

PROJECT AGREEMENT

BETWEEN THE DEPARTMENT OF STATE, AGENCY FOR INTERNATIONAL DEVELOPMENT (AID), AN AGENCY OF THE GOVERNMENT OF THE UNITED STATES OF AMERICA, AND THE NATIONAL COORDINATING BOARD FOR SURVEY AND MAPPING (BAKOSURTANAL), AN AGENCY OF THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

13/0

Page 1

Under the terms of Economic Cooperation Agreement signed October 16, 1950, as amended, and the agreements and provisions noted below, it is agreed to carry out a project in accordance with the terms set forth herein.

- Agreement (Specify)
Standard Provisions Annex Other (Specify)

1. Project No. 93L-11-995-902-72-312916
2. Agreement No. FY 1972 - 15
3. Original or Revision No.

4. Project/Activity Title Application of Remote Sensing
5. Project Descrip. (Annex A)

6. Appropriation 72-1121004
7. Allotment 254-31-099-00-20-21

Table with columns: BID DOLLAR FINANCING (Cost Component), PREVIOUS TOTAL (A), INCREASE (B), DECREASE (C), TOTAL TO DATE (D). Rows include PERSONNEL COSTS, LOCAL AND TCM, PARTICIPANTS, COMMODITIES, OTHER COSTS, and TOTAL (ALL COSTS).

10. REFERENCES AND REMARKS USAID authorized to sign this Agreement for AID/AA/TA by State 100669 dated June 8, 1972, Implementing documents will be issued by August 31, 1972. This represents a waiver pursuant to AID M.O. 712.4, Section III, Part A, Para 3.a.

11. DATE OF ORIGINAL AGREEMENT June 29, 1972
12. DATE OF THIS REVISION
13. ESTIMATED FINAL CONTRIBUTION DATE June 30, 1972

14. FOR THE COOPERATING GOVERNMENT OR AGENCY: Ir. Pranoto Asmoro (Brig. Gen.)
15. FOR THE AGENCY FOR INTERNATIONAL DEVELOPMENT: Richard M. Cashin
SIGNATURES and TITLES with dates.

**PROJECT AGREEMENT  
BETWEEN AID AND  
BAKOSURTANAL**

**AN AGENCY OF THE GOVERNMENT OF  
The Republic of Indonesia**

1. Project/Activity No. **312916**  
**931-11-995-902-72-**

PAGE 2 OF 4 PAGES

2. Agreement No.  
**FY 1972 - 15**

3.  Original or  
Revision No. \_\_\_\_\_

3. Project/Activity Title

**Application of Remote Sensing**

**I. Project Purpose and Objectives**

The purpose of this joint project is to conduct in Indonesia a demonstration of relatively low-cost remote sensing techniques from conventional aircraft for natural resources inventory and assessment. The conduct of this demonstration is intended to (a) establish a beginning institutional capability in Indonesia to plan, execute, and interpret multispectral photographic surveys, (b) introduce the potential benefits of such techniques in providing data for priority natural resource development programs to the GOI Departments and agencies concerned, and (c) through publication of demonstration results, provide other interested developing countries which are short on trained manpower, facilities, and investment capital an appreciation of the usefulness, costs, and requirements of such techniques.

As an ancillary benefit, it is expected that this project will complement the approved 1972/73 ERTS-A experiment designed by the GOI for the island of Bali by providing intermediate (aircraft altitude) ground truth for the spacecraft imagery, thus facilitating interpretation of that imagery and generation of new earth resource information for Indonesia. Data from this remote sensing project is also expected to contribute in the future to a comprehensive integrated survey of Bali being planned by the GOI with UNESCO assistance.

**II. Project Description**

In outline, this experimental 18-month project consists of:

A. Joint identification and selection by Indonesian and U. S. specialists of those remote sensing applications with highest potential developmental payoff for Indonesia in the near term, such as agriculture, forestry, geology, hydrology, fisheries, or others.

B. Joint selection of one or more test areas of appropriate size for specific studies related to earth resource applications selected above.

For the Cooperating Government or Agency

For the Agency for International Development

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

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TITLE: \_\_\_\_\_

TITLE: \_\_\_\_\_

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AN AGENCY OF THE GOVERNMENT OF  
The Republic of Indonesia

1. Project/Activity No. 312916  
931-11-995-902-72-

PAGE 3 OF 4 PAGES

2. Agreement No.  
FY 1972 - 15

3.  Original or  
Revision No. \_\_\_\_\_

3. Project/Activity Title

Application of Remote Sensing

C. Outfitting and testing of multispectral camera equipment on an Indonesian aircraft.

D. Flights over the test area(s) by Indonesian aircraft and conduct of related ground truth surveys as necessary for the particular applications being tested.

E. Interpretation and analysis of the photography by Indonesian specialists.

F. Publication and dissemination of the results of the demonstration by the GOI.

The Work Plan attached to this Project Agreement provides an estimated schedule for the above operations and technical detail for one test site on Bali, (including Bali Strait). Applications selected for this site include Forestry, Agriculture, Soils, Geology, Marine Biology and Fisheries, and Geography including land use. Additional test sites and applications may be jointly selected during project implementation if additional GOI budgetary resources are made available.

III. U. S. Contribution

A. The U. S. will provide expert advisory services for the project through the U. S. Geological Survey (USGS). A team leader will be designated to coordinate advisory services with the BAKOSURTANAL Project Manager. In the team leader's absence from Indonesia continued project monitoring and coordination of the U. S. inputs will be performed by the USGS team already resident in Bandung, which is advising the Indonesian Geological Survey (GSI) under another A. I. D. -assisted project. In addition, approximately eleven man-months of short-term expert services will be provided in Indonesia through USGS to assist in installation and testing of equipment, and in detailed planning, in-country training, and interpretation and analysis for the specific earth resource applications selected. (\$59,000)

B. The U. S. will provide the following equipment and materials through USGS:  
- Mark I multispectral camera with accessories  
- Addcol viewer  
- Kodak 2424 aerographic infrared film, duplicating film for diapositives, and film processing. (\$38,000)

For the Cooperating Government or Agency

For the Agency for International Development

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

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AID 1330-1A (2-70)  <b>PROAG</b> CONTINUATION SHEET  ANNEX _____	<b>PROJECT AGREEMENT          BETWEEN AID AND          BAKOSURTANAL</b>	1. Project/Activity No. <b>312916</b> <b>931-11-995-902-72-</b>	PAGE <b>4</b> OF <b>14</b> PAGES
		2. Agreement No. <b>FY 1972 - 15</b>	3. <input checked="" type="checkbox"/> Original or Revision No. _____
	AN AGENCY OF THE GOVERNMENT OF <b>The Republic of Indonesia</b>	3. Project/Activity Title <b>Application of Remote Sensing</b>	

C. Subject to availability of funds, the identification of qualified candidates, and the commitment of the candidates' GOI Department or agency to further significant applications of remote sensing for natural resources development, USAID will consider providing future training opportunities for such candidates in the U. S. or third countries at academic institutions and/or U. S. Government facilities. Funding of such out-of-country training is not provided under this Project Agreement

the

Following the completion of this demonstration project, it is/intention of both parties to this Agreement that the GOI will continue to utilize the above equipment for purposes related to Indonesia's earth resources development.

#### IV. GOI Contribution

A. BAKOSURTANAL will designate and provide management and technical leadership for the overall planning and implementation of this project, and will coordinate the participation of other GOI departments and agencies in the specific resource applications selected.

B. BAKOSURTANAL will provide and cover all costs of aircraft flights for this project.

C. Ground truth surveys and data analyses will be conducted by participating GOI Departments and agencies, as arranged and coordinated by BAKOSURTANAL.

D. Necessary office, laboratory and classroom space and supplies will be provided or arranged for by BAKOSURTANAL for USGS and GOI participants in this project.

E. BAKOSURTANAL will provide for photography of data from the Addcol viewing screen and its processing.

F. Local transportation and in-country travel of USGS technicians will be provided by BAKOSURTANAL.

For the Cooperating Government or Agency  SIGNATURE: _____ DATE: _____ TITLE: _____	For the Agency for International Development  SIGNATURE: _____ DATE: _____ TITLE: _____
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PROJECT AGREEMENT  
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BAKOSURTANAL

AN AGENCY OF THE GOVERNMENT OF  
The Republic of Indonesia

1. Project/Activity No.  
931-11-995-902-72\_312916 PAGES 5 OF 14 PAGES

2. Agreement No.  
FY 1972 - 15

3.  Original or  
Revision No. \_\_\_\_\_

3. Project/Activity Title  
Application of Remote Sensing

A budget for GOI rupiah costs of this project is included in the attached Work Plan. BAKOSURTANAL expects to provide an estimated amount of Rp. 12,000,000 in the 1972/73 GOI fiscal year under this budget, and will request Rp. 27,000,000 for this project in the 1973/74 fiscal year. Both parties to this Agreement understand that if the required GOI rupiah funds are not made available, the project may be terminated in accordance with the attached Standard Provisions.

V. Reports

A. Since one of the objectives of this project is to extend an appreciation of the uses of remote sensing within the GOI and in other countries, BAKOSURTANOL agrees to prepare a comprehensive final report, with USGS assistance as requested, covering project methodology and planning, execution, and analysis. The report should be sufficiently complete to facilitate the transfer of the methodology to another developing country. At least 200 copies in total of the final report will be prepared by the GOI in the Indonesian and English languages for dissemination within Indonesia and to interested developing countries, international and regional organizations. Ten English copies will be provided to A. I. D.

B. The USGS will also prepare a final report, giving its assessment of the demonstration project, recommendations for future steps in the development of remote sensing applications in Indonesia, and suggestions for the transfer of the methodology to other countries. Ten copies will be provided to BAKOSURTANOL.

For the Cooperating Government or Agency

For the Agency for International Development

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

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TITLE: \_\_\_\_\_

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PROAG  
CONTINUATION  
SHEET

ANNEX \_\_\_\_\_

**PROJECT AGREEMENT  
BETWEEN AID AND  
BAKOSURTANAL**

AN AGENCY OF THE GOVERNMENT OF  
The Republic of Indonesia

1. Project/Activity No.  
931-11-995-902-72\_312916

PAGE 6 OF 14 PAGES

2. Agreement No.  
FY 1972 - 15

3.  Original or  
Revision No. \_\_\_\_\_

3. Project/Activity Title

Applications of Remote Sensing  
(Work Plan)

WORK PLAN

I. TIME PHASING

Phase 1 (July through August 1972)

A. Designation in writing of BAKOSURTANAL Project Manager and principal investigators from participating GOI agencies.

B. Formulation of joint BAKOSURTANAL/USGS training plan and schedule with designation of approximately 20 trainees for in-country training.

C. Arrangements for purchase of camera and viewing systems made through the USGS.

D. Remote sensing specialists engaged to provide training in techniques for specific disciplines and to assist in experiment design.

E. USGS to provide specifications for modification of aircraft for I<sup>2</sup>S camera and mount.

Phase 2 (September through November 1972)

A. Training of Indonesian scientists in theory and applications of multispectral aerial photography and other remote sensing techniques of value for their specific disciplines.

B. After sufficient training the investigators proceed to design their experiments with the assistance of their instructors.

C. Modification of GOI aircraft to be used in the survey flight to accommodate camera.

D. USGS to order film for survey flights and duplication for diapositives, and to arrange for processing.

For the Cooperating Government or Agency

For the Agency for International Development

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

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TITLE: \_\_\_\_\_

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AID 1050-1A (2-55)  <b>PROAG</b> CONTINUATION SHEET  ANNEX	PROJECT AGREEMENT BETWEEN AID AND <b>BAKOSURTANAL</b>	1. Project/Activity No. <b>312916</b> <b>931-11-995-902-72 -</b>	PAGE <u>7</u> OF <u>14</u> PAGES
	AN AGENCY OF THE GOVERNMENT OF <b>The Republic of Indonesia</b>	2. Agreement No. <b>FY 1972 - 15</b>	3. <input checked="" type="checkbox"/> Original or Revision No. _____
		3. Project/Activity Title <b>Application of Remote Sensing          (Work Plan)</b>	

Phase 3 (December 1972 through February 1973)

- A. Acquisition, installation and in-flight testing of multispectral camera with assistance of instrumentation specialist provided by USGS.
- B. Collection and preparation of equipment for ground control studies by GOI.

Phase 4 (February through May 1973)

- A. Testing of ground control methods and equipment by GOI.

Phase 5 (June to July 1973)

- A. Remote sensing mission flights over Bali area for acquisition of multispectral photography.
- B. Coincident collection of ground control data.
- C. Film and ground control data processing and reduction.

Phase 6 (August through October 1973)

Interpretation of data with the assistance of remote sensing specialists provided by USGS.

Phase 7 (November 1973)

- A. Wet season flights over Bali area.
- B. Coincident collection of ground control data.
- C. Film and ground control data processing and reduction.

Phase 8 (December 1973 or later as time requires)

Completion of final reports by GOI and USGS participants

For the Cooperating Government or Agency

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SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_  
 TITLE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_  
 TITLE: \_\_\_\_\_

<b>PROJECT AGREEMENT BETWEEN AID AND BAKOSURTANAL</b>	1. Project/Activity No. <b>312916</b>	PAGE <u>8</u> OF <u>4</u> PAGES
	2. Agreement No. <b>931-11-995-902-72 - FY 1972 - 15</b>	
	3. Project/Activity Title <b>(Work Plan) Application of Remote Sensing</b>	
AN AGENCY OF THE GOVERNMENT OF <b>The Republic of Indonesia</b>		

**II. DESCRIPTION OF BALI TEST SITES**

The Bali test sites consist of three areas which cover about 20 percent of the island (see attached map). One area on the eastern side of the island is 2050 square kilometers and includes Gunung Agung volcano whose slopes were recently devastated by an eruption and by post-eruption mud flows. The volcano has provided fresh volcanic flows and ash deposits for geologic study. Limestone terrain is available for study on the southern peninsula of the island, as are reefs and terraces along the southeastern coast. This site also includes a large agriculture area on the south and would provide a hydrological and pedological comparison of the wet southern slope with the rain shadow area of the northern slope. Demographic data is available throughout the area of coverage.

A second area of 2800 square kilometers includes the western end of the island, Bali Strait, and the southeasternmost tip of Java. Western Bali would provide heavy vegetation for forestry studies and older volcanic rocks for the geologist. The adjoining strait with its rich biota and fishing is of interest to the marine biologist and fisheries scientists.

A third area of about 200 square kilometers consists of a portion of the bay between southernmost Bali and eastern Java. It will be used by marine fisheries to study a problem existing in the area.

For the Cooperating Government or Agency	For the Agency for International Development
SIGNATURE: _____ DATE: _____	SIGNATURE: _____ DATE: _____
TITLE: _____	TITLE: _____

**PROAG**  
**INTRODUCTION**  
**SHEET**

ANNEX \_\_\_\_\_

**PROJECT AGREEMENT**  
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**BAKOSURTANAL**

**AN AGENCY OF THE GOVERNMENT OF**  
**The Republic of Indonesia**

1. Project/Activity No. **312916**  
**931-11-995-902-72**

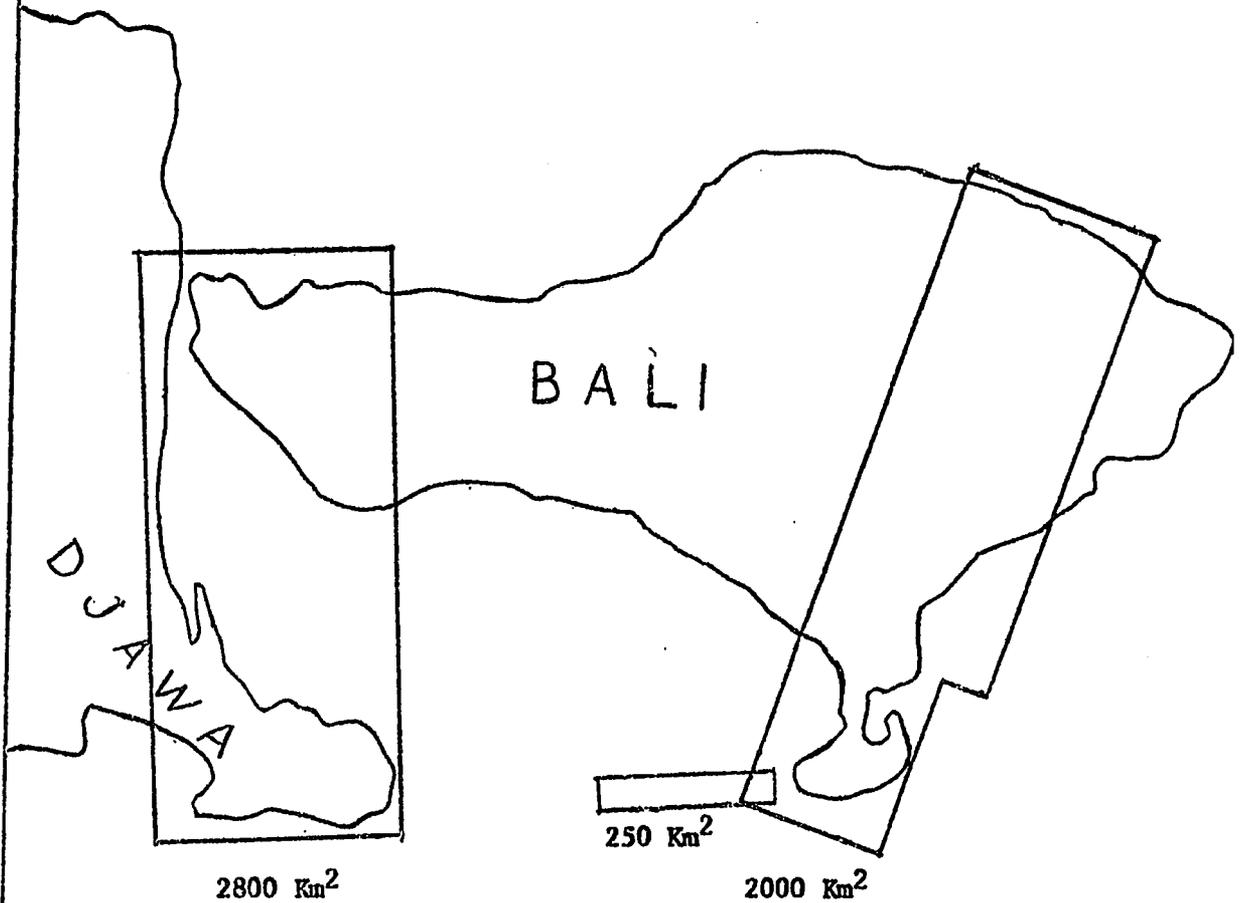
PAGE **9** OF **14** PAGES

2. Agreement No.  
**FY 1972 -15**

3.  Original or  
Revision No. \_\_\_\_\_

3. Project/Activity Title  
**(Work Plan)**  
**Application of Remote Sensing**

**BALI TEST SITES**



**TECHNICAL SPECIFICATIONS:**

**Aircraft : Aero Commander**  
**Speed : 150 mph**  
**Focal length : 100 mm.**  
**Flight height : 4000 m.**

**Scale of photography : 1:40,000**  
**Overlap : 5%**  
**Side lap : 15%**  
**Cloud coverage : max. 5%**

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SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

AID 1820-1A (12-65)  <b>PROAG</b> CONTINUATION SHEET  ANNEX _____	<b>PROJECT AGREEMENT          BETWEEN AID AND          BAKOSURTANAL</b>	1. Project/Activity No. <b>312916</b> <b>931-11-995-902-72 -</b>	PAGE <u>10014</u> PAGES
		2. Agreement No. <b>FY 1972 - 15</b>	3. <input checked="" type="checkbox"/> Original or Revision No. _____
	AN AGENCY OF THE GOVERNMENT OF <b>The Republic of Indonesia</b>	3. Project/Activity Title <b>(Work Plan)</b> <b>Application of Remote Sensing</b>	

### III. U. S. DOLLAR BUDGET

#### A. U. S. Advisory Services \*

<u>Position</u>	<u>Salary &amp; Allowances</u>	<u>Man Weeks</u>	<u>Int'l Travel</u>	<u>Total</u>
Rem. Sensing Spec. & Proj. Manager (intermittent during term of project)	\$ 8,096	14	\$ 7,020	\$ 15,645
Rem. Sensing Spec. (Sept. -Oct. 1972 & Aug. 1973)	8,096	14	6,020	14,016
Rem. Sensing Spec. (Sept. -Oct. 1972 & Aug. 1973)	8,096	14	6,020	14,016
Instrumentation Spec. (January 1973)	3,038	4	2,990	<u>6,028</u>
			Subtotal	\$ 49,705
			Overhead 18.7%	9,295
			Subtotal Advisory Services	<u>\$ 59,000</u>

\* Distribution of amounts for specialists is tentative and subject to further adjustment in PIO/T.

For the Cooperating Government or Agency  SIGNATURE: _____ DATE: _____ TITLE: _____	For the Agency for International Development  SIGNATURE: _____ DATE: _____ TITLE: _____
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PROJECT AGREEMENT  
BETWEEN AID AND  
BAKOSURTANAL

AN AGENCY OF THE GOVERNMENT OF  
The Republic of Indonesia

1. Project/Activity No. 312916

931-11-995-902-72 -

PAGE 1 OF 4 PAGES

2. Agreement No.

FY 1972 - 15

3.  Original or  
Revision No. \_\_\_\_\_

3. Project/Activity Title

(Work Plan)

Application of Remote Sensing

B. Equipment and Supplies

Quantity	Description	Model	Price
1	I <sup>2</sup> S multispectral camera system with 100 mm. lens and accessories	0050-02	\$ 6,270.00
1	I <sup>2</sup> S/Mini-Addcol viewer with input capability option to accept both 70 mm. cut film and 9-1/2 roll film 2.6x magnification	6040	8,826.45
1	I <sup>2</sup> S Print frame head (8"x10" holder) and print frame console	6005	2,500.40
Open	Kodak 2424 black and white infrared film, duplicating film for diapositives, developing and printing		16,403.15
	Air freight charges for equipment and film		<u>4,000.00</u>
	Subtotal equipment and supplies		\$38,000.00
	GRAND TOTAL		\$97,000.00

For the Cooperating Government or Agency

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_  
TITLE: \_\_\_\_\_

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SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_  
TITLE: \_\_\_\_\_

**PROJECT AGREEMENT  
BETWEEN AID AND  
BAKOSURTANAL**

AN AGENCY OF THE GOVERNMENT OF  
The Republic of Indonesia

1. Project/Activity No.  
**931-11-995-902-72-312916** PAGE 12 OF 14 PAGES

2. Agreement No.  
**FY 1972 - 15** 3.  Original or  
Revision No. \_\_\_\_\_

3. Project/Activity Title  
**(Work Plan)  
Application of Remote Sensing**

**IV. GOI BUDGET ESTIMATE (\$1.00 = Rp. 415)**

**GOI Fiscal Year 1972/1973**

1. Provision of training and laboratory facilities	Rp. 2,300,000
2. Training: Per diem 20 trainees, 2 months each	6,000,000
3. Installation and In-flight testing of camera	200,000
4. Transportation	2,400,000
5. Office personnel and drivers	288,000
6. Administration cost	600,000
<b>Total</b>	<b>11,788,000</b>

**GOI Fiscal Year 1973/1974**

1. Photo-flight	5,000,000
2. Field work (ground control)	11,141,000
3. Laboratory work (data reduction, interpretation, etc.)	2,540,000
4. Reporting and reproduction	2,670,000
5. Transportation	4,075,000
6. Personnel and drivers	576,000
7. Administration cost	1,200,000
<b>Total</b>	<b>27,202,000</b>

**Total budget**

Fiscal year 1972/1973	Rp. 11,788,000
Fiscal year 1973/1974	27,202,000
<b>Total</b>	<b>38,990,000</b>

For the Cooperating Government or Agency	For the Agency for International Development
SIGNATURE: _____ DATE: _____	SIGNATURE: _____ DATE: _____
TITLE: _____	TITLE: _____

PROJECT AGREEMENT  
BETWEEN AID AND  
**BAKOSURTANAL**AN AGENCY OF THE GOVERNMENT OF  
The Republic of Indonesia1. Project/Activity No. **312916**  
**931-11-995-902-72-**PAGE 3 OF 14 PAGES2. Agreement No.  
**FY 1972 - 15**3.  Original or  
Revision No. \_\_\_\_\_3. Project/Activity Title.  
**(Work Plan)**  
**Application of Remote Sensing****V. PRELIMINARY LIST OF PRINCIPAL INDONESIAN INVESTIGATORS**

<u>Name</u>	<u>Department/Agency</u>	<u>Subject</u>
Prof. Kardono Darmojuwono	BAKOSURTANAL	GOI Project Manager
Djoko Prawoto, BSc	Marine Research Institute (LPL)	Oceanography
Ir. Budi Salyo	Marine Fishery Research Institute (LPPL)	Fishery
Ir. I. Suradji	Directorate of Forest Planning (DITPERAN)	Forest land use and species identification
Drs. Suroto	Soil Research Institute (LPT)	Soil mapping
Drs. Soetarto	National Coordinating Board for Surveys & Mapping (BAKOSURTANAL)	Geography and land use
Ir. Edy Mitojat	Faculty of Agriculture UGM	Pest control
Drs. Soeroso	Department of Public Works and Power	Watershed study, rural and urban development, road survey and coastal geomorphology
Ir. Adjat Sudradjat MSc	Directorate of Geology	Geological interpretation

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For the Agency for International Development

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

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TITLE: \_\_\_\_\_

TITLE: \_\_\_\_\_

Natural Resources

Project No. 095-002  
 Title Remote Sensing  
 Contract/PASA No.            Name USGS/ERIM  
 (IC) 2-72  
 Project Manager John Fry Extension 20545  
 Contract/PASA Officer            Extension           

TAB - GENERAL TECHNICAL SERVICES

FY 1975 Interegional Program Budget Review  
 Project and Budget Analysis Matrix

Major Country/Countries  
Indonesia/Afghanistan/Sahelian  
countries/other selected LDCs

ATTACHMENT 4

Obligation: Begin FY 1971 End FY 1971  
 Work Begin FY 1971 End FY 1975  
 PROP Status: PROP approved thru FY 1973  
New/Revised Required in FY 1975

Estimated Submission Date June 1975  
 Month Year  
 Evaluation Schedule June 1974  
 Month Year Type

Narrative	Objectively Verifiable Indicators	Important Assumptions and Progress to date																																																																																															
<p><b>B1 PURPOSE:</b>                      To identify institutional, manpower, training and equipment requirements in applying remote sensing to development problems. To assess the usefulness of remote sensing to agricultural, hydrological, and mineral resource development in selected developing nations.                      To broaden understanding of remote sensing technology and use of its products in generating new information through regional and U.S. training programs.</p>	<p><b>B2 End of Project Status:</b>                      1. Knowledge of methodology for applications of aircraft and satellite imagery to resource development, including principal institutional, technological, facility and manpower constraints in developing countries.                      2. Basis for making investment decisions concerning techniques for acquiring natural resource data.                      3. Methodology and course content for remote sensing applications training programs.</p>	<p><b>B3 Assumptions for Achieving Purpose:</b>                      Remote sensing imagery can provide cost effective information needed for economic development particularly in fields of agriculture, hydrology, natural resource development, and land use planning.  <b>B4 Progress to date:</b>                      1. 7 LDCs assisted in formulating ERTS proposals.                      2. About 90 participants familiarized with remote sensing in regional seminars and 1 U.S. training course.</p>																																																																																															
<p><b>C1 OUTPUTS:</b>                      1. Established methodology for implementing low cost aircraft multispectral surveys in LDCs.                      2. Broader understanding within LDCs of advantages and limitations of remote sensing for technological choice of applications to development and strengthened institutional capabilities for this purpose.                      3. Cost benefit assessment of usefulness of ERTS imagery for development purposes.</p>	<p><b>C2 Output Indicators:</b>                      1. Application of methodologies and techniques by selected LDCs.                      2. Interest of other countries in remote sensing pilot efforts.                      3. Improvements in resource development in selected LDCs resulting from pilot efforts.</p>	<p><b>C3 Assumption for Achieving Outputs:</b>                      LDC capabilities can be advanced to exploit the information in regard to decisions on economic development.  <b>C4 Progress to date:</b>                      1. 18 month demonstration project activated in Indonesia.                      2. Cost benefit assessment to begin June 1975.</p>																																																																																															
<p><b>D1 INPUTS:</b>                      1. Technical information and consultation provided by U.S. experts.                      2. Regional and U.S. training activities.                      3. Contributions by collaborating institutions in LDCs (Mali, Indonesia, Afghanistan, etc.).                      4. Use of specialized equipment for data interpretation.</p>	<p><b>D2 Budget Summary (in thousands of dollars)</b></p> <table border="1"> <thead> <tr> <th rowspan="2">All Prior Years</th> <th colspan="2">(1)</th> <th colspan="2">(2)</th> <th rowspan="2">(3)</th> <th rowspan="2">(4)</th> <th rowspan="2">(5)</th> <th rowspan="2">(6)</th> <th rowspan="2">(7)</th> <th rowspan="2">(8)**</th> <th rowspan="2">(9)</th> <th rowspan="2">Termination Date</th> </tr> <tr> <th>Personnel Dollars</th> <th>M</th> <th>Participants Dollars</th> <th>EX</th> </tr> </thead> <tbody> <tr> <td>1. Thru FY 1972</td> <td>95</td> <td>36</td> <td></td> </tr> <tr> <td>2. Actual FY 1973</td> <td>172</td> <td>70</td> <td></td> <td></td> <td></td> <td></td> <td>15</td> <td>110</td> <td>10</td> <td>100</td> <td></td> <td>June 1974</td> </tr> <tr> <td>3. Estimated FY 1974</td> <td>180</td> <td>72</td> <td></td> <td></td> <td></td> <td></td> <td>20</td> <td>192</td> <td>167</td> <td>145</td> <td></td> <td>June 1975</td> </tr> <tr> <td>4. Proposed FY 1975</td> <td>180</td> <td>72</td> <td></td> <td></td> <td></td> <td></td> <td>20</td> <td>200</td> <td>502</td> <td>0</td> <td></td> <td>June 1974</td> </tr> <tr> <td>5. All other</td> <td>186</td> <td>72</td> <td></td> <td></td> <td></td> <td></td> <td>20</td> <td>200</td> <td>702</td> <td>0</td> <td></td> <td>June 1975</td> </tr> <tr> <td>6. Total</td> <td>807</td> <td>322</td> <td></td> <td></td> <td></td> <td></td> <td>95</td> <td>902</td> <td>902</td> <td>0</td> <td></td> <td>June 1976</td> </tr> </tbody> </table>		All Prior Years	(1)		(2)		(3)	(4)	(5)	(6)	(7)	(8)**	(9)	Termination Date	Personnel Dollars	M	Participants Dollars	EX	1. Thru FY 1972	95	36											2. Actual FY 1973	172	70					15	110	10	100		June 1974	3. Estimated FY 1974	180	72					20	192	167	145		June 1975	4. Proposed FY 1975	180	72					20	200	502	0		June 1974	5. All other	186	72					20	200	702	0		June 1975	6. Total	807	322					95	902	902	0		June 1976
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\*Key Problem Area, Area of Concentration, or Field Support.

\*\*Expenditures are to be computed on an accrual basis.

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