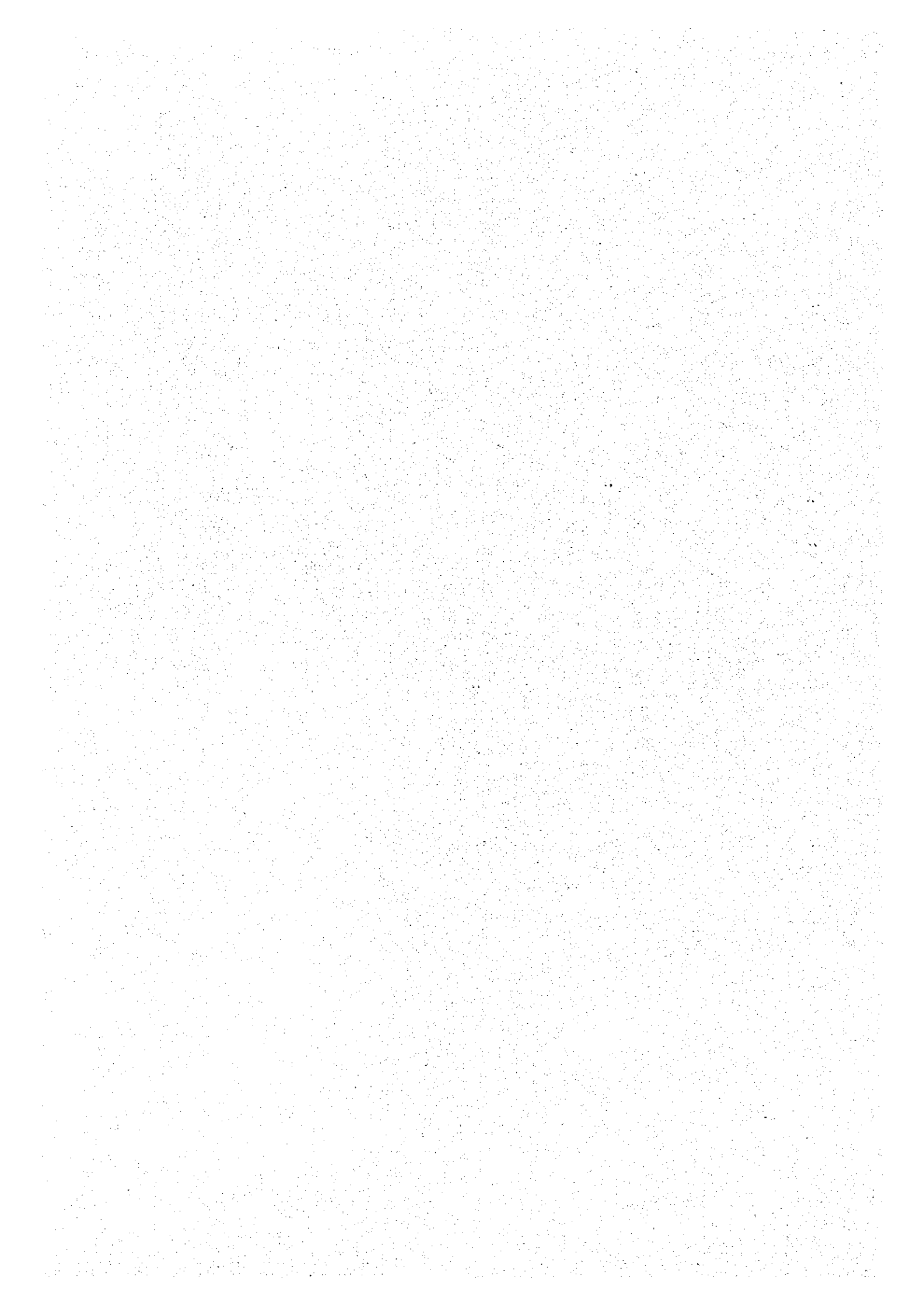
**(3) Implementation of Nationwide Air Navigation System Development**

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

**(4) Simultaneously with the implementation of the development of airport and air navigation facilities, NAC is required to review and perform improvements of management issues as shown below:**

- Funds required for the projects should come from soft loans as much as possible, and supplementary from government budget.
- To implement restructuring of the existing organization of NAC, clearly separating functions of governmental services, airport operation and airlines (commercial business);
- Improvement of accounting system and deregulation of disclosure of information;
- Adjustment of airport employment level;
- Training and service from a passenger-oriented approach.

**CHAPTER 7**  
**REVIEW OF ORGANIZATION AND**  
**MANAGEMENT PROCEDURES OF NAC**



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

### **7.1            Overview of NAC Organization**

For decades civil aviation in Uzbekistan had been under the control of Aeroflot, the civil aviation system of the former Soviet Union. It ranged from policy making, legislation, control and enforcement of regulations, as well as to the operation of air transportation as well as its necessary infrastructure such as air traffic control and airlines.

After the collapse of the USSR in late 1991, the 12 CIS republics formed the Interstate Aviation Committee with the primary role of securing the regulatory safety standards, with most of Aeroflot expertise taking part.

On January 28, 1992, Presidential Decree, NO. UP-326 was promulgated for establishing a national air company integrating the Uzbekistan Civil Aviation Administration, Civil Aviation Factory No.243, and Aviaspetsmontajnalagka under the Aviasstroy. Based on this Decree, the National Aviation Company of Uzbekistan Airways (NAC) was then founded by a Resolution of Cabinet Ministers of the Government of Uzbekistan on February 4, 1992.

Uzbekistan is associated with the International Civil Aviation Organization and NAC "Uzbekistan Havo Yullari" with IATA. The General Director of NAC is considered as a Government representative in all questions concerning the preparation and conclusion of international agreements and commitments with different countries on a contractual basis.

Presently, NAC seems to combine the strength of the former Aeroflot centered operations with new Western aircraft and air traffic control equipment aiming at the position of becoming one of the largest carriers in the CIS region.

### **7.2            Present Organization of NAC**

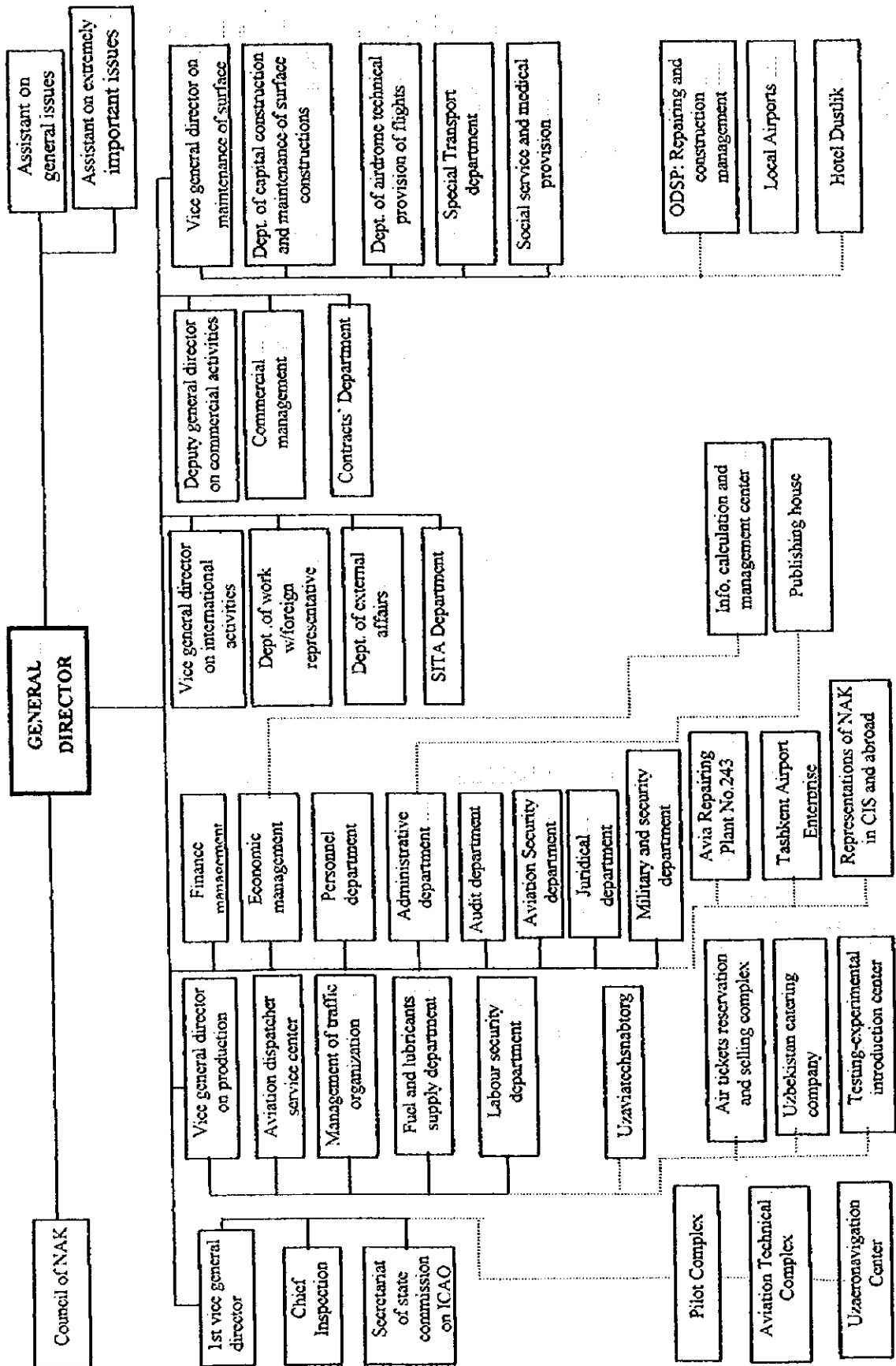
NAC presently covers three principal functions; first, to make and manage policy, legislation, administration, and international aeronautical affairs, second, to operate air transport services as an air carrier, and third, to operate and manage the airport and air navigation facilities, including air traffic control.

NAC also has various subsidiaries under its control with more than 16 thousand employees. Its major subsidiaries are Tashaviacpetsmontaj, Inter Cargo Services, Uzaviabank, ODSP (Repairing and Construction Management Enterprises), Avialease, Aviation Institute and catering company.

The organization and number of staff of NAC is shown in Fig. 7.2.1.



Fig. 7.2.1 Organization Chart of NAC



### **7.3 Relevant Laws and Regulations for Air Transport**

The "Air Code of the Republic of Uzbekistan" was then approved by a decree of the Supreme Council on May 7, 1993. From that date, more than 70 regulations, rules, norms, guidelines and instructions have been issued in order to regulate civil aviation activities of NAC.

MAK (Interstate Aviation Committee) is an aviation organization formed under the former Soviet Union, and establishes various certification systems relating to aviation activities, namely, Certificate for Airport, Certificate for Radio Station, Certificate for Manufacturer, Certificate for Model, Certificate for Carrier, Certificate for Repair Station, Certificate for Pilot, Certificate for Mechanics, Certificate for Inspector and Certificate for Dispatcher.

According to the Articles of Incorporation established on February 4, 1992, NAC is designated as the national air company duly established under the Laws and Presidential Decree and vested with legal powers and responsibilities from the Uzbekistan Civil Aviation Department, and with its own accounting system on a self-paying basis. Its major functions are:

- Promulgation, coordination and execution of laws and policies related to civil aviation transport;
- Air transport services for both international and domestic air traffic demand to contribute to national economic activities;
- Inspection and control on air transport safety and operation of affiliated enterprises, subsidiary companies and other domestic air transport companies;
- Inspection and control of air space for civil aviation use;
- Inspection and control of air transport service companies; and
- Operation and control of airport, affiliated enterprises, and other individual companies which operate airports and air transport.

### **7.4 Financial Situation and Accounting System of NAC**

#### **7.4.1 Revenues and Expenses**

##### **(1) Revenues**

NAC's overall reports contain various types of revenues surfacing from twenty-five subsidiary companies as shown in **Table 7.4.1**.

- Four items, namely, "Regular Transportation", "Order and Charter", "Aircraft Lease" and "Agriculture Aviation" seem to be airline revenues. But, the items of "Aircraft Departure", "Commercial Passenger & Cargo Service", "(%) of Passengers and Cargo Revenue" are normally considered, in the accounting system of Western airlines, as expenditure rather than revenue items.
- The revenue scale as a part of an airline activity might be estimated as 65~75% of NAC's overall revenue.
- "Aircraft Departure" has increased favorably, indicating a normal development of aviation in the territory.

- "Order and Charter" forms less than ten percent of regular flight revenues, which seems reasonable.
- The increase of "Aircraft Lease" might show a positive attitude of NAC management to utilizing its assets.

(2) Expenses

- A rapid increase in "Current Maintenance" and "Lease of Communication Channels" would indicate that some efforts to improve total flight safety are being made, following to introduction of western-made aircraft.
- "Depreciation" remains at a low level.
- "Sales Commissions to Agent" and "Ground Handling Charges" do not appear in the list. They may have been included in "Other Production Costs". But they appear regularly in the list of expenses of ordinary airlines but do appear in the list of the airport revenues that appear on later pages.

**Table 7.4.1 Current Revenues and Expenses of NAC**

Items	1994	1995	1996
<b>[ Revenues (in Million Sum) ]</b>			
1. Regular Transportation	811.1	3,171.2	7,137.2
2. Commercial Passenger & Cargo Services	41.9	162.9	258.8
3. Aircraft Departure	102.6	419.3	924.5
4. Order and Charter	102.0	283.1	546.5
5. Aircraft Lease	3.8	55.8	214.6
6. (%) of Passenger & Cargo Revenue	36.5	81.4	133.6
7. Agriculture Aviation	7.2	45.5	136.8
8. Other Revenue	148.8	889.0	1,127.3
<b>Revenue Total</b>	<b>1,253.9</b>	<b>5,111.2</b>	<b>10,479.3</b>
Tax on Addition Value(TAV)	153.1	531.4	1,091.9
<b>Revenue without TAV</b>	<b>1,100.8</b>	<b>4,579.9</b>	<b>9,387.5</b>
<b>EXPENSES (in Million Sum)</b>			
<b>I. Self Cost</b>	<b>826.0</b>	<b>4,210.7</b>	<b>9,655.2</b>
1. Aviation Fuel & Lubricant	178.5	873.1	1,851.6
2. Over-haul & Maintenance	24.1	212.8	260.2
3. Current Maintenance	19.0	179.2	764.6
4. Maintenance of Building	37.4	179.3	287.8
5. Radio Communication	3.1	15.9	25.1
6. Lease of Communication Channels	3.4	3.6	51.5
7. Labour Payment	84.3	239.2	655.6
8. Social Insurance	30.7	95.2	260.8
9. Depreciation	18.3	128.1	139.0
10. Other Production Cost	427.3	2,284.4	5,359.0
<b>II. Expenses of Period</b>	<b>N/A</b>	<b>549.2</b>	<b>996.1</b>
1. Expenses of Sale	N/A	41.5	43.8
2. Administrative Expenses	N/A	329.3	564.3
Salary of Administration personnel	N/A	(68.7)	(152.1)
Allocation on Insurance(40%)	N/A	(19.1)	(55.7)
Materials & Technics for Admin Personnel	N/A	(241.6)	(365.5)
3. Other general economies	N/A	178.3	388.0
<b>Expense Total(I+II)</b>	<b>826.0</b>	<b>4,759.9</b>	<b>10,651.3</b>

### 7.4.2 Profitability

Both operating revenues and expenses have increased rapidly by ten times over the past three years. But, profitability in 1996 had been decreased to minus 13%.

**Table 7.4.2 Profitability of NAC as a Whole**

Account	1993	1994	1995	1996
a) Operating Revenue	106.00	1,110.70	4,579.90	9,378.50
b) Operating Expenses	87.80	826.00	4759.90	10,651.30
c) Operating Profit (Loss)	18.20	274.70	-180.00	-1,263.50
d) Non-operating Revenue	5.59	132.80	114.40	63.60
e) Non-operating Expenses				
g) Profit (Loss) before taxes	23.79	407.50	-65.60	-1,200.20
h) Profitability (g/a x 100%)	22%	37%	-1.4%	-13%

Source : NAC

### 7.4.3 Balance Sheet (Assets and Liabilities)

Table 7.4.3 shows the Balance sheet (Assets and Liability) of NAC.

**Table 7.4.3 Assets and Liabilities of NAC**

Account	(in Million Sum)		
	1994	1995	1996
<b>Assets</b>			
Fixed assets, net	1,305.50	1,325.10	4,112.60
Current assets (Debit Debt)	321.40	590.10	517.60
Other assets	821.20	2,452.79	5,681.90
<b>Total of Assets</b>	<b>2,448.10</b>	<b>4,367.99</b>	<b>10,312.10</b>
<b>Liabilities &amp; Equity</b>			
Long-term liabilities	35.40	1,058.20	5,328.70
Current liabilities	412.30	1,491.69	3,452.40
Equity	2,000.40	1,818.10	1,531.00
<b>Total of Liabilities &amp; Equity</b>	<b>2,448.10</b>	<b>4,367.99</b>	<b>10,312.10</b>
<b>Ratio of Fixed Assets to Equity</b>	<b>0.65</b>	<b>0.72</b>	<b>2.69</b>

#### (1) Stability (Ratio of Net Worth to Total Capital)

The ratio of equity to total assets is known as "Stability" or "ratio of net worth to total capital". The "Stability" is one of the management indices characterizing the long-term stability of capital fund procurement of a company, and a higher ratio means a stable capital fund composition. The Stability of NAC over recent years is as follows:

$$\frac{\text{Equity}}{\text{Total Assets}} \Rightarrow \frac{2,000}{2,448} = 82\% \quad \frac{1,818}{4,368} = 42\% \quad \frac{1,531}{10,312} = 15\%$$

Most of today's airlines depend very much on long-term liability to purchase their aircraft. In this regard, the ratio of fixed assets to equity plus long-term liability, which is also one of the indices representing "Stability" seems more realistic index.

	1994	1995	1996
$\frac{\text{Fixed Assets}}{\text{Equity Plus Long-term Liability}}$	$\Rightarrow \frac{1,306}{2,036} = 64\%$	$\frac{1,325}{2,876} = 46\%$	$\frac{4,113}{6,860} = 60\%$

(2) Efficiency of Assets (Capital Turnover)

The ratio of revenues to total assets is known as "Efficiency of Assets" or "Capital Turnover", and indicates efficiency of capital fund usage. Generally, it is desirable for this ratio to be more than 1.0 in western self-paying companies. Efficiency of Assets of NAC is as follows;

	1994	1995	1996
$\frac{\text{Revenues}}{\text{Total Assets}}$	$\Rightarrow \frac{1,254}{2,448} = 0.51$	$\frac{5,111}{4,368} = 1.17$	$\frac{10,479}{10,312} = 1.02$

(3) Growth

The ratio of revenue and total assets to those of respective figures for the previous year shows the "Growth" of company operation.

$\frac{\text{1995 Revenue}}{\text{1994 Revenue}}$	$\Rightarrow \frac{5,111}{1,254} = 4.1$	$\frac{\text{1996 Revenue}}{\text{1995 Revenue}}$	$\Rightarrow \frac{10,479}{5,111} = 2.1$
$\frac{\text{1995 T. Assets}}{\text{1994 T. Assets}}$	$\Rightarrow \frac{4,368}{2,448} = 1.8$	$\frac{\text{1996 T. Assets}}{\text{1995 T. Assets}}$	$\Rightarrow \frac{10,312}{4,368} = 2.4$

(4) Liquidity (Current Ratio)

"Current Ratio" is the ratio of current assets to current liabilities. It is one of the most important indices to measure a company's financial "Liquidity" which represents the capability of securing short-term stability for payment or repayment.

Current assets are only 5% of the total assets of NAC, and other assets, with details unknown, are 55% of this. It is surmised that other assets may include some that should be classified as current assets. Consequently, it is meaningless to calculate the Current Ratio of NAC.

The desirable Current Ratio in a western company is a figure in excess of 200 %. When the Current Ratio falls to below the 1.0 threshold, fixed assets are partially being used to finance the current liability for the payment of outstanding obligations, which have to be paid in a short period of time.

(5) Overall Review of NAC's Financial Situation

- Deterioration of profitability has led to a sharp decrease in equity in 1996, and this decrease seems to be weakening NAC's financial base.
- Profitability deteriorated both in terms of ratio and real amounts in 1996 due to excessive operating losses.
- Growth of Revenue and Assets seems to be caused mainly by inflation, not by actual growth of the company.

- NAC's index shows a reasonable level.
- Current Assets/Liability ratio was not determined this time, nor was "Cash Flow Check" due to the lack of the necessary data.

#### 7.4.4 Revenues and Expenses of Tashkent Airport Enterprise (TAE)

##### (1) Charges for Airport and Air Navigation Services

###### Charges for Airport

- Landing and Take-off Charges based on the maximum take-off weight of aircraft. This rate is US 13 dollars per ton.
- Charges for Maintenance and Commercial Services (charges for parking and guarding) based on the maximum take-off weight.
- Escort Crew Services in the Uzbekistan Airspace, US\$245 per diem
- Passenger Airport Charge at the rate of US 10 dollars per each passenger.
- Charges for Securing the Safety of Transportation at the rate of 10% of Landing and Take-off Charges
- Charges for Meteorological Services at the rate of 15% of Landing and Take-off Charges.
- Charges for Services at Aerodromes such as heating unit (US\$ 40), ground power unit (US\$ 50), deicing (as per weight), towing (US\$ 30), car for crew (US\$ 15), food ice (US\$ 1.5 per Kilo), anti-hoarfrost measures (as per weight), etc.

###### Air Navigation Services Charges

- Charges for use of air navigation facilities within the Uzbekistan airspace are calculated based on the maximum take-off weight (MTOW) of aircraft and flight distance for every 100 km along the airways. For example, the 300 ton MTOW charge is US\$ 67 per 100 km distance.

##### (2) Operating Revenues and Profit of TAE

Balance sheet of TAE is shown in Table 7.4.6.

**Table 7.4.6 Balance Sheet of TAE**

Account	1993	1994	1995	1996
Operating Revenue	9.04	122.47	591.5	936.6
Operating Expenses	3.5	48.07	272.0	590.4
Operating Profit (Loss)	5.54	74.4	319.5	346.2
Non-operating Revenue				
Non-operating Expenses				
Non-operating Profit			37.9	13.4
<b>Profit (Loss) before Taxes</b>			<b>357.4</b>	<b>359.6</b>
Profitability				
... Profit ... Revenues	61.3%	60.7%	54.0%	37.0%

### (3) Overview of Revenues

Main revenue items of TAE consist of the following elements;

• Passenger/Baggage Handling	16.9%
• Cargo/Mail Handling	0.9%
• Aircraft Handling	
Departure Service	18.0%
Meteorological Service	1.5%
• Landing Charge	9.1%
• Sales Commissions (Passenger and Cargo)	1.9%
• Other Revenues	51.8%
Total	100%

## 7.5 Review of Airport Operation Sector

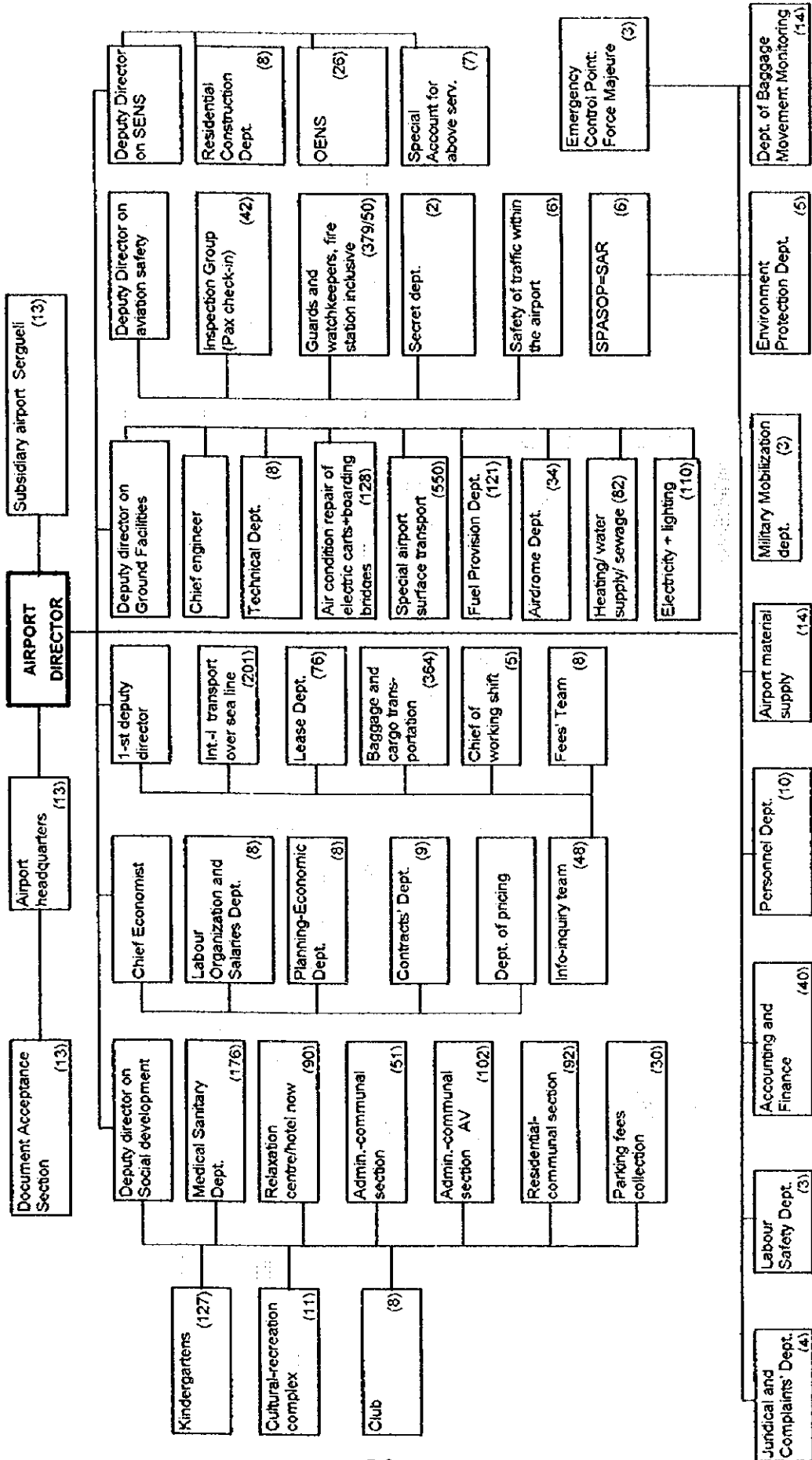
### 7.5.1 Organization of Tashkent Airport Enterprise (TAE)

#### (1) Establishment of TAE

Tashkent Airport and all other local airports are under NAC's responsibility. TASHKENT AIRPORT ENTERPRISE (TAE) is organizationally one of the sub divisions of NAC. It now has about 3.500 personnel representing roughly a quarter of the total workforce of NAC.

Under the leadership of the "Airport Director" who is the top administrator, five Deputy Directors on the same hierarchical level direct the different organizational units as shown in Fig. 7.5.1.

Fig. 7.5.1 Organisation of Tashkent Airport





### 7.5.2 Operation of Tashkent Airport

- C.I.Q services are made under the jurisdiction of the state, and at present this service is executed and controlled by the Military.
- At Tashkent Airport, passenger check-in and baggage handling services are operated by TAE personnel, not Uzbekistan Airways personnel. In most western and Asian airline companies, this service is provided by the individual airline company.
- There are two buildings for passenger departures at Tashkent airport. One is for international lines (No.1), the other for domestic lines (No.2). All passengers had been categorized not only by their destinations, but also by their nationalities as shown below, but recently modified to only destination classification.

**Table 7.5.1 Usage of Passenger Terminal Building by Nationality**

Destinations	Nationality		
	Foreigners	CIS Nationalities	Uzbekistan Citizens
Overseas	1	1	1
CIS	1	1	1
Domestic	1	2	2

- Catering for Uzbekistan Airways is performed by one of the subsidiary companies of NAC.
- The fire station is managed and operated under the control of the Deputy Director for Aviation Safety, and this Division has 379 personnel in total.
- Airport Security is being controlled by military unit.

### 7.5.3 Management of Samarkand Airport

Under the leadership of the "Airport Director" and "Airport Committee" as the top of the administrative body, three Deputy Directors almost on the same hierarchical level direct the different organizational units, namely the Ground, Aviation Safety and Handling Departments.

Essential units for decision-making and administration, such as the Economic Division, Accounting/Finance Division and Personnel Division report directly to the Airport Director.

### 7.5.4 Overall Review of the Airport Operation Sector

As result of current management and operation procedures for airport, the following deficiencies are pointed out:

- No clear separation of command line and activities between airport operation sector and air carrier sector;
- Redundancy of employment in airport operation sector;
- Differences with international standards of facilities;

- Low service level for passenger comfort;

## 7.6 Review of Air Carrier Sector (Uzbekistan Airways) of NAC

(Note: There is no specific group or sub section called as “Uzbekistan Airways” under the NAC organization, but, in this Chapter, “Uzbekistan Airways” means the air carrier sector or air carrier function within the NAC organization, and “NAC” means the entire body of NAC)

### 7.6.1 Background

Uzbekistan Airways was officially formed in 1992 and incorporated Aeroflot’s former central Tashkent operations as well as the Uzbekistan Civil Aviation Board.

Uzbekistan is associated with the International Civil Aviation Organization (ICAO), and NAC as “Uzbekistan Havoyullari” with the International Air Transportation Association (IATA).

### 7.6.2 Management of Uzbekistan Airways

A brief comparison of organization and management between Uzbekistan Airways and the major western airlines can be sketched as follows. These may be some misunderstandings and even arbitrary decisions or prejudices as the case may be.

**Table 7.6.1 Comparison of Uzbekistan Airways and Western Airlines**

Functions	Uzbekistan Airways	Western Airlines
<b>Head Office Function</b>	<ul style="list-style-type: none"> <li>• Besides normal functions of an airline's head office, all jobs concerned with the national aviation. Including air policy making, bi-lateral agreement and airport construction.</li> </ul>	<ul style="list-style-type: none"> <li>• National aviation's affairs are governmental matter. Construction of airport is also a matter of government or local authority. (Except Kansai International Airport Company in Japan)</li> </ul>
<b>Sales/Reservation</b>	<ul style="list-style-type: none"> <li>• Several ticket offices at airports and down-town Tashkent with less developed computerized network.</li> <li>• No specialized salesmen to go outdoors for sales.</li> <li>• Small quantity of advertisement and promotional activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Through many sales/reservation agents with well developed computerized network.</li> <li>• Many salesmen going outdoors for sales.</li> <li>• Positive sales promotional activity and events.</li> </ul>
<b>Flight Operation (including crew)</b>	<ul style="list-style-type: none"> <li>• All jobs concerned with flight operation by NAC</li> </ul>	<ul style="list-style-type: none"> <li>• Self-supporting</li> </ul>
<b>Passenger Handling</b>	<ul style="list-style-type: none"> <li>• At Tashkent Airport, all services are done by TAE (One of NAC's subsidiary companies – Tashkent Airport Enterprise).</li> <li>• Other ramp work (also the same)</li> </ul>	<ul style="list-style-type: none"> <li>• Self-supporting or by subsidiary company or entrusted to other airlines.</li> </ul>
<b>Cargo / Mail Handling</b>	<ul style="list-style-type: none"> <li>• Same as above</li> </ul>	<ul style="list-style-type: none"> <li>• Same as above</li> </ul>
<b>Aircraft Maintenance</b>	<ul style="list-style-type: none"> <li>• Self-supporting</li> <li>• Almost no-difference from other airlines for line-maintenance (A, B services).</li> </ul>	<ul style="list-style-type: none"> <li>• Self-supporting or entrusted to other airlines.</li> </ul>
<b>Fueling Company Catering Company</b>	<ul style="list-style-type: none"> <li>• Almost no difference from other airport.</li> <li>• Catering services are performed by one of NAC's subsidiary company.</li> <li>• Fueling company is a independent from NAC entity.</li> </ul>	

### **7.6.3 Review of Current Air Routes Structure**

#### **(1) Product Amount of Airlines**

In western airlines, the following indices are adopted to define the product amount or scale of transport activity of an airline.

- Flight frequency
- Number of aircraft departure (= Landing times)
- Flight kilometer
- Block time
- Number of passenger
- Cargo ton
- Revenue Passenger kilometer (RPK)
- Available seat-kilometer (ASK)
- Passenger load factor (RPK/ASK)
- Revenue Ton-kilometer of passenger, cargo and mail (RTK)
- Available Ton-kilometer (ATK)
- Weight load factor (RTK/ATK)
- Length of scheduled routes network

#### **(2) Estimate of Product Amount of Uzbekistan Airways**

Since data and information related to the production of the air carrier sector of NAC was not made available, production amount and air routes structure of Uzbekistan Airways was analyzed based on the official timetable of NAC effective March 31, 1997.

The main purposes in analyzing the air route structure are:

- To establish which routes are product resources of Uzbekistan Airways put-in and how much they are respectively;
- To determine which types of aircraft support the company's product;
- To estimate the size or scale of the company as an airline.

Table 7.6.11 Summary of Production

	Frequency (a)	Flight Km (10 <sup>3</sup> ) (b)	Block Time (c)	Number of Seat (10 <sup>3</sup> ) (d)	Seat % (e)	Available Seat Km (10 <sup>6</sup> ) (f)	ASK % (g)
<b>[INTERNATIONAL]</b>							
Euro-USA	572	7,908	10439	230	8%	1,595	22%
Mid Near East	572	4,634	6010	216	7%	869	12%
India/Pakistan	676	5,501	7115	239	8%	995	14%
East Asia	156	1,864	2340	65	2%	386	5%
<b>Subtotal</b>	<b>1,976</b> 12%	<b>19,907</b> 42%	<b>25904</b> 32%	<b>750</b>	<b>25%</b>	<b>3,845</b>	<b>52%</b>
<b>[CIS]</b>							
Moscow, Kiev, St. Petersburg	1,768	11,230	14304	679	23%	2,151	29%
Black Sea	312	1,535	2201	97	3%	238	3%
Ural	364	1,463	1915	113	4%	227	3%
East Siberia	208	1,281	1720	64	3%	196	3%
Neighboring Countries	468	860	1720	73	2%	67	1%
<b>Subtotal</b>	<b>3,120</b> 19%	<b>16,369</b> 35%	<b>21861</b> 27%	<b>1,026</b>	<b>35%</b>	<b>2,879</b>	<b>39%</b>
<b>[DOMESTIC]</b>							
Fergana Basin	3,848	2,672	8770	386	13%	134	2%
Others	7,644	7,937	23547	831	28%	470	6%
<b>Subtotal</b>	<b>11,492</b> 69%	<b>10,609</b> 23%	<b>32318</b> 40%	<b>1,217</b>	<b>40%</b>	<b>605</b>	<b>8%</b>
<b>TOTAL</b>	<b>16,588</b> 100%	<b>46,885</b> 100%	<b>80084</b> 100%	<b>2,993</b>	<b>100%</b>	<b>7,329</b>	<b>100%</b>

ASK : Available Seat-Kilometer

### (3) Review of Air Route Structures

Among the various indices, ASK seems to be most effective to measure the productive volume of an airline's activities.

#### a) ASK by Routes

- More than half of total ASK (53%) is put into international routes, while 39% is put into CIS routes and only 8% is put into domestic routes;
- About 75% of ASK in CIS is put into Moscow. This means other CIS routes have comparatively small weight for the state and the airlines.

1) Moscow	29.3 %
2) Euro-USA	21.8 %
3) India/Pakistan	13.6 %
4) Mid Near East	11.9 %

#### b) ASK by Aircraft Types

Two types (A-310 and B767) of western aircraft cover 63% of total ASK, while they share only 16% in flight frequency and 37% in block time.

1) A-310	32.3 %
2) B-767	30.8 %
3) Tu-154	21.4 %
4) IL-62	5.6 %

#### c) Number of Seat by Routes

The ranking of number of seat by routes goes as below:

1) Domestic except Fergana Basin	27.8 %
2) Moscow	22.7 %
3) Fergana Basin	12.9 %
4) Euro-USA	7.7 %

#### d) Number of Seat by Aircraft Types

Ranking of number of seat provided by aircraft types is as follows:

1) Tu-154	28.0 %
2) A310	21.3 %
3) Yak40	19.5 %
4) B767	13.0 %

#### e) Flight Frequency by Routes

Ranking of frequency of flights by routes is as follows:

1) Domestic except Fergana Basin	46.1 %
2) Fergana Basin (Domestic)	23.2 %

3) Moscow	10.7 %
4) India and Pakistan	4.0 %

f) Flight Frequency by Aircraft Types

Ranking of flight frequency by aircraft types is as follows:

1) Yak 40	43.9 %
2) An24	21.3 %
3) Tu-154	16.3 %
4) A-310	10.0 %

g) Block Time by Air Routes

Ranking of Block Time by Air Routes is as follows:

1) Domestic except Fergana Basin	29.4 %
2) Moscow	17.9 %
3) Euro-USA	13.0 %
4) Fergana Basin	11.0 %

h) Block Time by Aircraft Types

Ranking of Block Time by Aircraft Types is as follows:

1) Yak-40	27.0 %
2) A-310	19.9 %
3) Tu-154	19.0 %
4) B-767	17.5 %

#### 7.6.4 Comparison of Annual Production

Tables 7.6.12 and 7.6.13 present production volume in 1996 and major production indices of world airlines.

ASK/Block Time of Uzbekistan in terms of All Flights is low level as same as that of airlines in the former USSR countries, showing 92, while ASK/Block Time in terms of International Flights is 148.

**Table 7.6.12 Production Volume and Indices of Airlines in th World (All Scheduled Flights: 1996)**

Names of Airlines	Flight kilo ( $\times 10^3$ )	Aircraft Departure	Block Time (Hrs)	ASK ( $\times 10^5$ )	(A) Pax Load Factor (%)	(B) Ave. Seat	(C) Ave. BT/FLT	(D) Ave Kilo/FLT	(E) Ave. Speed	(F) ASK/B.T. ( $\times 10^3$ )
Uzbekistan Airways	46,885	33,176	80,083	7,329	?	156	2.41	1,413	585	92
American	1,472,775	787,415	2,339,966	245,662	68.5	167	2.97	1,870	629	105
United	1,347,179	785,158	2,069,804	261,755	71.7	194	2.64	1,716	651	126
Delta	1,187,047	924,988	2,000,116	215,023	70.3	181	2.16	1,283	593	108
Northwest	812,492	585,924	1,354,798	151,135	73.1	186	2.31	1,387	600	112
British Airways	529,057	306,665	833,517	137,542	73.1	260	2.72	1,725	635	165
Lufthansa	537,755	470,142	933,085	91,998	68.8	171	1.98	1,144	576	99
Air France	380,641	197,290	581,235	75,800	75.8	199	2.95	1,929	655	130
Alitalia	272,855	260,872	498,669	50,137	68.9	184	1.91	1,046	547	101
Thai Airways	140,274	91,728	216,147	42,683	69.8	304	2.36	1,529	649	197
Singapore	246,324	69,661	318,367	72,378	74.4	294	4.57	3,536	774	227
Garuda	124,634	71,653	158,438	32,475	54.9	261	2.21	1,739	787	205
Air India	63,794	22,736	92,177	17,833	64.7	280	4.05	2,806	692	193
Pakistan	73,818	69,973	136,749	16,543	64.0	224	1.95	1,055	540	121
Turkish	100,922	84,932	189,698	16,297	67.2	161	2.23	1,188	532	86
Etial Israel	67,310	22,912	96,319	15,998	72.0	238	4.20	2,938	699	166
Oriropic	65,847	92,357	135,157	13,049	65.4	198	1.46	713	487	97
Cathay Pacific	181,295	54,810	243,076	54,252	74.0	299	4.43	3,308	746	223
Quantas	270,389	136,021	405,066	77,241	72.0	286	2.98	1,988	668	191
Korean Airlines	216,439	146,741	360,331	52,982	71.2	245	2.46	1,475	601	147
Japan Airlines	328,144	140,242	468,619	108,503	69.9	331	3.34	2,340	700	232
All Nippon Airways	226,848	199,444	360,506	72,351	65.0	319	1.81	1,137	629	201
Japan Air System	90,685	139,234	187,313	20,088	60.7	222	1.35	651	484	107
Aeroflot	142,364	46,502	180,458	22,389	59.4	157	3.88	3,061	789	124
Transaero	28,648	12,342	39,601	4,750	61.6	166	3.21	2,321	723	120
Air Ukraine	28,584	18,500	42,568	2,046	55.0	72	2.30	1,545	671	48
Estonian	3,559	5,646	6,399	334	36.4	94	1.13	630	556	52
Lithuanian	6,100	4,453	10,410	641	43.2	105	2.34	1,370	586	62
Armenian	8,570	2,207	11,135	1,141	65.4	133	5.05	3,883	770	102

Notes: (B) = ASK/Flight Kilo(FLT KILO) (C) = Block Time(B.T.)/Departure (D) = FLT KILO/Departure (E) = FLT KILO/B.T.

Resources: World Air Transport Statistics WATS 6/67 No.41 IATA

**Table 7.6.13 Production Volume and Indices of Airlines in th World (International Scheduled Flight 1975)**

Names of Airlines	Flight kilo ( $\times 10^3$ )	Aircraft Departure	Block Time (Hrs)	ASK ( $\times 10^6$ )	(A) Pax. Load Factor (%)	(B) Ave. Seat	(C) Ave. B.T./FLT	(D) Ave. Kilo/FLT	(E) Ave. Speed	(F) ASK/B.T. ( $\times 10^3$ )
Uzbekistan Airways	19,907	3,952	25,904	3,845	?	193	6.55	5,037	768	148
American	406,541	143,534	567,139	78,599	69.8	193	4.09	2,832	692	134
United	336,617	67,216	432,996	98,902	73.4	294	6.44	5,008	777	228
Delta	226,036	64,014	305,699	49,264	73.0	218	4.78	3,531	739	161
Northwest	219,050	57,812	293,576	64,308	78.3	294	5.08	3,789	746	219
British Airways	484,265	218,876	724,514	129,760	73.2	268	3.31	2,213	668	179
Lufthansa	466,774	286,913	747,746	83,264	69.8	178	2.61	1,627	624	111
Air France	375,860	188,950	570,254	75,103	75.8	200	3.02	1,989	659	132
Alitalia	206,607	122,437	335,266	40,107	69.9	194	2.74	1,687	616	120
Thai Airways	118,288	45,944	168,568	37,773	70.2	319	3.67	2,575	702	224
Singapore	246,324	69,661	318,367	72,378	74.4	294	4.57	3,536	774	227
Garuda	86,028	26,292	94,861	26,387	54.5	307	3.61	3,272	907	278
Air India	56,906	16,143	79,784	16,077	68.1	283	4.94	3,525	713	202
Pakistan	51,960	21,859	77,682	13,492	63.5	260	3.55	2,377	669	174
Turkish	73,978	34,812	121,169	12,579	65.2	170	3.48	2,125	611	104
Etial Israel	67,310	22,912	96,319	15,998	72.0	238	4.20	2,938	699	166
Oriropic	49,576	31,217	81,717	11,495	64.6	232	2.62	1,588	607	141
Cathay Pacific	181,295	54,810	243,076	54,252	74.0	299	4.43	3,308	746	223
Qantas	172,467	31,289	218,962	58,499	71.5	339	7.00	5,512	788	267
Korean Airlines	186,354	52,228	266,283	46,414	70.1	249	5.10	3,568	700	174
Japan Airlines	260,620	53,565	336,854	82,517	73.1	317	6.29	4,865	774	245
All Nippon Airways	70,055	12,657	93,419	22,198	68.7	317	7.38	5,535	750	238
Japan Air System	1,682	1,054	2,889	435	72.3	259	2.74	1,596	582	151
Aeroflot	137,653	45,058	174,659	21,781	59.8	158	3.88	3,055	788	125
Transaero	13,021	7,121	18,518	2,071	54.3	159	2.60	1,829	703	112
Air Ukraine	17,816	6,663	19,284	1,370	57.7	77	2.89	2,674	924	71
Estonian	3,559	5,646	6,399	334	36.4	94	1.13	630	556	52
Lithuanian	6,100	4,453	10,410	641	43.2	105	2.34	1,370	586	62
Armenian	8,570	2,207	11,135	1,141	65.4	133	5.05	3,883	770	102

Notes: (B) = ASK/Flight Kilo(FLT KILO) (C) = Block Time(B.T.)/Departure (D) = FLT KILO/Departure (E) = FLT KILO/B.T.

Resources: World Air Transport Statistics WATS 6/67 No.41 IATA



### **7.6.5 Productivity of Uzbekistan Airways**

In general, old Russian-made aircraft presently owned by Uzbekistan Airways are bound to inflict huge operating expenditure to the company, compared with western-made aircraft.

In this regard, development of a compiling system for air transport statistics and financial data is indispensable, adopting the manner commonly used by western airlines, IATA and ICAO.

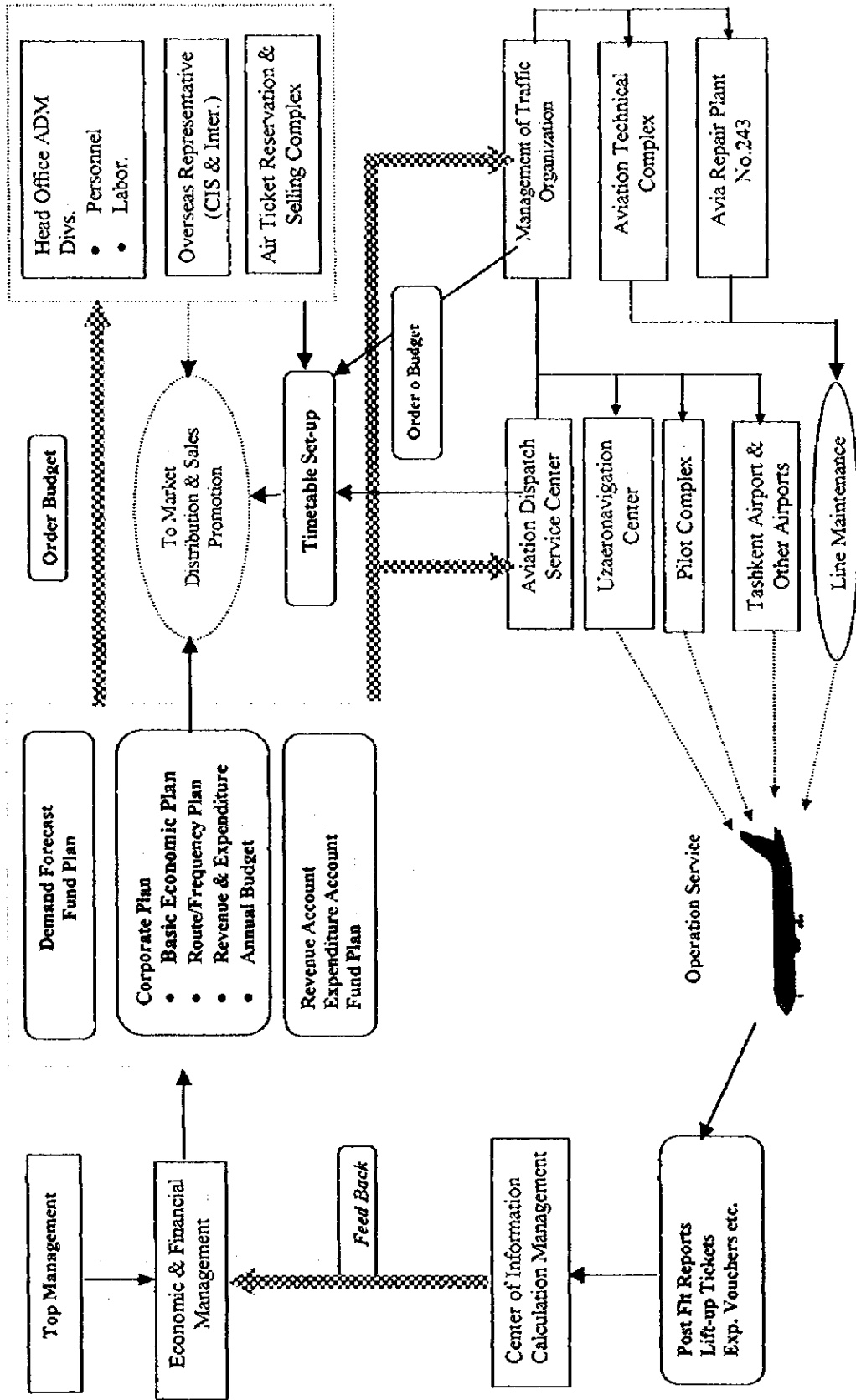
Major elements for analysis of productivity in western airlines are as follows:

- Sales amount (in US\$) by route
- Number of passenger aircraft
- Number of total employee
- Revenue passenger kilometer (RPK)
- Available seat-kilometer (ASK)
- Number of passenger carried
- Passenger load factor (RPK/ASK)
- Revenue per passenger
- Revenue per employee.
- ASK per employee
- Passenger per employee

### **7.6.6 Current Process for Business Management of Uzbekistan Airways**

Diagram of current process for business management of Uzbekistan Airways shown in **Fig.7.6.3.**

Fig. 7.6.3 Presumed Diagram of Current Business Process of UZ Airways



### 7.6.7 Corporate Planning

Brief comparison for corporate planning between Uzbekistan Airways and western airlines is shown below.

#### **Uzbekistan Airways**

##### **Step 1:**

Basic economic plan including revenues, expenditures, profit, budget, taxes and total product volume are calculated based on the theoretical ratio.

##### **Step 2:**

Route and frequency plan to meet with the above basic economic plan is prepared.

##### **Step 3:**

Timetables are prepared.

#### **Some of Western Airlines**

##### **Step 1:**

Route and frequency plan is prepared.

Company's product volume is obtained by accumulating product volume of each route

##### **Step 2:**

Revenues, expenditures, profits and budgets are calculated based on the route and frequency plan.

##### **Step 3:**

Timetables are prepared

### 7.6.8 Sales and Reservation

In the era of the former Soviet Union, all planning and management of air transport was made and controlled exclusively by Aeroflot, which had a huge air route networks and a well developed computerized system.

Without sales and reservation agents, salesmen, sales promotional activities and advertising, handling volume of air passengers at Tashkent airport reached a considerable level. There was no need for sales activities.

During the field survey, it was not easy to obtain a published timetable of Uzbekistan Airways. Without a published timetable, how can reservations and sales promotion be made?

As a matter of fact, the sales division of Uzbekistan Airways has just begun a big move toward adjusting itself to the market-oriented situation through the following effective actions:

- To improve its computer reservation system (Gabriel)
- To strengthen its sales network by increasing sales agents
- To publish printed time-tables on time and distribute them widely
- To publish its first advertising pamphlet, etc.

### 7.6.9 Passenger/Baggage Handling at Tashkent Airport

As stated above, passenger, baggage, cargo and mails are totally handled by personnel of Tashkent Airport Enterprise (TAE), which also performs ramp services (handling aircraft), except line maintenance. This is the biggest difference from other western airlines.

Transporting passengers and checked baggage to the destinations without fail is an essential duty and responsibility of airlines. All passengers are usually very much concerned about their checked baggage being transported safely to their destinations.

Airport staff, of course, is very eager not to make any mistakes with checked baggage handling, but their main jobs are loading them to the assigned aircraft. In this job they are therefore less

concerned with the arrival of the baggage items at the destination.

Once trouble has occurred, trouble-shooting must be done between staff at a remote overseas station and staff of TAE, exchanging information. Overseas staff is trained differently from TAE's staff. They belong to different enterprises with different command lines. Baggage trouble-shooting requires professional staff with skill and knowledge.

Furthermore, nowadays the all-through check-in of baggage is considered a necessary service for connecting flights. Passengers, especially high-yield business passengers are very concerned about their through-checked-in baggage, hoping for secure and smooth handling by the airlines concerned.

Once an airline is rumored to have a problem with baggage handling on its international lines, some of the passengers would bring their big baggages into the cabin and the atmosphere within the cabin would deteriorate.

As a result, passenger and baggage handling, at least, should better be performed by Uzbekistan Airways staff, not by airport people.

#### **7.6.10 Aircraft Operation**

##### **(1) Fleet of NAC**

Yak-40's and AN-24's are mainly put into domestic services, Tu-154's are into services inside of CIS and IL-62's, A-310's and B767's are into international services.

Fleet contains very old aircraft aged more than twenty (20) years such as Yak-40, AN-24 and AN-2, which are being replaced with the newly introduced RJ-85 model. Already two (2) of RJ-85' were delivered in July and in September 1997.

##### **(2) Operation Planning**

Daily utilization of Russian-made aircraft such as IL-62 and IL-86 is estimated as seven (7) hours, while for Western-made aircraft, such as A-310 and B-767, this is fourteen(14) hours.

Average Flight hours per year by Russian-made aircraft is approximately between seven hundred (700) and eight hundred (800) hours, while that by Western-made aircraft is approximately four thousand five hundreds (4,500) hours.

Remarkable imbalance between number of crew and number of airplane of the model is gradually corrected.

##### **(3) Approval for Flight Crew License**

Current qualification requirement for cockpit crew was prepared by Uzbekistan Airways, and reviewed and consented by Lufthansa. About 30% of licensed crew have been examined and passed by Lufthansa (A-310), and by Boeing (B767) before they approved.

##### **(4) Crew Training(Emergency Evacuation)**

Emergency evacuation training is performed every six (6) months. Participants are both cockpit and cabin crew.

##### **(5) Audit by Foreign Authorities**

Before start of service to New York, they reviewed and followed comments and recommendations by FAA after inspection both in operation and maintenance of Uzbekistan

Airways.

(6) Preparation for Departure

Preparation, check and confirmation procedures are conducted in the same manner as those of western airline.

(7) Cabin Services

Cabin services currently being provided on flights of Uzbekistan Airways seems to be equal or better than those in western airlines and training programs for western designed aircraft are already well established.

(8) Evaluation of Present Operation Plan

Table 7.6.17 and 7.6.18 show the required number of airplanes and crew as the result of evaluation based on the current timetable, which excludes special flights such as charter flights, and crew duty hours/pattern, maintenance requirement as well.

- There are more eastern-made aircraft than required.
- Crew training is making progress step by step and balance between number of airplane of the model and number of crew (captain, co-pilot, flight engineer, and navigator) is being improving. Meantime imbalance between the number of airplanes of the individual models and number of crew will gradually be resolved.
- Number of cabin crew for A-310 is probably less than required.

**Table 7.6.17 Fleet Required for Scheduled Flight**

Aircraft Model	Present Number of Aircraft	Number of Airplanes	Remarks
B767	2	3	Replacement required during "C-Check"
A-310	2	3	
IL-62	9	8	One is for "Replacement"
Tu-154	24	7	
An-24	24	9	
Yak-40	21	16	

**Table 7.6.18 Required for Flight and Cabin Crew**

Aircraft Model	Flight Crew			Cabin Crew	
	Present Pilot	Present Copilot	Required	Present (*)	Required (set)
B767	1	22	16	156	16
A-310	15	25	11	41	11
IL-62	19	29	18	-	-
Tu-154	29	56	31	106	31
An-24	59	59	10	26	10
Yak-40	91	74	18	31	18
<b>Total</b>	<b>214</b>	<b>265</b>	<b>104</b>	<b>163</b>	<b>59</b>

Note: Present (\*) indicates the number of present cabin crew.

(9) Evaluation on number of employee

Current number of employee is fairly reasonable when evaluation is made on the basis of the number of airplane owned by NAC. However, this comes out to be larger when analyzed on the basis of number of scheduled flights served. This means that production efficiency is much lower than that in western airlines.

## 7.6.11 Aircraft Maintenance

### (1) Applicable Regulations for Maintenance

Current applicable regulations for aircraft maintenance in NAC are based on MAK (Regulations approved by Interstate Aviation Committee of CIS) for Russian model aircraft and FAR (Federal Aviation Regulations established by Federal Aviation Agency of USA) for Boeing 767 and 757, and JAR (Joint Aviation Regulations established by civil aviation authority organization in EU countries) for A310.

Maintenance of NAC's eastern built fleet aircraft is mainly carried out by two (2) parties, namely, Aviation Technical Complex (ATK) under the NAC organization and state company, Avia Repairing Plant No.243 situated at Tashkent Airport.

### (2) Aviation Technical Complex (ATK)

ATK is one of NAC's complexes with 600 engineers and mechanics, 50 inspectors for quality control and 650 other staff in Tashkent airport and 500 staff in total at local airports.

ATK has been planning to send about two hundred (200) mechanics for training to Boeing, Lufthansa and Avro. ATK is now applying for "Repair Station Certificate" of JAA.

### (3) Repair Plant No.243

Repair Plant No.243 was established in 1924, and is scheduled to become a stock company in order to form a technical maintenance center in Central Asia with a view to receiving orders for maintenance of western-designed aircraft such as B757, B767 and A310 from countries in the CIS such as Turkmenistan, Azerbaijan, the Ukraine and Russia.

The total number of employees is about 2,500 and its production capability is estimated at a level so that three(3) IL-62 can be repaired in a month. It also applies for the JAA Certificate for the Repair Station.

### (4) Qualification Requirement for Mechanics

Aircraft maintenance mechanics working at ATK or Repair Plant No.243 require the following qualifications:

- Training on model of aircraft and practical training in the Training Center and Factory.
- License for Technical Service is limited to three (3) models of aircraft.
- Permission to sign documents is given to aviation mechanics with a degree not lower than 4.
- Permission to approve work in Technical Maintenance is granted to aviation technicians before the approval of the technician.
- The license is given to personnel not younger than 18 years and not older than 55 years.

### (5) Current Procedures of Aircraft Maintenance

#### a) Training course

In general, training courses for employee in every field are prepared in the training center. However, the required courses such as training course for A-310/ B767, which are not available, may be prepared and conducted by ATK.

#### b) Approval for mechanic license

Current authorized mechanic for A-310 is approved by French authority and authorized

mechanic for B767 are approved by Uzbekistan authority under the agreement with Bunnuda authority.

c) Maintenance for A-310 and B767/B757

Maintenance agreement with Lufthansa, which covers heavy maintenance of aircraft and its components has been executed effective until February 1999.

d) Foreign Repair Station Certificate

Preparation for application to JAA is almost completed in ATK, which is to be rated as line maintenance, and is under progress in Repair Plant No.243. In addition to the above, application to FAA is planned.

e) Fleet Plan

Serviceable ratio of eastern-built aircraft such as Il-62 is fairly low as 40%, which does not allow them to fly any chartered flight.

f) Maintenance Planning

Current maintenance plan (application of maintenance program) is based on Lufthansa's. However requirement approved by the French authorities for Uzbekistan Airways is not identical to that for Lufthansa, so that modifications are applied.

g) Manual

Manual used for maintenance of western-manufactured aircraft are written in English and for eastern-manufactured in Russian.

h) Record Keeping

Records are kept by mainly as manuals (not on computer systems). This is not different from western airlines.

i) Recurrent Training

Training program includes recurrent training, which is quite identical to that in western airlines.

j) Monitoring

Monitoring system works effectively the same as in western airlines.

k) Calibration

Calibration of equipment and instruments is performed in accordance with "state standards".

l) Engineering Approval

Engineering approval is granted mainly by manufacturers and by the authorities when needed. This is identical procedure adopted also by western airlines.

#### 7.6.12 Overall Review of Air Carrier Sector

As the results of review on air carrier sector of NAC, the followings are major issues for modernization of Uzbekistan Airways.

- Compared with management styles of western airlines, air carrier services are not clearly separated in NAC's management as an independent area. Management procedures of the air carrier sector seem to be very uncertain and not systematically established due to the slow

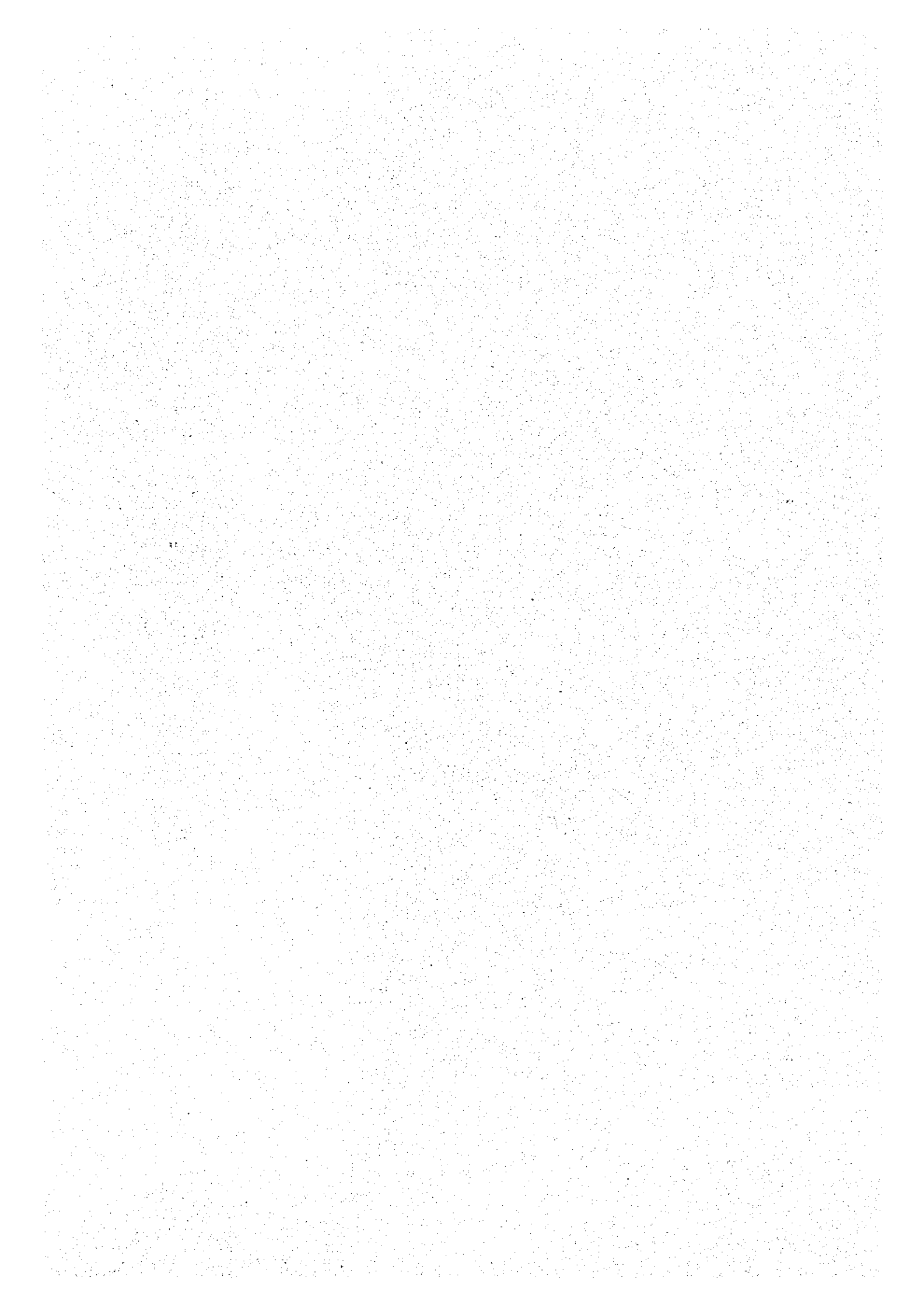
introduction of a self-supporting system and corporate policy.

- Sales division of Uzbekistan Airways seems less influential in making corporate planning, comparing with western airlines.
- Their current status of maintenance and operation of aircraft can not be considered perfect for "Safe Operation". Especially number of personnel required by the size of activity is not fulfilled, for example, licensed mechanic for A-310 and B767.
- In emergency situations, the movements of cabin attendants are very important for assuring safe operation. Therefore, training for emergency evacuation with combinations of flight crew and cabin attendants is indispensable.





**CHAPTER 8**  
**MODERNIZATION PLAN OF**  
**NAC AND RECOMMENDATIONS**



## CHAPTER 8      MODERNIZATION PLAN OF NAC AND RECOMMENDATIONS

### 8.1      General

The present NAC organization covers various roles and functions related to the civil aviation activities of Uzbekistan from policy making, airport management, air traffic control services, air transport services and management of subsidiaries, having a huge complex and with a large number of employees. However, the NAC organization and its infrastructure have many serious deficiencies, which need to be improved if air transport is to be efficient and effective in supporting the country's development.

Similar to the other countries in the CIS region, Uzbekistan is also faced with a big transition and confusion period in respect to both its economic and social systems, and institutional structure after independence in 1991.

Firstly, one of the phenomena seen after independence was the remarkable decline of air traffic demand since 1992 in Uzbekistan as well as other CIS countries. Air passenger traffic volume of Uzbekistan in 1996 decreased to 25% of the 1991 figures, although the decline is becoming a gentle slope recently.

It is considered that the decrease in air traffic demand may be caused by the following reasons;

- Fall in air passenger demand due to economic reform and confusion in Uzbekistan;
- Impact from raising air fares and freighter rates due to price increases on fuel and other expenses;
- Stagnation and inactivity in trade and exchanges of persons and goods between Russia, in particular, Moscow, and CIS countries after breakdown of the former Soviet Union; and
- Collapse and breakdown of differentiated production systems among the CIS countries under the centralized planned economy previously controlled by Moscow.

Secondly, during time of the former Soviet Union, 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 resources.

Thirdly, NAC has actively introduced western-built aircraft and equipment with western financial support, but, discrepancies between Uzbekistan standards/procedure and international standards/procedure are unfolding day by day.

Geographically and from the viewpoint of the existence of natural and tourist resources, Uzbekistan has a strong advantage and potential as an aviation transport center of the CIS region. Therefore, modernization of the civil institutional entity, as well as of the aviation infrastructure, is a main issue for this double land-locked country to achieve the above target, and to help in the implementation of a market-oriented economy.

### **8.1.1 Current Situation of World Civil Aviation**

As principal tendency of current civil aviation sector in the World, the following points are recognized.

- **Tendency for Open Skies Policy**

Since 1978, the government of The United States of America has been advocating an "Open Skies Policy" in its air talks with other countries. The main principle is to liberalize the air services market and to press for lifting of governmental regulations with regards to nominated airlines, frequencies, locations served and tariff. The USA has concluded "Open Skies Agreements" with 25 countries, including 11 European countries (Netherlands and Germany) and 5 Asian nations (Singapore and Malaysia).

- **Deregulation**

Uzbekistan Airways is the only air carrier in Uzbekistan supported and controlled under governmental laws and regulations. However, the trend towards deregulation throughout the world is being extended not only to civil aviation industries, but also expanded widely from other businesses to social and economic activities.

- **Globalization and Mega-Carriers**

In the course of the development process of the air transport business, various types of business tie-ups from joint operation and code sharing, to capital cooperation have been created among the world airlines, in order to expand and strengthen their competitive market.

With clear progress in the liberalization of the air transport business, strategic business cooperation is being formed between such major world airlines as KLM (Royal Dutch Airlines) and Northwest Airlines (USA), United Airlines (USA) and Lufthansa (Germany). Furthermore, new group formations based on business cooperation in international air transport is in progress between major airlines in the USA, Europe and Asia.

- **Privatization and Commercialization in the Aviation Sector**

In many countries, airports and air navigation facilities have been developed on government budgets in the course of the development of social capital and infrastructure. However, many developing countries, and even some developed countries are suffering from difficulties in the procurement of funding resources required for infrastructure development, due to a shortage in national revenues and restraint policies on external loans.

Recently, to promote privatization and commercialization of national companies and to improve financial and operation efficiency, privatization policies have been adopted for the development of various infrastructures including airports in many countries.

### **8.1.2 General Issues for Modernization of Air Transportation**

#### **(1) Necessity for Restructuring of NAC Organization**

The present organization of NAC is not like that of the governmental civil aviation agencies in many countries. In most western countries, there are clear divisions of responsibility, activities and institutional structure of organizations in the civil aviation sector.

In the institutional structure of the present NAC organization, these two functions are combined and tenaciously held by one huge entity.

Regardless of the social framework, the governmental services are apt to falter due to the lack of a competitive spirit and customer-oriented services, and poor business effectiveness in general.

NAC is too big organization to be able to attend to detailed services, especially in the area of commercial business operation.

Therefore, in planning a restructuring of the existing NAC, it will be necessary to take into account the commercial viewpoint and ability of the system to support itself.

(2) Support of "Open Door Policy" by Aviation Sector Development

Now headed by a market-oriented, democratic-style government, Uzbekistan is slowly but steadily shifting its governmental policy from the former unified political and economic system, to a new market economy, pursuing an "Open Door Policy" creating favorable possibilities for attracting foreign investments.

(3) Activation of Role of Air Transportation

The role of air transport is very important for the development of economical and social activities. Taking into account the geographical characteristics of Uzbekistan, air transport, especially international air traffic, is an essential requisite for Uzbekistan. Uzbekistan lies in the middle of the Asian continent and has no access to the open sea.

Activation of air transportation is one of the most important issues for national economic development. Especially, the strengthening and modernization of Uzbekistan Airways is an urgent subject.

(4) Redundancy of Employment in Organization

According to information available, the number of personnel belonging to NAC and its subsidiaries are counted at more than 16 thousand. Although this figure includes staffs carrying out non-aviation sector tasks in NAC, it is considered that present level of employment in NAC is rather supernumerary.

All airports in Uzbekistan are over-staffed compared to the volume of air traffic handled. These employees consist of specialists who have special skilled and of ordinary working staff.

From the viewpoint of a self-supporting business, it is also essential to be aware of the need for saving costs. In this regard, a reasonable restructuring of the manning in respective units in NAC and establishment of training programs for airport staff will be a very important issue in the future.

(5) Securing of Safe Operation

In any public transport system, provision for safety of operation is the primary subject. Especially, safety of operation services in air transport is the first priority.

To secure safety of operation of air transport, in parallel with the implementing of modernization of the aviation infrastructure, concentrated effort should be paid to the securing safe operation.

## **8.2 Restructuring Plan of National Air Transport Administration**

### **8.2.1 Recent Restructuring Plan**

#### **(1) NAC's Restructuring Plan for Organization**

NAC had developed "a concept for functioning of Civil Aviation of Uzbekistan" under the circumstances of market economy proposing to create a Holding Company of NAC so as to give financial independence to NAC. The concept had been approved by NAC Board in 1995.

Recently, NAC is finalizing restructuring plan of the existing organization. According to the brief explanation given through the meeting with the General Director of NAC during final stage of the second field survey, main points of the plan are as follows;

- To create a State Civil Aviation Supervisory Committee under the Cabinet Ministers, independent of NAC organization, in order to control and supervise air safety related to the civil aviation including air traffic, airport facilities, airworthiness of aircraft and licensing of airlines
- To divide Uzbekistan Airways into the following three affiliated companies, International Air Company to operate western fleet, B-767, B-757, A-310 and RJ-85, Regional Air Company to operate eastern fleet, IL-96, IL-62, Tu-154, An-24, Yak-40, and IL-114, Air Cargo Company to operate cargo jets, IL-76 and An-12

General tendency of world airlines now is going toward unification and alliance of airline companies aiming at survival in the struggle of existence. However, the situation in Uzbekistan seems a little different. The modernization of all of the present Uzbekistan Airways would impose tremendous burdens and time on the airlines, especially in the field of staff training and maintenance of aircraft. In order to utilize company energy and its limited resources, it seems very reasonable to separate the international routes and concentrate the company's power on them in order to have a better competitive capability among other strong airlines.

### **8.2.2 Alternative Plans for Restructuring of NAC**

#### **(1) Basic Philosophy**

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 organization(s). To be more concrete, it is recommended that a clear line should be drawn between the services by such governmental administration bodies and the services by commercial enterprises.

#### **(2) Alternative Plans for Restructuring**

Basic concept of alternatives for restructuring of NAC organization is to aim at establishing responsible units in accordance with the particular purpose of activities and revenues.

In line with the above concept, three (3) alternatives of restructuring plan of NAC are proposed below.

a) Alternative A

Alternative A is intended to newly create Department of Civil Aviation (DCA) as a governmental body responsible for civil aviation policy and regulation, and certification of airmen, airlines, aircraft and airports. New DCA will be formed by transferring necessary functions and personnel to conduct its purpose from the existing NAC.

Air carrier units, airport units and air traffic control unit of NAC will remain under the control and responsibility of NAC.

Expenditure required for maintaining the DCA is to be basically covered by the state budget, and slightly supplemented by certification fees of aircraft, airmen and airports.

b) Alternative B

In addition to the functions of the DCA in Alternative A, DCA in Alternative B intends to cover air traffic control services and operation/maintenance of communication facilities and air navigation aids in Uzbekistan.

Air carrier units, airport units of NAC will remain under the control and responsibility of NAC.

Expenditure required for maintaining the DCA is to be basically covered by the state budget and certification fees, and supplemented by air navigation facility charges.

c) Alternative C

Alternative C is intended to clearly separate air carrier unit from the governmental organization.

The air carrier unit is to be managed and operated under the self-supporting account system, and shall concentrate on airline business. The air carrier unit (Uzbekistan Airways) shall be intended to transfer from the state companies to privatized company, if such circumstance come.

In addition to the functions of the DCA in Alternative A, Alternative C intends to cover air traffic control services and operation/maintenance of communication facilities and air navigation aids in Uzbekistan. Tashkent airport is to be managed and operated by TAE, but its ownership will be in hands of the DCA.

Expenditure required for maintaining the DCA is to be basically covered by the state budget and revenues from certification fees, and supplemented by air navigation facility charges and revenues from airports.

(3) Model for Organization for Department of Civil Aviation

Principal roles and functions of the new "Department of Civil Aviation" should include the following matters;

- To make aeronautical policy, laws and regulations related to air transport, airports, air navigation facilities and air traffic services;
- To negotiate and conclude on air agreements;
- To construct, operate and maintain the aviation infrastructure;
- To issue airport licenses;



- To issue aircraft registration certificates;
- To issue airworthiness certificates;
- To issue licenses for air transport services;
- To issue certification ;
- To designate paths through airspace, as airways, appropriate for the navigation of aircraft;
- To provide air traffic control services; and
- To determine and control rules and regulations on matters related to civil aviation activities in Uzbekistan.

#### (4) Requisites for Implementation of Restructuring

The Government of Uzbekistan has adopted a gradual reform of the economic system from a centralized planned economy to a market-oriented economy, emphasizing the promotion of privatization of state companies expanding from small firms to medium and large enterprises.

Reform of social, progress of economic and financial market reform in Uzbekistan, especially in respect to stability of the exchange rate, settlement system for commercial transactions, and finance and capital trading market will be required. If NAC will substantially pursue the restructuring of the present organization, it is strongly recommended that the following matters should be taken into account:

- Centralized control and management system should be improved so as to transfer responsibility and decision making to the respective divisions;
- Disclosure system of information should be established according to progress of privatization. No foreign investor and financier should be allowed to invest without information relating financial and management situation;
- Accounting system should be modernized incorporating international account practice;
- Statistic data processing system should be developed;
- Difference of technical standards between western and eastern systems should be reviewed and revised;
- Reduction in number of staff should be reviewed and revised in accordance with the job volume and financial aspects.

### 8.2.3 Reforming of Revenue Components and Accounting System

This section discusses the present revenue sources and reallocation of its component in accordance with the assumed restructuring plan of NAC.

#### (1) Overview of Present Revenue System

According to the present revenue items of NAC as a whole as listed in **Table 8.2.2** are intermingled with airline-hood revenues, airport-hood revenues.

As to the airline-hood revenue items, there are items of "Regular Transportation", "Order and Charter", "Aircraft Lease", and "Agriculture Aviation", which occupy 77% of total revenue of NAC in 1996.

On the otherhand, regarding the airport-hood revenues, there are "Commercial Passenger and Cargo Services", "Aircraft Departure", and "(%) of Passenger and Cargo Revenue". Those items are normally considered to be revenues for airport operation. However, for western airlines, they are considered expenditure items.

**Table 8.2.2 Major Revenue Items of NAC**

Revenue Items	Revenue in 1996 of NAC Total (Million Sum)	%	Revenue in 1996 of TAE (Million Sum)	%
1. Regular Transportation	7,137.2	68.1		
2. Commercial Passenger & Cargo Services	258.8	2.5	189.1	17.8
3. Aircraft Departure	924.5	8.8	303.1	28.5
4. Order and Charter	546.5	5.2		
5. Aircraft Lease	214.6	2.0		
6. (%) of Passenger & Cargo Revenue	133.6	1.3	20.3	1.9
7. Agriculture Aviation	136.8	1.3		
8. Other Revenue	1,127.3	10.8	550.6	51.8
9. Total of Revenue	10,479.3	100	1,063.5	100

**(2) Reform Plan of Revenue Sources and Accounting System**

It is recommended that revenue sources and accounting system should be reformed in accordance with the restructuring plan of the NAC organization, taking into account the clear separation of activities between government, airline and airport services.

**8.2.4 Law and Regulation for Civil Aviation**

NAC is administrated based on the Corporate Article dated February 1992. However, according to restructuring of organization of NAC, its modification would be required.

**8.3 Improvement Plan for Management and Operation of Airports**

**8.3.1 Major Issues in Management and Operation of Airports**

Present problems related to management and operation of Tashkent and other local airports are summarized, although information and data was limited, as follows:

**(1) Type and Function of Airport Administration Organization**

Among airports for civil aviation use in Uzbekistan, only Tashkent airport is nominally managed and operated by an independent body with its own accounting system. Other local airports are directly managed by NAC through each local airport.

Tashkent airport as well as local airports have provided many different fields of services, ranging from airport operation and maintenance to check-in services and passenger/cargo handling.

In general, the airport business and airlines business functions are separated very clearly in western countries. Airport business is mainly to provide space and facility to airlines and passengers in order to obtain revenues. Airlines business is mainly to provide transport services to passengers and cargo in order to earn revenues.

Intermingling of management, functions and staff in airport administration organization will result in poor efficiency and functions as shown below:

- No transfer of responsibility and command line;
- Inefficiency of business planning (corporate plan) and control;
- Difficulty of trouble-shooting in account system and performance.

(2) Redundancy of Employment

According to information available, the number of personnel belonging to airport organization in NAC is more than 6 thousand, including Tashkent and local airports. Although this figure includes staff carrying out airline-hood tasks, it is considered that the present level of employment for airport operation is rather supernumerary.

Whether the future institutional position of the airport organization is that of a government organization or not, the airport operator and its employees will require to have a clear notion as to the need for providing efficient services to passengers and airport users.

(3) Superannuating of Airport Facilities

Most airport facilities had been constructed in 1970s/80s under the former USSR control. After collapse of the USSR, rehabilitation had not been conducted frequently and timely. Presently, it is time moment to improve these facilities in order to upgrade efficiency and quality.

(4) Differences with International Standards

Airport facilities and air navigation aids had been planned and designed based on the MAK standards. After the independence from the former USSR, NAC installed, at Tashkent airport, western-made air navigation aids which are designed ICAO regulations and MAK.

Double standards may lead to confusion in design, operation and maintenance procedures of facilities. Furthermore, training for western-made facilities will also be required.

(5) Low Service Level for Passenger Comfort

Impression on comfort of passenger at airport is generally determined by physical conditions of airport facility, and attitude and procedure of staffs at airport and airlines.

Improvement of physical conditions of airport facilities is matter of financial arrangement and maintenance practice. As a project for improving the existing terminal building at Tashkent airport is being carried out with the finance of EBRD (European Bank for Rehabilitation and Development), the terminal building facility will be expected to become better.

As far as passenger-handling procedures in Tashkent airport are concerned, the present service level is below international practices. Customer (passenger)-oriented services are not founded in the course from check-in to boarding, and from arrival to immigration procedure.

For example;

- slow processing in check-in, and immigration and customs inspections
- no explanations to passengers in case of delay of flight schedule
- bad arrangement of ramp transportation for arrival
- high fee level of use of business lounge
- no adequate facilities for passenger relaxation such as lounges, restaurants

(6) Accounting System of Airport

TAE has its own accounting system, but is largely controlled by the NAC headquarter. Revenues and expenditures of local airports are reported to NAC headquarter. It seems that there is no procedure for identifying the clear financial and economic responsibility of each self-controlled operation unit.

(7) Improvement of Revenue Resources

Revenues from non-airport operation are seriously important to airport operators in western airports. Therefore, it will be necessary for the airport operator to take active promotion measures, for example, expansion of the concession area, rental space for advertisement and provision of car park charge, in order to increase revenues from non-airport operation.

(8) Maintenance Procedure and Training

Present maintenance procedures stressed the need for repair work rather than preventive maintenance due to the financial reasons and lack of spare parts. Staff for maintenance unit seemed to be well trained. Equipment for maintenance of airfield facilities is very superannuated.

### 8.3.2 Options for Airport Administrative Organization

(1) Type of Ownership/Operator of Airports

Traditionally, in many countries, airport land and basic infrastructure such as runway, air navigation facilities and air traffic control facilities have been constructed, operated and owned by the governmental organizations.

Currently, however, there are several variations and exceptions to these traditional rules. The costs to government for operating and maintaining airports can be reduced, for example, by transferring smaller airports from government to come under the control of local authorities.

Form of airport administration is commonly classified into the following four types:

- Constructed, owned and operated by a national agency or Corporation set up for the purpose;
- Operated and owned by provincial or local government;
- Owned and operated by a privatized airport company;
- Combination of above types to suit the particular circumstances and aviation background of a country.

## **(2) Options for Airport Administrative Organization Type**

If an airport is intended to operate under self-supporting account system, restructuring of the present airport organization will be required in order to attain efficient operation and profitable management.

From viewpoints of self-supporting account system, the following options are proposed as follows:

### **Option 1: Independent State Corporation**

Financially, institutionally an independent State Corporation.

In this case, airport operation services and airline services should be clearly separated, including command line, and account system.

Major financial resources of the corporation will be landing fee, passenger airport charges and concession fee. Presently, Uzbekistan Airways doesn't pay landing fee. However, after the restructuring of NAC, the Corporation should collect the landing fees from Uzbekistan Airways.

Air traffic control service should remain under the responsibility of the new civil aviation administration body.

### **Option 2: Airport Administration Authority**

This type is similar to the State Company.

All airports including Tashkent and local airports belong to the Authority.

Revenue from Tashkent airport will be used for expenses for local airports, which cannot be operated financially without financial back-up from TAE or other sources.

Air traffic control service should remain under the responsibility of new civil aviation administration body.

### **Option3: Local Government**

Ownership and operation of existing airport is transferred to a local government.

Local government is responsible for operation and maintenance of the airport. Main revenue sources will be landing charges, passenger airport charge and concession fees.

Air traffic control service and responsibility for regulatory for airports should remain under responsibility of new civil aviation administration body.

### **Option 4: Privatized Airport Company**

A privatized airport company operates under a commercial concept.

In general, a private company has to operate the airport, seeking commercial profit in a market-oriented economic system, with revenues from airport users of passengers and airlines. Therefore, provision of comfort and quality service might rather be a matter of secondary importance.

However, as an airport facility is a kind of public infrastructure for the state and

community, provision of services at airports is considered to be a public utility, selection of privatized airport company should be analyzed and evaluated with careful deliberation.

Even if the airport is privatized, air traffic control service and responsibility for regulation for airports should remain under the responsibility of the new civil aviation administration body.

#### **Option 5: Build, Operate and Transfer (BOT)**

A private concession company authorized by NAC, or new civil aviation administration body.

The government grants a concession to a private firm to build or improve a specific airport facility, and to operate it and obtain revenues from its operation for a designated period. After the expiry of the designated period, such facility may be transferred to the government.

A range of BOT may vary from a full set of airport operation to a part of airport facility such as passenger terminal building, car park.

In this case, air traffic control service should remain under the responsibility of NAC, or new civil aviation administration body.

#### **(3) Process to Self-supporting Organization**

Development and management of airports traditionally, even at present, belongs to the government. Recently, attempts at commercialization, privatization and the establishment of self-supporting airport system are being made in the aviation sector in many countries.

Airports including ATC system are an indispensable element in air transportation. The airport is a point of contact between air transportation and land transportation. Therefore, it is necessary to consider the relationships among elements relevant to air transportation in the selection of organization style. Principal elements of air transportation consist of three elements, i.e. airlines, airport including ATC system and passengers and visitors.

The following points should be taken into account in process to self-supporting system of airport organization:

- Efficiency of services to respond with airport users (visitor, passengers, airlines);
- Review and adjustment of number of airport staff in accordance with tasks;
- Measure for increasing of revenues from non-airport operation;
- Incentive privilege regarding taxation.

#### **8.3.3 Proposed Airport Administration Structure**

Compared with the number of airport administration staff in Japan, the number of personnel engaged in management and operation services of airports in Uzbekistan is rather high, against the current handling traffic. At Tashkent airport, the number of staff who are directly in charge of airport operation and maintenance are estimated at 23 % of the total employment, plus several percentage within part of "Passenger and Cargo Services". Furthermore, 18%

of the staff is in charge of non-airport services in the TAF organization.

The New Tokyo International Airport Authority, which is the airport administration body established especially to manage and operate the New Tokyo International Airport in Japan, has about nine hundred (900) staffs, including management and operation sections, and construction offices. Handling volume in 1996 was more than 24 million passengers and 1.5 million tons of cargo.

Kansai International Airport Company, which was established in 1995, as the first private company for airport administration in 1995, has about five hundred and sixty (560) staffs. Handling volume in 1996 was approx. 16 million passengers and 660 thousand ton of cargo.

At the above both airports, the airport administration organization has only a minimum of staffs required for airport management and construction. Major parts of maintenance works such as cutting grass, sweeping of airfield and buildings, utilities, security check services, fuel supply are subcontracted out to the private companies.

(1) Prototype of Organization for Airport Administration

A schematic diagram of an administration organization that would be necessary to ensure the efficient operation and management of Tashkent and local airports is proposed.

Under the Airport General Manager, three departments, namely, Administration Department, Technical Department, and Operation Department are set up.

Operation Department will carry out the services related to apron use management, rescue and fire fighting services, passenger/cargo terminal and fuel supply.

(2) Manning Adjustment for Tashkent Airport and Local Airport

Table 8.3.3 shows the proposed manning plan for administration of the Tashkent Airport and local airports. The proposed manning was planned, taking into account the number of staff for the administration organization of airports in Japan.

**Table 8.3.3 Indicative Manning of Airport Organization**

Positions	Tashkent		Local Airports	
	Present	Plan	Present	Plan
<b>Airport General Manager</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>[ Administrative ]</b>				
Deputy General Manager	1	1		1
Personnel/General Management	203	49		10
Accounting/Statistic Management	64	36		6
Juridical & Contract Management	13	13		3
Public Relations/Information	48	26		5
Procurement/Sales Management	14	14		5
Subtotal	343	139	30	30
<b>[ Operation ]</b>				
Deputy General Manager	2	1		1
Apron Management	555	16		4
Rescue and Fire Fighting	429	66		36
Security Services	0*	66		10
Passenger Terminal Services	72	36		6
Cargo Terminal Services	14	36		3
Fuel Supply Services	121	129		15
Others	87	0		0
Subtotal	1,280	360	118	75
<b>[ Technical ]</b>				
Deputy General Manager	2	1		1
Airfield Maintenance	55	48		9
Building Maintenance	128	128		9
Electric Facility Maintenance	110	81		5
Mechanical Facility Maintenance	82	111		5
Environment Protection	5	8		5
Subtotal	382	410	36	34
<b>Subtotal of Airport Staff</b>	<b>2,006</b>	<b>910</b>	<b>185</b>	<b>140</b>
<b>Airline-hood Services</b>	<b>565</b>	<b>-</b>	<b>53</b>	<b>-</b>
<b>Non-Airport Services</b>	<b>545</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total</b>	<b>3,116</b>	<b>910</b>	<b>238</b>	<b>140</b>

#### 8.3.4 Improvement of Passenger Comfort

It is recommended to upgrade quality level of facilities, and to promote improvement of attendance performance as soon as possible.

##### (1) Quality Level of Facilities

- Sufficient lighting and brightness of the passenger terminal building;
- Sufficient English guidance of facility and direction indication;
- Public address system and information counter in English;
- Appropriate air-conditioning in passenger terminal building;
- Efficient communication system;
- Relaxation facilities for passenger such as restaurant, duty free shops, clean rest room.



(2) Attendance Performance

- Infiltration of a passenger-oriented attitude in employees;
- Quick, efficient and simplified inspection at each checking point;
- Training of English;
- Procedure that are easy to understand.

**8.3.5 Improvement Plan of Financial Operation Practice**

To improve accounting system of TAE, it is recommended to take the following measures:

- Uzbekistan Airways should pay landing fees to Tashkent Airport Enterprise as well as to the local airport.
- Its price level should be determined so as not to discourage foreign airlines from flying over Uzbekistan airspace.
- It is recommended that PAC should be collected directly at Tashkent Airport and other local airports. PAC should be collected from domestic and CIS routes passengers.
- It is recommended that introduction of Car Park Charge should be considered as an airport revenue.
- It is recommended that airport operators should promote increases in revenue from concession.

**8.3.6 Proposed Maintenance Plan**

The following measures are recommended to improve maintenance procedures for airports:

- Establishment of maintenance manual;
- Modification of maintenance procedures from repair maintenance to prevention maintenance;
- Improvement of training center;
- Outsourcing of routine maintenance work.

**8.3.7 Airport Emergency Plan**

An airport emergency plan should be prepared to indicate the responsibilities of as well as the action to be taken by agencies that could be of assistance in responding to an emergency, considering the following matters:

- To serve as a guide to internal and external agencies who have a part to play, especially local fire departments, police, ambulance services, hospitals and medical units in the event of an aircraft accident on or near the airport;
- To set out in detail the responsibilities of all the emergency organizations as to their role in response to and participation in an aircraft accident on and off the airport;
- To establish the sequence of arrangement for calling of airport rescue and fire fighting services as well as police, ambulance, hospitals, medical units, and local fire department.
- To establish a fixed emergency operations center in the airport;

- To set out command lines for the emergency services. Normally, the officer-in-charge of the airport rescue and fire fighting service will be the first person in command.
- To determine the degree and responsibilities of response for rescue between the airport rescue units and externally based emergency services;
- Two grid maps should be prepared. One, the internal airport maps, should depict all relevant airport details including taxiways, access roads, water supplies, rendezvous points. The second, airport external maps should show in detail the perimeter of the airport, surrounding communities, access roads, bridges, swampy area, etc., up to eight (8) kilometers from the airport.
- To establish method of training and rescue drill, and review the results to allow for improvements to enhance the effectiveness of emergency plan.

### **8.3.8 Training Plan**

At least the following program is recommended to keep maintenance skill of airport staff.

- Training Course for Recruit
- Advanced Training Course
- Senior Training Course

## **8.4 Modernization of Air Carrier Sector (Uzbekistan Airways)**

### **8.4.1 Summary Review and Issues for Modernization**

The following is a summary review of issues on current management and operation of the air carrier sector (Uzbekistan Airways).

#### **(1) Management for Air Carrier Sector**

Compared with the management styles of western airlines, management of Uzbekistan Airways is not clearly separated in NAC's management as an independent unit for airline business.

Although the unit of Uzbekistan Airways is now buried under overall organization of NAC, its business management process as an airline will be required to be functionally the same as in most western airlines.

#### **(2) Employment Volume**

Present personnel level for Uzbekistan Airways is considered to be very high, compared with the present production volume.

Index of ASK/employment represents productivity per employee, and the same of Uzbekistan Airways is 1.21. ASK/Employment of the western airlines is ranging from 2.12 to 5.00, while the indices of airlines in the former USSR are below 2.0 except Transaero.

#### **(3) Financial and Accounting System**

Only Profit and Loss (P/L) and Balance Sheet (B/S) for all over NAC was available for analysis on financial and accounting system. Basically, present account system of NAC is not clearly separated in accordance with activity of each unit in NAC.

Therefore, as for financial conditions of Uzbekistan Airways, it was difficult to extract financial and accounting data of the Airways from the above P/L and B/S.

(4) Air Route Structure and Production

During the field survey, information relating to the air route structure of Uzbekistan Airways was not available. Basic indices showing the airlines' capacity and activity are normally compiled and reported based on the common format of IATA and ICAO. Analysis on the current air route structure was made based on the timetable as of March 1997.

- A big part of the company's production (ASK) is put into international routes and the Moscow route (82%).
- A big part of the company's production (ASK) is covered by two types of western made aircraft: A310 and B767 (63%).
- Many flights are put into domestic routes and exhaust much frequency and block time by using small Russian made aircraft, Yak40 and An24.

It is important to establish efficient analysis method for air route structure as a part of Corporate Planning procedures, in accordance with the practices of IATA and ICAO.

(5) Corporate Planning

Procedures of making corporate plans differ from western airlines.

(6) Sales and Reservation

The sales/reservation division of the Airways seemed not active.

It is also necessary for the airlines to strengthen market study and sales promotion by establishing effective sales channels.

(7) Passenger/Baggage Handling at Airports

Handling of passenger and baggage is to be conducted by staff under the direct command line of the Airways.

Airline business and operation is a complete set of activities (= provision of services to customers) comprising reservation, sales of ticket, check-in at airports, passenger and baggage handling to/from aircraft, transport work (in-flight services) to the destination, and delivery of baggage at destination airport. Those activities should be provided smoothly and comfortably with a customer-oriented attitude.

(8) Safe Operation

Current status of maintenance and operation of aircraft is not considered satisfactory for Safe Operation, even though the training is programmed. Especially, the number of licensed mechanics required for A-310 and B767 by the size of activity is not met.

(9) Aircraft Operational Productivity

Uzbekistan Airways has more aircraft than required from an analysis of the route structure planning based on the timetable. Current fleet was built up over the years, not by reasonable analysis based on the route structure. Annual flight hours of Russian-made aircraft such as IL-62 and Tu-154 are approximately 800 hours, while that by western-made aircraft is more than 4,000 hours.

#### **(10) Training of Cabin Crew**

In emergency situations, the movements of cabin attendants are very important for assuring safe operation. Therefore, training for emergency evacuation with combinations of flight crew and cabin attendants is indispensable.

#### **8.4.2 Proposed Restructuring of Air Carrier Sector**

Uzbekistan Airways should be clearly separated from the governmental administration bodies and airport operation organization;

The number of staff should then be reasonably adjusted in accordance with the production level of flight operation, and the proposed corporate planning procedure.

#### **8.4.3 Proposed Improvement Plan for Corporate Planning**

##### **(1) Necessity of Corporate Planning**

Uzbekistan Airways is strongly expected to grow up and become a leading airline in the central Asia region connecting Asia and Europe closely in the near future. However, the Airways seems to have suffered from a shortage of revenue, especially from local currency drop against US\$, the prevailing currency in many other developing countries all over the world.

It will be very important to select these essential routes and establish their characteristics through route profitability analysis. Generally, essential routes offer the conditions below:

- Large amount of revenue
- Big demand (number of passenger and cargo volume)
- High yield (unit revenue per RPK)
- Competitive with other airlines
- High potential demand in future
- Strategic importance, etc.

##### **(2) Selection of Essential Routes and Route Analysis**

It is essential to select essential routes for the Airways, applying precise route profitability analysis for these routes, in order to increase revenues.

##### **(3) Introduction of International Practice in Corporate Planning**

In order to develop corporate planning procedures of the Airways, the Airways should better introduce route profitability analysis by rearranging all the revenue and expenditure items and production indices in accordance with the international practice.

Indices such as ASK, ATK, Block Time, Seat Occupancy (load factor) and break even point of the selected essential routes have to be prepared in the planning stage.

##### **(4) Introduction of Concept of Middle-Size Group for Air Routes**

It is also necessary to introduce the concept of the "Middle-Size Group" for air routes in corporate planning.

“Middle-Size Group” in air routes can be gathered based on geographically similar routes, for example, such as the European Route and South East Asian Route.

The Uzbekistan Airways does not seem to have such a concept, and it has only a category of major size route groups, International, CIS and Domestic.

According to the concept of “Middle-Size Group” for air routes, the demand forecast is better done by market segmentation such as foreigner/domestic passenger, business/tourism and individual/group with their respective unit yield, taking into account the following aspects:

- What is the demand tendency in the long- and medium-term?
- Which area or zone would have a higher growth rate of passenger demand, Europe or South East Asia?
- How about the level of yield for that region in future?
- Furthermore, it is also necessary to have a long- or medium-term planning of western airline's type that contains a rough framework of route and frequency and future aircraft plan.

#### **8.4.4 Improvement of Competitiveness and Customer Satisfaction**

All essential routes of the Airways must be competitive. The Airways has to develop a competitive power so as to compete seriously with other airlines to earn much hard currency.

Generally, competitive factors include safety, punctuality of flight schedule and comfort, and elements of attractiveness of airline for passengers can refer the following items:

- Cheaper airfare
- Absolute safety
- Modern and new aircraft
- Convenient schedule
- High punctuality
- Quality service performance

##### **(1) Punctuality**

Punctuality is often measured by dispatch reliability and presented as flight delay and flight cancel rates. Keeping high punctuality is an important factor to get high-yield business passenger and much more important for keeping the airline's good reputation.

Presently, Uzbekistan Airways seems to have 85 to 90% dispatch reliability, and it may have higher figure for international routes, but it should improve more to raise its competitive factor with the efforts of each productive divisions.

##### **(2) Quality Services Performance**

Quality service has a broad meaning, but from the viewpoint of the passenger, it can be classified into the following stages.

- Reservation:

If he could not find out a timetable or even telephone number of Uzbekistan Airways,

he may call another airline such as Transaero for getting a ticket for Tashkent-Moscow route.

- Purchase of Air Ticket
- Check-in at Airport
- Services in Cabin
- Picking-up checked baggage at destination airport;

When passenger could not find his baggage, he would probably change airlines for his next tour.

### (3) Sales Service

Recommended measures to improve sales service are as follows:

- Supply timetable and other advertising materials in time as necessary through the sales network;
- Improve quality of reservation and ticketing staff (with a service-minded attitude and professional knowledge);
- Physically modify the main ticketing building to a well-lighted one with a clean, open, friendly atmosphere.

### (4) Check-in and Baggage Handling

To improve check-in and baggage handling service at airport, especially Tashkent, it is firmly recommended to replace the present airport staff with Uzbekistan Airways staff as discussed in the previous chapter.

## 8.4.5 Computerization in Airline Management

The present major airlines in the world have developed own computerization by constructing huge systems with big machines taking long time and hung investment. However, with a rapid developments of computer and communication technology, many types of smaller, cheaper and high performed office/ personal computers has recently become available.

So far as the construction of computer hardware is concerned, there must be many options to be selected for the airlines. There are so many kinds of computer application in the field of airlines business.

However, before proceeding deeply on this matter, the Airways has to adjust its accounting system to international practice. Revenue items, expenditure items and productive indices are always the most important factors for developing various applications.

## 8.4.6 Training Plan for Air Carrier Sector

To achieve modernization of Uzbekistan Airways, Uzbekistan Airways has to establish efficient training programs for every field based on the future restructuring plan;

- Preparation of training program based on the self-supporting accounting system
- Training of English for chief class staff, passenger attendance, and mechanic;
- Improvement of training center.

#### 8.4.7 Enhancement Plan of Aircraft Operation and Maintenance

At this moment at NAC, the national policy for modernization allows only a very short period and small own budget. Under such circumstances, modernization of aviation sector is often be impelled toward the formal reforming of organization and/or introduction of new hardware.

Terms of "Quality Control" and "Production Planning/Control" have been long out of concept, and is the most gigantic problem to be solved as soon as possible.

Approval system for flight crew and mechanic may be observed satisfactory in formality. In reality, however, supports and advisees from foreign authorities and private firms are still needed due to the insufficient number of the well-trained and competent personnel.

In the course of application for "Foreign Repair Station Certificate" to JAA (Joint Aviation Authority) and FAA, Uzbekistan Airways has reminded themselves that they have very little of working experience and that they do not have any concrete idea to handle about western-made aircraft including business procedures with western authorities.

This also implies that Uzbekistan Airways has not yet satisfied requirements for well-trained and competent personnel who can be trained through the real working experiences (On the Job Training).

However, Uzbekistan Airways is currently understanding the concept of western-made aircraft and equipment more than before, and have desire to have well-trained and competent personnel who can establish their philosophy for operation of each organization including preparation of manuals and internal rules.

At the same time, Uzbekistan Airways is approaching to the waypoint where they must make a choice from two directions for western-made aircraft. One is to introduce completely the western system, and the other is to keep the current semi-western system.

Uzbekistan Airways has agreed that western-made aircraft should be operated in accordance with western system in every field such as maintenance including fulfillment of the very biggest burden of well-trained and competent personnel. However, it could not be satisfied without enough budgets for continuous training by any means.

To establish "Safe Operation" in Uzbekistan Airways, it is absolutely inevitable to establish the operation and maintenance system in western manner for western-made aircraft, because "Safe Operation" can be assured by only person who operates, not by excellent hardware.

It is strongly recommended to establish an action plan for acquisition of business methods and/or procedures in every field such as flight operation, maintenance, and production planning/control.

To achieve this target, the best and nearest way is to provide with instructors and specialists, who can instruct personnel at "On the Job Training" basis for the following fields:

- Certificate of maintenance;
- Organization operation for maintenance and flight operation;
- Production Planning and Control for maintenance and flight operation;
- Quality Control for maintenance system;
- Operation Planning of aircraft.

- Training for mechanic and flight crew including training for English

## **8.5 Recommendations for Modernization of NAC**

### **8.5.1 Recommendations**

Present National Air Company (NAC) is too big 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. Major airport facilities developed during the former USSR era have reached the moment to be rehabilitated substantially. Russian-made aircraft are superannuated, and operating and maintenance cost are not economical compared with western-made aircraft.

NAC is recently implementing its restructuring plan by separating Uzbekistan Airways into three affiliated companies under management of NAC as a step towards commercialization and modernization.

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.

#### **(1) Restructuring of Organization**

- *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.*
- *It is recommended that a clear line should be drawn between the services by such governmental administration bodies as the "Department of Civil Aviation" and the services by commercial enterprises.*
- *It is strongly recommended to take into account the following in the implementation of restructuring:*
  - Centralized control and management system should be improved so as to transfer responsibility and decision making to respective divisions;
  - Deregulation for disclosure system of information should be established according to progress of privatization. No foreign investor and financier can invest without information relating to the financial and management situation;
  - Accounting system should be modernized, incorporating international account practice;
  - Statistic data processing system in accordance with the market-oriented economy should be developed.



## (2) Improvement of Accounting System

- *It is recommended that revenue sources should be reformed in accordance with the restructuring plan of NAC organization, taking into account a clear separation of activities between government, airline and airport services.*
- *Tashkent Airport Enterprise is intended to operate under the self-supporting account system, it is important to reduce expenditures necessary to airport management and operation. Therefore, number of staff needs adjusting to the minimum level required for airport operation and maintenance.*
- *To improve the accounting system of TAE, it is recommended to take the following measures:*
  - *To adjust its system to the international accounting practice so as to facilitate financial control;*
  - *To clearly separate accounting of TAE from NAC as a whole;*
  - *To incorporate computerized system at a reasonable investment cost.*
  - *Disclosure of its statement of account will also be required.*
- *If Tashkent Airport is expected to be a hub airport in the CIS region, landing charge should be set at a competitive level, taking the landing fees of airports in the neighboring countries into consideration*
- *Uzbekistan Airways should pay landing fees to Tashkent Airport Enterprise as well as to the local airport operators.*
- *Air Navigation price level should be determined so as not to discourage foreign airlines from flying over Uzbekistan airspace.*
- *It is recommended that PAC should be collected directly at Tashkent Airport and other local airports. PAC should be collected from domestic and CIS routes passengers.*
- *It is recommended that the introduction of Car Park Charge should be considered as an airport revenue*
- *It is recommended that airport operator should promote an increase in revenue from concessions.*
- *Uzbekistan Airways should be clearly separated from the governmental administration bodies and airport operation organization;*

## (3) Level-up of Passenger Comfort

- *To improve passenger comfort at airports, it is recommended to upgrade the quality level of facilities, and to promote improvement of attendance performance as soon as possible.*
  - *Sufficient lighting and brightness of passenger terminal building;*
  - *Sufficient English guidance of facility and direction indications;*
  - *Public address system and information counter in English;*
  - *Appropriate air-conditioning in passenger terminal building;*

- Efficient communication system;
- Relaxation facilities for passenger such as restaurant, duty free shops, clean rest rooms.

□ *It is recommended for airport administration unit to coordinate those groups to improve attendance performance to passengers considering the following items:*

- Passenger-oriented attitude;
- Quick and efficient reception at each checking point;
- Training in English;
- Procedure should be easy to understand.

#### (4) Corporate Planning for Airline Business

□ *In order to develop corporate planning procedure of the Airways, the Airways should better introduce route profitability analysis by rearranging all revenue and expenditure items and production indices in accordance with international practice.*

□ *It is vital to select essential routes for the Airways, applying precise route profitability analysis for these routes.*

□ *It is also necessary to introduce a concept of "Middle-Size Group" for air routes in corporate planning, taking into account the following aspects:*

- What is the demand tendency for long- and medium-term?
- Which area or zone would have a higher growth ratio of passenger demand, Europe or South East Asia?
- How about the level of yield for that region in the future?
- Furthermore, it is also necessary to have long- or medium-term planning of western airline's type that contains a rough framework of route and frequency and future aircraft plan.

#### (5) Re-recognition of Passenger-Oriented Attitude

□ *Improvement of attractiveness of the airline to customers and offering customer satisfaction with the airlines services by considering the following items:*

- Punctuality of flight schedule;
- Cheaper airfare;
- Absolute safety;
- Modern and new aircraft;
- Convenient schedule;
- Quality service performance.

□ *As a whole customer satisfaction should be a key concept for improving competitive factor, and might also be generally a key word for success in most of the market oriented business.*

- *In order to recognize customers' requirements, and feed this back into actual performance to the customers, it is recommended to conduct customer's requirement survey using a written questionnaire.*
  - *It is recommended to analyze the stubs of air tickets to build up a customer database.*
- (6) Improvement of Sales Service
- *Supply timetable and other advertising materials in time as necessary through sales network;*
  - *Improve quality of reservation and ticketing staff (with service-minded attitude and professional knowledge);*
  - *Physically modify the main ticketing building to a well-lighted one with a clean, open, friendly atmosphere.*
- (7) Improvement of Check-in and Baggage Handling
- *To improve check-in and baggage handling service at airport, especially Tashkent, it is firmly recommended to replace the present airport staff with Uzbekistan Airways staff.*
- (8) Training Programme
- *To realize achievement of modernization of Uzbekistan Airways, Uzbekistan Airways has to establish efficient training program for every field based on the future restructuring plan;*
  - *Especially, to improve English proficiency of staffs, it is strongly needed to set up training programs and put them into practice.*
  - *It is necessary to develop the existing training center so as to cope with required training purposes.*
- (9) Improvement of Aircraft Operation
- *To establish "Safe Operation" in Uzbekistan Airways, it is absolutely inevitable to establish the operation and maintenance system in the western manner for western-made aircraft, because "Safe Operation" can be assured by only person who operate, not by excellent hardware.*
  - *It is strongly recommended to establish an action plan for the acquisition of business methods and/or procedures in every field such as flight operation, maintenance, and production planning/control.*
  - *To achieve the target for maintaining safe operation, the best and nearest way is to provide efficient training with instructors and specialists consultants, who can instruct personnel on an "On the Job Training" basis in the following fields:*
    - *Certificate of maintenance;*
    - *Organization operation for maintenance and flight operation;*
    - *Production Planning and Control for maintenance and flight operation;*
    - *Quality Control for maintenance system;*

- Operation Planning of aircraft.
- Training for mechanic and flight crew including training in English

### 8.5.2 Programs for Modernization of NAC

As a result of reviewing the existing organization, management procedures and financial aspects of NAC, it is not easy to propose a proper program or action plan for modernizing institutionally and administratively the present NAC structure.

However, in summarizing, the review of institutional aspects of NAC, there are several points that can be identified as in need of improvement. Table 8.5.1 is attempted to shows the possible programs for strengthening and modernization of NAC organization and management procedures.

**Table 8.5.1 Program for Modernization of NAC**

Program	Purpose	Example Procedure
<b>1 : Program for Establishment of Department of Civil Aviation</b>	<ul style="list-style-type: none"> <li>• To establish of the new Department of Civil Aviation (DCA)</li> <li>• To prepare relevant laws and regulations for the new Department.</li> </ul>	<ul style="list-style-type: none"> <li>• Hiring experts or consultants from other countries.</li> <li>• Organizing of Ad-hoc committee for establishment of DCA</li> </ul>
<b>2 : Program for Establishment of Corporate Planning Procedure for Airline Management</b>	<ul style="list-style-type: none"> <li>• To develop a corporate planning procedure as an airlines.</li> <li>• To train NAC's staff in developed corporate planning procedures. (OJT)</li> </ul>	<ul style="list-style-type: none"> <li>• Hiring experts or consultants from other western airlines</li> </ul>
<b>3 : Program for Establishment of Aircraft Operation Planning Procedure for Airline</b>	<ul style="list-style-type: none"> <li>• To establish corporate planning procedure as an airlines.</li> <li>• To train NAC's staff (OJT)</li> </ul>	<ul style="list-style-type: none"> <li>• Hiring experts or consultants from other western airlines</li> </ul>
<b>4 : Program for Improvement of Quality Control Method for Aircraft Maintenance</b>	<ul style="list-style-type: none"> <li>• To introduce the quality control method for Aircraft Maintenance and OJT.</li> <li>• To obtain certificates of JAA and FAA</li> </ul>	<ul style="list-style-type: none"> <li>• Hiring experts or consultants from other western airlines</li> </ul>





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