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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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ASSISTANCE TO THE CENTRE FOR SCIENTIFIC AND TECHNICAL INFORMATION

DP/MON/88/007
XP/MON/89/011

MONGOLIA

Terminal Report*

Prepared for the Government of Mongolia
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of Yu. Gornostaev and team of the International Centre for Scientific and Technical Information, Moscow,
acting as UNIDO subcontractors,
Contract No.: 89/53

Backstopping officer: J. Pavlik
Institutional Infrastructure Branch

United Nations Industrial Development Organization
Vienna

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* This document has not been edited.

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CONTENTS

1. Abstract

The present report covers subcontract activities of the International Centre for Scientific and Technical Information (ICSTI) within UNIDO Projects No. DP/MON/88/007 and XP/MON/89/011 "Assistance to the Centre for Scientific and Technical Information of the Republic of Mongolia". The aim of the subcontract was to assist Mongolia in developing its national information system. To this end ICSTI supplied and provided specified technical means, hardware, training, expertise and consultations. The report is concluded by recommendations put forward by ICSTI specialists on further development of the national information system in Mongolia.

2. Introduction

The subcontract on assistance to the Mongolian Centre for Scientific and Technical Information was awarded to ICSTI in June 1989. The main objectives of the subcontract were outlined as follows:

- Strengthen the potentialities of the Centre for Scientific and Technical Information (CSTI) of Mongolia and the national industrial information network in providing information services and scientific, technological, economic, statistical and other relevant information to the Government, industrial enterprises and research institutes.

- Organize a national focal point for exchange of technological, economic, etc. information at CSTI in Ulan-Bator that will serve as a node for the national information network and will enable to maintain a permanent access to international networks and data bases.

- Install and develop technological data bases as CSTI and other selected centres.

- Advise the Government in drafting of a national-level policy for the creation of standardized information facilities and a harmonized technological and information network.

The present report covers the activities of ICSTI on implementation of the above objectives and in keeping with UNIDO Basic Principles of Scientific Report Writing will follow the specified plan:

- Recommendations;
- Activities and Outputs;
- Achievement of Immediate Project Objectives;
- Utilization of Project Results;
- Conclusions;
- Annexes.

3. Recommendations

During final acceptance of the work under subcontract 89/53 the authorized commission recommended to continue further development of the national information system in Mongolia, specifically to carry out the following:

- upgrade the technical system of the EC-1040 mainframe by a more powerful file server;
- connect the packet switching network to international X.25 and X.75 networks;

- upgrade existing means of connecting LAN to packet switching network and the public telephone network;
- develop contacts with the RELCOM mailing network, organize an e-mail node in Mongolia, increase reliability and traffic throughput of the communication channel between Russian and Mongolian e-mailing nodes.

4. Activities and Outputs

4.1. Under the subcontract ICSTI supplied CIF Project site, installed, tuned and tested the following equipment (Annexes 1 and 2):

- LAN including PS-2 file server, laser printer, scanner and 10 ZEMA work stations united by ARCNET controllers;
- 4 ZEMA PCs;
- telecommunication packet switching network based on a packet switching centre, 3 packet assembling/disassembling devices, modem pool and 10 separate modems.

Specifically, ICSTI experts carried out the following:

- generation of OC EC 6.1 M9B operational system with additional software components: LOOK, PRIMUS, SERVIS;
- generation of emulation programmes for the installed data processor IBM 3705;
- installation of KAMA telecommunication monitor and DIALOG-2 software package;
- generation of the NETWARE network operational system, version 2.15 for ARCNET local network and installation of a file server.

The above work enabled to create a terminal network based on the EC-1040 computer with the possibility to employ 8 units of EC-7927 local terminals, 4 units of EC-7934 printers and remote terminals, connected through the IBM 3705 TCU (2 units) (supplied by UNIDO). The network provided support for 24 start-stop communication channels under EC-8570 protocol and 24 synchronous communication channels under BSC3 protocol. The installed hardware was demonstrated for EC-7927,7934 by test sections DMES and in OC EC operation system by PRIMUS package, for IBM 3705 ECHO programme was used, especially developed in ICSTI to test the work of the chain: mainframe - TCU - modem - communication channel - modem - terminal. In this case RACAL-MILGO communication channel and modems were used with the speed of 300 bit/sec. and the VDT 521XX (BP) terminal.

Similar testing was carried out within EC OC operating system with a KAMA telemonitor demonstrating DIALOG-2 software package. A local ARCNET network (the equipment supplied by UNIDO) was designed for CSTI requirements consisting of 10 nodes (1 server and 9 working stations) and tested with the installed software.

During the second stage of field work the following technical means were supplied, installed, connected, tuned and tested:

- "Estafeta" local area network with 8 stations;
- packet switching centre consisting of a PSC-8325, PAD- z 80 20 modems of CASE brand.

In particular, the following work had been carried out:

- set up of X.25 network, including connection of Darkhan, Erdenet cities and 10 industrial enterprises of Ulan-Bator;
- generation of the network operating system;
- generation of emulating systems for users of KERMIT network;
- testing of communication lines between the cities and enterprises.

The carried out work enabled to set up a network consisting of a mainframe EC-1040, IBM TCU 3705/J2, ARCNET and Estafeta LANs, as well as CASE 8325 packet switching centre.

All remote users were connected via CASE modems 400/240/SU and "ZEMA" PC/AT computers. Connection of users with the host computer was supported by IT/90 software package, communication between users was supported by KERMIT programmes.

"Estafeta" LAN for CSTI requirements, consisting of 8 nodes was developed and demonstrated.

4.2. ICSTI supplied the following software:

- operational system, system of terminal control, information retrieval system for procession of documentary data bases,
- NETWARE 2.15 network operating system for LAN (supplied under contract XP/MON/89/011);
- electronic-mail software, enabling operations of LAN and access to RELCOM, the Russian e-mail network;
- DIALOG-M, software for support of documentary data bases;
- KERMIT file transfer protocol and terminal emulation system;
- WORD 5.0 text processor.

4.3. Training of Mongolian specialists;

The training programme covered such topics as operations of the mainframe computer, micro-computers, international and national on-line networks, computerized information services, generation of data bases and information retrieval languages.

Additionally, one specialists of the Mongolian CSTI took part in a training seminar on advanced information technologies, organized by UNIDO in Warsaw, Poland, during 23-27 October 1989.

Detailed subjects of ICSTI training programme for specialists from the CSTI are specified in Annex 3.

Apart from lectures and training ICSTI provided the trainees with technical and methodological documentation.

4.4. The following data bases were supplied and installed:

- UNIDO data bases - OFFR, REQST, VENT (sections up to 1000 records); Currently CSTI receives updates of these data bases from UNIDO on a regular basis.

- protection of the environment (2500 documents, section of VINITI data base);

- information on Russian business (company profiles, names of decision-makers in bodies of State and Government authority, economic information about regions, etc.);

- quotations from Russian Commodity Exchanges;

- offers of goods on Russian Commodity Exchanges;
- digest of economic news from Russia.

4.5. Supply of technical documentation allowing use and maintenance of the supplied hardware, software and data bases.

4.6. Following the requirements of the subcontract ICSTI carried out work on preparation of the draft national information policy for Mongolia.

Specifically, ICSTI specialists analyzed the present technology information potential of the country. The current Mongolian information resources are inadequate to back-up the planned industrial development of the country, they are limited in number and subject. Therefore, organization of a national industrial and technology information system, providing information exchange and support of technology transfer could meet the requirements of national industrialization.

A. Proposed organizational structure of the national industrial and technology information system.

ICSTI suggests establishing a national information system, based on a network of organizations professionally dealing with information. This network could consist of the CSTI, as the central coordinating body, sector nodes according to respective branch of economy and regional nodes, uniting end-users from

industrial enterprises. Participants of the network at each level maintain data bases, provide information services to users and interact with each other by telecommunication means. The central body maintains communication with UNIDO headquarters in Vienna, providing users in Mongolia with access to UNIDO data bases available.

The network enables to carry out collection of technological, industrial information, its processing and organization into data bases, its successive use by interested clients in Mongolia and exchange with UNIDO/INTIB.

B. Computerized support of the network.

The national network of industrial and technological information requires provision of appropriate telecommunication means. In particular, it is considered imperative to:

- improve and upgrade the performance of the mainframe computer in the Centre for Scientific and Technical Information, that maintains communication with remote users and UNIDO headquarters in Vienna;

- sustain connection to international communication protocols of X.25 type;

- develop communication at horizontal levels between users.

In keeping with the assessed requirements for equipment specific technical recommendations for future development of CSTI in Mongolia were made by the accepting commission during hand-over/acceptance of work under the subcontract as mentioned above in Chapter 3.

C. Data bases and information services.

Available UNIDO data bases such as data bases with technology requests, technology offers, as well as joint venture opportunities provide a sound foundation for development of national information resources. Specifically, the following directions in information have been identified as supporting the objectives of industrialization of Mongolia:

- collection of information on technologies from potential technology users/suppliers throughout the country and generation of respective data bases making use of UNIDO formats (data bases of the OFFR, REQT, VENT types); such information resources allow search for partners in joint-venture endeavours, search for specific technologies required or supply of technologies to interested customers;

- generation of data bases with referral company profile information, i.e. addresses of industrial enterprises in the country, description of their production facilities, goods produced, raw materials and other input requirements; such types of data bases allow prospect partners to assess the investment opportunities in the country and choose their business counterpart;

- generation of referral and full-text data bases with information on aspects of economic and industrial development of the country: such as legal background (laws and legislation) of doing business in Mongolia, national and regional economic indices of development, etc.

5. Achievement of Immediate Project Objectives

The accepting commission in Mongolia (list of members of the commission as per Annex 4) on 15th September 1992 stated compliance of the carried out work with the terms of the subcontract and confirmed readiness of all functional subsystems for operation. The technical, technological and software means as well as data bases, brought together during execution of the subcontract will form a good foundation for further development of the scientific, technological and economic information system in Mongolia.

6. Utilization of Project Results

As a result of ICSTI subcontract activities the following functional subsystems were prepared and tested on Project site allowing applications specified:

- a subsystem for monitoring and search in data bases with scientific, technological, economic and political information. The subsystem can operate in two variants - on a mainframe and within a LAN of personal computers. Both variants enable access to information by end-user from local work stations, as well as from remote working stations via commuting telephone lines and packet switching network.

- e-mail subsystem, providing exchange of data between organizations in Mongolia and access to the Russian e-mail network - RELCOM, uniting 25 thousand organizations, including State and Government bodies, public and private enterprises, banks, commodity exchanges, public foundations, as well as access to network exchanges throughout the world. An important component of the RELCOM system is the possibility to access USENET, the international news network, in teleconference mode which will give Mongolian users the opportunity to receive the latest information on science, technology, politics and economy.

- subsystem of file transfer between interested Mongolian organizations, connected via the telephone network or packet switching network to the file server;

- subsystem of a desk-top publishing system based on WORD 5.0 word processor, laser printer and a set of national fonts.

7. Conclusions

The equipment, software, training, documentation and consultations, provided under the subcontract, improved the potential of the Mongolian Centre for Scientific and Technical Information in information servicing of customers and information handling, as well as that of the national information network on the whole. At the same time the work implemented provided a good basis for further upgrading the technological and quality level of CSTI information services within the national and international networks. In this connection the accepting committee made specific recommendations on further activities as mentioned in para 2. The total amount of means utilized under the subcontract was US$ 130,500.00, of which US$ 60,000.00 was spent on purchasing and installation of telecommunication equipment in CSTI in Ulan-Bator.

The accepting committee expressed its appreciation and high regard of the contribution of the international team of UNIDO experts, ICSTI and CSTI specialists made to the accomplishment of the subcontract.

Annex 1

List of equipment and documentation supplied to CSTI by ICSTI

1. "ESTAFETA" LAN with 8 stations	1 set
2. Packet switching centre:	
- PSC-8325	1 pc.
- PAD-Z 80	1 pc.
- CASE modem	20 pcs.
3. Plate 8325/PIM/V24 DTE	6 pcs.
4. Plate 400/24Q/C/SU	10 pcs.
5. Rack 400 QRM	1 pc.
6. Modem 400/24Q/SU	10 pcs.
7. Interface 8000/M/3/DCEV24	10 pcs.
8. Interface 8000/C/1/DCEV24	2 pcs.
9. Modem rack 1020	1 pc.
10. Rack 8325/BU/V6	1 pc.
11. Plate 8160/CARD/V5	2 pcs.
12. Plate 8325/SAC	2 pcs.
13. Interface 8000/M/3/DTEV24	4 pcs.
14. LAN cable	400 m
15. Socket	48 pcs.
16. User's manual 8325	1 book
17. User's manual 8160	1 book
18. User's manual 400/24Q	10 books
19. Interface IBM 3705	3 pcs.
20. Interface disconnectors	8 pcs.
21. EC-7920 Display station (GDR origin):	
- EC-7922	1 pc.
- EC-7927	8 pcs
- EC-7934	4 pcs.

Annex 2

List of equipment supplied to CSTI by UNIDO

No	Description	Qty
1.	Wandel and golterman data analyzer, type DA-15, complete	1
2.	X 25 decoder module, type ZUB/ACC	1
3.	Personal computer, ZEMA-AT286, 12MHZ, 1Mb RAM, 200 W PS, 2 SER/1PAR, FDC/HDC, FDD 1.2 MB, CLOCK+ BATT, KB101-CYR/LAT	14
4.	ST 251 - 0 40MB/40MS 5,25"	14
5.	EGA (640x400) CYRILLIC	14
6.	EGA 14" (0.31 mm) DOT	14
7.	Mongolian characterset F.KB101, EGA, PRINTER	1
8.	NB 24-15 24P, 216 CPS, 136 COL STAR-PRINTER	14
9.	PRINTER HEAD 18/24 P	5
10.	MODEM MPS48	1
11.	Communication controller IBM 3705/J04, 512KB	2
12.	Personal system IBM PS/2 mod 80-111, 4 MB, 115 MB, 1.44 MB, disk	1
13.	IBM PS/2 COLOUR DISPLAY	1
14.	IBM MF - Keyboard cyrillic	1
15.	IBM 2MB/8MB 80386 mem.. expansion F, mod 70, 80	1
16.	IBM 2 MB memory module	3
17.	HP LASER JET-II	1
18.	HP CYRILL/LATIN Laser Jet Font CARTRIDGE	1
19.	Memory expansion 2 MB for HP LASER JET-II	1
20.	ARCNET ADAPTER FOR PC (8-bit-adapter pure)	10
21.	ARCNET ADAPTER FOR PS/2 PURE DATA	1
22.	Active hub for 8 stat. extern/PURE DATA	2
23.	NOVELL ADV. NETWARE 2.15, 3.5"	1
24.	XTALK XVI NETWORK 5.25"	1
25.	IBM Async. communications server programm	1

Annex 3

Training programme for CSTI specialists

Subject	Duration m/m
1. LANs: software, hardware and creation of computerized working places	1
2. TSO: system of time division and KAMA teleprocessing	2
3. Application of CDS/ISIS for data base generation on EC computers	1
4. Packet switching centre software and data exchange protocol	1
5. Multiusers operating system for PS/2 and software for Desk Top Publishing System	1
6. Methods and algorithms for assessing the technical level of products and quality control	1
7. Methods of creating data bases on quality control and assessment of technical level	1
8. Information retrieval languages and data bases search strategy	1,5
9. Technology and experience in testing, diagnosis, servicing and repair of equipment:	
9.1. IBM 3705 TCU, MDT	2
9.2. terminals and terminal control devices	1
9.3. disc drivers for 29 MB discs	1
9.4. PAD, LAN stations and modems	1
9.5. PC, Laser printer and Scanner	0,5
Total	15 m/m

Annex 4

List of members of the National Accepting Commission

Tundeviin DORJBAL, CSTI Director, Chairman,

Baltaviin TSOGOO, CSTI Deputy Director,

Dendeviin NAMDAG, Head of Department, Ministry of National Progress of Mongolia

Lhamajaviin BAYARMAGNAI, CSTI Chief engineer

Metaviin BAZARRAGCHA, CSTI Senior Scientific Researcher

Annex 5

Translation from Russian

MINUTES
of the meeting of the National Commission on accepting the work within UNIDO project "Assistance to the Centre for Scientific and Technical Information of Mongolia in developing the national system of scientific and technical information"

The Commission, consisting of

T. DORJBAL, CSTI Director, Chairman
B. TSOGOO,
L. BAJARMAGNAI,
M. BAZARRAGCHA,
D. NAMDAG

carried out acceptance of pilot exploitation of the system of technical, technological and software means and data bases, created within the aforementioned UNIDO Project and installed at CSTI (Ulan-Bator).

According to the terms of subcontract 89/53 a team of specialist from the International Centre for Scientific and Technical Information together with specialists from the CSTI carried out field work and prepared for acceptance of the system including the following:

1. **Hardware:**

- EC-1040 mainframe computer (supplied by ICSTI)
- LAN, including a PS-2 file server, laser printer, scanner and 14 ZEMA working stations, united by an ARCNET controller (supplied under contract XP/MON/89/011 by UNIDO);
- telecommunication network with packet switching based on a packet switching node, 3 packet assembling/disassembling devices, modem pool and 10 separate modems (supplied under subcontract 89/53 by ICSTI);

2. **Software:**

- operational system, system of terminal control, information retrieval system for procession of documentary data bases for the EC computer (supplied by ICSTI);
- NETWARE network operational system 2.15 for the LAN (supplied under contract XP/MON/89/011);
- software for functioning of electronic mail within the LAN

- DIALOG-M, software for data base support supplied by ICSTI;
- KERMIT file transfer protocol and terminal emulation;
- WORD 4.0 text processor (purchased by the CSTI).

3. **Data bases:**

- protection of the environment (section of the VINITI data base, 2500 documents);
- business Russia (profiles of organizations, companies, enterprises, information on regions and decision-makers);
- quotations from Russian commodity exchanges (bidding results from the Russian Commodities and Raw Materials Exchange);
- offers for sale of goods at Russian commodity exchanges;
- digest of Russian economic news.

4. **Set of technical documentation on utilization and maintenance of the hardware, software and data bases.**

Based on the above ICSTI specialists prepared and tested on Project site, the following functional subsystems:

- a subsystem for monitoring and search in data bases with scientific, technological, economic and political information. the subsystem can operate in two variants - on a mainframe and within a LAN of personal computers. Both variants enable access to information by end-user from local work stations, as well as from remote working stations via commuting telephone lines and packet switching network;

- e-mail subsystem, providing exchange of data between organizations in Mongolia and access to the Russian e-mail network - RELCOM, uniting 25 thousand organizations, including State and Government bodies, public and private enterprises, banks, commodity exchanges, public foundations, as well as access to network exchanges throughout the world. An important component or the RELCOM system is the possibility to access USENET, the international news network, in teleconference mode which will give Mongolian users the opportunity to receive the latest information on science, technology, politics and economy;

- subsystem of file transfer between interested Mongolian organizations, connected via telephone network or packet switching network to the file server;

- subsystem of a desk-top publishing system based on WORD 5.0 text processor, laser printer and a set of national fonts.

The Commission considers it necessary to continue follow-up development of the project, specifically in the following directions:

- upgrade the technical system of the EC-1040 mainframe by a more powerful file server;

- connect the packet switching network to international X.25 and X.75 networks;

- upgrade existing means of connecting LAN to packet switching network and the public telephone network;

- develop contacts with the RELCOM mailing network, organize an e-mail node in Mongolia, increase reliability and traffic throughput of the communication channel between russian and Mongolian e-mailing nodes.

Such development requires resolution of organizational and financial issues on the part of UNIDO, ICSTI and CSTI.

The accepting Commission expresses its gratitude to UNIDO and ICSTI for substantial and fruitful cooperation within the project "Assistance to the Centre for Scientific and Technical Information of Mongolia in developing the national system of scientific and technical information:

Signed:

T. DORJBAL
Chairman of the national Accepting Commission

15th September, 1992
Ulan-Bator, Mongolia

Annex 6

CONFIGURATION OF THE NETWORK