EUROPEAN COMMISSION
JOINT RESEARCH CENTRE
Institute for Remote Sensing Applications
VEGETATION International Users Committee
Secretariat

VEGETATION

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VEGETATION Preparatory Programme

CALL for PROPOSAL #1

Prepared by G. Saint
Programme Scientist

Approved by JP Malingreau
Chairman
International Users Committee

I-21020 Ispra (VA) Italy Tel: +39-332-789335 Fax: +39-332-789536 Telex: 380058 EUR I

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SUMMARY

1. INTRODUCTION

Investigations related to this Call for Proposal must be designed to contribute to the preparation of use of data which will be provided by the VEGETATION system.

Through this Call for Proposal, the VEGETATION International Users Committee (IUC) solicits Proposals to prepare the user community at large, both from the partners of the programme and from other countries or international entities, to the integration of VEGETATION data into its projects. Selection of the Proposals will be performed by the International Users Committee on the basis of their relevance to the objectives of the system and of their quality, both for scientific purposes and for operational applications. The following priorities have been defined as essential to the development and the promotion of the system:

- support for development or improvement of applications, primarily for the sectorial policy of the European Union (for agriculture, forestry, environment...)
- R&D on the use of remote sensing data (problems associated with scaling, integration of high frequency and high resolution data, multitemporal analysis or modeling, spectral studies mainly in the short wave infrared),
- development leading to an enhancement of the definition of the proposed products or to algorithms to be implemented in the Ground Processing Segment.

The IUC plans to select at most about 100 projects : these projects will be selected from proposals made in response to two Calls for Proposal, the present one and a second one that will be issued around the end of 1995. The selected projects will preferably be conducted in two phases : a pre-launch phase, using only simulated data sets, and a post-launch phase where actual data acquired through the validated VEGETATION system will be made available for final conclusions. The results of the investigations should be made available to the VEGETATION Programme and to the entire user community through publications, documentation, workshops and symposia.

2. INVESTIGATION GOALS AND OBJECTIVES

The basic objectives of the VEGETATION Preparatory Programme are :

i. to foster development of methodologies for the use of medium spatial resolution and high frequency remote sensing data for vegetation studies,
ii. to prepare the integration of VEGETATION data sets into existing projects or projects still under development which are routinely using or will use similar data sets before 1997.

The investigations proposed in response to this Call for proposal should contribute to the above goals of the VEGETATION Preparatory Programme.

Propositions to the Call for Proposal should focus on the following fields :

1. support for development or improvement of applications or scientific projects using VEGETATION type data to better evaluate the impact of the use of VEGETATION on the quality and operationality of the projects and to prepare the integration of VEGETATION products into the systems and procedures which contribute to the objectives of these projects. A high priority will be given to projects which are related to the sectorial policies of the European Union, and to activities, both for application and for science, which are supported either by the European Union or by the partners of the programs. For this category of investigation, proposals should concentrate on the impacts of specific VEGETATION characteristics such as : « almost real time » access to any region, multitemporal measurements, capability to mix VEGETATION and high spatial resolution data (both from simultaneous SPOT acquisitions and other sensor systems), the short wave infrared spectral band, the « experimental » blue band for possible atmospheric effects characterization.
2. development of methodologies for the use of remote sensing data. This will be considered only when the specific characteristics of VEGETATION offer new capabilities or imply research and development activities to improve the quality of informations which can be extracted from the VEGETATION products. The topics which are priorities for selection are the following : multiscale analysis using simultaneous or asynchronous high spatial resolution data and possibly ground sampling techniques, multitemporal analysis related to the dynamics of the surface processes, physical and biophysical parameters extraction
3. definition of improved products that could be generated by the VEGETATION Ground segment making full use of the specific characteristics of the system. The capability to improve the standard VEGETATION products is a specification for the entire system and will be possible with a frequency of every 18 months to two years

For information, as an indication of the weight that will be assigned to each of the above priorities, the following distribution was defined by IUC as being a good sharing of the interest of the program : about 50% of the effort should deal with support to projects (field 1), 30% on methodological development (field 2) and 20% on definition of improved products (field 3).

3. ORGANIZATION OF THE VEGETATION Preparatory Programme

The total budget for the VEGETATION Preparatory Programme is 2MECU, representing about 2% of the total cost of the VEGETATION Programme for development of the first flight model and Ground Segment. This budget will be devoted to specific studies that could be contracted directly and to investigations that will be selected through Calls for Proposals with the objectives described above.

After the selection of Proposals has been made by the IUC, the technical and scientific follow-up will be the responsibility of the Programme Scientist and the IUC, and all financial management aspects will be the responsibility of CENTRE NATIONAL D'ETUDES SPATIALES acting as the « Maître d'Oeuvre » of the VEGETATION Project.

3.1 Investigations

Investigations will be selected after this first Call for Proposal. It is planned that each investigation should preferably be separated into two phases that should be described in the proposals :

1. a prelaunch phase where data sets « similar » to those that could be provided by the actual system will be used. During this phase, investigations should address all methodological and development problems.
2. a postlaunch phase, where the conclusion of the prelaunch phase should be adapted and discussed, using actual VEGETATION data sets.

No duration is imposed on the investigations during the first phase. However, the schedule of each investigation should be adapted to provide an intermediate report on the activities and on preliminary results after about one year from the beginning.

For the second phase, final results are expected to be reported about one year after the system is declared operational.

3.2 Information exchange and reporting

To maintain a high level of communication between the Programme and the investigators and to foster exchanges within the VEGETATION user community, meetings will be organized by the IUC at several critical stages of the investigations. It is envisaged to have three to four meetings for each investigation : a kick-off meeting, after each selection is announced where each investigator team will have to present its research plan and expected results, an intermediate meeting where investigators will present their Intermediate Report and a final meeting where all the results of the two phases will be presented by the investigators and discussed.

3.3 Funding

The total funds available for the investigations is a little less than 2 MECU (from 1.6 to 1.8 MECU). In principle, the selected investigations will be funded with a maximum participation of 50% from the VEGETATION Programme where only material, data and travel costs should be considered (direct labor costs will not be considered). It is also desired that funds allotted to the selected investigations are sufficient to allow for an efficient contribution to the objectives of the retained projects. During the selection phase, the IUC reserves the right to retain much less than 50 proposals for each Call for Proposal if it is deemed necessary to increase the funding level to some selected investigations

No decision has been taken concerning the generation and provision of simulated data sets by the Programme. Therefore the proposal should separately and clearly describe and justify the cost of generating the necessary simulated data sets with the assumption that they will have to be generated as part of the investigation. For actual VEGETATION data that will be used in the post launch phase, the proposal does not have to mention costs but the actual data sets should be clearly described in terms of product nature, area to be covered, dates of acquisition, preferred format and support.

The Data Simulation Plan and Data Cost Plan which must be part of the proposal as described in Appendix A will be the basis for interaction between the Programme Scientist and investigators with respect to simulated and other data distribution.

3.4 Planning

The investigations selected after this first Call for Proposal should begin in February 1995, to continue with the postlaunch phase with a nominal launch date of October 1997.

3.5 Proposal preparation

The proposal should be prepared following the guidelines given in Appendix A. It is required that all proposals include the Investigation and Technical Plan and the Management/Cost Plan. If a prospective investigator fails to observe the requirements given in Appendix A, the IUC reserves the right to return the proposal to the proponent upon receipt without further review or evaluation.

3.6 Proposal submission

The proposals should be sent in 12 copies to the following address :

Institute for Remote Sensing Applications
VEGETATION International Users Committee
attention : Gilbert SAINT
Joint Research Center
I-21020 ISPRA (Varese) Italy

They should be received no later than October 15 1994.

3.7 Selection procedure and criteria

The selection will be led by the IUC, possibly with external expertise from specialized internationally recognized experts. The following criteria will be used:

1. the relevance of the proposed investigation to the VEGETATION Preparatory Programme specific opportunity and to its objectives,
2. the scientific and technical merit of the investigation, together with its importance within the objectives of the Programme,
3. the feasibility of accomplishing the proposed investigation in the context of the schedule presented above,
4. the acceptance and proposed contribution by the Principal Investigator and any CoInvestigator to participate to the two phases of the Programme,
5. the competence and relevant experience of the Principal Investigator,
6. the reputation and interest of the investigator's institutions,
7. the quality and completeness of the Management/Cost.

1. INTRODUCTION

On behalf of the VEGETATION Programme Steering Committee, the VEGETATION International Users Committee (IUC) announces the opportunity to conduct research and development related to the characterization of terrestrial surface parameters, to the monitoring of agriculture, forestry and pasture productions and to the study of the continental biosphere. Investigations related to this Call for Proposal must be designed to contribute to the preparation of use of data which will be provided by the VEGETATION system.

The VEGETATION Programme is developed jointly by France, the European Commission, Belgium, Italy and Sweden. It is composed of an instrument which will be flown onboard SPOT 4, scheduled for launch in October 1997, and of a ground segment that will process the instrument measurements and make standard products available to the general user community. Its characteristics were tailored to monitor land surface parameters with a frequency of about once a day on a global basis and a medium resolution of about 1km. The VEGETATION system will complement the high resolution capabilities of SPOT, and provide corresponding visible to short wave infrared measurements in four spectral bands. Its original features and its situation onboard SPOT 4 will allow users to have access to :

1. robust and simple multitemporal measurements of the solar reflection domain radiative characteristics of land areas,
2. a continuous and global monitoring of the continental areas either through a centralized archiving and processing facility or using local receiving stations for local or regional studies,
3. long term data sets with accurate calibration and positionning, continuity and consistency through the renewal of the system on further satellites,
4. multiscale approaches using simultaneous measurements acquired through VEGETATION and the High Resolution instruments of the SPOT series in the same spectral bands.

Through this Call for Proposal, the VEGETATION International Users Committee solicits Proposals to prepare the user community at large, both from the Programme partner countries and from other countries or international entities, to the integration of VEGETATION data into its projects. Selection of the Proposals will be performed by the International Users Committee on the basis of their relevance to the objectives of the system and of their quality, both for scientific purposes and for operational applications.

The following domains of investigation have been defined as essential to the development and the promotion of the system itself:

- support for development or improvement of applications, primarily for the sectorial policy of the European Union (for agriculture, forestry, environment...)
- R&D on the use of remote sensing data (problems associated with scaling, integration of high frequency and high resolution data, multitemporal analysis or modeling, spectral studies —mainly in the short wave infrared),
- development leading to an enhancement of the definition of the proposed products or to algorithms to be implemented in the Ground Processing Segment.

The IUC plans to select at most about 100 projects : these projects will be selected from Proposals made in response to two Calls for Proposal, the present one and a second one

that will be issued around the end of 1995. The selected projects will preferably be conducted in two phases : a pre-launch phase, using only simulated data sets and a post launch phase where actual data acquired through the validated VEGETATION system will be made available for final conclusions.

The results of the investigations should be made available to the VEGETATION Programme and to the entire user community through publications, documentation, workshops or symposia.

2. INVESTIGATION GOALS AND OBJECTIVES

The basic objectives of the VEGETATION Preparatory Programme are :

i. to foster development of methodologies for the use of medium spatial resolution and high frequency remote sensing data for vegetation studies : the availability of similar data sets for about ten years (namely from NOAA-AVHRR) has lead to a rapid increase in research activities and applications related to regional and global analyses of the land areas, even when the systems which provided these data sets were not designed to facilitate measurements on vegetation canopies. As VEGETATION will provide products which are specifically tailored to improve quality of such measurements, the user community must develop an ability to extract the most adequate information from these improved kinds of data sets.

ii. to prepare the integration of VEGETATION data sets into existing projects or projects still under development which are routinely using or will use similar data sets before 1997: the specific characteristics of the system were designed to provide products which are adapted to identified projects or programmes, both through their technical features (spectral bands, radiometric and geometric accuracies...) and through the operationality of the entire system (delivery time and quality control for products, long term commitment...). As the design was entirely based on generally known methodologies, it is expected that the VEGETATION data sets will be included almost directly into the existing projects. Improvements related to the quality and adaptation of VEGETATION data sets can also be prepared in advance to benefit from the system as soon as possible after launch.

The VEGETATION Preparatory Programme will be based both on projects which will be selected through Calls for Proposal such as this one and on studies that will be contracted by the Programme to fulfill particular points which are deemed necessary to better define the characteristics of the system. The investigations proposed in response to this Call for Proposal should contribute to the above goals of the VEGETATION Preparatory Programme. Specific fields have been defined by the IUC as priorities for these investigations. They correspond to priorities that should be taken into account in the proposals in order for them to fit better the general objectives. These priorities are based on the most important aspects that should be developed as major sectors where VEGETATION data will be used, taking as much benefit as possible from its specific characteristics and from the capability to associate simultaneous high spatial resolution measurements from the SPOT series.

Propositions to the Call for Proposal should then focus on the following fields :

1. support for development or improvement of applications or scientific projects using VEGETATION type data
    - to better evaluate the impact of the use of VEGETATION on the quality and operationality of the projects

- and to prepare the integration of VEGETATION products into the systems and procedures which contribute to the objectives of these projects.

A high priority will be given to projects which are related to the sectorial policies of the European Union, and to activities, both for application and for science, which are supported either by the European Union or by the partners of the programs. For this category of investigation, proposals should concentrate on the impacts of specific VEGETATION characteristics such as : « almost real time » access to any region, multitemporal measurements, capability to mix VEGETATION and high spatial resolution data (both from simultaneous SPOT acquisitions and other sensor systems), the short wave infrared spectral band, the « experimental » blue band for possible atmospheric effects characterization.

2. development of methodologies for the use of remote sensing data. This will be considered only when the specific characteristics of VEGETATION offer new capabilities or imply research and development activities to improve the quality of informations which can be extracted from the VEGETATION products. The topics which are priorities for selection are the following :

   - multiscale analysis using simultaneous or asynchronous high spatial resolution data and possibly ground sampling techniques. Proposals could emphasize on the association and complementarity of VEGETATION (for frequent acquisitions) and of high spatial resolution systems (for less frequent acquisitions but giving access to spatial heterogeneity for subpixel analysis and/or to information on other biophysical parameters of vegetation canopies),
   - multitemporal analysis related to the dynamics of the surface processes. Proposals could be built on the use of the VEGETATION consistent data sets (calibration, geometric registration accuracies) on different time scales, from seasonal to multi year studies, to address problems related to vegetation or ecosystems functioning and to the interaction between biosphere and climate,
   - physical and biophysical parameters extraction. For this topic, proposals should show benefits due to the spatial and temporal sampling rates which are provided by the VEGETATION products, including all spectral measurements and especially the short wave infrared and blue bands.

3. definition of improved products that could be generated by the VEGETATION Ground segment making full use of the specific characteristics of the system. The capability to improve the standard VEGETATION products is a specification for the entire system and will be possible with a frequency of every 18 months to two years. While the first set of product has now been defined and should be kept for development efficiency, minor modifications might be considered and a definition of evolution for the first update is expected from some investigations. Proposals which focus on that type of investigations should conform to the basic principle which was applied for the first product definition : namely that new products or methods should be widely accepted by the users community at large (through usual exchanges, publication in scientific journals...) and be applicable for products to be delivered to the entire user community and not only for specific applications or geographical areas.

For information, as an indication of the weight that will be assigned to each of the above priorities, the following distribution was defined by IUC as being a good sharing of the interest of the program : about 50% of the effort should deal with support to projects (field 1), 30% on methodological development (field 2) and 20% on definition of improved products (field 3).

3. DESCRIPTION OF THE VEGETATION SYSTEM

(This section is a summary of the specifications which are given in the two annexes on Mission specifications and Products definition)

The overall objectives of the VEGETATION system are to provide accurate measurements of basic characteristics of vegetation canopies on an operational basis,

- either for scientific studies involving both regional and global scales experiments over long time periods (for example development of models of the biosphere dynamics interacting with climate models),
- or for systems designed to monitor important vegetation resources, like crops, pastures and forests.

The VEGETATION system, consisting of a satellite-borne sensor and of its associated ground segment, will provide long term basic measurements adapted to biosphere studies. Opportunities for scale integration are provided by the combination with the main SPOT instruments (HRVIR High Resolution Visible and shortwave InfraRed) which allow high spatial resolution for detailed modelling activities or multilevel sampling procedures. Availability of data to different types of users is facilitated through the centralisation of reception and archiving global data sets. The launch date (nominally October 1997) and duration of the system (5 years of estimated life time for a first model and continuation on future SPOT satellites) are adapted to a systematic and extensive long term monitoring of the biosphere.

Clearly this system will benefit from detailed studies based on other systems that are dedicated to specific studies of the characteristics of remote sensing measurements or to their relationships with surface or processes' parameters. It must be envisaged that the evolution of the mission specifications will have to take into account results of such studies to provide improved characterisation of the biosphere state and dynamics.

3.1 Mission objectives

Three types of mission were identified for the system, taking into account the need for measurements of surface characteristics and the existence of other systems which are already or will provide other measurements which to infer various parameters related to biosphere processes :

• Surface parameters mapping : this is the basic requirement, especially for climate and meteorological studies where boundary conditions have to be prescribed as in the case of General Circulation Models or forecasting models. Factors such as albedo, surface roughness, resistances to heat exchanges —sensible and latent— are important variables for these models and they can be either determined directly from the measurements or inferred from identification of land cover. The seasonal and long-term variations of such variables are related to vegetation dynamics. The capability to identify, through these variations, physical characteristics of land cover is a key to accurate prescription of these variables. Scales addressed in GCM or forecasting models (typically about 100 km) require that land cover and its variability must be determined with a sampling of about 8 to 10km: the basic spatial resolution needed for identification of land cover and its variability is 1 km.

• Agricultural, pastoral and forest production : since the beginning of the land surface satellite remote sensing era (1972), important projects (for example LACIE, AGRISTARS for USDA, MARS for CEC, TREES for JRC/ESA...) have been set up to develop methodologies

and strategies to use remote sensing data either for mapping of land use in anthropogenized or natural ecosystems or for estimation of production potential. Their specific objective was to determine the evolution of productions. This objective had to be adapted to the management of crop production for agricultural exporting countries, to the monitoring of pastoral resources and their dependence from meteorological evolution, to the evaluation of possible global impacts of deforestation and more generally to the need for information related to political or social orientations and decisions.

• Terrestrial biosphere monitoring and modelisation : the contribution of the continental biosphere to the biogeochemical cycles (exchanges of carbon and other trace gases) and to water and energy exchanges is one of the objectives of the development of global models. Interaction with human activities is also one of the main points to be studied, because the effect of human pressure on the biosphere might be one of the means by which man is acting on climate in the long term. Biosphere processes and land cover characterisation are the basis for quantification : estimations of land cover variables as well as the dynamics of these variables have to be made in order to obtain a good understanding of these processes upon which models may be built. Predictions of impact of climate change on the biosphere and of interactions of the biosphere with the climate — either due to natural factors or to human pressure— can only be inferred from quantification and formalisation of the mechanisms by which vegetation cover and ecosystems are functioning. Multilevel series of models have to be developed and linked, ranging from ground studies, local parameterisation and exchange models to regional or global dynamics and interaction models. Remote sensing of the vegetation as shown above offers a unique tool for these developments, providing the specification of the systems be adapted to each particular need.

3.2 System characteristics

Radiometry

Spectral bands		Wavelength	Surface refl. range
Operational :	RED	0.61 - 0.68 µm	0.0 - 0.5
	NIR	0.78-0.89 µm	0.0 - 0.7
	SWIR	1.58-1.75 µm	0.0 - 0.6
Experimental :	BLUE	0.43-0.47 µm	0.0 - 0.5

Radiometric resolution (NE$\Delta\rho$)
RED : 0.001% up to reflectance of 0.10%, linear increase up to 0.003% for reflectance of 0.5%
NIR, SWIR : 0.003% for the entire range
BLUE : 0.003% for the entire range

Intra-image consistency : within an entire image, corresponding to a NE$\Delta\rho$ of 0.005 for any reflectance value

Calibration accuracy :
interband and multitemporal : better than 3%
absolute : better than 5% .

Geometry

Spatial resolution : in both directions 1.15 km at nadir, minimum variations for off-nadir observations

Field of view : maximum off-nadir observation angle of about 50.5° (~2200 km swath width)

Geometric accuracies :

local distortion :	less than 0.3 pixel,
multispectral registration :	0.1 km desired 0.3 km specified
collocation with HRVIR :	0.3 km for the simultaneous acquisitions
multitemporal registration :	0.3 km desired, 0.5 km specified
location accuracy :	better than 500m desired, 1000m specified

Spatial coverage : about 90% of the equatorial areas are imaged each day, the remaining 10 % being imaged the next day. For latitudes higher than 35° (North and South), all regions are acquired at least once a day

Operation specifications

Equator crossing time (descending node) : 10:30 local solar time

Image transmission : All spectral bands at full spatial resolution acquired on terrestrial areas will be stored onboard in a solid state memory, allowing the use of only one receiving station to which data will be transmitted in X band. All the spectral bands will also be transmitted in L band, for possible local receiving stations.

3.3 Products characteristics

The standard products have now been defined by the International Users' Committee. They are adapted to the particular missions described above and coherent as much as possible with the needs of existing projects. Two general categories of users could be identified :

- research teams which are developping methodologies for the use of VEGETATION data or scientific biosphere studies : they generally have a study site (about 500 x 500 km2) and need long time series (one year of daily or weekly data),
- projects which are based on the use of both VEGETATION and other data sets, for which the data delivery has to be fully operational and for long periods, for comparison or historical studies (one continent every day). Typically, these projects are : MARS, TREES, IGBP...

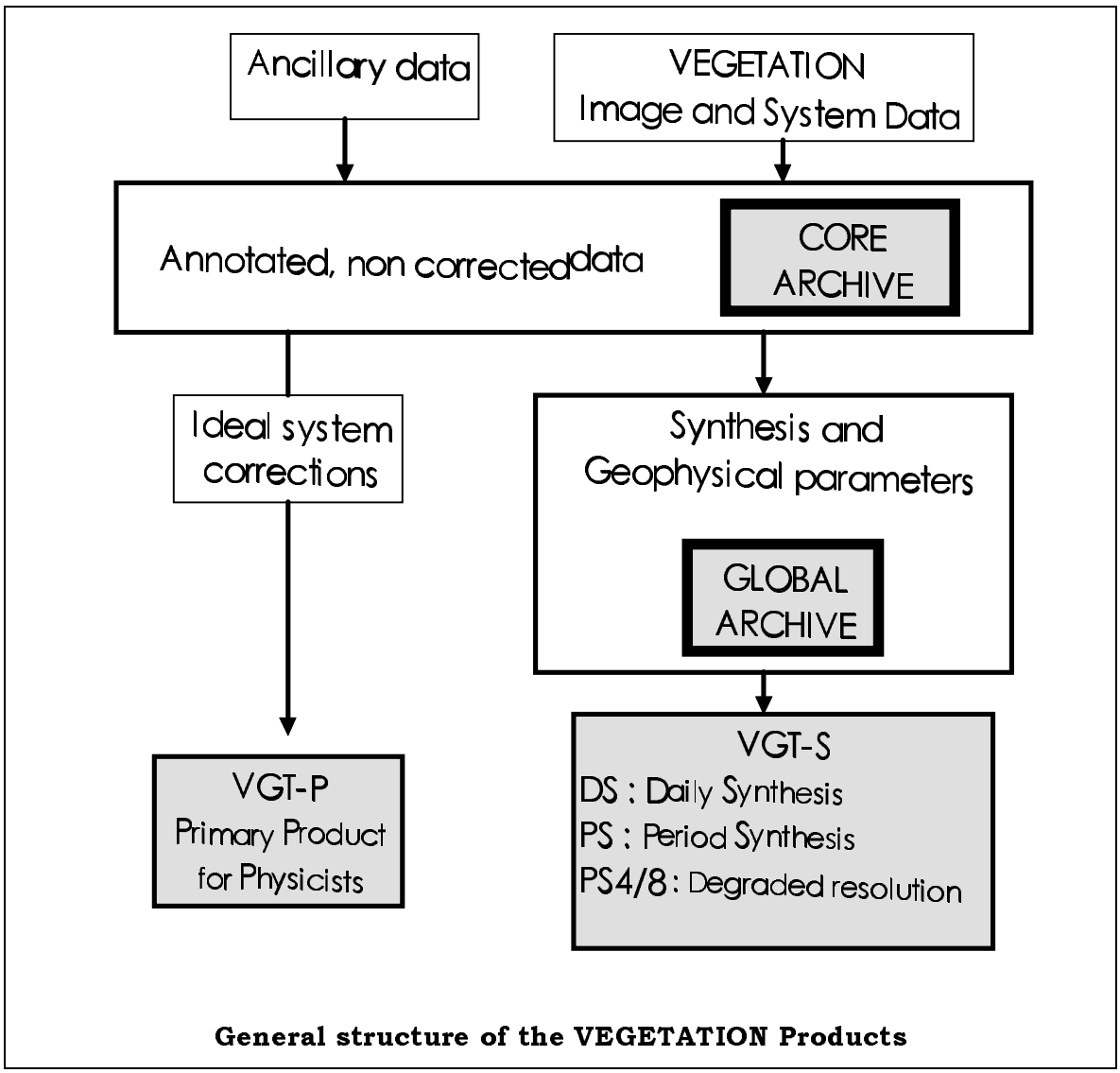
The overall organisation of the different levels as well as the general characteristics of the products are now defined, as shown in the attached figure. To illustrate the special characteristics of the instrument, high priority was given to design products that would allow direct multitemporal registration as well as simple superposition with simultaneously acquired high resolution data.

VGT-P products are adapted for the first type of users for which physical quality of data is important. They correspond to data which would have been acquired by an ideal instrument : they are corrected for system errors (misregistration of the different channels, calibration of all the detectors along the line-array detectors for each spectral bands) and

resampled to geographic projections for multitemporal analysis as well as for comparison with high resolution data. The accuracies given above apply to this data level. Annotations giving full information on applied corrections (calibration information, geometric parameters taking into account attitude and position on the orbit), or for further non-system corrections ("standard" atmosphere parameters) are attached to the data sets.

VGT-S products are most probably the data sets which will be frequently used operationally : they correspond to VGT-P data to which corrections have been applied using the annotations and for which some syntheses are provided :

- a daily synthesis using all available measurements on one day for a specific location,
- a 10-day synthesis, based on the selection of the "best" measurement of the entire period. The selection could be based on the maximum NDVI value, as it is commonly accepted today, even if many problems associated to that selection are identified.



General structure of the VEGETATION Products

To adapt to the evolution of users needs as well as to the validation of new algorithms, a procedure to regularly update the processing system is requested : it should provide

capabilities to include new methods for data correction, synthesis... as soon as they are commonly accepted by the user community.

Support to users will be provided to facilitate the use of VEGETATION data : a catalogue with browsing capability on the data quality (cloudiness) will be accessible through telecommunications lines and usual networks. Validated software templates for the common operations for data handling and standard correction will be made widely available.

3.4 Programme organization

To develop the entire system and prepare its exploitation, the partners set up a structure which is composed of a Steering Committee, an International Users Committee and an Integrated Project Team. The role of each of the entities is the following :

The Steering Committee (SC) gives guidelines concerning the development to all the entities which are part of the Programme :

- it approves the mission specifications and any modification proposed by the International Users Committee (IUC),
- it approves the management and organisation plan submitted by the Integrated Project Team (IPT) and supervises its application, receiving reports on all aspects of the Project Management.

The Steering Committee is composed of representatives of all the partners of the Programme. The chairman of the International Users Committee and the Programme Scientist are observers to the SC.

The International Users Committee (IUC) represents and voices the interests of the international community of remote sensing data users in the VEGETATION Programme. It submits specifications and technical recommendations to the Steering Committee :

- defining the mission and products,
- providing advice to the Programme Scientist regarding modifications to the initial specifications during the development phase,
- preparing technical recommendations regarding data reception, processing, archiving and distribution,
- preparing and managing a VEGETATION Preparatory Programme to stimulate the interest of a broader users community into the capability of the system and to prepare the users to efficient integration of VEGETATION data into their projects,
- proposing orientations for the evolution of the Programme after the launch of the first instrument.

The Programme Scientist ensures coordination between the IUC and the IPT and the secretariat of the IUC. He also manages, on behalf of the IUC, the VEGETATION Preparatory Programme.

The Integrated Project Team (IPT) is in charge of the complete follow-up of the payload and ground segment development and its integration on SPOT 4, until the in-orbit acceptance.

- it drafts all major technical and management specifications in accordance with mission specifications and monitors their application,
- it manages all activities concerning contracts to national industries

The « Maître d'Oeuvre » for the VEGETATION Project is Centre National d'Etudes Spatiales (CNES)

4. ORGANIZATION OF THE VEGETATION Preparatory Programme

The present Call for Proposal is part of the VEGETATION Preparatory Programme which is led by the VEGETATION International Users Committee under executive responsibility of the Programme Scientist. The general orientations of the VEGETATION Preparatory Programme were approved by the VEGETATION Programme Steering Committee. The total budget for the VEGETATION Preparatory Programme is 2MECU, representing about 2% of the total cost of the VEGETATION Programme for development of the first flight model and Ground Segment. This budget will be devoted to specific studies that could be contracted directly and to investigations that will be selected through Calls for Proposals with the objectives described above.

4.1 Responsibilities

While the Steering Committee will have to approve all actions related to it, the VEGETATION Preparatory Programme will be executed under responsibility of the VEGETATION Programme Scientist, with permanent participation of the IUC, especially during the phases concerning the definition of objectives of the Calls for Proposal, the selection of investigations and the evaluation of results. The objectives of the Second Call for Proposal will be defined at a later stage.

After the selection of Proposals has been made by the IUC, the technical and scientific follow-up will be the responsibility of the Programme Scientist and the IUC, and all financial management aspects will be the responsibility of CENTRE NATIONAL D'ETUDES SPATIALES acting as the « Maître d'Oeuvre » of the VEGETATION Project.

4.2 Call for Letters of Intent

The first action of the VEGETATION Preparatory Programme was a Call for Letters of Intent which was issued in March 94. Its objectives were to identify individuals or teams that would be interested to participate to the Programme, to have a survey of topics that were most frequently presented for potential investigations and to assess the need of specific simulated data sets that would have to be generated by any means.

About 180 letters were received and their analysis led to establish the priorities which are outlined in the Investigation Goals and Objectives section. The IUC envisages to select a maximum of about 100 investigations for the entire duration of the VEGETATION Preparatory Programme.

The need for simulated data sets appeared to be quite different depending upon the type of project for which an intention to submit a proposal was declared : for participation to large projects related to fields 1 & 2 of the objectives, a large majority of the letters of intent were indicating that data sets were already existing or were part of the project, thus requiring no specific action from the VEGETATION Preparatory Programme; for other participation, mainly limited in space and time and related to fields 2 and 3, small simulated data sets were expected from the VEGETATION Preparatory Programme.

As it was apparent from the letters of intent that the generation of data sets could lead to a large number of simulations that would be quite different in terms of geographical area, periods (dates and length), type of data (spectral bands, resolutions,...) no decision to generate simulated data sets was taken. Therefore, for each proposal, the need for

simulated data sets will have to be presented in the Data Simulation Plan as described later in Appendix A and a decision to provide the data sets or to contribute partially or totally to their generation will be taken on a case by case basis considering the proposals themselves.

4.3 Investigations

Investigations will be selected after this first Call for Proposal. It is planned that each investigation should preferably be separated into two phases that should be described in the proposals :

1. a prelaunch phase where data sets « similar » to those that could be provided by the actual system will be used. During this phase, investigations should address all methodological and development problems. All hypotheses and issues presented as the objectives of the proposal should be addressed during this phase, based on the assumptions that data sets which are used are representative of the actual VEGETATION data or describing and taking into account differences between the data sets which are used and the actual ones. Limitations to the conclusions and the extrapolations that could be made to assess the usefulness of VEGETATION will have to be clearly presented.
2. a postlaunch phase, after the entire system is declared operational, where no essential methodological or development problem should have to be addressed (except those related to adaptation of data formats or related actions). During this phase, the conclusion of the prelaunch phase should be adapted and discussed, using the results of application of methods and procedures defined and tested in phase 1 on actual VEGETATION data sets. The proposal should clearly present the strategy for this second phase, especially the data needs (which are not necessarily the same as for the first phase), and the objectives and methods to be used to finally assess the usefulness of VEGETATION products for the needs of the investigation.

No duration is imposed on the investigations during the first phase. However, the schedule of each investigation should be adapted to provide an intermediate report on the activities and on preliminary results after about one year from the beginning. Longer investigations should plan a second report some time before launch of the system where all the conclusions of the first phase should be presented.

For the second phase, final results are expected to be reported about one year after the system is declared operational.

4.4 Information exchange and reporting

To maintain a high level of communication between the Programme and the investigators and to foster exchanges within the VEGETATION user community, meetings will be organized by the IUC at several critical stages of the investigations. During these meetings, the investigators will be informed of the latest development of the Programme and research plans or progress reports of investigations will be presented. These meetings will also offer opportunities for exchanges among the international user community, scientific cooperation and sharing of information related to the Programme and to fields of activity related to the mission of the Programme. The investigators might also use these meetings to make their comments on the progress of the Programme, make recommendations for future evolution either of the first Ground Segment, of its first update or on the next system that will follow the first one. Some specialized workshops might be established as appropriate to

address specific scientific or technical objectives. It is envisaged to have three to four meetings for each investigation :

- a kick-off meeting, after each selection is announced : during this meeting, each investigator team will have to present its research plan and expected results,
- an intermediate meeting (possibly two for investigations selected from Call for Proposal #1 that would require two years for the prelaunch phase) where investigators will present their Intermediate Report,
- a final meeting where all the results of the two phases will be presented by the investigators and discussed.

If appropriate, another meeting might take place after launch when the system is declared operational where the quality of the actual system would be presented to the investigators to prepare the beginning of the postlaunch phase.

Proceedings of the intermediate and final meetings will be published by the Programme Scientist and the IUC and be made available to the entire community. These proceedings will be edited jointly with each Principal Investigator.

Besides, all investigators will be firmly encouraged to publish their findings in the usual scientific and technical journals. They may also be invited to present their results in scientific or technical meetings organized by the partners of the Programme.

Note : travel costs of these meetings should be part of the cost plan for the proposals.

4.5 Schedule

From the analysis of the letters of intent, the principle to have two Calls for Proposals was retained, and the schedule of events is given in the following table:

Date	Call for Proposal #1	Call for Proposal #2
July 1994	First Call for Proposal issued	
October 15th 1994	Deadline for submission of proposals in response to First Call	
December 1994	Announcement of First Set of Selected Investigations	
February 1995	Beginning of First Set of Investigations - KickOff Meeting	
December 1995		Second Call for Proposal issued
April 1996	First Intermediate Report	Deadline for submission of proposals in response to Second Call
April 1996		Announcement of Second Set of Selected Investigations
June 1996	First Intermediate Meeting	Beginning of Second Set of Investigations - Kick Off Meeting
April 1997	Second Intermediate Report	Intermediate Report
June 1997	Second Intermediate Meeting	First Intermediate Meeting
January 1998	Beginning of Post Launch Phase	
November 1998	Final Report	
December 1998	Final Meeting	

Note : Dates for Intermediate and Final Reports are indicated for draft reports which will have to be submitted before they are presented in the following meeting.

The schedule for the postlaunch phase will possibly be adapted to the effective date at which the VEGETATION system will de declared operational.

4.6 Funding

As mentioned above, the total funds available for the investigations is a little less than 2 MECU (from 1.6 to 1.8 MECU). The IUC and Steering Committee have recommended a maximum of about 100 investigations retained for the two selections mentioned above. In principle, the selected investigations will be funded with a maximum participation of 50% from the VEGETATION Programme where only material, data and travel costs should be considered (direct labor costs will not be considered).

It is also desired that funds allotted to the selected investigations are sufficient to allow for an efficient contribution to the objectives of the retained projects. Proponents are recommended to establish all the links they could find necessary to group similar or related proposals and then get substantial support from the VEGETATION Preparatory Programme. During the selection phase, the IUC reserves the right to retain much less than 50 proposals for each Call for Proposal if it is deemed necessary to increase the funding level to some selected investigations.

Data Costs :

As mentioned above, no decision has been taken concerning the generation and provision of simulated data sets by the Programme. Therefore the proposal should separately and clearly describe and justify the cost of generating the necessary simulated data sets with the assumption that they will have to be generated as part of the investigation. This information should be clear so that the IUC can estimate the cost of the investigation with no data set generation if the simulated sets are generated in a centralized manner for all the investigations.

For actual VEGETATION data that will be used in the post launch phase, the proposal does not have to mention costs but the actual data sets should be clearly described in terms of product nature, area to be covered, dates of acquisition, preferred format and support.

The Data Simulation Plan and Data Cost Plan which must be part of the proposal as described in Appendix A will be the basis for interaction between the Programme Scientist and investigators with respect to simulated and other data distribution.

5. REQUIREMENTS AND CONSTRAINTS

This Call for Proposal is open to any individual or team, with no limitation concerning nationality, type of organisation, structure and components of the proposing team.

5.1 Number and organization of investigations

As mentioned above, the IUC expects to select a maximum number of about 100 investigations, shared between the two Calls for Proposals.

It must be noted that the IUC may desire to select only part of a proposed investigation or to propose to several investigators that they merge their proposed investigations into a single one, when two or more proposals address similar or complementary topics and when a joint investigation is felt more efficient. Furthermore, the IUC has the option to propose a

phased implementation for any investigation; in that case, the development could be discontinued at the completion of the prelaunch phase.

Each proposal must designate a Principal Investigator who will be responsible for the definition, planning and implementation of the efforts, including the quality of the scientific and technical investigation, dissemination of results and all developments and timely delivery of required reports.

Investigations that require more than one investigator may include CoInvestigators. However, the Principal Investigator will be responsible for the work performed by its CoInvestigators. Each CoInvestigator must have clearly defined responsibilities in the definition and execution of the proposed investigation. These responsibilities should be explicitly described and justified in the proposal.

The Principal Investigator will be the only point of contact for all contractual matters related to the investigation.

5.2 Investigation and technical plan, management and cost plan

The investigations should preferably be planned to be conducted in two phases and the investigations selected after this first Call for Proposal should begin in February 1995, to continue with the postlaunch phase with a nominal launch date of October 1997. All planning should be based on these dates and the investigation and technical plan, management and cost plan as defined in Appendix A should address the activities of the two phases, according to the objectives of each phase as described above.

5.3 Proposal preparation

The proposal should be prepared following the guidelines given in Appendix A. It is required that all proposals include the Investigation and Technical Plan and the Management/Cost Plan.

As a large number of proposals are expected to be submitted, in order to insure fairness to all applicants and keep within the planned schedule, the organisation and length restrictions given in Appendix A will be strictly enforced. If a prospective investigator fails to observe the requirements given in Appendix A, the IUC reserves the right to return the proposal to the proponent upon receipt without further review or evaluation.

5.4 Proposal submission

The proposals should be sent in 12 copies to the following address :

Institute for Remote Sensing Applications
VEGETATION International Users Committee
attention : Gilbert SAINT
Joint Research Center
I-21020 ISPRA (Varese) Italy

They should be received no later than October 15 1994.

5.5 Selection procedure and criteria

The selection will be led by the IUC, possibly with external expertise from specialized internationally recognized experts. The recommendation for selection and support of investigations will be transmitted to the Steering Committee for approval.

During the selection phase, reviewers will evaluate the scientific and technical merits of each proposed investigation in terms of its strengths and weaknesses. The scientific and technical merits will be evaluated prior to any cost aspects and will be considered as a first basis for possible final selection. Costs aspects will then be analyzed taking into consideration the availability of funds for the entire set of investigations and the balance between the different fields.

The scientific and technical evaluation process will identify the best scientific and technical proposals to meet the goals of the VEGETATION Preparatory Programme as defined above in section 2, and to ensure that a balanced set of results is obtained and made available to the user community. It should lead to recommendations for the support of the selected investigations by the Programme. The following criteria will be used:

1. the relevance of the proposed investigation to the VEGETATION Preparatory Programme specific opportunity and to its objectives,
2. the scientific and technical merit of the investigation, together with its importance within the objectives of the Programme,
3. the feasibility of accomplishing the proposed investigation in the context of the schedule presented above,
4. the acceptance and proposed contribution by the Principal Investigator and any CoInvestigator to participate to the two phases of the Programme,
5. the competence and relevant experience of the Principal Investigator and any CoInvestigators and collaborators as an indication of their ability to carry the investigation to a successful conclusion, including communication of results,
6. the reputation and interest of the investigator's institution, as measured by its willingness to provide necessary support to complement support by the VEGETATION Preparatory Programme to ensure that the investigation can be completed satisfactorily,
7. the quality and completeness of the Management/Cost Plan ensuring realistic planning for achievement of the different phases within the funding proposal.

5.6 Reports and publication of results

Investigators selected through this Call for Proposal will be required to provide reports and to participate in the intermediate and final meetings. The reports will be the basis of the presentations in the meetings. For each of these reports, a draft must be submitted to the Programme before the meeting for publication. The IUC reserves the right to discuss assumptions and results.

The final reports or results will be made available as soon as possible to the general user community through publication in related journals or presentation at conferences.

Any publication on results related to the selected investigations should mention that they were obtained by an investigation selected by the VEGETATION Preparatory Programme. In the event that such publication is copyrighted, the partners of the Programme shall have a royalty free right under the copyright to reproduce and use such copyrighted work for their own purposes.

Investigators selected as a result of this Call for Proposal are expected to make available to the partners of the Programme all techniques developed, methods of analysis and results in the course of their investigations in accordance with the limitations mentioned in Appendix B.

APPENDIX A : INSTRUCTIONS FOR PROPOSAL PREPARATION

A.1 Introduction

Proposals submitted to the VEGETATION Preparatory Programme should adhere to the following guidelines for format and content. While strict adherence to these guidelines is not absolutely necessary, a uniform format is desired to aid the IUC to review and evaluate strengths and weaknesses of all the proposals, with maximum fairness to all applicants. Proposals must provide information related to all items described in this section and as otherwise specified in this Call for Proposal.

All proposals should contain an Investigation and Technical Plan describing the technical aspects of the investigation and a Management/Cost Plan describing how the investigation will be implemented. The Investigation and Technical Plan should include a Data Simulation Plan where particular aspects related to data simulation techniques should be clearly presented. The Management/Cost Plan should include a Data Cost Plan where particular aspects related to data simulation costs should be clearly presented.

Proposals should be typed single space, with text in font size no smaller than 10 points. The applicants should conform to the page limits given in the following sections. Appendices and annexes can be added when they are felt necessary. However, the proposal text within the page limit should be self consistent and appendices or annexes should not include any essential information for the evaluation of the proposal. Every effort should be made to keep the proposal as brief as possible, while still providing all required information.

All proposals must be submitted in English, with abstracts in English and French. A French version of the proposal may be appended. They must be submitted in 12 copies, each copy including all the appendices and annexes even when they are not required in the proposal format.

A.2 Proposal format and content

All proposals should be composed of the following parts :

- a cover letter,
- a title page with identifying information (1 page),
- abstract pages (2 pages),
- a table of contents,
- an investigation and technical plan (up to 20 pages),
- a management and cost plan (up to 10 pages),
- a biographical part,
- a bibliography

and possible appendices.

A.2.1 Cover letter

A letter or cover page should be forwarded with the proposal. It should be signed by the Principal Investigator and an official of the Principal Investigator's organisation who is authorized to commit the organization to the contents and implementation of the proposal. In case of a CoInvestigator, it is the responsibility of the Principal Investigator to ensure the commitments of CoInvestigator's organizations. This cover letter should include the name and address of the organization's authorizing official.

A.2.2 Title page (one page)

A title page should include all necessary information to identify the proposal :

- Proposal Title (brief and descriptive),
- Type of Proposal
- Principal Investigator name, address, telephone and fax numbers, email address,
- Names of all CoInvestigators, with their organizations, addresses, telephone and fax numbers, email addresses,
- Total proposed budget of the proposal, showing year by year and total requests,
- Costs for simulated data generation, showing year by year and total requests,
- References to parallel or related proposals to the VEGETATION Preparatory Programme.

It is required that proponents follow the title page format given in appendix C.

A.2.3 Abstract pages (2 pages)

It should contain keywords that could be used to index the proposal and one page abstracts summarizing the objectives, scientific and technical approach and anticipated results. English and French abstracts are required (one page each). The abstracts should contain a simple, concise overview of the investigation, its conduct, the expected results and their relevance to the VEGETATION Preparatory Programme goals and objectives. It is very important that these abstracts be specific and accurately represent the proposed research.

A.2.4 Table of Contents

The table of contents should clearly indicate page numbers of all the major sections of the proposal, including the Data Simulation Plan, the Data Cost Plan and the Cost Plan.

A.2.5 Investigation and Technical Plan (up to 20 pages)

The Investigation and Technical Plan should contain a detailed statement of the investigation to be undertaken and should describe objectives, scientific and technical justification, technical approaches and expected significance of the work.

Experimental objectives :

The proposal should identify and detail its contribution to each of its fields of relevance among the fields listed in section 2.

A brief description of the scientific and technical objectives and their relationship to past efforts and the current state of the art should be provided. The scientific rationale for the proposed investigation should be clearly established through reference to existing scientific and technical 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 VEGETATION mission. Proponents are encouraged to define explicit hypotheses that will be tested and evaluated by the proposed investigation.

Approach:

The concept of the investigation should be clearly stated and the methods to be employed in data analysis and interpretation results should be presented. The data analysis should be clearly related to one of the following categories :

1. application of proven techniques for analyzing multispectral, multitemporal or multiscale data to a new problem or a new geographical area including VEGETATION data,
2. extrapolation of conventional methods that are already used on data sets which are similar to VEGETATION data sets and possible other sensors data sets,
3. development of new procedures or techniques for handling and analysis of multispectral, multitemporal or multiscale data acquired by VEGETATION and possible sensors,
4. development for procedures or techniques specifically adapted to the new features of VEGETATION.

Experimental and Work Plan

The general plan of research should be outlined, experimental methods and procedures to be undertaken should be described in sufficient detail for the IUC to adequately assess their contribution to the scientific and technical approach.

The overall methodology and sequence of key points of the investigation should be presented in detail, including description of plans for each of the two phases (prelaunch and post launch) and the relationships between these two.

Data Simulation Plan :

The Investigation and Technical Plan must include a special section on data sets generation for the prelaunch phase : the data sets that will be used must be described and their representativity as VEGETATION simulated data sets should be justified, taking into account the specific objectives of the proposal. Any limitation to the interpretation of these data sets and to the extrapolation to the interpretation of actual VEGETATION data should be clearly identified and related to the structure of experimental plans for the prelaunch and postlaunch phases.

Specific requirements that would have to be taken into account should the simulated data sets be generated under the responsibility of the IUC, must be clearly stated in that section.

VEGETATION Data Plan

For actual VEGETATION data that will be used in the post launch phase, the proposal should clearly describe the data sets in terms of product nature, area to be covered, dates of acquisition, preferred format and support.

Anticipated results :

As far as possible, the expected outcome of the investigation should be presented, with specific formulation for each of the two phases. The significance and implication of these results to related projects which are important for the future use of the VEGETATION Programme should be discussed.

Significance of the investigation :

The significance of the proposed investigation should be defined in terms of its relationships with earlier studies and of the implication of its anticipated results. The proposal should attempt to characterize the degree of innovation associated with the objectives or approach and the impact of using VEGETATION data on its anticipated results.

A.2.6 Management and Cost Plan (up to 10 pages)

Management Plan :

The Management Plan sets forth the investigator's approach for efficiently managing the work, recognizing essential management functions and effectively integrating these functions in the overall execution of the investigation. The Management Plan should give insight into the organization proposed for the work, including the internal operations and lines of authority with delegations, together with internal operations and relationships with the IUC or Programme Scientist, subcontractors or associated investigators. Likewise the Management Plan should reflect various schedules necessary for the logical and timely pursuit of the work, accompanied by a description of the Principal Investigator's work plan and the responsibilities of the CoInvestigators if any. Roles and responsibilities of all investigators and collaborators must be adequately described.

All major facilities and equipment essential to the proposed investigation should be indicated, including those of the investigator's contractors. Existing equipment should be explicitly differentiated from facilities that will be developed to implement the investigation. Procurement schedules and lead time for the acquisition and installation of new equipment and/or facilities should also be indicated. The development of new equipment and facilities will be strictly limited to the support required to fulfill the VEGETATION Preparatory Programme objectives.

Cost Plan

The Cost Plan should summarize the total investigation cost by major categories of cost as well as by function. It must be broken down into the following categories that apply : supplies and materials, equipments, computer time, services, publication costs, communications, travel and other cost items to be detailed. While salaries and wages will not be considered during the selection to determine the level of funding by the VEGETATION Preparatory Programme, associated costs could be indicated briefly as they give indications on the willingness of the proposing organisations to contribute to the Programme.

Each category should be detailed and explained. Equipment purchases should specify the type of equipment, number of units and unit cost. Travel expenses should give the estimated number of trips, destinations, duration, purpose, number and role of travellers, anticipated dates.

The Cost Plan should mention the cost of attending the intermediate(s) and final meetings, with the assumption that they will take place in Europe.

The Cost Plan should list other sources of funding and their scheduling for any aspect of the investigation.

A particular section of the Cost Plan should be the Data Cost Plan where all the costs related to the generation of simulated data sets justified in the Investigation and Technical Plan should be detailed clearly enough for the IUC to evaluate the cost of the investigation under each of the two following assumptions :

- the simulated data sets are generated under responsibility of the Principal Investigator as part of the investigation
- or the simulated data sets are generated under the responsibility of the IUC and provided for reproduction costs to the Principal Investigator.

The Cost Plan should present separate schedules for each year and for the above categories. Any detail giving insight to the breakdown of costs will be appreciated, especially to allocate expenses to the Principal Investigator's and CoInvestigator's activities, ancillary data sets to be acquired, data analysis and processing, possible field studies...

A.2.7 Biographies

Brief resumes (one page maximum for each) of all named investigators and collaborators should be enclosed. They should include a list of scientific or technical contributions made in the last six years and a list of the five most significant publications.

A.2.8 Bibliography

A bibliography related to the investigation should be attached, limited to the most significant publications which are relevant to the proposed investigation.

APPENDIX B : PROPOSAL EVALUATION AND SELECTION

B.1 Tentative selection, phased development, partial selection, selection with discussion

By submitting a proposal, the investigator and his organisation agrees that the IUC has the option to make a tentative selection pending a successful feasibility or definition study of the proposed investigation, especially related to limitations in data availability (either simulated or actual data), and, in addition, upon confirmation of the availability of adequate support of other sources of funding indicated in the Cost Plan. Furthermore, the IUC has the option to recommend a contract in phases for implementation of a proposed investigation and to discontinue the development of an investigation effort at the completion of any phase.

The investigator should also understand that the IUC 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 where two or more proposals address similar or complementary problems and/or adopt similar approaches to data analysis, the IUC may recommend to join the participation on part or total of two or more proponents into a single investigation proposal. In that case, when joint participation with other investigators is agreed to, a single individual will be designated as the Principal Investigator for the investigator group.

The VEGETATION Programme reserves the right to reject any proposal received in response to this Call for Proposal that would not be compatible or related to the objectives of the VEGETATION Preparatory Programme. Notice is also given of the possibility that any selection may be made either without discussion or after limited discussion with the proponents.

B.2 Evaluation and selection procedures

All proposals received by the IUC in response to this Call for Proposal will be initially screened to determine the relevance to the objectives of the VEGETATION Preparatory Programme and to determine if they conform to the instructions for proposal preparation. Proposals considered to be unresponsive to the stated objectives of the Call for Proposal will be returned to their author as soon as possible with a written explanation of the decision. They will not be considered further for the selection of proposals in response to this Call for Proposal.

The proposals considered to be responsive to the objectives of the Call for Proposal will be reviewed by the VEGETATION International Users Committee which could ask participation of individuals with widely recognized expertise in the scientific and technical fields covered by the VEGETATION mission. The purpose of this review will be to evaluate the scientific and technical merits of each proposal in terms of its strengths and its weaknesses, rating each evaluation criterion given in section 6.5.

Proposals having scientific merit will be reviewed to determine their technical feasibility and compatibility with the overall VEGETATION Programme.

Finally, the financial constraints will be included in the selection procedure, balancing the retained investigations as indicated above, taking into account the objectives of the VEGETATION Preparatory Programme, the specific fields which are are defined for this Call

for Proposal and the necessity to insure adequate funding support to the most interesting investigations.

B.3 Treatment of proposal data

B.3.1 Commercial and Financial data

The commercial and financial data included in the proposals submitted in response to this Call for Proposal will only be used for evaluation purposes. Where it is the practice of a Principal Investigator or of his proposed subcontractors 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 the next section to those portions to be maintained as a trade secret.

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

B.3.2 Technical data

The technical data contained in any proposal submitted to this Call for Proposal will be used only for evaluation purposes. 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. Technical data labelled in this fashion will be protected as a trade secret. CENTRE NATIONAL D'ETUDES SPATIALES, acting as the Maitre d'Oeuvre of the VEGETATION Programme or any other partner of the Programme will assume no liability for use or disclosure of any proposal technical data to which the Notice would not have been applied.

Notice :

Data on pages... of this proposal constitute a trade secret. It is (are) furnished in confidence with the understanding that it will not, without permission of the proponent, be used or disclosed other than for evaluation purposes. In the event a contract is awarded on the basis of this proposal, CNES, acting as the Maitre d'Oeuvre of the VEGETATION Programme may obtain, in the contract, additional rights to use and disclose this data.

B.4 Invention and data rights

Within the implementation of an investigation selected under this Call for Proposal, the Principal Investigator will be required to inform the Maitre d'Oeuvre (CENTRE NATIONAL D'ETUDES SPATIALES) within eight days of any patent or model request deposited for the protection of inventions which may result from the work performed.

Whenever the Principal Investigator may decide not to deposit such a patent or model request, CENTRE NATIONAL D'ETUDES SPATIALES as the Maitre d'Oeuvre of the VEGETATION Programme reserves the right to do so and, if so, in agreement with its partners of the Programme.

The Principal Investigator is required to grant the partners of the VEGETATION Programme a royalty-free license to use patents and models deposited as a result from the work

performed within investigations selected after this Call for Proposal, provided he is free to do so and no major interest opposes to it.

APPENDIX C : TITLE PAGE FORM