

National Institute for Space Research INPE

Instituto Nacional de Pesquisas Espaciais

José Antonio Aravéquia

CPTEC / INPE

Brazil



Summary

I. Mission and Profile

II. Main Products and Services

III. Status of NOAA-INPE Cooperation



Mission

- **National reference centre for space science and space technology.**
- **Develop and implement applications.**
- Mission: “To be the national reference centre in space science and technology, maximizing returns to society in the form of products and services, industrial policy and diffusion of knowledge”.



Profile - Headquarters and Regional Units



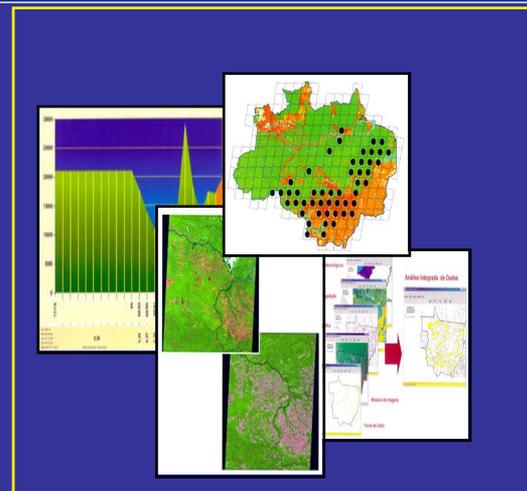
Profile - Areas



Space Technology



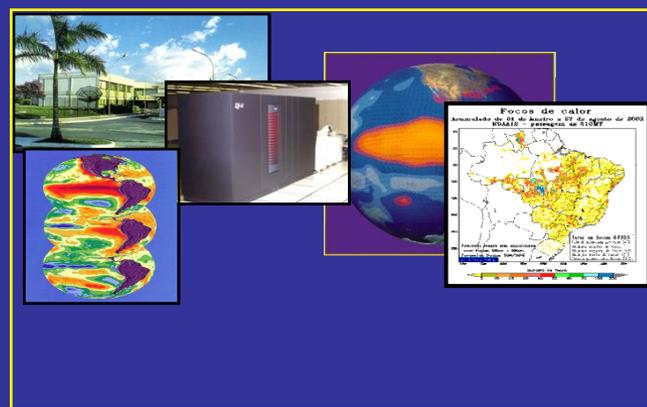
Space Science



Earth Observation



Earth System Sciences



Meteorology and Climate

Space and Atmospheric Science – CEA

■ Geophysics

- ✓ Atmospheric Electricity
- ✓ Geomagnetism
- ✓ Chemistry and Physics of the Lower Atmosphere
- ✓ Ionosphere
- ✓ Physics of the Higher Atmosphere
- ✓ Atmospheric Luminescence

■ Astrophysics

- ✓ High Energy Astrophysics
- ✓ Optical and Infrared Astrophysics
- ✓ Experimental Cosmology
- ✓ Interplanetary Medium Physics
- ✓ Radiophysics
- ✓ Gravitational Waves

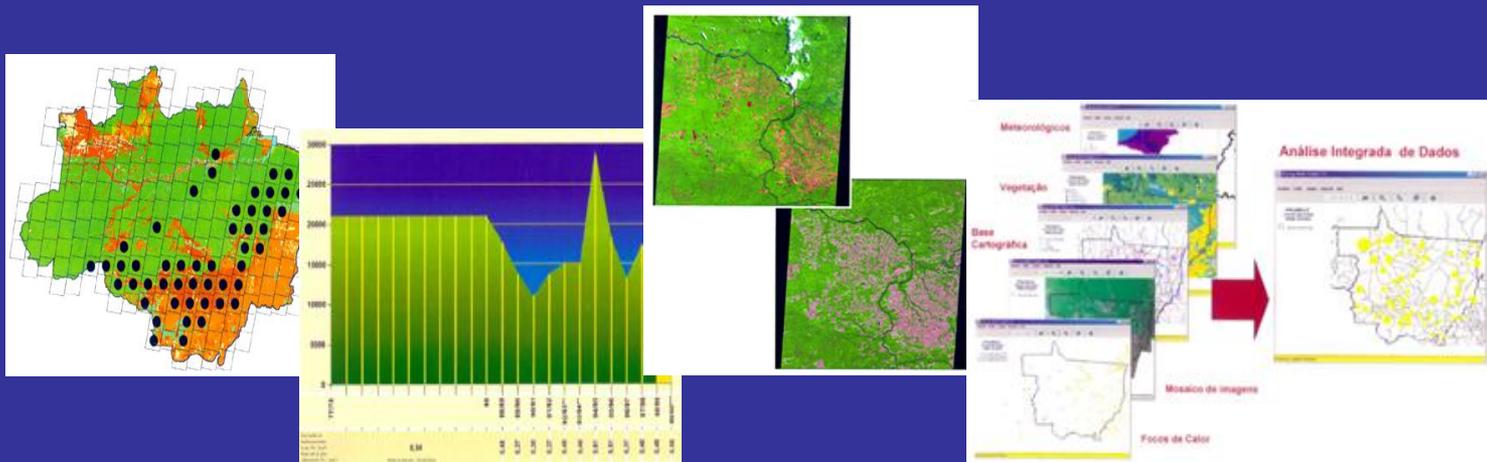
• Aeronomy

- Ionosphere physics
- Ionospheric bubbles
- Space climate



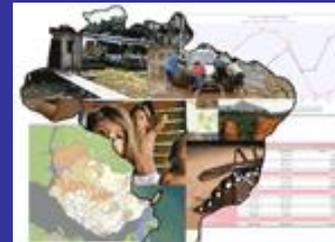
Earth Observation – OBT

- Remote Sensing Research on Geology, Water Resources, Oceanography, Ecosystems and Territorial Management and Monitoring.
- Technological Development: SPRING, Terralib, etc
- Amazônia Program – Monitoring of Deforestation in the Amazon Region
- Forest Fire Monitoring and Prevention



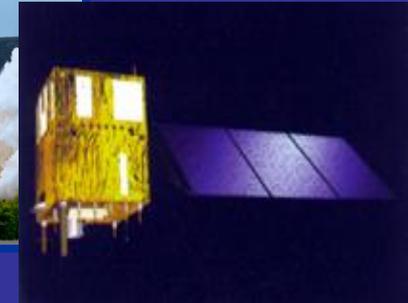
Earth Science Center - CCST

- To provide technical and scientific information to guide public policies of mitigation and adaptation to global environmental changes.
- Brazilian Global Climate Model System
- Environmental Biogeochemistry
- Renewable Energies
- Future climate and environmental scenarios
- Carbon Dynamics and Socio-environmental scenarios
- Surface-Biosphere-Atmosphere Interactions
- Natural Disasters



Space Technology and Engeneering – ETE

- Technological development and industrial policy
 - ✓ Sino-Brazilian Program
 - ✓ CBERS 3&4
 - ✓ Application Satellites
 - ✓ Amazonia-1 Satellite
 - ✓ Brazilian Data Collecting System



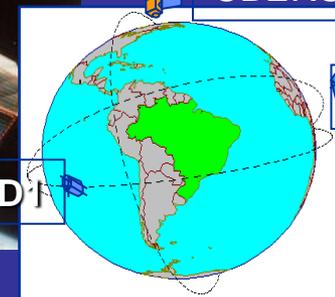
SSR-1



SSR-2



CBERS-2



SCD2

SCD1

Laboratories



- LAP – Associated Plasma Laboratory



- LAC – Associated Laboratory of Computing and Applied Mathematics

LAS

- LAS – Associated Laboratory of Sensors



- LCP – Associated Laboratory of Combustion and Propulsion



Integration and Test Laboratory – LIT

- ❑ R&D:
 - ✓ satellite integration and tests
 - ✓ mechanical engineering
 - ✓ applied electromagnetism
 - ✓ informatics
 - ✓ opto-eletronics
 - ✓ Mechatronics
 - ✓ parts qualification
 - ✓ metrology
 - ✓ contamination control
 - ✓ maintenance engineering
 - ✓ system and quality engiennering
- Provision of testing and metrology services to the Industry



Satellite Control and Tracking Operations - CRC

- SCD-1
- SCD-2
- CBERS-1
- CBERS-2
- CBERS-2B



Space Technology – Accomplished Missions 2013



MECB – Missão Espacial Completa Brasileira



CBERS – Satélite Sino-Brasileiro de Recursos Terrestres

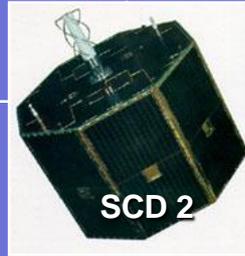
Other Projects

1993



SCD 1

1998 1999



SCD 2

2002



CBERS 1

2003



CBERS 2

2007



CBERS 2B



Sistema Brasileiro de Coleta de Dados



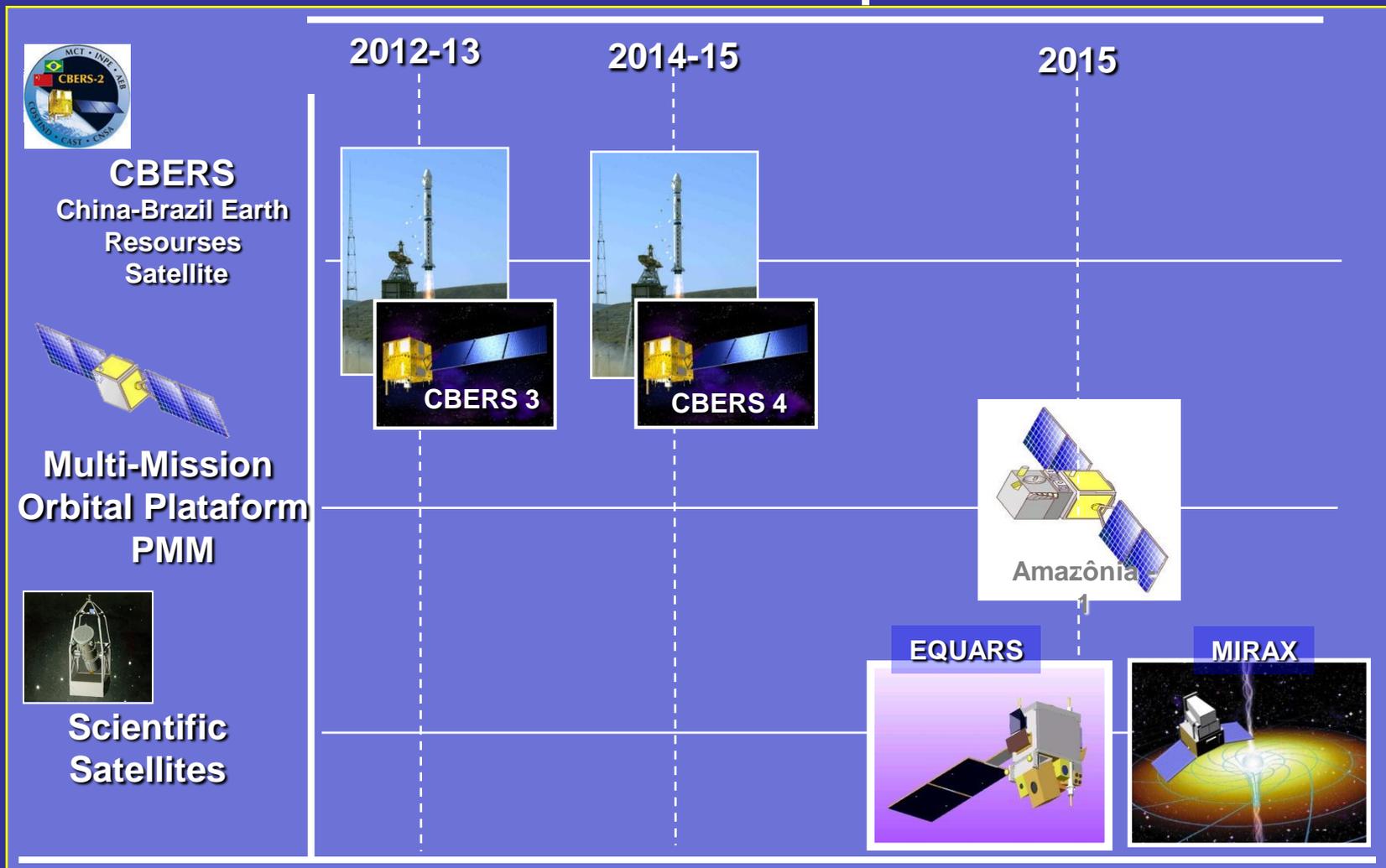
SACI 1



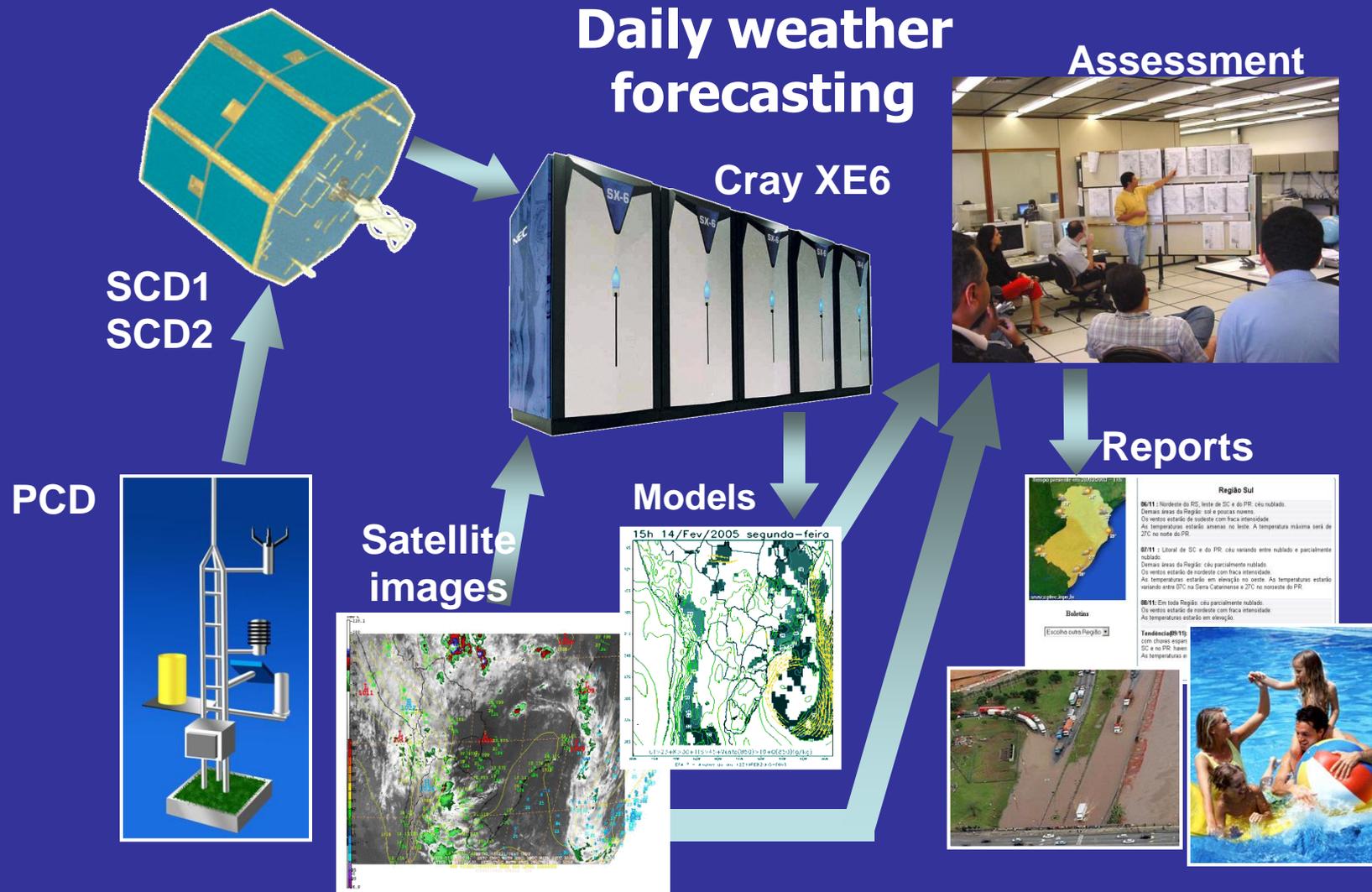
HSB - AQUA

Space Technology

Missions in development

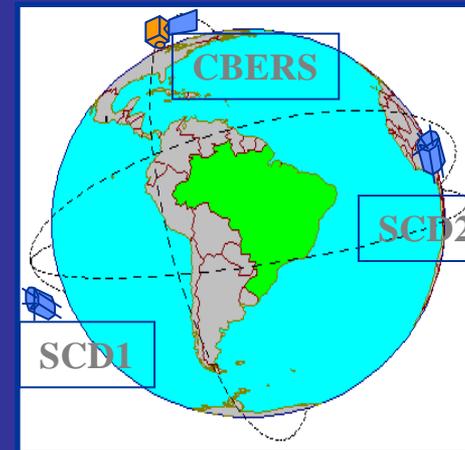
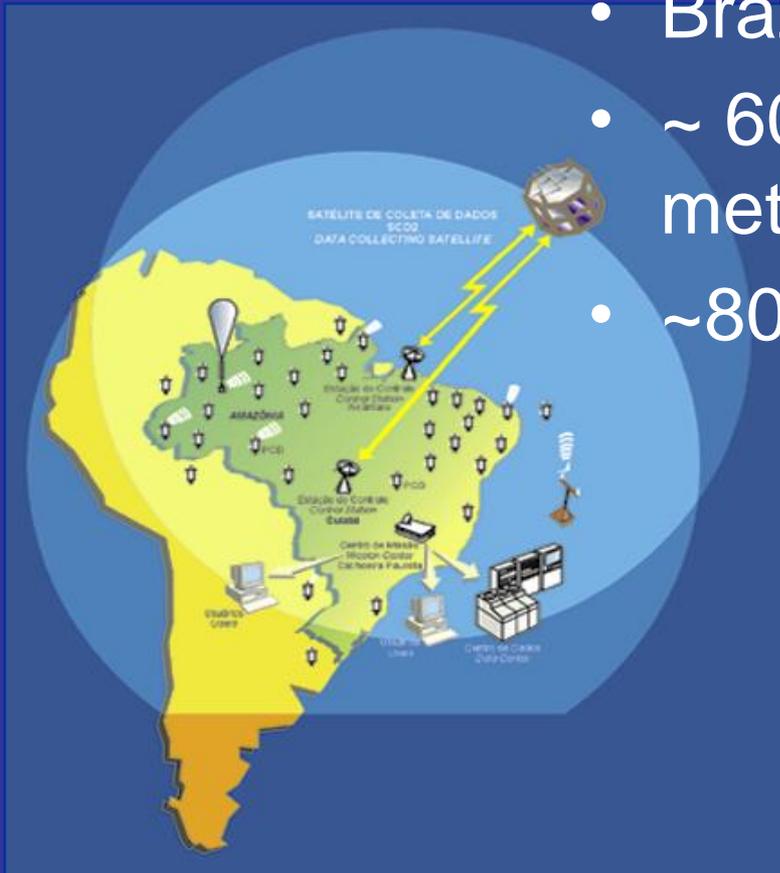


Main Products and Services



Main Products and Services *(cont.)*

- Brazilian Data Collecting System
- ~ 600 platforms (mainly hydro-meteorological)
- ~80 institucional users

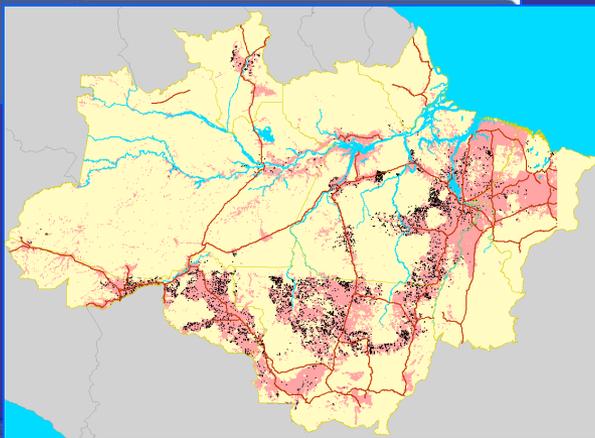


Main Products and Services (cont.)

The screenshot shows the CPTEC website interface. At the top, it says 'CPTEC Centro de Previsão de Tempo e Estudos Climáticos'. Below this, there are several sections:

- Produtos do CPTEC:**
 - Tempo:** Previsão de Tempo para todo o país, Boletim por regiões e para as capitais.
 - Clima:** Condições climáticas para o Brasil e no Mundo. Mapas, gráficos e vídeos.
 - Previsões Numéricas:** Previsão Global, Brasil e várias cidades. Previsão Oceanica e Meteorológica.
- Noticias:**
 - 01/09/2003 - Todas as cidades do Brasil. Veja a previsão de tempo para os próximos 3 dias para todas as cidades do Brasil feita pelo CPTEC. **Notícia Completa**
 - 01/09/2003 - Oceano. Previsão de altura de ondas para diversas cidades litorâneas do Brasil atualizadas diariamente. **Notícia Completa**
 - 01/09/2003 - Poluição. Níveis de concentração de poluentes atmosféricos emitidos por queimadas e fontes urbanas. **Notícia Completa**
- Condições:**
 - Previsão para 10/09 cidade: mín. máx. cond.
 - São Paulo: 16°C 22°C
 - Rio de Janeiro: 18°C 20°C
 - Belo Horizonte: 17°C 20°C
- Produtos Especiais:**
 - Programas Ambientais: FEA, PNEC, PNEC, PNEC, PNEC, PNEC.
- Destaque:**
 - Veja a previsão de tempo para os próximos 3 dias para TODAS as cidades do BRASIL feita pelos nossos Meteorologistas, utilizando tecnologia inédita no Brasil.

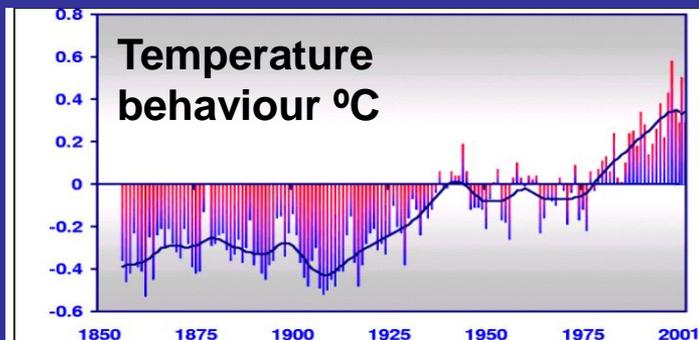
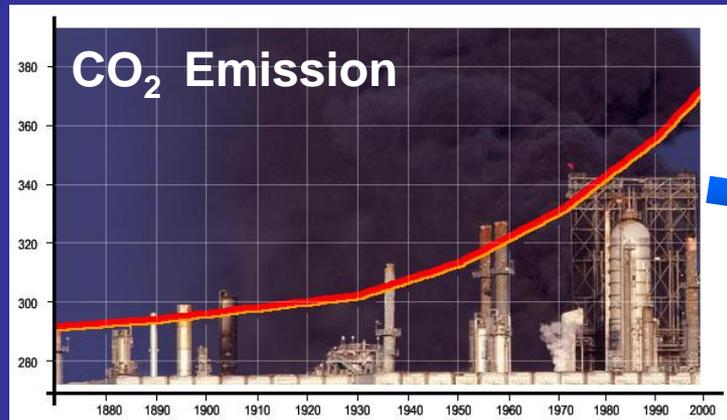
- **Atmospheric Sciences**
 - Weather and climate numerical forecasting
 - Solar irradiance, wind velocity
 - Forest fires
 - Severe storms
 - Vegetation index
 - Atmospheric discharges
- **Remote Sensing**
 - Amazônia Program – monitoring of deforestation in the Amazônia Legal region
 - Monitoring of the Floresta Amazônica Brasileira through satellite images
 - DETER System
 - Technological development: SPRING, Terralib, etc
- **Clients**
 - Universities, public sector and private sector.



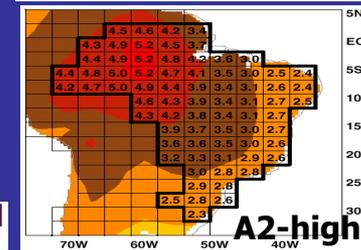
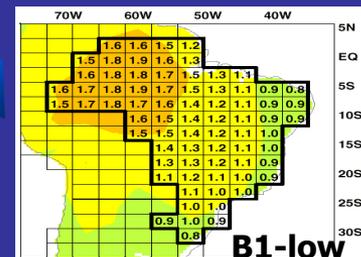
Main Products and Services *(cont.)*

Climate Change

Changes of temperature in Brazil



Temperatura anomaly

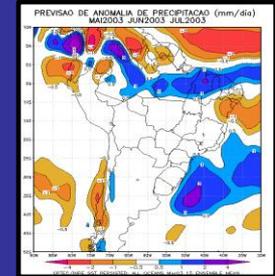
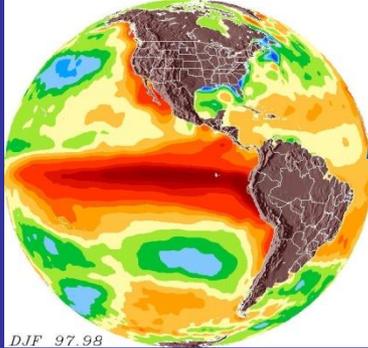


Nível de cooperação

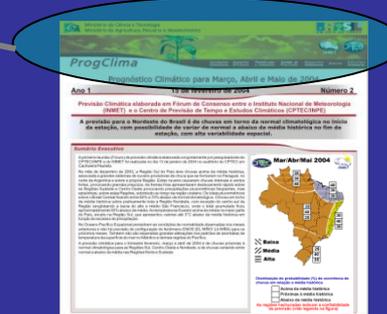
Main Products and Services (cont.)

Seasonal Climate Forecasting

Sea surface temperature

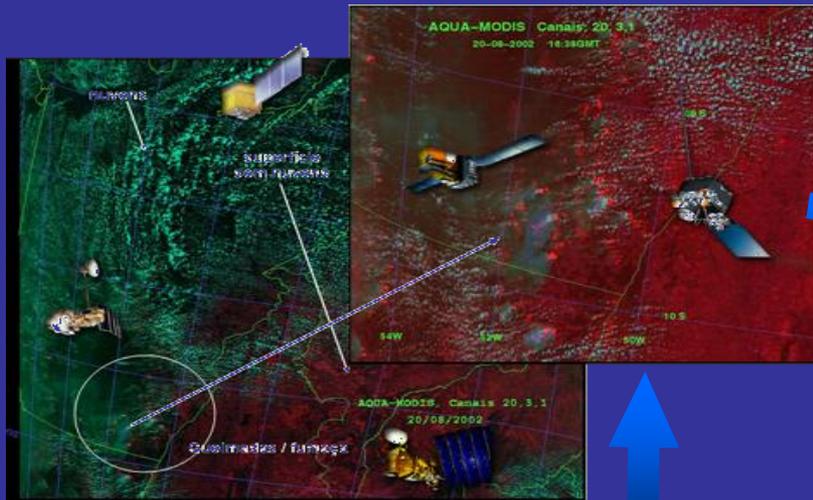


Climate Studies

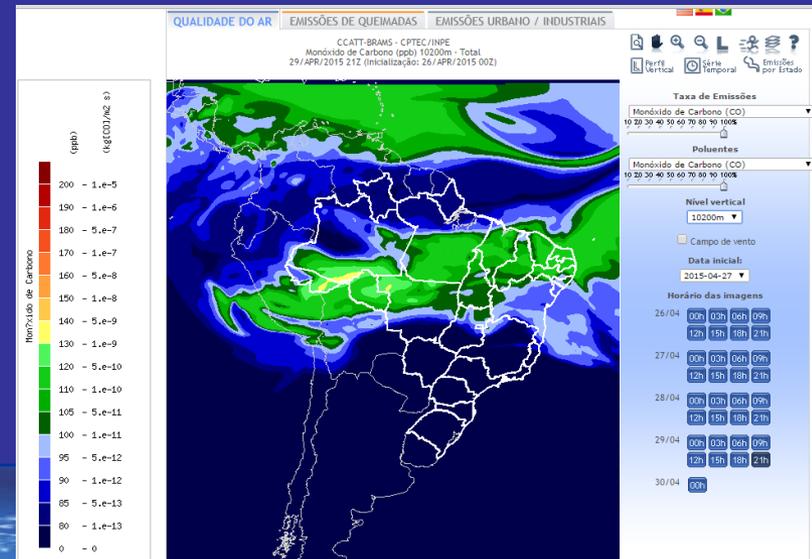


Main Products and Services (cont.)

Forest fires monitoring and air quality forecast

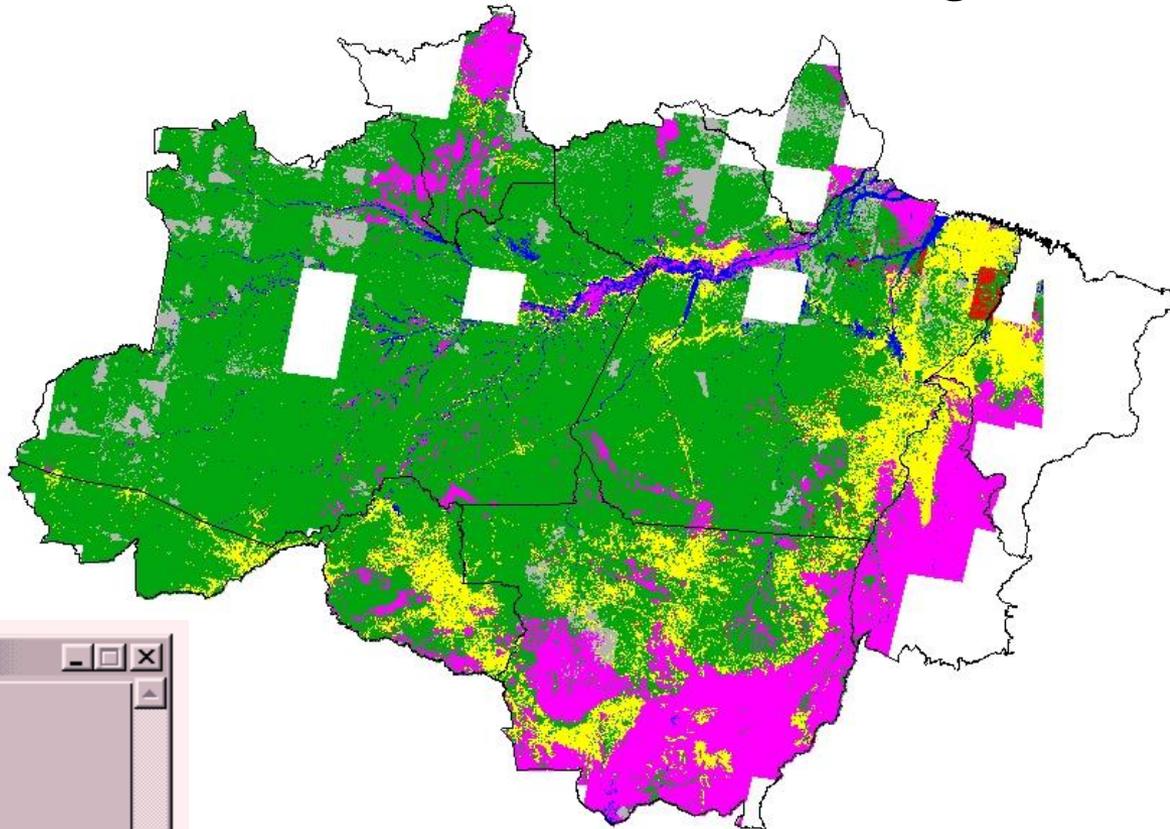


Cray XE6



Main Products and Services *(cont.)*

PRODES - Amazônia Legal



Legenda

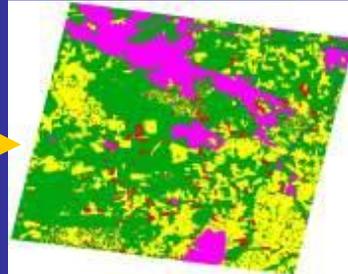
- MAPA FINAL
-  desmatamento
-  floresta
-  hidrografia
-  nao_floresta
-  nuvem

Main Products and Services *(cont.)*

DETER



**PRODES
Project**



Deforestation



MODIS images



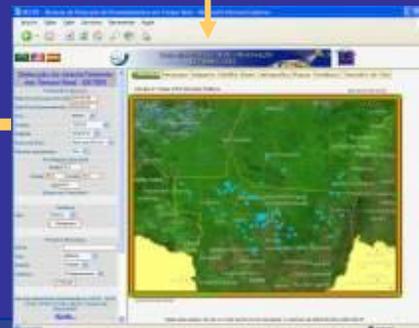
**Reception
station**

**Processing: SPRING –
identification of new
deforestation areas**

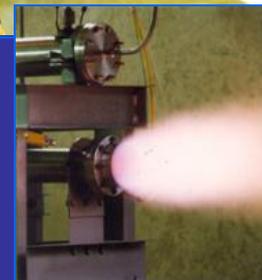
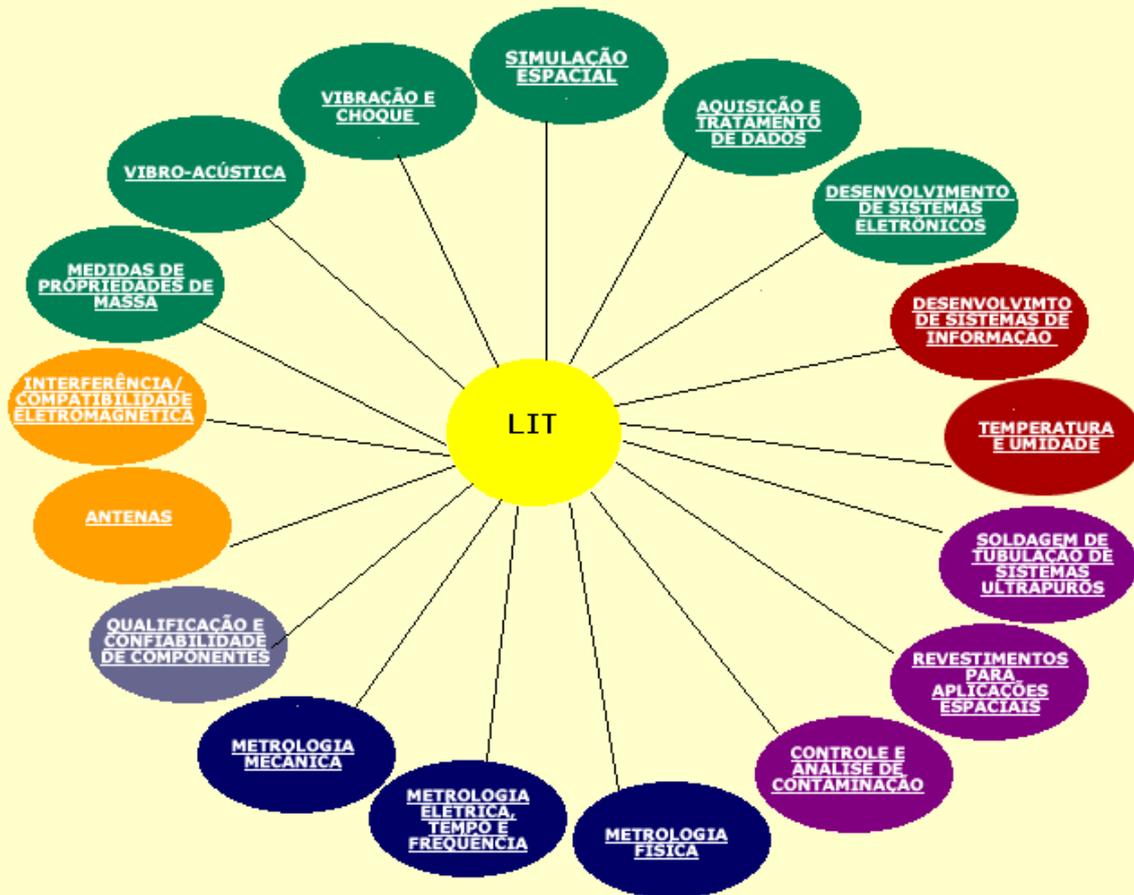
**Internet products:
Databasis TERRALIB**



IBAMA situation room



Main Products and Services (cont.)



Main Products and Services (cont.)



- **Control and Tracking**
 - SCD 1-2
 - CBERS 2
- **Image and data reception:**
 - AQUA, TERRA, NOAA 12/16/17 e LANDSAT 5 (EUA)
 - SPOT (França)
 - RADARSAT (Canadá)
 - ERS (ESA)
 - SCD1-2, CBERS 2 (Brasil)

PCDs - Plataformas de Coleta de Dados - Microsoft Internet Explorer

Address: <http://tempo.cptec.inpe.br:9080/PCD/>

Ministério da Ciência e Tecnologia

Plataformas de Coleta de Dados CPTEC

Dados meteorológicos, hidrológicos e ambientais de PCDs

Home CPTEC / Tempo / Clima / Previsões Numéricas / Satélite / Ondas / Energia / Dados Observacionais / Pesq. & Desenvolvimento / Pós-Graduação

Localização das PCD's

Clique sobre o estado abaixo para obter os dados

■ Hidrometeorológica ■ Meteorológica ■ Agrometeorológica

AC AL AM AP BA CE DF ES GO MA MG MS MT PA PB PE PI PR RJ RN RO RR RS SC SE SP TO

Dados Atuais - apresentação aleatória das PCDs

» PCD Meteorológica

Cidades	TempAr	Precip	Umidade	Data/Hora*
Andreique-MG	26.5°C	137.25mm	73%	21/11/05 15:00
Canindé-CE	34.7°C	-mm	28.8%	21/11/05 18:00
Chapadão do Céu-GO	28.5°C	21.75mm	62%	14/09/05 18:00
Caratinga-MG	24°C	119.75mm	86%	21/11/05 12:00

» PCD Agrometeorológica

Cidades	TempAr	Precip	TempSolo	Data/Hora*
s/m-PR	26°C	48.5mm	26.5°C	21/11/05 18:00
s/m-RN	28°C	-mm	32.5°C	21/11/05 12:00
Araquá-MG	28.5°C	107mm	28.5°C	21/11/05 15:00
Pirapora-MG	22.5°C	137.25mm	24.5°C	21/11/05 15:00

» PCD Hidrometeorológica

Cidades	Nível da Régua	Precipitação	Data/Hora*
Bacabal-MA	-m	-mm	09/10/04 12:00

Dados Históricos

Meteorológicos Hidrológicos

Agrometeorológicos Bóias - Projeto Pirata

Consultas especiais

start

INPE Instituto ... INPE_Port Agg... INPE - Notícias ... PCDs - Platafor... 47:46

Status of NOAA-INPE Cooperation

NOAA AND INPE ARE STRENGTHENING THEIR LONG-TERM COOPERATION TIES WITH TWO NEW COOPERATION AGREEMENTS CURRENTLY IN FINAL PHASE OF NEGOTIATION:

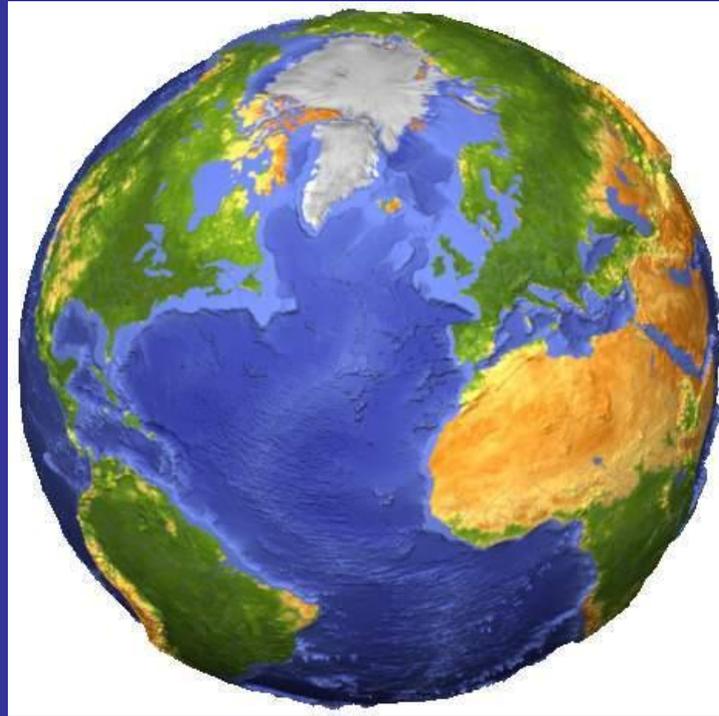
1. COOPERATION ON THE GEONETCAST AMERICAS SERVICES (GNC-A) regarding the joint management of the services and the increase in the GNC-A broadcast bandwidth which should allow for the inclusion of new products as well as for the overall improvement of the GNC-A services.
2. COOPERATION ON THE COSMIC-2 SATELLITE PROGRAM, regarding INPE's participation in the COSMIC-2 distributed S-band ground station network with the installation and operation of a receive-only COSMIC-2 ground station in Brazil.

CPTEC:

In name of CPTEC/INPE, I would like to thank very much NOAA Staff that always helped CPTEC in several areas.



INPE



Thank you for your attention
jose.aravequia@cptec.inpe.br

