

IRAN

The Islamic Republic of Iran occupies the entire eastern Gulf (Figure 36) and dominates the strait through which much of the world's oil supply travels, making it of great interest and concern to others. Only slightly (16 percent) smaller than the region's largest country, Saudi Arabia, Iran is by far the most populous, with more than three times as many citizens (Table 66) as the second most-populous country, Iraq. It is the only non-Arab country proximal to the Persian Gulf; the majority of its inhabitants are of Persian descent, although there are significant Arab and non-Arab minorities. Although demographically and officially an Islamic country, the majority of Muslim Iranians adhere to the Ja'afari school of "Twelver" Shi'ism, considered heretical by the majority Sunni sect of Islam.



Figure 36. Map of the Islamic Republic of Iran

Historically the center of first Persian and then Islamic empires, Iran has retained its strategic importance if not its former glory in the 20th Century. With its pivotal location in the center of the "Great Game" of the 19th Century, the friendship of Iran was sought by all of the great powers, and was finally obtained by the United States following World War II and the ascendancy of the Pahlavis to the Peacock Throne. This friendship was not without cost, however, as the

Table 66. Iran in Statistics		
Metric	Value ²²⁸	Remarks
Population	67.28	millions, 1995
Population density	41	per km ² , 1995
GDP	57.6	US\$billions, 1994
GDP per capita	876	US\$, 1994
Telephones	5,090.4	thousands, 1995
Teledensity	7.57	per 100 inhabitants, 1995
Teledensity in largest city	22.21	per 100 inhabitants, 1995
Cellular subscribers	9.2	thousands, 1995
Cellular density	0.01	per 100 inhabitants, 1995
PCs	na	
PC density	na	
Television sets (receivers)	9,000	thousands, 1995
Television density	13.4	per 100 inhabitants, 1995
Literacy rate	72.1 ²²⁹	per 100 inhabitants older than 15 years, 1994
Infant mortality	52.7 ²³⁰	per 1000 inhabitants, 1996 estimate

relationship between the United States and Iran continued to grow in importance to American national security with the emergence of a hostile and apparently expansionist Soviet Union and regional oil reserves in the second half of this century. Thus was Iran's continued support for American policy in the region so important to the United States that great lengths were taken to accommodate the Shah, especially in supporting his military and internal security

apparatus. With the collapse of the monarchy, a popular revolution was led by Shi'ite Islamic

²²⁸ Source: *World Telecommunication Development Report*, 3rd ed., 1996/97 (Geneva: International Telecommunications Union, March 1997), unless otherwise noted.

²²⁹ *The World Factbook 1996*, <<http://www.odci.gov/cia/publications/nsolo/factbook/ir.htm>> (9 February 1998).

²³⁰ *ibid.*

fundamentalists who instituted an Islamic Republic in 1979. During the ensuing period of instability in Iran, the Soviet Union invaded Afghanistan, and there were expectations that Iran was next. Instead, Iraq attacked, starting what was to be a bloody eight-year war that produced no gains for either side.

The new regime, ideologically opposed to Western capitalism, of which the United States is at once the epitome and principal exporter, singled out the United States for vilification because of its decades of support for the Shah's repression of the Iranian people. With American hostages being held in the former American Embassy in Tehran and the accompanying vitriol from the new regime, the United States all but declared the Islamic regime that had overthrown America's long-time ally its enemy. The stage was thus set for the ensuing 17 years of mutual recrimination, competition for the principal role in Persian Gulf security (including open combat), and American embargoes against Iran and attendant attempts to isolate the Islamic regime economically and diplomatically.²³¹

Iran's support for Islamist terrorists throughout the Middle East and North Africa, and probably in Europe and the Americas as well, its strategic position overlooking major oil shipping routes (to say nothing of its own petrochemical reserves), its pursuit of development programs for weapons of mass destruction and long-range delivery systems, and the continuing competition with the United States over primacy in the Persian Gulf²³² make Iran a country of significant national security concern to the United States. As part of the strategy of "dual containment" of Iran and Iraq, instituted in 1991 following the successful ejection of Iraqi forces from Kuwait, the United States government has attempted to curtail development in Iran through unilateral export controls and embargoes and attempts at instituting multi-lateral sanctions, thus far with limited success.

However, development in all sectors in Iran has not only continued, but has maintained an average rate of growth far exceeding that of the neighboring Arab countries. In part because of a popular mandate, as an Islamic government, to develop the economy and infrastructure as quickly as possible to raise the population's standard of living, and in part due to continuing national security concerns of its own, the Iranian government set out on a course of attaining "self-sufficiency" and has been for the most part successful. Whether this has been because or in spite of American sanctions is a moot point; Iran is today significantly more powerful and well-developed in every respect than it was when the Islamic revolution occurred.

Networks in Iran

Given the critical role of communications in projecting military power, the United States has been especially concerned regarding Iranian development of the telecommunications sector, the Internet included. But data communication has lagged well behind other telecommunication development in Iran, most likely due principally to investment decisions geared toward expanding basic services as rapidly as possible, and possibly also to security concerns. As recently as 1993, the country had no internal data networks, although it did have an international dial-up connection to BITNET. Early in 1993, Massoud Saffari, the head of the High Council of Informatics, noted

²³¹David D. Newsom, Forward to Shireen T. Hunter, *Iran After Khomeini*, CSIS Washington Papers series (New York: Praeger Publishers, 1992), p. vii.

²³²Michael Eisenstadt, "Déjà vu All Over Again? An Assessment of Iran's Military Buildup," in Patrick Clawson, ed., *Iran's Strategic Intentions and Capabilities*, McNair Paper 29 (Washington, D.C.: National Defense University, April 1994), p. 95.

that the Council was discussing with the Telecommunication Company of Iran (TCI) the possibility of establishing data communications networks over the country's telephone lines.²³³ The TCI, however, had already announced a call for tenders the previous year to establish a nationwide packet-switched network based on the X.25 protocol, *IranPac*. Also during 1993, the private use of modems was permitted for the first time since the Islamic revolution.

During the ensuing years, development has been hampered by a lack of incentive for investment on the part of the TCI, which is the monopoly provider of all telecommunications services, a lack of central direction, and bureaucratic competition. While the government was still deciding what to do in the area of data communications, the market was essentially left to itself and a number of private "information provider" companies were formed, several of which established their own international links over lines leased from the TCI. In 1995, however, the government clamped down on private information services and advanced the development of its own data communication network.

Government Internet

In 1995, the TCI petitioned the *Majles* to be allowed to establish a public joint stock company, the Data Communication Company of Iran (DCI), to take over responsibility for *IranPac* and the further development of data services on a monopoly basis. Those who argued against the formation of the DCI noted that international data communications were already being provided by a private company (Pars Supaleh), the network of the Institute for Studies in Theoretical Physics and Mathematics (IPM), and the "Iranian Data Outreach Center" (or "Iranian Pek Center of Information Outreach"). The *Majles* also maintained data connections, including an Internet connection, for its *Majles* Research Center. Those who argued in favor of the formation of the new company pointed out that it was inefficient to have several organizations performing the same function. They also noted that the Pek Center was in fact operated by the TCI, with the

Islamic Republic of Iran
Ministry of P. T. T.
Data Communication of Iran



جمهوری اسلامی ایران
وزارت پست تلگراف و تلفن
امور ارتباطات دیتا

criticism that the TCI should not be in the business of selling information (i.e., should not be a content provider).²³⁴ The formation of the DCI was finally approved on 19 September 1995 after the then-Minister of Post, Telegraph, and Telephone, Mohammad Gharazi, noted that the Ministry was obligated by the Computer Communications Council to establish a dedicated data communications network.²³⁵

The DCI, working with the TCI and their parent ministry, is trying to establish monopoly control of the data services market, especially Internet service. This does not appear to be a function of government policy, however, but rather a decision on the part of the Ministry of Post, Telegraph,

²³³"ISI on the Right Track," *Computer News Middle East* (April 1993): 28.

²³⁴*Resalat* (18 September 1995), p. 13, as translated in FBIS-NES-95-235-S, *Daily Report: Near East & South Asia: Reports on Majles Sessions* (7 December 1995), pp. 33-34.

²³⁵*Resalat* (20 September 1995), pp. 5, 12, as cited in *ibid.*, p. 38.

and Telephone to maintain a monopoly in all telecommunications services, despite legislation that authorizes competition in everything except the provision of basic (fixed-line switched voice) services and ministry assurances to the contrary. To this end, the DCI has taken steps to restrict private ISPs by having the TCI disconnect their international circuits while fighting with the IPM, which remains the .ir TLD manager, over control of the Internet within Iran.

Internet service is now being offered to the public by the DCI, albeit on a limited and expensive basis. While commercial Internet access was developing slowly, the DCI was pursuing its own goals. Phase I of the DCI's "Internet project" provided the capability to support 20,000 Internet users via *IranPac* (Table 67). The company recently announced the completion of Phase II, which involved the installation of equipment to handle 300,000 Internet accounts,²³⁶ although it has yet to open its doors to the public, despite having been publicly demonstrated and announced at Iran's first international telecommunications exhibition in Tehran 24-28 June 1997. At that exhibition, the DCI demonstrated the use of the Netscape Worldwide Web browser via *IranPac*.²³⁷

Table 67. *IranPac* Nodes

Abadan	Chalus	Khoram Abad	Orumieh	Shahid Ghandi
Ahwaz	Dezful	Khoy	Qazvin	Shahr-e Kord
Amol	Firuzkuh	Kish	Qazvin Ind. City	Shiraz
Andimeshk	Ghamsar	Korram Shahr	Qeshm	Tabriz
Arak	Gonbad-e Kavus	Lar	Qom	Tehran
Ardabil	Gorgan	Maragheh	Quehan	Torbat-e Jam
Babol	Hamedan	Marand	Rasht	Torbat-e Naidareyeh
Bandar 'Abbas	Ilam	Mashhad	Sabsevar	Varamin
Bandar Imam	Iranshahr	Mianeh	Sanandaj	Yasuj
Bandar Lengeh	Isfahan	Minab	Sarakhz	Yazd
Bazargan	Jahrom	Mobarakeh	Saravan	Zabol
Birjand	Jask	Mobarakeh Station	Sarcheshmeh	Zahedan
Borujerd	Karaj	Mojtam Fulad	Sari	Zanjan
Bumehan	Kerman	Naishabur	Saveh	
Bushehr	Kermanshah	Najafabad	Semnan	
Chahbahar	Khark	Nasen	Senay-e Nezamd	

The DCI's Internet connection has been via a 9.6 Kbps X.75 satellite link to Interlog in Ontario, Canada. At the DCI end of the link, conversion from TCP/IP to X.75/X.25 is performed by a Sun SPARC server (dci.iran.com).²³⁸ The IP backbone runs over *IranPac*'s lines, providing 64 Kbps connections between ten cities (Figure 37).

More recently, the DCI has established a service agreement with GulfSat Kuwait, a joint venture with the Kuwaiti Ministry of Communications and Hughes Network Systems (USA), which operates two VSAT hubs in Kuwait to facilitate satellite communications links between Europe,

²³⁶ *Salam* (12 July 1997), p. 15, as translated in FBIS-NES-97-232, *Daily Report: Near East & South Asia* (21 August 1997) via World News Connection.

²³⁷ "Iran hosts its first international telecommunications exhibition, *Middle East Communications* 12 (August 1997), p. 9.

²³⁸ Payman Arabshahi, *The Internet In Iran: A Survey*, 4 October 1996, <<http://www.iranian.com/Sep96/InternetIran/InternetIran.html>> (9 February 1998).

Asia, the Middle East, and North Africa. The DCI has leased a 64 Kbps link between Tehran and GulfSat's Internet access point in Kuwait. The first public announcement of this new set-up in the West appeared in a trade journal announcing that the Feizieh School of Islamic Education established a web site at the address dciweb.dci.co.ir (194.126.32.20),²³⁹ since the C-class network 194.126.32 is registered to GulfSat. More recently, the DCI is reported to have upgraded its link to 2 Mbps. However, only a few governmental organizations and private firms could afford its \$30,000 set-up charge with monthly flat-rate charge of IR 5,000,000 (\$1,667), and most DCI subscribers are still using the old 9,600 bit/s connection.²⁴⁰

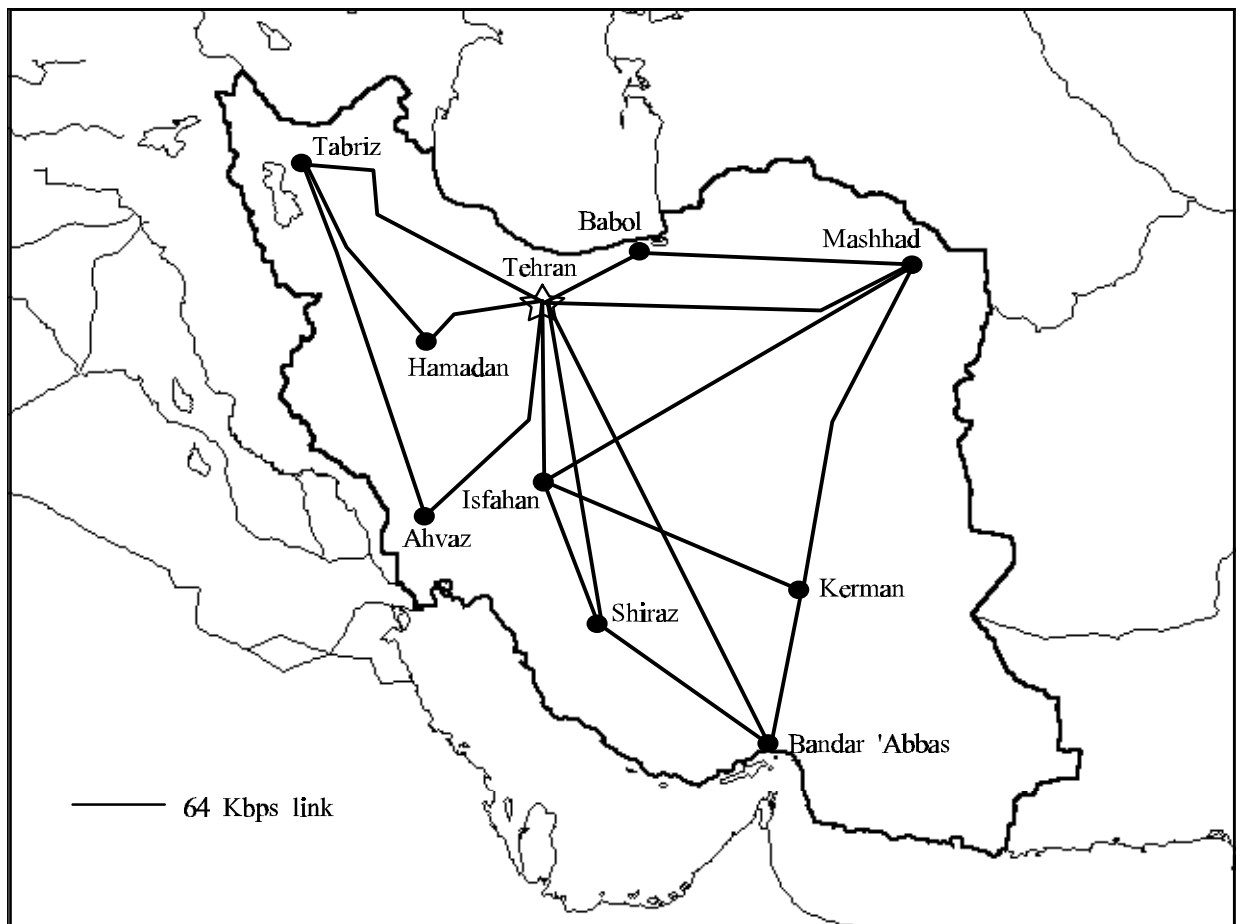


Figure 37. DCI Internet Backbone Network

Following up on Neda Rayaneh's lead in offering daily news (see below), the DCI announced in early 1997 that it, too, would be publishing the daily newspaper *Hamshari* on-line, along with ten other daily papers. DCI's other offerings include *Abrar*, *Akhbar*, *Ettala'at*, *Iran*, *Iran News* (in English), *Jomhuri-e Eslami*, *Kar va Kargar*, *Kayhan*, *Resalat*, and *Salam*. The newspapers are posted on a DCI bulletin board that is accessible by Internet subscribers.²⁴¹ The announcement did not indicate whether there would be an extra charge for access to these newspapers, or how the Farsi text was rendered (i.e., hypertext or in graphic format).

²³⁹"In Brief... Iran," *Middle East Communications* 12 (July 1997), p. 9.

²⁴⁰Farid Mashhadi, "Iran on the Internet," *Middle East Communications* 12 (March 1997), p. 8.

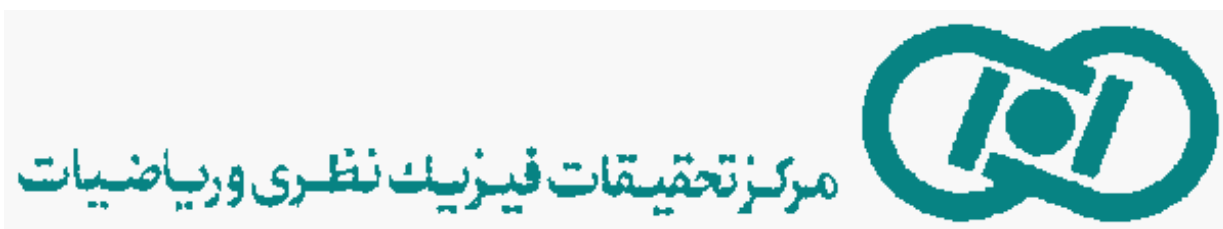
²⁴¹"In Brief...Iran," *Middle East Communications* 12 (February 1997), p. 3.

Meanwhile, the Islamic Republic News Agency (IRNA) wasn't about to wait for other government agencies to settle their disputes and develop a decent Internet capability. IRNA went to BT in the United Kingdom for its web services and a high-speed Internet connection. The news agency established a site www.irna.co.uk (194.74.211.250),²⁴² and used the Internet to broadcast a football match between Iran and Saudi Arabia in September 1997. The coverage was retransmitted from an Iranian international radio broadcast via the a Real Audio feed from IRNA's web site (www.irna.co.uk/Audio/IRIB.ram).²⁴³ IRNA is also using Real Audio to relay programming to Japan, which had heretofore been unable to receive Iranian radio.²⁴⁴ In early November 1997, IRNA moved its Web site to the United States, where it can now be accessed as www.irna.com (209.1.163.28). The [irna.com](http://www.irna.com) domain name is registered to IRNA at its address in New York City, but the Web server belongs to Exodus Communications Inc. and is located in Santa Clara, California.

Academic Internet

The "founder" of the Internet in Iran is the Institute for Studies in Theoretical Physics and Mathematics (IPM), which is also the *.ir* national TLD manager (www.nic.ir), the hub of an academic and research network in Iran, and until recently the host of the only international gateway to the Internet.

In mid-1994, IPM modified its BITNET gateway to TERENA (formerly EARN), a MicroVAX 3100/20E, to support the TCP/IP protocol suite, establishing an Internet connection for IREARN members (vax.ipm.ac.ir). The network was assigned 512 IP addresses (194.225.70.0-194.225.71.255) and used the same 9.6 Kbps link to Vienna as had been used by IREARN.²⁴⁵ The slow connection was explained by Ebrahim Mashayekh, then director of IPM, as being due to the poor quality of the telephone lines available.²⁴⁶ Thus, the universities that had IREARN connections (Table 68) gained access to the Internet, although applications were limited to principally e-mail, due to the slowness of the international link. At least 18 government uni-



versities and research centers were connected to the Internet via IPM. Other universities gained dial-up access to the Internet via IPM at this time. Due to the lack of LANs at most universities,

²⁴² *ibid.*, p. 6.

²⁴³ "In Brief... Iran," *Middle East Communications* 12 (October 1997), p. 4.

²⁴⁴ "Iranian Radio Broadcast in Japan Via Internet," Islamic Republic News Agency at 1039 GMT (24 September 1997), as reported in FBIS-NES-97-267, *Daily Report: Near East & South Asia* (25 September 1997), via World News Connection.

²⁴⁵ *ibid.*, pp. 21, 23; Waller, *op. cit.*; Farid Mashhadi, "Iran's Internet upgrade," *Middle East Communications* 12 (October 1997), p. 4.

²⁴⁶ Pejman Pourmand (ce452@freenet.carleton.ca), "Iran's Internet -- faster links???" (22 May 1995), message <of soc.culture.iranian>.

however, Internet access was generally limited to some faculty and graduate students, who used a single computer terminal or a small LAN.²⁴⁷

City	Location	Institution	Node	Connection
Hamedan	3500N 04825E	Bu-Ali Sina University	bu_ali_u	dial-up
Isfahan	3241N 05141E	Isfahan University of Technology	isf_tech	leased line
		University of Isfahan	univ_isf	dial-up
Kerman	3017N 05705E	University of Kerman	kerman_u	dial-up
Mashhad	3618N 05239E	Ferdowsi University of Mashhad	mashad_u	dial-up
Rasht	3713N 04945E	Guilan University	guilan_u	leased line
Shiraz	2938N 05234E	Shiraz University	shiraz_u	dial-up
Tabriz	3800N 04613E	Tabriz University	tabriz_u	dial-up
Tehran	3450N 05126E	Amir Kabir University	cc_aku	leased line
		Iran University of Science and Technology	iustech	dial-up
		Khajeh Nasir-Edin Toosi Univ of Technology	kntoosi	dial-up
		Shahid Beheshti University	behesti	dial-up
		Sharif University	sharif_u	leased line
		Tarbiat-Modares University	modares	leased line
		University of Tehran	tehran_u	leased line

Internet connections within Iran were also limited to 9.6 Kbps links, again due to the poor infrastructure, except for a 64 Kbps line between two of IPM's buildings in Tehran and a 64 Kbps satellite link to Guilan University in Rasht, 260 km northwest of Tehran.²⁴⁸ Each of IPM's three buildings has an internal TCP/IP-based LAN interconnected with leased lines. The Ekhtairieh building, which houses IPM's computer division, has two Ethernet segments linking the gateway MicroVAX, an IBM RS/6000, and some Sun and i80486-based servers.²⁴⁹

This rather rudimentary network, but in 1994 the second most extensive intranet in the Middle East (after Israel's), supported between 30,000²⁵⁰ and 60,000 individuals,²⁵¹ mostly at universities.

Working with the RIPE Network Control Center (NCC) in Amsterdam, IPM up-graded its intranet network to Class B and was assigned two large blocks of IP numbers²⁵² (194.165.0.0-194.165.32.255 and 194.225.0-194.225.255.255). By January 1996, there were more than 500 registered Internet domains in Iran, of which at least 387 were on-line. In April 1996, there were 1,100 usernames on IPM's main server, most of which represented general group-access accounts used by more than one individual.²⁵³

²⁴⁷ Mohdjers, *op. cit.*, p. 27.

²⁴⁸ Arabshahi, *op. cit.*

²⁴⁹ "Iran gains access to the Internet," May 1995, <<http://www.gpg.com/cnme/0595/23net.html>> (9 February 1998).

²⁵⁰ Carroll Bogert, "Chat Rooms and Chadors, *Newsweek* (21 August 1995), p. 36.

²⁵¹ Arabshahi, *op. cit.*

²⁵² Mashhadi, "Iran's Internet upgrade," *op. cit.*

²⁵³ Arabshahi, *op. cit.*

In 1997, IPM gained permission from the DCI to use its installed satellite link to connect to the Internet. A 128 Kbps satellite link has been established between IPM²⁵⁴ and Archway s.r.l. in Milan, Italy. Archway is a subsidiary of EUNet (Netherlands), which is in turn owned by UUNet Technologies (USA), which was the prime contractor for the installation of the required routers and servers. All Internet servers and networks connected to the Internet via IPM are now registered under UUNet's autonomous system (AS) numbers. IPM's satellite system is capable of supporting 2 Mbps communications, but IPM must wait for DCI to finalize its negotiations with the space segment provider, the Intelsat international consortium, before expanding its Internet link again. However, an IPM official recently noted, "We have been waiting for ever and ever for this signature between DCI and Intelsat."²⁵⁵ DCI is not very keen on moving ahead due to IPM's competition with DCI's own attempt to provide Internet services.

Commercial Internet

The first commercial Internet service provider in Iran was the Neda Rayaneh Institute (NRI) (www.neda.net.ir), a non-profit company affiliated with the municipal government of Tehran, which started a BBS in early 1994 and Internet access in February 1995 via two 9.6 Kbps SLIP leased lines. One of these lines connected its LAN to IPM, and the other used a satellite link to connect to a Canadian ISP, Cadvision. NRI is the largest ISP in Iran, hosting an extensive array of business and news Web pages, all of which are mirrored in California by the Global Information Group.

NRI's basic offerings include extensive domestic news and information services and e-mail. A basic e-mail and BBS ("Neda-1") account costs IR 300,000 (US\$100) per year; access to the Internet is a premium service, open only to Neda-1 subscribers, that costs an additional IR 50,000 (US\$16.67) per 200 KB of traffic.

NRI also maintains the Tehran "Yellow Pages" and commercial and private telephone directories, as well as city information and an interactive map of Tehran. The company hosts numerous corporate web pages, for which it provides the design expertise, as well as a full version (Persian hypertext and graphics) of the Tehran daily newspaper *Hamshari*.²⁵⁶ NRI formerly offered domain name registration and hosting services for a flat fee of IR 2,000,000 (US\$667), but had to discontinue the service due to the congestion this caused the network. The company still offers Web hosting services on its intranet (i.e., with no Internet link). All services are available in English and Farsi.

In early August 1995, all 200 of NRI's dial-up lines were disconnected by the TCI, ostensibly due to the misuse of the network by NRI subscribers looking for mates via the Internet, but more likely related to attempts by the Ministry of Post, Telegraph, and Telephone (MPTT) to stifle competition to its own companies, including DCI. The connections were restored within the week, but NRI was required to post a message warning subscribers to refrain from inappropriate activities.²⁵⁷ Only 16 of the dial-up lines were allocated for Internet access, but there were plans to add 100 more Internet lines by the end of 1995. NRI also has a full-time connection to *IranPac*.

²⁵⁴ Mashhadi, "Iran's Internet upgrade," *op. cit.*

²⁵⁵ Mashhadi, "Iran on the Internet," *op. cit.*

²⁵⁶ *Hamshari* (30 May 1996), p. 1, as translated in FBIS-NES-96-111, *Daily Report: Near East & South Asia* (7 June 1996), p. 61.

²⁵⁷ Bogert, *op. cit.*

In early 1996, the Central Library of the Foundation of the Holy Shrine of Imam Reza, *Astan Qods Razavi*, announced that it would join the Internet in the near future, apparently via NRI.²⁵⁸

Virayeshgar (“Vira”) is a Tehran software engineering company whose major products include a Farsi version of Lotus Corporation’s “WordPerfect” and the “DataEase” Farsi-language database management system. The company also represents 3Com (USA) in Iran. Vira maintains a local BBS and initially offered Internet e-mail and some technical Usenet newsgroups via a UUCP link to Holonet (USA),²⁵⁹ but now offers public commercial Internet access via a link through IPM.²⁶⁰

Pars Supaleh, the AT&T (USA) representative, offers access to commercial databases, such as Dialog and Dow Jones databases, via its own international communication link, a 9.6 Kbps leased line to the Netherlands.²⁶¹ Most of its 100 subscribers are reported to be government agencies, including the Iran Industrial and Scientific Research Organization. The company charges a set-up fee of IR 400,000 (US\$133) and a monthly fee of IR 200,000 (US\$67), plus additional charges for access to foreign databases. Pars Supaleh formerly offered Internet e-mail services, but discontinued it due a lack of subscribers.²⁶²

Internet Dimensions

The following section discusses the dimensions of the Internet in Iran, as best as can be determined, with the assessment summarized in Table 69 and depicted in Figure 38. Due in part to Iran’s relative isolation and in part to the on-going competition between the DCI and IPM, reliable figures have been hard to acquire. The recent commissioning of the new satellite links has also made data collection more difficult, as the bulk of Iran’s Internet infrastructure is now “hidden” behind routers located in Italy (in the case of IPM’s network) and Kuwait (for DCI’s network).

Pervasiveness Arabshahi’s estimate that as many as 60,000 people (fewer than 1 in 1,000 Iranians) may have used the Internet as of late 1996²⁶³ is not unreasonable, given the late development of data networking and the Internet in Iran, the lack of infrastructure, and the uncertainty of government regulation. The number has probably not increased significantly since that time, but will likely jump in the near term, now that the new infrastructure and international connections have been brought on-line. The recent (August 1997) change of government in Iran may also encourage increased Internet use, as the population is expecting a general relaxation the of strict Islamic controls of the previous regime.

Geographic Dispersion Such Internet infrastructure as exists in Iran is dispersed over a wide area. The government’s network, piggy-backed on its X.25 packet-switched network, connects ten cities, while the academic network connects eight, for a total of eleven unique cities connected to the Internet via one or the other network, resulting in an Internet presence in almost half of the provinces (*ostan*) of Iran. These cities are the most important population, industrial, and academic centers. Although there are two separate international links to the Internet, the termini for both links are located in Tehran.

²⁵⁸Neda Rayaneh Institute, *Iran Business Digest*, 7 February 1996, <<http://www.neda.net/ibd/headlines>> (9 February 1998).

²⁵⁹Arabshahi, *op. cit.*

²⁶⁰Mohdjers, *op. cit.*, p. 28.

²⁶¹Mohdjers, *ibid.*

²⁶²Arabshahi, *op. cit.*

²⁶³*ibid.*

Dimension	Level	Explanation
Pervasiveness	(1) <i>Experimental</i>	Although the Internet has been available to some extent in Iran for more than three years, the level of usage remains less than one in a thousand. Internet usage has extended beyond a core of computing professionals, but is insufficiently available to the general public for widespread use.
Geographic Dispersion	(2) <i>Moderately Dispersed</i>	Almost half of the country's provincial capitals, as well as the nation's capital, have full-time links to the Internet via one of two international connections from two Tehran-based organizations.
Sectoral Absorption	(1) <i>Rare</i>	Although the most important universities have full-time Internet connections, few or no schools and very few organizations in other sectors are connected.
Connectivity Infrastructure	(1)	There are 64 Kbps dedicated IP connections to ten cities and two international satellite links with a total bandwidth of less than 200 Kbps. There are no Internet exchanges in Iran. Access to the Internet is via dial-up or 64 Kbps leased line.
Organizational Infrastructure	(2) <i>Controlled</i>	There are only a few ISPs in Iran, and the position of the non-government providers appears tenuous. The market is closely controlled by government regulation.
Sophistication of Use	(1) <i>Minimal</i>	Development of Internet expertise has been hampered by the lack of a sophisticated clientele and the poor condition of the infrastructure. Use of the Internet is very basic.

Table 69. Internet Dimensions for Iran

Sectoral Absorption Unlike most of the other countries in the region (and more in line with the North American and European experiences), the academic community was an early adopter and proponent of the Internet. However, due to the same reasons that have prevented the Internet from becoming pervasive, little progress has been made beyond the original 15-18 organizations that formed the country's first wide area network. Take-up by the commercial sector is likely to increase, given the recently-expanded infrastructure, so long as a somewhat liberalized environment continues. Aside from a few "hard core" computing/networking advocates that are likely to attempt to continue to push the Internet regardless of government policy (and perhaps with more vigor, the more the government attempts to clamp down on them), the level of usage is likely to vary with the regulatory climate. The vagaries of government policy have thus far discouraged many organizations, especially in the commercial sector, from making the investments required to establish a permanent Internet connection and presence, for fear of losing their investment should the government attempt to limit Internet use.

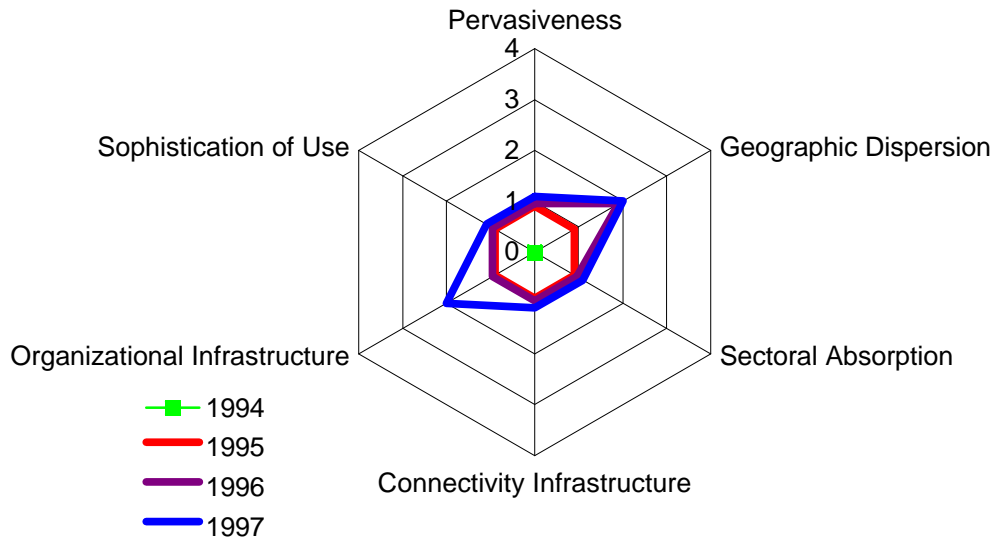


Figure 38. Internet Dimensions for Iran, 1994-1997

Connectivity Infrastructure The current IP backbone has an aggregate bandwidth of less than T-1, and the aggregate bandwidth of the two international links is less than 200 Kbps, although IPM has indicated its intention to up-grade its satellite link to Italy to 2 Mbps (E-1) as soon as the DCI has completed the requisite negotiations with Intelsat for the space segment lease. There are no Internet exchanges in Iran at present, as the DCI and IPM networks apparently do not intersect, although both run over lines provided by the telephone company. Should the two competing organizations work out a *modus vivendi*, an interchange in Tehran would greatly increase intra-Iranian capabilities. Access to the Internet networks is via dial-up lines or 64 Kbps leased lines. Speeds on dial-up lines are currently limited to 9.6 Kbps or less by the poor local loop quality in most areas.

Organizational Infrastructure The organizational infrastructure today is minimal and the government is attempting to maintain close control over it, apparently attempting to clamp down further. There are two commercial ISPs, as well as the government's DCI and the IPM. While nominally state-controlled, the academic community in Iran appears to have a great degree of autonomy, largely derived from its own powerful sponsors within the government. If the IPM is able to maintain control over the national TLD, it is likely that it will be continue to run its own network for the academic community. Its freedom of action is limited, however, by the requirement to acquire leased lines from the telephone company (TCI), which is the DCI's sister company under the aegis of the PTT ministry. Should the MPTT be successful, however, in wresting control of Internet domain assignments from IPM, it is likely that further controls will be instituted, principally for the purpose of maintaining control in general rather than for any particular security or moral purpose. The MPTT's claim to the Internet is based on the argument that the Internet is first and foremost a telecommunications medium, which by law falls under the purview of the MPTT, and secondly that the Internet is principally a commercial and public-service network, rather than an academic system.

Sophistication of Use Exploitation of the Internet in Iran appears to be very conventional, with the principal uses being e-mail, file transfers, and bulletin board-type applications. There is a great deal of interest in information collection; however, the existing user community is accustomed to using more organized systems, such as Dialog and other commercial information services, rather than having to conduct its own searches and data evaluation. It does not appear that Iran would-be “Web surfers” have the requisite skills to do so effectively. The development of Internet use skills have been hampered by the lack of wide-spread and efficient service, which in turn has been checked by several factors, including bureaucratic obstacles, lack of funding, and inconsistent regulation. These conditions have also hindered the development of the technical skills that are required to build and manage an extensive network. It is telling that Iran has hired a Western company, a subsidiary of an American company no less, to implement its Internet expansion plans.

Determinants

As in every country, the subject of the Internet is controversial in Iran, the more so because the government is so concerned about control of domestic and international information flows (Table 70). Both the government and religious community have spoken out against the Internet on more than one occasion, but both have also endorsed the use of the Internet within limits and for specific purposes. The major stated concerns regarding the Internet are the availability of pornography and the general Western “cultural imperialism,” while the potential benefits include the ready availability of foreign information to support domestic research programs and the potential to use the Internet for Iran’s own cultural and religious propaganda. The latter views are tempered by the more pessimistic, and common, view that the West controls the Internet: “Although apparently there are no restrictions on the receipt or transmission of information over the Internet, who can deny the fact that due to the natural backwardness of the Third World and developing countries, equal opportunities for the exchange of information do not exist?”²⁶⁴

Iran’s Deputy Foreign Minister, Javad Zarif, said that “there is stuff on the Internet that people have access to that is as offensive as *The Satanic Verses* and it is updated every day. We believe a certain level of decency must be provided.” That opinion was echoed on the pages of *Zobh*, an Iranian clerical publication, which equated the threat to Islamic values from the Internet to that

²⁶⁴“The Information Technology Barrier,” *Khorasan* (28 November 1996), p. 12, as translated in FBIS-NES-96-238, *Daily Report: Near East & South Asia* (11 December 1996), via World News Connection.

Table 70. Determinant Impact

Determinant Quality	Affected Dimension
State domination of telecommunications sector, despite limited competition policy	Pervasiveness—inhibited by lack of competition Geographic Dispersion—inhibited by emphasis on revenue generation Sectoral Absorption—inhibited by emphasis on public sector Organizational Infrastructure—constrained by monopolist practices
Strained foreign relations	Geographic Dispersion—inhibited by limited investment funds and difficulty in acquiring some equipment
Information control and policies	Pervasiveness—constrained by access limitations and surveillance
Unstable regulatory environment	Pervasiveness—limited by unpredictability of government controls Sectoral Absorption—commercial sector's lack of Internet use is unusual for the region and results from an inability to rely upon consistent and supportive (or at least benign) government regulations Organizational Infrastructure—emergence of potential competitive ISPs inhibited by wavering competition/privatization policy
Emphasis on social equity	Geographic Dispersion—supported to some extent by the Islamic regime's universal access policy, which has resulted in the rapid proliferation of basic telephone services to rural areas
Lack of English language skills	Pervasiveness—limited by a general lack of English language capability, exacerbated by the Islamic regime's anti-American bent, which is only slightly off-set by the development of Persian language tools for the Internet Sophistication of Use—English language proficiency is a pre-condition to developing proficiency in Internet applications
Wide variations in geography	Geographic Dispersion—Rugged and variable terrain and climatic conditions, and the large size of the country, make infrastructure development difficult.
Good and improving telecommunications system	Pervasiveness—the proliferation of basic telephone services at low rates increases the Internet's accessibility Geographic Dispersion—the reach of the Internet expands with the telecommunications network, to which hundreds of villages and millions of lines are added each year Connectivity Infrastructure—the completion of the nationwide fiber optic network by 1999 will provide a high-speed backbone for IP connections, <i>inter alia</i> .
Competing stakeholder communities, no clear champion	Sectoral Absorption—competition between academic sector and the MPTT limits growth and dispersion of academic networks; government ministries and the health sector are faced with uncertainty regarding where to obtain Internet connections Connectivity and Organizational Infrastructures—limited by competition rather than cooperation between academic and government sectors
Strong history of innovation and adaptation	Geographic Dispersion and Connectivity Infrastructure—local development or adaptation of Internet hardware and software is likely Sophistication of Use—Language deficiencies notwithstanding, the presence of a technically proficient and resourceful technical community could speed integration of the Internet into daily life

from direct satellite broadcasting, and called for a ban on all Internet connections.²⁶⁵ The head of the Islamic Propagation Organization, Ayatollah Jannati, also criticized the Ministry of PTT for offering Internet access in Iran.²⁶⁶

These views are countered by more optimistic, and opportunistic, voices, including that of the director of the Ayatollah Gulpaybagane Computer Center in the Iranian holy city of Qom, who has decided to launch his own competition in the religious sphere. His instructors are in the process of converting about 2,000 Islamic instructional documents for presentation via the World Wide Web. Shaykh Ali Korani said that “the Internet is a reality Iran must learn to live with,” and that the main way to counter the Internet’s Western influences and bias is to load it up with information from other cultures. “You can use it in different ways.” he said. “What you make out of it is important, and at the present our leaders have not banned it.”²⁶⁷ The Shaykh did not disclose the address of the web server that would host his center’s documents. The Mayor of Tehran opined that “Maybe in the future we will have to open the curtain surrounding Iran. Ultimately we know we cannot control it mechanically; we will have to control it spiritually.”²⁶⁸

The DCI’s Internet control and censorship plans were explicitly criticized by the High Council of Informatics, which in a recent newsletter accused the DCI of fostering security concerns about the Internet to convince people that only the DCI could protect the Iranian people, as part of its attempt to monopolize telecommunications.²⁶⁹

As is typical in developing countries, the international flow of information is also restricted by circumstances, such as lack of funds for purchasing periodicals or attending international symposia, poor and expensive postal systems, and a general lack of knowledge of what is potentially available, as well as by design, usually in the form of government control on the outward flow of scientific information and inward flow of political opinions. The Iranian academic and research communities are looking for the Internet to address the attendant shortage of scientific information, especially books and publications that cannot generally be purchased due to a shortage of hard currency. The Internet is also viewed as a substitute for foreign travel.²⁷⁰

Some members of both the scientific and religious communities view the Internet as a vehicle for publishing their own findings and points of view, which is also important to cultural authorities. A survey of the Worldwide Web reveals numerous sites dealing with Iran, and extensive information resources. However, virtually none of it originates in Iran, a situation which some Iranians hope to change.²⁷¹ One official, Dr. Hadi Khaniki, advocates making the maximum use of modern communications technologies, especially the Internet—“one of the greatest and most important news and information networks in human life”—to enhance and spread Iranian culture and Islamic concepts.²⁷²

²⁶⁵ Edward Waller, “Boom time for Iranian telecoms,” *Middle East Communications* 11 (November 1996), p. 12.

²⁶⁶ Mashhadi, “Iran on the Internet,” *op. cit.*

²⁶⁷ Farid Mashhadi, “Koran on the Internet,” *Middle East Communications* 12 (July 1997), p. 9.

²⁶⁸ Waller, “Boom time for Iranian telecoms,” *op. cit.*

²⁶⁹ Mashhadi, “Iran on the Internet,” *op. cit.*

²⁷⁰ “The Internet—the First Station in Global Communications,” *Khorasan* (8 July 1996), p. 13, as translated in FBIS-NES-96-139, *Daily Report: Near East & South Asia* (18 July 1997), p. 76.

²⁷¹ *ibid.*, p. 77.

²⁷² *Iran* (4 September 1996), p. 5, as reported in FBIS-NES-97-043, *Daily Report: Near East & South Asia* (6 March 1997), via World News Connection.

Finally, access to the Internet is not entirely a domestic matter, as the Iranian government discovered on two occasions when Iran's Internet access to the United States, which hosts about 80 percent of the world's Web sites, was interdicted. The first occasion was in 1994, shortly after Iran joined the Internet, when the (American) National Science Foundation (NSF), which formerly sponsored the Internet, removed the IP numbers assigned to Iran from its master domain name server. As this deletion propagated throughout the Internet, Iranian Internet users gradually lost the ability to contact foreign Web sites and were unreachable via e-mail from affected countries, principally those in the Western Hemisphere.²⁷³ More recently, in August 1996, following President Clinton's signing of the Iran and Libya Sanctions Act, an employee of the NSF in the Networking and Communications Research and Infrastructure (NCRI) division sent a letter to the University of Vienna (Austria), demanding that the University block the transmission of data packets between the United States and Iran. The University apparently complied, although the order was neither required by the new sanctions act nor legal under existing U.S. or international law. Following angry denunciations of the action by both Americans and resident aliens of Iranian origin, the NCRI Division Director rescinded the disconnection order. The NSF maintained that the employee was acting on his own, and not in an official capacity.²⁷⁴

²⁷³ Mashhadi, "Iran on the Internet," *op. cit.*

²⁷⁴ Declan McCullagh, "Banning Iran," *HotWired* (28 August 1996), <www.netizen.com/netizen/96/35/special3a.html>; George O. Strawn, NCRI Division Director, National Science Foundation <gstrawn@note1.nsf.gov>, "Iran Internet Access," 28 August 1996, distribution list (29 August 1996).

Problems and Prospects

The outlook for further diffusion of the Internet in Iran is uncertain. The principal reason for this uncertainty is the current inability of the government to establish a consistent regulatory environment and unambiguously assign responsibilities. Part of the problem appears to be the “official” telecommunications sector’s late entry in the data communications arena, exacerbated by the MPTT’s drive for monopoly control and maximized profits.²⁷⁵ The Internet, like the remainder of the telecommunications sector and the Iranian government at large, is presently more subject to competing interests and power centers than more apparently pertinent factors like academic and/or commercial potential, national security, legality, or operational efficiency.²⁷⁶

Beyond the bureaucratic/political questions, the prospects for further development of the Internet in Iran appear to be quite good. The basic telecommunications infrastructure is being expanded and up-graded rapidly, with the highest compound annual growth rate in the Middle East (see Table 60, p. 155). The current Five-Year Plan, which runs through 20 March 1999, will see the completion of an extensive nationwide fiber optic network that will provide high-bandwidth connections between all provincial capitals and major cities.²⁷⁷ The December 1997 commissioning of the Trans-Asia-Europe (TAE) “Silk Road” fiber optic network,²⁷⁸ connecting Shanghai, PRC, with Frankfurt-am-Main, FRG, via two redundant lines through northern Iran, will put 33 Iranian cities directly on line with Europe and the Far East and provide high-bandwidth access for the rest of the country.²⁷⁹

Both the academic and commercial sectors appear eager to gain more access to the Internet. If unrestrained, growth in the academic sector is most likely to be in the number of users served at institutions with existing connections in the near term, with additional higher education institutes added as connections become available. Insufficient funding for leased lines is the current bottleneck, although funding for computers and networking equipment are also pertinent issues. Absent restrictive government regulation, growth in the commercial sector is likely to be rapid and large, both in end-users and resellers (ISPs). The availability of funds is not as critical an issue in this sector as it is in the others; uncertainty due to an unstable regulatory and enforcement environment is the stumbling block to further diffusion of the Internet in this sector. Given its wealth and vigor, the commercial sector could easily become the driving force for more rapid development and diffusion of Internet services in Iran.

There has also been some interest in the Internet in government and religious quarters; however, as noted previously, opposition from these sectors is also significant. Government interest thus far

²⁷⁵ Indeed, questions of “control” over the Internet are being addressed in many countries. However, the transition from an academic and government system to a commercial network is going more smoothly, although not problem-free, in countries without a monopoly telecommunications authority/operator.

²⁷⁶ Arabshahi, *op. cit.*

²⁷⁷ Presentation by Reza Rashidi, Deputy Managing Director of TCI for Planning and Development at the “Arab, Middle East, and Gulf GSM ‘95 Conference,” Doha, Qatar (12 November 1995).

²⁷⁸ “TAE cable operational by the end of 1997,” *Middle East Communications* 12 (October 1997), p. 11; “East Asia-Europe Fiber-Optics Phone Cable to Become Operational in 1997,” Xinhua (Bonn) (24 September 1997).

²⁷⁹ The system comprises 1550 nm mono-mode fiber optic cable using synchronous digital hierarchy (SDH) transmission technology operating at the STM-4 (622.080 Mbps) data rate, with the possibility of being speeded up to STM-16 (2.488 Gbps). The system as currently configured will carry 7,560 channels of traffic. All of the cable and transmission equipment used in the Iranian and Turkmen sections of the TAE was manufactured in Iran. See “TAE to use locally-made cable,” *Middle East Communications* 11 (September 1996), p. 5.

has taken the form of interest in gaining access to new sources of information and knowledge, and improved access to existing sources. A key feature of the government's self-sufficiency campaign has been the transfer of technology, which use of the Internet is expected to enhance. What little positive response there has been from the religious sector has taken the form of employing the Internet to promulgate the Iranian Shi'ite views of religion and society. While this appears to be the most reasonable response to "cultural imperialism," the success of this venture is uncertain. With the exception of a single medical college, nothing has been heard from the health sector regarding the Internet. The potential for the Internet to improve both teaching and services in the medical sector suggests that there must be some fundamental reason, such as possibly an overall technical backwardness, for this apparent lack of involvement. Insufficient information is available to assess the prospects for development of health sector involvement with the Internet.

Surprisingly, security issues relative to the Internet have yet to be raised in Iran, where officials and clerics are more concerned about the cultural and moral aspects of Internet use. Security is sure to become a significant concern in the future, if the Internet continues to develop and its use grows in Iran. There is a very large Iranian Diaspora comprising both political and economic emigrants, many of whom are hostile to the current Islamic government. There are additionally numerous opposition movements, both within and outside the country, that could potentially benefit from exploiting an additional communications medium. The largest and most aggressive opposition movement, the *Mojahedin-e Khalq* Organization (MKO), has shown a willingness and capability to make innovative use of information technology in its anti-Islamic regime campaign, such as using the high-power Israeli *Amos* satellite to beam television programming into Iran.²⁸⁰

It may be that security has not been viewed as a problem because of the limited user community and the minimal number of international links. Both conditions would make surveillance, if it is being attempted, less difficult. It is possible, however, that the potential for problems arising out of the use of the Internet by the currently small number of users was not viewed as being worth the cost or trouble of attempting to oversee and censor Internet communications. That someone is aware of at least some of the uses of the Internet that were viewed as inappropriate is attested to by the cutting off of NRI's lines in 1995 and the subsequent enjoinder to avoid prohibited topics. However, that event was triggered by moral rather than security concerns, and there is nothing in the available reporting to suggest that the authorities were alerted to the activity by eavesdropping rather than through informers in some way in contact with some NRI subscribers.

There are few clues, therefore, as to how the security services might react to the proliferation of the Internet and attendant probable misuse—from the security organs' perspective—of that medium. If the current concentration of gateways persists or is consolidated, centralized control, and presumably surveillance, of Internet activities will be less difficult than would be the case should gateways proliferate. For at least legal and bureaucratic reasons, it appears likely that the MPTT will continue its central role in the establishment and operation of international communications links, and that any future expansion of the Internet, even to include the licensing of commercial ISPs, will continue to depend upon government telecommunications links. Thus,

²⁸⁰ Voice of the Islamic Republic of Iran at 1130 GMT on 7 August 1997, as translated in FBIS-NES-97-219, *Daily Report: Near East and South Asia* (8 August 1997) via World News Connection. The satellite broadcasts complemented terrestrial television broadcasting directed at Iran from MKO transmitters in Iraq. Following the reaffirmation by the U.S. Department of State that the MKO was a terrorist organization, the Iranian government protested the MKO's use of the *Amos* satellite to both the Israeli and American governments. MKO's transponder lease was subsequently canceled and the satellite transmissions have ceased.

while commercialization of Internet services could increase the difficulty of monitoring internal communications, the government could maintain a high degree of control over international traffic. The single exception appears to be the academic community. Although IPM is dependent upon the MPTT for negotiation of transponder leases, it operates its own satellite earth station and Internet gateway. As long as there is but a single academic gateway, however, the task of the security services should not be overly difficult.

The question remains as to what, if any, security concerns might arise for the United States or Iran's neighbors, given Iran's ambitions and a postulated increase in Internet connectivity and use. To the extent that use of the Internet expedites Iran's attempts to acquire and assimilate high technology from the West, the proliferation of the Internet in Iran would complicate, and perhaps ultimately foil, Western (mainly American) attempts to prevent Iran from acquiring dual-use high technology equipment and expertise. To the extent, however, that widespread use of the Internet increases contacts between Iranians and the rest of the world, already-developing pressure on the Islamic government to become more democratic and open might be encouraged, thus mitigating any threat from Iran in the long run based on a reduction of hostile/hegemonic intentions, regardless of the country's military capabilities. Whether Iran, or any other country, could and would use the Internet as a basis for directly attacking or influencing other countries remains a moot if hotly-debated question.

Clearly Iran has the technical expertise, industrial base, and commercial requirements to be a major user of the Internet, and possibly a contributor to the Internet's development in the longer term. Before that potential can be realized, however, it must come to terms with its current internal religious and political contradictions. This will certainly be accomplished, but the time frame and peacefulness of this rationalization process are uncertain and causes for concern.