



REPUBLIC OF TURKEY PROJECTS

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REPUBLIC OF TURKEY

Privatization of Türk Telekom

Project Summary

Subsector	Telecommunications
Location	Turkey
Project Cost	Up to US\$5.1 Billion (expected share price)
Export Potential	US\$15 Billion
Project Type	Privatization
Project Executing Agency	Privatization Administration



Project Outline

This project involves the proposed privatization of the Government-owned Türk Telekom through a combination of block sale and global Initial Public Offering. On May 12, 2001, the Turkish Grand National Assembly passed a new law with regards to the privatization of Türk Telekom. At the time of writing this project profile, the law is awaiting approval by the President. The law allows that 100% of Türk Telekom could be privatized except for a golden share retained by the government giving it veto rights over certain strategic issues. The law also stipulates that a foreign strategic investor will not be able to hold more than a 45% share of Türk Telekom.

The activities of Türk Telekom are comprehensive, encompassing PSTN, mobile, cable TV, satellite and marine communications. The Turkish Government earlier accepted a valuation of US\$10 billion for 100% of Türk Telekom's shares. The recent deterioration in its competitive edge versus the mobile networks and the dramatic devaluation in the foreign exchange value of the Turkish Lira together with the introduction of a GSM 1800 system will likely require a modification in the valuation to be agreed prior to the forthcoming tender.

The proposed privatization tender follows two similar previous tenders that failed for a variety of reasons including the lack of acceptable management control and high share valuations. The proposed privatization is apparently an important element of the loan package that has been negotiated with the International Monetary Fund. The sale of the shares is expected to be finalized by the end of 2002.

Türk Telekom is the dominant telecommunications operator in Turkey that provides a variety of services that range from basic voice telephony to value-added services such as Cable TV, Internet and Satellite. Recently, it was awarded a DCS 1800 license, which is expected to commence operations during the first half of 2001. With more than 18 million access lines in service, it is ranked as the 13th largest operator in the world. The following table presents a summary of operating data for Türk Telekom.

At 31 December	1996	1997	1998	1999	2000¹
Access lines in service ('000s)	14,286	15,744	16,807	17,912	18,289
Access line capacity ('000s)	15,812	17,584	18,559	19,679	21,196
Fixed line penetration (%)	23%	25%	27%	28%	28%
Digitalization (%)	78%	82%	83%	84%	85%
Number of employees	73,933	73,177	72,845	72,462	72,412

(1) As of 30 October, 2000

Despite the recent decline in its competitive position due to the increasing popularity of cellular networks, the ability of Türk Telekom to leverage its modernized network through the provision of new services offers the potential of substantial revenue growth. In view of the current profitability of the corporation and its efficiency in areas such as lines per employee, there is significant potential for revenue gains leading to enhanced profitability. The 42% real revenue growth experienced in 1997, which followed a 30% price increase and network growth of 10%, demonstrates substantial market potential.

While Türk Telekom has a high level of teledensity compared to peer group operators in neighboring countries, Turkey spent just 1.8% of reported GDP on telecommunications services in 1997. Another growth prospect for the Turkish telecommunications market relates to international traffic. Due to the widespread Turk population outside the country and its cultural relations in the region, there is a considerable amount of international traffic with other countries. Despite an unbalanced tariff structure, Türk Telekom's international traffic increased by an average of 33% between 1995 and 1997.

Technical Description

A decade of expansion and modernization of the Türk Telekom network has resulted in an infrastructure that has now reached 87% digital at the local exchange level and 97% digital for the transmission network. Following are the principal components of the PSTN network:

	Transmission Infrastructure⁽¹⁾	Switching Infrastructure⁽¹⁾
Local	<input type="checkbox"/> Largely twisted pair	<input type="checkbox"/> 10,884 local exchanges
Long-distance	<input type="checkbox"/> 63,848 km of fiber optic cable <input type="checkbox"/> 9,564 microwave transmitters/receivers	<input type="checkbox"/> 20 first class toll exchanges
International	<input type="checkbox"/> Satellite <input type="checkbox"/> Submarine fiber optic cables <input type="checkbox"/> 18,071 voice and data channels at different speeds	<input type="checkbox"/> 3 international digital gateway switches

(1) As of 30 October, 2000

Türk Telekom uses a mixture of fiber optic and microwave transmission media, largely depending on the topography and traffic needs of each link. The network interconnects the Company's toll exchanges, international exchanges, transit exchanges, and, where necessary, rural exchanges. About 80% of the transmission infrastructure consists of fiber optic transmission media that uses synchronous digital hierarchy ("SDH") operating at 2.4 Gbs and plesiochronous digital hierarchy ("PDH") technology operating at either 140 Mbs or 565 Mbs on some of the higher capacity routes.

In 1995, Türk Telekom began to install SDH equipment in high volume routes (connecting Ankara, Istanbul, and Izmir). Siemens and Alcatel supplied the cable and transmission infrastructure, while Ericsson provided the transmitter/receiver and supervisory electronics. In the future, Phase 3 of the SDH project will result in a nationwide network that will be more resilient against faults and with more efficient capacity utilization. Transmitting at speeds up to 2.5 Gbs, the SDH backbone will enable the system to handle significantly greater volumes of data traffic. The SDH network will be central to the expansion of ATM, frame relay, and IP-based services. In 2001, the main routes of this SDH network will be upgraded to 80 Gbs with the use of DWDM technology.

Digital microwave systems are widely used, covering most of the major traffic destinations and providing back-up to the fiber optic routes. Such links typically operate at 140 Mbs. On high traffic routes, five links have been configured in parallel. Most of the equipment employed uses PDH. Digital microwave systems account for approximately 17% of Türk Telekom's transmission capacity. About 3% of transmission capacity is provided by analogue microwave circuits.

Microwave and satellite systems link Turkey to smaller adjacent countries. The following table shows Türk Telekom's interests in major international transmission links:

Major International Transmission Links					
Name	Type	Origination	Routing	Technology	Capacity
ITUR	Submarine	Istanbul	Italy, Turkey, Ukraine, Russia	PDH	5x565 Mbs
TAE	Terrestrial	Istanbul/Açrı	Germany, Austria, Hungary, Romania, Turkey, Iran, Turkmenistan, Uzbekistan, Afghanistan, Pakistan, China	SDH	622 Mbs
TBL	Terrestrial	Istanbul	Bulgaria, Macedonia, Albania, Italy	SDH	155 Mbs
EMOS-1	Submarine	Marmaris	Italy, Turkey, Israel, Greece	PDH	2x140 Mbs
SEA-ME-WE2	Submarine	Marmaris	Egypt, Saudi Arabia, India, Sri Lanka, Singapore, Indonesia, Algeria, France	PDH	565 Mbs

KAFOS	Submarine	Istanbul	Turkey, Romania, Bulgaria	SDH	2x622 Mbs
SEA- ME-WE 3	Submarine	Marmaris	Western Europe-Asia	DWDM	20 Gbs
Turkey- Syria	Terrestrial	Hatay	Syria	PDH	140 Mbs
Turkey- Greece	Terrestrial	Istanbul/ Keóan	Greece	SDH	622 Mbs

Recently, Türk Telekom has participated in the SEA-ME-WE 3 sub-sea fiber optic cable project, which involves WDM transmission technology, uses SDH network protocols and is capable of transmitting at speeds up to 20 Gbs. Türk Telekom has signed a memorandum of understanding to participate in the US Tycom Global Network ("TGN"), a global submarine fiber optic network and is in negotiations to participate in the French submarine global fiber optic network, Axone.

Türk Telekom employs equipment incorporated into the switching infrastructure in order to facilitate network monitoring and distinguish transmission-related faults from those relating to the switching equipment. The following table shows the switching equipment employed as of October 2000:

Switching Equipment Summary						
Switch	Type	Vendor	No. in Net- work	Position in Network	Subscrib- ers	% Remote Manage- ment
DMS 100 DMS 200 DMS 300	Digital	Netaş	299	Local (100), Toll (200), International (300), Combined Offices: DMS 100/200	5,330,10	70%
S-12	Digital	Teletaş	268	Toll, Transit, Local	5,228,70	75%
EWSD	Digital	Simko	156	Transit, Local	2,431,00	90%
SI-2000	Digital	Iltek	100	Rural (local or combined)	350,145	100%
DICLE	Digital	Netaş	3,737	Rural (local or combined)	2,179,70	100%
FIRAT	Digital	Netaş	51	Rural	14,400	100%
LEVENT	Digital	Teletaş	1,518	Rural	593,693	100%
ANADO	Digital	Simko	1,640	Rural (local or	1,364,04	100%

LU				combined)		
ELIF	Ana- logue	Netaş	2,973	Rural	938,944	100%
AXE	Digital	Ericsson	20	Local	210,176	-
X-BAR	Ana- logue	Netaş (NT)	122	Local/Transit	1,719,71	-

Türk Telekom is undertaking a major project to deploy SS7 signaling across its network and by October 2000 had implemented SS7 on 414 exchanges. Projects are also underway to increase the degree of centralization in the billing process and to provide on-line links between the billing computers and the switches that being installed in four regions.

Türk Telekom operates different types of systems for providing management and control over its switching infrastructure depending on the switch type and location. Centralized exchange maintenance and control systems are located in the major cities. Two different systems are in operation: one supports the Siemens-based switches, and the other (supplied by a local company, Meteksan) supports the Nortel and Alcatel-based switches. The two systems result in some duplication of functions, with two centers in Istanbul, two in Ankara, one in Izmir, and one in Adana. Smaller PC-based systems are used to support the switches in Mersin, Antalya, Konya, Bursa, Samsun, and Istanbul. Türk Telekom is installing a custom made rural system developed by Ericsson and Netaş to support rural area centralized maintenance centers. The system provides remote supervisory and diagnostic facilities as well as remote management. 79 such systems have been deployed serving almost all the rural exchanges in service.

Most of the local access network employs copper twisted pair links from the local exchange level to the customer premises. The typical local loop infrastructure makes limited use of concentrators in urban areas, although junction boxes are used to route twisted pairs through one breakout point. In rural areas, local loop is commonly connected directly to the rural exchanges without passing through remote concentrators. In 1999 wireless local loop systems were deployed in rural and industrialized areas where rapid expansion has led to urgent demand for telecommunications facilities. About 62,000 lines using wireless local loop technologies were expected to be in use by the end of January 2001.

Project Site

The privatization process involves the entire Türk Telekom network throughout Turkey. The corporate headquarters are based in Ankara.

Project Status/Timeline

The sale tender for a 20% stake of Türk Telekom to a strategic technical partner was issued on June 13, 2000. A number of domestic parties expressed interest but the tender

for the 20% stake could not be finalized. A second tender was issued on December 13, 2000 offering for sale a 33.5% share block reserved for a foreign strategic technical partner with enhanced management rights. While various Turkish groups showed interest, the international telecommunications operator criteria were not fulfilled.

Several factors that have apparently contributed to the failure of these tenders including the inadequacy of the number of shares offered for sale, the lack of full management control for the strategic partner and the erosion of the competitive position of the PSTN business versus the mobile operators in the international telecommunications arena.

The privatization of Türk Telekom remains a prominent element in the Turkish government's privatization agenda. On May 12, 2001, the Turkish Grand National Assembly passed a new law with regards to the privatization of Türk Telekom. At the time of writing this project profile, the law is awaiting approval by the President. The following stipulations are included in the law:

- 100% of Türk Telekom could be privatized except for a golden share retained by the government giving it veto rights over certain strategic, national security issues.
- 5% of Türk Telekom shares will be sold to employees and retail investors through a domestic IPO. The sales strategy for the remaining shares will be decided by the Council of Ministers in the near future.
- Foreign real and legal persons cannot possess more than 45% of the shares of Türk Telekom.
- The Turkish telecommunications industry will be fully liberalized when the state's share in Türk Telekom falls below 50%, even if this occurs prior to the December 31, 2003 deadline.
- When the government's share in Türk Telekom falls below 50%, all civil servants working for Türk Telekom will be transferred to other state owned enterprises.
- All rights of the Ministry of Transportation related to telecommunications concessions and licenses are transferred to the independent Telecommunications Authority.

Equipment and Services

This project relates to the sale of equity shareholding only. While there are no immediate prospective sales opportunities of related IT or telecommunications equipment or services associated with this equity sale, the Turkish government is actively pursuing the involvement in this tender of the "Baby Bells". Should one of those U.S. fixed network operators successfully bid for control of Türk Telekom, long-term sales opportunities for American telecommunications equipment, software and service providers will be substantially enhanced. For the purposes of this project outline, potential exports over five years are estimated to be \$15 billion. This amount includes potential sales of GSM 1800 infrastructure equipment related to the establishment of Türk Telekom's recently licensed cellular network company.

U.S. Competitiveness

The Turkish government is primarily interested in considering investment offers from firms with direct experience in operating significant scale fixed telecommunications networks. The government is hoping to attract the interest of one of the so-called “Baby Bells” to participate in the bidding process.

Project Financing

The corporation is profitable and capable of funding its ongoing expansion programs.

Conclusion

Potential strategic U.S. technical investors are actively encouraged by the Turkish authorities to participate in this revised third privatization tender. The Turkish government is determined to go ahead with the privatization of Türk Telekom. If the political will continues to be supportive of these new proposals, the envisaged privatization could attract several bidders and ultimately be successful after two earlier false starts.

Key Decision Makers

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REPUBLIC OF TURKEY

IT Procurement for Phase II of the Basic Education Project

Project Summary

Subsector	Information Technology
Location	Turkey
Project Cost	US\$2,000+ Million
Export Potential	US\$100+ Million
Project Type	Equipment Procurement
Project Executing Agency	Ministry of National Education



Project Outline

This project relates to the procurement of computer hardware and software for basic education schools throughout Turkey.

The goal of the World Bank funded Basic Education Project is to increase the effectiveness and capacity of basic education schools in Turkey (schools for grades prior to secondary school). The objectives of the project are to: (a) expand enrollment in basic education schools; (b) train teachers, school principals and inspectors; (c) provision of hardware, software, and training for information technology in basic education schools; (d) develop central and provincial implementation capacity to carry out the program; (e) create a mechanism to monitor and evaluate the outcomes of the program; (f) reconstruct and rehabilitate educational facilities for preschool, basic education and secondary education that were destroyed or damaged in the Marmara earthquake; and (g) resume education in the areas affected by the earthquake.

The Information Technology (IT) procurement of hardware and software is for the establishment of IT classrooms in schools throughout Turkey. During Phase I of the project, an IT classroom was set up in 2,802 schools. During Phase II (the upcoming procurement phase) an IT classroom will be established in 81 provinces in 3,000 schools. 5,000 rural schools will be provided with one or two PCs and one printer based on the number of schools.

Technical Description

For each IT classroom, the project will provide on average 15 personal computers and monitors, software, one server, one scanner, one printer, modems and other peripherals (i.e. overhead projectors and televisions).

The overall goal of the IT component of the Basic Education project is to increase computer literacy in basic education schools throughout Turkey and to enhance learning

by using IT as a productive tool across the basic education curriculum. Phase I of the project began in 1998 and was scheduled for closure in June 2001, but it has been extended for a year to allow for full disbursement of the first tranche of the loan. In the 81 provinces covered by the project, there are 16,000 primary schools with eight grades and 30,000 schools in rural areas with fewer than eight grades. The main focus of the Basic Education project is on the schools with eight grades. Phase I of the project identified at least two schools in each sub-province in which to establish an IT classroom. IT classrooms were phased in first to existing schools in sub-provinces with high student populations, then to regional basic education boarding schools, and subsequently to remaining basic education schools. Phase II of the program will identify 3,000 new schools in which to establish an IT classroom. While internet connectivity is not a funded portion of the project, there is a potential future need for such capability for each IT classroom. At present, parent associations have funded internet connectivity for some IT classrooms established during Phase I. All 2,082 schools have had interconnectivity in Phase I and it is expected that the 3,000 schools in Phase II will have it as well.

Project Site

The IT procurement will be used to set up IT classrooms in schools in 81 provinces throughout Turkey.

Project Status/Timeline

While Phase II of the financing has yet to be finalized, discussions between the Ministry of National Education and the World Bank are underway. One of the triggers for closing out Phase I is preparing the tender of the Phase II IT procurement. While, the tender could be released as early as September 2001, it is not expected to be released later than January 2002.

Equipment and Services

For each of the 3,000 planned IT classrooms, the project will provide on average 15 personal computers and monitors, software, one server, one scanner, one printer, modems and other peripherals (i.e. overhead projectors and televisions). Each package of equipment (which includes multiple schools) will also include routers, hubs, switching hubs, and cabling. Firms providing equipment will also need to provide initial operational training for the equipment and software at each IT classroom site (i.e. 1-3 days). Firms providing bids will be rated on the type of equipment the firm can provide and the firm's maintenance and technical support capacity.

IT Procurement under Phase I was divided into 10 packages (each package included equipment for a set number of schools) and any one firm could not win more than three

packages. Because Phase II is somewhat larger than Phase I, the Ministry expects that there will be a few additional packages, but the package size will remain the same as under Phase I.

U.S. Competitiveness

U.S. hardware and software companies are well situated to provide at least some of the procurement needs for the project. Under Phase I, four firms provided packages of equipment: three Turkish firms and one French firm. The Ministry is open to the introduction of U.S. technology and would welcome U.S. companies among the bidders. In fact, in some other unrelated tenders in the Ministry there have been no response received for tenders.

Project Financing

Financing of Phase II has not been published yet since the Phase II disbursement by the World Bank has not been finalized. According to a senior Ministry official, it will most likely be similar to the Phase I financing. As an illustration that financing was as follows:

Government of Turkey – US\$2,021.7 million
Provincial Administration – US\$41.7 million
IBRD (World Bank) – US\$300.0 million
National Donors – US\$151.8 million

The World Bank loan for Phase II will again be US\$300 million. Even with the present economic crisis in Turkey, education remains one of the top priorities of the government of Turkey with the Ministry's budget equaling about 4% of the country's GNP. Therefore, the Ministry of National Education does not expect its budget to be cut and should not affect the procurement for the IT classrooms.

Conclusion

U.S. companies are in a good position to provide the IT hardware and software needed for the 3,000 IT classrooms to be established in Phase II of the Basic Education project. The Ministry of National Education has also indicated that they would like to see U.S. companies as part of the tender process. The Ministry is also in discussion with the World Bank for the development of a new project for Secondary Education. The Secondary Education project will have a large IT component similar to Phase II of the Basic Education project. Positive exposure by U.S. companies during the tender for Phase II of the Basic Education project could put U.S. companies in a good position to participate in any IT tenders under the Secondary Education project.

Key Decision Makers

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REPUBLIC OF TURKEY

Bus and Ferry Fleet Tracking and Management System

Project Summary

Subsector	Information Technology
Location	Izmir, Turkey
Project Cost	US\$2 Million
Export Potential	US\$1.2 Million
Project Type	Transit Tracking System
Project Executing Agency	Greater Izmir Municipality



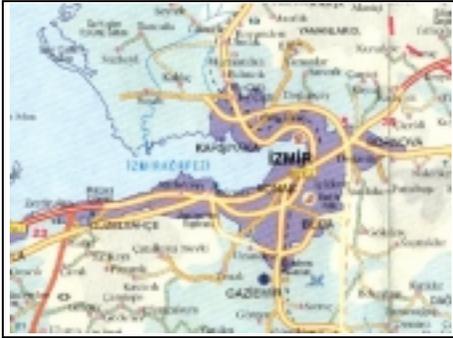
Project Outline

After Istanbul and Ankara, Izmir is the third largest municipality in the Republic of Turkey. The collective public transit operations of the Greater Izmir Municipality transport about one million passengers each day on 1,500 buses, 21 ferries and 11 kilometers of Light Rail Transit (LRT) line.

The proposed project is an important element in the Municipality's upgrade of its transit system. This project will focus on service scheduling and the monitoring components of the integration. The Bus and Ferry Fleet Tracking and Management System will include:

- Bus fleet scheduling;
- Crew scheduling;
- Automatic vehicle location;
- Monitoring of maintenance associated with the municipal bus fleet;
- Schedule adherence (regularity);
- Data transfers; and
- Passenger information systems at bus stops, stations, piers and on-vehicles to provide information on the status of buses and ferries.

Technical Description



When fully implemented, the enlarged transit network, which is expected to cost \$400 million, will convey one million passengers per day. An integral element of the expansion project will be the proposed Bus and Ferry Fleet Tracking and Management System.

Project Site

The project will cover the entire bus and ferry operations of the Greater Izmir Municipality in Turkey.

Project Status/Timeline

The project is relatively advanced, but several strategic viability issues still need to be finalized. Project implementation is expected during the course of the next year.

Equipment and Services

In order to implement the tracking system the municipality will need the following equipment:

- Software and hardware necessary for automatic vehicle location, bus fleet scheduling, crew scheduling, schedule adherence, monitoring of maintenance associated with the fleet of municipal buses, and passenger information systems;
- Global Positioning System; and
- Telecommunications system to support the tracking system.

U.S. Competitiveness

U.S. technology in this sector is well-regarded by the municipality's chief engineer and project sponsor, Ismail Hakkı Acar, who is a key decision-maker in this procurement that will ultimately be tendered according to municipality requirements. As the process of fully defining the technical requirements of the envisaged tracking system is on-going, prospective U.S. system suppliers might cooperate with the Greater Municipality of Izmir

to define those needs and in the process establish a competitive edge over their competitors. Outstanding viability study elements include:

- Analysis, review and evaluation of the existing bus and ferry tracking management system (hardware, software, operations and management);
- Definition of vehicle tracking system objectives and structure;
- Definition of system requirements (upgrading and/or renewing hardware, software, etc.); and
- Definition of project specifications, feasibility and schedule of implementation.

Project Financing

According to the project sponsor, the Greater Municipality of Izmir has the financial resources to undertake the entire procurement. Mr. Acar suggested, however, that the municipality might be willing to consider alternate funding strategies that could include build-operate-transfer, “service providing”, out-sourcing, etc.

Conclusion

The project sponsor is familiar with USTDA and is well disposed towards the introduction of U.S. technology and systems and software in expanding the transit system of the Greater Municipality of Izmir.

Key Decision Makers

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REPUBLIC OF TURKEY

Electronic Fare Collection System Upgrade

Project Summary

Subsector	Information Technology
Location	Izmir, Turkey
Project Cost	US\$6 Million
Export Potential	US\$4 Million
Project Type	Rapid Transit Fare Collection
Project Executing Agency	Greater Izmir Municipality



Project Outline

Izmir is the third largest municipality in the Republic of Turkey (after Istanbul and Ankara). The collective public transit operations of the Greater Izmir Municipality transport about one million passengers each day on 1,500 buses, 21 ferries and 11 kilometers of Light Rail Transit (LRT) line.

The Municipality has completed an integrated electronic fare collection system and a distance-based staged fare structure covering all transit modes. The Municipality will take over 80 km. of existing commuter rail operations, upgrade and integrate it with the existing transit systems.

The proposed project will focus on reviewing and upgrading of the existing electronic fare collection system's hardware, software, operations and management with the addition of the commuter rail operations.

Technical Description



The future expansion of the light rail transit system is predicated on piggy backing on the existing national rail infrastructure within the municipality and will cover more than 80 kilometers of track. Discussions in this regard are ongoing with the national railway corporation and the Transport Ministry.

When fully implemented the enlarged transit network, which is expected to cost \$400 million, will convey one million passengers per day. An integral element of the

expansion project will be the light rail transit ticketing system project that is intended to replace an existing outdated system.

Another important element of the proposed transit expansion project and the related fare collection project is the proposed integration of bus routes and parking areas to alleviate existing traffic and parking congestion. This project is necessitated by the increased scale and large number of zones of the proposed transit system compared with the existing system.

Project Site

The project will cover bus, light rail transit, ferry, commuter rail, and parking (including park-and-ride parking lots) operations of the Greater Izmir Municipality.

Project Status/Timeline

The project is quite advanced, but several strategic viability issues still need to be finalized. Project implementation is expected during the course of the next year.

Equipment and Services

No determination has been made about the kind of technologies or applications to utilize at this stage. One solution under consideration by the project sponsor would be to examine the use of close proximity smart card technology that will allow charges to be made relative to the zones of travel. As an alternative, one prominent Turkish bank has expressed interest in providing the requisite technology for free in exchange for allowing daily revenues to be used by the bank for a minimum period of four consecutive days. This proposed solution is a reflection of the high real interest and inflation rates prevailing in Turkey early in 2001.

U.S. Competitiveness

U.S technology in this sector is well-regarded by the municipality's chief engineer and project sponsor, Ismail Hakkı Acar, who is a key decision-maker in this procurement that will ultimately be tendered according to municipality requirements. As Mr. Acar is still in the process of fully defining the technical requirements of the envisaged fare collection system, prospective U.S. system suppliers might consider cooperating with the Greater Municipality of Izmir to define those needs and in the process establish a competitive edge over their competitors. Outstanding viability study elements required by Mr. Acar include:

- Analysis, Review and Evaluation of the existing electronic fare collection (EFC) system (hardware, software, operations and management);
- Definition of new fare collection objectives and structure;
- Definition of system requirements (upgrading and/or renewing hardware, software, etc.);
- Defining specifications, costs, feasibility and implementation schedule of the system improvement; and
- Possible use of fare collection data as a part of management information and control system for all transit operations.

Project Financing

According to the project sponsor, the Greater Municipality of Izmir has the financial resources to cover the procurement. Mr. Acar suggested, however, that the municipality might be willing to consider alternate funding strategies that could include build-operate-transfer, “service providing”, out-sourcing, etc.

Conclusion

The project sponsor is familiar with USTDA and is well disposed towards the introduction of U.S. technology and systems and software in the expanding transit system of the Greater Municipality of Izmir.

Key Decision Makers

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REPUBLIC OF TURKEY

Urban Parking Management and Operations

Project Summary

Subsector	Information Technology
Location	Izmir, Turkey
Project Cost	US\$2.5 Million
Export Potential	US\$1.2 Million
Project Type	IT in Parking Management
Project Executing Agency	Greater Izmir Municipality



Project Outline

Izmir is the third largest municipality (after Istanbul and Ankara) in the Republic of Turkey. The collective public transit operations of the Greater Izmir Municipality transport about one million passengers each day on 1,500 buses, 21 ferries and 11 kilometers of Light Rail Transit (LRT) line.

The Izmir Municipality proposes to develop an integrated electronic fare collection system and a distance-based staged fare structure covering all transit modes. The municipality is negotiating with the state corporation responsible for railways to take over 80 kilometers of rail line within its boundaries. If the proposal is accepted, that rail line will be upgraded and integrated with the existing transit systems.

The Izmir Municipality intends to acquire up-to-date information and electronic control technologies to solve acute parking management problems in the urban core. The city urgently needs an urban parking investment and operations plan and a management system based on information technology applications.

Technical Description



The future expansion of the light rail transit system is predicated on piggy backing on the existing national rail infrastructure within the municipality and will cover more than 80 kilometers of track. Discussions in this regard are ongoing with the national railway corporation and the Transport Ministry.

When fully implemented the enlarged transit network, which is expected to cost \$400 million, will convey one million passengers per day. An integral element of the expansion project will be the light rail transit ticketing system project that is intended to replace an existing outdated system.

Another important element of the proposed transit expansion project and the related fare collection project is the proposed integration of bus routes and parking areas to alleviate existing traffic and parking congestion. This project is necessitated by the increased scale and large number of zones of the proposed transit system compared with the existing system.

The municipality will need software and hardware to implement the parking and management control system as well as the technology to set up electronic parking information boards and a control center. In addition, the municipality will need to develop parking strategies and policies and a parking investment and operations plan.

Project Site

The project will concentrate in the central business areas of the Greater Izmir Municipality.

Project Status/Timeline

The project conceptualization is relatively advanced, but several strategic viability issues still need to be finalized. Project implementation is expected during the course of the next year.

Equipment and Services

In order to implement the tracking system the municipality will need the following equipment:

- Hardware and software for the parking management and control system; and
- The infrastructure and technology for electronic Parking Information Boards and a central Control Center for parking management.

U.S. Competitiveness

U.S. technology in this sector is well-regarded by the municipality's chief engineer and project sponsor, Ismail Hakkı Acar, who is a key decision-maker in this procurement that will ultimately be tendered according to municipality requirements. As Mr. Acar is still in the process of fully defining the technical requirements of the envisaged parking management and control system, prospective U.S. system suppliers might consider cooperating with the Greater Municipality of Izmir to define those needs and in the process establish a competitive edge over their competitors. Outstanding viability study elements required by Mr. Acar include:

- Definition of new parking management and control system objectives and structure;
- Definition of system requirements (upgrading and/or renewing hardware, software, etc.); and
- Defining specifications, costs, feasibility and implementation schedule of the system improvement.

Project Financing

According to the project sponsor, the Greater Municipality of Izmir has the financial resources to cover the procurement. Mr. Acar suggested, however, that the municipality might be willing to consider alternate funding strategies that could include build-operate-transfer, "service providing", out-sourcing, etc.

Conclusion

The project sponsor is familiar with USTDA and is well disposed towards the introduction of U.S. technology and systems and software in the expanding transit system of the Greater Municipality of Izmir.

Key Decision Makers

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REPUBLIC OF TURKEY

EasyBridge Software

Project Summary

Subsector	Telecommunications and Internet
Location	Istanbul, Turkey
Project Cost	US\$0.5 Million
Export Potential	Subject to negotiation
Project Type	Software Development
Project Executing Agency	Oxygen Technology Development



Project Outline

Oxygen Technology Development was established in September 2000 with the main objective of developing new technologies and providing services in the emerging fields of mobile communication and Internet. Oxygen is a member of the Rumeli industrial holding group that also comprises one of Turkey's leading GSM mobile network operators as well as a number of television and print media companies. Oxygen is, therefore, able to take advantage of the readily available testing ground of cross-technology opportunities. It offers telecommunications and Internet applications to fixed and wireless network operators, service providers, content providers and corporations throughout the world. Oxygen also offers a range of turn-key project integration and advisory services in these fields.

Oxygen partners with other technology providers world-wide. HP, Cisco, Motorola, NX, AePona and Emblaze are among these companies. New partners are welcomed to complement the product range, for joint development activities and co-marketing.

EasyBridge provides its operators with a complete solution in the development of content providing applications over various service delivery channels, e.g. web, WAP, SMS, and IVR. Its aim is to replace application development activity with a simple service definition step through a Graphical User Interface (GUI). The services created by the GUI can be further modified/enhanced by adding/modifying scripts or Java classes that are generated by the platform.

Technical Description

The product functionality of EasyBridge can be illustrated in three main areas. The **presentation layer** carries out the presentation of the services enabling smooth two-way interaction between the system and the end user. It is responsible for understanding the medium through which the service requests are originating and the results are to be delivered with the associated conversion/translation activity.

The **service core** is responsible for providing content-based services. Utilities are the necessary management tools for the whole application to run smoothly by enabling all monitoring, access control and other maintenance/administration related functions. It enables the conversion of the service definitions made through GUI (or other) to the actual code (Java classes). They cover html/wml generators for defined services, a service creation tool for GUI-based creation of new services and a stand-alone application for generating external triggers to the service core. The framework provides two basic service types:

- **Request/response services** - A dictionary service that translates the requested word into a specified language (English, French, German, etc.) or a melody service to download a specified melody file to a mobile phone upon request from the subscriber. Other customer services might include foreign currency, cinema, lotto, and pharmacy; and
- **Trigger Services** - These **comprise** three main categories:
 - Data trigger services are “triggered” by the change in the content such as a notification to subscribers of stock exchange prices;
 - Time trigger services are services that are time triggered at a specified time; and
 - External trigger services are those services that are activated by external applications such as administrative usage, where the service core provides an interface for generating external triggers.

The third main area relates to utilities where a framework provides a scripting language for defining individual services. Each service has one script, which describes the control flow during service definition/deletion/execution/user-registration. Service definition assumes bi-directional flow of data between the presentation layer (delivery agents) and the service core. Information from a delivery agent to the service core constitutes a service name and a list of parameters, whereas information from the service core to the presentation layer consists of a multi-part message with the possibility of having a different content type for each individual part. It is up to the relevant agent to present multiple message parts in a delivery specific manner (sending multiple SMSs or preparing a wml card for each line, etc).

Notebook	Software Development & Project Follow
Standard PC software	Windows 2000, Office Pack
Ultra 60	Software Development
Ultra 10	Software Development
Ultra 5	Software Development

It is not expected that there will be significant purchases of equipment associated with this opportunity.

U.S. Competitiveness

The project sponsors are interested in gaining the participation of a strategic technical partner to cooperate in the development of this and other software products. This activity will be of interest to companies involved in the development of applications for SMSCs, IVR, WAP and Internet.

Project Financing

Project Financing Component	Way of sponsoring
1. Oxygen	Internal funds
2. Telsim	Provides real time testing environment
3. Turkish Technical and Scientific Research Council	May provide research and development support

The company is a small, technology, focused company that welcomes discussions with prospective foreign technical partners relating to financial participation and/or development lab assistance (hardware/software/development licenses, etc.) on this and other software products under development.

Conclusion

All ISPs, ASPs and telecom operators willing to launch value added services based on SMS, IVR, WAP and Internet are potential customers for the envisaged product. Apart from the sales opportunities, joint development and marketing activities with other technology developer companies such as multi-media application vendors are welcomed.

Oxygen is a technology development company that views interaction with U.S. technology companies in two possible ways:

- **Partnership in joint development and/or in product integration** - Joint development will allow both parties to complement each other by utilizing their respective strengths in specific areas. Oxygen believes that its skill set in telecommunications technologies, specifically in intelligent networks and softswitch,

and also in Internet and Internet applications, is a very strong asset in that scenario. Product integration will allow both parties to rapidly enhance their own products. The resulting products will be more complementary and compatible in the market. Oxygen's products utilize an open architecture and public APIs that allow integration with other similarly open products.

- **Co-marketing and/or reseller agreements** – Oxygen's target market comprises telecom operators, Internet service providers, application service providers and corporations worldwide. The company is willing to join in co-marketing activities or in reseller agreements with companies that are related to its industry and preferably with companies with which it partners. The company is of the view that opportunities in the U.S., Europe, Middle East, Turkey and NIS countries are large and believes that co-marketing or re-seller agreements would allow the exploitation of those opportunities.

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REPUBLIC OF TURKEY

INOX-O – Intelligent Network Services

Project Summary	
Subsector	Telecommunications and Internet
Location	Istanbul, Turkey
Project Cost	US\$1 Million
Export Potential	Subject to negotiation
Project Type	Software Development
Project Executing Agency	Oxygen Technology Development



Project Outline

Oxygen Technology Development was established in September 2000 with the main objective of developing new technologies and providing services in the emerging fields of mobile communication and Internet. Oxygen is a member of the Rumeli industrial holding group that also comprises one of Turkey's leading GSM mobile network operators as well as a number of television and print media companies. Oxygen is, therefore, able to take advantage of the readily available testing ground of cross-technology opportunities. It offers telecommunications and Internet applications to fixed and wireless network operators, service providers, content providers and corporations throughout the world. Oxygen also offers a range of turn-key project integration and advisory services in these fields.

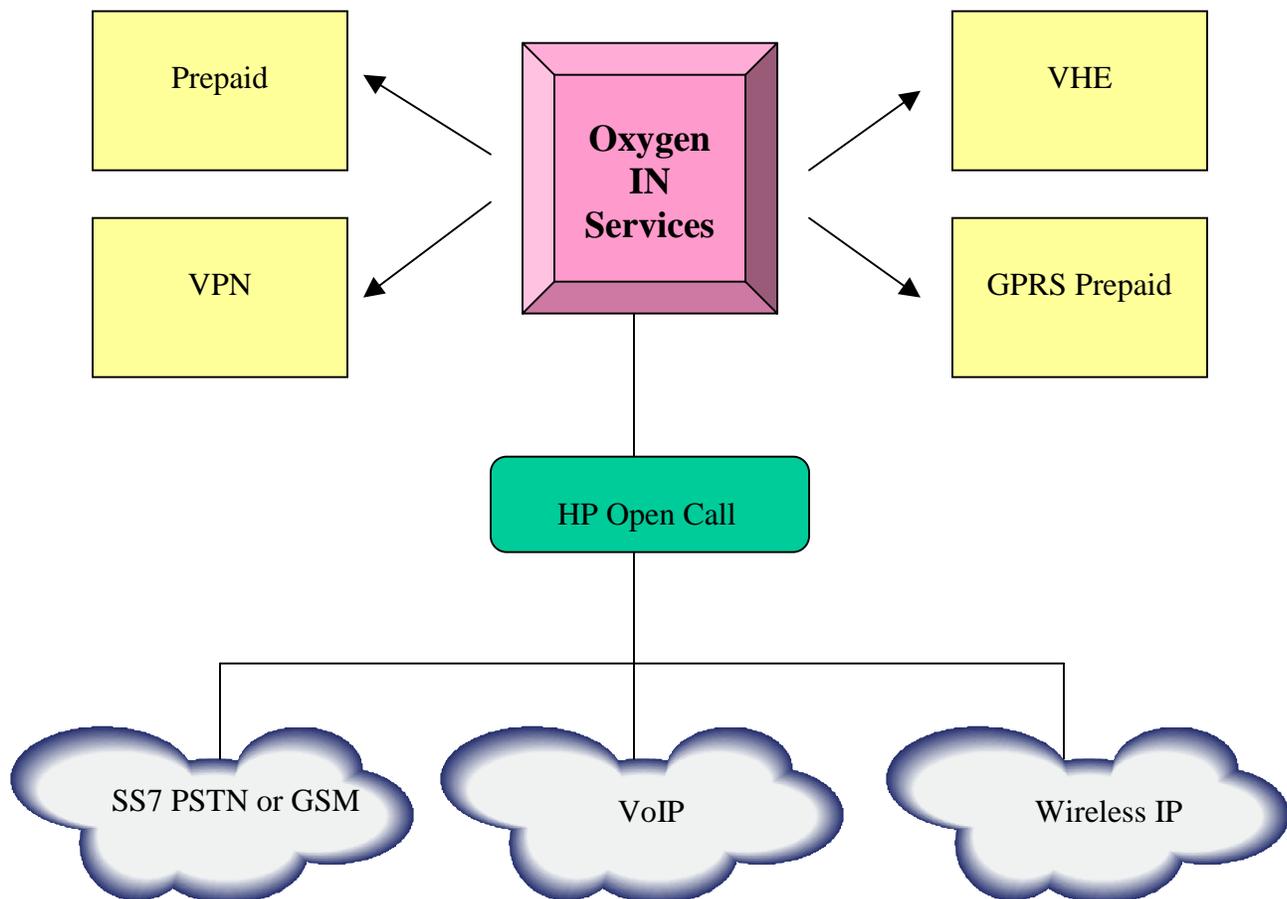
Oxygen partners with other technology providers world-wide. HP, Cisco, Motorola, NX, AePona and Emblaze are among these companies. New partners are welcomed to complement the product range, for joint development activities and co-marketing.

This project involves Intelligent Network (IN) Services development using HP Open Call IN Platform. Those services might be network independent (GSM, PSTN, GPRS, IP) IN Services such as Prepaid, Prepaid with roaming capability, Prepaid supporting GPRS network, VPN, and IP services such as Click to Dial.

Technical Description

Primary project elements include:

- Oxygen Services** Prepaid service;
Prepaid service with roaming capability that supports Camel Phase 2;
Prepaid supporting GPRS network using Camel Phase 3;
Virtual Private Network – VPN;
Click To Dial; and
Virtual Home Environment – VHE.
- HP Open Call Platform** SEP – Service Execution Platform;
SMP – Service Management Platform; and
SCE – Service Creation Environment.
- Other Elements** SMSC – Short Message Service Center;
IVR – Interactive Voice Record;
Web server for Graphical User Interface; and
Application Server for SMSC Interface.



Project Site

The project will be based in Istanbul, Turkey. The finished software product will be sold worldwide.

Project Status/Timeline

Time line and basic milestones of the project are shown below:

Phase	
1. Project start date	02 January 2001
2. Prepaid service completion	30 June 2001
3. Prepaid service with reverse charging completion	30 September 2001
4. Prepaid service with roaming completion	30 December 2001
5. Prepaid service for GPRS networks completion	30 March 2002

Equipment and Services

The following equipment will be used for the software development:

- 2 or 3 SCE – Service Creation Environment (HP-UX WS, HP OC SCE software);
- 1 SEP – Service Execution Platform for Test-bed (L1000 in a rack, telecom signaling Unit, HP OC SEP Software, [10 TPS]);
- 1 SMP – Service Management Platform for Test-bed (L1000 in a rack, HP OC SMP software, [10 DBP]); and
- 1 UNIX WS to be used for web server and application server.

This proposed project would primarily require services that will be negotiable on the part of prospective investors and/or development partners.

U.S. Competitiveness

The project sponsor welcomes the participation of U.S. partners in the development of this and other related software.

Project Financing

Project financing components are as follows:

Project Financing Component	Way of sponsoring
1. Oxygen	Internal Funds
2. HP	Development Lab
3. Telsim	Provides real time testing Environment
4. Turkish Technical and Scientific Research Council.	Research and Development support may be available

The company is a small, technology, focused company that welcomes discussions with prospective foreign technical partners relating to financial participation and/or development lab assistance (hardware/software/development licenses, etc) on this and other software products under development.

Conclusion

All network operators in U.S. that are using or want to use IN platforms and services are targets for sales opportunities.

Oxygen is a technology development company that views interaction with U.S. technology companies in two possible ways:

- **Partnership in joint development and/or in product integration** – Joint development will allow both parties to complement each other by utilizing their respective strengths in specific areas. Oxygen believes that its skill set in telecommunications technologies, specifically in intelligent networks and softswitch, and also in Internet and Internet applications, is a very strong asset in that scenario. Product integration will allow both parties to rapidly enhance their own products. The resulting products will be more complementary and compatible in the market. Oxygen's products utilize an open architecture and public APIs that allow integration with other similarly open products.
- **Co-marketing and/or reseller agreements** – Oxygen's target market comprises telecom operators, Internet service providers, application service providers and corporations worldwide. The company is willing to join in co-marketing activities or in reseller agreements with companies that are related to its industry and preferably with companies with which it partners. The company is of the view that opportunities in the U.S., Europe, Middle East, Turkey and NIS countries are large and believes that co-marketing or re-seller agreements would allow the exploitation of those opportunities.

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REPUBLIC OF TURKEY

INOX-P – Intelligent Network Services

Project Summary

Subsector	Telecommunications and Internet
Location	Istanbul, Turkey
Project Cost	US\$0.8 Million
Export Potential	Subject to negotiation
Project Type	Software Development
Project Executing Agency	Oxygen Technology Development



Project Outline

Oxygen Technology Development was established in September 2000 with the main objective of developing new technologies and providing services in the emerging fields of mobile communication and Internet. Oxygen is a member of the Rumeli industrial holding group that also comprises one of Turkey's leading GSM mobile network operators as well as a number of television and print media companies. Oxygen is, therefore, able to take advantage of the readily available testing ground of cross-technology opportunities. It offers telecommunications and Internet applications to fixed and wireless network operators, service providers, content providers and corporations throughout the world. Oxygen also offers a range of turn-key project integration and advisory services in these fields.

Oxygen partners with other technology providers world-wide. HP, Cisco, Motorola, NX, AePona and Emblaze are among these companies. New partners are welcomed to complement the product range, for joint development activities and co-marketing.

The INOX-P project aims to fulfill requirements of independent and Innovative Intelligent network (IN) Services using Parlay standards. Parlay is an application layer API that offers a new level of abstraction from underlying network technologies. Applications can be developed much more rapidly to the Parlay standards and are independent of the bearer network on which they are to be provisioned and of the type of the constituent network nodes.

While network independent prepaid solutions will be the first IN application developed as a part of this project, other applications such as telephony, IP and multimedia based applications for current and next generation telecommunications networks are also planned. The flexibility of the Java based application development environment facilitates time to market for the implementation of new telecommunications functionality that represents a new paradigm for value added services.

Applications developed by Oxygen will be deployed using a Parlay Gateway to access network functionality in a secure and consistent manner. Parlay standards have been adopted by Oxygen as the basis of their specifications to perform an Open Service Architecture.

Technical Description

Primary project elements include:

1. Development of Oxygen Parlay Client that includes the following sub items:

- Oxygen Java Parlay Client APIs;
- Oxygen Service Supervisor;
- Oxygen Call Processing; and
- Oxygen Charging.

These components will be developed with OO Design Methodologies, and Java will be used as the programming language.

2. Development of Oxygen User Interaction Manager and OAM that includes the following sub items:

- OAM and User Interaction Manager;
 - Web Server
 - SMS Manager
- IVR; and
- Banking Interface Handler.

This part of the project contains not only OAM functionality, but also handles the user interactions that have not been regulated by Parlay yet. As the interactions are regulated, corresponding functions will be replaced by an application that will be residing in Oxygen Parlay client.

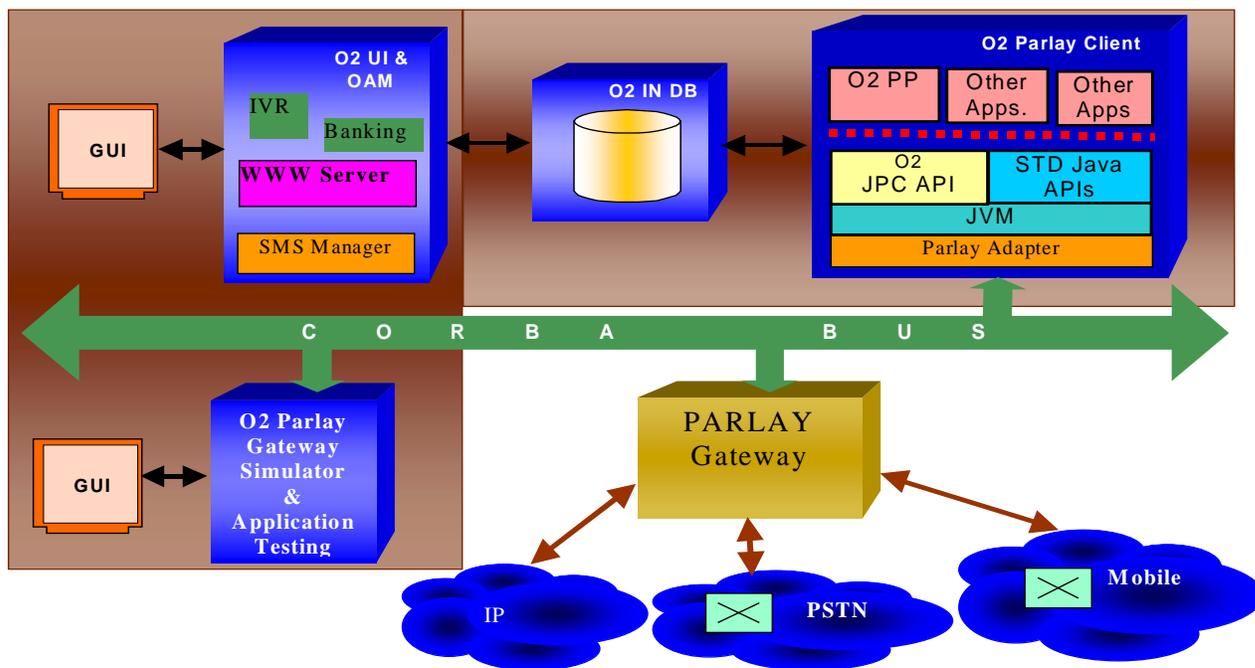
3. Development of Oxygen DB and related functionality. Oxygen DB is an Oracle database server that hosts the IN Application and platform specific data. A distributed, synchronized data base access is allowed.

4. Development of Oxygen Parlay Gateway Simulator and Application Tester. Oxygen Parlay Gateway Simulator and Application Tester requirements have increased due to lack of Parlay Gateway. To be able to test Parlay IN Applications developed by Oxygen, the company has started to develop a Gateway simulator to fulfill these requirements.

The Oxygen Parlay Gateway simulator and Application Tester will be developed with OO Design Methodologies and either Java or C++ will be used as the programming language.

Project Site

The proposed project is under development and is based in Istanbul, Turkey. The basic deployment architecture is shown below.



Project Status/Timeline

The time line and basic milestones of the proposed project are shown below:

Phase	Start	End	Duration (months)
1. Requirements analysis and the determination of relevant standards produced by international organizations	01.11.2000	01.01.2001	2.0
2. Top level design of a generic application deployment platform	01.12.2000	01.04.2001	3.0
3. Prepaid application development (implementation) on this platform	02.04.2001	15.06.2001	2.5
4. Testing and integration of the application platform	15.06.2001	07.07.2001	1.0
5. Development of GPRS prepaid application	02.08.2001	01.04.2002	9.0
6. Developing the other services and making Oxygen Parlay Client as a Parlay service creation environment.	02.04.2002	31.11.2002	8.0

Equipment and Services

Development will be mainly undertaken on UNIX workstations, but will also be compiled and built in a PC environment.

- HW Requirements;
- SUN UNIX WSs;
- PC;
- SW Requirements;
- Jbuilder;
- Solaris; and
- Rational Rose.

Integration requirements include Parlay Gateway or Parlay Gateway Simulator. It is not expected that there will be significant purchases of equipment associated with this opportunity.

U.S. Competitiveness

In the U.S. there are between 5 and 10 companies ranging from rather small companies to large vendors (such as Nortel and Lucent) developing Parlay products containing services as well. Innovative Parlay IN Applications are marketable to the big telecommunication operators. The final version of the Oxygen Parlay Service Creation Environment will also be marketable to the third party service developers.

There are no existing applications available that deliver the targeted functionality, although it is expected that the number of vendors will increase quickly. Since such applications are not deployed extensively, it is difficult to predict the future.

Project Financing

Project Financing Component	Way of sponsoring
1. Oxygen	Internal Funds
2. AePona, Ireland	Service Creation Environment
3. Telsim	Provides real time testing Environment
4. Turkish Technical and Scientific Research Council	May receive research and development support

Oxygen is a small, technology, focused company that welcomes discussions with prospective foreign technical partners relating to financial participation and/or development lab assistance (hardware/software/development licenses, etc.) on this and other software products under development.

Conclusion

The proposed software product best fulfills network operator requirements due to reduced time to market period for a new service, enabling operators to deploy innovative services, that are fraud proof and open to support new data networks (GPRS and UMTS).

When being used by third party service developers the Oxygen Parlay Service Creation Environment hides the proprietary and complex Telco interfaces and it enables the developers to develop fast and innovative services. Joint development opportunities will exist for:

- Joint development with Parlay Gateway vendors;
- Joint development with Parlay-based service creation environment developers; and
- Joint development with Parlay-gateway simulator/application tester developers.

Oxygen is a technology development company that views interaction with U.S. technology companies in two possible ways:

- **Partnership in joint development and/or in product integration** – Joint development will allow both parties to complement each other by utilizing their respective strengths in specific areas. Oxygen believes that its skill set in telecommunications technologies, specifically in intelligent networks and softswitch, and also in Internet and Internet applications, is a very strong asset in that scenario. Product integration will allow both parties to rapidly enhance their own products. The resulting products will be more complementary and compatible in the market. Oxygen's products utilize an open architecture and public APIs that allow integration with other similarly open products.
- **Co-marketing and/or reseller agreements** – Oxygen's target market comprises telecom operators, Internet service providers, application service providers and corporations worldwide. The company is willing to join in co-marketing activities or in reseller agreements with companies that are related to its industry and preferably with companies with which it partners. The company is of the view that opportunities in the U.S., Europe, Middle East, Turkey and NIS countries are large and believes that co-marketing or re-seller agreements would allow the exploitation of those opportunities.

Key Decision Makers

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REPUBLIC OF TURKEY

Location Based Services Platform

Project Summary	
Subsector	Telecommunications and Internet
Location	Istanbul, Turkey
Project Cost	US\$0.5 Million
Export Potential	Subject to negotiation
Project Type	Software Development
Project Executing Agency	Oxygen Technology Development



Project Outline

Established in September 2000, Oxygen Technology Development is a member of the Rumeli industrial holding group tasked with developing new technologies and providing services to other group companies in mobile communications and the Internet. The Rumeli group comprises one of Turkey's leading GSM mobile network operators as well as a number of television and print media companies. Oxygen is, therefore, able to take advantage of the readily available testing ground of cross-technology opportunities. It offers telecommunications and Internet applications to fixed and wireless network operators, service providers, content providers and corporations throughout the world. Oxygen also offers a range of turn-key project integration and advisory services in these fields.

Oxygen partners with other technology providers world-wide such as HP, Cisco, Motorola, NX, AePona and Emblaze. New partners are welcomed to complement the product range, for joint development activities and co-marketing.

Oxygen Technology Development is seeking to identify a prospective U.S. technology partner willing to contribute to the development of Oxygen's Location Based Services Platform (LBSP) software, as well as location based applications on Oxygen LBSP. The latter is intended to provide a complete solution of location-based services over various service delivery channels, such as WEB, WAP and STK (*SIM Tool Kit*). With its mapping capabilities, adapters for SMSC, WAP Gateway and E-Mail server, Location Broker and location detection technologies, the platform creates the basis for location based applications.

The location based applications that currently run on LBSP are mobile Yellow and White Pages. Asset Tracking Application will be available in July 2001. These applications are designed with data driven and three-layer architecture on a powerful directory structure. In addition to LBSP's capabilities, the application provides directory maintenance, batch-upload, address matching and correction functions and search engine.

Technical Description

LBS Platform and LBS Applications on LBSP have an application architecture that is open and its presentation, application and data layers are de-coupled. These features allow for easy integration with other applications. Primary elements of LBSP include:

- **Service Engine**
 - Registration and Authentication
 - Service Request Forwarding
 - Event Log System
 - Interface to Billing System
 - Interface to Customer Care System
 - Interface to Network Management System

- Network Interfaces
 - SMSC Adapters
 - WAP Gateway Adapters
 - E-Mail Server Adapters

- **Location Broker**
 - Location Broker
 - Location Detection with STK (*Sim Tool Kit*) Application
 - Location Detection with MPTP Protocol for BENEFON-GPS phones
 - Interface to GMLC via XML and HTTP

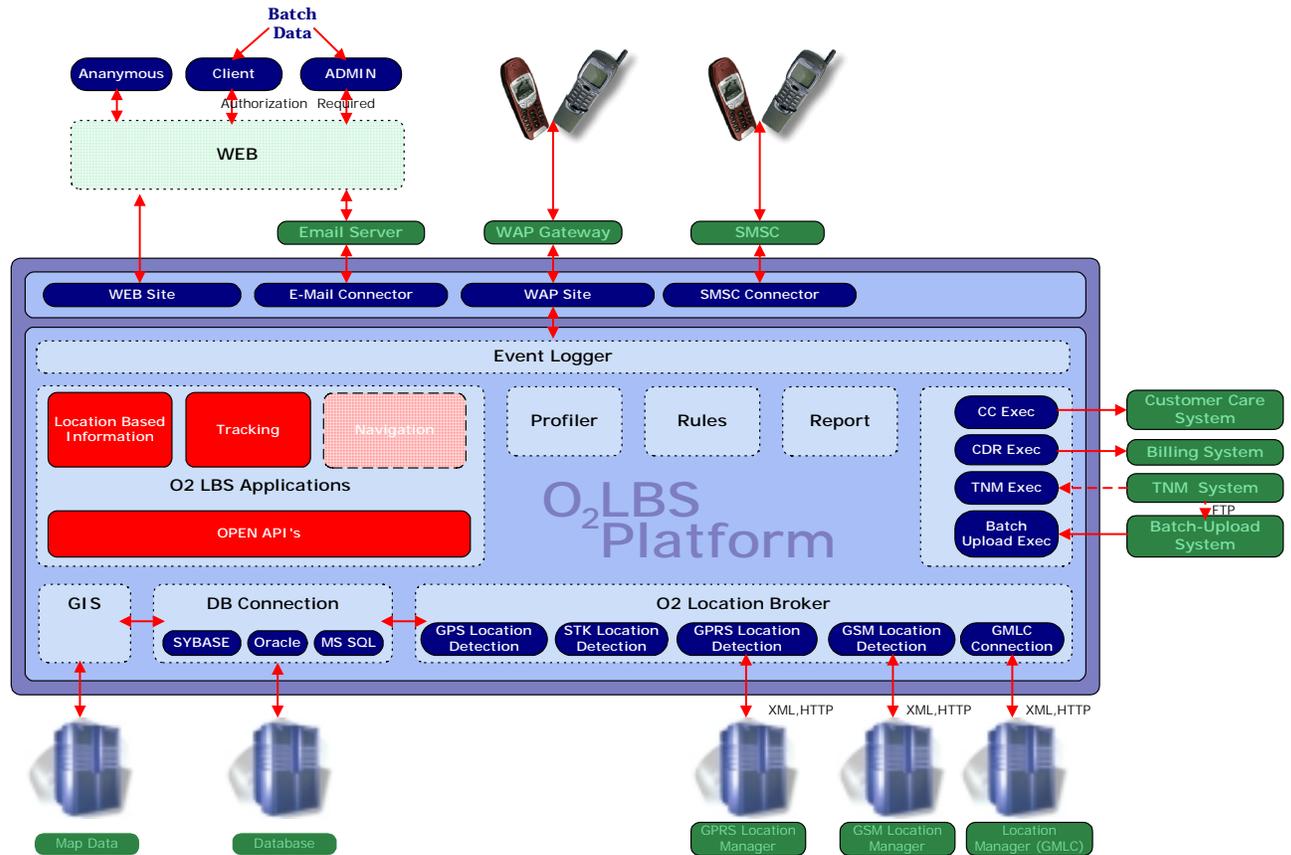
- **Map Application**

- **Directory Application.**
 - Directory maintenance functions
 - Address matching and correction function
 - FTS(*Full Text Search*), CBS(*Category Based Search*) and LBS(*Location Based Search*) functions
 - Data driven graphical user interfaces for WEB and WAP

- **Utilities**
 - Function for service provider/operator to design new search and directory maintenance graphical user interfaces on WEB and WAP

Project Site

The project will be based in Istanbul, Turkey. The basic system architecture is shown below.



Project Status/Timeline

Phase	Completion
Yellow and white pages over Web/WAP/SMS, location broker with GPS and STK location detection and map application	19 March 2001
Telsim (sister GSM network) deployment of first phase	30 May 2001
IVR integration with speech recognition and text to speech	30 May 2001
Asset tracking, GPRS location detection and video streaming	06 August 2001

Equipment and Services

This project proposal relates to the provision of software development services. Participation in the project and the level of services provided will be dependent on the outcome of negotiations with the project sponsors.

The following software and equipment will be used for system development:

- 1 NT Server with IBM WebSphere Application Server and Oracle Database Server;
- 1 NT Server with MapInfo MapXtreme (included HahtSide Application Server, Apache Server, TomCat);
- 5 PC for every member in LBS team with the Visual Age for Java, NetObjects;
- WAP Simulation software, STK Development Kit; and
- Various handsets that support the related technologies.

It is not expected that there will be significant purchases of equipment associated with this opportunity.

U.S. Competitiveness

The project sponsor welcomes the participation of U.S. companies as a partner in the development of this proposed and similar software. The company already has negotiated a similar agreement with Motorola relating to the development of software for 3G digital telecommunications.

Project Financing

Project Financing Component	Nature of Sponsorship
1. Oxygen	Internal funds
2. MapInfo	MapXtreme development license
3. Basar	Map content for Turkey, development license
4. Telsim	Provides real time testing Environment
5. Turkish Technical and Scientific Research Council	May provide research and development funding on a grant basis

The company is a small, technology, focused company that welcomes discussions with prospective foreign technical partners relating to financial participation and/or development lab assistance (hardware/software/development licenses, etc.) on this and other software products under development.

Conclusion

All GSM network operators and service providers in the U.S. that want to provide location-based services to their customers are prospective clients for this software product.

Oxygen is a technology development company that views interaction with U.S. technology companies in two possible ways:

- **Partnership in joint development and/or in product integration** – Joint development will allow both parties to complement each other by utilizing their respective strengths in specific areas. Oxygen believes that its skill set in telecommunications technologies, specifically in intelligent networks and softswitch, and also in Internet and Internet applications, is a very strong asset in that scenario. Product integration will allow both parties to rapidly enhance their own products. The resulting products will be more complementary and compatible in the market. Oxygen's products utilize an open architecture and public APIs that allow integration with other similarly open products.
- **Co-marketing and/or reseller agreements** – Oxygen's target market comprises telecom operators, Internet service providers, application service providers and corporations worldwide. The company is willing to join in co-marketing activities or in reseller agreements with companies that are related to its industry and preferably with companies with which it partners. The company is of the view that opportunities in the U.S., Europe, Middle East, Turkey and NIS countries are large and believes that co-marketing or re-seller agreements would allow the exploitation of those opportunities.

Key Decision Makers

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REPUBLIC OF TURKEY

Multimedia Messaging Services Platform

Project Summary	
Subsector	Telecommunications and Internet
Location	Istanbul, Turkey
Project Cost	US\$0.5 Million
Export Potential	Subject to negotiation
Project Type	Software Development
Project Executing Agency	Oxygen Technology Development



Project Outline

Oxygen Technology Development was established in September 2000 with the main objective of developing new technologies and services in mobile communication and the Internet. Oxygen is a member of the Rumeli industrial holding group that also comprises one of Turkey's leading GSM mobile network operators as well as a number of television and print media companies. Oxygen is therefore able to take advantage of the readily available testing ground within the group of cross-technology opportunities. It offers telecommunications and Internet applications to fixed and wireless network operators, service providers, content providers and corporations throughout the world. Oxygen also offers a range of turn-key project integration and advisory services in these fields.

Oxygen partners with other technology providers world-wide such as HP, Cisco, Motorola, NX, AePona and Emblaze are among these companies. In the case of Motorola there is a memorandum of agreement in place for the joint development of 3G products. New partners are welcomed to complement the product range, for joint development activities and co-marketing.

Multimedia message services (MMS) will be a key application within the wireless messaging business, and one of the enablers of the mobile information society, in which an increasing part of all personal information transmission will take place wirelessly. Oxygen aims to lead the way towards the Mobile Information Society by supporting international standards and open platforms that enable wide market adoption and stimulate growth. To meet the demand for multimedia messaging, Oxygen will provide complete solutions for multimedia. In this regard, Oxygen Technology Development is seeking to build strategic alliances with U.S. firms to develop advanced Multimedia Messaging Services.

The key element in MMS network architecture is the MMS Center. The very nature of MMS Center is similar to an SMS Center – it is a store and forward platform. The Oxygen MMS Center enables multimedia messages to be sent with various content types from terminal to terminal, with instant delivery. The Oxygen MMS Center is able to handle all

kind of message types from pure text to video clips or any given combination of content types.

Oxygen's MMS Center is a high capacity service platform, which will take mobile messaging to a higher level. The MMS Center will deliver text combined with rich content types such as photographs, images, voice clips and video clips.

Technical Description

The creation of multimedia messaging involves various actions from the composer, such as shooting a video clip or taking a picture, adding text or voice annotation, selecting the addressee(s) and sending the message. Following is a brief description of each of these functions:

Message Creation - The Message Creation Application enables users to easily create messages with an intuitive user interface that can be customized for the specific operator's request. The Message Creation is not limited just to the user interface, but also connects to the MMS Media Bank that contains general pictures, clips and animations as well as private user accounts with their personal favorites.

Application and Content - The MMS can be used by content and application providers to deliver messages to subscribers in a similar way to the SMSC. Initially, standard SMTP will be used for this purpose, but in due course an API will be unveiled which incorporates application billing and advanced message tracking.

Matching Message Content to Terminals - During a message retrieval session, the MMS determines the necessity and scope of any content reformatting and then reformats content to suit terminal capabilities. There are two types of content reformatting:

- Media format conversion (for example GIF to WBMP, both still image formats); and
- Media type conversion (for example MPEG4 to WAV, that is video to audio). When media type conversion is performed, the MMS notifies the user that a conversion took place.

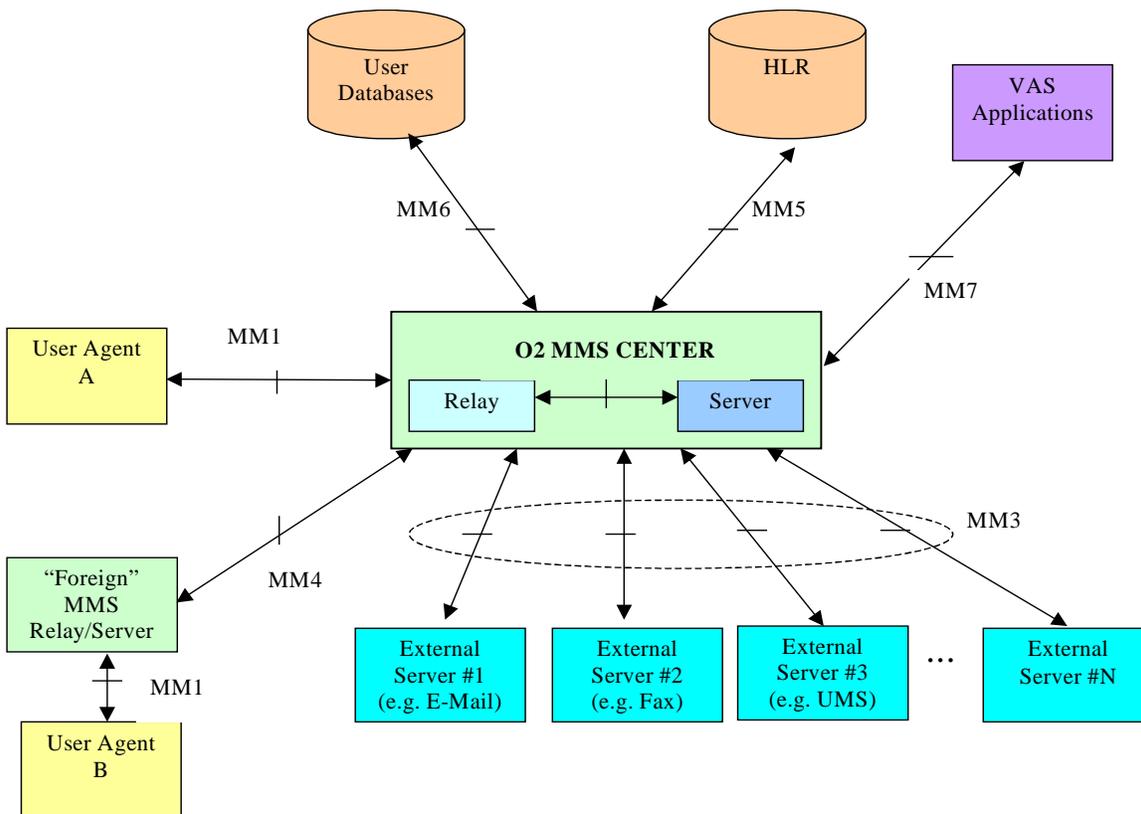
Media Streaming on Demand - Media streaming on demand lets the user play stored messages without having to completely download them prior to playing. This is especially important when handling large files with rich media content, such as audio and video. The media-streaming feature also lets users navigate within the message (jump backward 15 seconds, perform a fast forward) during the retrieval session, without having to download the skipped parts. Users enjoy immediate response to their actions, and the network benefits from reduced congestion.

Multimedia Push to Handset - Multimedia push to phone lets the user define scenarios and profiles where the multimedia message is pushed to the handset

(avoiding the notification and pull sequence). The Multimedia Push allows the MMS to use the network economically, pushing content to suitably enabled terminals in off-peak hours. Primarily, the push function is enabled by sending SMS through SMSC and later on by creating a PDP context to the terminal application.

Project Site

The project is based in Istanbul, Turkey. The basic system architecture is shown below.



Project Status/Timeline

Phase	End
First phase: Multimedia messaging service with pictures, text, voice, audio and streamed video supporting WAP 1.2/1.1, WAP MMS UA, HTML based mobile client (PDAs), PC Web client, and UM Functionality	September 2001
Additional clients support (C-HTML, IMAP4, MExE (Java) All-IP ready (SIP supported; PCM-VoIP Transcoding)	June 2002

Equipment and Services

The following equipment and services will be used in this project:

- Unix Servers;
- Database Development License;
- Java Environment;
- WAP GW supporting 1.2 WAP forum specs;
- MMS(Multimedia messaging server) agents;
- E-mail, Fax, Voice GWs SW license and HW; and
- Streaming capable server.

It is not anticipated that there will be significant procurement associated with this proposed project. The sponsor is intent in establishing formal relationships with U.S. software developers to cooperate in the development of new products for use on wireless telecommunications networks and the Internet.

U.S. Competitiveness

The project sponsor actively encourages U.S. companies to partner in the development of this envisaged and other related software.

Project Financing

Project Financing Component	Sponsorship Method
1. Oxygen Technology Development	Internal funds
2. Telsim (sister GSM company)	Provides real time testing environment
3. Turkish Technical and Scientific Research Council	Research and development support possible

The company is a small, technology, focused company that welcomes discussions with prospective foreign technical partners relating to financial participation and/or

development lab assistance (hardware/software/development licenses, etc.) on this and other software products under development.

Conclusion

MMS is a messaging platform for the GSM 2.5 and 3G world. Target customers will be large telecom operators that plan to implement UMTS in the coming years and operators that already have implemented technologies such as GPRS.

The project sponsor welcomes joint development opportunities with U.S. companies and views interaction with those technology companies in two possible ways:

- **Partnership in joint development and/or in product integration** – Joint development will allow both parties to complement each other by utilizing their respective strengths in specific areas. Oxygen believes that its skill set in telecommunications technologies, specifically in intelligent networks and softswitch, and also in Internet and Internet applications, is a very strong asset in that scenario. Product integration will allow both partners to rapidly enhance their own products. The resulting products will be more complementary and compatible in the market. Oxygen's products utilize an open architecture and public APIs that allow integration with other similarly open products.
- **Co-marketing and/or reseller agreements** – Oxygen's target market comprises telecom operators, Internet service providers, application service providers and corporations worldwide. The company is willing to join in co-marketing activities or in reseller agreements with companies that are related to its industry and preferably with companies with which it partners. The company is of the view that opportunities in the U.S., Europe, Middle East, Turkey and NIS countries are large and believes that co-marketing or re-seller agreements would allow the exploitation of those opportunities.

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REPUBLIC OF TURKEY

SoftSwitch Call Control

Project Summary	
Subsector	Telecommunications and Internet
Location	Istanbul, Turkey
Project Cost	US\$1.5 Million
Export Potential	Subject to negotiation
Project Type	Software Development
Project Executing Agency	Oxygen Technology Development



Project Outline

Oxygen Technology Development was established in September 2000 with the main objective of developing new technologies and providing services in the emerging fields of mobile communication and Internet. Oxygen is a member of the Rumeli industrial holding group that also comprises one of Turkey's leading GSM mobile network operators as well as a number of television and print media companies. Oxygen is, therefore, able to take advantage of the readily available testing ground of cross-technology opportunities. It offers telecommunications and Internet applications to fixed and wireless network operators, service providers, content providers and corporations throughout the world. Oxygen also offers a range of turn-key project integration and advisory services in these fields.

Oxygen is a member of a group of companies that incorporates one of the leading GSM mobile network operators in Turkey as well as a number of television and print media companies. As a result, Oxygen is able to take advantage of the readily available in-house testing ground of cross-technology opportunities.

In achieving these objectives, Oxygen partners with other technology providers worldwide such as HP, Cisco, Motorola, NX, AePona and Emblaze. Oxygen welcomes new partners to complement existing product ranges, joint development activities and co-marketing.

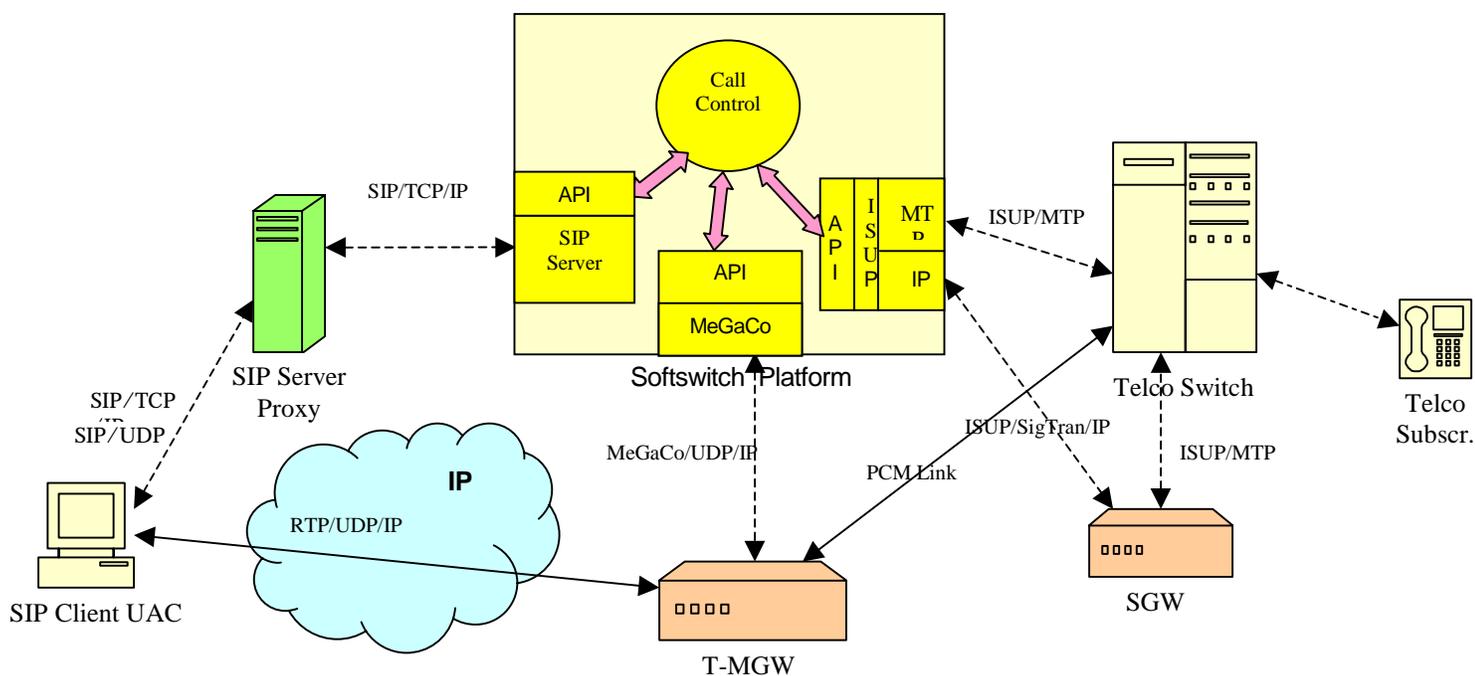
This project involves the development of a software component for a softswitch - a platform that addresses the signaling interworking for circuit switched PSTN, PLMN and packet switched IP networks. The platform and the basic management software can communicate with various network elements with different protocols, and with a central logic, call control manages the interaction between the components. Services are also delivered on this platform.

Technical Description

Primary elements of the proposed project include:

- Development of call control based on SIP (Session Initiation Protocol);
- Extension of SIP call control software to support MeGaCo (Media Gateway Control Protocol) and ISUP (ISDN User Part); and
- Enhancement of the basic core functionality with other protocol stacks (MAP-Mobile Application Protocol, H.323, MGCP-Media Gateway Control Protocol, SIP-T-SIP for Telephony, BICC-Bearer Independent Call Control, etc) and the service interface (INAP-IN Application Part, CAP-CAMEL Application Part, PARLAY, etc)

The first version of the product developed under this proposed project will be used to replace transit fixed switches and transit Mobile Switching Center’s (MSCs). The software will “talk” to the circuit switched network nodes via SS7 protocols (ISUP) and to the IP network nodes via Multimedia over IP protocols (SIP, H.323), while also managing the media conversion over the Media Gateways by MeGaCo. Basic deployment architecture is shown below.



API	Application Programmer Interface	RTP	Real Time Protocol
IP	Internet Protocol	SGW	Signaling Gateway
ISUP	ISDN User Part	SigTran	Signaling Transport
MeGaCo	Media Gateway Control Protocol	T-MGW	Trunking Media Gateway
MGW	Media Gateway	TCP	Transp. Cntl. Protocol
		UDP	User Datagram Protocol

Project Site

The project will be developed in Istanbul, Turkey.

Project Status/Timeline

Project will be undertaken in five major phases:

Phase	Start	End	Duration in Months
1. Requirements analysis and determination of relevant standards produced by international organizations	01.01.2001	01.03.2001	2
2. Top level design	02.03.2001	01.05.2001	2
3. SIP based first call control development	02.05.2001	01.07.2001	2
4. Development of the call control managing SIP, ISUP and MeGaCo – addressing circuit switched/packet switched interworking	02.07.2001	01.04.2002	9
5. Incorporation of other protocols and development of services interface	02.04.2002	31.11.2002	8

Equipment and Services

This project relates primarily to the provision of technical services for the development of new software. The involvement of a U.S. company will be dependant on the outcome of negotiations with the project sponsor.

Development will be mainly undertaken on UNIX workstations, but will also be compiled and built in a PC environment. For this reason, a number of UNIX workstations (both SUN and HP), UNIX servers and PCs will be required.

The communication protocols will not be developed in-house. These will be purchased from known protocol stack vendors or developed in partnership. Test bed and integration testing requires MGWs, SGWs, and a model small switch that will be purchased. Most of the simulators and emulators needed for testing purposes will be developed in house.

It is not expected that there will be significant purchases of equipment associated with this opportunity.

U.S. Competitiveness

There are about 20 U.S. companies ranging from relatively small companies to large vendors, such as Nortel, Lucent, etc, working on softswitch platforms. The Oxygen Call Control will be the building block for a final softswitch allowing it to also be marketed to telecommunication equipment vendors.

There are no applications presently delivering the desired functionality, but the number of vendors is likely to increase quickly. Since such applications are not as yet deployed extensively, in terms of functionality delivered or inter-operability, it is difficult to extrapolate where the present vendors stand. As far as utilization is concerned, the extensive deployment of such products will be reliant upon a deregulated telecommunication market.

Project Financing

Project Financing Component	Method of Sponsoring
1. Oxygen	Internal Funds
2. Telsim	Provides real time testing environment
3. Turkish Technical and Scientific Research Council	Expected to provide research and development support

The company is a small, technology, focused company that welcomes discussions with prospective foreign technical partners relating to financial participation and/or development lab assistance (hardware/software/development licenses, etc.) on this and other software products under development.

Conclusion

Target customers can be categorized in the following three profiles:

- **Enterprises** – Individual enterprises and large organizations with several diverse offices, with deployed PBXs and/or leased lines for remote connections to sites for voice traffic, are a market for the product. This market will be best addressed not only with the software, but in conjunction with the platform vendor and in partnership with the GW vendors to offer a full end-to-end solution.
- **Operators** – Telcos and a wide variety of service providers also represent a potential market for the software solution. Operators are continuously searching for cheaper and more customizable solutions. With the protocol stacks being a commodity, the plug-and-play call control will offer operators the ability to deploy their own GWs and create switching and service solutions according to their specific needs and economies.

- **Equipment (Switch/GW) vendors** – Equipment vendors also are searching for the software that offers functionality and is a part of their needed end-to-end complete solution. For vendors lacking specific core technology expertise in some areas, or who do not want to make the investment, the software application will form a configurable tool with a number of industry standard configuration and development APIs.

Oxygen is a technology development company that views interaction with U.S. technology companies in two possible ways:

- **Partnership in joint development and/or in product integration** - Joint development will allow both parties to complement each other by utilizing their respective strengths in specific areas. Oxygen believes that its skill set in telecommunications technologies, specifically in intelligent networks and softswitch, and also in Internet and Internet applications, is a very strong asset in that scenario. Product integration will allow both parties to rapidly enhance their own products. The resulting products will be more complementary and compatible in the market. Oxygen's products utilize an open architecture and public APIs that allow integration with other similarly open products.
- **Co-marketing and/or reseller agreements** – Oxygen's target market comprises telecom operators, Internet service providers, application service providers and corporations worldwide. The company is willing to join in co-marketing activities or in reseller agreements with companies that are related to its industry and preferably with companies with which it partners. The company is of the view that opportunities in the U.S., Europe, Middle East, Turkey and NIS countries are large and believes that co-marketing or re-seller agreements would allow the exploitation of those opportunities.

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REPUBLIC OF TURKEY

Customer Relationship Management – Household Appliances

Project Summary

Subsector	Information Technology
Location	Istanbul, Turkey
Project Cost	US\$2 Million
Export Potential	US\$0.8 Million
Project Type	Customer relationship management (CRM) by Internet, direct mail and call center
Project Executing Agency	Gunkol Gunes Enerjisi ve Klima Sanayii A. S.



Project Outline

Gunkol, the project sponsor, is a Turkish manufacturer and exporter of white goods. The company's research has identified a market demand for networked and smart household equipment. As Gunkol considers itself a "solution supplier of household appliances" rather than a "white goods manufacturer", it has set aside a dedicated budget of US\$1.5 million and embarked on a project called "Networked and Smart Household Appliances". The company also provides sales and service of its products via the Internet and operates a customer relationship management (CRM) center.

The project sponsor is well aware of the technological lead held by U.S. companies in the information technology sector and is interested in linking with American companies that can provide CRM solutions. The company is presently selling white goods using U.S. marketing channels and OEM agreements with U.S. equipment manufacturers. Gunkol is also selling some products under the brand name of Avanti in the U.S.

Gunkol is interested in exploring the use of new Internet and communications technologies to support its electronic trade and customer management operations. It is also seeking a strategic technical partner to finance the project.

Technical Description

The following describes the technical sequence of the project:

- 1.) Prepare web sites and publicize;
- 2.) Select CRM (B2B, B2C) software integrated with ERP package
 - a. Marketing and sales through the Internet
 - b. Service management through the Internet
 - c. Supply chain management through the Internet

- d. Call Center (inbound, outbound)
- e. Direct mailing
- 3.) Select requisite hardware to use with the chosen CRM software
 - a. Equip computer with software
 - b. Equip call center (IVR)
- 4.) Position the chosen products (implementation)

Gunkol uses ERP software, Oracle Applications and SGI Silicon Graphics Server Hardware (as ERP Servers) which are of U.S. origin. Along with these, the company is interested in considering CRM products that are of U.S. origin.

Project Site

The proposed CRM project will initially concentrate on sales and production companies located in Istanbul and Izmir, Turkey. In later stages, the project will be linked to the company's foreign sales outlets that are as follows:

- England (Reading), Worldco Appliances Ltd.;
- Germany (Kehl), Weltco GmbH;
- France (Strasbourg), Weltco Sarl;
- U.S. (Philadelphia), Worldsel Limited Co.;
- China (Shanghai), Teba China; and
- Norway (Oslo), Branch Office.

Project Status/Timeline

Gunkol's cooking appliances are exported to over 85 different countries. During 2000, the company exported US\$1.8 million worth of white goods to the U.S. and aims to increase this figure to US\$2.27 million in 2001. Gunkol expects to further increase its exports to the United States and in so doing create new business opportunities for its partners and service and logistic support firms.

In 1998 the project sponsor became the first white good company in Turkey to sell its products over the Internet. At the same time, the company initiated a call center with sales and service support utilizing in-house development and software that was not fully integrated. The company upgraded to an Enterprise Resource Planning (ERP) package and is in the process of initiating Oracle Applications ERP package version 11i. The company is prepared to start shortly on the CRM application with a proposed completion during the second quarter of 2003.

Equipment and Services

The project sponsor is interested in meeting U.S. companies that can provide CRM hardware and software solutions. Once the vendor has positioned the requisite software, the sponsor's in-house staff will operate the software and hardware.

U.S. Competitiveness

In the past the sponsoring company has used U.S. IT products and, as a result, is familiar with the benefits of utilizing U.S. produced hardware and software for the proposed CRM upgrade project.

Project Financing

The company is seeking a strategic technical partner to finance the project. The company will also most likely receive financial support from the governmental incentives for research and development studies.

Conclusion

Gunkol proposes to undertake this CRM project in cooperation with U.S. companies. Gunkol is fully aware of the technological leadership of U.S. companies with respect to CRM and is very motivated to work with U.S. companies in this area.

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REPUBLIC OF TURKEY

Digikids Children's Media Channel

Project Summary

Subsector	Digital Media Channel
Location	Istanbul, Turkey
Project Cost	US\$5.3 Million
Export Potential	US\$2 Million/year
Project Type	Strategic Investment and Sale of Program Content
Project Executing Agency	Turktell Information Services



Project Outline

Turktell Information Services, a recently created media company owned by Cukurova Holding, one of Turkey's largest industrial groups, is seeking a strategic investment partner capable of contributing programs to a new digital media channel that will be broadcast to Turkey and several Central Asian countries.

This project involves creating a kids universe (a media channel) to provide a synergy between the below media platforms:

- A TV station (Digital Platform, the leading Turkish PAY-TV channel);
- A radio station (also Digital Platform);
- An ITV portal (Interactive TV- Superonline, the leading Turkish ISP);
- An Internet portal (again Superonline);
- A WAP portal (Turkcell, the leading Turkish GSM mobile network operator); and
- A newspaper (Aksam, one of the top four Turkish daily newspapers).

Each company mentioned above is a subsidiary of Cukurova. The target territory for the television, radio and Internet network is Turkey, Northern Cyprus, Azerbaijan, Turkmenistan, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Georgia.

Technical Description

The project sponsor proposes the production and broadcasting of a full scale television station, radio and an Internet portal on the following basis:

- Digital Broadcast via satellite, direct to home;
- Encrypted; and
- Signal carried by a digital platform.

Program content for the satellite digital broadcast network will be as follows:

- Television
 - Local Productions (40%) [Game Shows, Cartoons, Documentaries]
 - Foreign Content (60%) [Cartoons, Interactive Games, Documentaries]
- Radio
 - Local Productions
 - Music
- ITV
 - Games
 - Info
- Internet Portal
 - Local Content
 - Games
- WAP
 - Info
- Newspaper
 - Local content

Project Site

The project is based in Istanbul, Turkey.

Project Status/Timeline

The Internet and WAP portals are already in place and fully operational. The on-line newspaper is up and running (www.oxopixo.com). The television and radio platforms are scheduled to be launched on July 1, 2001.

Equipment and Services

The project's direct reach to the target group (children aged two to twelve) within the territory on the above mentioned platforms is expected to surpass five million households within the next five years.

The project sponsors are intent on implementing the project in a joint venture with a U.S. company that has expertise in providing primarily foreign content in the aforementioned digital platforms.

U.S. Competitiveness

U.S. companies have an acknowledged global advantage in the provision of program content in all forms of digital media.

Project Financing

Following is an indicative financing plan for the project:

- Sponsor's own funds - US\$500,000
- Subordinated debt - US\$1 million
- Short-term Loan - US\$800,000
- Strategic Partnerships - US\$3 million

Conclusion

The project sponsors envisage that the U.S. strategic investor will become an equity partner in either the existing company or in a special purpose joint venture and will provide the requisite funds and technical know-how going forward.

The U.S. strategic investment partner, in return, will gain access to a fast growing, dynamic and young market by joining forces with a company established by one of the largest industrial conglomerates in Turkey.

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REPUBLIC OF TURKEY

E-Customer Relation Management System

Project Summary

Subsector	Information Technology
Location	Istanbul, Turkey
Project Cost	US\$1 Million
Export Potential	US\$0.5 Million
Project Type	CRM Software Development
Project Executing Agency	YÖRE Elektronik Yayıncılık A.Ş.



Project Outline

This project involves the development of a Customer Relationship Management (CRM) system that specifically targets the Internet customers of e-Commerce applications.

The project sponsor, YÖRE Elektronik Yayıncılık A.Ş., is a high technology company that owns various custom solutions on e-publishing and e-commerce applications and carries out several portal development projects. These custom solutions include:

- A newspaper archive portal;
- A tourism portal and reservation system;
- A book-store portal;
- A book-club portal;
- A real-estate portal;
- A B2B portal; and
- Electronic payment systems with interfaces to several Turkish banks (including Pamukbank, Garanti Bankası, and İktisat Bankası.).

While YÖRE management believes that these systems should be supported by a flexible e-CRM system, the company has little expertise in that area. The company management has plans to obtain relevant consultancy services from a nearby university.

The developed system will be flexible or generic enough to be used to support all types of e-Commerce applications as well as e-Community systems and portals. Additionally, the system will incorporate facilities for easy integration with a COTS call center system. Besides being a standalone asset, the resulting e-CRM system will also support the export of YÖRE's existing e-Commerce portals.

Technical Description

Primary project elements include:

- Development of techniques for the efficient collection of data on customer interest and customer profile, both dynamically (via click-through analysis) and manually (via electronic forms);
- Development of techniques for customer trend analysis and market segmentation;
- Development of techniques for direct marketing;
- Integration with the call-center; and
- Integration with the existing portals of YÖRE.

Project Site

The project will be executed at YÖRE's head office in Istanbul, Turkey. The 250 m² office is located in Şişli district, which is the commercial center of the city and the country.

Being a technology company with in-house custom developed solutions, YÖRE already has expertise and owns the technology needed for n-tier software development.

Project Status/Timeline

The first phase of the overall project related to the establishment of a tourism portal and was recently initiated. The tourism portal should be completed during 2001. Timing of the implementation of the entire project is dependent on the participation of a strategic investor who will contribute project funding.

Equipment and Services

A team comprising one project leader and six engineers will be formed for the 10-month development phase of the e-CRM system project. Also, consultancy services related to marketing issues will be essential to the success of the project and will be procured from one of the nearby universities. Total cost of this project phase is US\$450,000.

In phase two, the e-CRM is integrated with the six existing portals. The aforementioned team will be hired for an additional two months at a cost of US\$80,000.

Although YORE owns enough computers for the development project, two new servers (one for database and the other for web serving related developments) and four new dedicated workstations will be purchased at a cost of US\$50,000 in order to speed up the development. The networking infrastructure (cabling and switch) and other supporting devices (such as the UPS and electricity generator) will be improved at a cost of US\$150,000.

U.S. Competitiveness

Customer Relationship Management is extremely important for all kinds of IT and telecommunications oriented commerce. The continuous growth of the Internet as an electronic commerce media has allowed marketers the opportunity to carry out powerful direct marketing strategies.

At present, there are several CRM tools in the market, but most were initially designed for non-Internet based applications. As a result, they lack several advantages that exist in YÖRE's approach. With the largest Internet e-Commerce market of the world, such a CRM tool would be extremely valuable for U.S. e-Commerce companies.

Project Financing

Just after the initiation of the CRM development project, Turkey experienced a severe economic crisis that deeply affected YÖRE as well as other Turkish IT and telecommunications companies. A sudden lack of financial resources forced the temporary suspension of project related activities.

To successfully complete the proposed project, hardware needs to be purchased and three engineers hired. While the total required investment will be US\$1 million, YÖRE is seeking a strategic investment partner willing to contribute US\$730,000 to the project and to act as the sales partner to market the resulting software.

Conclusion

When compared with the products offered by competitors, the completed software product is likely to be priced very low.

YÖRE is prepared to offer the strategic U.S. investor a revenue share agreement based on a percentage of worldwide sales. Also, YÖRE is willing to discuss a partnership for the international marketing of the product and is prepared to provide exclusive marketing rights to the product within the U.S. market.

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REPUBLIC OF TURKEY

Expansion of E-Commerce Retailer

Project Summary

Subsector	E-Commerce
Location	Istanbul, Turkey
Project Cost	US\$5 Million
Export Potential	US\$1 Million
Project Type	Online Retail Investment
Project Executing Agency	Deppo International Electronic Communication, Retail and Trade, Inc.



Project Outline

This project proposal involves the potential of joining forces with a leading Turkish online retailer to expand in a growing, young and dynamic market.

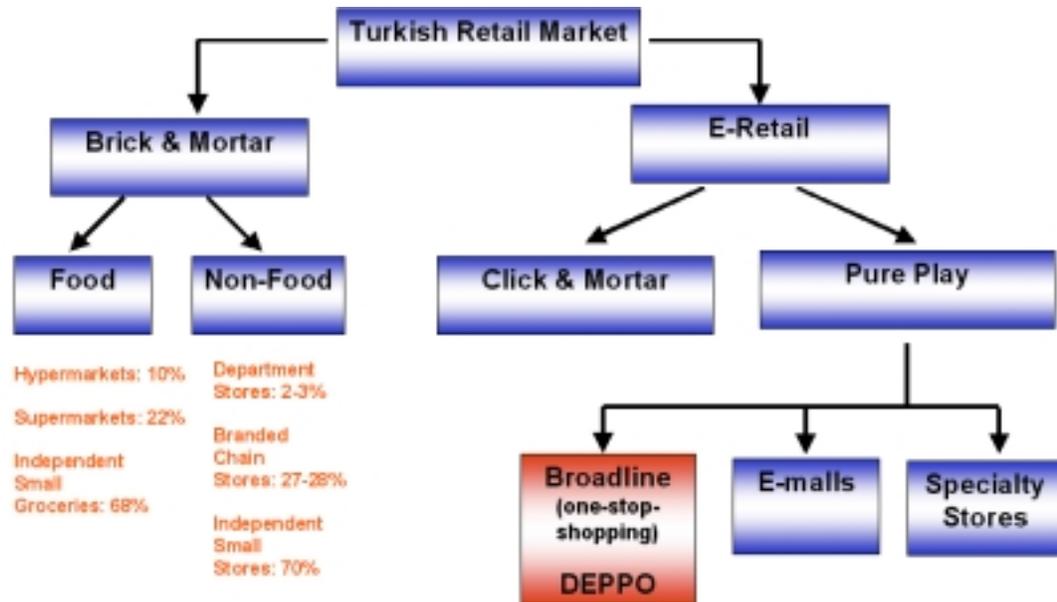
Since its launch in May 2000, www.deppo.com[®] has quickly become the leading online retailer in Turkey and the company's principal objective is a pre-eminent position in the Turkish overall retail sector by 2005.

This goal is supported by the following factors:

- Turkey's current population is 65 million of whom 50% are below 30 years of age;
- Within OECD member countries, Turkey is second after Germany with 14 million households and has the highest annual increase in working population;
- People living in urban areas (where Internet infrastructure is in place) increased from 44% in 1980 to 74% in 1999;
- It is estimated that the number of issued credit cards will reach 35 million in 2005, from its current level of 13.5 million (65% of credit card usage is for shopping);
- PC penetration is expected to reach 17% in 2005 from its current level of 3%;
- Internet penetration is expected to reach 15% in 2005 from its current level of 3%;
- Cellular phone penetration is expected to reach 45% in 2005 from its current level of 21%;
- The current 99% household penetration rate of TV sets and the estimation that digital TV penetration will reach 30% in 2005;

- 85% of the current 18 million fixed telephone lines are digital, a requirement for quick access to the Internet;
- The liberalization of Turk Telekom in 2003 and the expectation that the UMTS license will be put to tender; and
- The affordable costs of PC ownership and Internet access because of intense competition.

In addition, the Turkish Retail Market is structured as follows:



The above figure shows that there is considerable promise for an on-line retailer to flourish.

Deppo currently offers more than 25,000 products from over 500 local and foreign brands organized under 17 sections, 66 categories and 933 sub-categories with 60 features to facilitate shopping (one-stop shopping concept). The company plans to have 100,000 products online by the end of 2002. The products offered by Deppo come from a network of 133 suppliers. Deppo does not operate a warehouse and carries no inventory.

Within the present set-up, when an order is received online, Deppo picks up the item from the supplier, brings it to Deppo's premises for quality control and packaging, and then delivers it to the customer. This process is completed at the latest by next day in Istanbul and within four days for the rest of Turkey.

Technical Description

The current hardware and software used by Deppo is summarized in the following table.

HARDWARE	
Server	Silicon Graphics Inc. SGI 1500
Server Size	Mini Tower
Processor	Intel XEON 600
Number of Processors	2
Hard Disk	1 SCSI 18 GB (raid)
CD ROM	1 SCSI
RAM	1.5 GB

SOFTWARE	
Application System	Red Head 6.2 Linux 2.2.14
Web Server	Apache / 1.3.12 web server
Database Server	Oracle 8I
Application Language	Php 4.0.2

Deppo's online presence is currently on the world-wide-web and it is planning to extend its brand on digital-interactive TV before the end of 2001. The company is currently serving the entire country. Plans envisage an expansion of service to include surrounding Turk language-speaking countries in the region. Site address: www.deppo.com.

Deppo's products are categorized under the following sections: Computers, Flowers, Children, Decoration, Electronics, Men, Women, Health & Beauty, Office & School Supplies, Books, Music, Gourmet, Kitchen, Pet Supplies, Art, Sports, Telephones. Sales, Free Gift, New items, and Special at Deppo.

Following are Deppo's service options: Help, Search by Price, Brand or Product, Membership, Site Map and Customer Services.

Project Site

The project is based in Istanbul, Turkey.

Project Status/Timeline

Deppo was founded in July 1999 and became operational in May 2000. The anticipated break-even point is 2003, with profitability reached in 2004.

Equipment and Services

The expansion project will include two Web Servers each with 2 CPU, 2 GB RAM and both expandable to 4 CPU and 4 GB RAM. The servers will have load balancing through a switch, 2 x 36 disk, and switching ability. The project will also require two Database Servers (1 Active and 1 Passive each with 2 CPU and 2 GB RAM). In terms of software requirements, the project expansion will need the latest customer relationship management (CRM) applications, auction platforms, interactive imaging technologies and integrated solutions.

U.S. Competitiveness

The United States is well known for being extremely competitive in the technology sector and for having the latest, as well as most proven, technologies in hardware and software available on the market. Also, the U.S. is leading the world in online retail concepts, technologies and solutions.

As the Turkish online retail sector is approximately four to five years behind that of the U.S., Deppo is seeking to join forces with an experienced U.S. partner to further penetrate the fragmented retail sector in Turkey and the surrounding region.

Project Financing

Deppo raised its seed capital of US\$1.2 million in January 2000. The company is currently seeking secondary financing of US\$500,000 in 2001 to make the necessary infrastructure investments. This business expansion will allow Deppo to remain competitive and to finalize several strategic alliances it has been pursuing. Deppo envisages that it will require additional investment in 2002 of US\$1.5 million and US \$3 million in 2003.

Conclusion

In anticipation of its expansion, Deppo is currently looking for a U.S. financial and strategic partner to maintain the company's leading edge and accelerate its presence in

the extremely fragmented retail sector in Turkey. A U.S. company that works in the “visual merchandising” sector would be an effective strategic partner. The U.S. joint venture partner will benefit from entering the high growth Turkish market and have the opportunity of expanding also in the region (the Balkans, the Middle East and Central Asian Republics). The U.S. company may also continue to supply products and services to Deppo after the initial expansion phase.

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REPUBLIC OF TURKEY

Information Technology Incubator

Project Summary

Subsector	Technology Investment
Location	Istanbul, Turkey
Project Cost	US\$7.5 Million
Export Potential	US\$1 Million
Project Type	Facility-based incubator for convergence projects
Project Executing Agency	IncubaTR Management



Project Outline

IncubaTR is a recently created Turkish company that is a subsidiary of Cukurova Holding, a large industrial conglomerate in that country. It is a sister company to Turkcell, the leading mobile network operator in Turkey, Superonline (the country's leading ISP), Digital Platform (the leading Pay TV operator) and the newly formed multi-access portal company, Mapco.

IncubaTR is focused on germinating and developing Turkish and regional technology firms in the Internet, mobile telecommunications, and digital media industries. The company's main focus is "on seed-stage companies with market maker potential based on proven or successful business models." IncubaTR shepherds new ideas through a rigorous process that maximizes potential, reduces risk and accelerates time to market. This is done by combining business, marketing, technology, and partnership strategies.

In part due to the financial crisis facing Turkey, IncubaTR is seeking a U.S. joint-venture partner and/or financier to provide a US\$3 million contribution to its US\$7.5 million budget.

Technical Description

The company's organic relationship with Turkcell, the largest GSM operator in Turkey, is of considerable strategic advantage. In addition, IncubaTR will reap the benefits of strategic partnerships with market leaders such as Sun Microsystems and Turkcell Group companies such as Superonline (the leading ISP), Digital Platform (the leading PAY-TV company) and the newly formed multi-access portal company, Mapco. These partnerships were formed to trade hardware, strategic support and deal flow in exchange for the opportunity to grow new sources of business.

IncubaTR continues to seek partnerships with companies that have a shared vision and approach to growing new sources of business. Seed-stage Internet infrastructure and technology companies will be able to benefit from the highest international standards of business enterprise development along with fast-track positioning on Turkey's widest electronic distribution channel which Superonline has developed in conjunction with Turkcell and Digiturk (a digital broadcasting satellite company). Faced with only fledgling domestic competition, IncubaTR's combination of talent, strategy, network and strong backing make it uniquely qualified to graduate Turkey's future generations of successful E-businesses.

It is expected that technological investments made in line with U.S. and European models of convergence technologies - Internet/IP, GSM, and Direct-to-Home digital television - will provide a new wave of sustainable and rapid growth to Turkey's E-economy. Statistics of Turkish usage of these devices are nothing short of phenomenal, with the favored medium, mobile telephony (GSM), growing by 11% in December 1999 alone and expected to reach 37% in 2005.

With the advent of WAP technology and the mobile Internet, users are demanding content and services previously unavailable in Turkey. Successful companies will be those that optimize their content offerings to provide a targeted service based on user preferences and the newest delivery platform.

Project Site

As a pioneering venture capital effort, IncubaTR brings organization to Turkey's emerging yet still immature Internet and IT sectors. It does this by providing the key infrastructure elements needed to create entrepreneurial expertise and start-up initiatives. By using the key tenets of venture capitalism and present-day facilities-based incubation, incubaTR is positioning itself to be the stepping-stone into the new economy for Turkish entrepreneurs and companies eager to enter the Internet economy but unversed in the business methodology needed to do so.

As one of Turkey's first venture capital institutions, IncubaTR will nurture and graduate businesses within six months, enabling fast track entry to the wide distribution channel of Turkey's converged electronic media. IncubaTR's principal geographic emphasis will be Turkey, but the company will review on a case-by-case basis projects that target other neighboring consumer markets.

Project Status/Timeline

The project is currently in operation with three start-ups in incubation. Two of these start-ups are near the end of their incubation period and preparing for commercial launch during May 2001.

Equipment and Services

This project profile relates to a proposed investment in a venture capital incubator. There are no immediate equipment envisaged with this project opportunity, although it is possible that a strategic technical investor might second technical resources to IncubaTR under a management or services contract.

U.S. Competitiveness

The project sponsor believes that U.S. companies are the market leaders in the provision of IT venture capital and have the necessary understanding of the process of creating technological breakthroughs. Those U.S. companies are therefore likely to appreciate the sponsor's growth strategy and might be willing to provide the necessary growth capital.

Project Financing

IncubaTR is seeking a U.S. joint venture partner and/or financial institution willing to contribute US\$3 million to the venture capital pool. Total project valuation will be US\$7.5 million.

Conclusion

IncubaTR is seeking a joint venture partner to assist in growing its incubation business.

In keeping with the global explosion of high-tech innovation elsewhere, Turkey is making its own technological advances. Nowhere is this growth as dynamic as in small companies positioning themselves to take advantage of high-tech modernization in Turkey. Some of the trends driving this growth are:

- Increasing amounts of private and public investments in technological education, infrastructure and hardware;
- A large consumer market of 65 million with Europe's youngest population base;
- A rapidly stabilizing economy whose lower interest rate environment will lend itself to greater consumer and business spending; and
- High adoption rates of new technology as can be seen in the example of wireless telephony.

As in more developed markets, hurdles presented by the financial environment to small business growth are often coupled with gaps in financing know-how on the part of the technological entrepreneur, who may not possess the management skills required to obtain financing in home or foreign markets.

The sponsor's mission is to help small technology companies and entrepreneurs close these gaps by providing both the managerial expertise and financial know-how needed to grow successful ventures. In order to take advantage of these major developments, it is important for companies to have an Internet strategy, ease of access to financing and logistical support. IncubaTR believes these are crucial elements in a successful and meaningful migration to the online workspace and marketplace as they rapidly converge with voice, data and video technology.

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REPUBLIC OF TURKEY

Internet Access Solution for Hotels

Project Summary

Subsector	Information Technology
Location	Turkey
Project Cost	US\$11.5 Million (over 2 years)
Export Potential	US\$1 Million/year
Project Type	Internet Infrastructure
Project Executing Agency	Probil



Project Outline

This project involves an Internet access service for hotel guests and includes the necessary hardware, software, support and management activities and marketing. The aim of the project is to provide reliable high-speed Internet access devices to the hotel guests during their stay to allow them to use their own Internet enabled or rented devices to gain access to their assigned rooms. This service would later be expanded to provide access to conference rooms, hotel front offices, and public Internet access points. The system would also operate in-house portals to provide information about activities, booking options and Voice over IP operations.

In order to undertake the project, the project sponsor, Probil, seeks to establish a joint venture in Turkey with a prospective U.S. partner who will either contribute the necessary equipment or the bulk of the capital to finance the proposed project. Alternatively, Probil is seeking to attract vendor financing to undertake the project.

The target hotels will be selected from luxury, business and leisure hotels in the Turkish market but will also be drawn from eastern Mediterranean, Middle Eastern and East European countries. The stated project cost of US\$1.65 million is per hotel and is based on a profit sharing model with the client hotel.

Technical Description

Primary project elements include:

- High speed Internet access for hotel guests via Ethernet and dial-up at rooms, conference rooms, public Internet access points and hotel's front office;
- Full-time support and maintenance, management and integration with hotel's front office system;
- Voice over IP access from guest's rooms; and

- A local portal providing information about the hotel itself, about the city, about the local activities, booking option for restaurants, music halls and cruises, etc.

The service is based on a zero-configuration model without the need:

- To reconfigure the guest's device,
- For a roaming agreement with the guest's local ISP;
- To buy a separate ISP account; or
- To pay any telecom access fee to access these ISPs locally or internationally.

Project Site

The first implementation of the project is envisaged for hotels located in major Turkish cities. The project sponsors are planning to expand this service network to the Balkans, Eastern Europe, Russia, Caucasian States, the Middle East and Egypt.

Project Status/Timeline

The development phase of the project is already completed. Negotiations with leading hotels in Istanbul have been initiated and the project sponsor expects service to commence at the end of July 2001. During the second half of 2001, the sponsors are planning to expand service to include all of the other major hotel chains in Turkey.

Equipment and Services

Equipment required includes: Ethernet switches, access servers, server hardware, operating systems, notebook computers, kiosks, application servers, firewalls, routers and modems.

U.S. Competitiveness

U.S. technology providers are well positioned to provide the necessary project infrastructure. The sponsors propose to acquire the following equipment and software from major U.S. suppliers:

- Ethernet switches, firewalls, access servers and routers;
- Server hardware, notebook computers, and kiosks; and
- Operating systems and application servers.

Project Financing

The Internet Access Service for Hotels Project is about to build an outsourced service network for hotels with the project sponsor, Probil, providing the startup investment of US\$2.5 million for the first year of operation. During the first year, 10 hotels in Turkey will be targeted. The service will be provided on a profit-sharing basis with the client hotels. Contracts will be for a minimum period of four years. Probil expects the initial investment to be recouped within the first year.

The project sponsor is seeking a strategic technical partner to provide financing, totaling US\$9 million, for the expansion during the second year of operation. 50 hotels in the Middle East, Europe, and Russia will be targeted during the second year of operation.

Conclusion

Internet Access Service for Hotels enables hotel guests to access their personal and corporate business data from anywhere while they are traveling abroad. This service is designed for developing countries, especially where international telecommunications access and/or Internet access opportunities are weak or very expensive.

Probil is planning to realize this project with a U.S. company either by means of vendor financing or by setting up a joint venture where the U.S. partner will either provide the equipment or the bulk of the capital to finance the project.

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REPUBLIC OF TURKEY

IP-Based Integrated Communications Network and Services

Project Summary

Subsector	Telecommunications
Location	Turkey
Project Cost	US\$4 Million
Export Potential	US\$3.5 Million
Project Type	Network and Services Development
Project Executing Agency	Miltel Communications Services Ltd.



Project Outline

This project involves the development of a state-of-the-art IP-based (Internet protocol based) network to provide integrated communications services in Turkey. The integrated services to be offered include: voice, data and video services provided to individual businesses, business centers, government institutions and universities. The project sponsors envisage ultimately expanding the network outside of Turkey to the U.S., Western and Southern Europe, Central Asia and the Caucasus.

The project sponsor, Miltel, is a privately held company that is concentrating on the provision of communications services enabled by emerging Internet technology. The company aspires to become a major telecommunications services provider in Turkey as the domestic telecommunications market is liberalized.

Three former AT&T employees founded Miltel in August 1998. The President of Miltel, Mr. Zafer Yakin, worked at Bell Labs in the U.S. and then held several positions with AT&T in Turkey including that of country representative. The founders and the management team have extensive experience in telecommunications and Internet technology. Their experience covers a wide area of telecommunications including network planning and design, development of advanced services, marketing and sales of telecommunications equipment and services, new service introduction, service provisioning and management, carrier services, customer care and niche marketing of consumer services and Internet telephony.

Technical Description

This proposed project includes the following primary elements:

1. **Service development:** Voice, data and video services will be offered as integrated services over an IP-based network. Service architecture for these integrated

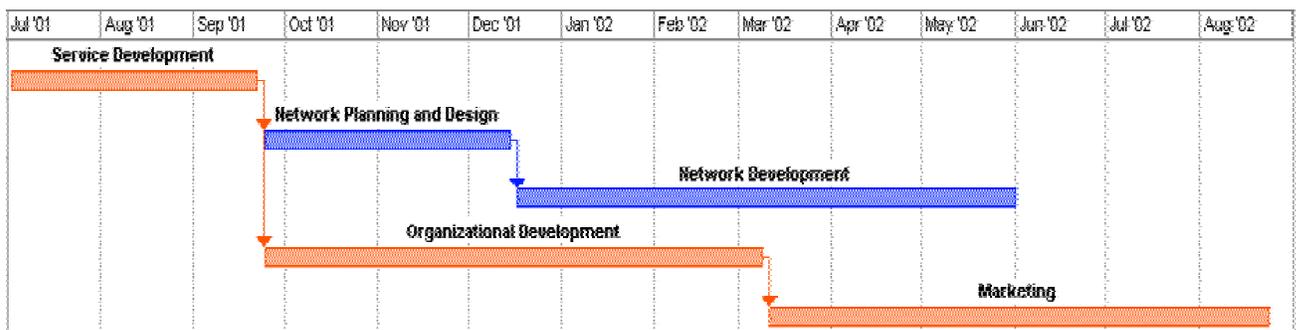
- services will be developed according to the requirements and realities of the local marketplace;
2. **Network planning and design:** The IP-based network will be planned and designed according to the business plan and the service architecture;
 3. **Network development:** Network elements including IP routers and switches, customer care and billing systems, network management and maintenance systems will be procured and installed according to the business plan. The IP transmission infrastructure will be provisioned from the present fixed line network provider, Turk Telekom, or alternative network infrastructure providers;
 4. **Organizational development:** Human resources for different organizational functions such as network operations, customer care, marketing and sales, finance and accounting will be developed. This will require definition of organizational functions, identification of human resource requirements and selection and training of personnel satisfying those requirements; and
 5. **Marketing:** This element includes the marketing of integrated services in the market entry phase of the business plan.

Project Site

This proposed project will be based in Ankara, Turkey. Initial network development will take place in Istanbul, Ankara and Izmir, the three largest cities in Turkey. The network will be expanded to the 20 largest cities in Turkey within two years of initial deployment.

Project Status/Timeline

The project will be initiated as soon as financing is secured. The project sponsor has already applied for a license that will allow it to set up the network. The following timeline will be followed for different elements of the project:



Equipment and Services

The following **equipment**, totaling US\$ 3.5 million, will be required to implement this project:

- IP routers;
- IP switches;
- IP-based Integrated Access Devices (IAD);
- Database management systems;
- Customer care systems; and
- Billing systems.

The following **services**, totaling US\$500,000 will be used in implementing this project:

- Consulting services for service development, network planning and design;
- System integration services; and
- Human resources consulting and training.

U.S. Competitiveness

U.S. companies are market leaders in the equipment that will be used in this project. The project sponsors estimate that 90% of the equipment used in this project will be procured from U.S. companies.

There are local companies in Turkey that can provide some of the services required to develop this project. The project sponsors estimate that about half of the services required in this project will be procured locally in Turkey and the remaining portion will be procured from the U.S.

Project Financing

The project sponsors have strong technical and marketing skills associated with the Turkish telecommunications market, but require full financing to implement the project.

Conclusion

This project will offer the following opportunities for U.S. companies:

- **Equipment providers:** About 90% of the equipment that will be used in this project will be procured from U.S. companies. This proposed procurement will cover a number of equipment providers in different fields of telecommunications and the information technology industry.
- **IT Consultants:** Consulting services in service development, network planning and design and system integration will be required from U.S. companies.
- **Organizational development and training consultants:** Development of organization and human resources will require services of qualified U.S. companies in telecommunications management, consulting, and training. The project sponsor would consider joining with an equity partner that can provide such organizational

development expertise. Such a linkage would complement the strong technical expertise of the project sponsor.

The project sponsor is highly skilled and very knowledgeable about the Turkish and regional telecom industry and would make an effective potential technical partner.

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REPUBLIC OF TURKEY

Mobile Internet Portal Services

Project Summary

Subsector	Mobile Telecommunications
Location	Istanbul, Turkey
Project Cost	US\$33.8 Million (over 2 phases)
Export Potential	US\$13.8 Million
Project Type	Multi-access portal
Project Executing Agency	MAPCO Management



Project Outline

This project involves the identification of a U.S. strategic investor to participate in the advanced development and implementation of a multi-access Internet portal service for Turkcell, Turkey's leading GSM network operator, which provides 10 million customers with a broad array of mobile services. The project sponsors are presently implementing the pilot phase of a mobile Internet portal for Turkcell. Strategic investors interested in Web and WAP enabled applications, and possibly digital terrestrial television, might be interested in participating in the subsequent development and implementation phases of this proposed project.

Customers who are already Internet and mobile telephone users represent the initial target audience of the pilot phase. At the project's core is the sense of community, where friends can meet and chat and arrange where to visit. Users drag and drop content "bricks" they desire, such as news or horoscopes, from the website into their personal files. These changes are not only captured on the Web, but also on the mobile phone.

Technical Description

Primary phase 1 project elements include individual applications and services to allow the end user to easily personalize the services offered in the mobile portal. The project is conducted in cooperation with the Swedish equipment manufacturer, Ericsson, with the portal platform hosted at AU System in Lund, Sweden. The mobile portal comprises the portal itself (e.g. Web servers, the Ericsson WISE application, portal services implemented, file system and email system) and the necessary network and systems (e.g. Internet connections and internal LAN) to make the portal available to users.

Major portal content that will be integrated to the mobile portal to be used through web, WAP and SMS includes:

- **My Portal** (personalized services -Web, WAP, and SMS);
- **News** (breaking news, weather, politics, sports, people, economy, world, and magazine);
- **Finance** (online real time national and international stock quotes, gold market, foreign currency exchange rate, investment funds, and bonds); and
- **Fun/Entertainment** (games, movies, gourmet, daily recipes, national lottery, horoscope, horse race results, ringing tones, and logos).

Project Site

The project is based in Istanbul, Turkey.

Project Status/Timeline

The first phase of the mobile portal project commenced in January 2001 and was expected to last for 18 weeks until late May 2001. Subsequent phases of the multi-access portal will be implemented according to a new project timeline, which will be dependent on the identification of a strategic investor.

Equipment and Services

The equipment and services required for the subsequent phases are not fully determined at this time. Such a determination is dependent on the outcome of the Phase 1 pilot project as well as discussions with prospective strategic partners. Operational hosting services and maintenance services will be required.

U.S. Competitiveness

The start of 2001 has seen a substantial squeeze in the mobile Internet industry, as a result of a combination of factors that began in 2000:

- The slow uptake of technologies such as WAP and GPRS;
- The sub-optimal business models involved with these technologies;
- High prices paid for 3G spectrum;
- Handset shortages and continued turbulence in the fundamental change in the requirements for non-voice centric terminals compared to voice ones;
- The negative change in venture capital investment sentiment toward the sector; and
- Over funding of certain key sectors such as portals, B2B wireless aggregation and corporate wireless enablement, leading to high competition.

According to the project sponsors, the foregoing has led to start up companies going out of business, laying off staff or terminating or outsourcing handset projects. In order for the mobile Internet to be a success, there are two critical success factors that must be taken into account:

- Business models have to be fair for all players in the value chain such that the application developers and content creators earn revenues from the usage they generate; and
- The need to recognize that the Mobile Internet is five years away from critical mass. The successful companies will be those that are patient enough to ride the inevitable delays occurring whenever a new mobile service or technology is rolled out.

This observation is reflected in the fact that SMS, Smart Messaging, and voicemail services took at least 24 months to reach critical mass from the point of their respective first launches.

Project Financing

Turkcell is financing the US\$10 million for the Phase 1 pilot project in its entirety. The financial model relating to the next phases of building a multi-access portal is open to discussion. The project sponsor is seeking a strategic investor to provide US\$10 million of the needed US\$23.8 million for Phase 2 of the project.

Conclusion

With global equity markets presently valuing telecommunications stocks so poorly, development capital for viable project expansion is scarce. Despite the relative scarcity of capital, however, the project sponsors believe that the Turkcell multi-access portal has a strong competitive advantage.

The project sponsors are interested in identifying a strategic investor to participate in Web and WAP enabled applications, and possibly digital terrestrial television. A partnership with Turkcell, an aggressive company with 68% share of the Turkish mobile market, would provide the additional benefit of strategic partnerships with market leaders such as:

- Superonline (the leading ISP and another Turkcell Group company);
- Digital Platform (the only Turkish digital television company and another Turkcell Group company); and
- Mapco, the newly formed multi-access portal company.

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REPUBLIC OF TURKEY

Networked and Smart Household Appliances

Project Summary

Subsector	Information Technology
Location	Izmir, Turkey
Project Cost	US\$1.5 Million
Export Potential	US\$1 Million/year
Project Type	Networked and Smart Household Appliances
Project Executing Agency	Gunkol Gunes Enerjisi ve Klima Sanayii A. S.



Project Outline

Gunkol, the project sponsor is a manufacturer and exporter of white goods in Turkey. The company's research has identified a market demand for networked and smart household equipment. As Gunkol considers itself a "solution supplier of household appliances" rather than a "white goods manufacturer", it has embarked on a project called "Networked and Smart Household Appliances".

The project sponsor is aware of the technological lead held by U.S. companies in this IT market sector and is interested in linking with American companies that can provide networking solutions in the design of proposed equipment lines, as well as suppliers of electronic controller units and micro controllers. The company is presently selling white goods using U.S. marketing channels and OEM agreements with U.S. equipment manufacturers. Gunkol is also selling some products under the brand name of Avanti in the U.S. and expects to soon begin selling GE appliances. It would also like to explore other marketing channels. It is also seeking a strategic technical partner to finance the project.

Technical Description

Gunkol is interested in linking with a U.S. company that can provide the following networking solutions related to the design of a proposed product line of "Networked and Smart Household Appliances":

- Design of controller units for the following white goods:
 - Cooking appliances;
 - Refrigerators;
 - Washing machines; and
 - Dish washers;

2. Creating a network solution for the foregoing appliances to be able to communicate with each other with accessibility from the Internet, through a gateway;
3. Adding smart features to those appliances for easy use, low energy consumption and to eliminate any user adjustment;
4. Creating friendly user and application interfaces for easy access to those appliances through a wide area network such as the Internet; and
5. Creating a compatibility with most common white goods designed and manufactured with similar properties.

Project Site

The project will be coordinated from the Gunkol headquarters in Izmir, Turkey. Gunkol's manufacturing plant for cooking appliances is also located in Izmir.

Project Status/Timeline

Gunkol initiated this project in the third quarter of 2000 and made considerable progress to date. The first prototype of a cooking hob is ready and copies will be made for the market in order to have a Focus Group test. Prototypes for the ovens will be ready during the third quarter of 2001 and the products for the ovens and hobs will be launched into the market by the beginning of 2002. By the third quarter of 2003, Gunkol expects to launch the entire line of kitchen appliances.

Equipment and Services

Gunkol will manufacture most of these aforementioned appliances in their Izmir factory. Some of these appliances will be outsourced from other OEM suppliers, using the Gunkol design and know-how.

Under the proposed development project, Gunkol's requirements will be as follows:

- Necessary controller units to be developed according to the Gunkol design criteria. The know-how for these controllers will belong to Gunkol, while the hardware design and software implementation will belong to the manufacturer of those units;
- Device networking solution supplier will be needed to create the connectivity for home automation;
- Residential gateway manufacturer and distributors needed to adapt the Gunkol appliances; and
- Lightweight data transmission equipment and solution suppliers needed for carrying data from the appliances to the gateway and through the Internet (such as power line communication systems, RF systems, Blue Tooth and CAT5).

U.S. Competitiveness

The concept of networked and smart appliances is a rapidly increasing trend in the U.S. Gunkol has a market share in U.S. for household appliances with its 20” and 24” cooking appliances. There are very few manufacturers in this market segment and overall market for manufacturers in that segment is low.

Only the largest appliance manufacturers are developing networked and smart appliances. Those products command high prices, a factor that tends to also make the Gunkol appliances more competitive in the U.S. OEM market. Gunkol expects to be able to launch its networked and smart appliances at reasonable prices.

To date, U.S. networking and lightweight data transmission solution suppliers have shown considerable interest in participating in this proposed project.

Project Financing

The company is seeking a strategic technical partner to finance the project. It is also anticipated that industrial incentives will be available from the Turkish government to support associated research and development studies.

Conclusion

As described earlier, it is expected that Gunkol will develop this project in cooperation with U.S. Information Technology companies. With respect to networking solutions, Gunkol acknowledges that this industry sector is probably the most highly developed in the United States. The company is also intent on utilizing solutions from U.S. suppliers of electronic controller units and micro controllers.

Gunkol is presently selling some products in the U.S. under the brand name Avanti and there is an expectation that the company will soon begin supplying to GE. Gunkol has expressed an interest in developing other OEM and marketing channels into the U.S. market for white goods.

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REPUBLIC OF TURKEY

News/ Economic Information/ Market Research Portal

Project Summary

Subsector	Information Technology
Location	Istanbul, Turkey
Project Cost	US\$9 Million
Export Potential	US\$5 Million
Project Type	Internet Portal Development and Commercialization
Project Executing Agency	Reform Management Consultancy Co. Ltd.



Project Outline

This proposed project involves the development and commercialization of an Internet Portal focusing on news, economic information, and market research in Turkey. The opportunities for U.S. companies include the supply of hardware and software for the establishment of the portal as well as the potential to join as partners for the commercialization of the portal.

The target market will be the corporate business sector in Turkey as well as potential and existing foreign investors that would like to be kept abreast of all key economic and political events impacting on the business environment in Turkey. The Portal will form alliances with selected newspapers, information agencies, and portals as necessary to secure relevant content and will provide clients with regular and frequent updates on information on Turkey.

The management of Reform Management Consultancy Co. Ltd. is highly experienced. Dr. Yalçın Baran, the President, is a former Deputy Director of the Privatization Administration of Turkey as well as a former country economist for the World Bank. Dr. Baran also consults for leading domestic and large blue-chip multinational companies, which wish to enter the Turkish market. Mr. Metin Demirsar, an Associate in the company, is an experienced economic journalist who has worked for numerous news agencies including 10 years as the Wall Street Journal's Turkey correspondent. Mr. Erhan Çalışkan, the company's IT and Logistics specialist, has extensive experience with several large Turkish companies as an information systems and logistics manager.

Technical Description

Primary project elements include the acquisition of advanced technical equipment (servers) as well as the development of relevant software and alliances with news agencies in Turkey and in the U.S. The project sponsors already have a verbal agreement to link with two prominent Turkish news agencies. The comparative advantage of the Internet Portal will be the combined judgment of key global and local news providers as their coverage impacts the Turkish business environment and investment framework. There is a trend in Turkey towards accessing news on the Internet rather than in print. Circulation of the top eight print newspapers in Turkey is approximately 2.5 million, while 2 million Turks access a growing number of independent Internet news sites.

The Portal will emphasize timely, on-line, relevant, local, as well as global, news for business executives with forecasts and seasoned judgments on a 24 hour basis. The most important news will be that which the project sponsors provide. This news will focus on timely analysis of major events. The Portal will also feature articles about the Turkish economy, Turkish companies and banks, and analysis of key political developments as they impact on the business environment. The Portal will conduct interviews with important political and economic figures. Key drivers for business growth will emanate from fast changing economic and political events and the need to act quickly so that investors are able to make informed investment decisions in the Turkish context. The news section could be supported with general and economic news of an international news agency, such as the Bloomberg, AP-Dow Jones, or Bridge News Agency of the U.S. Users of the portal will also have access to news, features and editorials that appear in business newspapers and magazines published in Turkey, such as *Dünya*.

In addition to various newspapers and magazines that will be accessible on-line, the project sponsors plan to provide English news related to international tenders from Turkey. This would allow foreign business people to follow the developments of major contracts on which they are bidding from the tendering and bidding stage to contract signing. The project sponsors will also provide instant news coverage of any major changes in the country's tax laws that will affect the business of a foreign company in Turkey.

Perhaps the most important element will be news that the project sponsors generate themselves. This news will be on-line and in real time. Every day, the sponsors will provide 10 to 15 business-related news reports as they occur. These reports should be made available immediately and not appear one-day after they have occurred. These could be reports of a government crisis, a major devaluation, a report on a stock market listed company reporting solid profits, new initiatives for increased trade with neighboring countries, or moves by the Central Bank to soak up liquidity. If a major news event takes place at night that affects foreign investors, this will be covered and reported immediately. The project sponsors will also monitor the semi-official Anatolia News Agency and major TV networks, such as CNN-Turk and CNBC-E, for breaking news.

Existing and expected high level of uncertainty sustains the need for such premium, timely, and focused services. There is also a critical mass of enterprises and business

people both in Turkey and outside of Turkey, who have come to appreciate the need for such services. The Portal's financial journalists will handle the news side of this work on a daily basis. The market research sub-module will provide additional value-added services for local blue chip companies, as well as multinational companies in cooperation with a respected local market research firm.

Project Site

The Portal will be headquartered on the Anatolian side of Istanbul with a branch located in Ankara. The Portal will also work with associates around the globe.

Project Status/Timeline

The expected start up date is the first quarter of 2002. Currently, strategic alliances are being formed.

Equipment and Services

The Portal will require the purchase of servers, routers and switches, UPS (uninterruptable power supply), generator, network, fast printers, video conferencing equipment, and other ancillary IT equipment, and software. Equipment costs will total approximately US\$4 million. Fees charged for content supplied by U.S. news agencies could add to the export value of the project by as much as US\$1 million.

U.S. Competitiveness

U.S. companies would be well positioned to provide services and the necessary equipment and software to establish the Internet portal. The project sponsors are in preliminary discussions with Detecon, the consultancy arm of Deutsche Telecom, as a potential technical partner. The project sponsors expressed interest in discussing the project with prospective U.S. technical partners, as well as identifying U.S. news portals and services with which to join as strategic partners.

Project Financing

Project financing is needed to purchase equipment (i.e. servers) as well as software. The project sponsors are also seeking funding from joint venture partners in the commercialization of the portals.

The project sponsors state that project revenue will be raised from the sale of access subscriptions to the Portal. The project sponsors estimate that the Portal will attract approximately 2,000 domestic and 1,500 foreign subscribers within two years from project startup. Base annual subscriptions will be set at \$5,000. Revenue derived from subscriptions after the first two years is expected to be \$17.5 million. The sponsors expect that advertising and fees derived from market research will add \$1.5 million to total revenue within the first two years. Total annual revenues are expected to reach \$20 million within the first two years.

Conclusion

The development and commercialization of the Internet Portal will provide several potential business opportunities for U.S. companies. The project sponsors are seeking to purchase equipment and software, obtain financing, source venture capital, and identify strategic and technical partners to implement and operate the Internet Portal. The project sponsors have long established track records in the core areas required for successful operation of the Portal - in media, economics, finance, politics, follow up of relevant global events, contacts with key local players, multilateral institutions and private financial institutions.

Key Decision Makers

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REPUBLIC OF TURKEY

Smart Card Development

Project Summary

Subsector	Information Technology
Location	Istanbul, Turkey
Project Cost	US\$6.5 Million
Export Potential	US\$2 Million
Project Type	Plastic and Smart Cards
Project Executing Agency	PMB Smart Card and Information Technology Corp. (PMB Akilli Kart)



Project Outline

The project sponsor, PMB Smart Card and Information Technology Corporation (PMB Akilli Kart), is a leading supplier of labels and label products for the Turkish cosmetics, automotive, food, textile, government, electronics and retailing industries. PMB leads the local industry with exports to Russia, the Middle East and the Balkans as a major vendor for barcode label products. PMB and its related companies also provide software-based security systems, accounting and distribution (e.g. supply chain management) software for a wide range of customers. PMB is owned by Marmara Bilgisayar, which is in turn wholly-owned by three Turkish entrepreneurs. Those entrepreneurs also own 50% of Porcan Holding, which has a 90% stake in Porcan Bilgisayar (a developer of software for various Internet, e-business and supply-chain management applications, as well as hardware importation and distribution).

This project involves PMB's expansion of its business into the production of plastic and smart cards, as well as systems integration services including the personalization, secure transporting, secure printing and complementary software and hardware provisions. PMB is one of the two licensees of Microsoft's smart card operating system in Europe. The project sponsor is seeking a strategic partner that will contribute to and enhance the company's systems integrating capabilities such as PKI, digital certificate application program, and card management systems. The sponsor is seeking a total of US\$4.5 million from a strategic partner. The sponsor needs to procure about US\$2 million in equipment to increase its smart card capacity. The sponsor needs an additional US\$2.5 million for financial restructuring to pay the debt incurred during the initial investments of the smart card project.

Technical Description

PMB was founded in 1985. The business line was initially barcode related activities, including supply chain management systems integration (with portable terminals and warehouse management software). These solutions were targeting the manufacturing, distribution and retail industries and PMB had the opportunity to sell new products into this existing customer base. As a result of expanding demand from its existing customer base, PMB decided to extend its business line to produce self-adhesive labels and ribbons for product identification (name plates), warehouse barcode labels, etc.

Since the manufacturing activity is much different than the computer software and hardware development, Porcan Bilgisayar was spun off as an Auto ID company in 1994. PMB has been producing labels as well as selling small system solutions since then.

Marmara Bilgisayar, the parent company, acted as the marketing company for the labels produced by PMB in 1999 and 2000, and also traded small computer solutions along with labels. However, in an effort to further expand the business, sales and marketing activities were transferred back to PMB in 2001.

Attracted by the lucrative market for plastic and smart cards in Turkey, PMB conducted research on smart cards in 1998. The Group's experience in computer hardware, software and systems coupled with printing know-how, represent the major competitive advantages PMB has in the smart card business. Based on this knowledge and experience in delivering integrated systems, design, manufacturing, personalization and smart card processing, PMB is capable of delivering turnkey smart card systems.

The proposed project relates to PMB's business expansion into the production of plastic and smart cards, as well as systems integration services including the personalization, secure transporting, secure printing and complementary software and hardware provisions. As part of this project, the sponsor is seeking to procure smart card components, including chips and modules, chip implanting and card milling equipment, and personalization machinery. The plastic cards and smart cards that PMB will manufacture are intended for use in telecommunications, banking services, mass transportation, loyalty programs, utilities and identification (plus access controls). PMB is also involved in the development of software and hardware systems such as POS readers, smart card readers, fingerprint readers and smart meters.

The project sponsor has already acquired a building that is being renovated according to international standards for secure printers. This building will be a complete secure site for secure printing, card personalization, mailing shop, WEB hosting services, and secure application programming for plastic cards and similar applications. The project sponsor has ordered the necessary equipment and machinery for the card manufacturing business and is about to procure personalization machinery to function as a service bureau.

PMB will be able to produce all types of bank cards, prepaid cards, SIM cards, ID cards, and loyalty cards. The current capacity is 100 million plastic cards per year, 30 million of which can be allocated for smart cards. With the new machinery that constitutes the export potential, smart card capacity will increase to 100 million cards per year.

Particular elements of the production facility include:

- Secure building;
- Film processing machine;
- Printing machine;
- Lamination machine;
- Card milling machine;
- Test machine;
- GSM punch machine;
- Card counting equipment; and
- Collation table.

The investment bank assisting the project sponsor has identified the following immediate market opportunities for PMB's expansion into the smart card production business:

- PMB is engaged in a six-party consortium, which will bid for two substantial government tenders (Bagkur and SSK) to issue identification cards nationwide. The initial launch will be for 40 million smart cards, with an additional 6 million cards within six months. Should PMB win these tenders, the expected revenues would be more than US\$160 million during the next two years.
- Additional specifications are being developed for a Military ID cards project that consists of 1.75 million cards with 32-Kb memory. PMB is partnering with Bell I.D., which has already supplied cards to NATO in Brussels. Bell I.D.'s leadership in card management systems and military experience is anticipated to increase PMB's chances to win the tender. The tender will be announced in the second quarter of 2001 and is worth approximately US\$6 million. PMB has contributed to the tender documents and taken the military decision-makers to Bell I.D. in Holland.
- The National ID project, which involves distributing 70 million laser engraved non-smart PC cards to every single citizen in Turkey will involve form processing and card personalization. The size of the project is estimated to be US\$70 million over five years. The tender is expected to open in the second quarter of 2001.
- The Police ID cards project, similar to the National ID cards project, consists of delivering 250,000 cards with laser engraved personalization and form processing. The size of the project is estimated to be US\$2 million. PMB believes that it has more than a 50% chance for being awarded the tender since it already has form processing capability.

Project Site

The facility is located in Istanbul, Turkey.

Project Status/Timeline

The proposed project is a start-up business with the initial operations phase expected to commence in June 2001.

Equipment and Services

The equipment that the project sponsor needs to procure includes: personalization machinery and equipment, a secure printing machine, an access control system, chip implanting and card milling equipment, and smart card components, including chips and modules. The estimated value of the equipment is US\$2 million.

U.S. Competitiveness

U.S. companies are well positioned to provide the necessary equipment since the project sponsor has specifically mentioned a desire to access U.S. technology for the project. The project sponsor is also interested in linking with a strategic partner for this initiative.

Project Financing

The project sponsor has acquired a secure building under a long-term loan and entered into a leasing agreement to finance the card manufacturing machinery and equipment. The sponsor is seeking a total of US\$4.5 million in financing from a strategic partner. This financial contribution would comprise US\$2.5 million for financial restructuring and US\$2 million to procure production machinery and equipment.

Conclusion

By serving as a strategic partner to the project sponsor, a U.S. company will have the opportunity to enter the fast-growing Turkish card market and to expand into Eastern Europe and the NIS countries. These markets have further room for growth especially in the systems integration market for bank cards, SIM cards, ID cards and prepaid cards for meters, telecommunication and transportation.

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REPUBLIC OF TURKEY

Telecommunications Network Installation

Project Summary

Subsector	Telecommunications
Location	Turkey
Project Cost	US\$8 Million
Export Potential	US\$6 Million
Project Type	Telecommunications Network Installation
Project Executing Agency	Botaş Petroleum Pipeline Corporation



Project Outline

Botaş Petroleum Pipeline Corporation is the operator of oil and gas pipelines in Turkey and is wholly owned by the government of Turkey. Botaş intends to install a 2,050 kilometer fiber optic telecommunications network along a natural gas pipeline in Turkey along a route from eastern to western Turkey. The telecommunications network will be used for both voice and data transmission. The project will be a turnkey project (excluding the fiber optic cable procurement and installation) and, therefore, Botaş will require the contractor to provide the equipment, engineering and system design, installation, training, and commissioning of the telecommunications system. Botaş would like to meet with equipment suppliers in order to develop its telecommunications network. Please note that while this is not a SCADA project, the proposed telecommunications system will work in conjunction with a SCADA system.

The Turkish Petroleum Corporation established Botaş in 1974 in order to transport Iraqi crude oil to the Gulf of Iskenderun following the signature of the 1973 pipeline agreement between the governments of Turkey and Iraq. In 1987, Botaş expanded its original business of transportation of crude oil by pipelines to include natural gas and trading activities. Currently, Botaş holds a monopoly in the import, distribution, pricing and sale of natural gas in Turkey. In 1995, Botaş was restructured as a State Economic Enterprise and is no longer affiliated with TPAO. In addition to operating all oil and natural gas pipelines in Turkey, Botaş is also responsible for exploration, drilling, production, transportation, storage, and refining in order to provide crude oil and natural gas from outside of Turkey.

Technical Description

Botaş is seeking to install a fiber optic telecommunications network along a natural gas pipeline in Turkey following the 2,050 kilometer east – west route through Turkey. Botaş

is still developing the specifications for the telecommunications network and has not decided upon SDH, ATM, or IP technology will be used in the network. Procurement and laying of the fiber optic cable is not included in the scope of the project. Turk Telekom, the government owned fixed-line operator, will lay the fiber optic cable. Because Turk Telekom will use Botaş right of way for the fiber optic cable, Botaş will be able to access two pairs of fibers per cable for free.

This tender is only for line-equipment, multiplex equipment, PABX, rectifiers, batteries, etc. to be installed at the 65 stations along the pipeline for voice and data communication purposes. The minimum capacity of the system needs to be STM-1.

Current crude oil transportation activities of Botaş include: the Iraq-Turkey crude oil pipeline; the Batman-Dörtyol crude oil pipeline; the Şelmo-Batman crude oil pipeline; and the Ceyhan-Kirikale crude oil pipeline. Current natural gas transportation facilities and trade of Botaş include: the Russian Federation-Turkey natural gas pipeline; the liquefied natural gas import terminal; natural gas trade; natural gas distribution in cities; and natural gas purchase agreements.

Botaş also has several investments presently under construction including natural gas transmission lines in the following locations: Eastern Anatolia; Samsun to Ankara; Karacabey to Izmir; and Çan to Çanakkale.

Other projects that Botaş is considering and which are in the advanced study phase are: Baku-Tbilisi-Ceyhan crude oil pipeline; Turkmenistan-Turkey-Europe natural gas pipeline; Iraq-Turkey natural gas pipeline; Egypt-Turkey natural gas pipeline; Georgia-Turkey natural gas pipeline; and natural gas pipelines within Turkey.

Project Site

The telecommunications network will be installed on two main routes along the pipeline. The first cable will start in eastern Turkey at D. Beyazit along the Turkey-Iran border and will continue westward through Erzurum, Erzincan, Sivas, Kayseri, Konya, Seydişehir, and Ankara. The second route starts at Ankara and follows a northerly route to Samsun.

Project Status/Timeline

Botaş is currently developing the specifications for the telecommunications network. The tender is planned for the middle of 2001. The fiber optic cable will be put in place by Turk Telekom this year. The engineering and design phase of the telecommunications project will most likely occur while the cable is being laid and installation of the equipment will occur after the cable is in place.

Equipment and Services

Botaş is seeking to procure the following equipment to connect 65 stations along its natural gas pipeline:

- Fiber optic line equipment;
- Multi-plex equipment;
- PABXs;
- Rectifiers;
- Batteries; and
- VHF mobile telecommunications system (optional).

The minimum capacity for the system needs to be STM-1. The project will be a turnkey project and, therefore, Botaş will require the contractor to provide the equipment, engineering and system design, installation, training, and commissioning of the telecommunications system. Total equipment value is expected to be approximately US\$6 million.

U.S. Competitiveness

U.S. companies are well situated to meet the procurement needs of Botaş as the company is receptive to the use of U.S. technology. In the past, the company received a funding for US\$1.2 million pipeline feasibility study from the U.S. Trade and Development Agency.

U.S. companies will be highly competitive in the provision of the telecommunications network for the gas pipeline system. While the U.S. will face competition from European bidders, it is still well positioned to bid. Given that Botaş has plans to implement several major gas and oil pipelines over the next several years, the present telecommunications project could give an U.S. technology provider an advantage in bidding on future SCADA projects with Botaş.

Project Financing

Botaş will utilize its own finances to fund the purchase of the equipment and services for this project. The tender for the project will be conducted by invitation only and will not be subject to a public announcement. Only companies that are manufacturers of appropriate telecommunications equipment and have references will be invited to participate.

Conclusion

U.S. companies are well positioned to provide the fiber optic telecommunications equipment needed by Botaş for its gas pipeline network. Botaş would like to see U.S.

companies actively participate. Botaş would like to meet with equipment suppliers in order to develop its telecommunications network. Botaş has extensive plans to construct crude oil and natural gas pipelines in Turkey in the next two years. The successful bidder will most likely have an advantage on future telecommunication or SCADA system procurements connected to those planned pipeline projects.

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REPUBLIC OF TURKEY

Telephone Network/Voice Over Internet Protocol

Project Summary

Subsector	Telecommunications
Location	Istanbul, Turkey
Project Cost	US\$12 Million
Export Potential	US\$12 Million
Project Type	Telephone Network/VoIP
Project Executing Agency	SANNET



Project Outline

SANNET was recently established as a national telecommunications service provider with initial operations in the three largest Turkish cities of Istanbul, Ankara and Izmir. The company intends to expand its network to at least 30 cities. SANNET is seeking a joint venture partner or financier to contribute to the funding of this project. The company is prepared to use its own corporate group resources to fund portions of the hard currency requirements of the project.

In phase one, SANNET will specialize in alternate telecommunications business opportunities relating to the termination of international phone calls in Turkey. In the second phase, the company will provide origination and termination services to corporate clients through the provision of xDSL leased lines. In the third phase, SANNET plans to offer phone-to-phone origination services to most countries through existing VoIP gateways and network structure of well-known international carriers. During all three phases, the company will seek to develop point-to-point SLA assured medium to high speed bandwidth and backbone options for data, voice streaming audio and video and e-commerce applications for use by corporate customers and to other Service Providers.

In the Turkish market there are varying levels of competition facing this project. For instance, there are small Service Providers (SPs) offering call termination services, but none operate on a national scale. Those SPs do not offer toll quality voice services due to variable delays, packet losses or non-proper upstream Internet connections. Also, since they do not optimize bandwidth and gateway investment between locations, their unit costs are higher.

Call origination through DSL and leased lines is very rare. Those Service Providers route VoIP traffic and normal net services such as http, ftp, and email through the same level of service. Service quality is unsatisfactory and not one SP offers inexpensive DSL connections. SANNET proposes to offer DSL services to interested corporate or private customers to minimize monthly telecom costs for leased lines.

According to SANNET, prior to start-up an enquiry was received from a foreign telecom carrier relating to the termination of three million minutes per month. On this basis, the sponsor believes that a monthly goal of 20 to 30 million minutes of termination is attainable after the first several months of operation.

Technical Description

SANNET, the project sponsor has evaluated many technical criteria in order to minimize excess investment in hardware or idle positioning of hardware over the three proposed phases of the project. While a traditional network design might involve the placement of one or more VoIP gateways from each manufacturer in each city due to lack of common standards, SANNET has taken an innovative approach to ensuring that the duplication of hardware required in the network is kept to a minimum.

For the SANNET network, the majority of the POPs will be connected directly to local Turk Telecom exchanges via fiber optic cable. There will be medium, TSM1 or STM4 SDHs at both ends to carry multiple E1s and E3s between POPs and central NOCs. Except for Ankara and Istanbul borders, all cities will be connected to HQ1 in Istanbul and to HQ2 either in Istanbul 2 and Ankara via different ATM and FR (to be redundant) links and Nortel carrier grade Passport 6xxx and 7xxx switches. These high speed expandable and telco WAN switches are specialized in ATM, FR and IP switching at wire speed and they can bring ISDN PRI lines as well without any distortion. In Istanbul 1 and 2 and in Ankara NOCs there will also be Juniper M20 redundant high-speed routers to connect this national switch network to an outside Internet cloud and to other SPs in Turkey. Voice gateways from different manufacturers will be placed only in Istanbul and in Ankara for redundancy and only in those two locations will there be IP satellite connections (full duplex symmetrical).

Output of VoIP gateways as PRI lines will be connected to Nortel Passport 7xxxx main switches that will carry these PRI lines to all edge cities through the ATM backbone. This Nortel equipment is able to extract the area code for each call on these PRI lines and will terminate calls according to area codes. Another advantage of those switches is their own layer 2 protocol to route the traffic according to the links' available bandwidth, availability and packet loss ratio. The same property will be used for data, audio and video link services as well.

There will be no layer 3 routing (only layer 2 switching) between Istanbul-Ankara and other locations to prevent overheads, delays and packet drops in classical router configurations. The two Juniper M20 routers are redundant as a box with redundant STM1 connections to switches and they do wire speed routing and switching via their own ASIC chipset. QoS will be assured by 2 Allot 301 or 401 in Istanbul and Ankara and priority will be assigned to each service as VoIP, audio, video steaming or for critical data transmission for specific applications like SAP, Oracle and low level priority for emails and other data.

All devices in the four main data centers (Istanbul 1 and 2, Izmir and Ankara) will be connected to each other over high-speed Extreme Networks Summit 48i. This equipment has layer2-Layer7 switching properties, QoS per port, bandwidth management per port

and has redundant parallel connections to overcome any interruption of service in critical data centers.

In small cities with different area codes than their mother cities, Cisco 2650 and 3640 routers with NM HDV-1E1-12 (-30) cards will be used to minimize cost and keep the same architecture features. Each unit will be sufficient for voice termination, TDM links as 64K slices and pure point-to-point communications between headquarters and branches of corporate customers.

For call origination and termination in the second and third phase of the project, Lucent Max (up to 90 channels) and Lucent TNT (up to 720 channels) equipment will be used. Any kind of origination services like SANNET prepaid calling cards, standard credit card utilization for each session and membership through advance or monthly payments with credit limits will be available. Accountancy applications will be hosted and provided by Rodopi and will be rented and paid on a monthly basis. Rodopi will also provide international roaming with other international SPs using Cisco and Lucent VoIP gateways and will act as a clearinghouse for all international transactions.

For multinational customers requiring ISDN phone lines for origination and termination in the US and UK, the project sponsor will have ISDN lines available in the Nortel switches in those countries co-located at Inter Packet premises.

Project Site

Data centers for the proposed project will initially be based in Istanbul, Ankara and Izmir. The network will later be rolled out to the locations listed in the following table.

Istanbul	Bursa	Kastamonu
Istanbul	Kayseri	Bolu
Ankara	Diyarbakır	Trabzon
Izmir	Sivas	Van
Antalya	Malatya	Şanlıurfa
Adana	Erzurum	Nevşehir
Gaziantep	Kocaeli	Afyon
Muğla	Kırklareli	Kahramanmaraş
Konya	Yozgat	İçel
Eskişehir	Çorum	

Project Status/Timeline

The implementation of the first phase of the project is underway in Istanbul, Ankara and Izmir. Fiber optic links between local exchanges and the SANNET data centers have been setup, SDH protocols have been signed with Turk Telecom for local exchanges, and PRI lines have been organized for April/May 2001. Infrastructure relating to those data centers such as raised floors, redundant air conditioners and generators, redundant

UPS, and rack mount systems are in the process of being delivered. Nortel passport switches and the first Juniper M20 will arrive in September as well as other critical components like Extreme Network core switches, VoIP gateways from Lucent MAX, Cisco 3640 and Nortel Pizza Box units.

Two main satellite links (both downlink and uplink) have been organized with Intelsat and are connected to Level 3 in London and Digex in New York for toll quality VoIP services. Streaming audio, video and data transmission services will be handled through an (inclined orbit) Eutelsat connection that is two to three times more competitively priced than the premium quality Intelsat link. The differentiation between these services and the choice of proper link will be handled by Allot QoS and the bandwidth management unit. Satellite links will be operational in September 2001.

The establishment of datacenters in other cities involving fiber or copper link setup, SDH protocols, PRI line requests, POP infrastructures, Nortel Passport switch (or Cisco 2600 /3600 router + VoIP gateway solutions for small cities) will commence once a requisite credit line has been setup. SANNET plans to rollout new locations on under an investment program that will last until June 2003.

Equipment and Services

The proposed project is based on the use of Nortel Passport switches and Cisco 2600/3600 routers + VoIP gateway solutions.

U.S. Competitiveness

One of the principals of SANNET, Mr. Akif Isik, is General Secretary of the prestigious Turkish – American Businessmen’s Association. Mr. Isik is strongly committed to using U.S. equipment for this innovative project.

Project Financing

SANNET is seeking a joint venture partner or financial institution to finance an investment of up to US\$12 million in the network infrastructure. A large portion of the network rollout is programmed from cashflow. Due to the existing financial crisis in Turkey, there is an urgent need for funding of about US\$1.5 million of foreign currency costs associated with the infrastructure equipment. SANNET is prepared to use its own group resources to fund a portion of the initial hard currency requirements.

Conclusion

This proposed project is focused on an existing niche market and is designed to take maximum advantage of the impending liberalization of the Turkish telecommunications sector, which are likely to be accelerated owing to the country's financial crisis and subsequent negotiations with the international financial community. The project's sponsor is a prominent member of the Turkish – American Businessmen's Association and is strongly committed to the use of U.S. technology and equipment.

Key Decision Makers

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