BDA PROTOTYPE OF 5 ELEMENTS AT INPE-SJC. CAMPUS

Valley in Chchoeira Paulista selecting “T”array site, Prof. G. Swarup, Director GMRT – India Dr. H.S. Sawant - INPE and Dr. Hari Om Vats – PRL - India discussing with civil engineer on 13th September 1997.

BDA 5 ELEMENTS SHIFTED TO FINAL SITE OF BDA AT CACHOEIRA PAULISTA

Visit of Indian Consulate to

Present status of BDA

Present status of BDA

DISTRIBUTION OF RADIOHELIOGRAPHS IN THE WORLD.

Location: INPE's campus at Cachoeira Paulista (Longitude 45º 0' 20'' W Latitude 22º 41' 19'' S).

Configuration: "T" shaped array consisting of 38 parabolic antennas of 4 m diameter, with the longest baseline of about of 2.3 km (East-West) and 1.2 km (South). The central portion have 26 antennas distributed in a compact "T", with base lines up to 252 m (E-W) and 162 m (S).

Spatial and time resolutions: < 10 sec of arc at 5.6 GHz and 100 ms.

Frequency: 1.2 - 1.7, 2.8 and 5.6 GHz.

Sensitivity: 3 mJy at 21 cm for a system temperature of 50 K, using low–noise amplifiers.

PARTICIPATING INSTITUTIONS & PRIVATE COMPANIES

Institutes:

1. National Institute for Space Research – INPE:
2. Astrophysics Division (DAS)
3. Laboratory of Applied Computation (LAC)
4. Aeroespace Electronic Division (DEA)
5. Laboratory of Integration and Tests (LIT)
6. Catholic University of Minas Gerais (PUC-MG)
7. Center of Radio Astronomy – Mackenzie (CRAAM) – INPE
8. ***Tata Institute of Fundamental Research (TIFR) – GMRT – NCRA - India***
9. ***Indian Institute of Astrophysics (IIA) – Bangalore, India***
10. University of California - Berkeley (UCB), Dept. of Radioastrophysics, USA
11. New Jersey Institute of Technology (NJIT), USA
12. ***Physical Research Laboratory, Ahemedabad, India***

Industries/Companies:

1. Centro de Pesquisa Renato Archer - CENPRA - - Campinas
2. **Intelligent Motion Technology, IMT- LTd. – Pune India**
3. Neuron Ltd. - São José dos Capos - Brazil
4. UC GRAÇA – São José dos Campos - Brazil.
5. F4R FIBRA PARA RADIO – Campinas
6. Two micro-companies Eletronics / Electrical

TEAM MEMBERS

Scientific / Technical

NATIONAL PARTICIPANTS

DAS/FMI – INPE São José dos Campos

1. Prof. H. S. Sawant
2. Dr. J. R. Cecatto
3. Dr. F. C. R. Fernandes
4. Dr. J. W. V. Boas
5. PhD Student F. R. H. Madsen
6. MSc. M. C. Andrade
7. MSc. Student J. F. V. Silva
8. Eng. E. M. B. Alonso
9. Eng. M. C. P. Almeida
10. Eng. V. Sawant
11. Sec. E. C. P. Souza
12. Téc. A. B. Cassiano
13. Téc. C. M. Souza
14. Téc. L. C. P. Moraes
15. Téc. M. B. Silva

DAS-INPE Cachoeira Paulista

16. Téc. A. O. Souza
17. Téc. K. L. R. Souza
18. Téc. L. M. Costa

OTHER DEPARTMENTS OF INPE

19. Dr. R. R. Rosa (LAC – INPE)
20. Dr. S. Stephany (LAC - INPE)
21. Dr. Feranando M. Ramos (LAC – INPE)
22. Eng. B. S. M. C. Galvão (LIT-INPE)
23. Eng. M. S. Ribeiro (SMF-INPE)
24. Dr. L. B. T. Cividanes (DEA-INPE)
25. Dr. C. A. I. Miranda (DEA-INPE)
26. Téc. I. O. G. Vila (DEA-INPE)
27. Téc. F. P. V. Mesquita (DAE-INPE)
28. Dr. L. C. L. Botti (CRAAM-INPE S.Paulo)

UNIVERSITIE'S PARTICIPANTS

29. Dr. J. H. Saito (UFSCar)
30. Dr. C. E. Moron (UFSCar)
31. Dr. N. D. Mascarenhas (UFSCar)
32. Dr. E. Ludke (UFSM)
33. PhD Student MsC. C. Faria (PUC-Minas)
34. MSc. Iran C. Abrão (PUC-Minas)

INTERNATIONAL PARTICIPANTS

35. Prof. Emeritus G. Swarup (NCRA India)
36. Prof. S. Ananthkrishanan (NCRA India)
37. Dr. K. R. Subramanian (IIAP India)
38. Dr. R. Ramesh (IIAP Bangalore India)
39. Dr. P. Subramanian (IIAP India)
40. Eng. M. S. Sundararajan (IIAP India)
41. Téc. E. Ebenezer (IIAP India)
42. Dr. H. O. Vats (PRL Ahmedabad India)
43. Dr. Padamnabham Janardhan (PRL – Ahmedabad)
44. Dr. R. A. Sych (Irkutst Russia)
45. Eng. M. R. Sankararaman (NCRA India)
46. Prof. T. Kosugi (NRO Japan)
47. Dr. W. J. Welch (UCB Berkeley USA)
48. Dr. S. R. Kane (UCB Berkeley USA)
49. Dr. S. Krucker (UCB Berkeley USA)
50. Dr. D. E. Gary (NJIT New Jersey USA)
51. Dr. M. Karlický (Ondrejov Czech Republic)

BDA International Advisory Committee

Dr. M. Chamon – INPE

Prof. S. S. Hasan – IIA - India

Prof. W. J. Welch - Univ. Cal. – Berkeley – USA

Prof. D. E. Gary - NJIT – USA

Dr. G. J. Hurford - Univ. Cal. – Berkeley – USA

Prof. A. Pramesh Rao - NCRA – Pune – India

Dr. R. Ramesh – IIA - India

Prof. Z. Abraham - USP –IAG - Brazil

Indian scientists participating in BDA

1.Prof.Govind Swarup

2.Prof.Anantha Krishnan

3.Prof.A.Pramesh rao

4 Prof.Jayram Chengalur

5.Prof.P.K.Manoharan

6.Eng.Shankararaman

7.Dr.Sandeep

8.Prof. Siraj .Hasan

9.Prof. K.R.Subramanian (4)

10.Prof.Vinod Krishan

11.Eng.M.S.Sundararajan

12.Prof.R.Ramesh

13.Dr.Ebenezer

14.Prof.Som Krishan IISC.,

15.Prof.Hari om Vats PRL

16.Prof.Janardhan

17.Dr.Umesh Joshi

18.Dr.Nanditha Srivatsav

19.Eng.Abhay Joshi (4)

21.Eng.Shrijkanth Bhanu

Brazilian Scientists visited India for the BDA project

1.Dr. Angelo Neri (2)

2. Prof.Saito

3. Dr. Claudio Faria

4. Dr. Felipe Madsen - One Ph.D (2)

5. Dr. J.R Cecatto

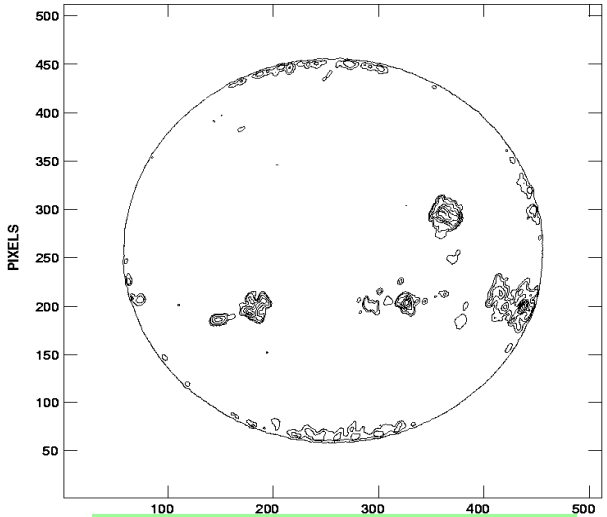
6. Ms. Andrade Maria Con (2)

7. Prof.Jacquim E.r.Costa

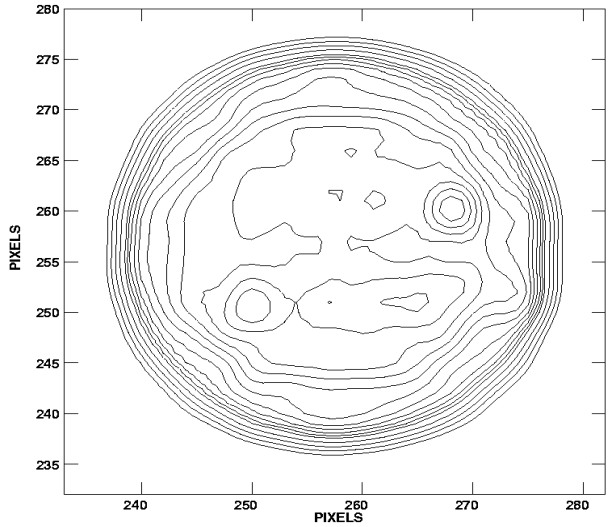
8. Prof. Ferandes Cr. Fernandes

9. Dr. Claudemir JDS Silva

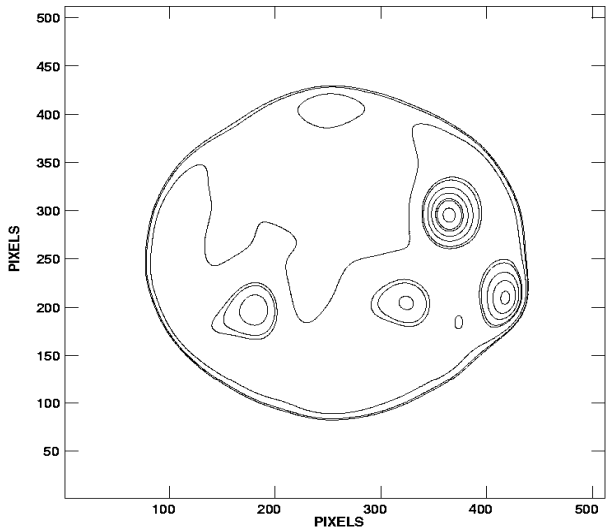
SOLAR IMAGE CAPABILITY



Nobeyama 17 GHz



BDA “Dirty” Image

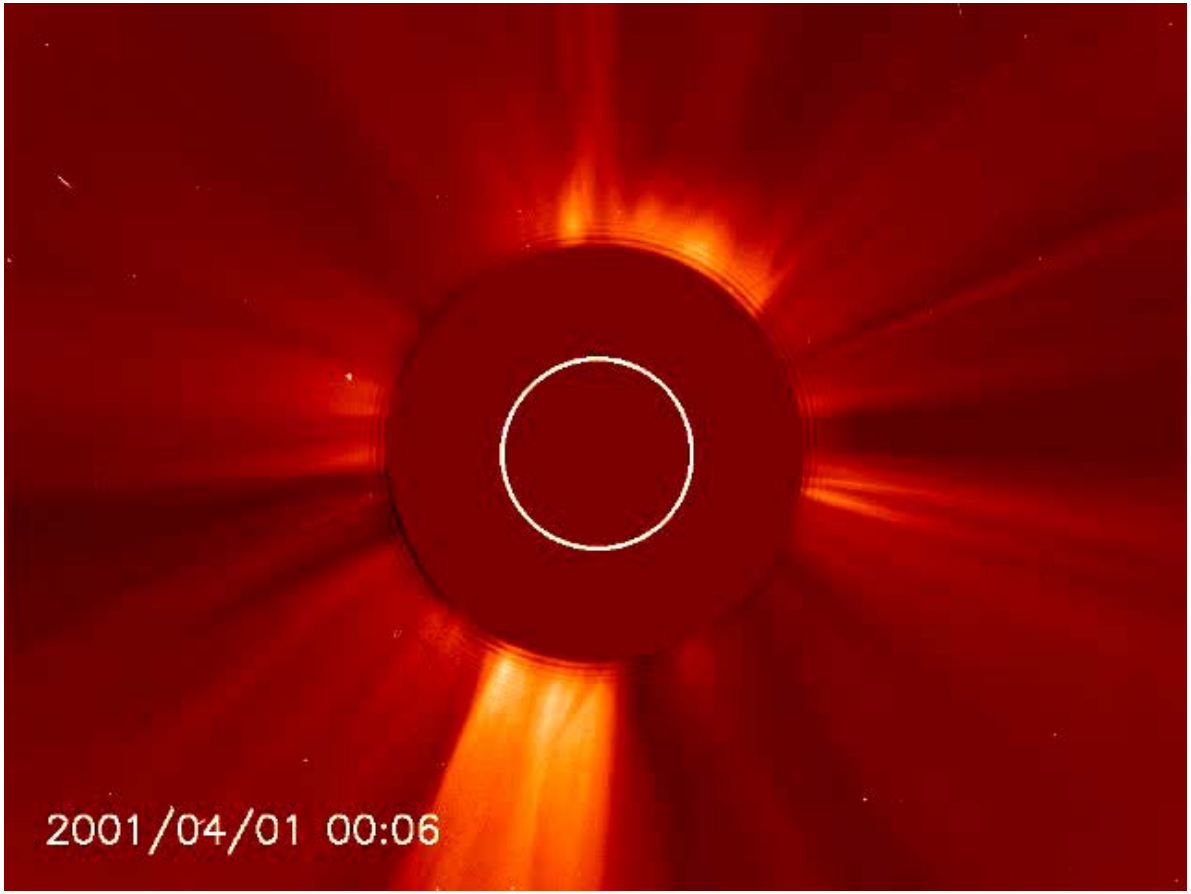


BDA “Clean” Image

SCIENTIFIC GOALS

- BDA will produce **high spatial and time resolution images** of radio sources with high dynamic range.
- BDA will provide solar radio **images in the lower corona** where **energy release** to solar flare takes place, their analysis will lead to better understanding of the fundamental problems in solar physics and also will be used, in a spectral tomography technique being developed for **application to space weather forecasting**.
- BDA will be very useful for **galactic and extra-galactic investigations** of the southern sky not accessible to VLA.

CME events of April 2001



Effects of Space weather

- currents induced in power grids
- spacecraft detector upsets
- hazards to humans in space
- ozone depletion in major events
- speculated climate impacts
- aurora
- spacecraft drag, collisions, loss
- communications & navigation

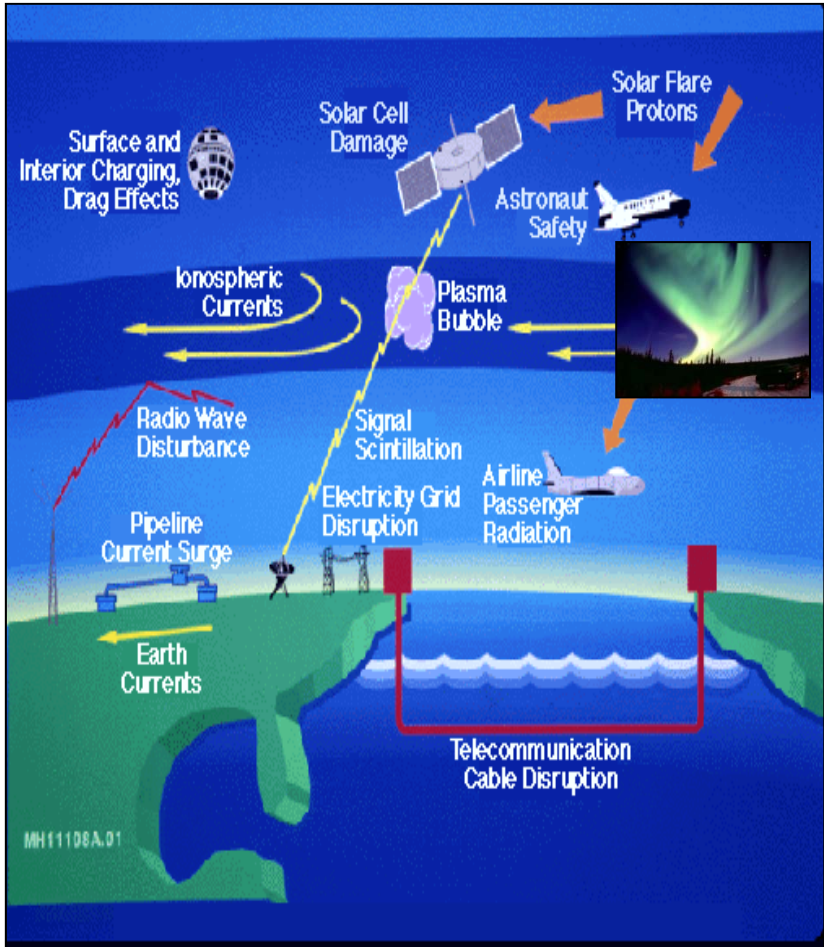
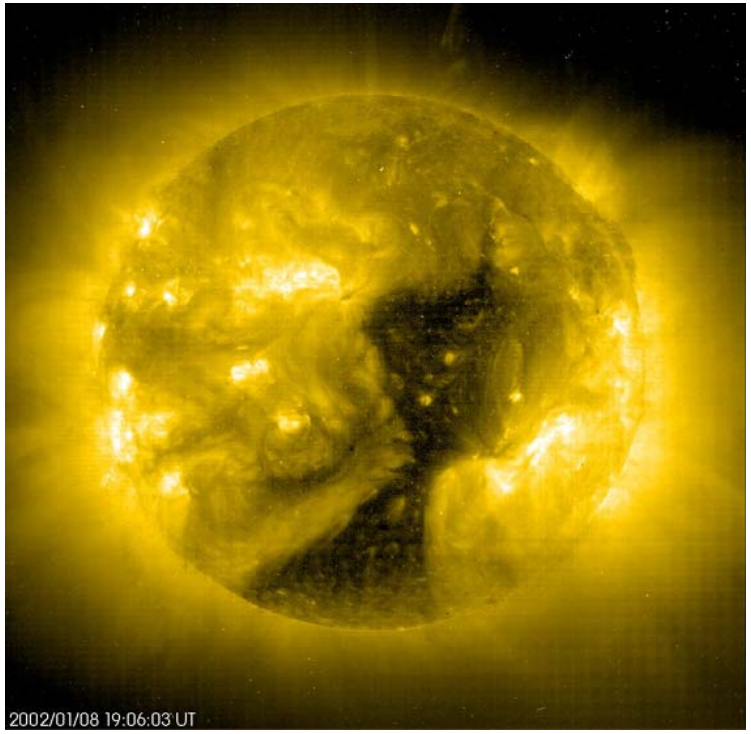


Image Credit: L. J. Lanzerotti, Bell Laboratories, Lucent Technologies, Inc.

CORONAL HOLES

Coronal holes are important large-scale structures on the Sun, which produce high-speed solar wind streams (HSS). Interaction of Solar Wind with magnetosphere produces **Geomagnetic storms that are known for producing MeV electrons in Earth's magnetosphere.** These electrons can be hazardous to satellites and astronauts in the space, and hence important for space weather prediction.

BDA can observe the coronal holes at multi frequenies.



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BRAZILIAN DECIMETRIC ARRAY

Inauguração do Protótipo do Arranjo

BDA
BRAZILIAN DECIMETRIC ARRAY

Inauguração do Protótipo do Arranjo

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Inauguração do Protótipo do Arranjo

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Construção do Prédio – Sala de Controle

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Construção do Prédio – Sala de Controle

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Drenagem de solo

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BRAZILIAN DECIMETRIC ARRAY

Drenagem de solo

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Abertura de valas para instalação de dutos de distribuição de Cablagem

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Organizações na Infra-instrutora do Local

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Organizações na Infra-instrutora do Local (Pavimentação)

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Lançamento de Cabos de Referencia (10Mhz) em fase

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Implementação de RoF

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Fusão de Fibra Óptica – Ethernet Controle de Rastreio

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Implementação de RoF

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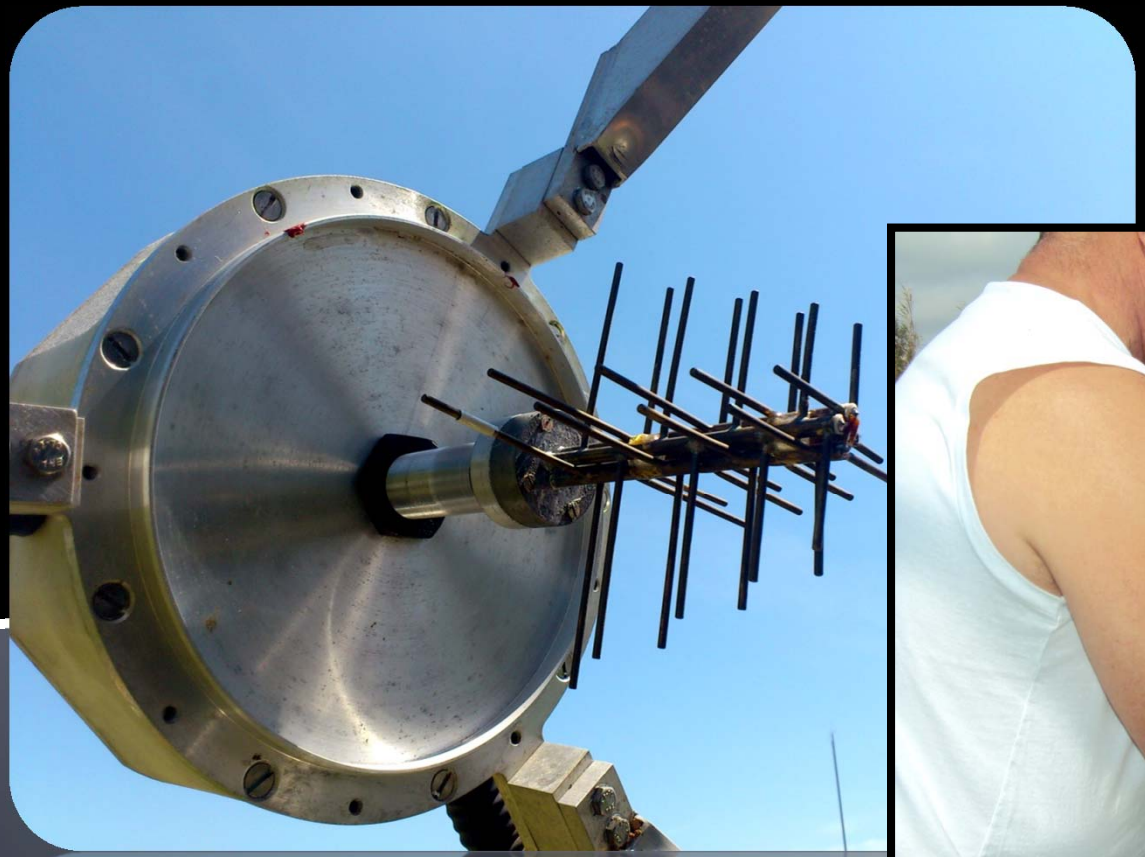
Instalação e testes de Alimentadores



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Instalação e testes de Alimentadores

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Testes do sistema de Rastreio em Campo

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Testes do sistema de Rastreio em Campo

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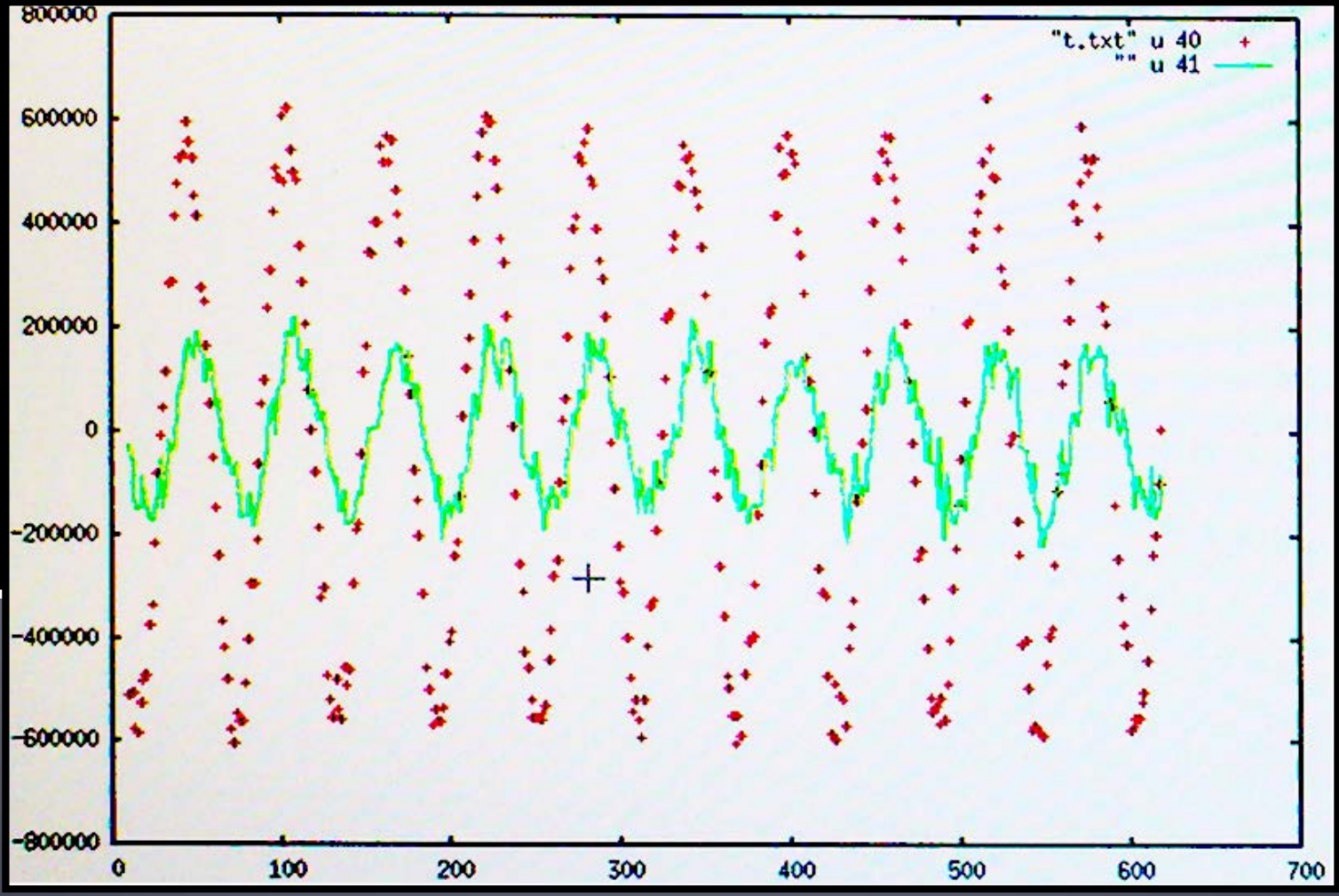
Primeiras Franjas Interferométricas com novo sistema



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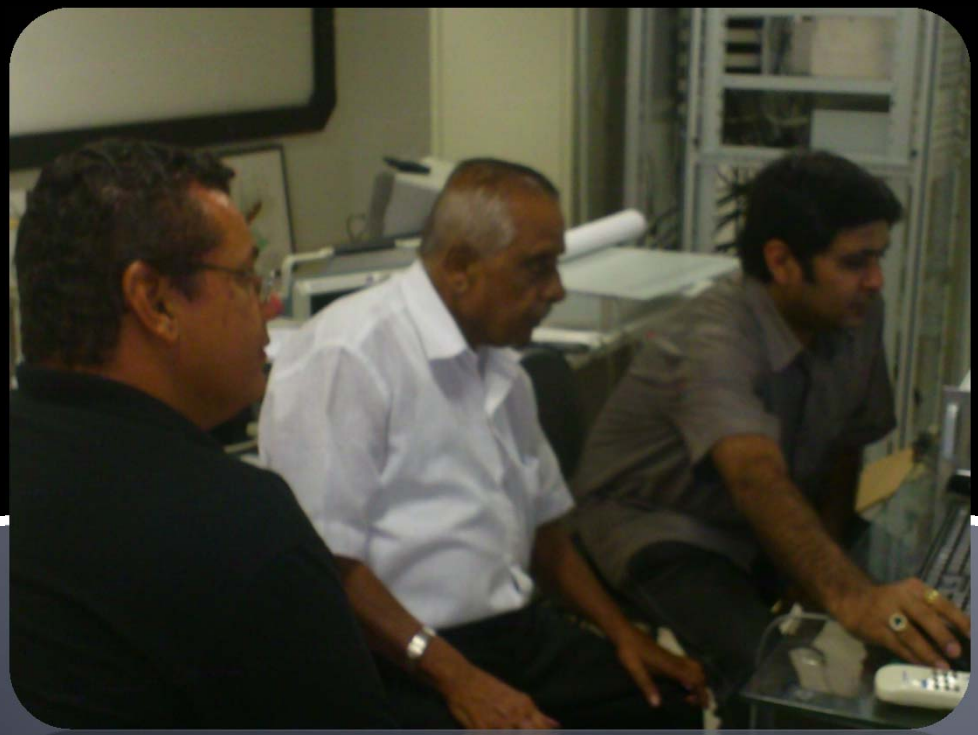
Primeiras Franjas Interferométricas com novo sistema



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Primeiros testes em campo de FI – 70Mhz

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Primeiros testes em campo de FI – 70Mhz

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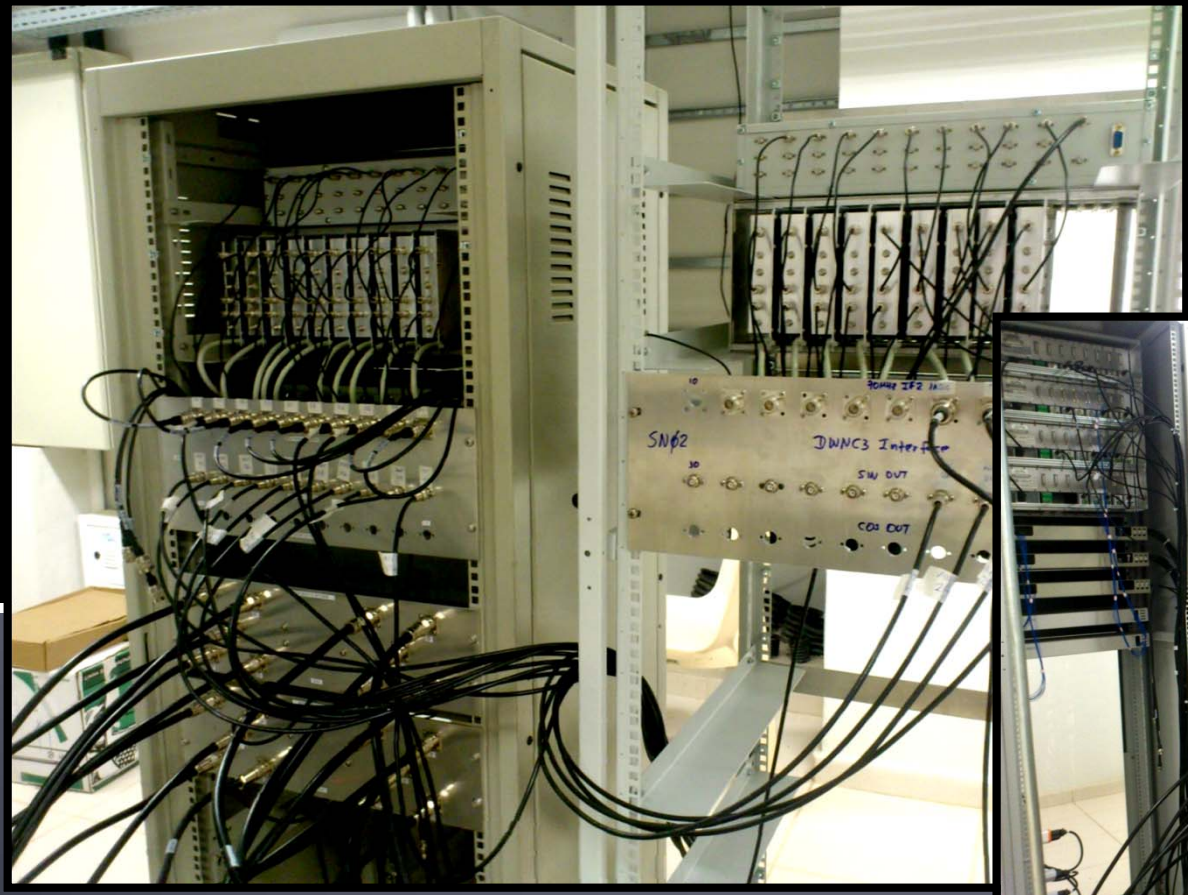
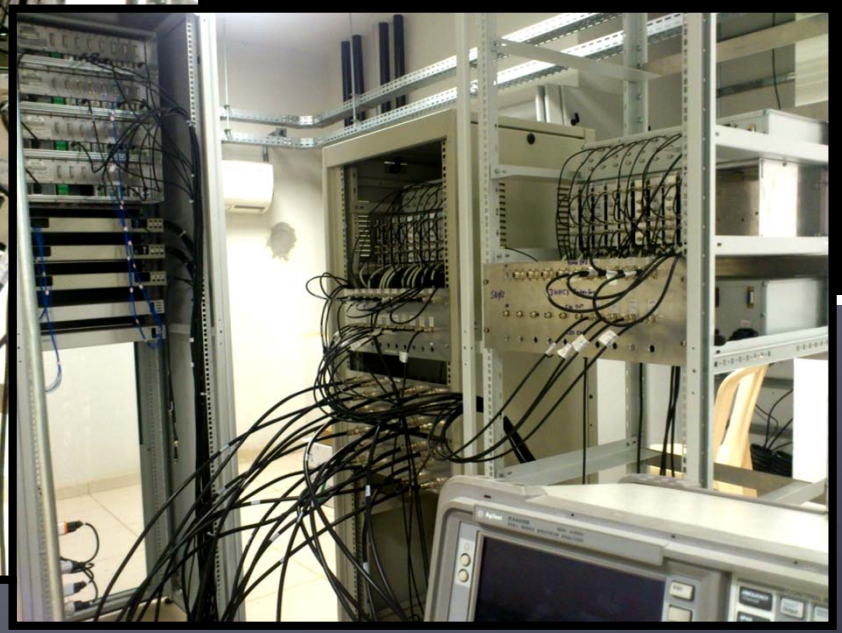
IF Down Converter – Banda Base (5Mhz)





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Lançamento de cabo óptico - RoF

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BRAZILIAN DECIMETRIC ARRAY

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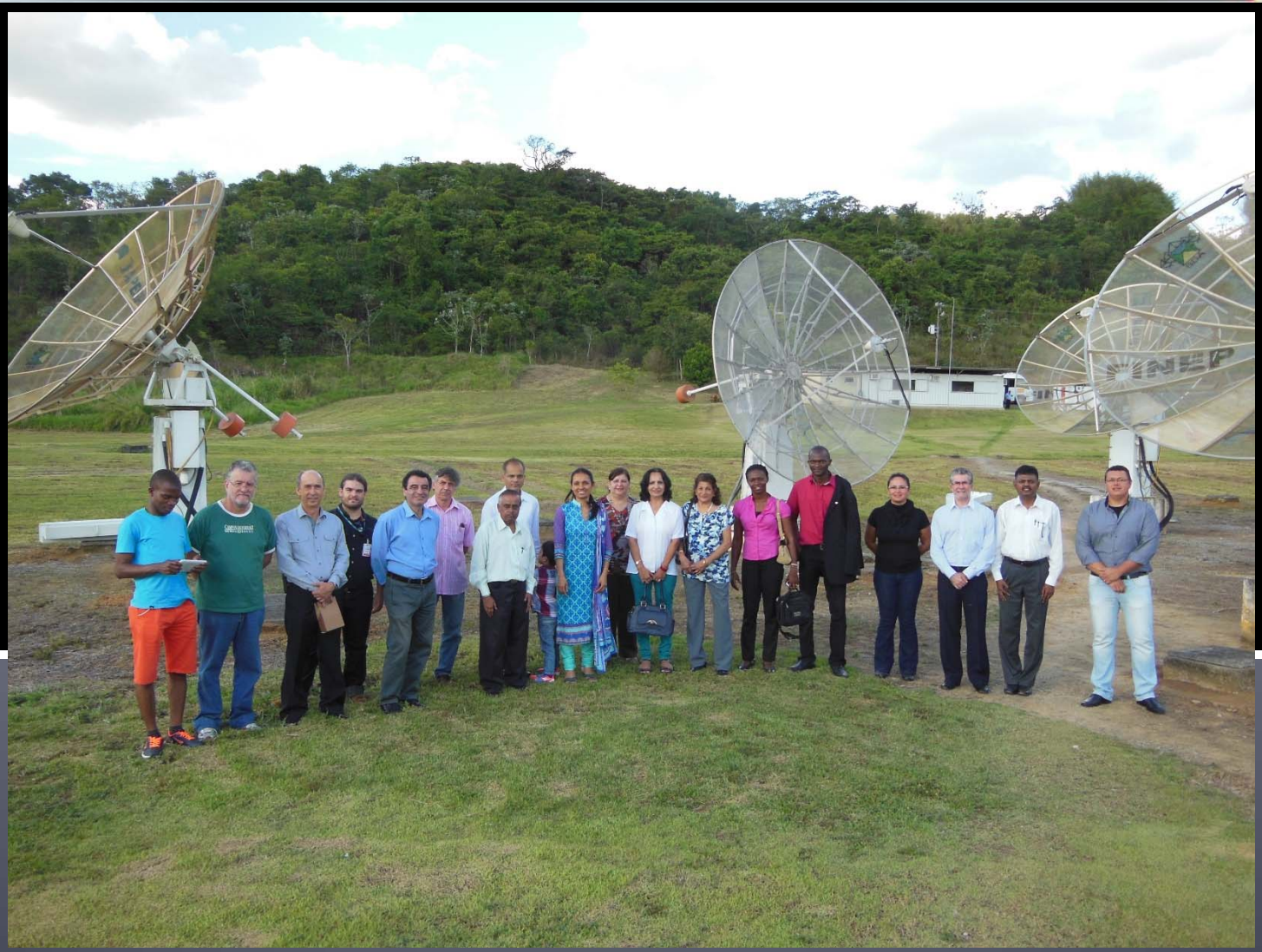
BRAZILIAN DECIMETRIC ARRAY



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Imagens Cotidianas

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Imagens Cotidianas

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Imagens Cotidianas

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Animais Silvestres

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BRAZILIAN DECIMETRIC ARRAY

Colaborações:

INPE

ufsjcat

PUC Minas
Poços de Caldas

UniVap
UNIVERSIDADE DO VALE DO PARAÍBA
São José dos Campos - SP

INDIAN INSTITUTE OF ASTROPHYSICS

NCRA • TIFR

Berkeley
University of California

NJIT
New Jersey's Science & Technology University

FAPESP

TECSAT

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