

6.6.6 Environment Impact Assessment of New Tashkent Airport Development

(1) Current Condition

a) Air Quality

Air quality at the site of new Tashkent airport was surveyed by GlavHydroMet in 1997. Air samples were collected from December 5 to December 8, 1997. The monitoring was conducted for seven air pollutants: inorganic dust, sulfur dioxide (SO₂), carbon monoxide (CO), nitrogen dioxide (NO₂), nitrogen monoxide (NO), ozone (O₃), and hydrocarbons (HC). The monitoring results are shown in Table 6.6.21.

Table 6.6.21 Air Quality Monitoring Data at New Tashkent Airport Construction Site

Parameter	Concentration (daily average) mg/m ³	
Inorganic dust	0.0 - 0.24	(0.1)
Sulfur dioxide (SO ₂)	0.0 - 0.018	(0.003)
Carbon monoxide (CO)	0.3 - 0.8	(0.5)
Nitrogen dioxide (NO ₂)	0.0 - 0.034	(0.009)
Nitrogen monoxide (NO)	0.0 - 0.025	(0.004)
Ozone (O ₃)	0.0 - 0.053	(0.018)

Dry sub-base course, typical for the territory of Uzbekistan, forms increased levels of dust pollution. Within the period of the survey, dust concentrations varied from 0 to 0.24 mg/m³.

Concentrations of sulfur dioxide, carbon monoxide, nitrogen dioxide and monoxide, and ozone were sufficiently lower than the permissible levels.

b) Water Quality

• Construction Site

Chemical analysis for surface water and precision analysis were conducted by GlavHydroMet from November 29 to December 2, 1997. The analysis results are shown in Table 6.6.20. The sampling stations are shown in Fig. 6.6.7.

Table 6.7.20 Water Quality Analysis Data at New Tashkent Airport Construction Site

Item	St. 1	St. 2	PDK
pH	7.53	7.83	6.00
COD (mgO/l)	6.2	4.9	30.0
DO (mg/l)	11.36	11.40	6.00
BOD-5 (mgO/l)	1.84	1.14	3.00

Analysis result revealed that oxygen consumption in water was at a satisfactory level, because the dissolved oxygen concentration was at 100 % level corresponding to 11.36 -

11.40 mg/l. The pH levels were recorded to be 7.53 and 7.83. The pH levels met with the Uzbekistan water quality standard of 6.5-8.5. Organic substance content, defined in terms of BOD and COD, was not high. In samples 1 and 2, COD and BOD value were recorded to be 6.2 - 4.9 mgO/l and 1.84 - 1.14 mg/l, respectively. The COD and BOD values were considerably less than the Uzbekistan water quality standard of 15.0 mg/l and 3.0 mg/l, respectively.

Heavy metals including cadmium, chromium, lead, mercury, and iron were not detected at both stations. Negative results were gained by chromatography & mass-spectrometry test for chlorides HCs, including dichloromethane, dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, tetrachloroethylene, and 1,3-dichloropropene. Chloro-organic pesticides such as PCB, benzene, and cyanide were not detected. SS concentrations of 2.8 and 2.6 mg/l were not high. A slight excision of PDK (by 1.05 times) was noted only for sulfates, their concentrations in water samples were recorded to be 103 and 105 mg/l.

Contents of other mineral components were sufficiently lower than PDK. Off the biogene components, 2.5 times PDK excision was registered by nitrite nitrogen ($\text{NO}_2\text{-N}$), that had concentrations at 0.049 and 0.056 mgN/l. Concentrations of nitrate ($\text{NO}_3\text{-N}$) and ammonium nitrogen ($\text{NH}_4\text{-N}$) were sufficiently lower than the PDK. Test for pollutant substance content, such as phenols and semi-organic components did not show their presence. Concentrations of petroleum were sufficiently lower than the permissible levels.

• Outskirts of Construction Site

The water quality data for the outskirts of New Tashkent Airport are shown in Fig. 6.6.8. There are two main rivers. One is Bozsu canal; it is located in the north of New Tashkent Airport. The other is Chirchik River located on the south side. Bozsu canal had a sampling station, dissolved oxygen (DO) was 9.55 and BOD was 1.275 mgO/l on average, they met with the water quality standard of more than 4 mg/ml and less than 3.0 mgO/l, respectively. The $\text{NO}_2\text{-N}$, $\text{NO}_3\text{-N}$, and $\text{NH}_4\text{-N}$ concentrations were 0.016 mg/l, 0.595 mg/l, and 0.045 mg/l, respectively. The water quality of this station was satisfactory.

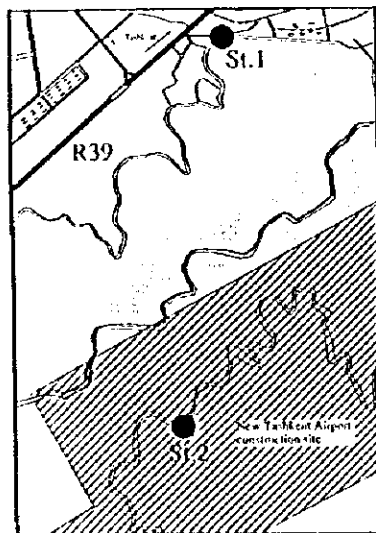


Fig. 6.6.7 Sampling Point of Water for Quality Test (New Tashkent Site)

The Chirchik River had two sampling stations. Karasu village was located upstream of the New Tashkent Airport. Dissolved oxygen (DO) was 9.55 mg/ml and BOD was 2.59 mgO/l on average, they met with the water quality standard. The NO₂-N, NO₃-N, and NH₄-N concentrations were 0.0955 mg/l, 2.975 mg/l, and 0.135 mg/l on average, respectively. However, the highest concentration of NO₂, NO₃, and NH₄ were 0.532 mg/l, 3.93 mg/l, and 1.05 mg/l, respectively. The water quality at this station was poor.

The other sampling station was Chinaz city, it was located downstream of the New Tashkent Airport. Dissolved oxygen (DO) was 9.27 and BOD was 1.9 mgO/l on average, and met the water quality standard. The NO₂-N, NO₃-N, and NH₄-N concentrations were 0.065 mg/l, 1.69 mg/l, and 0.07 mg/l, respectively. The water quality of this station was relatively good.

c) Noise

Ambient noise-levels around New Tashkent Airport construction site were measured at three stations on April 26, 1997.

Noise samples were recorded three times at intervals of five seconds at each station. The results are shown in Table 6.6.22. The recorded ambient noise levels are presented as L_{Aeq} and L_{Amax}. Noise levels at New Tashkent Airport construction site were low level compared with the noise surrounding Tashkent Airport area.

Table 6.6.22 Measured Ambient Noise Levels in New Tashkent Airport Construction Site

LOCATION	TIME	L _{Aeq} dB(A)	L _{Amax} dB(A)	Weather	Temperature (°C)	Major Noise Source
A	12:15-12:20	42.0	59.9	Fine	31	Car
	12:20-12:25	36.8	56.0			Birds
	12:25-12:30	34.5	56.8			
B	12:35-12:40	35.4	55.3	Fine	32	Wind through foliage
	12:45-12:50	33.1	48.9			Running Water
	12:52-12:57	37.8	56.8			
C	13:30-13:35	40.3	57.8	Fine	35	Wind through foliage
	13:35-13:40	40.3	57.9			Running Water
	13:45-13:50	41.5	66.3			

A: Near village and road in eastside of New Tashkent airport runway

B: Near the farm and the irrigation channel in eastside of New Tashkent airport runway

C: Near the farm and the irrigation channel in north side of New Tashkent airport runway

d) Traffic Noise

The traffic noise level monitoring was conducted in November 5, 1997. The result was shown in Table 6.6.23.

Table 6.6.23 Result of Traffic Noise Monitoring

Time	Temperature (°C)	Humidity	Wind Direction	Wind velocity (m/s)	L _{Aeq} (dB)	L _{Amax} (dB)
13.15 - 14.15	6	47%	N	1.4 - 1.8	61.2	82.8
14.15 - 14.45	12	46%	N	1.4 - 2	62.2	85.8
15.00 - 15.15	11	46%	N	1.2 - 1.6	60.5	77.4

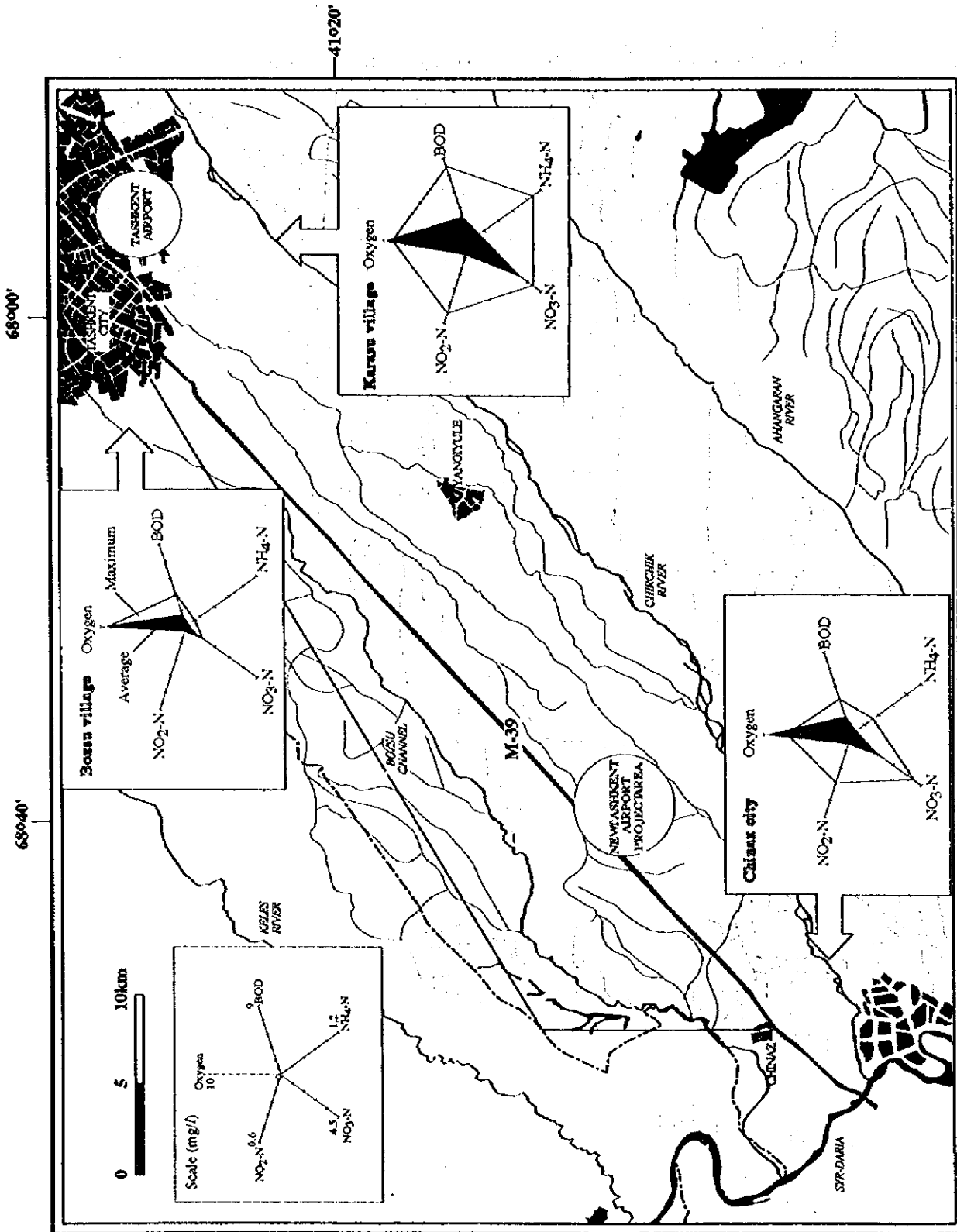


Fig. 6.6.8 Surface Water Quality in Surrounding Area of New Tashkent Site

Noise levels ranged from 60.5 to 62.2 dB in L_{Aeq} . These levels were relatively high compared with the noise standard of each country.

e) Survey of Road Traffic

A survey of road traffic on the Road M39 was conducted in November 5, 1997. The result was shown in Table 6.6.24.

Table 6.6.24 Result of Traffic Census

To the direction of Tashkent (/minutes)			To the direction of Samarkand (/minutes)		
truck	bus	car	truck	bus	car
0.77	0.19	2.79	1.18	0.76	4.33

The traffic volume of cars with 2.79 and 4.33 /minutes was the highest among the surveyed vehicles. The truck volume was the second of 0.77 and 1.18 /minutes and the bus was the third of 0.19 and 0.76 /minutes. The volume of traffic toward Samarkand was higher than the direction of Tashkent.

(2) Prediction and Evaluation

a) Air Pollution

The US EPA approved model of ISCLT3 (Industrial Source Complex - Long Term) was used to predict the ground level concentrations from emission sources of the site. The receptor grid for the ISCLT3 simulations is in 1 kilometer increments within 15 kilometer area.

Standard Landing and Take-Off (LTO) cycle of EPA and operation mode was used to calculate the emission rate from airplane engines as shown in Table 6.6.25.

Table 6.6.25 Standard LTO Cycle (unit : second)

Mode	Jets	Turboprop	Engine Power
Stay and			
Movement to Apron	1,140	1,140	5%
Take-Off	42	35	100%
Climbing	132	150	85%
Landing	240	270	30%
Movement to Terminal	420	420	5%
Average Cycle	1,974	2,010	

The simulation conditions summarized on the basis of the above LTO cycle data, future operation plan in the year 2020, and existing literature are shown in Table 6.6.26.

Table 6.6.26 NOx Emission from Airplanes (unit : g/s)

Operation Mode	Daytime	Evening	Nighttime
Stay and Take-Off	5.894	1.703	1.265
Rise	0.522	0.151	0.112
Climbing	0.313	0.090	0.067
Approach	0.209	0.060	0.045

Note : Daytime : 07:00 - 15:00 Evening : 15:00 - 23:00
Nighttime : 23:00 - 07:00

Averaging time ground level concentrations were estimated for statistical Annual Meteorological Data measured at the meteorological station "Sirdarya". Since there are no data on Stability Category this was calculated on the assumption that the distributions of six stability categories (A, B, C, D, E, F) corresponds to the same frequency pattern as that during the measurement period.

The predicted result indicates that the maximum annual average ground level concentrations of NO₂ is 8.86 µg/m³ is shown in Table 6.6.27. 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/m³. The effects of gas emission from airplanes on the ambient air quality are therefore considered to be low.

Table 6.6.27 Predicted Maximum Annual Average NOx Ground Level Concentration

Rank	Ground Level Concentration µg/m ³	Receptor	
		East, West	South, North
		m	m
1	8.86	W 1,000	0
2	8.67	0	S 1,000
3	8.54	0	N 1,000
4	8.06	E 1,000	0
5	4.10	W 1,000	N 1,000
6	4.09	W 1,000	S 1,000
7	3.75	E 1,000	S 1,000
8	3.28	E 1,000	N 1,000
9	3.17		S 2,000
10	3.13	W 2,000	0

b) Water Pollution

The effluents affecting the ambient water quality in the year 2020 can be classified as follows:

- -Waste water discharged from mechanic area,
- -Waste water discharged from terminal area,
- -Sanitary wastes.

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

Wastewater discharged from the airport facility will be above the value of about 250 kg/day on BOD, assuming a wastewater concentration of 204 mg/l on BOD. T-N can be estimated to be about 44 kg/day, assuming a wastewater concentration of 36 mg/l on T-N, and assuming also that T-P can be estimated to be about 68 kg/day, assuming the wastewater concentration of 55 mg/l on T-P.

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 waste water 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 including the toxic substances should be carefully monitored.

c) Noise

• Aircraft Noise

The predicted contour of aircraft noise level with the weighted equivalent continuous perceived noise level (WECPNL) is shown in Fig. 6.6.9. According to the future aircraft movement plan, most aircraft will be converted to the low-noise type in the year 2020 as shown in Appendix. It is expected that aircraft noise would become larger compared with the present condition. However, mitigation measures for aircraft noise as shown in Fig. 6.6.3 should be adopted.

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

(3) Mitigation Measures

As the impact generated from the construction and operation of the new airport on the environment can 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. The following baseline survey will be inevitable to understand the above natural and social environmental characteristics:

- air quality, geology and soil, hydrology, water quality, noise and vibration, flora and fauna, and socioeconomic.

Air pollution, noise and vibration are the major impacts on the environment under operation of the airport. Hence mitigation plan for above two impacts will be important 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 accruing to the Republic of Uzbekistan by the implementation of the high priority projects.

The method of the preliminary economic analysis used in Chapter 4.9 is again adopted to evaluate the feasibility of the projects.

(1) High Priority Projects

Among the six (6) high priority projects selected in Chapter 4, 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 both the with/without cases regarding the costs of modernizing navigation aids in order to examine economic viability of small-scale low-income airport projects.

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

a) Existing Tashkent Airport Extension Project (Development of Domestic Passenger and Cargo Facilities)

Project Case: The international related facilities are being developed on the basis of the EBRD financed project, while development of the domestic passenger and cargo related facilities is to be carried out as proposed in Chapter 6.2.1.

Base Case: It has been assumed that the present domestic and cargo related facilities would remain unaffected, while the international related facilities are developed under the EBRD financed project.

b) New Tashkent Airport Construction Project (Alternative 1)

Project Case: The New Tashkent Airport would have international related facilities only, while the EBRD-financed international related development of the existing Tashkent airport were also implemented. The domestic and cargo facilities of the existing Tashkent airport would remain untouched.

Base Case: It has been assumed that the present domestic and cargo related facilities would remain unaffected, while the international related facilities are developed under the EBRD financed project.

c) New Tashkent Airport Construction Project (Alternative 2)

Project Case: The New Tashkent Airport would have both international and domestic as well as cargo related facilities, while the EBRD-financed international related facilities development of the existing Tashkent airport were also implemented. The domestic facilities of the existing Tashkent airport would remain unaffected.

Base Case: It has been assumed that the present domestic related facilities would remain untouched, while the international related facilities are developed by the EBRD financed project.

d) Namangan Airport Extension Project (with the cost of navigation aids)

Project Case: The domestic and international related facilities as well as navigation aids would be developed as proposed in Chapter 6.2.3.

Base Case: It has been assumed that the present facilities would remain untouched.

e) Namangan Airport Extension Project (without the cost of navigation aids)

Project Case: The domestic and international related facilities except navigation aids would be developed.

Base Case: It has been assumed that the present facilities would remain unaffected.

f) Termez Airport Extension Project (with the cost of navigation aids)

Project Case: The domestic and international related facilities as well as navigation aids would be developed as proposed in Chapter 6.2.4.

Base Case: It has been assumed that the present facilities would remain unaffected.

g) Termez Airport Extension Project (without the cost of navigation aids)

Project Case: The domestic and international related facilities except navigation aids would be developed.

Base Case: It has been assumed that the present facilities would remain unaffected

h) Nukus Airport Extension Project (with the cost of navigation aids)

Project Case: The domestic and international related facilities as well as navigation aids would be developed as proposed in Chapter 6.2.5.

Base Case: It has been assumed that the present facilities would remain unaffected.

i) Nukus Airport Extension Project (without the cost of navigation aids)

Project Case: The domestic and international related facilities except navigation aids would be developed.

Base Case: It has been assumed that the present facilities would remain unaffected.

(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 project life as follows:

- a) Existing Tashkent Airport Extension Project : 2006-2025
- b) New Tashkent Airport Construction Project (Alternative 1) : 2010-2029
- c) New Tashkent Airport Construction Project (Alternative 2) : 2010-2029
- d) Namangan Airport Extension Project : 2006-2025
- e) Termez Airport Extension Project : 2006-2025
- f) Nukus Airport Extension Project : 2006-2025

Physical capacity limit of the existing facilities and the improved facilities has been set as shown in Table 6.7.1.

Table 6.7.1 Physical Capacity Limit of Facilities

Project	Facility	Limit of Base Case (Existing)	Limit of Project Case (Improved)
Existing Tashkent	International & CIS Passenger Terminal Bldg.	2027	2027
	Domestic Passenger Terminal Bldg.	2000	2020
	Cargo Terminal Bldg.	2000	2010
New Tashkent	International & CIS Passenger Terminal Bldg.	2027	2027
	Domestic Passenger Terminal Bldg.	2000	2020
	Cargo Terminal Bldg.	2000	2015
Namangan	International & CIS Passenger Terminal Bldg.	-	2023
	Domestic Passenger Terminal Bldg.	2023	2030
Termez	International & CIS Passenger Terminal Bldg.	-	2030
	Domestic Passenger Terminal Bldg.	2005	2015
Nukus	International & CIS Passenger Terminal Bldg.	-	2030
	Domestic Passenger Terminal Bldg.	2012	2030

Note. Columns indicated with “-“ mean that there are no existing facilities.

6.7.2 Estimate of Economic Benefits

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

(1) Direct Benefits

a) Net Increase in Tourist Income

The international air passenger transport demand at the study airports will overflow in the Base Case, and such overflowing would force air passenger to give up their trip.

Those overflowing international air passengers who would give up their trip in the Base Case can be accommodated by the airports if the Project is implemented. The average tourism expenditure per capita, according to the market research conducted by Uzbek Tourism, is US\$ 500 in 1996.

On the basis of the above considerations, the net increase in the tourist income attributable to the implementation of the Project has been estimated.

b) Airport Revenue Increments

The incremental airport revenues 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. The incremental airport revenues have been estimated based on

the current airport tariff system that is described in Chapter 6.8.

c) Travel Time saving

The overflowing Uzbek air passengers who would make their trips would have to switch to the surface transport mode such as railways or road in order to reach their destinations or neighboring international airports for transfer.

Such travel time spent of Uzbek would be saved by the implementation of the Project, comprising economic benefits to the Uzbek economy attributable to the Project.

Theoretically, such benefits could be estimated in monetary terms by using the concept of time value.

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

In case of the New Tashkent Airport Construction Project (Alternative 2), the existing airport property (except the runway and maintenance area) could be commercially and socially utilized after transfer of both international and domestic airport function to the new airport.

For the purpose of the economic evaluation of the New Airport case (Alternative 2), it has been assumed that the existing airport property would be rented out to foreign enterprises, and the rental fee has been quantified as the economic benefit attributable to the Project.

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

e) Increase in Comfort and Convenience

The service level of the terminal area facilities in particular will be much improved by the implementation of the Project as compared with that of the Base Case. Air passengers will enjoy increased comfort and convenience from the improved facilities in the passenger terminal building.

The Project will also reduce the average handling time of air cargo, at the same time reducing possible occurrence of damage to, or decay of, air cargo, by the renewal of the air cargo terminal building. These advantages 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

The airport development Project is expected to contribute to increasing the national income of Uzbekistan by providing increased employment opportunities both during and after the construction of the facilities. 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

The Project will cause a multiplier effect on the Uzbek economy as a whole through increased procurement of goods and services related to the construction and maintenance of the facilities. 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.

(2) Maintenance and Operation Cost

Maintenance and operation costs of each projects have been estimated based on the TAE data on present maintenance and operation costs as shown in Table 6.7.2.

Table 6.7.2 Maintenance and Operation Costs

(US\$ (thou.))

Project	Case	Personnel	Maintenance	Administration	Others
Tashkent	Base	13,100	17,500	4,100	12,800
	Project	15,700	20,900	4,900	15,300
New Tashkent (Alternative 1)	Base	13,100	17,500	4,100	12,800
	Project	14,930	19,950	4,670	14,590
New Tashkent (Alternative 2)	Base	13,100	17,500	4,100	12,800
	Project	12,450	16,630	3,900	12,160
Namangan	Base	650	850	200	650
	Project	1,680	2,200	520	1,680
Termez	Base	650	850	200	650
	Project	1,680	2,200	520	1,680
Nukus	Base	350	450	100	350
	Project	1,070	1,370	310	1,070

(3) Environmental Compensation Cost

Aircraft noise pollution is one of the most significant negative impacts, which the existing Tashkent Airport is currently bringing to the neighboring area. Although no mitigation measures such as noise proofing of houses have been taken so far, such social negative impact needs to be taken into account in the large-scale project appraisal from the national economic viewpoint. In order to quantify such social negative costs in monetary terms, it has been assumed that the Republic of Uzbekistan would incur environmental compensation costs of US\$ 400 per resident in the aircraft noise affected area of both the existing and new Tashkent airports by the year 2020.

6.7.4 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
New Tashkent Airport	b) Alternative 1	1.93%
	c) Alternative 2	7.01%
Namangan Airport	d) With navaids	8.20%
	e) Without navaids	12.46%
Termez Airport	f) With navaids	6.13%
	g) Without navaids	11.61%
Nukus Airport	h) With navaids	7.60%
	i) Without navaids	12.25%

The social discount rate of the Republic of Uzbekistan is considered to be approximately 12 %.

The EIRR of the Existing Tashkent Airport Extension Project (development of domestic and cargo related facilities only) has shown a negative value because domestic passenger and cargo related benefits have only been quantified in this evaluation, and such benefits are very small reflecting current low wage rate of Uzbekistan workers.

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 4.9, and therefore the overall development of the existing Tashkent airport can be seen as almost economically feasible.

Because 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 seen as justifiable.

As for the New Tashkent Airport Construction Projects, the EIRRs obtained are also 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 which would alone produce adequate capacity to cater for the demand up to the year around 2027, resulting in double investment in accommodating limited international demand.

The need for the new capital airport arises not so much for the reason that it will balance demand/capacity, but that it will alleviate noise problems and risk of aircraft accident on the surrounding area by transferring traffic from the existing to the new airport to a significant extent.

Therefore, it is 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 national economic view point, depending on acceptability of higher tariff system by foreign airlines.

The EIRRs for the development of the three local airports 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 Projects could be economically feasible because EIRRs of equal to or more than 12 % are achievable.

6.7.5 Sensitivity Analysis

For reference, sensibility 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
New Tashkent Airport	b) Alternative 1	1.93%	2.97%	0.65%
	c) Alternative 2	7.01%	7.58%	6.39%
Namangan Airport	d) With navaids	8.20%	10.44%	5.60%
	e) Without navaids	12.46%	15.02%	9.50%
Termez Airport	f) With navaids	6.13%	8.21%	3.70%
	g) Without navaids	11.61%	14.09%	8.73%
Nukus Airport	h) With navaids	7.60%	9.93%	4.85%
	i) Without navaids	12.25%	15.00%	9.04%

6.8 Financial Analysis

6.8.1 General

The purpose of this financial analysis is to examine the financial feasibility of the projects. The evaluation is made in terms of the financial internal rate of return (FIRR), which is derived from financial cost/benefit analysis, based on the assumption that the airport has to be administrated on the self-supporting accounting principle. The financial evaluation has been made by measuring the total airport revenue increments by all users as the financial benefits.

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)

The portion applicable to the navigation charge has been applied to cases except e), g) and i) (without navigation aids cases).

b) Parking Charge

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

c) Technical and Commercial Service Charge

Although this charge is considered a kind of a baggage and cargo handling charge, it is estimated as a substitute for the general airport charge, passenger boarding bridge charge, and concession and rental charge which many of the foreign airports usually levy and Uzbekistan airports do not.

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 charges are counted as a 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 a 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 Chapter 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	-10.0%
	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%

Generally, when FIRR is considered as the index of benefit generated from investment, the assessment can be done by comparison with interest rate. The desirable FIRR is 7% in Uzbekistan, judging from the domestic bank interest rate, and the average interest rate on foreign loans in average.

Remarks: the average interest rate is 6.6%, a figure estimated from the average domestic rate (about 30%), the average interest of foreign loans (about 2.5 %), and the project cost – with 15 % local portion and 85% foreign portion of the investment cost.

The result of the financial analysis has shown a negative FIRR value for all the projects except the case c) New Tashkent Airport Construction Project (Alternative 2) whose FIRR becomes 4.07 %.

6.8.5 Sensitivity Analysis

Financial 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 the 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 FIRRs 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 nav aids	-10.00 %	5.55 %
	e) Without nav aids	-9.40 %	8.31 %
Termez Airport	f) With nav aids	-5.43 %	6.83 %
	g) Without nav aids	-3.20 %	11.26 %
Nukus Airport	h) With nav aids	-11.15 %	3.17 %
	i) Without nav aids	-11.60 %	5.72 %

The following findings have been obtained through comparison as shown in **Table 6.8.2**:

- in order to achieve financial viability for the Project case a), domestic passenger charge needs to be introduced,
- with regard to the New Tashkent Airport Project, utilization of the existing airport property for commercial purpose is essential to achieve financial viability,
- as for the domestic airports project, it is difficult to achieve financial viability if the projects are implemented on a self-supporting basis, and therefore the government's own budget together with foreign soft loan should be provided.

6.9 Implementation Plan of the Projects

6.9.1 Projects

On the basis of the Master Planning for the development of 12 airports and Nationwide Air Navigation Facilities, the following six (6) development projects were selected for the subsequent pre-feasibility study covering preliminary design, construction plan, and economic/financial analysis.

- Existing 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 the management of project implementation under TAE or local airport unit. This agency should have all responsibility and authority for decision-making regarding project implementation, and the following experienced staffs should be assigned in the agency:

- Project Manager
- Administrators
- Airfield Engineers
- Architects
- Electrical and mechanical engineers
- Legal advisor

6.9.3 Principal Events in Implementation Schedule

In general, implementation schedule for the projects can be largely classified into 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 executing agency for project implementation should be established based on appropriate governmental procedures. Executing agency should be responsible 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.

Most important tasks of the executing agency is to develop its own Project Implementation Program based on a former feasibility study taking into account the governments policies. This programme is a basic document to submit financing agencies, and should clearly state the following issues:

- Executing agency and its structure;
- Purpose and necessity of project;
- Future traffic demand;
- Possible environmental impact;
- Feasibility of project from viewpoint of technical and financial/economic aspects;
- Required funds and method of fund procurement;
- Method of procurements of engineering consultants and contractors;
- Operation and maintenance plan after completion of project.

After due approval of higher authorities, the programme will be applied to financing agency.

(2) Procurement of Consulting Firms and Engineering Design Stage

Once a funding plan and agreement plan has been determined and concluded between the executing agency and the financing agency, the executing agency is to commence with the selection of engineering consultants for the design of various facilities and preparation of tender documents of works.

Normally, international financing agencies recommend to employ consultants in order to carry out engineering services from the viewpoint of assuring the smooth implementation of project, and maintain files of capable consulting firms, which are available to the executing agency.

Selection method commonly adopted among Japan and financing agencies is a short list method. Financing agency recommends several consulting firms to executing agency, referring own file of consultants. Executing agency will send invitation letters with brief description of works and scope of services to submit prequalification proposal to each firm, or advertise for prequalification.

After evaluation of prequalification documents submitted by consulting firms, 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. Executing agency will send an invitation letter with Terms of References on the scope of consulting services. Proposals received by the executing agency are evaluated in accordance with pre-established evaluation criteria.

Normally, scope of consulting services shall cover the following task items:

- Preliminary and detailed design of airport facilities;
- Preparation of tender documents including a tender forms, technical specifications, drawings;
- Cost estimates of works;
- Assistance of tendering to procure contractors for works;
- Supervision and management of construction contract.

(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.

Executing agency often set up a special tender committee for the purpose of evaluation tender proposals. This stage normally includes the following events:

- Advertisement for selection of prequalified construction companies;
- Evaluation of prequalified construction companies;
- Invitation to tender to prequalified construction companies;
- Preparation of proposals by prequalified construction companies;
- Evaluation of proposals;
- Awards of contract to the best construction companies;
- Conclude of contract.

(4) Construction Works Stage

During the construction stage of project, the executing agency should be responsible for managing the construction contract and the execution of works, with assistance from consulting firms. Preparation of local counterpart fund for works is also important for smooth implementation of works, because slow progress of works is often seen due to the lack of local fund preparation.

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 the project is to be procured from soft loans from international financing agency. Detailed cash flow is shown in Appendix.

The plans were made based on the following conditions:

- | | |
|--------------------------------------|--|
| • Fund for foreign currency portion: | Soft loan from appropriate official financing organization |
| • Repayment of loan: | 30 years |
| • Grace Period: | 10 years |
| • Interest of Loan: | Annually 2.2% |
| • Fund for local currency portion: | Own budget |

- Major cost items: Investment cost (Construction cost)
Operating and maintenance cost
Repayment of principal and Interest
- Major revenues items: Landing charge
Passenger airport charge
Other revenues (concession, safety charge)

Table 6.9.1 shows a cash flow for the New Tashkent Airport Project based on the above conditions.

Table 6.9.1 Cash Flow for New Tashkent Airport Project

Year	Cash Receipts				Cash Disbursements			Annual Cash Surplus/Deficit (10)	Cumulative Surplus/Deficit (11)	
	Operating Surplus/Deficit (1)	Depreciation (2)	Loan (3)	Government Budget (4)	Total Receipt (5)	Investment Cost (6)	Principal (7)			Interest (8)
1998	36,830	0	24,000	0	60,830	27,600	0	0	27,600	33,230
1999	39,423	0	24,000	0	63,423	27,600	0	1,680	29,280	34,143
2000	-6,938	1,656	0	0	-5,282	0	0	3,360	3,360	-8,662
2001	1,656	1,656	30,255	0	33,567	45,615	0	3,360	48,975	-15,408
2002	-2,308	1,656	24,304	0	23,652	36,492	2,000	4,026	42,518	-18,866
2003	17	1,656	6,051	0	7,724	9,123	4,000	4,418	17,541	-9,817
2004	2,342	1,656	48,392	0	52,390	57,831	4,000	4,271	66,102	-13,712
2005	4,667	1,656	82,400	0	88,723	95,395	4,000	5,060	104,455	-15,732
2006	0,756	1,656	86,251	0	94,663	99,674	4,000	6,293	110,267	-15,604
2007	8,845	1,656	94,295	0	104,796	110,070	4,000	8,211	122,281	-17,485
2008	10,934	1,656	157,590	0	170,180	184,054	4,000	10,005	198,059	-27,879
2009	13,023	1,656	167,670	0	182,349	196,292	4,000	13,192	213,484	-31,135
2010	45,630	26,692	0	0	72,322	0	4,000	16,601	20,601	-1,279
2011	49,118	26,692	0	0	75,810	0	4,000	16,321	20,321	55,489
2012	52,607	26,692	0	0	79,299	0	5,513	16,041	21,554	57,745
2013	56,096	26,692	0	0	82,788	0	6,723	15,727	22,450	60,338
2014	59,585	26,692	0	0	86,277	0	8,026	15,387	23,413	65,964
2015	63,073	26,692	0	0	89,765	0	9,425	15,181	24,606	69,129
2016	66,389	26,692	0	0	93,081	0	10,824	15,001	25,825	72,304
2017	69,704	26,692	0	0	96,396	0	12,223	14,824	27,047	75,481
2018	73,019	26,692	0	0	99,711	0	13,622	14,647	28,269	78,658
2019	76,335	26,692	0	0	103,027	0	15,021	14,470	29,491	81,835
2020	79,650	26,692	0	0	106,342	0	16,420	14,293	30,713	85,012
2021	83,021	26,692	0	0	109,713	0	17,819	14,116	31,935	88,189
2022	86,392	26,692	0	0	113,084	0	19,218	13,939	33,157	91,366
2023	89,763	26,692	0	0	116,455	0	20,617	13,762	34,379	94,543
2024	93,134	26,692	0	0	119,826	0	22,016	13,585	35,601	97,720
2025	96,505	26,692	0	0	123,197	0	23,415	13,408	36,823	100,897
2026	99,876	26,692	0	0	126,568	0	24,814	13,231	38,045	104,074
2027	103,247	26,692	0	0	129,939	0	26,213	13,054	39,267	107,251
2028	106,618	26,692	0	0	133,310	0	27,612	12,877	40,489	110,428
2029	110,000	26,692	0	0	136,692	0	29,011	12,700	41,711	113,605
2030	113,381	26,692	0	0	140,073	0	30,410	12,523	42,933	116,782
2031	116,763	26,692	0	0	143,454	0	31,809	12,346	44,155	119,959
2032	120,144	26,692	0	0	146,835	0	33,208	12,169	45,377	123,136
2033	123,525	26,692	0	0	150,216	0	34,607	11,992	46,600	126,313
2034	126,906	26,692	0	0	153,597	0	36,006	11,815	47,822	129,490
2035	130,287	26,692	0	0	157,000	0	37,405	11,638	49,044	132,667
2036	133,668	26,692	0	0	160,403	0	38,804	11,461	50,266	135,844
2037	137,049	26,692	0	0	163,806	0	40,203	11,284	51,488	139,021
2038	140,430	26,692	0	0	167,209	0	41,602	11,107	52,710	142,198
2039	143,811	26,692	0	0	170,612	0	43,001	10,930	53,932	145,375
2040	147,192	26,692	0	0	174,015	0	44,400	10,753	55,154	148,552

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 with the demand in 2010. As the existing passenger building will be saturated in the year of 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 to cause no 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 for future demand increase to consider and establish the mitigation plan to decrease the impact from airport operation onto the surrounding environment of the airport.

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% of 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 seen 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 Projects 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 developments 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 Projects 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 developments of Nukus airports 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 Projects 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 overfly 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 48 million US Dollars. 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 EBRD 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 tendency for air traffic demand to increase and the social environment.

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

(2) Implementation of Local Airport Development

Development of each of the three local airports, namely, the Namangan, Termez and Nukus airports was viewed not viable financially, but economically viable subject to reduction of scope of project and 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

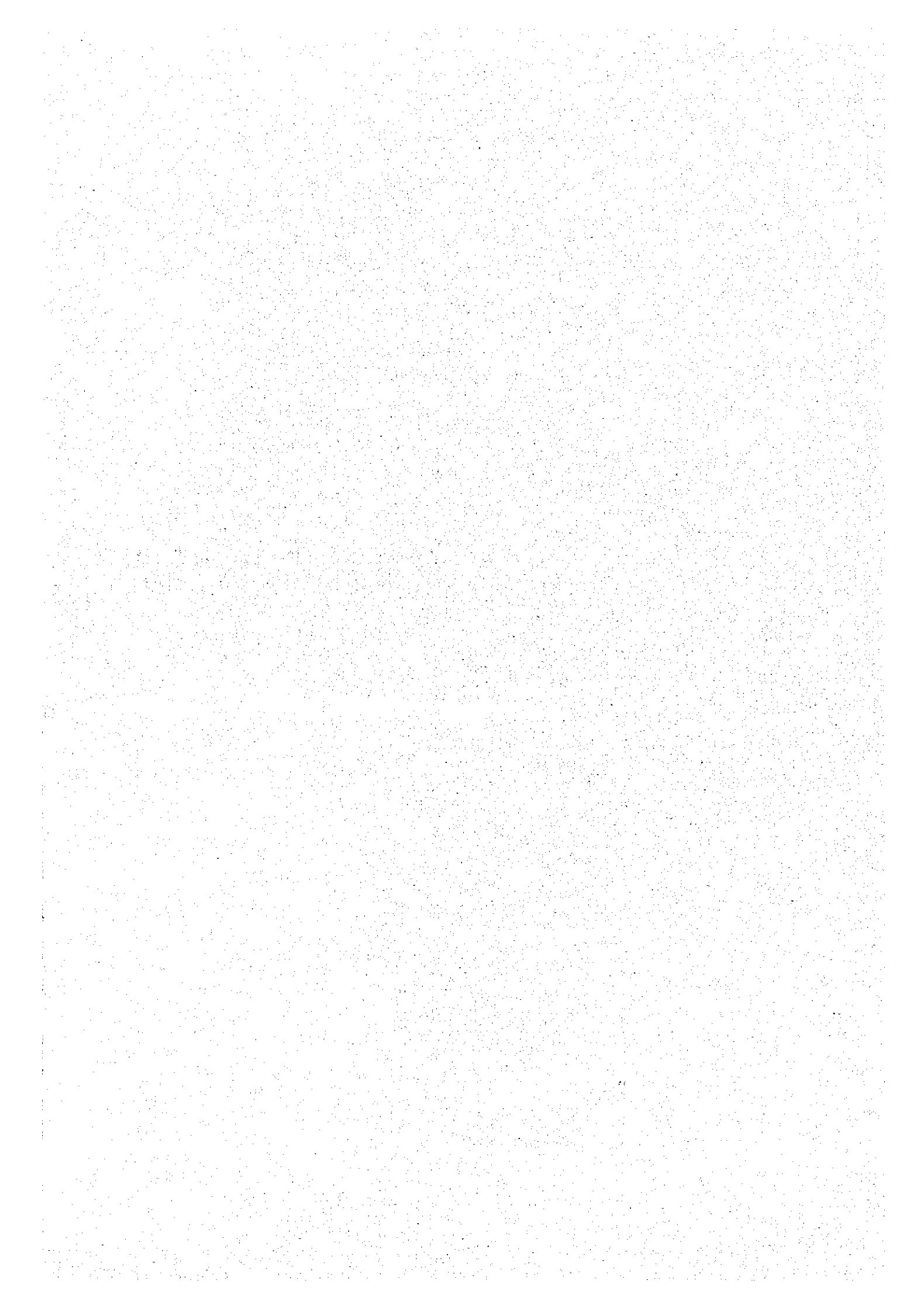
Implementation of the development of Nationwide Air Navigation System should be executed from the viewpoint of encouraging revenue increases from overfly charges and contributing to the improvement of aviation safety.

(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 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

(1) Historical Background

For decades civil aviation in Uzbekistan had been under the control of Aeroflot, the civil aviation system of the former Soviet Union. Under that system, the full range of entities had been integrated in all fields of aviation-related business and industry in Uzbekistan. 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.

At that time, most of the institutional and operational functions of the civil aviation system were centralized and exclusively managed from the respective leading entities in Moscow.

Following the dissolution of the former unified political and economic system, Uzbekistan had a difficult time in forming its own all round and self-controlled civil aviation system in the region.

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 Aviastroy.

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. The basis for the foundation of NAC was the territorial Civil Aviation unit as that had been a constituent of the former USSR Ministry of Civil Aviation.

To retain the professional staff potential, the Government of the Republic assumed responsibility, to the greatest possible extent, for the foundation of the Integral Board, managing both commercial and state aeronautical activities in Uzbekistan.

The air transportation system of Uzbekistan inherited the Laws and Regulations previously used by Aeroflot. 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.

(2) Economic and Social Background

Uzbekistan conserves a key position in many branches of industry, agriculture, science and culture. Firstly, this is due to the extensive natural resources found in Uzbekistan.

The majority of the districts in which mineral deposits have been discovered possess a developed infrastructure, including availability of energy and communications, and manpower reserves.

In the framework of international economic cooperation, President Karimov I.A. and the Government pursue an "open door" policy, creating favorable possibilities for, and attracting, foreign investments. At present, more than 700 joint ventures and foreign enterprises have already been established in the territory of Uzbekistan.

(3) Geographical Characteristics of Tashkent and Other Main Cities

Geographically, Tashkent is located on a crossroads to the European and Asian countries and is a center of economic links among the CIS countries.

Foreign air companies hope the reconstruction of relevant airport facilities, as well as new aeronautical installations will be equivalent to international standards.

For smooth and safe operation of air transport to and from various countries, a leveling up of the aviation infrastructure such as air traffic service and upgrading of aeronautical installations equal to international standards are inevitable.

One of the factors stimulating the necessity for improving the aviation sector arises from the international activities that Uzbekistan has proclaimed after its independence.

Samarkand, Bukhara and Urgench boast a rich historical heritage, historic monuments of the ancient era. Bukhara, in particular, harbors central Asian history in its entirety. Its origin dates back to the 1st century.

Over the centuries it remained the center of caravan roads from Europe to Asia. The age-old treasures of Bukhara, most of them historical architectural monuments, are an irreplaceable heritage of world civilization. Touring around these sights, the traveler will marvel at them and take home many exciting impressions.

7.2 Present Organization of NAC

(1) General

NAC of Uzbekistan is one of the largest aeronautical companies in the former USSR and the leading one in Central Asia. As previously mentioned, 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. However, these functions are not clearly classified in terms of their organizational structure.

NAC also has various subsidiaries under its control. Its major subsidiaries are Tashaviaacpetsmontaj, 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 summarized as shown in Table 7. 2.1

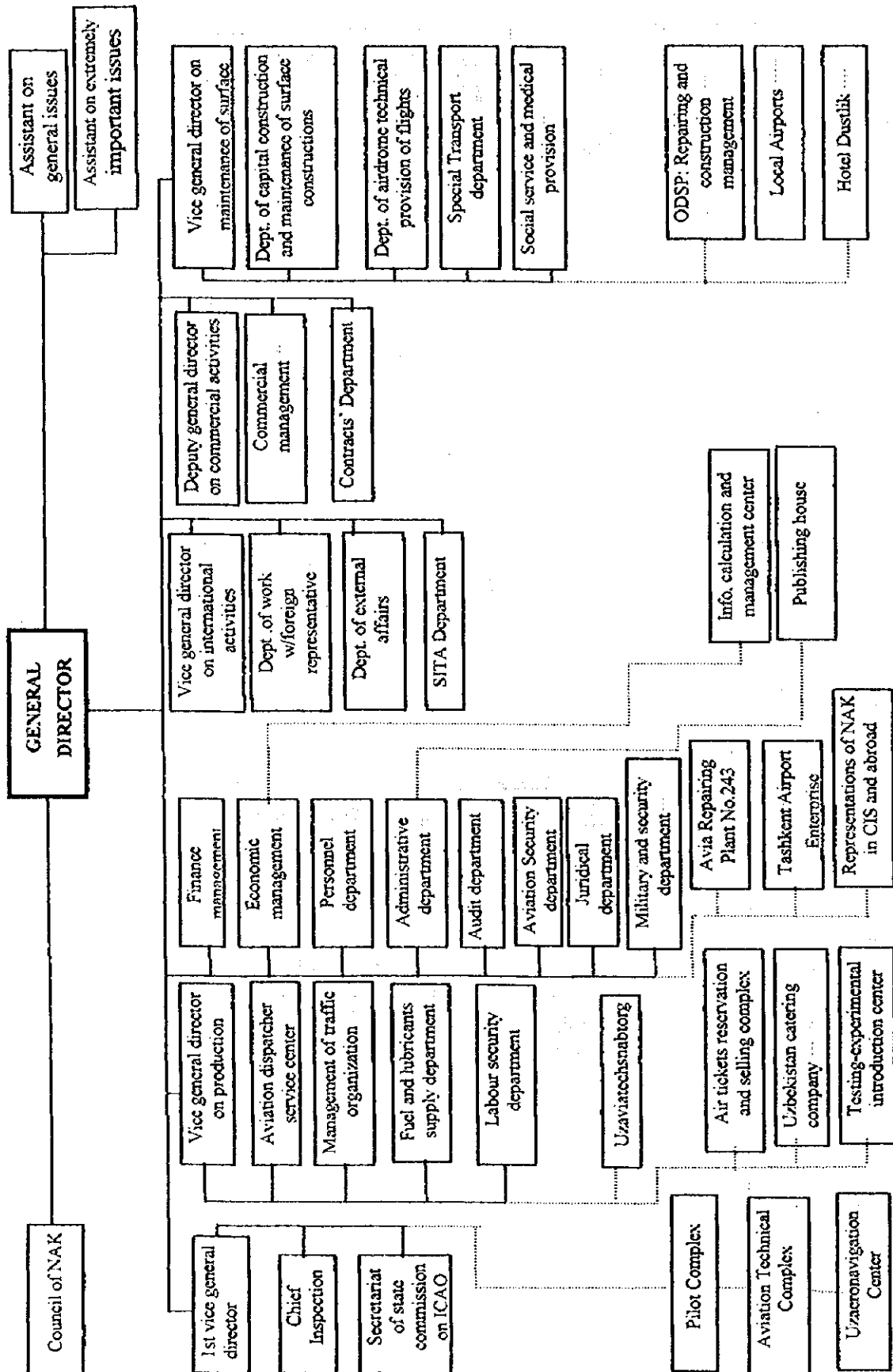
and Fig. 7.2.1 respectively.

Table 7.2.1 Number of NAC's Staff and Employment

Department	Number of Personnel
1. NAC Headquarters	460
2. Pilot Complex	1,633
3. Aviation Technical Complex (ATK)	2,350
4. Uzaeronavigation Center	1,540
5. Uzaviatechsnabtrog	75
6. Air Tickets Reservation and Selling Complex	750
7. Uzbekistan Catering Company	200
8. Testing - Experimental Introduction Center	20
9. Avia Repairing Plant No. 243	2,750
10. Information, Calculation and Management Center	150
11. ODSP	250
12. Tashkent Airport	3,116
13. Local Airports	2,750
Total	16,044

Note : Number of personnel is an approximate estimate taken on oral basis from each subdivision of NAC.

Fig. 7.2.1 Organization Chart of NAC



(2) Function of Each Section

Under the leadership of the "General Director" and the "NAC Council" as the top administrative body, five "Deputy General Directors" on the same level are in charge of the different organizational units. Two sections under the direct control of the General Director play a great part in the screening of general questions to the General Director and arrangement of VIP flights.

Except for the First Deputy General Director, four other Deputy General Directors have the respective titles of are Production, International Activity, Commercial Activity and Maintenance of Surface construction/Airport Management Directors.

Every division under the direction of the same Deputy General Director is a different organizational unit but closely related to each business service.

Under the direct control of the First Deputy General Director are the Chief Inspection, ICAO Activity Section, Pilot Complex, Navigational Technical Complex and Center "Uzaeronavigation" with individual finance and accounting systems in their organizations.

The Uzaeronavigation Center provides air traffic control services as well as managing international overflights under their jurisdiction.

Finance Management, Economic management, Personnel management and other Divisions drawn in a line in the organizational chart are directly under the control of the General Director, and these divisions are independent.

The Chief of Finance management is on the same level as the Deputy General Director in terms of functional duty. Two divisions of Finance management and Economic management have seats on the Council of NAC. Both of the Chiefs are members of the Council of NAC. It is worthy of special mention that the heavy maintenance factory No.243 and big entity of TAE are both being directed solely by the General Director.

The council of NAC consists of a General director and all the leaders of each Department and the Chief of Finance Management, Chief of Economic Management and Director of Tashkent airport and those from all local airports. The number of members totals up to 40.

The Council sits periodically every three months. Very important issues such as safe operation of air transportation, reconstruction of structures and transition from winter to summer flight schedules are topics normally discussed by the Council. General questions and proposals from members are also subjects of discussion.

The Chiefs of the divisions concerned hold Production meetings every week. These are called "ANALYSIS" meetings. Flight schedule, and financial reports are usually the regular topics of "ANALYSIS" meetings. Monthly reports on revenues and expenditures are also included.

7.3 Relevant Laws and Regulations for Air Transport

The Presidential Decree was promulgated on January 28, 1992, and the Resolution of Cabinet Ministers was then issued on February 4, 1992 to establish the National Aviation Company of Uzbekistan Airways (NAC). 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.

NAC considers the importance of standardizing regulations, codes and standards of airport facilities and air navigation facilities to cope with western requirements, and this work is being carried out by NAC.

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 that 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**. Within the revenue items 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.

- a) The revenue scale as a part of an airline activity might be estimated as 65~75% of NAC's overall revenue.
- b) "Aircraft Departure" has increased favorably, indicating a normal development of aviation in the territory.
- c) "Order and Charter" forms approx. ten percent of regular flight revenues, which

seems reasonable.

- d) The increase of "Aircraft Lease" might show a positive attitude of NAC management to utilizing its assets.
- e) Increase in revenues from Aircraft Lease is a favorable tendency.

(2) Expenses

- a) 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 the introduction of western-made aircraft.
- b) "Depreciation" remains at a low level.
- c) It is difficult to understand the meaning of the wordings "Self Cost" and "Expense of Period".
- d) "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
[Revenues (in Million Sum)]			
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	84.4	133.6
7. Agriculture Aviation	7.2	45.5	136.8
8. Other Revenue	148.8	889.0	1,127.3
Revenue Total	1,253.9	5,811.2	10,479.3
Tax on Addition Value(TAV)	153.1	531.4	1,091.9
Revenue without TAV	1,100.8	4,579.9	9,387.5
EXPENSES (in Million Sum)			
I. Self Cost	826.0	4,210.7	9,655.2
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	2,281.4	5,359.0
II. Expenses of Period	N/A	549.2	996.1
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)	(152.3)
Allocation on Insurance(40%)	N/A	(19.1)	(55.7)
Materials & Technics for Admin. Personnel	N/A	(241.6)	(365.5)
3. Other general economics	N/A	178.3	388.0
Expense Total(I+II)	826.0	4,759.9	10,651.3

7.4.2 Profitability

Operating revenues and expenses and profit (loss) of NAC from 1993 to 1996 are shown in

Table 7.4.2.

Both operating revenues and expenses have increased rapidly over the past three years. From 1993 to 1994 both items rose ten fold and, from 1994 to 1995 by 4~5 times. The latest annual increase was double. During these three years both sets of figures multiplied by a 100 times. This phenomenon appears to be mainly caused by purchasing costs of western aircraft and raising of airfares.

However, operating profit has been deteriorating sharply during the same period, especially from 1995 to 1996, marking a net loss of 1,200 million sum. Profitability in operation of NAC Non-operating revenues also in 1996 to half the level of the corresponding figure the previous year.

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	9,3785.50
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

According to ICAO statistics, profitability of major other airlines in 1994 was as follows:

- Japan Airlines -3%
- All Nippon Airways 3%
- Thai Airways 9%
- British Airways 17%
- Asiana -25%
- Korea Airlines 3%
- American Airlines 10%
- Pakistan International 1%
- Crimea Air (Ukraine) 4%
- Lithuanian Airlines -5%

7.4.3 Balance Sheet (Assets and Liabilities)

Table 7.4.3 shows the Balance sheet (Assets and Liability) of NAC. Generally, in analyzing the financial situation of a self-paying company, various management indices are used in western companies. Four key indices are adopted in reviewing the financial situation of NAC.

Table 7.4.3 Assets and Liabilities of NAC

Account	(in Million Sum)		
	1994	1995	1996
Assets			
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
Total of Assets	2,448.10	4,367.99	10,312.10
Liabilities & Equity			
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
Total of Liabilities & Equity	2,448.10	4,367.99	10,312.10
Ratio of Fixed Assets to Equity	0.65	0.72	2.69

(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:

	1994	1995	1996
$\frac{\text{Equity}}{\text{Total Assets}} \Rightarrow$	$\frac{2,000}{2,448} = 82\%$	$\frac{1,818}{4,368} = 42\%$	$\frac{1,531}{10,312} = 15\%$

According to ICAO statistics, stability of major western airlines in 1994 was as follows:

- Japan Airlines 22%
- All Nippon Airways 13%
- Thai Airways 15%
- British Airways 8%
- Asiana 16%
- Korea Airlines 11%
- American Airlines 10%
- Pakistan International 12%
- Crimea Air (Ukraine) 30%
- Lithuanian Airlines 58%

Since investments in fixed assets are not expected to be collected over a short period, investment funds must be met either by equity or long-term liability or equity plus long-term liabilities.

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

In the above second case, stability of major western airlines of in 1994 was as follows:

- Japan Airlines 99%
- All Nippon Airways 94%
- Thai Airways 101%
- British Airways 135%
- Asiana 110%
- Korea Airlines 155%
- American Airlines 284%
- Pakistan International 131%
- Crimea Air (Ukraine) 47%
- Lithuanian Airlines 59%

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

Efficiency of Assets of major western airlines in 1993 was as follows;

- Japan Airlines 0.60
- All Nippon Airways 0.66
- Thai Airways 0.52
- British Airways 0.69
- Asiana 0.53
- Korea Airlines 0.11
- American Airlines 0.10
- Pakistan International 0.12
- Crimea Air (Ukraine) 0.30

- Lithuanian Airlines 0.58

(3) Growth

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

$$\frac{1995 \text{ Revenue}}{1994 \text{ Revenue}} \Rightarrow \frac{5,111}{1,254} = 4.1 \qquad \frac{1996 \text{ Revenue}}{1995 \text{ Revenue}} \Rightarrow \frac{10,479}{5,111} = 2.1$$

$$\frac{1995 \text{ T. Assets}}{1994 \text{ T. Assets}} \Rightarrow \frac{4,368}{2,448} = 1.8 \qquad \frac{1996 \text{ T. Assets}}{1995 \text{ T. Assets}} \Rightarrow \frac{10,312}{4,368} = 2.4$$

(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.

However, according to the Balance Sheet shown in **Table 7.4.3**, 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 based on **Table 7.4.3**.

Current Ratio (%) of major western airlines in 1994 was as follows;

- Japan Airlines 128%
- All Nippon Airways 154%
- Thai Airways 185%
- British Airways 141%
- Asiana 41%
- Korea Airlines 64%
- American Airlines 97%
- Pakistan International 119%
- Crimea Air (Ukraine) 444%
- Lithuanian Airlines 97%

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.

If an entity is unable to meet its obligations to repay its current liabilities, this will create an extremely critical situation in terms of meeting financial obligations. This is a common theory widely adopted in western accounting.

According to the "Balance Sheet" above, NAC has a very large amount of "Current Liability" compared to "Current Assets". But, simultaneously NAC has very large

"Other Assets"; exceeding the amount of the "Fixed Assets". If the nature or contents of "Other Assets" is made clear to the Study Team, a classification into "Current" or "Fixed" assets can be made.

Further more, according to the data given to the Study Team, "Details of Current Assets" shown in the Balance Sheet do not include "Cash" and "Accounts Receivable". The general practice in western accounting is that "Current Assets" should consist mainly of "Cash" and "Accounts Receivable" and other monetary elements to be cashed in a short period.

(5) Overall Review of NAC's Financial Situation

Summing up the previous analysis, major management indices of NAC and its overall review can be summarized as shown below;

a) Stability:

Deterioration of stability has led to a sharp decrease in equity in 1996 as shown in Table 7.4.4 and this decrease seems to be weakening NAC's financial base. Equity/Total Assets ratio of NAC shows a rapid decrease. The index ranges from 10 to 25 percent for most of the world airlines.

Fixed Assets/Equity + Long-term Liability ratio should be below 1.0 threshold. NAC's index is 0.60 in 1996.

Table 7.4.4 Details of Equity of NAC

(In Million Sum)			
Items	1994	1995	1996
1. Statutory Fund	12.8	1,571.5	2,513.7
2. Reserve Fund			
3. Special Purpose Fund	124.9	126.7	74.0
4. Other Surplus			
5. Profit (Loss)	337.0	-119.1	-1,224.2
6. Profit Utilization		239.0	167.5
7. Revaluation	1,525.7		
Total	2,000.4	1,818.1	1,531.0

b) Profitability:

Profitability deteriorated both in terms of ratio and real amounts in 1996 due to excessive operating losses.

c) Growth:

Growth of Revenue and Assets seems to be caused mainly by inflation, not by actual growth of the company.

d) Efficiency of Assets:

NAC's index shows a reasonable level.

e) Liquidity:

Current Assets/Liability ratio was not determined this time, nor was "Cash Flow Check" due to the lack of the necessary data.

Table 7.4.5 Summary of Major Management Indices of NAC

	1994	1995	1996
Stability:			
Equity	82%	42%	15%
Total Assets			
Fixed Assets	64%	46%	60%
Equity Plus			
Long-term Liability			
Profitability:			
Operating Profit	24.7%	(-3.9%)	(-13.5%)
Revenue			
Growth:			
Growth Rate of Revenue		4.1	2.1
Growth Rate of Total Assets		1.8	2.4
Efficiency of Assets:			
Revenue	0.51	1.71	1.02
Total Assets			

7.4.4 Revenues and Expenses of Tashkent Airport Enterprise (TAE)

(I) Charges for Airport and Air Navigation Services

Charges for airport and air navigation services of Uzbekistan as of January 1993 are summarized as follows;

a) Category of Charges for Airport

Category of Charges for Airport consists of the following 7 charges;

- Landing and Take-off Charges based on the maximum take-off weight of aircraft. This rate is US\$ 13 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 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.

b) 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.

Unauthorized take-off and landing within the territory of Uzbekistan carries a penalty of US\$ 10,000 plus a further US\$ 5,000 for air navigation charges.

(2) Operating Revenues and Profit of TAE

Revenues of TAE have increased rapidly over the past three years. From 1993 to 1994 they rose by more than tenfold, from 1994 to 1995 by 4~5 times and the latest annual increase was about double.

During the last three years, figures rose by more than a 100 times. This high rate of growth almost matches similar growth witnessed at NAC in general.

Operating profit has remained positive while NAC's overall figures have deteriorated severely over the same period. TAE earned 360 million Sum in 1996, thereby contributing very much to NAC's overall financial position. These figures are quite outstanding for an enterprise.

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
Profit (Loss) before Taxes			357.4	359.6
Profitability				
Profit				
Revenues	61.3%	60.7%	54.0%	37.0%

(3) Details of Revenues and Expenditures of TAE

Details of revenues and expenditures of TAE for the past three years are shown in Table 7.4.7 and sub-items of revenues and expenditures are as shown in Table 7.4.8.

Table 7.4.7 Details of Revenues and Expenditures of TAE

(in Million Sum)

Items	1994	1995	1996
REVENUES			
1. Commercial Passenger & Cargo Services	28.3	103.3	189.1
2. Aircraft Departure	55.0	88.4	303.1
3. (%) of Passenger & Cargo Revenue	1.5	3.9	20.3
4. Other Revenue	62.5	480.5	550.6
Revenue Total	147.3	676.2	1,063.5
Tax on Addition Value(TAV)	24.8	84.6	126.9
Revenue without TAV	122.5	591.6	936.6
EXPENDITURE			
I. Self Cost	41.8	214.9	423.6
1. Maintenance of Building	8.9	52.4	108.7
2. Labour Payment	11.0	32.3	93.5
3. Social Insurance	4.2	12.8	36.9
4. Depreciation	3.4	17.4	19.8
5. Other Production Costs	20.6	100.0	164.7
II. Expenses of Period	N/A	57.1	166.8
1. Expenses of Sale	N/A	0	0.8
2. Administrative Expenses	N/A	15.0	40.7
Salary of Administration personnel	N/A	(6.8)	(23.3)
Allocation on Insurance(40%)	N/A	(2.7)	(9.3)
Materials & Techniques for Admin. Personnel	N/A	(5.5)	(8.0)
3. Other general economics	N/A	42.1	125.3
Expense Total(I+II)	41.8	272.0	590.4

Source : NAC

Table 7.4.8 Sub-Items of Revenues and Expenditures of TAE in 1996

Items	Amount (in thousand Sum)	
DETAILS OF AIRPORT REVENUES		
• Commercial Passenger & Cargo Services		
- Domestic & CIS Passenger Handling	121,916	
- Domestic & CIS Cargo & Mail	4,666	
- International Passenger Handling	57,517	
- International Cargo & Mail Handling	5,014	
Sub Total	189,113	
• Aircraft Departure		
- Domestic & CIS Departure Service	131,232	
- Domestic & CIS meteorological service	13,212	
- International Departure Service	59,976	
- International Meteorological Service	2,416	
- International Landing Charge	96,609	
Sub Total	303,445	
• (%) of Passenger. & Cargo Revenue		
- Commission of Passenger Sales	927	
- Commission of Cargo Sales	19,407	
Sub Total	20,334	
DETAILS OF AIRPORT EXPENDITURES		
• Social Insurance		
- Allocations on Social Insurance and Pension Fund (38%) (38% of labor payment 93,502)	35,014	
- Allocations into Fund Occupancy	1,843	
Sub Total	36,857	
• Depreciation		
- Amortization of Basic Means (Building, Constructions, Equipment etc.)	13,532	
- Amortization of Special of Auto Transport	6,284	
Sub Total	19,816	
• Other Production Cost		
- Works & Services of Production Made Other Organization	1,041	
- Expenditure of Maintenance of Special Cars (without amortization)	66,435	
- Losses due to Lack or Spoilage of Material	216	
- Traveling Allowances	873	
- Expenditure on Safety of Labor	1,581	
- Expenditure on Security Guard-team	3,832	
- Obligation Payments into the Budget as Taxes	80,511	
Including tax on		
lead maintenance	(9,366)	
Transport means	(1,482)	
Property etc.	(4,924)	
- Others	127	
- Other Expenditures of Production Purposes in Total	10,130	
Total	164,746	
• Administrative Expenses		
- Salary of Administration Personnel	23,335	
- Allocation on Insurance (40%)	9,334	
Including allocation on social insurance of administration	(8,867)	
Including allocation into fund of occupancy	(467)	
- Material & Technical Means Facilities, Transport in Total	7,996	
Sub Total	40,665	
• Other General Economics		
- Expenditures on Training & Re-training of Personnel	147	
- Expenditures on Improvement of Health & Sanitary Conditions	60,980	
- Fund of Salary	32,852	
- Social Allowances on the Account of Production Means	1,947	
- Others	32,129	
- Other Revenues of Basic Activity	-2,708	
Sub Total	125,347	
Non-Operating Revenues		
Revenues & Expenditures of Financial Activities		
Revenues	35,531	
Expenditures	22,115	
Difference	13,416	

(4) Overview of Revenues and Expenditures

Based on the classification of the sub items of revenues and expenditures given on the previous pages, it appears, that the rearrangement of the sub items of both revenues and expenditures in 1996 have made them more understandable, with the use of the familiar wordings and categories employed in the western accounting system, as shown in Table 7.4.9.

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%

All of these elements except "other revenues" are not likely to be found regularly in the revenue list of an ordinary airport enterprise or authority in the West. Only "other revenues" appear to correspond to revenues of an ordinary airport enterprise.

On the previous page the ratio of profits / revenue was calculated, revealing a very high figure. But, without the above 5 items, other revenues only remain as "due airport revenues". They amount to only 550,590 thousand Sum, while costs were 590,452 thousand Sum. Thus some net loss would occur. (-39,861)

It is worth noting that "Passenger / Baggage Handling" revenues are not usual among western airlines. Wherever the authority of the airport might be, airlines do not pay a charge of this nature to the authority. This charge is said to be proportional to the number of passengers departing from airports.

This charge is very important for airports as one of their major revenue items and sometimes very important for airlines, as one of their biggest expenses. That is why they both seem to be very eager to obtain the statistical data, as to how many passengers they have handled (on departure basis) at respective airports.

"Cargo Handling" revenues usually appear as revenue for warehouse agents and sometimes for of airlines with a large staff and facilities in their home bases entrusted by other airlines.

"Aircraft Handling" revenues also appear as revenues of airlines or their subsidiary companies entrusted by other airlines.

"Sales commission" revenues are also categorized as those of sales agents. At other airports airline staff sells tickets directly without paying a commission. Since the majority of items of TAE's Revenues are based on some different accounting rule or system, further discussion is difficult.

Table 7.4.9 Rearrangement of Revenues and Expenditures of TAE

Items	DOMES./CIS	INTER.	TOTAL
REVENUES			
1) Passenger / Baggage Handling	121,916	57,517	179,433
2) Cargo and Mail Handling	4,666	5,014	9,680
Subtotal	126,582	62,531	189,113
3) Aircraft Handling			
Departure Service	131,232	59,976	191,208
Meteorological Service	13,212	2,416	15,628
Subtotal	144,444	62,392	206,836
4) Airport Charge (= landing fee, inter. only)	0	96,609	96,609
5) Commission (Dome./CIS and Inter. are mixed-up)			
of Passenger Sales			927
of Cargo Sales			19,407
Subtotal			20,334
6) Other Revenues (These revenues consist of various types of revenues arising from miscellaneous activities in the airport)			550,590
Ground Total (before tax)			1,063,492
EXPENSES			
1) Salaries / Labor Payments			
Labor Payment			93,502
Salary of Administrative Personnel			23,335
Subtotal			116,837
2) Social Insurance			
Labor Payment x 39%			36,857
Admin Salary x 40%			9,334
Subtotal			46,191
3) Maintenance Costs for Airframe / Facility / Equipment			108,729
4) Depreciation			19,816
5) Material Costs			67,692
Sub Total			
6) Other Costs (Including "Obligation Tax" (80,511) and "For Maintaining Health and Sanitary Conditions" (60,930))			231,160
Ground Total			590,425

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 more than 3.000 personnel representing roughly a quarter of the total workforce of NAC.

In the organizational structure of NAC, TAE is in a line of independent Division groups headed by the Finance Management unit as shown in Fig. 7.2.1. Heavy aircraft maintenance plant No.243 is also in this line of organization.

TAE is responsible for all business services concerned with Tashkent airport activities. It is one of the biggest enterprise units of the NAC organization. TAE was founded on July 21, 1995 based on a Special Order by the Cabinet of Ministers. In the course of establishing TAE as one of the sub divisions, NAC has gradually taken over the air transportation sector under its own control, taking over succeeding the assets and services of the civil aviation system of Aeroflot.

(2) Present Organization of TAE

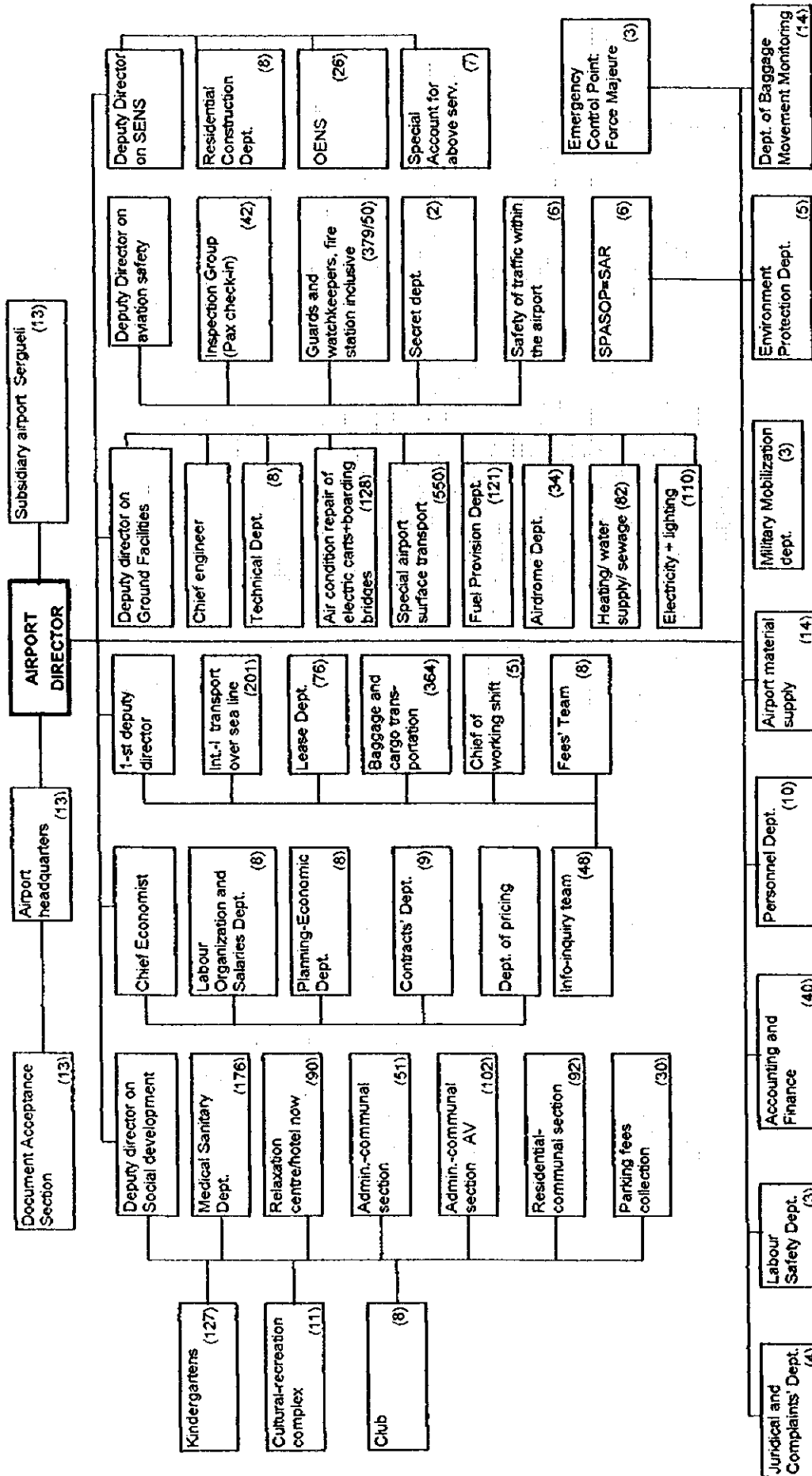
Under the leadership of the "Airport Director" who is the top administrator, five Deputy Directors on the same hierarchical level direct the different organizational units as shown in Fig. 7.5.1.

Essential units for decision-making and administration, such as the Economic Division and Accounting/Finance Division report directly to the Airport Director. Chief of the Economic Division, directing the perspective divisions in the line of the organization's structure, is also on the same hierarchical level as the Deputy Director.

Except for the First Deputy Director, the four other Deputy Directors head the Social Development, Surface Services, Aviation Safety and Service /Maintenance Surface Facility and Construction Directors, respectively.

Every division under the direction of the same Deputy Director is a different organizational unit, but they are all closely related in each business field.

Fig. 7.5.1 Organisation of Tashkent Airport



7.5.2 Operation of Tashkent Airport

TAE achieved an expansion of business due to its good management and operation based on the independent profit system. Tashkent Airport will inevitably be a core element in the air transport network of Uzbekistan. It can, and therefore should be made a model case for the intended organizational development, and could act as a showcase for the successful realization of economic reform policies in Uzbekistan.

Passenger and cargo/mail handling are all done by TAE, also ramp works (handling of aircraft) are under the control of TAE. In western countries these areas of business are completely under the jurisdiction of the respective airline companies. For the smooth movement of passengers as well as the sound carriage of checked baggage to the destination airport, this job should be executed by the respective airline companies or should be entrusted to other airlines. These services are an essential part of business of the airlines.

(1) Customs, Immigration and Quarantine Services

C.I.Q services are made under the jurisdiction of the state, and at present this service is executed and controlled by the Military. Passing of the national boundary is a matter strictly under the control of the State organization.

(2) Passenger Check-in and Baggage Handling

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. The transport of both passengers and their baggage is the unified service of an air carrier. For the purpose of securing the expeditious flow of passenger and the sound transport of baggage, passenger-check in and baggage handling service is under the jurisdiction of the respective 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

The following are standard procedures for out-going foreign passengers:

Step 1 - Customs inspection by the Government officers

(Passport, visa, air tickets, all types of currencies with due documents, contents of all baggage by X-ray, etc.)

Step 2 - Check-in at airlines counter by TAE staff.

Step 3 - Passport control with other due documents by Government officers

Step 4 - Security check by Government officers

(passengers and hand-carried baggage through the metal detector gate and X-ray)

Step 5 - Proceed to departure lounge on the second floor.

Step 6 - Boarding tickets are collected at the departure gate by TAE staff.

Procedures for domestic passengers to domestic destinations are more simple, especially for step 1, shown above.

The arrival terminal is common to all passengers, but with separated gates for first and business class and economy class. The necessary documents differ greatly according to nationalities and country of departure and passage.

At the check-in counter for overseas flights, computerized departure-control systems are available. All checked baggage is also handled by TAE staff. At Tashkent airport, placards and other signs for passengers seem to be somewhat smaller and less clear than Western ones. Most of them are only in Russian. At Samarkand airport, however, these are much better than at Tashkent.

Post-departure traffic information, including number of passengers on board, loaded cargo and mail tonnage is to be sent immediately to NAC head office by telex. But on some long-distance CIS flights, this information is not transferred to the destination by telex, but by direct reporting from the crew on board, just around one hour before arrival through VHF communication.

(3) Cargo and Mail Handling Services

The standard procedures for export of outgoing cargo are as follows:

Step 1 - Bring-in to the customs office for inspection all necessary documents, which differ greatly depending on the countries of destination

Step 2 - TAE cargo office for AWB and others and for payments

Step 3 - Again to customs' office for approval stamps

Some of the cargo for export might contain onions to Khabarovsk, vegetables to Moscow and packed raw-cotton to Seoul. About 60 % of outgoing cargo are for CIS and domestic destinations (Weight base). 80-85 % of incoming cargo is from overseas, most of the consumer goods are from overseas countries. Cargo containers of regular size are used only for A-310 and B767/B757 flights.

(4) Catering Services

Catering for Uzbekistan Airways is performed by one of the subsidiary companies of NAC. The following outline of the business explains the situation:

- There are special laws and regulations concerning finance, sanitary conditions and technology;
- Overall annual planning is made by Technological-Engineers together with the management of the company and the Council of catering staff. Finance management needs the approval of NAC;

- Decision on meal/menu planning are made by the Chief Technological Engineer and Production Manager;
- Inspections of the catering factory are executed by the State Sanitary Epidemic Control authority, once or twice a month;
- Quality level of meals is controlled by the Chief Technological Engineer and the Vice-Chief Production Manager Production Manager. There is a special REGISTER, which is completed every day;
- Evaluation of total activities is performed by NAC from the point of view of finance. (Audit control and tax inspection).

From the point of view of quality, evaluation is made by the Chief Technological Engineer. If any complaints arise, a penalty is due. If any praise is given, extra benefits are paid.

- In the case of recruiting cooks, they propose an assortment of meals, prepared by cooks and evaluate them by the quality of the meals and the qualifications of each cook.
- Payment rules between Airlines and Caterers are as follows :

If a flight is canceled 6 hours before the schedule, no charge is made to airlines. If the catering company is informed less than 3 hours before flight cancellation, then the airline pays a 100 % penalty.

- The catering company is insured up to reasonable amounts.
- Production capacity is supposed to be 1,500 meals a day.

(5) Fire and Rescue

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. The Search and Rescue Section reports directly to the Airport Director with 6 personnel. The Section that would cope with a major emergency such as an earthquake, flood and so on, also reports directly to the Airport Director. This section has 3 staff members.

(6) Airport Security

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.

The Document Management Section is directly under the control of the Airport Director. The Chief Engineer who, in general, commands the airport facility reports directly to the Deputy Director of the Ground Department. Chiefs of Administrative Divisions such as Economic, Finance and Personnel have direct contact with the NAC head office chief

concerned for smooth transaction of business.

The airport has 511 employees in total. The organization, management and the operation of the Samarkand Airport is very similar to that of Tashkent Airport. After a full day's study of the airport, we wonder whether the Samarkand Airport is managed and operated by Samarkand Airport Enterprise the SAE.

The airport is said to be on a smaller scale than TAE in terms of airport management and operation.

The main revenue of the airport operation comes from navigation fees, sale of tickets and landing fees. This income usually covers the expenses. When the balance of accounts remains in the black, the surplus is transformed to the NAC head office.

Samarkand airport is operating its airport service on a self paying basis, and the airport attracted a highly favorable appraisal for the competence it shows in the effective running of airport activities.

7.5.4 Overall Review of the Airport Operation Sector

As a 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 the airport operation sector;
- Differences from international standards of facilities;
- Low service level for passenger comfort;

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

7.6.1 Background

(1) Brief History of Uzbekistan Airways

For many years, civil aviation in Uzbekistan had been integrated as a branch organization of the civil aviation system of the former Soviet Union. Uzbekistan Airways was officially formed in 1992 and incorporated Aeroflot's former central Tashkent operations as well as the Uzbekistan Civil Aviation Board.

(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)

Uzbekistan is associated with the International Civil Aviation Organization (ICAO), and NAC as "Uzbekistan Havo Yullari" with the International Air Transportation Association (IATA).

(2) Geographical Advantage of Uzbekistan

Uzbekistan Airways is one of the largest aeronautical companies of the former USSR and

the leading one in Central Asia. It possesses a developed air network, linking Uzbekistan with large CIS cities, almost all its capitals, health recreation centers in the Crimea and the Caucasus, industrial cities in Central Russia, Siberia, Russian Far East, the Ukraine, Belarus and the Central Asian Republics.

Geographically, Tashkent itself is literally a crossroads of European and Asian countries and a center of economic links. Historically, its ancient cities were on the Silk Road routes. The development of Uzbekistan Airways in the region is supposed to make Uzbekistan the gateway for all the Republics of Central Asia and providing international traffic to and from various parts of the world.

Qualified experts of developed countries unanimously foresee an increase in international traffic. As a matter of fact, after the year 1990, international traffic has witnessed a considerable growth, with an annual rate of increase of 6.6%.

(3) Strategic Position of Uzbekistan Airways in the National Economy and its Development

The principles of a centrally planned economy are to be substituted by efficient market economy mechanisms according to international standards. Under the framework of international economic cooperation, President Mr. Karimov I. A. and the Government have set forth the policy of "open doors" to the world, creating favorable conditions for attracting foreign investments and tourism.

The transport infrastructure in general and air transport in particular form an important component of the national economy and its development. Thus, the air transport industry is the general forerunners in the economic restructuring process.

Now, headed by a market-oriented, democratic-style government, Uzbekistan Airways is supposed to have one of the best prospects for development of its aviation among the five former Central Asian Soviet Republics.

Responding to this national expectation, Uzbekistan Airways was ambitious enough to promote aggressive management. The company became one of the first of the former Soviet airlines to directly purchase Western made jet transport craft. The two B767s were 85 % financed by a US\$ 171 million Export-Import Bank Loan from the USA.

(4) Management

The carrier currently operates more than 75 international flights per week, as well as at least 30 round trips a day to 16 destinations in Uzbekistan. The airline also flies to about 30 airports throughout Russia and the former Soviet Central Asian Republics. Russian-designed transport craft are used for most of the flights to destinations in the former Soviet Union.

Based in the capital city of Tashkent, Uzbekistan Airways continues to focus on rebuilding traffic, after the dissolution of Aeroflot in 1992, passenger numbers plummeted.

The numbers of passengers fell from 6,5 million in 1990 to 900,000 in 1994, but by last year, 1996, the carrier required ridership to the 2,3 million level, while Aeroflot marked 3.9 million and the new Russian carrier Transaero achieved 1,5 million passengers during the same period. This year, 1997, the airline estimates to carry about 2,5 million passengers.

The airline earned US\$ 78 million in hard currency on its international routes last year,

not including local currencies. Forecast had been only US\$ 60 million. Overall, the carrier reported a US\$ 7 million profit in 1996. Uzbekistan Airways pays for its western-made airplanes with hard currency, generated by international routes.

(5) Various Measures for Modernization

The fragmentation of aviation services that followed the collapse of the Soviet Union has proven economically disastrous for airlines in Russia and its former states and has compromised safety. Safety is the definite mission for commercial airlines.

As the head of the centralized former Aeroflot organization, Mr. Ruzmetov has been able to exercise "tight control" of operational and safety issues. He, himself is a B-767 and A-310-rated pilot with 28 years' experience and he took quick actions to improve overall safety of aviation in his country.

These measures include the following:

- Introduction of modern western aircraft
- Renovation of ATC systems
- Upgrading airports

a) Introduction of Modern Western-made Aircraft

The airline took delivery of its second 207-seat Boeing 767 -300 ER in March 1997 and has a VIP-configured 757-200 due to be delivered in May 1997. It is also operating two Airbus 310-300s. (one more to be delivered: thus there'll be three in total) To promote domestic tourism, the airline signed a US\$ 75 million contract to acquire three Aero International (Regional) RJ85-75 seat transports.

b) Renovation of ATC Systems

In addition to acquiring Western-made aircraft, Uzbekistan Airways also has spent US\$ 40 million replacing almost 100 % its obsolete, ground-based air traffic control, air management and navigation systems with French-built Thomson -CSF equipment. The systems contribute greatly to the company revenues due to overflight fees for approximately 80 international flights that cross Uzbekistan airspace daily. The country is strategically located between Europe and destinations in South-East Asia.

c) Upgrading Airports

Uzbekistan Airways is continuing its ground-based modernization by upgrading the airports at its three main domestic tourist destinations, namely Samarkand, Bukhara and Urgench. Investment for the above three will total US\$ 146 million, a sum supplied by a Japanese Yen Credit Loan.

The NAC has already brought its Tashkent hub's runways and facilities up to ICAO Category 2 status. This includes a new US\$ 3 million domestic flight terminal, capable of handling 300 passengers per hour.

(6) New International Routes and Review of Domestic Lines

While keeping the existing international lines, Uzbekistan Airways is planning to enlarge its network. The carrier is likely to increase frequency of flights to London, Frankfurt and Beijing. A new route to Jakarta is due to start this summer. The airline is expecting to start scheduled service to Ho Chi Minh City and a destination in Japan. Last year the airline carried 4,000 Japanese tourists to Uzbekistan on charter flights.

Uzbekistan Airways also concentrates on its main domestic routes. Such airports in Uzbekistan as Tashkent, Samarkand, Bukhara, Urgench possess a considerable tourist potential as these towns are world renowned historic and cultural centers, attracting many people from all over the world. Beside this, it is possible to provide tourists with other attractions in the mountainous areas, which westerners know little about.

Old twin turbo-propelled AN-24s and Yak-40 Jets are to be replaced with modern RJ-85 transporters in the near future. Unlike some other state owned airlines, Uzbekistan Airways sets its own domestic fares. (Although Government approval is still necessary.) Uzbekistan Airways recognizes tourism on these routes as a major driving force for ticket sales and local services are likely to be profitable.

(7) Reinforcement of Aircraft Maintenance

In parallel, to shift towards the use of Western-made transport craft, NAC has the goal of establishing "a maintenance base within its maintenance center", specializing in servicing Western-built jets. "Lufthansa Technik", which has worked with the airline since 1993 on its A-310s, recently won a contract to help provide on-site expertise and supervision of the new enterprise. The first C-checks on a Western-built transport are scheduled for late 1998 and also, C-check on B767/B757 are expected to begin in 1999.

The carrier aims to become a maintenance contractor for neighboring airlines, especially those of CIS countries and East European countries, which have introduced Western jets since 1990. During the past two years, the airline has sent some 500 maintenance and pilot staff to Western countries for training. More are scheduled to be dispatched hereafter.

Thus, the airline is just beginning to move toward a market-oriented style of management with various modernization measures of still to be implemented. Yet, the company still has to overcome some difficulties in the near future.

7.6.2 Management of Uzbekistan Airways

It is very difficult to comment on the organization and management procedures of NAC as an airline due to the limited data and insufficient explanations given from NAC's headquarters. However, during the Field Survey, there were several opportunities to visit Tashkent Airport and to be in contact with personnel on duty. The review of the organization and management is therefore limited to a general presentation of the structures and functions of NAC from the view of the functional activities in other airlines.

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
Head Office Function	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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)
Sales/Reservation	<ul style="list-style-type: none"> Several ticket offices at airports and down-town Tashkent with less developed computerized network. No specialized salesmen to go outdoors for sales. Small quantity of advertisement and promotional activity. 	<ul style="list-style-type: none"> Through many sales/reservation agents with well developed computerized network. Many salesmen going outdoors for sales. Positive sales promotional activity and events.
Flight Operation (including crew)	<ul style="list-style-type: none"> All jobs concerned with flight operation by NAC 	<ul style="list-style-type: none"> Self-supporting
Passenger Handling	<ul style="list-style-type: none"> At Tashkent Airport, all services are done by TAE (One of NAC's subsidiary companies – Tashkent Airport Enterprise). Other ramp work (also the same) 	<ul style="list-style-type: none"> Self-supporting or by subsidiary company or entrusted to other airlines.
Cargo / Mail Handling	Same as above	Same as above
Aircraft Maintenance	<ul style="list-style-type: none"> Self-supporting Almost no-difference from other airlines for line-maintenance (A, B services). 	<ul style="list-style-type: none"> Self-supporting or entrusted to other airlines.
Fueling Company Catering Company	<p>Almost no difference from other airport. Catering services are performed by one of NAC's subsidiary company. Fueling company is a independent from NAC entity.</p>	

NAC includes 25 subsidiary companies in its entity. Among them, "Tashkent Airport Enterprise", "Uzaeronavigation" and "Factory 243" are typical. TAE gets 5% sales commission on passenger and cargo sales at Tashkent airport, as a sales agent.

But, sales and reservation functions of TAE and NAC seem to be weak and not active. Since the market has long been under a "Planned Economic" and not under "Market Oriented" system there has been almost no competition. However, recently the sales division of NAC is making strong efforts to face "Open and Free Market" by improving various sales functions.

Uzbekistan Airways does not operate the handling services of passengers or baggage and cargo /mail at Tashkent Airport or other local airports. These services are done by staff in the TAE organization, who does not really belong to Uzbekistan Airways. This is supposed to be a big difference from the western airlines. Line and base maintenance of aircraft are completely separated. Base maintenance is being performed at the Repair Plant No. 243. As far as technical divisions, as flight operations, crew and aircraft maintenance are concerned, no big differences from other western airlines seem to exist.

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

These indices are used for separately classifying into scheduled and non-scheduled flights in order to incorporate both in the planning stage and as-achieved stage. These indices are used for officially reporting to IATA, and are disclosed in publications.

(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.

The calculation of product amount of Uzbekistan Airways is based on the conditions below:

- Sector distance given by NAC operation division;
- Sector block-time estimated from Timetable;
- Number of seats by aircraft type estimated.

Note: Available Ton-Kilometer (ATK) was not calculated due to lack of allowable carry load (ALK).

a) Weekly Flight Frequency

Weekly flight frequency of Uzbekistan Airways based on the timetable is as shown in **Table 7.6.2**. As far as number of flights is concerned, about 70% of total flights are domestic services, while CIS flights account for a share of 19% and international flight are only 12%.

Table 7.6.2 Weekly Flight Frequency

Route	A310	B767	IL-86	IL-62	Tu-154	AN-24	Yak-40	Total	%
International	11	18	0	5	4	0	0	38	12
CIS	21	0	3	1	29	0	6	60	19
Domestic	0	0	0	0	19	68	134	221	69
Total	32	18	3	6	52	68	140	319	100
%	10	6	1	2	16	21	44	100	

b) Annual Product Amount

Based on the weekly flight frequency, annual production volume in terms of frequency, block times, number of seats thrown and ASK by aircraft types were estimated. Table 7.6.3 shows summary figures, and detailed calculation sheets of annual product amount are attached in Tables 7.6.4 to 7.6.11.

Table 7.6.3 Annual Production of Uzbekistan Airways

Airlines	Frequency	Flight Km.(10 ³)	Block Time	Number of Seat	ASK (10 ⁶)
International	1,976	19,907	25,904 hrs.	750,000	3,845
CIS	3,120	16,369	21,861 hrs.	1,026,000	2,811
Domestic	11,492	10,609	32,318 hrs.	1,217,000	7,261
Total	16,588	46,885	80,083 hrs.	2,993,000	13,811

Each service route of Uzbekistan Airways is classified into several middle-sized groups in accordance with destination area, in order to facilitate route structure analysis. The middle-size groups are summed up in three major-sized groups as International, CIS and Domestic routes as shown below:

- Domestic routes: 2 middle-size groups
Fergana basin
Nukus and others;
- CIS routes: 5 middle-size groups
Moscow, Kiev, Petersburg
Black Sea (Volgorad, Rostov, Mineralnnui, Krasnodar, Simferopol)
Ural (Chelyabink, Ekaterinburk, Kazan, Ufa, Samara, Tymen)
East Siberia (Kransoyarsk, Novosibirsk, Khabarovsk)
Neighboring Countries (Ashgabad, Bishkek, Afmaty);
- International: 4 middle-size groups
Euro, USA (New York, London, Amsterdam, Frankfurt)
Mid Near East (Shariah, Istanbul, Male, Tel-Aviv, Athens)
India, Pakistan (Delhi, Karachi, Bangkok, Kuala Lumpur, Jakarta)
East Asia (Beijing, Seoul)

Due to the lack of sufficient information related to the characteristics of air routes of Uzbekistan Airways, the above classification into middle-sized groups was made based on service routes of Uzbekistan Airways flying to same direction or distinct areas or zones. As is often the case, classification can be made based on other factors such as type of prevailing passenger, whether business, or tourist.

Table 7.6.4 Estimated Weekly Production Volume (International)

Route	Type of Aircraft	Weekly Frequency	One way Distance (km)	Weekly Flight Km (d = b x c x 2)	Block Time (Hour)	Weekly Block Time (Hour) (f = b x c)	Weekly Number of Seat (g)	Weekly Available Seat Km (10 ³) (h = c x g)
	(a)	(b)	(c)		(e)			
[EURO- USA]								
New York (via Ams.)	A310	1	11,530	23,060	29:55	29:55	384	4,428
	B767	2		46,120		59:50	828	9,547
London	B767	2	5,679	22,716	14:20	28:40	828	4,702
Frankfurt (via Berlin)	A310	2	5,015	20,060	13:35	27:10	768	3,852
	B767	2		20,060		27:10	828	4,152
	A310	1	5,015	10,030	14:00	14:00	384	1,926
	B767	1		10,030		14:00	414	2,076
Subtotal		11		152,076		200:45	4,434	30,682
[MID NEAR EAST]								
Shariah	Tu-154	1	2,596	5,192	7:30	7:30	310	805
Istanbul	A310	2	3,633	14,532	9:25	18:50	768	2,790
	B767	2		14,532		18:50	828	3,008
Male (via Bahrain)	Tu-154	1	6,300	12,600	18:00	18:00	310	1,953
Tel-Aviv	A310	1	4,246	8,492	10:15	10:15	384	1,630
	B767	3		25,476		30:45	1,242	5,274
Athens	IL-62	1	4,141	8,282	11:25	11:25	300	1,242
Subtotal		11		89,106		115:35	4,142	16,702
[INDIA/PAKISTAN]								
Delhi	A310	2	2,167	8,668	6:00	12:00	768	1,664
	IL-62	2		8,668	6:00	12:00	600	1,300
Karachi	T-154	2	2,067	8,268	5:45	11:30	620	1,282
Bangkok	A310	2	5,151	20,604	13:20	26:40	768	3,956
	B767	2		20,604	13:20	26:40	828	4,265
Kuala Lumpur	IL-62	2	6,102	24,408	15:00	30:00	600	3,661
Jakarta (via KLP)	B767	1	7,282	14,564	18:00	18:00	414	3,015
Subtotal		13		105,784		136:50	4,598	19,143
[EAST ASIA]								
Beijing	B767	1	4,426	8,852	12:00	12:00	414	1,832
Seoul	B767	2	6,750	27,000	16:30	33:00	828	5,589
Subtotal		3		35,852		45:00	1,242	7,421
TOTAL		38		382,818		498:10	14,416	73,949

Table 7.6.5 Estimated Weekly Production Volume (CIS)

Route	Type of Aircraft	Weekly Frequency	One way Distance (km)	Weekly Flight Km	Block Time (Hour)	Weekly Block Time (Hour)	Weekly Number of Seat	Weekly Available Seat Km (10 ³)
	(a)	(b)	(c)	(d = b x c x 2)	(e)	(f = b x e)	(g)	(h = c x g)
[MOSCOW, KIEV, PETERSBURG]								
Moscow	A310	21	3,130	131,460	7:50	164:30	8,064	25,240
	IL-86	3	3,130	18,780	7:50	23:30	1,896	5,934
(via Urgench)	Tu-154	1	3,150	6,300	8:55	8:55	310	977
(via Fergana & Nukus)	Tu-154	1	3,450	6,900	8:50	8:50	310	1,070
(via Andizhan & Karshi)	Tu-154	1	3,526	7,052	9:00	9:00	310	1,093
(via Namangan & Urgench)	Tu-154	1	3,450	6,900	8:50	8:50	310	1,070
(via Samarkand)	Tu-154	3	3,100	18,600	7:50	23:30	930	2,883
(via Bukhara)	Tu-154	1	3,000	6,000	8:30	8:30	310	930
Kiev	Tu-154	1	3,285	6,570	9:20	9:20	310	1,018
St. Petersburg	Tu-154	1	3,698	7,396	10:10	10:10	310	1,146
Subtotal		34		215,958		275:05	13,060	41,361
[BLACK SEA]								
Volgograd	Tu-154	1	2,080	4,160	6:30	6:30	310	645
Rostov	Tu-154	1	2,513	5,026	7:40	7:40	310	779
Mineralnui via Nukus	Tu-154	1	2,000	4,000	6:00	6:00	310	620
Krasnodar	Tu-154	2	2,559	10,236	6:55	13:50	620	1,587
Siniferopol	Tu-154	1	3,046	6,092	8:20	8:20	310	944
Subtotal		6		29,514		42:20	1,860	4,575
[URAL]								
Chechyabink	Tu-154	1	1,706	3,412	4:45	4:45	310	529
Ekaterinburk	Tu-154	2	1,874	7,496	5:20	10:40	620	1,162
Kazan	Tu-154	1	2,306	4,612	4:20	4:20	310	715
Ufa	Tu-154	1	1,954	3,908	5:25	5:25	310	606
Samara	Tu-154	1	2,180	4,360	5:55	5:55	310	676
Tymen	Tu-154	1	2,176	4,352	5:45	5:45	310	675
Subtotal		7		28140		36:50	2,170	4,362
[EAST SIBERIA]								
Kransoyarsk	Tu-154	1	2,525	5,050	7:00	7:00	310	783
Novosibirsk	Tu-154	2	2,105	8,420	5:50	11:40	620	1,305
Khabarovsk	IL-62	1	5,582	11,164	14:25	14:25	300	1,675
Subtotal		4		24634		33:05	1,230	3,762
[NEIGHBORING COUNTRIES]								
Ashgabad	Yak-40	3	1,016	6,096	3:50	11:30	240	244
Bishkek	Yak-40	1	630	1,260	3:25	3:25	80	50
Almaty	Tu-154	3	919	5,514	3:10	9:30	930	855
	Yak-40	2	919	3,676	4:20	8:40	160	147
Subtotal		9		16546		33:05	1,410	1,296
TOTAL		60		314,792		420:25	19,730	55,356

Table 7.6.6 Estimated Weekly Production Volume (Domestic)

Route	Type of Aircraft	Weekly Frequency	One way Distance (km)	Weekly Flight Km (d = b x c x 2)	Block Time (Hour)	Weekly Block Time (Hour) (f = b x c)	Weekly Number of Seat (g)	Weekly Available Seat Km (10 ³) (h = c x g)
	(a)	(b)	(c)	(d = b x c x 2)	(e)	(f = b x c)	(g)	(h = c x g)
[FERGANA BASIN]								
Fergana	An-24	20	320	12,800	2:15	45:00	2,000	640
	Tu-154	1	320	640	1:40	1:40	310	99
Andizhan	Yak-40	17	396	13,464	2:20	39:40	1,360	539
	Tu-154	1	396	792	2:00	2:00	310	123
Namangan	An-24	14	396	11,088	2:30	35:00	1,400	554
	An-24	7	320	4,480	2:10	15:10	700	224
	Yak-40	7	320	4,480	2:20	16:20	560	179
Kokand	Tu-154	1	320	640	1:50	1:50	310	99
	Yak-40	6	250	3,000	2:00	12:00	480	120
Subtotal		74		51,384		168:40	7,430	2,577
[NUKUS & OTHERS]								
Nukus	Tu-154	7	824	11,536	4:00	28:00	2,170	1,788
	Yak-40	7	824	11,536	4:40	32:40	560	461
Urgench	Yak-40	7	723	10,122	3:50	26:50	560	405
	Tu-154	7	723	10,122	3:20	23:20	2,170	1,569
Bukhara	An-24	7	450	6,300	3:00	21:00	700	315
	Yak-40	14	450	12,600	2:45	38:30	1,120	504
	Tu-154	1	450	900	1:45	1:45	310	140
Samarkand	An-24	14	266	7,448	2:10	30:20	1,400	372
Termez	Yak-40	19	596	22,648	3:25	64:55	1,520	906
	An-24	6	596	7,152	3:35	21:30	600	358
	Tu-154	1	596	1,192	2:10	2:10	310	185
Karshi	Yak-40	19	450	17,100	2:45	52:15	1,520	684
Shakhrisyabz	Yak-40	2	500	2,000	3:00	6:00	160	80
Navoi	Yak-40	12	370	8,880	2:35	31:00	960	355
Uchkuduk	Yak-40	3	490	2,940	3:00	9:00	240	118
Zadafshan	Yak-40	7	410	5,740	2:40	18:40	560	230
Furtkul	Yak-40	7	680	9,520	3:45	26:15	560	381
Sarassiva	Yak-40	7	350	4,900	2:40	18:40	560	196
Subtotal		147		152,636		452:50	15,980	9,046
TOTAL		221		204,020		621:30	23,410	11,623

Table 7.6.7 Yearly Frequency Composition

Type of Aircraft	A310	B767	IL-86	IL-62	Tu-154	An-24	Yak-40	Total	%
Seat Capacity	192	207	316	150	155	50	40	(Times)	
[INTERNATIONAL]									
Euro-USA	208	364						572	
Mid Near East	156	260		52	104			572	
India/Pakistan	208	156		208	104			676	
East Asia		156						156	
Subtotal	572	936	0	260	208	0	0	1,976	12%
[CIS]									
Moscow, Kiev, St. Petersburg	1092		156		520			1,768	
Black Sea					312			312	
Ural					364			364	
East Siberia				52	156			208	
Neighboring Countries					156		312	468	
Subtotal	1092	0	156	52	1508	0	312	3,120	19%
[DOMESTIC]									
Fergana Basin					156	2,132	1,560	3,848	
Others					832	1,404	5,408	7,644	
Subtotal	0	0	0	0	988	3,536	6,968	11,492	69%
TOTAL	1,664	936	156	312	2,704	3,536	7,280	16,588	100%
Ratio by Aircraft	10%	6%	1%	2%	16%	21%	44%	100%	

Table 7.6.8 Yearly Block Time Composition

Type of Aircraft	A310	B767	IL-86	IL-62	Tu-154	An-24	Yak-40	Total	%
Seat Capacity	192	207	316	150	155	50	40	(Hours)	
[INTERNATIONAL]									
Euro-USA	3,696	6,743						10,439	
Mid Near East	1,512	2,578		594	1,326			6,010	
India/Pakistan	2,011	2,323		2,184	598			7,116	
East Asia		2,340						2,340	
Subtotal	7,219	13,984	0	2,778	1,924	0	0	25,905	32%
[CIS]									
Moscow, Kiev, St. Petersburg	8,554		1,222		4,528			14,304	
Black Sea					2,201			2,201	
Ural					1,915			1,915	
East Siberia				750	971			1,721	
Neighboring Countries					494		1,226	1,720	
Subtotal	8,554	0	1,222	750	10,109	0	1,226	21,861	27%
[DOMESTIC]									
Fergana Basin					286	4,949	3,536	8,771	
Others					2,873	3,787	16,887	23,547	
Subtotal	0	0	0	0	3,159	8,736	20,423	32,318	40%
TOTAL	15,773	13,984	1,222	3,528	15,192	8,736	21,649	80,084	100%
Ratio by Aircraft	20%	17%	2%	4%	19%	11%	27%	100%	

Table 7.6.9 Seat Capacity Composition

Type of Aircraft	A310	B767	IL-86	IL-62	Tu-154	An-24	Yak-40	Total	%
Seat Capacity	192	207	316	150	155	50	40	(10 ³)	
[INTERNATIONAL]									
Euro-USA	80	150						230	
Mid Near East	60	108		16	32			216	
India/Pakistan	80	65		62	32			239	
East Asia		65						65	
Subtotal	220	388	0	78	64	0	0	750	25%
[CIS]									
Moscow, Kiev, St. Petersburg	419		99		161			679	
Black Sea					97			97	
Ural					113			113	
East Siberia				16	48			64	
Neighboring Countries					48		25	73	
Subtotal	419	0	99	16	467	0	25	1,026	34%
[DOMESTIC]									
Fergana Basin					48	213	125	386	
Others					258	140	433	831	
Subtotal	0	0	0	0	306	353	558	1,217	41%
TOTAL	639	388	99	94	837	353	583	2,993	100%
Ratio by Aircraft	21%	13%	3%	3%	28%	12%	20%	100%	

Table 7.6.10 ASK Composition by Aircraft

Type of Aircraft	A310	B767	IL-86	IL-62	Tu-154	An-24	Yak-40	Total	%
Seat Capacity	192	207	316	150	155	50	40	(10 ⁶)	
[INTERNATIONAL]									
Euro-USA	530	1,065						1,595	
Mid Near East	230	431		65	143			869	
India/Pakistan	292	378		258	67			995	
East Asia		386						386	
Subtotal	1,052	2,260	0	323	210	0	0	3,845	52%
[CIS]									
Moscow, Kiev, St. Petersburg	1,312		309		530			2,151	
Black Sea					238			238	
Ural					227			227	
East Siberia				87	109			196	
Neighboring Countries					44		23	67	
Subtotal	1,312	0	309	87	1,148	0	23	2,879	39%
[DOMESTIC]									
Fergana Basin					17	74	44	135	
Others					191	54	225	470	
Subtotal	0	0	0	0	208	128	269	605	8%
TOTAL	2,364	2,260	309	410	1,566	128	292	7,329	100%
Ratio by Aircraft	32%	31%	4%	6%	21%	2%	4%	100%	

Table 7.6.11 Summary of Production

	Frequency (a)	Flight Km (10 ³) (b)	Block Time (c)	Number of Seat (10 ³) (d)	Seat % (e)	Available Seat Km (10 ⁶) (f)	ASK % (g)
[INTERNATIONAL]							
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%
Subtotal	1,976 12%	19,907 42%	25904 32%	750	25%	3,845	52%
[CIS]							
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%
Subtotal	3,120 19%	16,369 35%	21861 27%	1,026	35%	2,879	39%
[DOMESTIC]							
Fergana Basin	3,848	2,672	8770	386	13%	134	2%
Others	7,644	7,937	23547	831	28%	470	6%
Subtotal	11,492 69%	10,609 23%	32318 40%	1,217	40%	605	8%
TOTAL	16,588 100%	46,885 100%	80084 100%	2,993	100%	7,329	100%

ASK : Available Seat-Kilometer

(3) Review of Air Route Structures

a) ASK by Routes

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

From the result of analysis on ASK by routes, up to the 4th-rank, they occupy 76% of the total company's product as shown below:

- 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;
- ASK ranking of middle-sized group runs as shown below:

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. The remaining are covered by Russian-made aircraft.

Ranking of ASK by aircraft types are as follows:

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

As far as the number of passengers to be carried is concerned, the number of seats to be thrown is a most suitable index. Up to the 3rd-rank, they occupy more than 60% of the total seats provided. It means that domestic plus Moscow routes are main resources in terms of number of passenger to be carried.

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

Seats to be supplied by Uzbekistan Airways are evenly distributed to various types of aircraft.

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

As far as flight frequency (number of landings) is concerned, 70% of total flight frequency is put into domestic services.

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

Russian-made aircraft cover more than 80% of flight frequency. Ranking of flight frequency by aircraft type 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

About 40% of the total block time is occupied by domestic services. 60% of the total block time is put into former USSR regions.

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

About 66% of block time is taken up by Russian-made aircraft, which may imply a low productivity.

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 %