



National Aeronautics
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October 2, 1998
AO 98-OSS-07

Announcement of Opportunity

NEAR EARTH ASTEROID RENDEZVOUS

(NEAR)

Participating Scientist Program

Notice of Intent to Propose
Proposals due:

November 3, 1998
December 7, 1998

OMB Approval No. 2700-0085

**NEAR EARTH ASTEROID RENDEZVOUS
PARTICIPATING SCIENTIST PROGRAM**

**Announcement of Opportunity
Soliciting Proposals for
Basic Research in Space Science**

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**Office of Space Science
National Aeronautics and Space Administration
Washington, DC 20546-0001**

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1. DESCRIPTION OF THE OPPORTUNITY

1.1 INTRODUCTION

This NASA Announcement of Opportunity (AO) solicits proposals for Participating Scientist investigations on the Near Earth Asteroid Rendezvous (NEAR) mission. Principal Investigators (PI's) of selected proposals will become Participating Scientists and join the NEAR Science Team, which presently consists of Facility Instrument Team Leaders and Team Members who are listed in Table 1 and who were selected via a previous announcement (NASA AO 94-OSS-02). The NEAR Science Team is co-chaired by the NEAR Project Scientist, Dr. Andrew F. Cheng of The Johns Hopkins University Applied Physics Laboratory (JHU/APL) and the NASA Program Scientist, Dr. Thomas H. Morgan of the Research Program Management Division in the Office of Space Science at NASA Headquarters. It is organized into five Facility Instrument Teams, one for each of the instruments on NEAR as shown in Table 1. As members of the Science Team, Participating Scientists will have full rights of access to NEAR data and of participation in NEAR data analysis, archiving, and publication. The selected Participating Scientists will coordinate their analyses with those of the present NEAR Science team.

Table 1 NEAR Science Team, Facility Instrument Team Leaders and Team Members

Magnetometer (MAG)

Dr. Mario Acuna, Team Leader	NASA Goddard Space Flight Center
Dr. Christopher Russell	University of California at Los Angeles

X-Ray/Gamma Ray Spectrometer (XRS/GRS)

Dr. Jacob I. Trombka, Team Leader	NASA Goddard Space Flight Center
Dr. William Boynton	University of Arizona
Dr. Johannes Brueckner	Max-Planck Institute Mainz
Dr. Steven Squyres	Cornell University

Multispectral Imager/Near Infrared Spectrograph (MSI/NIS)

Dr. Joseph Veverka, Team Leader	Cornell University
Dr. James F. Bell	Cornell University
Dr. Clark R. Chapman	Southwest Research Institute
Dr. Michael C. Malin	Malin Space Sciences
Dr. Lucy-Ann A. McFadden	University of Maryland
Dr. Mark S. Robinson	Northwestern University
Dr. Peter C. Thomas	Cornell University
Dr. Scott Murchie	John Hopkins University/Applied Physics Laboratory

Radio Science (RS)

Dr. Donald Yeomans, Team Leader	Jet Propulsion Laboratory
Dr. Jean Pierre Barriot	Centre Nationale d'Etudes Spatiales
Dr. Alexander Konopliv	Jet Propulsion Laboratory

NEAR Laser Rangefinder (NLR)
Dr. Maria Zuber, Team Leader

Massachusetts Institute of
Technology

NEAR is a Discovery mission that will rendezvous with the near-Earth asteroid 433 Eros in December 1998, after which it will orbit Eros at low altitude for approximately one year (See Table 2). It was launched on February 17, 1996, and on June 27, 1997, executed a successful flyby of the C-type main-belt asteroid 253 Mathilde. The instruments on NEAR are a Magnetometer (MAG), a Multispectral Imager/Near Infrared Spectrometer (MSI/NIS), an X-ray/Gamma Ray Spectrometer (XRS/GRS), and a Laser Rangefinder (NLR). There is also a Radio Science (RS) investigation using the spacecraft coherent X-band telecommunication system. The primary goal of the mission is to perform the first comprehensive measurements of an asteroid's surface composition, geology, physical properties, and internal structure.

Table 2 Summary of major milestones for NEAR

1998

January 23	Earth swingby and gravity assist
December 20	Begin rendezvous sequence with Eros

1999

January 10	Orbit insertion at Eros
------------	-------------------------

2000

February 6	End of nominal mission
September 30	End of data validation period and submission of data for archiving

Through the participating scientists to be selected through this AO, expertise is sought for reducing and validating scientific data from the mission; preparing raw and reduced data for archiving in NASA's Planetary Data System (PDS); and analyzing, interpreting, and publishing scientific results. The scope of this Announcement includes not only analyses of NEAR data from Eros but also analyses of Mathilde data, analyses of NEAR gamma ray burst data, and ground-based or laboratory investigations that would directly and substantially enhance the science return of the NEAR mission.

NEAR, as the first launch of the Discovery Program, is a cost-capped mission. Cost constraints will require, among other things, strict limits on the number of Science Team members (see Section 3). Approximately \$1M is available for competition via this Announcement.

There will be no change in the scope of the NEAR mission to accommodate science investigations of Participating Scientists. Additional background information on the mission, instruments, and observation plans may be found in special issues of *The Journal of Geophysical Research*, *Space Science Reviews*, and *The Journal of the Astronautical Sciences*; references are given below in Sections 2.1 and 2.3. Additional technical information

that may be relevant to proposing in response to this Announcement is provided in Section 2.2, which supersedes information in the literature. There is no separate Proposal Information Package (PIP) for this Announcement. Further general information is also available on the World Wide Web (WWW) at <http://sd-www.jhuapl.edu/NEAR>.

1.2 SCOPE AND LIMITATIONS OF PROPOSALS

Participation is open to all categories of organizations, both domestic and foreign: including educational institutions, profit and nonprofit organizations, NASA centers, and other Government agencies.

In accordance with NASA policy, all investigations by non-U. S. participants will be conducted on the basis of no exchange of funds.

Only the Principal Investigator (PI) from each investigation selected through this AO will be designated as a Participating Scientist on the NEAR Science Team. PI's may identify and may request support for specific individuals or support staffs considered essential to the conduct of their investigations, but none of these individuals will be eligible for Science Team membership without their submitting an independent proposal.

Proposed investigations must be of primary relevance to at least one of the instrument teams listed in Table 1 (i.e., MSI/NIS, XRS/GRS, MAG, RS, or NLR); however, interdisciplinary investigations are also encouraged in response to this Announcement.

1.3 AO SCHEDULE

Proposers are strongly encouraged to submit a Notice of Intent (NOI) by November 3, 1998. The Notice of Intent should be submitted electronically using the form found at URL <http://www.hq.nasa.gov/office/oss>. Further guidance on the NOI is contained in section 4.1 below.

The proposal deadline is 5 PM EST, December 7, 1998. The proposals will be evaluated by a science peer review panel. The proposal selections are expected within three months of the proposal due date. It is expected that proposals will be selected for support for the period March 1, 1999, through September 30, 2000.

Options for an extended mission are not to be included in the proposal to this AO.

1.4 FORMATION OF SCIENCE TEAM

A Science Team (ST) will be formed by NASA consisting of the present Facility Instrument Team Leaders and Team Members (Table 1) plus the PI's whose science investigations are selected through this AO. The ST will be co-chaired by the Project Scientist (Dr. Andrew F. Cheng, JHU/APL) and the NASA Program Scientist for NEAR (currently Dr. Thomas H. Morgan, NASA Headquarters). The ST will meet regularly throughout the lifetime of the

mission and will work with the NEAR Project Manager (Mr. Tom Coughlin, JHU/APL), and, if necessary, the NASA Headquarters NEAR Program Scientist, to resolve conflicts among requirements to optimize the scientific return.

1.5 RESPONSIBILITIES OF SCIENCE TEAM

The roles of the Science Team (ST) are to:

- Provide science input for mission planning and instrument operations;
- Reduce and validate scientific data;
- Prepare raw and reduced data for archiving for future use by the scientific community;
- Analyze, interpret, and publish first results and findings in peer reviewed literature; and
- Support education and outreach efforts of the NEAR Project.

Participating Scientists will join the NEAR Science Team after the orbit insertion at Eros, by which time detailed orbital mission plans will already have been developed. Therefore, science inputs for mission planning and sequence development will not be a primary responsibility of Participating Scientists. While Participating Scientists will be welcome to participate in mission and science planning, provision of science inputs to these activities will continue to be the responsibility primarily of present Science Team members. Likewise, inflight calibration activities for NEAR instruments will continue through the Eros rendezvous, but will remain a principal responsibility of present Science Team members.

Participating Scientists on the NEAR Science Team will be required to adhere to the NEAR Mission data policy that is given in the following section.

1.6 NEAR MISSION DATA POLICY

The ground rules for the data analysis and release policies for the Near Earth Asteroid Rendezvous (NEAR) Project given below cover the preflight, postlaunch, and data analysis activities of the NEAR Science Team and associated scientists.

- Selected uncalibrated data, including imaging, will be publicly released over the Internet in close to real time.
- Fully reduced, calibrated, and corrected data products will be published and forwarded to the Planetary Data System in accordance with the Data Archive Plan (available on request from the program scientist).
- Shared data analyses, under the direction of the teams whose data are being used and among members of different instrument teams, is strongly encouraged.

- The Team Leaders are responsible for coordinating all scientific investigations involving the use of data from their respective instruments.
- In case of differences of opinion, the issues will be brought before the Project Scientist, and if necessary the Program Scientist, for resolution.

Data archiving with the Planetary Data System (PDS) is the primary responsibility of the NEAR Science Data Center (SDC). Present members of the Science Team are responsible for assisting the SDC with documentation of mission data sets and algorithms as required by PDS. The SDC will transmit to the PDS archive all experiment data records, ancillary data, and best available processing and calibration algorithms. Final delivery to PDS is currently scheduled for mid-2000. Participating Scientists may propose to prepare data products for archiving in PDS, and if so, they should plan to assist SDC in preparing required documentation.

1.7 POINT OF CONTACT FOR ADDITIONAL INFORMATION

Questions concerning this AO may be directed to:

Dr. Thomas H. Morgan
 NEAR Program Scientist
 Research Program Management Division
 Code SR
 NASA Headquarters
 Washington DC 20546-001.
 Telephone: 202-358-0828
 E-mail: tmorgan@hq.nasa.gov

2. ANNOUNCEMENT OBJECTIVES

2.1 SCIENTIFIC AND TECHNICAL OBJECTIVES

Participating Science investigations proposed for the NEAR mission should enhance the mission science return and complement the investigations of present Science Team members. Mission science objectives are summarized as follows. The top-level science objectives are to:

- Characterize an asteroid's physical and geological properties and infer its elemental and mineralogical composition;
- Clarify the relationships among asteroids, comets and meteorites; and,
- Advance the understanding of processes and conditions during the formation and early evolution of the planets.

The primary measurement objectives of the NEAR mission are to determine for the asteroids encountered:

- Bulk properties - size, shape, mass, density, gravity field, spin state;
- Surface properties - elemental and mineralogical composition, geology, morphology, and texture; and,
- Internal properties - search for heterogeneity and intrinsic magnetic field.

Proposed investigations in response to this Announcement that complement the investigations performed by members of the present Science Team will be given priority. Descriptions of investigations by members of the present Science Team were published in a special issue of *The Journal of Geophysical Research* and are as follows:

- J. Veverka *et al.*, An Overview of the NEAR Multispectral Imager-NEAR Infrared Spectrometer Investigation, *J. Geophys. R.*, **102**: 23709-23727, 1997.
- J. Trombka *et al.*, Compositional Mapping with the NEAR X-ray/gamma ray Spectrometer, *J. Geophys. R.*, **102**: 23729-23750, 1997.
- M. Acuna *et al.*, The NEAR Magnetic Field Investigation: Science Objectives at Asteroid 433 Eros and Experimental Approach, *J. Geophys. R.*, **102**: 23751-23759, 1997.
- M. Zuber *et al.*, The NEAR Laser Ranging Investigation, *J. Geophys. R.*, **102**: 23761-23773, 1997.
- D. Yeomans *et al.*, The NEAR Radio Science Investigation, *J. Geophys. R.*, **102**: 23775- 23780, 1997.

A mission overview was presented by A. F. Cheng *et al.*, *J. Geophys. R.*, **102**: 23695-23708, 1997.

Detailed descriptions of instrument designs and calibration results, including in-flight calibrations, were published in a special issue of *Space Science Reviews* along with a mission overview and a description of the NEAR Science Data Center, which distributes spacecraft, navigation, and science data to users:

- A. F. Cheng *et al.*, Near Earth Asteroid Rendezvous Mission Overview, *Space Science Reviews*, **82**:3-29, 1997.
- S. E. Hawkins *et al.*, Multispectral imager on the Near Earth Asteroid Rendezvous Mission, *Space Science Reviews*, **82**:31-100, 1997.
- J. W. Warren *et al.*, Near Infrared Spectrometer for the Near Earth Asteroid Rendezvous mission, *Space Science Reviews*, **82**:101-167, 1997.
- J. Goldstein *et al.*, The X-ray/gamma Ray Spectrometer on the Near Earth Asteroid Rendezvous Mission, *Space Science Reviews*, **82**:169-216, 1997.
- T. D. Cole *et al.*, The Near Earth Asteroid Rendezvous Laser Altimeter, *Space Science Reviews*, **82**:217-253, 1997.
- D. Lohr *et al.*, NEAR Magnetic Field Investigation, Instrumentation, Spacecraft Magnetism and Data Access, *Space Science Reviews*, **82**:255-281, 1997.
- K. J. Heeres *et al.*, The NEAR Science Data Center, *Space Science Reviews*, **82**:283-308, 1997.

2.2 EXPECTED SCIENCE RETURN

The science goals for NEAR have been derived from the NASA program strategy to develop missions that are focused on a limited set of scientific objectives. Science goals of the NEAR mission at the rendezvous target 433 Eros were summarized in the *JGR* special issue cited above and also in Section 2.3. Initial science results from the flyby target 253 Mathilde have been reported in *Science*, also cited in Section 2.3.

Since the time of preparation of the *JGR* special issue, some aspects of the science observation plan at Eros have been updated. These updates will be summarized in this Section, which will also provide the latest available information on the mission timeline and data rate allocations. Also noteworthy is that the NEAR Gamma Ray Spectrometer (GRS) now has a gamma ray burst measurement capability which became operational in late summer 1998. Gamma ray bursts will be monitored by NEAR throughout the Eros rendezvous period. Participating Science proposals in response to this Announcement should use information provided in this Section which supersedes information published in the literature.

2.2.1 NOMINAL MISSION TIMELINE AND DATA ALLOCATIONS

Table 3 shows a significant change to the early mission timeline as compared to earlier published timelines. Namely, the low solar phase angle spectroscopic mapping sequence, which was earlier planned to occur during an initial flyby prior to orbit insertion, has been postponed to later in the orbit plan and will occur around the beginning of March, 1999. The initial flyby has been deleted to simplify the orbit insertion phase so NEAR will be captured into an elliptical retrograde orbit upon first crossing the desired orbit plane. The low-phase mapping sequence begins on March 5, 1999, when the spacecraft is boosted to a high altitude elliptical orbit such that the spacecraft will pass through zero solar phase angle at a range of ~166 km from the center of Eros and at a latitude of ~65°S relative to the Eros equator. NIS will map mainly the southern hemisphere of Eros (excluding much of the northern hemisphere) at optimal illumination geometries, spending ~28 hours at phase angles less than 30°. The NIS slit dimensions have recently been determined from in-flight calibrations to be 0.38° x 0.74° in the narrow setting.

Table 3. Nominal Eros Rendezvous Plan

Date (UTC)	Day	Length [days]	Orbit [km x km]	Incl [deg]	Mission Phase	MSI/ NIS	XRS/ GRS	MA G	NLR
1/1/99 0:00	1049.0	9.6			Approach	385.3	20.7	8.3	0
1/10/99 15:01	1058.6	10.0	14,285 x 400	135	MSI/NIS Mapping	385.3	20.7	8.3	0
1/20/99 15:59	1068.7	7.0	401 x 200	137	MSI/NIS Mapping	385.3	20.7	8.3	0
1/27/99 16:41	1075.7	18.1	205 x 195	138	MSI/NIS Mapping	381.0	20.7	8.3	4.3
2/14/99 19:32	1093.8	6.3	196 x 75	148	MSI/NIS Mapping	381.0	20.7	8.3	4.3

2/21/99 2:32	1100.1	12.5	102 x 98	149	MSI/NIS Mapping	381.0	20.7	8.3	4.3
3/5/99 15:33	1112.6	7.7	508 x 101	99	Low Phase Map	385.3	20.7	8.3	0
3/13/99 8:50	1120.4	7.0	499 x 100	160	Low Phase Map	385.3	20.7	8.3	0
3/20/99 8:20	1127.3	6.5	100 x 50	159	XRS/GRS Mapping	277.4	124.3	8.3	4.3
3/26/99 20:58	1133.9	14.9	54 x 48	164	XRS/GRS Mapping	277.4	124.3	8.3	4.3
4/10/99 18:58	1148.8	14.5	47 x 35	172	XRS/GRS Mapping	277.4	124.3	8.3	4.3
4/25/99 6:25	1163.3	46.0	36 x 34	179	XRS/GRS Mapping	277.4	124.3	8.3	4.3
6/10/99 6:25	1209.3	7.4	49 x 35	179	XRS/GRS Mapping	418.3	186.4	12.4	4.3
6/17/99 15:09	1216.6	7.7	51 x 49	178	XRS/GRS Mapping	418.3	186.4	12.4	4.3
6/25/99 8:27	1224.4	7.4	50 x 49	147	XRS/GRS Mapping	418.3	186.4	12.4	4.3
7/2/99 18:07	1231.8	19.4	52 x 49	120	XRS/GRS Mapping	418.3	186.4	12.4	4.3
7/22/99 4:11	1251.2	7.7	50 x 40	123	XRS/GRS Mapping	418.3	186.4	12.4	4.3
7/29/99 20:43	1258.9	24.5	46 x 42	91	Polar Orbits I/NLR	418.3	186.4	12.4	4.3
8/23/99 8:03	1283.3	7.4	105 x 42	90	Polar Orbits I	573.6	31.1	12.4	4.3
8/30/99 16:42	1290.7	6.3	100 x 95	91	MSI/NIS Mapping	573.6	31.1	12.4	4.3
9/6/99 0:16	1297.0	7.5	515 x 95	76	Plane Flip	577.9	31.1	12.4	0
9/13/99 13:23	1304.6	7.4	545 x 200	104	Polar Orbits II	418.3	186.4	12.4	4.3
9/21/99 0:00	1312.0	7.5	201 x 199	105	MSI/NIS Mapping	573.6	31.1	12.4	4.3
9/28/99 12:00	1319.5	9.5	201 x 40	108	MSI/NIS Mapping	573.6	31.1	12.4	4.3
10/7/99 23:14	1329.0	7.3	51 x 49	113	XRS/GRS Mapping	418.3	186.4	12.4	4.3
10/15/99 6:13	1336.3	13.4	51 x 49	128	XRS/GRS Mapping	418.3	186.4	12.4	4.3
10/28/99 16:34	1349.7	14.2	51 x 45	142	XRS/GRS Mapping	418.3	186.4	12.4	4.3
11/11/99 21:25	1363.9	7.1	49 x 35	177	XRS/GRS Mapping	418.3	186.4	12.4	4.3
11/18/99 23:23	1371.0	79.0	34 x 33	178	XRS/GRS Mapping	418.3	186.4	12.4	4.3
2/6/00 0:00	1450.0		35 x 33		End of mission				

A second low phase spectroscopic mapping sequence is planned during the plane flip maneuver beginning about September 6, 1999. The plane flip will maintain the spacecraft in retrograde orbit as required for orbital stability. The second low phase mapping sequence will also take the spacecraft through zero phase and will be similar to the first, except that Eros latitude will be $\sim 6^\circ\text{N}$ so the northern portion of Eros will be illuminated.

In Table 3, the first column shows the first day of each mission phase, followed by the corresponding mission day number and the duration (length) in days to the next phase. The semi-major and semi-minor axes of the orbit in each mission phase are given in the fourth column (if blank, the orbit is hyperbolic relative to Eros). The orbit inclination follows, where values $> 90^\circ$ indicate retrograde orbit relative to the Eros spin.

The sixth column of Table 3 is a mnemonic for the mission phase. The “approach” occurs before the orbit insertion burn and includes a satellite search as well as color imaging sequences and rotation movies. Eros observations are actually scheduled to begin on November 5, 1998. After orbit insertion, NEAR descends progressively to a 102x98 km orbit, performs the first low phase mapping sequence, and then resumes its descent to low altitude orbit. Beginning April 25, 1999, NEAR has achieved a nominal 35x35 km circular orbit, in which it will remain for 46 days of mapping by XRS/GRS. During this low altitude XRS/GRS mapping phase, the orbit will be nearly equatorial retrograde. After June 10, 1999, the inclination of the orbit rises again and the spacecraft is raised to a series of higher orbits, culminating in the first polar orbit phase starting July 29, 1999. The second low phase sequence and plane flip maneuver follow. A second polar orbit phase begins September 13, 1999, and the orbit inclination tilts toward more equatorial retrograde values throughout October 1999. On November 18, 1999, the spacecraft is again placed in a 34x33 km retrograde, equatorial orbit, where it remains for the next 79 days. The total time in the 35x35 km or similar orbits is, therefore, 125 days.

The Project currently plans a descent to the surface of Eros at the end of the nominal mission. This is not reflected in Table 3. Details of this maneuver and observation plans are not available at this time.

The last four columns of Table 3 give typical data volumes that can be returned to Earth for the MSI/NIS, XRS/GRS, MAG, and NLR investigations, assuming one Deep Space Network (DSN) 70 m pass per day. This DSN coverage is currently planned but still preliminary. Table 3 shows data volume allocations in units of Mbits per day (Mb/d) for each of the days in the corresponding mission phase. Reasonable allowances for spacecraft housekeeping, link margins, and solid state recorder usage have been made, based upon in-flight experience. However, detailed science and spacecraft operational timelines are still under development, and actual data volumes returned may not correspond to the values predicted in Table 3. The data volumes shown in Table 3 are current best estimates which should be used in preparing responses to this Announcement. For example, MSI/NIS can return 381 Mb/d during the 12.5-day mapping phase beginning February 21, 1999. Zero values are shown for NLR during times when there is no possibility of ranging to the asteroid.

2.2.2 GAMMA RAY BURST OBSERVATIONS

The NEAR gamma ray burst detector provides continuous measurements of the total intensity of gamma ray flux in the energy range from 150 keV to 10 MeV. These measurements are provided as the result of the shared processing of signals from the NEAR Gamma Ray Spectrometer (GRS). The GRS consists of a central NaI(Tl) scintillator surrounded by an active anticoincidence shield of bismuth germanate (BGO). While the primary purpose of the anticoincidence shield is to suppress the cosmic ray and locally-induced gamma-ray contributions to the background in the NaI(Tl) spectra, the attributes of the shield (a high gamma-ray cross-section and large effective area) provide an inherently sensitive burst detector.

To make use of the shield for burst detection, integral BGO counts are recorded once per second and grouped into 166-sample packets for downlink. Each packet is time-stamped with the spacecraft Mission Elapsed Time (MET). Spacecraft time relative to Universal Coordinated Time (UTC) will be maintained to better than one second during the rendezvous. Gamma ray burst data will be collected continuously without any impact on asteroid observations and with only a minimal (17.7 bits/s) increase in the data rate allocated to the instrument. Recognition and cataloging of bursts is the responsibility of ground-based data processing. To enhance burst detection sensitivity, onboard processing includes a commandable upper level discriminator to limit the energy range of interest and exclude portions of the background due mainly to galactic cosmic rays. Limiting the energy range to 2.5 MeV eliminates roughly two-thirds of the background.

The burst detector essentially covers the whole sky except for those solid angles occulted by either the spacecraft or the asteroid. The BGO detector has an effective area of 437 cm². During cruise, with the energy limit set to 2.5 MeV, the mean count rate is approximately 500 counts/s with a standard deviation of 22 counts/s. Burst detections to date have ranged from 4 to 11 sigma with intensity profiles lasting seconds to minutes. Typically, three bursts are observed per week.

2.2.3 MSI/NIS OBSERVATION PLAN

The MSI/NIS team considers NIS to be the primary instrument for obtaining spatially resolved spectroscopic measurements of Eros. During the low altitude phases at Eros (roughly, less than 100 km), the MSI observation plan will emphasize monochrome, stereo imaging.

2.2.4 XRS/GRS DATA SYSTEM

The XRS/GRS team recommends that scientists who intend to use NEAR x-ray or gamma ray data should plan to work with XRS/GRS team members to become familiar with the unique data system that the team will use for data analysis.

2.3 APPLICABLE REFERENCES

The motivation for relevant planetary science can be found in the Committee on Planetary and Lunar Exploration (COMPLEX) report, *An Integrated Strategy for the Planetary Sciences, 1995-2010* (National Academy of Sciences Press, Washington, DC, 1994). A summary of asteroid science may be found in the volume *Asteroids II*, edited by R. P. Binzel, T. Gehrels, and M. Matthews (University of Arizona Press, Tucson, 1989). A summary of NEAR mission science is given in a special issue of *The Journal of Geophysical Research* (full citations in Section 2.1). Descriptions of the NEAR instruments and calibrations can be found in a special issue of *Space Science Reviews* (full citations in Section 2.1). Aspects of mission design and navigation are discussed in a special issue of *The Journal of the Astronautical Sciences* (volume 43, no. 4, 1995).

Current knowledge of Eros is summarized by:

D. Yeomans, *J. Astronaut. Sci.*, **43**: 417-426, 1995.

First science results from the Mathilde flyby were published in *Science*:

J. Veverka *et al.*, *Science*, **278**: 2109-2114, 1997.

D. Yeomans *et al.*, *Science*, **278**: 2106-2109, 1997.

3. SPECIAL PROGRAM CONSTRAINTS

Certain special constraints are mandated by the intended low-cost character of the NEAR mission:

1. Selection of Participating Scientist investigations will be based, among other factors, on the relevance of the proposed science investigation to at least one of the NEAR instruments (listed in Table 1).
2. Current NASA policy does not allow for any proprietary rights to mission science data beyond a reasonable period for calibration and validation.

A science data validation period will exist for a limited period of time after the end of the nominal mission, after which the data will be archived and made available to the scientific community through the Planetary Data System (PDS). The period for data reduction and final archiving is expected to end September 30, 2000.

3. Funding for this program comes from the NEAR mission budget. The program is expected to extend from March 1, 1999, through September 30, 2000. Proposers should submit budgets for this period. It is anticipated that up to fifteen proposals will be selected. It is expected that, in total, the sum of \$1M is available for the Participating Scientist Program.
4. The Office of Space Science (OSS) has developed a comprehensive approach for making education at all levels (with a particular emphasis on precollege education) and the enhancement of public understanding of space science integral parts of all of its missions and research programs. In accord with established OSS policy, up to 2% of the NASA

budget for NEAR Participating Scientists can be allocated to education and outreach. Because of the limited scope of the NEAR Participating Science Program, NASA does not expect a stand-alone Education/Public Outreach proposal component to be submitted with each research proposal. NASA does, however, expect that selected, NASA-funded investigators will become involved in and support the Existing NEAR Education/Public Outreach program to be defined and implemented in conjunction with the NEAR Project Office. Therefore, selected investigators should be prepared to spend up to about 5% of their time supporting such activities, which may include, but not be limited to, coming up with ideas for creative and worthwhile educational materials; preparing written background information suitable for primary and secondary school educational resources; and preparing portions of the NEAR data for use in educational and public outreach materials.

4. PROPOSAL SUBMISSION INFORMATION

4.1 NOTICE OF INTENT TO PROPOSE

NASA strongly encourages all prospective proposers to submit a Notice of Intent in accordance with the schedule in Section 4.3. Proposers must prepare this Notice of Intent in English and submit it electronically using the form found at Internet URL <http://props.oss.hq.nasa.gov>. Anyone experiencing difficulty with this process should call Ms. Deborah Tripp for assistance at (202) 554-2775 (email dtripp@hq.nasa.gov).

To the extent that the proposer knows the following information by the due date, the Notice of Intent should include:

- (a) Name, institutional address, telephone number, E-mail address, and fax number of the Principal Investigator, and
- (b) Title of the proposed investigation, a brief statement of the scientific objectives, and the NEAR facility instrument(s) relevant to the investigation.

4.2 FORMAT AND CONTENT OF PROPOSALS

Appendix A contains general NASA guidance for proposals, and NASA considers this guidance binding unless specifically amended in this AO. In order to facilitate evaluation, NASA also requires a uniform proposal format, described in Appendix B, for all proposals submitted in response to this AO. Failure to follow this outline may result in reduced ratings during the evaluation process, or in extreme cases, could lead to rejection of the proposal without review.

4.2.1. CERTIFICATION

An official of the PI's institution who is authorized to certify institutional support and sponsorship of the investigation, as well as the management and financial parts of the proposal, must sign the proposal.

4.2.2. QUANTITY

Proposers must provide 20 copies of their proposal, plus the original signed proposal.

4.2.3. SUBMITTAL ADDRESS

Proposals must be delivered to:

NASA NEAR Participating Scientist Program
Jorge Scientific Corporation
400 Virginia Avenue, SW Suite 700
Washington DC 20024

Point of contact for commercial delivery: Ms. Deborah Tripp, telephone: (202) 554-2775.

4.2.4. DEADLINE

The organization at the address above must receive all proposals by 5:00 PM, Eastern Standard Time, by the closing date specified in Section 1.3. NASA will treat all proposals received after the closing date in accordance with NASA's provisions for late proposals (Appendix A, Section VII).

4.2.5. NOTIFICATION OF RECEIPT

NASA will notify the proposers in writing that their proposals have been received. Proposers not receiving this confirmation within two weeks after submittal of their proposals should contact the address given in Section 4.2.3.

4.2.6. CONTACT FOR FURTHER INFORMATION

Dr. Thomas H. Morgan
NEAR Program Scientist
Research Program Management Division
Code SR
NASA Headquarters
Washington, DC 20546-0001
Telephone: (202) 358-0828
E-mail: <tmorgan@hq.nasa.gov>

4.3 NON-U.S. PROPOSALS

Non-U.S. proposers need not submit a Cost Plan unless NASA-supported U.S. individuals are involved in the proposal, but must follow all other specifications given in this section. Non-U.S. proposers must have their proposals reviewed and endorsed by their appropriate government agency. An endorsed original of the proposal should be sent to the NASA Space Science and Aeronautics Division (address given in Appendix B) and should arrive before the deadline for receipt of proposals. The additional copies of the proposal, including one copy with original signatures, should be sent directly to the address given in Section 4.2.3 above.

Appendix B contains additional guidelines for non-U.S. proposers.

5. PROPOSAL EVALUATION, SELECTION, AND IMPLEMENTATION PROCEDURES

5.1 EVALUATION CRITERIA

The fundamental goal of the evaluation process is to identify scientific ideas and unique theoretical and analytical capabilities that best meet the scientific objectives of the NEAR mission as described in this Announcement. Accordingly, the following criteria, listed in descending order of importance, will be used in evaluating all proposals submitted in response to this Announcement:

1. The scientific and technological merit of the proposed investigation and its relevance to this specific opportunity and to the established mission plans and objectives.

Factors of equal priority that will be considered in determining the scientific and technical merit of a proposal also include the following:

- A clear understanding of the NEAR mission, its instruments and its scientific and technical capabilities, particularly those related to the proposed investigation.
 - Feasibility of the proposed investigation using the instrument and the data returned from it and a clear statement of the instrument data required for the proposed investigation.
 - The ability, capabilities, and commitment of the investigator to participate in planning, collection, reduction, and evaluation of the data to be submitted to the PDS for archiving in the specified amount of time. A description of the specific data products that will be produced by the investigation should also be included.
2. The competence and relevant experience of the proposing PI and any proposed support personnel as an indication of their ability to perform the proposed technical tasks and carry the investigation to a successful conclusion.
 3. Realism and reasonableness of total costs and the comparison of these costs to the available funds. Total costs will be considered to include not only those proposed for scientific investigation and science data analysis, but also the impact the proposed investigation may have on space mission operation costs.
 4. Management considerations, including demonstrated capability to adhere to sound business practices.
 5. The commitment of the PI's institution, as measured by the willingness of the institution to provide the necessary support (logistics, facilities, etc.) to ensure that the investigation can be completed satisfactorily.

5.2 EVALUATION AND SELECTION PROCEDURES

Proposals received in response to this Announcement will be evaluated in accordance with the provisions of NASA Federal Acquisition Regulations (FAR) 1870.102, Appendix I (Guidelines for Acquisition of Investigations). All proposals will be subjected to a preliminary screening by NASA to determine their suitability and responsiveness to the Announcement. Proposals that are not responsive to the intent of the Announcement will be handled as correspondence and returned.

Following this preliminary action, the scientific and technical aspects of each proposal will be assessed by a panel composed of scientific and technical peers of the proposers. The purpose of this peer evaluation will be to determine the scientific and technical merit of each proposal, expressed in terms of its strengths and weaknesses. Members of the NEAR Science Team will be asked to provide written reviews on the technical feasibility of the proposed investigations with respect to both capabilities of the NEAR instruments and also the investigations already planned by the science team.

After these evaluations, an *Ad Hoc* Subcommittee of the Space Science Steering Committee (SSSC), composed entirely of Civil Servants, will consider the proposal evaluations, together with additional information regarding management and cost aspects, and categorize the proposals according to the following definitions:

Category I: Well-conceived and scientifically and technically sound investigations pertinent to the goals of the program and the Announcement's objectives and offered by a competent investigator from an institution capable of supplying the necessary support to ensure that the investigation can be delivered on time and within budget. Category I investigations are recommended for selection, and normally may be replaced only by other Category I investigations.

Category II: Well-conceived and scientifically and technically sound investigations that are recommended for acceptance, but at a lower priority than Category I.

Category III: Scientifically and technically sound investigations that require further development. (For the purpose of this AO, there is neither funding nor time to allow further development of Category III proposals; any Category III proposals will be treated as Category IV).

Category IV: Proposed investigations that are recommended for rejection for this particular opportunity, for any reasons.

Following the evaluations described above, the NASA Program Scientist will develop a recommendation for selection of Science Team members. This recommendation, and all peer review and categorization materials for all proposals, will be submitted to the SSSC, appointed by the Associate Administrator for Space Science, which will review all materials for adherence to NASA policies and procedures, and completeness. The SSSC will then submit these materials to the co-signers of the AO for final selection. The Science Program Director for Solar System Exploration has been designated the selection official by the Associate Administrator for the Office of Space Science. These selections will be final; no Accommodation Phase or Science Confirmation Review is planned for these investigations.

5.3 IMPLEMENTATION PROCEDURES

Following the selection, the PI's of the selected investigations will be notified immediately by telephone, followed by formal written notification. Proposers of investigations that were not selected will be notified in writing and offered an oral debriefing.

6. CONCLUSION

The Discovery program represents a challenging new way for NASA to carry out scientific exploration of the solar system. NASA invites you to participate in proposals for Science Team membership in the NEAR mission.

Carl B. Pilcher
Science Program Director
Solar System Exploration
Office of Space Science

Alan N. Bunner
Science Program Director
Structure and Evolution
Office of Space Science

Appendix A

General Instructions and Provisions

I. INSTRUMENTATION AND/OR GROUND EQUIPMENT

By submitting a proposal, the investigator and institution agree that NASA has the option to accept all or part of the offeror's plan to provide the instrumentation or ground support equipment required for the investigation, or NASA may furnish or obtain such instrumentation or equipment from any other source as determined by the selecting official. In addition, NASA reserves the right to require use of Government instrumentation or property that subsequently becomes available, with or without modification, that meets the investigative objectives.

II. TENTATIVE SELECTIONS, PHASED DEVELOPMENT, PARTIAL SELECTIONS, AND PARTICIPATION WITH OTHERS

By submitting a proposal, the investigator and the organization agree that NASA has the option to make a tentative selection pending a successful feasibility or definition effort. NASA has the option to contract in phases for a proposed investigation and to discontinue the investigative effort at the completion of any phase. NASA may desire to select only a portion of the proposed investigation and/or that the individual participates with other investigators in a joint investigation. In this case, the investigator will be given the opportunity to accept or decline such partial acceptance or participation with other investigators prior to a NASA selection. Where participation with other investigators as a team is agreed to, one of the team members will normally be designated as its leader or contact point. NASA reserves the right not to make an award or cancel this Announcement of Opportunity at any time.

III. SELECTION WITHOUT DISCUSSION

The Government intends to evaluate proposals and award contracts without discussions with offerors. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint. However, the Government reserves the right to conduct discussions, if later determined by the Contracting Officer to be necessary.

IV. NONDOMESTIC PROPOSALS

See Appendix B, Section VII, Sub-Section G.

V. TREATMENT OF PROPOSAL DATA

It is NASA policy to use information contained in proposals and quotations for evaluation purposes only. While this policy does not require that the proposal or quotation bear a restrictive notice, offerors or quoters should, in order to maximize protection of trade secrets or other information that is commercial or financial and confidential or privileged, place the following notice on the title page of the proposal or quotation and specify the information, subject to the notice by inserting appropriate identification, such as page numbers, in the notice. In any event, information (data) contained in proposals and quotations will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

RESTRICTION ON USE AND DISCLOSURE OF PROPOSAL AND QUOTATION INFORMATION (DATA)

The information (data) contained in (insert page numbers or other identification) of this proposal or quotation constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed for other than evaluation purposes; provided, however, that in the event a contract is awarded on the basis of this proposal or quotation, the Government shall have the right to use and disclose this information (data) to the extent provided in the contract. This restriction does not limit the Government's right to use or disclose this information (data), if obtained from another source without restriction.

VI. STATUS OF COST PROPOSALS

The investigator's institution agrees that the cost proposal submitted in response to the Announcement is for proposal evaluation and selection purposes, and that, following selection and during negotiations leading to a definitive contract, the institution may be required to resubmit or execute all certifications and representations required by law and regulation. Because the value of awards will be less than \$500,000, submission of a Standard Form (SF) 1411 Contract Pricing Proposal Cover Sheet is not required.

VII. LATE PROPOSALS

The Government reserves the right to consider proposals or modifications thereof received after the date indicated for such purpose, if the selecting official deems it to offer NASA a significant technical advantage or cost reduction. (See NFS 18-15.412.)

VIII. SOURCE OF SPACE INVESTIGATIONS

Investigators are advised that candidate investigations for space missions can come from many sources. These sources include those selected through the Announcement of Opportunity, those generated by NASA in-house research and development, and those derived from contracts and other agreements between NASA and external entities.

IX. DISCLOSURE OF PROPOSALS OUTSIDE THE GOVERNMENT

NASA may find it necessary to obtain proposal evaluation assistance outside the Government. Where NASA determines it is necessary to disclose a proposal outside the Government for evaluation purposes, arrangements will be made with the evaluator for appropriate handling of the proposal information. Therefore, by submitting a proposal, the investigator and institution agree that NASA may have the proposal evaluated outside the Government. If the investigator or institution desires to preclude NASA from using an outside evaluation, the investigator or institution should so indicate on the cover. However, notice is given that if NASA is precluded from using outside evaluation, it may be unable to consider the proposal.

X. EQUAL OPPORTUNITY

For any NASA contract resulting from this solicitation, the clause at FAR 52.222-26, Equal Opportunity, shall apply.

XI. PATENT RIGHTS

A. For any NASA contract resulting from this solicitation awarded to other than a small business firm or nonprofit organization, the clause at NFS 18-52.227-70, New Technology, shall apply. Such contractors may, in advance of a contract, request waiver of rights as set forth in the provision at NFS 18-52.227-71, Requests for Waiver of Rights to Inventions.

B. For any NASA contract resulting from this solicitation awarded to a small business firm or nonprofit organization, the clause at FAR 52.227-11, Patent Rights--Retention by the Contractor (Short Form), (as modified by NFS 18-52.227-11) shall apply.

XII. RIGHTS IN DATA

Any contract resulting from this solicitation will contain the Rights in Data - General clause: FAR 52.227-14.

Appendix B

Guidelines for Proposal Preparation

The following guidelines apply to the preparation of proposals in response to an Announcement of Opportunity. The material is a guide for the proposer and not intended to be encompassing or directly applicable to the various types of proposals that can be submitted. The proposer should provide information relative to those items applicable or as required by the Announcement. In the event of an apparent conflict between the guidelines in this Appendix and those contained within the body of the AO, those within the AO shall take precedence.

I. GENERAL GUIDELINES

All documents must be typewritten in English, use metric units, and be clearly legible. Submission of proposal material by facsimile, electronic media, videotape, floppy disk, etc., is not acceptable. In evaluating proposals, NASA will only consider printed material. Proposals may not reference a World Wide Web site for any data or material needed to understand or evaluate the proposal.

The proposal must consist of only one volume, with readily identified sections corresponding to items A through F given in section III below. Note the guidance on page count for the various sections specified in Table B-1.

In order to allow for recycling of proposals after the review process, all proposals and copies must be submitted on plain white paper only (e.g., no cardboard stock or plastic covers, no colored paper, etc.). Proposers are requested not to use three-ring binders. Photographs and color figures are permitted if printed on recyclable white paper only. The original signed copy (including cover page, certifications, and non-U.S. endorsements) should be bound in a manner that makes it easy to disassemble for reproduction. Except for the original, two-sided copies are preferred. Every side upon which printing appears will be counted against the page limits.

II. PAGE LIMITS

While there is no limit on the total size of the proposal, there are limits on the sizes of several key components. See Table B-1. Proposals may contain fold-out pages up to a size of 11 x 17 inches (28 x 43 cm), but such fold-out pages count as two pages on each printed side against the page limit. All pages other than fold out pages shall be 8.5 x 11 inches or A4 European standard.

Table B-1: Page Limits for Proposals

Section	Page Limits
A. Cover Page/Investigation Summary	Use form from web site (see III.A below)
B. Table of Contents	1
C. Description of Scientific Investigation	15
D. References	No limit
E. Resume, Relevant Experience, Curriculum Vitae (total for all named personnel)	5
F. Management Plan and Budget	No limit

Single- or double-column format is acceptable. In complying with the page limit, no page should contain more than 55 lines of text and the type font should not be smaller than 12-point Times (i.e., approximately 15 characters per inch). Figure captions should be in 12 point. Figures and cost tables may contain smaller font as long as they are easily legible.

III. CONTENTS OF PROPOSALS

The content of each proposal is described below.

A. COVER PAGE/INVESTIGATION SUMMARY

All proposals must be prefaced by an integrated Cover Page/Proposal Summary that contains important, required information (see below). Produce this item by first entering the requested information electronically through the World Wide Web site given in Section 4.1 of this AO. Section 4.1 also provides a point of contact for any proposer who does not have access to the Web or who experiences difficulty in using the specified site. Use a printed copy of the electronically submitted form to obtain original signatures of the PI and an official from the proposing institution to submit with the original copy of the proposal. In addition, use reproductions of this original *Cover Page/Proposal Summary* to preface the required printed copies of the proposal.

The electronic *Cover Page/Proposal Summary* form will provide a block of space (about one page in length) for a self-contained Proposal Summary of the proposed research activity. The Proposal Summary is intended to provide background and perspective to the interested reader and, therefore, should include the following key information:

- A description of the key, central objectives of the proposed research in terms sufficient for a nonspecialist not familiar with the document to grasp its essence; and,
- A statement of methods proposed to accomplish those proposed objectives.

Note: NASA intends to publish the proposal title, the PI name and institution, and the Proposal Summary of every selected investigation in a public data base. Therefore, the Proposal Summary should not include proprietary information that would preclude its unrestricted release (see also Appendix A, Section V).

Changes (such as whiteout or strikethrough) to the printed Cover Page/Proposal Summary are not permitted. The proposer may make needed changes to the information submitted electronically only by editing the electronic submission following the instructions at the World Wide Web site given in Section 4.1 of the AO. After submitting the final Cover Page/Proposal Summary electronically, the proposer must then print the correct and final version and obtain the necessary signatures.

Note: The authorizing institutional signature now also certifies that the proposing institution has read and is in compliance with the three required certifications printed in full at the end of this Appendix. NASA does not, therefore, require institutions to separately submit these certifications with the proposal.

B. TABLE OF CONTENTS

The proposal should contain a table of contents which parallels the outline provided below in Sections C through F of this Appendix.

C. DESCRIPTION OF SCIENTIFIC INVESTIGATION

The description should include the scientific objectives of the proposed investigation, what data are needed in order to perform the investigation, operational constraints that must be met while acquiring the data, how the data will be analyzed, and how the data products will be used to achieve the scientific objectives.

Scientific Goals and Objectives. This section should consist of a discussion of the goals and objectives of the investigation, the value of the investigation to the scientific understanding of Eros (or Mathilde) in particular, asteroids in general, and the overall advancement of the Solar System Exploration theme of Space Science, and the relationships to past, current, and future investigations and missions. It should describe the history and basis for the proposal and should discuss the need for such an investigation. Those proposing to analyze gamma ray burst data should also discuss how their investigations will contribute to the Structure and Evolution of the Universe Theme and the need for the investigation.

Data Requirements. The NEAR science instrument whose measurements are required, the measurements to be taken in the course of the NEAR Eros encounter, and the approach that will be taken in analyzing this data to achieve the scientific objectives of the investigation should be discussed. This description should identify the quality of the data to be returned (resolution, coverage, pointing accuracy, measurement precision, etc.), as well as the quantity of data needed (bits, images, etc.) for the proposed investigation. The relationship between the data products generated and the scientific objectives should be explicitly described, as should the expected results..

Mission Requirements. This section should describe any expected unusual requirements and constraints on the operation of the mission as the data are acquired (Note that any such requirements that are judged untenable during proposal evaluation may be reason for the proposal to be downgraded).

Education/Public Outreach Requirement. OSS has developed a comprehensive approach for making education at all levels (with a particular emphasis on precollege education) and the enhancement of public understanding of space science integral parts of all of its missions and research programs. The two key documents that establish the basic policies and guide all OSS Education and Outreach activities are a strategic plan entitled *Partners in Education: A Strategy for Integrating Education and Public Outreach Into NASA's Space Science Programs (March 1995)*, and an accompanying implementation plan entitled *Implementing the Office of Space Science (OSS) Education/Public Outreach Strategy (1996)*. Both can be accessed by selecting Education and Outreach from the menu on the OSS homepage at URL <<http://www.hq.nasa.gov/office/oss>>, or from Dr. Jeffrey Rosendhal, Office of Space Science, Code S, NASA Headquarters, Washington, DC 20546-0001, USA.

NEAR, as a Discovery class mission, has an established Education/Public Outreach program. Because of the limited scope of this program, NASA does not expect a stand-alone Education/Public Outreach proposal component to be submitted with each research proposal. NASA does encourage the participating scientists to become involved in and support the existing Education/Public Outreach program directed by the NEAR Project Office at APL. Therefore, proposers may include an optional Education/Outreach section to cover up to 5% of their time supporting such activities, which may include, but not be limited to, coming up with ideas for creative and worthwhile educational materials; preparing written background information suitable for primary and secondary school educational resources; and preparing portions of the NEAR data for use in educational and public outreach materials.

D. REFERENCES

This section must provide a list of reference documents used in the proposal. The documents themselves cannot be submitted except as a part of the proposal and included within the prescribed page count.

E. RESUME, RELEVANT EXPERIENCE, CURRICULUM VITAE

This section should describe the capabilities of the Principal Investigator and any other named personnel for carrying out the proposed investigation. A summary of relevant experience should be included, along with a short version of investigator's curriculum vitae. Proposers should be sure to describe the skills and relevant experience being offered in support of the special needs for the NEAR instruments.

F. MANAGEMENT PLAN AND BUDGET

The cost plan should summarize the total investigation cost using the categories of cost given below. The first page should give a summary for the total effort, covering both fiscal years, and the following pages should give a summary for each fiscal year beginning with Fiscal Year 1999.

The categories of cost should include the following:

1. **Direct Labor**--List by labor category, with labor hours and rates for each. Provide actual salaries of all personnel and the percentage of time each individual will devote to the effort.
2. **Overhead**--Include indirect costs. Usually this is in the form of a percentage of the direct labor costs.
3. **Materials**--This should give the total cost of the bill of materials, including estimated cost of each major item. Include lead time of critical items,
4. **Subcontracts**--List those over \$25,000, specify the vendor and the basis for estimated costs. Include any baseline or supporting studies.
5. **Special Equipment**--Include a list of special equipment with lead and/or development time.
6. **Travel**--List estimated number of trips, destinations, duration, purpose, number of travelers, and anticipated dates.
7. **Other Costs**--Costs not covered elsewhere.
8. **General and Administrative Expense**--This includes the expenses of the institution's general and executive offices and other miscellaneous expenses related to the overall business.
9. **Fee** (if applicable).

If the effort is sufficiently known and defined, a funding obligation plan should provide the proposed funding requirements of the investigations by quarter and/or annum keyed to the work schedule.

IV. ADDITIONAL GUIDELINES APPLICABLE TO NON-U.S. PROPOSERS ONLY

The following guidelines are established for non-U.S. responses to NASA's AO. Unless otherwise indicated in a specific announcement, these guidelines indicate the appropriate measures to be taken by non-U.S. proposers, prospective non-U.S. sponsoring agencies, and NASA leading to the selection of a proposal and execution of appropriate arrangements. They include the following:

1. Where a "Notice of Intent" to propose is requested, prospective non-U.S. proposers should write directly to the NASA official designated in the AO and send a copy of this letter to the Space Science and Aeronautics Division, Code IS, NASA Headquarters, Washington, DC 20546-0001, U.S.A.
2. Unless otherwise indicated in the AO, proposals will be submitted in accordance with this Appendix excluding cost plans. Proposals should be typewritten and written in English.
3. Persons planning to submit a proposal should arrange with an appropriate non-U.S. governmental agency for a review and endorsement of the proposed activity. Such endorsement by a non-U.S. organization indicates that the proposal merits careful consideration by NASA and that, if the proposal is selected, sufficient funds will be available to undertake the activity envisioned.
4. An endorsed original of the proposal and letters of endorsement from the non-U.S. governmental agency should be sent to:

Ms. Wavalene N. Barnes
Space Science and Astronautics Division
Code IS
NASA Headquarters
Washington DC 20546-0001

These documents must arrive before the deadline established for the AO.

1. Those proposals received after the closing date will be treated in accordance with NASA's provisions for late proposals. Sponsoring non-U.S. government agencies may, in exceptional situations, forward a proposal directly to the above address if review and endorsement is not possible before the announced closing date. In such cases, NASA should be advised when a decision on endorsement can be expected.
2. Successful and unsuccessful non-U.S. proposers will be contacted directly by the NASA Program Office coordinating the AO. Copies of these letters will be sent to the sponsoring Government agency.
3. NASA's Space Science and Aeronautics Division will then begin making the arrangements to provide for the selectee's participation in the appropriate NASA program. Depending on the nature and extent of the proposed cooperation, these arrangements may entail:
 - (a) A letter of notification by NASA.
 - (b) An exchange of letters between NASA and the sponsoring non-U.S. governmental agency.
 - (c) An agreement or Memorandum of Understanding between NASA and the sponsoring non-U.S. governmental agency.

V. CERTIFICATIONS

The following pages contain, for reference only, copies of the three currently required Certifications. Note that the original signature of the Authorizing Institutional Representative on the printed version of the Cover Page submitted with the proposal now verifies that the proposing organization complies with these Certifications; therefore, these Certifications do not have to be independently signed and submitted as in previous Announcements of Opportunity.

**Certification Regarding Debarment, Suspension, and
Other Responsibility Matters**

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participant's responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211).

- (1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
 - (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
 - (d) Have not within three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.
- (2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Certification Regarding Lobbying

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000 for each such failure.

**Certification of Compliance with the NASA Regulations Pursuant to Nondiscrimination
in Federally Assisted Programs**

The (*Institution, corporation, firm, or other organization on whose behalf this assurance is signed, hereinafter called "Applicant "*) hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352), Title IX of the Education Amendments of 1962 (20 U.S.C. 1680 et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and the Age Discrimination Act of 1975 (42 U.S.C. 16101 et seq.), and all requirements imposed by or pursuant to the Regulation of the National Aeronautics and Space Administration (14 CFR Part 1250) (hereinafter called "NASA") issued pursuant to these laws, to the end that in accordance with these laws and regulations, no person in the United States shall, on the basis of race, color, national origin, sex, handicapped condition, or age be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives federal financial assistance from NASA; and hereby give assurance that it will immediately take any measure necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of federal financial assistance extended to the Applicant by NASA, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which the federal financial assistance is extended to it by NASA.

This assurance is given in consideration of and for the purpose of obtaining any and all federal grants, loans, contracts, property, discounts, or other federal financial assistance extended after the date hereof to the Applicant by NASA, including installment payments after such date on account of applications for federal financial assistance which were approved before such date. The Applicant recognized and agrees that such federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign on behalf of the Applicant.