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UNCLASSIFIED

INTERNATIONAL DEVELOPMENT

COOPERATION AGENCY

AGENCY FOR INTERNATIONAL DEVELOPMENT

Washington, D.C. 20523

PROJECT PAPER

TUNISIA: Computer Technology Project  
664-0334

UNCLASSIFIED

FD-AAS-006

<b>AGENCY FOR INTERNATIONAL DEVELOPMENT</b> <b>PROJECT DATA SHEET</b>		<b>1. TRANSACTION CODE</b> <input checked="" type="checkbox"/> A A = Add <input type="checkbox"/> C = Change <input type="checkbox"/> D = Delete		<b>DOCUMENT CODE</b> 3					
<b>2. COUNTRY/ENTITY</b> Tunisia		<b>3. PROJECT NUMBER</b> 664-0334							
<b>4. BUREAU/OFFICE</b> ANE No. 03		<b>5. PROJECT TITLE (maximum 40 characters)</b> Computer Technology							
<b>6. PROJECT ASSISTANCE COMPLETION DATE (FACD)</b> MM DD YY 03 31 89		<b>7. ESTIMATED DATE OF OBLIGATION</b> (Under "B." below, enter 1, 2, 3, or 4) A. Initial FY 85 B. Quarter <input checked="" type="checkbox"/> C. Final FY 85							
<b>8. COSTS (\$000 OR EQUIVALENT \$1 = )</b>									
<b>A. FUNDING SOURCE</b>		<b>FIRST FY 85</b>		<b>LIFE OF PROJECT</b>					
		B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total		
AID Appropriated Total		3500		3500	3500		3500		
(Grant)		( 3500 )	( )	( 3500 )	( 3500 )	( )	( 3500 )		
(Loan)		( )	( )	( )	( )	( )	( )		
Other U.S.									
1.									
2.									
Host Country			7175	7175		7175	7175		
Other Donor(s)									
<b>TOTALS</b>		3500	7175	10675	3500	7175	10675		
<b>9. SCHEDULE OF AID FUNDING (\$000)</b>									
<b>A. APPROPRIATION</b>	<b>B. PRIMARY PURPOSE CODE</b>	<b>C. PRIMARY TECH. CODE</b>		<b>D. OBLIGATIONS TO DATE</b>		<b>E. AMOUNT APPROVED THIS ACTION</b>		<b>F. LIFE OF PROJECT</b>	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ES	600	600				3500		3500	
(2)									
(3)									
(4)									
<b>TOTALS</b>						3500		3500	
<b>10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)</b> 870 874 960						<b>11. SECONDARY PURPOSE CODE</b> 751			
<b>12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)</b>									
A. Code		R/ED		RDEV					
B. Amount		300		500					
<b>13. PROJECT PURPOSE (maximum 480 characters)</b> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;">         To assist the GOT to institutionalize its critical capacity to evaluate, plan, design, modify, and implement microcomputer applications, primarily through public education and research, in a contextually appropriate manner.       </div>									
<b>14. SCHEDULED EVALUATIONS</b> Interim MM YY MM YY Final MM YY 					<b>15. SOURCE/ORIGIN OF GOODS AND SERVICES</b> <input checked="" type="checkbox"/> 000 <input type="checkbox"/> 941 <input type="checkbox"/> Local <input type="checkbox"/> Other (Specify)				
<b>16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)</b>									
<b>17. APPROVED BY</b>		Signature: <i>James R. Phippard</i> Title: Director USAID/Tunis				Date Signed: MM DD YY 09 26 85			
						<b>18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION</b> MM DD YY			

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## ACRONYM LIST

A.I.D.- Agency For International Development  
CAD - Computer Assisted Design  
CAI - Computer Assisted Instruction  
CAM - Computer Assisted Manufacturing  
CBE - Computer Based Education  
CBMI - Centre Bourguiba Micro-Informatique  
CIPIT - Interministerial Council for Computer Technology Policy  
CIT - Carthage Institute of Technology  
CNI - National Commission on Computer Technology  
EOPS - End of Project Status  
FY - Fiscal Year  
GOT - Government of Tunisia  
IBI - Intergovernmental Bureau for Informatics  
IRSIT - Institut Regional des Sciences Informatiques et  
Telecommunications  
LDC - Lesser Developed Country  
MIT - Monastir Institute of Technology  
MOE - Ministry of Education  
MOHESR - Ministry of Higher Education and Scientific Research  
MOP - Ministry of Plan  
O.E. - Operating Expense  
PACD - Project Assistance Completion Date  
PIL - Project Implementation Letter  
PM - Person month  
PSC - Personal Services Contractor  
PY - Person year  
TA - Technical Assistance  
UNESCO - United Nations Education and Science Organization  
USAID - United States Agency for International Development  
Mission in Tunisia

## I. PROJECT RATIONALE, BACKGROUND AND SUMMARY DESCRIPTION

### A. Project Rationale

The availability of the microelectronics revolution poses a challenge to the developing world (see, for example, the Club of Rome Study). Tunisia has recognized this challenge and has decided to pursue the opportunity of effectively utilizing computers in widespread applications for its economic development, including efforts in the private sector and government, as well as vocational applications. The GOT sees computer applications as leading to more efficient operation in the public and private sectors and to more effective use of limited resources. Support for activities in this area comes from the highest levels of the GOT and is being directed throughout the country, including into the educational system. The GOT recognizes that the United States is a leader in computer technology and has requested that the U.S. government provide assistance to the GOT in development of its national programs. Needs in both financial and human resources exist and the GOT has requested both forms of assistance from the USG.

The GOT has already introduced computers into both secondary schools and higher education institutions on a pilot basis. Plans presently exist to expand this program on a broad scale, without either a clear-cut programmatic direction or an applications focus. This project is timely since it will permit the GOT to examine its expansion of computer applications in education and beyond and to make programming decisions which will lead to both efficiency and cost-effectiveness.

This project will assist the GOT in developing its capacity to move expeditiously toward applications of microelectronics, emphasizing applications to the education system and research that will lead to the long-term goal of increasing development efficiency through introduction of microelectronics to other productive sectors. The project will work with the Regional Institute for Computer Science and Telecommunications (IRSIT) as the GOT's implementing agency and will help to build the capacity of IRSIT, the MOE and the MOHESR to evaluate software and hardware for Tunisian applications, modify software, develop well-designed experimental trials for computer applications and plan new software to meet applications needs. The project will provide linkage with U.S. institutions to enhance Tunisia's capacity to plan, design, modify, implement and evaluate computer applications in education. The project will provide technical assistance, exposure to international experiences in computer applications, training, and some commodities.

This project will be implemented at a time when Tunisia's economic situation is deteriorating and a need for efficiency and cost containment is growing. Prospects for oil -- the most important source of foreign exchange -- are at best uncertain; recession in neighboring Arab Gulf states is taking its toll on remittances -- also an important source of foreign exchange; and the entry of Portugal and Spain into the EEC promises to have a negative impact on Tunisia's foreign trade. Accordingly, A.I.D. has decided to reverse its phase-out decision and continue its assistance through 1990. Assistance under the project is planned for FY 86 through FY 88.

The USAID/Tunis mission strategy, which will be amplified in the upcoming CDSS, focuses on three priority areas, with strong emphasis on the private sector:

- Directing resources where there is significant potential for policy dialogue,
- Promoting technology transfer, and
- further strengthening of Tunisian institutions which A.I.D. has previously assisted.

The proposed computer technology program will provide assistance in each of these three areas. Specifically, the proposed project will:

- work with IRSIT to further develop its capacity to evaluate, plan, modify and implement computer applications to meet specific Tunisian applications needs,
- work with the MOHESR and the MOE, through IRSIT, to support the GOT's commitment to introduction of computers into the education sector,
- continue to encourage greater cooperation among organizations involved in computer science, education and research to develop educational applications which are meaningful in the Tunisian context,
- provide linkages between Tunisian institutions, primarily IRSIT, involved in computer based education and applications and U.S. universities and organizations involved in these areas,
- perform an institutional analysis to examine future directions for Tunisia's national program in computer based education, including IRSIT and higher education needs (such as development of CIT),

- support specific pilot activities in computer applications, and,
- provide specific recommendations to the GOT for directions to follow in the implementation of its national program of computer based education, based on lessons learned in the project's pilot activities and evaluation.

This strategy is consistent with the overall U.S. objective of strengthening Tunisia's pro-Western, democratic institutions at a time when they are under increasing pressure.

The project is also consistent with the 1983-1988 Near East Bureau Strategy which, in examining projected needs in basic education and technical training states that

The major problem to be faced in the coming years by ... Tunisia is the provision of technically trained manpower for existing and future jobs requiring secondary and post secondary education. The expansion of secondary and post secondary education, with a strong emphasis on technical training will require major investments ... The expansion of higher education in Tunisia ... will be particularly crucial for meeting the need for highly skilled manpower ... An additional problem ... is building adequate mechanisms to access U.S. and other western science and technology.

In addition, the project is consistent with directions outlined by Curt Farrar, former A.I.D. Deputy Assistant Administrator for Research, as expressed before the House Sub-committee on Scientific Research in 1982 when he said "our experience has been that developing countries are able to use very advanced technologies (e.g., computers) and, in effect, skip over the years of learning process".

The project will be a grant to the government of Tunisia (GOT), rather than a loan, since from the beginning negotiations with the GOT have been for a grant program in computer technology.

#### B. Project Background and Problem Statement

A.I.D. has provided assistance to the Tunisian education program for several years through the Technology Transfer project to support higher education in the field of engineering, including computer science and electrical engineering. In addition, A.I.D. supported the development of Tunisia's School of Engineering at the University of Tunis. For the past nine months, the GOT has been in dialogue with A.I.D. to develop a program which will provide assistance in developing a national program introducing computers into

Tunisia, particularly into the area of education. This project aims to provide technical assistance for the development stages of this national program and to provide a basis for decision making for the GOT as it expands the program so that the GOT will have a systematic approach, including policies and procedures, for implementing its national program. This project will provide access to other relevant experiences as well as analysis of types of applications and target areas for potential implementation of computer based education.

The GOT has already introduced pilot programs in computer science into secondary education and has for some time had a university-based program in computer science at the University of Tunis. Officials within the GOT express concern that these existing programs are not sufficient to meet Tunisia's developing needs in information sciences, since at present both the public and private sector are increasingly turning toward computer applications to meet programmatic needs.

Manpower studies recently conducted indicate an immediate sufficiency in the number of computer scientists in Tunisia, but there is widespread belief that the demand for these professionals is growing considerably faster than the rate at which they are being trained. In addition, there is a rapidly developing need for individuals familiar with computer applications, but not trained to the technical levels of engineers or computer scientists, for positions which are opening in all aspects of the public and private sector, from budget and finance to statistical analysis. At present no systematic program exists to train individuals for an applications orientation in the field of computers. Clearly existing training in electrical engineering and computer science is far too technical to meet these application needs; the GOT's proposal for a broad-based training program addresses this need for individuals who will be sufficiently trained to assume applications-oriented computer-related positions. The proposed project will assist the GOT in examining its proposal for this program and will help develop the institutional capacity to make rational choices and implement the selected policies.

The project will have an application focus and will support specific pilot projects which will lead to clearly defined computer applications. The project will provide support for materials development in secondary and higher education and will analyze the roles of institutions involved in computer education and research such as IRSIT, the GOT's research institute in computer science and will examine what, if any, other organizations are necessary to meet needs in this area. The project will strengthen Tunisia's existing ties with the United States in the area of computer science. It will work

with Tunisian educators, planners and researchers to develop curricula and develop and adapt courseware and will expose selected Tunisians to international experiences in computer based education. In addition, it will provide limited quantities of essential equipment and software.

C. Summary Problem Statement:

Tunisia has accepted the challenge of moving rapidly to apply computer technology to its development needs. Therefore a major increase in the capacity of its educational sector to train people to use computers and to catalize the introduction of computers in the productive sectors is required. The Tunisian educational system is technically competent in many respects and has been able to initiate pilot computer based educational programs. However, the program is limited in scope, and at the secondary level has thus far been introduced only in the most elite schools and on a limited scale. The focus at all levels has been on training by exploiting business-oriented applications packages but without stressing student oriented needs. In addition, the program is aimed only at students, and there is little attention given to training for end users. Emphasis is needed on developing Tunisia's ability to introduce a program which is needs oriented; included in this is the need for computer assisted instruction which is both appropriate to the Tunisian context and cost-efficient in delivery of learning material. Foremost is the need for developing rational, systematic plans and policies for introduction of computers in the educational program and the institutionalization of the capacity to plan, develop, modify and evaluate experiences in computer based education. Faculty/ teacher training will be an important aspect of the effort.

C. Summary Project Description and Budget

Goal: The long-term goal for this project is effective widescale utilization of information technology to improve socio-economic performance in achieving Tunisia's development goals. Specifically, the project aims to bring about the introduction of computer technology in public and private sectors such as manufacturing and services, to achieve a more effective and efficient use of computer technology in education at all appropriate levels, to produce a trained specialized and general workforce to assume computer-related roles.

Indicators of the achievement of the project goal are:

- widespread utilization of computers in effective and efficient applications in various sectors of the Tunisian economy,

- indigenous capability to manage various phases of a computer-oriented society,
- enhanced research and at least a limited manufacturing capacity to serve the specific needs of Tunisian society and related applications,
- improvement of the welfare of all factions of Tunisian society by access to various information sources and better services (e.g., record management, communications, information access, education and training, job opportunities -- at higher intellectual satisfaction, improved quality of life),
- greater role for the private sector in various functions.

Assumptions for achievement of this goal, based on successful accomplishment of the project purpose are:

- ministerial/industrial acceptance of system analysis within their organizations and modification of operations according to findings of these analyses;
- continued support by the GOT for introduction of computers and information technology into the Tunisian economy;
- continued high level attention to governmental stimulation and coordination of the introduction of information technology into the educational system and into governmental functioning and the private sector;
- continued openness on the part of the GOT and the Tunisian private sector to innovation, new approaches, evolution of vocational opportunities, financial flexibility and decentralization, encouragement of the private sector, new ventures, innovation, flexibility, new industry;
- social acceptability of the introduction of information technology into the society;
- liberalization of society to provide more access to information;
- the robustness of cultural values in the face of technological changes; and,
- continued investment in education, research, training.

Purpose: The project's purpose is to assist the GOT to institutionalize its critical capacity to evaluate, plan, design, modify, and implement computer applications, primarily through public education and research, in a contextually appropriate manner. This will be accomplished under four project components:

1. technical support for IRSIT, the MOHESR and the MOE,
2. pilot projects and applications research,
3. training, and,
4. institutional planning, development and analysis.

This purpose relates directly to Tunisia's current focus of computerizing various aspects of its society, including introduction of computer-based education in high schools and colleges. The purpose aims to help the GOT develop policies, procedures, and a systematic approach to the introduction of computer-based education and to provide the GOT with U.S. expertise and experience in computer applications, including computer-based education.

Evaluation of applicability of computers to various aspects of the educational sphere will include:

- o Ability to manage computer technology at higher education levels, including applicability to various curricula, especially engineering and service applications.
- o Computer-managed education at the secondary level including the issues relating computers to various elements of curricula, policy issues surrounding logistics of student use, teacher preparation, courseware development.
- o Ability to choose the proper hardware and software, with consideration to coordination, expansion, utility for various applications, maintenance, financing, bureaucratic aspects.
- o Planning and organizing research in the various related areas.
- o Coordination among institutions involved in research.

End of Project Status (EOPS)

Objective indicators of Project Purpose attainment will include:

(A) The Ministry of Education, having evaluated project outputs and having the support of the GOT, will establish a plan for the extended utilization of computers in the education system, involving:

- o evaluation mechanisms for satisfying pedagogical and curricular requirements;
- o development and selection of necessary courseware and maintenance of a data base of applications;
- o acquisition of appropriate hardware and peripherals; and,
- o further training of teachers.

(B) The Ministry of Higher Education and Scientific Research, having evaluated project outputs and having the support of the GOT, will establish a plan for the extended utilization of computers in higher education, involving:

- o evaluation mechanisms for selecting appropriate applications to the higher education curricula (e.g., CAD, CAM, simulation, statistical analysis, data base access),
- o further training of instructional personnel,
- o development and selection of necessary courseware and maintenance of data banks,
- o acquisition of hardware and peripherals.

(C) The GOT, having evaluated the plan and priorities for the various research institutes, will take the actions necessary to organize a concerted attack on priority research and will begin to devote the necessary resources to the successful development of IRSIT as the capping institution in harmony with the other elements of the research infrastructure.

(D) The GOT will implement the necessary high level coordinating mechanisms to see that these various institutional efforts work together in a complementary fashion, and that they respond to national needs and priorities.

(E) Plans will be formulated to define the role(s) and future activities of IRSIT.

(F) Links will exist between IRSIT and US Universities, research institutions and private sector organizations.

(G) Teachers and resource personnel will be in place in several Tunisian education institutions.

Assumptions relating to EOPS

Achievement of the desired end-of-project status requires a number of assumptions about the educational system in Tunisia, specifically,

- Ministerial and institutional support for project efforts;
- acceptance of project activities by schools and teachers;
- adequate teacher training;
- willingness to modify curricula in the schools;
- research as a necessary concomitant of higher education;
- continued high level coordination among institutions;
- effective evaluation of lessons learned in the course of the efforts so as to enable the GOT to create the necessary organizations and functions in the different ministries and institutes;
- the GOT will take the actions necessary to implement the findings;
- continued high level attention will be given to see that the complex coordination can take place efficiently;
- GOT investment in resources necessary to sustain the institutions and support the teachers, professors, equipment, new efforts, etc. necessary to keep the activities viable (recurrent cost support, etc.);
- retention of links with outside organizations to maintain awareness and openness as well as to derive benefits from these relationships; and,
- maintenance of an environment to stimulate and encourage creative research through structuring a flexible arrangement (with private sector, venture capital, etc.) to stimulate innovative applications.

TABLE 1.1: Total Project Budget by Component

Component	YEAR 1		YEAR 2		YEAR 3		TOTALS	
	AID \$US 000	GOT \$ 000						
#1	307.8	75.6	368.9	82.9	371.1	90.9	1,047.8	249.4
#2	480.5	188.7	249.2	91.8	35.8	17.1	765.5	297.6
#3	150.3	88.4	85.7	69.4	85.4	43.5	321.4	201.3
#4	701.6	1928.9	66.2	1811.0	69.5	2686.9	837.3	6,426.8
Adminis- tration	123.9		215.4		188.7		528.0	0.0
Totals	1764.1	2281.6	985.4	2055.1	750.5	2838.4	3,500.0	7,175.1

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## II. DETAILED DESCRIPTION OF PROJECT COMPONENTS AND BUDGETS

The project will be implemented by IRSIT, which will coordinate all project activities. IRSIT will work with concerned ministries, institutions and the private sector in carrying out activities in secondary and higher education and industry.

The project will focus principally on strengthening the capacity of IRSIT to lead in planning, managing and conducting research strategies for a broader, contextually appropriate application of computer technology in Tunisia. Through training, technical support and the support of research and development and formal planning exercises, the resource base of IRSIT will be improved as well as that of the MOHESR and the MOE. A key vehicle for the project will be the selection and prosecution of pilot activities introducing computers into the higher, secondary and non-formal educational systems of the country. While these subprojects will themselves be developmentally and economically important, they are justified primarily as providing the experience to the GOT in innovation in computer technology to allow forceful future efforts on a larger scale.

The project can perhaps be most clearly understood by focusing on the project components, including a description of the specific outputs, inputs required to produce these and their associated financial requirements.

### Component No. 1: Technical Support

Technical assistance under the project will establish institutional capacity of the GOT, through IRSIT, to develop the ability to critically assess the feasibility of potential computer research and development activities leading to applications throughout the Tunisian economy, with respect to cost benefit and practability, applications, to evaluate software and hardware, to modify applications accordingly for the Tunisian context, and to evaluate developments in computer technology. A primary objective of the technical support component of the project will be to establish linkages between Tunisian institutions, primarily IRSIT, and U.S. institutions and industry. Another objective is to link Tunisian research capacity in computer technology with Tunisian industry and other sectors so that research can be driven by specific applications needs. There will be a contracted U.S. institution working with IRSIT for the life of the project which will have a U.S. resident scientific advisor and additional short term TA advisors working as necessary with IRSIT, MOHESR, MOE or pilot activities, institutional analysis, or planning exercises as required. IRSIT will provide a full-time counterpart for project activities and establish research

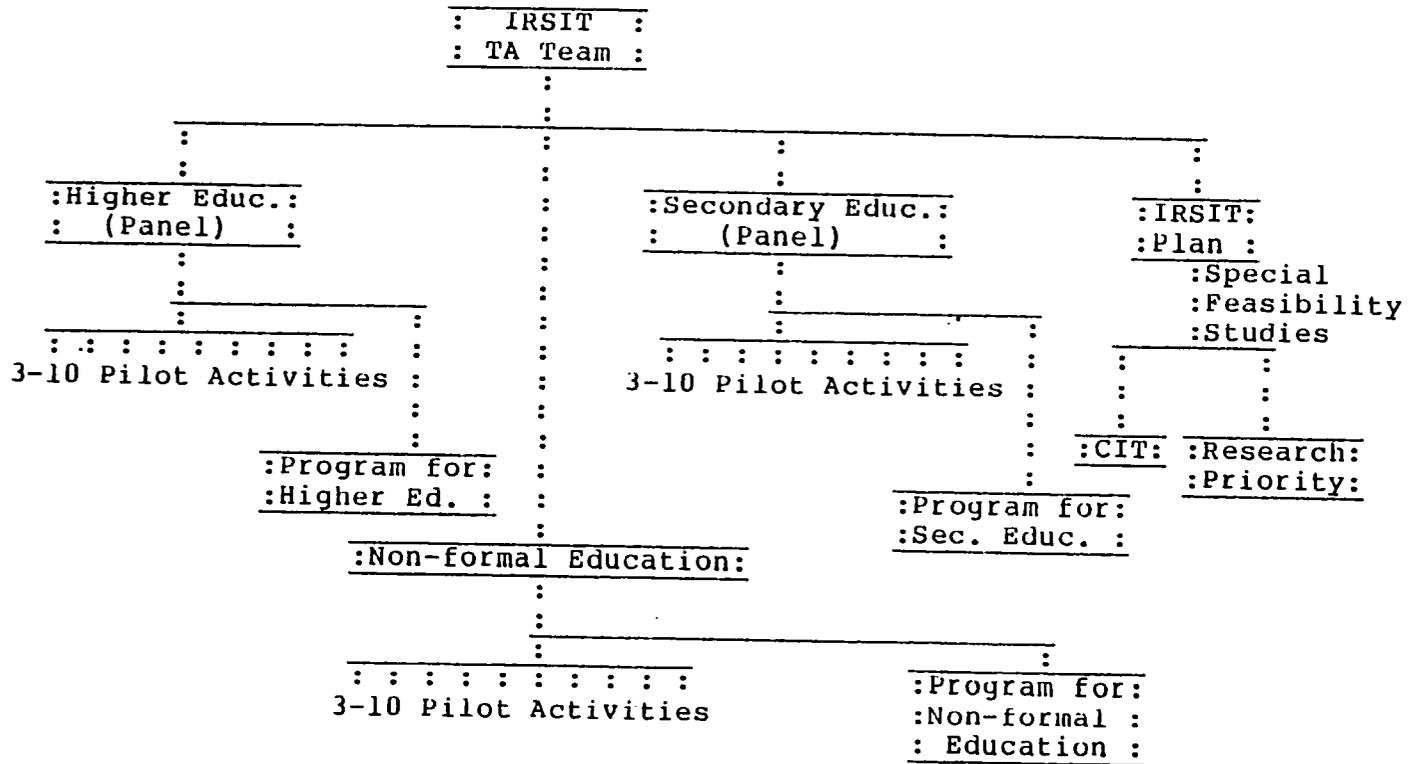


FIGURE 2.1: Project Design



TABLE 2.2: Budget for Project Component #1:  
Technical Support

Activity	YEAR 1		YEAR 2		YEAR 3		TOTALS	
	AID \$US 000	GOT \$ 000						
<b>Technical Assistance</b>								
*Person months	6.0		4.0		4.0			
Salary	36.0	15.0	24.0	15.0	24.0	15.0	84.0	45.0
Per Diem	13.5	0.0	9.2	0.0	9.2	0.0	31.9	0.0
Travel/Misc.	9.0	0.0	6.0	0.0	6.0	0.0	21.0	0.0
Overhead	60.0	0.0	40.0	0.0	40.0	0.0	140.0	0.0
Long-term:								
Res. Advisor	90.0	15.0	90.0	15.0	90.0	15.0	270.0	45.0
Admin. Asst.	0.0	15.0	0.0	15.0	0.0	15.0	0.0	45.0
Office	0.0	15.0	0.0	15.0	0.0	15.0	0.0	45.0
<b>Institutional Links</b>								
*Travel	18.0	6.0	18.0	6.0	18.0	6.0	54.0	18.0
*Communications	5.0	3.0	5.0	3.0	5.0	3.0	15.0	9.0
<b>Exchange of Teachers &amp; Scientists</b>								
Travel	7.2	0.0	14.4	0.0	7.2	0.0	28.8	0.0
Support Costs	40.4	0.0	127.6	0.0	121.2	0.0	288.6	0.0
<b>Development of Training of Trainers</b>								
	12.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0
<b>Selection of Institutions</b>								
	2.0	3.0	1.0	1.5	0.0	0.0	3.0	4.5
<b>Subtotal</b>								
FX	293.1		334.6		320.6		948.3	
LC		72.0		70.5		69.0		211.5

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and development teams to support project research activities as necessary.

The technical assistance contractor will be responsible for developing linkages with U.S. and third country institutions, for developing exchanges of teachers and scientists, for developing a program for training of trainers, for designing observation tours to the U.S. so that key Tunisian scientists and educators will continue to develop and reinforce contacts and experiences. The technical assistance will provide guidance in all project components and will provide leadership to the GOT in developing its capability in these areas. Particular attention will be given to development of Tunisia's ability to objectively evaluate activities in the area of computer technology with a focus on impact, cost effectiveness and cost benefit. Initially the technical assistance contractor will provide computer science experts to the GOT, through IRSIT, who will stimulate an environment conducive to designing research projects, developing proposals for their execution and funding these activities. The contractor and CNI, working on behalf of the National Committee for Computer Technology, will also make recommendations to IRSIT for initial selection of institutions and substantive areas for project activities in computer technology. Also, the contractor will provide a framework for evaluation of existing hardware and software with respect to Tunisian needs and resources.

Technical assistance will assist IRSIT, the GOT and the private sector to work with advisory groups for computer technology activities and to help the GOT establish priorities for research in computer technology. A joint GOT/USAID advisory committee (including industrial and commercial sector representation) will be established by the contractor for the project. A necessary output of this project component will be clear research planning in the area of computer technology within IRSIT, and plans within the MOHESR and the MOE for introducing computer technology and supporting planned activities.

#### Component No. 2: Pilot Projects and Applications Research

Pilot project activities will be aimed primarily at developing the institutional capacity of IRSIT, the MOE and the MOHESR to examine proposals for computer applications in education and other sectors and to determine feasibility, funding mechanisms, evaluations designs, and implementation plans. While there will be immediate outcomes for those participating in the pilot activities and users of products developed, the primary outcome from this project component will be a capacity to continue developing and evaluating appropriate applications of computer technology to the education sector and to the industrial and service sectors.

Inflation								
FX (5%)			16.7		32.9		49.6	
LC (12%)				8.5		17.6		26.0
Contingencies	14.7	3.6	17.6	3.9	17.7	4.3	49.9	11.9
(5%)								
Totals	307.8	75.6	368.9	82.9	371.1	90.9	1,047.8	249.4

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Activities in this project component will be in three categories: higher education pilot projects, secondary education pilot projects and applications research. All three categories aim to introduce microcomputers in a manner which is efficient and cost effective.

In higher education, emphasis in pilot projects will be on use of computer applications to enhance the teaching environment. At this level, however, it is expected that clear applications will be identified (e.g., CAD in the engineering schools) which will lead to greater productivity in post-collegiate employment and increased efficiency in use of the applications. Students who participate in these pilot projects are expected to be able to directly apply skills obtained in the project experiences immediately after graduation. Participation in the pilot activities should prepare them for roles in computer technology directly applicable to Tunisian applications, and, accordingly, the sectors in which they work should experience immediate benefits from their participation in project pilot activities. Pilot activities in higher education will be based on complete proposals for activities including plans for evaluating the impact of the activity both on the learning from the activity and on the impact in terms of cost effectiveness and cost benefit of the application.

Projects will be selected, based on merit, by the following criteria: 1) the estimated economic and developmental importance of the proposed innovation, to be verified by cost-benefit analysis as appropriate, 2) the need for innovation of computer technology in the field chosen, 3) the scientific and technical merit of the proposal (i.e., appropriate hardware, software and courseware, state-of-the-art applications, etc.), 4) the appropriateness and cost-efficiency of the didactic approach that would be followed, 5) the clarity and importance of the university-industrial linkage in the project, 6) the linkage with appropriate U.S. institutions, 7) the variety of projects approved (i.e., efforts will be made to carry out subprojects in a variety of disciplines and institutions, both to maximize the experience gained and the demonstration impact), 8) the integration of practical Tunisian case study material with appropriate educational curriculum, and 9) quality and efficiency of proposed plans for evaluation of the pilot activity. In addition the general criteria for all pilot activity proposals (listed below) will apply.

In secondary education, the focus of the project will be on developing specific pilot activities within carefully chosen content areas and student populations to evaluate the efficacy of computer use in teaching. Both cost and quality factors will be required in the designs of these activities. Activities will require clear proposals defining the content to be delivered, the learning objectives to be achieved, and the

methods for evaluating the impact and relative value of the computer based activity. It is important to recognize the distinction between efforts in education to prepare and train computer scientists and engineers on the one hand and on the other to prepare and equip the larger numbers who will have to be adequately trained with the proper skills to make efficient use of modern computer techniques in the efficient organization and processing of information as the need to do so finds a ubiquitous place in all phases of the production and service sectors of the economy. For those involved in project pilot activities, achieving this "computer literacy" in the broadest sense of the concept is an important outcome of this project. This is mandatory if the experiences are to be replicated on a broader scale by the GOT. Use of computers in a clearly defined and appropriate application will lead students to a level of "computer literacy" which will provide them with an introduction sufficient to adapt to applications which they will face in higher education or in applications after schooling is completed.

Examples of possible secondary education projects would be a project to test the utility of computers in teaching mathematics to college bound students, or a project to train high school business majors for future employment in computerized banking and financial services sectors. In the first case, applications might range from computer graphics for teaching of the behavior of mathematical functions, to artificial intelligence based interactive devices for tutoring on proof procedures for algebra or geometry. A competitive procedure will be used to select organizations and projects for funding, with selection criteria based on 1) diversity of secondary school applications (i.e., it would be better to have an application in electrical-mechanical studies and one in mathematics than to have two in mathematics), 2) scientific and technical merit of the proposal, 3) feasibility of the proposed innovation, 4) educational, economic and developmental importance of the proposed training innovation, 5) involvement of teacher training institutions and other institutions that would be required for the large scale dissemination of the subproject if successful, 6) involvement and approval of private sector representatives, 7) quality of the evaluation scheme proposed for the innovation, and 8) such other criteria as the MOE may deem appropriate.

The final set of pilot activities under the project will be in the public and private sectors outside of the formal field of education. Activities in this area should lead to on-the-job training which will make a specific sector or industry more productive as an immediately visible output of the activity. Again, the activity must have a clearly defined proposal including a systematic approach to evaluating the cost effectiveness and cost benefit of the activity. To the extent possible, up to half of these activities must be aimed at the

Tunisian private sector.

Assistance in pilot activities will include cofinancing costs with the GOT, helping IRSIT set up criteria for selecting activities and institutions, both in Tunisia and in the U.S. for involvement in activities, training of resource teachers, selection of curricular content appropriate for computer based approaches, working with principal investigators and senior scientists of IRSIT, MOHESR and MOE in reviewing existing courseware and experiences in the areas, insuring hardware and software access, working with IRSIT in training of pilot teachers and developing a program for training of teachers in computer based instruction, and providing assistance and training in developing evaluation designs for activities.

The contractor will work to establish linkages, primarily for IRSIT, with U.S. based schools, universities and other organizations involved in computer technology so that a continuous exchange of ideas and experiences can be developed. Information banks developed under the project will serve as a basis for examining previous experience in areas considered for pilot activities under the project. Finally, necessary hardware and software will be provided under the project to ensure that the pilot activities can be accomplished without undue delay.

A coordinating committee will be established early in the project, under the auspices of IRSIT, to review all proposals for pilot activities. This committee will include members from IRSIT, CNI, the MOHESR, the MOE and other members as seen necessary, including industrial/commercial sector representation either on a permanent or ad hoc basis, to evaluate substantive proposals received. The chair of the committee will be the Director of IRSIT or his representative. For funding approval, the following criteria are necessary, but not sufficient prerequisites:

- o a clear detailed proposal indicating objectives, staffing, implementation plans, budget, timetable, equipment needs and other support provided,
- o a justification for the proposed activity, including a clear explanation of the applicability of the results of the activity in reducing costs, expanding services, improving quality, etc. in a specific sector,
- o an assessment of the likely impact on cost in the sector of application,
- o a clear and methodologically sound design for evaluation of the activity, and,

TABLE 2.3: Project Implementation Schedule: Component #2  
Pilot Projects and Applications Research

ACTIVITY	YEAR 1				YEAR 2				YEAR 3			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Secondary Pilot Proposal:		X				X						
Selection of Secondary Activities			X				X					
Implementation of Secondary Activities			X	X	X	X	X	X	X	X	X	
Evaluation of Sec. Activity					X	X	X		X	X	X	
Higher Ed. Pilot Proposal:		X				X						
Selection of Higher Ed. Activities			X				X					
Implementation of Higher Ed. Activities			X	X	X	X	X	X	X	X	X	
Evaluation of H.Ed Activity					X	X	X		X	X	X	
Applications Pilot Proposal:		X				X						
Selection of Applications Activities			X				X					
Implementation of Application Activities			X	X	X	X	X	X	X	X	X	
Evaluation of App. Activity					X	X	X		X	X	X	
Coord. Comm.	X	X	X	X	X	X	X	X	X	X	X	X
CBE Recommenda.									X	X	X	X

TABLE 2.4: Budget for Project Component #2:  
Pilot Projects and Applications Research

Element	YEAR 1		YEAR 2		YEAR 3		TOTALS	
	AID	GOV	AID	GOV	AID	GOV	AID	GOV
	\$US 000	\$ 000						
Coordinating Committee								
In-country travel	1.0	3.0	1.0	3.0	1.0	3.0	3.0	9.0
Development of Recommendations								
Printing	0.0	0.0	0.0	0.0	15.0	10.0	15.0	10.0
Pilot Activities								
*High School								
TA	5.0	0.0	5.0	0.0	5.0	0.0	15.0	0.0
Hardware and Software	147.2	58.9	70.0	25.0	0.0	0.0	217.2	83.9
*Higher Education								
TA	5.0	0.0	5.0	0.0	5.0	0.0	15.0	0.0
Hardware and Software	147.2	58.9	70.0	25.0	0.0	0.0	217.2	83.9
*Applications Research								
TA	5.0	0.0	5.0	0.0	5.0	0.0	15.0	0.0
Hardware and Software	147.2	58.9	70.0	25.0	0.0	0.0	217.2	83.9
Subtotal								
FX	457.6		226.0		31.0		714.6	
LC		179.7		78.0		13.0		270.7
Inflation								
FX (5%)			11.3		3.1		14.4	
LC (12%)				9.4		3.3		12.7
Contingencies (5%)	22.9	9.0	11.9	4.4	1.7	0.8	36.5	14.2
Totals	480.5	188.7	249.2	91.8	35.8	17.1	765.5	297.6

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- o verification of institutional support for the activity by the institution(s) involved in the implementation of the activity.

Evaluation of the proposal will place high priority on the potential of producing applicable products, cost implications (including cost benefit of likely products), and likelihood of continuation of the activity after pilot funding terminates.

Those activities which the committee recommends for funding are subject to A.I.D. final approval.

While no minimum or maximum values of funding are set a priori under the project, it is expected that activities will have costs not to exceed \$150,000 each. The project will fund at least 3 and up to 10 activities in each of the three component areas.

### Component Number 3: Training

Training activities under the project will fall into four categories: U.S. short-term training, in-country training, and observational tours/conference attendance. No long-term training will be supported under the project, but will be provided under USAID Project 664-0315, Technology Transfer.

U.S. training is necessary under the project since many activities in the area of computer technology are under development in the U.S. and since computer usage in education is more advanced and computer technology is more widely used in U.S. industry than in Tunisia or other developing countries. If IRSIT is to develop its capacity as a viable research institute then its scientists must receive state-of-the-art preparation to make them competitive among developers of computer applications. U.S. based training will consist primarily of supporting Tunisians to participate in short courses exchanges and similar activities of one semester or less, primarily at U.S. institutions of higher education with outstanding computer programs and U.S. based research institutions. This training will be authorized by the contractor. Candidates for U.S. training will be proposed by IRSIT's governing committee and subject to approval by A.I.D. for project funding. Preference will be given to training which will lead to clearly applicable skills. The project will support, on average, up to three trainees per semester for the three years of the project. Trainees will be from IRSIT or, while under the auspices of IRSIT, will be drawn from Tunisian institutions of higher education and organizations involved in application of computer technology in Tunisia. Since long-term training is provided under agreement A.I.D. Project 664-0315, Technology Transfer, in the field of computer science, the project will require that specific trainees supported under this other project be assigned clearly identified positions to

work with this project.

The question of "computer literacy" should be addressed within the Tunisian context. The tendency so far has been to include primarily familiarity in operating and utilizing to a limited extent the packaged U.S. generated popular software programs such as Lotus 1-2-3, dBase II, Framework, etc. Teaching of programming skills, especially in conjunction with the use of authoring systems and other aids, as well as efforts in graphics, Arabic language, CAI methods, etc. will be included in the teacher training programs. Furthermore, it is necessary to make provision for the availability of released time from the normally heavy teaching loads if local contributions to the revised curriculum and insertion of suitable CBE materials is to be effective.

Since research activity is clearly dependent on knowledge of existing research activities, previous findings, and present experiences, the project will fund observational travel for key Tunisian researchers and planners involved in information technology to the U.S. to visit education institutions, research institutes, industry, and public and private sector organizations involved in computer technology. These visits will be proposed by IRSIT and approved by the A.I.D. project officer. The project agreement will require that the agenda, purpose and objectives of the visit are specific and of obvious impact for the individuals in the positions which they hold. The project will support those visits which are most applicable to directions being taken by the Tunisian program and a justification for the observational tour must be presented to A.I.D. by IRSIT and the technical assistance contractor, who will make logistical arrangements.

Since A.I.D. requires host country participation in project costs, consistent with A.I.D. policy and regulations, the project will not fund international airline fares for training.

In-country training will be aimed at producing teachers qualified to undertake introduction of computer technology in appropriate educational settings and at providing researchers, scientists and end-users with skills necessary to apply computer technology in their work. While most of this training will be conducted by Tunisians, the project will support technical assistance necessary to develop curricula for this training and to set up institutional capacity for IRSIT and the GOT to maintain this training capacity after the project. Emphasis in project technical assistance in this area is support for a center for training of trainers.



TABLE 2.6: Budget for Project Component #3:  
Training

Element	YEAR 1		YEAR 2		YEAR 3		TOTALS	
	AID	GOT	AID	GOT	AID	GOT	AID	GOT
	\$US 000	\$ 000						
U.S. Short-term Training								
Tuition	4.8	0.0	4.8	0.0	4.8	0.0	14.4	0.0
Support Costs	9.0	0.0	9.0	0.0	9.0	0.0	27.0	0.0
Travel	1.0	6.0	1.0	6.0	1.0	6.0	3.0	18.0
Training Institute								
Hardware and Software	48.3	42.2	0.0	20.0	0.0	0.0	48.3	62.2
Equipment	20.0	10.0	0.0	5.0	0.0	5.0	20.0	15.0
Incountry Training								
Travel	1.0	1.0	3.0	3.0	1.0	2.0	5.0	6.0
Equipment	1.0	1.0	2.0	1.0	0.0	1.0	3.0	3.0
Observational Tours								
Travel	5.0	12.0	5.0	12.0	5.0	12.0	15.0	36.0
Per diem	21.0	0.0	21.0	0.0	21.0	0.0	63.0	0.0
Conferences								
Travel	5.0	12.0	5.0	12.0	5.0	12.0	15.0	36.0
Per diem	21.0	0.0	21.0	0.0	21.0	0.0	63.0	0.0
Registration	6.0	0.0	6.0	0.0	6.0	0.0	18.0	0.0
Subtotal								
FX	143.1		77.8		73.8		294.7	
LC		84.2		59.0		33.0		176.2
Inflation								
FX (5%)			3.8		7.6		11.4	
LC (12%)				7.1		8.4		15.5
Contingencies (5%)	7.2	4.2	4.1	3.3	4.0	2.1	15.3	9.6
Totals	150.3	88.4	85.7	69.4	85.4	43.5	321.4	201.3

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Component No. 4: Institutional Planning, Development and Analysis

Activities under this project component aim to develop a capacity within Tunisian institutions to maintain relevant research and other activities in computer technology after the project ends. The project will work with IRSIT, and through it with CNI, the MOHESR, the MOE, CBMI and educational institutions such as CBMI, ENSI, ISG, etc. to develop a comprehensive plan for activities in the field of computer technology. IRSIT has been chosen as the implementing agency and primary target for technical assistance under the project since it has been given high level support and attention for this role by the GOT. Contacts with GOT officials in all related institutions and ministries indicate that IRSIT is acceptable in this function and that they are willing to work with IRSIT in this capacity. Ministerial support for IRSIT comes from CIPIT and high level technical support is provided on a regular basis by IRSIT's task force. Specific outputs from this project component will be clear coordinating mechanisms for institutions involved in computer technology, GOT statement of priorities in computer applications, including computer based education, plans in both the MOHESR and the MOE for introducing computer technology in an integrated way to the curricula of the schools in a cost efficient and cost competitive basis. The project will provide technical assistance to the GOT to evaluate the impact of computer technology on education and to examine its needs in the area of computer technology, based on existing resources and manpower projections and will result in specific recommendations for educational and institutional changes needed and include an examination of needs related to graduates from the pilot high schools Bourguiba and Ariana with respect to a new institute of science and technology for these students (i.e., Carthage Institute of Technology).

The project will specifically work to establish linkages between higher education institutions and private industry in Tunisia to develop a needs based approach to computer technology in higher education and research.

As a prerequisite to institutional capacity, the project will provide support for developing a clearinghouse for evaluated applications in both education and industry and will provide minimal necessary equipment to stimulate research capability at IRSIT.

Since communication is necessary to stimulate quality research, the project will support an annual colloquium for presentation of research activities, findings and priorities. This will be under the auspices of IRSIT and is expected to draw at least on a regional participation.

Finally, since a research institution cannot survive without senior scientists to stimulate activity and guide research efforts, the project will provide support over the three years of the project for supplies and incidental costs of research for senior scientists at IRSIT, on the condition that half of the funding such support be obtained from other Tunisian or regional sources. The GOT will provide the senior scientists for these positions either on a permanent basis or on release time from university or private sector positions. This support recognizes the commitment of the GOT to encourage individuals from throughout the region to assume posts as senior scientists at IRSIT.

TABLE 2.7: Project Implementation Schedule: Component #4  
Institutional Planning, Development and Analysis

ACTIVITY	YEAR 1				YEAR 2				YEAR 3			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Industry Linkages	:	:	:	:	X	X	X	X	X	X	X	X
Clearinghouse Established	:	:	X	X	:	:	:	:	:	:	:	:
Research Scientist Support	:	:	X	X	X	X	X	X	X	X	X	X
Colloquia	:	:	:	X	:	:	:	X	:	:	:	X

TABLE 2.8: Budget for Project Component #4:  
Institutional Planning, Development and Analysis

Activity	YEAR 1		YEAR 2		YEAR 3		TOTALS	
	AID	GOT	AID	GOT	AID	GOT	AID	GOT
	\$US 000	\$ 000						
Clearinghouse								
Software	50.0	12.0	0.0	0.0	0.0	0.0	50.0	12.0
MIS	12.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0
Books, journals	10.0	5.0	10.0	5.0	10.0	5.0	30.0	15.0
Colloquia								
Support Costs	25.0	10.0	25.0	10.0	25.0	10.0	75.0	30.0
Research Scientist								
Support at IRSIT	10.0	10.0	25.0	25.0	25.0	25.0	60.0	60.0
IRSI'T Development								
Hardware and Software	561.2	300.0	0.0	0.0	0.0	0.0	561.2	300.0
IRSI'T Building	0.0	1000.0	0.0	1000.0	0.0	1000.0	0.0	3000.0
IRSI'T Furnishings	0.0	0.0	0.0	0.0	0.0	500.0	0.0	500.0
IRSI'T Salaries, etc.	0.0	500.0	0.0	500.0	0.0	500.0	0.0	1500.0
Subtotal								
FX	668.2		60.0		60.0		788.2	
LC		1837.0		1540.0		2040.0		5417.0
Inflation								
FX (5%)			3.0		6.2		9.2	
LC (12%)				184.8		519.0		703.8
Contingencies (5%)	33.4	91.9	3.2	86.2	3.3	127.9	39.9	306.0
Totals	701.6	1928.9	66.2	1811.0	69.5	2686.9	837.3	6426.8

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TABLE 2.9: Project Administration Budget

Element	YEAR 1	YEAR 2	YEAR 3	TOTALS
Project Manager	35.0	35.0	35.0	105.0
Secretary	5.5	5.5	5.5	16.5
Logistics	1.0	1.0	1.0	3.0
Office Equipment	2.5	0.0	0.0	2.5
Office Supplies	0.5	0.5	0.5	1.5
Communications	1.0	1.0	1.0	3.0
Miscellaneous	0.5	0.5	0.5	1.5
Travel	2.4	3.6	2.4	8.4
Overhead	69.6	68.3	67.1	205.0
External Audit	0.0	30.0	0.0	30.0
Evaluation	0.0	50.0	50.0	100.0
Subtotal FX	118.0	195.4	163.0	476.4
Inflation (5%)		20.5	16.7	26.5
Contingencies (5%)	5.9	10.3	9.0	25.1
Totals	123.9	215.4	188.7	528.0

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### III. IMPLEMENTATION PLAN

Implementation of the overall project will begin with the signing of a Project Agreement with the Ministry of Foreign Affairs in September, 1985. This ProAg will describe the purpose of the project, its major inputs and planned outputs. An initial obligation of the full \$3.5 million will be made at this time. Implementing documents (PIO's, PIL's, etc.) will be prepared within three months after project agreement.

The major implementation actions of each of the four components are shown in tables 2.1, 2.3, 2.5, 2.7 in Section II of this Project Paper.

#### Project Management Plan

##### a. Within the GOT

IRSIT will be the primary recipient of U.S. assistance under this project. IRSIT has financial autonomy (authority to disburse without prior approval from other agencies) and relative management autonomy. IRSIT has authority to recruit and contract.

The Project Manager will maintain final authority on technical matters and project activities. The Project Manager will be IRSIT's signatory and the direct counterpart of the USAID project manager for all activities under this project.

IRSIT has maintained close and open contact with USAID throughout project design. Major project activities will be elaborated with IRSIT technical staff during implementation.

Other GOT ministries and/or Tunisian organizations participating in the project will include the CNI, MOHESR, MOE, and educational institutions such as CBMI, ENSI, ISG, the faculty of science, professional schools, and secondary schools, specifically including the Bourguiba and Ariana high schools. This project will encourage the assumption by these groups of an active role in curriculum design, development of courseware, and input into national policy and procedures in computer based education. IRSIT has initiated this process via CBMI and its Task Force on computer education.

##### b. In the Private Sector

Since material support will depend in great part on private sector input, including sales, and since a major placement of

trained individuals will be in the private sector, the project will encourage continued and expanded private sector input in program development and design. In particular, applications in higher education level will be aimed at specific needs of industry, banking, and other private sector organizations.

c. Contractors

The project activities will be under the guidance of a single contractor, selected under competitive procurement procedures. This contractor will have a full-time project manager who will be responsible for administrative details for the project and also to arrange for technical assistance related programming, management, budget, training, and other TA needs. In addition, the contractor will provide a full-time resident expert in Tunisia who will work with a Tunisian counterpart administrative assistant on all project implementation matters. The contractor will be required to support most aspects of project implementation, identification and scheduling of short-term consultants and scopes of work, identification of training candidates and programs, etc.; and assist the USAID project officer draft PILs in accordance with the terms of the project agreement.

This contractor will be responsible for working with IRSIT in developing training, scheduling, equipment procurement, development of the institutional analysis, arrangement for observational tours, seminars, conferences, linkages with information bases in the U.S. and third countries and other project design and implementation activities.

The contractor will be expected to bring to the task considerable experience and expertise in the areas of computer policy, computer research and applications in higher education, and computer based education at the secondary level.

d. Within USAID

The USAID/Tunis computer science portfolio will be monitored in the Mission's Program Office, where an officer will be assigned to monitor the project. USAID will assume administrative, documentary and coordinative responsibilities of the project.

Contracting Plan

Contracting under the project will include procurement both within Tunisia and in the United States. Most project activities will be under the competitively awarded direct A.I.D. contract. PIO/Ts will be issued for technical assistance not covered by this contract and for project mid-term and final evaluations; PIO/Ps will be issued for all training and observational visits outside of Tunisia.

Commodities, including computers and software, will be purchased by the contractor directly for the project, except that PIO/Cs will be issued for any commodities necessary under the project which are not covered under other contracts.

The contract for the coordinating contractor will be let through open competition under A.I.D. regulations. It will be required that the contractor make every effort to subcontract to minority organizations and historically black colleges and universities. The contracting institution should have the following capabilities and characteristics:

- strong ties with university and private sector institutions and the ability to establish linkages between Tunisian institutions, primarily IRSIT, and US based organizations.
- demonstrated in-house strength in educational research and evaluation with expertise in the area of computer applications and evidence of long-range commitment to building and maintaining an integrated program of research and evaluation training and assistance in the area of computer education and development,
- demonstrated strength in planning with experience in third world applications of microcomputers, including applications in education at the secondary and higher education levels, preferably in the Near East. Senior project staff should have national/international reputations for innovative work in computers in education and development.
- capacity to utilize cost benefit, cost-effectiveness analyses to demonstrate economic feasibility of the pilot projects.
- demonstrated capacity to manage a large scale, national education project in a developing country,
- understanding of constraints on computer applications imposed by third world settings,
- commitment to establishing long-term institutional relationships with LDC research and educational institutions for purposes of maintaining effective research/consulting exchanges and networks,
- demonstrated institutional strength in computer science and in the application of computers to problems in developing countries, including in the delivery of education,

- an existing institutional capacity to design policies, programs and projects which address the problems of developing countries. Especially, a capacity to circumvent creatively the severe constraints of scarce skilled manpower, limited organizational capacity and the need to limit recurrent costs in third world settings,
- a capacity to strengthen host country institutions to conduct research, evaluation, analysis and planning,
- expertise in networking research teams and research findings through seminars, workshops and through the use of electronic media,
- technical and theoretical expertise in the application of a wide variety of computer technologies to third world settings,
- demonstrated effectiveness in information dissemination, in facilitating linkages between research results and project and policy recommendations, and promoting policy dialogue at central and regional levels of third world educational systems,
- expertise in developing microcomputer based simulations and demonstrated knowledge of demographic and forecasting issues relevant to making cost projections.

The contractor will be responsible for fiscal management of the project, employment and supervision of consultants and advisors to carry out project activities, coordination of project activities, coordination with the A.I.D. Mission and the relevant Tunisian Ministries and agencies, establishment of contractual commitments/cooperation with host-country researchers and research and educational institutions, arrangement of necessary training, and arrangement of observational visits. The contractor will also be responsible to develop a detailed annual Work Plan in conjunction with IRSIT.

The contractor will hire experts on a part-time, as needed basis to work on individual project activities. The contractor will be required to summarize findings and generalize recommendations and strategies as a basis for future planning of computer based education activities in Tunisia. A goal is policy dialogue with senior government officials using findings of evaluations of pilot activities. The contractor will have an advisory committee which will provide a continuing support for the effort in bringing to bear necessary expertise, guidance and liaison.

The contracting plan for the project is given in Table 3.1.

TABLE 3.1: Contracting Plan

<u>Component/Activity</u>	<u>Method of Implementation</u>	<u>Approximate A.I.D. Amount</u>
<u>1. Technical Support</u>		
Technical Assistance	Direct A.I.D. Contract	546.9
Institutional Links	Direct A.I.D. Contract	69.0
Exchange of Scientists	Direct A.I.D. Contract	317.4
Development of Training of Trainers	Direct A.I.D. Contract	12.0
Selection of Institutions	Direct A.I.D. Contract	3.0
<u>2. Pilot Projects and Applications Research</u>		
Pilot Activities	Direct A.I.D. Contract	696.6
Coordinating Committee	Direct A.I.D. Contract	3.0
Development of Recommendations	Direct A.I.D. Contract	15.0
<u>3. Training</u>		
In-Country Training	Direct A.I.D. Contract	8.0
U.S. Based Training	Direct A.I.D. Contract	44.4
Observational Tours	Direct A.I.D. Contract	78.0
Training Institute Established	Direct A.I.D. Contract	68.3
Conferences	Direct A.I.D. Contract	96.0
<u>4. Institutional Planning, Development &amp; Analysis</u>		
Clearinghouse	Direct A.I.D. Contract	92.0
Colloquia	Direct A.I.D. Contract	75.0
Research Scientist Support	Direct A.I.D. Contract	60.0
Equipment for IRSIT	Direct A.I.D. Contract	561.2
<u>5. Project Administration</u>		
Project Management	Direct A.I.D. Contract	346.4
Audit	PIO/T	30.0
Mid-term & Final Evaluations	PIO/T	100.0

#### IV. MONITORING PLAN

All project activities will be monitored by USAID/Tunisia. Direct monitoring will be the responsibility of the project manager, in the Program Office of the Mission. USAID will follow project progress in accordance with the implementation plan and/or detailed work plans established for individual activities; and will ensure sufficient project documentation (PIL's, PIO's, semi-annual progress performance reports from long term contractors) for reference during evaluation.

IRSIT will submit quarterly a report indicating activities conducted during the previous quarter, issues and problems encountered during the quarter, and a plan of activities for the subsequent quarter. In addition, IRSIT will submit yearly, by January 15th, a summary report of activities conducted under the project for the previous year and a program of activities for the subsequent year.

The USAID project manager will participate in all project evaluation activities, and will ensure that evaluation findings and recommendations are reflected in revisions, as appropriate, in project design or execution.

In addition, an advisory committee of three U.S. and three Tunisian experts, set up by the contractor, will meet at least once a year to review plans and accomplishments and advise the GOT and USAID on directions for the project.

## V. SUMMARY OF ANALYSES

### A. Technical Feasibility Analysis

The activities under the project will build on an existing infrastructure. IRSIT has been in existence for over a year now and has successfully implemented a pilot project of training in microcomputer applications. In addition, CBMI has instituted training in two experimental secondary schools, the Bourguiba and Ariana schools. Also, CNI provides professional training in microcomputer applications, primarily for the private sector. The University of Tunis has a VAX computer and provides training in computer science with this hardware. In addition, several professional schools are beginning to implement use of microcomputers in their programs. The GOT has established IRSIT, proposed to be a regional research institute in the field of computer science, as the "capping" institution which will stimulate and coordinate all activities in the areas of computer applications in the Tunisian society. The computer environment in Tunisia has already attracted private sector involvement in supply of hardware and software and there are representatives of the principal world suppliers. Furthermore, efforts in training for microcomputer maintenance and repair are already underway at CNI (sponsored by IBI) and at CBMI. In addition, there are plans for the development of the Carthage Institute of Technology as a specialized higher education institution using the English language and stressing computer science and technology.

The project will need to address issues of coordination among all organizations involved in computer based education in Tunisia. In addition, the project, as a specific project activity will examine the role of IRSIT and the existing institutions as well as plans for proposed institutions and provide recommendations to the GOT for maximizing inputs in computer based applications in Tunisia. There will be a need to closely monitor the proper assumption of this role by these institutions.

The effective working relationships between IRSIT, the MOHESR, the MOE, CBMI and other institutions (existing and proposed) will need to be monitored closely. Since IRSIT is the prime implementing agency for the project, it is necessary to insure that it continues to serve in a coordinating role and continues to be able to guide decision making in the computer activities in Tunisia, particularly in the field of education.

## B. Financial Analysis

In spite of a general deterioration in the Tunisian macro-economic situation during the early 1980s, GOT allocations to CBMI increased in 1984, with TD 400,000 allocated for equipment and logistic support. In addition, the GOT allocated TD 3 million for building IRSIT. The GOT is providing personnel support and it is expected that this support will continue throughout the project.

The annual local currency recurrent costs implied by the proposed project are estimated to equal 8 percent of the projected GOT contribution to the CBMI in 1988. In view of anticipated pressures on the GOT to reduce the growth of public expenditures, the ability of the GOT to pick up these additional recurrent costs will depend to a great extent on the strength and level of political support for computer based education in Tunisia.

The annual foreign exchange recurrent costs implied by the project are difficult to estimate at this time. IRSIT, through development of viable research projects for the regional market should be able to meet additional foreign exchange costs after the life of the project.

## C. Economic Analysis

An economic analysis examines the cost-benefit and the cost-effectiveness of a program to determine whether it is a sound investment for society as a whole, i.e., its social profitability. It is difficult to use traditional methods of cost-benefit analysis for education programs since it is hard to assign a value to knowledge obtained. Approaches which are usually used either evaluate the effects of increased productivity by the introduction of new technology on a macroeconomic level or to examine increases in income in the society due to jobs created by the technological change as a surrogate for growth in the economy as a result of the introduction of the technology. Both approaches indicate that computer technology introduced into education would have a high return.

Examining the cost-effectiveness of this program is difficult since there are several new components which have not been tried in Tunisia and since it is difficult to determine the effectiveness of existing programs in increasing productivity and increasing skills.

## D. Social Soundness Analysis

Introduction of computer technology raises several social

issues, namely privacy, retention of cultural values, job displacement, consumption of time in initial introduction, and equality of access to the technology, including the possibility of exacerbating differences between the rich and the poor, the access of women to the technology, and the possibility of differential benefits from the technology. None of the impacts can be clearly assessed prior to implementation of the project, but the project will seek to sensitize Tunisian counterparts and decision makers to possible impacts and will aim to minimize impacts in these areas.

It is important to note that computers are already in use in Tunisian colleges and high schools without noted adverse social affects or cultural constraints to their use. With respect to cultural impact, it should be pointed out that this problem will be addressed directly in the project through adaptation of software, courseware and manuals to Arabic in the Tunisian context.

Project beneficiaries will be students exposed to the technology, ministries and public and private sector organizations in which the technology is introduced, and finally consumers who will be served by these organizations. The project is designed to maximize the fan effect of introduction of the technology, primarily by the institutionalization of capacity to go beyond project activities. In particular, the training of trainers approach will ensure continued computer technology education and the applications focus of activities will ensure that consumers will be most likely to benefit, both in increased service levels and in lower costs for services and goods.

#### E. Administrative Analysis

The project will work primarily with IRSIT and secondarily with CNI, CBMI, the MOE and the MOHESR. The focus will need to be on accentuating the coordination role of IRSIT in pioneering research for computer applications in Tunisia, including methods of computer based education which are efficient and cost-effective. Because several Tunisian educational and research institutes will be involved in the project, the input and coordination among organizations will need to be carefully monitored.

Monitoring of the program will be within the program office of USAID.

VI. POLICY ISSUES, CONDITIONS, COVENANTS AND NEGOTIATING STATUS

Policy Issues

Policy adjustments which are crucial to the success of this project and, more importantly, to Tunisia's ultimate incorporation of information science to achieve its development goals fall into the following categories: 1) liberalization of regulations regarding import of computers; 2) the inclusion of focused educational policies for computer based education reflected in the VIIth National Development Plan (to begin January 1, 1987); 3) liberalization of faculty consulting rules to encourage greater private sector participation by computer using departments of the higher education system; and, 4) development of appropriate norms and standards for information technology to prevent proliferation of systems that would complicate training and maintenance requirements.

Recommended Conditions Precedent

(1) Prior to disbursement under the Grant, or to the issuance of any commitment documents pursuant to which disbursement will be made, for any pilot project, the Grantee shall submit to A.I.D., in form and substance satisfactory to A.I.D., documentation showing that the pilot project meets the criteria set forth in this Project Paper.

(2) Prior to disbursement under the Grant, or the issuance of any commitment documents pursuant to which disbursement will be made, for any computer hardware, the Grantee shall submit to A.I.D., in form and substance satisfactory to A.I.D., a maintenance plan for such hardware.

(3) Prior to disbursement under the Grant, or to the issuance of any commitment documents pursuant to which disbursement will be made, for research, the Grantee shall submit to A.I.D., in form and substance satisfactory to A.I.D., evidence that the research will be at least half funded by funds other than those provided by A.I.D. under this Grant.

(4) Prior to disbursement under the Grant, or the issuance of commitment documents pursuant to which disbursement will be made, for training, the Grantee shall submit to A.I.D., in form and substance satisfactory to A.I.D., a training plan which shows the individuals to be trained, the training program to take place and the dates and cost of that training. This training plan may be submitted and the training funded on an annual basis.

(5) Prior to disbursement, or to the issuance of any commitment documents pursuant to which disbursement will be made, after November 30, 1986, the cooperating country shall submit to A.I.D. a plan, in form and substance satisfactory to A.I.D., defining the process for assigning to IRSIT individuals returning to Tunisia from long-term training in the U.S. under the Technology Transfer Project (664-0315).

#### Recommended Covenants

Based on the above policy considerations, it is recommended that the following Covenants be included in the project agreement:

(1) The Parties agree to establish a Project Evaluation program. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter: (a) evaluation of progress toward attainment of the objectives of the Project; (b) identification and evaluation of problem areas or constraints which may inhibit such attainments; (c) recommendations as to how such problems or constraints should be addressed; and (d) evaluation, to the degree feasible of the overall development impact of the Project. IRSIT, in collaboration with the institutions responsible for technical assistance under the Project, will develop an information system which will satisfy A.I.D. project evaluation requirements. The periodic evaluations required by this Section will be carried out by teams composed of representatives of A.I.D. and Government officials appointed by IRSIT.

(2) The Grantee agrees that all pilot projects shall meet the criteria set out in this Project Paper in order to be funded under this Project.

(3) The Grantee agrees that the Ministry of Education will establish a plan for the extended utilization of microcomputers in the education system involving: evaluation mechanisms for satisfying pedagogical and curricular requirements; development and selection of necessary courseware and maintenance of a data base of applications; acquisition of appropriate hardware and peripherals; and, further training of teachers.

(4) The Ministry of Higher Education and Scientific Research will establish a plan for the extended utilization of microcomputers in Higher Education involving: evaluation mechanisms for selecting curricula (e.g., CAD, CAM, simulation, statistical analysis, data base access); further training of instructional personnel; development and selection of necessary courseware and maintenance of data banks; and acquisition of hardware and peripherals.

(5) The Grantee agrees to take the actions necessary to organize a concerted attack on priority research and will begin to devote the necessary resources to the successful development of IRSIT as the capping institution in harmony with the other elements of the research infrastructure.

(6) The Grantee agrees to implement the necessary high level coordinating mechanisms to see that these various institutional efforts work together in a complementary fashion, and that they respond to national needs and priorities.

(7) The Grantee agrees to develop a detailed plan, spelling out the role of IRSIT and its relationship with other Tunisian institutions, mechanisms for funding, governance, definitions of its relationship with industry and the private sector, release time for scientists from the public sector and training plans in conjunction with technical assistance under the project which will be completed by the third year of the project.

(8) The GOT agrees to provide the following management support for the Project: a project manager who will have authority to sign on behalf of the GOT and who will manage all activities under the project and work toward implementation project activities on behalf of the GOT; and management support for the project at IRSIT, including an administrative assistant and budget and financial supporting personnel.

(9) Except as agreed to in writing:

(a) All imported equipment financed by A.I.D. under the Grant shall be granted an exemption from import or customs duties by the Government and shall be titled to IRSIT, which shall promptly clear such equipment through Tunisian customs and arrange for delivery to the project site within 30 days of customs clearance. IRSIT shall further be responsible for all maintenance, insurance, registration or other similar costs in connection with such equipment as well as for all duties and taxes on commodities imported under the Grant.

(b) The equipment provided under the Project shall be restricted to the purposes specified by this Agreement.

(c) IRSIT will be responsible for logistical support of A.I.D.-financed contract personnel within the project area, including office space, clerical support and transportation outside of the Tunis area.

(d) Disbursements under the Project will be used exclusively to finance the costs of goods and services required for the Project having their source and origin in the United States, except as A.I.D. may otherwise agree in writing, and

except as provided in the Standard Provisions Annex, Section C.1(b) with respect to marine insurance. Ocean transportation costs will be financed under the Assistance only on vessels under flag registry of the United States or Tunisia, except as A.I.D. may otherwise agree in writing. If A.I.D. determines either that there are no vessels under flag registry of Tunisia generally available for ocean transportation, or that Tunisia has no access to U.S. flag service, the Government and A.I.D. in a Project Implementation Letter may agree to finance under the Assistance ocean transportation costs on vessels under flag registry of any country included in A.I.D. Geographic Code Book 941.

(e) Local currency disbursements under the Grant will be used exclusively to finance the costs of goods and services required for the Project having their source and, except as A.I.D. may otherwise agree in writing, their origin in Tunisia ("Local Currency Costs").

## VII. EVALUATION PLAN

Evaluations will be critical to ensure that activities are selected and implemented in light of what the project has been designed to achieve. As such, scopes of work must be designed to identify special or on-going problems impeding execution of output activities and to determine if implementation plans and/or strategies need to be modified.

Several evaluative procedures have been built into this project. These procedures are both specific to the project components and to evaluation of overall progress toward the project purpose. For the technical support project component, clear institutional linkages should exist and an output of this project component should be clear research planning in the area of computer technology, including plans within the MOE, the MOHESR and IRSIT for introducing computer technology and supporting planned activities. Both evaluations will examine accomplishments in this area, in terms of mechanisms for sustaining institutional linkages and feasibility of implementation of plans developed in the relevant ministries. Since in the pilot activities project component assistance includes helping IRSIT set up criteria for selecting institutions, both in Tunisia and in the U.S. for involvement in activities, training of resource teachers, selection of curricular content appropriate for computer based approaches, working with principal investigators and senior scientists of IRSIT, MOE and MOHESR in reviewing existing courseware and experiences in the areas, insuring hardware and software access, working with IRSIT in training of pilot teachers and developing a program for training of teachers in computer based instruction, and providing assistance and training in developing evaluation designs for activities, evaluation of this component will examine first the mechanisms in place at IRSIT to accomplish these tasks and second the institutionalization of this capacity. In addition, evaluation of this component will examine impact of specific pilot activities and lessons learned from them as well as assess their cost effectiveness and benefit. Training activities will be evaluated on the basis of their effectiveness in contributing to a GOT programming and planning, supervision and evaluation function in education; and increased collaboration among Ministries/agencies. As the training component is necessary to all project elements, an assessment of its effectiveness will be made by category. Finally, evaluation of the institutional development project component will examine effectiveness of coordinating mechanisms for institutions involved in computer technology, GOT priorities in computer applications, including computer based education, plans in both the MOE and the MOHESR for introducing computer technology in

an integrated way to the curricula of the schools in a cost efficient and cost competitive basis. Also, the development and use of the clearinghouse on computer technology at IRSIT will be examined as will the availability and retention of senior scientists for the IRSIT staff.

An external evaluation will be undertaken in mid-project (approximately November, 1987) and at the end of the project. They will review the contractor reports and assess actions taken. A major focus of these evaluation will be on policy changes, important assumptions affecting achievement of the project purposes, and the general socio-political-economic setting and lessons learned as a basis for further activity. Other project components will be evaluated against benchmarks and EOPS conditions. The primary goal of these evaluations will be to examine the relative success of the project in each of its components, but moreover to examine the overall success of these components in bringing about a capacity at IRSIT to identify needs in the Tunisian context for computer technology, to bring scientists and resources together to develop methods to address these needs, to fund such activities, and to develop useful products for application in the Tunisian context. Particular emphasis should be placed on applications developed in the project and their usefulness in applications situations. At the same time, the growth of computer technology in the Tunisian context should be examined and the level of efforts under the project assessed in terms of this developing demand. The evaluations will both be joint USAID/GOT efforts. They will use external consultants (contractors/IQCs) and A.I.D. employees and GOT nominees. Each evaluation team will consist of probably three A.I.D. nominees and three GOT nominees as well as the project officer from USAID and the GOT project officer.

The overall evaluation is to judge how well the project is strengthening the capacity of IRSIT and the educational system to manage and stimulate the introduction of computer technology. This is best done by the informed opinion of experienced professionals using case studies. The individual pilot activities will have their own proposed evaluation components and will be judged accordingly.

A total of \$100,000.00 has been budgeted for evaluation.

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ANNEX I

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TAGS:

SUBJECT: COMPUTER TECHNOLOGY PROJECT (664-0334)

REF: (A) TUNIS 7139, (B) SHERPER/VERMILLION TELECOM  
8/9/85

1. REGRET DELAY IN INFORMING MISSION OF AID/W VIEWS ON RELEASE OF LAWLESS/PASSMAN REPORT. THE REPORT WAS REVIEWED BY NEAC ON JUNE 25 AND SEVERAL MAJOR ISSUES WERE RAISED, MANY THAT ARE SUMMARIZED IN THE MEMO PREPARED BY JOHN DALY. HOWEVER, IT WAS DETERMINED THAT THE REPORT WOULD SERVE ADEQUATELY AS A BASIS FOR DEVELOPMENT OF A PROJECT PAPER.

2. AID/W CONCURS WITH SUGGESTED RELEASE OF LAWLESS/PASSMAN REPORT ACCOMPANIED BY DALY COMMENTS TO GCT. IT MAY BE USEFUL TO POINT OUT TO LATIRI THAT PRINCIPAL CONCEPTS IN REPORT WERE USED AS FOUNDATION FOR PROJECT PAPER, BUT IT WAS NECESSARY TO MAKE SOME MODIFICATIONS IN RECOMMENDATIONS FOR PROJECT IMPLEMENTATION IN ORDER TO MEET AID REGULATORY/PROCEDURAL REQUIREMENTS. SPIERS

*Handwritten:* APN 8/10 Passed to GCT

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ANNEX II

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Life of Project:  
From FY 85 to FY 88  
Total U.S. Funding \$ 3.5 million  
Date Prepared: 9/20/85

Project Title & Number: Computer Technology (664-0334)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Assumptions for achieving goal targets:
Effective widescale utilization of information technology to improve socio-economic performance in achieving Tunisia's development goals; specifically: <ul style="list-style-type: none"><li>o Introduction of computer technology in public and private sectors such as manufacturing, services, etc.</li><li>o more effective and efficient use of computer technology in education at all appropriate levels</li><li>o trained specialized and general workforce to assume computer-related roles</li></ul>	<ul style="list-style-type: none"><li>o Widespread utilization of micro-computers in effective and efficient applications</li><li>o Indigenous capability to manage various phases of computer-oriented society</li><li>o Enhanced research and limited manufacturing capacity</li><li>o Improved access to information and services</li><li>o Greater private sector role</li></ul>	<ul style="list-style-type: none"><li>o VIIIth Development Plan definition of developmental role for computer technology</li><li>o Import statistics</li><li>o Surveys of the Public and Private sectors</li></ul>	<ul style="list-style-type: none"><li>o Ministerial/Industrial acceptance of system analysis/modification</li><li>o Continued attention to stimulation and coordination</li><li>o Continued openness to innovation</li><li>o Social acceptability of information technologies</li><li>o Continued investment in education, research, training</li><li>o Continued GOT support for CS</li><li>o Societal tolerance of changes inherent in technological change</li><li>o Robustness of cultural values in face of technological innovation</li></ul>

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose:	Conditions that will indicate purpose has been achieved: End of project status.		Assumptions for achieving purpose:
<p>To assist the GOT to institutionalize its critical capacity to evaluate, plan, design, modify, and implement micro-computer applications, primarily through public education and research, in a contextually appropriate manner, through:</p> <ol style="list-style-type: none"> <li>1. Technical Support</li> <li>2. Pilot Projects and Applications Research</li> <li>3. Training</li> <li>4. Institutional Planning, Development and Analysis</li> </ol>	<ul style="list-style-type: none"> <li>o MOE program for microcomputer use in secondary education system based on project experiences (2,4)</li> <li>o MOHESR program for microcomputer use in higher education based on project experiences/recommendations(2,4)</li> <li>o GOT statement of priorities in computer based education (1,4)</li> <li>o GOT resources committed to coordination of education/research efforts in microcomputer applications in education (1,4)</li> <li>o Implementation of high level coordinating mechanisms for institutions involved in CBE (4)</li> <li>o Mechanisms for staffing and funding IRSIT (including release time for scientists from university posts) (4)</li> <li>o Clarification of role of IRSIT vis a vis CBMI, MOE, MOHESR and other research and education institutions (4)</li> <li>o Links with US Universities and software firms (1,3)</li> <li>o IRSIT linkages with university, industry (4)</li> <li>o Evaluation mechanism for education applications (1,2,3,4)</li> <li>o Evaluation of computer usage in schools (usage statistics, repair and maintenance statistics, etc.) (1,2,3)</li> <li>o Teacher training center in operation (3)</li> <li>o Functioning teachers and resource personnel in selected institutions (3,4)</li> </ul>	<ul style="list-style-type: none"> <li>o GOT/MOE/MOHESR records</li> <li>o Site visits to institutions</li> <li>o Project records</li> <li>o VIIIth Development Plan</li> </ul>	<ul style="list-style-type: none"> <li>o Ministerial/Institutional support</li> <li>o Acceptance by schools and teachers</li> <li>o Adequate teacher training</li> <li>o Willingness to modify curricula</li> <li>o Research as a necessary concomitant of higher education</li> <li>o Continued high level coordination among institutions</li> <li>o Effective evaluation of lessons learned</li> <li>o Implementation of evaluation findings</li> <li>o High level attention to coordination</li> <li>o Resources for materials and personnel</li> <li>o Continued linkages with outside organizations</li> <li>o Continued stimulation of research</li> </ul>

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Project Title & Number: Computer Technology (664-033)

NARRATIVE SUMMARY Outputs:	OBJECTIVELY VERIFIABLE INDICATORS Magnitude of Outputs:	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS Assumptions for achieving outputs:
<p>Coherent policy and strategy plan for utilizing microcomputer technology in education (1,4)</p> <p>Regular meetings of policy makers (1)</p> <p>Development of functioning decision-making mechanisms at IRSIT (4)</p> <p>Establishment of mechanisms for setting priorities in IRSIT (1,4)</p> <p>Key staff trained in evaluation of software with respect to needs (3)</p> <p>Key staff trained in methods for funding of activities (3)</p> <p>Key staff exposure to applications of computers outside Tunisia (1)</p> <p>Regional participation in development of computer applications (1)</p> <p>Trained curriculum designers (3)</p> <p>Linkages with U.S. Universities and research institutions (1)</p> <p>Criteria for evaluating potential applications (1,3)</p> <p>Information base/clearinghouse (1)</p> <p>Mechanisms for soliciting and funding appropriate proposals for computer applications (1,4)</p> <p>Experience in carrying out applications research (2)</p> <p>Physical facilities (including computers and software) (1,4)</p> <p>Training in dissemination technology (3)</p>	<ul style="list-style-type: none"> <li>o VIIIth Plan statement on technological education, including directions for microcomputer applications (1)</li> <li>o At least 8 pilot projects using CBE in secondary education (2)</li> <li>o At least 8 pilot projects using CBE in higher education (2)</li> <li>o IRSIT, MOE, MOHESR staff trained in design technology (3)</li> <li>o Annual regional colloquia for presenting computer technology (1)</li> <li>o Library of courseware (1)</li> <li>o Functioning information exchange (1)</li> <li>o Monitoring body for IRSIT (4)</li> <li>o Specific plan for IRSIT and identification of need for other institutions (4)</li> <li>o Recommendations for future action (4)</li> <li>o MOE policies and strategies developed (1,4)</li> <li>o MOHESR policies and strategies (1,4)</li> <li>o 5-yr plan for development of research (1,4)</li> <li>o Action plan for coordination of efforts (1,4)</li> </ul>	<ul style="list-style-type: none"> <li>o VIIIth Development Plan</li> <li>o Project records</li> <li>o Site visits to participating schools/institutions</li> <li>o Survey of public and private sectors</li> <li>o GOT/MOE/MOHESR documents</li> </ul>	<ul style="list-style-type: none"> <li>o Sufficient coordination among Tunisian institutions</li> <li>o Timely placement of teachers</li> <li>o Availability of qualified experts</li> <li>o Expedient acquisition of needed hardware and software</li> <li>o US institutions will find collaboration feasible and worthwhile</li> <li>o Continued IRSIT existence and influence in policy setting</li> <li>o Existence of methods for retaining competent computer instructors</li> <li>o Linkages with U.S. institutions can endure over a long term</li> <li>o Evaluation process will become systematized</li> </ul>

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Project Title & Number: Computer Technology (664-0334)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS		MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs:	Implementation Target (Type and Quantity)			Assumptions for providing inputs:
	USG	GOT		
	(US \$000)	(US \$000)		
o Technical Assistance	\$ 782.5	\$ 244.5		o Approval of project by GOT
o Training	\$ 197.4	\$ 96.0		o Timely GOT budgeting of resources
o Commodities	\$1376.1	\$ 668.9		
o Evaluation/Audit	\$ 130.0	\$ 0.0		
o Other	\$ 736.2	\$5066.0		
o Contingencies	\$ 166.7	\$ 341.7		
o Inflation	<u>\$ 111.1</u>	<u>\$ 758.0</u>		
TOTAL:	\$ 3500.0	\$7175.1		

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ANNEX III. STATUTORY CHECKLIST

1. COUNTRY CHECKLIST

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 481; FY 1985 Continuing Resolution. Has it been determined or certified to the Congress by the President that the government of recipient country has failed to take adequate measures or steps to prevent narcotic and psychotropic drugs or other controlled substances (as listed in the schedules in section 202 of the Comprehensive Drug Abuse and Prevention Control Act of 1971) which are cultivated produced or processed illicitly, in whole or in part, in such country or transported through such country, from being sold illegally within the jurisdiction of such country to United States government personnel or their dependents or from entering the United States unlawfully? No
  
2. FAA Sec. 620(c). If assistance is to a government, Is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government? No
  
3. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? No
  
4. FAA Sec. 620(a), 620(f), 620D; FY 1985 Continuing Resolution Secs. 512 and 513. Is recipient country a Communist country? Will assistance be provided to No

Angola, Cambodia, Cuba, Laos, Vietnam, Syria, Libya, Iraq or South Yemen? Will assistance be provided to Afghanistan or Mozambique without a waiver?

5. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U. S. property? No
6. FAA Sec. 620(l). Has the country failed to enter into an agreement with OPIC? No
7. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. (a) Has the country seized or imposed any penalty or sanction against, any U.S. fishing activities in international waters? (b) If so, has any deduction N/A required by the Fishermen's Protective Act been made? No
8. FAA Sec. 620(q); FY 1985 Continuing Resolution Sec. 518. (a) Has the government of the recipient country been in default for more than six months on interest or principal of any A.I.D. loan to the country? (b) Has the country been in default for more than one year on interest or principal on any U.S. loan under a program for which the appropriation bill appropriates funds? No
9. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the amount of foreign exchange or other resources which the country has spent on military equipment? (Reference may be made to the annual "Taking into Consideration" memo: "Yes taken into account by the Administrator at time of approval of Agency OYB." This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.) Yes  
Taken into account by the Administrator at time of approval of Agency OYB.

10. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No
11. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the A.I.D. Administrator in determining the current A.I.D. Operational Year Budget? (Reference may be made to the Taking into Consideration memo.) Current
12. FAA Sec. 620A; FY 1985 Continuing Resolution Sec. 521. Has the country aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed an act of international terrorism? Has the country aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed a war crime? No
13. FAA Sec. 666. Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. who is present in such country to carry out economic development programs under the FAA? No
14. FAA Sec. 669, 670. Has the country after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials or technology without specified arrangements or safeguards? Has it transferred a nuclear explosive device to a non-nuclear weapon state, or if such a state, either received or detonated a nuclear explosive device, after August 3, 1977? (FAA Sec. 620E permits a special waiver of Sec. 669 for Pakistan.) No
15. ISDCA of 1981 Sec. 720. Was the No

country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Aligned Countries to the 36th General Session of the General Assembly of the U.N. of Sept. 25 and 28, 1981, and failed to disassociate itself from the communique issued? If so, has the President taken it into account? (Reference may be made to the Taking into Consideration memo.)

16. FY 1985 Continuing Resolution. If assistance is from population functional account, does the country (or organization) include as a part of its population planning program involuntary abortion? No

17. FY 1985 Continuing Resolution Sec. 530. Has the recipient country been determined by the President to have engaged in a consistent pattern of opposition to the foreign policy of the United States? No

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria

FAA Sec. 116. Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy? N/A

2. Economic Support Fund Country Criteria

a. FAA Sec. 502B. Has it been determined that the country has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, has the country made such significant improvements in its human rights record that furnishing such assistance is in the national interest? No

2. PROJECT CHECKLIST

A. GENERAL CRITERIA FOR PROJECT

1. FY 1985 Continuing Resolution Sec. 525; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that amount)?

Congressional  
Notification

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

a. Yes  
b. Yes

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

N/A

4. FAA Sec. 611(b); FY 1985 Continuing Resolution Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973, or the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See A.I.D. Handbook 3 for new guidelines.)

N/A

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

N/A

6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.
- No. Project will encourage regional computer activities.
7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
- By design, the project will enhance private enterprise in Tunisia
8. FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
- Contract will be competitively awarded to U.S. institution under the project.
9. FAA Sec. 612(b), 636(h); FY 1985 Continuing Resolution Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.
- Yearly Reports of the GOT contribution will be required
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?
- No

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? Yes
12. FY 1985 Continuing Resolution Sec. 522. If assistance is for the production of any commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity? N/A
13. FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in A.I.D. Regulation 16? Does the project or program take into consideration the problem of the destruction of tropical forests? Yes
14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)? N/A
15. FY 1985 Continuing Resolution Sec. 536 Is disbursement of the assistance conditional solely on the basis of the policies of any multilateral institution? No

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria
- a. FAA Sec. 102(b), 111, 113, 281(a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and ensuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical N/A

assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

- b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used? N/A
- c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)? N/A
- d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)? N/A
- e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? (M.O. 1232.1 defined a capital project as the "construction", expansion, equipping or alteration of a physical facility or facilities financed by A.I.D. dollar assistance of not less than \$100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character.) N/A

- f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth? N/A
- g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country, utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government. N/A
2. Development Assistance Project Criteria (Loans Only)
- a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest. N/A
- b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan? N/A
3. Economic Support Fund Project Criteria
- a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of FAA Section 102? Yes
- b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities? No
- c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives? No

- d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? No



Le Financement global du dit projet serait assuré par une dotation supplémentaire de 4 Millions de  $\text{₯}$  E.S.F. de l'année 1986 et 2,5 Millions de  $\text{₯}$  sur les Fonds Américains d'Aide au Développement de 1985 (AID/Washington).

- 3 - Transfert de Technologie Agricole (664-0304) = 1,5 Million de  $\text{₯}$  US. Un montant de 1,2 Million de  $\text{₯}$  US des Fonds E.S.F. 1986 permettrait de compléter le schéma de financement du projet dont le coût total est évalué à 2,7 Millions de  $\text{₯}$  US.
- 4 - Technologie de l'Informatique (664-0334) = 3,5 Millions de  $\text{₯}$  US. Ce projet devant être préparé, dans les meilleurs délais, par les experts tunisiens et leurs homologues américains.

Aussi vous saurais je gré de bien vouloir porter ce qui précède à la connaissance de vos Hautes Autorités afin de pouvoir procéder à la signature des Accords de Coopération se rapportants aux projets de développement sus-mentionnés.

Pr. le Secrétaire d'Etat auprès du  
Ministre des Affaires Etrangères Chargé  
de la Coopération Internationale



Abdelaziz JOULAK

ANNEX V: TECHNICAL FEASIBILITY ANALYSIS

There is clearly a widespread and sincere expression of enthusiasm for Tunisian mastery of the entire field of computer science based on a recognition of its indispensability for future development of almost all sectors of Tunisian society. This is expressed at all levels of the structure from the highest government levels on down, so that one observes a very high priority attached to development of computer capacity and applications and a desire to make real progress and to do so with all deliberate speed. Tunisia looks toward the United States as its primary resource for assistance, not only financial but also technical, in developing its national computer education and research program.

While Tunisia has given high level government support to computer science development in the past, as witness by active participation in international forums such as the IBI, UNESCO, and the joint IBI-UNESCO SPIN Conference (Strategies and Policies for Informatics, 1978) and their creation of such important national institutions as the CNI and the National Commission for Informatics (c. 1974), it is fundamental that a new impulse of interest and a high level decision to attach real priority to this area has been underway for approximately the last two years. This impulse comes from the prime movers in the government who clearly support the innovative efforts now underway. The recent political and structural changes and priorities reflect the desire to accelerate Tunisia's progress and position in the world, employing computer science and its applications as a vector in development.

Parallel to this commitment is the realization that these so-called "new" developments in computer science, exploiting recent technological developments in hardware and software, namely the "micro-computer revolution", require new approaches to fully realize the computer potential for society. The creation of a number of new institutions and the thrust of the GOT proposals for support reflect this innovative impulse.

The Centre Bourguiba Micro-Informatique (CBMI), directed by Mokhtar Latiri, is an impressive new development active since November 1984. It is endeavoring to expose the broadest possible community to the potential of microcomputers for a range of popular applications in which education has a privileged central place. Operated under the auspices of the Minister of National Education, it has rapidly acquired an eclectic collection of "micros" contributed by many sources and of many types from the U.K., France, Japan and the U.S., together with the well-known popular software packages from primarily U.S. origin (modified in France), including dBase II, Lotus 1-2-3, Multiplan, Framework, etc.

Through affiliation with the two pilot high schools (Bourguiba and Ariana) and supported by an active Task Force drawn from various levels of the education community, CBMI has been able to introduce a small but growing number of secondary students to hands-on familiarity with computers as well as introducing computer assisted instruction (CAI) in certain limited areas of curriculum. Open access of the Center to youth and the larger public is another important hallmark of the effort, aided by the central location in downtown Tunis.

CBMI has embarked on a project which involves the diffusion of its pilot activities to some 45 other sites in the country involving at least 15 high schools, 15 higher education institutions and 15 clubs for young people.

The technological development of microcomputers (i.e., powerful computers based on high speed microprocessors with large internal memories, rapid access, high capacity disk storage and with costs a fraction of earlier comparable capacity computers) represents the first significant technological advance which a developing country can assimilate and exploit with a relatively low capital investment and without extensive prior knowledge or involvement in prior technologies. As stated by Curt Farrar, former Deputy Assistant Administrator for Research with A.I.D., in a hearing before the House Sub-committee on Scientific Research in 1982, "Our experience has been that developing countries are able to use very advanced technologies (e.g., computers) and, in effect, skip over the years of learning process".

The advent of computers has revitalized the applications of computers to various aspects of education. Currently there is a worldwide movement towards these applications, with the field in a state of flux and some of the utility still being, or to be, evaluated. Hebenstreit (1984) noted that "the use of computers as pedagogical tools has been the very first use of computers in education and remains today, in all developed countries, the main application." Techniques in use include:

- o programmed learning, including tutorials, similar to a textbook approach, but with capacity for extensive branching to pace the student's answers,
- o drill and practice, which individualizes instruction with the computer adapting to student performance,
- o dialog-mode, which allows for learning through trial and error and in its more complex form will permit a truly interactive computer assisted instruction, and,

- o modeling and simulation, which promotes the discovery approach to learning as well as an opportunity to gain insight and to expand the opportunities to become familiar with systems that would otherwise be beyond the school environment.

In addition the applications to computer managed education are also of potential utility, as is the opportunity of computers to assist educators in the planning, management and assessment of instruction.

The expansion of the field of computer based education will obviously depend upon the successful evaluation of the experiments underway in various systems and the evolution of high-quality educational software (courseware). Data bases of software with some attention to quality control are being developed nationally, such as at Columbia University's Teachers' College and regionally. A major factor which will affect all applications will be the development of programs for the relevant training of teachers in computer use and their involvement in the specific pedagogical and curricular issues.

To date, CAI has been shown to have real potential, based on student achievement and against the criterion of instructional time. A third important effect of CBE has been to establish harmonious student-machine relationships. The positive computer attitude and skills developed in students exposure to CAI may improve learning attitudes in general as well as preparing students with the necessary computer literacy to take their place more effectively in the expanding computer society.

A.I.D. has a number of efforts underway in CAI and related educational technology, under the administration of ST/ED, which should be of value to further efforts in this project. The IFIP world conference on computers and education (latest in July 1985) should also provide relevant materials; UNESCO and IBI are also valuable resource institutions on the subject.

This opportunity for Tunisia to use information at the same level as in developed countries is the basis for numerous initiatives by donor organizations to LDCs and by LDCs themselves. At present, Brazil, Chile, Mexico, Sri Lanka, Thailand and Jamaica have relatively new programs for broad-based introduction of computers.

The Director General of UNESCO has recently stated that computer science "opened up such tremendous vistas for modern societies that any failure to master it would mean a life of permanent subordination. For (computer science) is more than a form of power; it is a power system. The technology which it involves is not just one form of technology among others, but

an ability to make use of other techniques, to give or to refuse access to a whole range of scientific data and knowledge and thus to design new models of development".

Dr. Mohan Munasinghe, Chairman of the Sri Lanka Computer Technology Council and Senior Energy Advisor to the President of Sri Lanka included the following comments in his welcoming address at the First International Symposium on Microcomputer applications in Developing Countries (a symposium jointly sponsored by the GOSL and the NRC's Board on Science and Technology for Development under AID/S&T support) held in Colombo, Sri Lanka in November 1984:

"If we examine the evolution of human society, the spear is the nomadic hunter's implement, the plough symbolizes the farmer, and the lathe represents the industrial worker. In the same vein the computer is the tool of the thinker, because it will greatly enhance human brain-power, just as machines now amplify our muscle power. In the highly competitive world marketplace of the future, knowledge will increasingly become the basis of national power and prestige -- more so than arms, or natural resource. The power of the microchip will outweigh the power that grows out of the gunbarrel. Therefore mastery of the computer is vital for us ... Let me now briefly turn to our own hopes and expectations for computer development in Sri Lanka. These aspirations have much in common with those of other developing countries. We in Sri Lanka hope to rapidly modernize and transform our society, and help this nation stride confidently into the 21st century, by using the computer to enhance the thinking power of our richest resource, a well educated and youthful population ... Working level operational efficiency and quality of work will also improve. Better application of computers to science and technology will enable the intellectual community to enhance their contribution to national development."

Tunisian leaders echo the same concerns regarding the need to keep Tunisia current with the computer revolution and to integrate computer science into the Tunisian society as a tool for development. In a speech to a recent regional computer science conference held in Tunisia, Habib Bourguiba, Jr., special advisor to the President, expressed the concern of Tunisian authorities for priority attention to computer technology:

"Our conviction is that if the third world lets this chance of promoting this new tool for education, culture and communication slip by, our chances in the campaign we are waging against the imbalance in cultural, scientific and technological exchanges between the North and the South would be definitively and irreversibly jeopardized and we would become in this process history's misfits."

The contribution to development that would result from computer literacy and widespread use of computers in Tunisia can only be projected based on experience in developed countries since computer science programs on a broad scale are relatively new in developing countries. One of the unique characteristics of microcomputers is that they are "stand alone" devices. The user must learn to solve computer problems independently. This encourages the development of independent thinking, problem solving attitudes and entrepreneurship.

Based on results in developed countries, it seems reasonable to impute that a broadly computer-literate population should stimulate wide improvements in the administrative and technical procedures used in government, commerce and industry. It should result in the establishment of several new enterprises, increase the efficiency of existing establishments and produce an important increase in the growth of the economy. Foreign investment should be attracted by growth in new enterprises, the increased general efficiency and relatively low wage rates in Tunisia.

Tunisia is currently manufacturing a number of components and products for export. In a computer oriented environment, manufacturing for export should be one of the faster growing segments of the economy. One of the by-products of a rapidly growing economy is a shortage of trained manpower, which in turn stimulates training of the "less employable".

There would not seem to be a single area of development in Tunisia that would not be impacted by widespread use of computers. They are currently being used in developing countries to improve and advance programs in health, agriculture, energy, education -- in fact in every sector. In Tunisia, the field of agriculture has already begun employing computer technology for research and extension services. In management, the Institut Supérieur de Gestion, the management school, has for several years taught computer applications and programming and its graduates are introducing computers to produce more efficient management in the public and private sectors. The Ministry of Plan has a computer laboratory which is being used to develop models and projections of population growth, debt service, finance, etc. The Ministry of Health has introduced microcomputers for management of primary health care. The Ministry of Education has introduced microcomputers to track trainees in other countries. Computer applications in research are common throughout Tunisia. Private enterprise is adapting computer applications for stock inventory, finance, budgeting, and various other applications. The number of microcomputers in Tunisia has more than doubled over the past year. Yet this state of usage is still very limited but rapidly growing.

Quoting again from Farrar's congressional testimony, "a more complex issue is computer training and institutionalization of computer use. Very often a computer will be built into a project to solve a particular problem and then be left without adequate attention. We need to think about long-term use, training people in its use, and the institutional structure in which the computers can be more fully used. We are aware of this problem, and we expect to pay more attention to it in the future."

This project aims to build that infrastructure which will insure that there is proper training, support and institutionalization of computer applications for the Tunisian context.

Given the infrastructure which already exists in Tunisia and its rather graduated level of development, Tunisia seems an appropriate country for establishing a program of building institutional capacity for introduction of computers into the society. The socio-economic impact on Tunisia should be strong and favorable and Tunisia should serve as an appropriate model for demonstrating advantages and the necessity of a broad-based computer science program in a LDC.

The special assessment team which visited Tunisia for three weeks in April and May, 1985 concluded that they "believe that the Tunisian authorities are on the right track in having recognized the potential which (computer science) offers to their development and (they) believe that A.I.D. could be helpful in providing the resources to encourage them in this endeavor".

Specific comments of the team were:

1. The interest in (computer science) at all levels and the expressed desire for its mastery and utilization in Tunisian development is very evident and quite remarkable. High priority for this area of effort is clearly recognized. Furthermore, we came away from our various institutional visits with a great impression of competence, industriousness, energy and enthusiasm on the part of all concerned.
2. There evidently is a widespread belief that Tunisia must accelerate its utilization of (computer science) by all phases of society or it will not be able to compete and will fall further behind in the development process. As stated, they have no choice but to move in this direction or to miss the train of development.

3. The extraordinary dedication and commitment of Tunisia to the education of its youth and to its specialization in science and technology is remarkable. The fraction of GNP devoted to all phases of education must rank in the upper level for all developing countries.

4. In spite of these great efforts expended to provide and improve education, the demands are so great that inadequate conditions often apply, due to the shortage of school rooms, teachers, teaching equipment, (especially modern educational technology), etc. Also, dissatisfaction with certain long-standing overly conservative methods is evident and suggests the need for modern innovations.

5. Tunisia looks to the U.S. for leadership in the science and technology area, especially concerning computer science. It further admires the progressive image of U.S. educational methods and the general flexibility and innovativeness in our society. Links with the U.S. in all phases of such programs are sincerely welcomed. The wider use of English in instruction and research would also be welcomed and is currently being encouraged. New research and higher education institutions modeled after U.S. approaches are very much desired, as are other modern approaches such as greater inter-institutional relations with industry and extended opportunities of the initiatives of the private sector. Opportunities for cooperation in all these areas are promising.

With respect to the computer science initiative in Tunisia, the team had the following comments:

1. Tunisian authorities and education and technical personnel truly believe that expanded (computer science) activities in diffusing microcomputer literacy, computer assisted instruction as well as other applications are vital to their development efforts and that time is of the essence in taking major steps in this direction. They respect U.S. achievements in this broad area and would like to profit from increased cooperation and further cooperation and further individual and institutional contacts.

2. The efforts of CBMI in generally stimulating the secondary education system to utilize microcomputers is impressive and commendable. They have moved rapidly to utilize effectively their limited supply of hardware and software in the center and in assisting the two pilot high schools (Bourguiba and Ariana). Their dedicated task force, meeting weekly, follows their progress and problems closely and can provide some of the pedagogical and curriculum context for backstopping the limited initial

efforts. However, further efforts in diffusion must proceed in harmony with the training and preparation of teachers to effectively introduce computers to achieve literacy and to employ computer assisted instruction (CAI) in a significant contribution to the secondary school curriculum. Reference to other countries' efforts as reviewed by UNESCO as well as U.S. experience shows that considerable prior efforts must be expended in the preparation of "courseware" so as to provide significant tutorial material and accomplish more than simple drill exercises on the microcomputers at their introduction into the system. For this reason, we believe that the proposed U.S. cooperation in microcomputer diffusion should not just consist of the provision of X number of computers -- but must include a comprehensive program of cooperation to include exposure of teaching personnel to the universe of software so far developed for various subjects, together with training and arrangements for indigenous program development appropriate to the Tunisian conditions, all to be accomplished in cooperation with the responsible authorities in the Ministry of Secondary Education. As this ground is prepared, the acquisition of the appropriate microcomputers and peripherals, chosen to satisfy the necessary specifications, can be accomplished and efficiently phased into the previously prepared institutions. Furthermore, we believe that this effort should all be considered as an experiment with the associated evaluation procedures so as to provide opportunities for learning and improvement in subsequent adaptation if this should prove desirable.

3. The introduction of microcomputers into "clubs" for general use including games and special programs to achieve literacy, etc. seems like a useful direction in which to proceed. It would be worthwhile, however, to obtain evaluation results from the CBMI experience as to how well this really works and determine its specific value for, and impact on young people, before it is widely replicated. We believe that this aspect of the proposed cooperation might therefore be factored out from the above detailed secondary school effort for the time being.

4. The diffusion of microcomputers to the various, so-called junior colleges (the first cycle in higher education carried out in their associated technical institutes or faculties) would appear to us distinct and separate from the secondary and popular education responsibilities of CBMI (other than their general concern for the widest possible diffusion of [computer] literacy and their success as a general "animateur"). The usefulness of computers in the higher education experience depends upon the technical context in the curriculum and

the programming applications ability of the teaching staff. Greater familiarity with other efforts so as to profit from the specialized developments of comparable higher education institutions in other countries would also be warranted. We believe that each of the candidate recipient institutions should be assisted in developing a program, under the supervision of the Ministry of Higher Education and Scientific Research, for the effective utilization of microcomputers in their programs, and that hardware provision should not commence until such a utilization program is developed and the required technical specifications and characteristics of the equipment are determined. Access to equipment by professors should be provided during this design period.

5. On our visits to the various specialized higher education institutions we observed some pioneering uses of microcomputers in the research and engineering efforts underway. However, there is clearly a need for a greater supply and utilization of these valuable tools in the overall higher education environment. This part of the overall effort in the diffusion of (computer science) capacity ought to be addressed to this more sophisticated use which should be able to employ indigenous programming skills in addition to exploiting available software.

6. In connection with the various approaches to higher education, although we were exposed to some of the pro and con arguments in the course of our visits, we are not able to "take sides" on the relative merits of the University Faculty or Department structure vs. the special technical institute or "grandes ecoles" approach. Frankly, we were impressed with the good efforts we saw underway at both types of institutions. We encourage the Higher Education authorities to continue to make use of both approaches. Furthermore we counsel caution on making abrupt changes since the turbulence introduced may undo the gains sought in the conversion. In the plans for such changes and especially in the organization of radically new institutions, detailed consideration must be given to the availability of resources, both human and financial including recurring elements of the budget. It is important to provide real opportunity for research and innovation to proceed in all the appropriate institutions. This effort is not a privilege to be reserved only for special new elite organizations. The relationship between faculty teaching and research is of proven value and the involvement of bright creative students is an excellent stimulus to the advancement of research.

This project aims to include these recommendations by focussing on IRSIT as the coordinating institution in computer applications in Tunisia. The project will support activities in computer based instruction at both the secondary and higher education levels, with a focus to direct applications of computer technology to the Tunisian context as the driving force behind educational trials. It also will aim to bring about training of resource individuals in IRSIT who will train future educators in computer applications and computer science. The project will create linkages with U.S. based institutions and will encourage coordination among those Tunisian institutions involved in computer science.

## ANNEX VI: FINANCIAL ANALYSIS

The purpose of this annex is to provide an assessment of the GOT's ability to finance their contribution to the project and post-project recurrent costs. The following subjects are covered:

- A. Discussion of the Tunisian macroeconomic situation and its expected influence on GOT financing for IRSIT.
- B. Analysis of the financial contributions of the GOT, AID, and other donors, to IRSIT over the period 1984-1986.
- C. Estimation of the recurrent costs (FX, LC) of the proposed project. Discussion of the GOT's ability to finance these recurrent costs.
- D. Summary of findings.

### A. The Tunisian Macro-economic Situation

Tunisia's overall economic situation is deteriorating, albeit slowly. While the deterioration will affect adversely the GOT's ability to undertake requisite recurrent costs, the recurrent costs generated by this project are sufficiently small that they will not be affected.

Economic Growth: Last year, real GDP grew 5.5 percent. While this represents an improvement over the 4.4 percent recorded the year before, the overall trend in the 1980s is still one of deterioration. Annual real output growth averaged but 3.9 percent over 1981-1984; on a per capita basis, the increase is only on the order of a little over 1 percent. This contrasts to 7.7 percent real growth over 1977-1980 and 6.3 percent for the entire decade of the 1970s. Growth prospects for the remainder of the 1980s are not sanguine.

Public Finance: The central government deficit has gone from \$338 million in 1982 to a projected \$533 million in 1985. As a ratio of GDP, the central government deficit has increased steadily, rising from 4.1 percent of GDP in 1982 to 7.0 percent in 1984. If the budget projections are realized, the 1985 deficit-GDP ratio will be the same as in 1984. Given the already high level of fiscal pressure in the country which puts the Tunisian share of government revenues as a percent of GDP around the mean of the OECD countries but relatively high in comparison to other less developed countries, the deficit will have to be controlled by restraining the rate of growth of government expenditures, in particular current expenditures. The biggest threat is continuous uncontrollable increases in

transfers to public enterprises and consumer subsidies. To be able to close the deficit gap in the future, the GOT has to change radically present pricing policies. Public enterprises, where possible, should charge a price equal to the opportunity cost of the product, and subsidized prices should be continuously raised by formula, and, in some cases, subsidies entirely removed.

Balance of Payments: Tunisia's balance of payments position has been weakening. Last year, the current account deficit shot up to \$850 million, equivalent to 10.5 percent of GDP. It had stood at but 6.9 percent of GDP in 1983. Factors contributing to the underlying weakness are (a) depressed global oil prices, (b) the recession in Western Europe and its negative impact on Tunisian exports, (c) the appreciation of the U.S. dollar -- one of the currencies to which Tunisia's currency is pegged -- against currencies of Western European states -- Tunisia's most important tourism market, and (d) sluggish remittances earnings because of depressed economic conditions in neighboring Arab Gulf states. As for the future, continued deterioration is likely. Prospects for oil -- the most important source of foreign exchange -- are at best uncertain; the global glut of oil through its impact on neighboring Arab Gulf states will take its toll on remittances -- also an important source of foreign exchange; and the entry of Portugal and Spain into the EEC promises to have a negative impact on Tunisia's foreign trade.

Foreign Debt: Tunisia continues to encounter little difficulty in securing financing from abroad from both private sources and international financial institutions. This is of some importance to the GOT since external borrowing for export-oriented projects is an integral part of the country's developing philosophy. Tunisia's excellent credit rating is a consequence of the reputation its economic leaders enjoy as savvy money managers. However, many GOT officials are fearful that burgeoning fiscal deficits and problems inherent in the imminent coming of the post-oil exporting era as well as high interest rates could lead the government to bite off more foreign credits than it can chew. Last year external borrowing stood at \$734 million, up over 20 percent over the year before. By the end of the year, in spite of the modest increase in exports, the debt service ratio was 19.5 percent with total foreign debt exceeding \$4 billion; the GOT had planned to limit the ratio to 18.5 percent. The debt service ratio was up alone 5 percentage points in 1983. As for 1985, the GOT expects to take on \$269 million in new public foreign debt (exclusive of military). Nearly half the total will come in the form of commercial rather than traditionally favored concessional borrowing. While debt servicing requirements are still not excessive, they are of some concern. The GOT should insure that any foreign loans are "self-liquidating"; that is,

that they generate the foreign exchange required with which to make payment.

Implications for IRSIT Financing: These recent macro-economic developments point toward: 1) pressures to reduce the rate of growth, and possibly the level of government expenditures, and 2) competition for foreign exchange. However, the recurrent cost implications of this project are rather inconsequential. If we were to project recurrent costs at \$750,000, that would represent less than 0.2 percent of the GOT recurrent budget for education in 1984. Also, any foreign exchange outflows for this project would be an infinitesimal portion of total foreign exchange inflows. Nonetheless, the extent to which the public finances and balance of payments pressures affect GOT funding for computer-based education depends on the political support for these activities in Tunisia.

#### B. IRSIT Financing, 1984-1987

GOT-financed education activities include the programs of IRSIT, contributions of personnel and facilities of various government ministries (e.g. Ministry of Higher Education and Scientific Research, Ministry of Education). Although the proposed project will require limited inputs from other GOT ministries, this analysis focuses on the ability of the GOT to finance the current and anticipated program of IRSIT.

Since 1984, GOT support to IRSIT has grown considerably. The GOT provided support in the amount of TD 400,000 to develop a pilot program in the area of computer based education. This program was initially housed in the actual Center, formerly administrative offices of the Bourguiba school, but was then placed in the two pilot schools, the Bourguiba and Ariana high schools. In 1985, the GOT has increased its contribution to this educational experiment and has also committed resources to expansion of the program to include IRSIT, the regional computer science research institute which is being placed in La Soukra. The La Soukra site is approximately 6000 square meters in size. The 1985 budget for development of this site into headquarters for IRSIT amounts to 2.5 million TD, with an additional contingency allocation of TD 500,000. In addition, the GOT is providing teachers and space for computer based education programs and is in the process of procuring additional computers for the project, both from U.S. and European manufacturers.

In a speech delivered on July 1, 1985, President Bourguiba announced that a tax of one millime would be placed on each litre of gasoline sold in Tunisia. This will go to a special research fund which can be used to meet both capital and recurrent costs of the computer based education project in

general and IRSIT activities specifically. In addition, the GOT has announced that graduates returning from abroad with expertise in computers and computer based education will be required to serve from 12 to 15 months with the government in the computer based education program. This will provide both a budgetary support and a minimum of needed personnel support for project activities.

In summary, GOT expenditures in support of computer based education total and recurrent budgets have increased in real terms over the period 1984 and 1985.

#### C. Recurrent Costs of the Proposed Project:

Given the preceding discussion of the recurrent costs of computer based education, the discussion below will focus on estimation of the additional recurrent costs, associated with the new project, which will require GOT financing. The discussion first considers project inputs that will require local currency (LC), then those requiring foreign exchange (FX).

Local Currency: The project inputs which are to be financed by the GOT from the outset of the project consist of projected salary costs for staff at IRSIT, which would be incurred with or without the funding of this project. Thus it is anticipated that IRSIT will not face additional recurrent salary costs as a result of this project.

A second group of project inputs will require GOT-financing during the LOP, but are not expected to continue after the project, and thus will not involve on-going, additional recurrent costs. These inputs are support for international travel associated with training activities and managerial support for the project.

It is important to note that the very nature of the project emphasizes activities which are applications oriented. This should lead to IRSIT's ability to raise funding in the private sector for future activities which have direct application to specific private sector applications. The proposed linkages with industry and the private sector should help to reduce the dependence on GOT funding for salaries and other support costs in LC after the project.

Foreign Exchange: Project inputs which will require foreign exchange from the GOT are computers, software, disks, power supply protectors, cables, spare parts, maintenance and depreciation of personal computers and other equipment. These requirements over the life of the project, and estimates for their annual cost after the end of the project, are difficult to estimate at this time. It does appear, however, that if IRSIT is successful in developing applications for regional

markets, these recurrent costs should be covered by income generated at IRSIT.

In view of difficulties the GOT may have in the future in financing FX-requiring inputs for IRSIT activities, it is possible that the GOT might ask for continued support in providing computers and other hardware and software after the end of the project in 1989. This possibility will be an important issue for consideration during the mid-term and final project evaluations.

Given the regional nature of IRSIT, and its applications focus, some FX costs should be defrayed by regional support for specific applications research and development activities. While it is difficult at this time to give precise estimates of how much FX might be generated this way, the success of the project can partly be measured in terms of generation of support for regionally oriented applied research.

The expected final result of this project will be plans for the development of higher and secondary educational programs and research programs involving computers. Moreover, it is expected that these plans will call for substantial increase in financing for such activities, comparable to substantial increasing benefits from computer services and activities in Tunisia. A major portion of the planning exercises will be the analysis of the potential economic benefits and potential sources of financing for such an expansion of computer technology training, education and research.

#### D. Summary of Findings:

In spite of a general deterioration in the Tunisian macro-economic situation during the early 1980s, GOT allocations to IRSIT and computer based education activities increased considerably in 1984 and 1985. Although the GOT has demonstrated its commitment to pick up the costs associated with their computer based education program, donor support may be required after 1987 to maintain current programs until transfer of financial responsibility for these programs to the GOT is complete.

The annual local currency recurrent costs implied by the proposed project are estimated to equal 8 percent of the projected GOT contribution to IRSIT in 1988. In view of anticipated pressures on the GOT to reduce the growth of public expenditures, the ability of the GOT to pick up these

additional recurrent costs will depend to a great extent on the strength and level of political support for computer based education in Tunisia.

The annual foreign exchange recurrent costs implied by the project are difficult to project at this time. It is expected that the additional revenue generated as a consequence of altering GOT gasoline pricing policy will cover at least the local currency equivalent cost of the necessary equipment and personnel, and thus a large percentage of the above recurrent costs. Foreign income generated by IRSIT should defray a large portion of foreign exchange costs.

Although the proposed project will be financed with ESF funds, it is Near East bureau policy that all projects include a contribution from the host country equivalent to at least 25 percent of the total cost of the project. The budget tables A6.1 and A6.2 give the inputs and their estimated cost to the GOT. In addition to these inputs, A.I.D. recognizes that the GOT will make a number of additional contributions to the project that have not been estimated because they cannot be anticipated at this time, and/or they will be provided in such small increments that they cannot readily be evaluated as a GOT contribution. Thus, the estimated GOT contribution is a minimum estimate of the actual contribution that the GOT will make to the project.

TABLE A6.1: A.I.D. Project Inputs by Component

	COMP #1	COMP #2	COMP #3	COMP #4	ADMIN	TOTALS
TA	677.5	45.0		60.0		782.5
TRAINING	12.0	0.0	185.4			197.4
COMMODITIES		651.6	71.3	653.2		1376.1
OTHER	258.8	18.0	38.0	75.0	346.4	736.2
EVALUATION/AUDIT					130.0	130.0
CONTINGENCIES	49.9	36.5	15.3	39.9	25.1	166.7
INFLATION	49.6	14.4	11.4	9.2	26.5	111.1
TOTAL	1047.8	765.5	321.4	837.3	528.0	3500.0

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TABLE A6.2: GOT Project Inputs by Component

	COMP #1	COMP #2	COMP #3	COMP #4	ADMIN	TOTALS
TA	184.5			60.0		244.5
TRAINING			96.0			96.0
COMMODITIES		261.7	80.2	327.0		668.9
OTHER	27.0	9.0		5030.0		5066.0
EVALUATION/AUDIT						0.0
CONTINGENCIES	11.9	14.2	9.6	306.0		341.7
INFLATION	26.0	12.7	15.5	703.8		758.0
TOTAL	219.4	297.6	201.3	6426.8		7175.1

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ANNEX VII: ECONOMIC ANALYSIS

Cost Benefit

The application of cost-benefit analysis requires delineation of the benefits and costs of the proposed investment in economic terms. Application of cost-benefit analysis to education programs have taken one of the following approaches. One approach is to evaluate the effect of educational interventions on productivity increases. Another approach is to calculate the present value of the expected income of an individual both with and without training in computer technology and to use the value added as a surrogate for benefits for the economy resulting from introduction of the technology.

Application of these approaches to evaluation of education programs in other countries -- both developed and developing -- has shown high positive returns, with the proportion of social benefits to individual/family benefits sufficiently high to warrant government subsidization of continued education planning efforts. For instance, for the United States, Leontief (Scientific American) has estimated that the internal rate of return for introduction of computer-based automation was (a) more than 30 percent in government enterprises and the computer and semiconductor industries, (b) more than 20 percent in lumber products, wood containers and petroleum refining, (c) more than 18.5 percent in several mining industries, construction, food, paper, chemicals, plastics, drugs, and paints, and (d) more than 12.5 percent in livestock, forestry, fisheries, agricultural service, fabrics and textile fabrication, furniture and leather tanning. In West Germany, in 34 subsectors of mining and manufacturing new computer technology applications promoted productivity increases averaging almost 120 percent over 1970-79. The subsector that was quickest to adapt the new computer technology is plastics and productivity increases in the subsector have been the greatest. The primary source of the productivity increases has been improved quality control; less skilled employees have been displaced by computer-based control. Generally speaking the greatest potential for computer technology in most countries lies in transportation (information, railways, shipping), distribution (data processing, text processing, point of sale terminals), banks and insurance companies, public administration and offices, and these types of industries are prevalent in Tunisia. This discussion augurs well for the project's economic viability.

This project, however, does not lend itself well to cost-benefit analysis. The benefits that will accrue from this project, although potentially significant, are difficult to quantify. The economic impacts are relatively delayed, highly

uncertain, and indirect. What this project seeks to do is to increase the productivity of Tunisia's private and public sectors. This will be accomplished by assisting the GOT to develop its capacity to move expeditiously toward applications of microelectronics, emphasizing applications to the education system and research that will lead to the long term goal of increasing development efficiency through introduction of microelectronics to the productive sectors. Increased productivity means (a) that the same output that was achieved before can now be produced using less resources or (b) similarly with the same amount of resources more output can be produced than before. Increased productivity, in turn, will lead to greater overall economic output and hence more employment opportunities and will generate needed foreign exchange. Increased productivity should place Tunisia in a better position with respect to international trade; promotion of domestic production, through productivity increases, will encourage exports and discourage imports, leading to an improvement in the balance of payments. These productivity gains, though, are difficult to measure.

With respect to the assistance directed to the private sector, this project's assistance covers a broad range of private activity. Hence, any measure of overall benefits would be highly imprecise. The economic viability of the assistance to be provided under this project to the public sector is more difficult to assess than that to be directed to the private sector. Measures that define public sector productivity are difficult to develop. These difficulties are compounded by the pilot nature of the proposed activities to be funded by this project. Nonetheless, this project seeks to upgrade and improve the administrative and technical capabilities of the public sector. This will permit a more effective utilization of government resources. The project will provide participant training directed toward improving the institutional human resource base in key areas of the private sector and GOT administrative structure. The project also intends to increase productivity in the private sector.

While cost benefit analysis for the project is indeed difficult, we will use such analysis to derive some economic implications for the project's composition of activities. With costs specified, we calculated the annual benefit stream required to yield a 15 percent return, a rough estimate of the opportunity cost of capital for Tunisia. A 15 year benefit stream was assumed. GOT counterpart includes airfare for participant training during the life of the project (LOP). We assume that a certain degree of institutionalization takes place. Hence, after the LOP the GOT will incur costs such as salaries, computers, software, disks, power supply protectors, cables, spare parts, and maintenance of personal computers. The after LOP GOT counterpart costs are projected

conservatively at roughly half the average annual total LOP costs, both GOT and USAID. Benefits were expected to commence in year two (2) of the project, to peak by year four (4), and to remain at that level thereafter for the remainder of the benefit stream\*.

\* Actually this is unrealistic. Benefits should be increasing throughout the benefit stream, if activities are indeed institutionalized. The stock of individuals and enterprises that have been assisted should increase each year. Details on project activities, however, are sufficiently imprecise to preclude making anything more than the most simple assumptions.

In light of these assumptions the project needs to generate almost \$1.5 million in benefits annually to be considered a viable economic initiative. This project will be generating benefits through interventions with both the private and public sectors. Measures to assess benefits consist of (a) wages of individuals with and without computer expertise, (b) productivity increases in firms using computer intensive technology and (c) estimates of efficiency gains in government, e.g., expenditure cuts facilitated by the adoption of the computer technology. Therefore, to be a viable undertaking, the project must:

- generate wage increases for at any one time almost 3,000 individuals. This assumes that computer application training yields on average per individual annual salary increases of \$500. A number of other permutations are possible. For instance, if annual individual salary increases of only \$250 were achieved, almost 6,000 individuals would have to be affected.

or

- produce productivity increases for almost 600 business concerns assuming that the productivity increases for each concern average \$2,500 per year. As above, many other permutations are possible.

or

- yield annual increases in GOT productivity amounting to \$1.5 million either in the form of higher output, however measured, or input savings, e.g., personnel in the various GOT ministries.

The implication of this analysis is that the pilot projects/activities should have a clear economic focus. Pilot projects/activities should not be undertaken unless they are expected to have an economic pay-off. This is not to say that only riskless activities should be undertaken. Rather, high

risk activities can be funded if projected returns are sufficiently high\*.

A key aspect of this project is to make the education system more efficient through the introduction of computer technology. The GOT has devoted significant resources for education. Of total budgeted recurrent spending of \$2.4 billion in 1984, 17.2 percent or roughly \$420 million went for education. Only a very modest increase in the efficiency of the education system would be required to justify the project. For instance, an increase of but 0.3 percent in the efficiency of the education system would be required to generate the requisite \$1.5 million in annual benefits.

Where possible, recipients -- either individuals or concerns -- should pay for assistance rendered under this project for three reasons. First, the willingness to pay would provide some notion of the benefits derived by the recipient. Obviously, if the recipient partakes of the project's services at a fee, the recipient values the services provided at, at least, the value of the fee. Hence, a fee system puts a lower bound on the benefits derived by the recipient. Second, a fee system provides a benchmark whereby the "efficiency" of the project can be gauged. Since a fee system permits computation of the minimum value placed by the recipient on services received, the system can be used by the project implementer to make sound decisions on whether a particular program should be expanded or discontinued. Third, in light of potential GOT recurrent cost difficulties, a fee system would help assure the long-term viability of the project.

#### Cost-Effectiveness

In cost effectiveness analysis, we seek to minimize costs, holding as constant a given level of output. In this project, the issue of cost-effectiveness has arisen over implementation. Implementation promises to be very costly. For instance, more than \$200,000 has been allotted in 1987 for administration. The full time services of a technical assistance contractor will be required. While costly, the services of the technical assistance contractor are needed to assist in implementing and coordinating the numerous activities to be carried out under the project. Tasks for the contractor will include (a) providing computer science experts, (b) assisting in selection of institutions and substantive areas for project activities in computer technology, (c) furnishing a

\*This discussion is based on financial portfolio theory which dictates low returns on riskless assets -- savings accounts, government bonds -- and high returns on high risk assets -- investments in speculative stocks, real estate -- where some potential for loss exists.

framework for evaluation of hardware and software with respect to Tunisian needs and resources and (d) developing a program for training of trainers and observation tours to the U.S., among other tasks. Without effective implementation and appropriate coordination of these activities, the project benefits will not be realized.

### Employment Considerations

While the Tunisian economy is at a sufficiently advanced stage to be able to use computers effectively having commenced the transition from primary to secondary and tertiary economic activity, we are concerned over the project's impact on employment. It is true that the project will create jobs, including computer programmers, systems analysts, and maintenance and repair personnel, among others. On the other hand, adoption of computer technology will result in some layoffs. If the economy were operating near or at full employment, we could assume that those individuals losing their jobs would find positions elsewhere. Hence, the economy would not lose their output. However, with total unemployed and underemployed at roughly 20 percent of the Tunisian labor force, the individuals who have been laid off may encounter difficulty locating alternative employment opportunities.

A related concern is that of wage rates. Firms in deciding upon input mixes will tend to adopt technology that use more of the low cost inputs and less of the high cost inputs. In Tunisia, the growth in the use of computers has been exponential, rising from a few score in 1980 to a few thousand currently. Imports of microcomputers stood at 160 in 1982 and by 1985 the imports totaled 2,500. Clearly, the increased use of computers would not be taking place if firms did not find it advantageous economically to do so. The significant increased use of computers may be a consequence of rising labor costs.

The national minimum wage and the minimum guaranteed agricultural wage have an important impact on other wage rates. Other wages in both the union and non-union sector tend to go up automatically with increases in the minimum wages. The national minimum wage and the minimum guaranteed agriculture wage went up rapidly in the early 1980s. The national minimum wage was increased 18.3 percent in April 1981, 31.5 percent in February 1982, and 11.2 percent in March 1983, while the increases for the minimum guaranteed agricultural wage were 22.6 percent, 20 percent, and 11.7 percent respectively. In large part because of these increases, the average annual wage in the economy grew 13.4, 23.1 and 16.2 percent, respectively, in 1981, 1982, and 1983. When deflated for price increases, the increases were still on the order of 4.0, 8.4, and 6.6 percent in respectively 1981, 1982 and 1983. Wages appear to be determined by forces other than market,

e.g., strength of unions, and bear no connection to productivity. Hence, they may be furnishing inappropriate economic signals, encouraging excessive use of computers and less than optimal use of labor. In this regard, the GOT decision to link wages to productivity and to hold the line on additional wage increases for this year bodes well.

These concerns suggest that the project focus on those activities and programs that will have the least disruptive impact on employment.

TABLE A7.1: Calculation of Benefits Required to Justify Project Implementation

YEAR	COSTS			Discount	Present Value	Benefits	Present Value
	AID	GOP	TOTAL	Factor	of Project Costs		of Benefits
				(15%)	(\$000)		
1	1012.4	257.2	1269.6	1.000	1269.6	0.00	0.00
2	1448.2	498.0	1946.2	.870	1693.2	0.33X	0.287X
3	1028.6	471.7	1500.3	.756	1134.2	0.67X	0.506X
4	0.0	750.0	750.0	.658	493.5	1.00X	0.658X
5	0.0	750.0	750.0	.572	429.0	1.00X	0.572X
6	0.0	750.0	750.0	.497	372.8	1.00X	0.497X
7	0.0	750.0	750.0	.432	324.0	1.00X	0.432X
8	0.0	750.0	750.0	.376	282.0	1.00X	0.376X
9	0.0	750.0	750.0	.327	245.2	1.00X	0.327X
10	0.0	750.0	750.0	.284	213.0	1.00X	0.284X
11	0.0	750.0	750.0	.247	185.2	1.00X	0.247X
12	0.0	750.0	750.0	.215	161.2	1.00X	0.215X
13	0.0	750.0	750.0	.187	140.2	1.00X	0.187X
14	0.0	750.0	750.0	.163	122.2	1.00X	0.163X
15	0.0	750.0	750.0	.141	105.8	1.00X	0.141X
					<u>7171.1</u>		<u>4.892X</u>

$B/C = 1 = 4.892X/7171.1$   
 $X = 7171.1/4.892 = 1465.9$

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## ANNEX VIII: SOCIAL SOUNDNESS ANALYSIS

### Economic Basis for Project

The number of microcomputers imported into Tunisia has increased from 160 to 2500 between 1982 and 1985. The economic implications of this trend in Tunisia merit attention. Several questions arise. Will the trend retard the tempo (in relative terms) at which productive skills are accumulated, already-existing advanced technologies are introduced, and labor-saving and labor productivity-increasing innovations are developed and adopted? Exploiting the advantages of being a technological follower will be more difficult. Will the process of eliminating the structural backwardness in these economies be slower than could be the case with less rapid rates of expansion of the labor force? How can the country best accommodate, within the traditional sector of the economy, the population not absorbed into the modern sector? Finally, how much will economic and political processes be affected by full and partial unemployment? The attention to these and other questions would naturally take into account the enlightened education policies that Tunisia has followed since independence and the results of these policies. Clearly the number of entrants to the labor market is growing more rapidly than the number of jobs being created. Demand in the education, housing and agricultural sectors is likewise problematic. These issues are discussed more fully in the Economic Analysis for the project.

### Previous Project Design and Execution

This project builds on a history of A.I.D. assistance to Tunisia in the field of education. A.I.D. has provided assistance to the GOT under the Technology Transfer project for building Tunisia's capacity to integrate technological innovation into the Tunisian society. This project has been underway for several years now, with reasonable success. This project works with the MOHESR for implementation. Graduates of undergraduate programs in the U.S. in the fields of electrical engineering and computer science will be required by the GOT to return to Tunisia and work for the government, primarily in the implementation of the proposed project, for a period of between twelve and fifteen months. Also, as far back as 1972, A.I.D. worked with the University of Tunis' School of Engineering (in a grant with the University of Minnesota), in developing an instrumentation laboratory. Participants in both earlier projects will be equipped to work with the present project and to provide service for computer equipment in this project.

In addition, several A.I.D. projects in Tunisia have provided both computers and computer training in several

sectors of the Tunisian economy. The Agriculture Technology Transfer project aimed to provide capability to conduct agricultural research on a widescale basis. The Technology Transfer project implemented a management information system for tracking participants. The Child Nutrition project provided capability in research and information management. The Rural Community Health Project provided a basis for management information in primary health care.

Regional activities which are underway in computer technology include efforts by UNESCO in the Arab states and by IBI which might provide useful cooperative programs. In addition, the GOT has already begun constructive work with France (Centre Mondial and training) and the U.K. (CAI experiences). Canada and Japan have begun preliminary negotiations in examining possible avenues of involvement. In addition, there is negotiation underway with Kuwait to develop Arabic CAI. These activities should be seen as important further assistance; project activities should be carefully planned to complement and not overlap with these efforts.

#### Social Consequences and Benefits

Geographic factors and Tunisia's limited natural resources, coupled with migration toward the cities, place pressure on these cities well beyond the capacity of the existing infrastructure. Public services are greatly overburdened in urban areas and are insufficient in rural areas. Moreover, economic pressure on the government will increase and the need for insuring cost efficiency in the program will become vital.

Potential benefits of the program to both the nation as a whole and to individuals served by the program have been well demonstrated. Planned activities should lead directly to increased quality in provision of services, primarily through better information management systems and availability of information.

Particular concerns of a project such as this are protection of privacy, cultural changes, job displacement, time consumption of initial changes, and equal access to the technology. While privacy issues are important, this concern is not felt as acutely in the developing world as in the developed world. There will need to be sensitization of privacy needs as an integral part of project activities. In particular, placement of information in a computer-accessible form provides a vehicle for abuse of information, and data base creation will need to be done with due concern for possible abuses of information.

Introduction of any new technology poses risks for changing the cultural fabric into which it is introduced. While the GOT sees computer technology as a basis for preserving its culture (see initial IRSIT concept paper), there will need to be specific attention paid to potential unintended consequences of project activities. In addition, the project will need to specifically sensitize key GOT officials to potential cultural impacts of project activities.

Possible changes in job demand and displacement are further discussed in the Economic Analysis of the Project Paper.

An important consideration of introduction of computer technology is the initial time-consuming nature of computerization of procedures. Time needed for conversion of a system to a computer base is always underestimated and information is, at least for a short time, harder to obtain under a new system due to system failures and lack of training. For at least a while there will need to be duplication of activities while computer technology is introduced.

Finally, a major social concern in introducing computer technology is the potential for further dividing the allocation of resources and access to the technology. When computers are introduced into the education system, there is the possibility that they will be available for the higher social classes and not universally available throughout the society. At a minimum, they cannot be introduced easily in areas which have no electricity, the poorest areas of the country. Since the Tunisian education system draws on students from all over the country, based on academic achievement, there is at least an initial step to ensure equal access. This, however, is problematic in that scores on examinations are somewhat influenced by prior access. The GOT's plan to introduce computers nationwide is aimed at addressing access problems, but is probably unrealistic and needs further examination. This project will need to help the GOT in developing its plans for introduction of computers into the educational system, taking into account access concerns and needs. An approach which would provide computers throughout the educational system, while appealing from an access point of view, might serve to commit resources in a manner which is not cost effective and might, in the long run, channel resources away from needs of the poorer segments of society into temporary computer fads in education thus having detrimental effects on this segment of society. This project aims to introduce systematic examination of the role of

computer technology in education and should, in the long run, serve to protect the interests of the poorer segments of the Tunisian society. At least in the short run, with respect to pilot activities, equity issues in distribution of the technology will need to be addressed in proposals for support. With respect to applications, access questions should be easier to address. As a result of computer applications, services to the poor should improve, and prices of goods and services for the poor should relatively decrease.

With respect to access of women to computer technology, it is important to note that Tunisia has made considerable gains in providing women with access to education since independence. Indeed, in several Tunisian schools there are presently more females enrolled than males. This program will be introduced, albeit on a pilot basis, in such a way that access will be primarily by demonstrated achievement, rather than by arbitrary choice and this should serve to ensure equal access to female students. The GOT's effort to implement computer based education on a widescale basis will enable reaching all phases of the society, in education and in other applications so that, if successful, elitism will not be a possible outcome of the activity. The use of computers should be especially favorable to the improvement of opportunities for women. First, the educators and students will be chosen so as not to discriminate against women. Second, the rapport with CAI should help break down inhibitions of women to be involved with science and technology and applications. Already there are a considerable number of women involved at CBMI and the pilot high schools and in computer applications in higher education in Tunisia.

#### Project Beneficiaries

The project aims at three groups of beneficiaries: students who receive training on computers, ministries and industrial organizations which receive applications for their implementation, and consumers. Clearly the students will have exposure to computers in their use of them during pilot activities. There will be a fan effect to other students in that pilot activities will be evaluated for adaption by the GOT in other schools and subject areas. The project activities will serve as a basis for decision making in the implementation of this fan effect.

With respect to Ministries and industrial applications, the project will support activities directly related to functioning of these organizations. Since the focus will be application-based, there should be immediate use of the project outcomes and this should lead to immediate

implementation. This should benefit both the employees of the organizations since they will be more productive and those served by the organization, since they will receive better service and/or lower costs for services.

In addition, the fact that the project institutionalizes a R&D effort, there should be future applications which benefit the society on the whole. Because there is development of a training center for trainers, there should be an on-going effort in training teachers in computer literacy which will lead to continuous training of students contributing to a far effect for the project.

ANNEX IX: ADMINISTRATIVE ANALYSIS

1. Administrative Structure of Organizations Involved in the Project

A. GOT

IRSIT will be the primary recipient of U.S. assistance under this project. IRSIT's principle functions include establishing policies, programs and standards for introduction of computers in education and research. IRSIT was established by law as a "public entity of an industrial and commercial nature". The classification gives it financial autonomy and relative management autonomy. Limits are imposed by current laws governing the conduct of all public entities, by the board of directors (composed of representatives from the various ministries), and by "Contrôle des Dépenses". Financial autonomy is the authority to disburse without prior approval from other agencies. IRSIT has authority to recruit and to contract for services.

IRSIT's President and Director are advised by a board including the directors of the relevant institutes (and is expected to include representatives of the education community). CNI and CBMI serve as further links between IRSIT and the educational communities including the larger public. Some mechanisms will have to be developed for IRSIT links to the private sector and of course the regional focus will require links to be developed with other institutions.

While still in a formative stage of development, IRSIT is being designed for an already acquired attractive seven acre site on the outskirts of Tunis in La Soukra. The GOT has provided IRSIT with a temporary location on Avenue Mohammed V which presently has a suite of offices on the second floor. IRSIT now has a staff consisting of the President, the Director, secretarial support, clerical support, contractual technical support and a management staff. The basic objectives of IRSIT include:

- o providing a regional framework so as to achieve cooperation in the Arab, African and Islamic regions in computer technology,
- o Arabization of computer technology and the promotion of the Arabic language via computer technology,

- o development of computer technology in all sectors where its impact is expected to be significant such as education, communications, information and industry,
- o promotion of the computer technology industry in the region,
- o providing a center of excellence, where relevant information is collected, selected and diffused, and providing data banks on technology, research, etc. for the regional community,
- o providing a forum for exchange of ideas,
- o assisting in norms and standards,
- o providing a post-university research and training center and otherwise stimulating research, and,
- o developing a telecommunications network to link research facilities in Tunisia and the regional countries, and via satellite research facilities and data banks in the U.S. and Europe.

IRSIT is attempting to break new ground in its establishment as an innovative research center -- on the one hand to facilitate its role in research stimulation in all portions of the Tunisian scientific and technological community, that is concerning education, university faculties, special institutes, parastatal organizations, industry and the private sector, and on the other hand to maintain a regional coverage with links to other national efforts.

For the first area they are seeking a flexible charter which will enable them to accept funds from all sources including primarily the government - public sector, as well as loans and contributions from banks, industry, multi-nationals, etc. and permit them to invest and make grants to any worthwhile institution. Models for this might be the National Science Foundation in the U.S. or the several analogous organizations in Korea as an example of a prospering developing country helped substantially by USAID.

With respect to regional interest, meetings have already been convened in Tunisia by IBI, for the Arab States Region, UNESCO for CAI and education in the Arab States, etc. Tunisian authorities have also established promising links in the Maghreb countries and had an offer of cooperation from the United Arab Emirates. An agreement with IBI could provide a regional focus as well as some contributions from that

intergovernmental organization. It is also expected that UNESCO's Regional Bureau for Science and Technology in the Arab States will locate in Tunisia in the next year and this office can also encourage an Arab Region focus in computer technology research in cooperation with IRSIT.

IRSIT maintains three major budget categories: 1) operating expenses (O.E.) budget, 2) program budget; and 3) investment budget.

With respect to O.E., IRSIT's Director develops the budget on an annual basis. The investment budget is reviewed by the MOE and negotiated with the Ministry of Plan.

The MOHESR is an important player in IRSIT's function; many of IRSIT's activities relate to activities in higher education, so these activities must be coordinated through the MOHESR. IRSIT coordinates all computer based education which will take place in institutions under the MOHESR and allocates equipment to these institutions. The Director of IRSIT works with the MOHESR in carrying out these functions.

While IRSIT will be the prime implementing agency for the project, other key institutions will also be involved. The CBMI, which has been in operation since November 1984, endeavors to expose the broadest possible community to the potential of computers for popular applications. It has worked in affiliation with two pilot high schools (Bourguiba and Ariana) to develop their programs. The CBMI experience will need to be examined closely as background for developing other secondary school experiences. Also, CBMI might be used for training teachers for secondary school applications.

In the field of higher education, the GOT has had a long standing focus on computer training at the University in the Faculty of Science's Department of Computer Sciences. The full six year cycle of this department, leading to the master's level degree, provides a classical training in computer science; many of the graduates of this program now occupy important posts throughout the structures of the government and the private sector often going on for doctoral work in the U.S. or France.

Concern regarding the growing demand for computer specialists and impatience with the relatively small output from the University, as well as the desire to create new institutes to accelerate training along more technological and practical lines has lead the GOT to develop ENSI in Tunis and MIT in Monastir as stand-alone institutions experimenting with the introduction of computers in their instruction, research

and laboratory work. These institutions, along with the schools of public administration, teacher training and engineering are likely candidates for pilot activities in this project, given their clear applications foci.

The CNI is the formal governmental structure representing computer technology in the more traditional sense including large scale data processing. CNI is a parastatal corporation headed by a President Director General which assists government bureaus to manage their data processing tasks until they have their own facilities and provides advice to other agencies for procurement. CNI serves as the secretariat for the National Commission of Informatics and its various committees and is also designated as the official focal point for GOT adherence to international programs and organizations such as IBI and UNESCO's new Intergovernmental Program on Informatics. Further, it exercises an important reviewing function for the general acquisition of computers in the country. This latter function, originally created to assist organizations to avoid making possible errors in computer purchases, has apparently contributed to a recent bottleneck delaying the timely provision of computers by vendors to customers in the private sector. The CNI has an additional building besides its main computer center which houses facilities for all levels and sizes of training courses of short and medium term duration. CNI also carries out similar decentralized programs at facilities in other parts of the country. Maintenance of computer hardware is one of the key areas for training in this program. Some efforts of CNI are underway in development and standardization, especially in Arabization and telecommunications. Some contact with U.S. institutions (e.g., UCLA) exist, based primarily on personal contacts.

While the government recognizes the contribution of CNI in computer technology in Tunisia, it believes that IRSIT is necessary as a separate institution to ensure that a research focus is maintained and that training for applications and development of software to meet application specific needs will be pursued. IRSIT will, of course, work closely with CNI in developing its programs and research directions under the project.

With respect to national coordination, there are a number of long standing and effective elements. Those institutions reporting to the Minister of Higher Education and Scientific Research achieve their coordination through a committee of that Ministry. The CNI is well placed for coordination with other agencies since its charter places it under the office of the Prime Minister and they staff the National Commission for Informatics which he chairs. The Prime Minister's annual report to that commission provides a remarkably thorough

national state of computer technology problems, accomplishments and future directions plans and priorities. In addition, the National Commission has also coordinated a five year computer technology plan (1981-1985) and is working on the second plan which is to be integrated into the VIIth Development Plan, under the supervision of the Ministry of Plan.

Nevertheless there has been a concern that the above mentioned mechanisms have not been sufficiently timely and coherent to respond to the rapid dynamics of the developments in computer technology. Consequently, the recent impulse of priority and modernization has led to the establishment of a more action-oriented ministerial committee known as CIPIT, chaired by the Prime Minister, with Habib Bourguiba, Jr. as spokesman, which meets frequently and oversees progress in coordination and implementation of computer technology plans.

Since this project will work primarily with IRSIT to carry out project activities, it is important to note that up to the present time, IRSIT has not only coordinated educational activities with computers, but has also provided direct training, not only to students, but also to faculty and to faculty from other third world countries. This is important since one must examine the degree to which there will be a fan effect from this project.

#### USAID

This project will be monitored through the Program Office of USAID/Tunis. The prime contractor will have regular meetings with the USAID project officer and will provide quarterly reports of project activities and progress and projections of activities to be accomplished in the subsequent quarter.

The USAID project officer will participate in all project evaluations and will regularly visit project sites to ensure that project activities are being accomplished in a timely and efficient manner.

#### OTHER DONORS

The Tunisian interest in computer technology has led to development of lines of support with several donors. The United Kingdom has supported development of a CAI program in the English speaking Ariana high school which has been in operation for two years now. This support is primarily in the provision of the ACORN software, a CAI program, and modest hardware for implementing the program. Japan has committed

approximately \$500,000 for hardware acquisition for training of students in electronics as related to computer technology. There is presently a project in negotiation with Kuwait to support translation of CAI programs into Arabic. In addition, France has provided approximately twelve cooperants who are involved in providing instruction at the secondary and higher education levels. Tunisia has links with the Centre Mondial in Paris also. Preliminary IRSIT studies have been financed by both Japan and Canada and a preliminary contribution to IRSIT was made by the United Arab Emirates. All of these programs are complementary to activities proposed under this project and will not interfere with implementation of the project.

On the regional level, the IBI has undertaken programs of regional interest such as organizational meetings, use of Arabic in computer technology, maintenance of computers, CAI, access to data bases via telematics, and policy issues. UNESCO has an intergovernmental program in computer technology which also examines the use of Arabic, regional cooperation, CAI techniques in various educational applications, relationships among donor organizations such as banks and UNDP for the use of CAI in Arab states.

The Peace Corps has already provided one volunteer who is working with the CBMI in developing a training program in computer based education. There are plans for at least four more volunteers to begin work with the GOT in Tunisia; these volunteers will work with CBMI and IRSIT in relation to project activities.

ANNEX X: ENVIRONMENTAL EXEMPTION

Under the provisions of 22 CFR 216, "A.I.D. Environmental Procedures", this project is exempted from environmental review by "Categorical Exclusion".

XI. BIBLIOGRAPHY

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ACTION MEMORANDUM TO THE DIRECTOR

FROM: James E. Vermillion, HPN  
DATE: September 20, 1985  
SUBJECT: Computer Technology Project (664-0334)

PROBLEM: The Computer Technology project was reviewed during action week with Robert Bell, DAA/ANE, presiding and Gerry Kamens and Barry Sidman attending. PRC recommended approval of subject project paper at meeting on August 2, 1985 subject to modifications identified in STATE 240577 and receipt of a financing request from the GOT. Modifications identified in STATE 240577 have been made and negotiated with the GOT and accommodated in project design. STATE 240577 delegated authority for project approval to Mission with Bell, Sidman and Kamens participating.

The paragraphs which follow constitute a request for approval of the Project Paper.

DISCUSSION: The Computer Technology project is designed to provide technical assistance, training, institutional support and commodities to Tunisia to enable it to institutionalize its critical capacity to evaluate, plan, design, modify and implement microcomputer applications, primarily through public education and research, in a contextually appropriate manner.

The project works with IRSIT as the Tunisian implementing agency and provides support in four areas: institutional support, pilot projects, training, and institutional development, analysis and planning.

A. Institutional Support. Activities in this area include technical assistance for developing research activities at IRSIT and for assisting in implementing other project components. A long-term advisor is supported at IRSIT, as are institutional linkages, exchange of teachers and scientists, and development of a training of trainers program.

B. Pilot Projects. This project component supports pilot activities in secondary education, higher education and pilot activities directly related to applications in the public and private sectors. It also supports evaluation of these activities and development of recommendations for future application of microcomputer technology in Tunisia.

C. Training. The training component supports short-term training in the U.S., development of a training institute within IRSIT (housed at CBMI), incountry training, observational tours of Tunisians to the U.S., and attendance at international conferences for Tunisians.

D. Institutional Development. This component supports development of a clearinghouse at IRSIT, annual regional colloquia sponsored by IRSIT, support for research scientists at IRSIT, and computer resources for research activities at IRSIT.

Over the life of the project, funding will be \$3.5 million. The project assistance completion date will be March 31, 1989. Contracting for the project will be on a competitive basis with one prime contractor responsible for all project activities.

RECOMMENDATION: That you approve this request to authorize funds in the amount of 3.5 million dollars and sign the attached project authorization.

Approved: 

Disapproved: \_\_\_\_\_

Date: 9-26-85

Attachments: (1) Project Authorization  
(2) Cable of Delegation of Authority (STATE 240577)  
(3) Project Paper  
(4) Project Agreement  
(5) Cable of Congressional Notification  
(STATE 286712)

cc: ADIR, PROG, CONT, HPN, C&R-2  
HPN:JVermillion:jv

Clearances: ADIR: ELeonard   
PROG: LMacary   
CONT: ESHardy   
RLA: AWilliams (substance)



PERSONS WOULD BE A STAFF MEMBER AT TRIST. WHILE WE RECOGNIZE THAT MR. LATIRI HAS OVERALL GOT RESPONSIBILITY FOR THE PROJECT, WE BELIEVE THAT A COMPUTER SPECIALIST, WHO WOULD IN EFFECT BE AN ALTER EGO OF LATIRI, IS NEEDED TO CONCENTRATE SOLELY ON THE PROJECT. WE WOULD EXPECT THAT THIS PERSON WOULD CONTINUE TO PLAY A MAJOR ROLE IN TUNISIAN COMPUTER DEVELOPMENT AFTER AID PROJECT FUNDING ENDS. ACCORDINGLY, WE SUGGEST THAT THE REQUIREMENT OF A FULL-TIME TUNISIAN COUNTERPART EITHER BE WRITTEN INTO THE GRANT AGREEMENT OR IN THE FIRST PROJECT IMPLEMENTATION LETTER WHICH, PRC SUGGESTS BE DRAFTED SOONEST AND SUBMITTED FOR COUNTERSIGNING AFTER REDUCTION OF THE GRANT AGREEMENT.

5. SECTION ON ECONOMIC ANALYSIS AND A PORTION OF THE FINANCIAL ANALYSIS HAVE BEEN REWRITTEN BY AID/W STAFF. THESE WILL BE HANDCARRIED TO MISSION BY RAMENS ALONG WITH THE ENVIRONMENTAL CLEARANCE AND A FEW SUGGESTED REVISIONS HANDWRITTEN ON A PP COPY. THESE SHOULD NOT DELAY OR AFFECT DISCUSSIONS WITH GOT.

6. PRC UNDERSTANDS THAT AFTER FINAL AGREEMENT WITH GOT, PP WILL HAVE SECTIONS WHICH DISCUSS MAINTENANCE, RECURRENT COSTS AND WAIVERS (IF REQUIRED).

7. SINCE CONTRACTING WILL BE AID DIRECT, IT IS EXPECTED THAT EVERY EFFORT WILL BE MADE TO INVOLVE AN HISTORICALLY BLACK COLLEGE OR UNIVERSITY OR MINORITY RESEARCH INSTITUTION EITHER IN A PRIME CONTRACTING ROLE, OR IN A JOINT RELATIONSHIP WITH A NON-MINORITY HIGHER EDUCATION INSTITUTION. A LIST OF HBCUS WITH REQUIRED EXPERTISE HAS BEEN GIVEN TO VERMILLION.

8. AID/W WISHES TO COMMEND JIM VERMILLION FOR OUTSTANDING PERFORMANCE IN COMPLETING THOROUGH AND HIGH QUALITY PP UNDER CONSIDERABLE TIME PRESSURE AND WITHOUT BENEFIT OR SUPPORT FROM MISSION STAFF AND DOCUMENTATION AVAILABLE IN TUNISIA. SHULTZ

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SUBJECT: PROJECT 664-0334, COMPUTER TECHNOLOGY

CONGRESSIONAL NOTIFICATION FOR SUBJECT PROJECT IN THE  
AMOUNT OF DOLS 3,500,000 ESP GRANT, EXPIRED WITHOUT  
DEFLECTION AND OBLIGATION CAN BE INCURRED SEPTEMBER 18,  
1985. SHULTZ

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UNCLASSIFIED STATE 286712

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Project Review Committee

James E. Vermillion, USAID/Tunis, Chairman  
Harold Freeman, ANE/TR/HD  
John Daley, SCI  
Gary Theisen, S&T/ED  
Charles Shorter, ANE/PD  
Joe Carroll, ANE/PD  
Don Harrison, ANE/DP  
Sidney Passman, Contractor  
Emily Leonard, USAID/Tunis  
Louis Macary, USAID/Tunis  
Mark Karns, USAID/Tunis  
Mohamed Abassi, USAID/Tunis  
Steve Narkin, ANE/GC  
Anne Williams, RLA

Senior Review Committee

James R. Phippard, Mission Director  
Robert Bell, DAA/ANE  
Gerry Kamens, ANE/MENA  
Barry Sidman, ANE/DP

No. 0407H

PROJECT AUTHORIZATION

Name of Country: Tunisia

Name of Project: Computer Technology

Number of Project: 664-0334

1. Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Computer Technology Project for Tunisia (the "Cooperating Country") involving planned obligations of not to exceed dols. 3,500,000 in grant funds over a one year period from date of authorization subject to the availability of funds in accordance with A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project. The planned life of the project is three years and six months from the date of initial obligation.
2. The project consists of the provision of technical assistance, training and commodities to enable the cooperating country to institutionalize its critical capacity to evaluate, plan, design, modify and implement microcomputer applications, primarily through public education and research, in a contextually appropriate manner.
3. The project agreement(s) which may be negotiated and executed by the officer(s) to whom such authority is delegated in accordance with A.I.D. regulations and delegations of authority shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

(A) Source and origin of commodities, nationality of services

- Commodities financed by A.I.D. under the project shall have their source and origin in the cooperating country or in the United States except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the cooperating country or the United States as their place of nationality except as A.I.D. may otherwise agree in writing.
- Ocean shipping financed by A.I.D. under the project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

(B) Conditions Precedent. The Project Agreement shall have Conditions Precedent in substance as follows:

(1) Prior to disbursement, or the issuance of any commitment documents pursuant to which disbursement will be made, the cooperating country shall submit to A.I.D., in form and substance satisfactory to A.I.D., documentation showing that the pilot projects meet the criteria set forth in the amplified project agreement.

(2) Prior to disbursement, or the issuance of any commitment documents pursuant to which disbursement will be made, for any computer hardware, the cooperating country shall submit to A.I.D., in form and substance satisfactory to A.I.D. a maintenance plan for such hardware.

(3) Prior to disbursement, or to the issuance of any commitment documents pursuant to which disbursement will be made, for research, the cooperating country shall submit to A.I.D., in form and substance satisfactory to A.I.D., evidence that the research will be at least half funded by funds other than those provided by A.I.D. under this Grant.

(4) Prior to disbursement, or the issuance of commitment documents pursuant to which disbursement will be made, for training, the cooperating country shall submit to A.I.D., in form and substance satisfactory to A.I.D. a training plan which shows the individuals to be trained, the training program to take place and the dates and cost of that training. This training plan may be submitted and the training funded on an annual basis.

(5) Prior to disbursement, or to the issuance of any commitment documents pursuant to which disbursement will be made, after November 30, 1986, the cooperating country shall submit to A.I.D. a plan, in form and substance satisfactory to A.I.D., defining the process for assigning to IRSIT individuals returning to Tunisia from long-term training in the U.S. under the Technology Transfer Project (664-0315).

(C) Covenants. The Project Agreement shall have covenants in substance as follows:

(1) All pilot projects shall meet the criteria set out in Annex I to the Project Agreement.

(2) The Ministry of Education will establish a plan for the extended utilization of microcomputers in the education system involving: evaluation mechanisms for satisfying pedagogical and curricular requirements; development and selection of necessary courseware and maintenance of a data base of applications; acquisition of appropriate hardware and peripherals; and, further training of teachers.

(3) The Ministry of Higher Education and Scientific Research will establish a plan for the extended utilization of microcomputers

in higher education involving: evaluation mechanisms for selecting appropriate applications to the higher education curricula (e.g. CAD, CAM, simulation, statistical analysis, data base access); further training of instructional personnel; development and selection of necessary courseware and maintenance of data banks; and acquisition of hardware and peripherals.

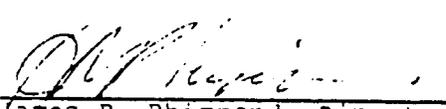
(4) The cooperating country will take the actions necessary to organize a concerted attack on priority research and will begin to devote the necessary resources to the successful development of IRSIT as the capping institution in harmony with the other elements of the research infrastructure.

(5) The cooperating country will implement the necessary high level coordinating mechanisms to see that these various institutional efforts work together in a complementary fashion, and that they respond to national needs and priorities.

(6) The cooperating country shall develop a detailed plan, spelling out the role of IRSIT and its relationship with other Tunisian institutions, mechanisms for funding, governance, definitions of its relationship with industry and the private sector, release time for scientists from the public sector and training plans in conjunction with technical assistance under the project which will be completed by the third year of the project.

(7) The cooperating country agrees to provide the following management support for the project: a project manager who will have authority to sign on behalf of the cooperating country and who will manage all activities under the project and work toward implementation of project activities on behalf of the cooperating country; and management support for the project at IRSIT, including an administrative assistant and budget and financial supporting personnel.

Signature

  
James R. Phippard, Director  
USAID/Tunis

Date:

9. 26. 85