

SBTVD Forum

Status of the Digital TV Project in Brazil
Lecture at ARIB

May/2007



Agenda

- 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

Introduction

- **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.

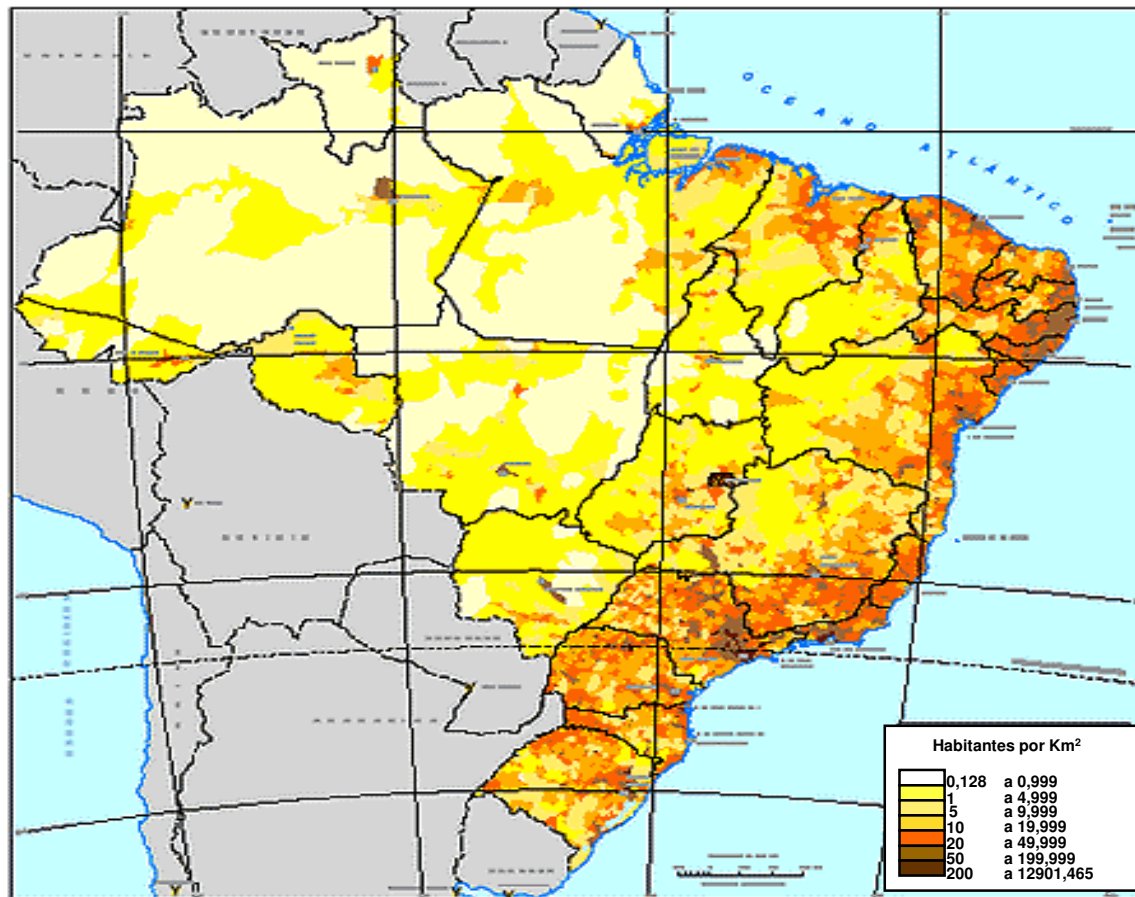


Brazilian Context

Population: 187 MM

Households: 53 MM

Demographical density asymmetrically distributed along the country



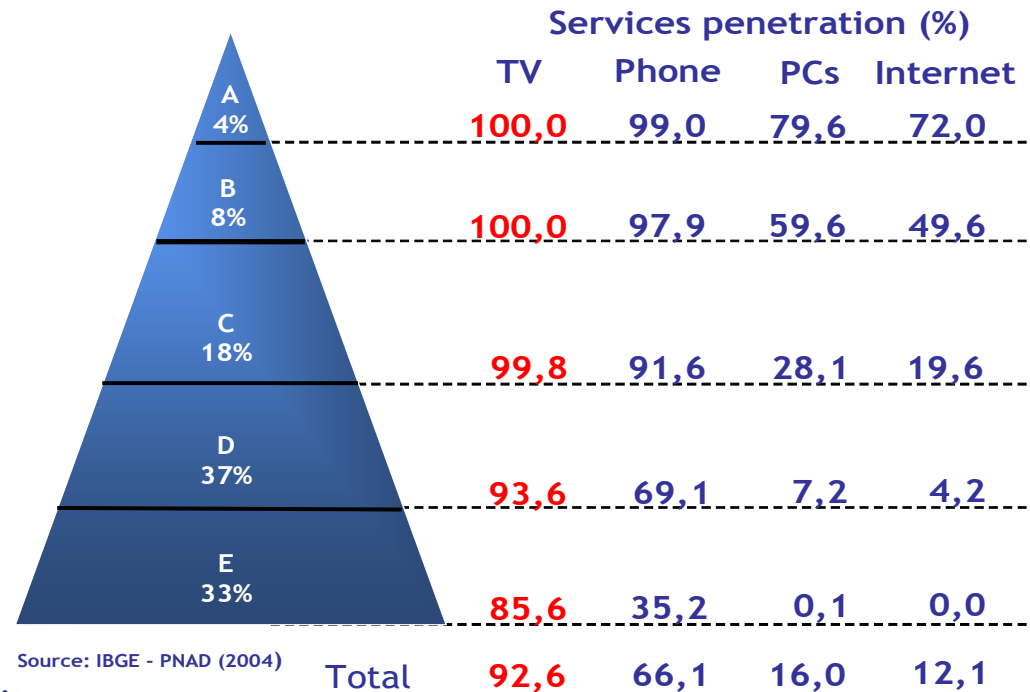
Source: IBGE (2006)

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%

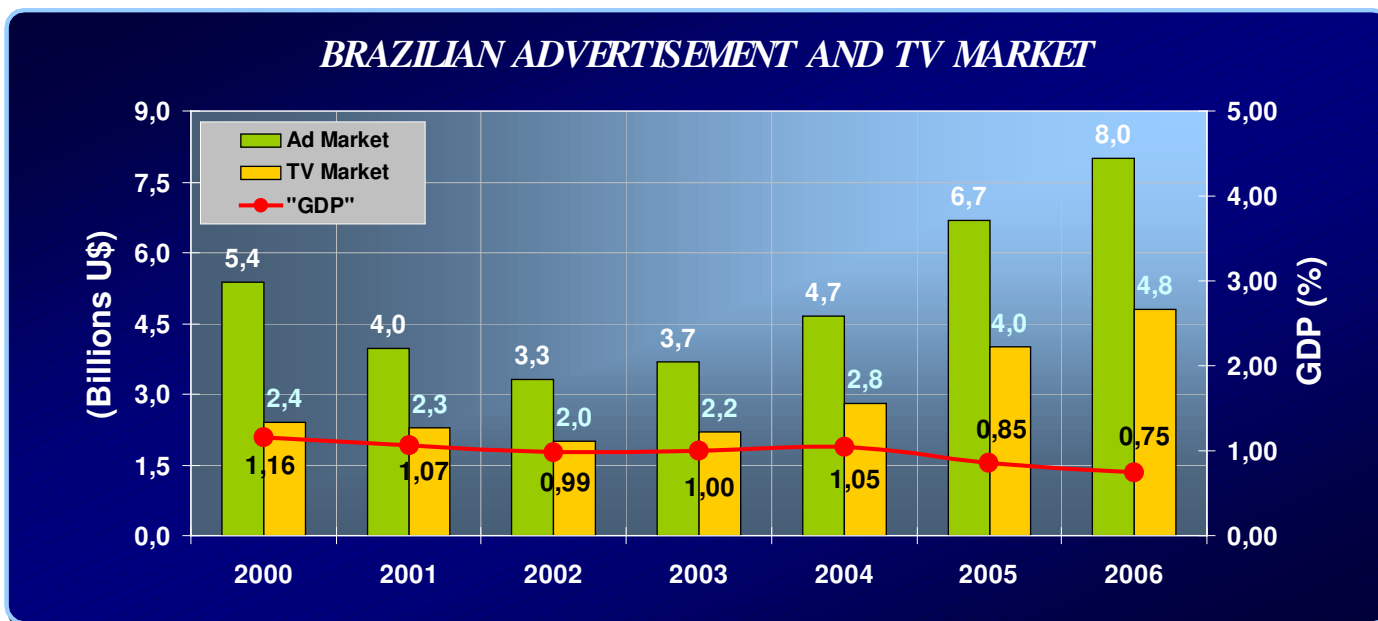
Source: Anatel / IBGE PNAD(2005/2006)



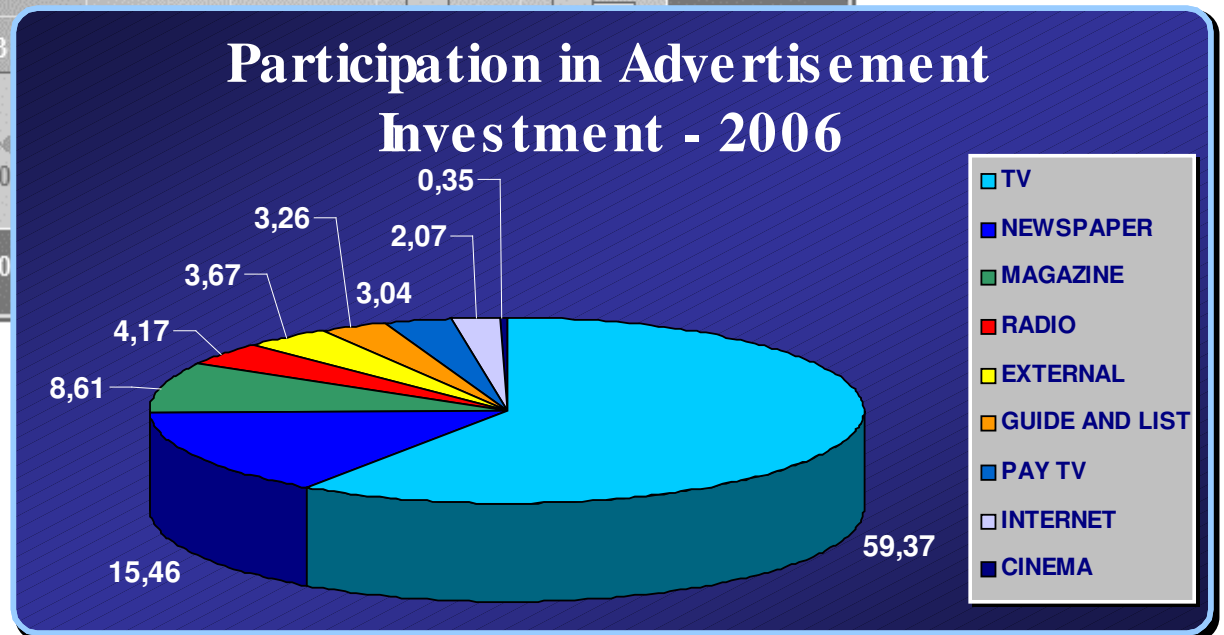
- Broadcasting (FTA)

- 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.

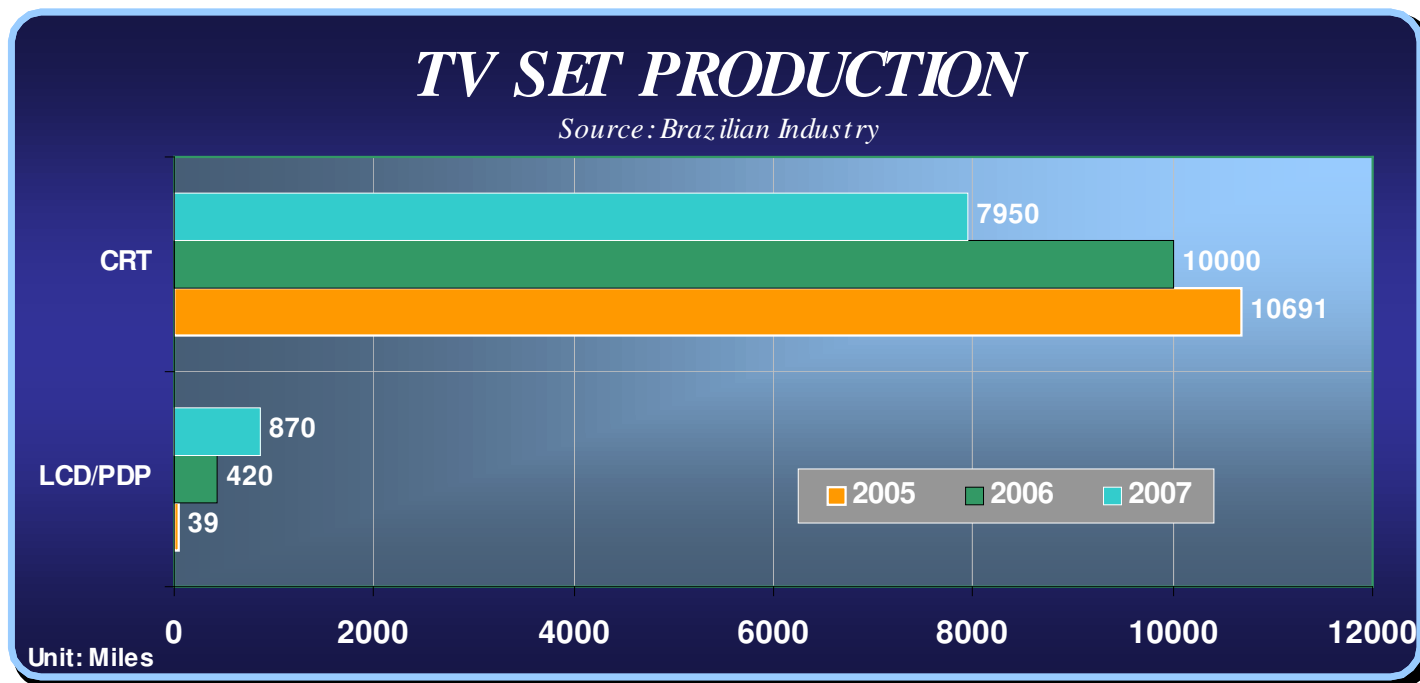
Brazilian Context



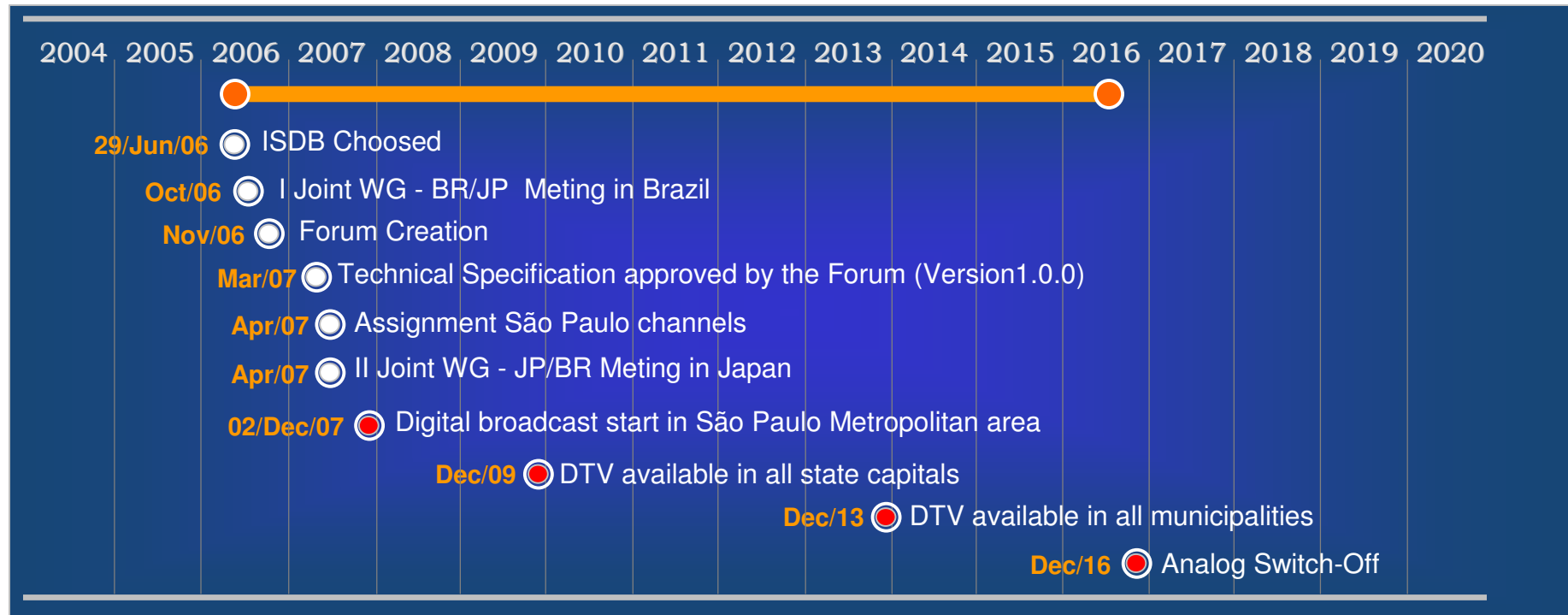
Brazilian Context



Brazilian Context

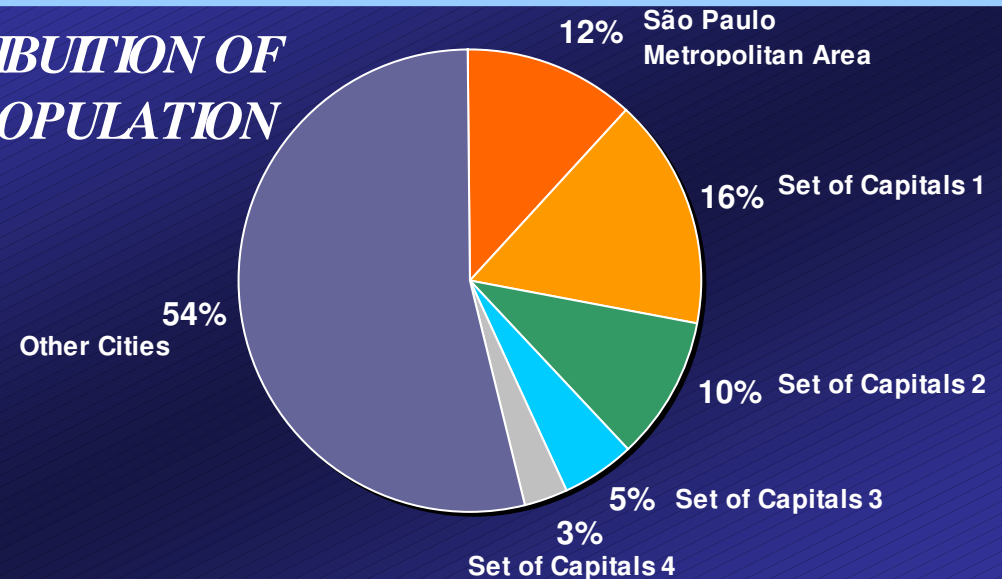


Status – Implementation Schedule



Status – Implementation Schedule

DISTRIBUTION OF THE POPULATION



2004 2005 2006 2007 2008 2009

29/Jun/06 ● ISDB Chooosed

Oct/06 ● I Joint WG - BR/JP

Nov/06 ● Forum Creation

Mar/07 ● Technical Spec

Apr/07 ● Assignment Sa

Apr/07 ● II Joint WG - JP/BR Meting 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 – SBTVD Forum

What is the Forum?

It is a opened non profit organization;

Founded in November 2006;

Currently has approximately 100 members.

Mission:

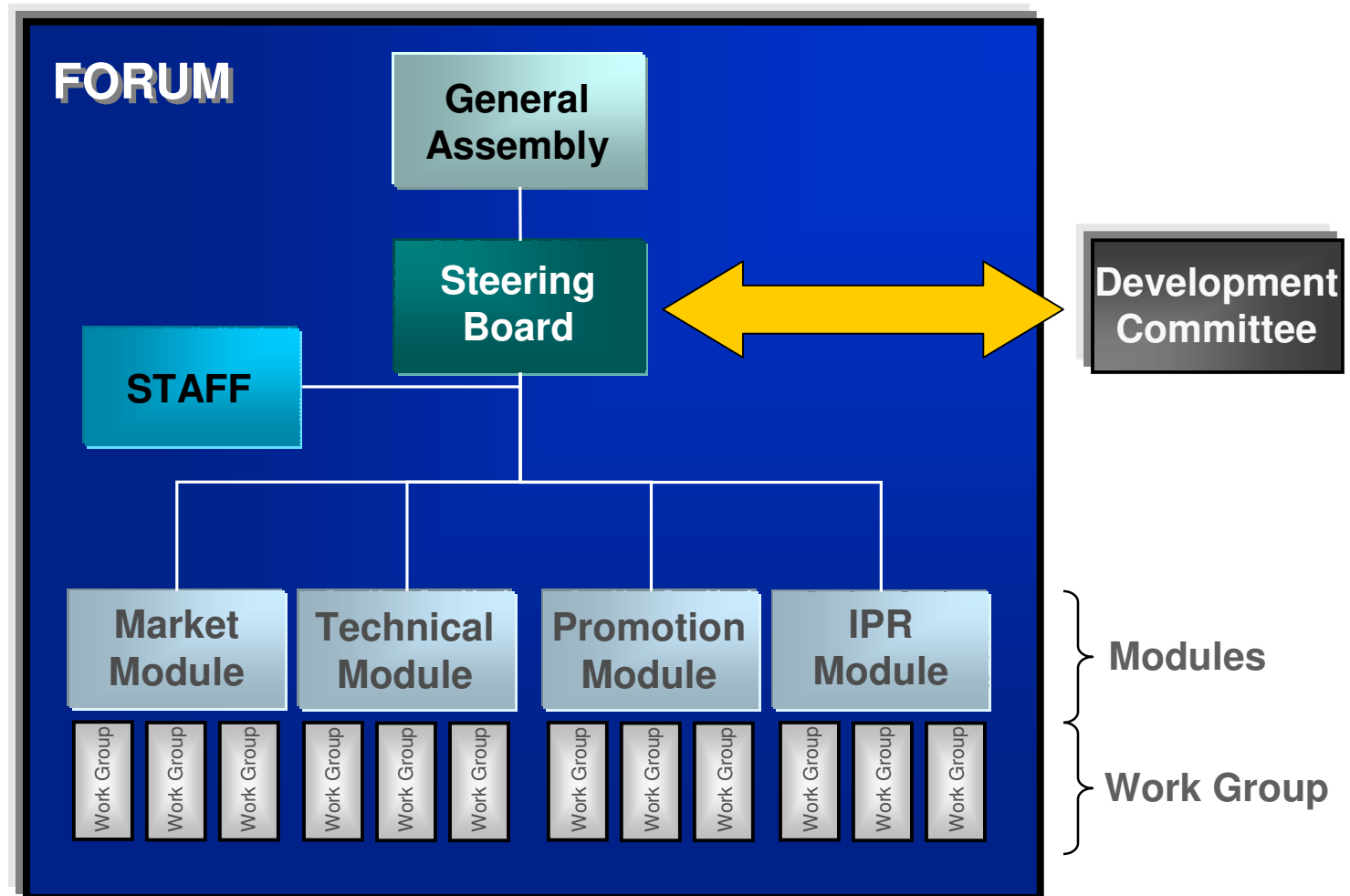
To assist and stimulate the creation and improvement of transmission and reception digital system of Brazil, standardizing and guaranteeing the quality demanded by the consumers.

Objective:

To consider norms, standards and technical regulations, voluntary or not for the transmission and reception system for Digital TV.

Status – SBTVD Forum

- Organizational Structure



Status – SBTVD Forum

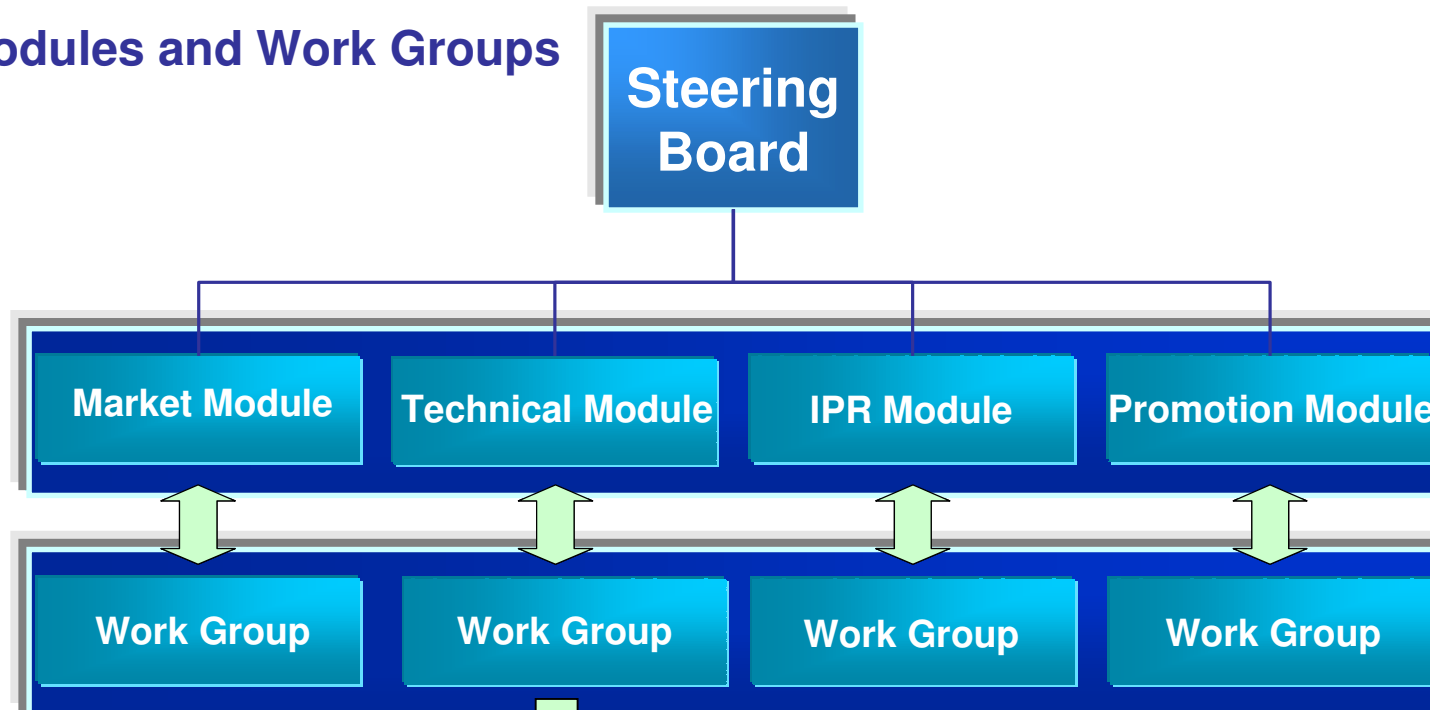
• Organizational Structure

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

Member	Governmental Body
Andre Barbosa Filho	Casa Civil
Rodrigo A. Carvalho	Ministério das Relações Exteriores
Roberto Pinto Martins	Ministério das Comunicações.
Jairo Klepacz	Ministério do Desenvolvimento Industria e Comercio Exterior
Júlio Almeida	Ministério da Fazenda
Augusto Gadelha	Ministério da Ciência e Tecnologia
Pedro Alem Filho	ABDI

Status – SBTVD Forum

- Modules and Work Groups



Module	Coordinator	Company
Técnico	Paulo Henrique	Globo
Transmission	Gunnar Bedicks	Mackenzie
Audio and Video Coding	Paulo Henrique	Globo
Multiplexer and SI	Carlos Fini	Globo
Receiver	Aguinaldo Silva	Gradiente
DRM	Marcelo Zuffo	LSI-USP
Data Coding (Middleware)	Luis Fernando	PUC-RJ
Return Channel	Aguinaldo Silva	Gradiente

Status – Channel Planning

- Channelization

Brasil

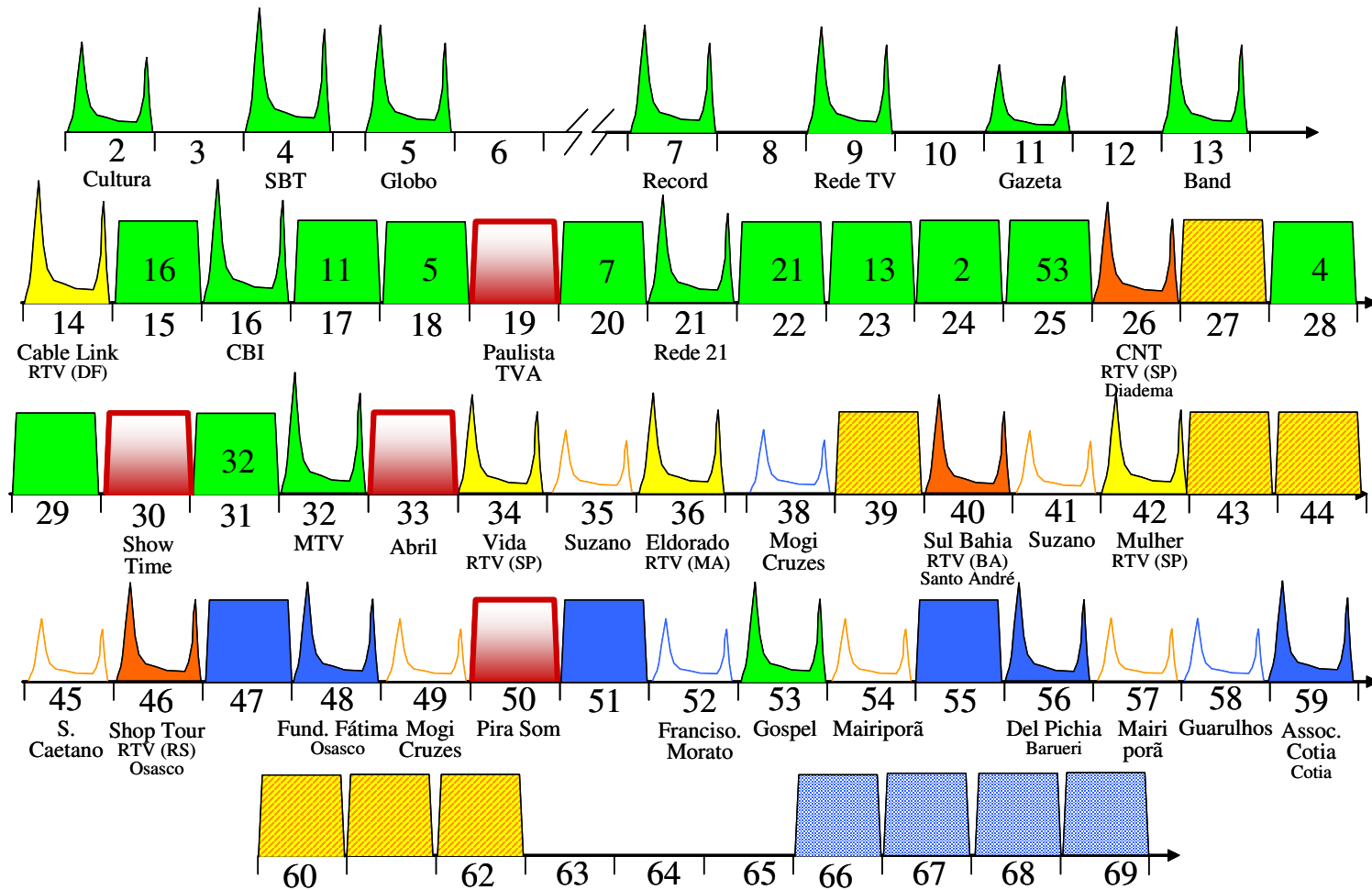


Japan



Status – Channel Planning

- São Paulo Channel Allotment





Status - Specifications

- General Guideline:

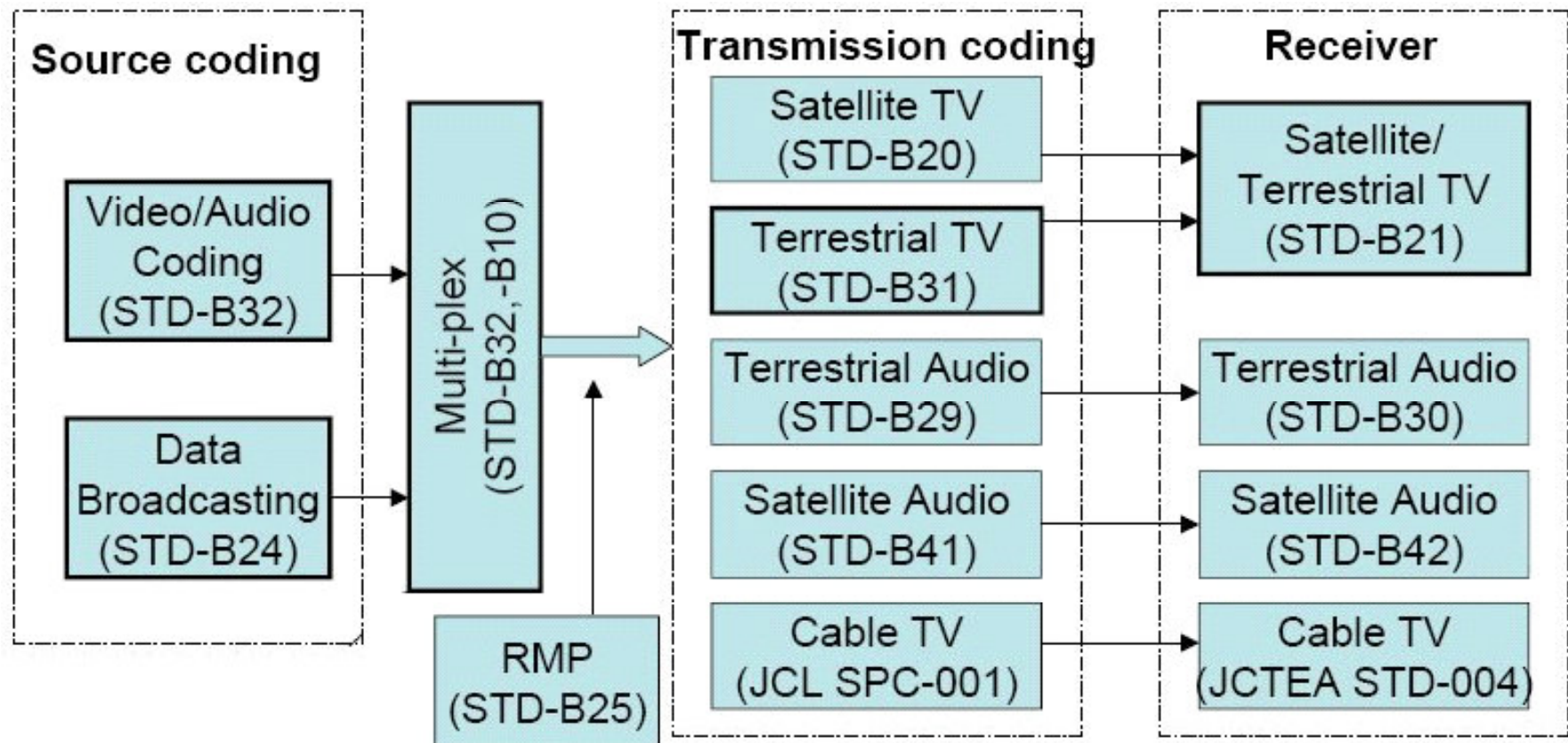
Maximum similarity with ISDB-T shall be pursued

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

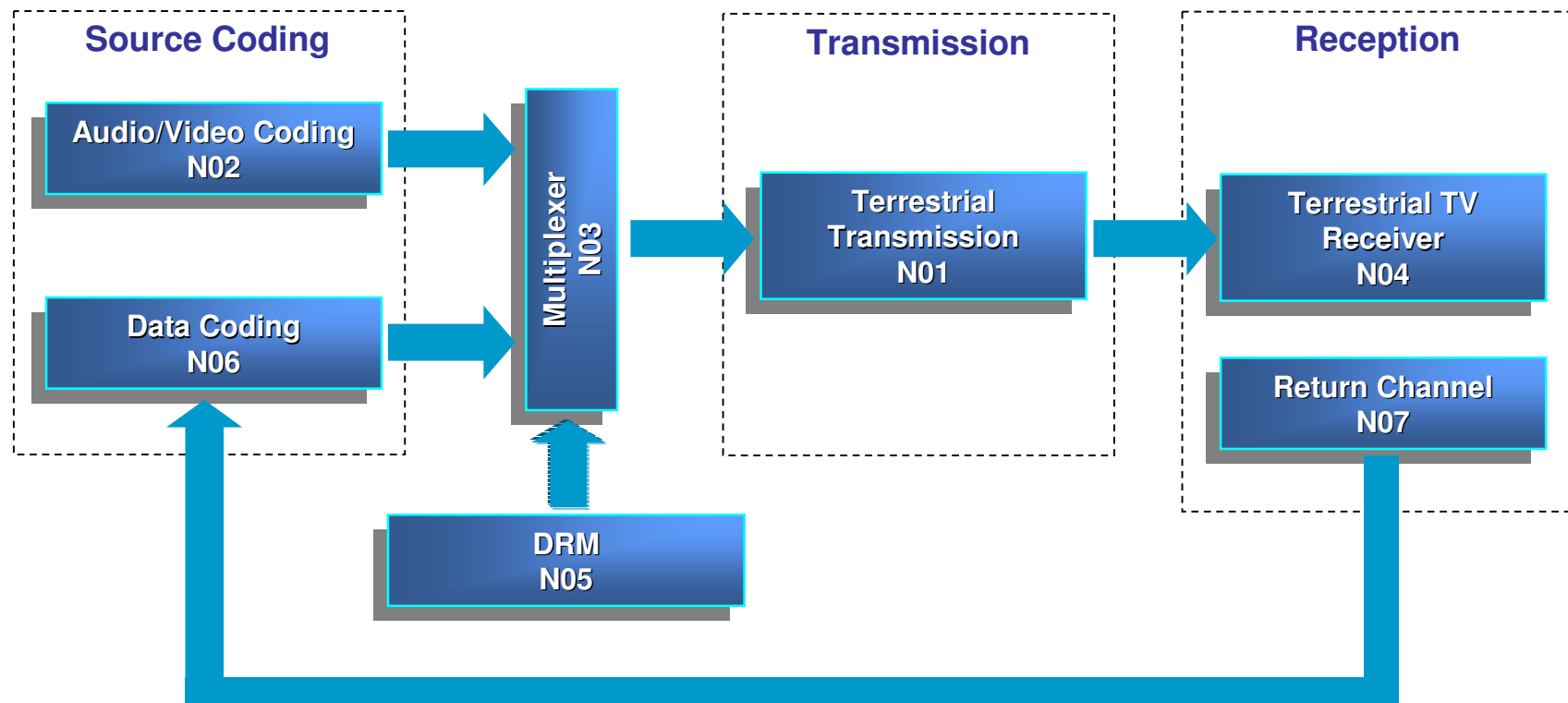
Status - Specifications

- ISDB Standards:



Status - Specifications

- SBTVD-T Standards:





Status - Specifications

- 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



Status - Specifications

- **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:**

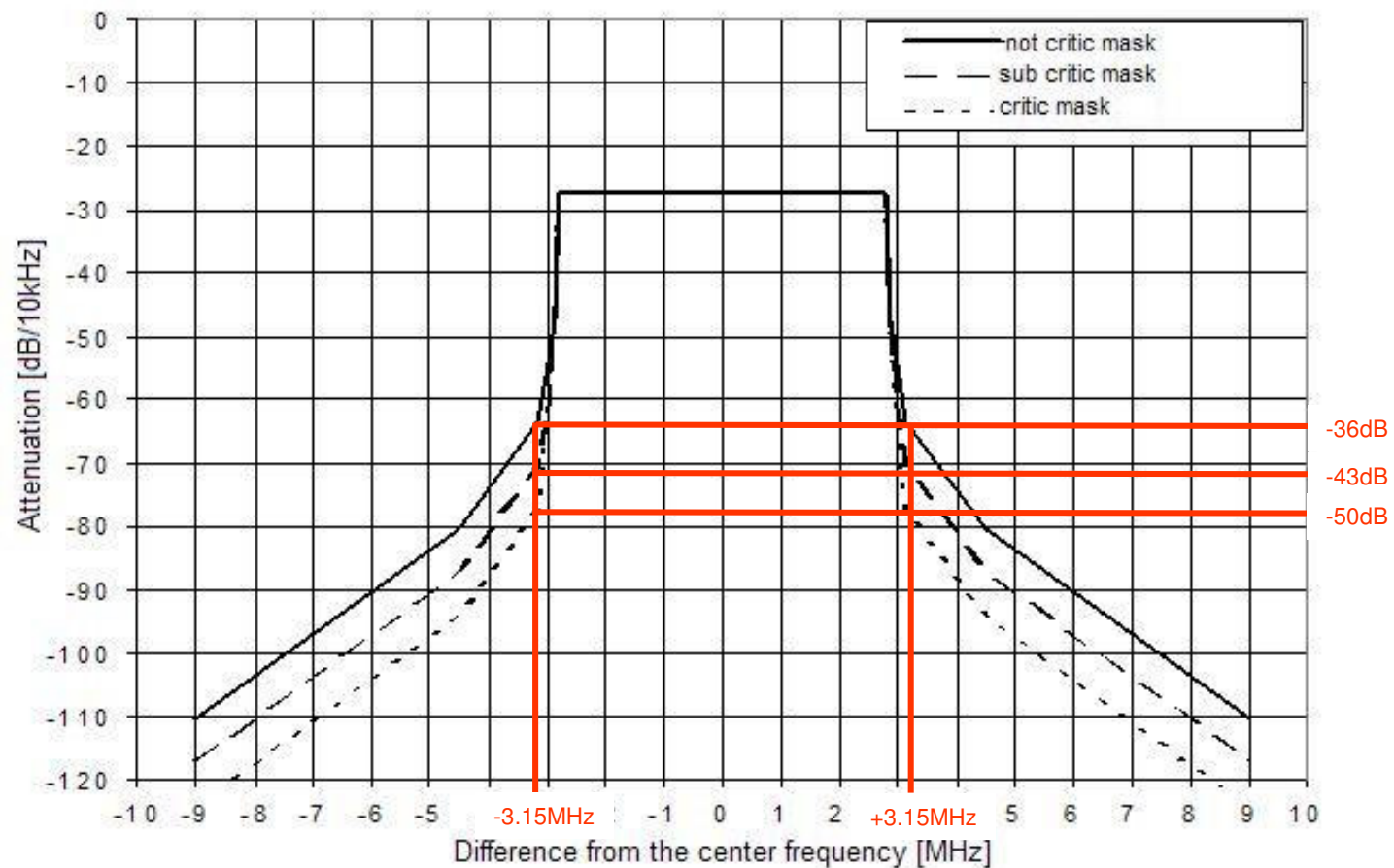
- ARIB STD-B31 English Version 1.6

- ARIB TR-B14 English Version 2.8

- <http://www.dibeg.org/aribstd/ARIBSTD.htm>

Status - Specifications

- Transmission Mask





Status - Specifications

- **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
 - <http://www.iso.org/iso/en/>
 - ITU-T Rec. H.264.1
 - <http://www.itu.int/rec/T-REC-H.264/en>



Status - Specifications

- 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



Status - Specifications

- 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



Status - Specifications

- **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/aribstd/ARIBSTD.htm>



Status - Specifications

- 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>



Status - Specifications

- **N04 - TERRESTRIAL TV RECEIVER:**
 - **Prioritary 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

Status - Specifications

- 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



Status - Specifications

- **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>



Status - Specifications

- **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

Status - Specifications

- 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



Status - Specifications

- **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 integrity 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



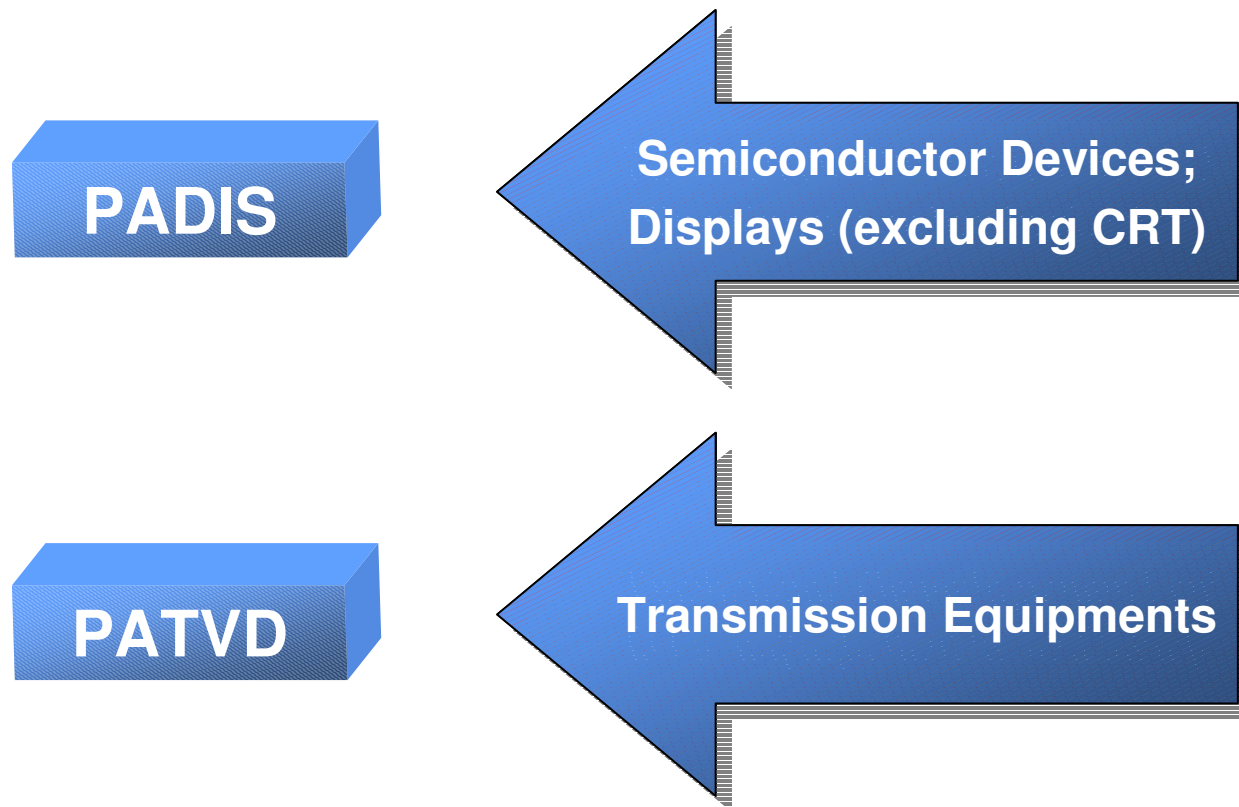
PROTVD - Support Program to the Implementation of Brazilian DTT

- 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; or
Mauricio Neves - Head of Electronic Industry Department msn@bndes.gov.br

Support Programs – Special Regimens

PAC - Accelerated Growth Program



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

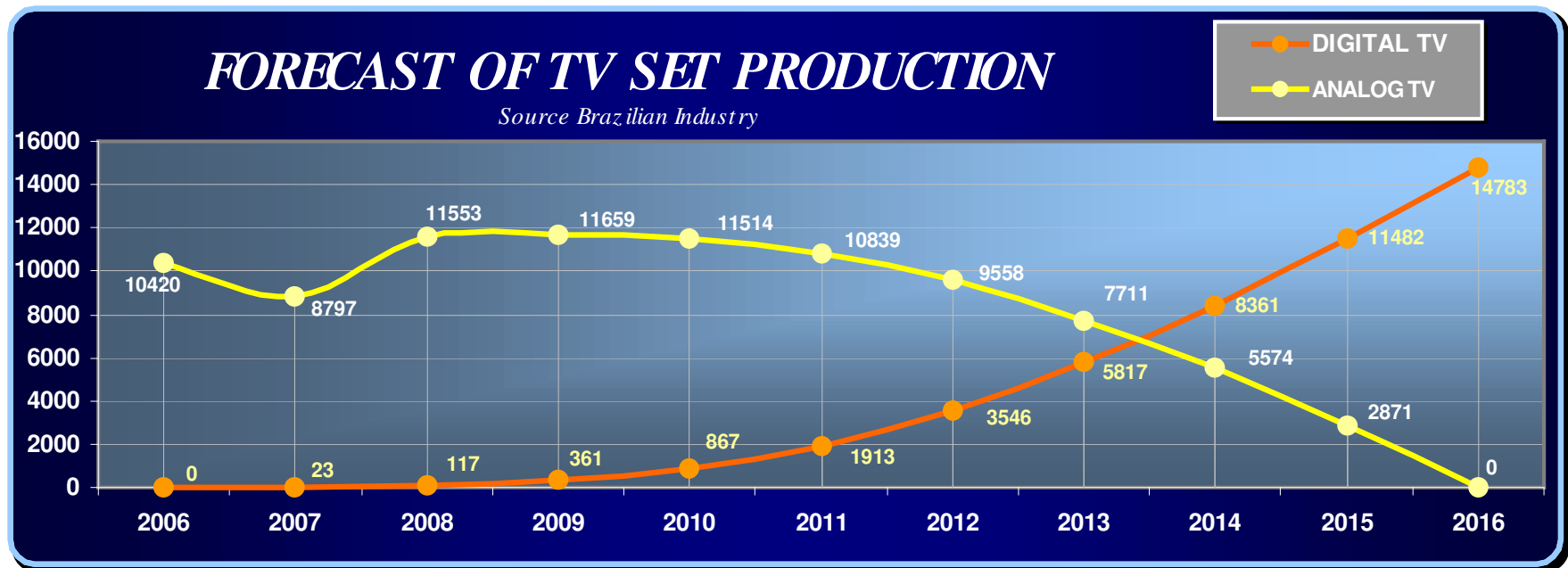
● HDTV – High Definition

● SD – Standard Definition

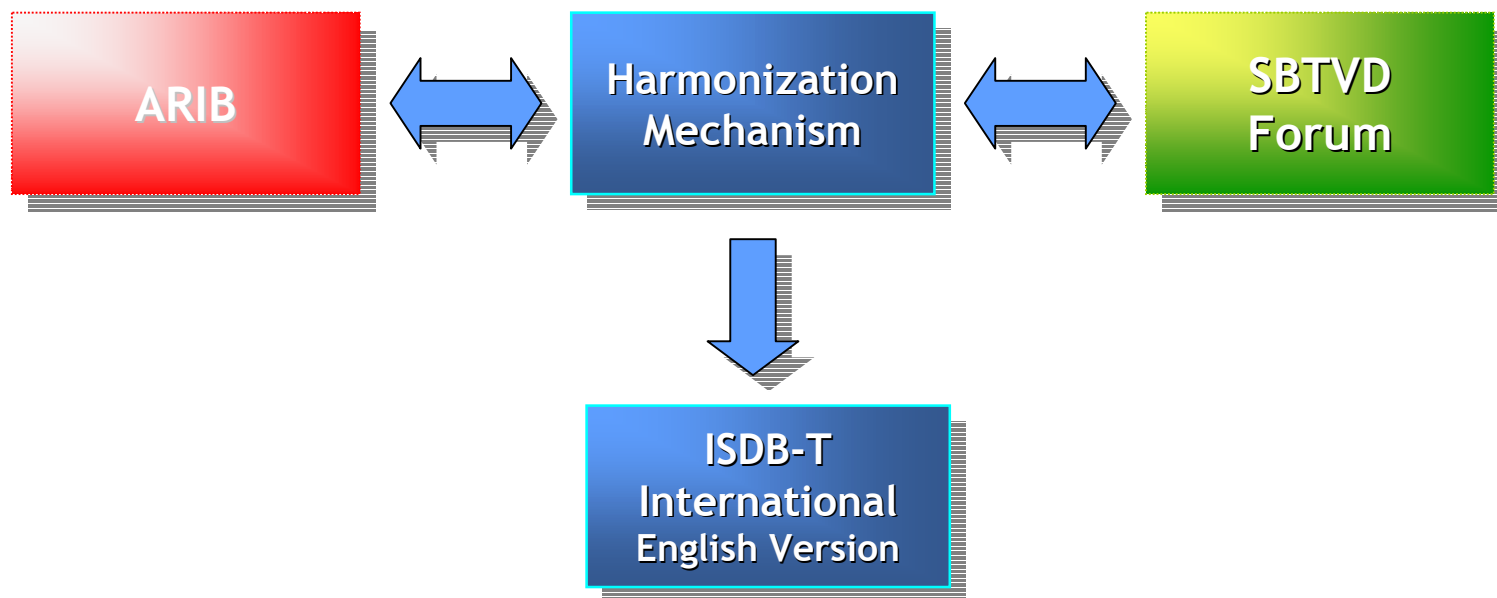
● LD – Low Definition (Portable)

● Interactivity

Expectations



International System





Domo arigato !