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Morocco

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NATIONAL INTELLIGENCE SURVEY

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Transportation and
Telecommunications

NATIONAL INTELLIGENCE SURVEY PUBLICATIONS

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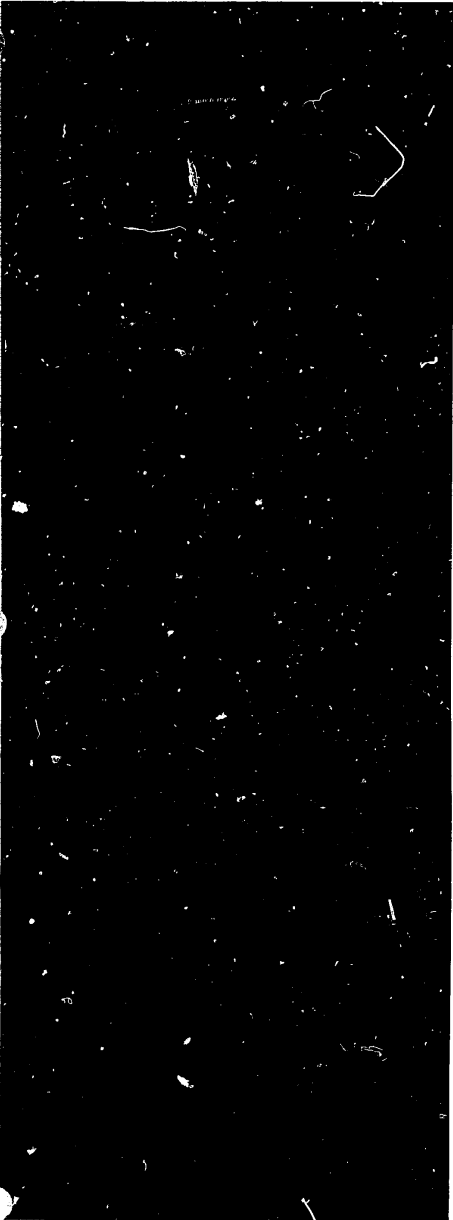
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This chapter was prepared for the NIS by the Defense Intelligence Agency and includes a contribution on merchant marine from the Department of the Navy and on airfields from the Defense Mapping Agency, Aerospace Center. Research was substantially completed by November 1972.



Morocco

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Transportation and Telecommunications

A. Summary (C)

1. Systems

The Moroccan transportation and telecommunication (telecom) networks are superior to those of most African countries. Facilities are concentrated in the more heavily populated northern and northwestern coastal areas (Figure 9). The most important routes are along the coast or pass through the valleys of the Rif and Atlas mountains and along the plateau inland. Routes extend inland from the ports to connect the coast with hinterland routes. The mountainous and desert interior areas have few routes and tracks.

The major international road and rail connections are with the Algerian systems east of Oujda. There are no main routes linking southern Morocco with bordering countries, but tracks connect with Algerian tracks in the southeast and southwest to become part of trans-Saharan routes. A multiconductor cable is the principal telecom link with Algeria and Tunisia. There are good radio-relay and submarine cable connections with Spain.

Railroads carry more freight than is moved on the highways, but the importance of railroads is somewhat limited by the sparseness of the network. The efficiently operated railroads are the primary means of transporting phosphates, the principal export commodity, and other minerals from mines in inland areas to the ports. The highways effectively serve the large cities and many large agricultural and mining areas not served adequately by the railroads. Casablanca, the leading port, handles over 75% of the overseas trade. Seven other major ports, two of which are under Spanish control, are distributed along the coast and serve limited hinterlands. The merchant fleet is modern and efficient but is too small to transport significant amounts of the country's trade. Except for the Sebou River (Oued Sebou), which serves as a means of access to Kenitra, there are no navigable inland waterways. Because of the depletion of petroleum resources in the Sidi Rhalem area, the country's only significant crude-oil pipeline is no longer in regular use. Domestic air transport plays only

a minor role in the transportation system. The telecom system is modern, of high capacity, and sufficient for the needs of the country.

Most transportation and telecom facilities are government owned and are administered by various agencies under the direction of the Ministries of Public Works and Communications and of Posts, Telephone, and Telegraph. Air France owns a minor interest in the Moroccan national airline, and there are some private French and Spanish interests in the railroads. Competition between railroad and highway transport has been minimized by strict government control which favors development of the railroads. However, highways are becoming more important under current highway expansion and improvement programs. Most rail developments are related to improving the ability to transport phosphates and other minerals for export. Casablanca has development plans to increase the size of the port by creating new basins east of the present facilities. A submarine cable to be laid in 1973 linking Casablanca with Penmarch, France, will have 630 channels.

2. Strategic mobility

The transportation and telecom systems are capable of supporting military operations in the northern and northwestern areas, but there are some significant limitations. Concentration of most major transportation facilities along the principal route from Marrakech through Casablanca and Fes to Oujda, in a corridor between two major mountain chains, makes the system particularly vulnerable to disruption. The preponderance of single-track rail and the lack of alternative rail and highway routes are also important vulnerability factors. The vulnerability of the telecom system is diminished by use of buried and submarine cables and the availability of alternative routes. Military operations in the mountainous and desert interior areas in the south and southeast would be limited by the paucity of routes and facilities, adverse weather conditions, narrow and low capacity bridges, and sharp curves and steep grades on mountain roads.

All of Morocco's ports could be converted to military use. The merchant fleet's nine dry cargo ships represent a considerable military support potential. These units, with an estimated capacity of 35,467 cargo deadweight tons, have a short-haul (48 hours steaming) troop-lift capability which could be used for near-seas operations. Only one cargo ship has a hatch of more than 50 feet in length; none have booms of 40 tons or more lift. Five dry cargo units, which are employed in international trade, are government owned and would be used for military support if available.

Morocco has 23 airfields with permanent runways capable of supporting jet aircraft. The planes of Royal Air Maroc (RAM) and Royal Air Inter (RAI), and those of other government agencies could be mobilized on short notice for military purposes. Since many RAM pilots are French and all RAI pilots are Pakistani, political and personnel constraints exist which might deny the use of Moroccan commercial aircraft for military purposes. Adequate Moroccan flight personnel are believed to be available to fly the RAM aircraft in the event of mobilization; however, there are no qualified Moroccan pilots available to fly the F-27 aircraft of RAI, the Moroccan domestic airline.

B. Railroads (C)

The government-owned National Moroccan Railroads (ONCF) total 1,100 route miles of standard-gauge line; 493 miles are electrified at 3,000 volts direct

current, and 93 miles are double track. The main line of the system extends north from Marrakech, serving the capital of Rabat and the major ports of Casablanca, Mohammedia, and Kenitra. The line then extends eastward and provides the only international rail connection with Algeria, 10 miles east of Oujda. Although traffic is minimal, this line affords through traffic to Tunis, Tunisia. Lines from the major ports of Safi and Tangier connect with this primary route as does the line from Bou Arfa in southeastern Morocco.

The railroads serve the major population, agricultural, mining, and commercial centers of the country and are capable of carrying heavy traffic. The system is superior to those of most African nations although it is limited by poor area coverage, a lack of alternate routes, the predominance of single track, and its vulnerability to interdiction. Although a rail line extends into the Atlas hills and mountains, grades do not exceed 1.8%, which occurs between El Guef and Ait Ammar, and curves are moderate. The mountainous areas have necessitated the construction of a number of bridges and tunnels.

Personnel at the end of 1969 totaled 7,780. Their level of competence is high, largely due to good training programs which include a 2-year apprenticeship training center at Meknes, specialized training courses, and an exchange of trainees with Morocco, Algeria, and Tunisia.

Two major classification yards and a number of small yards adequately serve the rail system. The two major classification yards are at Casablanca (Figure 1)



FIGURE 1. Classification and repair facilities, Casablanca (U/OU)

and Oujda. The yard at Marrakech is used for the formation of manganese ore trains and the one at Khouribga, for the formation of phosphate trains. Facilities at Mohammedia and Kenitra serve major ports.

Varied terrain and numerous rivers and dry river beds have necessitated the construction of many bridges, tunnels, and a number of long, high viaducts. Most of the 350 bridges, 12 feet and over in length, are of steel construction and all have 22-short-ton axleload capacities. The longest bridge, a 673-foot steel and concrete structure of through-truss and deck-girder design, is located at Rabat. Thirty of the 38 tunnels on the network are located on the line between Fes¹ and Oujda. The longest tunnel is 8,472 feet and located 10 miles west of Taza. All structures are well maintained.

Train movements are controlled by the manual block system and communications are by telephone. Signaling is being upgraded by replacing mechanical signaling with lights, and old levers are being replaced by electromechanical posts. Motive power consists of electric and diesel locomotives in very good condition; approximately 10% of the inventory is undergoing normal repair at any given time. Rolling stock is old and in fair condition but is being upgraded by recent purchases. Normally only 2% is undergoing repair at any given time. All equipment utilizes standard European design couplers and side buffers 41 1/2 inches above the top of rail. Air brakes are used on all equipment. The equipment inventory is adequate in quantity, and the quality is being improved with domestically manufactured equipment at Sebaa Aïoun or imported equipment assembled in the Casablanca shops. The 1971 inventory was as indicated below.

Major repair facilities for diesel and electric locomotives are located at Casablanca and for diesel locomotives and rolling stock, at Meknes. Maintenance depots are located at Casablanca, Oujda, Ksar el Kebir, and Safi.

The railroads consume approximately 4 million gallons of diesel oil and 75 million kilowatt hours of electricity per year. Morocco refines imported crude oil, most of which comes from Algeria, the U.S.S.R., and Libya. Diesel-oil storage facilities are located throughout the network. Electricity is furnished at 3,000-volts, direct current from the national net.

Maintenance standards are high and mechanized equipment is used on heavily trafficked lines, especially in areas where flooding periodically causes damage. Maintenance sections of 6 to 30 miles are

¹For diacritics on place names, see the list of names on the apron of the Transportation map, Figure 9, and the map itself.

Locomotives:	
Electric	58
Diesel, main line	31
Diesel, switchers	39
Total	128
Diesel-electric trainsets	4
Passenger-train cars:	
Passenger cars	273
Baggage, etc.	70
Total	343
Freight cars (government owned):	
Box cars	1,562
Gondola	2,132
Flat	1,323
Hopper	1,152
Tank	87
Other	43
Total	6,279
Freight cars (privately owned):	
Tank	377
Other	140
Total	517

each served by gangs of 12 to 60 men. Presently, major upgrading activities include grinding of tracks, renewing drainage facilities, rehabilitating structures, and welding of track. Signal lights are replacing mechanical signals on the Casablanca-Sida Kacem line and electromechanical posts are replacing old levers.

Freight traffic has continued to increase steadily since 1965. In 1965 the ONCF carried 17 million short-tons for 1,391 million ton-miles and in 1970 carried 19 million tons for 1,615 million ton-miles. Passenger traffic during the same period increased from 3.6 to 3.7 million ton-miles with an average journey of 79 miles and in 1970 totaled 292.3 million passenger-miles. Phosphates account for nearly half the rail freight and result in dense traffic between the Khouribga mining area and Casablanca. Other principal commodities include manganese ore, cement, petroleum, fertilizer, and cereals and other food stuffs. Interruptions to train operations occur due to washouts resulting from periodic flooding.

For the past few years the ONCF has shown an operating profit, with 1970 expenditures of US\$798,600,000 and revenues of \$804,500,000 for a \$5,900,000 profit.

T-section rail weighs 93 pounds per yard on heavily trafficked lines and 73 pounds on others. The heavier rail measures 39 and 59 feet in length and is being welded from station to station on the main lines. Ties are laid 1,880 to 2,770 per mile and are steel,

FIGURE 2. Selected line characteristics of the Moroccan railroads* (C)

TERMINALS; LENGTH	MAXIMUM GRADE		MINIMUM RADIUS OF CURVATURE	MAXIMUM AXLELOAD	PAVING TRACKS		REMARKS
	Going	Coming			Maximum interval	Minimum length	
	Percent	Feet			Miles	Feet	
Rabat-Casablanca; 55 miles.....	0.8	0.8	2,624	24.2	15	1,673	Electrified; double tracked on 4-mile section Ain Sebaa-Casablanca.
Casablanca-Sidi el Aidi; 35 miles.....	1.0	0.2	1,148	24.2	Electrified and double tracked.
Sidi el Aidi-Khouribga; 51 miles.....	1.2	0.0	1,312	22.0	Do.
Khouribga-Beni Idir; 7 miles.....	na	na	na	22.0	na	na	Electrified; serves phosphate mines at Beni Idir.
El Guefaf-Ait Ammar; 14 miles.....	1.8	1.0	na	22.0	na	na	Electrified; serves phosphate mines at Ait Ammar.
Khouribga-Oued Zem; 24 miles.....	1.0	1.2	na	22.0	12	2,021	Electrified; double tracked on 3-mile section Khouribga-Sidi Rhazouani; serves phosphate mines at Oued Zem.
Sidi el Aidi-Benguerir; 72 miles.....	1.5	1.5	1,148	24.2	18	1,969	Electrified.
Benguerir-Marrakech; 46 miles.....	1.4	1.5	1,148	24.2	23	1,969	Do.
Benguerir-Safi; 88 miles.....	0.2	0.8	1,640	22.0	30	1,870	Diesel traction.
Rabat-Kenitra; 24 miles.....	0.5	0.5	2,624	24.2	13	1,673	Electrified.
Kenitra-Sidi Kacem; 53 miles.....	0.8	0.5	2,624	24.2	16	1,969	Do.
Tangier-Sidi Kacem; 124 miles.....	1.3	1.4	984	22.0	16	1,083	Owned by Tangier-Fes; diesel traction.
Sidi Kacem-Fes; 69 miles.....	1.5	1.2	984	24.2	11	1,673	Owned by Tangier-Fes; electrified.
Fes-Beni Oukil; 209 miles.....	1.5	1.5	1,148	24.2	23	1,706	Diesel traction.
Beni Oukil-Oujda; 11 miles.....	0.6	0.8	1,148	24.2	11	1,969	Do.
Oujda-Algerian border; 11 miles.....	0.0	0.0	1,148	24.2	11	na	Operated by Algerian National Railways; diesel traction.
Beni Oukil-Guenfouda; 11 miles.....	1.5	0.0	2,140	22.0	11	1,969	Diesel traction.
Guenfouda-Hassi Bellal; 28 miles.....	1.5	0.4	984	22.0	na	na	Diesel traction; serves Morocco's only coal-producing area.
Guenfouda-Bou Arfa; 168 miles.....	1.5	0.8	2,140	22.0	22	1,640	Diesel traction; serves manganese mines at Bou Arfa.

na Data not available.

... Not pertinent.

*Owned and operated by OMCF unless otherwise stated.

prestressed concrete, and wooden types; the steel and wooden ties are imported. Domestically available crushed stone, sand, and gravel are used for ballast.

Selected line characteristics of Moroccan railroads are listed in Figure 2.

C. Highways (C)

The highway system of Morocco is well developed for Africa, and generally well maintained. The network is adequate for the economy of the country and is assuming increasing importance owing to highway development and improvement programs. The density of the network is greatest in the western and northern parts of the country, particularly within 150 miles of the coast where the principal urban centers, seaports, and agricultural and mining areas are located. The sparsely populated regions of the south and southeastern parts of the country are served mainly by desert tracks. The basic network consists of a coastal route extending from Tangier to the border of Spanish Sahara. This route links the major cities of Tangier, Rabat, Casablanca, Safi, and Agadir. An east-west route extends along the Mediterranean coast from Ceuta, which is a Spanish possession, to the Algerian border near Oujda. Radial route systems also emanate from the principal cities of Marrakech, Meknes, and Fes. There are highway and rail junctions in the principal port and urban areas. A few bituminous-treated highways along with several unimproved earth roads provide access to Algeria; only unimproved earth roads connect with Spanish Sahara.

The network totals approximately 32,180 miles and consists of 11,200 miles of bituminous-treated surfaces, about 3,250 miles of gravel, crushed stone, or stabilized soil, and 17,730 miles of unimproved earth roads and tracks. Road widths on main roads generally range from 15 to 30 feet. Surface widths on other roads range from about 8 to 20 feet. There are earth or crushed stone shoulders generally 3 to 6 feet wide on most main roads. The general condition of the highway system ranges from poor to good. Roads in the vicinity of larger cities are usually wider and have better constructed surfaces. The alignment of roads in the mountainous areas is winding (Figure 3), and there are numerous steep grades.

There are few structures on the highways in Morocco. Most of the bridges are on the main roads, and many of these are very narrow. Concrete bridges are the most common; this type is preferred because sand and gravel are available locally. Gross load capacities range generally from 12 to 21 short tons, but



FIGURE 3. Eighteen-foot wide bituminous-treated highway, extending through a mountain pass 45 miles north of Ksar es Souk (C)

newer structures will sustain heavier loads. On many roads and tracks, streams are crossed by submersible bridges or fords (Figure 4). A number of bridges were damaged by severe flooding in December 1969 and January 1970.

The Ministry of Public Works and Communications is responsible for the construction and maintenance of roads. Responsibility consists of financing, constructing, and maintaining state highways as well as some regional roads. Most regional road construction programs are formulated by provincial departments and include responsibility for maintenance. Financial assistance is provided by the Ministry of Public Works. Prefectures and municipalities are responsible for financing, constructing, and maintaining roads within their areas.

Rough terrain in the Rif and Atlas mountains greatly complicates the construction of highways. Heavy seasonal snow and rainfall in the mountains and shifting sands in the southern desert regions bring additional problems. Construction materials such as stone, gravel, and sand are available locally, but steel, lumber, and bituminous materials must be imported.

Highway improvement is being accomplished within the framework of the Five Year Development Plans. Under the 1968-72 plan the highway program has been directed mainly to the maintenance and upgrading of roads to sustain heavier traffic volumes, extension of interregional roads, and the construction of roads to connect isolated population centers. Approximately US\$12 million has been allocated for work on public primary and secondary roads and about \$19 million has been allocated for tourist routes,



FIGURE 4. Road that crosses a wadi about 23 miles southeast of Ksar es Souk. It becomes a ford after heavy rain. (C)

special projects, and third class roads. Among the more important projects are those involving the improvement or reconstruction of road links from Rabat to Casablanca; Sidi Ifni to Tiznit; Tan-Tan to Tarfaya; and Agadir to Marrakech.

Restrictions to highway transport include inadequate road surface and bridge widths; a lack of all-season roads in many areas; narrow and low-capacity bridges, especially in the mountains of the Rif; fords which are often flooded in the rainy season; and steep grades and sharp curves in the mountains. Snow intermittently blocks roads at higher elevations from November through April. Landslides interrupt traffic in the mountainous regions during rainy weather, and fog limits visibility along the Atlantic coast. Intense heat and severe sandstorms are serious factors in the southern desert regions.

Intercity, common carrier road freight is allocated exclusively among the various privately owned, government-licensed truckers by the National Transport Office (ONT), an agency of the government. Merchandise hauled by private firms for their own account is excluded from this control. The principal goods transported include agricultural products (grains), leather goods, clothing, and textiles. Traffic volumes of up to 1,000 vehicles per day are generated on most primary roads, and 200 to 500 vehicles per day on most secondary roads. The annual average increase in traffic volume has been 8% to 10% in recent years.

As of 1971, there were 207,450 motor vehicles registered in Morocco, consisting of 150,450 passenger cars and 57,000 trucks and buses. Motor vehicles and transport equipment are imported, mostly from France and Italy.

Characteristics of the most important highways are listed in Figure 5.

D. Pipelines (C)

Morocco has no significant long-distance petroleum pipelines in regular use; there are two pipelines, one for crude and one for refined products, which were formerly of some importance. There are also crude-oil gathering lines near the refinery at Sidi Kacem and several natural-gas pipelines.

The crude-oil line was installed from the Sidi Rhalem oilfield east of Essaouira to rail transport facilities at Safi. The 120-kilometer line is 4 inches in diameter and has a capacity of about 2,000 barrels a day. Since the petroleum resources of the Sidi Rhalem field are nearly depleted, little oil is currently flowing through this line.

The refined-products pipeline was constructed by the U.S. Government to transport fuel from the port of Casablanca to four U.S. Air Force bases that formerly operated in the northwestern part of the country. The line has a total length of nearly 500 kilometers, but it has not been used since the airfields were turned over to the Moroccan Government in the early 1960's.

Gathering lines, all less than 15 kilometers in length, transport crude to the petroleum refinery at Sidi Kacem from several small oilfields in the vicinity. The only long distance natural-gas pipeline extends approximately 55 kilometers from gas deposits at the Sidi Rhalem oilfield to Essaouira. There are also some minor natural-gas pipelines which serve the Sidi Kacem refinery and several small industrial plants.

FIGURE 5. Selected highways of Morocco (C)

ORIGIN AND DESTINATION	DISTANCE	SURFACE TYPE	SURFACE WIDTH	SHOULDER WIDTH	REMARKS
	<i>Miles</i>		<i>Feet</i>	<i>Feet</i>	
Agadir to Casablanca via Marrakech (347 miles):					
Mile 0 to Mile 91.....	91	Bituminous treatment.....	17	0-3	Undulating alignment. Four fords and three bridges. Road being improved.
Mile 91 to Mile 197 (Marrakech).....	106	...do.....	12-17	0-3	Mountainous alignment. One mountain pass, one defile, and two bridges. Road being improved.
Mile 197 to Mile 347.....	150	...do.....	18	0-3	Undulating to hilly alignment. Two bridges.
Marrakech to Meknes via Azrou (29 miles):					
Mile 0 to Mile 50 (El Kelaa des Srarhna).....	50	...do.....	20	5-11	Undulating alignment.
Mile 50 to Mile 254 (Azrou).....	204	...do.....	15-20	0-3	Mountainous alignment. Four bridges.
Mile 254 to Mile 294.....	40	...do.....	20	3	Undulating alignment.
Rabat to Oujda via Guercif (346 miles):					
Mile 0 to Mile 244 (Guercif).....	244	...do.....	20	4-6	Undulating alignment. Six bridges.
Mile 244 to Mile 346.....	102	...do.....	20	0-3	Undulating alignment. One bridge.
Meknes to Tangier via Souk el Arba du Rharb (163 miles):					
Mile 0 to Mile 68 (Souk el Arba du Rharb)....	68	...do.....	20	3	Undulating alignment.
Mile 68 to Mile 163.....	95	...do.....	18-30	0-3	Hilly to flat alignment.
Oujda to Algeria border near Figuig via Bou Arfa (263 miles):					
Mile 0 to Mile 193 (Bou Arfa).....	193	...do.....	15-25	0-3	Undulating alignment.
Mile 193 to Mile 263.....	70	...do.....	12	6-10	Flat alignment. Many fords and culverts. One-half mile of earth road between Figuig and border.
Agadir to Rabat via Tleta Sidi Mbarek Bou Guedra and Casablanca (360 miles):					
Mile 0 to Mile 169 (Tleta Sidi Mbarek Bou Guedra).....	160	...do.....	14-20	2-4	Undulating to mountainous alignment. Nine bridges.
Mile 160 to Mile 360 (Rabat).....	200	...do.....	21-30	4-6	Flat to undulating alignment. Six bridges.

E. Ports (C)

There are eight major and 11 minor ports. The largest, Casablanca (Figure 6), and four of the other major ports, Agadir, Safi, Mohammedia, and Kenitra, are on the Atlantic coast; one major port, Tangier, is on the Strait of Gibraltar, and the remaining two major ports, Ceuta and Melilla, are on the Mediterranean and under Spanish control. Port development has been difficult because of the irregularity of the coastline, and in almost all instances costly breakwaters are needed to provide adequate shelter. The importance of the ports is growing with the increasing development of trade.

Together the ports handled almost 30 million tons of imports and exports in 1970. They also accommodate a small volume of coastal traffic, are

bases for a sizable fishing industry, and some, particularly Ceuta, are important bunkering stations. Two of the ports are also naval bases. Moroccan Naval Headquarters, naval schools, and naval ship repair facilities are at Casablanca, and a Spanish patrol craft base is at Ceuta. Kenitra, formerly an important U.S. Navy air and logistics facility, is now a minor naval facility. The U.S. Navy maintains a communications facility at the Royal Moroccan Air Force base 2 miles northwest of the city. Moroccan ports, except Ceuta and Melilla, are managed by the Ministry of Public Works.

The largest port, Casablanca, is well maintained and well equipped with modern, efficient handling facilities and is completely adequate to meet normal requirements. However, congestion sometimes causes a problem. The remaining major ports of Morocco are

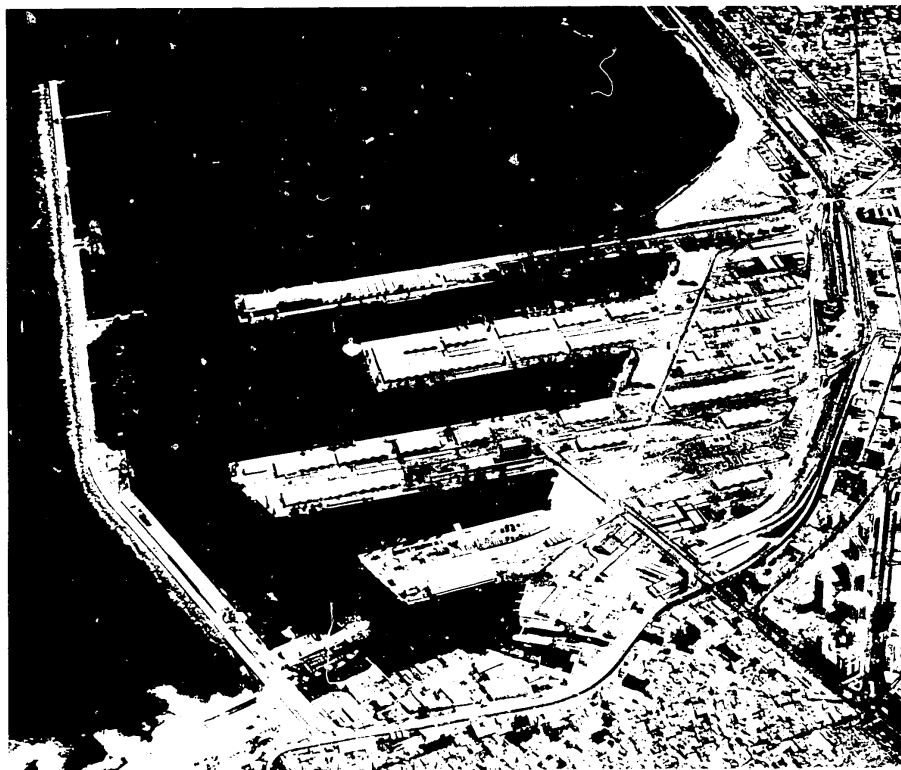


FIGURE 6. Port of Casablanca, looking east (U/OU)

FIGURE 7. Major ports (C)

NAME; LOCATION; MILITARY PORT CAPACITY*	ACTIVITIES	HARBOR	BERTHS
Agadir..... 30°24'N., 9°36'W.; on Atlantic coast about 210 miles SSW. of Casablanca. 5,800	Development of port has resulted largely because of need of an outlet for agricultural products and minerals of southern Morocco. Principal receipts are POL products, building materials, food products, fertilizers, insecticides, and machine tools. Principal shipments are ores, agricultural products, and fish. Small shipyard specializes in repair of fishing craft.	Artificial inner harbor and a roadstead. Inner harbor has water area of about 120 acres and depths of 15 to 33 ft. Berths rather than fairways leading to them restrict the size of the vessels accommodated.	Alongside--For 2 standard and 5 small ocean-type cargo vessels, 5 small coaster-type cargo vessels, 10 lighters, and 1 small ocean-type tanker. Anchorage--Large number of standard berths of all classes S. of harbor entrance in depths of 20 to 50 ft. over good holding ground of sand; good protection except from occasional W. winds which make berths untenable.
Casablanca..... 33°36'N., 7°37'W.; on NW. coast about 160 statute miles SW. of the Strait of Gibraltar. 25,100	Handles over 75% of the maritime trade of the country. Principal receipts are POL products, lumber, coal, unrefined sugar, food products, and general cargo. Principal shipments are phosphate, iron and manganese ores, grain, fruit, refined sugar, and vegetable fibers. Moroccan Naval Headquarters is located here. One shipyard has graving dock with floor length of 492 ft. and 2 marine railways, the larger having a hauling capacity of 700 tons.	Artificial well-protected coastal harbor consisting of an outer harbor and an inner harbor with 3 basins, a water area of about 2 sq. miles and depths ranging from 7 to 55 ft. Limitations on size of vessels that can be berthed in the port are imposed by the dimensions of the berths rather than by the controlling dimensions of the fairways.	Alongside--For 16 large, 13 standard, and 3 small ocean-type cargo vessels, 2 standard and 3 small coaster-type cargo vessels, 18 lighters, and 2 large ocean-type tankers and 1 standard coaster-type tanker. Anchorage--2 ocean-type cargo vessels, light cruiser, 5 coaster-type cargo vessels, small naval vessels. In outer harbor in depths of 20 to 52 ft. over poor holding ground of sand and rocks, exposed from N. to E. Mooring--1 large passenger ship, aircraft carrier, and 1 coaster-type cargo vessel; small naval vessel. Single-buoy berths in outer harbor, depths 21 to 30 ft., exposed from N. to E.
Ceuta..... 35°54'N., 5°19'W.; on N. coast 13 miles S. of Gibraltar and 25 miles E. of Tangier. 15,100	Port is entirely Spanish. Best and most active bunkering port in Morocco. Principal receipts are POL products, coal, sugar, wheat, and potatoes. Principal shipments are cement, cork, and minerals. Location of Spanish patrol-craft base. Two small shipyards specializing in repair of small craft. Largest marine railway has hauling capacity of 350 tons.	Artificial, well-protected, semicircular harbor with water area of about 400 acres and depths of 9 to 50 ft. Depths leading to berths exceed depths in berths.	Alongside--For 4 large, 7 standard, and 3 small ocean-type cargo vessels, 2 standard and 8 small coaster-type cargo vessels, 20 lighters, 1 large, 1 standard and 1 small ocean-type tankers, and 1 standard coaster-type tanker. Anchorage--For large numbers of standard berths of all classes N. of harbor entrance in depths of 36 to 120 ft. over poor holding ground of sand, gravel, and rock; unprotected except from S.
Kenitra..... 34°16'N., 6°36'W.; about 110 miles SW. of the Strait of Gibraltar and 70 miles NE. of Casablanca; 9 miles above mouth of Oued Sebou (river). 5,600	Small river port whose activities have declined in recent years. Principal receipts are POL products and general cargo. Principal shipments are grain, lead ore, wine in bulk, cork, finished paper and cardboard, and agricultural products. Site of U.S.-operated naval communications system. One small repair facility with a mud slipway for hauling out vessels up to 50 tons.	Consists of a stretch of the Sebou River about 10 miles long from the river mouth upstream and 350 to 1,500 ft. wide between the chart datum lines; general depths are 8 to 24 ft. Maximum length of vessel that can be accommodated is 377 ft. and draft 16 ft.	Alongside--For 9 small coaster-type cargo vessels, 28 lighters; 1 standard coaster-type tanker, and 2 representative sound-and-river-type tank barges. Anchorage--For large numbers of standard berths of all classes in open roadstead off river entrance in depths of 20 to 100 ft. over good holding ground of mud, but completely exposed to winds and swells.

*Footnote at end of table.

FIGURE 7. Major ports (C) (Continued)

NAME; LOCATION; MILITARY PORT CAPACITY*	ACTIVITIES	HARBOR	BERTHS
Melilla..... 35°19'N., 2°57'W.; on N. coast about 150 miles E. of the Strait of Gibraltar. 8,000	An ancient port belonging to Spain; primary activity ore shipping. Principal receipts are POL products, coal, and food products. Principal shipments are iron ore. One small shipyard specializes in repair of small native craft.	Artificial harbor consists of an open bight protected by 2 breakwaters with water area of about 225 acres and depths of 7 to 45 ft. Depths leading to berths exceed depths in berths.	Alongside—For 5 large, 3 standard, and 1 small ocean-type cargo vessels, 2 standard and 1 small coaster-type cargo vessels, and 3 lighters. Also for 3 small ocean-type tankers as alternative berths. Anchorage—For large numbers of standard berths of all classes in roadstead in depths of 48 to 90 ft., over good holding ground of mud and sand. Area unprotected.
Mohammedia..... 33°42'N., 7°25'W.; about 150 miles SW. of the Strait of Gibraltar and about 14 miles NE. of Casablanca. 1,200	Primary importance is as an oil-discharge port and fishing center. Principal receipts are POL products and principal shipments are fish and fish products. One small shipyard specializes in repair of small fishing craft.	Improved natural harbor formed by a peninsula and 2 converging breakwaters with water area of about 27 acres and depths of 6 to 19 ft. Harbor entrance between the heads of breakwaters is about 600 ft. wide and has controlling depth of 17 ft., over width of 260 ft.	Alongside—For 1 small ocean-type cargo vessel, 5 lighters, 1 large ocean-type and 1 standard coaster-type tankers. Anchorage—For large numbers of standard berths of all classes 1/2 mile N. of port in depths of 40 to 90 ft., over poor holding ground of sand and rock, unprotected and exposed to winds and heavy swells.
Safi..... 32°19'N., 9°14'W.; on Atlantic coast about 110 miles SW. of Casablanca. 5,700	An important phosphate-shipping and fishing port. Its location has been an important factor in its growth and development. Principal receipts are POL, building materials, and general cargo. Principal shipments are phosphate and fish. One small shipyard makes floating repairs to ocean-going vessels and specializes in repairs to small craft; 1 marine railway, hauling capacity 60 tons.	An open roadstead and an artificial inner harbor with water area of about 70 acres and depths of 7 to 29 ft. Depths leading to berths exceed depths in berths.	Alongside—For 7 standard and 2 small ocean-type cargo vessels, 1 standard and 2 small coaster-type cargo vessels, and 3 lighters; also for 1 small ocean-type tanker as an alternative berth. Anchorage—For large numbers of standard berths of all classes in roadstead in depths of 20 to 90 ft. over good holding ground of mud and sand open to W. and untenable during strong W. winds.
Tangier..... 35°48'N., 5°48'W.; on NW. coast on Strait of Gibraltar opposite Spanish mainland. 5,500	Primary activities center around the "free zone" operation which was created in January 1962. Principal receipts are food, POL products, manufactured goods, and steel products. Principal shipments are cement, cork, and vegetable fiber. One small shipyard specializes in repair of small fishing craft.	Artificial harbor protected by a breakwater on the N. side and mole on the S. side with a water area of about 100 acres and depths of 6 to 33 ft. Depths leading to berths exceed depths in berths.	Alongside—For 4 standard and 2 small ocean-type cargo vessels, 3 standard and 2 small coaster-type cargo vessels, 17 lighters, and 1 standard ocean-type tanker. Anchorage—For large numbers of standard berths of all classes northeast of port in Tangier Bay in depths of 40 to 100 ft. over good holding ground of sand, open from N. to E.

*The estimated military port capacity is the maximum amount of general cargo—expressed in long tons—that can be unloaded onto the wharves and cleared from the wharf aprons during a period of one 24-hour day (20 effective cargo-working hours). The estimate is based on the static cargo-transfer facilities of the port existing at the time the estimate is prepared and is designed for comparison rather than for operational purposes; it cannot be projected beyond a single day by straight multiplication.

also adequate to meet normal requirements. Casablanca has plans to increase the size of the port by creating new quays and basins eastward of the present facilities. The new facilities will be used for handling containers, roll-on/roll-off traffic, grain, and general cargo.

Figure 7 provides details on all major ports.

F. Merchant marine (C)

Morocco's merchant fleet carries only a small portion of the country's total volume of international seaborne trade. Most of the seaborne exports and imports are transported by foreign shipping, mainly foreign-flag ships under Moroccan charter.

The merchant fleet consists of 13 ships of 1,000 gross register tons (g.r.t.) and over, totaling 36,889 g.r.t. or 48,404 deadweight tons (d.w.t.) as follows:

TYPE	No.	G.R.T.	D.W.T.
Dry cargo	9	31,414	42,224
Refrigerator	2	3,050	3,980
Wine tanker	2	2,425	2,200

Of the fleet deadweight tonnage 8% (two ships) is less than 5 years old, 64% (four ships) is between 11 and 15 years old, and 28% (seven ships) is more than 15 years. Eleven ships (seven dry cargo, two refrigerator, and two wine tanker) are between 700 and 3,000 d.w.t.; the two remaining ships are dry cargo units of 12,545 d.w.t. and 14,260 d.w.t. All ships are diesel powered and have operating speeds of 12 to 16 knots.

Merchant tonnage is controlled by four domestic and two foreign beneficial owners (entities which take the profit or loss from operations). The largest owner is the Moroccan Navigation Company (*Compagnie Marocaine de Navigation*), Casablanca, which operates five dry cargo ships and one wine tanker totaling 35,694 d.w.t., comprising 74% of the total fleet deadweight tonnage. The Moroccan Government controls about 80% of the capital shares of this company; the remaining shares are owned by private interests. The privately owned domestic shipping companies, all located in Casablanca, which control 7,580 d.w.t., are the Moroccan Naval Company (*La Navale Cherifienne*, S.A.), with one 700-d.w.t. wine tanker; the Moroccan Fruit Shipping Company (*Societe Marocaine de Navigation Fruitiere*), with one 2,900-d.w.t. dry cargo ship; and the Moroccan Sea Navigation Company (*Societe Marocaine de Navigation Maritime*, S.A.) with two 1,990-d.w.t. refrigerator ships. Two French-owned shipping companies, with headquarters in Paris, control a total of 5,130 d.w.t. as follows: the General Transatlantic

Company (*Compagnie Generale Transatlantique*, S.A.)—two 1,367-d.w.t. dry cargo ships; and the Shipping Management Corporation (*Societe Anonyme de Gerance et d'Armement*, or SAGA)—one 2,396-d.w.t. dry cargo ship.

The fleet is employed in both liner (scheduled) and tramp (unscheduled) service in the general areas of the east and west coasts of Africa, Mediterranean, Western Europe, Baltic, east coast of Canada, east coast of South America, south and east coasts of Asia, and Australia.

Morocco's fishing fleet of more than 26,000 vessels, consisting mainly of small, wooden family-owned craft, includes five oceangoing ships ranging between 100 and 499 g.r.t.

Merchant marine functions are administered by the Ministry of Industry and Trade through the Directorate of the Merchant Marine and Sea Fishing. Included in Moroccan laws and regulations is a provision that Moroccan-flag ships or Moroccan-chartered vessels will carry where practicable 40% of the import and 30% of the export of certain seaborne commodities. In addition, the government stipulates that all goods exported or imported by government establishments, semipublic establishments, companies holding government concessions, or companies receiving subsidies, must be carried by Moroccan-flag ships or Moroccan-chartered vessels. Charters are authorized only for Moroccan shipping companies, freight companies, and registered agents in Morocco. Morocco is a member of the Inter-Governmental Maritime Consultative Organization (IMCO) and a party to the following IMCO conventions: Safety of Life at Sea, 1948 and 1960; Prevention of Collisions at Sea, 1960; Oil Pollution, 1954 and 1962; and Load Lines, 1966. The Moroccan Government provides neither direct nor indirect subsidies for ship operations or shipbuilding.

The government provides training for seafaring personnel at the Merchant Marine Officers Training School at Casablanca and the Maritime Apprenticeship Schools at Agadir and Safi. In addition, the government grants scholarships for out-of-country training for selected officer personnel.

G. Civil air (C)

Royal Air Maroc (RAM), Morocco's principal scheduled airline, was formed in 1953 by the merger of two Moroccan carriers, Air Maroc and the Air Atlas Company (*Societe Air Atlas*). Ownership is shared by the Moroccan Government (67%), Air France (17%), and minor shareholders. RAM flies 23,900 undupli-

cated route miles to 22 cities in Europe and northwest Africa and to four domestic points. Flights to France and to some domestic points are flown in pool with Air France, which also provides technical assistance to the airline. RAM leads neighboring countries' airlines in technical capacity, nationalization of key positions, and earnings.

Royal Air Inter (RAI) was established early in 1970 to operate services within Morocco. Principal shares are held by RAM (85%) and the remainder by minor shareholders. Scheduled passenger services are operated between Agadir, Al Hoceima, Casablanca, Fes, Ksar es Souk, Marrakech, Meknes, Ouarzazate, Oujda, Rabat, Tangier, and Tetuan. RAI flight personnel are primarily foreign nationals. All required ground service is handled by RAM. RAI showed a deficit in its first year of operation.

Civil air activities other than air carrier operations encompass agricultural flying—particularly for locust control—aerial photography, and charter flights. These operations are carried out both by government agencies and commercial companies. The principal airwork company, Agro-Air Maghreb (*Societe Agricolaire Maghreb*), provides crop dusting, surveying, air taxi, and charter services, as well as maintenance and repair of light aircraft and engines. The Moroccan Government supplies some support to general aviation by maintaining airfields and subsidizing aeroclubs.

Approximately 145 civil aircraft are registered in Morocco. Of these, 10 have a gross weight of 20,000 pounds or more. RAM owns six of the major transport aircraft consisting of four Aerospatiale Caravelle III's, and two Boeing 727-200's. RAI owns two Fokker F-27-600's; and the King of Morocco owns two Dassault Falcon 20's. Agro-Air Maghreb operates a fleet of 18 light aircraft. The remaining aircraft are owned and operated by various governmental agencies; aeroclubs, nonscheduled, airwork, and nonaviation enterprises; and private individuals.

Approximately 6,500 personnel are engaged in civil aviation activities in Morocco, including 2,500 employed by the Civil Air Directorate, 1,600 by RAM, and about 100 by RAI. In addition, about 2,200 persons have been issued student or private pilot permits. RAM employs about 40 transport pilots (including six Moroccan captains and 15 Moroccan first officers), 18 other flight personnel (mostly Moroccan), and 275 maintenance personnel. RAM's foreign employees are primarily French nationals. RAI employs Moroccan, Belgian, West German, Australian, and Pakistani pilots; the remaining RAI employees are on loan from RAM. Efforts are being

made to train indigenous personnel to fill all airline positions. It is expected that all flight engineer positions will be held by Moroccans by the end of 1972.

Much of the aviation training activity in Morocco is conducted by the Air Directorate at the Training Center for Civil Aviation and Meteorology. The school is located at Casablanca/Anfa airfield and provides training in the fields of electronic maintenance, meteorology, navigation, air traffic control, and communications. The RAM training center, also located at the Casablanca/Anfa airfield, conducts courses for pilots (including flight instruction), flight engineers, radio operators, and aircraft maintenance technicians. Foreign students are accepted at both schools on a quota basis. Basic flight instruction in light aircraft is given by the aeroclubs. Advanced pilot training for RAM personnel is provided in France by Air France. Boeing 727 transitional training for RAM flight personnel has been received in the United States. Moroccan aviation students also receive training at the school sponsored by the International Civil Aviation Organization (ICAO) in Tunis, Tunisia.

Major maintenance and repair of RAM and RAI aircraft are performed at Casablanca/Anfa airfield. Limited maintenance facilities are located at Casablanca/Nouasseur and Rabat-Sale airfields. Major maintenance and overhaul are accomplished by Air France in Paris. RAM is also a major customer of the Middle East Airlines engineering department in Beirut. Agro-Air Maghreb has the principal light aircraft repair station in Morocco and services aircraft for most of the private owners and the aeroclubs. Its facilities at Casablanca/Anfa are equipped to service all types of light American aircraft. *Maroc-Aviation* of Casablanca, a subsidiary of the French firm, Aerospatiale, maintains a repair shop for aircraft instruments.

Control and regulation of civil aviation in Morocco are the responsibilities of the Air Directorate of the Ministry of Public Works and Communications. The Air Directorate functions primarily through three subordinate organizations which handle civil aeronautics, airports, and meteorology, respectively. Legislation dealing with basic civil aviation law was codified by government decree in July 1962 and amended in 1970.

Morocco is a member nation of ICAO, adhering to the Chicago Convention on International Civil Aviation in November 1956. The Moroccan Government has civil aviation agreements or provisional arrangements with 26 nations including

Bulgaria, Czechoslovakia, Hungary, Yugoslavia, and the U.S.S.R. Morocco is served by 20 foreign airlines including Communist carriers from Bulgaria, Czechoslovakia, and the U.S.S.R. These airlines conduct flights between Morocco and 39 countries in North and South America, Europe, the Middle East, and Africa. Air France has cabotage rights between five points in Morocco.

Air Maghreb, a proposed joint international consortium involving the pooling of equipment and services of Royal Air Maroc, Air Algerie, and Tunis Air, was abandoned because of political difficulties, and the proposal has not been renewed.

H. Airfields² (C)

The air facilities system of Morocco consists of 87 airfields and four seaplane stations. Three airfields are joint military/civil, 21 are military, and 63 are civil. In addition there are 56 unusable sites. Most of the major installations are near the large urban centers in the northwest coastal area. The remaining airfields, both major and minor, are evenly distributed throughout the country. Three of the four airfields constructed by the U.S. Air Force are closed: Ben Slimane, Benguerir, and Sidi Slimane.

Casablanca/Nouasseur, a former U.S. Air Force base and Morocco's largest and best international airfield, has excellent facilities; Casablanca/Anfa, also one of Morocco's main civil airfields, has support facilities which are adequate. Tangier/Boukhalf, Fes/Saiss, and Al Hoceima-Cote du Rif are civil airfields, capable of handling jet traffic. Rabat-Sale and Sidi Ifni are joint airfields which can support jet fighter aircraft as well as medium bombers. Two of the former U.S. airbases could support heavy bombers. A total of 23 have hard-surfaced runways and are capable of handling jet aircraft; the remaining airfields are usable by C-47 type aircraft. The four seaplane stations are available only for emergency use. Most primary airfields are well maintained and have support facilities. The secondary airfields have occasional maintenance.

Figure 8 lists characteristics of selected Moroccan airfields.

I. Telecommunications (C)

The telecommunications (telecom) system of Morocco consists of well-integrated, high-capacity, open-wire, cable and radio-relay networks which serve

²For detailed information on individual airfields in Morocco see Volume 17, *Airfields and Seaplane Stations of the World*, published by the Defense Mapping Agency, Aerospace Center for the Defense Intelligence Agency.

practically all populated areas. Nearly all telecom facilities are owned and operated by the government. The Ministry of Posts, Telephone, and Telegraph controls public telephone and telegraph facilities; radio and TV broadcasting is controlled by the Ministry of Information and administered by *Radiodiffusion Television Marocaine* (RTM), a subordinate agency.

Domestic telecom systems have been considerably expanded and modernized in recent years. Long distance and local networks generally provide sufficient channels or circuits to handle most requirements. Open-wire lines, many of which are carrier equipped, serve practically the entire country and form an extensive intercity network. The principal trunk lines between the major cities, however, are provided by the coaxial cable network, which extends along the Atlantic coastal region from Agadir in the south to Tangier in the north, with extensions inland to Marrakech, Fes, and Tetouan. The Moroccan portion of the underground, multiconductor North African cable extends from Casablanca westward across the country to Oujda and on into Algeria and Tunisia. Several separate radio-relay networks supplement the open-wire and cable networks. A special radio-relay net is used exclusively to relay TV programs. Domestic submarine cables serve the area along the Mediterranean coast. Domestic radiocommunication facilities are of little importance except in the former Spanish enclave of Sidi Ifni. The HF circuit between Sidi Ifni and Rabat offers the only connection this area has to the public telecom system. Telephone and telegraph service is available nationwide and telex service is available in most government and commercial centers. The country ranks fourth in Africa and fourth among all Arab countries in total number of telephones. Approximately 45% of the almost 170,000 telephones are in the principal telecom centers, Casablanca and Rabat. The more important secondary centers are Marrakech, Tangier, Tetouan, and Fes. Over 80% of the nation's telephones are connected to automatic exchanges; most of the remaining manual exchanges are in small settlements southeast of the Atlas Mountains.

International service is provided by HF radiocommunication, landline (both open-wire and multiconductor cable), radio-relay, submarine cable, and communications satellite facilities. International radiocommunication stations are located at Casablanca and Rabat. The Casablanca station provides a direct link with France; the Rabat station, with transmitters near Rabat and Tangier, has direct circuits with France, Mali, Senegal, and Tunisia. The North African cable, which originates at Casablanca,

FIGURE 8. Selected airfields (C)

NAME AND LOCATION	LONGEST RUNWAY: SURFACE; DIMENSIONS; ELEVATION ABOVE SEA LEVEL	ESWL*	LARGEST AIRCRAFT NORMALLY SUPPORTED	REMARKS
	<i>Feet</i>			
Al Hoceima-Cote du Rif..... 35°11'N., 3°50'W.	Asphalt..... 7,087 x 148 89	36,000	Viscount.....	Civil. Primary purpose for construction was to develop tourist potential of this section of the Mediterranean. Airfield has both jet fuel and aviation gas.
Casablanca/Anfa..... 33°34'N., 7°40'W.; SW. of Casablanca.	Asphalt..... 6,004 x 148 203	36,000	...do.....	Civil. International airfield for both international and domestic airlines. Aviation gas and jet fuel available.
Casablanca/Nouasseur..... 33°22'N., 7°35'W.; S. of Casablanca.	Asphalt..... 12,205 x 300 655	105,590	Boeing 747.....	Do.
Fes/Saïss..... 33°56'N., 4°58'W.	Asphalt..... 6,556 x 148 1,900	36,000	Viscount.....	Civil. Civilian airlines use airfield utilizing Caravelle, DC 6, and C-47 equipment. No services available.
Kenitra..... 34°18'N., 6°36'W.	Concrete..... 8,000 x 200 16	50,000	C-124.....	Military. The U.S. Navy maintains a vast communications system on this Moroccan base. Both aviation and jet fuels are available.
Marrakech..... 31°36'N., 8°02'W.	Asphalt..... 7,644 x 148 1,539	23,680	F-27.....	Joint. RMAF uses base for pilot training. Civil airlines use base. Jet fuel and aviation gas available.
Meknes..... 33°53'N., 5°31'W.	Asphalt..... 8,268 x 164 1,890	36,000	C-130.....	Military. Headquarters for RMAF fighter squadron. Aviation gas and jet fuel available.
Rabat-Sale..... 34°03'N., 6°45'W.	Asphalt..... 8,268 x 148 276	36,000	...do.....	Joint. Civil airlines and RMAF First Transport Squadron use airfield. Jet fuel and aviation gas available.
Tangier/Boukhalf..... 35°44'N., 5°55'W.; SW. of Tangier.	Asphalt..... 1,483 x 148 56	66,560	Boeing 727.....	Civil. Domestic airlines used only on this airfield, purchased by the government from Air France.

*Equivalent Single-Wheel Loading: Capacity of an airfield runway to sustain the weight of any multiple-wheel landing-gear aircraft in terms of the single-wheel equivalent.

continues eastward through Algeria to Tunis, Tunisia; there are also extensions of the open-wire network into Algeria. The radio-relay station at Cap Spartel, near Tangier, provides telephone and telegraph links to Gibraltar and to Seville, Spain; an additional link, used exclusively for TV, extends to Lujar, Spain. There is also a radio-relay link between the Spanish enclave of Ceuta and Algeciras, Spain. In addition to the government PTT facilities, a major international HF radio-relay station at Tangier is operated by RCA Global Communications, Inc., a private international corporation. Although not directly serving Moroccan users, the RCA facility facilitates the handling of worldwide traffic. Eleven submarine cables interconnect Morocco and the Spanish enclaves of Ceuta and Melilla with foreign countries; six extend to Spain, two to France, and one each to Algeria, Gibraltar, and Senegal. A communication ground satellite

station at Ain el Aouda, 30 kilometers south of Rabat, is operated by the Moroccan Satellite Communications Company (SOMATELSAT) and is affiliated with the International Telecommunications Satellite Consortium (INTELSAT). The station is used primarily for transatlantic communications.

Special-purpose systems are operated by a number of government agencies, including the police, military, aeronautical, maritime, and railroad authorities. Coastal radio stations at Agadir, Casablanca, Safi, and Tangier provide telephone service to ships at sea.

Morocco has extensive radiobroadcast and TV facilities. AM radiobroadcast stations provide almost nationwide coverage. The most powerful station, located at Azilal, south of Beni Mellal, has a 400-kilowatt transmitter. This station, and the 100- to 140-kw. stations at Agadir, Oujda, and Sebaa Aioun, provide coverage to almost all of the country. They are

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supplemented by 50-kilowatt transmitters at Tetouan and by low-power transmitters at Casablanca, Marrakech, Rabat, Safi, and Tangier, and the Spanish enclaves of Ceuta and Melilla. International programs are broadcast in several languages from transmitters at Sebaa Aioun and Tangier. There is a large Voice of America station also at Tangier. FM transmitting facilities are located only at Rabat, Casablanca, and Sebaa Aioun. Radiobroadcast receivers number about one million. TV programs are originated at stations in Casablanca and Rabat and are rebroadcast by 13 relay stations. Distribution of the stations is sufficient to provide satisfactory reception throughout most of the region northwest of the Atlas Mountains. The most powerful transmitting facilities are at Casablanca, Rabat, and high elevations in various parts of the country selected to provide coverage over extensive areas. Additional relay stations, located in urban areas, have low-power outlets and were established to serve local areas. Telecasts are exchanged with Europe through the Eurovision network and with Algeria and Tunisia through the Maghrebvision network; Ceuta and Melilla also have TV stations. There are approximately 300,000 TV receivers in Morocco and the enclaves.

The Atlas Mountains divide the country and affect the distribution of telecom facilities. On the northwestern side of the mountain range, climatic conditions do not impose any significant difficulties on installation or maintenance of telecom equipment. This area, extending inland from the Mediterranean and Atlantic coast, is heavily populated, and telecom facilities are adequate. In contrast, southeastern

Morocco is a mixture of rugged mountains and desert wasteland, where telecom facilities are difficult to install. As the population in this area is extremely sparse, there is little need for extensive telecom installations.

The domestic telecom manufacturing industry is limited to the assembly of telephones, telephone switchboards, and radio and TV broadcast receivers; it is heavily dependent on components imported from France. Telephone and telegraph equipment and radio and TV transmitters are primarily of French manufacture; some equipment has also been obtained from Japan, the Netherlands, the United Kingdom, the United States, Sweden, and West Germany. Telecom training in Morocco is limited; specialized courses in electronics are not included in university and college curricula. Some technical courses are offered by the Telecommunication School of the Ministry of Posts, Telephone, and Telegraph, but many trainees are sent abroad for specialized training. Although the number of trained technicians is increasing, some foreign personnel, mostly French, are still required to maintain and operate the system.

Morocco's telecom system has been expanded and improved on a continuing basis as new requirements developed. Plans for the future include the extension of telephone, telegraph, and telex services; the installation of additional automatic equipment; and the laying of a submarine cable between Casablanca and Penmarch, France. This new 1,933-kilometer cable, which is to be laid in 1973, will have 630 channels. The estimated cost of approximately \$16 million will be shared equally by France and Morocco.

Glossary (U/OU)

ABBREVIATION	FRENCH	ENGLISH
ICAO		International Civil Aviation Organization
IMCO		Inter-Governmental Maritime Consultative Organization
ONCF	<i>Office National des Chemins de Fer</i>	National Moroccan Railroads
ONT	<i>Office National de Transport</i>	National Transport Office
RAI	<i>Royal Air Inter</i>	Royal Air Inter
RAM	<i>Royal Air Maroc</i>	Royal Air Morocco
RTM	<i>Radiodiffusion Television Marocaine</i>	Moroccan Radio and Television Broadcasting
SAGA	<i>Societe Anonyme de Gerance et d'Armement</i>	Shipping Management Corporation
SOMATELSAT	<i>Societe Marocaine de Telecommunications par Satellites</i>	Moroccan Satellite Communications Company

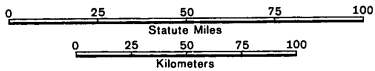
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Morocco

- International boundary
- - - Province or préfecture boundary
- ⊙ National capital
- Casablanca Province or préfecture capital
- +— Railroad
- Surfacéd road
- - - Unsurfaced road or track
- ✈ Airfield
- ⌋ Major port

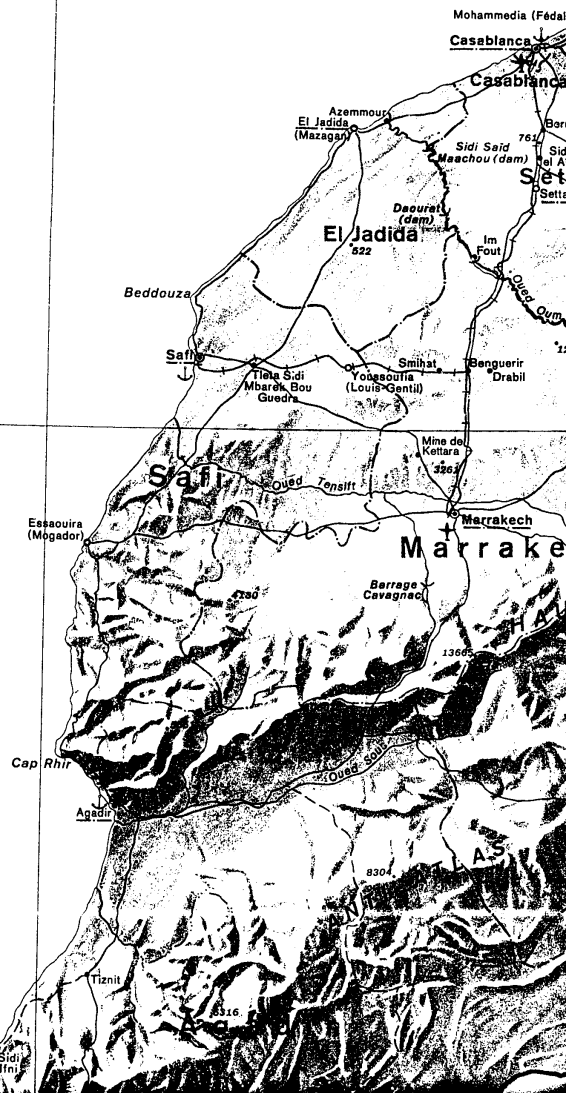
Populated places
 ⊙ Over 100,000
 ○ 25,000 to 100,000
 • Under 25,000

Spot elevations in feet
 Scale 1:2,430,000

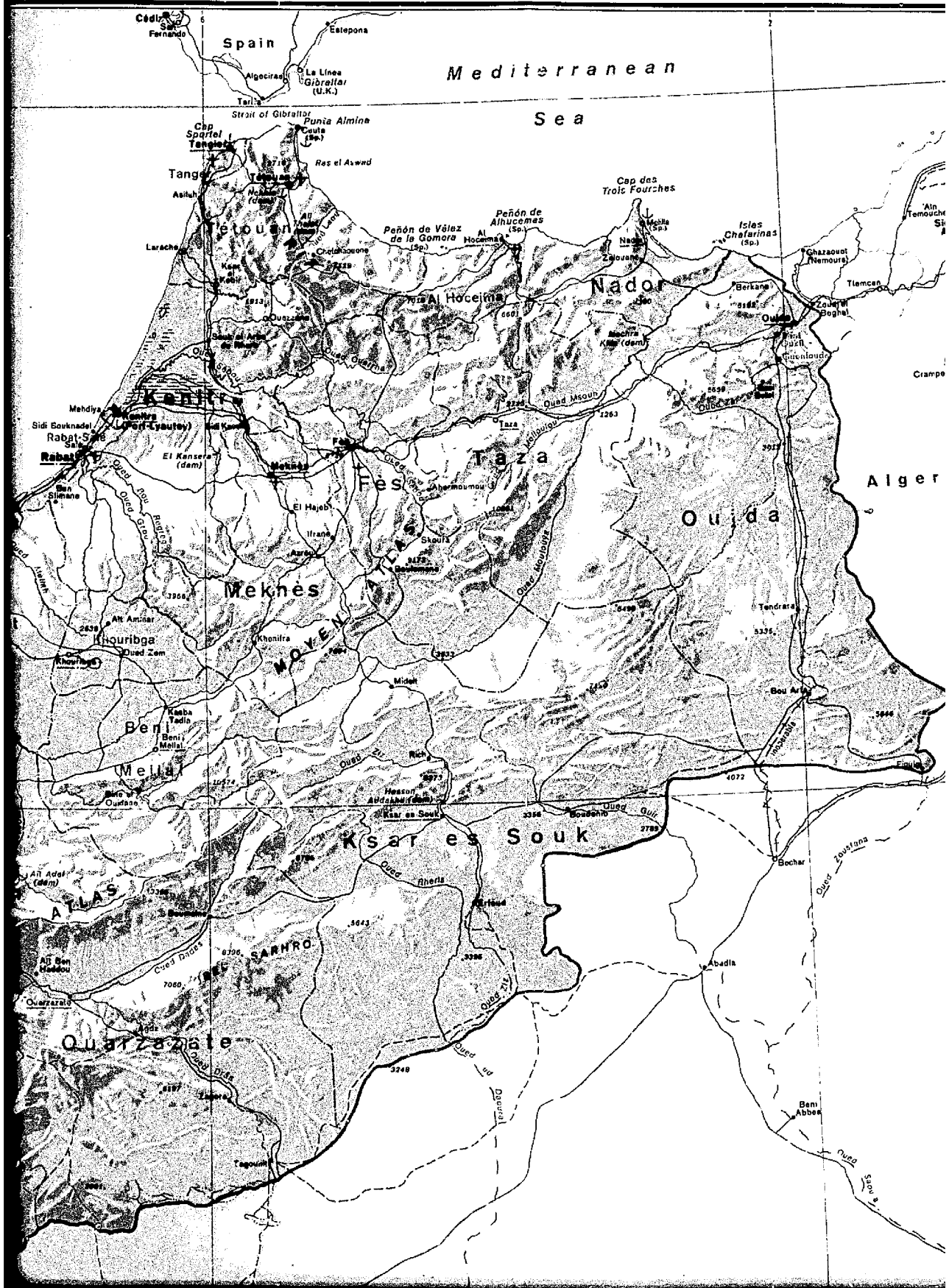


Atlantic

Ocean



3



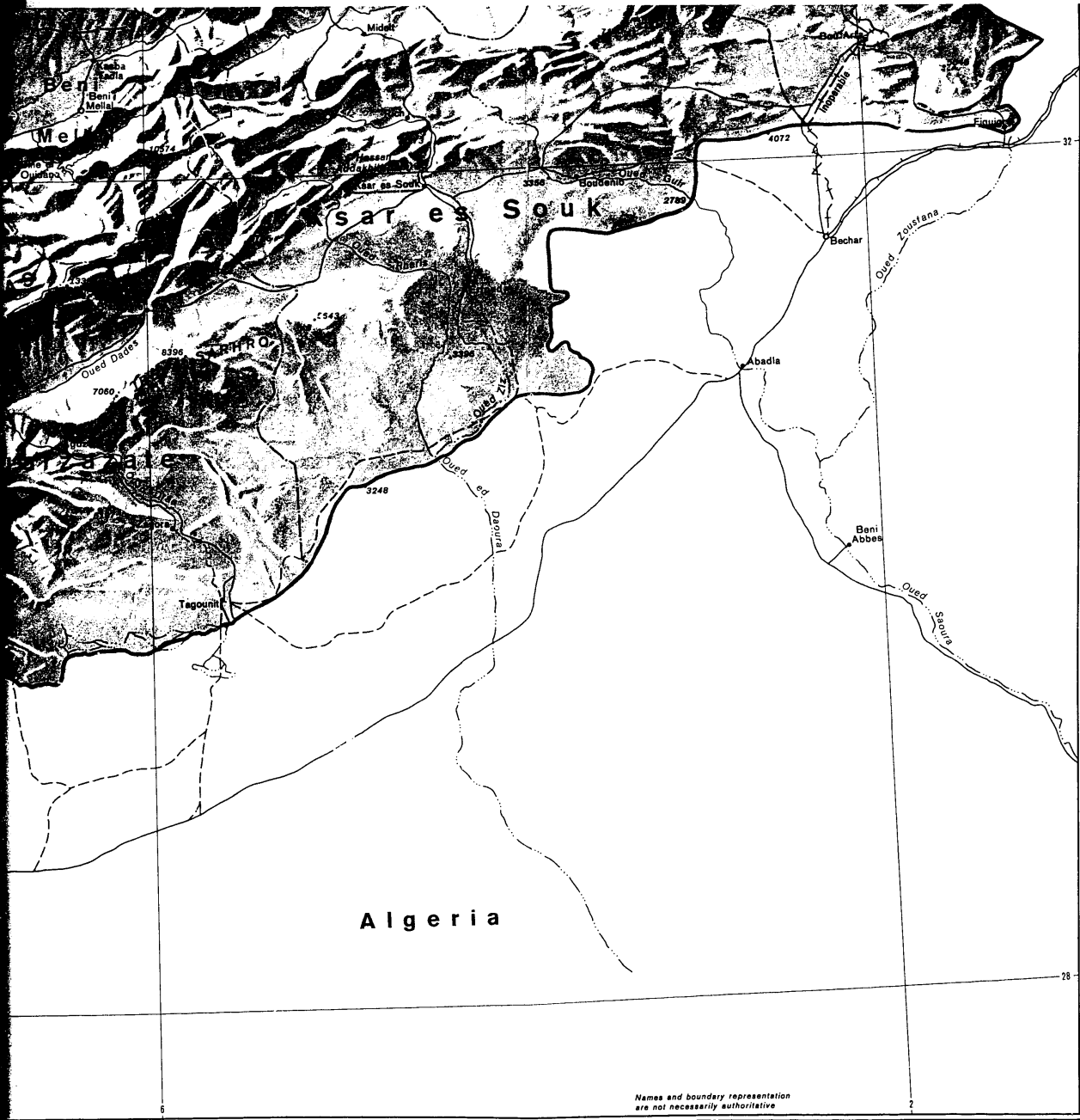


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(4)



(5)

Terrain and Transportation Figure 9

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