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M E M O R A N D U M

To: Dr. Alfred J. Ravelli, HRO

From: Homero F. de Oliveira *Homero F. de Oliveira*
Communications Media Specialist, HRO

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Subject: Instituto de Pesquisas Espaciais (INPE), ex-CNAE

Upon invitation of their General Director, Dr. Fernando de Mendonça, I visited the Instituto de Pesquisas Espaciais (INPE), in order to gain knowledge which will be helpful to USAID in evaluating this program and coordinating activities in related fields.

As a result of this visit, and some prior knowledge, the following account of operations and plans is given:-

a) - Background Information:

The Organization Group for the development of the National Commission for Space Activities (CNAE) was created as a branch of the National Research Council by Presidential Decree, on August 3, 1961, and was based on a report of a Committee of the National Research Council (CNPq). Decree 61,532, of April 22, 1971 transformed CNAE into the Instituto de Pesquisas Espaciais (INPE).

The plans developed for INPE until 1973 project a growth of activities compatible with the country's financial resources, and to be based on realistic studies of industrial output and the capability of Brazilian scientists and technicians. These plans aim at training initially a group of two hundred Brazilian Ph.Ds and M.Sc.s in science and, simultaneously, developing projects of pure and applied science which should present, within a reasonable period, solutions for the Brazilian problems of communications as applied to education, meteorology, natural resources survey, transference of technology and scientific administration.

b) - SACI Project (Advanced System of Inter-Disciplinary Communications)

This project, extensively described in previous reports, aims at the solution of the evergrowing problem of education, in its broad sense, through the integrated use of a geo-stationary satellite system with surface redistribution systems.

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An inter-disciplinary team of forty-five specialists is presently preparing TV and radio programs, programmed instruction material and proficiency tests for a teacher training course aimed at lay teachers, scheduled for the period March-August 1972. Different strategies are being adopted for each of the disciplines: mathematics, language, science, social studies and principles of pedagogy, by means of integrated use of these educational media, for future cost/effective analysis. The course will be delivered to 500 selected schools in the State of Rio Grande do Norte, most of them located in the area of activities of SAR (Serviço de Assistência Rural) and CRUTAC (Rural Center for Training and Social Action of the Rio Grande do Norte University). Different alternatives will be adopted by using TV and/or radio associated with programmed instruction and proficiency tests. Feedback will be obtained daily from the students and programmed in the computer. The results obtained from the different methodologies used in the 500 schools will be compared with each other, as well as with the results obtained from a control group of 100 schools, based on conventional patterns of instruction. This teacher training program will reach 2,000 to 3,000 teachers and will be followed, in 1973, by a second phase, at a more advanced level.

The computer system in Natal is in operation providing services to the Federal University and to State and Municipal Governments. The RTV station is practically finished and will be operational for the course. Three radio stations are available and will be used for the radio aspects.

The courses for the students are scheduled to start in 1973, although it is expected that already in 1972 many of the teachers will allow their classes to follow some of the programs which had been offered to them the previous day.

The planning and implementation of SAGI is the responsibility of INPE, but in several instances will be executed by means of agreements with Fundação Centro Brasileiro de Televisão Educativa, Fundação Padre Landell de Moura, School of Economic Sciences of Rio Grande do Norte, Serviço de Assistência Rural, Secretariat of Education, State Government, Federal University of Rio Grande do Norte and Secretariat of Science and Technology of Guanabara. Other agencies will also contribute, such as:

INEP (National Institute of Educational Research/MEC), PAMP (Teacher Training and Upgrading Program/MEC), Educational Radio Service of MEC and CRUTAC.

c) - Economically Feasible Communities

As a result of social and economic studies, already carried out in different areas of Rio Grande do Norte for establishing the groundwork

of the SAGI Project, it became evident that the single effort to provide school education would not bring about the social and economic benefits desired. On the contrary, a migratory flow would drain the scarce potential manpower, which would go after new opportunities in more developed areas. Therefore, as a parallel but complementary effort, INPE prepared plans based on Israel and Sudan experiments for the development of economically feasible communities. This project aims at the development of agro-industrial complex on a modular basis consisting of 200 families. Such communities would be developed on an integrated basis in such a way that after three years they would become self-manageable.

Entities and programs involved in this project will be: SAGI; INCRA (National Institute of Colonization and Agrarian Reform); SUDENE (Superintendency for the Development of the Northeast); CRUTAC; Federal University of Rio Grande do Norte; Secretariats of Agriculture, Education and Health; INPS (National Institute of Social Security); ANCAR (Northeastern Association of Rural Credit and Assistance), banks among other institutions.

A project proposal for technical support was submitted to the Inter-American Social Development Institute.

d) - System Analysis

INPE is providing technical assistance in this area to the municipalities of the Vale do Paraiba Consortium, as well as to some governmental agencies. Recently a one-week full-time course was delivered to 25 Ministry of Education (MEC) technicians in charge of planning, control and evaluation of MEC priority projects. As part of this effort, follow-up on-the-job will be provided.

The curriculum for a post-graduate course on system analysis is being proposed and will be offered by INPE, in compliance with the governmental program for the preparation of a support group in the area of planning for government and private institutions.

e) - Educational Technologies

The group of INPE specialists, which returned recently from a 10-week program on educational technologies at FSU, has developed a course for individualized instruction on the subject, based on their experience in the U.S. This course will be provided to MEC specialists and the participants will conduct their studies at their individual locations.

f) - Analysis and Computer Center

To provide the project research groups with fast and modern data processing, INPE created an Analysis and Computer Center in early 1965.

The first computer used was an IBM 650 which, however, with the expansion of studies proved to lack capacity to cope with the project necessities. For this reason, in February 1968, INPE purchased and installed a Burroughs 3500 computer with a nucleus magnetic memory which now includes 280,000 digits. Several additions have been made to the unit, including an auxiliary memory (magnetic disc), with capacity for 30 million characters, a tape reader with reading velocity of 500 to 1000 characters per second, magnetic tape units (9 tapes for 9 channels) and program plotter.

A hybrid computer, EAI-648, and a digital computer HP 2116-B have also been recently installed to increase the system flexibility. A new B-6700 computer will also be installed within the next few months.

The areas in which this group is working are operations research, optimal control, systems engineering, simulation theory, decision analysis, applied mathematical economics and human resources with emphasis on education and natural resources.

Application is aimed at the following systems:

Industrial - Organization of the activities of a complex system in production, distribution, choice of research strategy, sales, expansion of facilities, etc.

Public - National and local problems. For example: transport problems, electricity and water resources, communications, justice, crime prevention, medical service systems, and public administration systems.

Development- Problems in local, regional and national development. Development in infra-structure and super-structure. Problems of transfer of technologies.

Human Resources - Problems in man-machine systems, communications, planning in educational systems, development of human resources.

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g) - Remote Sensors - Up to now, INPE has been developing and organizing its Remote Sensors Unit and is now going into the execution of projects with Brazilian entities. One of these tasks will be a social and economic study of the Grande São Paulo area.

INPE is in the process of becoming a Training and Research Center of Remote Sensors for all developing countries, under a project sponsored by the United Nations.

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