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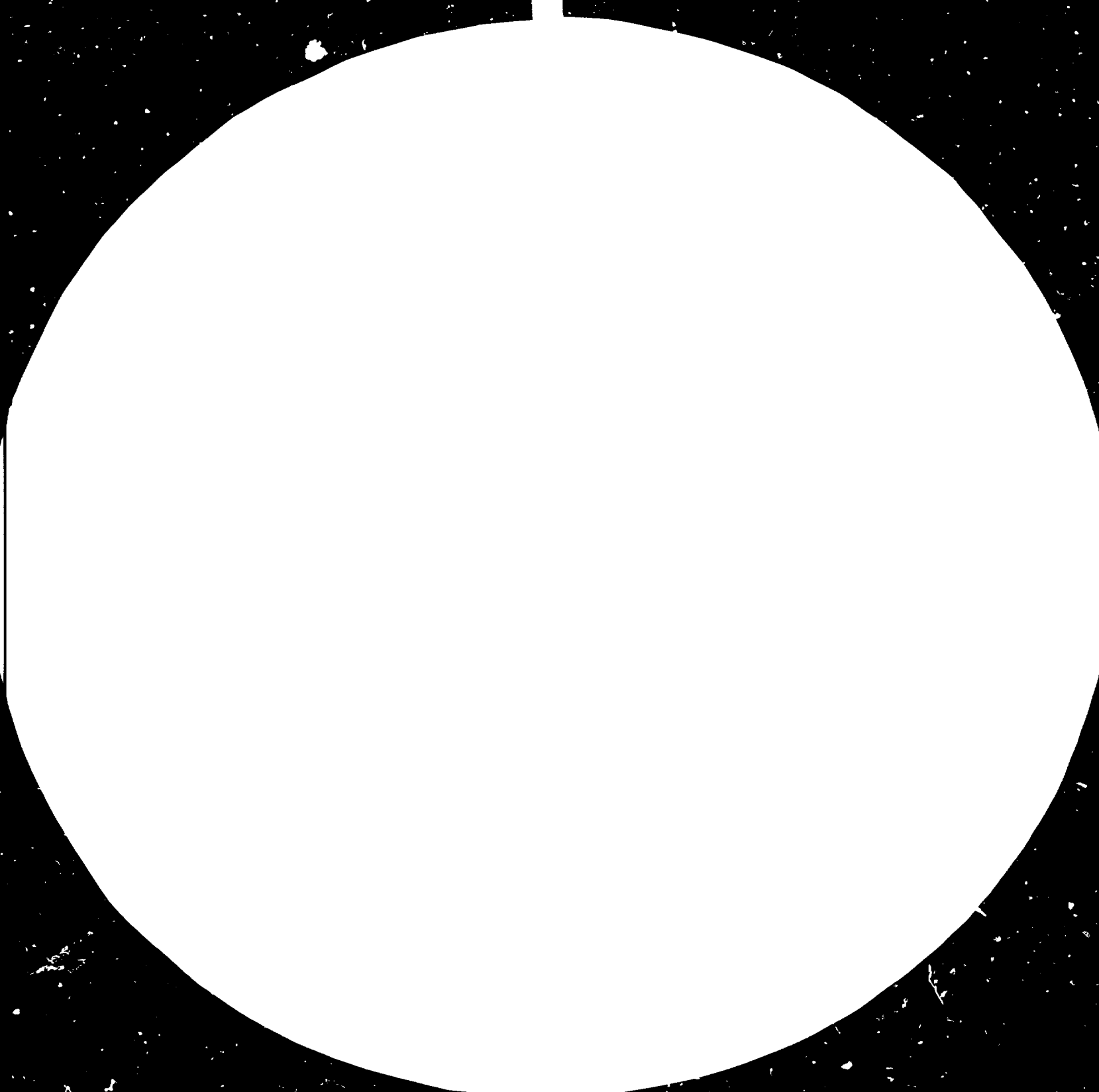
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1.0

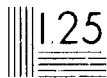
2.0



2.0



1.8



Resolution Test Chart  
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 1.1  
 1.25  
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13642

10 March 1984

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MISSION REPORT

COOPERATIVE PROGRAM BETWEEN THE  
TECHNOLOGICAL INFORMATION EXCHANGE SYSTEM  
AND THE  
ANDEAN SYSTEM OF TECHNOLOGICAL INFORMATION

[Cooperation between TIES and  
SAIT]

Prepared by  
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UNIDO Consultant

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I. INTRODUCTION AND  
ACKNOWLEDGEMENTS

### Introduction

Resolutions adopted at the last TIES meeting in Caracas as well as at the regional meeting of TIES participants from Andean Pact countries in October of 1983 recommended close cooperation between the Technological Information Exchange System (TIES) and the Andean System of Technological Information (SAIT). Since that time staff of UNIDO and the JUNTA have worked together to rationalize data input procedures to facilitate participation in the two systems by member countries. The purpose of this mission was, *inter alia*, to introduce this first phase of the cooperative program between UNIDO and the JUNTA as related to these two information systems.

### Acknowledgements

I am most grateful to Johan Cramwinckel and G.S. Gouri for making it possible for me to complete this mission to the Andean Pact countries to introduce the cooperative program between TIES and SAIT. This association will only serve to strengthen TIES and its value in improving the negotiation capabilities of the participating countries.

I wish to thank all registry personnel who so willingly gave of their time and made their facilities available to me to make my mission such a success. Among those I would especially like to thank are Gustavo Flores Guevara and Jorge Osorio of the JUNTA; Jorge Falconi, CONITE, Peru; José Villacís, María Estrada, Jandry Coello, Eduardo Morillo and Oswaldo Noboa, MICEI, Ecuador; Diego Naranjo, Ernesto Duque, Myriam Zarate, Superintendencia de Industria y Comercio, Colombia; Rafaela de Sánchez, Trina Michelangeli, Vladimir Ramirez and Trina Zavarse of SIEX, Venezuela; and David Bustos of the Dirección General de Normas y Tecnología, Bolivia.



(9)

II. ACTION ITEMS

## ACTION ITEMS

### JUNAC

- Resolve issue as to whether UNIDO will be modifying TIES system to incorporate SAIT data items. If not JUNAC must be notified that they will have to input these data fields.
- Follow up on Gustavo Flores' agreement to provide introduction to TIES/SAIT coding manual and clarification and examples of 'Relación de filiación' and 'Relación proveedor/receptor' fields.
- Send sample tape to JUNTA so they can test input procedures.

### ECUADOR

- Consider review of application form for Ecuador as agenda item for regional TIES meeting.
- Follow up on Sorbitol issue with Ecuador and CONCIT - Venezuela.
- Consider foreign firm contracting as agenda item for next TIES meeting.
- Send product codes (in Spanish) and supplier country codes as soon as possible.

### COLOMBIA

- Letter to Carlos Balderama requesting his cooperation in providing data on service agreements via the Superintendencia.
- Follow up on corrections to back TIES data.
- Send documents from last TIES meeting (in Spanish where possible) to Ernesto Duque.
- Invite participation in next TIES meeting at least 2 months in advance.
- Follow up on COLCIENCIAS request for assistance on negotiation of service agreements.
- Correct TIES Newsletter mailing list to Diego Naranjo Meza in the Superintendencia and delete Freddy Castaño.

VENEZUELA

- Send next ID Key to be used
- Follow up Sorbitol issue with CONCIT

BOLIVIA

- Send TIES Newsletter to Bustos, higher level personnel change too often and he never sees newsletter.
- Send industry and product codes (both in Spanish). Send supplier company codes.
- Send technology policies of other countries.
- Follow up on request for help in formulating national technology policy.
- Send a bibliography of UNIDO technology transfer documents published.

TIES RELATED

- Provide explanations and clear examples of Guarantees and Penalties on Service Agreements form.
- Make corrections to TIES coding manual.
- Review my comments on TIES coding manual and incorporate if necessary.

III. JUNAC REPORT

A. Background

Gustavo Flores has assumed a new position as head of the Communications and Informatics Group (Jefe de Comunicaciones y Informática). His responsibilities include public relations for the JUNTA and information systems. He remains the principal TIES contact as the manager of the various databank projects.

B. Review of TIES/SAIT Information Systems

Jorge Osorio, Gustavo Flores and I had detailed review sessions on the TIES/SAIT coding form and manual during my initial visit to Lima. We felt it necessary to incorporate certain changes to correct inconsistencies and errors. I revised the manual and coding form so that a complete correct version could be delivered during my visits to the participating countries. A copy of the corrected version was pouched to UNIDO from Lima. An additional copy is submitted together with this report.

Jorge Osorio has agreed to write an introduction to the manual and clarify certain data items, specifically 'relación de filiación' and 'relación proveedor/receptor'. He will send copies to the countries and to UNIDO. No further substantive changes (addition of restrictive clause data, for example) are foreseen.

During my initial visit to Lima the following schedule was agreed to for submission of data to UNIDO:

|              |           |  |
|--------------|-----------|--|
| TIES II data | 1972 - 82 | March 15, 1984   |
|              | 1983      | June 1, 1984 (due to the fact that the JUNTA has not received all the 1983 data yet) |

Data will be submitted, typed, in the format pouched to UNIDO from Lima.

|             |           |                |
|-------------|-----------|----------------|
| TIES I data | 1971 - 81 | March 15, 1984 |
|             | 1982      | May 30, 1984   |
|             | 1983      | June 30, 1984  |

TIES I data for 1971 - 82 will be on an annual basis only; 1983 on a biannual basis.

The JUNTA will provide all future (1984 on) TIES I data. They felt that they were in a better position to supply this information than the countries. I agreed as this relieves the countries of time consuming TIES I data preparation. I translated the TIES I coding instructions into Spanish for them, a copy was pouched to UNIDO from Lima. An additional copy is submitted together with this report.

The following methodology of data exchange was agreed upon:

1. Countries submit data to the JUNTA

2. JUNTA forwards it to UNIDO

3. UNIDO processes data and submits:

- one time:
- a. magnetic tape to the JUNTA with all historical data from all countries participating in TIES
  - b. reports to the individual countries (who have not previously received this information) with historical data
- on going:
- a. magnetic tape to the JUNTA with most recent data
  - b. reports to the individual countries with most recent data

I indicated that UNIDO would make every effort to forward the historical data as soon as possible, probably in the July - August time frame and most recent data in the August - September time frame. I suggest UNIDO confirm this to the JUNTA once the first batch of historical data is received.

During my debriefing visit to Lima I attempted to further clarify data processing issues. Gustavo Flores had been under the impression that UNIDO intended to incorporate SAIT data items in the TIES database and require all participating countries to use the new TIES/SAIT coding form. It seemed unlikely to me that UNIDO would modify the TIES system to include the SAIT data items or require all countries to use the new form. Such a modification would not be trivial or recommended.

The DBMS package used for the TIES system limits the number of records in a database to 32; the existing TIES form has 31. Inclusion of the SAIT items would require another database structure linked to the existing database to produce reports. That was the reason that the TIES service agreements are kept in a separate database; to avoid having to link two databases.

It is necessary to confirm to the JUNTA that the data they will receive on magnetic tape from UNIDO will be only the TIES data items. SAIT data items will not be sent in processed form either from Andean Pact or other participating countries. This implies that they must retain copies of the coding forms submitted to them by the countries and input the SAIT data items to the SAIT system. I suggest that UNIDO also confirm the data submission schedule detailed above in light of this misunderstanding.

The TIES section of this report discusses some possible longer range solutions to the limitations of the current TIES system.

### C. Computerization

The JUNTA has an interactive database package called 'STAIRS' running on their IBM system. This package will be used to develop the SAIT databank. As of my initial visit actual work had not yet begun on system development.

STAIRS is a powerful database management package which allows records of variable length; i.e no limit on the number of data fields per record. The system is interactive meaning that a user can sit down at a terminal and enter all data on a given contract in real time. The current plan is to load TIES data via magnetic tape supplied by UNIDO. SAIT data items must be input by the JUNTA. I estimate that the system will be ready by December 1984, if not sooner.

I suggest that UNIDO send the JUNTA, as soon as possible, a sample tape with 500 or so records so that they can test tape loading procedures as they develop their system.

A sample screen from the system might look something like the format on the next page.

Once implemented, JUNTA personnel will be able to access data on individual contracts from terminals in their offices. Plans are underway to provide each registry office with a terminal which can access the JUNTA's databank via telephone lines. Registry personnel would therefore have on-line access to all contracts in the TIES/SAIT database.

In principle there is no reason, why in the long run, individual countries could not directly input data on most recent contracts from their own offices. This would eliminate the need to fill out coding forms. The JUNTA could supply UNIDO with a magnetic tape of Andean Pact data on a binannual basis. UNIDO would then be keying data in from five fewer countries.

The status of terminal installation in individual countries is on hold pending negotiations with national phone companies to set up the network (telecommunications) lines between the JUNTA and the individual registries. Terminals have not yet been purchased. There is presently \$70,000 allocated to this project. They hope to accomplish this phase within one year. The project also encompasses other databanks; foreign trade, foreign investment and document abstracts.

Mr. Flores is exploring various financing alternatives for the remainder of the project. He is preparing a draft project concept on modernizing the telecommunications systems and reinforcing data banks in the individual countries. This second phase will take place over the next five years.

Separately there is a project underway to include information on patents in the Andean Pact countries into a Spanish data bank on industrial property. Each country and the JUNTA will be connected via a network to the data bank in Spain and have on-line terminals in their offices.

UNIDO should be aware that the JUNTA has at least three excellent computer professionals with masters degrees in computer science from U.S. universities. UNIDO may wish to call on those experts for any national computerization projects contemplated in the Andean Pact countries.

SAMPLE SCREEN

SISTEMA ANDINA DE INFORMACION TECNOLOGICA

CODIGO ID: 000028

RECEPTOR

PAIS: PERU  
PARTICIPACION EXTRANJERA: 25%  
ORIGEN DE LA INVERSION EXTRANJERA: USA, Suiza, Austria  
TIPO DE RECEPTOR: Privada  
ACTIVIDAD ECONOMICA PRINCIPAL: Medicinas  
NOMBRE: CIA XXX  
DIRECCION: Calle 6, Lima

INDUSTRIA (CIIU): 3522 Farmaceutica  
RELACION DE FILIACION: Ninguna

PROVEEDOR

PAIS: USA  
NOMBRE: Warner Lambert  
DIRRECCION: Morristown, NJ.

CODIGO DEL PROVEEDOR: ABCDEF

CONTRATO

MONEDA DEL CONTRATO: Soles Peruanos  
DURACION: 5 anos  
RELACION PROVEEDOR/RECEPTOR: Ninguna  
CONTRATOS VINCULADOS: Ninguno  
TIPO DE COLLABORACION: Know-how: reportes de laboratorio, secretos comerciales  
Marcas  
Patentes

FECHA: Octubre 1983  
TIPO: Primero entre las partes

PRODUCTOS(SITC):xxx.xxx Medicinas  
DESCRIPCION DEL OBJETO DEL CONTRATO:

UNIDADES DE PRODUCCION: Toneladas  
TIPO DE REGALIA: Fija  
PAGO GLOBAL: US\$10,000  
VOLUMEN PRODUCCION ANUAL: 20000 toneladas

REGALIA: 2.5%  
VENTAS ANNUALES:xxxxxxxxxxx  
CAPACIDAD ANUAL: 25000 toneladas

OBSERVACIONES:



At the moment the JUNTA does not see computerization in individual country registries as necessary or practical. It is difficult to imagine, however, that registry personnel will halt plans to develop national databanks directly under their control even with all the duplication of effort that such development will entail. The speed with which the JUNTA is able to implement their plans for centralized databanks could influence individual country decisions to pursue databank development plans.

D. REGIONAL TIES MEETING

I delivered the draft project concept on the October regional TIES meeting during my initial visit to Lima. Mr. Flores had not completed his comments on the document upon my return and agreed to forward them directly to UNIDO.

In general their interest in such a meeting was reaffirmed provided UNIDO could finance participation. The proposed dates were seen as convenient.

E. MISCELLANEOUS

- Pharmaceutical Study

Mr. Flores will review the documents on the pharmaceutical study and submit his comments directly to UNIDO.

IV. PERU: COUNTRY REPORT

#### A. Background

The TIES/SAIT contact is now the National Commission of Foreign Investment and Technology (CONITE), Director of Technology, Jorge Falconi. UNIDO thus has direct relations with the authority which is actually approving technology contracts rather than the National Department of Planning which previously acted as the TIES focal point.

In addition, the 'Foreign Investment and Technology Statute' published in 1982 now lays out clear guidelines for foreign investment and technology transfer into Peru. The document should be of interest to other TIES participants.

#### B. Introduction of TIES/SAIT Information Systems

Mr. Falconi was well informed about both information systems and stands ready to actively participate in TIES/SAIT. He had provided substantial input to the JUNTA and UNIDO on the new TIES/SAIT coding form. Gustavo Flores and Jorge Osorio of the JUNTA view Peru as a sort of pilot project for the information systems and have been working closely with CONITE on system development.

Mr. Falconi did not feel it was necessary to review the manual and coding form in detail with his staff. Because of personnel limitations he wants to hire temporary staff to fill out the coding forms at the end of each six month period. I advised that it is far easier for someone familiar with the contracts to fill out the forms immediately after registration. He conceded that this is the ideal situation. He intended to request funds from the JUNTA, however, to complete the forms. Due to the low volume of contracts (250 reviewed, approximately 150 approved yearly) I doubt that the JUNTA will approve his request. Gustavo Flores has agreed to insure that Peru provides data to TIES/SAIT on a timely basis.

#### C. Workflow

I reviewed the workflow of contract registry and made changes as indicated by Mr. Falconi. The revised workflow is attached as Appendix 1. The main changes involve resubmission of contracts with modifications.

#### D. Country Profile

The country profile is submitted together with this document. Information is based on interviews with Mr. Falconi, Raul Fajarda of ITINTEC, 'Foreign Investment and Technology Statute of Peru' and 'Industrial Property Rights in Peru'. Copies of those two documents are enclosed.

#### E. Questionnaire on Technology Transfer Registry Information Systems

A review of the already completed questionnaire with Mr. Falconi brought to light a few changes in the information collected. The questionnaire is submitted together with this document. Changes/additions are highlighted in blue.

#### F. Computer Resources and Plans

Peru plans to fully participate in the four JUNTA information systems under development. They are, however, concerned about the time to completion of these systems.

As such, they are keen to have their own computerized system if it can be accomplished in a shorter time period. They are looking into getting funds from the government in order to be able to approach various agencies for matching funds.

It seems that they are essentially looking to duplicate the JUNTA's efforts. However, one must recognize that control of information by the sovereign government is undoubtedly a concern. In spite of the fact that the JUNTA's information system would fulfill CONITE's information processing and retrieval needs they may continue to push for their own system. Additionally it could be of value for them to track data on contracts reviewed as well as contracts approved. Reviewed but rejected contracts are of course not included in TIES or SAIT databases.

Should system development be undertaken UNIDO must work closely with CONITE to ensure compatibility between the TIES/SAIT systems and the national system. In principle CONITE would be in agreement with this approach.

In the interim CONITE is considering microfiche storage of various documents including and related to the technology contracts. Such storage would serve as a back-up to future information systems and allow storage of actual documents rather than just data abstracted from them. Such a back-up in case of fire is invaluable.

#### . Miscellaneous

#### . CONITE Publications

UNIDO will be placed on the mailing list for the CONITE annual report and any other external publications they may issue from time to time. There currently exists no regular publication.

V. ECUADOR: COUNTRY REPORT

#### A. Background

The competent authority for approval of technology transfer contracts in Ecuador is the Ministerio de Integración, Comercio e Industria and specifically the Foreign Investment and Technology Department headed by José Villacís Paz y Miño. Approved contracts are registered by the Banco Central de Ecuador.

It should be noted that only contracts between private sector firms and foreign companies fall under the charter of the Ministry. This signifies that the majority of technology contracts in Ecuador do not pass through the Technology Department as public sector firms are excluded. Moreover, since there is no penalty for non-compliance with the law to register contracts, there is no accurate way to determine what percentage of technology transfer contracts in the country are actually registered.

It follows that the total number of contracts registered and the number on which data has been submitted to SAIT is small; around 200. Mr. Villacís estimates that on a yearly basis his office reviews some 150 contracts of which one third are approved.

It should be borne in mind that with the change in government on August 10, 1984 it is not clear what the new policy toward technology transfer will be nor whether Mr. Villacís will continue in his post as Director of the Foreign Investment and Technology Department.

#### B. Introduction of TIES/SAIT Information Systems

There is no doubt that Ecuador stands ready to actively participate in the TIES/SAIT information systems. The new coding form and manual were reviewed in detail with Mr. Villacís and his staff and sessions held to actually code data from existing contracts. The staff is capable and have a clear understanding of the requirements for submitting data to the systems.

Overall the office is in agreement with the form design. Certain areas of the manual related to SAIT data items, however, require clarification by the JUNTA. Specifically the JUNTA was requested to expand the coding instructions for the 'Relación de filiación' and 'Relación proveedor/receptor' data fields.

While the office requires certain information be submitted in addition to the actual contract (see submission form attached to the Technology Transfer Questionnaire) the data is at best sketchy. Since they have no well defined application form such as one finds in Colombia or Venezuela, filling out the TIES/SAIT forms is a painstaking process requiring pouring through contracts and related documents. I have recommended that they explore the possibility of requiring an application form at the time of contract submission. They should design such a form and review it with their counterparts at the regional TIES meeting in October 1984 for their suggestions.

In the meantime, blank fields on TIES/SAIT forms should not be interpreted as unwillingness to provide data but simply that the data is unavailable.

Please note that Ecuador needs copies of the product codes in Spanish and of the Supplier Company codes.

C. Workflow

There have been certain changes to the workflow of contract review and registry (see Appendix 2). Specifically, while the Comité de Transferencia de Tecnología still exists it acts only as a policy making body. It no longer reviews individual contracts or hands down decisions on them. Competence and constant turnover of board members seem to have led to this change. Final contract approval essentially rests in the hands of the Director and the Subsecretario de Integración.

It should be noted that there is no requirement to hand down a decision on a contract within a certain time period though in practice this often takes place within 15 - 30 days.

D. Country Profile

The completed profile is submitted together with this report. Mr Villacis is forwarding a copy of the 'Regimen Legal de la Inversión Extranjera en el Ecuador' to UNIDO.

E. Questionnaire on Technology Transfer Registry Information Systems

The completed questionnaire is submitted together with this report. Attached to the questionnaire is a copy of the form submitted with contracts.

F. Computer Resources and Plans

Ecuador plans to fully participate in the four JUNTA information systems under development. Work has already begun on SAIT and the Industrial Property systems.

The Ministerio has no mechanized or computerized information systems covering foreign investment or technology transfer at this time. They have access to computer resources in the Dirección Nacional de Asesoría Técnica of the following configuration:

HARDWARE: ALTOS ACS-8000-14 Microcomputer  
1 3MB floppy disk drive  
208KB main memory  
40MB hard disk  
4 terminals  
1 Texas 820 printer  
1 DMP7 plotter

NOTE: NO MAGNETIC TAPE DRIVE

SOFTWARE: Operating system MP-M2  
Microsoft FORTRAN compiler F20  
Microsoft BASIC compiler 80  
FORTRAN  
BASIC  
Word Processing (WORDSTAR package)  
Microplan  
Ashton-Tate D-Base II; data base management package

Mr. Villacís is exploring the possibility of computerizing foreign investment and technology transfer data. Reasons are similar to those of Peru. No work has as yet been done, nor have programming resources been identified.

G. Miscellaneous

. Sorbitol Request from Venezuela

Mr. Villacís never received any requests from UNIDO for information on the SORBITOL case. He is preparing a reply which will be forwarded to UNIDO. A partial text is submitted together with this report.

Sorbitol is a product reserved by Andean Pact agreement to production in Ecuador and Bolivia until the end of 1984. They have every expectation that this concession will be extended. They were not a little dismayed to see the request from Venezuela. Obviously this case must be handled 'con mucho cuidado'.

. Topics for Next TIES Meeting

1. Fast Food Franchising/Franchising

Ecuador is very interested that this topic be covered in detail. They are aware of the study UNIDO has underway. The importance of its availability in Spanish cannot be overemphasized.

In addition to dealing with fast food franchising I suggest that the study cover, in detail, what franchising is and how it functions in developed and developing countries and alternatives for dealing with it. I also suggest that the study cover methods for helping local firms to franchise. Franchising can be an excellent way for people with limited capital to go into business for themselves. Why not 'Pollos Criollos' instead of 'Kentucky Fried Chicken'?

2. Foreign Firm Contracting

Ecuador is most interested in how other countries handle foreign firms in the host country that contract with other foreign firms for technology or services. Perhaps this is best handled at the regional meeting as a first pass.



Information Dissemination

There seems to be some problem with dissemination of UNIDO/TIES information within the office. UNIDO may wish to consider adding the following staff members to the mailing list, at least for the TIES Newsletter:

Ing. Maria Estrada  
Ing. Jandry Coello  
Dr. Eduardo Morillo  
Dr. Oswaldo Noboa

The staff is also extremely interested in any training programs for registry personnel that may be developed.

VI. COLOMBIA: COUNTRY REPORT

#### A. Background

Over the last year there has been a problem regarding the official contact for the TIES and SAIT systems.

The focal point for technology transfer contract registry in Colombia is the Superintendencia de Industria y Comercio headed by Mr. Diego Naranjo Meza. This office has been the TIES contact through Ernesto Duque the head of the Sección de Regalías y Tecnología.

The focal point for registry and approval of service agreements is the Oficina de Cambios, Legal Department headed by Carlos Balderama who attended the last TIES meeting.

Freddy Castaño of the Departamento Nacional de Planeación has been the contact for the SAIT information system. In November of 1983 Mr. Castaño requested that this responsibility be transferred to the Superintendencia de Industria y Comercio. The transfer became effective in December 1983 and the JUNTA was duly notified though they had not received the advice as of February 22, 1984.

The TIES and SAIT contact is now the Superintendencia de Industria y Comercio. There still exists a potential problem regarding submission of data on service agreements. This will be discussed in greater detail in the following pages.

#### B. Introduction of TIES/SAIT Information Systems

Colombia has been an active participant in the TIES system since its inception. They are pleased that TIES/SAIT have arrived at a common coding form and will provide data to the systems on a timely basis.

A detailed review of the manual and coding form as well as practice sessions filling out forms led to the discovery of errors in data already prepared. Specifically:

1. 1982 July - December contract data
2. 1983 January - June contract data
3. 1983 January - June TIES I tables

In items 1 & 2 the currency code and exchange rate are incorrect. In item 3 Table 8, only lump sum payments were reported rather than total contractual payments. Corrections are being prepared and will be sent to the JUNTA and UNIDO together with contract data and TIES I tables for the second half of 1983. This information will be sent by the end of March 1984.

There exists the possibility that the currency error goes back even further. The staff will review back data and, where necessary, send corrections to UNIDO as soon as possible. A careful review of data by UNIDO before entry into the system should have caught these errors; the data as coded do not make sense.

### C. Workflow

A copy of the workflow of contract approval and registry is attached as Appendix 3. - The entire process takes on the average of two months. Some 60 contracts per year are reviewed with approximately two thirds receiving approval. It is interesting to note that part of the technical study includes a visit to the recipient firm to obtain detailed information on the need for the technology under consideration.

A complete new set of technical and economic studies is done after 3 years (for contracts of duration greater than 3 years) to assess the impact and transfer of the technology. Non-compliance with contract terms can lead to registry revocation preventing payments to the supplier.

### D. Country Profile

The revised country profile and 'Regimen Legal del Comité de Regalías en Transferencia de Tecnología y Propiedad Industrial' are submitted together with this report.

### E. Questionnaire on Technology Transfer Registry Information Systems

The questionnaire and the application forms for new contracts, contract extensions and the manual describing the contract approval and registry procedure are submitted together with this report.

### F. Computer Resources and Plans

Colombia is planning to fully participate in the four information systems of the JUNTA. Work on the Industrial Property database is well advanced.

The department responsible for monitoring the assembly industry has recently acquired a personal computer (i.e. only one terminal may be used on the system) of the following configuration:

HARDWARE: APPLE II Plus  
1 floppy diskette drive  
10MB CORVUS hard disk  
Epson Printer

SOFTWARE: CORVUS operating system  
BASIC

Since this department is part of the Ministerio de Industria and is located next door to the Sección de Regalías y Tecnología Ernesto Duque is considering utilizing the machine for an 'inventory of existing technology contracts' (some 500).

They are aware that the APPLE is not compatible with an IBM mainframe and that data could not be submitted via magnetic media to the TIES/SAIT systems. They may, however, proceed with this project though it is unlikely to occur within the next year. They anticipate that they will be able to utilize the

programming resources of the assembly department. The reasons for wanting to undertake this project are the same as found in other countries:

- Control over data
- Back up in case lines to JUNTA's computer do down (which they certainly will from time to time)
- Easy access to data on reviewed as well as approved contracts
- Internal statistical purposes

It is unlikely that in the short run, UNIDO can establish machine compatibility across all countries. It was suggested to the Director that if the project is undertaken that one of the outputs be the TIES/SAIT forms duly completed to avoid double data entry. UNIDO would still have to input the data to the TIES system.

#### G. Miscellaneous

##### . Service Agreements

Most service agreements do not pass through the Seccion de Regalias y Tecnologia. Only those requiring extensions for tax payments are reviewed in this office. Carlos Balderama of the Legal Department of the Oficina de Cambios handles the vast majority of service agreements. Ernesto Duque has agreed to work with Mr. Balderama to ensure that service agreement data is submitted to the TIES/SAIT systems through the Superintendencia. The details are yet to be worked out.

Given that Mr. Balderama attended the Caracas meeting and is aware of the resolutions taken at the meeting a prompt letter from UNIDO urging his cooperation with the Superintendencia is recommended. Gustavo Flores will be sending a similar letter. I, unfortunately, was unable to meet with Mr. Balderama. A close watch should be kept on this situation to ensure that the double focal point problem does not recur. The volume represented by service contracts makes it imperative that they be included in the TIES/SAIT systems.

##### . Documents

The Superintendencia has not received the documents from the last TIES meeting. A complete set, in Spanish if possible, should be sent to Ernesto Duque.

##### . Next TIES Meeting

Be advised that in order to participate in the next TIES meeting in October the Superintendencia must receive the invitation, financing information and other meeting details at least 2 full months before the meeting date in order to secure the necessary permission to travel.

## TECNE

There have been no funds for the publication of TECNE over the last several months. The next issue is scheduled to appear before the middle of the year. UNIDO is still on the mailing list.

## Request for Assistance from Felix Moreno Posada

As described in his correspondence to UNIDO Mr. Moreno is working as a consultant to COLCIENCIAS on the preparation of materials for a seminar program on negotiation of engineering and construction contracts. Mr. Moreno pointed out that Colombia pays out over \$200 million per year for service contracts and only approximately \$20 million per year for license contracts. While a lot of good work has been done in improving negotiation of license contracts it is felt that given the dollar volume, efforts should be concentrated on service agreements.

COLCIENCIAS is a well funded organization with some \$20 million over the next 4 years from the Interamerican Development Bank. \$50,000 has been allotted for this negotiation project.

While COLCIENCIAS has no objection to collaborating with UNIDO via Diego Naranjo's office a direct contact would probably be more appropriate. One obvious concern is the time lag in communicating via a third party. Note that COLCIENCIAS is not seeking outright funding but rather direct technical assistance from UNIDO experts on negotiation.

Mr. Moreno has been in contact with the UNCTC, UNCTAD, CEPAL, JUNAC, the Investment Negotiation Center at Georgetown University and the Harvard Negotiation Project to gather information and documents for the negotiation project. He is most impressed with UNIDO's materials on the subject but feels some of the material should be updated and geared toward service contracts (he specifically mentioned 'Pautas para la adquisición de tecnología por los países en desarrollo' by Singh dated 1971 and the 'Manual on the Use of Consultants'). (Please note that as of February 15 Mr. Moreno had not received Mr. Cramwinkel's letter of 18 January nor the documents mentioned in it). Mr. Moreno's request may be thought of as assistance in the form of a 'patron' or higher level authority on the negotiation of service agreements. He feels UNIDO is most qualified to provide this type of expertise.

The Comité de Fortalecimiento de la Capacidad Nacional de Negociación on which Ernesto Duque sits is scheduled to convene in March to lay out the program for the negotiation project. COLCIENCIAS will most likely contact UNIDO again to discuss specific kinds of assistance.

Mr. Moreno had unofficially been made aware of a grant of \$20 million by UNDP for the establishment of a Department of International Negotiations at the Universidad de los Andes. The Department will encompass not only political negotiation but economic and technology negotiation as well. UNIDO may wish to look into this project in more detail.

Mr. Moreno also mentioned that Carlos Aquirre, the Director de Tecnología of the JUNTA will be holding a meeting on international negotiations in the mining sector. The meeting will take place in Lima from 25 - 28 April, UNIDO will be invited to participate (He did not know who the invitation would be directed to).

It is suggested that the Technology Department of UNIDO seriously pursue the possibility of directly assisting COLCIENCIAS in the negotiation projects. Benefits for the developing countries are obvious and fit well with the aims of the TIES program. If UNIDO is not able to directly assist COLCIENCIAS Mr. Moreno requests that he be given the names of experts or developing country governments (India?) that may have special expertise in this area.

. UNDP UNIDO Contact

The new program officer handling UNIDO projects in the Bogota UNDP is Carlos Felipe Martinez. Mr. Martinez is well aware of the TIES/SAIT project and COLCIENCIAS request for assistance and stands ready to follow up as necessary.

. International Mail

Be advised that the Superintendencia has run out of funds for international mail. I have arranged for them to send materials to UNIDO via the UNDP pouch until new funds are secured. Gustavo Flores will try to arrange something similar for materials that must be sent to the JUNTA.

. Ties Newsletter Mailing List

Delete Freddy Castaño from mailing list and add Diego Naranjo Meza and Ernesto Duque of the Superintendencia.

VII. VENEZUELA: COUNTRY REPORT



#### A. Background

For the moment key personnel and TIES contacts at SIEX remain the same. Changes may still, however, be made as a result of the new government.

SIEX has had the benefit of two UNIDO consulting projects regarding internal procedures and information systems. Internal procedures are gradually being revised. Progress on the information system will be discussed in more detail later in this report.

#### B. Introduction of TIES/SAIT Information Systems

SIEX is a long time participant in the TIES system and has been regularly providing data to SAIT. Comments on the new TIES/SAIT coding form echoed concerns of other countries, namely:

- (SAIT) 1. Explanation needed for 'Relación filiación' and 'Relación proveedor/receptor' fields. What is the difference? Examples are needed.
- (TIES) 2. Explanation needed on guarantees and penalties on the service agreements portion of the form. Are these by the recipient or the supplier? Clear examples of each type are needed.
- (SAIT) 3. Explanations needed for collaboration types:
  - R - Control de calidad
  - S - Diseño de modelos
  - T - Varios
- (TIES) 4. Suggest changes to production units as follows:
  - Code 1 from meters to square meters
  - Code 2 from metric tons to tons
  - Add a code for pieces (This would imply changing codes from numeric to alphabetic).

Since SIEX personnel have had a great deal of experience in filling out TIES forms emphasis was on answering questions about specific coding cases and details rather than on training per se. One can be completely confident that data coming out of Venezuela will be virtually error free.

NOTE: Please send as soon as possible the next ID code that Venezuela should use in coding data. As soon as this is received 1983 data will be sent to TIES/SAIT systems.

C. Workflow

One minor modification was required to the workflow and is attached as Appendix 4.

D. Country Profile

The completed country profile and reference documents are submitted together with this report.

E. Questionnaire on Technology Transfer Registry Information Systems

There were no changes to the questionnaire responses.

F. Computer Resources and Plans

SIEX personnel were surprised that Mr. Simões report had not reached them, so I turned over my copy. They seemed to be very pleased with the results.

Apparently little actual progress has been made on the development of the information system. As reported at the last TIES meeting a clear concept of what the system was to accomplish had not been arrived at. SIEX now, however, seems to be comfortable with the concept of the system as informational rather than statistical. They realize that 100% of the cases can never be fully codified or covered. There will always be exceptions in this type of a system. A modified coding form has been developed by the software firm and is now under review by SIEX. The form is submitted together with this report.

I reviewed this form and provided my comments regarding:

1. Form design (too long and complicated, coding spaces too small)
2. Missing data items needed for TIES/S&IT systems including:
  - .Origin of foreign investment
  - .Affiliation
  - .Supplier/Recipient Relation
  - .Related contracts
  - .Lump sum payment
  - .Addresses of recipient and supplier
3. No need to include TIES codes. The system should be programmed to transfer data items to TIES codes before output. One should not have to enter the data and the code.

Example: Once the level of foreign investment is entered (25%) the system should output the corresponding TIES code 2.

The overall observation is that the SIEX system should not reproduce the suboptimal aspects of TIES that were included due to the limitations of the DBMS package. Wherever possible, 'codification' should be reduced to a minimum and clear text used.

The D-Base II package being used for system development unfortunately has some of the same limitations as DBMS (limit of 32 fields or 1000 characters per record). This means that, in effect, to incorporate all the data items (113 fields) that SIEX wants to track, four separate databases must be established (Note that the original TIES form has 31 fields to accommodate this limitation). In the printed output this separation will be transparent to the user. Multiple databases can be searched and data on a single contract printed on a page.

The implication for interactive use though, is that one can never see all data on a single contract on a single screen or in a single record. One must search four databases (i.e. view four screens) for all of the data on a single contract. This is not to say that the system will not be of use but only that the solution is suboptimal. A variable record length system which does not restrict record length, such as will be used by SAIT (IBM STAIRS package), is the elegant solution. It would be a good idea to explore the availability of a similar package (MAG/BASI by MAG Software is one such package) that runs on the micros that many countries are acquiring.

A further limitation of the proposed SIEX system is obviously that data cannot be submitted to TIES on magnetic media (lack of compatibility between hardware). Nonetheless one of the outputs of the system should be the completed TIES/SAIT forms. One can program a 'report' that looks like the coding form so personnel will not have to fill out the 'Ficha-Resumen Contrato' and the TIES/SAIT coding forms.

The contract with the software consultant apparently ended on February 15. They will be submitting a report to UNIDO describing progress to date and next steps to be taken.

#### G. Miscellaneous

##### . Sorbitol

SIEX was not aware of the Sorbitol request sent to UNIDO by CONCIT. Perhaps CONCIT should be advised that such requests be submitted through SIEX as SIEX was aware that sorbitol production is limited to Ecuador and Bolivia by Andean Pact agreement.

##### . Evaluation of Software Contracts

I spent considerable time discussing the evaluation of software contracts with SIEX personnel. Such contracts generally fall into four categories:

1. Hardware and software
2. Software packages
3. Computer time sharing services
4. Use of data banks
  - a. From independent firms
  - b. From parent company (charges usually represent a method of reallocating costs from the parent to the subsidiary)

None of these contract types involve transfer of technology. They represent outright product or service purchases. Technology transfer might only be found in hardware manufacturing or software subcontracting agreements.

I pointed out that registry personnel do not have the expertise to evaluate off-the-shelf or custom-designed software or hardware. Furthermore there is no need to do so. Software packages undergo detailed evaluation by numerous independent users groups and computer magazines in the United States. Hardware undergoes similar evaluations. One has only to reference these magazines and user publications. A list of some such publications and a sample software evaluation appear in Appendix 5.

Such computer publications should be available at any university with a computer science curriculum. Such information could be made available to local industry to aid in their decision making process when selecting software and hardware.

VIII. BOLIVIA: COUNTRY REPORT

#### A. Background

I was unfortunately unable to meet with Edgar Romero, the new Representante Titular of the Dirección General de Normas y Tecnología (Gregorio Bernal Yañez had been replaced). Due to the imminent general strike, which actually took place on February 23 and continued for 14 days, many staff were absent from the office. I did, however, hold meetings with David Bustos and his staff in the Technology Department.

The situation in Bolivia, in general, and in the Technology Department in particular, continues in flux. Mr. Bustos felt that Mr. Romero was likely to be replaced in the not too distant future.

There is an OEA based project underway known as 'La Implementación del Sistema Nacional de Negociación y Transferencia de Tecnología' to mount a technology law. To date the following phases of the project have been completed:

1. Study of institutions which should be involved in implementation.
2. Field study to gather data on existing licence contracts in the country.
3. Technology transfer expert contracted to study agreements in place. Study to be completed by end of March 1984.

Next steps include publication of the study and elaboration of a technology transfer law followed, hopefully, by implementation of the same.

Possible UNIDO inputs are described under this topic in Section VII, Miscellaneous.

#### B. Introduction of TIES/SAIT Information Systems

Though Bolivia is a signatory of the Andean Pact and has adopted Decision 24 there exists no law requiring the registry of technology transfer contracts. The Departamento de Tecnología of the Dirección General de Normas y Tecnología (Organization chart and background information on the Dirección are submitted together with this report). is eager to participate in the TIES/SAIT information systems but may hit roadblocks on active participation due to the uncertain nature of the government situation. They have submitted data on technology contracts registered to date (less than 25) to SAIT and will continue to do so for future contracts. The volume will, however, be very small.

I reviewed the TIES/SAIT coding manual in detail with Mr. Bustos and his staff. They may be unable to provide much of the detailed data as it is simply not available to them. They require no application form to accompany the contract and do no technical or economic evaluations of contracts submitted. Information at their disposal is at best sketchy. The only

contracts which reach the Technology Department for legal evaluation are those which are passed on to them by INI, the Instituto Nacional de Inversiones which reviews foreign investment contracts.

Note: The Technology Department would like to receive TIES reports on microfiche rather than hard copy.

C. Workflow

The workflow of technology contract review is attached as Appendix 6. It must be borne in mind that of the 140 technology contracts determined to exist in Bolivia by the Negotiation System study, only 25 have been reviewed by the Technology Department. In 1982 seven contracts were reviewed while none were reviewed in 1983. This was attributed to the low level of foreign investment in the country in 1983 (hence no technology contracts passed to the Technology Department) because of the extremely unstable government situation and high inflation rate.

D. Country Profile

The completed Country Profile is submitted together with this report.

E. Questionnaire on Technology Transfer Registry Information Systems

Since there is no technology transfer legislation or well organized review procedures this questionnaire does not apply.

F. Computer Resources and Plans

The Dirección has recently acquired a micro computer of the following configuration:

Hardware:           Radio Shack Model 16  
                      512K Main Memory  
                      1 diskette drive  
                      Radio Shack Daisy Printer

Considering purchase of hard disk.

Software:           Radio Shack operating system

NOTE: No programming, database management or other applications software

They intend to train experts in-house and develop databanks on alternative technologies to answer requests for information from national institutes, local industry and to do sectoral studies. There is a staff member with programming expertise. They apparently have access to the following technological and economic databanks: ORBIT, DIALOGUE and PREDICAST.

They will be participating in the JUNTA's four databanks as follows:

|                                      |                     |
|--------------------------------------|---------------------|
| Departamento de Propiedad Industrial | Industrial Property |
| DICOMEX                              | Foreign Trade       |
| Local universities                   | Documentation       |
| Instituto Nacional de Inversiones    | Foreign Investment  |

As far as could be determined no work has been done on inputting data to these systems other than to SAIT.

While it is unlikely that the Technology Department will have a need or the wherewithal to develop a technology transfer contract database for some years when the time comes, they must be reminded that the Radio Shack machine is not compatible with IBM and that one output from such a system must be the completed TIES forms.

G. Miscellaneous

. Unofficial Request for Assistance on Technology Policy

Mr. Bustos expressed interest in having UNIDO assistance in formulating technology policy under the Negotiation System. They are entitled to similar help from JUNAC; Gustavo Flores is following up on that request. In the meantime, Mr. Bustos is interested in receiving copies of Technology Policy from other developing countries as well as a bibliography of technology transfer publications from UNIDO.

. Next TIES Meeting

In order for Bolivia to participate in the next TIES meeting all their expenses must be met by outside sources. There are no funds available for travel or per diem.

. UNDP

Mr. Calderone, JPO was out of La Paz, apparently in Vienna. I was unfortunately unable to meet with the person handling Mr. Calderone's projects, Hans Ubo as I had to leave La Paz a few hours early to avoid being caught in the general strike.



IX. TIES SYSTEM REVIEW

#### A. System Modernization

The original design of the TIES computer system was in many respects dictated by the capabilities/limitation of the DBMS software package available at UNIDO at the time. The long range goal was a custom designed interactive system running on Technology Group hardware. Data input was to be done by Technology Group personnel from terminals in their offices.

The current availability of relational database management packages make it possible to customize a system with minimal programming time. One such package for IBM equipment is 'STAIRS'. This is also the package that the JUNTA will be using to develop the SAIT database.

The use of this package would allow major streamlining of the TIES coding form and eliminate many of the annoying aspects of the existing system. Since record lengths are variable in STAIRS there is effectively no limit to the number of fields. This eliminates the need to codify data to save space.

| <u>Instead of:</u>        |             | <u>One could enter:</u>         |
|---------------------------|-------------|---------------------------------|
| Country:                  | PER         | Peru                            |
| Level of Foreign Holdings | 2 (1 - 25%) | 13.6%                           |
| Collaboration Type: B     |             | Know-how, cost/benefit analysis |

and so on for most of the codified fields. Currency and production multipliers could be eliminated. Actual currency and production figures could be entered. Specific royalty levels and arrangements could be entered textually, for example:

Royalty is 2.5% up to 10,000 tons, 2.0% from 10,000 - 20,000 tons and 1.5% over 20,000 tons for a maximum payment of \$200,000 over the life of the contract.

Such detailed descriptions would increase the value of the system and eliminate the need for participants to learn a somewhat complex coding system.

Since STAIRS is an interactive system UNIDO personnel could access individual contract data on line and do searches on any of the fields such as:

1. Display all contracts with the supplier DUPONT
  2. Display all contracts with minimum royalty fees greater than \$10,000
  3. Display all contracts for penicillin production;
- etc.

The reporting mechanism is also quite flexible allowing redesign of TIES reports if necessary.

Steps involved in a switchover to the STAIRS package might include:

1. Restudy TIES data items; determine any fields to be included in the system.
2. Redesign TIES forms to reflect elimination of codes; revise coding manual.
3.
  - Define records and fields
  - Design the screens
  - Specify search criteria
  - Specify report formats

Note that system need not be set up by a programmer. STAIRS is designed to be user-friendly; anyone with some familiarity with computers should be able to set up the system.

4. Once system is set up data should be input from magnetic tape from the DBMS based TIES system. No re-keying of data is necessary.

I would estimate that it would take a maximum of one person-month for someone familiar with the STAIRS package to set up the system. Data transfer and system testing might take as much as another month. Even someone unfamiliar with STAIRS should be able to accomplish this project in a maximum of three months.

There would be no need to retrain registry personnel in coding procedures as the forms would be text based and hence much simpler. Eventually terminals in registry offices could access UNIDO's TIES system via telecommunications.

UNIDO may wish to explore the possibility of getting a copy of the SAIT STAIRS based information system when it is developed. This would eliminate the need to do any system development at UNIDO.

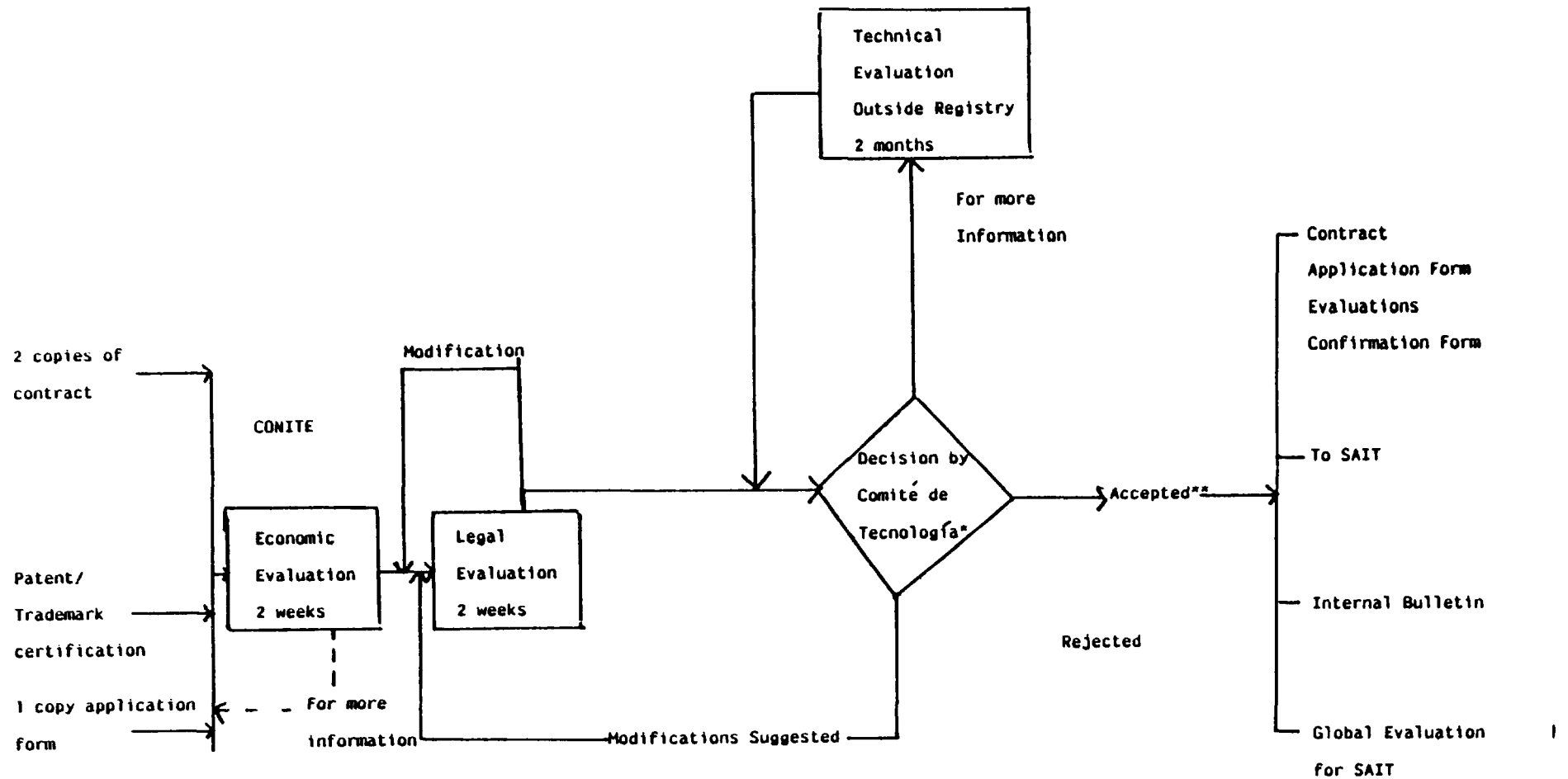
Acquisition of hardware by the Technology Group should not be the gating factor on modernizing the TIES system. The software portion can be implemented on the centralized machine and transferred to Technology Group hardware when it is obtained.

I recommend that the TIES system administrators explore the availability of the STAIRS package at UNIDO or the IAEA. There is a good possibility that the package is already in use somewhere in-house. Set up a demonstration with existing users; the benefits of such a system will be immediately obvious.

## B. Recommendations for Existing TIES System

Should UNIDO decide to delay the modernization of the current TIES system certain modifications to the coding manual must be made. A copy of the manual is submitted together with this report detailing suggested changes. Major points include:

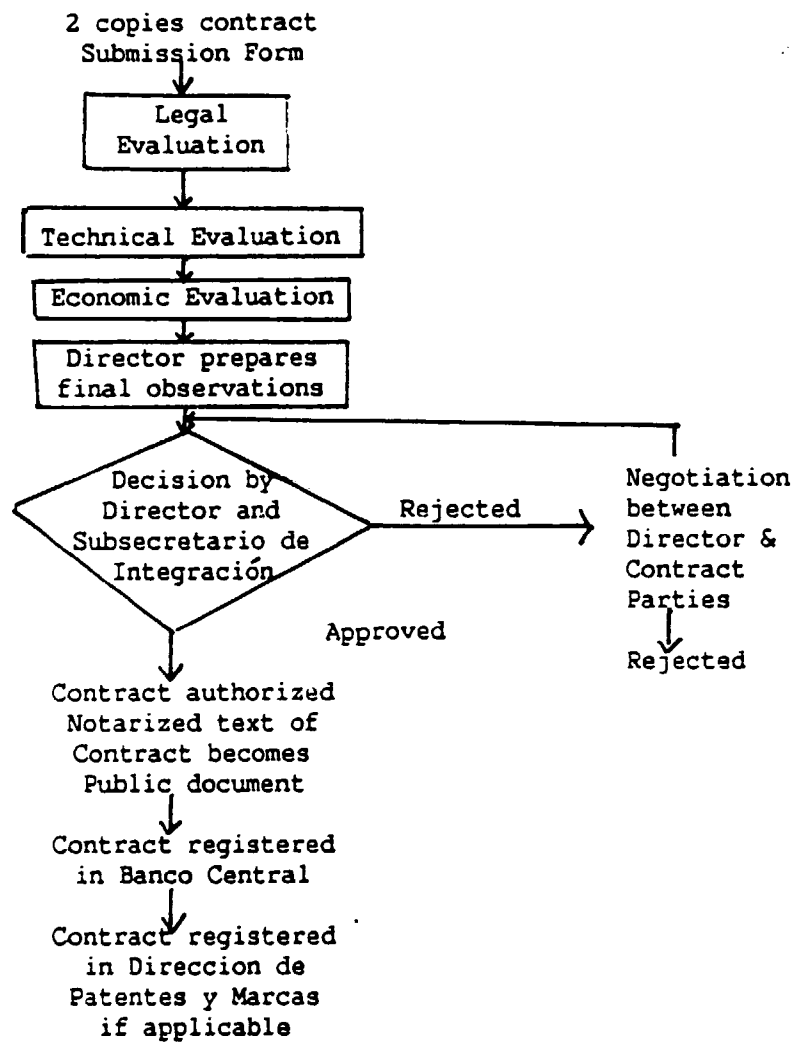
1. Correction of various spelling errors; wording suggestions and need for examples highlighted.
2. Recipient and Supplier Names:  
  
Number of coding spaces on coding form (30) and tape specs (30) does not correspond to number referenced in coding instructions (40).
3. Tape specs for service agreements missing.
4. On service agreements form no field lengths are provided for:
  - Price adjustment formula
  - Object
  - Names and addresses
  - Comments
5. Personnel Fees:
  - Not clear whether one enters the fee in rounded or unrounded figures.
  - Class distinctions in terms of number of years experience are highly spurious. They confuse the issue. Suggest omitting them and just using the titles.
  - Need a better definition of professionals and technicians.
6. Performance guarantees and performance penalties need a clear example for each type. Also clarify if guarantees/penalties are by the supplier or the recipient. Many countries were unclear on these fields.
7. Total price as % of investment:  
  
Does investment refer to:
  - a. Foreign investment in recipient
  - b. Total capital of recipient
  - c. Total investment in this contract project
  - d. Some other definition?
8. Suggest that TIES coding manual be processed by the 'word processing department' and stored on diskette. This would greatly ease the amount of work involved in making changes to the manual. Neatness and presentation would obviously be greatly improved.



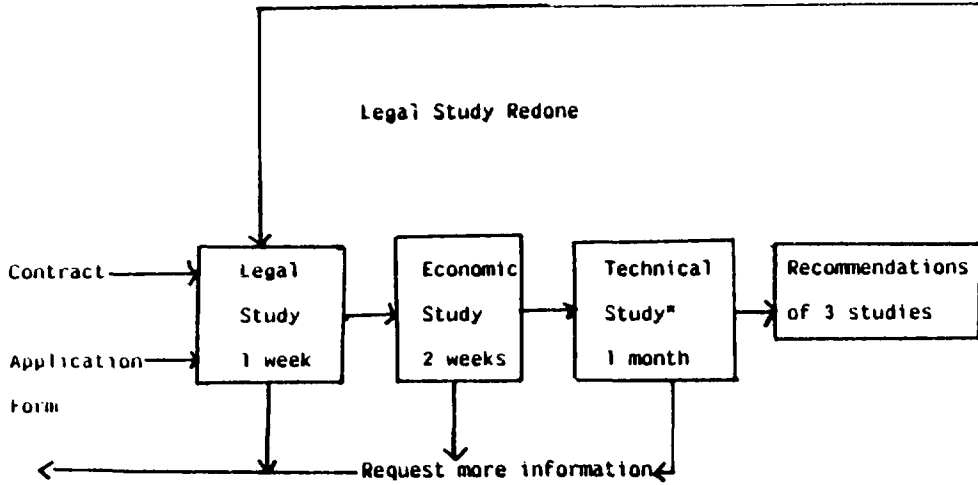
\* For royalties from 0 - 5% decision made by Comité de Tecnología  
 For royalties greater than 5% decision made by Directorio de CONITE

\*\* Approval - Registration; no further paperwork required

ECUADOR



COLOMBIA



\* Visits to the recipient may be made during the study period

Appendix 3

Conditional  
Approval

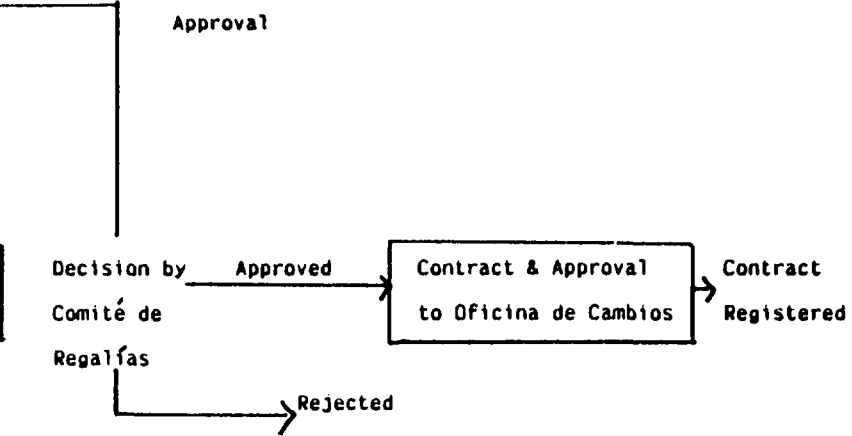
Decision by  
Comité de  
Regalías

Approved

Contract & Approval  
to Oficina de Cambios

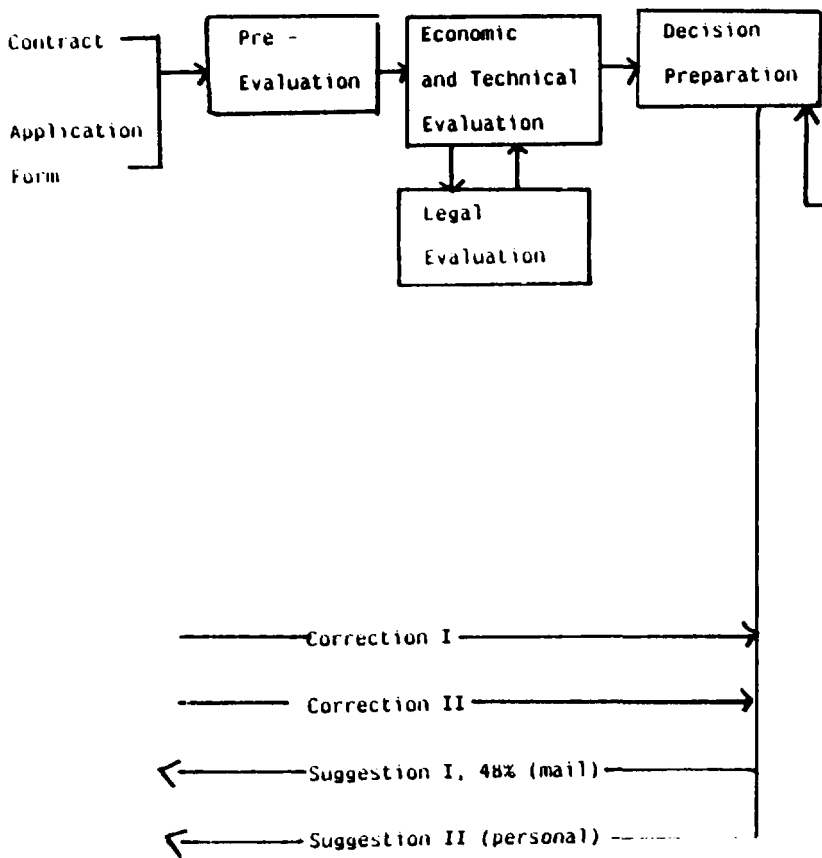
Contract  
Registered

Rejected

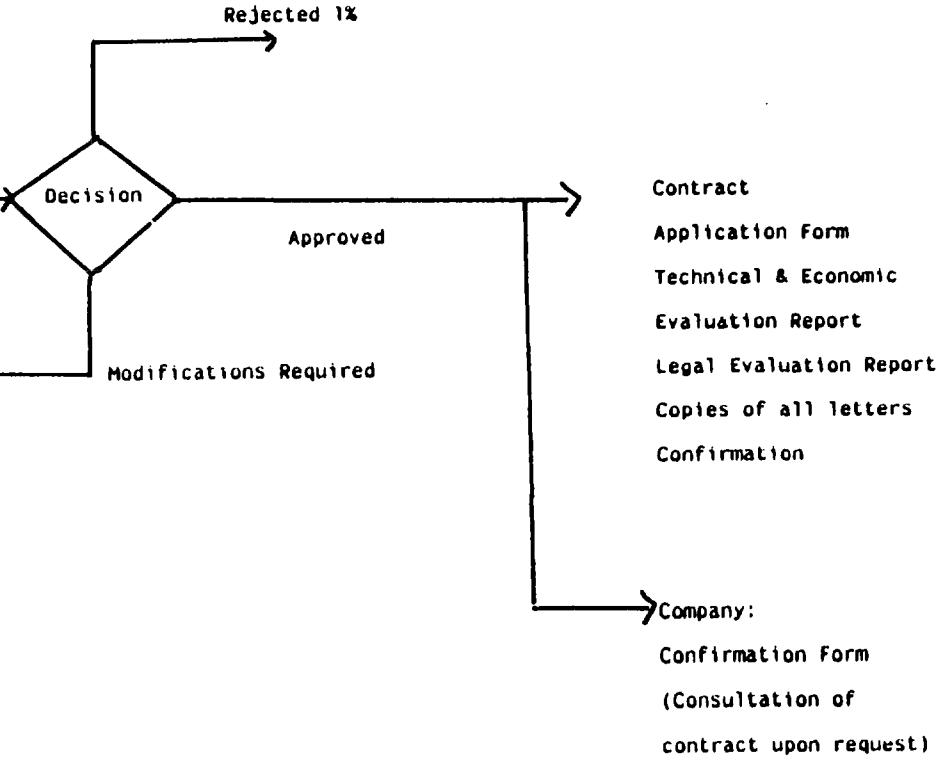




VENEZUELA



Appendix 4



## Computer Publications

|  |                           |
|--|---------------------------|
| ACM Computing Reviews                        | UNIQUE: Your Independent  |
| BIT  | Guide to UNIX & C Advisor |
| Business Computer Systems                    | UNIX/C Market News        |
| BYTE   | Wang Professional         |
| Computer Aided Design                        | World UNIX & C            |
| Computer-Aided Engineering                   |                           |
| Computer & Data Processing Technology        |                           |
| Computer Bulletin                            |                           |
| Computer Decisions                           |                           |
| Computer Graphics & Image Processing         |                           |
| Computer Graphics News                       |                           |
| Computer Graphics World                      |                           |
| Computer Journal                             |                           |
| Computer Performance                         |                           |
| Computer Technology Review                   |                           |
| Computer Vision, Graphics & Image Processing |                           |
| Computerwoche                                |                           |
| COMPUTERWORLD                                |                           |
| Computing                                    |                           |
| Computing Europe                             |                           |
| Data & Graphics for Management               |                           |
| Datamation                                   |                           |
| Desktop Computing                            |                           |
| Dr. Dobb's Journal for Users of              |                           |
| Small Computer Systems                       |                           |
| EDP Performance Review                       |                           |
| Information and Management                   |                           |
| Information & Word Processing Report         |                           |
| Information Systems                          |                           |
| Information Systems News                     |                           |
| Infosystems                                  |                           |
| Infoworld                                    |                           |
| Lifelines: The Software Magazine             |                           |
| MIS Week                                     |                           |
| PC Magazine: The Independent Guide           |                           |
| to the IBM Personal Computer                 |                           |
| PC Tech                                      |                           |
| PC World                                     |                           |
| Personal Computing                           |                           |
| Popular Computing                            |                           |
| Small Business Computers Magazine            |                           |
| Small Systems World                          |                           |
| Softalk for the Apple Personal Computer      |                           |
| Softalk for the IBM Personal Computer        |                           |
| Software & Microsystems                      |                           |
| Software Practice and Experience             |                           |
| Software News                                |                           |
| Software Review                              |                           |

# A Simple Window Package

**W**indows are used to split a computer screen into several possibly overlapping viewing areas. Like a tiny screen, each window may be used to show a separate program or task (see Figure 1, page 37).

Windows are used extensively in the Xerox Star, VisiCorp's new VisiON operating system for the IBM PC, and are the basis of the Apple Lisa and the soon to be announced Macintosh computers. This article shows how you can create and use windows on your computer. While this article is geared towards the Osborne user, tips are included for modifying the routines for the IBM PC and other computers.

## Why Windows?

To understand the reason for windows, imagine a desk covered with sheets of paper. When we stop working on one project, we don't have to take everything off the desk. Instead, we can just plop the new work on top of the old.

Windows are like those sheets of paper, rather than piling sheets of paper on top of one another, our software simply draws windows on top of whatever else is on the screen. The new project or task is completed within the window boundaries, the window then disappears, and the original text is restored — just like working on a desk top.

Figure 1 shows a typical computer in use. At (a) the word processor is in operation. At (b) we momentarily leave the word processor to check our electronic mailbox, so a window is created for the MAIL program. Windows can also be placed on top of windows, as shown in (c), where a quick check of the file directory is made.

## The Window Package

Five procedures create and manipulate the windows. The window package is shown in Listing One (page 38), written in Augusta, a subset language based on Ada (see references 1 through 4).

DRAW\_WINDOW draws a new win-

*"Windows are like sheets of paper; rather than piling sheets of paper on top of one another, our software simply draws windows on top of whatever else is on the screen."*

dow on the screen, saving the text that was originally displayed. DRAW\_WINDOW can create windows anywhere on the screen, even on top of other windows. WRITE\_TEXT outputs text to an existing window. INSERT\_ROW and DELETE\_ROW add and remove a single line, respectively, from within a window and can be used for text editing and scrolling. Finally, REMOVE\_WINDOW completely erases the most recently drawn window, restoring the original text to the screen.

Some caveats: This package is a simple implementation, lacking many advanced features found in other products such as the Apple Lisa. For example, if one window is displayed on top of the other, you should write only text to the topmost window. Windows can be removed only in the reverse order from that in which they were drawn. And windows cannot be moved from one location to another nor scaled to different sizes. Some features, such as moving data between windows, are easy to implement, but they are not shown here.

Despite these limitations, the package has numerous applications. In fact, very few programs will ever need more advanced features.

## Implementation Details

When a window is created, the original text on display is saved in an array called STORAGE, which is indexed with the variable CUROFFSET. The function GETCH(X,Y) returns the character on the screen at cursor location (X,Y). A character is then saved in STORAGE with the statements:

```
STORAGE(CUROFFSET) :=  
  GETCH(X,Y);  
CUROFFSET := CUROFFSET + 1;
```

STORAGE is used like a stack. As text is saved, CUROFFSET is incremented. Consequently, the most recently saved text corresponds to the most recently drawn window.

A window is erased by decrementing CUROFFSET, fetching the character

from the array, and drawing it on the screen; this is repeated for all characters within the window. Because of this simple scheme for storing text, windows cannot be drawn and erased at random but must be erased in the reverse order from that used to draw them.

For each window, the system remembers the (X, Y) location of the upper left corner of the window (array variables WINDOW\_X() and WINDOW\_Y()), plus the width and height of the window (variables WINDOW\_XSZ() and WINDOW\_YSZ()).

Function DRAW\_WINDOW checks to see that array STORAGE has enough room to save the screen's current text. If enough memory is available, the coordinates and size of the new window are saved, and the text where the window will be drawn is written to the STORAGE array. The window border, consisting of hyphens "-" on the top and bottom edges and vertical bars "|" on the sides, is then sketched in place, and the window's interior is filled with blanks.

Windows are numbered consecutively from 0 according to the order of creation. The first window drawn on the screen is number 0, the second is number 1, and so on.

Text is written inside a window by calling WRITE\_TEXT and passing to it the window number, the X and Y locations relative to the window's upper left corner (e.g., (1,1) is row 1, column 1, within the window), and the string to be written.

REMOVE\_WINDOW erases the window that was just drawn; this is equivalent to the sheet of paper on top of all the others on a desk.

Two editing procedures, INSERT\_ROW and DELETE\_ROW, manipulate the contents of the windows. INSERT\_ROW creates a new blank line within the window, sliding all of the lines below it down one line position. DELETE\_ROW removes a line, sliding all those that are below it up one line and leaving a blank line at the bottom of the window.

GETCH, shown in Listing One, coded

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for the Osborne 1, reads characters from the screen by accessing the Osborne's memory-mapped video display. Characters are written to the screen simply by changing a value in memory. The same character, once it's on the screen, can be read by accessing the memory location in the memory-mapped display area. The PEEK() in GETCH and the POKE in PUTCH access these memory locations. See references 5 and 6 for additional details concerning the Osborne 1 video display system.

Different computer systems require different code for GETCH and PUTCH. Listing Two (page 43) shows versions of GETCH and PUTCH written in IBM Pascal for the IBM Personal Computer. In Listing Two, (a) is a global variable declaration needed to access screen memory, (b) initializes the global variable, and (c) is the code for GETCH and PUTCH.

### Summary

Windows are being used increasingly as a means to improve and simplify the user interface. The five procedures just described provide a simple implementation of windows for the Osborne 1 and are easily modified for use on other computers, including the IBM PC. These routines are not nearly as powerful as the windowing capabilities of the Xerox Star or Apple Lisa, but they will suffice for many of your applications.

### References

1. Edward Mitchell, "Augusta, An Ada Subset for Micros," *Dr. Dobb's Journal*, January 1983, p. 14.
2. \_\_\_\_\_, "Augusta, Part II - The Augusta P-Code Interpreter," *Dr. Dobb's Journal*, March 1983, p. 20.
3. \_\_\_\_\_, "Augusta, Part III - The Augusta Compiler," *Dr. Dobb's Journal*, May 1983, p. 13.
4. \_\_\_\_\_, "Augusta, Part IV - The Augusta Compiler (Continued)," *Dr. Dobb's Journal*, July 1983, p. 12.
5. *Osborne 1 User's Reference Guide*, Osborne Computer Corporation.
6. *IBM Personal Computer Technical Reference*, International Business Machines Corporation, 1981. See pages 2-37 through 2-63.

Note: The Augusta compiler, including source, p-code interpreter, disassembler, Jdebug utility, and 160-page reference guide, is available for 280-based CP/M computers for \$90 from: Laboratory Microsystems, 4147 Beethoven St., Los Angeles, CA 90066; (212) 306-7412.



(Listing begins on page 38)

#### Reader Ballot

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(a)

```

Windows are like those pieces of paper. But rather than
piling pieces of paper on top of one another, our software
simply draws windows on top of whatever else is on the
screen. The new project or task is then completed within
the window boundaries, the window disappears and the
original text is restored. Just like how we do our work
on a desk top.

Figure 1(a), (b), and (c) show a typical computer use: At
(a) is a word processor in operation. At (b) we
momentarily leave the word processor to check our
electronic mail box. A window is created on top of the
existing text. But windows can even be placed on top of
other windows, as shown in (c), where a file directory
listing is shown.
.....1.....2.....3.....4.....5.....6.....

```

(b)

```

Windows are like those pieces of paper. But rather than
piling pi-----, our software
simply dr----- is on the
screen. MAIL SYSTEM      pleted within
the windo: MAIL SYSTEM  and the
original |-----| do our work
on a desk: Messages Received: 3

Figure 1(( From      Date      Time      :puter use: At
(a) is a |-----| : ) we
momentari: John      1/24/83  0935    :k our
electroni: Kim       1/23/83  1547    :op of the
existing | Sam      1/23/83  1117    :ed on top of
other win: |-----| :directory
listing i: |-----|

Command?
.....1.....2.....3.....4.....5.....6.....

```

(c)

```

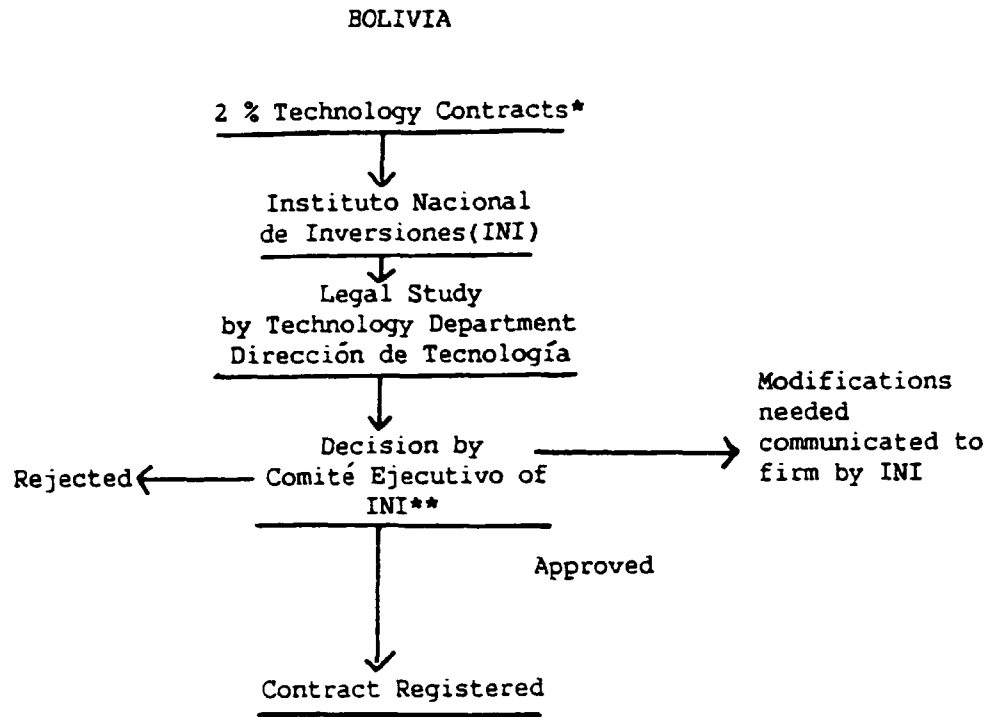
Windows are lik----- rather than
piling pi-----: our software
simply dr-----: our software
screen. MAIL: File Directory of B: s on the
the windo: MAIL:-----| eted within
original |-----| :nd the
on a desk: Mess: WINDOW.TXT :o our work
Figure 1(( Fr: KEYWORDS.TXT :ter use: At
(a) is a |-----| :we
momentari: Jo: RUN.COM :our
electroni: Ki: ARTICLE.BAK :op of the
existing | Sa: | :on top of
other win: |-----| :irectory
listing i: |-----|

Command?
.....1.....2.....3.....4.....5.....6.....

```

Figure 1.

Windows provide a way of presenting several tasks or programs on a single screen. At (a) is a typical word processing program. (b) shows the same screen but with a window superimposed on top of the word processor, allowing access to an electronic mail utility. And (c) shows a file directory window on top of the mail window.



\* Only those involving foreign investment.

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