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ELECTRONIC AND OPTICAL MAINTENANCE AND REPAIR CENTRE

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VIET NAM

Terminal report*

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

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Vienna

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SUMMARY

An Instrument Service Centre has been set up in Hanoi, Vietnam with the capability of installation, repair and routine maintenance of a variety of Scientific and - Technical Instruments and associated equipment. Although all the Departments do not have complete complement of machinery and spares it is able to undertake a wide variety of work either at the Centre's own premises or at the Customer's premises and even outside Hanoi.

The Centre is providing useful service to a large number of Users and is able to earn its keep from the fees collected for its services.

The Centre needs to be strengthened as well as duplicated in other parts of the country where there is a concentration of Scientific or Technical Institutions.

It can also perform the functions of an in-country training centre for the national staff of the other Centres.

CHAPTER I

INTRODUCTION & BACKGROUND OF THE PROJECT

Instruments are used today by every developing country in every major activity from Teching to Scientific Research, Industrial Quality Control and for Medical Diagnosis and Treatment.

Many of these are measuring devices and many others provide control action or help in producing useful environment. They are generally delicately built since they are not meant for production purposes or other heavy operation. They have not only to be used with care but also under controlled environment in areas which are dust-free and protected from extremes of temperature or humidity.

Even with the best of care, breakdowns will occur at the time of commissioning or during use. And except in countries where the apparatus was constructed, there are not many places where prompt attention is available to set right the non-working or the malfunctioning instrument. It is a different situation for entertainment instruments like Radio's or T.V's or Tape Recorders or Music Systems which is an area of mass consumption. Due to the large numbers and the set pattern in any category of these devices, commercial facilities are usually available at reasonable cost.

But for scientific apparatus especially for measurement instrumentation which also require re-calibration after repair, the number are

not large of any one type, the principles are different in each case and except for the period of guarantee provided by some manufacturers, the first run of the apparatus is generally the total run unless the user organisation possesses a large number of such instruments to set up its own Instrument Maintenance Facility.

Vietnam has been facing serious problems concerning Instrument Maintenance, because of its weather conditions of high humidity and high heat most of the time. The corrosion and wet-rot that sets in the un-protected apparatus soon damages the sensitive components leading to the general deterioration and eventual break-down of the equipment. Even where the awareness to protect the equipment exists, it is rendered in-effective due to frequent and long break-downs and destructive fluctuations in the city power supply. In either case, the need for repair facilities is acute.

Measurement and Control Instruments have reached Vietnam from various sources at different periods during the past 20 years. Equipment made in U.S.A., Western Europe, Eastern Europe, China and Japan exists in the various Institutes and Laboratories of this country, some as paid imports and some as donated equipment.

Technology has been changing fast and every 10 years or so, the older techniques become out-dated and spares are no longer available especially in the case of Electronics-based instruments. Moreover service manuals are not generally obtained at the time of purchase and it becomes difficult to get them afterwards.

To top it all, no maintenance budgets are provided by the user Institutions so that delays arise when the equipment needs repair and fresh approvals are necessary each time to arrange payments.

The COSTMAS which has been acting as the sales agency of Zeiss (DDR) Survey and other Optical instruments, had a small service centre which exclusively handled the maintenance of Zeiss instruments with the tools & spares provided by the manufacturer and purchased with the guarantee-period service commission paid by the manufacturer to COSTMAS.

This little centre with primitive and inadequate facilities became the nucleus of an enlarged Repair Centre which was sought to be created, with the help of U N D P, for Electronic and other Scientific Instruments and especially those from Western Countries bought for other U N D P Projects in and around Hanoi and to be called "Electronic and Optical Instruments Maintenance and Repair Centre". Earlier to this, the Company was purchasing Scientific and Technical equipment mainly from Comecon countries and its staff was mostly familiar with those makes only.

Negotiations for the proposed Centre started in 1983 and in June, 1984, a Project Document was signed after a Preparatory Assistance phase in May, 1983. The Project was proposed to be started in Sept. 1984. The first C T A who had written the Document, arrived in October 1984 but left in April 1985. In the meantime, he had ordered three Vehicles and some office equipment as well as some Mechanical and Electronic

equipment. The Project Office was located in the Company's head office building in 25 Hang Ga Street, Hanoi.

The present C T A arrived in June 1985 and started work at the same office. Frequent visits were, however, necessary to 30, Trang Tien Street where the small Zeiss Centre was located, to consult with the Director and other tedchnical staff.

The Project Document had assumed that 1671 sq. metres of space will be made available for the expanded Centre. This was based on the proposal to release two floors of a building yet to be constructed at the Company's Godown Campus at the 7th km. on the Tu Liem - Airport road, in addition to the partial space at 30, Trang Tien Street premises.

When the present C T A joined, the Tu Liem building was still at the level of foundations. It was earlier meant to be the Offices of the COSTMAS enterprise and the designing left no scope for modification to make it more suited for Laboratory or workshop use. The lay out had to be accepted as it was if further delay in execution was to be avoided. The room sizes and present utilisation are shown in the Annex VII.

It was later realised that it would lead to serious difficulties to run the Centre from two locations 7 km apart and at the persuasion of the C T A, the second National Project Director was kind enough to arrange for the transfer of the whole building i.e. 1700 sq, metres for

the use of the Centre so that all the facilities were located at the new campus which is situated on the main highway to the airport and is located in an area which is fast becoming an Institutional area, with the National Research Centre, The National Metrology Centre and the Teacher's Training College all within a few kilometres of each other.

It was realised early in 1986 that there was no storage space in town to stock the arriving equipment and both storage and extra work-space would have to be created. The first N P D and the present C T A made many visits in this connection and two storage sheds of the Company were vacated and renovated for this purpose. One of the sheds, 16 x 20 metres, happened to be adjacent to the proposed 4-level building and this was partitioned into four portions with a common access corridor. Since the low tin roof made it an un-comfortable place for work, a false ceiling was put up to improve the situation and new cement flooring was laid. It now houses the Machine Shop, The Glass Blowing Shop and the Glass Store. The other Shed was released back as soon as storage space was available in this Shed and which is now part of the Centre.

Inspite of the weekly visits of the C T A and much effort by the two N P D's, the progress of work on the main building was dis-appointingly slow and the C T A was able to persuade the authorities to put up a mezzanine floor in half of the space in Trang Tien Street, which had 5-metre high ceiling. This was done with the double purpose of increasing the work space and to be able to control the environment for

for delicate Optical and Electronic work. From July 1986 till October 1987 when the total activity shifted to the Tu Liem Centre, just 3 months before the termination of the Project, the daily work was carried out in the air conditioned area thus created.

CHAPTER II

A. PROJECT OBJECTIVES

Objectives

As mentioned in the Project Document and the Job Description for the CTA, see Annex L, the main objectives are:

I. Developmental Objectives

To raise the efficiency of Scientific Research and the application of its results to production by promoting the Maintenance and Repair of Electronic and Optical Equipments to professional standards.

II. Immediate Objectives

1. To strengthen in Hanoi a Centre created for the maintenance and repair of electronic and optical equipment and Instrumentation in Universities, Research and Development Centres, Technical Service Agencies of the Government Medical Services and Industrial production units at the national level.

2. To train qualified national staff in the techniques required for the repair and maintenance work to be provided by the Centre to its Client institutions.

3. To develop specialised human and technical resources through the provision of Expert Advisory Services to the Centre and the Organisation of training programmes, thus contributing to improving the quality of services provided by the Centre, to its clients.

4. To improve the durability and guarantee the proper functioning of equipment provided by U N D P Technical Assistance to other institutions within the various projects being implemented or already completed.

5. To re-inforce the constant use of regular preventive maintenance as the most cost-effective method of ensuring continued, accurate and dependable operation of the equipment concerned with minimum disruption of industrial or research operations.

B. THE APPROVED PROJECT DOCUMENT

The Project Document that the present C T A was expected to follow was full of mistakes. The only portion which was correct was the immediate Objectives and the Developmental Objectives.

The writer of the document had obviously no experience in either Instrument Maintenance or in an Instrumentation Laboratory and he also did not comprehend what was needed for Vietnam. There

were glaring in-consistencies everywhere. The Transport Vehicle budget was put at $50,000 while for the most important Mechanics Workshop, the budget was only $18,000 and the same was the case with the Electronics Department's outlay. A Scientific Glass Blowing Shop was supposed to be established for $12,000 only. Luckily the two Departments which were not relevant to a Maintenance Centre of this nature (where replacement of spares is a more useful activity than manufacture or semi-manufacture) i.e. Vacuum Coating and Grinding and Polishing of Optical Glass, had been withdrawn by the U N D P earlier.

The equipment put into the Project Document was a collection of odds and ends and if we had followed it to the letter, it would have resulted in having no workshop or laboratory. This became all the more clear when equipment already ordered for Machine Shop. Refrigeration Shop and Electronics, started arriving. These were all elementary items suited for a Hobby Centre.

Even the selection of vehicles, i.e. the smallest Station Wagon, the smallest Pick-up which could handle only one crate at a time and the mini-bus with low road clearance were hardly suited for a project of this size, (1.3 million Dollars) and with a complement of equipment worth 600,000 Dollars, to be received from a sea-port, 120 kms from site.Considering the bad road conditions outside Hanoi, the mini-bus was un-suited for Mobile team use and hence we had to go in later for a sturdy Land Cruiser.

Once this situation was grasped by the National Project authorities, they whole-heartedly co-operated with the C T A in modifying the purchases to the extent possible and agreeing to drop some sections for which the conditions were not right.

All the modifications made and the detailed specifications drawn up by the C T A and based on his 25 years of experience of similar work in many developing countries, were closely scrutnised by the N P D and the C D (National Project Director and Director of the Centre) and the result are before every one to see.

The department - wise break down of items and purchases,(see Annex IX) shows that we invested $53,000 in the Glass Blowing Workshop, $82,000 in Electronics Laboratory, $86,000 in Analysis Instruments Laboratory cum Standards for Calibration, $25,000 additionally in Opto-Machanics Laboratory.

Also,$93,000 in the Machine Shop and the Wocd-working Shop and the Mechanics Consultant has identified further machinery and spares worth $80,000, to make it a reasonably complete Shop. We have invested $52,000 in the Refrigeration and Air-conditioning Workshop and $13,000 for Project Office and Training Supplies and $20,000 for General Laboratory Supplies.

The Laboratory Furniture did not exist in the Project document but it became necessary to get it made-to-order, in an a more developed

country as the local product made to the same design was neither durable nor satisfactory in construction. Its plywood top wore out quickly and the general construction was shoddy. We got the work tables with steel frame made in Bangkok - the nearest place where we could examine them before they were shipped - and according to the requirements of each Laboratory, the working surface was different. For example, it was laminated for Optics and Electronics work or covered with cement - asbestos sheet for Glass Blowing work or was left plain for Electrical work. They were made with extra thickness for heavy use in Machine shop for fitting work and in the Refrigeration or Photo copier Shop, where each item could weight 50 kilos or more.

We also added appropriate trolley tables for each working area i.e. light work in Electronics or medium-level work in Electrical or heavy work in Refrigeration. Special scissors - type adjustable-height moving tables were useful for loading and un-loading Air conditionersor and other heavy equipment and for ease of working on all sides of the equipment.

A suitable document for an Instrument Maintenance Centre has been written by the present C T A for the second phase of this Centre in Southern Vietnam and which has been submitted to the Government and U N D P for consideration. It incorporates his earlier experience in many developing countries and the new experience gained for the first time while working in a Socialist country where the supply conditons are different.

The main reason why the present C T A did not ask for a project revision was that with no progress in building construction or the nomination of fellows etc. on his arrival, the project was under the th t of cancellation and this would have been a severe set-back for Vietnam which needs many more Centres of this nature.

CHAPTER III

A. WORK PROGRAMME OUTLINE

After taking stock of the existing situation on the departure of the first C T A and in consultation with the National Project Director and the Director of the Centre, the first Work Plan was prepared in July 1985 for the remaining period of about 2½ years of the Project. This is shown in the Annex and in the Bart Chart II. Subsequently the plans had to be revised for a variety of reasons. These revisions are shown in Annex III.

Major delays were caused in the construction of the new building and the availability of work space. The schedule for the calling of International Consultants had to be postponed to later dates. It was finally decided to call those Consultants who could start their work in the renovated Work Shed. We had planned to call the Refrigeration Consultant in the first instance but as the selected candidate was not medically cleared and the next on the list was not available immediately, therefore the Mechanics Consultant was called first to plan and lay out the machinery of the Precision Machine Shop. He was here from 1st May to 1st July, 1987 and identified further equipment and supplies to be purchased.

After that followed the Refrigeration Consultant from August 12 to October 5, 1987 and then the first mission of the Opto- Mechanics

Consultant from October 7 to October 21 and lastly the Glass Blowing Consultant, from October 14 to December 16.

During the inspection of the arriving electronics apparatus while the Centre was still located at Trang Tien Street, the C T A personally inspected all electronic test equipment which could be laid out in the limited space there such as Analogue and Digital Multimeters, Milli ohmmeters, Digital R L C Bridge, Function Generator, Oscilloscopes, Frequency Counter and D.C. Power packs, in the presence of the Electronics staff and explained to them the functions and their normal maintenance procedures. As no service manuals were received with the instruments, we got the P.A.C. at Vienna to intervene and were able to get them before payments were relesed. These are now stored near the instruments. In the new building, all of the Electronics equipment was laid out but there was no time to explain the use of the remaining ones.

The second important part of the Work Plan was the preparation of nominations and identifying the areas in which practical training abroad would be useful to the staff and to look for appropriate institutes for placement. The UNIDO Placement Manual was consulted but we could not make much headway in accpetances.

Personal contacts were established by the C T A with the Asian Institute of Technology in Bangkok, Agents of popular makes of Photo-Copiers, The British Council in Bangkok and with the Opto-Mechanics Company of WILD, Switzerland. The University of Roorkee in India and the University of Amsterdam were also contacted for the placement possibilities. These contacts were made either while going on home leave or on visit to Vienna, during the mid-term to expedite matters at the headquarters.

These were found useful in securing acceptances for many followships see Annex X. The Asian Institute of Technology had to be dropped later when they quoted excessive fees for the training.

B. GENERAL LAY OUT

The lay out of the Centre needs explaining. Since the Workshop contains heavy but precision machinery, special foundations were laid out to dampen the vibrations. For example, the concrete foundation for the Milling Machine is many times heavier than the weight of the machine.

Also the Glass Blowing activity generates a lot of heat and needs a separate Gas House and Compressor housing to reduce the noise and for reasons of safety. Therefore it is better off in an attached building than in the main building.

Again, the other heavy activities like Refrigeration and Air Conditioning, Motor-winding and Photo-copier repair have been located in the first floor rooms of the main building for convenience of reception and handling.

The Office of the Director & Receiving of Instruments for repair have been placed on the first floor as well as the Tool room and a discarded Instruments Store - where donations of discarded equipments from U N D P office and some Embassies and other sources is kept for taking out usable spares.

All the five Laboratories are located on the II Floor to keep them isolated from the movements of visitors and also as they are less damp than the first floor. All laboratory area is air-conditioned and each room has two entrances- the smaller one being used generally for staff movement so that there is less disturbance. Adequate ventilation and fluorescent lighting is provided.

The front of the building has vertical sun-breakers to block the morning sun but the access corridor at the back of the building and therefore the room entrance side remains unprotected and the afternoon sun puts an un-necessary load on the air-conditioning.

Availability of piped water remains restricted to the two wash room on each floor and this situation is not rectified even

through some activities like Refrigeration, Vacuum Practice and Glass Blowing work require continuous and nearby water connection and waste water disposal. Temporary water connection with rubber hose is now the only solution although not a desirable one.

The III floor houses the Technical Library, Reading Room, the General Store and the U N D P equipment and Spares Store which will merge when the Project supplies are handed over. The Machine Shop of the Centre was put to good use in making additional racks for the storage of a variety of items and for the Books in the Library. The Wood Working Machinery has been in constant use since the day it was un-packed. A Research Laboratory and a Staff Canteen are also accommodated on this floor.

The IV Floor has a large Conference Room cum Class Room in an area of 29 x 6 sq. metres. The rest of the space is ear-marked for the Training activities of the Centre.

The basic room in the Laboratory with one window in front has the dimensions of 8.4 x 3.4 i.e. 29 sq. metres with a height of 3.5 metres and the other rooms contain 2 or 3 or 6 windows as the case may be. The flooring is of cement tiles 20 x 20 cms but being of soft material, they will generate dust as they wear out and will need linoneum protection in sensitive areas.

The Laboratories are designated as Standards, Analytical Instruments, Opto-Mechanics, Electronics, Light Electric and Vacuum.

The total area of the Centre inclusive of the Work Shed, is now 2,000 sq. metres.

C. ACCOUNT OF ACTIVITIES

The following departments have been set up after the necessary equipment was purchased from various sources round the world. For a Centre of this type, a wide variety of machinery, tools and spare parts are needed and many sources had to be investigated before the supplies could be obtained. We had to choose well-known manufacturers or suppliers so as not to run into the difficulties associated with defective or sub-standard equipment.

Machine Shop

This includes a Lathe, a Milling machine, a pillar Drill machine, a Spot Welder, a socket Press, Bench Grinder and Buffer, Power Hack saw, Drafting table, Sheet cutting and Sheet bending machines and other usual mechanical accessories e.g. vises, anvil, fitters tables. etc.

This is located in the Work Shed which is an annex to the main building. It has an area of 12 x 7 sq. metres. A new cement floor was laid out in place of the conventional tiles. The false roof was installed to reduce the heat from the low tin roof. The ceiling is painted olive green as this was the only available color. It will be preferable to paint it white as soon as possible. Fluorescent lighting has been installed in addition to spot lights on some machines.

The Lathe machine and the Milling machine are installed in their special re-inforced concrete base which is at least twice the weight of the machine. These are isolated by a layer of pitch all around to dampendany vibrations.

The Pillar drill is installed on a heavy table with 7 mm thick top. The legs of the table have been sunk to make the working height suit the worker.

Tools for the Lathe and Milling are located in cup-boards nearby. A separate area in the main building, Room 109, is ear-marked for a variety of mechanical measuring devices such as height gauges, vernier caliper go-no-go gauges and special magnetic table as these need to be kept in a clean area.

The Wood working shop is located opposite the Machine shop across the corridor in an area of 8 x 7 sq. metres and following will be eventually located here. A circular Electric saw, a table planer, hand planers, wood working vise, Joiners table, sand blasting, spray painting and Sander. The chain lift and hydraulic lift are also stored here when not in use.

Glass Blowing Shop

This is located at the far end of the Work Shed in an area of 12 x 7 sq. metres and has similar flooring and ceiling as in the Machine Shop. For the time being, the two Petrol Gas Plants are also

located inside as well as the air - compressor till a separate Gas House can be constructed outside but nearby so as not to lose the pressure of gas on the way.

Four work benches with asbestos top are located at one end of the room two of them parallel to the long side of the room and two parallel to the short side and they are fitted with one burner each. Each table is self-contained with all the hand tools required by each gas-blower. Taps for extra gas connections are provided at the end of the two outside tables for work away from the tables.

Also located in this room is the linear graduations machine for marking thermometer stems. A glass Drill and a Glass tube/rod cutting machine for straight or bevel cuts - with a diamond tipped wheel- and a flat and conical Grinding machine for stop-cocks is located at the other end of the room. They have been placed next to each other as they require piped water connection and specially in the case of Glass drilling machine, a high-pressure water connection is necessary as well as waste water disposal.

A glass strain viewer, an electric cracking unit and a hollow glass tube thickness measurement apparatus are also located in this room. All this equipment which is now functional, makes this the best equipped glass shop in Hanoi.

It is also intended to install mercury cleaning apparatus by chemical means as well as mercury distillation apparatus in this shop. This will cater to the needs of the medical profession for clean mercury for their Blood pressure manometers as well as for scientific purposes such as measurement of vacuum by vacuustats or Mcleod gauges.

An annealing furnace which could go upto 900 degrees Centrigrade will be a useful addition to this shop.

Regrigeration Shop

This is located in a space of 29 x 3 sq. metres in Room 107 of the main building, on the first floor. It has the conventional tile floor which is usually un-even. It has two gas-charging stations complete with vacuum pump and charging gas cylinders and pressure reading gauges. There are also Gas welding torches and vapor de-greasing arrangement for compressors which have to be cut open and their motors cleaned and re-wound. There are heavy work tables as well as trolley tables and scissors-type lift tables for the movement of air conditioners, freeze drying apparatus or cetrifuges with cooling devices, all of which are quite heavy. The trolley tables with wood tops have been covered with metal sheet to lengthen their life.

Hand tools, heavy vises and other equipment required for day to day work are all available in the room while items like insulation

materials, for refrigerators, spare compressors, door gaskets, extra gas cylinders are kept in the Store, and issued when needed.

The Consultant has recommended the partitioning of areas especially the welding area and the motor winding area.

Project Office and C T A's Office

The first one is located in room 106 (29 sq. metres) and the second in room 105, in similar space. The first one has Filing cabinets, Project Catalogues, Photo-copier and other duplicating machines, as well as Slide Projector, Over head-Projector and Projection screen. Also located in this room are the English Typewriters, Vietnamese Typewriters, Printing materials and an Emergency Generator to run the Photo-copier etc. when the power fails.

Extra tables are laid out for the use of Consultants.

In the C T A's office, is located a Model Work table for Electric or Electronic work with Analogue/Digital multimeters, small voltage regulator, soldering iron, soldering gun, small illuminated magnifier, spot light, fluorescent bench light and all the necessary hand tools and a electric drill, solvents, cements etc. These are distributed over the 3 levels of the specially desiged tables. A trolley table is used for keeping oscilloscope or other test equipment required occasionally. This table acts as an incentive for the other workers to equip their tables in a similar fashion.

On the wall are white boards, listing the month's projected activities and also the week by week activities of the Project/ Centre. On another board are listed the details of Consultants who have come or are yet to come, and details of fellows going for training or already returned. There are also charts showing Work Schedule of the Project for the full period as well as the revised plans. On another chart appear the room locations and Laboratories.

Laboratories

Five Laboratories are located on the second floor. Each one is 10.2 x 8.6 metres and has two window-type air conditioners, six ceiling fans, six double fluorescent tubes and a de-humidifier installed in it as basic facilities. There are two doors to each Laboratory, the narrower one being reserved for staff movement. The larger one is opened only when a bulky piece of apparatus is to be moved. In this way, minium disturbance is caused to the Laboratory. Dust collecting foot-pads are provided for each door.

Standards Laboratory

The power supply for all instruments in this room is taken from the Automatic Power Conditioners which perform four functions - i.e. keep the line voltage constant, within $\pm$ 15% of input variations, keep the voltage constant against load variations, keep the power line frequency constant within 1%, and cuts off surges and transients.

The following equipment is in location for standardisation or re-calibration after repair:

Digital pH. meter with all accessories.

Ion meter.

Digital Flame Photometer with usual accessories.

Top-loading micr› balance.

High Frequency Counter/Timer.

Portable Grating type Spectro-photometer

Storage Oscilloscope.

Clamp-On meter.

On-Load Battery Tester.

Signature Analyser.

I. C. Tester

Transistor · Testor.

Un-interruptable Power supply.

Switching Power Supply.

Meter Calibrator.

Spectro-meter with Prism and Grating and standard spectral Lamps.

Conductivity Meter.

Refractometer.

An Angle Testing Instrument, used for Theodolite calibration has been moved to the Optics Lab, as it is used very often.

Electronics Laboratory

There are six workers in this room and each one has been provided with an independent three-level table with laminated main working

surface. The drawer space is meant for the storage of small tools while individual lockers have been provided for personal effects. Each table has one adjustable spot light and one adjustable Fluorescent table lamp and a magnifier. The power supply for each table is from the Voltage Stabliser. The basic test equipment includes:

Analogue Multimeter

Digital Multimeter.

Oscilloscope.

D. C. Power Supply

Variable A. C. Supply

Soldering Iron & Soldering Gun

Electronic Tools.

The other test equipment like, Milli ohmmeter, A.V. milli voltmeter X-Y Recorder, X-T recorder etc. are placed in the common area from which any worker can take it, use it and return it. Extension cords are provided with multiple sockets of different types so that the original plugs on customer's equipment are used as they are.

A separate table is utilised for light mechanical work with a vise, hand drill, power drill or high speed drill and few other tools.

The test equipment located in the common area is:

Oscillo-graph, one channel, two channel

Function Generator

Pulse Generator.

A. C. Microvoltmeter/millivoltmeter.

Oscillator

Megger

Earth Tester.

Stroboscope.

Common electronic Hardware.

Electronic Data Books

Test Instrument Service Manuals

Test Leads with BNC and other endings.

Opto-Mechanics Laboratory

This area deals with the repair of Microscopes, Hospital Optical Instruments, Land Survey Instruments and Single pan Balance using optical magnification. Hence this area has to be extra clean.

Individual laboratory tables are provided for each workers as in the Electronics Laboratory and also the level of illumination on the working tables can be controlled by the workers.

Since each instrument has to be dismantled and left open while some parts are being cleaned or replaced, bell jars are used, with or without dessicant, to save them from collecting dust or to maintain the order in which they were removed as to make re-assembly easier.

The tools used are mostly small screw drivers or hex-wrenches or circlip removers. The Monocromator and Angle Testing instrument are also located in this area.

Since Photogrammetry or Map making equipment repairs are generally carried out at site, in the Institution where they are located, not much space is required for this activity in the room except when some portion of the dismantled equipment is brought to the Centre for overhaul.

Analytic Instruments Laboratory

Although the same persons who work in the Electronics Laboratory also work in this area, but the Laboratory has been separated for the reasons:

1. The size of the equipment is rather large.

2. Not all of it is electronic.

3. Some Chemistry work is required in testing them which means solutions and spillage.

4. They may have to be left in dismentled condition for long periods and they would block space needed otherwise for smaller jobs.

5. It is necessary in some cases, to have access on all sides and therefore either trolley tables are used or only two level tables are used for this work.

There is no extra equipment in this room but whatever is needed is brought either from the Standards Room if a direct comparasion is necessary or from the Electronics room.

Vacuum Laboratory (Test & Measurement)

This work has to be separated from other Laboratories, as heat is generated when diffusion pumps are used and water connection is necessary. For lack of piped supply in the room, it has been placed nearest to the wash-room where piped water will be available later. This room has two vacuum units mounted on frames as well as separate Rotary pumps, vacuum gauges appropriate for the ranges involved, vacuum tubing, sealants, gaskets, and leak detection apparatus.

The primary purpose is to detect leaks in systems and measure the ultimate vacuum reached.

Light Electric Repair Shop

This activity shares space with the vaccum laboratory and has simple equipment and furniture for use for items like controlled

temperature ovens Controlled temperature water baths, small motors, emergency generators, voltage stablisers, voltmeters, ammeters and other similar appliances or instruments which do not need sophisticated test equipment.

Mobile Workshop

This has not been set up as a separate entity. The method of working at present, is to wait for requests for Instrument Repair Services from certain areas, send a small team to investigate what kind of corrective action is necessary and then to compose a team of Engineers and Technicians and the appropriate test equipment and supplies, along with an emergency generator. These are sent in the Land Cruiser and the team camps at site or sites for a week or ten days at a time to finish the work. In early stages, the Pick up van with a canvas top and improvised benches were used for this purpose but this was an inconvenient arrangement especially in hot or rainy weather. The arrival of the land cruiser has eased this situation considerably. The demand from southern areas of Vietnam is so pressing that it is proposed to use this arrangement from the Hanoi Centre till another Centre is functional in H C M city to cater to the south.

D. ESTIMATION OF OUTPUTS PRODUCED

I. Output 1 was stated in the Project Document that a Centre for electronic and optical maintenance and repair will achieve

professional standards in the rectification of faults in the above types of Instruments and restore them to the original specifications of the manufactures after maintenance work has been done on them.

This output involved the training of staff in institutions abroad so that they develop the capability to diagnose the faults in each apparatus and be able to rectify them with the help of technical manuals, proper tools for dismantling and re-assembly and then to check the working of the instrument to its rated accuracy.

This output is in evidence in the repeated work from the same institutions who were evidently satisfied with the workmanship. Also the instruments were tested against the in-house standards maintained for this purpose and the customers were invited to satisfy themselves in this respect before taking back the apparatus.

II. Output II . This output, in effect, meant the reduction in the down time of the instrument after a breakdown. Normally long delays were caused in the handling of such apparatus when outside expertise had to be saught. This output is effectively fulfilled since a body of experienced technical personnel is now available at the Centre who can handle such work expeditiously with individual or where necessary, collective expertise since all activities are located under one roof with immediate access to staff and facilities.

CHAPTER IV

ACHIEVEMENT OF IMMEDIATE OBJECTIVES AND THE CAPABILITIES OF WORKSHOPS AND LABORATORIES.

The five immediate objectives stated in the Project Document are reproduced in Chapter II.

The Electrical Workshops can re-wind damaged motors or re-wire heating elements in furnaces or other heating devices as well as make replacements of damaged electrical elements in a complex apparatus.

Like wise the setting up of Electronic Laboratory provides the necessary test instruments for creating wave forms and to have graphic displays on Oscilloscopes or hard-copy on the chart of X-Y Recorders or X-t recorders for study of defects in instruments from wave form analysis. The wave forms can be generated in appropriate apparatus.

The optics laboratory provides all the necessary tools and jigs for dismantling, cleaning re-assembly and testing of survey instruments, microscopes and other opto-mechanical instruments including monopan balances.

And the Laboratory for standards provides the necessary reference apparatus to check a parameter to the desired degree of accuracy. This facility is absolutely essential for calibration after repair and it has a variety of parameters in easily measurable forms.

National staff has been sent out to advanced laboratories abroad for on-the-job training in the disciplines of precision mechanical measurements, electronics repair, medical optical instruments repair, Photogrammetry and land-survey instruments maintenance. Analytical Instruments Repair and also the Repair of modern Photo copiers and Refrigeration devices. By setting up the workshops for precision mechanical work, Refrigeration and air conditioning, Scientific Glass Blowing and Electrical Workshops, a high quality infrastructure has been established at the Centre on which the Technical staff can draw upon for the repair of general as well as sophisticated instrumentation. This obviates the need for depending on other agencies to provide these services which are necessary for maintenance work. The machine shop has the capability to provide or duplicate machinable parts from appropriate raw materials, do milling work or cutting or bending of sheet metal or to make spot-welds.

The Refrigeration Shop is in a position to fill gas in refrigerating systems after flushing the system or to cut open the compressors, rewind the damaged motors and reassemble and weld the unit before filling the refrigerant gas.

The Scientific glass blowing shop has its own source of petroleum gas which is useful for work on the soft glass as well as oxy-acetyline flame for work on pyrex glass. The provision of appropriate machinery for cutting of glass tubing at an angle, cutting of plate glass, drilling of holes in glass and for making ground-glass joints

and for graduations on glass rods or capillary tubes has opened up many possibilities for the repair of damaged apparatus or to fabricate new apparatus as per design of user.

Consultants from advanced countries have come and trained the national staff while setting up the workshops for machining work, Glass Blowing work, Refrigeration work and opto mechanics work. These activities taken together serve to show that the first three objectives have been fulfilled.

The fourth objective is the crux of the whole matter and its fulfilment can be seen in the variety and complexity of instruments repaired for other projects of the UN and of Vietnamese institutions already existing.

The fifth objective is a corollary to the fulfilment of the earlier objectives and this can only be measured in the long run when the life-span of an instrument is increased due to quick and effective maintenance to which the Centre is already contributing.

CHAPTER V

UTILISATION OF THE PROJECT OBJECTIVES

The representative selection of letters received by the C T A (see Annex XIV) inquiring about or requesting the services of the Centre are indicative of the usefulness of this institution. And that the project objectives are being fulfilled is apparent from the work reports (see Annex VIII) which shows that the Centre is helping the target institutions both inside Hanoi and surroundings inspite of severe limitations recorded elsewhere in the report.

Customer contact has been maintained by the Director of the Centre and the C T A who have been making it a point to visit the institute concerned, personally, whenever a new request came - to explain what more could be attempted at the Centre and to answer any questions relating to this work.

The institutions making use of our services can be broadly classified as:

Teaching Institutions

Research Institutions

Testing Laboratories

Hospitals

U N Assisted Projects

U N Offices and Embassies.

The shift of the Centre to the new and final location was announced in Hanoi's daily newspaper NHAN DAN and Client Conference and an 'OPEN DAY' was arranged for other interested persons. (see annex XII). The type of Questionnaire given to prospective customers is also given in the Annex XIV as a part of continued contact with future customers.

CHAPTER VI

FINDINGS

The new building of the Centre has adequate space for most of the projected activities but it is still incomplete in many respects. All efforts should be directed to complete it as soon as possible as it affects the work of the Centre. Specially:

a. While the front of the building is protected against the morning sun by sun-breakers, the access corridor and the door-side of the rooms also need permanent protection against the afternoon sun, rain and wind. Without this there will be un-necessary load on the air-conditioners.

b. The Workshop Shed and the main building have a road in-between them. A protected cover is necessary between the first floor corridor of the main building and the entrance to the Shed where three Workshops are located.

c. The Workshop Shed needs to be made rain and rodent proof. Also for better luminance, the ceiling should be painted white instead of the present green color.

The electrical wiring is not safe. Instead of secure joints, the wires are merely twisted around. The joints should be soldered and

taped. The locally made plugs and sockets on the walls are of poor quality. They should be replaced as soon as possible.

Piped water supply is necessary as well as waste water disposal, in the Machine Shop, Glass Blowing Shop and Refrigeration Shop and Vacuum Laboratory. The Welding area in the Refrigeration Shop needs to be separated from other areas by partitions. The recommendations of the Expert in this respect should be implemented as quickly as practicable.

An inter-communication facility needs to be provided between the floors. Also the only external telephone line is in bad shape and needs to be improved.

The Vehicles should continue to be serviced regularly as has been done so far, in the interest of prolonged life.

The Centre should subscribe to Technical magazines in the areas in which it is working and workers should be encouraged to attend seminars/workshops in relevant subjects. The magazines have been identified by the C T A and Consultants and some of them were subscribed during the tenure of the C T A. These magazines contain information on future seminars or conferences.

Electrical cut-outs should be provided for every major machine to save it from low-voltage damage. As an interim measure, A.C. Voltmeters

should be fitted near the switchboards, as a visual indication and preventive action, manually.

All instruments above $1,000 in price should have price-tags fixed on them. This will help identify them in case of emergency evacuation and also they will be treated carefully in normal use.

The Centre is located on the main highway to the Airport which makes it easily accessible but also very noisy due to heavy vehicular traffic. The noise level could be reduced, (a) by persuading the Police to put a ' No Horn' sign near the presently existing Hospital Red Cross sign-post across the road (b) by planting fast-growing trees along the boundary facing the road.

The flooring of the 5 Laboratory rooms should be covered with linoneum sheets as the soft tile-floor wears out the generates dust, inside.

Fire protection and Fire control needs to be provided in both the buildings. The Petrol Gas Plants in the Glass Blowing Shop should be moved out to an adjacent building and no flammable liquids should be stored in the vicinity of the Workshop where flames are present all the time.

The Centre gets intermittent electric power with long and un-scheduled cuts which upsets all planned activity and is also injurious to its own equipment. The remedy is to press for a priority line like the University of Hanoi, especially since the Centre is a Dollar earning institution.

CHAPTER VII

RECOMMENDATIONS AND FUTURE DEVELOPMENT OF CAPABILITIES

Buildings

The recommendations given under Findings about the rectification of building deficiencies and electrical fittings should be carried out as soon as possible.

Training

Four fellows whose placement is finalised will leave in Jan. 1988 and two more should leave in March 1988 as acceptances have been received. They will all go to Institutions in India. With this 17 out of 18 nominees would have received training abroad. This is over 90% of the planned figure. The basis of 90 man months (18 nominees x 5 months each) of planned training which was stated by the national counterpart is not valid as we cannot insist that the host institution receive every trainee for 5 months.

Purchases

The remaining funds, which were held back till the Consultant had identified other necessary purchases for each department, can now be utilised by distributing them over Electrical & Refrigeration and Machine Shops and for Electronics and Analytical Laboratories. Unless

more funds are available further purchases of machinery for Machine Shop and Glass Blowing Shop should be held in abeyance. The lists of essential small items are given in the consultants reports.

However, these purchases are not catalogue items in general and a search will have to be made to locate sources in Singapore and Hong Kong - the two nearest duty-free shopping centres - who can supply small orders.

Consultants

The Project had started with an original figure of 20 man months distributed over 8 specialised subjects. At some stage the figure was found reduced to 13.

No comments were made earlier as the progress in calling the Consultants was slow due to lack of working space and suitable conditions of work. If the original figure can be restored, then a Consultant in Digital Electronics, Vacuum Technique and Analytical instruments can be accommodated. They should be called only after the last batch of six trainees have returned to Vietnam.

The present C T A whose speciality is the maintenance and calibration of Analytical Instruments can be considered for Analytical Instruments, and setting up the equipment in the Standards laboratory, if he is available.

Extension of Time

The present C T A had predicted in the June 87 meeting with Project Management and U N D P Hanoi, that at the present rate of progress the Project would need extension of time by one year after the December 1987 dead line in order to accommodate the purchases, training and calling of remaining consultants and that present C T A who had brought the Project to a viable level from the Zero stage, should continue to guide it.

However as the mandatory evaluation of the Project for which repeated requests were made from September 1987 onwards, never took place and the budget line for the C T A finished in December 1987, the Project was left without the guidance of a C T A. This will give a set back to this Project and will also reflect in the slower growth of this useful and essential activity in other parts of the country.

Future Development

Technical Information Service: Since a lot of Technical documentation has been collected at the Project in course of its purchase activity and technical inquiries, this fund of knowledge can be put to use for the benefit of other U N Projects or National Projects in Vietnam. This can be called Technical Information Service. This can also draw upon the Information in the Technical & Scientific books ordered for the Project.

Also as the Centre has reproduction facilities for documents, and has its own supply of circuit diagrams and instrument manuals, the Centre can become a repository of such information for the benefit of other Centres yet to come up.

The Centre can advise future purchases of instruments or measuring equipment and on the sources of supply, suitability for use under existing conditions and even specifications, in certain cases.

In-country Training

The Centre is also a suitable place for in-country training for the staff of other similar projected centres or for those scientific or Technical Institutions in the country who have some sort of maintenance facility for Instruments, already in existence. Practical training is possible in Machine Shop, Precision Glass Blowing, Refrigeration and Photo-copier Repair, i..e. areas which are well equipped and have the spare capacity for this. This could also form an intermediate base before staff is sent to highly developed countries for further training.

Monetary Support

The Centre will have recurrent need for spare parts to be purchased out side the country. Since old and new U N Projects are going to be the major beneficiaries of the Centre, it will be advisable for U N D P to provide $100,000 per year for this purpose for the next five years.

ACKNOWLEDGEMENTS

The C T A is indebted to Mr. A. S. Henderson, the first C T A for suggesting his name as a sucessor for this project and the Govt of Vietnam for accepting him.

He is much obliged to Mr. V. T. Boi, Chief Co-ordinator of U N Projects in Vietnam and to Mr. Dang Huu, President of the State Committee for Science and Technology, for showing active interest in the Project.

He offers his grateful thanks to Mr. Tran Tri, Vice President of the State Committee (SCST) for quick decisions and help and support received on many occasions and his easy availability which improved the pace of work considerably.

He is much obliged to Mr. T. H. Phuc, the Former Managing Director of the Company for the Supply of Scientific and Technical Materials, COSTMAS, and Mr. N. V. Thinh, the former National Project Director, (NPD), for their continued co-operation.

He offers his special thanks to Mr. D. X. Son, the present Mg. Director of COSTMAS and present NPD of the Project and Mr. N. V. Tinh, the National Director of the Centre (CD) and his band of dedicated Engineers and Technicians and support staff who made possible the coming

up of the Centre to its present level in the short time of 2½ years and for the hospitality provided to him and his wife on many occassions and making their stay in the country as pleasant as possible.

The organising ability and the capacity to take responsibility of Mr. D. X. Hung, the Project Interpreter, needs special mention as the Project benefitted much from his services.

JOB DESCRIPTION

DP/VIE/80/039/11-02/31.9.C

Post title Expert in Electronic Engineering / Chief Technical Adviser

Duration 30 m/m

Date required as soon as possible

Duty station Hanoi

Purpose of project To raise the efficiency of scientific research and the application of its results to production by promoting the maintenance and repair of electronic and optical equipment to professional standards.

Duties The expert will be attached to the Electronic and Optical Maintenance and Repair Centre and will specifically be expected to:

1. Prepare an overall work plan comprising the activities of the project during its entire duration.
2. Organize and co-ordinate all activities detailed in the work plan and the project document according to UNDP/UNIDO procedures.
3. Prepare job descriptions for specialised expert services which will be provided through short-term assignments of international experts.
4. Prepare detailed specifications for all items of equipment to be provided under UNDP funding.
5. Prepare fellowship training mission outlines, in consultation with Government authorities.
6. Give in-house training to the staff of the Centre on the installation, operation and maintenance of equipment within his own fields of expertise.
7. Advise counterpart staff on the best use of floor space, equipment layout and storage facilities within the Centre.
8. Assist Government authorities in the selection and processing of candidates for overseas fellowship training.
9. Plan and organise the phasing of the various UNDP inputs so as to ensure the smooth implementation of the work plan of the project.

The expert will furthermore be expected to prepare interim reports, one each of the end of the first two years of his assignment, as well as a final report setting out the findings of his mission and recommendations to the Government on further action which might be taken.

Qualification: Ph.D or equivalent, with extensive experience in manufacture and repair of electronic and optical equipment and good managerial experience in the above field.

Language : English and/or French

Background Information

Much of the electronic and optical equipment and instrumentation used in Viet Nam has been designed and manufactured in countries having temperate climates. Such equipment, when exported to tropical or sub-tropical countries, then suddenly is subjected to a hostile environment such as high ambient temperatures, high humidity and airborne dust all of which causing undesirable reactions which in turn affect the operation - thus the accuracy of life - of the equipment concerned. Installation of this equipment in an air-conditioned environment does much to alleviate these problems, but in developing countries such a solution is often meaningless due to frequent failures of the main electricity supply.

On the other hand, a few manufacturers offer "tropicalized versions" of some of their products, but these invariably are very much more expensive than the standard product, and therefore much less attractive to purchasers working with limited budgets.

At the invitation of the Government, a formulation mission concerning this project was organized and an expert visited Hanoi in May 1983, during which inspection tours were arranged to several of the larger users of the type of equipment with which the new Centre is required to cope. During these visits, a great diversity of equipment was encountered, some in good working order, others out of service for one reason or another. Some examples for this equipment are as follows:

- Survey and cartalogical equipment including stereo metographs.
- Optical spectroscopes and spectrographs, emission, absorption, fluorescence, infra-red, visible and ultra violet.
- Mass spectrometers and nuclear magnetic resonance spectrometers.
- Centrifuges, ultra-centrifuges, vacuum centrifuges and refrigerated centrifuges.
- Absorption spectrophotometers and colorimeters.
- pH meters and polargraphs.
- Gas and liquid phase chromatography equipment.
- Precision balances.
- Aminoacid analysis equipment.
- Electron microscopes.
- Etc.

In a few of the institutions, small-scale repair and maintenance procedures are already in operation using available staff and resources. The new Centre intends to encourage and assist such efforts. A service with some potential has already been started by the Laboratory Equipment and Instrument Co. (L.E.I) in Hanoi. At present its efforts are concentrated on rectifying and renovating new equipment which has suffered damage due to climatic changes and handling during the sea voyage, the transit through Hai Phong docks and the rail journey to Hanoi.

This organisation, however, is severely hampered in its efforts by the lack of necessary equipment and test gear, and by the lack of specific expertise by its staff members.

Since the formulation of the country programme 1982-86 the Viet Nam State Committee for Science and Technology has assumed overall responsibility for the establishment of the new Centre and it is foreseen that LEI Co. will play a substantive role in forming its nucleus. This new Centre has been given wide-ranging responsibilities in the care and control of electronic and optical equipment and instrumentation and it will eventually be responsible for:

- receipt and pre-installation checks,
- training of operators when and where necessary,
- specification of suitable working environments for equipment used in Viet Nam, such that good service life expectancies can be foreseen,
- routine maintenance on site by mobile teams of trained service personnel,
- organizing time-sharing arrangements for equipment items of which few units are available in Viet Nam or which are under-utilized,
- establishing special centres for expensive but little-used equipment (e.g. electron microscopes) as a service to other institutions,
- arranging a long-term work plan for the repair of the large amount of currently unserviceable equipment already in the country,
- encouraging and supporting the establishment of local 'satellite' maintenance centres in government institutions.

ANNEX II

CENTRE FOR REPAIR AND MAINTENANCE OF ELECTRONIC AND OPTICAL EQUIPMENT

WORK PLAN TIME TABLE (See Bar Chart also)

Total Time : 30 months (from June 85 to December 87)
CTA's first home leave - April/May 1986.

Fellowship Training Schedule: (90 m/m)

1st batch of 12 to leave in March 86 - till June 1986

2nd batch of 6 to leave in July 86 - til October 86.

Subjects for First Batch

- Fine machanics (1 person)
- Survey Instruments (1 person)
- Microscopes (1 person)
- Spectrophotometry (2 persons)
- Lens making (1 person)
- Photogrametry (1 person)
- Electrical Instruments (1 person)
- Eye Instruments (2 persons)
- Analysis Instruments (1 person)
- Mechanics and refrigeration (1 person)

Subject for 2nd Batch

- Electronic Instruments (2 persons)
- Vacuum and its measurement (1 person)
- Digital display instrument (1 person)
- Precision glass blowing (1 person)

- Electrical measurement (1 person)
- Mechanic caliberation(1 person)
- Optical caliberation (1 person)

Study Tour: Places (9 m/m)

- Technological (testing, caliberation, repair)
- Scientific (research and teaching)
- Production (factories and assembly plants)
- Management Training Institutions

4 persons. in April/May 86, duration: six weeks/m

2 persons in October/November 87 duration: six weeks/m

Short Term Consultants (20 m/m)

From July, September, November 1986

January, March, May, July, September 1987

Subject for Consultants:

1. Machine shop practice and precision mechanical measurements.
2. Refrigeration and cold chain apparatus (air-conditioning, refrigeration, deep freezer, de-humidification maintenance).
3. Digital electronics and digital measuring Instruments, maintenance and repair.
4. Electronic Analytical Instruments including electric measuring Instruments, maintenance and repair.
5. Preci[illegible] rto-mechanical Instruments including survey

5. Precision opto-mechanical instruments including survey and photogrametry and microscopes repair and maintenance.

6. Industrial vacuum generation and measurement and repair of equipment.

7. Surface treatment of metals (chemical treatment, electroplating, sand blasting, painting etc.)

8. Precision blown glass apparatus - making and repair.

Equipment Ordering Priorities

Remaining apparatus for machine shop (laboratory and workshop)

for electrical (lab. and workshop)

for electronic (lab.)

for optic mechanic (lab and workshop).

for vacuum and glass (lab and workshop).

Space Availability Time Table

- Tu Liem air conditioned room - ready by August 1985
- Tu Liem shed to be vacated by August 1985

  to be renovaced by October 1985
- Tu Liem New building start by August 1985

  finish by December 1986.
- Trang Tien mezanine floor start by October 1985.

  finish by January 1986.

Work Furnitures Available by January 1986

ANNEX 11-4

Office furniture — available by February 1986

Local Purchase and F. P. O. inventory — every month (last week)

Visits by CTA

- Inside of Hanoi : 3 times a month.
- outside of Hanoi: Danang - once
  Hochiminh City - twice

Mobile team organised — from July 87 - December 87.

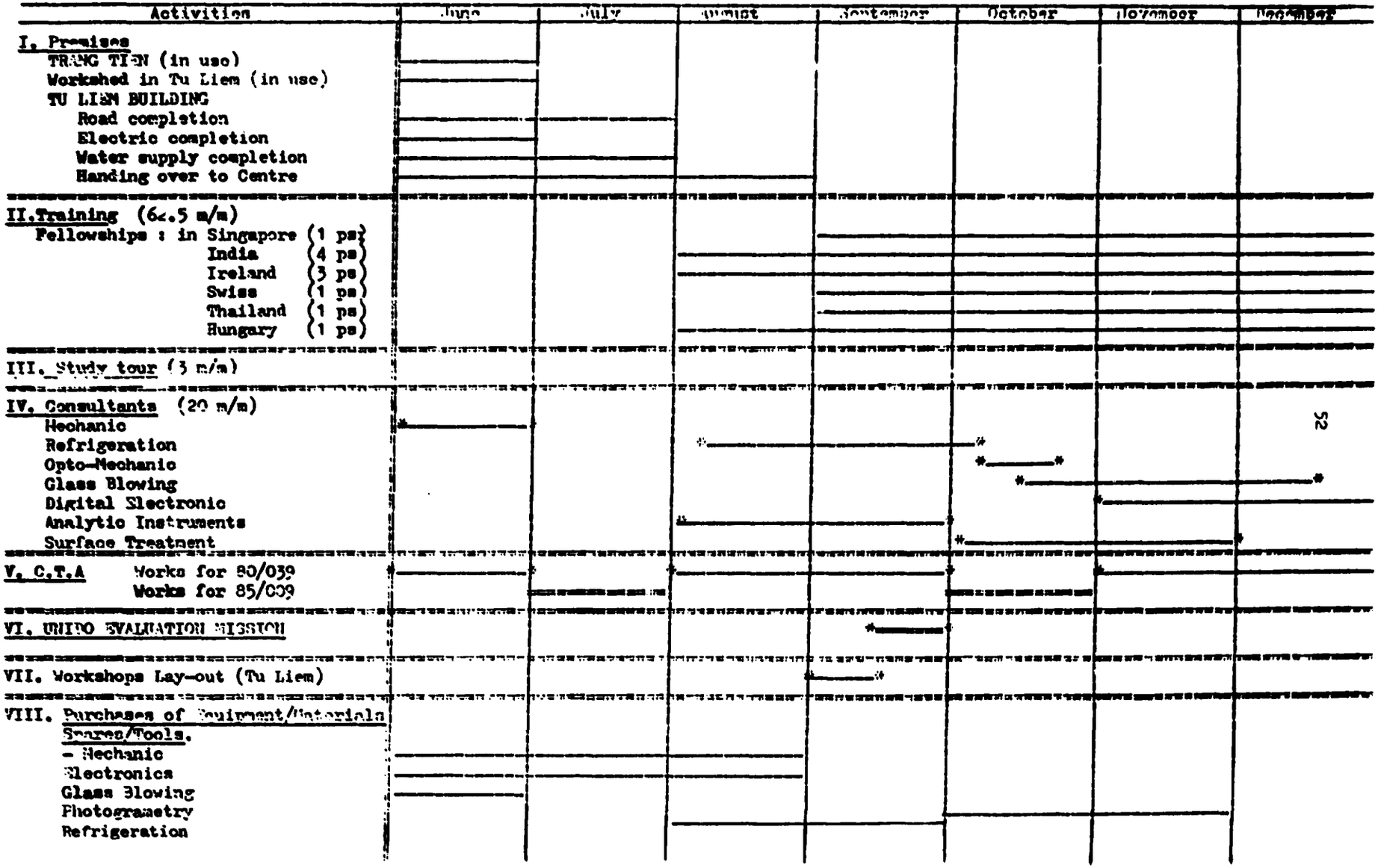
Instrument Inspection — October 85 - November 87

Notifications to U N D P and other foreign missions.

Inspection work starts from January 86.

SCHEDULE FOR PROJECT ACTIVITIES
From JUNE to DECEMBER '87

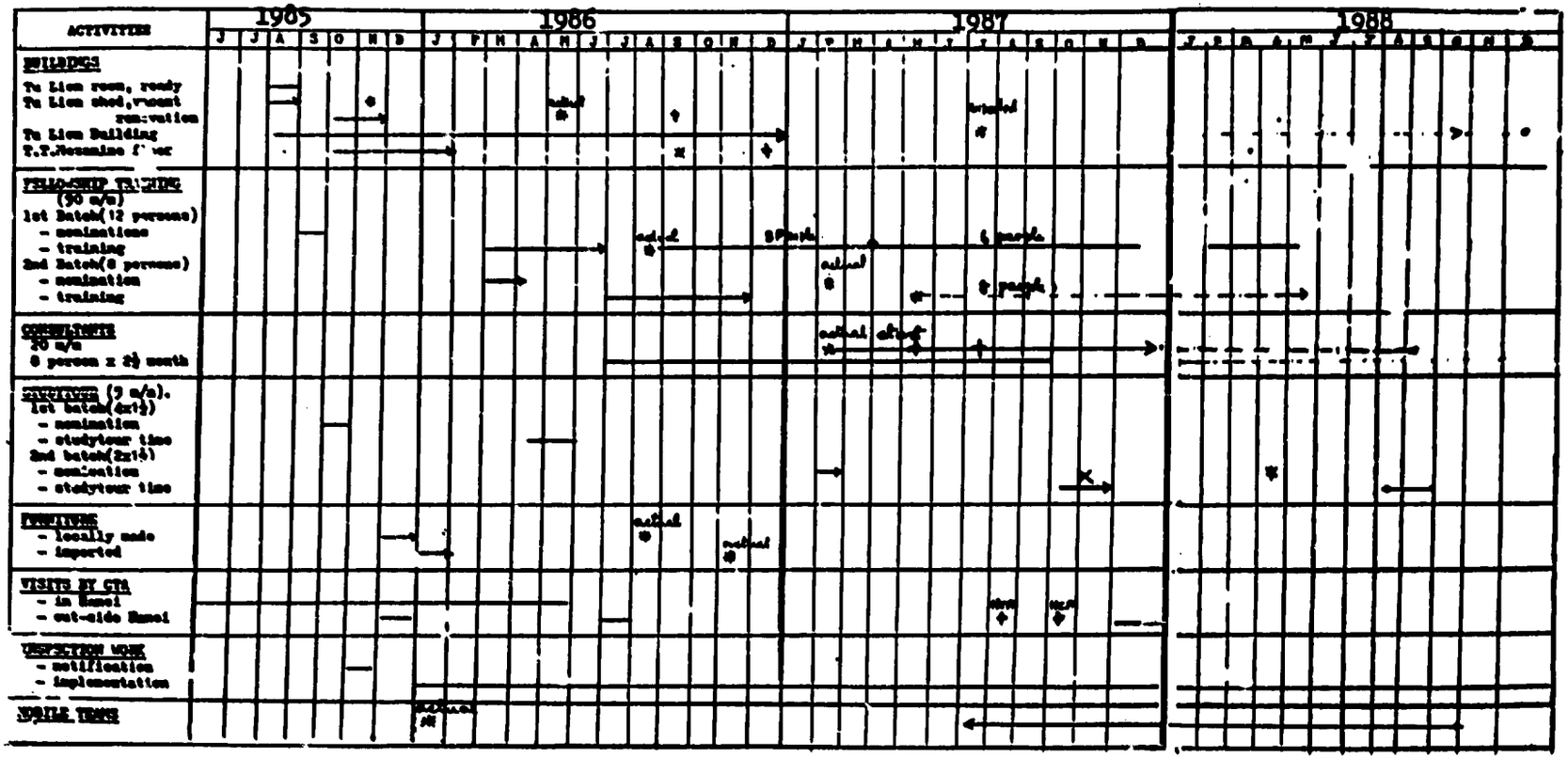
ANNEX III



ANNEX III-2

W O R K P L A N.

present ending 1987 proposed ending 1988



LIST OF TECHNICIANS

ANNEX IV

INSTRUMENT SERVICE CENTRE HANOI

***

I. Optical workshop

1. Mr. Tran Xuan Tu , Head of workshop, survey instrument.
2. Mr. Tran Xuan Toa, Engineer, survey instrument.
3. Ms. Nguyen Bich Dung, Engineer, Survey Instrument.
4. Mr. Nguyen Kim Sen, Engineer, Ophthalmological instrument.
5. Mr. Nguyen Vinh Hung, Engineer, Ophthalmological instrument.
6. Mr. Chu Xuan Quang, Engineer, precision mechanic equipment.
7. Mrs. Nguyen Phuong Bao, engineer, Microscopes.
8. Mrs. Nguyen Tu Oanh, worker, microscopes.
9. Mr. Tran Ngoc Tran, engineer, photogrametry equipment.

II. Refrigeration workshop

1. Mr. Pham Van Nhung, worker,
2. Mr. Nguyen Van Hien, worker,
3. Mr. Nguyen Nam Giang, worker.

III. Electric and Mechanic workshop

1. Mrs. Nguyen Thi Dan, worker,
2. Ms. Nguyen Thi Hong, worker (stocking)
3. Mr. Tran Viet Thang, engineer, mechanics.
4. Mrs. Tran Bich Thuy, worker
5. Mr. Tran Ngoc Thanh, engineer, mechanics.
6. Mrs. Tran Thi Thao, worker (stocking)

IV. Office equipment workshop

1. Mr. Le Duy Mai, engineer, electronics.

V. Glass Blowing workshop

1. Mr. Nguyen Ngoc Chinh, worker
2. Mr. Tran Anh Tuan, Technician,
3. Mrs. Hoang Thi Lieu, worker,
4. Ms. Nguyen Thu Ha, worker.

VI. Electronic workshop

1. Mr. Nguyen Huy Long, engineer, electronics.
2. Mr. Tran Ngoc Minh, engineer, electronics.
3. Mr. Dinh Trong Thuan, engineer, electronics.
4. Mr. Chu Manh Cuong, engineer, electronics.
5. Mr. Nguyen Khac Du, engineer, electronics.
6. Mr. Vu Cong Toan, engineer electronics.
7. Mr. Phung Hoai Thanh, engineer, electronics.

ANNEX V

UNITED NATIONS DEVELOPMENT PROGRAMME

PROGRAMME DES NATIONS UNIES POUR LE DÉVELOPPEMENT

TELEPHONE: 57485
57318

CHUONG TRINH CỦA LIÊN HIỆP QUỐC
VỀ PHÁT TRIỂN

CABLE ADDRESS:
UNDEVPRO HANOI

REFERENCE: ADM/250/AC
ADM/250/Gen.Maint.
VIE/80/039

TẠI CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
27-29 PHỐ PHAN BỘI CHÂU — HÀ NỘI

Hanoi, 21 November 1985

ADMINISTRATIVE CIRCULAR 85/62

To: Agency Representatives, WFP, UNFPA Deputy Representatives
Chief Technical Advisers and Officers-in-Charge

From: T.D.Jones
Resident Representative a.i.
UNDP, HANOI

Subject: Repairs of air conditioners and dehumidifiers

We have been informed by Mr. Suri, CTA of project VIE/80/039 "Repair and Maintenance Centre for Optical and Electronic Equipment", that air conditioners and dehumidifiers can be serviced, as spare compressors are in stock and motors can be rewound, at the Inspection Service of the project, at the following address in Hanoi:

30 Trang Tien Street
Tel. 54956

When sending the equipment for repair, please observe the following:

1. Only two items will be accepted at a time. When they are collected, two more can be sent;

2. A letter of request should be sent in advance or with the equipment following an appointment.

3. A demonstration of its normal working condition may be necessary. Therefore the user or a qualified person should bring the equipment.

4. Service manual, Instruction manual or any other written information from the manufacturer required.

5. If you have any spare parts, please bring them with you.

6. Equipment may be received between 9 a.m. and 11.30 a.m. or from 2 to 3.30 p.m. on working days.

ANNEX VI

Instrument Service Centre

HANOI

Distribution of Activities

Space promised in the Proj. Dec.	1671 Sq. Metres	
Space available on two floor of Mian Building in Tu Liem	390 + 390 = 780	=Passage of 26M² =754
Space available at 30 Trang Tien	400 + 100 = 500	
	Old new	
	1254	m²
Space available in the Work Shed.	320	
	1574	m²

It will be preferable to have all activities located at Tu Liem instead of splitting them over Tu Liem and Trang Tien, in the interest of efficiency. This can be done by giving to the Centre the upper two floor of the New Building, also, in lieu of Trang Tien space.

Workshops

1. Glass Blowing Workshop and Store for raw materials.
   (for making Hydrometers, Thermometers, Syringes, repairs to imported glass apparatus broken in transit, new apparatus made to order, Mercury Cleaning - chemical and Vacuum distillation)

2. Machine Shop. (Metal Working) + Tool Room and Drawing Office + Store (for cutting, bending, turning, milling, grinding operations to make spare parts)

3. Machine Shop (Wood working) + Store for raw material
   (for cutting, planning , joining operations)

4. Surface Cleaning, Spray Painting, Electro-plating Shop
   (for metal and wood)

5. Electrical Workshop
   (for repair of ovens, Incubators, water baths, heaters, centrifuges motors rewinding, emergency generators)

6. Refrigeration Worshop

(For repair of Refrigerators, Air Conditioners, De humidifiers, and cold chambers, refrigerated Centrifuges).

7. Automobile Maintenance Shop

(for 4 vehicles of the Centre and company vehicles to include Battery Charging, Distilled Water Still, Vulcanising, Washing, Greasing and oiling facilities)

8. Office Equipment Workshop

(mainly for Photo-copiers, and Typewriters-mechanical, electrical.

Laboratories

1. Optical-Mechanical Instruments Repair

e.g. Survey, Photogrammetry, Cartographic, Microscopes, Eye Hospital equipment, Opt-Mechanical Balances.

2. Electronic Instruments Repair

e. g. Oscilloscopes, Digital Multimeters, Frequency meters, Chart Recorders, Electronic Balances, Electronic Power Supplies.

3. Analytical Instruments Repair

e.g Spectrum Instruments (Spectrophotometers, Colorimeters, Flame Photometers) X-Ray Instruments, Derivatographs, Chromatographs, pH meters, Moisture Analysis, Gas Analysis.

4. Standards and Calibration Laboratory

for Mechanics/Electric/Electronic precision measurements for calibration purposes.

5. Vacuum Laboratory

vacuum generation, leak detection, vacuum measurement.

ANNEX VI-3

Reception

Of Visitors, Phone calls, Correspondence

Of Instruments, including dis-assembly, re-assembly, packing for transport

Delivery after demonstration of correct working.

Administrative Support

Rooms for Director, Deputy Director, C T A and Consultants (for duration of Project)

Rooms for Finance, Billing, Record Keeping, Contracts.

Library/Reading Room/Class Room

Canteen/Cooking/Common Room

First Aid Room

Guest Workers Rooms/Guest Rooms

Stores

1. Optical Materials (such as lenses, prisms, mounts, racks & pinion, Photogrammetry and carto-graphy spares, dessicants)

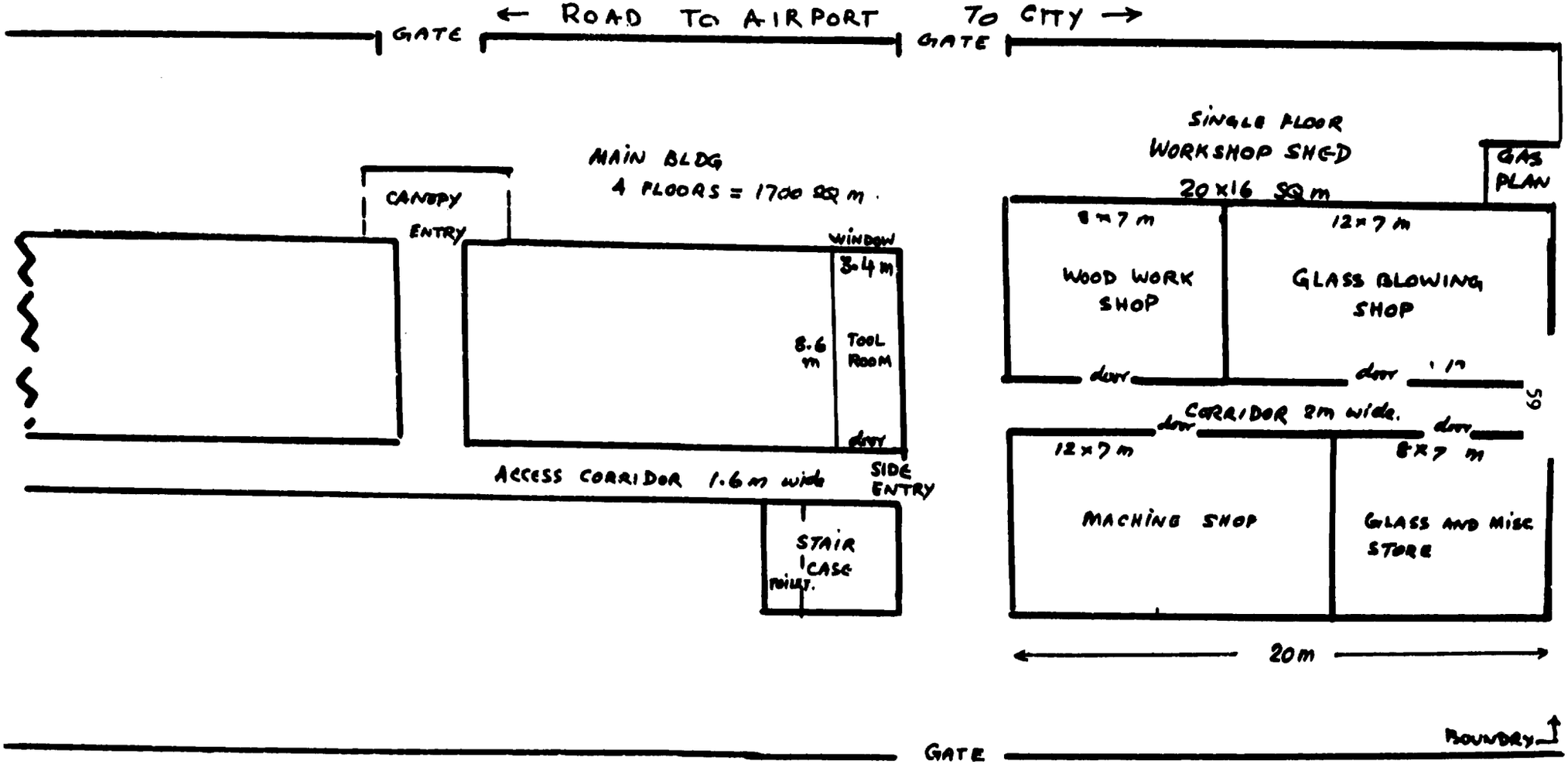
2. Electrical (such as wires, insulators, plugs, sockets, switch holders, cut outs, lamps, neon tubes and accessories)

3. Electronic/Analytic (electronic hardware, passive components e.g. resistors, capacitors, active components, such as transistors, Integ.circuits, Diodes, fuses, Ph elcetrodes, Thermocouples, Thermometers)

4. Mechanical (screws, nails, nuts, bolts, washers, circlips, metal kit greases, oils, abrasives, sheets, rods, angles, fibre,Plastics.

LAYOUT OF MAIN BUILDING AND
WORKSHOP AT TU LIEM, HANOI-
7TH.KM.

ANNEX VII



ANNEX VIII

Work Report of the Instrument Centre

Jan-June 1986

Client	(Outstation)
Hanh Minh Survey Company	3
Than Hoa Survey and Design Factory	3
Han Minh Food Factory	7
Ninh Binh Hospital	3
Hahn Nam Pharmalogical Testing Station	1
Haiphong Mechanical Factory	5
Haiphong Medicine Institute	29
Da Nang Pharmalogical Testing Station	10
Da Nang Goods Calibration and Testing Station	8
Da Nang Poly-technic	10
Quangson Union of Pharmalogical Factories	19
Da Nang Pharmalogical Factory	3
Da Nang Cement Factory	5

Types of Equipment Serviced (Instruments & Appliances)

Survey Equipment, Microscopes, Refractometers, Colorimeters Spectrometers, Balances, Ovens, Furnaces, Vibrators, Temperature Stablised Bath, Numerical Controlled Grinding machine Refrigerators, Air conditioners, Pho. copiers, Manual and Electric Type writers.

Hanoi and Surroundings

Contracts with 53 Clients, Factories and Institutions.

No. of Instruments/Appliances 500

In addition to the above categories.

Photogrammetry, Spectral Analysers, Chromatograph, Quartz Spectrophotometers I-R. Spectrographs, Stereometrographs, Tropocart, Interpreto scop.

At the request of the Hanoi Polytechnic, spare parts for their Scanning Electron Microscope of Jeol make, have been procured.

ANNEX VIII-2

Work Report - Instrument Service Centre - Hanoi

July 1986 to June 1987

Out-Station Work

Several Institutions, Companies and organisations were served during the period under review e.g.

	Numbering
Moc Chau Plantations	
Microscopes, Colorimeters, Ph meters, REfractometers & Refrigerators	35
Quang-ninh Geology Institute	
Colorimeter, Flame Photometer, Balance	3
Binh Tri Thien Survey Company	
Theodolites	5
Thai Nguyan General Hospital	
Microscopes, Flame Photometer, Colorimeter, Ovens Furnaces, Ditillation Apparatus	18
Son Tay Sugar Factory	
Refractometers, Sacharimeter, Microscopes	4
Total	65

Work done in and around Hanoi

Polytechnic Institute, Hanoi
Ovens, Balances, Microscopes, Universal Measuring Microscope

Hanoi Research Institute
Gas Chromatograph, Infra red Spectrograph.

ANNEX VIII-3

Cartography Institute

Topocart, Stereometrograph, Technocart, Interpretoscope.

Hanoi University

Colorimeter, Spectrum Analysis Instrument, Microscopes

Hospitals in Hanoi

Microscopes, Balances, Colorimeters, Flame Photometers, Ovens, Vibrators, Pottle shakers

Hanoi Textile Factory

Textile strength Tester, Lux meter

Metrology Centre I, Hanoi

Spectro Analysis Instrument, Universal Microscope, Optimat, Profilograph.

Total 1070

Apart from the Vietnamese Organisations, the following Embassies were served:

Belgium, Egypt, France, Holland, Hungary, U N D P, Office, UNHCR, FAO, UNFPA,

ANNEX IX

General Laboratory Supplies

S/No	Name of Equipment (x how many)	Price in $	Supplier	Country
1.	Emergency Generators (x5x3,2.2.0.5 KVA)	4000	A. Andrews	Hong Kong
2.	Tube Lights and fixtures (items 2,3,7,8)	8200		
3.	Ceiling Fans			
4.	Cup Boards (x4)	400	Habitat	Bangkok
5.	Steel Racks (x4)	180		
6.	Air Conditioners (x10)	4000		
7.	Switches/Sockets/Cut outs			
8.	Mercury Pressure Lamps			
9	Technical Books	1500	U.B.P.	India
10.	Jacks/Gauges/Foot Pumps/Tube repair	1500	A. Andrews	Hong Kong

Department Vehicles

1.	Land Cruiser + spares	16610	Toyata	Japan
2.	Station Wagon	3877		
3.	Pick up	3959		
4.	Minibus	5970		
5.	Spares	1525		

Opto-Mechanics Laboratory

1.	Special Tools	2000	Zeiss	DDR
2.	Angle Measuring Instrument	7000	L O T	FRG
3.	Microscope	300	"	"
4.	Working Tables (x10)	2650		
5.	Adjustable Chairs (x10)	325		

Glass Blowing Workshop

1.	Petrol Gas Plant (x2)	2500	Mansfield	India
2.	Air Compressor	2000	Arnold	F R G
3.	Universal Glass Cutting Machinery	3500		
4.	Glass Grinding Machinery	3700		
5.	Glass rod/tube graduation machine	3050		
6.	Annealing Furnace (vacuum)	1800	Griffin	U K
7.	Special Burners and Pressure Tube			
8.	Glass Blowing Hand Tools	5000		
9.	Strain Viewer	950	Arnold	F R G
10.	Optical Wall Thickness GAuge	1000		
11.	High Speed Glass Drill & Bits	2400		
12.	Circle Cutters	30		
13.	Disc Cutter	620		
14.	Electric Cracking Unit	600		
15.	Burners and Hand Torches (x10)	20000		
16.	Special Tools, Fixtures (x 6 sets)			
17.	Asbestos-covered Lab. Tables (x10)	2380	Habitat	Bangkok
18.	Adjustable Chairs (x5)	175		

Refrigeration Workshop

1.	Charging Station (x2)	3012	Mc Master	U S A
2.	Regulator/Torch/Filter	700	Buck & HIckman	U K
3.	Insulation Glass Wool + Gaskets	4426	Mc Master	U S A
4.	Auto Transformer & Deumidifiers	4000	A. Andrews	Hong Kong
5.	Heat Gun, Ultrasonic Cleaner-Crane	4276	Mc Master	U S A
6.	Air Conditioners (x10) spare compressors	12300	A. Andrews	U S A
7.	Testing Manifold, Flaring, Cutting Filter Dryer, 15 uF Capacitors	1833		
8.	Refrigerant Gases, Solvent, Cement	6685	Mc. Master	U S A
9.	Emergency Generaors, Room Heaters Compressor, Fan Motors	11000	A. Andrew	Hong Kong

10.	Silver Solder	2180	Buck & Hickman	U K
11.	Heavy Duty Tables (x10)	2100	Habitat	Bangkok
12.	Adjustable Chairs (x5)	175	"	"
13.	Trolley Tables (x2)	600	Kennedy Intl.	U K
14.	Adjustable Trolleys (x2)	2660	"	
15.	Open Racks (x2)	400	"	

Analysis Instruments Laboratory

1.	Spectronic 20, Spectrophotometer	1100	LABSCO	F R G
	Accessories	1017		
2.	pH Meter	1220		
	Accessories	802		
3.	Conductivity Meter	759		
	Accessories	306		
4.	Pirani Gauge 1%	748		
	Accessories	306		
5.	Penning Gauge	593		
	Accessories	360		
6.	Vacuum Tester.Tesla Type	338		
7.	Flame Photometer, Digital	3982		
	Accessories	730		
8.	Heating Mantle (x2)	418		
9.	A. C. Clamp on Meter	84		
10.	Surface Temperature Measuring Inst.	314		
	Accessories	547		
11.	Top Loading Balance (400gm/1mg)	1361		
12.	Spectrometer with Prism and Grating	978	Karl Kolb	F R G
	Accessories	2164		
13.	Top Loading Balance (220 gm/	1227		
14.	Mobile Vacuum Unit (10^{-4} Torr)	3413		
15.	do (10^{-6} Torr)	4136		
16.	Oil Pump-single Stage	495		
17.	do Double Stage	1159		
18.	Pirani Vac. Gauge (0.001 mb) (x2)	1418		
19.	Digital Vacuum Meter (1mb) (x2)	1754		

20.	Vacuum Dial Gauge	(x4)	256		
21.	Vacustat Vacuum Meter	(x2)	1206		
22.	Vac. Tubing		141		
23.	Vac. Oil		82		
24.	Vac. Rubber Rings		139		
25.	Diffusion Pump Oil		907		
26.	Wet/Dry Bulb Hygrometer	(x2)	64		
27.	Annealing Furnace 1150 oC		1727		
28.	Diamond Cutters		140		
29.	Contact Thermometers	(x130)	3851		
30.	Constant Temp Thermostats	(x10)	5786		
31.	Deep Freeze Spares	(x5)	1807		
32.	Glass pH. Electrodes	(x50)	4545		
33.	Calomel pH, Electrodes	(x20)	1364		
34.	Combined pH Electrodes	(x10)	909		
35.	Heating Elements	(x60)	5264		
36.	For different rangesand rates of heating	(x20)	10000		
37.	Thermocouples	(x30)	7909		
38.	Relays	(60)	5886		
39.	Laboratory Tables	(10)	2650		
40.	Adjustable Chairs	(10)			

Electronics Laboratory

1.	Oscillograph 50 Mhz	(x2)	2400	Philips	Holland
2.	Oscilloscope, Storage Type		5490		
3.	Frequency Counter 120 MHZ		3250		
4.	Pulse Generator 50 MHZ	(x2)	2400		
5.	Stroboscope		1100		
6.	Analogue Multimeter	(x2)	1000		
7.	Digital Multimeter 5½ digit		3000		
8.	Portable Digital Multimeter	(x3)	780		
9.	X-Y Recorder	(x2)	2600		
10.	X-T Recorder	(x2)	1000		

11.	Signature Analyser (x2)	2640		
12.	Line Conditioner 1.5 KVA (x2)	1400		
13.	A. C. Voltage Stabliser 1 KVA (x2)	3300		
14.	Un-interrupted Power Supply 500 VA	2300		
15.	Switch Mode Power Supply 5V/12A	380		
16.	Constant Voltage Transformer (x5)	900		
17.	D. C. Power Supply (20V/20Z)(x2)	2100		
18.	Oscillo-8 Trace	1485	National	Japan
19.	Oscillo-2 Trace, 200MHZ	5730		
20	Service Oscillo-15 MHZ	365		
21	Oscillo Cart	230		
22.	AM/FM Signal Generator	3520		
23.	Programmable R/C Oscillator	2775		
24.	Function Generator	1120		
25.	Sweep Generator	1280		
26.	A. C. Micro-volter	365		
27.	Analogue Voltmeter (1000V) (x2)	930		
28.	Digital Milli-Ohmmeter (x2)	1500		
29.	P. H. Simulator	770	Ogwe Seiki	Japan
30	Transistor Tester	616		
31	Digital I.C. Tester (Bench Type)	1493		
32.	Digital I.C. Tester (Portable)	733		
33.	Operational Amplifier Tester	782		
34.	Portable Oscilloscope		R.S.	U K
35.	Multiplexer			
36.	Portable Frequency Meter			
37.	Portable Oscillator			
38.	Portable A.V.O. Junior			
39.	Laboratory Tables (x10)	2650	Habitat	Bangkok
40.	Adjustable Bench Tube Light (x8)	560	Kennedy	U K
41.	Plastic Storage Cabinets	1460	Luna	Sweden
42.	Electronic Hand Tool.kits	3270	R.S.	U K
43.	Electronic Hardware (+items 34-37)	7200	R.S.	U K
44.	AVO Meters and Rechargable Cells	3200		
45.	Data Books	500		
46.	Spare Parts	3000	do	do
47.	Adjustable Chairs	325	Habitat	Bangkok

ANNEX IX-6

Machine Shop +Wood Working Shop

1.	Lathe + accessories ($1850 +	3490	Myford	U K
2.	Milling Machine + acc. ($13,000 +	17800	Luna	Sweden
3.	Tools	3900	"	"
4.	Spot Welder	870	"	"
5.	Tool Boxes, Plastic Containers etc.	3200	"	"
6.	Circular Saw + Bench	600	Kennedy	U K
7.	Planer	1900		
8.	Sander	450		
9.	Electric Saw	325		
10.	Saw Hood + Extractor Fan	60		
11.	Portable Planer and Cutters	560		
12.	500 Kg. Lift/3 Metres	250		
13.	Electric Drills (x5)	400		
14.	Ball Bearing Extractor (x2)	100		
15.	Tow Rope (x5)	100		
16.	Milling Cutters	1800		
17.	Engineers Level	100		
18.	Misc. Drills, Reamers, Taps, Dies Lathe Centre, Grinding Centre, Screw Thread Gauges, Plug Gauges Machine Vise, Grease Guns, Oil Guns, Dividing Head, Angle Plate. Parallel Bars, Pipe Vise, Knurling Rollers, Arbor Spacer Rings, 87 pc. Gauge Block set. Metric Gauges Fitters Trolleys, Trolley Tables Mobile Lift Tables, Storage Cabinets, Tool Cabinets Cypboards.			
19.	Sand Blast Booth	900	McMaster	U S A
20.	Vapor de-greaser	700		
21.	Grinder/Buffer	380		
22.	Drawing Board + Accessories	1115	A. Andrews	Hong Kong
23.	Heavy Duty Mech. Tables (x10)	2100	Habitat	Bangkok
24.	Adjustable Chairs (x5)	175	"	"

ANNEX IX-7

Training & Project Office Supplies

1.	Portable English Type-writer		140	A. Andrews	Hong Kong
2.	Vietnamese Typewriter		250	Robotron	D D R
3.	Overhead Projector		312	A. Andrews	Hong Kong
4.	Projection Screen		80		
5.	Facit English Type-writer				
6.	Photo Copier (Ricoh)		1800		
7.	Photo Copier Supplies		200		
8.	Spirit Duplicator		710		
9.	" Supplies		375		
10.	Ink Duplicator		694		
11.	Voltage Stabliser for Photocopier		460		
12.	Bottle Cooler	(x2)	973		
13.	Slide Projector		144		
14.	Selenium Drum for Photocopier	(x3)	1080		
15.	Display Board	(x2)	60		
16.	Wall Clock	(x2)	70		
17.	Dymo	(x2)	30		
18.	Paper Shredder		506		
19.	Filing Cabiner	(x2)	320		
20.	Visible Recorders	(x2)	514		
21.	Desk Calculator	(x2)	43		
22.	Pedestal Fans	(x10)	713		
23.	Gaz/Petrol/Kerosene Lamps	(x3)	360		
24.	Dehumidifiers	(x16)	1790		
25.	Work Tables	(x5)	1200		

ANNEX X

Fellowship Training Programme

S/No	Name	Subject	Period/From-to/Country	Training Cost.
1.	P M. Duc	Precision Machanics	5 mo. 7/86 to 1/87 India/CMTI	$7818
2.	T. N. Tran	Aerial Survey Instmt Repair	2½ mo. 9/86 to 11/86 Swiss/Wild	7534
3.	T. X. Toa	Land Survey Instmt	3½ Mo. 9/86 to 12/86 Swiss/Wild	8883
4.	Doanh	Refrigeration	3½ Mo. 9/86 to 12/86 F R G/Kassel	84?4
5.	N . H. Long	Electronic Instmts Repair	5 Mo. 10/86 to 3/87 India/ATI-EPI	42?9
6.	N. V. Hung	Eye Instruments Repair	4 Mo. 3/87 to 6/87 D D R/Zeiss	10692
7.	N. K. Sen	"	"	"
8.	L. D. Mai	Photo-copier Repair	5 Mo. 7/87 to 12/87 Thailand/4 Agents	
9.	N. P. Bao	Microscope Repair	2 Mo. 10/87 to 12/87 Swiss/Wild	12418
10.	T. N. Minh	Derivatographs	4 Mo. 12/87 to 3/88 Hungary/M O M	
11.	D. T. Thuan	Analysis Instruments	4 Mo. 12/87 to 3/88 India/Roorkee Univ.	
12.	C. M. Cuong	"	"	
13.	T. V. Thang	Precision Mechs.	4 Mo. 3/88 to 7/88 India CMTI	

ANNEX X-2

14.	V. C. Toan	Analysis Instruments	4 Mo. 12/87 to 3/88 India/Roorkee Univ.
15.	C. X. Quang	Optical Proceedures	4 Mo. 3/88 to 7/88 India, I.I.Sc.
16.	N. N. Giang	Mechanical Repairs	4 Mo. 12/87 to 3/88 India/Roorkee Univ.
17.	V. A. Toan	Stores/Purchase	

ANNEX XI

List of Consultants

S/No.	Name	Subject	Period/From-to	Costs
1	L. Drummond (U K)	Workshop Practice	2 Months 1/5 to 1/7/87	
2.	H. Gardner (U K)	Refrigeration Practice	2 Months 12/8 to 5/10/87	
3.	H. Ebneter (Swiss)	Opto-Mechanics (1st Time)	2 Weeks 7/10 to 21/10/87	
4.	A. Zwart (Dutch)	Glass Blowing Practice	2 Months 14/10 to 16/12/87	

VISITORS TO THE CENTRE.

ANNEX XII

S.	Name	Affiliation	Purpose of visit.
1.	Mr. Goussev G.H.	CTA. Project VIE/80/004	For writing Repair contract & Technical information for purchas
2.	Mr. Dobrinsky O.	CTA 80/006	do
3.	Mr. Hajas, Pal	CTA 80/013	do
4.	Mr. Gonzalez, G	DRR UNFPA	Open day visitor
5.	Mr Lijanco, H.	CTA 83/009	Photo copier Repair
6.	Mr. Das, B.C.	CTA 80/011	Microscope, Ovens & Copier repair
7.	Mr. Adermalm, L	J.P.O UNDP Hanoi	General visit
8.	Mr Bizot , F.C.	DRR UNDP "	"
9.	Mr Ring Rose, N.	RR (a.i.) " "	"
10	Mr Haille Mariam,:H	CTA 80/005	Refrig, Oven, Photocopier repair
11.	Mr Johnson,B.	CTA 84/004	Open day visitor
12.	Ms. Harkes,M.	Admn. Secy. UNDP Hanoi	"
13	Mr. Plear, G.	Admn. Secy UNDP "	"
14	Mrs Ringrose, A.	RR' wife	"
15	Ms ULLA	Admn. Secy Finland Emb.	"
16.	Ms Hurjo	Admn. " "	"
17	Mr. Schmied, A.	Technician 83/003	For training possibilities
18.	Mr. Asperare, A.	Relat' Support Dir. SIDA	for collaboration in Repairs
19.	Mr. Larsson	Swedish Health Repair Centre	"
20.	Mr. Bekker, P.	Head, Physics, UNIV of Amsterdam	Interested in our Glass shop
23.	Mr. Bekke Lar, M.	Head, Machine Shop, "	"
24.	Dr. Boonstra, H	Dutch Gync., Groningen	For Repair of Medical Colposcopes
25.	Dr. Kolin, M.J.	Karlova Univ, Praha, Eye Doc.	For repair of Eye instruments
26.	Mr. Rollins, A	Charge'd Affairs, Belgian Emb.	For maintenance of Photocopiers
27.	Mr.	French Emb. Hanoi	"
28.	Mr. Stokum. G	Hungarian Academy of Sciences	General visit.
29	Mr., Gonzalez, M.	UNICEF, Hanoi	Open day visitor
30.	Mr Bazoche, C.H.	D R R , UNDER, Hanoi	"
31.	Mr.	Red Cross Rep. Hanoi	"
32.	Ms. Josie Dimatulac.	CTA, 82/008	Gas Chromatograph repair
33.	Delegation, 10 people	Swedish Paper Mill, Haihong	Collaboration in training.
34.	Ms. Nicole	Belgian Embassy, Hanoi	Fridge repair
35	Mr Scholz	Trade Rep. Embassy of DDR	General visit
36.	Tilly, M.	Swedish Barge Project.	"
37	Bercsi, Z	CTA 83/001	Purchase information
38.	Branda, J.	Expert, Min of Agri, Hanoi	General visit.
39	Liberasch, R.	Topography Expt, Vientienne	General visit
40.	Mr. Gorski, J.	SIDPA, UNIDO, Rangoon	"

ANNEX XIII

List of Representative Letters Received by the C T A from Other Projects & UNDP Office

1. UNICEF (Hanoi) inquiring about training facilities for electronic technicians for maintenance of electronic control panels installed in Dalt for vaccine production.

2. UN Project on Diesel Railways in Ho Chi Minh City (VIE/80/054) inquiring about repair of photocopy machines of their Project and training of their technicians in their future maintenance.

3. UN Project on Housing and Building Construction (VIE/80/003) inquiring about repair of their optical and electronic field equipment in soil testing laboratories and if there will be branches of the Hanoi Centre, elsewhere in Vietnam.

4. UN Project on Quality Control and Pre shipment inspection (VIE/82/008) inquiring about possibility of installation of electronic equipment gas chromatograph equipment costing $38,000.00 & which did not work on arrival.

5. UN Project on Prawn Seed Production (VIE/83/002) inquiring about repair at site in Nghia Binh (2 days journeys) province of the projects photocopy machine.

6. UN Project (VIE/80/057) inquiring about repair possibility for Typewriters,imcrofiche machine, airconditioner and photocopiers.

8. Resident Representative of U N D P Hanoi, sending a covering letter for the repair of 15 airconditioners of miscellaneous makes.

ANNEX XIV

Information About Instruments Desired

from Future Customers

1. Name of the Equipment/Location in Department

2. Maker/Model/Serial Number/Country of Manufacture

3. What documentation is available. Service Manual/Instruction Manual/ Sales Pamphlet/Nothing.

4. Purpose of the Instrument/Equipment.

5. When received/Who installed.

6. Is it in use now/Is it working well/Not working well/not working at all.

7. Do you have any spare parts.

8. Is it heavy. Is there one piece or more, in the complete equipment.

9. If it is declared obsolete/too expensive to service--what further action can you take.

ANNEX XV

C T A. VIE/80/039 Hanoi, Vietnam

Lessons from running this Project for 2½ years
(1985 - 1987)

1. A Project should not be started here without a building. Renovations is a different matter but one should not count on the promise of a new construction.

2. The supply of continuous Power and Water should be insisted upon otherwise the whole effort goes waste. Large Generators are no substitute. Small generators can do a few jobs.

3. One support person with the C T A is not enough. There should be at least three persons. Secretary - Interpreter - Typist.

4. Appropriate vehicles should be purchased according to the requirements and their maintenance on a regular basis should be assured.

5. The Project should make use of Air letters and Envelopes with Thai postage for general correspondence to reduce the load on Telex service.

6. In a Project of 2 years or more, there should be provision of a visit to the Headquarters, by the C T A.

7. Study tours should be arranged after a Project starts and not before.

8. When choosing a C T A, previous work experience as a Consultant in the U N system should be insisted upon.

9. In Projects of this nature, C T A's should be allowed to visit nearest commercial markets for locating sources of supply of diverse items, not available in this country.

10. In the Briefing kit, a short write-up on the on-going projects in the country should be included. Also airport formalities at the time of arrival and departure should be adequately covered in the Living conditions brochure.