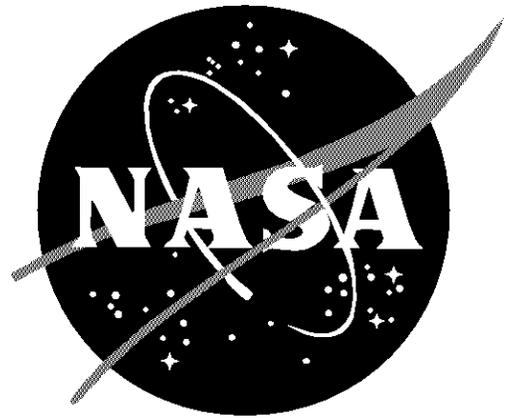




Centre National d'Etudes Spatiales



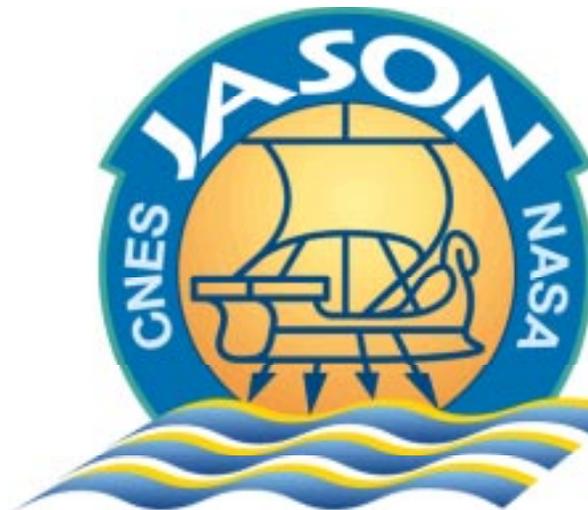
National Aeronautics and Space
Administration

August 19, 1997

NRA-97-MTPE-09
TP2-J0-BC-580-MS-CNES

JOINT RESEARCH ANNOUNCEMENT

JASON-1 SCIENCE WORKING TEAM



Proposals Due December 1, 1997

OMB Approval No. 2700-0087

Jason-1 Science Working Team
Joint NASA/CNES Research Announcement
Soliciting Research Proposals
for
Period Ending
December 1, 1997

NRA 97-MTPE-09
TP2-J0-BC-580-MS-CNES
Issued August 19, 1997

Office of Mission to Planet Earth
National Aeronautics and Space Administration
Washington, DC 20546

Centre National d'Etudes Spatiales
18 Ave Ed. Belin,
31401, Toulouse cedex 04, France

1. Goals of this joint NASA/CNES Research Announcement

The purpose of this NASA/CNES Research Announcement (NRA) is to solicit proposals for the joint US-French Jason-1 satellite altimeter mission. The primary objective of Jason-1 is to provide a continuation of the TOPEX/Poseidon mission's high accuracy radar altimetry measurements for global ocean circulation and sea surface studies for research and operational requirements. Launch of Jason-1 is expected in early 2000. Proposals are especially sought that will contribute to achieving the 1-cm overall accuracy challenge at a basin scale and use of the data for operational purposes.

2. Background

Based on results obtained from the TOPEX/Poseidon (T/P) Prime and Extended Missions, the joint US/French T/P Science Working Team (SWT) has validated T/P altimeter Geophysical Data Records as highly suitable for a wide range of scientific research and applications in physical oceanography. Jason-1 is required to provide the same accuracy as T/P and thus, a continuity of altimetric measurements with the T/P Extended Mission and beyond. A refinement in pre-processing and processing of data (primarily sea-state bias and orbit determination) is expected to provide an increased accuracy.

Like T/P, Jason-1 will provide accurate sea surface topography data to determine the general circulation of the oceans and its role in the Earth's climate. Other objectives are to monitor and interpret regional and global sea level change, to improve knowledge of long term ocean tides and to observe and use for marine meteorology wave-height and wind speed. Additional contribution of Jason-1 data are foreseen in various domains like geodesy, geophysics, shallow water and coastal environment, enclosed sea circulation, inland water and land topography survey.

In addition, it is an objective of Jason-1 to provide a near-real time data and product service for operational activities such as marine nowcasting, and numerical prediction of sea state, ocean circulation, and weather.

These objectives are now being pursued with great success by the TOPEX/POSEIDON Extended Mission, (TPEM) a collaborative effort between the United States (U.S.) and France that began in 1996. The TPEM will extend to six years or more the uniquely accurate time series of altimeter data from T/P.

This research announcement seeks proposals to establish a new SWT for the Jason-1 mission to conduct investigations during the prelaunch and post launch phases of the mission to achieve these goals. Proposals on application demonstrations which intend to prepare future operational systems are also solicited.

3. Program Objectives for the Jason-1 Mission Science Working Team

The main objectives of the joint US/French Jason-1 Science Working Team (SWT) during the prelaunch phase will be:

- to engage in activities that assure compatibility of Jason-1 and T/P data, and
- to consolidate expertise gained in using T/P and Jason-1 data into new approaches enhancing scientific and operational applications.

Use of T/P data in combination with other remote and in-situ observation programs is highly encouraged as a means for evaluating potential Jason-1 performances. Proposals are sought in (but not limited to) the areas given in the following lists:

3.1 Primary Tasks:

- Improvement of orbit determination, sea state bias, and other issues of algorithm refinement aimed at achieving a 1-cm overall system accuracy (at basin scale) for the altimeter data.
- Assurance of continuity of Jason-1 data with T/P data through development of ultra-precise calibration and validation techniques; this objective will take advantage of the expected overlap of some months between T/P and Jason-1.
- Preparation to utilize and use of Jason-1 data in conjunction with other concurrent remotely sensed parameters (e.g. surface winds, ocean color, sea surface temperature), with in-situ data from current networks and/or from programs such as CLIVAR and GOOS, and with models to characterize and understand ocean processes.
- Preparation to utilize and use of Jason-1 data in near-real-time data assimilation for a variety of purposes consistent with CNES/NASA priorities and with relevant national and international programs involving physical oceanography (e.g. seasonal-decadal climate prediction and mitigation of natural hazards).
- Preparation to utilize and use of the long term merged T/P and Jason-1 time series for new research opportunities in domains, like secular sea level changes, long period ocean tides, sea-state climatology.
- Preparation to utilize and use of combined Jason-1 and gravity mission data (e.g. CHAMP and GRACE) to better describe mean ocean dynamic topography and marine geoid.

3.2 Additional Task

- Use of Jason-1 data in conjunction with other satellite and in-situ data to pursue studies on coastal circulation and shallow water tides, geodesy and geophysics, enclosed seas ocean dynamics, inland water level changes and land topography.

In support of education goals, individuals participating in the Jason-1 mission science working team are encouraged to help foster the development of an informed and environmentally aware public through formal and/or informal education. Jason-1 represents an opportunity for NASA and CNES to enhance and broaden scientific literacy of and access to Earth system science. All participants are encouraged to promote general scientific literacy and public understanding of the latest understanding of our environment, appreciation for the Earth sciences, and to influence emerging Earth scientists to pursue study of the Earth as an integrated system.

4. Jason-1 Science Working Team Functions

This NASA/CNES Research Announcement provides for the selection of Jason-1 Science Working Team Members. They will conduct basic research and analysis to fulfill the Program Objectives as described above. The joint Jason-1 Science Working Team functions will intersect with those of the joint US/French Science Team for the TOPEX/POSEIDON Extended Mission. Both teams will work jointly and will be convened at the same meetings.

5. Proposal Requirements

All new Jason-1 Science Working Team Members must propose to carry out peer-reviewed, publishable scientific research using T/P, Jason-1 and other data that will contribute to a successful Jason-1 mission as judged by the quality of the data and its scientific impact.

In the U.S. a Project Scientist will be selected and serve as the primary U.S. liaison between the project and the Science Working Team.

Jason-1 proposals may be submitted by a Principal Investigator (PI) with a number of Co-Investigators (COIs). Selection will depend on the experience and qualifications of the PI and the COIs. Selection will not depend on the qualifications of support personnel. Accordingly, such personnel should be identified only by function and position, e.g., programmer, graduate student, post-doctoral researcher, etc.

NASA anticipates selecting Science Working Team Members for a period of four years. In the event that the Jason-1 launch is significantly delayed, proposals will be reviewed on a case-by-case basis to determine if continued activity is justified. In any case, continuity of support for successful investigators is subject to satisfactory progress and availability of funds.

Initially, the new funding available for US investigators under this NRA will be \$1.45M per year. An additional \$1.05M per year has already been committed by NASA to fund Jason-1 work done by US investigators under the T/P Extended Mission Announcement.

NASA seeks to maximize the return on these funds through a strong partnership with outside investigators and agencies. To this end, proposals that are coordinated with other related and ongoing programs are encouraged. It is essential for proposers to document their funding sources that are relevant to their proposed Jason-1 activities. The funding instruments for this announcement will be either grants or contracts, as appropriate.

Pending the result of the joint NASA/CNES evaluation, the funding available, for French investigators, will come from three different sources:

- National programs (such as PNEDC, PATOM & PNTS) where CNES participates in the joint effort set up by various French R&D organizations,
- the Jason project, (for activities directly related to instruments or system performance),
- Direct funding under CNES budget appropriations for scientific investigations using altimetry in Earth Observation.

For non French, non US proposals, the proponents will have to seek and secure appropriate sources of funding from relevant national authorities.

6. Proposal Submission and Selection Schedule

All prospective proposers are strongly encouraged to submit a letter of intent to propose in response to this announcement by 4:30p.m TUC, on 1 October, 1997. This letter should contain a brief description of the research to be proposed. The actual proposal must not exceed 20 pages (single space) including figures, tables, references (and budget for US and French proposers). Additional information such as curriculum vitae and other relevant information may be attached as an appendix.

All proposals from investigators from the U.S. should be sent to NASA and will be evaluated by a joint NASA/CNES panel. Note that NASA does not fund non-U.S. proposals.

All proposals from investigators from France and Europe should be sent to CNES and will be evaluated by a joint NASA/CNES panel. CNES does not fund non-french proposals.

All other proposals may be sent to either NASA or CNES. They will be jointly reviewed by CNES and NASA.

U.S. investigators already funded under Jason-1 as part of the TPEM NRA will be full and equal members of the larger Jason-1 Science Working Team developed by this announcement. It is the intent of this announcement to form the Jason-1 Science Working Team for a period of four years beginning 1 April 1998. Thus, present U.S. TPEM/Jason-1 investigators are invited to submit letters of intent and proposals detailing supplements to their present work and budgets which would allow their participation in the Jason-1 SWT for the period from 1 April 1998 to 31 March 2002. Such proposals should adequately detail current work, funding and the requested supplements so as to be reviewable without reference to successful TPEM proposals.

All other US investigators as well as non-US investigators already members of the TPEM SWT who are willing to continue working in the Jason-1 SWT are invited to submit letters of intent and proposals detailing supplement to their present TPEM work which would allow their participation in the Jason-1 SWT.

Foreign investigators must secure their funding from sources in their own countries. All proposals submitted in response to this announcement are due 4:30 p.m. TUC, on 1 December 1997. Late proposals will not be considered for review and funding, unless it is judged to be in the interest of the U.S. or French Government.

A complete proposal schedule is given below:

- * Release of NRA 19 August 1997
- * Letter of Intent to propose due 1 October, 1997
- * Proposals due at NASA Headquarters or CNES 1 December, 1997
- * Joint NASA/CNES announcement of final selections will be made in March 1998.

The letter of intent which should not exceed 3 pages in length, should include the following information:

- Name, address, telephone and fax numbers, E.mail, of the Principal Investigator and Co-Investigators
- Name and address of endorsing sponsoring and/or funding organizations
- Specific objectives of the intended investigation

Material in these letters is for information only and is not binding on the signatories

Appendix A provides the instruction for preparing the proposal: Appendix A1 provides the proposal cover sheet for all investigators. Appendix A-2 contains the basic guidance needed for NASA investigators to prepare solicited proposals in response to this announcement and provides the list of required declarations for USA investigators. Appendix A-3 contains the basic guidance needed for investigators to prepare proposals for CNES in response to this announcement. Appendix A4 provides additional guidance for investigators outside the USA or France. Appendix B provides information on Jason-1 scientific management, organization and responsibilities. Appendix C provides succinct description of Jason-1 mission, system and products.

Identifier: NRA 97-MTPE-09, TP2-J0-BC-580-MS-CNES

Submit Letters of Intent (5 copies) and Proposals (ten copies) to NASA (for proposals from USA) or CNES (for proposals from Europe) and either to NASA or CNES (for proposals from other countries)

NASA

Jason-1 Science Working Team
Code Y
1
400 Virginia Avenue, SW, Suite 700
Washington, DC 20024

CNES

CNES, DGA/T/ED/SG, bpi 2002,
Marie-Pierre JEANSON, AO Jason-1
18 Ave Edouard Belin,
31401, Toulouse cedex 4, France

For overnight mail delivery purposes only in USA the recipient telephone number is (202) 554-2775.

Non-USA/France proposals should submit one additional copy of the proposal to both:

NASA Headquarters
Office of External Relations
Internationales
Mission to Planet Earth Division
Mail Code IY
300 E Street, SW
Washington, DC 20546

CNES, DRE/RI
Direction des Relations
A.O. Jason-1,
2 place Maurice Quentin
75039, Paris cedex 01
France

Selecting NASA Official: Director, Science Division, Office of Mission to Planet Earth
Selecting CNES Official: Direction Missions&Programmes, Division Observation de la Terre

Obtain additional general information:

Eric J. Lindstrom
Physical Oceanography Program Manager
Mail Code YS
NASA Headquarters
300 E St. SW
Washington, DC 20546
ph. (202) 358-4540
fax (202) 358-2770
elindstrom@hq.nasa.gov

Yves Menard
Jason-1 Project Scientist
CNES, DGA/T/ED/AL
bp 2002
18 Ave. Ed. Belin
31401, Toulouse cedex 4, France
ph. (33) (0) 5 61 27 48 72
fax (33) (0) 5 61 28 25 95
Yves.Menard@cnes.fr

Your interest and cooperation in participating in this opportunity are appreciated.

William F. Townsend
Acting Associate Administrator for
Missions&Programmes
Mission to Planet Earth

Daniel Hernandez
Sous-Directeur
Direction des Programmes CNES

Appendixes

Appendix User's guide

Appendix A provides instructions for proposal preparation:

- **USA proponents** must refer to appendixes A1 and A2
- **Europeans proponents** must refer to appendixes A1, A3 and A4 (for non-French)
- **Non US and Non-Europeans proponents** must refer to appendixes A1, either A2 (if they submit to NASA) or A3 (if they submit to CNES) and A4

Appendix B provides information on Jason-1 scientific organization

Appendix C provides general information on Jason-1 mission and user's products

Appendixes A

INSTRUCTIONS FOR RESPONDING TO THE JASON-1 RESEARCH ANNOUNCEMENT

Appendix A1: Proposal cover sheet

Appendix A2: NASA instructions

Appendix A3: CNES instructions

Appendix A4: Additional instructions for non-US and non-French

Appendix A1

Proposal Cover Sheet NASA/CNES Research Announcement 97-MTPE-09

Proposal No. _____ (Leave Blank for NASA/CNES Use)

Title: _____

Principal Investigator:

Name: _____

Department: _____

Institution: _____

Street/PO Box: _____

City: _____ **State:** _____ **Zip:** _____

Country: _____ **E-mail:** _____

Telephone: _____ **Fax:** _____

Co-Investigators:

Name	Institution	Telephone
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Budget (for US and French Investigators only):

1st Year: _____ **2nd Year:** _____ **3rd Year:** _____

Total: _____

Authorizing Official: _____
(Name) (Institution)

Appendix A-2

INSTRUCTIONS FOR RESPONDING TO NASA RESEARCH ANNOUNCEMENTS

(JANUARY 1997)

(a) General.

(1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an NRA to be used as the basis of a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual proposals.

(2) A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that NASA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

(3) NRAs contain programmatic information and certain requirements which apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information which applies to responses to all NRAs.

(4) A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to an NRA. NASA will determine the appropriate instrument. Contracts resulting from NRAs are subject to the Federal Acquisition Regulation and the NASA FAR. Supplement. Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).

(5) NASA does not have mandatory forms or formats for responses to NRAs; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.

(6) To be considered for award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.

(b) NRA-Specific Items. Several proposal submission items appear in the NRA itself: the unique NRA identifier; when to submit proposals; where to send proposals; number

of copies required; and sources for more information. Items included in these instructions may be supplemented by the NRA.

(c) The following information is needed to permit consideration in an objective manner. NRAs will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

(1) Transmittal Letter or Prefatory Material.

- (i) The legal name and address of the organization and specific division or campus identification if part of a larger organization;
- (ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;
- (iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;
- (iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;
- (v) Identification of other organizations that are currently evaluating a proposal for the same efforts;
- (vi) Identification of the NRA, by number and title, to which the proposal is responding;
- (vii) Dollar amount requested, desired starting date, and duration of project;
- (viii) Date of submission; and
- (ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization (unless the signature appears on the proposal itself).

(2) Restriction on Use and Disclosure of Proposal Information. Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information contained in proposals 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.

Notice

Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal 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 other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

(3) **Abstract.** Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) **Project Description.**

(i) 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 NRA. 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.

(ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should 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.

(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.

(6) **Personnel.** The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications and any exceptional qualifications should be included. Omit social security number and other personal items which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

(7) **Facilities and Equipment.**

(i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.

(ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative. Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non-research purposes should be explained.

(8) Proposed Costs.

(i) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages; fringe benefits; equipment; expendable materials and supplies; services; domestic and foreign travel; ADP expenses; publication or page charges; consultants; subcontracts; other miscellaneous identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.

(ii) Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired; purpose and estimated number and lengths of trips planned; basis for indirect cost computation (including date of most recent negotiation and cognizant agency); and clarification of other items in the cost proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.

(iii) Allowable costs are governed by FAR Part 31 and the NASA FAR Supplement Part 1831 (and OMB Circulars A-21 for educational institutions and A-122 for nonprofit organizations).

(9) Security. Proposals should not contain security classified material. If the research requires access to or may generate security classified information, the submitter will be required to comply with Government security regulations.

(10) Current Support. For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.

(11) Special Matters.

(i) Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines.

(ii) Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

(d) Renewal Proposals

(1) 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. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

(2) NASA may renew an effort either through amendment of an existing contract or by a new award.

(e) **Length.** Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. Few proposals need exceed 15-20 pages. Necessary detailed information, such as reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of "one-of-a-kind" attachments.

(f) Joint Proposals.

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment which may be required. The proposal must be confined only to that which the proposing organization can commit itself. "Joint" proposals which specify the internal arrangements NASA will actually make are not acceptable as a means of establishing an agency commitment.

(g) **Late Proposals.** A proposal or modification received after the date or dates specified in an NRA may be considered if doing so is in the best interests of the Government.

(h) **Withdrawal.** Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

(i) Evaluation Factors

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal's relevance to NASA's objectives includes the consideration of the potential contribution of the effort to NASA's mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

(i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.

(ii) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the proposal objectives.

(iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.

(iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

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

(j) Evaluation Techniques. Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all cases proposals are subject to scientific review by discipline specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal which is scientifically and programmatically meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k) Selection for Award.

(1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.

(2) When a proposal is selected for award, negotiation and award will be handled by the

procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(1) **Cancellation of NRA.** NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone's failure to receive actual notice of cancellation.

Required declaration (for USA investigators only)

Certification Regarding Debarment, Suspension, and Other Responsibility Matters Primary Covered Transactions

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). Copies of the regulation may be obtained by contracting the U.S. Department of Education, Grants and Contracts Service, 400 Maryland Avenue, S.W. (Room 3633 GSA Regional Office Building No. 3), Washington, DC. 20202-4725, telephone (202) 732-2505.

- (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.

Organization Name

PR/Award Number or Project Name

Name and Title of Authorized Representative

Signature

Date

Required declaration (for USA investigators only)

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements.

The undersigned certifies, to the best of his or her knowledge and belief, that:

(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.

Signature and Date

Name and Title of Authorized Representative

Organization Name

Appendix A-3

INSTRUCTIONS FOR RESPONDING TO CNES RESEARCH ANNOUNCEMENT

A. GUIDELINES FOR PROPOSAL PREPARATION:

The proposals may be written in French or English, but **a full copy in English shall be made available at the time of submission.**

The proposal format outlined below is merely a guide for the prospective proponent. Strict adherence to most of these guidelines is not absolutely necessary. However, page limits will be strictly enforced and proposals should provide information related to all items described below and as otherwise specified in this Announcement.

I. COVER LETTER

A letter or cover page should be forwarded with the proposal. It should be signed by the proponent and an official of the proponent's organization who is authorized to commit the organization to the contents and implementation of the proposal.

II. TABLE OF CONTENTS

The proposal should contain a table of contents.

III. IDENTIFYING INFORMATION

The proposal should contain a short descriptive title for the investigation, the names of all investigators, the name of the organization or institution, the full name of the proposed principal investigator, his address with postal code, his telephone and fax numbers and E-mail and/or telex number.

IV. INVESTIGATION AND TECHNICAL PLAN

The investigation and experimental plan should not exceed 15 to 20 single-spaced pages or printed text, including illustrations, tables, references, bibliographies and biographical information. Information concerning the education, training and relevant experience of the investigators involved in the proposed study should be provided on separate sheets attached to the technical plan. Biographical information of this nature should be limited to two pages or less for each investigator who will play a substantial role in the investigation. Proponents who wish to provide evidence of their experience and competence in particular disciplinary fields are encouraged to quote relevant publications in general scientific literature of which they are the author. References to earlier publications should be limited to major publications that are directly relevant to the proposed investigation. These citations should be included within the two pages allotted to each investigator for biographical information. Proponents should not include lengthy publication bibliographies or copies of specific publications in their proposal.

Information concerning specialized equipment or facilities that will be used during the course of the investigation should not be presented in the technical plan. Information of this nature should be included in the management and cost plans described in next sections.

It is anticipated that a large number of proposals will be received by CNES in response to this Announcement. To expedite the proposal evaluation process and assure fairness to all proponents, the length restrictions described above will be strictly enforced. If a prospective investigator fails to observe the restrictions on proposal length cited above, CNES reserves the right to return the proposal to the proponent upon receipt without further review or evaluation.

The investigation and technical plan will generally contain the following:

IV.1. Summary

A simple, concise statement about the investigation, its conduct and the anticipated results. This summary should not exceed one single-spaced, typewritten pages.

IV.2. Experimental Objectives

Proposals are primarily solicited in the fields indicated in section 3 of the core document of this Announcement. The Proposal should identify and detail its contribution to each of its fields of relevance. For each contribution, a brief description of the technical objectives and their relationship to past research efforts and the current state-of-the-art should be given. The scientific rationale for the proposed investigation should be clearly established through reference to existing scientific literature and other publications. The proposed investigation should be defined in relation to the current state-of-the-art and to the specific objectives of the Jason-1 mission. Proponents are encouraged to define explicit hypotheses that will be tested and/or evaluated by the proposed project.

IV.3. Approach:

The concept of the investigation should be clearly stated and the methods to be employed in data analysis and interpretation should be presented.

IV.4. Experimental and Work Plan:

The overall methodology and the sequence of key milestones of the investigation should be presented in some detail.

The proposal should specifically identify the total amount of Jason-1 data required by the investigation, the desirable form in which it should be delivered to the proposed principal investigator (OSDR, IGDR, GDR or expertise products as described in appendix C). Ancillary types of data or models to be employed in the analysis and interpretation of Jason-1 data should be clearly identified. Sources of ancillary data should be described along with the procedures that will be used to obtain and reduce ancillary data sets. There should be a clear and logical connection between the data that will be employed by the investigation, the information that will be extracted or inferred from these data and the manner in which such information will be used in addressing the objectives of the investigation. The chronological sequence foreseen for the data collection, analysis and interpretation activities envisaged by the investigation should be explicitly described. This sequence of events will be carefully evaluated to ensure that the study can be successfully completed during the proposed lifetime of the investigation. In cases where detailed studies of particular regional areas will be conducted, the proposal should explicitly define the factors that were considered in regional selection. It should be noted that the experimental plan must also include an explicit discussion of those activities planned for the prelaunch phase of the investigation justifying the need for early involvement in the mission.

IV.5. Anticipated Results:

As far as feasible, the expected outcome of the proposed project should be presented. The significance of these results should be discussed, if possible, in terms of their scientific or real-time application interest and implications for future research and development.

IV.6. Significance of the Investigation:

The significance of the proposed study should be defined in terms of its relationship to earlier studies of a similar nature (as those using TOPEX/POSEIDON data) and/or to implications of the anticipated results. The proposal should attempt to characterize the relative degree of innovation associated with the objectives or approach of the proposed study. In addition, the proposal should attempt to characterize the importance of the anticipated results in relation to the current state of knowledge within particular disciplinary fields. The extent to which the anticipated results will influence the definition and conduct of future research and/or operational projects on similar or related topics should be discussed in the proposal.

V. MANAGEMENT PLAN AND COST PLAN

Management plans are required from all proponents submitting proposals to CNES.

Cost plans are required by CNES from French proponents and French participants in non-French proposals.

The investigation and technical plans and the management and cost plans will be reviewed independently during the various stages of the proposal evaluation process described in the last section of this appendix.

V.1. Management Plan

The management plan should summarize the management approach and the facilities and equipment required.

Management

The management plan sets forth the investigator's approach for efficiently managing the work, the recognition of essential management functions and the effective overall integration of these functions. If ancillary data are needed, the method for obtaining these data should be detailed.

The management plan gives insight into the organization proposed for the work, including the internal operations and lines of authority with delegations, together with internal interfaces and relationships with CNES, major subcontractors and associated investigators. It also mention the link (if any) with other national or international programs. Likewise, the management plan usually reflects various schedules necessary for the logical and timely pursuit of the work, accompanied by a description of the Principal Investigator's work plan, the amount and responsibilities of the scientific collaborators (if any) and the amount and responsibilities of the technical collaborators (if any).

Facilities and Equipment

All major facilities and equipment essential to the proposed investigation should be indicated, including those of the investigator's proposed subcontractors and those of CNES and other French Government agencies (or foreign agencies in the case of non-French proposals or joint proposals). Existing equipment should be explicitly differentiated from facilities that will be developed to implement the investigation. Procurement schedules and lead times for the acquisition and installation of new equipment and facilities should also be indicated. Since these investigations will focus on Jason-1 data analysis, the development of new equipment and facilities will be limited only to the support required for these analyses.

V.2. Cost plan (French investigators only)

The cost plan should summarize the total investigation cost by major categories of cost as well as by function.

Cost categories

- **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.

- Travel: This should give the estimated number of trips, destinations, duration, purpose, number of travellers and anticipated dates.

As a rule, direct labour and overhead costs will not be considered.

The cost borne by the PI organization or the organization endorsing the proposal (and signing the cover letter) should be clearly identified as well as those for which support will be requested to other organizations.

Detailed cost schedule

Separate schedules for each year, in the above format, should be attached to show total cost allocable to the following

- Principal Investigator and scientific collaborators costs.
- Data reduction and analysis including the amount and cost of computer time.
- Cost of auxiliary data (if any) to be acquired by the investigator.
- Cost of field studies.

B. PROPOSAL EVALUATION, SELECTION and IMPLEMENTATION

I. TENTATIVE SELECTION, PHASED DEVELOPMENT, PARTIAL SELECTION.

By submitting a proposal, the investigator and his institution agree that CNES has the option to make a tentative selection pending a successful feasibility or definition study of the proposed investigation and, in addition, upon confirmation of the availability of adequate financial support by the proponent's funding agency. Furthermore, CNES has the option to contract in phases for implementation of a proposed investigation and to discontinue the development of an investigative effort at the completion of any phase.

The investigator should also understand that CNES may desire to select only a portion of the proposed investigation in which case the investigator will be given the opportunity to accept or decline such partial acceptance. In cases in which two or more proposals address similar topical problems and/or adopt similar approaches to Jason-1 data analysis, CNES may desire joint participation on the part of two or more proponents in a single data analysis project. Where joint participation with other investigators is agreed to, a single individual will be designated as the PI for the investigator group.

II. SELECTION WITHOUT DISCUSSION OR AFTER LIMITED DISCUSSION

CNES reserves the right to reject any or all proposals received in response to this Announcement when such action shall be considered in the best interest of the French Government. Notice is also given of the possibility that any selection may be made without discussion or after limited discussion.

III. NON-FRENCH PROPOSALS

All non-French proposals will compete on an equal basis with proposals originating within France and will go through the same review evaluation, selection and confirmation process.

Should a non-French proposal be selected, CNES will make arrangements with the sponsoring foreign agency for the proposed participation on a cooperative (no-exchange-of-funds) basis, in which CNES and the sponsoring agency will each bear the cost of discharging its respective responsibilities, including travel and subsistence for its own personnel.

Non-French proponents must submit a Management Plan, such as described in section A of this appendix. In cases where the participation of a French individual is included in a proposal submitted by a non-French Principal Investigator and where it is anticipated that such participation will be supported by CNES and other French Research institutions, a Cost Plan covering such participation must be submitted to CNES as part of the proposal. This Cost Plan must be signed by the French proponent and certified by his institution. Such costs will be considered in the review and evaluation of proposals submitted by non-French individuals.

Sponsoring agencies may, in exceptional circumstances, forward in anticipation copies of unendorsed proposals to CNES if review and endorsement are not possible, before the specified deadline. In such cases, CNES should be advised when endorsement can be expected.

Non-French individuals who plan to participate as CoIs in a proposal submitted by a French PI must have such participation reviewed and endorsed by their appropriate governmental agency before proposals involving such participation can be selected in the selection process. Evidence of such review and endorsement should be provided at the time that the proposal is submitted or as soon as possible thereafter. Formal arrangements for such participation will be made by CNES International Affairs after selection of the proposed investigation.

All other correspondence from non-French proponents and their sponsoring organizations should be sent to CNES International Affairs (see address in core text).

IV. EVALUATION AND SELECTION PROCEDURES

All proposals received by CNES in response to this Announcement will be initially screened to determine their general relevance to the objectives stated in section 3 of this Announcement. Proposals considered to be unresponsive to the stated objectives of this Announcement will be returned to their authors immediately with a written explanation of this determination. Such proposals will not be considered further by CNES.

Those proposals considered to be responsive to the Announcement objectives will subsequently be peer-reviewed by a technical and scientific panel composed of individuals

with widely recognized expertise in the scientific fields covered by the Jason-1 mission. Experts pertaining to the International Scientific Community are expected to participate in this panel. The purpose of this review will be to evaluate the scientific and technical merit of each proposed investigation in terms of its strengths and weaknesses. Those proposals considered to be responsive to the Announcement and having scientific merit will be further jointly reviewed by CNES and NASA to determine their technical feasibility and compatibility with the overall Project Plan.

Proposals which do not request funds will be subjected to the same review and evaluation procedures as those proposals requiring financial support.

Final decisions concerning the acceptance of individual proposals will be made by the NASA-CNES Joint Steering Group for the Jason-1 programme on the basis of the recommendation by the review panel(s). These decisions will also take into consideration the overall balance between different scientific disciplines, the availability of funds and other mission-related resources.

After this selection, the investigations will enter the Jason-1 Science Investigation Plan and Principal investigators and Co-investigators will be active members of the Jason-1 Science Working Team

V. EVALUATION CRITERIA

The fundamental goal of the investigation process is to identify unique ideas and capabilities which best suit the overall scientific, technological and pre-operational objectives of the Jason-1 mission, as described in section 3 of the core text. All the following criteria, listed in descending order of importance, will be used by CNES in evaluating individual proposals:

1. the relevance of the proposed investigation to the Jason-1 specific opportunity and to the established experiment objectives quoted in section 3 of the core text of this Announcement.
2. the scientific and technological merit of the investigation, including the topical importance of the proposed study within a specific disciplinary field and the probability of achieving positive results,
3. the need for and planned contribution of the Principal Investigator and any collaborators to prelaunch and post-launch mission planning activities,
4. the competence and relevant experience of the Principal Investigator and any collaborators as an indication of their ability to carry the investigation to a successful conclusion,
5. the reputation and interest of the investigator's institution, as measured by the willingness of the institution to provide the necessary support to ensure that the investigation can be completed satisfactorily.

In the event that ancillary data is crucial to the success of the proposed investigation, the proposal must clearly indicate the adequacy and practicality of any plan to acquire these data. In addition to the criteria listed above, cost (when relevant) and management factors will be considered separately in all selections. Management aspects include the time and attention that the Principal Investigator plans to devote personally to the investigation.

VI. IMPLEMENTATION

It is currently expected that official notifications of acceptance or rejection will be jointly issued by CNES and NASA on March 1998.

Selected investigators will subsequently be contacted by a representative of CNES to discuss the specific terms under which the investigation will be implemented.

VII. TREATMENT OF PROPOSAL DATA

a. Commercial and Financial Data

It is CNES policy to use commercial and financial data included in proposals for evaluation purposes only. Where it is the practice of a proponent or his proposed subcontractor to treat certain commercial and financial data as a trade secret and such data is protectable as a trade secret under law, he may apply the "Notice" of paragraph b, below, to those portions to be maintained as a trade secret.

In any event, commercial and financial data submitted to CNES in a proposal will be protected to the extent permitted under the law, either as a properly noticed trade secret, or as commercial or financial information received from a person and considered confidential or privileged.

b. Technical Data

It is CNES policy to use the technical data contained in any proposal submitted in response to this Announcement for evaluation purposes only. Where any such technical data constitutes a trade secret under the law and the proponent or his potential subcontractor desires to maintain trade secret rights in such technical data, the following "Notice" must be affixed to the cover sheet of the proposal specifying the pages of the proposal which contain trade secrets to be restricted in accordance with the conditions of the "Notice". It is CNES policy to protect technical data labelled in this fashion as a trade secret. CNES assumes no liability for use or disclosure of any proposal technical data to which the "Notice" has not been applied.

"NOTICE"

"Data on page(s)... of this proposal constitute a trade secret. They are furnished to CNES in confidence with the understanding that they will not, without permission of the proponent, be used or disclosed other than for evaluation purposes. In the event a contract is awarded on this proposal CNES may obtain, in the contract, additional rights to use and disclose these data".

VIII. INVENTION AND DATA RIGHTS

Within the implementation of an investigation selected under this Announcement of Opportunity, the Principal Investigator will be required to inform CNES within eight days of any patent or model request deposited for the protection of inventions which may result from the work performed.

Whenever the Investigator may decide not to deposit such a patent or model request, CNES reserves the right to do so and if so, in compliance with the terms of the MoU for "Jason-1".

The Investigator is required to grant CNES a royalty-free license to use patent and models deposited as a result from the work performed under this Announcement.

The Investigator may use the Jason-1 data only for purposes related to his selected investigation. The Investigator is required to ask for CNES or NASA approval before distribution of any Jason-1 expertise, IGDR or OSDR data to a third party non-member of the Jason-1 Science Working Team. He should inform CNES or NASA about the distribution of GDR data to a third party non-registered in CNES or NASA data center.

As a general rule, it is understood that the investigator on the one hand and CNES on the other hand and under the terms of the aforementioned MoU, can use and disclose, without restriction, the data generated through the selected investigation.

Appendix A-4

GUIDELINES FOR FOREIGN PARTICIPATION

NASA and CNES accept proposals from entities located outside the U.S. and France, respectively (hereafter termed foreign entities) in response to this NRA. All proposals from Europe should be sent to CNES when all other proposals should be sent either NASA or CNES.

Proposals from foreign entities should not include a cost plan. Foreign proposals or proposals that include foreign participation must be endorsed by the respective government agency or funding/sponsoring institution in the country from which the foreign participant is proposing. Such endorsement should indicate the following points: (1) The proposal merits careful consideration by NASA/CNES; and (2) If the proposal is selected, sufficient funds will be made available by the sponsoring foreign agency to undertake the activity as proposed.

Proposals, along with the requested number of copies and Letter of Endorsement must be forwarded to NASA or CNES in time to arrive before the deadline established for this NRA. In addition, one additional copy of each of these documents should be sent to:

NASA Headquarters
Office of External Relations
Internationales
Mission to Planet Earth Division
Mail Code IY
300 E Street, SW
Washington, DC 20546

CNES, DRE/RI
Direction des Relations

Jason-1 Research Announcement
2 place Maurice Quentin,
75039, PARIS Cedex 01,
France

Any materials sent by courier or express mail to NASA should include the street address 300 E Street, S. W., and substitute 20024 for the indicated ZIP code.

All proposals must be typewritten in English. All foreign proposals will undergo the same evaluation and selection process as those originating in U.S. or France. Foreign proposals or proposals that include foreign participation, must follow all other guidelines and requirements described in this NRA. Sponsoring non-U.S. non-French agencies may, in exceptional situations, forward a proposal without endorsement to the above addresses, if review and endorsement are not possible before the announced closing date. In such cases, however, NASA's Mission to Planet Earth Division of the Office of External Relations and CNES External Relation office should be advised when a decision on the endorsement is to be expected.

Successful and unsuccessful proposers will be contacted directly by NASA and/or CNES program offices. Copies of these letters will be sent to the sponsoring government agency. Formal arrangements for the participation of the selected investigators in the programme will be made by CNES and NASA External Relation Offices.

Appendix B

JASON-1 SCIENTIFIC MANAGEMENT, ORGANIZATION AND RESPONSIBILITIES

The purpose of this Appendix is to describe the management approach for the science activities associated with the Jason-1 mission and the authority, responsibilities and interfaces of key participants in the mission.

I. ROLE OF THE JASON-1 SCIENCE WORKING TEAM

The timing of this Announcement is aimed at establishing an International Jason-1 Science Working Team (SWT) to advise CNES and NASA on implementation trade-offs from the point of view of the ultimate users of Jason-1 data.. Before launch, the SWT will work to assist and guide the Jason-1 Project in the optimisation of the Jason-1 mission within the constraints and resources of the Jason-1 systems. After launch, the PIs will have the responsibility of demonstrating through their investigations the scientific utility of Jason-1 data to the international research community.

The SWT will:

- assist the Project in the detailed definition and planning of the Jason-1 mission,
- assist the Jason-1 Project in the definition of Project/science interfaces,
- participate in reviews to coordinate science requirements and to advise the Project in mission decisions and on the way they might affect science objectives and investigations,
- assist and advise the Projects in identifying, planning, coordinating and conducting data verification activities,
- jointly discuss and coordinate among all members data analysis techniques and methods as well as the publication of the scientific results of investigations related to Jason-1,
- communicate Jason-1 plans and progress to, and coordinate with, related research programmes and pre-operational and operational programmes

II. RESPONSIBILITIES AND ROLE OF THE SWT PROJECT SCIENTISTS

Two Project Scientists are designated by CNES and NASA. They are responsible for creating the optimum conditions and mechanisms for maximizing the scientific return from Jason-1 within the applicable constraints. They will therefore coordinate the overall investigation plan, the planning and conduct of Jason-1 validation activities, encourage cooperation between investigation teams and with other investigator teams as appropriate and act as the principal science advisors to the CNES and NASA Project Manager and Programme Manager. They will also harmonize science requirements, plans and field experiments with other organizations, whether private, academic, national or international.

As chairman of the SWT, they will be the primary interfaces between the Principal Investigators and the Project on matters of scientific interest, they will represent the SWT in activities not requiring participation of all team members, they will report and pass recommendations to the NASA/CNES Joint Steering Group for Jason-1 on behalf of the SWT.

III. RESPONSIBILITIES OF THE PRINCIPAL INVESTIGATORS (PIs)

Each PI has full responsibility for:

- the conduct of the selected investigation including the cost, development and implementation of pre- and post-launch activities,
- the direction and coordination of the acquisition of any ancillary data necessary for the investigation, the analysis of all relevant data and the publication of scientific results.

Other specific activities of the PI include :

- allocating work assignments among and managing the activities of his Co-Investigators,
- ensuring that the investigation design is appropriate to the objectives and consistent with the capabilities of the Jason-1 mission,
- developing and maintaining adequate documentation regarding the investigation and preparing periodic progress summaries for the Jason-1 Project Scientist,
- planning, conducting and coordinating (with the Jason-1 Project) verification activities, over and above those conducted by the Project,
- identifying, planning and conducting prelaunch activities to assist the Projects in detailed definition and planning of the Jason-1 mission within the constraints and resources available,
- reporting the results or representing the interests of his Cols at all meetings of the SWT.

Appendix C

JASON-1 MISSION, SYSTEM AND PRODUCT DESCRIPTION

I. MISSION OBJECTIVE

The importance of altimetry data to better understand the ocean circulation and its impact on the climate of the Earth led to the TOPEX/Poseidon mission. With the launch of this mission began a data collection that must continue well into the next century in order to monitor the inter-annual evolution and separate transient phenomena from secular variations.

Thus Jason-1 will also use an Earth orbiting satellite equipped with a radar altimeter and other instruments to directly measure sea surface elevation along a fixed grid of sub-satellite groundtracks and thereby continue the data collection started with TOPEX/Poseidon. The sea surface height measurement will be to an accuracy of 4.2 cm or better with respect to a reference ellipsoid in order to meet the mission objective. Thus it is the aim of the follow-on to TOPEX/Poseidon, the Jason missions, to provide on a continuous basis, i.e. for a minimal period of 20 years or more, the same high accuracy altimetric measurements designed to study ocean circulation and sea surface elevation.

To this end, the Jason Project will design, develop, integrate and test a satellite system with its suite of instruments to be launched in early 2000 to ensure data continuity between TOPEX/Poseidon and Jason.

Jason shall also be considered as an operational altimetry mission. Therefore, distribution of altimetric products in near real time (3 hours data latency) for assimilation in operational meteorological and ocean models has also been included in the mission objectives.

II. PROJECT SYSTEM DESCRIPTION AND DEFINITION

II.1 Measurement technique

Radar altimetry from space is the only proven technique for observing ocean circulation and sea level on a global, quantitative and systematic basis. The accurate measurement of the shape of the sea surface is the only physical variable measurable from space that is directly connected to the large scale movement of water and the total mass and volume transport of the ocean. Indeed, the direction and magnitude of ocean currents can be inferred from the deflections of the "ocean topography".

The ocean topography is obtained through two basic measurements, first the satellite range above the sea surface using the altimeter and then the radial distance from the satellite to the reference ellipsoid using precise orbit determination systems.

The altimeter uses radar pulses to measure precisely the distance between the satellite and the ocean surface by measuring the time it takes for the emitted pulse to return. The shape of the echo also allows wave height and wind speed to be estimated.

Geophysical corrections are then applied to compensate the measurement errors introduced by propagation through the troposphere and through the ionosphere. The following features provide these corrections :

a) A two frequency altimeter is used for precise ionospheric correction consistent with the error budget.

b) A three frequency radiometer is required to meet the error budget requirement for the wet tropospheric correction.

The satellite precise position is calculated using data coming primarily from the Doris precise orbit determination system and also from the GPS system and the Laser system.

The heart of the Doris system is the Doris beacon permanent network. It includes about 50 beacons emitting a signal at 2 frequencies. The on board package, essentially a radio receiver is designed to accurately measure the carrier frequency of incoming signals. Whenever the receiver is within visibility of a transmitting beacon (situated at a known location), it measures the Doppler shifts in the two transmit frequencies. The second one is used to eliminate errors due to ionospheric propagation delays. Analysis of tracking data, combined with a mathematical model of the forces acting on the satellite allows for the refinement of positional data.

The GPS POD system is made up : 1) a dual frequency GPS receiver on the satellite with receiving antennas, 2) the existing globally distributed network of 150 GPS receivers that make up the IGS network, and 3) the existing GPS data processing center at JPL.

A laser retroreflector provides a reference target for laser tracking measurements which are necessary to calibrate the precise orbit determination system and the altimeter system several times throughout the mission.

II.2. Satellite description

The Jason Altimetry Program provides several satellites to ensure the continuity of the mission over a twenty year period. Some overlapping period between two satellites may also occur.

The satellite includes the launcher adaptor, the satellite bus and the instruments constituting the payload.

The satellite bus itself is then made up of a platform and a payload module.

The platform comprises the support functions for on orbit operations, including provision of electrical power, command and data handling, telecommunications, thermal control, propulsion/orbit maintenance, and primary structure.

The payload module provides mechanical, electrical, thermal and dynamical support to the Jason instruments.

The nominal Jason payload consists of :

- a two frequency altimeter called Poseidon-2 and its antenna
- a three frequency radiometer and its antenna
- the Doris on board package is made of :
 - the Doppler receiver (MVR)
 - the ultra stable oscillator (USO)
 - the associated antenna
- a laser retroreflector array
- a GPS space receiver and up to four (4) antennas

Altimeter (Poseidon 2):

The two frequency solid state altimeter is derived from the single frequency Poseidon altimeter and operates at 13.575 GHz and 5.3 GHz. Poseidon 2 electronics is configured in two boxes, the processing unit (PCU) and the RF unit (RFU). Poseidon 2

antenna will be of centered type (1.2 meter diameter) and located on the nadir face of the satellite.

Radiometer (JMR):

The three frequency microwave radiometer consists of three separate channels at 18.2, 23.8 and 34 GHz , the central frequency being redundant. The 23.8 GHz channel is the primary water vapor sensor. The 34 GHz channel provides a correction for non raining clouds and the 18.2 GHz channel provides the correction for effects of wind-induced enhancements in the sea surface background emission. The antenna will be a fixed offset paraboloid and will be located on the front of the satellite.

Doris :

The complete Doris system includes the Doris on board package, a network of approximately 50 beacons located around the world and a ground system. The on board package includes the receiver itself, the ultrastable oscillator and an omnidirectional antenna located on the nadir face of the satellite. It will include a dual beacon receiving capability and an on-board real time function (DIODE for 'Détermination Immédiate d'Orbite par Doris EmbarquÉ') to compute the orbit ephemeris accurate to 50 centimeters (1 sigma).

Laser reflector array :

The laser reflector array will be placed on the nadir face of the satellite. It will consists of several quartz corner cubes arrayed as a truncated cone with one in the center and the others distributed azimuthally around the cone.

GPS :

The Turbo Rogue Space Receiver (TRSR) is a twelve channel Global Positioning system receiver. The on board package is comprised of a down-converter processor assembly, up to four antennas and interconnecting RF cables. The purpose for the GPS is to provide supplementary positioning data to Doris in support of the POD function and to enhance and/or improve gravity field models. The baseline configuration of the TRSR has one zenith pointed antenna.

Satellite Bus Description:

The Jason satellite bus will be derived from the PROTEUS (Plate Forme Reconfigurable pour l'Observation de la terre, les Telecommunications et les Utilisations Scientifiques) platform today in development at CNES. A Jason specific payload module will be added to this platform for the payload instruments accommodation.

II.3. Launcher description:

Launch of the Jason satellite will be provided by NASA. The launch vehicle will be a Delta II 7920, a 2-stage liquid rocket with 9 solid propellant motors strapped to the first stage. Launch will be from Vandenberg Air Force Base over the Western Test Range.

II.4. Ground-system description.

The ground system consist of a control ground system and a mission ground system:

The control ground system includes :

- a Satellite Control Center (CCC) located in Toulouse

This center monitors the satellite during the complete mission life time. Satellite control and operations are executed from this center until the end of the assessment phase

- a Project Operation Control Center located in Pasadena (POCC)

This center will be operational from the end of the assessment phase and will control the satellite and the associated instruments for the remainder of the mission.

- an earth terminal network

The planned configuration is to have one earth terminal located in Fairbanks, Alaska and the second one in Aussaguel (France). If a third earth terminal is added, its location could be Wallops (TBC).

The Earth Terminal Network performs satellite telemetry capture, its recording and distribution to the control centers and to the mission centers. The earth terminals also perform the uplink commanding to the satellite.

The mission ground system includes :

- a CNES mission system including :

- a mission center (SSALTO : Segment Sol Multimission Altimétrie et Orbitographie)

The mission center functions are :

- instrument programming and monitoring (altimeter and Doris)
- commands requests generation (altimeter and Doris).
- mission management and operation plan definition.
- Precise Orbit Determination (POD) algorithm definition and POD data production and validation.
- scientific altimeter data processing and validation of altimetry

product

- data distribution and archiving

- the Doris system beacons network

- a NASA mission center (part of the JPL POCC)

The mission center functions are :

- instrument programming and monitoring (Radiometer and GPS)
- command requests generation (Radiometer and GPS).
- scientific altimeter data processing and validation of altimetry

product in parallel

with the CNES mission center

- operational altimeter data processing and (TBC) validation
- data distribution and archiving

III. PRODUCT DESCRIPTION.

III.1. Real-time products

The real time level 2 product is the Operational Sensor Data Record product (OSDR). It is a wind/wave product essentially dedicated to meteorological users. It contains: time, location, Ku-Band significant waveheight, Ku-band and C-band sigma naught, wind speed (from Ku-band data), water vapour correction from the JMR, Ku-band and C-band altimeter ranges, orbit data (state vector / altitude, **TBD**) and quality information derived from onboard data to help users editing the data.

It is noticeable that near real time products will have limitations/constraints from the available data: their segmentation will be driven by the dump over the ground stations.

The OSDR product is a non validated product. 75% of the OSDR data will be distributed within 3 hours after on-board acquisition, 95% within 5 hours after on-board acquisition.

III.2. Off-line level 2 products

Level 2 data are produced from the altimeter level 1b data, combined with precision orbit from POD, microwave radiometer data from the JMR, and a series of auxiliary data. There are 3 types of offline level 2 products.

IGDR

The Interim Geophysical Data Records (IGDR) product essentially contains information concerning: range orbital altitude, associated instrumental, environment and geophysical corrections, wave height, backscatter coefficient and wind speed, water vapour from the JMR.

In particular, it is noticeable that ground retracking of altimeter waveforms is systematically applied.

The IGDR product is a non fully validated OFL product. 95% of IGDR data will be distributed within 3 days after on-board satellite acquisition.

GDR

The Geophysical Data record (GDR) product formally contains the same information as the IGDR product with a series of parameters computed with updated and more accurate inputs such as the orbit.

The GDR product is a fully validated and ultimate OFL product. 95% of GDR data will be distributed within 30 days after satellite acquisition.

SGDR

The SGDR product contains all information included in the GDR plus information from level 0 and level 1b (for instance, waveforms) altimeter data. It is dedicated to altimeter experts interested in qualifying the performances of the instrument itself; it also answers requirements from science users looking at altimeter measurements for non usual ocean conditions essentially. Such users as land/lake users often perform their own processing of altimeter data using dedicated waveform retracking methods and all environment and geophysical corrections. It will be produced and distributed on request.

The SGDR product is a fully validated OFL product.

In addition to these «standard» products, a certain number of specific products will be made available upon request to users for expertise (see below).

III.3 Level 2 product summary

The basic geophysical altimeter product list and the major characteristics of each product are summarized in the following table:

Major characteristics of the product	OSDR	IGDR	GDR
Content	non validated level 2 product of the Wind/Wave type	non validated geophysical level 2 product	fully validated geophysical level 2 product
Alt. ground retracking	Not applied	Applied	Applied
Orbit information source	DORIS Navigator	Preliminary orbit	Precise orbit
Data latency / Data availability	3 hours / 75% 5 hours / 95%	3 days (down to 1 day, TBC) / 95%	3-4 weeks / 95%
Structure	segment	pass	pass
Packaging	segment	TBD	cycle
Ground Processing mode	systematic	systematic	systematic
Ground Processing centers	NASA Mission Center (CNES Mission Center**)	NASA and CNES Mission Centers	NASA and CNES Mission Centers

** CNES will systematically produce OSDR products during the verification phase with no constraint on production delays. CNES will continue the OSDR production during the observational phase for specific verification and expertise goals.

III.4. Expertise products

- Altimeter and radiometer

The following table lists the main characteristics of the altimeter and radiometer products that can be used by expert users for specific instrument performance analysis.

Major characteristics of the product	Altimetric SGDR	JMR Level 0	JMR Level 1b
Content	fully validated geophysical data plus waveforms	Raw radiometer scientific data	geolocated, calibrated brightness temperatures
Alt. ground retracking	applied	N/A	N/A
Orbit information source	precise orbit	N/A	TBD
Data latency / Data availability	3-4 weeks / 95%	(acquisition, downloading) interval	<3 working days

Structure	pass	pass (consolidated data)	pass
Packaging	cycle	cycle	cycle
Ground Processing mode	on request	systematic	systematic
Ground Processing centers	CNES Mission Center	NASA Control Center CNES Mission Center	NASA and CNES Mission Centers

- DORIS and GPS data

The following table lists the main characteristics of the tracking data products that can be used by orbit users for expertise and computation of orbit ephemeris using their own orbit determination schemes.

Details about content and format of the products listed in the table are yet to be determined.

Major characteristics of the product	DORIS level1b	GPS Level 1b
Content	pre-processed DORIS data	pre-processed GPS data
Data latency / Data availability	3-4 weeks	3 - 4 weeks
Structure	TBD	TBD
Packaging	TBD	TBD
Ground Processing mode	systematic	systematic
Ground Processing centers	CNES Mission Center	CNES Mission Center

- Other available user products

The following table lists the main characteristics of complementary products that can be used for specific purposes (for instance, expertise on product quality). These are the orbit ephemeris products.

Major characteristics of a product	DORIS Navigator Orbit*	Preliminary Orbit	Precise Orbit
Content	Position, Velocity	Position, Velocity	Position, Velocity
Data latency	3 hours	3 working days (down to 1 day, TBC)	3-4 weeks
Structure	TBD	TBD	TBD
Packaging	TBD	TBD	cycle
Ground Processing mode	TBD	systematic	systematic
Ground Processing centers	TBD	CNES Mission Center	CNES Mission Center