

Yasser Arafat International Airport
Damage Assessment

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Introduction:

Yasser Arafat International Airport is located at the eastern part of the Rafah city adjacent to the Palestinian – Egyptian borders.

It is about 36 Km away from the city of Gaza.

It was constructed in 1996.

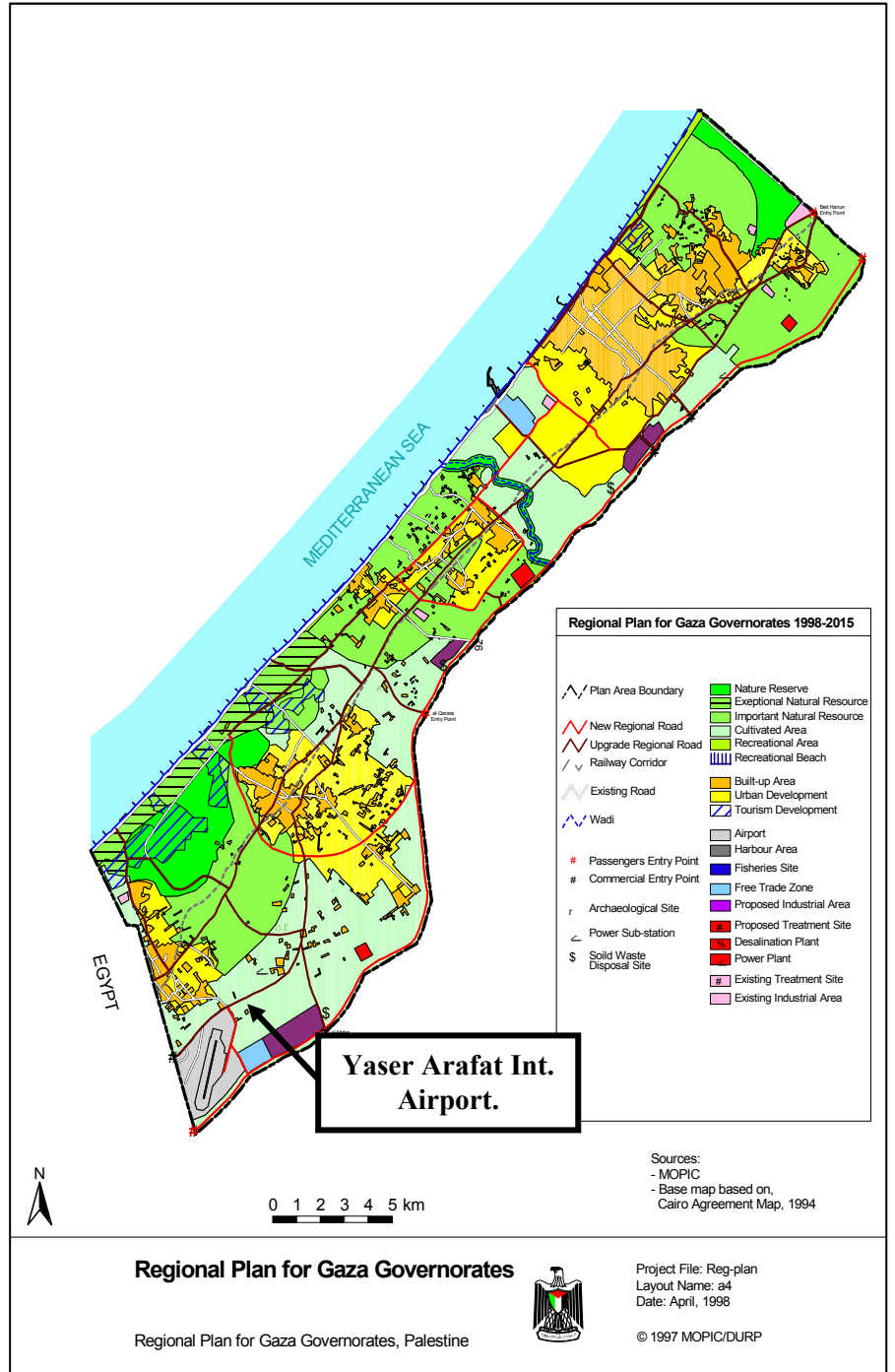
According to the Yaser Arfat International Airport Operation Protocol, signed with the Israeli Government, based on Way River Accord, Yaser Arfat International Airport is considered to be a Civil Airport.

It was inaugurated in the presence of Mr. Bill Clinton, the former US president on November 1998.

The operation of Yasser Arafat International Airport has commenced on the 24th Nov. 1998, till Sunday 8th Oct. 2000, as the Israeli Government ordered Airport Aerospace closure.

In addition of being the only gateway from/to the Palestinian territories, the airport has received several International Leaders and presidents from various countries.

On Tuesday 4th Dec. 2001 the Israeli armed forces, destroyed the main runway of the Yasser Arafat International Airport using the tanks and bulldozers.



Financing the establishment of Yasser Arafat International Airport:

More than \$ 110 millions were invested in the construction and equipping of Yasser Arafat International airport (YAIA), the following table shows contributions of various donors as well as the PNA participations in the process of establishing YAIA:

A) Projects accomplished:

	Donors Name	Details	Amount (\$)	Grant / Loan
1.	Egypt	Construction the Airport facilities	17,206,142	Loans from Egyptian Banks
2.	Spain	Supplying and installing Equipment	9,500,000	Soft Loan
3.	Spain	Supplying and installing Equipment	870,000	Soft Loan
4.	Spain	Supplying and installing Equipment	12,000,000	Soft Loan
5.	Spain	Supplying and installing Equipment	4,500,000	Grant
6.	Germany	Supplying Equipment	10,000,000	Grant
7.	Saudi Arabia	Supplying one Boeing Airplane	4,590,000	Grant
8.	Netherlands	Supplying two Fokker Airplanes	20,588,235	Grant
9.	PNA	Cost of the land used	7,400,000	Own Contrib.
Total			86,654,377	



B) ON GOING ACTIVITIES:

The following list shows the projects and the activities which was started before 28th September,2000 and still have not been accomplished yet due to the continued Israeli siege:

No.	Project	Amount	Donor	Comments
1.	Cargo Terminal Project	25 M Euro	EU	Still in the tendering phase
2.	Establishing the joint Building	2,27 M \$	Japan	80% of the project activities has been achieved
3.	Equipment and training to operate the joint Building	2,73 M \$	Japan	work will not start until finishing the construction phase
Total		35,00 M\$		

Damages to (Y.A.I.A.) as a result of the Israeli military operations:

Yaser Arfat International Airport was a target to the Israeli tanks and bulldozers for five times, we can summarize these military operations and their consequential damages as following:

On 8th Oct. 2000, the Israeli Government ordered Airport Aerospace closure.

On 4th December, 2001 Israeli tanks and bulldozers destroyed the runway and its lighting facilities.

On 12th December,2001 the Israeli warplanes completely destroyed the radar building causing damage to the power plant, control equipment, radar aerial, electricity network, fire alarm and meteorological station

On 15 December 2001 the Israeli bulldozers destroyed the major part of the runway which made its restoration too much difficult



The following table shows the details of damage caused to the Airport facilities due to the Israeli military operations.

No.	Item	Percentage of destruction
1.	Runway	60%
2.	Runway lighting System	100%
3.	Radar building	100%
4.	Radar building power plant	100%
5.	Radar Antenna	100%
6.	Control equipment	100%
7.		
8.	Electricity network and fire alarm	100%
9.	Metrological station	100%
10.	Radio navigation station	25%
11.	General petroleum authority building	10%
12.	Presidential Airplane hangar	5%
13.	Main maintenance hangar	10%
14.	New workshop building	5%
15.	Airlines building	5%



Rehabilitation of Yasser Arafat International Airport:

Due the current situation and the financial crises PNA is facing since September 2000 it is strongly recommended that the rehabilitation process has to take place as soon as possible and this process can be divided into two phases.

The first phase will enable initial daytime operation of the airport while the second phase will facilitate the operation of the Airport in its full capacity as it was before September 2000.

Runway rehabilitation and providing essential operation equipment is considered to be the main activities of the first phase. The expecting time period to achieve this phase is varying between 7-9 months plus the tendering process.

The following table shows the expecting cost of the airport rehabilitation based on UK prices by Mott MacDonald Consulting firm :

No.	Item	Estimated cost (\$)
1	Runway and Pavement Works	7,013,000
2	Instrument Landing System	1,555,775
3	DVOR/DME	688,860
4	Meteorological Equipment	269,301
5	Radar	4,568,900
6	Aeronautical Ground Lighting	1,580,000
7	Power Substation and Supply	1,501,365
8	Fiber Optic Ring	376,000
9	ATC Tower Equipment	2,048,750
10	Contingencies	1,963,195
Budget Estimated Total		21,600,000



Detailed Bill of Quantities

Item	Description	Unit	Quantity	Amount (\$)	Item Duration (Month)
1	Runway and Pavement Works Rehabilitation of the damaged area, 60% of the runway was bulldozed and damaged as described in Graph 1 Further clarifications concerning the design concept are available at the Annex 1			7,013,000	
1.1	Earthworks and surface preparation				
	1. Excavation of hard Material	m ³	34,000	272,000	
	2. surface preparation (Milling)	m ³	157,000	314,000	
	3. Fill	m ³	9,000	27,000	
1.2	Surface Reconstruction				
	1. 50 mm Asphalt sub-base	m ²	119,000	2,570,000	
	2. 70 mm Asphalt sub-base	m ²	51,000	1,530,000	
1.3	Pavement Strengthening				
	Pavement Overlay	m ²	225,000	2,200,000	
Total				7,013,000	6-8 Months
2	Instrument Landing System				
2.1	ILS Equipment			1,204,879	
	2 frequency Loc. Equipment	2			
	Element Loc. Antenna	2			
	2 Frequency GP Equipment	2			
	M-array GP Antenna	2			
	Middle and Outer Markers	4			
	NDBs	2			
	Equipment cabin	8			
	RCMS	1			
	Interlock Unit	1			
	Field Test set	1			
	Site Spares	2			
	Factory Training (no airfares)	1			
	Installation materials	2			
	Shipping Costs	1			
2.2	ILS Services			145,896	
	Excluding accommodation and subsistence				
2.3	ILS Flight Inspection			85,000	
2.3	ILS Civil Works			120,000	



	Localizer Foundations				
	Glidepath Foundations				
	Marker Foundations				
	Cable trenching, ducting and backfilling				
	Crane				
	Labour				
Total				1,555,775	1.5 Month
3	DVOR/DME				
3.1	DVOR/DME Equipment			534,760	
	DVOR	1			
	DME 1KW	1			
	Cabin	1			
	Test Accessory Kit	1			
	Site Spares	1			
	Factory Training (no airfares)	1			
	Installation materials	1			
3.2	Shipping Costs				
	DVOR Services			55,500	
	and subsistence Excluding accommodation				
3.3	DVOR Flight Inspection			85,000	
3.4	DVOR Civil Works			13,600	
	Antenna Foundation	1			
	Cabin Foundation	1			
	Crane	1			
	Labour				
Total				688,860	0.5 Month
4	METROLOGICAL EQUIPMENT				
4.1	Met EQUIPMENT			231,301	
	Wind Sensors	2			
	Temp, Humidity Sensors	1			
	Ceilometers	1			
	Pressure	1			
	Printer SADIS Terminal and				
	Installation materials	1			



4.2	Shipping Costs (airfares Factory Training (no Met Services and subsistence Excluding accommodation			30,000	
4.3	Met Civil Works Sensor Foundation backfilling Trenching and Labor			8,000	
Total				269,301	
5	RADAR Radar Equipment was apart of the Spanish support to the PNA, for more details please see the Annex 2 the damage report prepared by the Embassy of Spain - Economic and Commercial Office				
5.1	Radar Equipment Secondary Radar Radar Equipment Cabin Radar Data Processing Radar displays Controller Work staitaion Test Accessery Kit Site Spares (airfares Factory Training (no airfares ATC Training (No Site Training Installation materials Shipping Costs			4,037,000	
5.2	Radar Services and subsistence Excluding accommodation			403,702	
5.3	Radar Flight Inspection			85,000	
5.4	Radar Civil Works Antenna Foundation Cabin Foundation Crane			43,200	
Total				4,568,900	3Month
6	LIGHTING AERONUTICAL GROUND				
6.1	Lighting Aerodrome Ground			930,000	



	Approach Lights	2			
	Thresholds lights	2			
	lights Runway Edge and end	1			
	PAPIS	2			
	Taxiway and apron lights	1			
	Stop bars	4			
	Warning Lights	4			
	Apron Floodlights	1			
	Regulators	20			
	Signs	1			
	Wind Socks	2			
	Aerodrome Beacon	1			
	System Control and Monitoring	1			
	Test Accessory Kit	1			
	Installation materials	1			
	Shipping Costs	1			
6.2	AGL Services			110,000	
	and subsistence Excluding accommodation				
6.3	AGL Civil Works			540,000	
	AGL Foundation				
	backfilling Trenching and				
	Inspection pits				
	Labour				
Total				1,580,000	6 Months
7	SUPPLY POWER SUBSTATION AND				
7.1	Supply Power Substation and			844,225	
	HV Switchgear				
	LV Distribution				
	HV Cable				
	LV Cable				
	Generator				
	Test Accessory Kit				
	Installation materials				
	Shipping Costs				



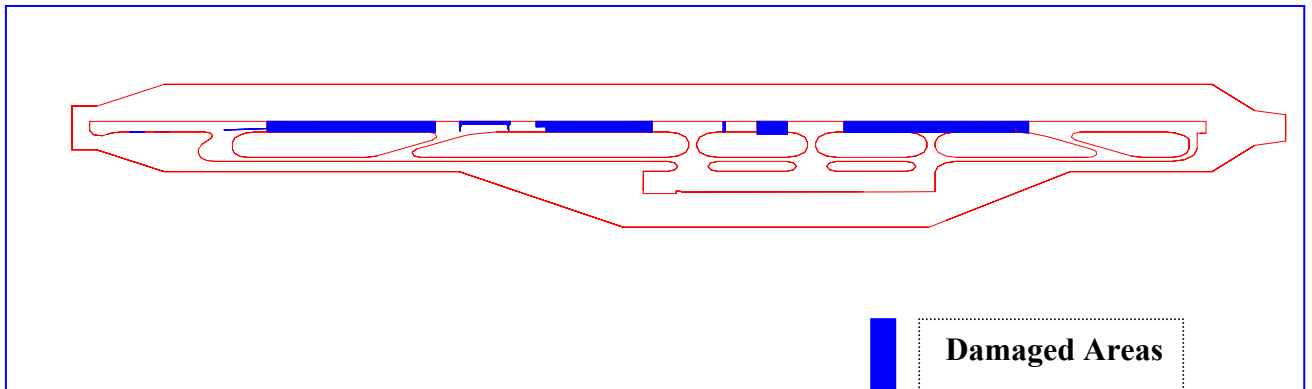
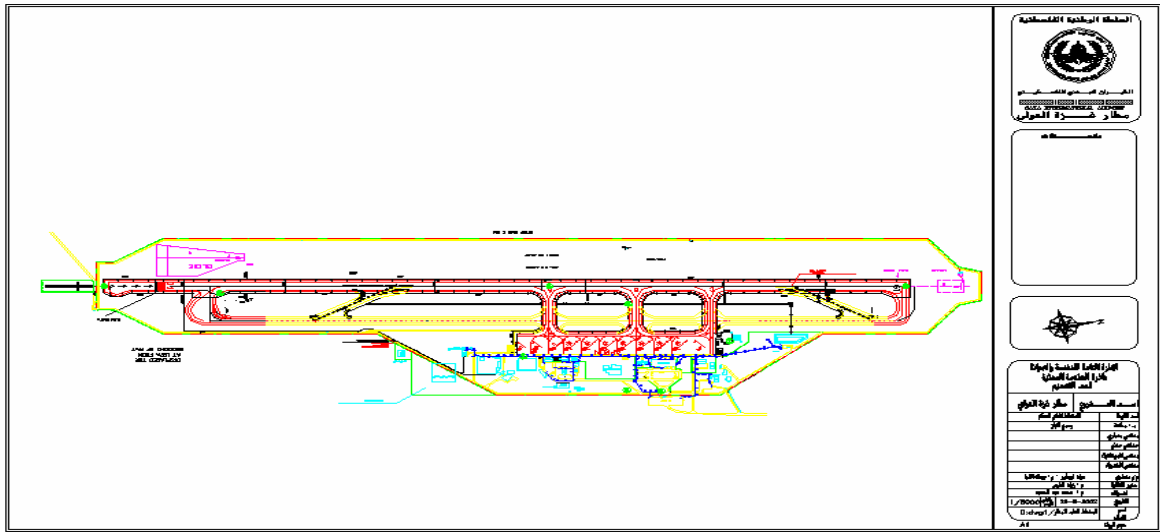
7.2	Essential ATC Services Standby Power for			397,970	
	HV Switchgear				
	LV Distribution				
	HV Cable				
	LV Cable				
	Generator				
	Test Accessory Kit				
	Installation materials				
	Shipping Costs				
7.3	Sservices			139,170	
	Excluding accommodation and subsistence				
7.4	Civil works			120,000	
	Building				
	Foundation				
	Plant				
	Labour				
Total				1,501,365	-
8	FIBER OPTIC RING				
8.1	Fiber optic ring			43,000	
	Fiber optic cable				
	Fiber Termination box				
	Test Accessory Kit				
	Installation materials				
	Shipping Costs				
8.2	Services			530,000	
	Excluding accommodation and subsistence				
8.3	Civil works			280,000	
	Trenching and backfilling				
	Inspection pits				
	Cable laying equipment				
	Labour				
Total				376,000	-
9	ATC TOWER EQUIPMENT				
9.1	Tower Equipment			1,668,750	
	VCR Console	3			



	Radar Console	3			
	Voice Switch	1			
	VHF Transmitters	4			
	VHF Receivers	4			
	UHF Transceivers	4			
	UPS	10			
	Integrated RCMS	1			
	Airport Information System	1			
	Met displays	1			
	AFTN Switch (airport only)	10			
	Clocks	1			
	Cash Alarm	1			
	Clearance to land indicator	1			
	Ancillary equipment	1			
	Test Accessory Kit	1			
	Installation materials	1			
	Shipping Costs 1	1			
9.2	Engineering Services			300,000	
	Excluding accommodation and subsistence			80,000	
	Civil Works				
	Building refurbishment				
	Labour				
Total				2,078,750	-
Contingencies = %10				1,963,195	
Budget Estimated Total				21,600,00	
Project Duration, 5-7 months to operate the Airport at the day time and 9 month more to operate the Airport 24 HRS					



GRAPH 1



Deep bulldozing of the runway



ANNEX 1

**Palestinian National Authority
Ministry of Transport
Gaza International Airport**

Runway Design as rigid pavement for potential wide range of aircraft.

1. SUBGRADE: Soil Survey shows $K= 50 \text{ MN} / \text{m}^2 / \text{m}$
2. AIRCRAFT USE: proposed aircraft use shown in Table below.

1 Aircraft	2 ACN	3 Pass to - Coverage Ratio	4 Passes/ Year	5 Coverages During Design Life 30x Col 4/Col 3	6 ACN Ratio	7 Rigid Mixed Traffic Factor (From Fig 9)	8 Equivalent Coverages Col 5/Col 7
Boeing 747-200	63	1.6	1600	30000	-	-	30000
Airbus A300-B4	59	1.6	1000	18750	0.94	1.8	10417
Boeing 707-320B	53	1.6	5000	93750	0.84	5.0	18750
Boeing 727-200	50	3.2	3800	35625	0.79	9.0	3958
Boeing 737-200, DASH 8, FOKKERE 27	28	3.2	28600	268125	0.44	1000	268
Total COVERAGES							63 393



3. AIRCRAFT DATA:

ACNs, Main Wheel Gears and Pass - to - Coverage Ratios

Aircraft Type	RIGID PAVEMENT SUBGRADES				Main Wheel Gear	Pass- to- Coverage Ratio
	High	Medium	Low	Ultra Low		
747-200	47	55	66	76	D-T	1.6
A300-B4	44	52	61	69	D-T	1.6
707-320B	39	46	55	63	D-T	1.6
727-200	45	48	50	53	Dual	3.2
737-200	24	26	29	31	Dual	3.2
DCH 8 DASH 8	11	12	13	13	Dual	3.2
Fokkere 27	10	11	12	12	Dual	3.2

4. DESIGN LIFE: 30 years.

5. DESIGN CRITERIA:

a) ACNs of user aircraft calculated at $k=50$ are shown in Table above.

The Design Aircraft is the Boeing 747-200. Design ACN= 55.

b) The Mixed Traffic Analysis is shown in Table above. The Total coverages are 63,393 and therefore Medium Frequency Trafficking is used.

6. CONCRETE STRENGTH: 4.5 N/ mm² mean at 28 days.

7. REQUIRED CONSTRUCTION: 340 mm PQC

175 mm RDLC

8. CLASSIFICATION:

a) Subgrade Category: CBR= 10%, i.e. Medium (B).

b) PCN is the ACN of the Boeing 747-200 on a Rigid High Subgrade = 47 (Say 50).

c) Pavement Type: Rigid (R).

d) Tyre Pressure limitations: No limitations on a concrete surface (W).

e) PCN 55/R/B/W/T.

