INSTITUTOS NACIONAIS DE CIÊNCIA E TECNOLOGIA – INCT

ACOMPANHAMENTO E AVALIAÇÃO

Período de abrangência do relatório: de 01/03/2009 a 30/05/2011

IDENTIFICAÇÃO DO PROJETO

TÍTULO: Instituto Nacional de Ciência e Tecnologia de Astrofísica

PROCESSO Nº: 573648/2008-5 (CNPq) e 2008/57807-5 (FAPESP)

COORDENADOR: João Evangelista Steiner

PROJETO DE PESQUISA

HOUVE ALTERAÇÕES NOS OBJETIVOS E/OU METAS PROPOSTOS?
( ) SIM (x) NÃO

Em caso positivo registrar as alterações ocorridas:

HOUVE ALTERAÇÕES NO CRONOGRAMA ORIGINAL? ( ) SIM (x) NÃO

Em caso positivo registrar as alterações ocorridas, como inclusão ou exclusão de objetivos e metas, dentre outros:

HOUVE PROBLEMAS E/OU DIFICULDADES NA EXECUÇÃO DO PROJETO?:
(x) SIM ( ) NÃO

Em caso positivo indicar quais foram: Dada a natureza estratégica da proposta, é natural que surjam dificuldades. A maior delas diz respeito a construir um consenso na comunidade a respeito da estratégia brasileira para os grandes telescópios.

EQUIPE

HOUVE ALTERAÇÃO NA COMPOSIÇÃO ORIGINAL DA EQUIPE?
(X) SIM ( ) NÃO

Em caso positivo indique o número de inclusões e exclusões:

Responsável p/ laboratório associado ( ) Inclusão ( ) Exclusão
Justificar:

Pesquisador (X) Inclusão ( ) Exclusão
Obs: Foram incluídos vinte e sete pesquisadores (a maior parte alunos) no INCT-Astrofísica, nomes

em anexo.

Nota: listar em anexo, o nome e CPF, dos pesquisadores incluídos e excluídos do INCT.

DESCREVER OS MECANISMOS DE INTERAÇÃO UTILIZADOS ENTRE GRUPOS DE PESQUISA PARTICIPANTES DO INCT:

Foram feitos dois eventos em conjunto com o INESPAÇO e o INCT em Eletrônica Orgânica.

RELATAR EVENTUAIS DIFICULDADES ENCONTRADAS ENTRE OS GRUPOS DE PESQUISA PARTICIPANTES DA REDE E POSSÍVEIS MECANISMOS UTILIZADOS PARA SUPERAR ESTAS DIFICULDADES:

Foi criado um “Comitê Científico”, com representantes dos principais grupos do INCT-A.

HOUVE A INCLUSÃO OU EXCLUSÃO DE INSTITUIÇÕES E EMPRESAS?
(x) SIM ( ) NÃO

EM CASO POSITIVO INDIQUE O NÚMERO:

Instituição de Ensino e/ou Pesquisa (X) Inclusão ( ) Exclusão
Justificar:
Novos grupos se formaram: FURG, UEFS, UFGD, UFS e UFFS

Empresas ( ) Inclusão ( ) Exclusão
Justificar:

RESULTADOS OBTIDOS / METAS

COMENTE OS 3 (TRÊS) PRINCIPAIS RESULTADOS CIENTÍFICOS E/OU TECNOLÓGICOS OBTIDOS ATÉ O MOMENTO PARA:

A – PESQUISA:

1 - Conclusão e Início do Comissionamento dos instrumentos SIFS (SOAR Integral Field Unit Spectrograph) e BTFi (Brazilian Tunable Filter Imager) – Os primeiros instrumentos de classe mundial construídos no Brasil.

2- Publicação de 148 papers em 2009 (83% Qualis A e 11% Qualis B) e 177 papers em 2010 (78% Qualis A, 12% Qualis B)

B – FORMAÇÃO DE RECURSOS HUMANOS:

1- 25 mestrados em 2009 e 25 mestrados em 2010 defendidos.
2- 10 doutorados em 2009 e 12 doutorados em 2010 defendidos.

C – TRANSFERÊNCIA DE CONHECIMENTO E TECNOLOGIA:

1- O desenvolvimento de instrumentação; isso requer grande capacidade de tecnologia de ponta e formação de quadros técnicos.

2- No BTFi foram formados 6 mestres em engenharia/tecnologia.

D – EDUCAÇÃO E DIVULGAÇÃO DA CIÊNCIA:

1 – Estruturação do Curso a Distância para Professores de Ciências
2 – Significativo apoio a grupos emergentes, entre outras coisas com 19 bolsas de IC.

ENUMERE OS ATÉ 03 (TRÊS) PRINCIPAIS IMPACTO(S) CAUSADO(S) PELAS AÇÕES E RESULTADOS DO PROJETO PARA A AMPLIAÇÃO, MELHORIA E CONSOLIDAÇÃO DA COMPETÊNCIA TÉCNICO-CIENTÍFICA NACIONAL PARA:

A – PESQUISA:

1- **Publicação de 148 papers em 2009**
2- **Publicação de 177 papers em 2010**
3- **Conclusão de 50 mestrados e 22 doutorados (2009 + 2010)**

B – FORMAÇÃO DE RECURSOS HUMANOS:
- Bolsas IC: 19 alunos (15 ainda vigentes)
- Bolsas mestrado: 8 alunos
- Bolsa de doutorado: 1 aluno
- Bolsa de Pós-doutorado: 6 bolsistas (2 ainda vigentes)
- Bolsa de pesquisador visitante:1

C – TRANSFERÊNCIA DE CONHECIMENTO E TECNOLOGIA:

Conclusão de dois instrumentos de classe mundial para o Telescópio SOAR

D – EDUCAÇÃO E DIVULGAÇÃO DA CIÊNCIA:
O curso de ensino a distância para professores de ciências começará em agosto/2011, por isso ainda não teve impacto.

PARA FINS DE DIVULGAÇÃO, RELACIONAR RESULTADOS OBTIDOS QUE MEREÇAM DESTAQUE PARA O DESENVOLVIMENTO CIENTÍFICO, TECNOLÓGICO E/OU SOCIAL:

Ver sites:

- http://www.lna.br/~sifs
- http://www.astro.iag.usp.br/~btfi/

RESULTADOS EM NÚMEROS

OBS.: Os Currículos Lattes dos pesquisadores do INCT devem estar atualizados com relação às publicações e aos bolsistas, de onde serão coletados pelo CNPq os dados de publicação científica e de orientação.

A – INDICADORES DE PESQUISA	
NÚMEROS DA PRODUÇÃO TÉCNICO-CIENTÍFICA E ARTÍSTICA NO PERÍODO (anexar referências):	
TIPO	**QUANTIDADE**
SOFTWARE	
PATENTE	
PRODUTOS	
PROCESSOS	
PRODUÇÃO ARTÍSTICA (ESPECIFICAR)	
OUTROS (ESPECIFICAR): PAPERS	**177 (em 2010)**

B – INDICADORES DE TRANSFERÊNCIA DE CONHECIMENTO E TECNOLOGIA	
NÚMEROS DA PRODUÇÃO NO PERÍODO (especificar e anexar referências):	
TIPO	**QUANTIDADE**

C – INDICADORES DE EDUCAÇÃO E DIVULGAÇÃO DA CIÊNCIA	
NÚMEROS DA PRODUÇÃO NO PERÍODO (especificar e anexar referências):	
TIPO	**QUANTIDADE**
Mestres formados (2010)	25
Doutores formados (2010)	25

INFORMAÇÕES ADICIONAIS

FORMAS DE DISPONIBILIZAÇÃO PÚBLICA DOS RESULTADOS DO PROJETO:

www.astro.iag.usp.br/~incta

COMENTE AS PRINCIPAIS MELHORIAS IMPLANTADAS NAS INSTALAÇÕES FÍSICAS DA SEDE E DOS LABORATÓRIOS ASSOCIADOS AO INSTITUTO, COMO ADPTAÇÕES FÍSICAS, EQUIPAMENTOS, ETC.:

FOI IMPLANTADO UM SERVIDOR COM PROCESSADOR GPU NO INSTITUTO DE ASTRONOMIA, GEOFÍSICA E CIÊNCIAS ATMOSFÉRICAS DA USP, PARA USO DE TODA A

COMUNIDADE.

HOUVE ATIVIDADES DE INTEGRAÇÃO COM OUTROS INCT's: (x) SIM ( ) NÃO

EM CASO POSITIVO COMENTAR:

Foram feitos dois eventos em conjunto com o INESPAÇO e o INCT em Eletrônica Orgânica.

Space Astronomy in Brazil
IAG-USP, held in September 2009
INCT-A + INCT INESPAÇO

Instrumentation in Optics
USP-São Carlos, School on Instrumentation for Astronomy and Organic Electronics held in September 2010.
INCT-A + INCT Organic Electronics

CONSIDERAÇÕES FINAIS

COMENTAR OUTROS ASPECTOS RELEVANTES DO DESENVOLVIMENTO GERAL DO INCT:

O INCT-A Iniciou suas atividades tardiamente (final de 2009), e acelerou muito em 2010. Trata-se de um projeto estratégico para a Astronomia brasileira e, portanto, seus impactos devem ser medidos no médio e longo prazos.
Uma apresentação mais detalhada está em relatório anexo.

LOCAL E DATA: São Paulo, 30 de maio de 2011.

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João Evangelista Steiner
Coordenador do INCT-Astrofísica

Anexo 1

Lista de pesquisadores incluídos no INCT-Astrofísica até maio/2011

Nomes	CPF	Instituição
Abilio Mateus Junior	694866621-34	UFSC
Adriano Ribeiro Hilário	098.393.778-84	UNIVAP
Alberto Garcez de Oliveira Krone Martins	311.868.328-78	IAG
Alberto Rodríguez Ardila	785.305.470-04	LNA
Alessandro Pereira Moisés	031.821.904-23	UNIVASF
Alexandre Bergantini de Souza	664.300.892-15	UNIVAP
Alexandre Miers Zabot	008.113.469-00	UFFS
Bernardo Walmott Borges	022.104.119-20	UFGD
Caius Lucius Selhorst	805.518.311-20	UNIVAP
Carlos Eduardo Paladini	151.593.438-14	IF-USP
Daniel Luquez Vianna	355.908.338-92	IF-USP
Danilo Maciel Gusmão	369.949.298-25	UNIVAP
Deise Aparecida Rosa	220.035.018-00	UNIVAP
Diana Paula Andrade Pilling Guapyassu de Oliveira	028.608.587-92	UNIVAP
Felipe Gomes dos Santos	385.965.978-03	UNIVAP
Joaquim Eduardo Rezende da Costa	733.973.348-53	INPE
Jorge Luis Melendez Moreno	3993523 (Peru)	IAG
Mairan Teodoro	273.437.618-03	IAG
Newton de Figueiredo Filho	484.900.326/53	UNIFEI
Oli Dors Júnior	715.794.190-20	UNIVAP
Paulo Fernando Penteado	292855608-73	IAG
Priscila Freitas Lemes	338.774.458 - 70	UNIVAP
Renato de Alencar Dupke	861924937-15	ON
Roberto Bertoldo Menezes	338.618.788-95	IAG
Sergio Pilling Guapyassu de Oliveira	O70.813.767-97	UNIVAP
Tiago Vecchi Ricci	300.048.038-25	IAG
William Schoenell	009.168.289-48	UFSC

Anexo 2

Report of the National Institute of Science and Technology in Astrophysics (INCT-A) - 2010

Coordinator: João E. Steiner (IAG-USP)

Vice-coordinator: Beatriz Barbuy (IAG-USP)

Management Committee: Albert Bruch (LNA), Beatriz Barbuy (USP), Daniela Lazzaro (ON), Hugo Capelato (INPE), Joao Steiner (USP) and Thaisa Storchi-Bergmann (UFRGS)

Scientific Committee: Adriano Cerqueira (UESC), Albert Bruch (LNA), Beatriz Barbuy (USP), Daniela Lazzaro (ON), François Cuisinier (UFRJ), Hugo Capelato (INPE), Ioav Waga (UFRJ), Jacques Lepine (USP), Joao Steiner (USP), Kepler Oliveira (UFRGS), Laerte Sodré (USP), Luis Paulo Vaz (UFMG), Raul Abramo (USP), Roberto Cid Fernandes (UFSC) and Thaisa Storchi-Bergmann (UFRGS)

What is the INCT-A? – An executive summary

Context

Brazilian Astronomy, although young, has already made some important achievements. The first graduate programs were established in the 1970´s and, since then, the community experimented continuous and vigorous growth. Today nearly 30 institutions support of astronomical research at some level. The first scientific equipment were planned and built in the early 1970´s; an important strategic step was the construction of LNA – the first (and for long time the only one) national laboratory to operate in Brazil. Thanks to this laboratory, Brazilian Astronomy experienced a growth, both in quantity and in quality. This allowed joining the Gemini and SOAR consortia in the 1990´s. These consortia operate world class astronomical instruments.

The situation of optical and infrared astronomy is, thus, quite favorable. The participation in the Gemini and SOAR consortia has put our community in contact with the best practices of science management and, at the same time, integrated networks of specialists. Although the SOAR telescope does not have its full instrumentation operational, we already can state that Brazilian contribution to the publications of both Gemini and SOAR consortia is at the highest ranking. At the same time the perspective of world–class instrumentation has revitalized the various groups and attracted young talented people to the graduate programs.

For the next decade, world astronomy is planning new and significant steps. At all wavelengths, a next generation of telescopes is under construction: optical 20-40m class (GMT, TMT, ELT) telescopes, radio-interferometers (ALMA, SKA), a new generation of space-borne instruments (IXO, Webb) and a large deep optical survey telescope (LSST). Many of these equipments are multinational initiatives, given the high costs involved, some of them, in the range of a billion dollars and will take 10 to 15 years to be built. Direct participation in such projects is beyond our possibilities, but there are niches from which our astronomy may benefit. The form and intensity of these benefits depend on some new

investments but mostly on careful and strategic planning. If this is not done, our community will have less and less opportunities in the international scenarios for the coming decades.

In the present INCT, a significant number of researchers from many institutions meet, to plan and implement actions, having in mind the future of Brazilian Astronomy. ***We are researchers from diverse institutions and of distinct specialties, but we all need the same scientific infrastructure and above all, similar collective strategies.*** *These are the characteristics that provide the* ***unity*** *to this initiative. These strategies are more and more necessary, given the high costs of the new research equipment and timescales needed for their construction.*

Our community already has a national laboratory (LNA) that operates the national infrastructure in optical and infrared astronomy. The INCTA aims toward a partnership with LNA and other institutions to mobilize the community in fostering the best insertion of Brazilian Astronomy in the great international projects underway and those that still will be proposed.

Moreover, we want to promote the culture of technological innovation by supporting the development of world class instrumentation aimed at basic research.

If in the recent past Brazilian Astronomy has advanced in a significant way, its future depends on our planning and organization capabilities. New large and expensive projects are under way in the developed countries, many of them in the form of international consortia, given their high costs, which are prohibitive toward our direct participation. However it is possible to create alternative routes, identifying niches that can bring benefits to our science through creative strategies of international cooperation.

Such associations will increase the networking, both institutional and individual, showing us the best international practices of organization, planning and management of science. This effort is of fundamental importance to provide the environment for the next generation of scientist to perform frontier research.

The "Instituto Nacional em Ciência e Tecnologia em Astrofísica – INCTA", in addition to the host institute, has one associated laboratory (LNA), 3 other MCT research institutes, 14 federal universities, 3 state universities and 6 private universities, comprising a total of 32 research groups, 12 being consolidated and 20 emerging ones in 27 different institutions. A total of 144 PhD scientists are joining the institute; 52 of them have CNPq scientific productivity fellowship, 12 being level 1A.

Misssion

The mission of the National Institute of Science and Technology in Astrophysics is to insert Brazilian Astronomy into the future of the World Astronomy.

Strategic Goals

1- Maximizing the return from the Gemini and SOAR telescopes.

a) Scientific return: Brazil already presents the highest productivity index among the Gemini partners (Brazilians have used 2.3% of the time and published 10% of the papers). For the SOAR telescope this statistical comparison is still premature as the telescope was built about 5 years later than Gemini. Surely the numbers that matter are not only the number of papers. Quality is also relevant. As a goal, we propose that Brazil maintains the leadership in scientific productivity for both Gemini and SOAR consortia for the next 5 years.

b) Graduate programs: There are 11 graduate programs that offer Master+PhD programs in Astronomy (USP; UFRGS; UFMG; ON; INPE; UFRN; UFSC; UNIVAP; UFSM; OV-UFRJ, FEG-UNESP). Another 4 offer master degree only (UNICSUL; UNIFEI; UESC; UERN). The possibilities opened with the access to the Gemini and SOAR telescopes have

attracted many new talented people to Astronomy. Today we have a good number of promising talented young people in our graduate programs and integrating them in the scientific production with the use of large telescopes and world-class instruments is one of the most effective ways of attracting and educating more talented people. Our goal is to double the number of papers published by Brazilian graduate students with data from the Gemini and SOAR telescopes in the next 3 years (2009-11 compared to 2006-08) with a following growth of 15% per year.

c) Supporting emerging groups: Besides attracting and educating talented people, we also want them to get a job in our country. Our major research institutes seem to be saturated growth wise. At the same time, the vast majority of universities do not have a single astronomy professor. In recent years Brazilian Astronomy has, in fact, experimented a new phenomenon: non-traditional universities, both public and private, have hired a number of young and productive astronomers in their faculty. These new groups, often very small in number, need to be supported, integrated in networks and have access to the best existing equipment. Our goal is to double the number of papers published with authors from emerging groups with data obtained from Gemini, SOAR and alike, for the next 3 years, followed by a growth of 15% per year. Among other incentives, INCTA will provide support to their research, by supplying computer equipment to researchers that obtain observing time with large telescopes provided they are justified within the aims of the Institute. We propose to support the participation of people from emerging groups in scientific meetings when presenting results from large telescopes. These groups will also have access to financial support to foster national and international networking, that is, contact with scientists for seminars, to avoid intellectual isolation, as most of these groups are located far from the main centers.

d) Stimulate the development of instrumentation for the Gemini and SOAR telescopes. The Brazilian participation in the Gemini and SOAR consortia has allowed, for the first time, the effective construction of modern instruments for large telescopes. Currently Brazil is concluding the construction of the SIFS – SOAR Integral Field Spectrograph – with 1300 fibers, capable of operating with adaptive optics. Other two instruments are in distinct phases of construction: the Steles (high resolution spectrograph) and the BTFI (Fabry-Perot large field imaging spectrograph). Our goal: to conclude the construction and commissioning of the three instruments underway and begin a new one in the next three years.

2 – Brazilian Astronomy in the era of the LSST and ELT projects. *The next generation of large telescopes is being planned now. The GMT, TMT and E-ELT are in the process of starting their construction. It is important for Brazilian astronomy to establish a strategy for the era of ELTs, that will be operational by the year 2020. The Large Synoptic Survey Telescope, on the other hand, is a North-American initiative for building and operating a telescope of 6.5 m effective aperture (8.4m nominal) to monitor the sky in 6 filters. This will be a deep survey with an unprecedented approach in the sense that it will revisit the same regions in the sky at about every 4 days, so that it will add a temporal dimension to the data. The magnitude limit for single observations will be r ~24 and it will have a cumulative limit of r~27.5. This project has 4 main broad goals: a) the nature of dark energy and dark matter; b) The transient sky; c) The structure of the Milky Way and d) The structure of the Solar System. This project will make some observations available in real time having profound impact on Brazilian Astronomy.*

Participation in the VISTA-VVV project will be a pilot to learning how to treat large datasets.

3 – Virtual observatories*. Great part of the data from space missions and also from ground*

based telescopes is available in databases. These datasets contain a wealth of information and mining them may be of enormous benefit to Brazilian Astronomy, without proportional financial investments. Significant effort in software is imperative to make the appropriate and necessary development. Our goal is to have an operational network of virtual observatories in Brazil within the next 3 years.

***4 – New projects of scientific equipment**. A minimum of 3 new projects, to be defined by the Science committee, will be elaborated and proposed: at least one in radio-astronomy, at least one scientific satellite and at least one in optical/infrared astronomy. These projects will be elaborated to the point where they can be presented to the funding agencies or to possible international partners.*

*5 – **Education activities:** Brazil has currently about 300 000 teachers of Science and Mathematics. The content and knowledge of Astronomy is minimum. We propose to organize a distance learning course on Astronomy for science teachers all over the Country. The idea is to establish a virtual ambient for an online "distance learning course". We propose to establish partnerships with the State Governments and Universities to create a large network to foster this idea.*

INCT-A: Institutions

INCT-A is a network of 144 researchers of the following institutions

Host Institution:
Instituto de Astronomia, Geofísica e Ciências Atmosféricas – Universidade de São Paulo

Associated Laboratory:
Laboratório Nacional de Astrofísica – LNA

Associated Universities and Institutes (31):

FURG – Fundação Universidade do Rio Grande – RS
UCS – Universidade de Caxias do Sul - RS
UDESC – Universidade para o Desenvolvimento do Estado de Sta. Catarina - SC
UEFS – Universidade Estadual de Feira de Santana - BA
UEL – Universidade Estadual de Londrina -PR
UESC – Universidade Estadual de Santa Cruz – Ilhéus/BA
UFABC – Universidade Federal do ABC-SP
UFFS – Universidade Federal da Fronteira Sul –PR
UFGD – Universidade Federal da Grande Dourados - MS
UFJF – Universidade Federal de Juiz de Fora-MG
UFMG – Universidade Federal de Minas Gerais-MG
UFPel – Universidade Federal de Pelotas-RS
UFRGS – Universidade Federal do Rio Grande do Sul-RS
UFRJ – Universidade Federal do Rio de Janeiro-RJ
UFS- Universidade Federal de Sergipe - SE
UFSC – Universidade Federal de Santa Catarina-SC
UFSCar - Universidade Federal de São Carlos – SP
UFSM – Universidade Federal de Santa Maria-RS
UNB – Universidade de Brasília - DF
UNESP – Universidade Estadual Júlio de Mesquita Filho-SP
UNICSUL – Universidade Cruzeiro do Sul - SP
UNIFEI – Universidade Federal de Itajubá-MG
UNIFESP - Universidade Federal de São Paulo - SP
UNIPAMPA – Universidade Federal do Pampa-RS
UNIVAP- Universidade do Vale do Paraíba - SP
UNIVASF – Universidade Federal do Vale do São Francisco-PE
Universidade Presbiteriana Mackenzie - SP

Centro Brasileiro de Pesquisas Físicas - CBPF
CTA/MD – Comando Tecnológico da Aeronáutica – SP
Instituto Nacional de Pesquisas Espaciais – INPE
Observatório Nacional – ON

The report: 2010

Introduction

This is a scientific report of the National Institute for Science and Technology in Astrophysics - INCT-A. The activity INCT-A began in May 2009, after the first resources were received. Soon after, we had the meeting of the IAU General Assembly in Rio de Janeiro, which required very large concentration of efforts of the main leadership. Therefore the activities started in fact in the second half of 2009 and were accelerated in 2010.

Also in May 2009 the Scientific Committee of INCT-A decided to adopt as a method of planning, the elaboration of "White Papers" for the different activities. Two months later, the MCT has formed a Special Committee on Astronomy - CEA. This Commission also decided to produce "White Papers" (WP), hence the initiative of the WP/INCT-A merged with those of CEA and a significant number of WP was released. This is the first step of planning INCT-A and WP with strong participation of members of INCT-A are reproduced in the annexes and make up the essence of this report. Both this report as the other documents are available to the public on the website of INCT-A:

www.astro.iag.usp.br /~incta

Below we present results, by item, of our five strategic objectives.

1 - Return on investments in the Gemini and SOAR

1a - Scientific Production

In 2009, the 144 researchers of the INCT in Astrophysics published 148 papers. Of these, 83% were published in journals classified as Qualis A by CAPES (see Table 1). In 2010, 177 papers were published, 78% of them were Qualis A, 12% Qualis B (see Table 2). It is true that significant scientific output would have occurred without the existence of INCT. On the other hand it shows that the group of researchers linked to INCT has a great capacity for scientific work and that a strategic plan for that area makes sense. The growth of the scientific production from 2009 to 2010 was 20%.

Brazil's participation in the Gemini and SOAR has shown significant return. In Gemini, the Brazilian participation in refereed publications is already about 10% and is growing. In 2009, Brazilian authors participated in 13% of the papers and 9% were the first authors. Altogether 78 Brazilian authors have signed papers with data from Gemini to date.

In SOAR, scientific production is still incipient. This telescope began its operation five years after the Gemini. Still, we can say that Brazil accounts for 54% of the papers published to date, having used only 30% of the time. We list the publications of Brazilian authors containing data from the Gemini and SOAR telescopes bellow. Perhaps more important at this time is that the SOAR Telescope has enabled Brazilian Astronomy to establish a world class instrumentation program (see below).

1b / c - Human Resources and Emerging Groups

In terms of human resource training, the INCTA allocated postgraduate scholarships for Masters, restricted to emerging groups. In addition, the emerging groups produced a "White Paper" proposing a strategy for action.

A collection of books in Astronomy, written in Portuguese, was acquired by INCT-A and allocated to all emerging groups.

A total of 8 lap-tops, 9 desk-tops, 2 VO servers and 1 videocon equipment were allocated to the emerging groups. 19 scientific initiation fellowships, 8 master degree fellowships and 1 Phd fellowship were allocated to the emerging groups. A total of 6 pos-docs fellowships were also allocated.

The researchers of the INCT-A advised 25 Ms and 10 PhD theses in 2009 and 25 Ms and 12 PhD theses in 2010

1d - Instrumentation

The SOAR Telescope has enabled the development of a world-class instrumentation program. In December/2009, SIFS (SOAR Integral Field Spectrograph) was sent (with financial support from INCT-A) to Chile. This spectrograph is already installed on the telescope and is in its commissioning phase. The spectrograph, with a cost of US$ 1 420 000.00, was funded mostly by FAPESP with a contribution from LNA/MCT. The participation of INCTA was small (components, transportation and fixing).

Most of the INCT/FAPESP spending in the first year was related to BTFi (Brazilian Tunable Filter Imager). This project, coordinated by Prof. Claudia Mendes de Oliveira, has a budget of one million dollars and is being funded directly by FAPESP (53%), indirectly by FAPESP through INCTA (29%) and by LNA (13%). The instrument has been transported to Chile and is being commissioned.

2 - Brazil in the era of LSST and ELTs

The discussions on ELTs (Extremely Large Telescopes) have taken much of the efforts of INCTA. Several contacts and meetings were held between the sub-group with special responsibility and the various projects.

3 - Virtual Observatories

A sub-group was appointed that is responsible for drafting a "White Paper". Three researchers participated in international events in the IVOA-International Virtual Observatory Alliance in Munich, Victoria and Naples. Their trip reports can be found on the INCTA site. Trough INCTA, Brazil became a member of the IVOA.

4 - New projects

With respect to this item, a sizable number of white papers were produced. As for projects, they can be classified between instrumental and purely scientific. They map the demand from Brazilian astronomy with detail.

The INCT along with INESPAÇO hosted a workshop on the prospects of space astronomy in Brazil.

The INCT-A has supported the study of a collaboration between groups from Spain and Brazil to built the J-PAS, a 2.5 meter telescope with 7 square degrees of field of view and 42 narrow band filters. This project aims to study the Physics of the Accelerating Universe (PAU). A southern version (PAU-Brasil) is under consideration.

5 - Education

For the past decade the number of professional astronomer has grown considerably in Brazil. Meanwhile, the educational paradigms for basic levels schools have also changed. A broad range of new scientific and technological approaches are now mandatory, and Astronomy has finally been placed as a key theme for science teaching. However, despite of

the increasing number of astronomers in the country, Astronomy has not reached the teacher's undergraduate courses. As a consequence, lectures at all basic level schools lack on scientific precision and essential concepts are misunderstood even by those who are supposed to teach. Currently, there are around 300,000 teachers of basic levels schools teaching Astronomy without any undergraduate level courses.

In this context, the INCT-A approved the creation of a working group on Astronomy Education to develop one of the strategic goals of the project. The working group is responsible for:

- create a course of Astronomy for teachers of basic level schools (completely free);
- establish a virtual ambient for an online "distance learning course";
- establish partnerships with local state government and federal government in order to guarantee professional advantages for the teachers;
- establish a network between the centers of Astronomy in Brazil in order to reach the maximum number of teachers, focusing on the less developed regions of the country.

The working group is formed by astronomers of several institutions including universities in South, Southeast and Northeast regions of Brazil. It also counts with the presence of experts on educational sciences that helps on the creation of the texts, podcasts, movies and animations that are been created for the online courses. The production of texts on basic Astronomy and Astrophysics was provided by the scientists members of the INCT-A. The current stage of the project is of adapting the texts to its educational context, which is being done by the learning science experts hired for this purpose. Meanwhile, the virtual ambient is also in the production process. The group estimates March/April as final deadlines for the material to be online and launching date for the course to the first group of teachers.

Investments made in the period 2009-2010

Acquisition of computer facilities for emerging groups:

Lap-top computers:

Alexandre Soares de Oliveira (UNIVAP)
Cássio Barbosa (UNIVAP)
Fabrício Ferrari (UNIPAMPA)
Hecktor Monteiro (UNIFEI)
Lucimara Martins (UNICSUL)
Nadja Magalhães (UNIFESP)
Paulo Afrânio Lopes (OV-UFRJ)
Wilton Dias (UNIFEI)

Desk-Top computers:

André Ribeiro (UESC)
Diego Falceta-Gonçalves (USP-Leste)
Gabriel Hickel (UNIFEI)
2 x Gustavo Lanfranchi (UNICSUL)
Henri Plana (UESC)
Ivan Soares (UNB)
Irapuan Rodrigues (UNIVAP)
Rogemar Riffel (UFSM)

Videocon equipment

Sílvia Lorenz (UFRJ)

Virtual Observatory servers:

Paula Coelho (UNICSUL)
Roberto Cid Fernandes (UFSC)

Acquisition of Astronomy books for emerging groups

- UNIPAMPA
- UFRJ/Observatório Valongo
- UNIFEI
- 2x UNICSUL
- 2x UESC
- UFSM
- UFABC
- UFSC
- 2x UNIVAP
- UNIFESP
- UNIVASF

Acquisition of computer facility for community use

High Performance GPU processor

Alex Carciofi (IAG-USP)

This equipment, running at 2.3 teraflops, has been installed at IAG-USP for community use.

Desk-top computer were allocated to people working for the INCT-A
Carlos Paladini (IAG-USP)
Anne Louise Scarinci (IAG-USP)
Maria Teresa Lopes (IAG-USP)

International Travel

- Visit to ALMA (Chile)
- Visit to TMT and GMT (Pasadena CA-USA)
- PFS (Los Angeles – USA)
- J-PAS (Teruel - Spain)
- SPIE Astronomical Telescopes and Instrumentation (San Diego-USA)
- Asymmetric Planetary Nebulae V (UK)-Denise Gonçalves
- Virtual Observatory (Munich - Germany)
- Virtual Observatory (Victoria - Canada)
- Gemini users training (Tucson – USA)
- Visit to SPARTAN (Chile)
- Observation mission to IRTF (Hawaii)
- Virtual observatory (Naples - Italy)

Support to Instrumentation

- SIFS – SOAR Integral Field Spectrograph
- BTFI –Brazilian Tunable Filter Interferometer
- LLAMA- Latin-American Astronomical Milimetric Array

Events held in 2009 and 2010

Space Astronomy in Brazil
IAG-USP, held in September 2009
INCT-A + INCT INESPAÇO

Instrumentation
USP-São Carlos, School on Instrumentation for Astronomy and Organic Electronics held in September 2010.
INCT-A + INCT Organic Electronics

The ASTER project
Sao Jose dos Campos, 27/10/2010
INPE+INCT-A

HUMAN RESOURCES

Master dissertations and PhD theses graduated in 2009 and 2010 under the advice of INCT-A members.

2009: Ms - 25; PhD – 10

2010: Ms – 25; PhD - 12

FELLOWSHIPS ALLOCATED BY THE INCT-A

Fellowships: Iniciação Científica

Adam Smith Gontijo Brito de Assis (Orientador: Ivan Soares Ferreira/UNB)
Aghata Harumi da Costa (Orientador: Rose Clívia dos Santos/UNIFESP)
Anderson Seiji Okada (Orientadora: Nadja Magalhães/UNIFESP)
Arthur Eduardo da M. Loureiro (Orientador: Horácio Dottori/ UFRGS)
Calliu Icaro da Silva Soares Rosa (Orientador: Militão Figueiredo/ UNIVASF)
Davi Rohe Salomon da Rosa Rodrigues (Orientador: Daniel Müller/UNB)
Dino Beghetto Junior (Orientador: Irapuan Rodrigues Oliveira Filho/UNIVAP)
Felipe de Paula Lima (Orientador: Ivan Soares Ferreira/UNB)
Francisco Elânio Bezerra (Orientador: Gustavo Lanfranchi/UNICSUL)
Frederico Vilela de Lima (Orientador: Anderson Caproni/UNICSUL)
Gabriela Augusta Prando (Orientador: Gustavo Rojas/UFSCAR)
Graciana Brum João (Orientador: Fabrício Ferrari/ FURG)
Helder José Farias Lima (Orientador: Alexandre Soares de Oliveira/UNIVAP)
Jamille Almeida Feitosa (Orientadora: Maria Jaqueline Vasconcelos/UESC)
Rafael Luiz Bernardi (Orientador: Abílio Mateus Jr/ UFSC)
Rafael Pantaleão Moreira (Orientador Oli Dors Jr/ UNIVAP)
Renato da Silva Severo (Orientador: Fabricio Ferrari /UNIPAMPA)
Thiago Marcel de Almeida Santana (Orientador; Iranderly Fernandes/UEFS)
Walter Silva Martins Filho (Orientador: Thais Mothé Diniz/OV)

Fellowships: máster

Iara Tosta e Melo (Orientador: Anderson Caproni/ UNICSUL)
Alexandre Bergantini de Souza (Orientador: Diana Andrade/UNIVAP)
Astor Leão Schonell Jr (Orientador: Rogemar Riffel/UFSM)
Luciana de Oliveira Ruiz (Orientador: Gustavo Lanfranchi/UNICSUL)
Fellipy Dias Silva (Orientador: Thais Idiart/IAG-USP)
Suzi Izaquiel Ferreira Diniz (Orientador: Lucimara Martins/UNICSUL)
William Schoenell (Orientador: Roberto Cid Fernandes Junior/UFSC)

Fellowship: Doctorate

Carlos Augusto Molina Velasquez (Paulo Afrânio Augusto Lopes/OV-UFRJ)

Fellowship: Technological and industrial development

Marília Jobim Sartori (LNA)

Fellowships: Post-Doctorate
Anne Louise Scarinci Brandao (Orientador: Diego Falceta Gonçalves-EAD/USP)
Cintia Quireza Campos (Orientadora: Denise Rocha Gonçalves/OV-UFRJ)
Daniela Borges Pavani (Orientador: Eduardo Bica/UFRGS)
Iranderly Fernandes de Fernandes (LNA)
Marcos Vinicius Borges Teixeira Lima (Orientador: Laerte Sodré/IAG-USP)
Natalia Vale Asari (Orientador: Roberto Cid Fernandes Junior/UFSC)

Fellowships: Visiting Fellow (BEV-A)
Noemi Pinilla-Alonso (Orientador: Thais Mothé-Diniz/UFRJ)

SCIENTIFIC PRODUCTION – 2009/2010

Table 1 - Distribution of the papers published by the INCT-A researchers in 2009, by journal

Journal	Qualis	Nr of papers	%
A&A	A2	34	23
MNRAS	A2	35	23
ApJ	A1	27	18
PhRvD	A2	10	7
AJ	A2	10	7
PhRvL	A1	1	1
AstL	s/c	1	1
CoPhC	s/c	1	1
JCAP	A1	5	3
PhLB	A2	3	2
Icarus	B1	2	1
GReGr	B2	1	1
AdSpR	s/c	4	3
APh	B3	1	1
P&SS	s/c	1	1
CeMDA	B4	1	1
ApSS	B4	4	3
RMxAA	B1	1	1
New Astron	B2	2	1
IJMPA	B3	3	2
PASJ	B1	1	1
PASA	s/c	2	2
Ast L	s/c	1	1
PhRvL	A1	1	1
CoPhC	s/c	1	1

148 papers:

83% Qualis A
11% Qualis B
6% Others

Table 2 - Distribution of the papers published by the INCT-A researchers in 2010, by journal

Journal	Qualis	Nr of papers	%
A&A	A2	45	25
MNRAS	A2	36	20
ApJ	A1	25	14
PhRvD	A2	13	7
AJ	A2	9	5
JCAP	A1	6	3
Icarus	B1	4	2
IJMPA	B3	8	4
AdSpR	s/c	6	3
APh	B3	2	1
ApSS	B4	5	3
RMxAA	B1	2	1
New Astron	B2	1	1
Nature	A1	1	1
PhLB	A2	2	1
PhRvC	A2	1	
JphCS		2	
IJT		1	
EL		1	
Cos Re		1	
SoPh		1	
JGRE		1	
CQGra		1	
AdAst		1	
AN		1	

Total: 177 papers:

78% Qualis A
12% Qualis B
10% Others

EVENTS FOR 2011

A - Science with Gemini and SOAR

Gemini:

1) *South American event for users training* (2011B)

SOAR:

First International Symposium on Science with SOAR - Cássio Barbosa/ Alberto Ardila
Maresias, 15-19 de maio de 2011

Workshop:

3D spectroscopy in Astronomy – Thaisa Storchi-Bergmann/ Claudia Mendes de Oliveira
In the context of SOAR (SIFS+BTFI) and Gemini (GMOS+NIFS) instrumentation

B- Virtual Observatory (Bravo) events:

1) *Advanced scientific computing in Astronomy* – Alex Carciofi/ BRAVO (2011A)
   4 day school + workshop for 80/100 people, to be held at UNICSUL
2) *School + workshop on Virtual Observatories* – Alex Carciofi/BRAVO (2011B)

C - J-PAS

Bi-national scientific event on observational cosmology – Spain + Brazil
(Dupke/Laerte/Claudia)

D – EAD

Science teachers training in Astronomy
Beginning of the first course.

E – Verão Quântico

Anchieta, ES (20 a 26 de Fev de 2011)