• Introduction

• Brazilian Context

• Status of the Brazilian Digital TV Project
  • Implementation Schedule
  • SBTVD Forum
  • Channel Planning / Assignment
  • Technical Specifications
  • Official Support Programs

• Launching

• International System
• **SBT:**
  - Second biggest TV Network in Brazil (Audience and Market Share);
  - 105 stations, more than 4 thousand TV translators;
  - 2 national satellite feeders, 8 regional satellite feeders;
  - Programming: News, Soap Opera, Movies, Shows, Games, Reality,…;
  - Content Production: more than 60%;

• **SET:**
  - Brazilian Society of Television and Telecommunications Engineering;
  - Founded in March 25, 1988;
  - Scientific and non-profit;
  - SET members: Professionals, researches, students, Companies, Educational and Government Entities;
  - Market: Digital Cinema/ Radio/ TV/ Pay TV/ Internet/ Telecommunications/ Production Ind.
Brazilian Context

Population: 187 MM
Households: 53 MM
Demographical density asymmetrically distributed along the country

Source: IBGE (2006)
Brazilian Context

- **Household (HH): 53 MM**
  - Stove: 97,5%
  - TV set: 91,4%
  - Radio: 88,0%
  - Refrigerator: 87,4%
  - Phone: 69,0%
  - PC: 18,6%
  - Internet Access: 13,7%
  - Pay TV: 7,3%

Source: Anatel / IBGE PNAD(2005/2006)

- **Broadcasting (FTA)**
  - Covers 100% of the country territory;
  - Reaches 97% of the population;
  - 5 big TV Networks with national coverage;
  - 478 TV stations;
  - More than 20,000 TV translators;
  - Main or the only option of entertainment, information and culture;
  - Main producer and distributor of national content;
  - Integration of the Federation, preservation of the idiom and national culture.

Brazilian Context

BRAZILIAN ADVERTISEMENT AND TV MARKET

<table>
<thead>
<tr>
<th>Year</th>
<th>Ad Market (Billions US)</th>
<th>TV Market (Billions US)</th>
<th>GDP (%)</th>
</tr>
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<tbody>
<tr>
<td>2000</td>
<td>5.4</td>
<td>2.4</td>
<td>1.16</td>
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<td>2001</td>
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<td>2003</td>
<td>3.7</td>
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<td>1.00</td>
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<td>2004</td>
<td>4.7</td>
<td>2.8</td>
<td>1.05</td>
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<td>2005</td>
<td>6.7</td>
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<td>2006</td>
<td>8.0</td>
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Brazilian Context

BRAZILIAN ADVERTISEMENT AND TV MARKET

Participation in Advertisement Investment - 2006

- TV
- NEWSPAPER
- MAGAZINE
- RADIO
- EXTERNAL
- GUIDE AND LIST
- PAY TV
- INTERNET
- CINEMA

- Ad Market
- TV Market
- "GDP"

(Billions US$)

2000 2001 2002 2003 2004 2005 2006

59,37
15,46
8,61
4,17
3,61
3,27
0,35
2,07
3,04
3,26
4,7
6,7
8,0
Brazilian Context

TV SET PRODUCTION
Source: Brazilian Industry

<table>
<thead>
<tr>
<th>Year</th>
<th>CRT</th>
<th>LCD/PDP</th>
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</thead>
<tbody>
<tr>
<td>2005</td>
<td>10691</td>
<td>39</td>
</tr>
<tr>
<td>2006</td>
<td>10000</td>
<td>420</td>
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<tr>
<td>2007</td>
<td>8750</td>
<td>870</td>
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Unit: Miles
Status – Implementation Schedule

- **29/Jun/06**: ISDB Choosed
- **Oct/06**: I Joint WG - BR/JP Meeting in Brazil
- **Nov/06**: Forum Creation
- **Mar/07**: Technical Specification approved by the Forum (Version1.0.0)
- **Apr/07**: Assignment São Paulo channels
- **Apr/07**: II Joint WG - JP/BR Meeting in Japan
- **02/Dec/07**: Digital broadcast start in São Paulo Metropolitan area
- **Dec/09**: DTV available in all state capitals
- **Dec/13**: DTV available in all municipalities
- **Dec/16**: Analog Switch-Off
Status – Implementation Schedule


29/Jun/06 ISDB Choosed
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Dec/09 DTV available in all state capitals

Dec/13 DTV available in all municipalities

Dec/16 Analog Switch-Off

DISTRIBUTION OF THE POPULATION

- São Paulo Metropolitan Area: 12%
- Set of Capitals 1: 16%
- Set of Capitals 2: 10%
- Set of Capitals 3: 5%
- Set of Capitals 4: 3%
- Other Cities: 54%
What is the Forum?

- It is a opened non profit organization;
- Founded in November 2006;
- Currently has approximately 100 members.

Mission:

To assist and stimulate the creation and improvement of transmission and reception digital system of Brazil, standardizing and guaranteeing the quality demanded by the consumers.

Objective:

- To consider norms, standards and technical regulations, voluntary or not for the transmission and reception system for Digital TV.
• Organizational Structure
## Organizational Structure

<table>
<thead>
<tr>
<th>Sector</th>
<th>Member</th>
<th>Company</th>
<th>Substitute</th>
<th>Company</th>
</tr>
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<tbody>
<tr>
<td>Broadcast</td>
<td>Roberto Dias Lima Franco</td>
<td>SBT</td>
<td>Liliana Nakonechnyj</td>
<td>Globo</td>
</tr>
<tr>
<td></td>
<td>Fernando Bittencourt</td>
<td>Globo</td>
<td>Tadao Takahashi</td>
<td>TVE Brasil</td>
</tr>
<tr>
<td></td>
<td>José Marcelo do Amaral</td>
<td>Record</td>
<td>José Chaves</td>
<td>TV Cultura</td>
</tr>
<tr>
<td></td>
<td>Amilcare Dalevo Jr</td>
<td>Rede TV</td>
<td>Frederico Nogueira e Silva</td>
<td>Bandeirantes</td>
</tr>
<tr>
<td>Reception</td>
<td>Moris Arditi</td>
<td>Gradiente</td>
<td>José Mariano Filho</td>
<td>Panasonic</td>
</tr>
<tr>
<td></td>
<td>Roberto Barbieri</td>
<td>Semp Toshiba</td>
<td>Carlos Goya</td>
<td>Sony</td>
</tr>
<tr>
<td></td>
<td>Manoel Correa</td>
<td>Phillips</td>
<td>Dilson Suplicy Funaro</td>
<td>LG</td>
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<tr>
<td></td>
<td>Benjamin Sicsu</td>
<td>Samsung</td>
<td></td>
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<tr>
<td>Transmission</td>
<td>Jakson Sosa</td>
<td>RF Telavo</td>
<td>Almir Ferreira Silva</td>
<td>RF Telavo</td>
</tr>
<tr>
<td></td>
<td>Carlos Fructuoso</td>
<td>Linear</td>
<td>Robson Caputo</td>
<td>Linear</td>
</tr>
<tr>
<td>University</td>
<td>Marcelo Knôrich Zuffo</td>
<td>USP</td>
<td>Luiz Meloni</td>
<td>Unicamp</td>
</tr>
<tr>
<td></td>
<td>Guido Lemos de Souza Filho</td>
<td>UFPB</td>
<td>Luiz Fernando Gomes Soares</td>
<td>PUC-RJ</td>
</tr>
<tr>
<td>Software</td>
<td>Laércio J. Lucena Cosentino</td>
<td>TOTVS</td>
<td>David Britto</td>
<td>Quality Software</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Member</th>
<th>Governmental Body</th>
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</thead>
<tbody>
<tr>
<td>Andre Barbosa Filho</td>
<td>Casa Civil</td>
</tr>
<tr>
<td>Rodrigo A. Carvalho</td>
<td>Ministério das Relações Exteriores</td>
</tr>
<tr>
<td>Roberto Pinto Martins</td>
<td>Ministério das Comunicações.</td>
</tr>
<tr>
<td>Jairo Klepacz</td>
<td>Ministério do Desenvolvimento Industria e Comercio Exterior</td>
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<tr>
<td>Júlio Almeida</td>
<td>Ministério da Fazenda</td>
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<tr>
<td>Augusto Gadelha</td>
<td>Ministério da Ciência e Tecnologia</td>
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<tr>
<td>Pedro Alem Filho</td>
<td>ABDI</td>
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</table>
• Modules and Work Groups

<table>
<thead>
<tr>
<th>Module</th>
<th>Coordinator</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Técnico</td>
<td>Paulo Henrique</td>
<td>Globo</td>
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<tr>
<td>Transmision</td>
<td>Gunnar Bedicks</td>
<td>Mackenzie</td>
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<tr>
<td>Audio and Video Coding</td>
<td>Paulo Henrique</td>
<td>Globo</td>
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<tr>
<td>Multiplexer and SI</td>
<td>Carlos Fini</td>
<td>Globo</td>
</tr>
<tr>
<td>Receiver</td>
<td>Aguinaldo Silva</td>
<td>Gradiente</td>
</tr>
<tr>
<td>DRM</td>
<td>Marcelo Zufo</td>
<td>LSI-USP</td>
</tr>
<tr>
<td>Data Coding (Middleware)</td>
<td>Luiz Fernando</td>
<td>PUC-RJ</td>
</tr>
<tr>
<td>Return Channel</td>
<td>Aguinaldo Silva</td>
<td>Gradiente</td>
</tr>
</tbody>
</table>
• Channelization

Brasil

Japan
Status – Channel Planning

• São Paulo Channel Allotment
• General Guideline:

**Maximum similarity with ISDB-T shall be pursued**

ARIB set of terrestrial broadcasting standards is the starting point for the Brazilian standardization effort

- Specify only the minimum necessary;
  - ISDB is the base standard. What’s already defined should be adopted
- Avoid legacy;
  - Even with the standard evolution, the first generation receivers should continue working
- Receiver’s cost;
  - It is being considered during the decision of the technologies to be used
- Robustness;
- Guarantee:
  - a minimum quality service provision;
  - interoperability between industry products and a minimum level of performance;
- Follow direction of the **decree Nº 5.820/2006,**
  - These decree states the implementation of the Digital Terrestrial Television in Brazil
ISDB Standards:
• SBTVD-T Standards:
• SBTVD Version 1.0.0

An Overview
Status - Specifications

- SBTVD Version 1.0.0

It is hereby understood that the use of such technologies is still pending negotiation with respect to the royalties, when applicable.
N01 - TERRESTRIAL TRANSMISSION:

- Coordination:
  - Prof. Gunnar Bedicks - Mackenzie

- Scope:
  - Transmission coding specification: channel coding and modulation

✓ The Brazilian specs are essentially similar to ARIB standard

✓ Minor adaptations on Spectrum Emission Mask in order to cope with the Brazilian allotment plan for digital television channels

- Reference:
  - ARIB STD-B31 English Version 1.6
  - ARIB TR-B14 English Version 2.8
  - http://www.dibeg.org/aribstd/ARIBSTD.htm
Status - Specifications

- Transmission Mask

![Graph showing transmission mask with attenuation levels and frequency differences.](image-url)
• **N02 - AUDIO AND VIDEO CODING:**
  
  • **Coordination:**
    - Eng. Paulo Henrique Castro - TV Globo RJ
  
  • **Scope:**
    - Audio and Video coding specifications
      - Implementation of high efficiency tools
    
  ✓ **Not similar to ARIB standards**
  ✓ **The correspondent standard is ARIB STD-B32**
    ✓ **Japanese system based on MPEG-2 video compression tools**

• **Reference:**
  - ISO/IEC 14496-10
  - ITU-T Rec. H.264.1
N02 - AUDIO AND VIDEO CODING:

- Fixed and Mobile Reception
  - Video Coding
    - Standard: Rec. ITU-T **H.264 (MPEG-4 AVC)**
    - Profile and Level: HP@L4.0
    - Video format: 480, 720, 1080
    - Frame Rate: 25, 30, 50 e 60Hz
  - Audio Coding
    - Standard: ISO/IEC 14496-3 **(MPEG-4 AAC)**
    - Level and Profile: AAC@L4 e HE-AAC@L4
    - High Efficiency tool: SBR
    - Number of channels: 5.1 channels (without SBR) or stereo (with SBR)
    - Sampling Rate: up to 48kHz
• **N02 - AUDIO AND VIDEO CODING:**
  
  • **Portable Service**
    
    ➢ **Video Coding**
      
      ➢ Standard: Rec. ITU-T H.264 (MPEG-4 AVC)
      ➢ Profile and Level: **BP@L1.3**
      ➢ Video Format: QVGA(4:3 e 16:9), SQVGA(4:3 e 16:9) e CIF
      ➢ Frame Rate: 5, 10, 12, 15, 24 e 30Hz
    
    ➢ **Audio Coding**
      
      ➢ Standard: ISO/IEC 14496-3 (MPEG-4 AAC)
      ➢ Level and Profile: HE-AAC@L3
      ➢ High Efficiency tools: SBR + OS
      ➢ Number of channels: 2 channels
      ➢ Sampling Rate: up to 48kHz
N03 - MULTIPLEXER AND SI:

- Coordination:
  - Eng. Carlos Fini - TV Globo SP

- Scope:
  - The Service Information tables (SI), multiplexed together with audio and video in the transport stream are responsible to provide the main information about each broadcaster service.
  - These information allow the receiver to organize and deliver the television channel audio, video and transmitted data to the viewers.

✅ Brazilian specification is essentially similar to ARIB specification

- Reference:
  - ARIB STD-B10 English Version 4.3
  - ARIB TR-B14 English Version 2.8
  - http://www.dibeg.org/arihstd/ARIBSTD.htm
• **N04 - TERRESTRIAL TV RECEIVER:**
  
  • **Coordination:**
    - Eng. Aguinaldo Silva - Genius Institute
  
  • **Scope:**
    - Specification of the minimum functionalities of the indoor, mobile and portable receivers
    - Guarantees basic service provision to viewers
  
  ✓ **Similar to ARIB standard**
  
  • **Reference:**
    - ARIB STD-B31 English Version 4.5
    - ARIB TR-B14 English Version 2.8
    - http://www.dibeg.org/aribstd/ARIBSTD.htm
• **N04 - TERRESTRIAL TV RECEIVER:**
  
  • **Priority Requests for Receiver table:**
    ➢ Mandatory and Optional requests for each receiver type
    ➢ Permits the manufacture to exceed any minimum request listed
  
  • **Ex. Fixed Receiver:**
    ➢ **MANDATORY:** AVC/H.264 HP@L4.0 / 480i, 480p, 720p e 1080i
    ➢ **MANDATORY:** Virtual channel selection
    ➢ **MANDATORY:** Parental rating interpretation
    ➢ **OPTIONAL:** Software upgrade
  
  • **Ex. Mobile Receiver:**
    ➢ **MANDATORY:** AVC/H.264 HP@L4.0 / 480i, 480p, 720p e 1080i
    ➢ **OPTIONAL:** Remote control with interactivity buttons
  
  • **Ex. Portable Receiver:**
    ➢ **MANDATORY:** AVC/H.264 BP@L1.3 / QVGA, CIF e SQVGA
    ➢ **OPTIONAL:** Composite Video Output 525i
• **N04 - TERRESTRIAL TV RECEIVER:**

- **TS:** MPEG-2 TS
- **Modulation:** BST - OFDM
- **IF:** 44 MHz
- **BW:** 6 MHz
- **Channel:**
  - VHF: 7 - 13 174 - 216
  - UHF: 14 - 69 470 - 806
• **N05 - DIGITAL RIGHTS MANAGEMENT:**
  
  • Coordination:
    - Prof. Marcelo Zuffo - USP
  
  • Scope:
    - Assure intellectual properties rights to registered brands to its holders
    - Based on the Transport Stream encryption and protection on output interfaces
  
  ✓ **Architecture similar to ARIB standard**
  
  • Reference:
    - ARIB STD-B25 English Version 4.2
    - [http://www.dibeg.org/aribstd/ARIBSTD.htm](http://www.dibeg.org/aribstd/ARIBSTD.htm)
**N05 - DIGITAL RIGHTS MANAGEMENT:**

- **Volume 1 - Source Encryption** - It will be implemented only in case of a specific legislation absence:
  - Encryption Algorithm
  - Specifies smart cards or integrated software technology
- **Volume 2 - Interfaces Protection:**
  - Uses of international algorithms in the protection of all the digital interfaces
  - Analog interfaces limited up to 480p resolution
- **Volume 3 - Additional Tools - Not critical for initial implementation:**
  - Software Update
  - Interactive applications
  - User Authentication
• N06 - DATA BROADCASTING (Data Coding):
  • Coordination:
    ➢ Prof. Luiz Fernando Soares - PUC-Rio
  • Scope:
    ➢ Middleware definitions
      ➢ Declarative
        ➢ Specification: “final intention”
        ➢ Highest level specification
      ➢ Procedural (imperative)
        ➢ Algorithmic specification: “how to do”
        ➢ More expressiveness
  ✓ Architecture similar to ARIB standard

More information:  www.ginga.org.br

Prof. Luiz Fernando Gomes Soares - PUC-Rio = lfgs@inf.puc-rio.br
Prof. Guido Lemos - UFPB = guido@lavid.ufpb.br
N07 - RETURN CHANNEL:

- Coordination:
  - Eng. Aguinaldo Silva - Instituto Genius

- Scope:
  - Make it flexible to choose the return channel (external device) on the receiver
  - Guarantees receiver’s integraty when na external device is connected
  - Specifies additional return channel technologies proposed in ARIB

✓ Not similar to ARIB standard

- Specifies the use of any return channel:
  - Example: Telephone line, GSM, WiMax

- Possible to use next generation networks:
  - Example: 3G, WiMax700

- Security and authentication technologies are under discussion
Support Programs - Financing

PROTVD - Support Program to the Implementation of Brazilian DTT

- **BUDGET =** US$ 500 MM
- **Three sub-programs:**
  - PROTVD-Supplier
  - PROTVD- Broadcasting
  - PROTVD- Content
- **CLIENTS =** Foreign and Brazilian companies which maintain, in Brazil, operations of broadcasting, development and/or production of software, electronic compounds, equipment or infrastructure for transmission network, receiving equipment and equipment for production of the content for Digital TV
- **SUPPORTABLE ENDEAVORS =** All sorts of investments excluding imported equipments for transmission network

More information = [http://www.bndes.gov.br/english/protvd_in.asp](http://www.bndes.gov.br/english/protvd_in.asp); or
Mauricio Neves - Head of Electronic Industry Department  [msn@bndes.gov.br](mailto:msn@bndes.gov.br)
Support Programs – Special Regimens

PAC - Accelerated Growth Program

PADIS
Seiconductor Devices; Displays (excluding CRT)

PATVD
Transmission Equipments

More information = http://www.mdic.gov.br; or
Manoel Lousada - MDIC/STI - lousada@attglobal.net
Launching

ANALOG TV

6 MHz

HDTV

LD

SD1 SD2 SD3 SD4 LD

- HDTV – High Definition
- SD – Standard Definition
- LD – Low Definition (Portable)
- Interactivity
Expectations

FORECAST OF TV SET PRODUCTION
Source Brazilian Industry

DIGITAL TV
ANALOG TV
International System

ARIB

Harmonization Mechanism

SBTVD Forum

ISDB-T International English Version
Domo arigato !