



RESEARCH ANNOUNCEMENT

- 4th -

**Tropical Rainfall Measuring Mission (TRMM) SCIENCE:
RESEARCH OPPORTUNITIES**

**Letter of Intent Due August 29, 2003
Proposals Due September 30, 2003**

National Space Development Agency of Japan

**TROPICAL RAINFALL MEASURING MISSION (TRMM) SCIENCE:
RESEARCH OPPORTUNITIES**

**NASDA Research Announcement
Soliciting Research Proposals
for Period Ending
September 30, 2003**

Issued: July 14, 2003

**Earth Observation Research Center
National Space Development Agency of Japan
Tokyo**

Identifier: NDX-030018

Submit Letter of Intent to: Mr. Noriyuki Yamane
Earth Observation Research Center
Office of Satellite Technology, Research and Applications
National Space Development Agency of Japan
Harumi Island Triton Square, Office Tower X 23F
1-8-10 Harumi, Chuo-ku, Tokyo 104-6023 Japan
Telephone: (03) 6221-9017
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Submit Proposals to: TRMM RA OFFICE (C/O Mr. Noriyuki Yamane)
Earth Observation Research Center
Office of Satellite Technology, Research and Applications
National Space Development Agency of Japan
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Copies Required: 8

Selecting Official: Director
Earth Observation Research Center
Office of Satellite Technology, Research and Applications
National Space Development Agency of Japan
Harumi Island Triton Square, Office Tower X 23F
1-8-10 Harumi, Chuo-ku, Tokyo 104-6023 Japan

Obtain Additional Information From: Mr. Noriyuki Yamane
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Please use identifier number NDX-030018 when making an inquiry regarding this announcement. Your interest and cooperation in participating in this effort are appreciated.

ORIGINAL SIGNED BY

Dr. Toshihiro Ogawa
Director
Earth Observation Research Center
National Space Development Agency of Japan

NASDA RESEARCH ANNOUNCEMENT
TROPICAL RAINFALL MEASURING MISSION (TRMM) SCIENCE:
RESEARCH OPPORTUNITIES

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5. LETTER OF INTENT

1. INTRODUCTION

The National Space Development Agency of Japan (NASDA)^(*) hereby announces the solicitation of research proposals to conduct scientific investigations in precipitation science and related tropical energetics in connection with the Tropical Rainfall Measuring Mission (TRMM) satellite launched in November 1997. TRMM's goal is to provide useful information on atmospheric heating, which drives the general circulation in the atmosphere, by estimating monthly rainfall using TRMM sensors; the Precipitation Radar (PR), the TRMM Microwave Imager (TMI) and the Visible/Infrared Scanner (VIRS). To achieve this goal, algorithms to estimate rainfall have been developed and revised. The new reprocessed datasets will be produced with the latest Version 6 algorithms in the near future. Aside from the algorithms, various researches on climate have been performed, including the trend analysis and precipitation statistics. Also the air-sea interaction and hydrological studies have been carried out. It is expected that further progress in understanding precipitation characteristics will, for example, enable us to estimate the latent heating profile in the tropics, which is one of the main objectives in the TRMM project. In the application field, new researches using the TRMM data, such as agricultural and fishery applications, have started. Since the lifetime of the TRMM satellite seems to be extended for some more years, it is expected that further useful data will be accumulated.

NASDA is therefore soliciting research proposals to promote utilization of the TRMM data for understanding the distribution and variation of tropical/extratropical rainfall and applying them to new scientific areas. Please note that any algorithm-related proposals are not covered in this Research Announcement (RA). Proposals are sought for new and continuing research associated with TRMM. This opportunity, which follows the third TRMM RA in 2001, is intended to support subsequent science investigations for the three-year period beginning in April 2004. NASDA will spend approximately 10 million yen during fiscal year 2004 for proposed activities of 7-10 new Principal Investigators (PIs). However, it should be noted that the budget allocated for the new PIs' activities after fiscal year 2004 may change substantially depending on NASDA's budget situation.

Participation in this program is open to all categories of domestic and foreign organizations, including educational institutions, industry, non-profit institutions, and Japanese Government agencies. In accordance with NASDA policy, all investigations by foreign participants will be conducted without any exchange of funds, that is, investigators whose home institutions are outside Japan cannot be funded by NASDA. Proposals may be submitted at any time until September 30, 2003. NASDA reserves the right to consider proposals received after that date if in accordance with section 3-8, that is, "the selecting official deems the late proposals to offer significant scientific and/or technical advantage or cost reduction." Proposals submitted to NASDA will be evaluated through a scientific peer review. Selection is expected to be announced in January 2004.

All proposers are strongly encouraged to submit a letter of intent (see section 5) to respond to this Announcement by August 29, 2003.

^(*) NASDA will be reborn as the Japan Aerospace Exploration Agency (JAXA) on October 1, 2003.

2. TECHNICAL DESCRIPTIONS

The first and second Research Announcements (RAs) focused mainly on “ Algorithm Development” and “Calibration and Validation” for the Precipitation Radar (PR). The third RA was on sophisticated algorithm developments and modeling/data analysis. Under the previous RAs, we could broaden the research area and expand users of the TRMM data. In the fourth RA, to broaden the research area is required further to explore new scientific and public applications.

By taking advantage of PR’s unique ability to measure not only the horizontal distribution of rain but also its vertical structure, scientific results relevant to precipitation distribution and variation have been obtained. Such important achievements include the study of the diurnal variations of cloud and precipitation and the study of the distribution of shallow convection over the ocean. More than five years of TRMM data have now been accumulated. This RA thus strongly encourages scientific climatological analysis of the rain distribution, structure and variation. The analysis may use not only TRMM data but also other satellite data and/or objective analysis data.

Advanced studies of TRMM data applications are also encouraged. Assimilation of TRMM data is an example. Applications could be extended to studies of properties other than rain. For example, agricultural application, hydrological application or fishery application etc. Such research that explores a new application of satellite data is highly encouraged.

The proposer should keep in mind that, unlike the previous RAs, NASDA will not support any algorithm development in this RA. The proposer should also keep in mind that NASDA is not a general funding body for the scientific community. This RA seeks to accomplish TRMM’s goal and to expand new utilization of TRMM data. The proposal should describe plans for TRMM data usage well.

Several specific examples of research fields sought by this RA are given below.

- Estimation of atmospheric heating profiles by TRMM data.
- Long-term monitoring study of the global water cycle.
- Data assimilation study for TRMM data.
- New application study to estimate physical characteristics other than rain from TRMM data.

3. INSTRUCTIONS FOR RESPONDING TO NASDA RESEARCH ANNOUNCEMENT

3.1 Proposal Contents

Investigators responding to this research announcement must provide the information below to NASDA for evaluation. Further detailed information and the forms are provided in section 4.

- (1) Proposal Cover Sheet
- (2) Abstract
- (3) Project Description
- (4) Management Approach
- (5) Personnel
- (6) Resource Requirements

3.2 Selection

Selection decisions will be made following peer and/or scientific review of the proposals. A peer review will be carried out by selected external discipline specialists in the area of the proposal. A selection committee will then be assembled in NASDA and will evaluate the proposals. The final decisions are made by a NASDA selecting official. The principal elements considered in evaluating a proposal are its relevance to the objectives, intrinsic merit and cost. Evaluation of its intrinsic merit includes consideration of the following equally important factors.

- (1) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.
- (2) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these that are integral factors for achieving the proposal objectives.
- (3) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.
- (4) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds.

3.3 Resources

NASDA will reserve funds to support selected proposals conducted by Principal Investigators (PIs) whose home institutions are in Japan, subject to availability of funds.

Data sets necessary for enhancing TRMM research and owned by NASDA will basically be provided free of charge. Provision of data sets that NASDA has no authority to disclose will be discussed separately. The following policy shall be observed by participants for using satellite, in-situ and other data sets.

- (1) Data sets shall be used only for research purposes that are proposed and selected under this RA.
- (2) Data sets shall not be disclosed to a third party or parties.

Investigators must provide information on desired resources as part of their proposals in accordance with the forms in section 4.

3.4 Relationship to Award

A contract, cooperative agreement or other agreement may be applied to accomplish selected proposals.

NASDA will contract with PIs for providing funds. The contract will include the title, purpose, subjects, period, plan, usage of facilities, usage of results, interim progress report, final report, participating personnel, statement of work, cost, nondisclosure obligation and other conditions.

NASDA will conclude a cooperative agreement with PIs whose institutes are outside Japan and do not receive any funds from NASDA. The agreement will include the objective, responsibilities, usage of facilities, usage of results, data exchange, nondisclosure obligation and other conditions.

Other agreements, such as a Data Nondisclosure Agreement, may be used for both Japanese and foreign investigators who receive data sets only and utilize them for their research.

3.5 Report to NASDA

PI has an obligation to report both interim and final report to NASDA.

3.5.1 Interim Report

Before the end of fiscal year PI is required to submit interim report to NASDA. The interim report covers the research activity and status in the project done during the fiscal year. PI is also required to present the status report at the interim report conference.

3.5.2 Final Report

PI is required to submit a final report to NASDA at the last fiscal year of the 3-year period.

3.6 Utilization of Results

Results derived from research activities shall generally be published.

A PI who wishes to release his or her research results to a third party organization shall

- (1) Provide NASDA with a copy of the publication before release.
- (2) State in the publication that he or she obtained the results through participating in the TRMM RA research.
- (3) Not disclose inventions in a publication before patent application without the prior written consent of NASDA.

3.7 Renewal Proposals

Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. Significant findings since the most recent progress report should also be described. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

NASDA may renew an effort either through amendment of an existing contract or by a new award.

3.8 Late Proposals

A proposal or modification received after the date specified in this RA may be considered if the selecting official deems it to offer NASDA a significant scientific and/or technical advantage or cost reduction.

3.9 Length

Proposals should be as brief as possible and concentrate on substantive material. Proposals should not exceed 20 pages in length. Necessary detailed information, such as reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal.

3.10 Schedule

JULY 14, 2003

AUGUST 29, 2003

SEPTEMBER 30, 2003

JANUARY 2004

Issue this research announcement

Due date for letter of intent

Due date for research PROPOSAL

Announcement of selection

4. INSTRUCTIONS FOR PROPOSAL CONTENTS

4.1 Language

Proposals shall be written in English.

4.2 Proposal Cover Sheet

Please fill out Form 1 according to the following instructions.

- (1) Title. A brief and scientifically valid project title.
- (2) Principal Investigator's Information. PI's legal name, title, department, name of organization, address, phone number, facsimile number and E-mail address.
- (3) Co-Investigator's Information. Name, organization, phone number and E-mail address.
- (4) Budget. 3-year budget broken down by year and 3-year total amount in Japanese yen (from JFY 2004 through JFY 2006).
- (5) Authorization. Signature of a responsible official or authorized representative of the proposing organization, or any other person authorized to legally bind the organization.

4.3 Abstract

Include a concise, one-page abstract describing the objective and the method of approach.

4.4 Project Descriptions

- (1) The main body of the proposal shall be a detailed statement of the work to be undertaken and should include objectives and expected significance, relation to the present state of knowledge, and relation to previous work done on the project and to related work in progress elsewhere. The statement should outline the plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the RA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.
- (2) When effort is expected to require more than one year for completion, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should, of course, be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.
- (3) Provide the project schedule in Form 2. Include a description of the major activities of the project and their associated schedule.

4.5 Management Approach

For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

4.6 Personnel

The principal investigator is responsible for supervising of the work and participates in the research. A short biographical sketch of the principal investigator as well as a list of principal publications and any exceptional qualifications should be included. Give similar biographical information for other senior professional personnel who will be directly associated with the project.

4.7 Resource Requirements

Information of required resources will be considered during the selection process. After deciding the total amount of funding for each PI, NASDA will send more detailed forms for

resource requirements to selected PIs. Before beginning the second and third years, NASDA will send the same forms for resource requirements again.

4.7.1 Instructions for Budget Summary (Form 3)

Provide a budget summary by cost elements (Personnel Expenses, Computers/Peripheral equipments, Subcontracts, Expendable Materials and Supplies, Travel Expenses, Observation Equipments, Satellite Data, Other Data and Others), sorted by Japanese fiscal year as in the example attached to this form. An annual summary budget should also appear on the last line of Form 1.

(1) Personnel Expenses

NASDA will provide some engineers and operators inside the Earth Observation Research Center (EORC) within the budget. Enter the number of working days. NASDA will convert the number of days to the cost using NASDA's standard rates. Also, enter expenses for part-time workers here as the total cost calculated by multiplying the unit cost per day by the number of days. For part-time workers, use your own cost estimates.

(2) Computers/Peripheral equipments

NASDA will lease Work Stations (WSs) and/or peripheral equipments based on specifications pre-determined by EORC and will provide them (including their maintenance costs) to PIs. Investigators who want to use other peripheral devices should enter their costs. Also, enter the costs of software here. Note that NASDA has the right to change specifications of any equipments that NASDA will provide.

(3) Subcontracts

Provide the cost of subcontracts to outside companies or organizations here.

(4) Expendable Materials and Supplies

Enter the quantity of each item, following the example.

(5) Travel Expenses

Describe the proposed domestic and/or international travels including, information on destination and number of days/number of travelers.

(6) Observation Equipments

Enter costs of observation equipment including installation cost.

(7) Satellite Data

Investigators requesting satellite data other than NASDA-owned/archived data (listed in the next section) should provide cost information here.

(8) Other Data

Enter costs for data other than satellite data.

(9) Others

Enter costs for publication and others here.

4.7.2 Instructions for Data requirements (Form 4)

NASDA owns satellite data including TRMM data, other satellite data listed below, and some ground validation data. NASDA also archives meteorological data provided by the Japan Meteorological Agency (JMA) for TRMM research. NASDA will provide requested data judged necessary for proposed research, subject to availability of data processing.

(1) NASDA-Owned Satellite Data Sets (Form 4-1)

NASDA has the authority to provide data sets that are received from:

- Marine Observation Satellite (MOS) (only around Japan)
- LANDSAT (only around Japan)
- SPOT (only around Japan, available until JFY2001)
- European Remote-sensing Satellite (ERS)-1, 2 (only around Japan, for Japanese researchers only, available until JFY2002)
- Japanese Earth Resources Satellite (JERS)-1 (global)
- ADEOS
- AQUA (AMSER-E)
- ADEOS-II (scheduled to be released after December 2003)

Data availability can be checked on the EUS web page.

(<http://www.eoc.nasda.go.jp/homepage.html/>)

To request these satellite data sets, complete Form 4-1.

(2) NASDA-owned TRMM related Ground Validation data (Form 4-2)

NASDA archives the following X-band Doppler radar data (NASDA data).

- GAME IOP on the Tibetan plateau
- IMCET'99 (May 15 - June 7, 1999) in Okinawa
- X-BAIU in Sendai/Kagoshima in June and July 1999, 2001 and 2002
- Tanegashima from September 1999 to the end of year 2002
- Obama/Fukui in February 2001 (snow data)

(3) NASDA-archived TRMM related JMA data (Form 4-3)

NASDA archives the following meteorological data that overlaps TRMM observation period and are provided by the Japan Meteorological Agency (JMA) based on an agreement on TRMM data utilization and processing technology between JMA and NASDA.

- Global analysis data
- Decoded data
- Buoy data
- AMeDAS 10-minute rain gauge data
- Raw radar data from the following sites.
 - Mt.Fuji, Kurumayama, Makinohara, Nagoya, Okinawa,
 - Tanegasima, Naze, Ishigaki-jima, Muroto, Fukuoka, Matsue,
 - Hirosima, Osaka, Tokyo, Fukui
- Radar-AMeDAS rainfall analysis data

5. LETTER OF INTENT

All prospective proposers are strongly encouraged to submit a letter of intent in response to this announcement. This will allow us to alert a peer review staff to adequately cover the proposal review process.

Please provide the following information no later than August 29, 2003.

- (1) PI and CI names and addresses
- (2) Title of proposal
- (3) Telephone number
- (4) Fax number
- (5) Email address
- (6) Brief summary of proposal

The information should be provided via e-mail or FAX or mail to:

Mr. Noriyuki Yamane
Earth Observation Research Center
Office of Satellite Technology, Research and Applications
National Space Development Agency of Japan
Harumi Island Triton Square, Office Tower X 23F
1-8-10 Harumi, Chuo-ku, Tokyo 104-6023 Japan
Telephone: (03) 6221-9017
Fax: (03) 6221-9191
Email: trmmcont@eorc.nasda.go.jp

Proposal Cover Sheet
NASDA TRMM Research Announcement

Proposal No.	_____ (Leave Blank for NASDA Use)
Title	

Principal Investigator

Name		Job Title	
Department			
Institution			
Address			
Country			
E-mail			
Telephone			
Facsimile			

Co - Investigator

Name	Institution	Telephone	E-mail

Budget (thousand yen)

JFY2004	JFY2005	JFY2006	TOTAL

(Leave Blank for NASDA Use)

Authorizing Official: _____ (Name and Title) _____ (Institution)

Research Schedule

JFY	2004			2005			2006					
Month	4	5	6	7	8	9	10	11	12	1	2	3
Milestone												
Activities												

BUDGET SUMMARY

1. Personnel Expenses**1.1 NASDA Provide** (Number of persons x days)

Engineers (at EORC): _____

Operators (at EORC): _____

1.2 Outside EORC (unit: thousand yen)

	2004	2005	2006	TOTAL

2. Computers / Peripheral Equipments**2.1 EORC Lease Workstation** Workstation**2.2 Peripherals / Software** (unit: thousand yen)

Peripherals / Software	2004	2005	2006	TOTAL

3. Subcontracts (unit: thousand yen)

ITEMS	2004	2005	2006	TOTAL

4. Expendable Materials and Supplies

ITEMS (unit)	2004	2005	2006	TOTAL

5. Travel Expenses (unit: days / times)

Departure Point - Destination	2004	2005	2006

6. Observation Equipments (unit: thousand yen)

ITEMS	2004	2005	2006	Total

7. Satellite Data (unit: thousand yen)

Name of Satellite / Sensors	Distributor	Purpose	Cost			
			2004	2005	2006	TOTAL

8. Other Data (unit: thousand yen)

Name of Datasets	Distributor	Purpose	Cost			
			2004	2005	2006	TOTAL

9. Others

ITEMS	2004	2005	2006	TOTAL

TOTAL				
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BUDGET SUMMARY

1. Personnel Expenses**1.1 NASDA Provide** (Number of persons x days)Engineers (at EORC): 2x10Operators (at EORC): 1x15**1.2 Outside EORC**

(unit: thousand yen)

	2004	2005	2006	TOTAL
<i>Part-time job for DSD data analysis</i>	320 (40x8)	320 (40x8)	160 (20x8)	800 (100x8)

2. Computers / Peripheral Equipments**2.1 EORC Lease Workstation** Workstation**2.2 Peripherals / Software**

(unit: thousand yen)

Peripherals / Software	2004	2005	2006	TOTAL
CD-RW Drive	50			50

3. Subcontracts

(unit: thousand yen)

ITEMS	2004	2005	2006	TOTAL
<i>Software development for DSD data analysis</i>	300	1,500	600	2,400

4. Expendable Materials and Supplies

ITEMS (unit)	2004	2005	2006	TOTAL
<i>8mm tape (112m)</i>	60	50	50	160
<i>CD-R</i>	100	100	120	320
<i>MO (640MB)</i>	10	15	10	35
<i>A4 Paper (package of 500 sheets)</i>	2	2	1	5

5. Travel Expenses (unit: days / times)

Departure Point - Destination	2004	2005	2006
<i>Tokyo - Washington, D.C.</i>	7/2	7/1	
<i>Tokyo - Paris</i>		5/1	8/1
<i>Tokyo - Paris</i>			6/1
<i>Tokyo - Osaka</i>	3/1		

6. Observation Equipments (unit: thousand yen)

ITEMS	2004	2005	2006	Total
<i>Micro Rain Radar</i>	1,500			1,500

7. Satellite Data (unit: thousand yen)

Name of Satellite / Sensors	Distributor	Purpose	Cost			
			2004	2005	2006	TOTAL

8. Other Data (unit: thousand yen)

Name of Datasets	Distributor	Purpose	Cost			
			2004	2005	2006	TOTAL

9. Others

ITEMS	2004	2005	2006	TOTAL

TOTAL	2,342	1,987	941	5,270
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NASDA DATA REQUIREMENTS

1. NASDA-Archived Satellite Datasets

(ADEOS, JERS-1, ERS, MOS, SPOT, LANDSAT, AQUA, ADEOS-II)

Data Search : <http://www.eoc.nasda.go.jp/homepage.html>

Name of Satellite / Sensors	Quantity (scene)	Purpose

2. NASDA Owned Ground Validation Data

Name of Dataset	Observation Period	Purpose
<input type="checkbox"/> GAME Tibet		
<input type="checkbox"/> IMCET '98 '99		
<input type="checkbox"/> X-BAIU		
<input type="checkbox"/> Tanegashima		
<input type="checkbox"/> Obama/Fukui		

3. NASDA-Archived JMA Data at for TRMM Research

Name of Dataset	Observation Period	Purpose
<input type="checkbox"/> Global analysis data		
<input type="checkbox"/> Decoded data		
<input type="checkbox"/> BUOY data		
<input type="checkbox"/> AMeDAS 10minutes rain gauge		
<input type="checkbox"/> Radar data (Site:)		
<input type="checkbox"/> Radar AMeDAS rain analysis data		