



MINISTÉRIO DA CIÊNCIA, TECNOLOGIA, INOVAÇÕES E COMUNICAÇÕES
INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS



Executive Summary

Institutional Plan for Internationalization

Space Sciences, Applications and Technologies

2018 – 2022

1. PRIORITY AREAS FOR STRENGTHENING INTERNATIONALIZATION

INPE (Brazilian National Institute for Space Research), through its seven Postgraduate Programs (PGPs), continuously promotes strong solid practice of and commitment to the internationalization its activities. The purpose of this plan, therefore, is to define the strategies for further expand the level of internationalization of its seven PGP programs. To achieve this goal, seven priority thematic areas were identified. Internationalization activities will be focused on these critical thematic areas, which will be led by each PGP.

The PGPs described in this document are:

AST: Astrophysics

CAP: Applied Computing

ETE: Space Engineering and Technology

GES: Space Geophysics

MET: Meteorology

SER: Remote Sensing

CST: Earth Systems Science

1.1. Instrumental Astrophysics

PGPs Involved: AST, GES, CAP, ETE

INPE's Astrophysics has as its characteristic to be the most focused in the country for the development of astronomical instrumentation. Instrumental development encompasses the entire electromagnetic spectrum, from the radio range, through the infrared and optical bands to the high energy range. INPE also leads the only Brazilian project for a gravitational wave detector. The constitution, formation, evolution and phenomenology of diverse astrophysical objects are investigated through the collection / analysis of observational data, the development of astronomical instrumentation and the construction of theoretical models. The research lines of the AST-INPE thematic area are: High Energy Astrophysics, Cosmology, Optical and Infrared Astrophysics, Radiophysics, Interplanetary Medium Physics, Gravitational Waves and, more recently, Space Weather. Due to the vocation for the development of instrumentation and development for technology generation, there is interaction with national companies and specific technology transfer activities for local industries. DIDAS / INPE is the main institution of the country in the effective instrumental development in astronomy. As a direct consequence, the AST-INPE program produced purely instrumental theses on pioneering instruments such as "Development of high sensitivity parametric transducers for the Mario Schenberg gravitational wave detector ", "Polarization of galactic radiation at 5 GHz: instrumentation, measurements and maps ", " High-energy astrophysics: development of the MASCO telescope and observations of GRO J1744-28 with the SIGMA telescope ", " Radio interferometric investigations of solar phenomena and calibration method using GPS satellites ". In addition, there are several dissertations and theses in which astronomical instrumentation is at least partly considered and/or studied. An internationalization program will give a new dimension to a training in astrophysical instrumentation, as it will allow:

- the arrival of foreign professors to teach advanced instrumentation techniques;
- the passage of Brazilian students and postdocs to the best international centers of astronomical instrumentation;
- the arrival of foreign students and postdocs from the United States and Europe, who had better laboratory training and, therefore, would have greater skills in the development of instrumentation theses;
- greater international visibility of the course.

1.2. Heliophysics

PGPs Involved: GES, AST, CAP, ETE, MET, SER

Heliophysics can be understood as an extension of Geophysics. It focuses on the interconnections between the Sun, interplanetary space and the planets. Historically, this research field has its roots on the First International Polar Year (IPY-1) in 1883 and the Second International Polar Year (IPY-2), in 1933 which paved the way to the International Geophysical Year (IGY), held in 1957. IGY was an unprecedented international cooperation during which the World Data Centers (WDCs) were established. Open access to a variety of instruments around the world fostered the advance of scientific knowledge. During the years 2007 to 2009 the International Heliophysical Year (IHY) took place, celebrating 50 years since IGY. Many experimental campaigns and activities occurred under the sponsorship of the United Nations (UN) and several Space Agencies around the world. The theme Heliophysics aims at qualifying, in an international standard, personnel coming from engineering and exact sciences to work on research, development and teaching at Universities and research institutes, as well as R&D in private companies. Of special interest are the disciplines related to solar physics, planetary physics, interplanetary medium, magnetospheres, ionospheres, atmospheres and planetary magnetic fields and other bodies.

The main connection of this thematic area is with the Postgraduate Program in Space Geophysics (GES). Member of the "Excellence Program" (PROEX), from Brazilian funding agency CAPES, GES began its activities in 1968. It has since graduated over two hundred of MsC and PhD. Other postgraduate programs at INPE are also involved in research within the heliophysics theme.

1.3. Tropical Meteorology

PGPs Involved: MET, SER, CST, CAP, GES

The region of South America has much of its extension in the tropical region, where there is a domain of meteorological systems that interact with the Amazon rainforest, the largest tropical forest in the world. The interaction between tropical and mid-latitude systems makes the theme unique and with great internationalization potential. Brazil has one of the largest collections of observational data from the tropical region, mainly from field experiments, with emphasis on the Amazon. Research developed and in development using this data together with parameterization of numerical models by the best specialists, members of the MET PGP, allows INPE to be a pole of research in the area of tropical modeling.

1.4. Space Missions

PGPs Involved: ETE, CAP, MET, SER, CST, GES, AST

This topic includes R & D from all segments of a space mission within the scope of its theses and dissertations: (1) subsystems/payloads and even complete satellites, (2) launchers and (3) ground systems (command and tracing, mission center and operation center). In the PG in Engineering and Space Technologies of INPE, there are a series of technical partnerships with other foreign institutions, as well as co-orientations of thesis/dissertations. An example is the development of RaioSat, a 3U cubesat that will keep the CCST's payload of interest for lightning monitoring. There is the opportunity for a German HEI to develop some subsystems (Optics and Control Attitude) and share the control infrastructure with Germany and Colombia. Another project to be investigated is sprites in the Space and Atmospheric Sciences, that could benefit from a payload in cubesats. Another project deals with research and development of materials with tolerance and/or attenuation properties of ionizing radiation, mitigation of impacts of space debris and of thermal oscillations in satellites and orbital platforms, in collaboration with Portugal and Italy. In the area of surface coatings of materials with Diamond Like Carbon (DLC), there is a strong collaboration with the University of Bogotá, Colombia. Other institutions that have shown

interest were from countries: Israel, Holland, Italy, China, USA, UK, Argentina, Colombia, Spain, Japan and Russia. In addition, there are many more academic partnerships, with doctoral students and postdoctoral researches developing part of their research in various countries topics.

1.5. Satellite Applications for Sustainable Development

PGPs Involved: SER, ETE, CAP, MET, CST

In the global context of the discussions on environmental change, sustainable development, health and food security, Brazil has a leading position in the development of satellite monitoring and geoprocessing techniques for natural resources, development of technologies for image processing, analysis of satellite data and provision of services. The main objective of this thematic area, within the context of the INPE Postgraduate Program, is to train scientists and professionals, guaranteeing that they acquire recognized competence and leadership to act on national issues aligned with global initiatives. Thus, the theme aims to form scientific leaderships to subsidize actions and create solutions within international forums such as the United Nations Framework Convention on Climate Change (UNFCCC), the Intergovernmental Panel on Climate Change (IPCC) the Convention on Biological Diversity (CBD), the Convention on Floodplains of International Importance (RAMSAR), the Convention to Combat Desertification (UNCCD) and the Sendai Framework for Disaster Risk Reduction (UNISDR). The competent acting of the leaderships formed within this thematic line, through the development of state-of-the-art knowledge, will strategically assist Brazil to fulfill its international targets established within the National Policy on Climate Change (PNMC - Law 12,187). This includes identifying and implementing actions on mitigation; impacts, vulnerabilities and adaptation; research and development; as well as education, training and communication. These actions will also have a direct impact on the National Strategy for REDD + in Brazil (ENREDD+), which formalizes, to the Brazilian society and signatory countries to the United Nations Framework Convention on Climate Change, actions to prevent and control deforestation and forest degradation and to promote sustainable development. This multidisciplinary subject requires not only the understanding of complex environmental systems, but also the knowhow on satellite image processing, the knowledge and capacity of developing sensors for the monitoring specific targets and the ability to model these systems.

1.6. Global Environmental Changes

PGPs Involved: CST, ETE, CAP, MET, SER, GES

The recently launched Sustainable Development Goals ("Sustainable Development Goals"-SDG) aim to guide the agendas and policies of the member states of the United Nations (UN) by the year 2030 and research in this priority topic can significantly contribute to the production of relevant indicators for some SDGs and the development process sustainable development of the tropical region. In this context, in the priority area of Global Environmental Changes, it is proposed to develop interdisciplinary research in search for scientifically based solutions and technologies that promote the path towards a sustainable, safe and socially fair development, particularly in the tropics, minimizing negative impacts of environmental changes in socio-economic and natural systems vital to environmental sustainability and human well-being, as regards access to food, water, energy and health. INPE's PGP's have many collaborative efforts in the areas of observation of the terrestrial system in surface networks or by remote sensing, as well as the development of computational modeling frameworks that represent the different components of the Terrestrial System, as well as parameterization of existing models, such as modeling the dynamics of the terrestrial biosphere, land cover and land use change models and greenhouse gas emissions, ecohydrological and agricultural models, and climate modeling.

1.7. Data Modeling and Analysis of Earth and Space

PGPs Involved: CAP, ETE, MET, SER, CST, GES, AST

Space and Earth data are those that allow the understanding of Earth and Space as dynamic systems composed of subsystems (such as the atmosphere, forests and urban areas, geosphere, oceans, interplanetary environment, etc.) that interact at different spatial and temporal scales. These data are used in applications for the systematic monitoring of environmental resources with impact on health, urban development, food security and to monitor impacts and changes in climate and the environment. These data are collected by sensors of various types, purposes and characteristics, created and deployed so that the measured systems can be understood through the application of scientific knowledge. Since its inception, the National Institute of Space Research has been an international reference in the collection, analysis and distribution of environmental and space sensor data and in applied research involving these data. For example, using data from remote Earth observation sensors along with other spatial data, INPE produces, through institutional projects or joint projects with other federal institutions, environmental monitoring data. Examples of these data products are the deforestation maps of the Brazilian biomes produced by the PRODES, DETER and FIP-Cerrado projects; information on burnings and fire risk produced by the Queimadas Program; and annual estimates of greenhouse gas emissions by changes in land cover in Brazil. Space and Earth data are voluminous and diverse, since they are collected systematically over time by different measurements obtained by different sensors. To model and analyze this data, several issues need to be addressed; from the organization and management of this data in an integrated way (information from diverse sources, different spatial and temporal scales and access to historical data) to the creation of analysis methods and tools that allow its use to solve important scientific questions. In addition to the analysis of data from Earth and Space sensors there is also the need to create, apply and evaluate numerical and computational models to better understand the various phenomena related to the subsystems of Earth and Space. Given the complexity of these systems and the knowledge about their operation, it is always necessary to look for new numerical techniques and to execute the models in an acceptable time.

2. INTERNATIONALIZATION PLAN OBJECTIVES

In more than 50 years, INPE has acquired competences, recognized nationally and internationally, in scientific and technological development activities, generating knowledge, products, processes and services that are disseminated to the society. These competencies are a result of the Institute's Postgraduate Programs (PGPs), which has been forming specialists and scientists contributing with the creation of new graduate and postgraduate centers throughout the country, since the 1960s or are employed by high-technology companies in Brazil. Through cooperation agreements and/or partnerships in several research fields, whether with national or international institutions, public or private, all INPE's activities had traditionally some degree of internationalization. Special attention has been given to terms of exchange of researchers (professors) and students, and to collaborations and partnerships in most different forms: cooperation projects, joint publications, courses and training, technology transfer, among others. In this way, the overall objective of this Project is to consolidate INPE as a leading institution with internationally recognized academic activities as well as technological developments. Moreover, further expanding international partnerships, collaborations and personnel training at an international level will help achieving its mission to produce science and technology in Earth and Space areas in order to offer singular products and services for the benefit of Brazil and enabling INPE to accomplish its vision of being a national and international reference in Earth and Space areas, with emphasis on the generation of knowledge and services, as well as the anticipation of development demands and quality of life of Brazilian society. Specifically, the objectives of the proposed internationalization project are to:

- I. Promote the development, implementation and consolidation of a strategic plan for the internationalization of the Institute's PGPs based on the seven priority thematic areas;
- II. Maintain and expand the existing international research networks at INPE as well as foment the creation of new networks to improve the quality of academic production of its PGPs;
- III. Expand the internationalization actions in the INPE's PGPs, encouraging the consolidation of research projects in cooperation with Institutions abroad;
- IV. Maintain and expand the academic training of human resources through the mobility of professors and students, with emphasis on doctoral students, postdoctoral students and professors, from Brazil to abroad and from abroad to Brazil, linked to the *stricto sensu* PGPs;
- V. Expand and consolidate INPE as an institute with an international environment;
- VI. Integrate several actions of each PGP for supporting INPE's internationalization effort.

3. MAIN ACTIONS FOR INTERNATIONALIZATION

INPE currently has extensive efforts on the internationalization of its research activities and technological development at different levels of each of its PGPs. Accordingly, the strategies and policies of this Plan consist essentially of improving the internationalization of the PGPs by expanding their international cooperation projects involving professors and students of different PGPs and increasing the network of collaborations within and outside INPE, nationally and mainly internationally. However, despite the institutional effort, the success of implantation of actions proposed in this plan depends on the availability of budget of support agencies (as CAPES, CNPq, FAPESP and foreign agencies).

3.1. Strategies

- a) In order to consolidate existing international partnerships, as well as to promote the creation of new partnerships and cooperation projects, aiming to increase the interaction between INPE and research groups abroad, we have to:
 - i. Expand the exchange of students and professors of the Institute with foreign institutions through the dissemination of announcements by the Technological Innovation Center (NUIINT), which has competence, together with the Technical-Scientific Council (CTC) and the International Relations Service (SCRIN) to identify potential opportunities for international cooperation;
 - ii. Encourage participation of students and professors in ongoing international projects through the provision of grants and/or resources for training and participation in scientific events;
 - iii. Encourage new partnerships through international workshops to discuss research topics of common interest, with emphasis on institutions based in countries which CAPES maintains cooperation agreements;
 - iv. Plan and develop an integrated on-line system for publishing opportunities of partnerships and calls for submitting projects of interest to INPE to attract international partners;
- b) In order to attract foreign students to Brazil, INPE will make efforts in:
 - i. Creating specific courses and/or offering courses in priority thematic areas in foreign languages (preferably English), enabling the student's interdisciplinary training and encouraging them to carry out academic activities at INPE;
 - ii. Publishing the activities and/or academic opportunities at international events through advertisements in trade journals, web pages and/or social media and implementation an on-line system for registration of potential candidates to INPE's PGPs;
 - iii. Promoting summer and winter schools with relevant topics in the priority areas;
 - iv. Publishing MSc dissertations and PhD theses in English, broadening access to the scientific production of INPE's PGPs;
 - v. Helping foreign students to apply for INPE's PGPs through the acceptance of the credits and/or prerequisites of subjects held outside country;

- vi. Promoting equivalence of Brazilian courses to foreign courses with the disciplines of the Postgraduate Programs of INPE through unified criteria in order to encourage that foreign students have facility in accomplishing academic activities in the Institute;
 - vii. Creating or adapting specific disciplines / strategies of the Postgraduate Programs to be taught by foreign lecturers / researchers through distance or face-to-face classes, when the researcher is visiting the Institute;
- c) In order to attract professors and researchers with international experience to periods of activities at INPE, the following strategies will be adopted:
- i. Organization of international workshops, conferences or symposiums to discuss research topics relevant to INPE and of interest to foreign institutions, partners or not;
 - ii. Promotion of international courses, schools, and trainings at INPE, where professors and researchers with international experience will be invited to integrate these activities by transferring their knowledge and experiences to the students and professors of the Institute's PGPs;
 - iii. Planning and organization of international courses at INPE by relevant researchers in topics of institutional interest, particularly those that already collaborate with research activities of the Institute in the projects of cooperation in execution;
 - iv. Encouragement of professors and researchers to advise foreign students and eventually include them in the research projects they coordinate or participate in, thus allowing foreign co-supervisors to carry out activities in Brazil within the scope of the project and related to the PGPs;
 - v. Carrying out, whenever possible, the objectives of the international cooperation projects and scientific campaigns in Brazil encouraging the participation of foreign researchers with longer stays in the country in order to integrate to the different scientific activities of the project and academic of the related PGPs.
- d) In order to prepare professors and/or students for both the period of activities outside Brazil and their return, particularly to allow the appropriation of knowledge and experience by INPE, we intend to:
- i. Promote, whenever possible, according to the available budget, language courses, focusing on the English language, for students of INPE;
 - ii. Encourage professors and students to have proficiency in foreign languages, especially the English language, by performing the tests of foreign language available in the country, such as TOEFL, IELTS, among others;
 - iii. Create opportunities and define specific criteria for professors and/or newly graduated foreign students to do postdoctoral studies in Brazil, continuing their research activities;
 - iv. Promote, within the framework of each international cooperation project and each PGP of the Institute, the exchange of scientific information through the encouragement of the joint production of specialized documentation, co-orientations of MSc Dissertations and/or PhD Theses and scientific and/or technical-scientific publications in peer-reviewed journals;
 - v. Stimulate permanent professors at INPE to do internships of short (3 to 6 months) and/or medium duration (1 to 2 years) so that, in return, they can establish the knowledge acquired by teaching new disciplines courses and/or lectures and orientation of new students;
- e) As innovative strategies for internationalization, we can:
- i. Promote and expand the interaction of different INPE PGPs in the construction of international cooperation projects and attraction of foreign professors and students;
 - ii. Integrate disciplines from the different subject areas, offering them in a foreign language
 - iii. List and rank research topics with strong potential international cooperation based on INPE's history and experience in the area of Sciences, Technologies and Space Applications;
 - iv. Provide language courses in INPE's Annual Training Plan for employees, students, and technicians;

- v. Create international environments where discussions, dialogues and interactions in foreign language and in Portuguese are encouraged for foreign students, support for foreign students;
 - vi. Enable and encourage bilateral programs in INPE's PGPs;
- f) After the publication of Law No. 13,243 of January 11, 2016 and its subsequent regulation through Decree No. 9283 of February 7, 2018, a new Legal Framework for Science, Technology and Innovation was established in Brazil. In addition to encouraging innovation and scientific and technological research, this legislation has established new mechanisms for the internationalization of Brazilian Scientific, Technological and Innovation Institutions, like INPE. INPE will use those mechanisms to promote the internationalization of its institutional projects and programs as well as its PGPs through the development of international cooperation and interaction with organizations and groups of excellence, allocation of human resources outside Brazil, which may be postgraduate professors, INPE's participation in international or foreign institutions involved in research and scientific and technological innovation by sharing of equipment, laboratories and/or infrastructure with foreign Institution.

3.2. Policies and Actions

Regarding cooperation projects and/or international partnerships:

- a) The selection of foreign partners should be made in order to consolidate the wide range of international cooperation already existing in INPE, whose activities produce relevant results in the production of advanced scientific knowledge, training of researchers and/or specialists, exchange of foreign professors and students and technological development, generating new products and services for society. Currently, most of the existing international partnerships at INPE already occur with foreign institutions in countries with which CAPES has effective cooperation.
- b) The selection of foreign partners for new projects should raise INPE's international cooperation, i.e. academic activities involving inter-country exchanges, transfer of technology between research groups and training of internationally-oriented personnel, giving priority to institutions in countries with which CAPES maintains effective cooperation, assuming they have similar activities.
- c) The internal selection of specific actions and beneficiaries will take into account, fundamentally:
 - i. Transparency in the dissemination of funding opportunities, with broad dissemination of the calls to the target audiences in the main INPE web site, mainly through Internet pages with Portuguese and English versions;
 - ii. The definition and detailing of merit criteria for selection, which include curriculum analysis, academic production quality from a technical point of view and impact factor, academic performance of the candidate, with an emphasis on international activities;
 - iii. The eventual use of notes and/or grades of international exams to apply for the programs and/or cooperation projects through the creation of a weights table that emphasizes the academic performance of the candidate with good grades and/or concepts in international exams;
 - iv. The inclusion, in the case of scholarships, of the criteria for ineligibility of candidates in accordance with the normative instruments of CAPES and INPE;
 - v. The requirements for language proficiency according to minimum requirements per modality by CAPES;
 - vi. The right to administrative appeal and respond to appeals by unapproved candidates;
 - vii. Compliance with the provisions of Decree 7.203 / 2010 and Binding Summary No. 13/STF, legal provisions dealing with the practice of nepotism in the public sector;

- d) Regarding the selection of research projects with international cooperation, the proponents will have to:
- i. Present of resource application plan;
 - ii. Provide plan of activities, detailing the objectives and actions that emphasize the innovative proposal as well as its international activities;
 - iii. Proof of the counterpart of infrastructure, personnel and financial of the Institution or foreign research team involved in the project;
 - iv. Show that activities that will benefit from exchanges of researchers and students between the Institutions (academic mobility), with emphasis on lectures, courses, trainings, internships and/or joint fieldwork;
 - v. Make joint technical-scientific production that guarantees the maintenance of the scientific knowledge acquired in the project activities at INPE;
 - vi. Draw strategies for transferring knowledge to INPE through masters and doctorates with co-orientation or co-supervision, execution of postdoctoral projects and/or training at INPE.

Regarding human resources:

- a) Whenever budget is available and authorization of the competent agencies, in the eventual holding of competitions to fill positions in the Institution, the criteria for analysis of merit that take into account the candidate's international experience will be included in the respective Contracts for recruitment of researchers, emphasizing academic activities carried out outside Brazil through participation / coordination of international cooperation projects, joint technical-scientific production with foreign groups, orientation or co-orientation of foreign students and participation in courses, workshops, training abroad.
- b) In the case of temporary activities foreseen in the ongoing cooperation projects, the granting of fellowships for researchers will take into account, in their criteria of merit, the level of internationalization of the candidate.
- c) The selection of visiting researchers to carry out specific activities at INPE will be based on scientific production and international experience which are directly related to the interests of the projects being carried out, in order to broaden the Institute's international research environments through maximum interaction with the researchers (professors) and students of the PGPs;

Regarding academic activities:

- a) Recognize the academic and scientific activities carried out by professors and students outside Brazil based on the following directions:
 - i. To allow the equivalence of the menus and hours of class of the disciplines and/or academic activities carried out by the student in other Graduate Programs abroad, if approved by the respective Course Council;
 - ii. To establish specific equivalence criteria of the subjects studied by the student in the foreign institution in order to meet the requirements of the PGPs;
 - iii. To recognize the activities carried out by students in foreign internships as credits for oriented-studies;
 - iv. To take as valid credits in the student's academic record, their participation in courses, lectures, seminars or isolated disciplines in foreign institutions, provided that they are officially recognized by the Institution as academic and/or scientific activities;
 - v. To encourage the participation of professors in events and/or training abroad for later incorporation of the new knowledge acquired in the menus of the subjects of the Graduate Programs of INPE.
- b) To encourage the development of academic activities of Doctorate under co-supervision with other institutions as provided in Art. 38, 39 and 40 of the General Regiment of INPE's PGPs, observing the current legislation and institutional recommendations;
- c) Acquire all knowledge and experience acquired abroad by the beneficiaries of the internationalization actions based on the following guidelines:

- i. Verify compliance with the CAPES Ordinance No. 186 of 09/29/2017;
 - ii. Publish articles in peer-reviewed journals, preferably with a high QUALIS classification, or technical reports of activities together with professors, researchers and/or students of the INPE's PGPs, or in the period of the foreign internship or when returning to the country;
 - iii. Integrate the beneficiary into existing cooperation projects or propose new cooperation projects in the area of research related to its activities abroad;
 - iv. Encourage the participation of the newly-doctoral student, who was a beneficiary of the Sandwich Program Abroad (PDSE), in the National Post-Doctoral Programs (PNPD) so that his international experience is internalized in the academic activities of the PGPs;
 - v. Encourage the orientation of new students or co-orientation of students already enrolled in the area of research that was the subject of their activities abroad, proposing innovative research themes;
 - vi. Promote mini-courses, special classes in courses of the Course, seminars, workshops and round tables to encourage new studies and increase the knowledge in the area of research related to the theme developed by the beneficiary abroad;
- d) Increase proficiency in foreign languages in INPE's PGPs by the following directions:
- i. To include language courses in INPE's Institutional Training Program, with the objective of periodically and within budget possibilities, to provide training for students, professors and technical staff in foreign languages, mainly English;
 - ii. To require proficiency in English as a criterion in the selection processes for the admission of Brazilian and foreign students in the Graduate Programs of the Institute and for candidates to INPE's national development programs with a view to internationalization;
 - iii. To encourage students, professors and staff members of the Institute to take language courses at more advanced levels in specialized schools with reduced costs due to the formalization of agreements and/or partnerships;
 - iv. To prioritize the selection of students, Brazilian and foreign, who have performed international language exams in Brazil or abroad through the use of the concepts obtained in these exams as a differential in the indicators of merit;
 - v. To prioritize the selection of international cooperation projects whose team of proponents has proficiency in languages, including this as a differential in merit indicators.
- e) Promote annual summer/winter schools as part of the academic activities of the INPE's PGPs in order to:
- i. Consolidate international environments within the Institute, where there is greater social and academic interaction between Brazilians and foreigners;
 - ii. Attract foreign students, professors and researchers to integrate into the activities of each PGP and eventually identify potential opportunities for future cooperation;
 - iii. Encourage the participation of students, professors and Brazilian researchers to the internationalization activities, expanding access to the opportunities and benefits offered by the Project;
 - iv. Provide the academic content of schools as credits in specific subjects of the organizing PGP, either as supervised studies, or as seminars;
 - v. Allow international experience to students, professors and researchers participating in that subsequently serve as differential indicators in the merit of the beneficiary selection process and/or cooperation projects under the internationalization project;
 - vi. Promote the co-orientation and/or co-guidance of Brazilian students by foreign professors and/or foreign students by Brazilian professors in research projects related to the subject(s) of the schools.
- f) Encourage the participation, mainly of students, in events abroad with the objective:
- i. Increase the visibility of your research projects;
 - ii. Consolidate your proficiency in a foreign language;

- iii. Encourage interactions with other foreign research groups working in related areas to allow potential future partnerships, such as joint technical-scientific publications, co-orientations, co-advising and the design of cooperation projects;
- g) Update the curriculum and schedule of academic activities of the INPE's PGPs to meet the objectives of internationalization as follows:
- i. To offer curricula of compulsory and elective courses in a foreign language, mainly English, in all PGPs;
 - ii. To allow that, in ad-hoc interviews, according to the thematic area in which the student's research project is inserted, his/her curricular timetable contains the disciplines of any PGP that compose that respective subject area, thus promoting the interdisciplinarity of topics;
 - iii. To allow activities carried out by students in internships abroad to be incorporated as study credits oriented in their school history;
 - iv. To allow the student's participation in courses, lectures, seminars, summer / winter schools or isolated disciplines in foreign institutions, provided that they are officially recognized by the Institution as valid academic and/or scientific activities, are used as credits or academic activities in their history school, and may even be used as an evaluation method;
 - v. To encourage the participation of professors in events and/or training abroad for later incorporation of the new subjects in the menus of the disciplines of the correlated PGPs of the thematic area;
 - vi. Organize and make available on-line teaching materials in support of the disciplines (in the form of textbooks or video-classes), technical-scientific documents, dissertations, theses and scientific articles in foreign languages for the students of the subject areas;
 - vii. Include foreign language courses as academic activities in the student's academic record;
 - viii. Encourage the writing, defense and publication of dissertations and theses in a foreign language;
 - ix. To regulate publishing standards for dissertations and theses in a foreign language, in particular formats based on scientific articles published in peer-reviewed journals;
 - x. Establish a minimum curricular workload in a foreign language in all thematic areas provided for in the Internationalization Project, which includes not only disciplines, but other academic activities such as participation in events, lectures, seminars, summer / winter schools, in Brazil or abroad.

Regarding support for foreign visitors:

- a) Create the Foreign Visitor Support Program (PAVE), which will have as basic guidelines:
- i. To establish a Foreign Visitor Support Committee (CAVE), which will be composed of students and at least one faculty member of the PGPs, with a 2-year term of office with the possibility of renewal, whose main function is to coordinate all activities foreseen in the PAVE;
 - ii. To appoint a professor, researcher or student as tutor of the respective professor, researcher or foreign student during the initial period of up to 60 days;
 - iii. To implement, during the first week of the arrival of the visitor, specific adaptation activities, including the Coordination of the PGPs, in order to enrich the foreign visitor to culture, social customs and language, giving them support in their arrival and installation in Brazil;
 - iv. To create a standard orientation material for foreign visitors that will be delivered in the adaptation week containing various information from the country, including basic legislation, customs, culture, cuisine, language, means of transportation, lodging, food options;
 - v. To promote activities such as lectures, short seminars, meetings, etc. aimed at integrating foreign visitors to the academic activities of the PGPs, including instructions about the regulations and guidelines of the PGPs and the Institution;

Regarding the management of institutional internationalization projects:

- a) Perform specific actions to ensure smooth running of the activities planned in the Institutional Internationalization Project, maximizing the achievement of the planned objectives and correctly executing the entire budget:
 - i. Engage the Project Management Group with the entire scientific community of the Institute through semiannual periodic meetings involving the Area and Academic Coordinators, in which the objectives of the Project, benefits, opportunities, rules and partial results obtained from its implementation will be presented, updating the information whenever there is progress in the progress of activities, changes in current legislation, budget re-allocation, prioritization and re-evaluation of activities whose results are not satisfactory, opening up new opportunities for cooperation projects;
 - ii. Establish detailed guidelines (through specific information and specific forms) for access to the benefits provided for in the Project in accordance with beneficiary selection policies and international cooperation projects, which provide for the transparency of the dissemination of opportunities, establish clear criteria and selection objectives, based on the academic / scientific merit of the project and/or the proponents, establish the alignment of the opportunities with the Thematic Areas prioritized in the Institutional Project and promote the wide dissemination of the results of the selective processes, with broad access to the administrative resource;
 - iii. Develop web pages for dissemination of all activities of the Institutional Project, including calls for funding opportunities, dissemination of academic / scientific events promoted within the scope of the Internationalization Project, publication of the Minutes of the meetings of the Management Group and its deliberations, conventions for administrative events, dissemination of related news through periodical information, dissemination of the evaluations of the goals and execution of the Project, among others;
 - iv. Produce of technical dissemination material containing the main objectives of the Project, its funding opportunities, goals, regulations, among others;
 - v. Evaluate the accuracy of the Institute's PGPs' rules in order to encourage the participation of the PGPs in the activities of the Internationalization Project, creating new regulatory mechanisms to increase access to internationalization for students and professors.
- b) To create an independent Evaluation Committee of Internationalization (ECI), of an advisory nature, to evaluate the results of the Institutional Project, which will be composed of internal and external members of INPE, in the approximate proportion of up to 50%, if there is sufficient availability of specialists interested in joining the ECI. Its main attributions will be:
 - i. Ensure the transparency of the process of monitoring and internal evaluation of the goals and execution of the Internationalization Project
 - ii. Apply the evaluation metrics of the Internationalization Project defined by the Management Group based on the information provided in the institutional diagnosis, the actions foreseen in the project, the targets established for each year and the allocated budget;
 - iii. Hold annual meetings to evaluate all the activities carried out and results achieved in the last year from the technical reports produced by the Project Management Group;
 - iv. Issue an evaluation report on the goals and execution of the Project, summarizing all the activities that effectively led to relevant results from the point of view of institutional internationalization, correlating them with the financial execution of the Project in order to verify the cost / benefit ratio of each share;
 - v. Recommend to the Management Group any revisions to the Project's goals and/or actions, in addition to possible re-allocation of resources, focusing on the activities with the greatest impact and/or producing relevant results and/or encouraging activities that are not yet producing satisfactory results. the fundamental objective of obtaining the maximum efficiency in the execution of the Project;

- c) Integrate the national programs of financial support to the internationalization effort through the following actions:
- i. Encourage the students and/or professors of the INPE Graduate Programs, who are beneficiaries of resources of the national programs, such as PROAP, DS, PROEX, PNPB, DINTER, PVNS, PAEP, to the internationalization activities according to the policies of management and operationalization of the Institutional Project described above, aiming at the engagement of beneficiaries of national programs with international resources;
 - ii. Prioritize access to national programs for students, professors and researchers who already have international experience or who are involved in international activities, either through the Institutional Project or through partner Institutions;
 - iii. Promote the training of the beneficiaries of the national programs for internationalization, publicizing the available opportunities and encouraging the realization of new projects of international cooperation and/or organization of international academic / scientific activities;
 - iv. Attract foreign researchers to Brazil through PNPB (post-doctoral fellowship) opportunities;