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ESTABLISHMENT OF A NATIONAL ELECTRONIC EQUIPMENT AND SCIENTIFIC INSTRUMENTS REGISTER

Project of the Government of Islamic Republic of Pakistan
UT/PAK/96/099

FINAL REPORT

Prepared for the United Nations Industrial Development Organization
Vienna

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Executive Summary:

Today all fields of economy (scientific research, quality systems, public health services, higher education, industry, etc.) need more and more sophisticated and expensive instruments. These instruments also represent a sizable part of national wealth.

It has been proved that the effective operation of the instrumentation infrastructure is an essential element of the economic development. The smooth operation of the systems such as metrology, quality control, testing, environment monitoring and control, laboratories of the industry, agriculture, education, research, public health, etc. - in any cases where measuring activities are applied - need the background instrumentation services.

The Contract is aimed at formulating National Instrumentation Policy Framework (NIPF) for Pakistan and establishing a National Electronic Equipment and Scientific Instruments Register (NEESIR) which is the basis for providing the necessary background information for the National Instrumentation Policy. It is further assisting in strengthening the capabilities of the national counterpart, National Institute of Electronics in Islamabad, (NIE) in monitoring the instrumentation services in the country under the supervision of Ministry of Science and Technology (MOST).

This report summarizes the findings, conclusions and recommendations of the work. Advice are outlined to form a National Instrumentation Policy and the National Instrument Acquisition Policy in Pakistan and the way is explained how to implement it. The MTA-MMSZ LTD's software of Computer based Instrument Registry (CIR) has been adapted to the requirements in Pakistan and the National Electronic Equipment and Scientific Instruments Register (NEESIR) was installed in the NIE's hard-ware system which was procured and successfully put into operation according to the original Workplan. The way of collecting data has been carefully explained and entering of data into the data-base was with the assistance of MTA-MMSZ commenced. The conditions and necessary actions of the sustainable operation of NEESIR are also described.

Considering the present situation in Pakistan it is necessary to develop the instrumentation background services. Significant development can be achieved on the basis of the existing national resources in a time period of 5 - 10 years. First the Governmental intention is necessary to be declared on the will for fundamental change, radical development of the facilities of instrumentation and measuring technique. The country should have proper National Instrumentation Policy and National Instrument Acquisition Policy, both approved by the Government with the strategic goal, to increase radically the efficiency of the existing national resources of the instrumentation. The most important elements of the complex procedure are the establishment of NIC of suitable competence and stress to control the implementation of the concept, sustainable operation of NEESIR which provides the basic information for the policy, implementation of the pilot project ISC and after this the foundation of the regional

ISCs. These elements in continuous co-operation can influence each other in a positive way and generate the implementation of this complex development procedure. All previously done serious work on this subject in Pakistan and their experience should also be taken into account. The policy papers should also take care of sources funding for ultimate implementation of the policy.

Through the realization of this complex program the essential improvement of the level in the instrument measuring culture and its personal, technical and institutional background can be attained.

List of Acronyms:

NIPF:	National Instrumentation Policy Framework: Annex 3 of Interim Report; prepared for UNIDO, dated November 27,1997
NIP:	National Instrumentation Policy Draft: Annex 1 of Final Report; prepared for UNIDO, dated July 10, 1998
NIAP:	National Instrument Acquisition Policy Draft: Annex 2 of Final Report, prepared for UNIDO, dated July 10, 1998
NIC:	National Instrumentation Committee: Appendix 4 of NIP
NEESIR:	National Electronic Equipment and Scientific Instruments Register: The establishment of NEESIR is detailed in Annex 3 of Final Report, prepared for UNIDO, dated July 10, 1998
ISC:	Instrumentation Service Centre, Appendix 4 of NIPF
MOST:	Ministry of Science and Technology, Islamabad, Pakistan
NIE:	National Institute of Electronics, Islamabad, Pakistan

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1) Introduction

Development of instrumentation techniques in Pakistan is a sine-qua-non for the overall technical/technological development. It is essential in a wide range of activities, from laboratory experiments in schools, scientific researches in universities to process- and quality control in manufacturing and agriculture plants. The industrial and technical development of Pakistan during the last decade brought out significant increase of expensive imported precision measuring and control equipment.

In our world Quality is increasingly recognized as the only way to success. The ISO 9000 family of standards and other quality programs such as Total Quality Commitment (TIC) determine what elements of production process are required to maintain quality regardless of the product manufactured both in cases of export and import. A key issue within these programs the product inspection and test. Evident that quality cannot be assured without strict control and accurate measurements. Well-planned quality management systems are needed which depend upon the background services of the country's instrumentation infrastructure. Without instrumentation infrastructure and suitable support (background) instrumentation services manufacturing companies are unable to build up and operate effective and economical quality systems.

Up to now most of the measuring instruments and equipment for scientific and technological purposes in Pakistan have been imported. Purchase of instruments is usually done indigenously. Large percent of this equipment is not functioning due to lack of proper maintenance and repair services. Maintenance and repair of these instruments as well as the related problems like the acute shortage of spare parts, accessories and technical documentation can not be solved without the minimal institutional framework.

Efficient use of national instrumentation resources is necessary not only for the viable operation of the existing systems, but also is a prerequisite for technical, industrial and economic development. In the country very little attention is paid to instrumentation both at the level of policy and strategy. A commonly recurring problem in Pakistan is the absence of sufficient repair and maintenance services with the result that many instruments are out of order. When the instruments are found to be defective they are shipped back through the authorized dealer to the manufacturer abroad to repair them if it is possible. Sometimes direct services from the manufacturers are called for repair. Both of the solutions are expensive and time consuming.

Building of such services and facilities is, therefore, an urgent and broad need. The status of instrumentation in general in Pakistan is resulting in wastage of national resources, low efficiency and productivity.

Although the Eighth Plan of Pakistan (1993-98) did not mention directly the necessity of the development of the instrumentation infrastructure, but it was present in the implementation and realization of a number of the goals, targets which involved the necessity of the qualified instrumentation background. The Eighth Plan shows the intention of the country to follow the export oriented trend of the Newly Industrialized Countries in South East Asia. In this connection strengthening of Pakistan's international competitiveness is a prerequisite. But the only way to strengthen the competitiveness is to strengthen the quality of the products. This is impossible without increasing the level of instrumentation infrastructure.

The Government of Pakistan decided to implement the Electronics Policy in 1993. The Policy takes into account the strength and weakness obtaining in Pakistan in the Electronic Sector. Through its implementation a series of short term and long term steps were carried out by MOST and it was monitored by National Commission of Electronics.

The Government of Pakistan has recognized the necessity of the development of the instrumentation infrastructure which is essential in managing the background instrumentation services necessary for the smooth operation of the instruments used in all fields of the economy in the country. The MOST requested United Nations Industrial Development Organization's (UNIDO) assistance in establishing a National Electronic Equipment and Scientific Instruments Register and also in the preparation of a National Instrumentation Policy Framework.

To reach efficiency in the use of instrumentation resources, the following basic principles and conditions are necessary:

- Development of well designed, coordinated instrumentation and instrument acquisition policy;

- Establishment of an electronic equipment and scientific instruments data bank;

- Establishment of suitable facilities for instrumentation repair and maintenance.

While national instrumentation policies need Government legislation, optimal utilization of available instruments can be achieved through the establishment of an Instrumentation Service Center (ISC).

In order to achieve the general objectives, a module system should be set up in the country with the purpose of optimal utilization of the national stock of instruments. The elements may be set up in the most practical sequence but the Instrumentation Service Infrastructure must finally comprise of the following basic elements:

(a) National register of instruments
(b) Maintenance and repair service
(c) Renting service
(d) Consultancy services
(e) Measurement technique services
(f) Development of special purpose instruments or measuring methods
(g) Education and training.

An establishment and efficient operation of an National Electric Equipment and Scientific Instrument Register (NEESIR) in Pakistan should result in the increase of co-operation among all the elements of the science and technology infrastructure.

Elements of the NEESIR should include the following:

* collection of information on domestic and foreign instruments used in the country and available on the market;

* assistance to the Government in formulating an instrumentation policy; and

* establishment of a scientific measuring and testing equipment, instruments and electronic equipment data bank.

The Project will provide direct benefits to the MOST, the R&D organizations, private companies, institutions and universities of Pakistan. After establishing the NEESIR it would be possible to get access to the data bank and get information on the equipment and scientific instruments available in the country. With a flexible query system developed, the NEESIR will serve as an important tool for decision-makers responsible for the development of the electronics, science and technology policies. It can also be an useful tool for the institutions in the country to cooperate with the instrument and equipment suppliers which can provide after-sale services, spare parts, technical documentation and training.

2) The Present Status of Instrumentation Infrastructure in Pakistan

Pakistan has a large number of science and technology institutions. At present, there are 13 science and technology oriented organizations working under the supervision of MOST. Beside the science and technology institutions supervised by MOST and other Ministries (Education, Public Health, Industries, Communication, Natural Resources, Water and Power, Agriculture), there are 161 professional colleges and 35 universities including 10 private sector universities, the several quality control laboratories of companies also using a great number of precision and control instruments, etc.

Pakistan has established a number of legal institutions which can ensure the implementation of appropriate instrumentation policies. In practice, however, the system needs to be strengthened to facilitate efficient usage of instruments in place. Apart from Government institutions, private companies can also contribute effectively to the national instrumentation strategy.

The Pakistan Council of Scientific and Industrial Research (PCSIR) was established in 1953 under the supervision of the MOST as a statutory body with the major functions in R&D including also the requirement of providing facilities for testing and calibration of precision instruments, and scientific apparatus for the determination of their degree of accuracy. As the only public industrial research and development institute established under the MOST the PCSIR acts as a consulting and analytical framework on behalf of industrialists, public departments and entrepreneurs. The major function of the PCSIR is research and development technology in support of the national industrialization policy programs. The PCSIR is therefore just a sub-system promoting the attainment of national industrial objectives.

The PCSIR runs four multi disciplinary laboratories at Karachi, Lahore, Peshawar and Quetta specializing in R&D areas and having a special relevance to their specific regional problems. There are also four other R&D centers in the country under the PCSIR. They are: Fuel Research Center at Karachi, Leather Research Center at Karachi, Solar Energy Center at Hyderabad, National Physical Standards Laboratory at Islamabad. All these centres are facing

a common problem relating to the proper operation of various scientific equipment and instruments.
On a limited scope PCSIR is developing and manufacturing special purpose instruments for the clients and providing training services for engineers.

National Institute of Electronics (NIE), under the supervision of MOST, is an organization dedicated to the development and spread of electronics and computer technology in Pakistan, with the longer term objective of helping the country achieve self-sufficiency in this area. It was the first establishment of its kind in the country. Components and Data bank were also planned to stock the current and advanced electronic components for design and development work. NIE has the capability to design, develop and implement any project related to electronics, computers, or telecommunication. The institute offers a wide variety of regular as well as customized educational courses on computer issues, automation and process control, computer aided PCB design and fabrication, microprocessor and microcontroller applications, internet applications.
There is expertise in NIE for repair and maintenance of instruments but the technical documentation, maintenance manuals and spare parts are missing.

The authorities, other organizations, institutes, companies than mentioned before and contacted in Pakistan are listed in Appendix 1 of NIP (Annex 1 of this Report).

In co-operation with these organizations, institutes, companies a survey was made on the present status of instrumentation infrastructure. This survey showed that there were no information among them on the instrumentation projects with a sum of at least US $ 500,000 in the field of research and development, quality control, education, public health except the projects of

- Process Control Instrumentation Training Centre in Karachi.
- Instrument Centres in Sargroda and Lahore maintained Ministry of Health of Government of Punjab
- Instruments Centres in Universities

The manufacturing firms of the measuring and control instruments the products of which are used by the organizations, institutes, companies who responded to the questionnaire are listed in Appendix 2 of NIP. The institutions in the main sectors in Pakistan use about several hundreds of different types of electronic/electrical equipment.
The most widely used instruments however, are oscilloscopes, PH meters, gas chromatographs, absorption spectroscopes, current meters, digital multimeters, centrifuges, etc. - at least 40 % of all institutions use these instruments. The wide variety of the equipment/instruments being used by the various institutions in the country limits the institutions' capabilities and capacities in maintaining and repairing them. Mostly the equipment which is not used is faulty, i.e. it has been broken and has not yet repaired. Approx. 35 % of the equipment is obsolete and cannot be serviced. If an instrument goes wrong there is only seldom choice to continue the work through a co-operation with a neighbour institution. Mostly this kind of co-operation is depending on personal relationship.

There are a lot of companies (see Appendix 3 of NIP) which can be contacted in the procurement procedure, however, **these firms are in most cases not specialized** in instrument purchase. In this way the technical expertise necessary for the efficient instrument investment is not available. No co-ordination of instrument investments and actions for solving the problems in operation of instruments neither on Ministry level nor on regional and

company level was notified except the education field where all instruments and equipment are purchased in regional level. The Pakistan Science Foundation, Islamabad submitted a proposal for the establishment of 'Science Equipment, Maintenance & Technical Advisory Centre" to the Government of Pakistan. This project is included in the 9th Five Year Plan.

The import of the instruments are liberalized and it is eased by Policy incentives, too, such as foreign exchange controls have been relaxed; ceiling on payment of royalties and technical fee have been abolished, etc. The testing apparatus appliances, electronic control and transmission and components, parts thereof are exempted from sales tax (SRO 600(I)/90 dated 7/6/1990). However, besides the price in instrument acquisition, the technical parameters, and reliability etc. , there is another essential point of view, which is terribly often forgotten in Pakistan, is the guarantee of a fast professional service, which is necessary for regular maintenance and fast repair. Nevertheless this is a perfectly understandable expectation from an institution purchasing an instrument, because the instrument is needed as a device, that will be used throughout an average lifetime (8 years). In developing the absolutely indispensable professional service which is necessary for this requirement - according to international experience - the firms delivering the instruments and the manufacturers should have a special role. In export to developing countries the instrument suppliers are often willing to give some discounts eluding their responsibilities. Seeing that the instrument suppliers want to keep, or more precisely to acquire the market, if a country importing insists on the exporters' taking part in developing the service infrastructure eventually these needs are fulfilled. If not, another supplier should be found. (see NIAP, the Annex 2. of this Report).

Generally the repair and maintenance of instruments, systematic upgrading of knowledge of maintenance engineers, technical documentation, spare parts and components are not provided for the interested clients, as required. The maintenance personnel are not familiar with the requisite procedures for handling modern equipment. The unnecessary changes in the models of equipment is only aimed at promoting sales and many times these additional features are not required. The spare part supply is not organized. Before installation of any equipment the users don't have hands on training. It was also pointed out that the suppliers of equipment did not provide back up and servicing of equipment. No sufficient calibration services are available. There are an Instruments Centre at University Grants Commission (U.G.C.) in Islamabad called Development And Maintenance of Equipment (DAME) providing services for universities and Government of Punjab maintains two Centres at Sargroda and Lahore which provide only limited services. U.G.C. worked out two new proposals (in Lahore and Mehran University) which are designed to provide services on regional level.

During this survey the management of instruments was outlined as a very important activity. The importance of NIE's approved scheme on Electronics Instrumentation Lab which will make possible the adoptive redesign of equipment and updating of equipment to enhance life time of the equipment was emphasized.

The urgent need for establishment of instrumentation services was outlined. The large dimension of the problem was stated and it was pointed out that a single institute would not be sufficient to solve it. Considering the size of the country a network is to be established. The project should aim to be self sustaining and provide services both for private and public sector. The incentives for retaining the highly trained technicians in the repair work have specific importance.

The importance of data bank of instruments owned by different institutes was stressed. So far no operating inventory was laid down for high performance instruments in the country. An effort was done by U.G.C. on ministry level few years back for the universities, only.

As an output of the project the finalized version of NEESIR (see Annex 3 of this Report) was installed on the PC system procured to this task in NIE. The staff of NIE were trained on the use of NEESIR. The sample data were entered into the installed data-base. The missing or incorrect data on the sample Registration Forms were cleared with the competent persons at the responsible institutes. During these personal visits it became evident, that the Forms are suitable and institutes are able to provide technically correct registrations.

3) How to Improve the Instrumentation Services

3.1 Co-operation with the National Counterpart during the Project

Preparatory Activities:

The UNIDO's award regarding the execution of services for the subject project was issued on 16 July 1997. The contract between UNIDO and MTA-MMSZ Ltd. was deemed to be effective from 18 July 1997 and the contract was signed on 28 August 1997.

The preparatory actions of the national counterpart with proposed deadlines necessary for the implementation of the Workprogram were summarized (see Annex 1 of Interim Report) by MTA - MMSZ and it was sent by UNIDO to the site in July 1997.

As a result of the active contribution of the UNIDO Office in Islamabad the Ministry of Science and Technology (MOST) started the preparatory works then took a final decision and instead of the Pakistan Council of Scientific and Industrial Research the National Institute of Electronics (NIE), Islamabad was selected as the Government Implementing Agency. The National Project Director was assigned on 10 September 1997. This change in the implementing agency caused also the change of the Workprogram which was finalized after the discussions in the field and agreed by UNIDO on 14 November 1997 (see ANNEX 4).

Performance of the Work

OUTPUT 1 of the Project

Formulation of the National Instrumentation Policy Framework

The fielding of the consultant (Dr. Gy. Stokum) started on 24 September 1997. In agreement with NIE's point of view that during the first survey only organizations/institutes in Islamabad are to be contacted as all important organizations have their headquarters in the capital no meeting was organized outside of Islamabad. The consultant could meet several senior officials both in the MOST and other organizations to make a survey on the needs and requirements of the country. The consultant could also meet Mr. Lt. Gen. (R) Javed Ashraf, Secretary of MOST which meeting provided possibility to summarize findings during the

mission and outline the Pakistani priorities and requirements regarding the National Instrumentation Policy Framework (ANNEX 3 of Interim Report) which was based on the information received as the first responses to the questionnaires (Appendix 3 of NIPF) and collected on the Seminar and Workshop on Management of Instrumentation Services.

The consultant took part in the Seminar and Workshop organized by NIE and presented the lecture Advantages of a Complex Instrumentation Service and conducted the practical discussion on Organization of Management, moreover on the Consultation on Establishing, Developing Instrumentation Services. The consultant finished his mission in Islamabad on 24 October 1997.

Due to the continuous urge of MTA-MMSZ Ltd. and UNIDO, Vienna and the efforts of National Project Director, MOST and the UNIDO Office in Islamabad several authorities organizations, institutes and companies responded to the questionnaire, which was forwarded to MTA-MMSZ in April 1998. On the basis of this information the survey on the present status of the instrumentation infrastructure was prepared. As agreed with UNIDO the National Instrumentation Policy Draft (NIP) and the National Instrument Acquisition Policy Draft (NIAP) are attached to this report.

OUTPUT 2 of the Project

Establishment of a National Electronic Equipment and Scientific Instruments Register

The first mission of the consultant (Mr. R. Radnai) started in the field on 24 September 1997. The aim of this mission is to make a site survey, necessary for the adaptation of the Computer-based Instrument Registry (CIR) software, to formulate the basic concept of NEESIR and to outline the future activities of the implementation of the project. The Report (ANNEX 4 of Interim Report) on this survey reviewed and put down in agreement with the National Counterpart the findings and results (terms, data inputs and outputs, data structure, menu system, etc.) formulated the basic concept of NEESIR, finalized the set of Registration forms designed according to local requirements with guide-lines necessary for fulfillment and summarized the future activities of the implementation. The adaptation work of CIR has been carried out in the home office, according to the Workprogram.

The consultant took part in the Seminar and Workshop organized by NIE and presented the lecture Consulting in the Field of Instruments and Measuring Technique and conducted the introduction of the Computer-based Instrument Registry. The consultant finished his mission in Islamabad on 24 October 1997.

Based on the specification of the UNIDO contract (ANNEX 6 of Project Document: List of Equipment Provided) a personal desktop computer system was procured and delivered to NIE. The equipment was perfectly installed with operating softwares at the premises of the NIE and it was accepted in good working condition by the National Counterpart (ANNEX 5). The quality and configuration of the selected system makes it ideal for the given task. All parts are branded and represent the latest technology. The computer is a Philips Pentium 200 MMX model, the printer is Panasonic 132 character, 24 pin dot matrix printer, which is ideal for printing wide database lists. The APC 600 VA uninterruptible power supply eliminate the effects of mains voltage disturbances.

The Pakistani Trainee has not arrived according to the Workprogram in November 1997. The UNIDO Office in Islamabad informed UNIDO on 27 November 1997 that the assistance of UNIDO in financing of the international travel of the Trainee (which belonged to the Pakistani Government inputs) is requested by MOST. Considering that the Fellowship Training is an essential part of the transfer of know-how and the efficient use of NEESIR in Pakistan MTA-MMSZ supported this which resulted in increasing the project budget. The project was revised and contract of the Project was extended, accordingly. On 2 February 1998 the NPD and the UNIDO Islamabad Office were informed that the international travel cost for the Trainee - as it was requested - will be covered by the project. Personal data of the Trainee was also requested to book the air ticket. No answer was received until 27 March 1998, when UNIDO informed MTA-MMSZ on the result of the selection and nomination procedure. Within a very short time all the necessary arrangements for the training (providing air ticket, booking an accommodation, assistance in obtaining visa for the Trainee) was made by MTA-MMSZ. The trainee, Mr. Anwar Butt, arrived to Budapest to attend the Fellowship Training on 5 April 1998. During the training the Trainee was acquainted with the concept of NEESIR and was trained to use the various functions of the system. This activity comprises the entering of the sample data taken by the Pakistani specialist into the adapted database. The sample registration was considered as a very important part of the training and the Trainee was provided by all the necessary knowledge needed for the successful registration.(The details of the training can be found in point 3.3 of Annex 3.) After the successful training the relevant part of the Workprogram was finalized (see Annex 5).

The second mission of Mr. R. Radnai started on 5 May, 1998. The consultant of MTA-MMSZ with the assistance of Mr. G. Rónaszegi, consultant in computer-technique (arrived to the site on 20 May 1998) successfully installed the finalized version of NEESIR database containing the test data on the PC system procured to this task (see Appendix 10 of Annex 3). The staff of NIE were trained on the use of NEESIR. This site training covered all the functions of the system including putting new data into the computer, saving data to floppy disks, searching in the database, etc. The sample data were entered into the installed data-base (see point 3.4 of Annex 3 of this Report).

At the end of the Mission on 2 June 1998 an introductory demonstration workshop was held at the NIE. This action was initiated by the UNIDO office in Islamabad after getting detailed information on the adapted software to promote the sustainability of the long term operation of NEESIR. The demonstration highlighted the advantages of NEESIR, the sample searches which was adjusted to the specific Pakistani circumstances and proved the usefulness of the database. The two consultants departed from Islamabad on 3 June 1998.

OUTPUT 3 of the Project

Workshop on Instrumentation Services organized for nationals in Islamabad

The field mission of the UNIDO consultant (A. Menyhard) started on 9 October 1997.
A seminar of one day was organized for decision maker senior officials (28 persons) to discuss all management and organizational aspects of the problem. The purpose of the seminar was to highlight the importance of the instrumentation services in the industrial development and introduce the problems on the necessary services for the smooth operation of the precision and measuring instrumentation to the decision makers.

Based on the views and expectations of the decision-makers a workshop of three days was convened for managers and instrument engineers assigned by the decision-makers of the seminar (28 selected managers and instrument engineers) responsible for the instrumentation.

Intensive discussions were held on the problems of continuous operation of the scientific instruments. The purpose of the workshop was to introduce the elements of instrumentation services, the advantages of the co-operation between these services and to show the modular structure of the Hungarian method. The Report of the Seminar and Workshop (ANNEX 6 of Interim Report) includes the conclusions and the recommendations of the workshop. During the Workshop the videofilm on the Systems Approach (attached to the Interim Report) which presents the experience of the UNIDO - MTA-MMSZ exercises in this field was also introduced.

The consultant took part in the Seminar and Workshop organized by NIE and presented the lectures The Modular System of the Instrumentation Service Centre (ISC) and Education and Training. To be able to explain all details of the instrumentation services MTA-MMSZ sent two further consultants to the field. Mr. J. Kiss presented the Importance of Instrumentation Services in the Quality Assurance Programme and Measuring Engineering and Mr. K. Henk advised on the problems of Maintenance and Repair, Calibration and Spare Part Supply moreover on The Instrument Renting and Leasing. The field missions of the consultants were finished on 17 October 1997.

3.2 Agreed and Proposed Future Activities necessary for the sustainable operation of NEESIR

The most important future activity is the organization of the effective, sustainable operation of NEESIR in the very specific Pakistani environment. The Practical suggestions and recommendations for the implementation and future operation of NEESIR (see Appendix 2 of Annex 3) summarizes the necessary steps of the NEESIR's operation. One of the most important tasks is the invitation of research institutes, universities, governmental and private companies to join to the registration. A letter of invitation for the institute Director's to register their instruments with NEESIR were drafted (see Appendix 8 of Annex 3). Another important activity of NEESIR's implementation is the establishment of administration procedures and an operational schedule. A very important task also the effective management of the user community, including the determination of priorities and privileges, regular analysis of the user's demands, and publicizing the services of NEESIR etc. According to the specific local conditions this work will be carried out by the Data Processing Team of NEESIR.

The consultant of MTA-MMSZ and the NPD of the Project conducted extended discussions with the interested parties, including senior officials of MOST and the responsible officials of institutes and companies, about the sustainability of NEESIR database. During these discussions practical suggestions were formulated. First of all an order issued by the Secretary of MOST is needed which will draw the institutes supervised into the circle of registration. The Secretary of MOST will be requested also to use his influence with other Ministries on Secretary level and ask them to issue approvals for registration of equipment with NEESIR. To involve private companies into the registration an expert consultancy service has to be developed, which can make these companies interested in the registration. The consultancy service will be available free of charge to those companies who register their instruments/equipment with NEESIR. These suggestions extended by the perspectives of the local conditions are presented in Appendix 9 of Annex 3.

4) Conclusions

4.1 In NIPF some conclusions are already defined. Moreover on the basis of the evaluation of the information received it can be stated that it is a real aim to develop considerably the level of instrumentation and measuring culture in the country within reasonable time (5-10 years) using the proposals in these documents (NIPF, NIP, NIAP). The starting moment of the complex procedure in the realization is if the Government approves the proposed concept. The governmental intention is necessary to be declared on the will for fundamental change, radical development of the facilities of instrumentation and measuring technique in the country. All of this can be achieved with the background of the existing national resources in the shortest possible time (5 - 10 years).

4.2 In the present situation it is a basic condition for any positive development that Pakistan should have a proper National Instrumentation Policy with the strategic goal, to increase radically the efficiency of the existing national resources of the instrumentation through:

- increasing the utilization of the national instrument pool
- avoiding unnecessary parallel investment
- stimulating really necessary well prepared investments.

4.3 The most important elements of the complex procedure for development of instrumentation services are, as follows:

- Establishing a NIC of suitable competence and stress to control the implementation of the concept,
- Approval of NIPF, NIP, NIAP which outline the aims and objectives of the concept,
- Accomplishment of NEESIR's development,
- Implementation of the pilot project ISC and after this the foundation of the regional ISCs.

These elements in continuous co-operation can influence each other in a positive way and generate the implementation of the complex development procedure. Practically it may result (in 5 - 10 years) in the next effects:

1./ Because of the lack in conditions of right human resources and technical facilities necessary for the repair and maintenance a remarkable great part of the country's instrument wealth is out of order. This part can be decreased to one third - one quarter in 5-10 years time.

2./ Well-considered, -established instrument procurement and investment procedure can be developed. The redundant, analogous instruments' investments and the waiting of years between the procurement and putting into operation will be discontinued.

3./ There will be alternatives for the new instrument investments, e.g.:

- renting of instruments, which is advantageous not only because of the considerably lower renting fee as compared to the cost of new investments but the usage of instruments can be multiplied, or
- procurement of second hand equipment which prices are considerably lower as compared to the new investment prices, if the conditions are appropriate.

4./ It will stop that in case of an instrument's getting faulty the problem can be only solved through buying a new instrument, because of the lack in conditions of repair and maintenance (multi-skilled experts, service-documentation, spare parts).

5./ Apart from some very exceptional case, the instrument suppliers can sell and market their products in Pakistan only if they provide the services of suitable technical level according to contractual conditions through Pakistani institutions for the customers under the guarantee period and for minimum 8 years after it (see NIAP).

6./ On the basis of point 5./ a service staff of 8-10 times more than present can be developed which may provide a more qualified background not only for operation of the instruments in the country, but it can be the base of an expert staff of greater number for the local development of the instruments and more qualified as compared to the present.

7./ An essential change in attitude to procurement, putting into operation and usage of instruments can be generated in senior officials of ministries, managers and chiefs of institutes and last but not least in the engineers, technicians using the instruments. They may recognize that they are personally interested in meeting the demands outlined in NIP and NIAP, because their salary, increase in salary, extra payments (premium) and maybe their posts are depending on their work. The instrument suppliers are interested in acquiring or holding the Pakistani market and they can be highly influenced through increase or decrease the business done in the country.

8./ The country-wide, regularly updated NEESIR may provide information for Governmental Officials, senior officials of ministries, leaders of institutions and all of those who are given access to the NEESIR in order to take well- considered decisions in essentially more efficient use of existing instrument wealth and in design and elaboration of future instrument development plans.

4.4/ All previously done serious work on this subject in Pakistan and their experience should also be taken into account. The policy paper in this respect should also take care of sources funding for ultimate implementation of the policy.

4.5 The complete realization of the National Instrument Acquisition Policy makes a safe ground/background in order to:

a) develop the practice of more effective use of national instrumentation resources in Pakistan,

b) reach that the procurement of instruments should not be random "ad hoc" typed, but well-considered one, aiming at the goals, and it should be effected from the instrument suppliers

providing a professional service necessary for the smooth operation of the instrument (throughout their whole lifetime),

c) evolve an awareness of keeping the prescriptions/aims of the National Instrument Acquisition Policy in their interest among both the Pakistani instrument customers and the instrument suppliers,

d) establish a nation-wide instrument stock in Pakistan which is in its combination and in its technical conditions both, suitable for the reasonably expected and proper use,

5) Recommendations

5.1 NIPF outlines the strategic aims of the implementation of the National Instrumentation Policy. The realization of the objects summarized in the documents NIPF, NIP, NIAP is advised to be commenced by submission of these aims to the Government for approval. Before the submission the comprehensive discussion of these aims are proposed for the relevant leaders and senior officials of MOST. After this discussion besides the conclusions of the debate in the submission the following suggestions are to be proposed for approval:

i) One of the most important priorities in the Ninth Plan is "To increase radically the efficiency of the existing national resources of the instrumentation;
ii) Establishment of the NIC with the tasks and competence outlined in NIP and NIPF;
iii) Establishment of a model ISC as a pilot project in Islamabad in two phases (3+2 years) in the first step. On the basis of the experience of the pilot project the establishment of further ISCs is suggested in the most important regions (e.g.: Karachi, Lahore, Peshawar);
iv) Assignment of the country-wide follow-up and development of the UNIDO project: "Establishment of National Electronic Equipment and Scientific Instruments Register" to an outstanding task.
v) Because of the requirement of specially trained human resource due to fast changing electronic technology, the effort initially may be collaborative between the different field of economy according to specific requirements. A strong pool of technical personnel is proposed to be established who may provide consultancy to users of electronics/scientific equipment. These personnel may be able to judge the technical equipment of an organization or a use. Special training program has to be worked out for training the Pakistani engineers/technicians.

5.2 The National Instrument Acquisition Policy should:

5.2.1 give preference to those foreign/local instrument manufacturers/suppliers, who provide their products in Pakistan - in co-operation with local Instrumentation Service Centres or Repair and Maintenance Workshops/Laboratories - with proper after sale service during the average lifetime,

5.2.2 declare that instrument/equipment even being the most sophisticated one makes only the first half of the requested full performance, the other half is made by a complete customer service/after sale service not only during the guarantee, but during the whole average lifetime. It is necessary to deny import from those manufacturers/suppliers who fail to consider this requirement,

5.2.3 prohibit such instrument/equipment investment when the basic conditions (financial sources, staff, etc.) are not available for the immediate installation/operation after acquisition,

5.2.4 carry out the investments in the case of great value instrument/equipment (US $ 50,000.- or more) only with the permission of NIC. In these cases before making decision NIC has to request the necessary technical background information from the ISC on the basis of NEESIR,

5.2.5 investigate alternative solutions of new investment for example renting or purchasing, second-hand instrument.

5.2.6 form /develop a better position for the bargain process with foreign and local instrument suppliers through collecting the purchases and joint acquisition of single/individual requirements for instrument investments of institutes, organizations belonging to the public sector of different ministries or regional centres.

Acknowledgment

The UNIDO Team leader wishes to express his thanks to the UNIDO Office in Islamabad. for its excellent and flexible assistance in the preparatory activities and through the implementation of the project.
With the help of the initiative action of the Office and on the basis of the recommendations of the Seminar and Workshop the Plan of Action (Appendix 8 of NIPF) for the development of instrumentation services in Pakistan has been identified. Further the sustainable operation of NEESIR was essentially promoted by the demonstration workshop initiated by the UNIDO office.

ESTABLISHMENT OF A NATIONAL ELECTRONIC EQUIPMENT AND SCIENTIFIC INSTRUMENTS REGISTER

Project of the Government of Islamic Republic of Pakistan
UT/PAK/96/099

NATIONAL INSTRUMENTATION POLICY DRAFT

Prepared for the United Nations Industrial Development Organisation
Vienna

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This document is a draft which has not been approved.

TABLE OF CONTENTS

List of Acronyms:

NIPF:	National Instrumentation Policy Framework: Annex 3 of Interim Report; prepared for UNIDO, dated November 27,1997
NIP:	National Instrumentation Policy Draft: Annex 1 of Final Report; prepared for UNIDO, dated July 10, 1998
NIAP:	National Instrument Acquisition Policy Draft: Annex 2 of Final Report, prepared for UNIDO, dated July 10, 1998
NIC:	National Instrumentation Committee: Appendix 4 of NIP
NEESIR:	National Electronic Equipment and Scientific Instruments Register: The establishment of NEESIR is detailed in Annex 3 of Final Report, prepared for UNIDO, dated July 10, 1998
ISC:	Instrumentation Service Centre, Appendix 4 of NIPF
MOST:	Ministry of Science and Technology, Islamabad, Pakistan
NIE:	National Institute of Electronics, Islamabad, Pakistan

1) Introduction

This National Instrumentation Policy Draft (NIP) was prepared on the basis of the information collected in Pakistan during the period from September 24 1997 to April 30, 1998. This document outlines the aims and functions of National Instrumentation Policy which has to be prepared for the Pakistan Government for approval according to the National Instrumentation Policy Framework (NIPF). The NIPF summarises the actions for collecting information which were carried out in the said period (see the Chapter of Methodology in NIPF). As a result of the efforts of the Ministry of Science and Technology (MOST), National Institute of Electronics, Islamabad and UNIDO Office in Islamabad a number of responses to the questionnaires (Appendix 3 of NIPF) were collected from institutes and organisations.

NIPF also outlines the formulation of National Instrument Acquisition Policy Draft (NIAP). It is necessary to use these three documents, together.

As a result of the discussions it is necessary to be stated, that the finalization of the National Instrumentation Policy and the National Instrument Acquisition Policy have to be carried out by the relevant Pakistani authority. The documents listed above summarise the proposals to be considered in this work and outline the approach to these issues.

1.1 Background

Identification of the critical role for human resource development for industrial growth and competitiveness calls for greater emphasis on building up efficient industrial support services. The instrumentation services form an essential part of these industrial support services.

According to the general trend the measurement methods of every kind become more instrument oriented and more automated. The new instruments that are appearing in the market frequently incorporate microprocessors, large memories, smart operator interfaces, advanced self-diagnostic and self-calibrating capabilities. To buy, to install, to maintain, to repair or to calibrate measuring instruments users generally look for assistance. They approach

to specialised companies for purchase of instruments, and to repair them and calibration laboratories who have professional experience in these support services. The support services have to be provided for the independent laboratories of the quality system and the surrounding labs of different manufacturers, agriculture, education institutions, public health, etc.

In most cases of the products the quantity of measuring and control instruments supplied by a producer in Pakistan does not justify the establishment of a comprehensive service activity in the country. For that reason it is an essential need to establish these services in the country.

1.2 Facts and Evidences

a) The role of instrumentation in the industrial development can be outlined , as follows:

- Development of instrumentation techniques in a country is one of the main pillars of the overall technical and technological development.
- The rapid industrialisation of Pakistan over the last years (or decades) has resulted in an even more rapid increase in the use of measuring and control instrumentation. Therefore, the penetration of instruments into the areas and/or institutions such as industrial process control, telecommunications, research and development, testing laboratories, universities, metrology centres, agriculture, public health institutions, etc. has been significant.
- Efficient use of national instrumentation resources is necessary not only for the viable operation of the existing systems, but also is a prerequisite for technical, industrial, economic and social development.

b) The importance of instrumentation in the quality systems may be summarised in the next announcements:

- One of the driving force of our world to day - both in developed and developing country - is quality and it's related disciplines that represent strategic national objectives as well as mean to achieve social and economic progress with respect to the domestic

and export markets. International standards for quality systems and goods have been established and are being expanded and promoted actively as one set of criteria for measuring capability of enterprises to compete against the international markets. An entire infrastructure of national/regional, corporate/enterprise support programmes, institutes, facilities and organisations in the quality disciplines is a recognised necessity. Quality represents a significant discipline and goal through which technical economic and social progress has been made, both in industrialised and industrialising countries at national, regional, institutional and enterprise levels.

- One of the main support means to quality development is the establishment of an adequate nation-wide instrumentation infrastructure. The development of the instrumentation and measuring technique has great importance to every country since all field of economy such as industry, telecommunication, education, research and development, health agriculture, etc. cannot meet the international quality requirements (ISO 9000, etc.) without the required high level of existing measuring technique.

2) The Policy Environment

2.1 In the last decades more and more modern end effective instruments and equipment have appeared in the technical life. These instruments became increasingly expensive and they represent higher and higher value in the national wealth and show bigger and bigger amount in the investment plans and at the expenses of operation and maintenance.

At the same time the fact has become essential whether these instruments are at the country's disposal or not, to carry out tasks in the national plan (quality control, public health, research and development, higher education, etc.) of the country.

2.2 Although the Eighth Plan of Pakistan (1993-98) did not mention directly the necessity of the development of the instrumentation infrastructure, but it was present in the implementation and realisation of a number of the goals, targets which involved the necessity of the qualified instrumentation background. The Eighth Plan shows the intention of the country to follow the export oriented trend of the Newly Industrialised Countries in South East Asia. In this connection strengthening of Pakistan's international competitiveness is a prerequisite. But the

only way to strengthen the competitiveness is to strengthen the quality of the products. This is impossible without increasing the level of instrumentation infrastructure.

2.3 The Government of Pakistan decided to implement the Electronics Policy in 1993. The Policy takes into account the strength and weakness obtaining in Pakistan in the Electronic Sector. Through its implementation a series of short term and long term steps were carried out by MOST and it was monitored by National Commission of Electronics.
The MOST was vested with the necessary executive and financial powers to: identify priority areas; assign contract projects; promote education and training of electronic engineers and technicians; support indigenous electronics industry; finance electronics research and development in the universities and private and public institutions; co-ordinate between R&D centres, universities, industry in private and public sectors and the Government; suggest to encourage local industry; carry out technical audit of local industry and qualify it for specific sectors of electronics technology for award of contracts, etc. oversee and follow the progress with various Ministries/Divisions of the Government on matters requiring action for implementation of the Policy; and advise the Government for periodic review of the Policy.
The Government planned direct serious efforts towards improving the teaching standards of electronic engineering and technology and creation of new facilities for their teaching at graduate, post graduate and doctorate levels.

2.4 The Government of Pakistan has recognised the necessity of the development of the instrumentation infrastructure which is essential in managing the background instrumentation services necessary for the smooth operation of the instruments used in all fields of the economy in the country. The MOST requested United Nations Industrial Development Organisation's (UNIDO) assistance in establishing a National Electronic Equipment and Scientific Instruments Register and also in the preparation of a National Instrumentation Policy Framework.

3) The Present Status of Instrumentation Infrastructure in Pakistan

Pakistan has a large number of science and technology institutions. At present, there are 13 science and technology oriented organisations working under the supervision of MOST.

Beside the science and technology institutions supervised by MOST and other Ministries (Education, Public Health, Industries, Communication, Natural Resources, Water and Power, Agriculture), there are 161 professional colleges and 35 universities including 10 private sector universities, the several quality control laboratories of companies also using a great number of precision and control instruments, etc.

Pakistan has established a number of legal institutions which can ensure the implementation of appropriate instrumentation policies. In practice, however, the system needs to be strengthened to facilitate efficient usage of instruments in place. Apart from Government institutions, private companies can also contribute effectively to the national instrumentation strategy.
The Pakistan Council of Scientific and Industrial Research (PCSIR) was established in 1953 under the supervision of the MOST as a statutory body with the major functions in R&D including also the requirement of providing facilities for testing and calibration of precision instruments, and scientific apparatus for the determination of their degree of accuracy. As the only public industrial research and development institute established under the MOST the PCSIR acts as a consulting and analytical framework on behalf of industrialists, public departments and entrepreneurs. The major function of the PCSIR is research and development technology in support of the national industrialisation policy programmes. The PCSIR is therefore just a sub-system promoting the attainment of national industrial objectives.

The PCSIR runs four multi disciplinary laboratories at Karachi, Lahore, Peshawar and Quetta specialising in R&D areas and having a special relevance to their specific regional problems. There are also four other R&D centers in the country under the PCSIR. They are: Fuel Research Center at Karachi, Leather Research Center at Karachi, Solar Energy Center at Hyderabad, National Physical Standards Laboratory at Islamabad. All these centres are facing a common problem relating to the proper operation of various scientific equipment and instruments.
On a limited scope PCSIR is developing and manufacturing special purpose instruments for the clients and providing training services for engineers.

National Institute of Electronics (NIE), under the supervision of MOST, is an organisation dedicated to the development and spread of electronics and computer technology in Pakistan,

with the longer term objective of helping the country achieve self-sufficiency in this area. It was the first establishment of its kind in the country. Components and Data bank were also planned to stock the current and advanced electronic components for design and development work. NIE has the capability to design, develop and implement any project related to electronics, computers, or telecommunication. The institute offers a wide variety of regular as well as customised educational courses on computer issues, automation and process control, computer aided PCB design and fabrication, microprocessor and microcontroller applications, internet applications.

There is expertise in NIE for repair and maintenance of instruments but the technical documentation, maintenance manuals and spare parts are missing.

The authorities, other organisations, institutes, companies than mentioned before and contacted in Pakistan are listed in Appendix 1.

3.1 In co-operation with these organisations, institutes, companies a survey was made on the present status of instrumentation infrastructure. This survey showed that there were no information among them on the instrumentation projects with a sum of at least US $ 500,000 in the field of research and development, quality control, education, public health except the projects of

- Process Control Instrumentation Training Centre in Karachi.
- Instrument Centres in Sargroda and Lahore maintained Ministry of Health of Government of Punjab
- Instruments Centres in Universities

The manufacturing firms of the measuring and control instruments the products of which are used by the organisations, institutes, companies who responded to the questionnaire are listed in Appendix 2. The institutions in the main sectors in Pakistan use about several hundreds of different types of electronic/electrical equipment.

The most widely used instruments however, are oscilloscopes, PH meters, gas chromatographs, absorption spectroscopes, current meters, digital multimeters, centrifuges, etc. - at least 40 % of all institutions use these instruments. The wide variety of the

equipment/instruments being used by the various institutions in the country limits the institutions' capabilities and capacities in maintaining and repairing them. Mostly the equipment which is not used is faulty, i.e. it has been broken and has not yet repaired. Approx. 35 % of the equipment is obsolete and cannot be serviced. If an instrument goes wrong there is only seldom choice to continue the work through a co-operation with a neighbour institution. Mostly this kind of co-operation is depending on personal relationship.

There are a lot of companies (see Appendix 3) which can be contacted in the procurement procedure, however, **these firms are in most cases not specialised** in instrument purchase. In this way the technical expertise necessary for the efficient instrument investment is not available. No co-ordination of instrument investments and actions for solving the problems in operation of instruments neither on Ministry level nor on regional and company level was notified except the education field where all instruments and equipment are purchased in regional level. The Pakistan Science Foundation, Islamabad submitted a proposal for the establishment of "Science Equipment, Maintenance & Technical Advisory Centre" to the Government of Pakistan. This project is included in the 9th Five Year Plan.

The import of the instruments are liberalised and it is eased by Policy incentives, too, such as foreign exchange controls have been relaxed; ceiling on payment of royalties and technical fee have been abolished, etc. The testing apparatus appliances, electronic control and transmission and components, parts thereof are exempted from sales tax (SRO 600(I)/90 dated 7/6/1990).

However, no repair and maintenance of instruments, systematic upgrading of knowledge of maintenance engineers, technical documentation, spare parts and components are provided for the interested clients, as required. The maintenance personnel are not familiar with the requisite procedures for handling modern equipment. The unnecessary changes in the models of equipment is only aimed at promoting sales and many times these additional features are not required. The spare part supply is not organised. Before installation of any equipment the users don't have hands on training. It was also pointed out that the suppliers of equipment did not provide back up and servicing of equipment. No sufficient calibration services are available. There are an Instruments Centre at University Grants Commission (U.G.C.) in Islamabad called Development And Maintenance of Equipment (DAME) providing services for

universities and Government of Punjab maintains two Centres at Sargroda and Lahore which provide only limited services. U.G.C. worked out two new proposals (in Lahore and Mehran University) which are designed to provide services on regional level.

The wastage of national resources in terms of out of order equipment was pointed out. The equipment has in some cases worked only a few hours then got out of order.

The management of instruments was outlined as very important activity. The importance of NIE's approved scheme on Electronics Instrumentation Lab which will make possible the adoptive redesign of equipment and updating of equipment to enhance life time of the equipment was emphasised.

The importance of data bank of instruments owned by different institutes was stressed. So far no operating inventory was laid down for high performance instruments in the country. An effort was done by U.G.C. on ministry level few years back for the universities, only.

The urgent need of a project for establishment of instrumentation services was outlined. The large dimension of the problem was stated and it was pointed out that a single institute would not be sufficient to solve it. Considering the size of the country a network is to be established. The project should aim to be self sustaining and provide services both for private and public sector. The incentives for retaining the highly trained technicians in the repair work have specific importance.

3.2 It is general experience in Pakistan that:

a) Approx. 40% of instruments at the institutions is out of work.
b) Too many brand-new instrument/equipment are not installed for one or more years.
c) In general the manufacturers/dealers of instruments are not requested to provide for their customers in Pakistan with technical services during the whole average lifetime of their products.
d) Very poor level of co-operation about instrumentation among the institutions.
e) There is no information source (data base) of existing instruments/equipment in the country.
f) There is no alternative solution of investment (Renting).

g) Institutions in Pakistan do not have enough interest in the better utilisation of their instrumentation infrastructure.

4) Basic Conditions and Infrastructural Elements of forming, implementing updating and controlling the National Instrumentation Policy

4.1 Forming, implementing, updating and controlling the policy

Based on the discussions and interviews carried out with senior Pakistani officials and leaders of institutions/organisations (the list of senior officials interviewed and institutions/ organisations contacted are listed in Appendix 1) in Pakistan, to have a successful implementation, the National Instrumentation Policy has to be approved by the Government.

a) First it is necessary to establish the National Instrumentation Committee (NIC) in Pakistan. NIC has to be such a body which disposes of suitable professional competence, authority, and has all rights for control and disposal in all procedures of implementation of National Instrumentation Policy. For that reason the members of NIC have to be the Secretaries of the Ministries interested in instrumentation (Ministry of Science and Technology, Ministry of Industry and Production, Ministry of Health, Ministry of Environment, etc.).

   The president of the Committee is proposed to be the Secretary of MOST. NIC has to operate under supervision of the Prime Minister. The tasks, organisation and financing of NIC are detailed in Appendix 4.

   The secretariat background and database necessary for the operation of NIC has to be provided by the Instrumentation Service Centre (ISC). according to the Recommendation 5 of NIPF.

b) It is also necessary to establish a National ISC (see NIPF) in Islamabad in two phases in the premises of the National Institute of Electronics (NIE) as an independent institution, being directly supervised by MOST. The ISC enables to manage all services needed for the operation of the precision and control instruments, together. Under one management these

services can be developed in a way to be able to support each other and at the same time all incentives necessary for holding the trained personnel for longer periods and motivating them for maximum output can be combined, suitably.

Activities of ISC in the first phase (3 years) suggested in NIPF, are, as follows:

- the database of NEESIR has to be operated and continuously updated
- Consultancy has to be provided for the customers
- Repair and maintenance with after-sale services for equipment supplied by foreign suppliers.
- Provision of Secretariat background for NIC.

Activities of the ISC in the second phase (2 years) besides the activities of the first phase are listed in NIPF:

- Calibration services;
- Training and education;
- Renting of instruments to meet the temporal demands instead of investments;
- Measuring technique services.

4.2 Strategic Policy Issues.

The realisation of the main target of National Instrumentation Policy that is "To increase radically the efficiency of the existing national resources of the instrumentation" needs strategic approach. Beside the establishment of the Basic Conditions and Infrastructural Elements which are necessary for forming, implementing, updating and controlling this Policy, the institutions/ companies using and operating the instruments, the ministries/ authorities interested in instrument economy and the all instrument suppliers both local and foreign have to be not only obliged but interested in implementation of the aims of the National Instrumentation Policy.

a) The organisations, authorities supervising the institutes, companies are advised to work out such sanction system which makes the user of instruments interested in procurement of instruments to carry out a careful preparatory work; in operation of instruments to think about efficiency (perhaps using more shifts) considering the international practice. If necessary, the personal responsibility has to be stated and the sanctions have to be taken. The appointments of ill-qualified manager and chiefs have to be withdrawn. The supports of Government or municipality are to be cancelled at such institutes/organisations which repeatedly do not comply with the prescriptions of the National Instrumentation Policy. On the other hand those leaders of institutes/companies who are successful in reaching higher efficiency of usage of instruments are advised to have positive incentives. The institutes/companies have to work out the proposals for measuring the efficiency of usage of instruments according the prescriptions provided by the ministries/authorities.

b) The ministries/authorities have to be necessitated to carry out the tasks which are necessary for the implementation of the National Instrumentation Policy in the institutes/companies supervised by them. Investment support is advised to provide for those institutes which are sharing the capacities of their instruments, equipment with other institutes/companies e.g. through introducing more shifts. The ministries/authorities have to approve the proposals for measuring the efficiency of usage of instruments prepared by the institutes/companies. The relevant leaders of the ministries/authorities have to have personal responsibility for making the institutes/companies to keep the prescriptions of the National Instrumentation Policy and for taking the necessary sanctions.

c) In the procedure of procurement and instrument investment those instrument suppliers (both local and foreign) have to be preferred which under the average lifetime of the instruments provide for the users for the installation and the continuous operation as essential service through local Pakistani institutions:

- the necessary spare parts, consumables, qualified, multiple skilled service-experts and documentation;

- in several cases to organise training courses for teaching of operation of instruments/ equipment in the site;
- and if needed by the Pakistan partner continuous maintenance under a relevant contract and supported by the suppliers.

5) Conclusions

5.1 In NIPF some conclusions are already defined. Moreover on the basis of the evaluation of the information received it can be stated that it is a real aim to develop considerably the level of instrumentation and measuring culture in the country within reasonable time (5-10 years) using the proposals in these documents (NIPF, NIP, NIAP). The starting moment of the complex procedure in the realisation is if the Government approves the proposed concept. The governmental intention is necessary to be declared on the will for fundamental change, radical development of the facilities of instrumentation and measuring technique in the country. All of this can be achieved with the background of the existing national resources in the shortest possible time (5 - 10 years).

5.2 In the present situation it is a basic condition for any positive development that Pakistan should have a proper National Instrumentation Policy with the strategic goal, to increase radically the efficiency of the existing national resources of the instrumentation through:

— increasing the utilisation of the national instrument pool

— avoiding unnecessary parallel investment

— stimulating really necessary well prepared investments.

5.3 The most important elements of the complex procedure for development of instrumentation services are, as follows:

— Establishing a NIC of suitable competence and stress to control the implementation of the concept,

— Approval of NIPF, NIP, NIAP which outline the aims and objectives of the concept,

— Accomplishment of NEESIR's development,

— Implementation of the pilot project ISC and after this the foundation of the regional ISCs.

These elements in continuous co-operation can influence each other in a positive way and generate the implementation of the complex development procedure. Practically it may result (in 5 - 10 years) in the next effects:

1./ Because of the lack in conditions of right human resources and technical facilities necessary for the repair and maintenance a remarkable great part of the country's instrument wealth is out of order. This part can be decreased to one third - one quarter in 5-10 years time.

2./ Well-considered, -established instrument procurement and investment procedure can be developed. The redundant, analogous instruments' investments and the waiting of years between the procurement and putting into operation will be discontinued.

3./ There will be alternatives for the new instrument investments, e.g.:
- renting of instruments, which is advantageous not only because of the considerably lower renting fee as compared to the cost of new investments but the usage of instruments can be multiplied, or
- procurement of second hand equipment which prices are considerably lower as compared to the new investment prices, if the conditions are appropriate.

4./ It will stop that in case of an instrument's getting faulty the problem can be only solved through buying a new instrument, because of the lack in conditions of repair and maintenance (multi-skilled experts, service-documentation, spare parts).

5./ Apart from some very exceptional case, the instrument suppliers can sell and market their products in Pakistan only if they provide the services of suitable technical level

according to contractual conditions through Pakistani institutions for the customers under the guarantee period and for minimum 8 years after it (see NIAP).

6./ On the basis of point 5./ a service staff of 8-10 times more than present can be developed which may provide a more qualified background not only for operation of the instruments in the country, but it can be the base of an expert staff of greater number for the local development of the instruments and more qualified as compared to the present.

7./ An essential change in attitude to procurement, putting into operation and usage of instruments can be generated in senior officials of ministries, managers and chiefs of institutes and last but not least in the engineers, technicians using the instruments. They may recognise that they are personally interested in meeting the demands outlined in NIP and NIAP, because their salary, increase in salary, extra payments (premium) and maybe their posts are depending on their work. The instrument suppliers are interested in acquiring or holding the Pakistani market and they can be highly influenced through increase or decrease the business done in the country.

8./ The country-wide, regularly updated NEESIR may provide information for Governmental Officials, senior officials of ministries, leaders of institutions and all of those who are given access to the NEESIR in order to take well- considered decisions in essentially more efficient use of existing instrument wealth and in design and elaboration of future instrument development plans.

5.4/ All previously done serious work on this subject in Pakistan and their experience should also be taken into account. The policy paper in this respect should also take care of sources funding for ultimate implementation of the policy.

6. Recommendations

NIPF outlines the strategic aims of the implementation of the National Instrumentation Policy. The realisation of the objects summarised in the documents NIPF, NIP, NIAP is advised to be commenced by submission of these aims to the Government for approval. Before the submission the comprehensive discussion of these aims are proposed for the relevant leaders and senior officials of MOST. After this discussion besides the conclusions of the debate in the submission the following suggestions are to be proposed for approval:

i) One of the most important priorities in the Ninth Plan is "To increase radically the efficiency of the existing national resources of the instrumentation;

ii) Establishment of the NIC with the tasks and competence outlined in NIP and NIPF;

iii) Establishment of a model ISC as a pilot project in Islamabad in two phases (3+2 years) in the first step. On the basis of the experience of the pilot project the establishment of further ISCs is suggested in the most important regions (e.g.: Karachi, Lahore, Peshawar);

iv) Assignment of the country-wide follow-up and development of the UNIDO project: "Establishment of National Electronic Equipment and Scientific Instruments Register" to an outstanding task.

v) Because of the requirement of specially trained human resource due to fast changing electronic technology, the effort initially may be collaborative between the different field of economy according to specific requirements. A strong pool of technical personnel is proposed to be established who may provide consultancy to users of electronics/scientific equipment. These personnel may be able to judge the technical equipment of an organisation or a use. Special training program has to be worked out for training the Pakistani engineers/technicians.

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Appendix 1

List of persons interviewed, authorities and organisations/institutions contacted

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Mr. A. Rashid Khan
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Ministry of Science and Technology, Islamabad

Dr. A. Q. Ansari
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Chak Shahzad, Islamabad

Pakistan Science Foundation
Civil Secretariat, Islamabad

Pakistan Academy of Sciences
Civil Secretariat, Islamabad

National Institute of Health
Chak Shahzad, Islamabad

Pakistan Telecommunication Academy
Islamabad

Central Telecommunication Labs.
Islamabad

Pakistan Television Academy
Islamabad

Pakistan Council for Science and Technology
Islamabad

Communication Technology Institute
Islamabad

Hydro Carbon Institute
Islamabad

Holy Family Hospital
Rawalpindi

Appendix 2

Manufacturers and distributors of major and measuring and control instruments used in Pakistan

Associated Environment Inc., USA
Bausch & Lomb, USA
Culligan Inc., USA
Diano Corp. USA
Grieve, USA
Hewlett Packard, USA
Hitachi, Japan
JEOL, Japan
Kayex Hamco, USA
Lab-Line Instrument, USA
Leco, USA
Leybold-Hereaus, Germany
LKB, Sweden
Merck, Germany
Mettler, Germany
Nikon, Japan
Oriel, USA
Perkin Elmer, USA
Philips, The Netherland
Phywe AG, Germany
Presco Inc., USA
Sartorius, Germany
Siemens, Germany
Simadzu, Japan
Thermco Inc., USA
Toshiba, Japan
Twin Cities Industries, USA

Anritsu, Japan
ELWE, Germany
FEEDBACK, UK
FESTO, Germany
Fluke, USA
Heatkit, USA
Honeywell, USA
Keithley, USA
Marconi, UK
Rohde & Schwarz, Germany
Tektronix, USA
Wandel & Goltermann, Germany

Appendix 3

Equipment companies

Business Masters,
No. 2, 87, East Azeem Mansion,
Fazal ul Haq Roads,
Islamabads

Ford and Lord,
Room No.7, Mezzanine floor,
23/E Zakia Plaza, Blue Area,
Islamabad

Falcon Engineering,
6 Mezzanine Floor, 96 East United Plaza,
Blue Area, Islamabad

Philips Electrical Industries of Pakistan Ltd,
168-F Adamjee Road, P.O Box No. 133,
Rawalpindi Cantt

Freinds Computers,
Potohar Plaza, Blue Area,
Islamabad

Advanced Communication,
No. 8-A. Street No.12, F-8/3,
Islamabad

Turnkey System International,
Suite-9, 3rd Floor, United Plaza,
Fazal ul Haq Road, Islamabad

Neeli Bar Traders,
16-A, Street No.44,F8/1.
Islamabad

Arbson International,
Tallah Bldge, 2nd Floor, Plot No.4.
Behind Grindlays Bank, Haider Road,
Islamabad

Jaffer Brothers,
5th Floor, Panorama Centre, Ghazanfer Ali Road,
P.O. Box 8518, Karachi-04

Ocean International,
Khalid Plaza, 4 Floor, 38 Blue Area,
Islamabad

Rafiq Sons Enterprises,
86/8 Shahrah-e-Faisal Road, Cantt Bazar,
Karachi

Mansoor Enterprises,
P.O. Box 2117, Islamabad

Atta Ullah Zia & Co.
66-A, Feroz Pur Road,
Lahore-16

Logical Systems (PVT) Ltd,
P.O. Box 6101, 95-A Abid Majeed Road,
Near Sher Pao Bridge,
Lahore Cantt

Metro International,
No.3. Abbas Centre, 78/W, Fazal ul Haq Road,
Blue Area, Islamabad

Faris Brothers Stationers
Shop No.4, Block No.21, Civic Centre,
Near GPO, Islamabad

Chaudharz Brothers,
Shop No.4, 39, Islamabad Centre,
Blue Area, Islamabad

Wajid Enterprises,
38 Khalid Playa, Blue Area,
Islamabad

Progressive Electronics & Brothers,
Block 12-D, Jinnah Super Market,
Markaz F-7, PO Box-2102, Islamabad

NCR Corporation,
State Life Building NO.1/A,
Chundrigar Road, Karachi

NCR Corporation,
35 School Road, F/7^1.
Islamabad,

ABM Data System,
14-Y, Johar Road, F-8 Markaz,
Islamabad

Western Computer,
69 Jail Road
Lahore

Western Computer,
115, G-9/4, Islamabad

Data Mation,
14-15, 1St Floor, 64-W, Jinnah Avenue,
Islamabad

Power Systems International,
3-ATS Centre, Block 30, West Blue Area,
Fazal ul Haq Road, Islamabad

Rachna Stationery Works,
Azeem Mansion Near Lal Quarter,
Blue Area, Islamabad

Hussain and Brothers,
4851, Adamjee Road,
Rawalpindi

A & Z Associates,
217 Bagh Sardaran, Ghazni Road,
Rawalpindi

Gero Corporation,
D. L. Khokhar Building, Ground Floor,
Block 26/783, Drig Road,
Cantt Bazar, Karachi-08

Sunny Decorators,
Room No. 315/1-C, Star Centre,
Tariq Road, Pechs, Karachi

Ali Contractors,
486, Railway Road, Opp. CCMA,
Rawalpindi

Ali Business Machine,
16, 2ND Floor, Mujahid Plaza, Blue Area,
Islamabad

B. M. International,
104-E, Mezzanine Floor, Chenab Inn,
Blue Area, Main Presidency Road, P.O. Box No.3022,
Islamabad

Gestetner (PVT) Ltd,
Block 4-B, F-7 Markaz,
Islamabad,

Canyon Products Ltd.
Room No.3, 5/F, Kinetic Industrial Centre,
7 Wang Kwong Road, Kowloon Bay
Hong Kong

Canyon Products Ltd.
SNC Plaza, 12-D, Blue Area,
Islamabad

Dynamic Engineers,
Plot No.1, I & T Centre, St. No.40,
G-10/4, Islamabad

Multiline Engineers,
36 Industrial Estate, Kot Lakhpat,
Lahore

Z.M. Trading Corp.
Faisal Market, Feroze Street No.4.
Near Loha Market
Lahore

Stark Corporation,
P.O. Box 1196,
Rawalpindi

Zafar Enterprises,
Plot No.44, Sector 1-9, Industrial Area,
Islamabad

Micropak (PVT) Ltd.
Plot No.217, Street No.7, 1-9,
Industrial Area
Islamabad

Strabac Electronics Co.
Basement No.7. 77 Ali Complex,
Fayal ul Haq Road, Blur Area,
Islamabad

Central Electronic Services,
P.O. Box 3079, Gulberg/II.
Lahore

Kyaf Corporation,
24, National T.V. Market,
Sohrab Katrak Road,
Saddar Karachi

Hi-Tech Business Machines,
1ST Floor, Rashid Plaza,
Khayaban-E-Qualid-E-Azam, Blue Area,
Islamabad

Chattan Paper Mart,
Liaquat Road,
Rawalpindi

Kashmir Paper Mart,
Liaquat Market,
Rawalpindi

Waco International,
Show Room No.16. 16-H,Safder Mansion,
East Blue Area, Islamabad

Beam Tech Electronics Co Ltd.
No.756, 4F-Chung-Cheng RD, Chung-Ho (235)
Taipei, Taiwan

Nasco Traders,
53/7, Haider Road, Rawalpindi

Business Aid & Equipment Ltd.
101/106 Bank Road,
Rawalpindi

K.B. Sarkar & Co.
Sheikh Attaullah Plaza,
Bank Road, Rawalpindi

K.B. Sarkar & Co.
Suit No.4, 2ND Floor, Shan Arcade,
Civic Centre, New Garden Town, Lahore

K.B. Sarkar & Co.
B-11, Sheristan Building,
Deen Mohhamad Wafayee Road,
Karachi - 74200

P.D.L.,
Azeem Mansion, Mezzanine-3,
87-E Blue Area
Islamabad

Ses Business Systems,
8 Arcade 20-A, 1ST Floor Markaz 1-9
Islamabad

General Lab. Supplies,
Faisalabad

Ahsen Brotthers,
Asia College Building Block No.13.
I & T Centre, G-9/4.
Islamabad

Infosys Management,
No.6. 1st Floor, 66-E Mujahid Plaza,
Blue Area
Islamabad

Elite Systems,
4-A Mezzanine Floor, Yasun Plaza,
74-W Jinnah Avenue,
Islamabad

Shaheen Systems,
48, Street No.17, F-8/3,
Islamabad

Silicon Business Equipment
No.105 Royal Centre 106-W
Fazul ul Haq Road, Blue Area,
Islamabad

Appendix 4

National Instrumentation Committee

I

The National Instrumentation Committee (NIC) is proposed to be a body of the Government which is supervising, co-ordinating and controlling the implementation of the National Instrumentation Policy i.e. the establishment of the instrumentation and measuring technique infrastructure directly connected to development plans of the country, the enhancement of the level of the country's instrumentation and measuring technique culture and the effective use of the existing national resources of the instrumentation. Through this activity the NIC advises the Government, expresses its opinion and supervises, directs the carrying out of all necessary preparatory actions for the decision procedure.

The tasks of the NIC:

1./ Essential tasks of the NIC are, as follows:

- to form and develop the National Instrumentation Policy and the National Instrument Acquisition Policy in co-operation with the interested ministries, authorities of nation-wide competence,
- to promote in many-sided way the development of nation-wide instrumentation and measuring technique culture through preparation of concepts, studies and prognostics and
-to develop, harmonise and make execute the Governmental Measures necessary for the establishment of infrastructural background facilities for the procurement, efficient usage and smooth operation of instruments and equipment of instruments character.
-to control the fulfilment of the relevant measures and prescriptions.

2./ NIC is carrying out the co-ordination and evaluation of implementation of National Instrumentation Policy and the National Instrument Acquisition Policy.

3./ The National Instrumentation Committee is analysing periodically the national/ sectoral/ regional instrumentation situation.

4./ The permission of the purchase of the equipment of great value;

5./ Preparation of recommendations, reports to the Prime Minister/Government in the field of the development of instrumentation infrastructure.

II.

The organisation, competence and financing of NIC

The NIC is advised to be directly supervised by the Government/Prime Minister. It is a body of nation-wide competence. The members of the NIC are the President, Members, Secretary and six permanent experts.

The President of NIC is advised to be the Secretary of Ministry of Science and Technology (MOST). He is suggested to be appointed to this task by the Prime Minister.

The Secretary of NIC is proposed to be the Director General of Instrumentation Service Centre (ISC), which institution provides for the NIC the information database (NEESIR) and the administrative background.

The members of NIC are the Secretaries of the Ministries interested in instrumentation (Ministry of Industry and Production, Ministry of Environment, Ministry of Health, and the interested ministries).

The Members and Secretary of NIC are proposed to be appointed for these tasks by the Prime Minister.

The permanent experts of NIC are proposed to be selected from the most well- known, nation-wide acknowledged experts of different fields of science and group of instruments of different character (e.g. such as NMR equipment, chromatographs, spectroscopes, electronic equipment, centrifuges, electronmicroscopes). The permanent experts of NIC are proposed to be appointed for these tasks by the Prime Minister, too.

In special cases, as decided by NIC the President of NIC can involve also outside experts.

The purchases of all instruments of a value exceeding USD 50,000.- are to be approved by NIC.

The costs of the administration/secretarial background (through the ISC) and the costs of experts are suggested to be financed from Governmental Budget.

ESTABLISHMENT OF A NATIONAL ELECTRONIC EQUIPMENT AND SCIENTIFIC INSTRUMENTS REGISTER

Project of the Government of Islamic Republic of Pakistan
UT/PAK/96/099

NATIONAL INSTRUMENT ACQUISITION POLICY DRAFT

Prepared for the United Nations Industrial Development Organization
Vienna

by Dr. Gy. Stokum
UNIDO Consultant

Contractor:
MTA MMSZ Ltd., Budapest, Hungary

Backstopping Officer: Victor SHATRAVKO

June 26, 1998

ORIGINAL: ENGLISH

This document is a draft which has not been approved.

TABLE OF CONTENTS

1) Introduction

The industry, the agriculture, the public health, the research and development, the higher education, the environmental protection and so on have to use more and more measuring instruments and equipment to perform their measuring tasks. These instruments have a growing value in the national wealth. Therefore the level of the availability of the National Instrument Wealth is becoming more and more important especially in tasks that can only be performed with the use of these devices. This does not only depend on the quality of the instrument, but later on it is still important to have professional assistance when putting them in operation and throughout the time of upkeep regularly (this means having educated technicians and engineers, providing components, service documentation, expendable material etc.).

Therefore, besides the price in instrument acquisition, the technical parameters, and reliability etc. , there is another essential point of view, which is terribly often forgotten in Pakistan, is the guarantee of a fast professional service, which is necessary for regular maintenance and fast repair. Nevertheless this is a perfectly understandable expectation from an institution purchasing an instrument, because the instrument is needed as a device, that will be used throughout an average lifetime (8 years). In developing the absolutely indispensable professional service which is necessary for this requirement - according to international experience - the firms delivering the instruments and the manufacturers should have a special role. In export to developing countries the instrument suppliers are often willing to give some discounts eluding their responsibilities.

Seeing that the instrument suppliers want to keep, or more precisely to acquire the market, if a country importing insists on the exporters' taking part in developing the service infrastructure eventually these needs are fulfilled. If not, another supplier should be found.

This draft of the National Instrumentation Acquisition Policy (NIAP) was prepared on the basis of the information collected in Pakistan during the period from September 24 1997 to April 30, 1998. This document outlines the aims and functions of National Instrumentation

Acquisition Policy which has to be prepared for the Pakistan Government for approval according to the National Instrumentation Policy Framework (NIPF). The NIPF summarizes the actions for collecting information which were carried out in the said period (see the Chapter of Methodology in NIPF).

NIPF also outlines the formulation of National Instrumentation Policy Draft (NIP). It is necessary to use these three documents, together.

2) Background

In Pakistan the instruments mainly come from import. Foreign instrument suppliers intending to establish professional services in Pakistan are able to recover their expenditures above a specific amount of sold equipment. Regarding this it would be suitable to reduce essentially the number of suppliers, this way the trade of certain companies would considerably grow providing the basis for developing a professional service. Further a certain reduction in the number of supplier companies would be justified also because this way the expenses of the necessary components, materials, training/upgrading-training of service technicians/engineers etc. are significantly reducible.

The maintenance and repair of instruments and measuring equipment are usually not taught at colleges or universities. This knowledge can be acquired at special courses that are held in plants and are regularly organized by the instrument manufacturers. (Not to be mistaken for the courses which teach instrument operation and use.)

While in Pakistan there are relatively many theoretically well prepared engineers/technician, the main obstacle of raising the professional services to the proper level is the fact that there is not enough of suitable skilled service engineers/technicians. This contradiction could be solved if the instrument supplier companies would be involved in the actions necessary for acquiring of the knowledge of special professional services (putting into operation, maintenance, repair) of the otherwise well prepared Pakistani engineers/technicians. The most practical solution - according to international experience - is when the suppliers would provide the necessary professional service based on a service contract agreement (see Appendix 1.) through Pakistani engineers/technicians of Pakistani institutions (not only throughout the time of guarantee, but

for the whole lifetime of the equipment). In order to uphold the market, the training and regular upgrading of training for the service engineers/technicians would be the interest of instrument supplier and manufacturer foreign companies. Further advantage of this solution would be that the foreign suppliers could be obliged in the service contracts to provide service documentation, service kits and in some cases components.

This would be very much advantageous for both sides. For Pakistan because the number of service experts would be considerably increased as well as their professional level resulting in, that shortage of service experts would disappear as an obstacle of increasing operation and exploitation of the instrument stock of the country. In 5-10 years a great capital (special professional knowledge) would be accumulated in the heads/hands of Pakistani service engineers/technicians working in the field of professional service. Personal and technical background of regular maintenance (see Appendix 2.) so important for the continuous usage of instruments (not only for the guarantee period, but for a whole lifetime) would be established. But also because in the case of tasks when putting into operation, repair, maintenance carried out by Pakistani experts of local Pakistani institution, the expenses and time losses of travel from abroad and back omitted, resulting in a considerably quicker and cheaper reparation of the broken down instrument. For the foreign instrument supplier this is a better solution because, due to the absence of traveling costs and somewhat cheaper payments of local service professionals, the service background for putting into operation, maintenance and repair of their instruments can be insured at a more reasonable price for Pakistani institutions. The selling trade of such companies will be increased in case of instruments manufactured with good technical parameters together with good service background and service supplement even after the guarantee has expired.

3) Guiding Principles to the Acquisition of Instruments

3.1 Complex service requirement must be expressed to the suppliers/manufacturers when acquiring instruments/measuring equipment, in which the instrument is only half part of expected services. The other half is ensuring professional service (trained service engineer/ technician, service documentation, components, expendable material etc.) necessary when

putting into operation and continuous operation (throughout an average lifetime) through frame contract (see Appendix 1.) with a Pakistani instrumentation service center.

3.2 Suppliers fulfilling requirements set in 3.1 should be preferred when acquiring instruments. Import should be denied of companies not fulfilling the content of 3.1 except for extraordinary cases (e.g. national security reasons etc.).

3.3 Concerning the content of 3.1 to ensure a better negotiation position of the Pakistani partner:

a) the number of instrument orders per supplier should be increased so that the number of companies from which instruments are imported by the Pakistani partner should be considerably decreased,
b) the number of pieces should be increased also in individual affairs so, that instrument orders from individual suppliers are regionally or if possible country-wide contracted.

3.4 Instruments with individual price of an amount of US $ 50,000.- or more can only be ordered from the instrument suppliers with written permission given in advance from the National Instrumentation Committee (NIC). A request for permission should be submitted to the NCI's secretariat with the attachment of the technical background information prepared by the Instrumentation Service Center (ISC).

3.5 Concerning observance of the National Instrument Acquisition Policy's content certain ministries are responsible, regarding the institutions under their supervision. Central/regional and government support should be withdrawn from those institutions which do not live up to these obligations. In each case the avoidance of obligations should be carefully examined and personal responsibilities should be brought up in the institute investing, and the ministry in charge as well.

3.6 The laws/rules concerning foreign trade/import in Pakistan should be revised, so that these can be in harmony with the prescriptions of National Instrument Acquisition Policy and can help validate these prescriptions.

3.7 Even though most instrument import is realized in the public sector, the possibility for enforcement of expectations in validation should also be checked in the private sector.

4) The Role of National Instrumentation Committee in the Implementation of National Instrument Acquisition Policy

The NIC has a determining role in the realizations of the aims of National Instrument Acquisition Policy throughout the following:

a.) it controls the implementation,

b.) it actualizes the goals and prescriptions of the National Instrument Acquisition Policy,

c.) it gives the permissions for instrument acquisitions of big value (at least 50.000 US $ and above).

5) The Role of National Instrument Acquisition Policy in the Realization of the Aims of National Instrumentation Policy.

One of the important elements in realization of the complex implement system of National Instrumentation Policy is the National Instrument Acquisition Policy. Through its efficient implementation it can be resulted in:

a) Availability of professional instrumentation services (trained service engineers/technicians, service documentation , components and consumable) for repair and regular maintenance at a reasonable price and proper rapidity in 5 years for all the instruments used in Pakistan when putting them into operation and throughout the guarantee period and beyond it (throughout the instrument's lifetime);

b) Drastical decreasing of the number of instruments out of order is, in quality control, research and development, health care and higher education, etc.

c) Essential improvement of the level in the instrument measuring culture and its personal, technical and institutional background in Pakistan.

6) Conclusions

The complete realization of the National Instrument Acquisition Policy makes a safe ground/background in order to:

a) develop the practice of more effective use of national instrumentation resources in Pakistan,

b) reach that the procurement of instruments should not be random "ad hoc" typed, but well-considered one, aiming at the goals, and it should be effected from the instrument suppliers providing a professional service necessary for the smooth operation of the instrument (throughout their whole lifetime),

c) evolve an awareness of keeping the prescriptions/aims of the National Instrument Acquisition Policy in their interest among both the Pakistani instrument customers and the instrument suppliers,

d) establish a nation-wide instrument stock in Pakistan which is in its combination and in its technical conditions both, suitable for the reasonably expected and proper use,

7) Recommendations

The National Instrument Acquisition Policy should:

7.1 give preference to those foreign/local instrument manufacturers/suppliers, who provide their products in Pakistan - in co-operation with local Instrumentation Service Centres or Repair and Maintenance Workshops/Laboratories - with proper after sale service during the average lifetime,

7.2 declare that instrument/equipment even being the most sophisticated one makes only the first half of the requested full performance, the other half is made by a complete customer

service/after sale service not only during the guarantee, but during the whole average lifetime. It is necessary to deny import from those manufacturers/suppliers who fail to consider this requirement,

7.3 prohibit such instrument/equipment investment when the basic conditions (financial sources, staff, etc.) are not available for the immediate installation/operation after acquisition,

7.4 carry out the investments in the case of great value instrument/equipment (US $ 50,000.- or more) only with the permission of NIC. In these cases before making decision NIC has to request the necessary technical background information from the ISC on the basis of NEESIR,

7.5 investigate alternative solutions of new investment for example renting or purchasing, second-hand instrument.

7.6 form /develop a better position for the bargain process with foreign and local instrument suppliers through collecting the purchases and joint acquisition of single/individual requirements for instrument investments of institutes, organizations belonging to the public sector of different ministries or regional centres.

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Appendix 1.

Technical and Application Advisory Service Contract

This contract has been concluded between

(hereinafter called: .....)

and

(hereinafter called: Contractor)

according to the following terms and conditions.

Section 1

Subject of the Contract

1. With this contract, (contractor takes over the application advisory and technical service obligations further - for the guarantee period and subsequently - in respect of the instruments, devices and equipment defined in Appendix A to this contract - hereinafter called: the Products - delivered by ..... to Pakistan through any of the Pakistani Foreign Trade companies before and during the validity of this Contract.

Section 2

Guarantee Obligations

1) The period of guarantee in respect of the individual products is determined in Appendix A of this Contract and has to be reckoned from the date of taking over of the Products by the end/users in good working condition. If the actual purchase contract or guarantee letter given for the Product prescribes a longer guarantee period, the latter (longer) period of guarantee has to be considered as binding. In this case, ...is obliged to pay a time-proportionately higher percentage to Contractor.

2) The guarantee terms concerning the individual products are governed by the guarantee terms of the purchase contracts and/or by the guarantee letters given to the products. The guarantee terms must be in conformity with this Contract, for which ..... is responsible.

   ..... has to enclose to this Contract its general guarantee terms valid at the time of the conclusion of this Contract as Appendix and to notify Contractor of the modification of these terms that may be possible in the future without delay.

   In case the guarantee terms are not laid down by ..... in the way determined in the previous paragraph, the guarantee services have to be ensured to the purchaser (user) of the Products in accordance with the prescriptions (usances) of the precision instrument trade in Pakistan.

   The judgment of validity of the guarantee claims is Contractor's task. Should, however, a dispute arise in respect of the guarantee services between. Contractor and the inland purchaser (end-user) Contractor will decide in respect of the legality of the claim, in consultation with .....

3) Contractor does not take over with this Contract the repair and other obligations of ..... resulting from constructional and/or serial defects; ..... is obliged to settle such claims at its own expense. The assistance in repair of such defects will be rendered by Contractor against payment on the basis of special agreement to be concluded with .....

   Repair jobs which become necessary due to damages that occurred with the Products in transit will be carried out by Contractor against separate payment, on the basis of orders to be placed in each case separately by the party responsible for the insurance of goods or rather who is bearing the risk.

Section 3

Technical and Application Advisory Servicing Activity

1) Contractor will provide to the end-users of the ..... Products in Pakistan the following technical and application advisory service:

1.1 Against the remuneration for the Service in lump sum as stated in Section 4 point l of this Contract to be paid by .....:
Contractor will provide for:

- putting into operation of Products and handing them over in good working order at the end-users (if required by them),
- giving instructions to the end-users of the products for the use and/or operation of the products,
- giving advice in the field of measuring and application technique,
- repair of defects occurring within guarantee, adjustment and/or testing of measures of the Products if necessary,
- replacement of defective parts in the frame of guarantee.

1.2 Ensurance of the following performances that must be carried out after the guarantee period or that fall outside of guarantee on separate orders and to the expense of the end-users:

- maintenance of the products in each case separately, or continuously, the latter on the basis of an appropriate agreement,
- performance of repairs of small and average range, general overhauls,
- spare parts supply for repairs.

1.3 The installation, putting into operation and handing over to the end-users of the products - larger equipment - marked separately in the Appendix to this Contract will be performed by Contractor against payment subject to special agreement.

2) At notice of guarantee defects Contractor is obliged to begin the job within two working days following the day of notification of the defect, if possible, and complete the repair of the products without any delay.

3) In case of difference of opinions between Contractor and the purchasers (end-users) in respect of one of the performances (jobs) determined in this Contract, and remunerated by ..... the decision in respect of the legality of the claim will be taken by Contractor in consultation with ....., if necessary.

Section 4

Remuneration for the Service and Settling of Accounts

1) As the counter-performance of the activity taken over by Contractor and defined in Section 3 point 1.1 of this Contract ..... will pay to Contractor for all Products delivered by itself to Pakistan, or after the ..... a lump sum remuneration that corresponds to the amount to be calculated from the prevailing net invoice value on the basis of the percent rates fixed at the individual Products in Appendix A of this Contract.

   The lump sum remuneration has to be remitted always within 30 days after each quarter of calendar year to the Contractor Account No. ..... with the ..... Bank of Pakistan under heading "LUMP SUM REMUNERATION FOR THE SERVICE CONTRACT NO: .....

2) ..... is obligated to send a turnover statement in triplicate with a separate covering letter directly to the address of Contractor simultaneously with the remittance. The turnover statement has to include the following data, grouped according to the importers in Hungary:

   - Contract (order) numbers of the importer
   - Date of the invoice
   - Number of the invoice
   - Net amount of the invoice
   - Per cent rate of the lump sum remuneration
   - Amount of the lump sum remuneration
   - Type of product.

Section 5

Spare Parts Supply and Settling of Accounts

1) To ensure the efficient and smooth technical service ..... places at the disposal of Contractor a consignment spare parts stock for the storage and handling of which Contractor will take care. The value of parts being simultaneously on the Consignment Stock may never surpass the maximum value of .....

2) Concerning the stock to be held on the Service Consignment store, ... will determine the assortment, quality, unit prices and total value of the initial stock of spare parts.

   Thereafter spare parts may be delivered to the Service Consignment Store only on basis of Contractor's notifications on demand (calls).

The notifications on spare parts demand (calls) must always bear the number of this Contract completed by the serial number of the pertaining demand note (.....).

..... will endeavor to deliver the spare parts called in for its Consignment Store held at Contractor within the following time limits:

at NORMAL calls	4-6 weeks
a URGENT calls	10-14 days.

The beginning stock as well as the quarterly replenishments will be called in by Contractor under heading "NORMAL", the spare parts needed for urgent repairs under guarantee but being not available on the Consignment Store will be called in by telex under heading "URGENT".

3) Service spare part shipment called in for the Consignment Store must be dispatched directly to Contractor's address ..... accompanied by detailed proforma invoices of which

   - two copies shall be enclosed in the parcel
   - one original and two copies shall be sent to on the day or dispatch.

4) The charges of shipments destined for the Consignment Store and to be delivered at the risk and expense of ..... must be prepaid on "freight or carriage and insurance paid to Pakistan Consignment Store" basis (INCOTERMS 1980) and in the relevant proforma invoices the prices of spare parts may figure only; packing, freight, air freight etc. costs may not be indicated as separate items, as the individual spare parts withdrawn from the Consignment Stock will be accounted for respectively invoiced at the prices indicated in the proforma invoices.

   At component parts belonging to the "exchange program" the exchange price has to be quoted as well beside the unit price in the proforma invoice.

5) Contractor shall send to ..... on every quarter period the "STATEMENT OF SERVICE SPARE PARTS STOCK OF THE CONSIGNMENT STORE/INVENTORY" on the form determined in the Appendix B with a specification and prices detailed in the proforma invoices that accompanied the individual spare parts shipments.
6) Within 30 days after receipt of the statements ..... will send (each in 6 copies)

   - "NO CHARGE" Invoice for Customs Purpose on the spare parts used within guarantee i.e. on the "FREE OF CHARGE CONSUMPTION"

     and

   - "INVOICE" on the spare parts used outside of guarantee i.e. on the "CONSUMPTION AGAINST PAYMENT".

After receipt, checking and acceptance of the invoices Contractor will arrange within 30 days for the remittance of the amounts.

Contractor accounts for the component parts belonging to the "exchange program" and sent with unit price and exchange price to consignment store as follows:

- in case of free of charge consumption (under guarantee) = at unit price and returns the defective piece in the quarterly account period to the address and at expense of .....

- in case of consumption against payment = at unit price if the defective piece cannot be repaired according to Contractor's judgment, or it is not at disposal

  = at exchange price if defective part can be repaired and it is returned in the quarterly account period with the difference value between the unit price and the exchange price to the address and at expense of .....

7) Spare parts having not been used from the Consignment Store within two years reckoned from the date of their delivery will be returned by Contractor after previous consultation with ..... to the address and at expense of .....

8) Contractor takes over the responsibility for the consignment spare parts stock and will compensate for the losses and/or damages always simultaneously with the settling of accounts on the relevant quarter of year.

9) After expiration of the present Contract the spare parts still available on the consignment store will be purchased or returned by Contractor to the address and at expense of .....

Section 6

Service Documentation and Training

1) The technical documentation required for the performance of the technical application advisory servicing tasks as well as the spare parts schedule with prices will be sent by ..... at the disposal of Contractor free of charge, each in 2 copies in English language within 90 days after signing of this Contract.

   The service documentation on the technical modifications made with the products as well as on the new types of the products will be sent continuously by ..... to Contractor free of charge.

2) ..... is obligated to provide initial training for ..... specialists of Contractor at the manufacturing establishment. Thereafter ..... will retrain Contractor's specialist s from time to time so that they can perform the technical service on a suitable level.

3) The costs in connection with the training or updating training of the specialists will be borne by the parties as follows:

   - Contractor bears the expense of the specialists labour costs and of the shortfall of production owing to their absence and travel costs to and from the place of training in .....

   - ..... bears the daily allowance expenses of the specialists staying abroad which are valid at the time according to the Pakistani prescriptions (a present at the rate of ..... capita per day).

   - ..... will provide the costs of accommodation and of the local travel which is necessary in the country of the training as well as the expenses emerging in consequence of possible sickness.

   - The daily allowance expenses of the specialists will be remitted by ..... 30 days before the start of the training to the Contractor. Account No. ..... with ..... Bank of Pakistan under the heading "SERVICE TRAINING, CONTRACT No. ..... ".

4) The certification on the efficiency of the training will be sent by ..... to the Contractor, each in triplicate, drawn up to the specialists name.

Section 7

Collaboration

1) Contractor is obliged to make out one set Service Job Sheet (listing the consumed materials) on each of the jobs determined in Section 3 Par. 1.1 and performed by him: further to have it verified by the end-users. The copies of the Service Job Sheets or a general report made on the job performed will be sent by Contractor to ..... quarterly.

2) ..... informs the users (purchasers) on the services given by Contractor.

3) Should guarantee defects occur that cannot for any reason be repaired by Contractor ..... is obliged to send its specialist at its own expense to the spot and to eliminate the defect together with Contractor's specialists. Contractor will ask for the delegation of specialist to the spot in such cases when Contractor having had technically consulted with ..... by telephone or in writing did not result in a successful conclusion within a reasonable period of time.

Performing the job the specialists of .....Contractor and the end-user will sign a protocol in which the reason of the defects, the method of elimination and the responsible partner causing the defect have to be determined in order to state who has to pay for the costs of ..... specialist staying in Pakistan.

4) To support Contractor ..... will provide to Contractor the special tools and devices which ..... deems necessary - hereinafter called: special equipment - that are necessary for performing the service activity FREE OF CHARGE, IN TEMPORARY ADMISSION (Attention: Not for Consignment Store!).

At least 4 weeks before the dispatch of special equipment ..... will send to Contractor a proforma invoice in six copies indicating the Service Contract No. ..... and the aforementioned-mentioned title, with itemized enumeration of the contents of the shipment (denomination of the items, their inventory number or the type and serial number, further their value) enabling the identification of each item on the basis of the proforma invoice.

Having approved the proforma invoice Contractor will notify ..... that the special equipment may be dispatched. Contractor is entitled to return - without any inquire - every equipment that had been shipped without this approval to the address and at the expense of .....

Contractor is obliged to return the special equipment after termination of the contractual obligations (or before, in case one of the parties has such a request) in a condition corresponding to the normal use, to the address at the expense of .....

5) In matters which have only a technical character concerning the application advisory service, the spare parts supply of the Consignment Store further the technical service, ... and Contractor are entitled to maintain a direct contact.

6) ..... is entitled to check at any time - during the working hours - Contractor's activity falling within the frame of this Contract, provided that it gives notice in advance to Contractor of its intention to do so.

Section 8

Closing provisions

1) This Contract will come into force, subject to Section 8 Par. 5, on the day of its signing by the parties and it is valid for an indefinite time.

The Contract can be terminated unilaterally by either party giving 3 months notification of the year of reference (until 30th September) in writing.

2) After - in spite of - the termination of this Contract, ... and Contractor will meet their remuneration, paying any guarantee obligations, in respect of the Products falling under guarantee obligations delivered to Pakistan during the validity of this Contract.

3) All disputes between the parties arising under or in connection with the agreement shall if possible settled by means of friendly consultation. In case no settlement can be reached through consultation the relevant dispute shall be submitted to the arbitration chosen by the International Chamber of Commerce. The arbitration shall take place in Zürich/Switzerland.

4) Alteration, supplements and appendices to this Contract can be considered as legally binding only in a written form, signed by both parties under reference to the number of this Contract.

5) The validity of this Contract is subject to the approval of the competent Pakistani authorities, upon the receipt of which Contractor will inform ..... by registered letter within 3 months reckoned from the signature of the Contract. In the absence of same this Contract should be considered as not concluded.

6) This agreement was made in English Language in six copies of which each party received three copies. All copies are binding to the same extent.

The enclosed Appendices A and B, part of the agreement.

for and on behalf of

.....

for and on behalf of

Contractor

Appendix 2.

CONTRACT FOR MAINTENANCE AND REPAIR

On the one part of

(hereinafter called: Customer)

on the other part of

(hereinafter called: Contractor)

enter into a contract for fulfillment of the following services:

1) The Contractor is charged by the Customer with doing maintenance, repairing work - incidentally expert advice activity - with regard to equipment of type and product number specified below:

2) The Contractor undertakes the fulfillment of services of subject and specification defined in preceding point under the following conditions

2.1 Periodical maintenance and repairing work on site will be performed maximum on ..... occasion pro year. The Customer can demand repair instead of periodical maintenance. But the repairing job performed within the frame of this contract cannot exceed the man-hour expenditure needed to maintenance job. The contract is not applicable for major repairing job or job of overhaul character.

2.2 The representative of Contractor presents himself by designate representative of Customer before beginning of the job, as well as, at finishing of that to discuss the technical and handling problems related to equipment.

2.3 According to wish of Customer the representative of Contractor gives professional advice to the designate person in connection with handling of equipment.

2.4 The Contractor divides the time of periodical jobs on site in equal proportions in the year and about this gives preliminary announcement required by Customer.

2.5 The right of fulfillment in advance or partly is reserved by the Contractor.

3) This contract, as undertaking defined in point 1 for fulfillment of services, is valid

from .../.../19..
to 31/12/19..

The contract becomes automatically longer for every calendar year, if no other arrangement is made by the parties with three months before the end of the year in registered letter.

4) It is fixed by the contractual parties that the countervalue of the services is flat rate belonging to form of uncontrolled prices.

The contractual parties define the undertaking fee in amount of

.....

the Customer is bound to remit this amount to bank account no. of Contractor on basis of bill presented by the Contractor within 8 days following the presentation of bill.

4.1 The Contractor charges separate the value of materials (material + commission work + turnover tax) consumed for maintenance or repair of equipment.
4.2 The Contractor has authority to present partial bill in case of part performance.

5) The customer is bound to make available - as intermediate cooperating services - the technical conditions (equipment, testing data of device, technical documents) for the Contractor to fulfill the services defined in point 1 of this contract and the workplace without hitch, as well as such data, the necessity of which cannot arise at conclusion of the contract, but the knowledge of those are necessary to obtaining of the undertaken result.

6) It is laid down by contractual parties if the Customer does not meet it cooperating engagements fixed in previous point, or meets those tardily or only in part respectively, so this can be accompanied with the unilateral modification of time appointed for fulfillment (partial fulfillment) or with termination of contract respectively.

7) Expenses arising by carrying out of services (workplace without hitch, providing a room, the operating of equipment, material, other devices, etc.) charge the Customer.

8) The Contractor is responsible for damaging or destruction of devices taking over in favour of fulfillment of services only in that cases, if the damage is attributable to him.

9) The completion of services should be verified by signature and stamp of competent person authorized by the Customer.

10)The exclusive jurisdiction of Court ..... is bound by contractual parties to be a judge of litigation originated from present contract.

11)Authorized persons are - in connection of contract - to do administration, to make a statement or to verify:

On behalf or Customer:

Name:

Address:

Phone:

On behalf of Contractor:

Name:

Address:

Phone:

12) Regulations of .....
.....
are guiding principle in questions not regulated in present contract

This contract comes into force subsequently the signature of Customer and after having to send back 2 copies of contract for the Contractor.

The contract was made in 3 Copies.

..../...../19.....

Customer Contractor

ESTABLISHMENT OF A NATIONAL ELECTRONIC EQUIPMENT AND SCIENTIFIC INSTRUMENTS REGISTER

Project of the Government of Islamic Republic of Pakistan
UT/PAK/96/099

REPORT

on establishment of (National Electronic Equipment and Scientific Instrument Register) NEESIR

prepared for the United Nations Industrial Development Organization (UNIDO), Vienna

by

R. Radnai, UNIDO consultant

Contractor:

MTA-MMSZ Ltd.
Budapest, Hungary

Backstopping Officer: Victor SHATRAVKO

June 24, 1998

Synopsis

The Output 2. of the project aims at providing technical assistance to National Institute of Electronics, Islamabad, Pakistan (NIE). in developing, establishing and efficient operating a National Electronic Equipment and Scientific Instrument Register (NEESIR). The Report reviews the data-collection on Registration Forms, the fellowship training of a Pakistani specialist in Budapest, and the installation of NEESIR and training of the personnel on site. The conditions and the necessary actions of the sustainable operation of NEESIR are also outlined.

Table of Contents

1. Introduction

Pakistan has a large number of science and technology institutions. At present, there are 13 science and technology oriented organizations working under the supervision of Ministry of Science and Technology (MOST). Beside the science and technology institutions supervised by MOST and other Ministries (Education, Health, Industries, Communication, Natural Resources, Water and Power), there are 35 universities. The institutions and universities, use many kind and types of measuring instruments and electronic equipment. Purchase of instruments is usually done indigenously. A large portion of these are not properly installed, maintained and serviced. Most of the equipment are purchased from abroad, and there is no local service network for these. A general problem is the lack of the technical documentation, Service Manuals and spare parts to replace faulty components during repairs. Furthermore only few of the Pakistani institutions have well qualified technicians and engineers capable to carry out the necessary maintenance and repair services required for sophisticated instruments. The enterprises and institutions instead of repairing their faulty equipment used to throw away them and purchase new pieces. This practice causes a considerable loss at national level.

Research becomes more and more multi-disciplinary. Research institutes (either commercial and national responsibilities) are forced to join their strength. Measurements and instrumentation are key fields in this in scientific and technological co-operation. The development of instrumentation technology will move towards intelligent instrumentation. An instrument that has the ability to select automatically the appropriate measuring method, schedule a work program, self-optimise, has fault alarm , capable of data conversion and reduction and self-diagnose itself is considered to be intelligent. Whereas such intelligent instruments offer many advantages for the user, they have to be taken into a brand service for repair and maintenance.

The Government has realized that the establishment and operation of a nation-wide database of the high value instruments and equipment (National Electronic Equipment and Scientific Instrument Register, NEESIR), could contribute to the development of the instrumentation infrastructure of the country. The establishment of NEESIR should result in more efficient information interchange among institutes, companies and supervisor organizations.

The information contained in the database can be very useful when evaluating manufacturers for additional pieces. Before ordering a new equipment users of the same models can be interviewed to determine whether the performance of the given model is suitable or not. It is possible also to compare the performance of similar but different make instruments. Over time users can standardise on instruments that performed best on the bench.

NEESIR will provide direct benefits to the MOST, the R&D organizations, institutions and universities of Pakistan. Indirectly all organizations including private companies will gain benefits from the utilisation of the data of NEESIR. This database can be an useful tool for the institutions in the country to initiate co-operations or at least to develop closer relations with the foreign instrument and equipment suppliers to provide after-sale services, spare parts, technical documentation and training.

2. Summary of activities performed in the first phase of the Project

During the first phase of the Project the following activities were accomplished:

2.1 Survey of the Pakistani requirements and definition the data inputs and outputs of NEESIR.

2.2 Determination the data structure (contents of records, lengths of code and text fields, initial data sets etc.).

2.3 Working out a questionnaire (set of Registration Forms) for data collection and print the required number of copies for the actual registration process.

2.4 Adaptation of the CIR software to the requirements in Pakistan according to 2.1 and 2.2.

2.5 Procurement of the PC system and putting it into operation.

Detailed description of these activities can be found in the INTERIM REPORT of the Project (dated November 27, 1997).

3. The completion of the work in the second phase of the Project

3.1 Collection of data on Registration Forms for the adapted NEESIR. This continuos activity is a task for the Data Processing Team assigned to operate NEESIR. For the registration two different Forms were designed:

- The **Registration Form 1** is for the identification of the owner institute,
- The **Registration Form 2** is for the announcement of the data of the individual instruments and equipment (see both in Annex 4 of INTERIM REPORT).

To assist the data providers (owners of instruments) to present the data of their instruments correctly a **Guide for Filling out Registration Forms 1 and 2** was also prepared during the first mission (see it in Annex 4 of INTERIM REPORT).

During specifying the data inputs and outputs of the planned NEESIR database the special circumstances of Pakistan were considered. The agreed and fixed specification is in the Annex 4. of the INTERIM REPORT. The software adaptation/development of NEESIR were carried out according to this specification. Initial data sets for Cities, Provinces, Supervisors, Sectors were built into the database. Beside this specific (Pakistani) data other important initial data sets were provided by MTA-MMSZ like Countries, Manufacturers and Classification records.

Important developments in NEESIR software are as follows:

- The actual condition of the instrument is stored among the individual data. This new feature was required by the Pakistani counterpart. There are no service workshops for foreign instruments in Pakistan. As a consequence according to estimations c. 40% of the existing instruments are out of order. The Condition field refers to the working condition of the given instrument at the time of registration (Working or Not working). The value of the field is set when a new instrument is registered into NEESIR and can be modified anytime to follow the changes in the condition of the instrument.

- All menus offer "browse" presentations. In browse presentation the fields for each record are arranged side by side on the screen, on the same text line, and the records selected for presentation are arranged one above another on succeeding lines. This arrangement allows quick reviews of large data-fields.

- A User's Manual was built-in into the software, which contain the description of all menu functions. This electronic guide is always at hand of the users of NEESIR.

- NEESIR is " year 2000-compliant" , that is it can accept, record and use dates correctly without any ambiguity as regards the century concerned. This was accomplished by extending the length of the date field to 8 digits. As the date information appears in many screens and printouts this required a basic reconstruction of the layouts.

The Reference Manual of NEESIR (Appendix 1) contains theoretical knowledge necessary for the operation, detailed description of each function and instructions for user's and useful general reference data for operating the computer system.

During the first mission in Islamabad the MTA- MMSZ expert was promised by the NPD to get sample data (filled Registration Forms) regarding the equipment of NEI and two neighbouring institutions, to test the Registry software during and after the adaptation. Despite of the daily urges no samples were handled during the mission. No samples were received after this, despite of the frequent urges sent to almost all interested parties including the UNIDO Office in Islamabad. As a result of the frequent urges and UNIDO offices' actions the Pakistani counterpart forwarded the sample Registration Forms from the National Physical and Standards Laboratory and the National Institute of Silicon Technology, both supervised by

MOST to MTA-MMSZ during the Fellowship Training in Budapest in April 1998. From the two institutes altogether 67 instruments and equipment were registered. The Forms were checked and corrected, then the instruments were registered into NEESIR (see Chapter 3.3 and 3.4). These were done in close team-work during the training, so the Pakistani specialists were able to learn also the basic approaches to solve the unpredictable problems in their future works.

3.2 Prescription of the work routines necessary for the operation of NEESIR. NEESIR's instrument records are built up from information provided by the institutes which own the instruments. They provide this on standard Registration Forms which are sent out periodically (typically once in a year) by the processing team of NEESIR. The Data Processing Team will also collect, check, code the Registration Forms, and enter the data into the database. Their tasks will be also the distribution of data extracted from the system; and maintaining the database and the computer hardware, providing consumable e.g. paper for the printer; etc.

The reliability of data retrieved from NEESIR will depend on the accuracy of registrations. Incomplete or erroneous information written into the Registration Forms by the owners can cause problems and will result in decreased effectiveness when searching, and finally in loss of information. Therefore all data in the Registration Forms must be checked with great care, and completed or modified if necessary.

3.3 The fellowship training of a Pakistani specialist on the use of NEESIR. The Pakistani Trainee has not arrived according to the Workprogram in November 1997. The UNIDO Office in Islamabad informed UNIDO on 27 November 1997 that the assistance of UNIDO in financing of the international travel of the Trainee (which belonged to the Pakistani Government inputs) is requested by MOST. Considering that the Fellowship Training is an essential part of the transfer of know-how and the efficient use of NEESIR in Pakistan MTA-MMSZ supported this which resulted in increasing the project budget. The project was revised and contract of the Project was extended, accordingly. On 2 February 1998 the NPD and the UNIDO Islamabad Office were informed that the international travel cost for the Trainee - as it was requested - will be covered by the project. Personal data of the Trainee was also requested to book the air ticket. No answer was received until 27 March 1998, when UNIDO informed MTA-MMSZ on the result opf the selection and nomination procedure. Within a very short time all the necessary arrangements for the training (providing air ticket, booking an accommodation, assistance in obtaining visa for the Trainee) was made by MTA-MMSZ. The trainee, Mr. Anwar Butt, arrived to Budapest to attend the Fellowship Training on 5 April 1998.

The Trainee was acquainted with the concept of NEESIR and was trained to use the various functions of the system. This activity comprises the entering of the sample data taken by the Pakistani specialist into the adapted database. This sample registration was considered as a very important part of the training and the Trainee was provided by all the necessary knowledge needed for the successful registration. The Guide for processing the completed Registration Forms of NEESIR (see Appendix 2) is a summary of the necessary steps and activities have to be performed when entering new data into NEESIR.

At the beginning the training the host institute, the MTA-MMSZ Ltd was introduced. The role of NEESIR in the system of instrumentation services and the basic database concepts (files, fields, tables, indexes, searches) were reviewed. After introduction to the theoretical basic of NEESIR, the basic records and their relations (Classification, Owners, Manufacturers, Countries, Provinces, Cities, Sectors, Supervisors, Types, Instruments) were discussed. The organisation and tasks of Data Processing staff and the daily practice of NEESIR's administration process (checking and coding the data of the Registration Forms) were introduced. After the survey of the common problems (incomplete or missing data, erroneous data) and their corrections; the concept of catalogue and leaflet collection to establish technical background for technical coding was introduced.

Exercises performed during the training: coding the Registration Forms (sample data) taken by the Trainee; exercises on entering and deleting various records; exercises on correcting mistakes, modifying data of instruments registered already; re-link instruments to follow Owner, Classification and Manufacturer changes. Searches were defined and executed, lists containing data selected according to requests were printed. Analyses were performed on the results of the searches; Practices on the use of Utility functions (backup, verify, re-index, restore etc.) were conducted.

All the required modifications were carried out, and the system specification and the User's Manual and Reference Manual were modified accordingly.

The following technical literature was provided to the Trainee (Appendix 2):

- Database basics – what goes on inside NEESIR,
- Guide for processing the completed Registration Forms of NEESIR, including the supplement Practical tips for processing Registration Forms,
- Practical suggestions and recommendations for the implementation and future operation of NEESIR,
- The role of NEESIR in the development of measurement infrastructure,
- Glossary of terms used in describing screen actions.

The detailed programme of the training, the Certification and the Pro Memoria on the closing discussion is in the Appendix 3 of this Report.

3.4 Installation of the adapted software on site, training the staff on use of NEESIR. The consultant of MTA-MMSZ installed the finalised version of NEESIR database containing the test data on the PC system procured to this task. The staff of NIE were trained on the use of NEESIR. The preliminary workprogram for Rudolf Radnai UNIDO Consultant is in the Appendix 4 of this Report. The training covered all the function of the system including putting new data into the computer, saving data to floppy disks, searching in the database etc. The sample data were entered into the installed data-base. The missing or incorrect data on the sample Registration Forms were cleared with the competent persons at the responsible institutes. During these personal visits it became evident, that the Forms are suitable and institutes are able to provide technically correct registrations.

With reference to the Contract between UNIDO and MTA-MMSZ Ltd. [Annex A Point 19(a)] a Licence Agreement was concluded between the National Counterpart (NIE) and the MTA-MMSZ Ltd. (see Appendix 5).

On 30 May 1998 to promote the use of NEESIR a practical site demonstration was organised at a large private company (National Radio and Television Company, NRTC of Pakistan). This company already indicated interest to invest in the future operation of NEESIR, and the demonstration hopefully will lead to a positive movement into this direction.

At the end of the Mission on 2 June 1998 an introductory demonstration workshop was held at the National Institutes of Electronics. This action was initiated by the UNIDO office in Islamabad after getting detailed information on the adapted software. It was proposed to promote the sustainability of the long term operation of NEESIR. The invitation letter and the list of participants are in the Appendix 6 of this Report. During this demonstration - organised by NIE and the UNIDO Office in Islamabad - a multimedia slide-show was projected first about the main features of NEESIR. (see the slide-show in printed form in the Appendix 7 of this Report. After this a user-oriented live demonstration was presented, with actual searches and statistical analyses. The demonstration highlighted the advantages of NEESIR, the sample searches which was adjusted to the specific Pakistani circumstances proved the usefulness of the database.

3.5 Future activities. The most important future activity is the organisation of the effective, sustainable operation of NEESIR in the very specific Pakistani environment. The Practical suggestions and recommendations for the implementation and future operation of NEESIR (see Appendix 2) summarises the necessary steps of the NEESIR's operation. One of the most important tasks is the invitation of research institutes, universities, governmental and private companies to join to the registration. A letter of invitation for the institute Director's to

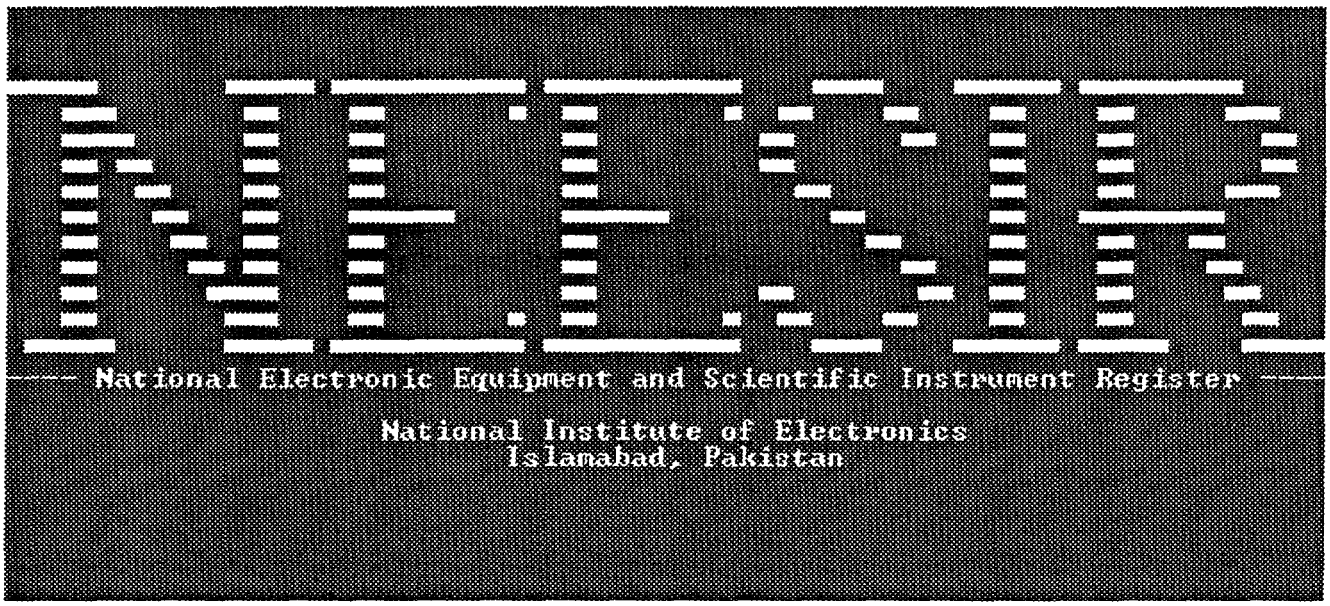
register their instruments with NEESIR were drafted (see Appendix 8). Another important activity of NEESIR's implementation is the establishment of administration procedures and an operational schedule. A very important task also the effective management of the user community, including the determination of priorities and privilages, regular analysis of the user's demands, and publicising the services of NEESIR etc. According to the specific local conditions this work will be carried out by the Data Processing Team of NEESIR.

The consultant of MTA-MMSZ and the NPD of the Project conducted extended discussions with the interested parties, including senior officials of MOST and the responsible officials of institutes and companies, about the sustainability of NEESIR database. During these discussions practical suggestions were formulated. First of all an order issued by the Secretary of MOST is needed which will draw the institutes supervised into the circle of registration. The Secretary of MOST will be requested also to use his influence with other Ministries on Secretary level and ask them to issue approvals for registration of equipment with NEESIR. To involve private companies into the registration an expert consultancy service has to be developed, which can make these companies interested in the registration. The consultancy service will be available free of charge to those companies who register their instruments/equipment with NEESIR. These suggestions extended by the perspectives of the local conditions are presented in Appendix 9.

The analysis on the installation, operation and use of NEESIR were performed by the Pakistani counterpart by the end of the Mission, the findings and results are in Appendix 10. It was found that the operation of NEESIR meets the local requirements, its organisation minimise the possibility of administrative mistakes. NEESIR allows users to perform complex queries for data and generate reports easily. The assistance provided by MTA-MMSZ during the training enables the sustainable and secure operation of NEESIR.

* * *

Appendix 1



Reference Manual

Under Separate Cover!

MTA-MMSZ Ltd.
Budapest, Hungary

ESTABLISHMENT OF A NATIONAL ELECTRONIC EQUIPMENT AND SCIENTIFIC INSTRUMENTS REGISTER

Project of the Government of Islamic Republic of Pakistan
UT/PAK/96/099

Appendices 2-10

to the Report on Activities of the Output 2 of Project

Contractor:

MTA-MMSZ Ltd.
Budapest, Hungary

Backstopping Officer: Victor SHATRAVKO

Appendix 2

Documents provided for the Trainee during the Fellowship training

1/ Database basics – what goes on inside NEESIR,

2/ Guide for processing the completed Registration Forms of NEESIR, including the supplement Practical tips for processing Registration Forms,

3/ Practical suggestions and recommendations for the implementation and future operation of NEESIR,

4/ The role of NEESIR in the development of measurement infrastructure,

5/ Glossary of terms used in describing screen actions.

Database basics - what goes on inside NEESIR

(Prepared for the fellowship training for Mr. Anwar Butt NPDUT/PAK/96/099 Establishment of a National Electronic Equipment and Scientific Instrument Register ,NEESIR)

A computerised database is a system for holding a lot of information in standardised form. The power of the computer makes it possible to sort through the data quickly to find information, to print out lists arranged in different ways, or to make lightning-fast statistical calculations. A user familiar with the system can sit at it and "consult" via the computer. Type in questions, and the answer appears almost instantaneously on the screen.

The simplest form of pre-computer database was the familiar card index. A library would use cards to keep track of its books. Postcard-sized cards stood one behind another in open-topped boxes, with author or title along the upper edge and information below. Cards were pre-printed with outlined spaces - "fields" - in which standard information could be written - reference number, date of publication, how many copies, publisher, comments about content. There might be two sets of such cards, one arranged by alphabetical order of authors, the other by order of subject. Cross-referencing made it unnecessary to write all the information on both sets of cards.

In a computerised database the equivalent of the card is the **record**, a grouping of information similar to that on a card. But you don't have to search through a box of cards to find the one you want - a few simple keystrokes and just the right record appears on the screen. You can read it, modify it if you want to, print out a copy, and put it back into storage. Tens of thousands of records can be stored in a computerised database, on the hard disk of the computer, even in a modest PC. And there is no need for two or more sets of records, arranged in different ways. The computer can sort and present its stock of records in any order you want. It does this without in any way disturbing the basic set of records on which all its activities are based.

We call a set of computerised data records all of the same general type (corresponding to one set of library cards made out in the same general way) a **datafile**. In the early days of databases the datafiles were ordinary digital computer files, and could be copied, or moved from one directory to another, like ordinary computer files. But they could also be written over accidentally, or duplicated in versions containing conflicting data - or even be deleted. There was real risk that errors might occur, because datafiles must often be manipulated do get access to the data they contain.

In NEESIR the datafiles are built into an integrated software system and so are protected from these risks. Software inside NEESIR ensures that there can be only one version of each datafile. The system makes sure that data is entered only in the proper form. If you try to enter data in a wrong form a warning message appears on the screen, you hear a warning beep, and you must try again until you get it right.

Although you do not manipulate NEESIR's datafiles directly you should know what types of data they contain and how they are layed out. You will find it useful to know what types of information are written in their fields, why certain datafiles are often used together in pairs, which need frequent updating, and which serve mostly as a reference, as permanent records.

It is much easier to remember the commands and procedures of NEESIR if you can visualise the operations going on behind the screen. Most of the commands you type in, or enter via the mouse, tell NEESIR to do something with one or more of its datafiles. You may ask it to find a certain datafile, sort or arrange its records in the way you want, and present them to you on the screen to look through. Or you may ask it to open two datafiles and use data in one of them to make a very selective display of information taken from the other.

Let's review NEESIR's datafiles.

NEESIR has ten datafiles, which fall into three groups. We discuss each in turn:

Group A (1 datafile) :	Instrument records
Group B (2 datafiles) :	Technical records
Group C (7 datafiles) :	Reference records

A. The **Instrument datafile** a1 is the main file of NEESIR. It is about real instruments, which belong to some institute and stand in its laboratories. This datafile has one record per instrument. In a national registration system it contains many thousands of records. These note only essential data about the instrument. For more detailed information they make cross-reference to other datafiles, which contain fewer records but more detailed information. This sharing of data avoids copying the same data into a great many records. It also speeds up many database operations.

B. **Technical datafiles** contain descriptions. They describe what instruments are and what they do.

b1. Class	General description, e.g. "spectrophotometer"
b2. Type	Manufacturer's models, e.g. "Beckman XYZ"

Each record in b1 allots a standard name to a recognised category of instrument, and associates a brief code with this name. Records in datafile a1 refers to these codes.

Records in b2 are based on manufacturers' catalogues and refer to actual models of instrument made by the manufacturer.

C. **Reference datafiles** may contain names and addresses, but some do no more than list geographical locations. All identify organisations and/or contact people connected with instrumentation. The seven reference datafiles are:

c1. Owner	Institute where an instrument is located
c2. Supervisor	Organisation responsible for Owner, e.g. a Ministry
c3. Sector	Economic sector served by Owner
c4. City	City where Owner's laboratory is located
c5. Province	Province in Pakistan where Owner is located
c6. Manufacturer	Instrument Manufacturer
c7. Country	Country where instrument Manufacturer in located

Work with NEESIR's main register A is continuous, as new instruments are added, old ones deleted, and statistical analyses are made. New owners are added to the system. NEESIR's software makes these operations simple and convenient and helps to keep them error-free.

Work with B is important and demanding, as continual technical change brings new types of instrument, and the classification system must be expanded and updated. New models from manufacturers must be assessed, entered, and linked to classification codes. Datafiles b1 and b2 must be kept properly interrelated. Work in this field brings valuable understanding of the ways instrumentation is being used in a country, in different working environments (hospitals, universities, industry, etc) and how these needs are developing. To work up a good classification system, relevant to national needs, is an important task in itself, independently of the more routine work of building a register. NEESIR's software is a very handy aid in this work.

Reference files c1-c7 present few problems. They are simple and factual. To keep them updated is a straightforward clerical activity.

As a user of information you use keyboard and mouse to look into NEESIR's datafiles. With actions described in the NEESIR Reference Manual you select which datafiles to use, specify how their contents is to be shown on the screen, and set conditions so that only relevant data is displayed.

There are three main ways of looking at NEESIR's data.

When you open the Instruments menu option the screen shows all the data in a **single instrument record**. This is like taking one card out of the hundreds of cards in a card index and looking at all the data on just that card.

But often one wants to look quickly at the same type of data in **many different records.** This is known as "browse" mode. In browse presentation the fields for each record are arranged side by side on the screen, on the same text line, and the records selected for presentation are arranged one above another on succeeding lines. As there may be many fields in each record this presentation would result in lines far too long to fit within the width of the screen. "Browse" solves this problem by allowing you to scan the whole presentation across the screen, to left and right.

The third way of looking at data in NEESIR is offered by the Quick Views menus, which make and display the **relations between different type of records**. Using these one can for example scan quickly down a list of all the instruments in one institute, or can see a list of all institutes which have an instrument of a certain type.

These are just some of the features which make NEESIR so useful and easy to work with. Soon they will be as familiar as pen, pencil, and paper. Begin with NEESIR's simple functions - select some instruments, then use browse to look at them, then try to find them from different directions. Soon you will be sorting, analysing, printing out. Asking questions and getting answers...

Prepared by R.Radnai

Guide for processing the completed Registration Forms of NEESIR

General aspects

NEESIR Registration Forms which have been completed, checked and processed are important documents. They must be archived in a safe place! The length of time they are to be preserved must be prescribed by current working rules for NEESIR.

Check that all the required fields are filled out. If any data is missing contact the person who filled out the form and ask for completion.

Check that all fields contain clear readable text. In case of doubt ask for clarification.

Check that all fields contain concise, understandable and technically exact text. Correct the text if necessary. Delete text which contains unimportant or redundant information. Use a different coloured pen to make your corrections.

In the following we often refer to "NEESIR Reference Manual" which describes actions to be taken when using registration forms to update the database. Use the Manual's index to find solutions to your problems.

This Guide covers the essential steps which must always be followed when entering data from Registration Forms. The supplement "Practical tips for processing Registration Forms" contains tips to make your work easier.

Checking and coding **Registration Form 1**

Registration Form 1 is to identify the owning institute ("Owner"). One copy is to be filled out in every reference period. A Form 1 must be sent back even if there has been no change in stock.

Field 1: Name of the Owner

Action: Check whether the Owner is registered in NEESIR already. To check, use the printed "Owner's worksheet" or open the NEESIR "*Owners*" menu option. If the Owner is already registered, write the Owner's code in the code field. If it is not, enter it, with full data!

Field 2: Address of the Owner

Action: Compare current data with the registered data. If there is any change, update the Owner record in NEESIR.

Fields 3 & 4: Telephone and fax numbers

Action: Compare current data with the registered data. If there is any change, update the data in *Owners* option of *Basic data* of NEESIR.

Field 5: Name of supervisor organization

Action: Compare current data with the registered data. "Supervisor" is linked to "Owner" by code. Therefore if there is a change in Supervisor, make a new Owner record, with the new Supervisor, and use the *Relinking* menu of NEESIR to relink all the Owner's instruments to the new Owner. Check first that the new Supervisor is already registered in NEESIR. If not, register it.

Field 6: Contact person

Action: Compare current name with the registered data. If there is any change, update the data in *Owners* option of *Basic Data* menu of NEESIR.

Checking and coding **Registration Form 2**

Registration Form 2 is to register individual Instruments. One copy is to be filled out for each Instrument.

Field 1: Name of the Instrument

Field 2: Type No. of the Instrument

Field 4: Name of Manufacturer

Field 5: Country of Manufacturer

Field 16: Technical data

Actions: These above fields describe the Instrument Type. First check whether the Manufacturer is registered in NEESIR. If it is, open the *Manufacturer⇒Instrument Types* menu option of *Searching* menu and check whether the given Type is registered in NEESIR. If it is, write the relevant Type Code from the screen into the corresponding code field of the Form.

If the given Type is not registered in the database (new Type), register it. To do this determine the applicable Instrument Class using the *Classification* menu option of NEESIR. Write the Class Code into the corresponding code field on the Form. Then open the "*Types*" menu option and select *Browse* to determine the 3-digit identifier (Type ID) of the new Type. To do this find the given Class in the browse list in the order of Type codes. Determine the first not assigned Type ID. Write it into the corresponding field on the Form. Step back to the basic screen of Types menu and enter the new Type record using the *Insert* command.

If the Manufacturer is not registered in NEESIR (new Manufacturer), register it. Then register the Type as described above.

Fields 3 & 6: Serial and inventory No. of the Instrument

Action: use these to fill in the corresponding fields of the Instrument Record, as described below.

Field 7: Type of the registration

Action: In case of TRANSFER or DELETE, open the *Instruments* menu option to find the given Instrument. Delete it from the database. In case of PURCHASE continue processing the Form, and register the Instrument using the *Enter new instruments* menu option.

Fields 8 & 9: Name and address of new Owner

Action: This information is for reference only.

Fields 10 & 11: Dates of transferring or deleting the Instrument

Action: For reference only.

Field 12: Date of purchase

Action: Write this data in the corresponding field of the Form and enter it into the corresponding field of the Instrument Record (format dd/mm/yyyy)

Field 13: Condition of Instrument

Action: If there is no comment here, or the Instrument is stated to be working, write 0 into the corresponding code field. If the Instrument is not working, write 1 into the field and enter 1 into the corresponding field of the Instrument Record.

Field 14: Place of use

Action: Determine the city code from a printed list of Cities or using the *Cities* menu of NEESIR. Write the code in the corresponding code field of the Form and enter it into the corresponding field of the Instrument Record.

Field 15: Purchase value

Action: Write the given value of the Instrument , in thousand Rupees, into the corresponding code field of the Form, and enter it into the corresponding field of the Instrument Record.

Field 17: Application (measurements performed) and

Field 18: Accessories and options of the Instrument

Action: Evaluate the information given in these fields and enter the relevant data into the Application/accessories field of the Instrument Record.

Field 19: Comments

Action: Evaluate the information given here and enter the relevant data into the Application/accessories field of the Instrument Record.

Practical tips for processing Registration Forms

(A supplement to the Guide for processing completed NEESIR Registration Forms)

Registration can cause problems for institutes which own instruments even if they have read NEESIR's "Guide for Filling out Registration Forms". Incomplete or erroneous information in these Forms can be critical, especially if registration leads to new entries in the Classification, Manufacturer or Type records. Mistakes in making new entries will result in decreased effectiveness when searching, and finally in loss of information. Therefore all data in the Registration Forms must be checked with great care, and completed or modified if necessary. This is a vital task for the Data Processing Team of NEESIR.

The following practical notes suggest how it can be done.

Instrument Classes

The Classification system (Thesaurus) is one of the most basic parts of NEESIR. It should cover all the instruments used in the system. But developments move quickly in instrumentation technology and new kinds of instrument continually appear. There are two ways to deal with this:

1. Link them to the most closely related existing Class. Then probably the name of this Class will have to be extended. For example, the Class "FIELD STRENGTH METERS" was extended to include "FIELD STRENGTH METERS, EMC TESTERS" when this new kind of equipment appeared.

2. Another solution is to insert a new Class into the Thesaurus. This is an action of great technical importance which needs serious consideration. Do this only if there are clear signs that the new kind of instrument will become important in the future. Otherwise the Classification system will become a vast and confusing jungle of entries.

Here is an example of a justified extension. Logic analyzers appeared as a new Class of instrument in the early 1970's. Now dozens of manufacturers offer several hundred models - this has become a basic tool for servicing digital equipment.

Manufacturers

The name of the Manufacturer is an important characteristic of an Instrument , and is a good starting point for any search. But the correct name of the Manufacturer must be used. A frequent problem nowadays is use of the name of the seller instead of the name of the Manufacturer. Some small Manufacturers do not sell their products directly, they pass them to a sales agent or even to another Manufacturer. Local sales agents can represent a dozen foreign Manufacturers. This can be source of confusion. To avoid this, treat every apparently new Manufacturer with distrust, and check carefully. The real Manufacture's name generally appears somewhere on the Instrument itself, either on the front panel or on an identification tag at the back (or inside).

When searching for a Manufacturer's name in an alphabetical list of Manufacturers a change in the order of the words forming the name can be misleading. This is a frequent problem if the manufacturer's name is a personal (family) name, which may be used in different forms. Use these names in a uniform way, for example by always putting the family name first:

FISCHER, HELMUT GMBH
KENT, GEORGE LTD
GNEHM, ALBERT APPARATEBAU
HARTRIDGE, LESLIE LTD
HERZOG, WALTER FABRIK.

In other cases an abbreviation of the name may cause confusion. Some Manufacturers use their complete name, some use an abbreviation, some use both. This is shown in these examples:

ADRET ELECTRONIQUE, or AE
BROWN-BOVERI, or BBC
COMPAGNIE GENERALE DE RADIOLOGIE, or CGR
HEWLETT-PACKARD, or HP
HCK, or HEINRICH C. KOSMEIER
IMAGING SENSING TECHNOLOGY, or IST
JASCO, or JAPAN SPECTROSCOPIC CO
PRINCETON APPLIED RESEARCH, or PAR

Another possible source of mistakes is changes in company names. This can be troublesome, because there may be a change in name without any change in the firm's activity (DISA ⇒ DANTEC ELECTRONIC, ATLAS COPCO ⇒ ABEM AB), or a change may be the result of a fusion or a split (e.g. the division of the Swedish firm AGA into AGEMA and GEOTRONICS).

To reduce the possibility of problems caused by confusions in names:
- Use the name of the Manufacturer correctly spelled and in a uniform format.
- When making a new entry in the *Manufacturers* subdatabase put in all known version of the name, with the better known version first.
- Include also any old name, to identify older instruments made when the company used that name.
- When looking for a registered Manufacturer, and you don't remember how to spell the name e.g. "Philips", just enter "Phil" and the program put you to the befitting part of the list were you can review all reasonable name variants.

Types

The TYPE records contain several fields: Name of Instrument , Type No., Technical data:

Names

Names can hold supplementary information as well as indicating the basic function of the Instrument. Some examples of extended names: Portable oscilloscope, Hand-held thermometer, Integrating voltmeter, Double power supply, Two-channel recorder, etc. Such auxiliary information can be very useful when making selections. Try to complete the name in this way if at all possible.

Type number

The Type number (in NEESIR screens, Type No.) is assigned to the Instrument by the Manufacturer. As well as identifying the actual model the Type No. can carry other information: series name, or the first letters of the manufacturer's name, etc. Always write the Type No. strictly as it is written in the Manufacturer's catalogue. Be careful! - it is a common mistake for Owners to enter order number instead of the Manufacturer's type number!

Technical data

The technical data of an Instrument can occupy several pages in the manufacturer's catalogue. In NEESIR only the main data can be listed. Abbreviated specification headings can save space and lead to more standardized data fields. Use abbreviations such as:

*R: Measuring range
*S: Sensitivity
*BW: Bandwith
*A: Accuracy
*RES: Resolution
*CH: Number of channels
*MEM:Memory
*MAX:Maximum
*MIN: Minimum
*LIN: Linearity
*DM: Display mode
*REC: Recorder output
*INT: Interfaces

Make your own list and keep it always displayed (one copy, updated!) in NEESIR's Data Processing office.

Numerical values written in different ways can cause problems. Use short, standardized forms. For example, instead of 6 Amper, write 6 A; or instead of 108 sample/min, write 108 S/M, etc.

Practical suggestions and recommendations for the implementation and future operation of NEESIR.

1. Administrative activities

1.1 Formulate the aims of NEESIR and define its data inputs and outputs.

The National Electronic Equipment and Scientific Instruments Register (NEESIR), will support the efficient and effective use of national instrument resources. It will serve as an information source for decision-makers responsible for the development of electronics, science and technology policies. It will promote the sharing of instruments available in the country between R&D organizations, research institutes, and universities. Through the more effective use of instruments it will increase the efficiency and productivity of services and/or products and/or plants. It will also be a useful tool for institutions in the country wishing to cooperate with instrument and equipment suppliers which can provide after-sale services, spare parts, technical documentation, and training.

1.2 Select institutes which will register their instruments with NEESIR.

Types of institution involved in registration: R&D organizations, research institutes, universities, governmental and private companies.

1.3 Issue an order which will set up and direct the registration system (assign collector of data, define equipment involved, set frequency and deadlines for registration, give guidance on use of data, assign responsibilities, indicate sanctions, etc.)

a) Collector of data: National Institute of Electronics (NIE).

b) Equipment involved: Measuring instruments and electronic equipment for which purchase price exceeds 200 000 Rupees. (The price limit can be modified later on according to the changing requirements.)

c) Frequency of registration: once per year.

d) Deadline for registration: six weeks after end of fiscal year.

e) Use of data:

Specific data (data about individual instruments) is available to the institution which provided it, and, by agreement with that institution, to other participating institutions.

Statistical data is available to governmental decision-makers and to those entitled by official permission.

2. Implementation

Upon completing the organizational framework for the operation of NEESIR, the implementation stage is a final critical step. In brief the following tasks can be accomplished:

- Establishment of administration procedures and an operational schedule

- Organisation of secretarial support services
(correspondences, telephone contacts, data archives)

3. User management

NEESIR operations include also the management of the user community with the following basic tasks:

- Definition of user policies

- Establishment of user access policies
  (determine priorities and privileges)

- Regular analysis of the user demands

- Publicising the services of NEESIR
  Arranging demonstrations for the potential users, and
  Evaluating the comments of the participants

prepared by: R. Radnai

The role of NEESIR in the development of measurement infrastructure

In less favoured regions and countries the scientific and technical objectives are now directed towards responses to satisfaction of social needs of the citizens: stimulate employment, improve life conditions and protecting our environment have become top priorities.

Markets are characterized by intense global competition, shorter product life cycles, financial uncertainty and rapidly advancing technology. Enterprises have to optimise their production costs and to improve the quality of their products and services in order to remain competitive.

Research becomes more and more multi-disciplinary. Research institutes (either commercial and national responsibilities) are forced to join their strength. Measurements and instrumentation are key fields in this in scientific and technological cooperation.

Knowledge is the most important resource in daily research work. NEESIR permits users to obtain comprehensive information on instruments and the performed measurements.

1. NEESIR provides information database both for fields/region of economy and institutes/companies

The NEESIR will support the efficient and effective use of national instrumentation resources for the viable operation of the existing system, and it is also a prerequisite for the future development of the economy. It helps the decision-makers in distributing the sources (financing and preferences) in a more economic and effective way. The NEESIR will serve as a basic information source on the technical parameters, figures, date of purchase, groups, manufacturers, suppliers, and free capacity of instruments for the same for decision makers responsible for the development of electronics, science and technology policies.

2. Evaluating user's satisfaction

The information contained in the database can be very useful when evaluating manufacturers for additional pieces. Before ordering a new equipment users of the same models can be interviewed to determine whether the performance of the given model is suitable or not. It is possible also to compare the performance of similar but different make instruments. Over time users can standardize on instruments that performed best on the bench.

3. Develop closer relation with instrument suppliers

In developing countries most of the measuring instruments and equipment for scientific and technological purposes have been imported. Purchase of instruments is usually done indigenously. Large percent of these equipment are not functioning due to lack of proper maintenance and repair services. Maintenance and repair of these instruments as well as the related problems like the acute shortage of spare parts, accessories and technical documentation can not be solved without the minimal institutional framework.

Glossary of terms used in describing screen actions

(Prepared for the fellowship training for Mr. Anwar Butt NPDUT/PAK/96/099 Establishment of a National Electronic Equipment and Scientific Instrument Register ,NEESIR)

List of terms

Active window
Activate
Alert
Browse window
Cancel
Case-sensitive
Character field
Check box
Choose
Click
Click on
Clipboard
Close
Command
Control key
Control key shortcuts
Copy
Cursor
Cut
Default
Default button
Deselect
Dialog
Disable
Dock
Double-click
Double-click drag
Drag
Edit
Enabled
File
Highlight
Hot key
Insert
Insertion point
Keyboard shortcut
List (to)
Menu
Menu bar
Menu options
Menu pads
Menu title
Menu system
Minimize
Modifier key
Open
Option
Paste
Pointer
Popup
Popup control
Position
Press
Pulldown menu
Push buttons
Radio button
Scroll
Scroll bars
select
selection
Shift+click
Shortcut
String
Text
Thumb
Title
Title bar
Triple-click
Triple-click drag
Window
Wordwrap
Zoom
Zoom control

Glossary of terms used in describing screen actions

(Prepared for the fellowship training for Mr. Anwar Butt NPDUT/PAK/96/099 Establishment of a National Electronic Equipment and Scientific Instrument Register ,NEESIR)

Active window
The window on the screen where the next action will take place. If a window is active its controls are clearly visible. Controls on an inactive window appear dimmed and cannot be chosen.

Activate
After a command or item has been selected it may be activated by pressing Enter or clicking with the mouse.

Alert
A warning message on the screen, or a sound from the computer's loudspeaker, or both.

Browse window
A display in which all the data for all the records is arranged in rows and columns. Data items extend beyond the edges of the screen but may be seen by scrolling horizontally or vertically.

Cancel
To stop execution of a command and return control to NEESIR.

Case-sensitive
Able to distinguish between upper-case and lower-case (capital letters and small letters). A case-sensitive search seeks to match case as well as characters.

Character field
A database field which may contain any keyboard character. The maximum width of a character field is 254 characters.

Check box
A pair of square brackets [] followed by explanatory text. Settings can be turned ON or OFF by clicking on the check box. If a check box is ON it has an X in it.

Choose
To select and activate a command, or option in a menu, or control in a dialog.

Click
Press and release the mouse button once.

Click on
Position the mouse pointer on something, then press and release the mouse button.

Clipboard
A holding place in memory for text you have "cut" or "copied". Text on the clipboard can be inserted ("pasted") into other text, even in another document.

Close
To make a window or file disappear from the screen so that it cannot be accessed until reopened.

Command
An instruction that causes the computer to perform some action. A command may be typed in from the keyboard, or selected from a menu or dialog.

Control
A push button, check box, radio button, popup control, list, or text box in a dialog that is used to designate, confirm, or cancel actions.

Control key
The keyboard Control key, which is often used in combination with other keys. Designated by <Control>, Ctrl, or ^. See Modifier key.

Control key shortcuts
Combinations using the Control key which can be used instead of choosing menu options. For example, the Control key together with the "A" key might be used to activate a command beginning with the letter A. This combination would be designated <^A>.

Copy
To make a copy of selected text or objects and place the copy on the clipboard, leaving the original selection intact.

Cursor
A symbol on the screen that marks where the next action will occur or where the next character typed from the keyboard will appear. For an item in a list the "cursor" may be the application of highlighting to that item.

Cut
To delete selected text or objects but place a copy of the selection on the clipboard.

Default
A preset response to a question or prompt. The default response is automatically used by the computer if the operator does not provide a response of his own.

Default button
The push button in dialogs that is enclosed in double angle brackets <<>>. Unless the operator chooses another button the default button is automatically chosen when <Enter> is pressed.

Deselect
To remove highlighting.

Dialog
A box that contains a message asking for information to complete a command.

Disable
If a control, or part of a control, is disabled it is currently not available for use. Disabled items in a control list appear dimmed and cannot be chosen.

Dock
The act of minimising a window and placing it in the lower right corner of the screen.

Double-click
Position the mouse pointer where an action is to take place and then press and release the mouse button twice in quick succession.

Double-click drag
Double-click without releasing the mouse button on the second click, and continue holding down the mouse button while dragging.

Drag
Position the mouse pointer, press and hold down the mouse button, move the mouse, and then release the mouse button.

Edit
Change or modify text. Includes inserting, removing or changing text.

Enabled
Available to be acted upon (a control).

File
Any named, ordered collection of information stored on a disk. You make a file when you create text or other data, give it a name, and save it to disk. A "database file" contains data arranged in a format that can be read and interpreted by a database program.

Highlight
To make something visually distinct (brighter, reverse video, colour change). Typically, an item has been selected for a subsequent operation is automatically highlighted by the program.

Hot key
In a list of commands or menu items one letter in each item may be shown highlighted. Pressing the corresponding keyboard key - the "Hot Key" - activates the item.

Insert
Add a character or portion of text at the cursor position. Text to the right of the cursor automatically shifts to the right.

Insertion point
The place in a document where something will be added.

Keyboard shortcut
See: Control key shortcut, hot key.

List
To display on a monitor or print on a printer the contents of memory or of a file.

Menu
A list of choices presented by the program from which you can select an option.

Menu bar
A horizontal strip that appears at the top of the screen and contains menu pads.

Menu options
Commands, found on a menu, that perform specific actions.

Menu pads
A word, phrase, or icon on the menu bar that designates one menu. Positioning the pointer on a menu pad highlights its title and pulls down a menu below it, displaying its options.

Menu title
The text on the menu pads found on the menu bar.

Menu system
The combination of menu bar, menu pads, menus, and menu options.

Minimize
The act of causing a window to become one line high by 16 characters wide, with the title of the window remaining visible.

Modifier key
Any key that affects the operation of other keys. The modifier keys are Alt, Control, Shift, and Capslock. When you hold down a modifier key and press another key the function of the other key is changed.

Open
To make available. You open files or documents so you can work with them.

Option
Something chosen, or available as a choice. For instance an item in a menu, or a command in a dialog.

Paste
To insert the contents of the clipboard at the insertion point (where the cursor is).

Pointer
A small solid box or arrow on the screen that follows the movement of the mouse and shows where your next action will take place.

Popup
The menu that appears when you choose a popup control in a dialog.

Popup control
A rectangle with double lines on the right and bottom edges that you can choose to display the associated popup.

Position
To place the cursor at a desired location in a window or dialog.

Press
Strike a key and then release it. You hold down a key only if you want to repeat a character, or if you are using a modifier key with another key.

Pulldown menu
A menu that appears when the mouse pointer is on a menu pad.

Push buttons
Key words enclosed in angle brackets <>. The action associated with a push button occurs immediately when you choose a push button unless it contains an ellipsis (...). The ellipsis indicates that another dialog will appear.

Radio button
A set of parentheses followed by text. Radio buttons are grouped so that only one can be chosen at a time, like the press buttons on a car radio. Choose a radio button to activate it. When a radio button is chosen a bullet mark appears in the parentheses and any previously chosen button is deselected.

Scroll
Move through the contents of a window or scrollable list so that a different part becomes visible.

Scroll bars
Controls used to view text that extends beyond the edge of a window. A window may have a vertical and/or a horizontal scroll bar.

Select
Designate where the next action will take place. To select using a mouse, click on or drag across the item(s) to be selected. You can also select menu items by typing a letter or number at a prompt, or by using a combination key press, or by using arrow keys. Selecting prepares something to be "chosen". When it has been selected it usually appears highlighted. It can then be chosen (activated) by pressing Enter, or clicking on it with the mouse.

Selection
Information or items that will be affected by the next command. A selection usually appears highlighted.

Shift+click
A technique that allows you to extend or shorten a selection. Position the pointer at the end of what you want to select and hold down the Shift key while clicking the mouse button.

Shortcut
You can use a Control key combination as a shortcut to choose a menu option without displaying the menu.

String
An item of information consisting of a sequence of text characters.

Text
Any information typed in from the keyboard that is not in a specific format. Names, comments, or technical information are examples of text, but dates in date format, or numeric data that may be used for calculation, are not.

Thumb
A diamond-shaped object in the scroll bar that indicates relative position in the text. To move through the text rapidly use the mouse to drag the thumb up or down.

Title
The name that appears at the top of a window.

Title bar
A horizontal bar across the top of a window that displays the window title.

Triple-click
Press and release the mouse button three times in quick succession.

Triple-click drag
Triple-click without releasing the mouse button on the third click and continue to hold the button down while you drag.

Window
An area on the screen that displays information. You can open or close a window, move it around, and sometimes change its size, scroll through it, or edit its contents.

Wordwrap
The automatic continuation of text from the end of one line to the beginning of the next, so there is no need to press Enter at the end of each line. If wordwrap is set OFF the text may extend beyond the edge of the window.

Zoom
To enlarge a window until it fills the screen. If you zoom a window that already fills the screen NEESIR shrinks it to its original size.

Zoom control
A window control that you can use to make the window as big as the screen and to change it back again.

Appendix 3

Documents of the Fellowship training

1/ Detailed Technical Programme of the Fellowship training for Mr. Anwar Butt

2/ Certificate

3/ Pro Memoria on the closing discussion of the Fellowship training of Mr. A. Butt

Establishment of a National Electronic Equipment and Scientific Instrument Register (NEESIR)

UT/PAK/96/099

Fellowship training for Mr. Anwar Butt NPD

5 April – 2 May 1998

(Detailed Technical Programme)

Subject of the training: Theoretical and practical education on the operation and use of NEESIR

Language of the training: English

Site of the training: Instrument, Measuring Technique Servicing & Trading Company Ltd (MTA-MMSZ Ltd.)
Etele u. 59/61, Room 220
1119 Budapest

Working time: 8^{30} - 16

Lunch time: 12^{00} - 12^{30}

Principal instructor of the training: R. Radnai (Head of group)

Instructors: J. Kiss (Managing Director)
A. Menyhard (Project Manager)
Gy. Stokum (Consultant)

Programme of the training:

1998. April 5.

Morning: Introduction of MTA-MMSZ Ltd. The role of NEESIR in the system of instrumentation services.
Afternoon: Discussions on proficiency in planning, establishing and managing of instrumentation services.

1998. April 6.

Morning: Brushing up the basic concepts of PC computing. Review of the basic DOS commands
Afternoon: The main concepts of word processing. Practices of text writing and editing.

1998. April 7.

Morning: Using the Norton Commander (NC) utility. File manipulations (viewing, deleting, moving, copying files)
Afternoon: Review of basic database concepts (files, fields, tables, indexes, searches). Providing the trainee the NEESIR Reference Manual and other concept papers.

1998. April 8.

Morning: Introduction to the theoretical basic of NEESIR.
Afternoon: Introduction to the Classification system used in NEESIR. Definition and level of classes.

1998. April 9.

Morning: The review of NEESIR's basic records and their relations (Owners, Manufacturers, Countries, Provinces, Cities, Sectors, Supervisors)
Afternoon: The structure and content of Type records

1998. April 10.

Morning: The structure and content of Instrument records

1998. April 11.
1998. April 12. Holidays
1998. April 13.

1998. April 14.

Morning: Demonstration of the computer database of NEESIR (menus, functions, screens).
Afternoon: Demonstration of the computer database of NEESIR (relations of data tables, structure of data files).

1998. April 15.

Morning: Introducing Basic data menus (Classification, Manufacturers, Countries)
Afternoon: Introducing Basic data menus (Owners, Supervisors, Sectors, Provinces)

1998. April 16.

Morning: Introducing the Type menu option
Afternoon: Introducing the Instruments menu option

1998. April 17.

Morning: Introducing the Searching menus

1998. April 18.
Holidays
1998. April 19.

1998. April 20.

Morning: Introduction to the daily practice of NEESIR's administration process (checking the data of the Registration Forms). Organisation and tasks of Data Processing staff.
Afternoon: Introduction to the daily practice of NEESIR's administration process (coding the Registration Forms).

1998. April 21.

Morning: Survey of the common problems (incomplete or missing data, erroneous data) and their corrections.

Afternoon: Introducing the concept of catalogue and leaflet collection to establish technical background for technical coding. Establish a technical literature (magazine and journal) background by sending Request Forms.

1998. April 22.

Morning: Coding the Registration Forms taken by the Trainee (Owner dependent data)

Afternoon: Coding the Registration Forms taken by the Trainee (technical coding)

1998. April 23.

Morning: Entering the data of the Registration Forms into the database. Delete sample Types and Instruments from the database.

Afternoon: Exercises on entering and deleting various records

---

1998. April 24.

Morning: Exercises on correcting mistakes, modifying data of instruments registered already (Owner dependent data).

1998. April 25.

Holidays

1998. April 26.

1998. April 27.

Morning: Exercises on correcting mistakes, modifying data of instruments registered already (Manufacturer dependent data).

Afternoon: Relink instruments to follow Owner changes.

1998. April 28.

Morning: Relink instruments to follow Classification and Manufacturer changes

Afternoon: Practical exercises on the use of NEESIR. Defining and running searches.

1998. April 29.

Morning: Printing lists containing data selected according to requests. Modifying filter conditions.

Afternoon: Analysing the results of the searches on screen and in prints.

1998. April 30.

Morning: Training on the use of Utility functions (backup, verify, reindex, restore etc.)

Afternoon: Farewell dinner

1998. May 1.	Holiday
1998. May 2.	Travel back to Islamabad

* * *

prepared by: R. Radnai

CERTIFICATE

This is to certify that

Mr. Anwar Butt

has successfully completed the fellowship training on

Use and operation of the National Electronic Equipment and Scientific Instrument Register (NEESIR)

held by the

MTA-MMSZ Ltd. (Budapest, Hungary)

during 5 April - 2 May, 1998 in Budapest

Alfred Menyhárd
Project Manager

MTA-MMSZ Ltd.

József Kiss
Director General

MTA-MMSZ Ltd.

Pro Memoria

on the closing discussion of the Fellowship training of Mr. A. Butt
(UT/PAK/96/099 Establishment of a National Electronic Equipment and Scientific Instrument Register)

Participants:

Mr. A. Butt NPD (NIE, Islamabad)
Mr. A. Menyhárd Project Manager (MTA-MMSZ, Budapest)
Mr. R. Radnai Principal Instructor (MTA-MMSZ, Budapest)

Between 5 April and 2 May 1998 Mr. Anwar Butt NPD of the above UNIDO Project attended the Fellowship training on the operation and use of the National Electronic Equipment and Scientific Instrument Register (NEESIR).

The training material

During the training the following literature was provided to the trainee:

1. Reference Manual of NEESIR
2. Database basics – what goes on inside NEESIR
3. Guide for processing the completed Registration Forms of NEESIR (including the supplement Practical tips for processing Registration Forms)
4. Practical suggestions and recommendations for the implementation and future operation of NEESIR
5. The role of NEESIR in the development of measurement infrastructure
6. Glossary of terms used in describing screen actions

The topics covered in the training

As an introduction the basic concepts of PC computing were reviewed , including the basic DOS commands, the main concepts of word processing and the use of Norton Commander utility.

During the training all the theoretical and practical aspects of the operation and use of NEESIR was discussed in details. The trainee got acquainted also with the administrative steps of registration, coded and entered into NEESIR the data of Registration Forms of National Institute of Silicon Technology.

Results

The organisers declare that the trainee attended all the lectures and practices of the training with outstanding activity and interest.

The trainee acknowledges that the material presented was clear and understandable, suitable to acquire all the necessary information on operation and use of NEESIR.

Budapest 30 April 1998.

A. Butt	A. Menyhárd	R. Radnai

Encl. Detailed Technical Programme of the Training

Preliminary workprogram for Rudolf Radnai UNIDO Consultant

2nd .Mission (5 May – 3 June 1998)

UT/PAK/96/099, Establishment of a National Electronic Equipment and Scientific Instrument Register (NEESIR)

The object of the Mission is to install the software of NEESIR adapted according to the requirements of Pakistani counterpart and to train the local staff on using and operation of the software.

1st week

- Installation of NEESIR software at NIE on the computer procured in the framework of the project.
- Restore the data entered into the database of the equipment of the National Institute of Silicon Technology during the Fellowship training of Mr. A. Butt.
- Introduction the operation and use of NEESIR to the staff of NIE.

2nd week

- Entering the data of equipment of National Physical and Standards Laboratory into NEESIR
- Complete and correct the missing or incorrect data

3rd week

- Organise the work of the consultant in developing software
- Practices on using NEESIR (searches, entering, deleting, modifying data, relink instruments, making printouts etc.)
- Discussion of proposals necessary for the proper functioning the system

4th week

- Discussion of future activities necessary for the smooth operation of registration system (define equipment involved, set frequency and deadlines for registration, guidance on use of data, assign responsibilities, sanctions, etc.)

LICENSE AGREEMENT

APPENDIX 5

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Budapest, "6" April 1998

.....	.....
A. Menyhard	A. Butt
Project Manager	National Project Director
for MTA-MMSZ	for NIE

APPENDIX 6

Helping the Nation Achie

Self Sufficiency in technol

Director General

National Institute of Electronics
Requests the pleasure of the Company of

Mr. _____

at the introductory demonstration of NEESIR a co-project with UNIDO
on 2nd of June at 10.00 Hours
In the National Institute of Electronics Auditorium
Secretary Ministry of Science and Technology is requested to be the chief gu

Programme:-

(i) Recitation from the Holy Quran	10.00 AM
(ii) Welcome Address by D.G. NIE	10.05 AM
(iii) Introduction of NEESIR	10.15 AM
(iv) Demonstration	10.25 AM
(v) Address by the Chief guest	10.50 AM
(vi) Light Refreshment	11.00 AM

LIST OF PARTICIPANTS OF NEESIR's DEMONSTRATION HELD ON 2nd JUNE 1998 at NIE

1. Mr. Khalid Mahmood
   Chairman
   PCSIR, Islamabad.

2. Dr. Robert G. Gumen
   UNIDO Country Director

3. Mr. Muhammad Ishaque
   Joint Electronics Advisor
   Ministry of Science & Technology, Islamabad.

4. Dr. Parvez Akhtar
   Director General
   National Institute of Silicon Technology, Islamabad.

5. Major Gen. Hamid Hassan Butt
   Member Technical
   Pakistan Telecommunication Authority
   Ministry of Communication, Islamabad.

6. Mr. Zafar Hameed Hashmi
   Director Instrumentation
   National Agricultural Research Council, Islamabad.

7. Dr. Altaf Shaikh
   University Grants Commission, Islamabad.

8. Dr. Mohammad Yasin
   Pakistan Atomic Energy Commission, Islamabad.

9. Mr. Saqib Ansari
   Wg CDR
   National University of Science & Technology, Islamabad.

10. His Excellency
    J-Barabas
    Ambassador of Hungary.

11. Mr. Micheal JA Zuyderduyn
    UNIDO, Islamabad.

12. Mr. Muhammad Ayub Iqbal Rana
    Director General
    National Institute of Electronics, Islamabad.

13. Mr. Idress M. Anwar
Chief Research Officer
National Institute of Electronics, Islamabad.

14. Dr. Khalid H. Qamar
Chief Research Officer
National Institute of Electronics, Islamabad.

15. Mr. Tariq M. Ubaid Wahla
Chief Research Officer
National Institute of Electronics, Islamabad.

16. Brig (R) M. sarwar Khan
Director Devlopment
National Institute of Electronics, Islamabad.

17. Mr. Sharif Parvez
Principal Research Officer
Defence Science & Technology Organization
Ministry of Defence, Islamabad.

18. Mr. Fahim-u-Rahman
Experimental Officer
Defence Science & Technology Organization
Ministry of Defence, Islamabad.

19. Mr. Abid Rashid
Deputy Director
Pakistan Council for Water Resources, Islamabad.

20. Mr. Riaz Hussain
Senior Scientific Officer
Nuclear Medicine, oncology & Radio Therapy Institute (NORI) Islamabad.

21. Mr. Anwar Butt
Principal Research Officer
National Institute of Electronics, Islamabad.

22. Mr. Muhammad Irum Baig
Assistant Professor,
University of Engineering, Taxila.

23. Mr. Jamil Ahmed Chaudhry
Senior Scientific Officer
National Physical Standard Laboratory, Islamabad.

24. Chairman
Department of Earth Sciences,
Quaid-e-Azam University, Islamabad.

25. Chairman
Department of Physics
Quaid-e-Azam University, Islamabad.

26. Chairman
Department of Chemistry
Quaid-e-Azam University, Islamabad.

27. Mr. Sardar Ali Malik
Deputy Controller
Equipment Production Unit
Pakistan Broadcasting Corporation, Islamabad.

28. Mr. Rudolf Radnai
MTA-MMSZ, Hungary.

29. Mr. Geza Rohaszegi
Hungary.

30. Mr. Anser Mahmood
Assistant Technical Officer
National Agricultural Research Council, Islamabad.

31. Mr. Manzar Abbass
Senior Research Officer
National Institute of Silicon Technology, Islamabad.

32. Mr. Khalid N. Ahmed
Senior Research Officer
National Institute of Silicon Technology, Islamabad.

33. Dr. Riaz Abro
Senior Research Officer
National Institute of Electronics, Islamabad.

34. Mr. Muhammad Rashid
Technical Officer
National Agricultural Research Council, Islamabad.

35. MR. Azfar Shafqat
Director Finance
National Institute of Electronics, Islamabad.

36. Mr. Eijaz-ul Haq
Director Research
National Institute of Electronics, Islamabad.

37. Mr. Muhammad Aslam
Principal Research Officer
National institute of Electronics, Islamabad.

38. Mr. Muhammad Haroon
Principal Research Officer
National Institute Of Electronics, Islamabad.

39. Mr. Saif-ul-Islam Qureshi
Principal Research Officer
National Institute of Electronics, Islamabad.

40. MR. Zafar Iqbal Khokhar
Principal Research Officer
National Institute of Electronics, Islamabad.

41. Mr. Saeed-u-Rahman
Principal Research Officer
National Institute of Electronics, Islamabad.

42. Mr. Muhammad Bashir Ahmed
Senior Research Officer
N.I.E. Islamabad.

43. Mr. Haq Bob
Senior Research Officer
N.I.E. Islamabad.

44. Mr. Waseem Ahmed
Manager Operation
Hydrocarbon Institute, Islamabad.

45. Shahid Akhtar
Chief Biological Production Division
National Institute of Health, Islamabad.

46. Mr. Abdul Haque Soomro
National Institute of Health, Islamabad.

47. Mr. Muhammad Asif
Senior Research Officer
National Institute of Electronics, Islamabad.

48. Mr. Javed Altaf Shaikh
Senior Research Officer
N.I.E. Islamabad.

49. Mr. Ahmed Nadeem Siddiqui
Senior Research Officer
N.I.E. Islamabad.

50. Mr. Asrar-ul-Haq
Senior Research Officer
N.I.E. Islamabad.

51. Mr. Nehal Ahmed
Deputy Director Personnel
National Institute Of Electronics, Islamabad.

52. Mr. Imtiaz Ali Khan Mazari
Administrative Officer
N.I.E. Islamabad.

53. Mr. Maqbool Minhas
Deputy Director Procurement
N.I.E. Islamabad.

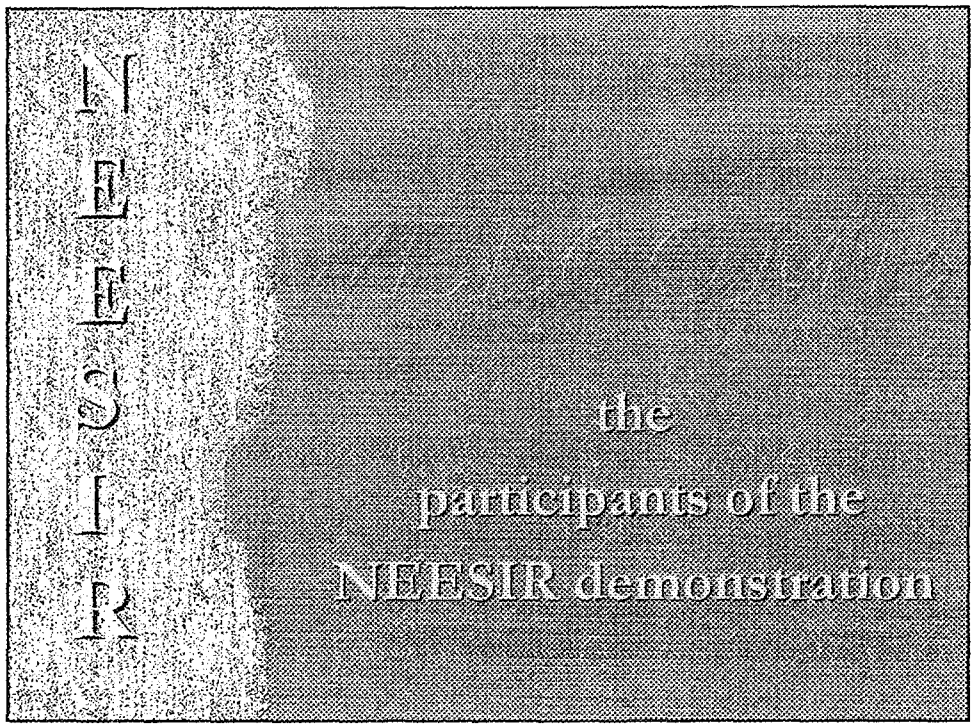
54. Col. Saeed
P.P.B. Rawalpindi.

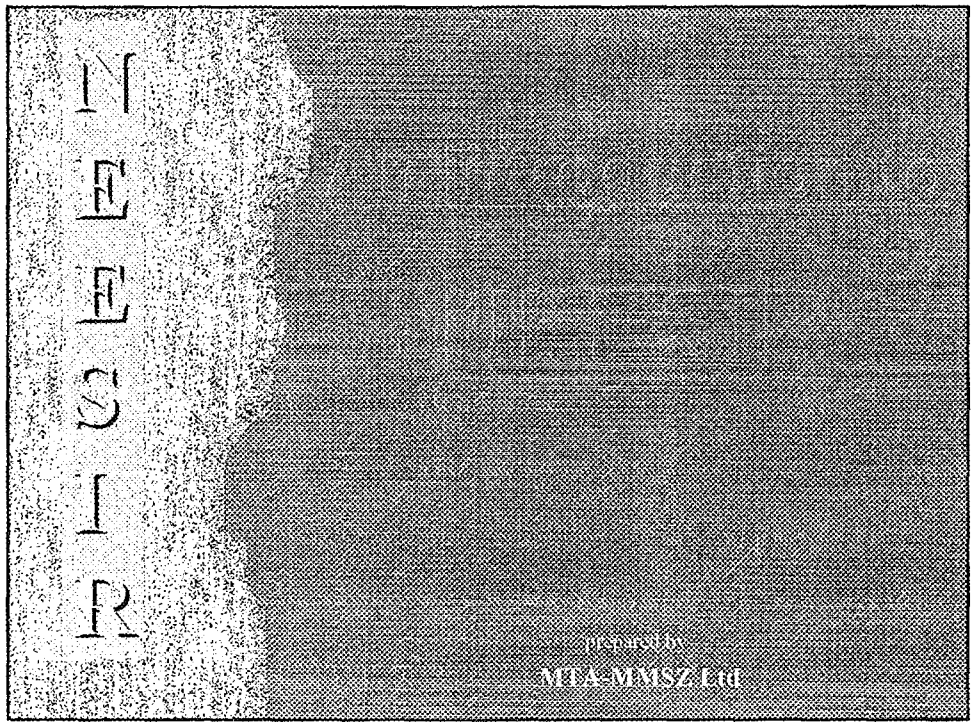
55. Azim Tariq
NRTC Haripur.

56. Abdul Majeed Soomro
Research Officer
National Institute of Electronics, Islamabad

NEESIR demonstration

(colour slide show with effects and music)





National Electronic Equipment & Scientific Instrument Register

MTA-MMSZ Ltd

What is NEESIR?

NEESIR is a sophisticated inventory register for high-value electronic equipment and measuring instruments (shortly: instruments), with facility for entering, deleting, classifying, checking, sorting and searching data, and printing out many kinds of lists and reports.

It can be used to analyze trends in instrumentation. It provides figures to use when planning purchase policy, establishing repair facilities, modifying administrative procedures.

About NEESIR database

NEESIR is a relational database. It was developed in the database language FOXPRO 2.6. This powerful language makes it possible to carry out searches very quickly, even if the database holds more than ten thousand records. NEESIR is a coordinated set of sub-databases which relate to each other and work together. This saves storage capacity and, which is more important, assures data consistency. Any change in a data field, e.g. a modification of a manufacturer's name, will automatically be made in every part of the database.

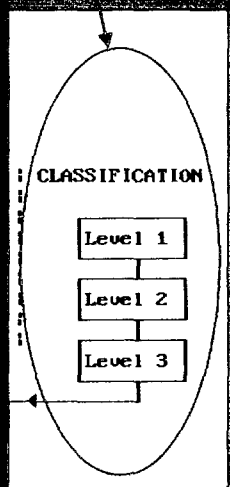
The main data registered in NEESIR

- name and type of instrument
- instrument classification
- technical data
- data of owner
- serial and inventory numbers
- data of purchase (date, price)
- condition
- place of use
- application and accessories

The instrument classification is the core of NEESIR

The following is an excerpt from the classification:

```
04      ACOUSTICAL INSTRUMENTS
0401    SOUND SOURCES
040101 ACOUSTIC OSCILLATORS, SOUND SOURCES
040102 ULTRASONIC OSCILLATORS
0402    INSTRUMENTS FOR ACOUSTIC MEASUREMENTS
040201 MICROPHONES, MEASURING
040202 SOUND & NOISE LEVEL METERS
040203 SOUND LEVEL METERS (PULSE)
040204 NOISE DOSE METERS
040205 SOUND & NOISE MEASURING SETS
```



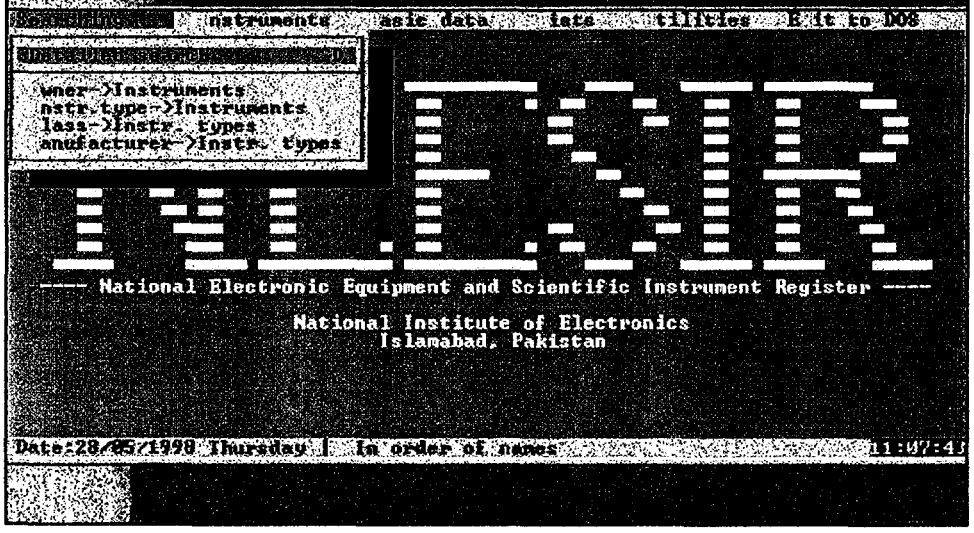
Abbreviations

```
*R:    MEASURING RANGE
*S:    SENSITIVITY
*BW:   BANDWIDTH
*RES:  RESOLUTION
*A:    ACCURACY
*DM:   DISPLAY MODE
*CH:   CHANNEL
*MAX:  MAXIMUM
*MIN:  MINIMUM
*LIN:  LINEARITY
*REP:  REPRODUCING
*REC:  RECORDING
*DIG:  DIGITAL
*AUT:  AUTOMATIC
#      ACCESSORIES
&      AND
10 ' = 10'3
10- = 10'-3
```

The user's interface

NEESIR offers users a very friendly interface, with clear menus and dialog windows accessed by mouse control. This makes it easy to use even for non-programmers. The opening menu (main menu) offers options with many choices of control command. The user can retrieve and display existing records, modify or delete them, type in new records, do statistical operations on the data, or print reports about them. There are options for utility functions such as back-up, re-index, restore, verify, etc.

The main menu of NEESIR



Data safety

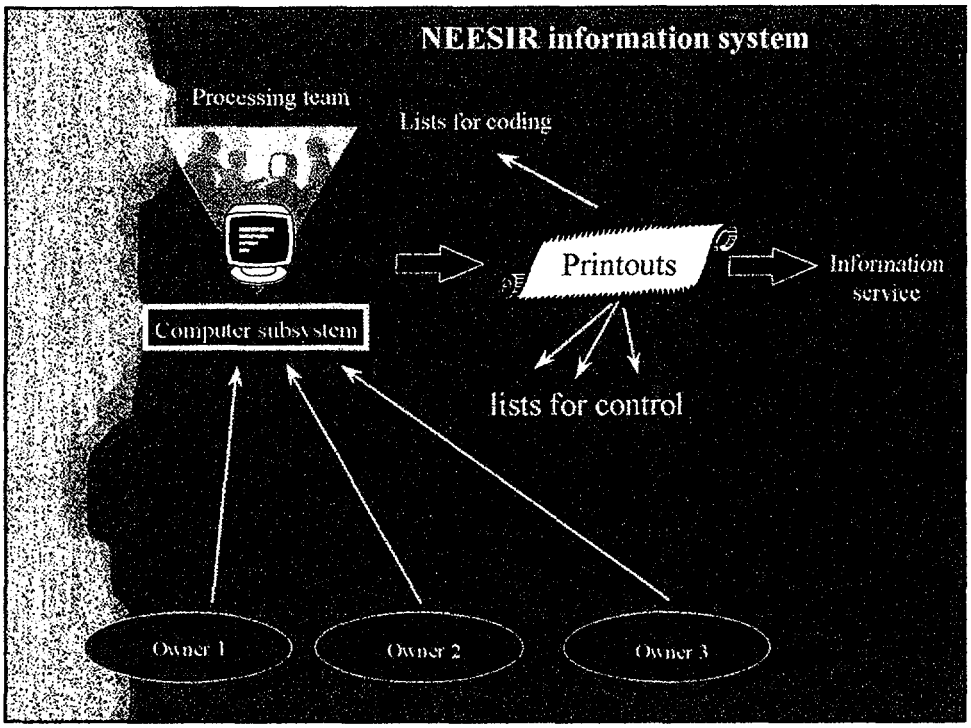
The system is password-protected against unauthorized use. At the start, before the opening menu, it asks for a password. Operation stops if the correct answer is not given.

NEESIR has facilities not only for entering data but also for checking it thoroughly. The program can discover syntactical and content errors related to the input it receives.

Registration into NEESIR

NEESIR's instrument records are built up from information provided by the institutes which own the instruments. They provide this on standard Registration Forms which are sent out periodically (typically once in a year) by the processing team of NEESIR.

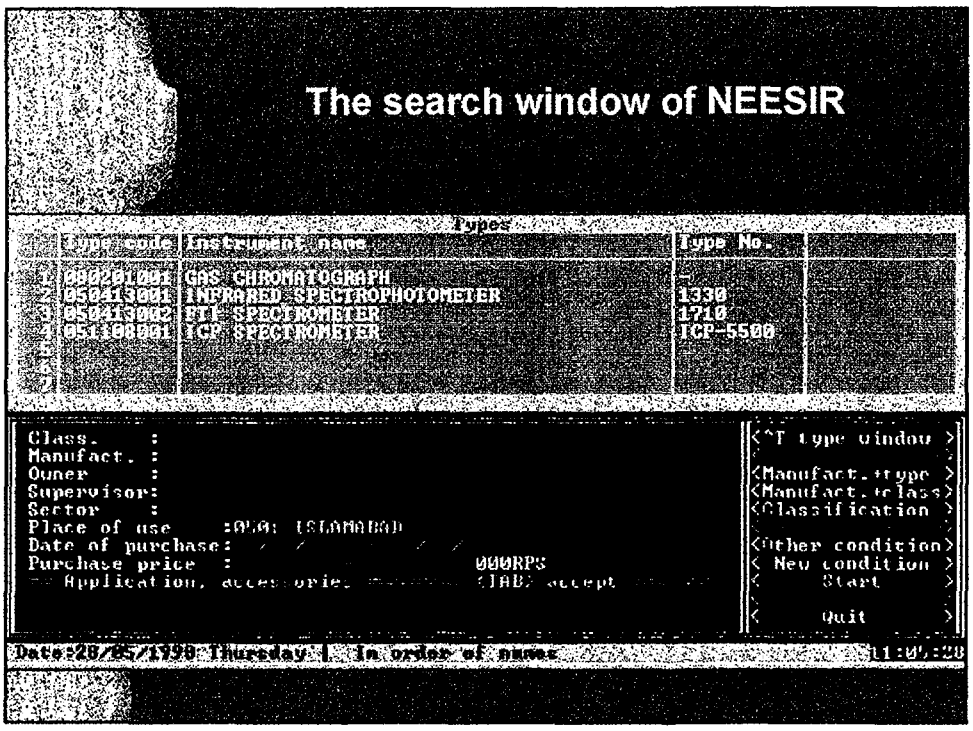
New data is entered into the database in predefined form, through the keyboard after checking and coding the completed Forms when they are received back from the owners.



Searching for instruments in NEESIR

Searching for data is done by quoting codes or referring to related text data fields. Some of the codes have an inner hierarchy which allows the user to apply different levels of search to different selections. For example, the instrument Classification Code describes instruments in a hierarchical way, at three levels. There might be a code for a very broad category ("Optical Instruments"), for a sub-category ("Optical Spectrometers"), and for a particular category ("IR Spectrometers"). When applying such codes during a search, selective or less selective criteria can be defined.

The search window of NEESIR



Printout data of selected instruments

After a successful search the information about instruments found by the search can be seen on the screen, one at a time. The user can step through them simply by pressing the "+" key. Or he can ask for a printed list.

Lists can be viewed on the screen before printing, to make sure they will be just how you want them.

Sample printout

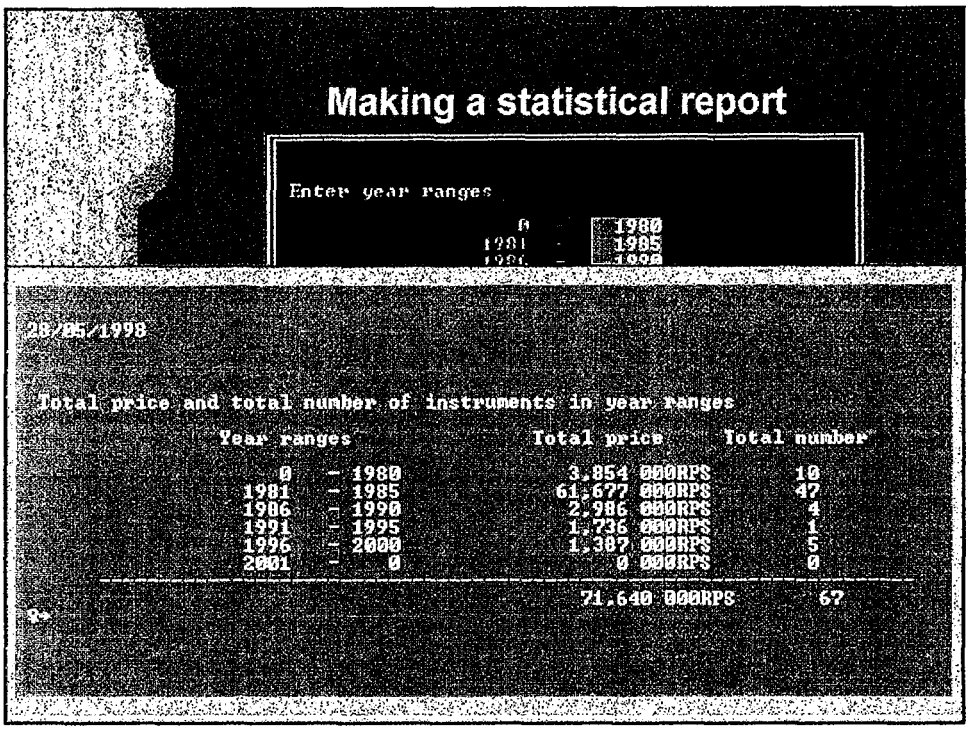
```
"STANDARD BALANCE
 TYPE  : 2405
 MANUR.: SARTORIUS WERKE AG
 TECHNICAL DATA
 "A: 30 GRAMS, "RES: 0.001 MILI GRAM"


 NATIONAL PHYSICAL STANDARDS LABORATORY
                16, H-7
                ABDUL GHAFOOR SHAH

                SERIAL NO.          :2811002
                INVENTORY NO.       :
                DATE of PURCHASE :01/01/1976
                PRICE               :   300 000RPS
                PLACE of USE    :ISLAMABAD

                MEASUREMENT OF MASSES, INTERCOMPARISON,
                CALIBRATION AND STANDARDIZATION OF MASSES CLASS
                E2, F1, F2.
```

Making statistical reports

The content of statistical outputs - "analyses" - can be defined by the user. Such reports contain data processed numerically.

Some examples: number and total value of instruments purchased within a given date range, number and total value of instruments in specified categories, numbers of instrument as a function of purchase value, etc.

Making a statistical report



Unique features of NEESIR

- Offers "browse" presentations. In browse presentation the fields for each record are arranged side by side on the screen, on the same text line, and the records selected for presentation are arranged one above another on succeeding lines.

- Protection against unjustified deleting. If you try to delete a record which is linked to other, lower-level records, the delete command will be refused by the program and an error message will be displayed.

- NEESIR is " year 2000-compliant" , that is accept, record and use dates correctly without any ambiguity as regards the century concerned.

Year 2000

Date in old databases	03/06/98
Date in old databases in year 2000	03/06/00
Date in NEESIR	03/06/2000

More information

For more information about NEESIR please contact:

Mr. Anwar Butt or Abdul Majeed Soomro at
National Institute of Electronics (NIE)
Plot 17, H-9, Islamabad- 44000.
Phone: 448436-38
Telefax: 448451

Appendix 8

National Electronic Equipment and Scientific Instruments Register
NEESIR

Dear Director General

Your institute is kindly invited to participate in the data-collection related to the recent UNIDO Project (UT/PAK/96/099). One output of this project is the establishment of the National Electronic Equipment and Scientific Instruments Register (NEESIR). This computer-based register in line with targets set by the Government of Pakistan, will support the efficient and effective use of national instrument resources. It will serve as an information source for decision-makers responsible for the development of electronics, science and technology policies. It will promote the sharing of instruments available in the country between R&D organizations, research institutes, and universities. Through the more effective use of instruments it will increase the efficiency and productivity of services and/or products and/or plants. It will also be a useful tool for institutions in the country wishing to cooperate with instrument and equipment suppliers which can provide after-sale services, spare parts, technical documentation, and training. Types of institution involved in registration are R&D organizations, research institutes, universities. The institutes who will register the data of their instruments will win several advantage. They can obtain lists on their own registered instruments anytime and can obtain also other data from the Register for their future instrument purchases and to repair/maintenance their existing equipment. This database will be the first step toward the establishment of a complex instrumentation service centre dealing with maintenance/repair, consultation, renting and development.

Please find enclosed the Registration Forms of NEESIR. Please manage to fill out these Forms as soon as possible, to allow us to put the data into the computer.

Sincerely yours,

Anwar Butt
National Project Director

Recommendations regarding the sustainable operation of National Electronic Equipment and Scientific Instruments Register (NEESIR), based on the Hungarian experiences and the local (Pakistani) conditions

(UNIDO Project UT/PAK/96/099 Establishment of a National Electronic Equipment and Scientific Instruments Register)

The National Electronic Equipment and Scientific Instruments Register (NEESIR), can support the efficient and effective use of national instrument/equipment resources. It can be an information source for decision-makers responsible for the development of electronics, science and technology policies. It can also be a useful tool for institutions in the country wishing to co-operate with instrument and equipment suppliers which can provide after-sale services, spare parts, technical documentation, and training. Through the more effective use of instruments it will increase the efficiency and productivity of services and/or products and/or plants.

1. Involving governmental institutes into the registration

The idea of Instrument Registry was originated by Ministry of Science and Technology (MOST). The document of the above UNIDO Project was also accepted by MOST. In line with the Instrumentation Policy Framework worked out by UNIDO MOST will issue an order for the supervised institutes which will co-operate by registration of their equipment and provide data when asked for.

The Secretary of MOST will be requested to use his influence with the following Ministries on Secretary level and ask their co-operation:

/1/ Ministry of Education
/2/ Ministry of Health
/3/ Ministry of Industries
/4/ Ministry of Communication
/5/ Ministry of Natural Resources
/6/ Ministry of Water and Power

The Secretaries of the above Ministries will be requested to issue their approvals for registration of equipment with NEESIR.

Secretary of MOST will also be requested to follow approval of Instrumentation policy after any adjusment in the proposed framework by UNIDO with the Government of Pakistan.

2. Involving private companies into the registration

An expert consultancy service has to be developed which can make companies interested in the registration. The consultancy service will be available free of charge to those companies who register their instruments/equipment with NEESIR. Other companies who do not register their equipment with NEESIR will be charged for consultancy service provided to them.

The effective consultancy service in the field of instrumentation is a hot-line service to customers who can solve their measuring problems and can choose the most suitable instrument for their specific measuring task.

The expert advice have to cover the following fields:

- Technical parameters,
- Ease of operation,
- Flexibility to react changing needs,
- Match the capabilities of the user's existing instrumentation
- Cost of maintenance,
- Local repair service,
- Technical support,
- Purchase price,
- Delivery time.
- Availability of free capacity and expertise on costly equipment
- Selection of suitable personnel from universities and arrange research projects with equipment owners
- Provision of statistical data.

To give advice on the above aspects in the framework of rules of NEESIR.

3. Technical Library

The Project will maintain a Technical Library contains organised collection of leaflets and catalogues of instruments manufactured by various foreign manufacturers. The operation scheme of the Technical Library was introduced during the fellowship training of the Pakistani expert in Budapest, and direct steps were made to establish a technical magazine review service.

Pakistan lacks in organised maintenance and repair service of instruments. Such service guarantees the reliable operation of instrument and the efficiency of investment. For this reason an other important database an Instrument Service Register have to be established. A proven method of registration of the local service representations was introduced to NIE's staff in the framework of the project.

This consulting service is directly beneficial for the private companies since this way they can:

- save investment
- cut down the investment cost to the required minimum defined by the actual demands
- eliminate the risk to buy an instrument which is not suitable for the given purpose
- ensure the conditions of reliable and economical operation so the long repairing term and problems of spare parts supply do not arise.

4. Instrumentation Service Center (ISC)

Based on information collected by NEESIR an instrument service center will be established in the next phase of the project. The ISC will provide the following services:

(a) Consultancy for new buyers.
(b) Installation services by qualified enqineers for new instruments.
(c) Calibration of equipment.
(d) Vendor services to co-ordinate hiring of costly instruments and expertise.
(e) Organize research programmes by providing information on mutual interest of universities and equipment owner's.
(f) Repair and maintenance service for a wide range of equipment.
(g) Establish local spare banks for common parts of the widely used equipment.

The Acitivities a to g in Para-4 and activities suggested in Para-2 are all commercial activities. Since the project is supported by the Government of Pakistan and is also the first of its kind, and since there is a dearth of instrument service provided before.

The ISC is expected to capture at least 40% procurement of instruments all over the country. These deals are roughly estimated to involve 2 million rupees. Hence the Center can earn about 100 Million rupees as installation charges only. Provision of other services on payment will ensure a very safe sustainability of the project.

It may not be out of context to note that a large private company (NRTC of Pakistan) has already shown interest to invest in this project and run it on commercial bases, A demonstration of the project on their place was made and in this respect a formal request from them is awaited.

Note: The success of the project will depend on the ability of the project to hold trained engineers for longer periods and to motivate them for maximum output. This may not be feasible under the pay structures of NIE, and any engineer trained by a multinational will have much more value in the open market. Therefore, the project will be continously loosing its strength. It is, therefore imperative that the project is implemented independently with its own commercial pays structure and incentives and its on corporate rules.

Islamabad, 2 June 1998

R. Radnai
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UNIDO Consultant

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.....2.6.98.
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Analysis on the installation, operation and use of NEESIR
(UNIDO Project UT/PAK/96/099: Establishment of a National Electronic Equipment and Scientific Instrument Register, NEESIR)

Activities performed during installation

1. The NEESIR software was installed successfully on the computer procured in the framework of the project.
2. The data of equipment owned by National Institute of Silicon Technology - entered into the database during the Fellowship training - was successfully restored.
3. The staff of NIE was introduced to and trained on the operation and use of NEESIR.
4. The Registration Forms containing missing or faulty datafields were completed and corrected.
5. The Registration Forms containing the data of equipment of National Physical Standard Laboratory was coded, and entered into NEESIR.
6. Performing searches and statistical operations, using the built-in functions of NEESIR. Practices were conducted to test the important utility functions like Backup, Restore and Reindex.
7. The operation of NEESIR was analysed and evaluated:

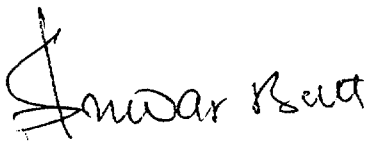
The result of the analysis

The operation of NEESIR meets the local requirements, it's operation and use are simple and straightforward. The installation of the program is easy, the regular use of Backup function provides effective protection against data losses. Data can be easily entered, modified, deleted and relinked. The organisation of the menus minimize system administrator involvement and reduces the possibility of mistakes. The system forces the user to make printouts on the important data changes (e.g.Delete and Relink functions).

NEESIR lets users perform complex queries and generate reports easily. When define queries the user can apply filters to any field, or combination of fields in the database. The reports can previewed on screen. The reports can be customized by selecting which field are to be displayed. The Reference Manual of NEESIR describes all functions in a clear understandable way.

The complementary documents (e.g. Practical suggestions and recommendations for the implementation and future operation of NEESIR and The role of NEESIR in the development of measurement infrastructure) as well as the consultant assistance provided by MTA-MMSZ enable and promote to make the Register sustainable and to secure its proper functioning.

Islamabad, 2 June 1998



Anwar Butt
National Project Director
National Institute of Electronics

Workprogramme of UNIDO Project "Establishment of a National Electronic Equipment and Scientific Instruments Register" **US/UT/PAK/96/099**

Description of activity (Responsibility)	**TIMING**																							
	1997																**1998**							
Month	SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
1. Conclusion of the subcontract (UNIDO)	July 1997																							
2. Personal																								
2.1. Selection of international experts (UNIDO)	July 1997																							
2.2. Selection of National Project Director (Government)	August																							
3. Output 1																								
3. 1 Identification and selection of organizations an institutions involved in preparation of instrumentation policy (Government)	August																							
3. 2 Fielding of consultant IC1 in instrumentation policy framework formulation (Subcontractor)			X	X	X	X																		
3. 3 Preparation of a national instrumentation polic framework (IC1)							X	X	X															
4. Output 2																								
4.1 Identification and selection of relevant organizations and institutions (NIE*)	August																							
4.2 Fielding of consultant IC3 (Subcontractor)			X	X	X	X																		
4.3 Design of a questionnaire (Registration Form) for collection of information on equipment (IC3)					X	X																		
4.4 Collection of data as per questionnaire (NIE*)							X	X	X	X	X	X	X	X	X	X	X	X	X	X				
4.5 Hardware and basic software procurement and installation (Subcontractor)					X	X																		
4.6 Adaptation of software (Subcontractor)									+	+	+	+												
4.7 Selection of Pakistan specialist and organization of international travel (Government)						X	X	X	X															
4.8 Fellowship training of one Pakistan specialist in Budapest (Subcontractor)											+	+	+	+										
4.9 Entering the sample data taken by the Pakistan specialist into the adapted data-base (Subcontractor)												+	+	+										
4.10 Fielding of consultant IC3 - second mission (Subcontractor)																					X	X	X	X
4.11 Fielding of consultant IC4 in developing software (Subcontractor)																							X	X
4.12 Installation of software (Subcontractor)																								X
4.13 Entering the data collected on scientific instruments and electronic equipment (NIE*)																					X	X	X	X
4.14 Training of NIE* staff on NEESIR (Subcontractor)																					X	X		
4.15 Making an analysis of the operation of the system established (NIE*)																								X

X Activities on site

\+ Activities in home office

* NIE, National Institute of Electronics, Islamabad, Pakistan

Description of activity (Responsibility)	TIMING																							
	1997																1998							
Month	SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER				JANUARY				FEBRUARY				MARCH			
5. Output 3																								
5.1 Organization and conduction of one week workshop on instrumentation services (Government)				X	X	X																		
5.2 Fielding of consultant IC2 in instrumentation services (Subcontractor)					X	X																		
5.3 Preparation of a workshop report (IC2)													+											
6. Reports																								
6.1 Submission of survey report to the UNIDO (IC1)													+											
6.2 Preparation of Interim Report (Subcontractor)													+											
6.3 Preparation of Draft Final Report (Subcontractor)																							+	
6.4 Preparation of a Final Report																								+

X Activities on site
+ Activities in home office

Prepared on November 4, 1997

Revision of Activities of Output 2 and Reports of Workprogramme
UNIDO Project
"Establishment of a National Electronic Equipment and Scientific Instruments Register"
US/UT/PAK/96/099

Description of activity (Responsibility)	**TIMING**																															
	1998																															
Month	JANUARY				FEBRUARY				MARCH				APRIL				MAY				JUNE				JULY							
4. Output 2																																
4.1 Identification and selection of relevant organizations and institutions (NIE*)	August 1997																															
4.2 Fielding of consultant IC3 (Subcontractor)	Sept-Oct 1997																															
4.3 Design of a questionnaire (Registration Form) for collection of information on equipment (IC3)	October 1997																															
4.4 Collection of data as per questionnaire (NIE*)	from Oct 1997				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
4.5 Hardware and basic software procurement and installation (Subcontractor)	October 1997																															
4.6 Adaptation of software (Subcontractor)	November 1997																															
4.7 Arrangement of the travel cost of the Pakistani trainee-Project revision	+	+	+	+																												
4.8 Selection of Pakistan specialist (Government)					X	X	X	X	X	X	X	X																				
4.9 Fellowship training of one Pakistan specialist in Budapest (Subcontractor)													+	+	+	+																
4.10 Entering the sample data taken by the Pakistan specialist into the adapted data-base (Subcontractor)													+	+	+	+																
4.11 Fielding of consultant IC3 - second mission (Subcontractor)																	X	X	X	X												
4.12 Fielding of consultant IC4 in developing software (Subcontractor)																			X	X												
4.13 Installation of software (Subcontractor)																	X															
4.14 Entering the data collected on scientific instruments and electronic equipment (NIE*)																	X	X	X	X												
4.15 Training of NIE* staff on NEESIR (Subcontractor)																	X	X	X	X												
4.16 Making an analysis of the operation of the system established (NIE*)																				X												
6. Reports																																
6.1 Submission of survey report to the UNIDO (IC1)	December 1997																															
6.2 Preparation of Interim Report (Subcontractor)	December 1997																															
6.3 Preparation of Draft Final Report (Subcontractor)																								+								
6.4 Preparation of a Final Report																															+	

X Activities on site
+ Activities in home office
* NIE, National Institute of Electronics, Islamabad, Pakistan

Prepared on 17 April, 1998