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Hungary

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NATIONAL INTELLIGENCE SURVEY

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NATIONAL INTELLIGENCE SURVEY PUBLICATIONS

The basic unit of the NIS is the *General Survey*, which is now published in a bound-by-chapter format so that topics of greater perishability can be updated on an individual basis. These chapters—Country Profile, The Society, Government and Politics, The Economy, Military Geography, Transportation and Telecommunications, Armed Forces, Science, and Intelligence and Security, provide the primary NIS coverage. Some chapters, particularly Science and Intelligence and Security, that are not pertinent to all countries, are produced selectively. For small countries requiring only minimal NIS treatment, the *General Survey* coverage may be bound into one volume.

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This chapter was prepared for the NIS by the Defense Intelligence Agency. It includes a contribution on the merchant marine from the Department of the Navy. Research was substantially completed by October 1972.

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HUNGARY

CONTENTS

This General Survey supersedes the one dated May 1969, copies of which should be destroyed.

SECRET

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

FIGURES

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

Transportation and Telecommunications

A. Appraisal (S)

The transportation and telecommunications (telecom) systems of Hungary are adequate for economic needs and would meet moderate military requirements, but all-out war conditions would impose a severe strain on them. The strategic importance of transportation and telecommunications is heightened by the fact that Hungary is a landlocked buffer state between Western Europe and other Warsaw Pact countries. Most major highways, rail lines, waterways, and telecommunications radiate from the capital, Budapest.

All transportation and telecom systems are state owned and are administered by the Ministry of Transportation and Postal Affairs. Railroads are the most important means of transport; on a ton-mile basis they account for about 70% of total traffic, while highways account for 20%, and inland waterways 10%. Highways handle over 75% of the total freight tonnage, but most trips are for short distances. The railroads, however, have not kept pace with the traffic increase. As a result, they are overloaded and unable to meet many requirements, which now must be met by other modes.

Most international rail traffic moves in a westerly or easterly direction, toward Austria or the U.S.S.R., respectively. Connections are made with the standard-gage systems of adjacent countries; differences in gage and equipment necessitate transloading only between Hungary and the U.S.S.R.

Highways are used primarily for short hauls and in areas not served by other modes of transport. Concentration of roads is heaviest in the west and lightest in the east; north-south routes are more numerous than east-west routes. Connections are made with all adjacent countries.

Inland waterways are of minor significance in the national economy. The waterway system includes a segment of the Danube, several smaller rivers and canals, and Balaton lake. Waterways offer a considerable potential for both domestic and foreign trade, but internal policies have worked against full realization of that potential. Budapest, the major waterway port, has some significance in a country without a seaport. Cargo destined for ocean shipping is usually moved down the Danube and transloaded at Izmail, U.S.S.R.

Although crude oil pipelines adequately support the current requirements of Hungarian refineries, both crude oil and natural gas pipelines are being expanded to meet the growing fuel demands of the country.

A small modern merchant fleet fulfills the shipping needs on the Danube and carries seaborne cargo to Black Sea and Mediterranean ports, and, in 1971, shipping service was inaugurated to Bombay, India.

The effectiveness of surface transportation and the relatively small size of the country have made it unnecessary for Hungary to develop an extensive air network. International services, however, are of importance, and the state civil aviation enterprise offers services from Budapest to a number of cities in Europe and the Middle East.

The Fourth Five Year Plan (1971-75) provides for extensive improvements to the transportation and telecom systems. Among the more significant current and future projects are the following:

Railroads—Extension of electrification, track renovation, modernization of yards and communication equipment, and acquisition of new locomotives and rolling stock.

Highways—Reconstruction of important roads, including part of the Hungarian section of the trans-European highway, and realignment, widening, and resurfacing of some secondary roads.

Inland waterways—Continued canalization work on the major waterways and development of pusher barge-train units and self-propelled barges.

Pipelines—Construction of other major long-distance pipelines.

Merchant marine—Acquisition of large oceangoing ships; addition of three 12,700-d.w.t. ships by the end of 1973.

Telecommunications—Continued modernization and expansion of all telecom services, including provision of the direct-dialing system, and color-TV transmissions.

B. Strategic mobility (S)

The defense strategy and logistic mobility of Hungary are determined largely by the differences in terrain which divide the country into two military geographic regions—the Northern Hills and the

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Hungarian Plains. Although there are marked differences between the two regions, the characteristics of each would have relatively uniform effects on strategic mobility within the regions.

For each mode of surface transport and air operations, the hilly to mountainous northern one-fifth of the country presents restrictions or limitations and would make large-scale logistic support operations extremely difficult. The flat to rolling Hungarian Plains are generally well suited for large-scale conventional operations—rail and highway networks are generally better able to handle east-west movements, while the north-south oriented Danube and Tisza waterway systems can support north-south logistical operations but present natural barriers to rapid cross-country movements. Seasonal climatic conditions create restricting factors in both the plains and in the moutains.

The railroad network, already capable of supporting large-scale movement of troops and supplies in military operations, is continuing extensive modernization that will further increase transport capacity and speed service between the U.S.S.R. and other neighboring countries.

Alternate routes are usually available, and although the network has been generally better able to handle east-west rather than north-south movements because many connecting lines have lower axleload limits than the main radial lines, this condition is being corrected.

Efforts to increase the railroads' capacity include electrification, dieselization, installation of automatic signals, and increasing axleload limits by strengthening track structure. Emphasis has been placed on lines running eastward to the U.S.S.R. and to those making international connections.

Neither topography nor weather present any serious problems to railroad operations in Hungary.

The two major lines leading northeastward from Budapest to Zahony and the connection with the U.S.S.R. rail network are of particular importance. They provide cross-country movement from the U.S.S.R. to Czechoslovakia and Austria. Interdiction of these lines or of the strategically significant Zahony-Chop[1] transloading complex at the border would be a critical blow to the network's military potential.

Improvements to secondary lines situated east of the major Debrecen–Nyiregyhaza–Zahony line and between it and the Romania and U.S.S.R. borders have been carried out since 1969 under the guise of "periodic repairs." All these lines provide connections to Zahony. Most of the tracks and facilities were strengthened, thereby raising the status of the lines to first category and allowing freight trains to travel at speeds of 37 to 40 m.p.h. Passing tracks at stations were lengthened to accommodate 100-axle trains, and improvements to security and signal systems are scheduled through 1971-72.

These improvements and modernization were considered to have a purely military aim and have, perhaps, been accomplished as part of various plans developed by the military authorities for the regulation of traffic and to assure direct connections between the improved lines and the stations of Mukachevo and Beregovo in the U.S.S.R. in the event the Zahony area could not be used.

Hungary's highway system—particularly the east-west network—on the whole is adequate to meet the requirements of military movements and logistic resupply. Military road transport would be restricted, however, by a variety of traffic bottlenecks, including sharp curves and steep grades, and the low capacity of many secondary roads. In the plains, muddy ground conditions in the spring present problems, and many roads would require constant maintenance to sustain heavy military traffic. In much of the northern hills region, numerous rugged slopes and dense forests would preclude vehicular cross-country movements. Highway logistic capabilities are being enhanced gradually by expanding road reconstruction and increasing vehicle inventories. Hungarian military capacities will be greatly improved by the completion—expected sometime in the late 1970's—of the Balaton superhighway. This will enable personnel, equipment, and supplies to move more efficiently to the Hungarian People's Army (MN) and the Soviet Southern Group of Forces stationed in Hungary. This autobahn would provide greater access to Hungarian border defense concentrations in the north, west, and southwest and would afford a high-speed, all-weather approach to the strategic Zagreb area of Yugoslavia, which includes Rijeka, Yugoslavia's most important Adriatic port.

Motor vehicles are of prime importance in providing support as transportation carriers during military operations. All privately owned vehicles as well as commercial trucks and buses are registered for potential military requisitioning by the Mobilization Group of the Ministry of Defense. Such vehicles are maintained and repaired on a priority basis and are inspected periodically by military authorities. Each transport enterprise is required to keep 30% of its vehicles ready for military use on 24- to 48-hour

[1]For diacritics on place names see list of place names on the apron of the Terrain and Transportation Map, Figure 14, the map itself, and maps in the text.

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notice. When vehicles are requisitioned, their drivers generally are assigned to serve also. Commercial vehicles are requisitioned to supplement military inventories and provide adequate transportation to meet military movement requirements until hostilities are initiated. Thereafter, adequate transportation depends on the ability of industry to replace losses and provide spare parts. Increasing cargo containerization is boosting the growth of Hungary's military capability.

The Hungarian Danube, as an integral part of the international Danube route, provides Warsaw Pact forces high-capacity access in the east-west movement of military supplies and equipment from southwestern European U.S.S.R. to southeastern West Germany. Within Hungary, the Danube and Tisza rivers, as north-south aligned routes, could provide logistical support to military forces traveling north or south. Although the waterway route capability for military supply/resupply operations on the Danube in Hungary is virtually unlimited, the through movement of Warsaw Pact forces from the U.S.S.R. to West Germany would be restricted to 352,000 short tons per day based on the locking facilities at the Iron Gate lock-and-dam installation on the Romanian-Yugoslav sector of the river. The nine significant ports have an estimated total military port capacity of 108,600 short tons per day, 50% of which is at Budapest. Tactically, the waterways are natural barriers to rapid overland movement. Most vulnerable are lock-and-dam installations, destruction of which would completely close through traffic and cause widespread flooding on the Tisza and flash flooding with subsequent loss of water level control on the main channel of the Danube—as well as complete closure of the Danube anabranch on which two installations are located. Serious interdiction could also be accomplished by destruction of ports, repair facilities, and large bridges—especially those in Budapest.

Utilization of the Hungarian merchant marine for military purposes would be limited to logistic support. The 18 dry cargo ships have a combined lift capability of almost 38,000 tons of cargo. Since there is only one ship equipped with large hatches (*Duna*, 4,502 d.w.t., has five 55-foot hatches) and only two ships (*Raba* and *Tisza*, 4,749 d.w.t. each) have a heavy-lift capability (50-ton boom each), the merchant marine is severely restricted as to the type of military hardware which might be transported. The lift capability could be supplemented by units in the large inland waterway fleet, which could transport about another 125,000 tons of cargo. Although Hungary has no oceangoing tankers, there are several tank barges which could transport about 200,000 barrels of petroleum products. There are no oceangoing passenger ships, but there are in service on the Danube River and Balaton lake a considerable number of ferries, hydrofoils, motor passenger craft, and paddle-wheel passenger steamers, some of which are capable of transporting as many as 1,200 passengers. Under emergency conditions, these vessels would no doubt be used to transport armed forces on a short-haul basis.

No formal mobilization plan with regard to the Hungarian Airlines (MALEV) is known to exist. However, MALEV equipment and personnel could be absorbed into the military with little difficulty, since civil aviation is a state-owned enterprise. The close relationship between the Hungarian military and MALEV is demonstrated by the fact that all MALEV personnel must undergo 30 days' annual military training. Military conversion during a national emergency should be performed quickly and easily. The major transport aircraft would be most valuable for troop and cargo carrying, the light aircraft for a variety of military functions including reconnaissance, training, and medical evacuation.

Although adequate for present military requirements, the Hungarian air facilities network would have some deficiencies if required for strategic military usage with little or no advance warning. Most of the reserve airfields are used seasonally in fair-weather months and are not provided upkeep on a year-round basis. Moreover, there is a general shortage of mobile support equipment for deployment to these reserve facilities, particularly in the area of electronic navigational and landing aids. These factors would militate against immediate all-out usage of Hungary's airfield system in a wartime environment; under such circumstances, probably only about half of the 48 operational airfields over 2,000 feet in length could be ready for sustained military use within several days.

The telecom system, comprised of networks of open-wire lines, and radio-relay links, is reasonably protected from sabotage. The main long-distance circuits are provided by underground cables, and important telecom facilities are closely guarded by security police or military personnel. Terrain and weather cause no unusual problems in maintenance of telecom facilities.

The main switching center for both domestic and international service is located in Budapest. Other principal centers are Szekesfehervar and Veszprem. Permanent radio contact is maintained with the Ministry of Defense in Budapest from this station.

Budapest is the headquarters of the Hungarian People's Army and the Southern Group of Soviet

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Forces. The 5th Army Headquarters is located in Szekesfehervar. A Corps headquarters of the 5th Army is located in Cegled, and Nyiregyhaza is the location of a 5th Army Division headquarters. Multiconductor cables are routed to each urban area where key military installations are located. Budapest, Nyiregyhaza, and Szekesfehervar each have high-power radiobroadcast transmitters which could serve the military in the event of an emergency.

C. Railroads (S)

The Hungarian railroad network, totaling 5,908 route miles and all but 96 miles government owned, is an important factor in the national economy. The railroads have difficulty, however, handling the rapidly growing freight traffic, and extensive modernization measures are being undertaken to increase their transport capacity.

Railroads serve both the agricultural and industrial sectors of the Hungarian economy. Main lines, which extend from Budapest in a radial pattern, are linked by numerous secondary lines to form a compact network that is distributed evenly throughout the nation. The lines generally traverse flat and gently rolling plains which permit light grades and easy curves; in the hilly and mountainous regions of the northeast and west they follow gently sloping river valleys.

The network comprises 5,098 miles of standard-gage (4'8½"), 788 miles of narrow-gage (mostly 2'5⅞"), and 22 miles of 5'0" broad-gage lines. Standard-gage lines carry most of the traffic and make all international connections; the narrow-gage lines are generally of only local significance. The 22-mile section of broad gage parallels the standard-gage line from Fenyeslitke and serves the Hungarian-U.S.S.R. transloading complex around Zahony in the northeast. The network is predominantly single track, but double track is being extended gradually and currently amounts to 688 miles; all double track is on standard-gage lines, and most of it radiates from Budapest. Electrification, also being extended, at the beginning of 1971 amounted to 581 route miles, all standard gage.

Hungarian railroads make international connections with all neighboring countries. Standard-gage lines serve all these connections, except for those with the U.S.S.R., and Hungarian equipment can be interchanged freely with that of all the other neighboring countries. Equipment exchange with the Soviet Union is limited to passenger cars in special through service. Soviet-Hungarian freight traffic is transloaded at Chop in the U.S.S.R. and at Zahony, Tuzser, Komoro, and Fenyeslitke in Hungary, which are connected by dual-gage (5'0"-4'8½") tracks. The transloading station at Zahony consists of separate yards where general commodities, coal, coke, and crude oil are transloaded. Grain and wood are transloaded at Tuzser, crude oil at Komoro, and general commodities at Fenyeslitke. Mechanical handling equipment available includes large derricks and cranes. Another connection with the U.S.S.R. is made by a line running from Tuzser through Tiszabezded to Batevo railroad station near Uzlovoye, U.S.S.R. Although this 6-mile single-track line is probably broad gage now, it may be scheduled for dual gage because it is planned as a bypass for the Chop–Zahony traffic.

Transloading facilities are being expanded at Zahony and installed at Eperjeske to help deal with the increasing quantity of freight to be transloaded at the Zahony complex. The Eperjeske installation has been equipped with a covered loading ramp served by broad- and standard-gage tracks, and six of the planned 14 cranes have been installed (Figure 1).

About 70% of the railroad construction and maintenance work is mechanized and compensates for a steadily growing shortage of manpower. Insufficient funds have always caused difficulty in completion of Hungarian railroad construction plans, necessitating that minor repairs frequently be made when more extensive rebuilding was planned. Spring and summer floods in low-lying areas near large rivers may interrupt construction and maintenance work and reduce roadbed stability. In the mountains of the north and west, landslides may create a maintenance problem where lines have been built along steep slopes and in deep cuts and valleys.

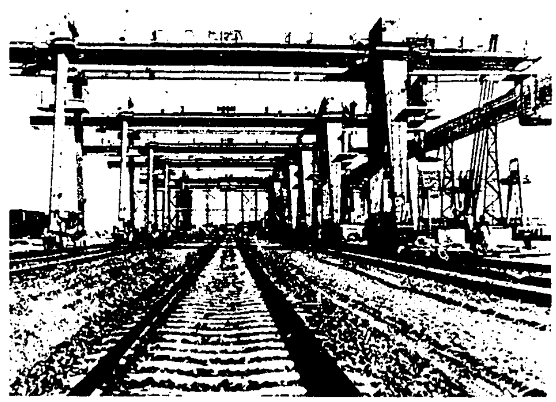

FIGURE 1. Cranes at the Eperjeske transloading installation. Six of a planned 14 of these 5-ton units are in place. (U/OU)

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Since the early 1950's few lines have been built, and efforts have been directed mainly toward improving the existing network. As a result of the priority given to lines serving the needs of the U.S.S.R. during the post-World War II reconstruction and expansion, much of which was accomplished with Soviet assistance, the network is generally better able to handle east-west rather than north-south movement. However, attention is now being given to improving some important north-south routes.

The two principal connections between Budapest and the U.S.S.R. also serve the industrial and commercial centers of Miskolc, Cegled, Szolnok, and Debrecen, and carry the densest traffic, which consists of mechanical equipment, raw materials, and military items. Other important lines serve international connections and carry heavy international traffic. They are the Budapest–Gyor–Hegyeshalom connection with Austria, the Budapest–Vac–Szob connection with Czechoslovaka, the Budapest–Szolnok–Bekescsaba–Lokoshaza connection with Romania, and the Budapest–Dombovar–Pecs–Magyarboly connection with Yugoslavia. Principal commodities transported are coal, coal briquettes, stone, crude oil, timber, iron and manganese ores, rolled steel, and sugar beets.

The Fourth Five Year Plan (1971-75) continues some of the programs of previous plans—further electrification, track renovation, acquisition of new motive power and rolling stock, and modernization of yards and signaling and communications systems.

Electrification of the Budapest–Cegled–Debrecen–Nyiregyhaza route to Zahony was completed in December 1970, thus permitting through electrified operations from the Zahony transloading area at the Russia border to Budapest by two routes,[2] and on to the Austria border by a single route. All but the 31 miles between Szerencs and Nyiregyhaza on the northern line are double track. Plans to double track the Szerencs–Nyiregyhaza section have been dropped, and installation of Centralized Traffic Control (CTC) and 1,640-foot passing sidings allow the line to handle a volume of traffic equivalent to that of a double-track line with the old signal installations.

Electrification of the main north-south Szob–Budapest–Lokoshaza line, begun in 1970, has been completed between Szob and Budapest, and a 20.5-million ruble (about US$22.5 million) loan from the Council for Economic Mutual Assistance (CEMA) International Investment Bank should allow completion of the project by December 1974.

Broad, long-range planning for the railroads is aimed at improving the main network and reducing the number of lines and stations. There are also plans to increase the axleload limit throughout the network to 25.3 short tons by 1980. Axleload limits are 24.2 short tons on a few especially important main-line sections, 19.8 and 22 short tons on most main lines, and range downward on less important lines. Some 1,800 miles are scheduled for reconstruction and strengthening to permit higher speeds. Discontinuance of many secondary lines is in progress; service in those areas is being diverted to highways.

Hungarian railroad structures include 14 tunnels and about 6,200 bridges. All tunnels are on single-track lines, and most are located in the mountainous northern part of the country. The longest tunnel on the network, measuring 2,556 feet, is on a secondary line at Pilisvorosvar, northwest of Budapest. Construction of a 1.2-mile tunnel between Vasvar and Pacsony has been planned. Most bridges span fairly narrow watercourses and are relatively short, but several long structures of major significance—ranging from 1,290 to 1,870 feet in length—span the Danube and Tisza rivers. Most bridges 100 feet and over in length are of steel construction. Of particular significance is the international bridge on the U.S.S.R. border between Zahony and Chop, which can accommodate both broad-gage and standard-gage trains. However, since the rails are on a common roadbed, trains of both gages cannot cross the bridge at the same time.

Track structure, which is in poor condition because of intensive use and inadequate maintenance, is being improved and strengthened in the modernization programs. Rails in use are produced in Hungary and range in weight from 47.6 to 109.7 pounds per yard. Most standard-gage main lines are laid with 97.4- and 89.3-pound rail; however, it was decided in 1970 to use 109.7-pound rail in modernization work on main lines carrying the heaviest traffic. Increasing numbers of long-welded rails are being laid. Wooden ties impregnated with creosote are characteristic of the track structure over most of the system. However, the trend is to use locally produced reinforced concrete ties for replacements and new track structure. A few light-weight steel ties are used, primarily on industrial sidings. Prefabricated 79-foot track sections using prestressed concrete ties are being produced and used in modernization work (Figure 2). Ballast is of crushed stone on main lines, of crushed stone or slag on station sidings and yards, and of crushed stone, slag, or gravel on secondary lines.

Hungarian railroads operate under both manual and automatic block systems. Signals include colorlights and semaphores. Plans to convert all main lines to an automatic signal system have been in

[2]The second route is via Miscolc and Hatvan.

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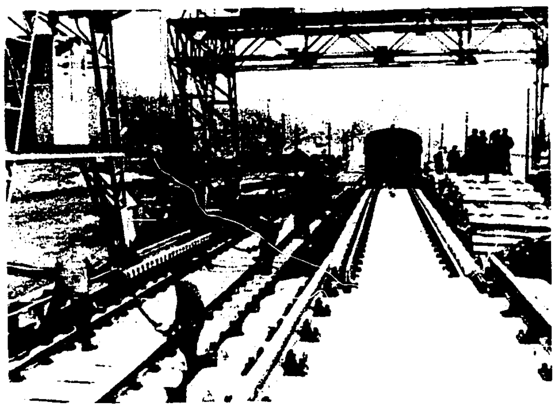

FIGURE 2. Prefabricated track sections being used in modernization work (U/OU)

existence for several years, and work is progressing toward this end. CTC is being installed on a few sections. Communications are by telegraph and a railroad telephone network.

Coal continues to be a principal railroad fuel, but the quantities consumed are decreasing as dieselization and electrification expand. Because of the poor quality of domestic supplies, it is necessary to import coal, primarily from the U.S.S.R. Hungary's production of petroleum is relatively small, and reliance will continue to be placed on imports obtained chiefly from the U.S.S.R. and Eastern European Communist countries. Current for the electrified lines is tapped from the national grid by railroad substations that transform it and feed it to the railroad overhead lines. Water supplies present no major difficulties, but water must be treated with soda for locomotive use.

Both freight and passenger traffic are important to the railroads. In 1970 they transported 129.6 million short tons of freight and 540.3 million passengers and accomplished 13.5 billion ton-miles and 10.2 billion passenger-miles. In that year the average gross weight of freight trains was 1,125 short tons, the average length of haul was 104.1 miles, and the average freight car turnaround time was 3.7 days.

With containerization surging ahead in Western Europe, the Soviet Union and countries of Eastern Europe are planning to increase container movement as quickly as possible. A coordinated container transport system is being developed by the CEMA countries to simplify intrabloc freight shipments; a committee is plotting a network of the most effective container routes and planning to adopt a standard freight container in 1972. Container services are already operating between East Germany, the U.S.S.R., and Czechoslovakia, and early in 1972 a new direct "freightliner" operation using 1,000-ton trains began service between Budapest and Moscow.

The Hungarian State Railways (MAV) and the railroads of the German Democratic Republic have been in the forefront of container development in East Europe; the first international container train service, Budapest–Prague–Berlin, began in 1969. MAV was also the first member of the Organization of Railroad Cooperation (OSShD) to join the Intercontainer Company on the Continent at its foundation in 1967. At present, domestic container service operates between Budapest and Miskolc. Hungary's first container terminal was constructed at the port of Budapest and operated by the Hungarian Shipping Joint Stock Company (MAHART). Budapest is to be MAV's main container center. Work has begun to transform part of the largest freight depot, Jozsefvaros Station, into a modern container terminal, and large increases in container traffic are expected. Stations to be be developed to handle containers include Gyor in the west, Miskolc in the north, Debrecen in the east, and Pecs in the south. A special project concerns installation of a container terminal at Zahony.

Although International Organization for Standardization (ISO) units were shipped over MAV lines by other organizations and importers, until mid-1970 MAV operated with only small containers ranging from 1½ tons to the OSShD standard 5-ton type. Of the 10,000 containers carried by MAV in 1970, more than two-thirds were of 5 tons or less. During the latter part of 1970 a number of ISO 20- and 30-ton aluminum containers were acquired, and more have been added since. Plans are to increase container movement to more than 50,000 units in 1975 and to over 150,000 in 1980.

Production of ISO containers has probably moved faster in Hungary than in any other CEMA country; some have been exported to Western Europe. Several plants are involved in their production, including the Hungarian Shipyard and Crane Factory, Budapest; the Hungarian Wagon and Machine Works, Gyor; and the Csepel Motor Truck Plant. Investment costs during the first few years are likely to be high, but amortization should lead to important economies for the railroads and for industry generally starting in 1974.

Hungarian equipment is inadequate in quantity and quality. Because of the shortage, equipment is overused and repairs are not scheduled frequently enough. Although electrification and dieselization programs are in effect, and steam locomotive production was stopped in 1959, many steam units are still in use because there are not enough diesel or

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electric locomotives to replace them; however, this condition is being rectified. The use of steam locomotives is to be discontinued on main lines by 1975 and on the entire network by 1980. A shortage of freight cars makes it difficult to handle peak traffic at harvest time in the autumn, and a shortage of passenger equipment keeps the network from meeting weekend and heavy summer vacation travel requirements. Participation in the Freight Car Pool (OPV) under CEMA, to which Hungary has contributed 21,200 cars, has relieved the freight car shortage to some extent.

Hungary produces diesel and electric locomotives, train sets, and passenger cars, but most of this equipment is exported to the U.S.S.R. and other Soviet-oriented countries, making it necessary for Hungary to import equipment. Diesels have been acquired from Sweden and the U.S.S.R., and freight cars from other European Communist countries.

The estimated equipment inventory as of January 1971 was as follows:

Locomotives:	
Steam	1,138
Diesel	576
Electric	232
Freight cars	64,836
Passenger cars	6,876

Most of this equipment was standard-gage. Acquisition of new motive power and rolling stock has been a major item in the last several 5-year plans and will undoubtedly continue to be for some time. Overage equipment is being retired as new units are put into service, and the inventory reflects a decline in the number of freight cars as well as steam locomotives. Purchase orders were signed in 1971 for 47 diesel and electric locomotives, 275 passenger cars, and about 5,000 freight cars. Information on delivery dates is not available. Major repairs are made at shops in Budapest, Debrecen, Miskolc, Szeged, and Szekesfehervar; minor repairs are made at enginehouses located throughout the network. New repair facilities for diesel locomotives are being installed at Szolnok and Szombathely, and for 4-axle cars at Dunakeszi.

All railroads in Hungary are government owned except for 96 miles of the Gyor–Sopron–Ebenfurth Railway (Gy. S.E.V.) in the northwest. The Gy. S.E.V., which also has 40 miles of lines in Austria, is nominally an independent private corporation, but the Hungarian Government holds a controlling interest in its stock and operates the Hungarian portion. Included in the Gy. S.E.V. mileage are 40 miles of another private railroad, the Lake Ferto Suburban Railroad (FHV), a secondary line that links Celldomolk with Neusiedl, Austria, crossing the border at Pamhagen. The MAV, under the Ministry of Transportation and Postal Affairs, is responsible for administering and operating the Hungarian railroads, including the Gy. S.E.V. lines in Hungary and the 73-mile Budapest Suburban Railways (BHEV).

There were about 133,500 employees on the railroad in 1969. There is, however, a shortage of skilled and unskilled workers. The MAV has an apprentice system and operates several technical schools.

D. Highways (S)

Highway transport in Hungary is used chiefly for short-haul movement of freight and passengers and provides a feeder and distribution service to other modes of transport. Highway transport operations—both domestic and international—have been growing rapidly and assuming an increasing significance for the national economy, reflecting its growth during recent years. The trend of passenger and freight traffic indicates a continuing upswing and fuller utilization of the economic and technical advantages of highway transport. In 1968 Parliament approved a new transportation policy aimed at streamlining the transport system. One of the important features of this concept is the discontinuation of about 1,000 miles of low-volume, uneconomic railroad lines and shifting their traffic to highways during the Fourth Five Year Plan (1971-75).

The following statistics denote the considerable increase in highway transport volume within a recent 10-year period:

	MILLION FREIGHT SHORT TONS	BILLION TON-MILES
1960	133.6	1.07
1966	254.6	1.85
1967	305.2	2.20
1969	411.0	3.41
1970	440.0	3.90
	MILLION PASSENGERS	BILLION PASSENGER-MILES
1960	236.3	2.24
1966	373.4	3.32
1967	386.8	3.45
1969	445.8	4.08
1970	474.5	4.47

The highway network is adequate for the normal requirements of the economy; the major routes, some of which have been modernized in recent years, are generally in good condition. Highways west of the Danube are in the best condition because of better construction and the availability of materials.

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Highways in the north-northwest of the Tisza river are in good condition, whereas most highways in the eastern portion of Hungary are in poor condition because of the lack of construction or repair materials.

The highway network is adequately distributed; the densest portions are in the more heavily populated areas west of the Danube and in the mountainous northern portion east of the Danube. North-south interconnecting roads are numerous and evenly distributed, but only four east-west through routes traverse the country, complemented locally by numerous secondary roads serving local industrial, commercial, and agricultural centers. The backbone of the network consists of major routes radiating from Budapest, thus giving the capital direct access to the larger cities and neighboring countries. The network is very dense near Budapest but is relatively sparse elsewhere.

Main highways provide border connections with all five adjacent countries. Several of the main highways combine to form through routes constituting segments of the trans-European network. The main highways, which total nearly 3,800 miles, constitute only about 20% of the network but carry about 50% of the traffic. On the basis of percentage of hard-surfaced roads, the Hungarian network is superior to the networks of Czechoslovakia, the U.S.S.R., Romania, and Yugoslavia, and only slightly inferior to that of Austria.

An official government breakdown of the approximately 18,360-mile Hungarian network is as follows:

	MILEAGE
First-class highways	1,360
Second-class highways	2,600
Secondary roads	14,400

An approximate breakdown by surface types, is as follows:

	MILEAGE	PERCENT OF TOTAL
Hard surfaced (concrete, bituminous, bituminous surface treatment, stone block, cobblestone)	11,048	60.2
Macadamized (gravel, crushed stone)	6,558	35.7
Earth (graded and drained)	754	4.1

Information is not available on mileage represented by motorable tracks or by forest roads that are used by the forestry industries and generally constructed by them.

Highway surface widths range from 12 to 36 feet. There are several divided-highway sections that have 24- or 28-foot concrete surfaces on each roadway. Predominant widths are 18 to 27 feet on the concrete, bituminous, bituminous-treated, and stone-block surfaces, and 12 to 18 feet on others. Base types include crushed stone, gravel, and some concrete. Shoulder types are earth, gravel, and some brick. Some shoulders measure up to 10 feet in width, but the majority are from 2 to 3 feet wide. Some roads do not have shoulders. Drainage facilities, at least on main routes, are adequate. Except for roads traversing mountainous terrain in the north-central, northeastern, and western regions, alignments are generally good.

The network has an estimated 9,000 bridges 20 feet and over in length. Most are constructed of steel or reinforced concrete (Figure 3), but secondary roads have a few old bridges of masonry construction and some timber bridges. In general, bridges are in good condition. No information is available on the existence of tunnels or fords on the highway network. Modern ferries operate between main highways on either side of Balaton lake (Figure 4). Ferry crossings are common on secondary routes; ferry craft capacities range from 10 to 33 short tons.

Construction and maintenance operations are hampered by economic difficulties, adverse terrain, and climatic conditions. Shortages of mechanized roadbuilding equipment and inadequate funds pose the most serious problems. In accordance with a contract recently concluded with Soviet foreign trading companies, about 1,500 units of various types of road construction equipment are to be imported from the U.S.S.R. during the 1971-75 period. Poor natural drainage in the valleys of western Hungary and in the plains east of the Danube River sometimes results in rapid deterioration of roadbeds and surfaces. This condition is especially severe during alternating freeze and thaw periods in spring and fall. In the Bakony mountain area, and in general in the entire western part of the country, maintenance is necessary to prevent snow blocking; snowdrifts occasionally present difficulties. Good-quality sand and gravel are available in varying amounts throughout most of the country, but in some regions road construction materials such as stone and timber are in short supply. In areas close to the border, rock materials have been imported from the U.S.S.R., Romania, and Czechoslovakia. Most bituminous materials and steel have to be imported. Although fairly large quantities of portland cement are produced locally, the supply of cement has been a matter of concern for some time. Several cement plants have been modernized and new plants built; nevertheless, the industry's growth has not been able to keep pace with the steadily increasing demands of road construction, and Hungary has to resort to importing cement from other countries, including Romania, Turkey, and Egypt.

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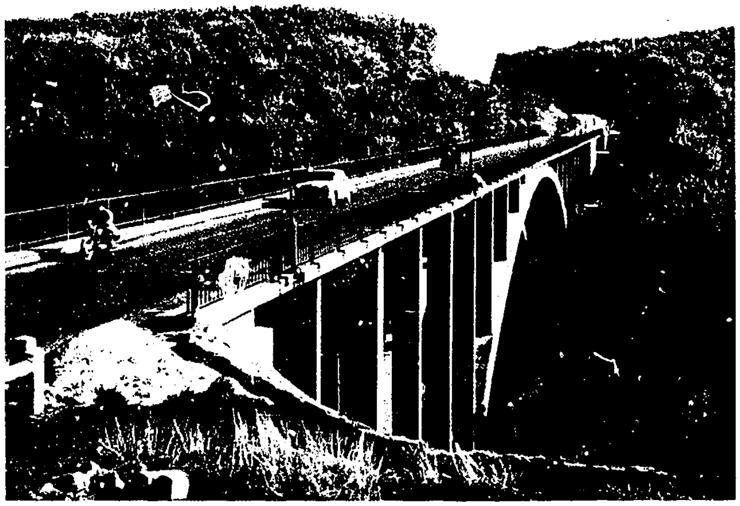

FIGURE 3. Highway bridge at Pecs (U/OU)

FIGURE 4. Vehicle ferry that provides link between main highways on opposite shores of Balaton lake. (U/OU)

Hungary's road development planning, designed to keep pace with the country's rapidly growing volume of motor vehicle traffic, is aimed chiefly at modernizing existing roads and, to a lesser extent, expanding the network. The Fourth Five Year Plan represents the second phase of a 15-year state highway development program initiated by the Highway Research Institute in 1965. Although during this period construction and modernization efforts will be focused chiefly on the first-class network, numerous highway reconstruction projects will involve realignment, widening, and resurfacing of secondary roads.

Construction efforts continue to be concentrated on Hungary's first divided-highway project, from Budapest to Szekesfehervar (Figure 5). This operation is given high priority because the area affected is important for military logistics as well as for vital industrial and tourist traffic. To date only part of this special road renovation project—an approximately 5-mile segment from Budapest to Torokbalint—has divided-highway characteristics; ultimately, however, the limited-access divided highway, to be called the Balaton Autobahn, is scheduled to extend via Siofok and Nagykanizsa to the Yugoslavia border. Work is continuing between Tatabanya, Komarom, and Gyor. This second projected divided-highway artery is part of the trans-European network of international highways. For about 5 miles, leaving Budapest, the two routes are a joint section having divided-highway features. Eventually the second superhighway is to extend to the Austria border, also providing easy access to Czechoslovakia. Other important roads undergoing reconstruction include the Budapest–Hatvan–Miskolc stretch, scheduled to become part of another superhighway; the Budapest–Szeged and Debrecen–Szeged highways; the road between Balatonkeresztur and Barcs, at the Yugoslavia border; and the Pecs–Dravaszabolcs route, extending to the Yugoslavia border and scheduled for conversion to a three-lane superhighway. Wherever necessary, construction plans generally include increasing the width and load-bearing capacity of roads being utilized by heavier traffic because of discontinued rail lines. Significant bridge projects include reconstruc-

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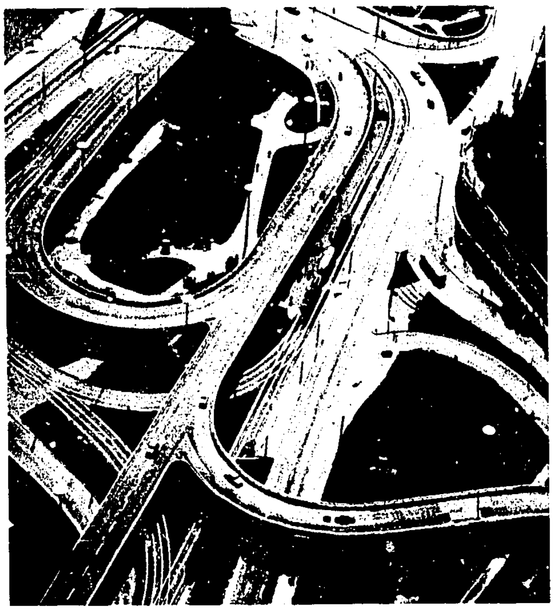

FIGURE 5. Interchange on divided-highway section of Route M-7 (U/OU)

tion of the Drava River bridge at Dravaszabolcs, a joint Hungarian-Yugoslav undertaking; construction of a bridge over the Danube River at the border crossing point between Gyor and Medvedov, Czechoslovakia; and a new bridge over the Tisza river at Algyo. Hungarian authorities frequently have to yield to Soviet commands stationed in Hungary who insist that priority be given to certain road projects; those fulfill Soviet needs but do not necessarily serve the Hungarian economy. In accordance with such a request, a program of road construction was initiated in June 1971 in various areas of northeastern Hungary. The Hungarian Government has allotted funds for these operations and has made available modern road construction machinery and trucks. The Soviets are providing road machinery, trucks, and paving materials.

The most serious restrictions to traffic result from seasonal weather conditions. Flooding in the Danube and Tisza river valleys occurs during spring thaws and periods of extended heavy rains. In early spring and late fall alternating conditions of freeze and thaw are especially destructive to roadway surfaces. In summer heavy thunderstorms cause many unpaved roads to become extremely muddy or impassable. During extended dry spells, dust on unpaved roads reduces visibility, and duststorms occasionally impede traffic in the plains east and south of Budapest. Snowfall from December through February impedes traffic to a limited extent. Heavy fogs of 3 to 4 days' duration occur from November through February, and early morning and evening mists are common throughout the winter. Physical bottlenecks include some sharp curves and steep grades north of Budapest and in mountainous areas of the country, some narrow bridges, a few low-capacity bridges, sharp turns and narrow streets in cities and towns, underpasses, and many ferry crossings. Slow-moving animal-drawn carts obstruct the normal flow of motor vehicular traffic, especially along rural roads.

Highway transport operations are directed—under the Ministry of Transportation and Postal Affairs (KPM)—by the Main Department of Highway Traffic and Motor Vehicles. Although theoretically the department is in charge of all motor transport activities, it exercises little or no control over truck transport units operated by government agencies. Subordinate to the department are six regional auto transport directorates; in each of these directorates motor transport enterprises (AKOV) provide common-carrier services to almost all parts of the country. Responsibility for their operations recently was assumed by the VOLAN Trust Transport Organization. The VOLAN Trust has 78,000 employees and 15,000 trucks, 5,000 buses, 3,000 taxis, and various other types of equipment. Most truck transport involves two types of operations—deliveries that complement rail transport and trucking operations related to highway construction and maintenance. The length of haul averages about 8 miles. To an increasing extent, truck transports are servicing industrial rather than agricultural markets. VOLAN Trust is in charge of vehicle registration procedures and has also assumed responsibility for freight services taken over from discontinued rail lines.

HUNGAROCAMION International Road Transport Company, subordinate to the KPM, handles Hungary's international road haulage service. It was founded in 1966 and since then has been developing at a rapid pace, more than tripling its vehicle inventory. In 1970, HUNGAROCAMION's vehicle fleet—mostly Mercedes and Volvo (Figure 6) trucks and trailers—surpassed the 500 mark, including tractor-trailer combinations having load capacities ranging from 17 to 40 tons and trailers having carrying capacities of 160 to 180 tons and used for transporting bulky and heavy freight. HUNGAROCAMION carries freight to practically every European country and also operates as far afield as Middle East and Asian countries; it has been developing its container transport capability, which has risen from 240 in 1969 to about 3,000 in 1971. It employs about 1,500 drivers, 500 technicians, and 200 specialists of various types.

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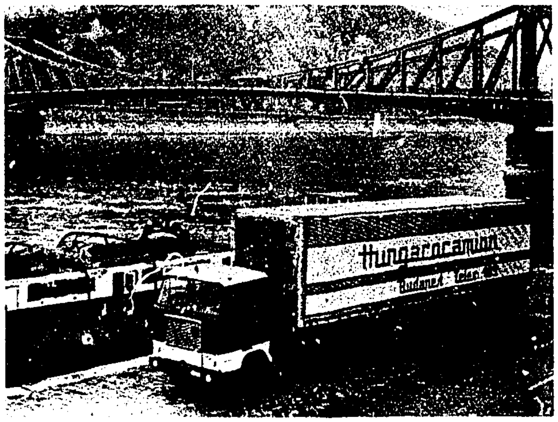

FIGURE 6. HUNGAROCAMION (International Road Transport Co.) Volvo FB 88-32 tractor and Fruehauf refrigerated trailer on a Danube quay in Budapest (U/OU)

Highway construction and maintenance is under the supervision of the KPM. The KPM controls 12 main departments, including the Main Department of Highways and Bridges, which is responsible for all highway and bridge construction and maintenance. In each of the country's 19 administrative divisions the department operates a regional office that controls and guides all road construction and maintenance activities within its administrative boundary. Two other offices subordinate to the KPM and concerned with construction and maintenance are the National Planning Office, dealing with budgetary problems, and the Road and Railroad Construction Planning Enterprise (UVATERV), in charge of preparing all preliminary studies relating to highway projects, in addition to redirecting discontinued rail traffic to road transport.

The Ministry of Construction and Urban Development controls special mechanized enterprises responsible for major highway construction. Subordinate to the Ministry of Construction and Urban Development is the Construction Main Directorate, which has six regional construction trusts under its supervision. Small work teams, responsible for 3- to 5-mile sections of road, perform routine road maintenance under the control of these trusts. In some areas extensive use of manual labor is still necessary.

For the operation of major projects, the construction and maintenance labor force is frequently supplemented by military personnel. For the past few years engineer units of the Hungarian People's Army have been engaged in highway and bridge construction and maintenance as part of their training, under the direction of the KPM. These units have at their disposal special military equipment for road and bridge construction. Members of the army are usually anxious to enlist for duty with the engineers because road construction elements are given extra pay.

The principal types of cargo hauled by truck include construction materials, livestock, agricultural products, fuels, machinery, and other industrial freight. Although highway traffic is growing rapidly, the overall volume still fails to be on a par with that of Western countries. Most traffic is concentrated in the immediate vicinity of large population centers, industrial complexes, and the Balaton lake area.

Cargo containerization has been fostering major changes in the transportation media, and Hungary's geographic location favors the development of extensive container transport traffic. Hungary is a charter member of the 19-nation European INTERCONTAINER (International Company for Transport by Transcontainers) whose functions include coordination of container traffic between the road networks of the various members. The country's containerized transport system is managed by the Main Administration of Transportation Policy within the KPM. The members of the recently formed top-level government Committee for the Promotion of Container Transport include representatives of the KPM. The share of truck traffic in Hungary's total container utilization is expected to reach 25% to 30% in the near future. The 1.5-ton container stock of VOLAN Trust totals almost 5,000. By the end of 1970, HUNGAROCAMION, using 600 20-ton transcontainers, was participating in international freight traffic. Several motor truck plants are producing ISO containers, some of which are exported to East Germany and countries in Western Europe. The Csepel container terminal is engaged in transcontinental container transportation. Additional terminals are scheduled to be established in industrial and transport hubs such as Miskolc, Debrecen, Pecs, and Gyor. Particular emphasis is being placed on the development of the Zahony transfer station at the U.S.S.R. border.

Bus services for the general public, until recently operated mainly by the Autobus Service of the Hungarian State Railways (MAVAUT), are now run by the VOLAN Trust Transportation Enterprises, catering to passenger service for both local and international travel. In 1971, VOLAN Trust purchased almost 1,000 new buses and retired more than 500 old vehicles. They are also producing a number of articulated buses in their own workshop. Adding 30 new stations to their long-distance bus network, they now serve more than 3,000 urban and

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rural communities. Intercity busline routes, totaling almost 15,000 miles, afford access to about 93% of all Hungarian localities. VOLAN Trust is also continuing the task of handling the passenger services of discontinued railroad lines.

As of 1 January 1972, Hungary's vehicle registrations totaled an estimated 330,000—225,000 passenger cars, 96,000 trucks, and 9,000 buses. Motorcycles are widely used, and there are about 615,000 in Hungary. Capacities of most trucks range from 3.5 to 4.5 short tons; bus seating capacities range from 48 to more than 100 in articulated units (Figure 7). Age and condition of vehicles vary considerably. Some trucks are old and in poor condition, while others are new and in good condition. Passenger cars and buses in general are of recent manufacture and in good condition.

The country's motor vehicle industry until recently was limited to the production of buses and medium to heavy trucks (up to 10 tons); in 1971, one plant started production of heavy-duty trucks of over 10 tons. In 1969, production of Hungary's first double-decker buses was initiated. Hungary does not produce passenger cars and, at present, has no plans for their manufacture in the near future. Instead of manufacturing passenger cars, which could be achieved only in small amounts, Hungary has chosen to produce a limited assortment of auto parts and accessories in large volume and to export these in exchange for passenger cars. According to an agreement running through 1975, Hungary will supply the U.S.S.R. with spare parts in exchange for passenger cars. Similar agreements have been concluded with Poland, East Germany, and Yugoslavia and with Western countries, including Italy, the United Kingdom, France, West Germany, Austria, and Sweden. The AUTOKER Automobile and Spare Parts Enterprise, subordinated to the Main Department of Highway Traffic and Motor Vehicles of the KPM, is the central distribution agency for automotive parts and is responsible for maintaining stockpiles of spare parts for use in military mobilization.

FIGURE 7. Articulated and standard buses at the Szeged bus station (U/OU)

To meet the country's needs, all passenger cars and most heavy-duty trucks have to be imported. By the end of 1970, motor vehicle imports amounted to about 60,000 passenger cars and 31,000 trucks. Most of the vehicles were obtained from the U.S.S.R.; some were imported from East Germany, Czechoslovakia, and Poland, and Western sources such as West Germany, France, Italy, and Sweden.

During the last few years vehicle exports have increased considerably. By the beginning of 1971, almost 22,000 vehicles—trucks, dumpers, and buses—had been exported to the U.S.S.R.; other vehicle exports, chiefly buses, were supplied to East Germany, Czechoslovakia, Poland, and Bulgaria, as well as Egypt and other Middle East nations. During the period of the Fourth Five Year Plan Hungary is slated to become one of the major European countries for the production and export of buses.

E. Inland waterways (C)

The Danube and Tisza, the major navigable waterways of Hungary, form two north-south-oriented systems, both physically separated within the country but connected at their confluence in Yugoslavia. The waterways total 1,320 miles and supplement the railroads and highways by affording basic industries and agriculture a low-cost means of bulk commodity transportation. The international Danube provides landlocked Hungary a connection to other riparian countries in the western, central, and southeastern parts of Europe and with dependable access to the Black Sea via U.S.S.R. river/maritime ports. The Tisza provides a lengthy north-south passage across eastern Hungary, where most other lines of surface communication are aligned east-west.

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The waterways and waterway facilities are adequate in extent and condition for the demands currently placed on them. The heavily trafficked Danube remains the best-developed and maintained waterway in the country. Other waterways have considerable potential for development into high-density routes.

In 1970 Hungarian vessels carried 11.2 million short tons of freight and generated 1.9 billion ton-miles in domestic and international commerce. Foreign-flag vessels annually carry an additional 5.5 million short tons in transit and about 700,000 short tons in Hungarian import-export trade on the Danube. During 1970, long-distance passenger traffic amounted to 3.4 million passengers, generating 59.0 million passenger-miles. The Hungarian Shipping Joint Stock Company (MAHART) accounted for 31% of the freight carried in Hungarian vessels but generated 94% of the ton-miles accomplished. The remainder was carried by various enterprises owned and operated by the Hungarian Government in short-haul domestic operations. Principal cargo shipments are ores and scrap, POL (including crude) and other liquids; coal and coke, and mineral building materials. Items shipped in lesser quantity include metals and metal goods, chemicals, timber, foodstuffs, and general cargoes. The traffic pattern is primarily one of continuous shipping on the Danube, with upstream traffic exceeding downstream. The greatest volume and density are encountered below Budapest, although at all times the traffic to, from, and through the capital is heavy. Lesser volumes are shipped on the Tisza system and are accounted for mostly in seasonal traffic below Szolnok.

Nine major waterways form the two systems and provide 1,134 route miles of primary navigation in and bordering Hungary. Of the two systems, the Danube is more important and accounts for slightly over half of the route mileage. Both systems are about equal in length, but their lack of an internal connection denies the country an integrated network. The Danube system serves key industrial manufacturing and tourist sites in central and west-central Hungary. The less developed Tisza system serves the agriculturally productive Great Alfold region of eastern Hungary. Generally flat river-basin topography results in waterways characterized by slight current velocities and gradients, moderate seasonal water-level variations and flooding, and meandering courses flanked by wide flood plains in shallow valleys. Regulated and canalized streams account for about 50% of the primary navigation, improved streams about 30%, and land-cut canals and routes on Balaton lake about 20%. The principal forms of regulation are extensive levee, dike, and groinwork systems supplemented locally by revetments, training walls, and a sparse arrangement of weirs, flood gates, and other water-control facilities. To the north the Danube forms part of the Hungary-Czechoslovakia border and provides access to West Germany through Austria. To the south it intersects the Hungary-Yugoslavia border, continuing eastward in or bordering parts of Romania, Bulgaria, and the U.S.S.R. to the Black Sea. The Tisza offers a direct connection south to the Yugoslav waterways and access to points along the Czechoslovakia, Romania, and U.S.S.R. borders.

Hungarian waterway operations are performed largely by tug-towed dumb barges. Self-propelled barges—mostly 400- to 700-ton craft—haul a lesser but increasing share of the yearly traffic. The Danube River-seagoing freighters (Figure 8) ply upstream to Budapest but rarely beyond. Most commonly operating on the Danube are 650- to 1,000-ton barges towed by 600- to 1,200-horsepower tugs. Limited pusher operations were inaugurated in the late 1960's. Sufficient channel and clearance dimensions on the Danube permit use of high-capacity convoys and flexibility in tow makeup, but at Gonyu most barge

FIGURE 8. River-seagoing vessels and 700-ton self-propelled barges at Budapest (U/OU)

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trains are reassembled because of differing navigation conditions on the middle and upper river. On the other major waterways tug and barge operations are limited to smaller convoys of one or two units towed astern in line-ahead formation. On the Danube insufficient depth during the shipping season is a major problem, requiring the light loading of 1,000-ton barges by 30% to 40% above Gonyu, and up to 20% below Gonyu. Operations on all waterways are aided by shore-based and floating navigational aids, traffic-control signals at locks, and radio and radiotelephone services. Although the entire Hungarian Danube is equipped for 24-hour operation, night navigation is generally practiced only below Budapest. A radar network is operational but inadequate.

The principal traffic interruption factor is ice. On the Danube system ice is generally prevalent between mid-December and mid-February, halting traffic for 30 to 35 days on the Danube, its branches, and Ferenc Csatorna (Ferenc canal) between Baja, Hungary, and Bezdan, Yugoslavia, and up to 60 days on Balaton lake and the Sio, a canalized stream. On the Tisza system ice normally halts traffic for an average of 55 days between late December and early March. Normal low- and high-water conditions rarely halt traffic, but severe floods can bring Danube and lower Tisza traffic to a standstill for periods of 15 to 20 days. Additional interruptions result from spring and autumn fogs, which may suspend Danube navigation for 2 or 3 days above Budapest; galelike winds, which may halt traffic for short periods, October through February, on the Danube below Budapest and the Tisza below Tokaj; and short, sectional closures of the Danube because of army river-crossing exercises.

Principal structures include four locks each on the Danube and Tisza systems, 142 known bridge crossings, eight small- and medium-size regulatory weirs, and a variety of channel and flood-control engineering works. The locks vary somewhat in size, and all but the one at Baja can accommodate 1,000-ton barges. The locks are single chambered, and most provide lifts of 13 to 15 feet, operate in 20- to 25-minute cycles, and have electrically operated steel miter gates. All but one of the river and canal bridge crossings have fixed spans, but all have adequate vertical and horizontal underbridge clearances for craft normally operating on these waterways. Most weirs are 2- or 3-gate sluices bypassed via locks. Engineering works include the lengthy system of reinforced earthfill levees and dikes and stonefill or masonry groins, offshore dikes, training walls, and revetments.

With the exception of Budapest and Dunaujvaros, both on the Danube, the inland ports are generally small, lack equipment for mechanized transfers, and have low yearly cargo turnovers. The major waterways are serviced by seven other ports of lesser significance: Almasfuzito-Szony, Baja, Gyor, Komarom, and Mohacs on the Danube and Szeged and Szolnok on the Tisza. Budapest is the only port that has a variety of fixed freight-handling equipment and extensive covered-storage facilities (Figure 9), but all ports have ample open-storage areas and direct or nearby clearance by rail and/or road from the principal wharves.

On 1 January 1970 the MAHART cargo fleet of 360 dumb barges and 41 self-propelled barges had an aggregate carrying capacity of 282,000 short tons. Total horsepower amounted to 52,000, 9-. . furnished

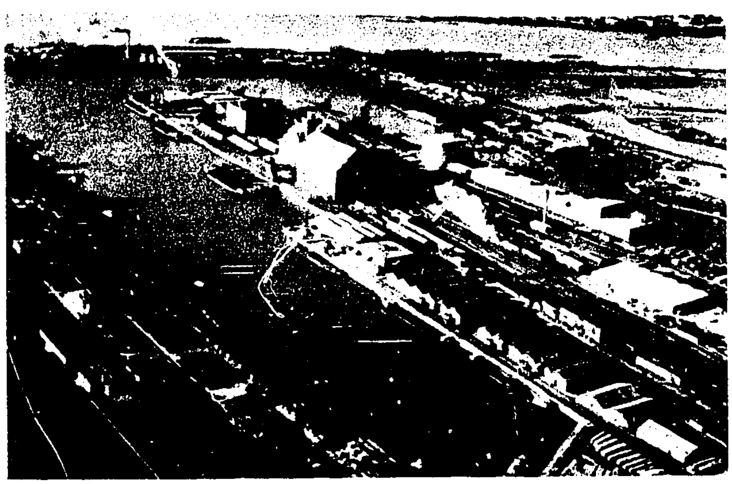

FIGURE 9. Budapest Free Port (U/OU)

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by the 83-unit tug fleet and the remainder by self-propelled barges. MAHART also operates 18 freighters, 16 of which are river-seagoing types having a total deadweight tonnage of 32,550. The company's passenger fleet comprised 55 vessels having a seating capacity of 16,000.

The combined fleet of the other government enterprises has an estimated carrying capacity of 45,000 short tons and aggregate horsepower of 10,800.

About 10% of the MAHART barge capacity is in dumb tankers exceeding a 700-ton capacity. The remaining 90% is for dry cargo, mostly in 400- to 750-ton craft or those of over 1,000 tons. Conventional 800- and 1,200-horsepower diesel tugs are greatest in number and perform most of the long-distance Danube towing. Since 1967 a small number of pusher units have become operational. About half of the river-seagoing fleet comprises 1,300-d.w.t. *Hazam* and 1,650-d.w.t. modified *Hazam*-class vessels built in Budapest between 1961 and 1966. Some passenger craft have capacities of more than 1,000, but the majority are 200- to 600-seat units. Five principal and two minor shipyards are responsible for the supply and maintenance of the MAHART fleet. Fleet enlargement is slow because about 80% of the annual shipyard production is exported—largely to the U.S.S.R.

The Ministry of Transportation and Postal Affairs has jurisdiction over inland waterway transport policy and operations. Policy administration is delegated to the ministry's Department of Shipping, and department directives are implemented and executed by MAHART. Waterway construction and maintenance is administered and coordinated by 12 regional directorates of the National Hydraulics Directorate. International Danube regulation is provided by the U.S.S.R.-sponsored Danube commission; all riparian countries except West Germany have membership. Primary commission functions are planning improvement projects, coordinating river maintenance, establishing and promulgating operating regulations, and publishing pilot charts and other navigational data.

A 30-year development plan proposes full canalization of the Danube and Tisza in and bordering the country and interconnecting both by a locked land-cut canal in central Hungary. The goal is to establish an integrated system, navigable throughout by fully loaded 1,350-ton self-propelled barges. Canalization works include five multipurpose hydroelectric dams for each river, all to be bypassed by locking facilities. Progress to date includes a completed installation on the Tisza at Tiszalok and a second under contruction downstream at Kiskore. A target date of 1980 has been fixed for all Tisza works and the projected 80-mile Danube-Tisza Canal. The year 2000 is the recommended completion date for all proposed works on the Danube. A lock-and-dam installation is under construction on the Sio Canal near its confluence with the Danube. Intermediate-range plans include lock enlargements, reconstructing the extensive levee and dike systems, and augmenting the Hungarian Danube radar network. A container terminal in the final stages of construction at Budapest is operational. Plans for fleet development and modernization include augmentation by river-seagoing vessels and pusher barge-trains up to 10,000-ton capacity.

F. Pipelines (C)

Hungary has about 500 miles of crude oil pipelines, 180 miles of refined petroleum product pipelines, and 1,200 miles of main trunk natural gas pieplines in operation or under construction. Construction of other major long-distance product and natural gas pipelines is planned.

More than half of Hungary's crude oil supply is received from the U.S.S.R. via the CEMA I "Friendship" pipeline, which enters Hungary at the Czechoslovakia border near Dregelypalank and extends 87 miles to Kapolnasnyek. Its capacity is about 110,000 barrels per day. The imported Soviet crude oil is processed in Hungarian refineries, including the country's largest refinery at Szazhalombatta. A branch of this line from Kapolnasnyek serves the refineries at Szony and Almasfuzito.

A second Hungarian branch of the CEMA system, completed in September 1972, will aid in meeting Hungary's growing requirements for crude oil. The new pipeline enters the country from the U.S.S.R. northeast of the town of Kisvarda and will serve the refinery at Szazhalombatta and a petrochemical complex at Tiszapalkonya. The capacity of this line is expected to reach 200,000 barrels per day when fully operational.

Domestic crude oil produced in the Szeged/Algyo region in south-central Hungary is conveyed by pipeline to the Szazhalombatta refinery. A major crude oil pipeline which was formerly used to transport highly viscous crude from the Lovaszi and Nagylengyel oilfields in southwestern Hungary to the Szazhalombatta refinery has been used primarily to transport natural gas in recent years.

Major natural gas trunklines include the converted line from the Lovaszi/Nagylengyel region, two lines

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FIGURE 10. Selected and planned pipelines (C)

TERMINALS						
From	To	LENGTH	DIAMETER	PRODUCTS TRANSPORTED	THROUGHPUT CAPACITY*	REMARKS
		Miles	*Inches*			
Czechoslovakia-Hungary border (near Dregelypalank).	Kapolnasnyek	87	16	Crude	110,000	Branch of CEMA I pipeline system completed mid-1962. Pumping stations at Sahy, Czechoslovakia, and Retsag and Godollo. Serves refinery at Szazhalombatta.
Kapolnasnyek	Szony	44	12	...do	40,000	Branch of CEMA I pipeline system completed mid-1970. Pumping station at Kapolnasnyek. Serves Szony and Almasfuzito refineries.
U.S.S.R.-Hungary border (near Tiszazentmarton).	Tiszapalkonya	68	22	...do	200,000	Branch of CEMA II pipeline system Pumping station at Fenyeslitke. Serves refinery in Nyirbogdany and petrochemical complex in Tiszapalkonya. Reported parallel pipeline is to transport ethylene from Tiszapalkonya to the U.S.S.R.
Tiszapalkonya	Szazhalombatta	110	20	...do	160,000	Extension of preceding line; completed in late 1972. Pumping station at Tiszapalkonya. Will serve refinery in Szazhalombatta.
Czechoslovakia-Hungary border (near Banreve).	Tiszapalkonya	50	*na*	...do	*na*	Unconfirmed loop section from CEMA I line at Safarikovo, Czechoslovakia, to CEMA II line at Tiszapalkonya. Reported as reserve or standby line for emergency use only.
Algyo	Szazhalombatta	105	12	...do	20,000	Completed 1971. Pumping station at Algyo. Route via Varosfold, Kecskemet, Orkeny, and Sari. Algyo terminal served by additional 90 to 100 miles of local collecting pipelines.
Nagylengyel	Devecser	38	10	...do	10,000	Completed 1957; operated intermittantly after 1966. Pumping station at Nagylengyel. Planned extensions to Petfurdo and Szony not realized.
Yugoslavia-Hungary border (near Gyekenyes).	Czechoslovakia-Hungary border (near Rajka).	150	14	...do	40,000	Planned line from Adriatic Sea; to serve Yugoslavia, Hungary, Czechoslovakia, and possibly Poland. Completion date 1975 or later.
Szony	Kapolnasnyek	44	6	Products	12,800	Former crude oil line which pumped oil in reverse direction. Parallels CEMA I crude oil line.
Szazhalombatta	Szolnok	76	7	...do	*na*	Reported operational and used intermittantly according to demand. Route via Sari and Cegled.
Do	Pecs	183	8	...do	20,000	Construction was to begin late 1971. Route to be via Szekesfehervar, Dombovar, and Kaposvar. May include unconfirmed line from Szazhalombatta to Lepseny.

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

Do	Szeged	161	*na*	....*do*	*na*	Construction was to begin late 1971. Route to be via Kiskunhalas, Cegled, Kecskemet, Szajol, Szentes, and Szeged. May be only extensions of Szazhalombatta-Szolnok line.
Romania-Hungary border (near Csenger).	Kazincbarcika	101	12	Natural gas	600,000	Transports imported gas from Romania via Tiszapalkonya. Short branches serve Nyiregyhaza and Miskolc. Connects with following line at Miskolc and Kazincbarcika.
Hajduszoboszlo	Borsodnadasd	91	16	....*do*	1,900,000	Route via Tiszapalkonya, Miskolc, Kazincbarcika, and Ozd. Capacity beyond Tiszapalkonya is 950,000 cubic meters per day.
Vecses	Salgotarjan	55	16-28	....*do*	*na*	Planned completion in 1973. 28-in. pipe to Aszod; 16-in. pipe Aszod to Salgotarjan.
Hajduszoboszlo	Vecses	137	*na*	....*do*	*na*	Route via Nadudvar and Szajol. Short branches serve Kunmadaras, Karcag, Szolnok, and Szandaszollos.
Do	Debrecen	13	*na*	....*do*	27,000	Two parallel lines under construction in 1971; capacity 165,000 cubic meters per day.
U.S.S.R.-Hungary border (near Beregdaroc).	Hatvan	143	25.5	....*do*	2,740,000	Planned. Scheduled for completion late 1974. Route to be via Vasarosnameny, Nyiregyhaza, Tiszavasvari, Polgar, Tiszapalkonya, and Heves. Will probably connect with Vecses-Salgotarjan line at Hatvan.
Kardoskut	Gyula	26	*na*	....*do*	180,000	Route via Pusztafoldvar and Bekescsaba. Two parallel 5-mile branches from Kardoskut to Oroshaza. Branch planned from Bekescsaba to Mezobereny via Bekes for 1971.
Do	Adony	89	12	....*do*	1,090,000	Route via Szentes, Csongrad, and Varosfold. 10-mile branch from Adony to Dunaujvaros.
Algyo	Vecses	87	24	....*do*	3,500,000	Under construction 1971. Route via Varosfold, Kecskemet, and Orkeny.
...	...	45	18	....*do*	1,900,000	Budapest Gas Ring; encircles city; main terminal at Vecses. Branch to Csepel.
Orszentmiklos	Budapest	9	12	....*do*	*na*	Double line originating at gas-production and underground storage facility.
Ujudvar	....*do*	123	8	....*do*	90,000	Formerly transported both crude oil and natural gas; presently used only for gas. Route via Balatonboglar, Lepseny, and Kapolnasnyek.
Dunaujvaros	....*do*	43	12	Manufactured gas	420,000	Possibly also transports natural gas.

... Not pertinent.
na Data not available.
*Barrels per day for crude oil; cubic meters per day for natural gas.

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from the Szeged/Algyo region, and a line from the Hajduszoboszlo gasfields, all of which terminate in the Budapest area. A pipeline from Romania and another which connects in Czechoslovakia with the BRATSTVO (Brotherhood) line from the U.S.S.R. serve the northeastern part of Hungary. An additional natural gas pipeline is planned for completion in late 1974. It is to enter Hungary from the U.S.S.R. and serve both the Budapest and northeastern industrial areas.

Details of selected and planned pipelines are given in Figure 10.

G. Merchant marine (C)

The Hungarian merchant marine consists of 18 dry cargo ships, 1,000 gross register tons (g.r.t.) and over, totaling 33,061 g.r.t. and 45,038 deadweight tons (d.w.t.). All units of the fleet, with the exception of three built in the early 1950's, were built between 1961 and 1968. Five ships were built in foreign shipyards; three of the five are secondhand purchases from West Germany, and two are *Sofia*-class dry cargo ships built to Hungarian order in Bulgaria. Deadweight tonnages of the 13 Hungarian-built ships are under 2,000 d.w.t. The largest ships in the fleet are the two Bulgarian-built ships at 4,452 g.r.t. and 6,225 d.w.t. each. All of the ships are diesel powered and have speeds ranging from 9.5 to 14 knots. Only one ship, *Duna* (4,502 d.w.t.), has large hatches (50 feet or longer), and two ships, *Raba* and *Tisza* (4,749 d.w.t. each), have a heavy-lift capability (40 tons or more). Characteristics of the fleet are given in Figure 11.

The state-owned merchant marine is controlled by the Shipping Department of the Ministry of Transportation and Postal Affairs and is managed by the Hungarian Shipping Joint Stock Company (MAHART), Budapest.

On 10 June 1970 Hungary became a member of the Intergovernmental Maritime Consultative Organization (IMCO), a specialized agency of the United Nations concerned with international maritime matters. Hungary also has agreed to comply with the General Agreement on Tariffs and Trade (GATT), a multilateral treaty which lays down a common code of conduct in international trade.

FIGURE 11. Hungarian merchant ship characteristics (C)
(All are dry-cargo units and are diesel powered)

NAME	G.R.T.	D.W.T.	BUILT In***	BUILT Year	SPEED	CALL SIGN
					Knots	
Borsod	1,207	1,188	HU	62	12.0	HAAR
Budapest	4,452	6,225	BU	67	13.0	HAAQ
Cegled	1,409	1,460	HU	66	12.0	HAAL
Debrecen	1,199	1,694	HU	65	12.0	HAAO
Duna*	2,350	4,502	WG	51	13.0	HAAH
Dunaujvaros	1,214	1,179	HU	63	12.0	HAAB
Hajduszoboszlo	1,262	1,460	HU	68	12.0	HAAM
Herend	1,199	1,694	HU	65	12.0	HAAI
Heviz	1,199	1,460	HU	65	12.0	HAAJ
Hungaria	4,452	6,225	BU	68	13.0	HAAP
Raba**	2,696	4,749	WG	51	14.0	HAAY
Somogy	1,259	1,733	HU	67	12.0	HAAN
Szeged	1,208	1,202	HU	63	12.0	HAAT
Szekesfehervar	1,403	1,300	HU	64	12.0	HAAU
Tata	1,199	1,694	HU	65	10.8	HAAD
Tihany	1,207	1,224	HU	61	9.5	HAAA
Tisza**	2,741	4,749	WG	52	14.0	HAAX
Ujpest	1,405	1,300	HU	64	11.0	HAAV

*Has large hatches 55 ft. long.
**Has heavy-lift capability of 50 tons.
***Abbreviations:
HU Hungary
BU Bulgaria
WG West Germany

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Hungarian authorities have expressed a desire to participate in the International Monetary Fund but feel that it would be presumptuous on their part to join before the U.S.S.R.

In 1970, Hungary's seaborne foreign trade amounted to 1.5 million metric tons, 406,000 metric tons (27%) of which were carried by Hungarian ships. To insure movement of this trade, Hungary chartered 11 non-Communist ships. In 1970, charter agreements, all on a voyage-charter basis, were negotiated with shipping companies in Greece (four), Liberia (two), Norway (two), Finland (one), Spain (one), and Tanzania (one).

Hungarian seagoing cargo had until 1971 been shipped largely by rail to the Polish ports of Szczecin (Stettin), Gdynia, and Gdansk for transshipment. In 1970, over 886,000 metric tons of Hungarian cargo passed through these ports. Lesser amounts were shipped from Hamburg, West Germany, and the East German ports of Rostock, Wismar, and Sassnitz. East German port facilities have been greatly expanded in recent years. Under a 1971 transportation agreement with East Germany, Hungary was assured of a 50% increase in available transshipment and cargo loading/unloading facilities.

Hungary's principal trading partners are Communist countries, one-third of the trade going to the U.S.S.R., one-third to the other Communist countries, and one-third to the non-Communist world. India occupies first place in Hungary's trade with the developing countries. Exports, which increased 19% in the first 11 months of 1971, include industrial and consumer goods, iron and steel products, chemicals, pharmaceuticals, medical instruments and installations, wood products, portal and floating cranes, containers, and seagoing ships. Imports include cotton and synthetic textiles and fabrics, crude oil, machinery, vehicles, metals, minerals, and consumer products.

Hungarian ships sail mainly between ports in the Black and Mediterranean Seas. Only two ships, *Budapest* and *Hungaria*, are assigned to international trade routes. In March 1971 *Budapest* became the first Hungarian merchant ship to travel between Europe and South America. A new shipping service to India also was inaugurated in March 1971 when the *Hungaria* arrived at Bombay loaded with steel.

It is expected that Hungary will benefit greatly from the proposed Danube-Tisza canal, scheduled to be built between 1975 and 1980. Connection of the Danube and Tisza water systems will facilitate water transportation of goods not only through Hungary but also through Europe.

With the charter market tightening and prices increasing rapidly, MAHART has concluded that in order to retain more convertible currency, the merchant fleet will have to be expanded considerably. Accordingly, the plan for 1971-75 calls for the acquisition of a sufficient number of large oceangoing ships to raise the present transport capacity by 150%. Currently on order from the U.S.S.R. are two dry cargo ships, *Poltava* class (12,700 d.w.t.) both scheduled for delivery sometime in 1973. In addition, commission of some 23,000 d.w.t. ships is being considered to transport increasing phosphate shipments from the North African countries.

The merchant marine provides employment for about 700 persons, about 450 of whom are assigned to sea duty. The remaining personnel are assigned to supervisory and administrative duties ashore. A secretary of the Hungarian Communist party, a secretary of the youth organization (KISz), and a trade union representative are assigned to each ship, and much literature from these organizations is provided crew members. It is not mandatory to be a party member or to read this material. However, it behooves crew members to participate as much as possible, since the captain is assisted by the party secretary in preparing periodic crew evaluations.

Maritime personnel are recruited through advertisements in newspapers, on radio and television, and in commercial schools. All applicants are required to have completed military service prior to employment. An exception to this requirement can be granted provided the applicant has completed 8 years of elementary school, 4 years of secondary school, and 3 years at the maritime officers academy. Such personnel would receive only army reserve training. The Ministry of Interior exercises close security control over prospective maritime personnel, particularly those with relatives in non-Communist countries. Such persons can be accepted for employment but cannot be assigned to ships traveling to non-Communist areas. After passing a stringent medical examination, and an examination on maritime theory, candidates for ship's officer positions, including master, attend the transportation college (*Kozlekedesi foiskola*) in Budapest, learning to perform all shipboard positions from deckhand to master. The curriculum is arranged to permit the men to spend 1 or 2 summer months on seagoing vessels. In 1971, about 10 Hungarians graduated from the Soviet Marine Engineer Academy and were assigned either to a Soviet or Hungarian ship.

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As of August 1969, the following pay scale, in forints (11.74 forints=U.S.$1.00), was in effect for maritime personnel:

POSITION	MONTHLY BASE PAY Forints
Captain/Chief Engineer	2,700
First Officer	2,400
Second Officer	1,700
Third Officer	1,500
First Engineer	2,500
Second Engineer	2,000
Radio Officer/Purser	930
AB Seaman/Boatswain	1,400
Ordinary Seaman	1,000
Apprentice Seaman	800
Carpenter	1,200 to 1,400
Cook	1,500 (includes much overtime)

Under a new foreign currency allowance for use in foreign ports, authorized in 1968, oceangoing personnel receive additional wages, in U.S. dollar equivalents, as follows:

Captain/Chief Engineer	60.00 per month
First Officer	1.80 per day
Employees with over 2 years' service	1.20 per day
Employees with less than 2 years' service	0.80 per day

In addition, crew members receive a monthly bonus, based on cargo tonnage and mileage covered by the ship, as follows:

Officers	300 to 600 forints
Seaman	300 to 400 forints

The captain and chief engineer are authorized an additional U.S.$15.00 to be used as "representation" funds when dealing with foreign maritime personnel. Maritime personnel also receive a yearend bonus based on the shipping company's annual profit. The amount is divided so that each employee is paid at the rate of the regular daily wage times the number of days due.

Membership in the Maritime Trade Union is mandatory, and dues are based on monthly earnings (approximately 1.65%). In addition, employees are assessed 3% monthly for social security and medical coverage and 2% monthly for uniforms—each crew member is issued one free uniform every 2 years. One fringe benefit derived from union membership is an allowance to cover all funeral expenses in connection with the death of an immediate family member.

H. Civil air (C)

Civil air transportation in Hungary is provided by a state enterprise, Hungarian Airlines (MALEV), and controlled by the Department of Civil Aviation, which is subordinate to the Ministry of Transportation and Postal Affairs. The ministry is solely responsible for the administration and control of civil aviation and commercial air services. In addition to MALEV, Hungary has a number of lesser aviation organizations assigned to other governmental agencies. All flight activities, however, are under the technical control of the ministry. There is no private aviation.

There have been no scheduled domestic air services in Hungary since 1970. Prior to that time MALEV operated a domestic route between Budapest and Debrecen. The longest possible air route from Budapest to another city within Hungary is about 200 miles. Air transportation on short routes is much more expensive than surface transport and is not significantly faster. Internal services were discontinued because there was little public demand for them, and they were unprofitable.

MALEV international services connect Budapest to 34 foreign cities. Year-round services are provided to nine cities in Eastern Europe and the U.S.S.R. (Moscow, Leningrad, Prague, East Berlin, Warsaw, Belgrade, Sofiya, Tirane, and Bucharest), and five additional cities (Erfurt, Dresden, Kiyev, Dubrovnik, and Constanta) are served during the summer. A total of 20 non-Communist cities are included in MALEV's international route network: Munich, Frankfurt, Paris, London, Vien- Zurich, Brussels, Madrid, Milan, Rome, Co[illegible]hagen, Stockholm, Oslo, Helsinki, Athens, Cairo, Nicosia, Damascus, Istanbul, and Beirut. MALEV also engages in nonscheduled domestic and foreign services.

The carrier currently operates six COOT (Il-18), seven CRATE (Il-14), and eight CRUSTY (Tu-134) aircraft. MALEV assigns its Il-18 and Tu-134 transports to international routes, and the Il-14 aircraft are used for charter services and for relief of overcrowded tourist flights in the summer. Long-range plans envision the addition of CARELESS (Tu-154) transports to the MALEV fleet by 1973 and CLASSIC (Il-62) long-range jetliners in the future.

It is estimated that MALEV has 60 to 70 transport pilots and about 110 other aircrew personnel among a possible 1,350 employees. Within a 3-week period during August and September 1971, two MALEV aircraft, one COOT and one CRUSTY, were destroyed in accidents, both resulting in heavy loss of life.

Routine aircraft maintenance is performed by MALEV in Budapest. The carrier has the capability to overhaul CRATE engines, but engine overhaul on COOT's and CRUSTY's must be performed in the U.S.S.R., which necessitates their return to the Soviet Union, often for long periods of time. Routine

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maintenance is complicated further by long and costly delays resulting from the fact that all spare parts must be shipped from the U.S.S.R.

Other agencies, such as aeroclubs (training and sports flying), the Ministry of Health (ambulance and rescue service), the Ministry of Agriculture and Food (cropdusting, fertilizing, and seeding), and the Geodetic Survey Institute (aerial survey work) have a total of about 100 aircraft. These are mostly single-engine light aircraft of Polish, Czechoslovak, and Soviet manufacture.

Basic aviation training is accomplished through aeroclubs associated with the Hungarian Sports Federation for National Defense (MHS). The MHS operates over 30 aeroclubs located in the vicinity of the larger cities throughout the country. Advanced pilot training for civil transport operations is conducted by MALEV at Budapest/Ferihegy Airport. The Ministry of Agriculture and Food operates its own school for the training of agricultural and forestry pilots. Other technical aviation training is provided by state technical schools in the Budapest area.

Hungary is signatory to the Convention for the Unification of Certain Rules Relating to International Carriage by Air (Warsaw Convention, 1929) and to the 1955 Hague Protocol to the Warsaw Convention. These international agreements govern the liability of an air carrier in case of damage caused to passengers, baggage, and cargo while engaged in international flights. Hungary is also party to the Convention on International Civil Aviation (Chicago Convention, 1944), which is the principal multilateral aviation convention regulating safe and orderly development in international air services on the basis of equality of opportunity. By virtue of adherence to the Chicago Convention, Hungary is a member of the International Civil Aviation Organization (ICAO).

The Government of Hungary has formal or informal civil air accords with at least 39 countries, including all the East European Communist states, the U.S.S.R., the People's Republic of China, and North Vietnam. MALEV, along with the air carriers of Czechoslovakia, East Germany, Poland, Romania, and Bulgaria, is party to a multilateral agreement known as the Six-Pool Agreement.

Under the terms of these various agreements and arrangements, regularly scheduled services to Hungary are provided by 15 foreign carriers. The following carriers operate services to Budapest:

Aeroflot (U.S.S.R.)
Czechoslovak Airlines (CSA)
TAROM (Romania)
Interflug (East Germany)
LOT (Poland)
BALKAN (Bulgarian Airlines)
Royal Dutch Airlines (KLM)
Belgian World Airlines (SABENA)
Swissair
Finnair
Scandinavian Airlines System (SAS)
Lufthansa German Airlines
British European Airways (BEA)
Air France
Austrian Airlines

I. Airfields[3] (S)

The Hungarian air facilities system consists of 48 operational airfields with lengths of 2,000 feet or more. Twenty-two of the airfields are military, six are jointly military and civil, and 20 are exclusively civil.

Of the 48 airfields, 28 are classed as major facilities with runways in excess of 6,000 feet; 13 of these have hard-surfaced runways, and 15 have runways of improved graded earth. One airfield is believed capable of supporting jet heavy bombers on a sustained basis, one probably can accommodate turboprop heavy bombers, three can support regular operations by jet medium bombers, eight can be used by jet light bombers, and each of the major 28 facilities can accommodate sustained jet fighter operations, assuming the use of mobile support equipment in some instances.

The Soviet Air Force, Hungary (SAFH), controls six military air bases, one joint usage airfield, and seven dispersal facilities within Hungary. The Hungarian Air Force has five military air bases and three dispersal airfields under its jurisdiction. Of the remaining six major airfields, five are controlled by the Hungarian Sports Federation for National Defense (MHS) and are utilized in premilitary flight training, soaring, and parachuting, and the other, Budapest/Ferihegy, is Hungary's international airport under the control of MALEV but also used frequently by Hungarian Air Force transports in the movement of national authorities. These civilian airfields, as well as some others of military potential measuring less than 6,000 feet, can be used by military aviation with little advance preparation.

Except in the northern hills area where existing airfields are rather sparse and limited in size and expansion capabilities, the Hungarian airfield network is well distributed throughout the country in locations suitable for both offensive and defensive military operations.

The airfield system is adequate for present military requirements. The 13 major airfields having hard-

[3]Detailed information on individual Hungarian airfields is contained in Volume 15, *Airfields and Seaplane Stations of the World*, published by the Defense Intelligence Agency.

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surfaced runways are well maintained on a year-round basis, as are the five Soviet graded earth primary dispersal facilities. The two SAFH secondary and the three Hungarian Air Force primary dispersal airfields are less well maintained, being serviced only during periods of use. Permanent caretaker cadres have been assigned to each of the five Soviet primary dispersal airfields, which have been provided some semipermanent support equipment and facilities—including housing, communications, fuel stores, runway and taxiway lighting, snow and ice removal devices, and ground maintenance equipment—to help assure their operational capability 24 hours a day in all seasons. Nonetheless, all dispersal airfields in Hungary are dependent to some degree on the use of mobile support facilities, and particularly so with regard to precision electronic navigational and landing aids.

Over the past few years significant improvements in active and passive defenses have been made at air bases in Hungary. At Hungarian Air Force bases numerous dispersed reinforced aircraft revetments have been constructed. Similar revetments also were built at the SAFH bases, but these have been largely replaced at four of them (Budapest/Tokol, Kiskunlachaza, Kunmadaras, and Sarmellek) by extensive numbers of hardened aircraft hangarettes. There now are a total of 184 hardened hangarettes at the five SAFH bases, including 10 newly completed at Debrecen. No hardened hangarettes have been noted thus far at Hungarian Air Force bases, but their appearance would seem to be only a matter of time since such a construction program has been initiated at national air bases in other Eastern European countries. Each SAFH airfield to which a tactical unit is assigned has been provided a surface-to-air missile unit (SAM-3) to enhance defensive capabilities against low-flying aircraft, and antiaircraft artillery (AAA) defenses are now located at most of the air bases in Hungary.

There is evidence to indicate that the SAFH may have initiated at its bases in Hungary a general program of "hardening" key operational and support facilities such as command and control, communications, and air-to-air missile (AAM) storage installations, personnel shelters, and fuel distribution systems. Such a project would be a logical follow-on to the hardened aircraft hangarette program.

Details on the most important airfields are noted in Figure 12.

J. Telecommunications (S)

Telecommunication (telecom) services in Hungary are provided by a network of multiconductor cables, open-wire lines, and radio facilities. Most government and industrial needs are adequately met, but telephones for use by the general public are limited. Special-purpose telecom systems, using public intercity circuits and separate landline and radiocommunication networks, serve military, police, railroad, government, and aeronautical organizations. The government-owned railroad system operates one of the largest telecom systems in the country. The Soviet Southern Group of Forces operates its own open-wire telephone system. Radiobroadcast service, using two national network programs, covers about 90% of the country, and TV programs can be viewed in 80% of the country. Wired broadcast has declined considerably in recent years and is expected to be discontinued in the near future. Among the Eastern European Communist countries, the degree of Hungarian telecom development slightly exceeds that of Albania, Bulgaria, and Romania, but it is not quite as advanced as those of West European countries.

All telecom facilities are owned by the government and administered by the Ministry of Transportation and Postal Affairs. Preparation of radio and TV programs is a responsibility of the Ministry of Culture.

Hungary is a member of the International Telecommunication Union, the International Radio and Television Organization, and the Organization for Telecommunication Cooperation.

The domestic wire systems provide telephone and telegraph services and circuits for broadcast program distribution. Local telephone facilities consist of both automatic and manual exchanges; the largest facility is located in Budapest. At the end of 1972 there were 873,194 telephones (about eight telephones per 100 persons) in use; nearly 100% of the telephones are connected to automatic exchanges. The telegraph system includes a network that provides interconnections between all major centers, many through the switching center at Budapest. Connections to international teleprinter facilities are available from this network. Telegraph facilities usually are located in post offices. Most telegrams are transmitted by teleprinter, but small rural offices pass messages by telephone to teleprinter-equipped offices. The national teletype network includes main centers at Budapest, Debrecen, Gyor, Miskolc, Pecs, and Szolnok. Facsimile service, available to 20 countries, is utilized 90% by the Hungarian News Agency. Networks of multiconductor cables and open-wire lines interconnect all population centers. A few large cities and some remote towns are interconnected by radio-relay links. Open-wire lines generally connect rural areas and small towns to the cable network, and some of the lines also parallel cable routes. The main switching center for both domestic and international service is located in Budapest.

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FIGURE 12. Selected airfields (S)

NAME AND LOCATION	LONGEST RUNWAY: SURFACE, DIMENSIONS, ELEVATION ABOVE SEA LEVEL	LARGEST AIRCRAFT NORMALLY SUPPORTED	REMARKS
	Feet		
Budapest/Ferihegy 47°26′N., 19°14′E.	Concrete 9,900 x 200 440	Tu-104 (CAMEL)	Civil, air force. Main civil airfield. Probably can support Tu-95 (BEAR) and Tu-114 (CLEAT) aircraft. Also used in military airlift of national authorities.
Budapest/Tokol 47°21′N., 18°59′E.	Concrete 8,200 x 310 330	Tu-16 (BADGER)	Soviet air force. Major all-weather jet fighter and transport base; depot maintenance. Can support jet medium bombers.
Debrecen 47°29′N., 21°37′E.	Concrete 8,200 x 260 345	Il-28 (BEAGLE)	Soviet air force, civil. Major all-weather jet light bomber base. Can support jet medium bombers. Also used as weather alternate for Budapest/Ferihegy.
Fokto 46°33′N., 18°57′E.	Concrete 6,600 x 200 300	Mi-10 (HARKE)	Soviet air force. Major helicopter base, but also can support jet fighters.
Kecskemet 46°55′N., 19°45′E.	Concrete 8,200 x 250 385	Il-28 (BEAGLE)	Air force. Major all-weather jet fighter base. Can support jet light bombers.
Kiskunlachaza 47°11′N., 19°05′E.	Concrete 8,200 x 240 320	....*do*	Soviet air force. Major all-weather jet fighter base. Can support jet medium bombers.
Kunmadaras 47°23′N., 20°47′E.	Concrete 8,200 x 230 310	....*do*	Soviet air force. Major ground support base. Nuclear weapons storage site. Can support jet light bombers.
Mezokovesd 47°49′N., 20°38′E.	Concrete 11,500 x 270 375	....*do*	Soviet air force. Believed to have been built as Warsaw Pact heavy bomber base.
Papa 47°22′N., 17°30′E.	Concrete 7,900 x 280 440	....*do*	Air force. Major all-weather jet fighter base. Can support jet light bombers.
Sarmellek 46°41′N., 17°10′E.	Concrete 6,600 x 200 400	....*do*	Soviet air force. Major all-weather jet fighter base.
Taszar 46°24′N., 17°55′E.	Concrete 8,200 x 230 500	....*do*	Air force. Major all-weather jet fighter base. Can support jet light bombers.
Veszprem 47°05′N., 17°58′E.	Concrete 6,600 x 240 935	Il-14 (CRATE)	Air force. Major helicopter and transport base. Can support jet light bombers.

International telecom circuits are maintained with most European countries and with Lebanon, Turkey, and the People's Republic of China, mostly by means of radio or multiconductor cable. Open-wire lines extend to all adjacent countries and provide the principal circuits with Romania and Yugoslavia. Radio-relay links are used to exchange international TV programs. All international telephone circuits are now switched manually, but an automatic exchange being installed will enable operators to dial long-distance calls. Two international radiocommunication transmitting stations are located about 40 miles southwest of Budapest, near Szekesfehervar. Both stations are controlled from the telegraph center in the Budapest Central Post Office. International radiocommunication receiving stations are located at Rakosszentmihaly, a suburb of Budapest, and Tarnok, about 10 miles southwest of Budapest.

Broadcast services are provided by AM, FM, and TV stations and by a diminishing wired-broadcast network. AM broadcast stations are located in 10 cities and provide good coverage throughout the country. FM broadcast service is provided by only four stations. Most domestic and all international programs originate at studios in Budapest. In mid-1971 over 2.5 million radio receivers were licensed. In comparison

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

with other Communist nations, Hungary's international broadcasting effort is quite limited, although daily programs are directed to listeners in Europe, the Middle East, the Far East, and to North and South America. There are one main and 10 TV relay stations; five are high-power stations at Budapest, Kabhegy mountain, Kekes mountain, Szentes, and Tokaj. The other six are low-power stations located to serve specific urban areas or to fill gaps in the coverage of a high-power station. Domestic TV programs originate in the Budapest studios and are broadcast simultaneously by all stations. In mid-1972 more than 1.9 million TV receivers were in use. International TV programs are exchanged regularly with the Intervision Network and occasionally with the Eurovision Network.

The telecommunications equipment industry ranks third among East European Communist countries in volume of output. The industry consists of nine major plants producing telephone, radio, and TV equipment in quantities adequate to fill nearly all domestic needs and to afford substantial exports. Exports, in some years amounting to as much as 40% of output, include telephone and microwave relay systems as well as articles such as telephone handsets and radio and TV receivers.

Telecom censorship is carried out by various agencies of the Ministry of Interior. Long-distance telephone calls are routinely monitored, and international telegraph traffic also is censored. Security police or military personnel guard the most important telecom facilities. Main long-distance circuits consist of underground cables, which are not easily sabotaged. Most vulnerable are the numerous repeater stations used on all sections of the wire line network.

Maintenance personnel are well organized and capable of handling their assignments. Periodic refresher training is provided. Repair and supply responsibilities are divided among six regional directorates.

Terrain and weather present no unusual problems in constructing or maintaining telecom facilities.

Plans provide for continued modernization and expansion of all telecom services. Telex exchanges are to be increased from 2,600 to 6,000, and more automatic telephone exchanges are to be installed. In 1969, 14 cities were believed to have direct-distance-dialing systems; by 1985, 90% of Hungary's phones are scheduled to be on direct-distance dialing. Plans also provide for expanding Hungary's TV relay system to 70 stations and the first transmission of color TV broadcasts. Color TV, using the SECAM system, was originally scheduled for 1969, but it is believed to have been delayed until 1973.

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

GLOSSARY (U/OU)

ABBREVIATION	FOREIGN	ENGLISH
AKOV	*Autokozlekedesi Vallalat*	Motor transport enterprises
AUTOKER	*Auto Keresekedelmi Vallalat*	Automobile and Spare Parts Enterprise
BHEV	*Budapesti Helyierdeku Vasut*	Budapest Suburban Railways
FHV	*Fertovidzki Helyierdeku Vasut*	Lake Fertő Suburban Railroad
Gy. S.E.V.	*Gyor-Sopron-Ebenfurti Vasut*	Győr-Sopron-Ebenfurth Railway
HUNGAROCAMION		International Road Transport Company
KIS	*Kommunista Ifjusagi Szovetseg*	Communist Youth League
KPM	*Kozlekedes es Postaugyi Minisz-terium*	Ministry of Transportation and Postal Affairs
MAHART	*Magyar Hajozasi Reszvenytarsasag*	Hungarian Shipping Joint Stock Company
MALEV	*Magyar Legikozlekedesi Vallalat*	Hungarian Airlines
MAV	*Magyar Allamvasatak*	Hungarian State Railways
MAVAUT	*Magyar Allamvasatak Autobusz Uzeme*	Autobus Service of the Hungarian State Railways
MN	*Magyar Nephadsereg*	Hungarian People's Army
MHS	*Magyar Honvedelmi Sportszovetseg*	Hungarian Sports Federation for National Defense
SAFH		Soviet Air Force, Hungary
TAROM	*Transporturi Aeriene Romane*	Romanian Air Transport
UVATERV	*Ut Vasut Tervezo Vallalat*	Road and Railroad Construction Planning Enterprise
VOLAN Trust	*Autokozlekedesi Troszt Volan*	VOLAN Trust Transport Organization

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

Places and Features Referred to in this General Survey (U/OU)

	COORDINATES	
	° ′N.	° ′E.
Abaliget (*rr sta*)	46 09	18 05
Adony	47 07	18 52
Adyliget (*sec of Budapest*)	47 33	18 56
Ajka	47 06	17 34
Algyő	46 20	20 13
Almásfüzitő	47 43	18 16
Alps (*mts*)	46 25	10 00
Apafa (*rr sta*)	47 35	21 40
Apafája	47 35	21 40
Arad, Romania	46 11	21 19
Aszód	47 39	19 30
Babócsa	46 02	17 22
Bábolna	48 37	17 59
Baia Mare, Romania	47 40	23 35
Baja	46 11	18 58
Bakony (*mts*)	47 15	17 50
Balaton (*lake*)	46 50	17 45
Balatonboglár	46 47	17 40
Balatonfüred	46 57	17 53
Balatonkeresztúr	46 42	17 23
Balassagyarmat	48 05	19 18
Balatonszárszó	46 50	17 50
Balkan Mountains (*mts*)	43 15	25 00
Balkan Peninsula (*peninsula*)	44 00	23 00
Bánréve	48 18	20 22
Baracska	47 17	18 46
Barcs	45 58	17 28
Batëvo, U.S.S.R. (*rr sta*)	48 22	22 23
Battonya	46 17	21 01
Bázakerettye	46 32	16 44
Békés	46 46	21 08
Békéscsaba	46 41	21 06
Beregdaróc	48 12	22 32
Beregovo, U.S.S.R.	48 13	22 39
Beremend	45 47	18 26
Berettyó (*strm*)	46 59	21 07
Berettyóújfalu	47 13	21 33
Bezdan, Yugoslavia	45 51	18 56
Biharkeresztes	47 08	21 43
Bodajk	47 19	18 14
Borsod (*sec of Miskolc*)	48 19	20 45
Borsodnádasd	48 07	20 15
Bruck, Austria	48 01	16 46
Buda (*sec of Budapest*)	47 30	19 02
Budapest	47 30	19 05
Bükk (*mts*)	48 05	20 30
Bükkábrány	47 53	20 41
Čakovec, Yugoslavia	46 23	16 26
Carpathian Mountains (*mts*)	47 00	25 30
Cegléd	47 10	19 48
Celldömölk	47 15	17 09
Chop, U.S.S.R	48 26	22 12
Csenger	47 50	22 41
Csepel	47 25	19 05
Csepelsziget (*isl*)	47 15	18 57
Csillebérc (*sec of Budapest*)	47 29	18 57
Csongrád	46 42	20 09
Csorna	47 37	17 15
Danube (*strm*)	45 20	29 40
Deákipuszta	46 59	17 24
Debrecen	47 32	21 38
Demjén	47 50	20 20
Devecser	47 06	17 26
Diósgyőr (*sec of Miskolc*)	48 06	20 41
Dombóvár	[illegible]	[illegible]
Gyöngyösoroszi	47 50	19 54
Győr	47 41	17 38
Gyula	46 39	21 17
Hajdúszoboszló	47 27	21 24
Halimba	47 02	17 32
Hamburg, W. Germany	53 33	10 00
Hatvan	47 40	19 41
Hegyeshalom	47 55	17 10
Heves	47 36	20 17
Hidasnémeti	48 30	21 14
Hódmezővásárhely	46 25	20 20
Hortabágy (*region*)	47 35	21 05
Inota (*sec of Várpalota*)	47 12	18 11
~~Iszkaszentgyörgy~~	47 14	18 18
Iza-major (*farm*)	46 57	17 25
Izmail, U.S.S.R	45 21	28 50
Kabhegy (*mt*)	47 03	17 39
Kalush, U.S.S.R	49 01	24 22
Kápolnásnyék	47 14	18 41
Kaposvár	46 22	17 48
Karcag	47 19	20 56
Kardoskút	46 29	20 40
Kazincbarcika	48 15	20 38
Kecskemét	46 54	19 42
Kékes (*mt*)	47 52	20 01
Kisköre	47 30	20 30
Kiskunhalas	46 26	19 30
Kiskunlacháza	47 12	19 01
Kisterenye	48 01	19 50
Kisvárda	48 13	22 05
Komárom	47 44	18 07
Komló	46 12	18 16
Komoró	48 18	22 07
Koppány (*strm*)	46 35	18 26
Körmend	47 01	16 36
Koslce, Czechoslovakia	48 42	21 15
Kunmadaras	47 26	20 48
Kunszentmárton	46 50	20 17
Leninváros	47 56	21 05
Lepsény	47 00	18 15
Lökösháza	46 26	21 14
Lovászi	46 33	16 34
Magyarbóly	45 50	18 30
Márianosztra	47 52	18 53
Maros (Mureşul, Romania) (*strm*)	46 15	20 12
Martonvásár	47 19	18 47
Mátra (*mts*)	47 53	19 57
Mecsek (*mts*)	46 10	18 18
Medved'ov, Czechoslovakia	47 48	17 40
Mezőberény	46 49	21 02
Mezőkövesd	47 49	20 35
Mezőszentgyörgy	47 00	18 17
Miskolc	48 06	20 47
Mohács	45 59	18 42
Mór	47 23	18 12
Mosonmagyaróvár	47 52	17 17
Mukachëvo, U.S.S.R	48 27	22 43
Mura (*strm*)	46 30	16 55
Murakeresztúr	46 22	16 52
Mureşul, Romania (*strm*)	46 15	20 12
Nádudvar	47 25	21 10
Nagycenk	47 36	16 42
Nagykanizsa	46 27	16 59
Nagylengyel	46 47	16 46
Rákhegy	47 17	18 16
Rákosszentmihály (*sec of Budapest*)	47 32	19 10
Rétság	47 56	19 08
Rijeka, Yugoslavia	45 21	14 24
Röszke	46 11	20 03
Rudabánya	48 23	20 38
Šafárikovo, Czechoslovakia	48 25	20 20
Šahy, Czechoslovakia	48 04	18 58
Sajó (*strm*)	47 56	21 07
Salgótarján	48 07	19 49
Sári	47 13	19 17
Sármellék	46 43	17 10
Sárvár	47 15	16 56
Sárvíz (*canal*)	46 21	18 46
Sassnitz, E. Germany	54 31	13 39
Sió	46 22	18 48
Sió (*canalized strm*)	46 20	18 53
Siófok	46 54	18 03
Somogy	46 07	18 19
Sopron	47 41	16 36
Subotica, Yugoslavia	46 06	19 40
Szabadság-hegy (*hill*)	47 30	18 59
Szajol	47 11	20 18
Szandaszőllős	47 08	20 14
Szarvas	46 52	20 33
Százhalombatta	47 20	18 56
Szczecin (Stettin), Poland	53 25	14 35
Szeged	46 15	20 10
Székesfehérvár	47 12	18 25
Szentendre	47 40	19 05
Szentgotthárd	46 57	16 17
Szentes	46 39	20 16
Szerencs	48 10	21 12
Szob	47 49	18 52
Szolnok	47 11	20 12
Szombathely	47 14	16 37
Szőny	47 44	18 10
Tapió (*strm*)	47 18	20 05
Tard	47 53	20 37
Tárnok	47 22	18 51
Taszár	46 22	17 55
Tatabánya	47 34	18 25
Tihany	46 55	17 54
Tiranë, Albania	41 20	19 50
Tisza (*strm*)	47 30	20 40
Tiszabezdéd	48 22	22 09
Tiszalök	48 01	21 23
Tiszapalkonya	47 53	21 04
Tiszaszentmárton	48 23	22 14
Tiszavasvári	47 58	21 21
Tokaj	48 07	21 25
Tököl	47 19	18 58
Tolna	46 26	18 47
Törökbálint	47 26	18 55
Tuzsér (*rr sta*)	48 21	22 09
Udvar	45 54	18 40
Újpest	47 34	19 05
Újudvar	46 32	17 00
Uzlovoye, U.S.S.R	48 22	22 24
Vác	47 47	19 08
Valea lui Mihai, Romania	47 31	22 09
Varaždin, Yugoslavia	46 18	16 20
Városföld	46 49	19 46
Várpalota	[illegible]	[illegible]

APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

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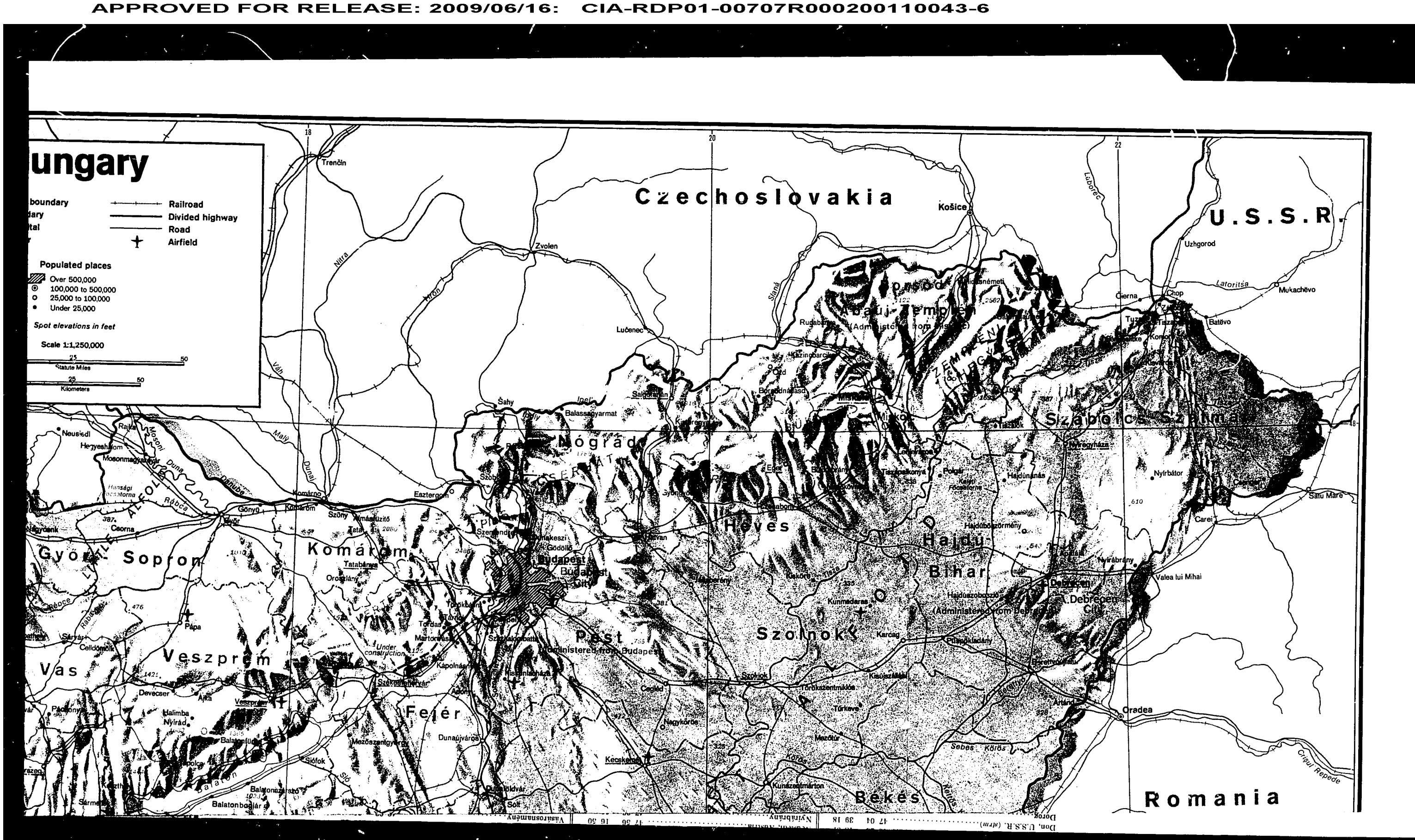

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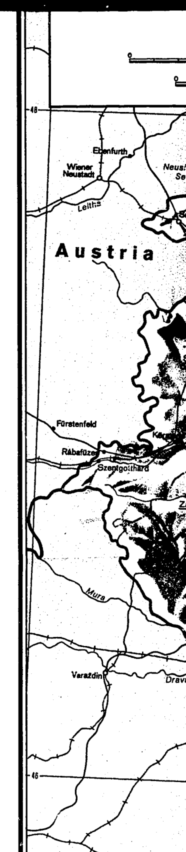
APPROVED FOR RELEASE: 2009/06/16: CIA-RDP01-00707R000200110043-6

Baja	46 11	18 58
Bakony (*mts*)	47 15	17 50
Balaton (*lake*)	46 50	17 45
Balatonboglár	46 47	17 40
Balatonfüred	46 57	17 53
Balatonkeresztúr	46 42	17 23
Balassagyarmat	48 05	19 18
Balatonszárszó	46 50	17 50
Balkan Mountains (*mts*)	43 15	25 00
Balkan Peninsula (*peninsula*)	44 00	23 00
Bánréve	48 18	20 22
Baracska	47 17	18 46
Barcs	45 58	17 28
Batëvo, U.S.S.R. (*rr sta*)	48 22	22 23
Battonya	46 17	21 01
Bázakerettye	46 32	16 44
Békés	46 46	21 08
Békéscsaba	46 41	21 06
Beregdaróc	48 12	22 32
Beregovo, U.S.S.R.	48 13	22 39
Beremend	45 47	18 26
Berettyó (*strm*)	46 59	21 07
Berettyóújfalu	47 13	21 33
Bezdan, Yugoslavia	45 51	18 56
Biharkeresztes	47 08	21 43
Bodajk	47 19	18 14
Borsod (*sec of Miskolc*)	48 19	20 45
Borsodnádasd	48 07	20 15
Bruck, Austria	48 01	16 46
Buda (*sec of Budapest*)	47 30	19 02
Budapest	47 30	19 05
Bükk (*mts*)	48 05	20 30
Bükkábrány	47 53	20 41
Čakovec, Yugoslavia	46 23	16 26
Carpathian Mountains (*mts*)	47 00	25 30
Cegléd	47 10	19 48
Celldömölk	47 15	17 09
Chop, U.S.S.R.	48 26	22 12
Csenger	47 50	22 41
Csepel	47 25	19 05
Csepelsziget (*isl*)	47 15	18 57
Csillebérc (*sec of Budapest*)	47 29	18 57
Csongrád	46 42	20 09
Csorna	47 37	17 15
Danube (*strm*)	45 20	29 40
Deákipuszta	46 59	17 24
Debrecen	47 32	21 38
Demjén	47 50	20 20
Devecser	47 06	17 26
Diósgyőr (*sec of Miskolc*)	48 06	20 41
Dombóvár	46 23	18 07
Don, U.S.S.R. (*strm*)	47 04	39 18
Dorog	46 38	18 17
Drava (*strm*)	45 33	18 55
Drávaszabolcs	45 48	18 13
Drégelypalánk	48 03	19 03
Dudar	47 18	17 57
Dunafoldvár	46 48	18 56
Dunakeszi	47 38	19 08
Dunántúl (*region*)	47 00	18 00
Dunaújváros	46 59	18 56
Ebenfurth, Austria	47 52	16 22
Ecséd	47 44	19 47
Eger	47 54	20 23
Eperjes-hegyhát (*hill*)	46 37	16 44
Eperjeske	48 21	22 13
Esztergom	47 48	18 45
Fényeslitke (*rr sta*)	48 16	22 07
Fenyőfő	47 21	17 46
Ferenc Csatorna (*canal*)	46 11	18 56
Foktő	46 31	18 55
Fürstenfeld, Austria	47 03	16 05
Gánt	47 23	18 24
Gdańsk, Poland	54 21	18 40
Gdynia, Poland	54 30	18 33
Göd	47 42	19 08
Godisa (*rr sta*)	46 13	18 06
Gödöllő	47 36	19 22
Gönyű	47 44	17 50
Great Alfold (*plain*)	47 00	20 00
Gyékényes	46 14	17 01
Gyöngyös	47 47	19 56
Iza-major (*farm*)	46 57	17 25
Izmail, U.S.S.R.	45 21	28 50
Kabhegy (*mt*)	47 03	17 39
Kalush, U.S.S.R.	49 01	24 22
Kápolnásnyék	47 14	18 41
Kaposvár	46 22	17 48
Karcag	47 19	20 56
Kardoskút	46 29	20 40
Kazincbarcika	48 15	20 38
Kecskemét	46 54	19 42
Kékes (*mt*)	47 52	20 01
Kisköre	47 30	20 30
Kiskunhalas	46 26	19 30
Kiskunlacháza	47 12	19 01
Kisterenye	48 01	19 50
Kisvárda	48 13	22 05
Komárom	47 44	18 07
Komló	46 12	18 16
Komoró	48 18	22 07
Koppány (*strm*)	46 35	18 26
Körmend	47 01	16 36
Koslce, Czechoslovakia	48 42	21 15
Kunmadaras	47 26	20 48
Kunszentmárton	46 50	20 17
Leninváros	47 56	21 05
Lepsény	47 00	18 15
Lökösháza	46 26	21 14
Lovászi	46 33	16 34
Magyarbóly	45 50	18 30
Márianosztra	47 52	18 53
Maros (Mureşul, Romania) (*strm*)	46 15	20 12
Martonvásár	47 19	18 47
Mátra (*mts*)	47 53	19 57
Mecsek (*mts*)	46 10	18 18
Medved'ov, Czechoslovakia	47 48	17 40
Mezőberény	46 49	21 02
Mezőkövesd	47 49	20 35
Mezőszentgyörgy	47 00	18 17
Miskolc	48 06	20 47
Mohács	45 59	18 42
Mór	47 23	18 12
Mosonmagyaróvár	47 52	17 17
Mukachëvo, U.S.S.R.	48 27	22 43
Mura (*strm*)	46 30	16 55
Murakeresztúr	46 22	16 52
Mureşul, Romania (*strm*)	46 15	20 12
Nádudvar	47 25	21 10
Nagycenk	47 36	16 42
Nagykanizsa	46 27	16 59
Nagylengyel	46 47	16 46
Neusiedl, Austria	47 56	16 50
Nyírábrány	47 33	22 02
Nyirád	47 00	17 27
Nyírbátor	47 50	22 08
Nyírbogdány	48 03	21 53
Nyíregyháza	47 57	21 43
Ócsa	47 18	19 14
Oradea, Romania	47 04	21 56
Örkény	47 08	19 26
Orosháza	46 34	20 40
Oroszlány	47 29	18 19
Őrszentmiklós	47 41	19 16
Osijek, Yugoslavia	45 33	18 42
Ózd	48 13	20 18
Pácsony (*rr sta*)	47 02	16 51
Paks	46 38	18 52
Pamhagen, Austria	47 42	16 55
Pápa	47 20	17 28
Pécs	46 05	18 14
Pécsvárad	46 09	18 25
Pest (*sec of Budapest*)	47 30	19 05
Pestlőrinc (*sec of Budapest*)	47 26	19 12
Pétfürdő	47 10	18 07
Pilis (*mts*)	47 42	18 57
Pilisvörösvár	47 37	18 55
Piszkés Tető (*mt*)	47 55	19 54
Polgár	47 52	21 07
Püspökladány	47 19	21 07
Pusztaföldvár	46 32	20 48
Rába (*strm*)	47 41	17 38
Rábca (*strm*)	47 41	17 37
Rajka	48 00	17 12
Sassnitz, E. Germany	54 31	13 39
Sió	46 22	18 48
Sió (*canalized strm*)	46 20	18 53
Siófok	46 54	18 03
Somogy	46 07	18 19
Sopron	47 41	16 36
Subotica, Yugoslavia	46 06	19 40
Szabadság-hegy (*hill*)	47 30	18 59
Szajol	47 11	20 18
Szandaszőllős	47 08	20 14
Szarvas	46 52	20 33
Százhalombatta	47 20	18 56
Szczecin (Stettin), Poland	53 25	14 35
Szeged	46 15	20 10
Székesfehérvár	47 12	18 25
Szentendre	47 40	19 05
Szentgotthárd	46 57	16 17
Szentes	46 39	20 16
Szerencs	48 10	21 12
Szob	47 49	18 52
Szolnok	47 11	20 12
Szombathely	47 14	16 37
Szőny	47 44	18 10
Tapió (*strm*)	47 18	20 05
Tard	47 53	20 37
Tárnok	47 22	18 51
Taszár	46 22	17 55
Tatabánya	47 34	18 25
Tihany	46 55	17 54
Tiranë, Albania	41 20	19 50
Tisza (*strm*)	47 30	20 46
Tiszabezdéd	48 22	22 09
Tiszalök	48 01	21 23
Tiszapalkonya	47 53	21 04
Tiszaszentmárton	48 23	22 14
Tiszavasvári	47 58	21 21
Tokaj	48 07	21 25
Tököl	47 19	18 58
Tolna	46 26	18 47
Törökbálint	47 26	18 55
Tuzsér (*rr sta*)	48 21	22 09
Udvar	45 54	18 40
Újpest	47 34	19 05
Újudvar	46 32	17 00
Uzlovoye, U.S.S.R.	48 22	22 24
Vác	47 47	19 08
Valea lui Mihai, Romania	47 31	22 09
Varaždin, Yugoslavia	46 18	16 20
Városföld	46 49	19 46
Várpalota	47 12	18 08
Vásárosnamény	48 08	22 19
Vasvár	47 03	16 48
Vecsés	47 24	19 17
Velencei Tó (*lake*)	47 13	18 36
Vértes	47 23	21 52
Vértes (*hills*)	47 25	18 20
Veszprém	47 06	17 55
Visonta	47 47	20 02
Voronezh, U.S.S.R.	51 38	39 12
Wiener Neustadt, Austria	47 48	16 15
Wismar, E. Germany	53 54	11 28
Zagreb, Yugoslavia	45 48	16 00
Zagyva (*strm*)	47 10	20 12
Záhony	48 25	22 11
Zalaegerszeg	46 50	16 51
Zsira	47 27	16 41
Zvolen, Czechoslovakia	48 35	19 08

Selected airfields

Budapest/Ferihegy	47 26	19 14
Budapest/Tokol	47 21	18 59
Debrecen	47 29	21 37
Fokto	46 33	18 57
Kecskemet	46 55	19 45
Kiskunlachaza	47 11	19 05
Kunmadaras	47 23	20 47
Mezokovesd	47 49	20 38
Papa	47 22	17 30
Sarmellek	46 41	17 10
Taszar	46 24	17 55
Veszprem	47 05	17 58



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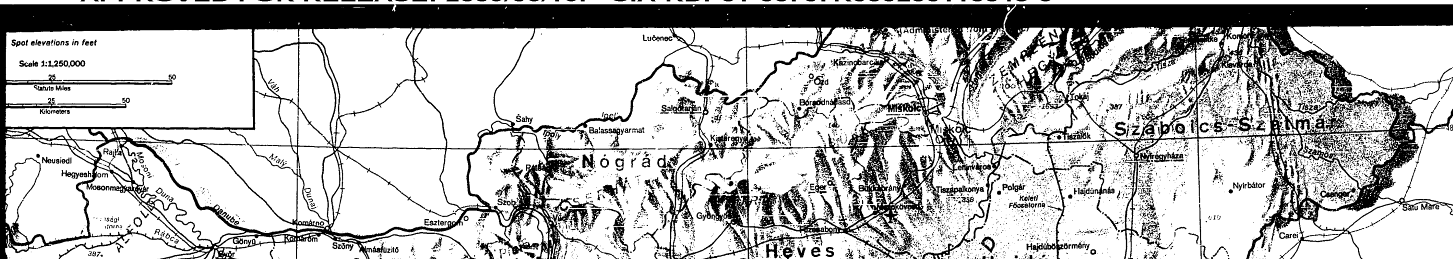

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Terrain and Transportation Figure 13

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