

Presentation 11

ISDB-T, the Future of Digital Television in the Philippines

Implementation of ISDB-T

28th February, 2007

Manila, Philippines

DiBEG JAPAN

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TV Asahi

Contents

- *Service and Business*
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 - *Tokyo broadcasting system*
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Service and Business

Service and Business solution

Service

- **Number of Channel**
- **Video Quality**
- **Communication**
- **Target**
- **Audience Action**
- **Where**

Analog Broadcasting

Single Channel
Standard (SDTV)
Casting
Viewer
Passive
Home

Digital Broadcasting

Multi Channel / HD
+ High quality (HDTV)
Interactive
Customer
Active
Anywhere

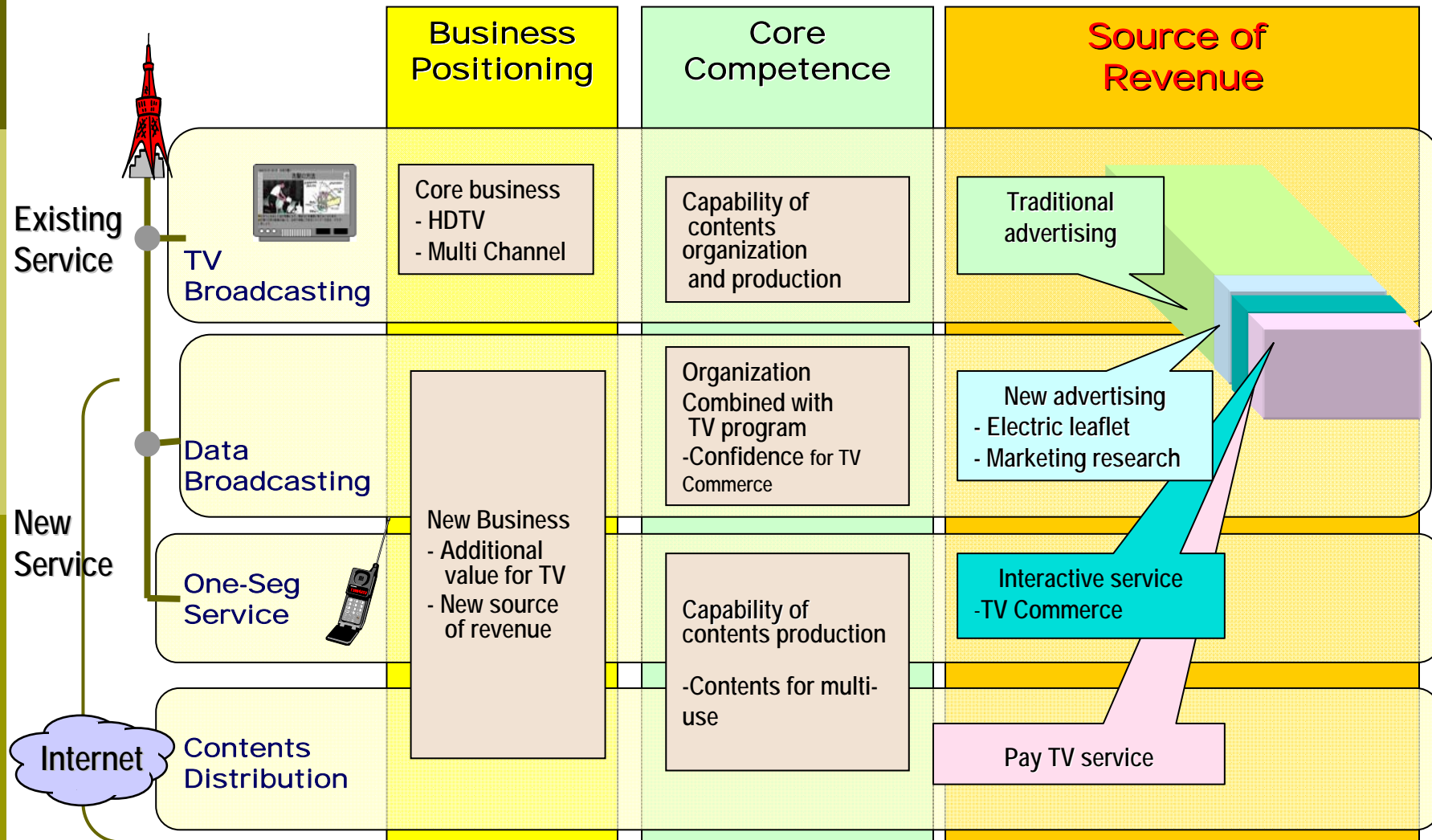
Business

- **Source of Revenue**
- **Advertising Target**
- **Media**
- **Potential**

Sponsor (Commercial station)
Mass
Broadcast
Low (Stability)

+ Subscriber, Industry
+ Segment, Personal
+ Interactive
High

Business and Source of revenue



Implementation

Broadcast premises

Example of implementation(1)

Tokyo Broadcasting System



Architecture concept

❑ Two-step approach

✓ First step

from end of 2003

"Add on" system

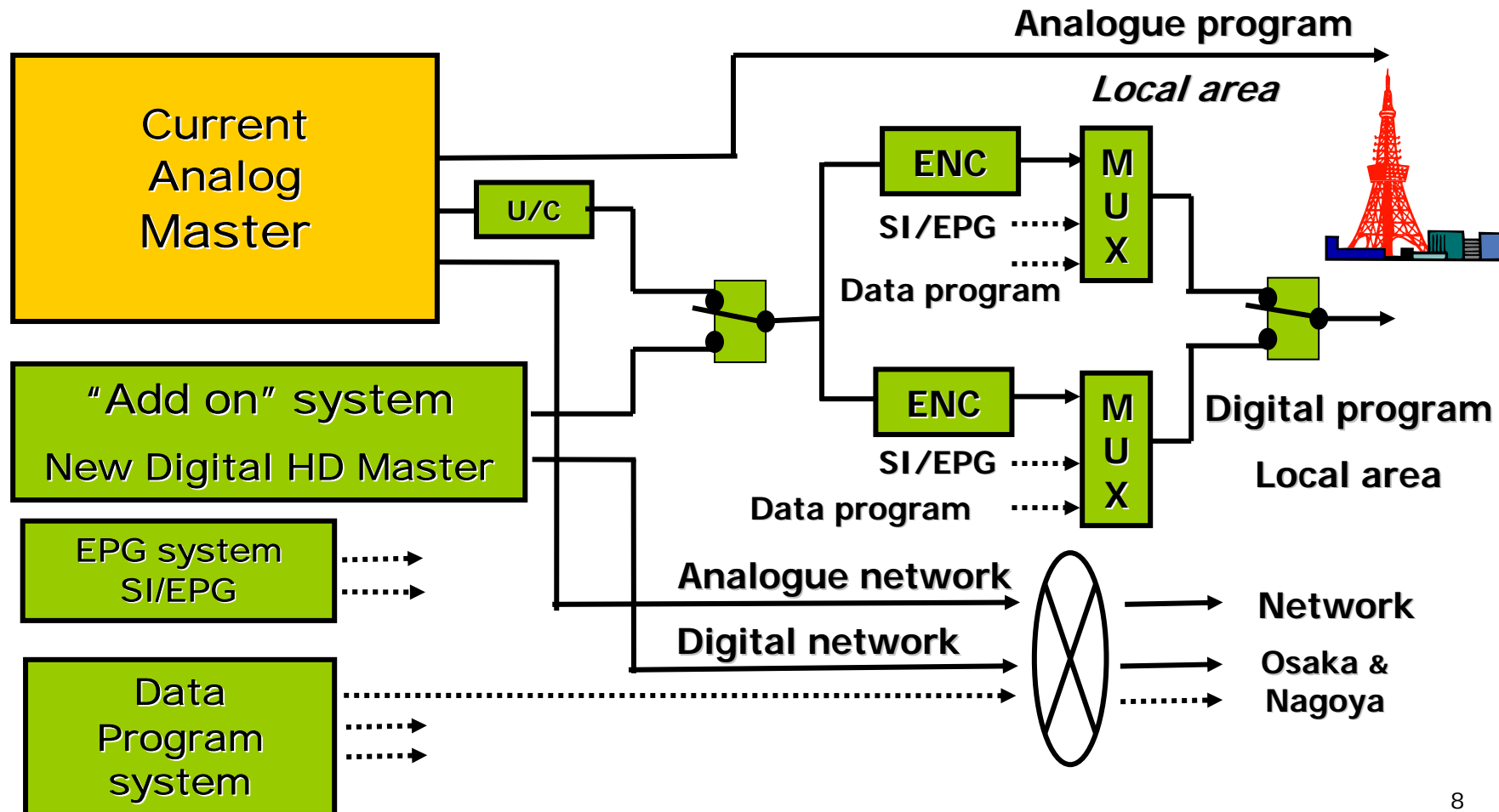
✓ Second step

from end of 2004

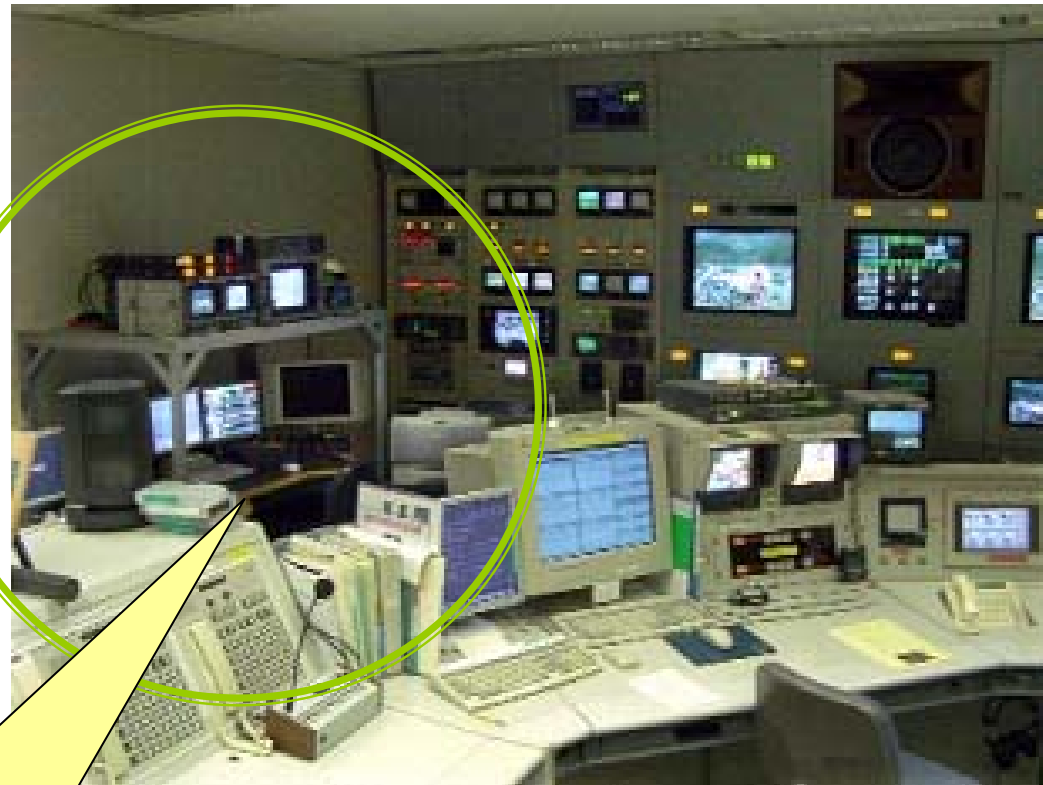
Full digital

"Add on" system

In the case of Tokyo broadcasting system



"Add on" system



"Add on" system

Appearance

Analogue program
Local Network

Digital program
Local Network



Example of implementation(2)

Nippon television network corporation



Architecture concept

❑ Full package approach

❑ Integrated system

**Production facilities/Storage
media/Broadcasting system**

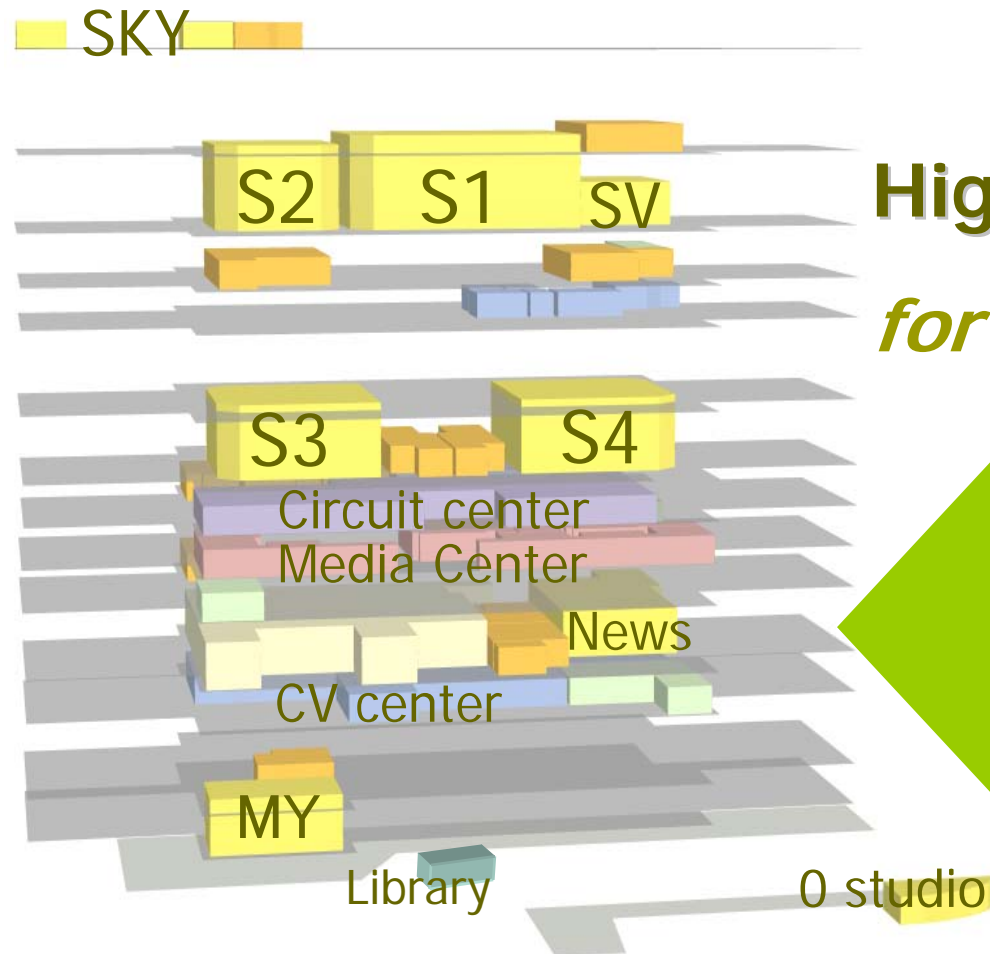
❑ Flexible system

Long term life/Expansion request

❑ Screening

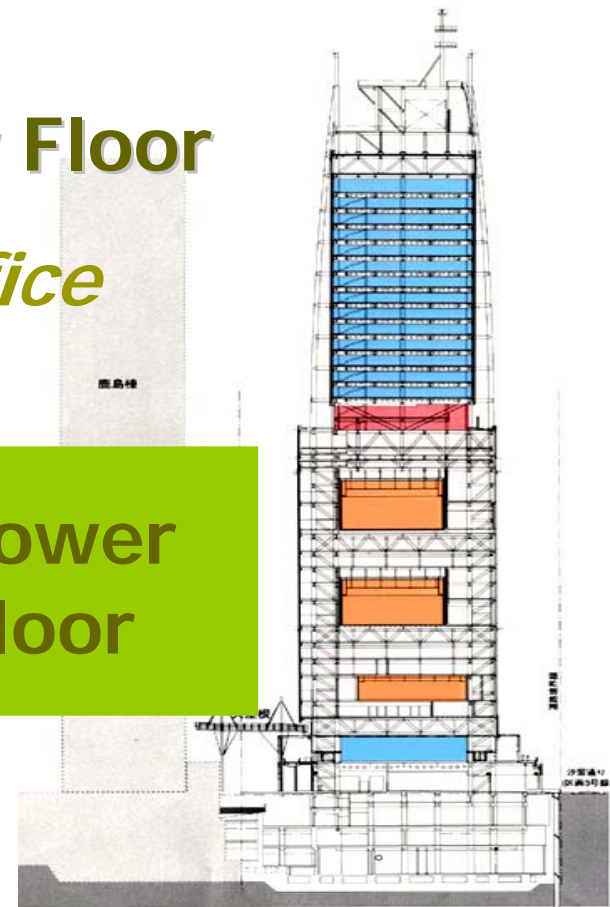
Trend technology

Layout

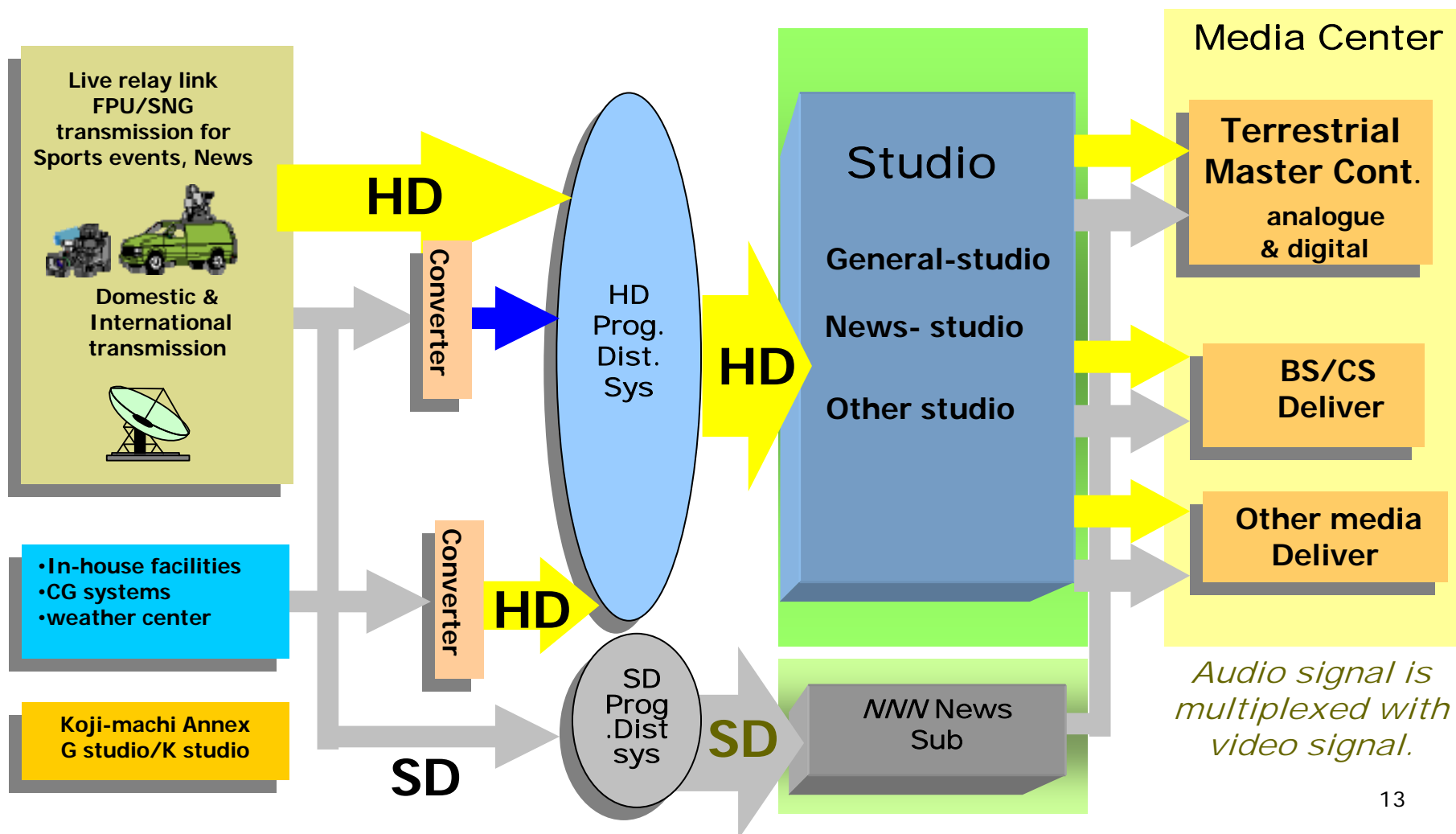


**Higher Floor
for Office**

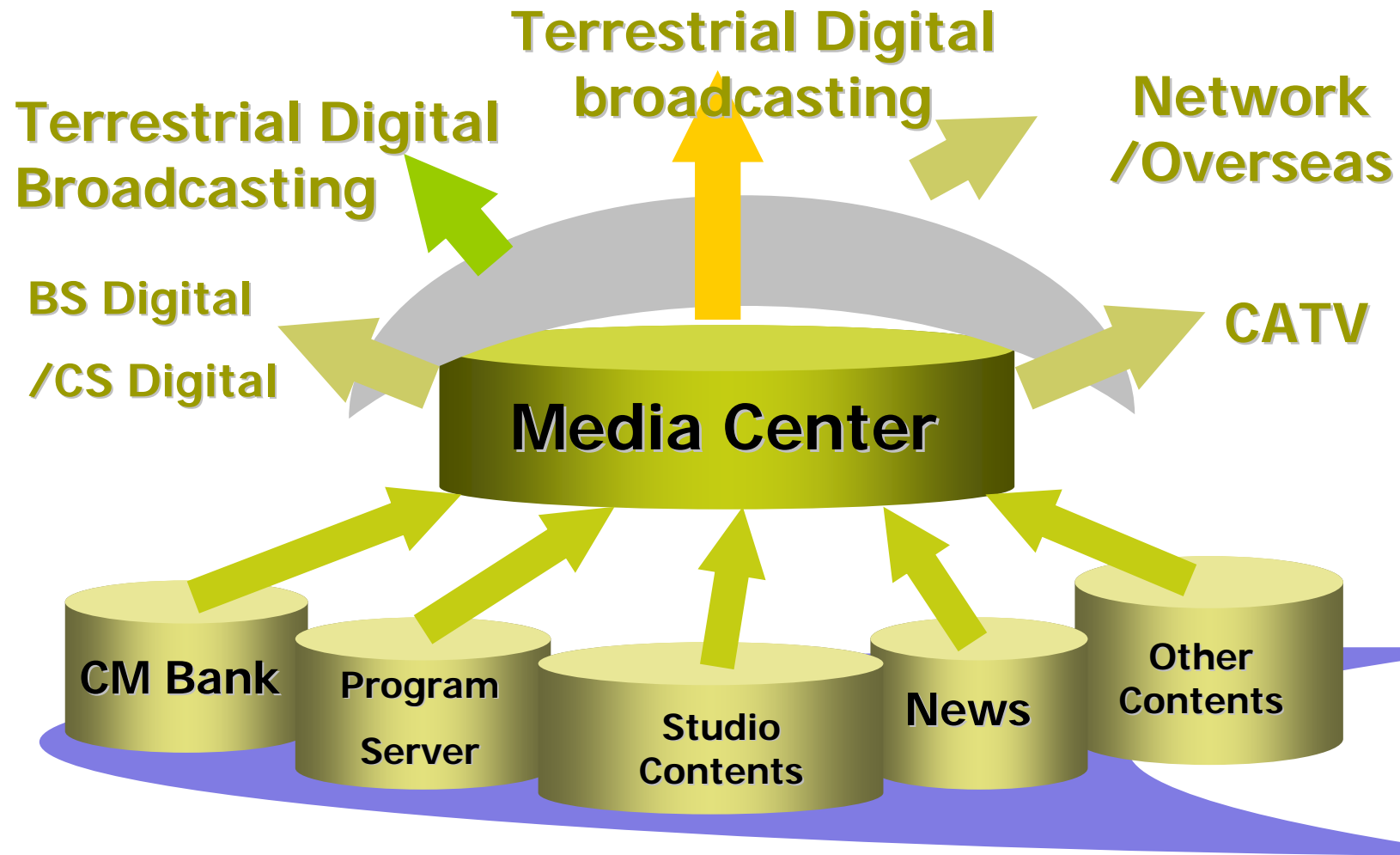
**Lower
Floor**



Flow of HD & SD Signal

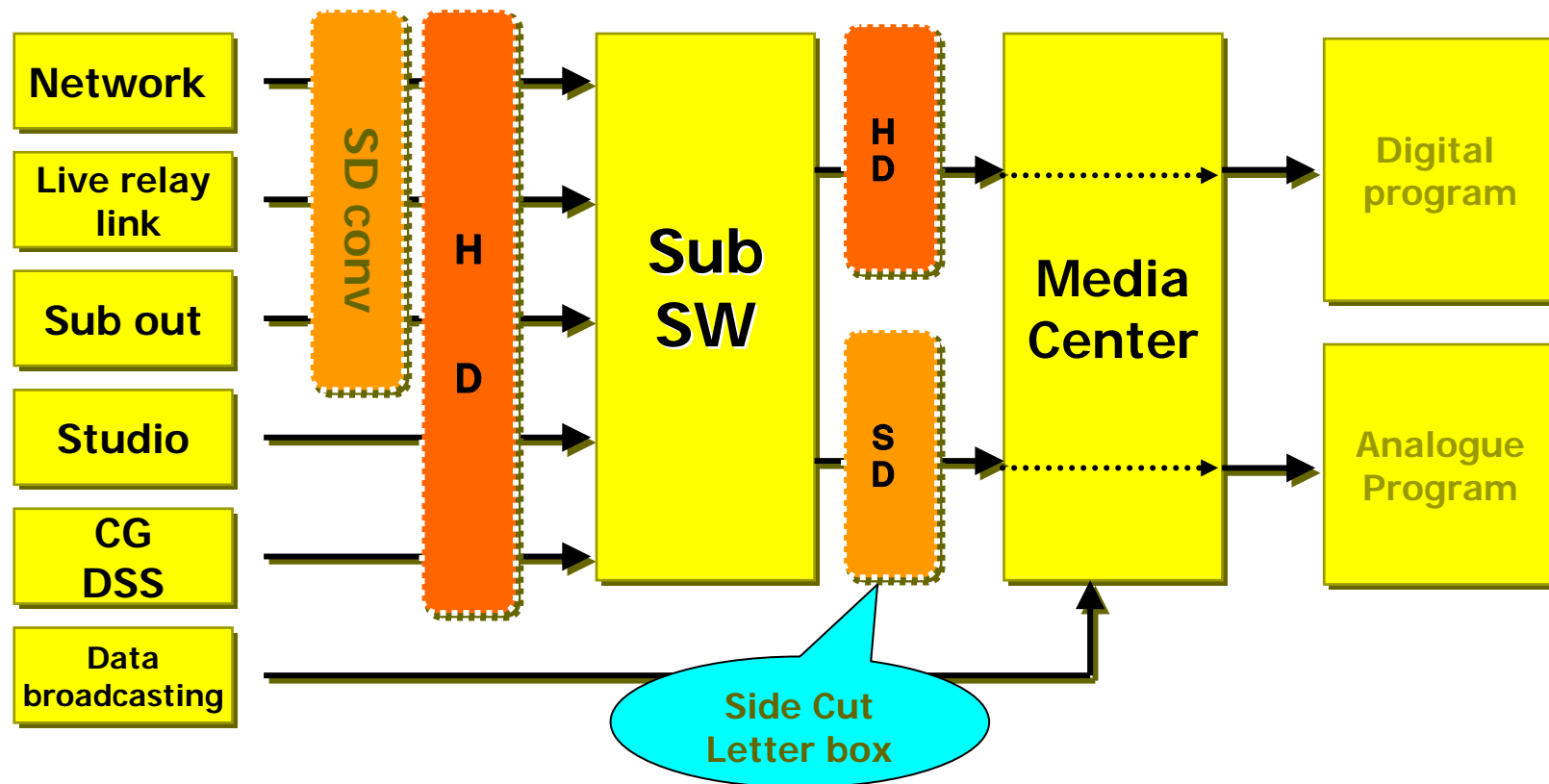


Media center concept



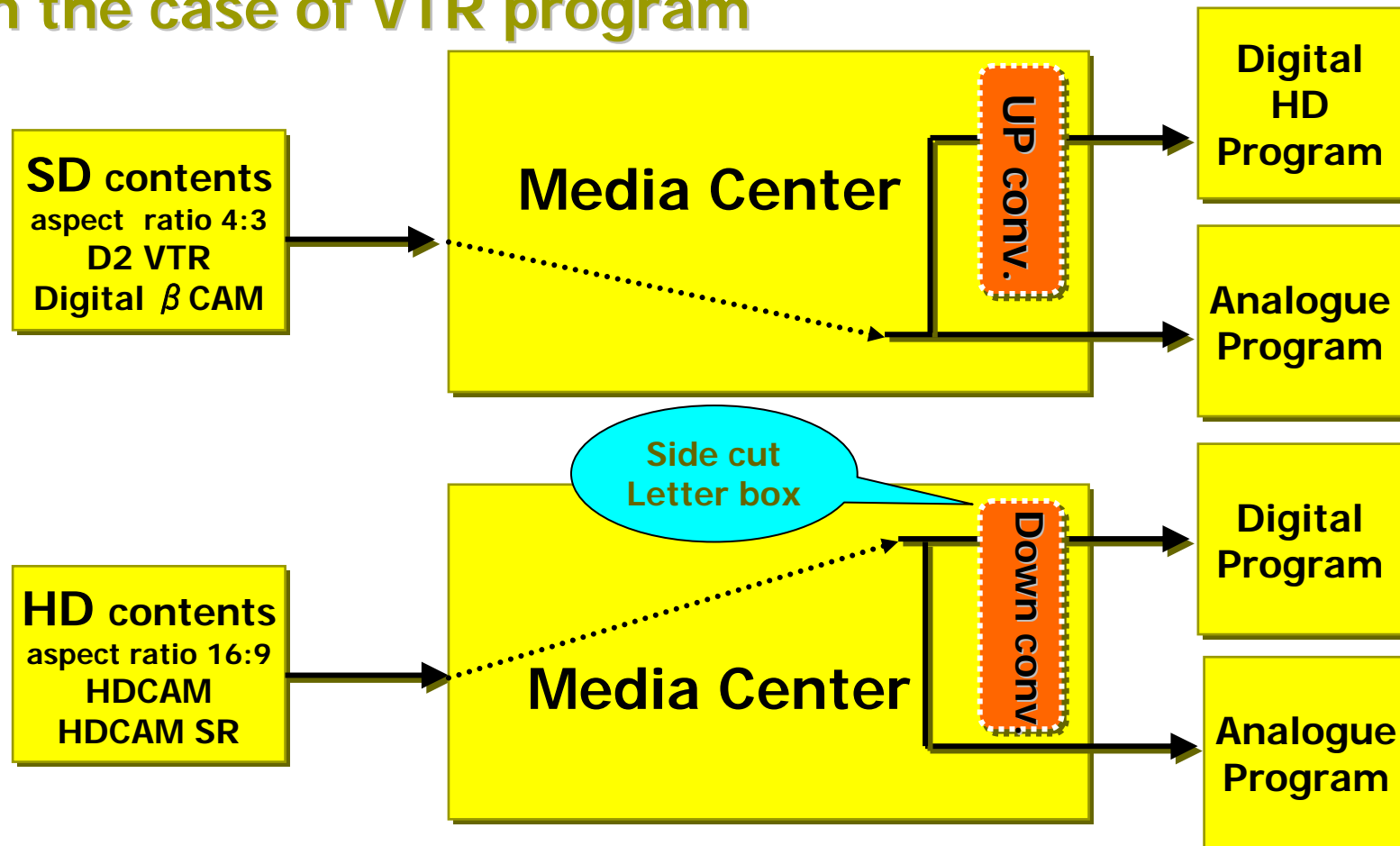
Simultaneous Broadcasting

□ In the case of Live program



Simultaneous Broadcasting

□ In the case of VTR program





*In the case of
TV Asahi*

Migration plan



Architecture concept

❑ Full package approach

❑ Full HD & Full digital system

❑ Contents for multi-use

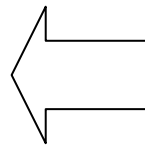
❑ Migration from VTR base to Server base

Move to the new site

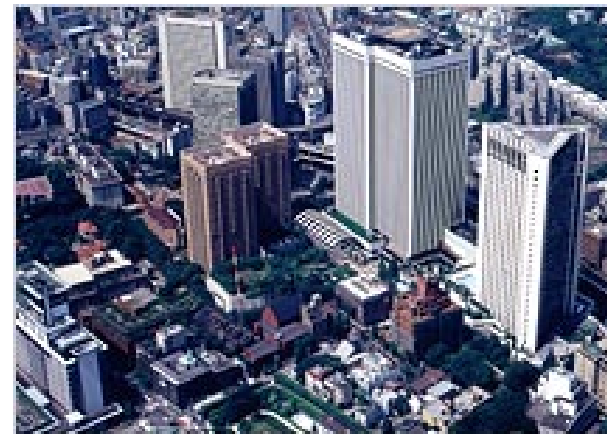
tv asahi's Head Quarter moved to new site "Roppongi hills" from Ark Hills premise on Mar.2003 to secure space to install new digital facilities in addition to the analogue facilities and to commence Digital broadcasting on Dec. 1st, 2003 .



Roppongi Hills



Mar31st.2003



Ark Hills

Construction of the new building



Building Outline

Construction period: Aug.1st 2000–Mar.31st2003

Building Area: 9,469.74m²

Number of Stories: 8 stories and 3stories below ground.

Total Floor Area: 73,700.43m²

Power Supply: 66kV Loop Substation

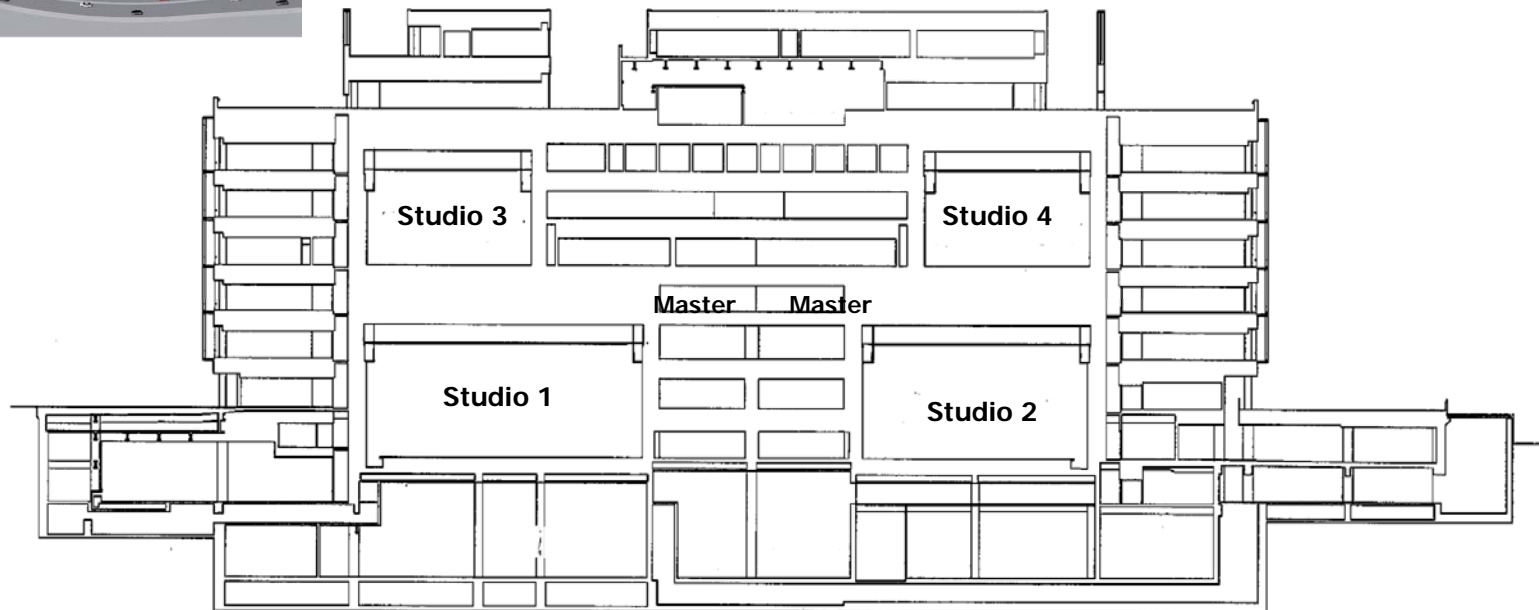
Private Power Generator: Gas Turbine PG. 3,500kVA 6.6kVx2

UPS: 1000KVAx2 Redundant operation

New building



tv asahi has installed full digital broadcasting systems for Analogue & Digital terrestrial television broadcasting at new building.



New building



Technical Design concept

1. Full HD-SDI & Full digital system
2. System total phase management
3. Distributed medium-scale matrix
4. One source-multi use

Digital signal interface

1. Digital HD

HD-SDI (1080i) BTA S-004B (SMPTE-292M)

Component serial digital

1080i/59.94Hz

2. Digital SD

SMPTE-259M (270Mbps)

Component serial digital

3. Embedded audio

SMPTE-299M

8ch:equivalent of AES/EBU 4pair/Fs48kHz/24bit

Master system



Requirements of Master System

□Multi format solution

rate-free matrix 1080i/720p/480p/480i

□Multi channel solution

up to a ceiling of three programs

□High reliability

three redundant systems

current/backup/test or maintenance

□High flexibility

Easy expansion and renovation

□Effective use of servers

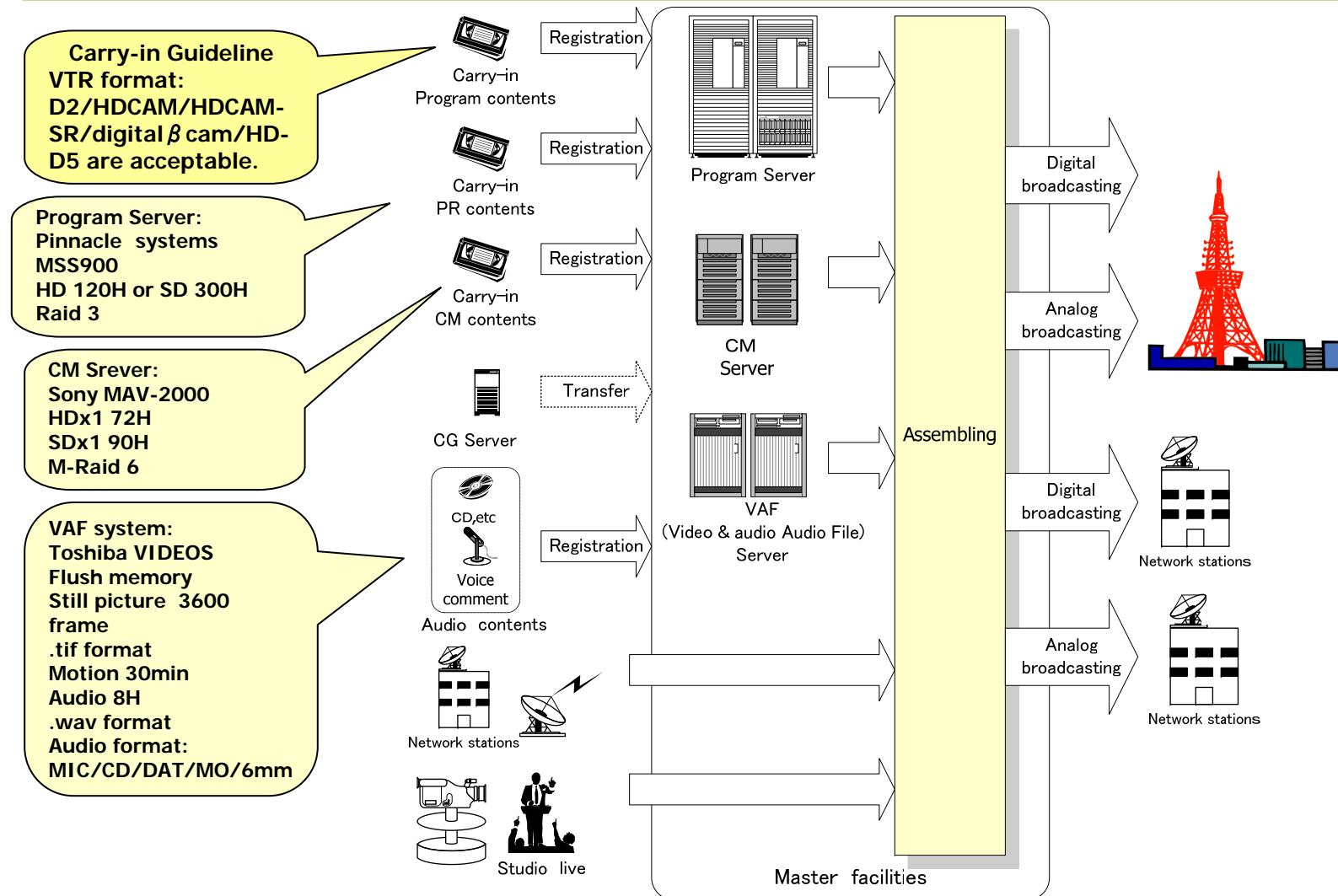
CM server/program server/CG server

Age Group	Percentage
18-24	15%
25-34	25%
35-44	30%
45-54	20%
55-64	10%
65-74	5%
75-84	2%
85+	1%

Segments: 1

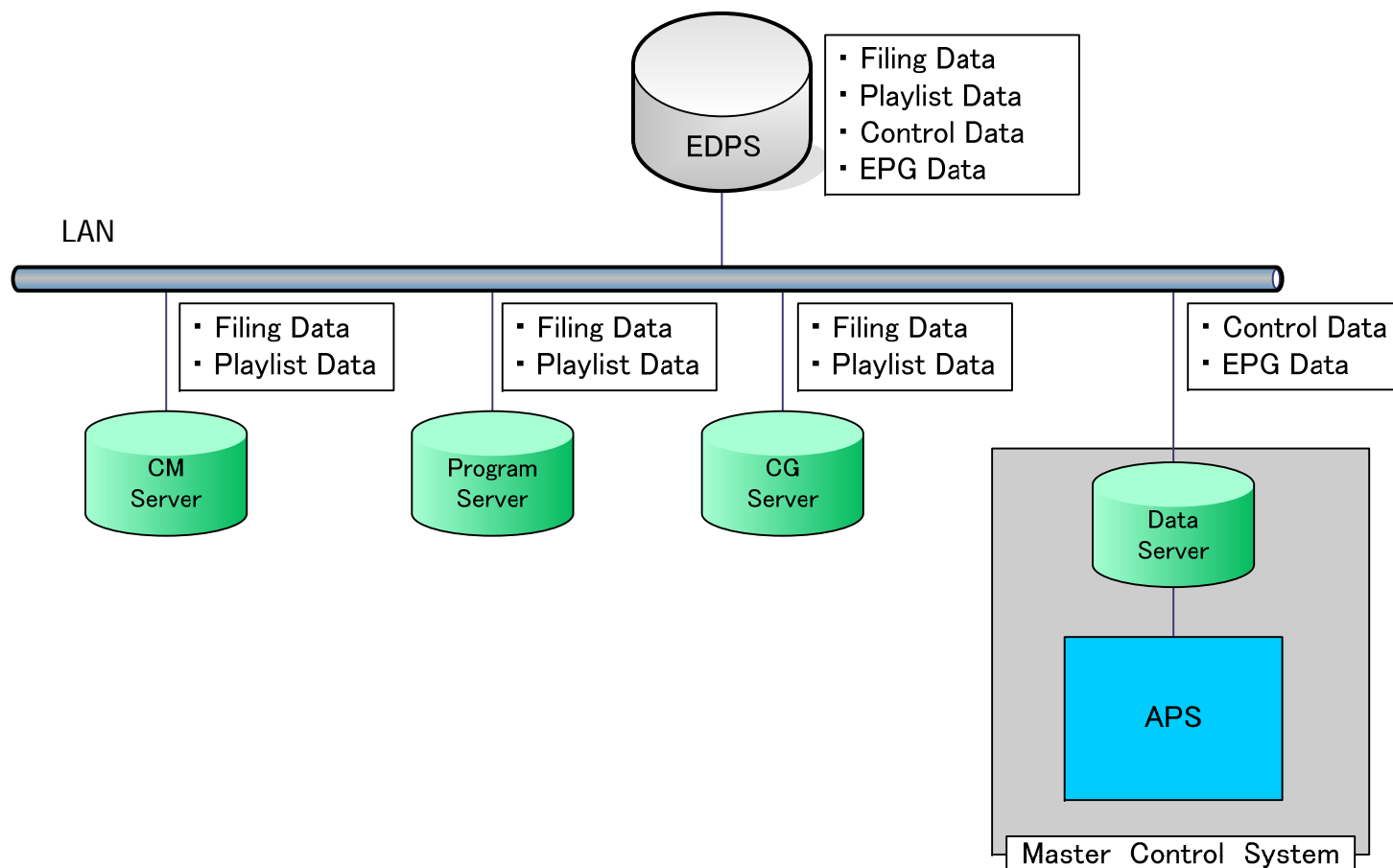


Conceptual diagram of Master



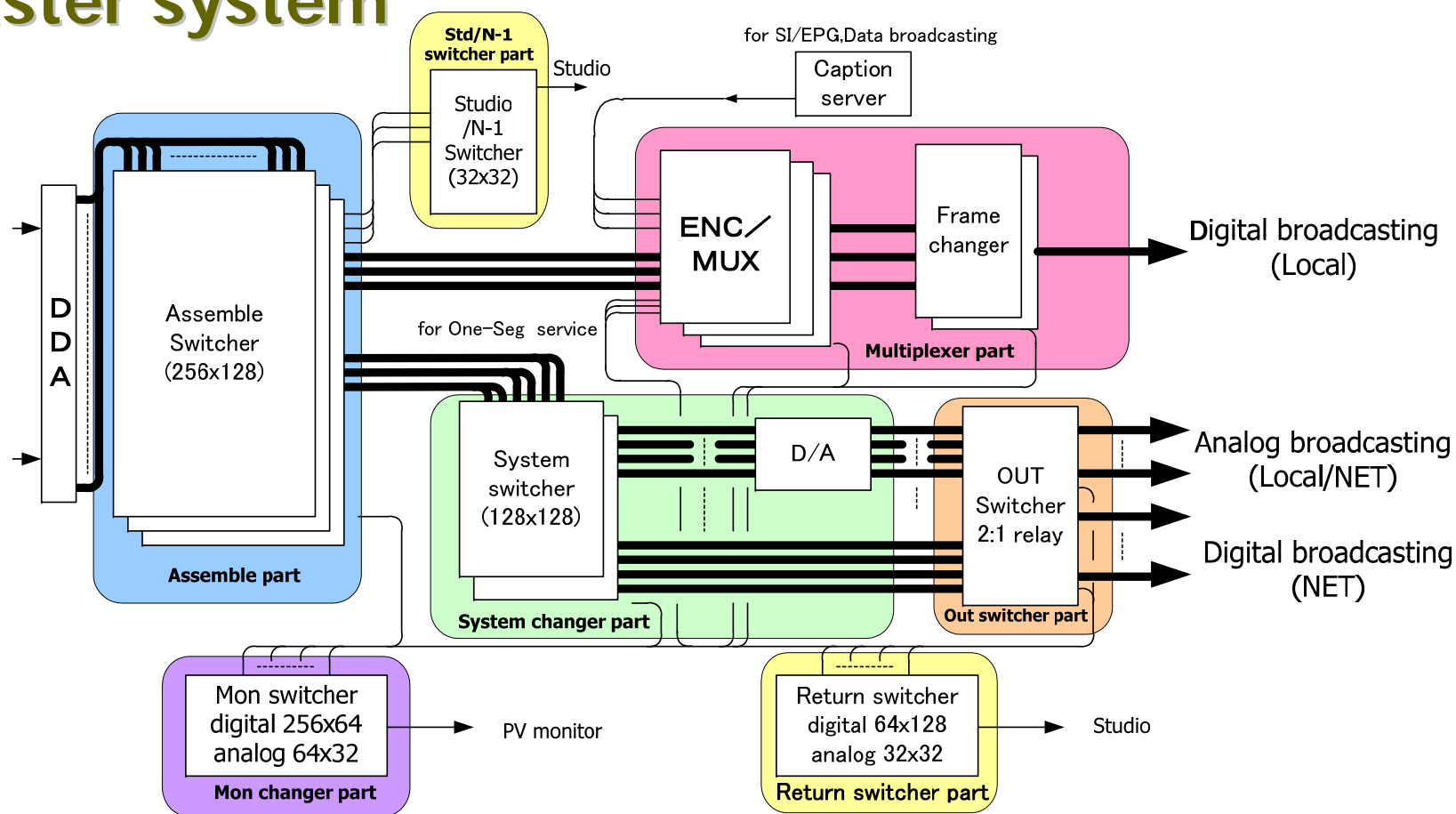
Conceptual diagram

EDPS (management of business & broadcasting data processing system) manages program and CM material data.



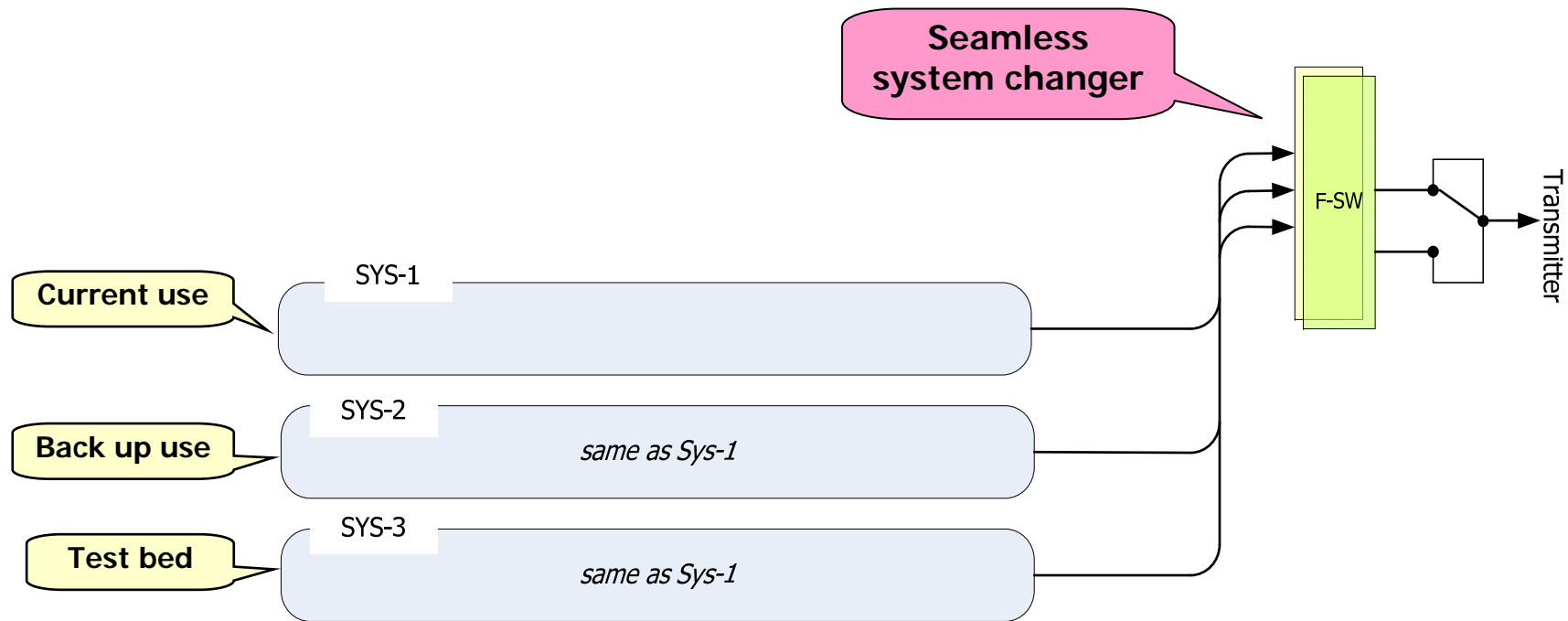
Conceptual diagram

Master system

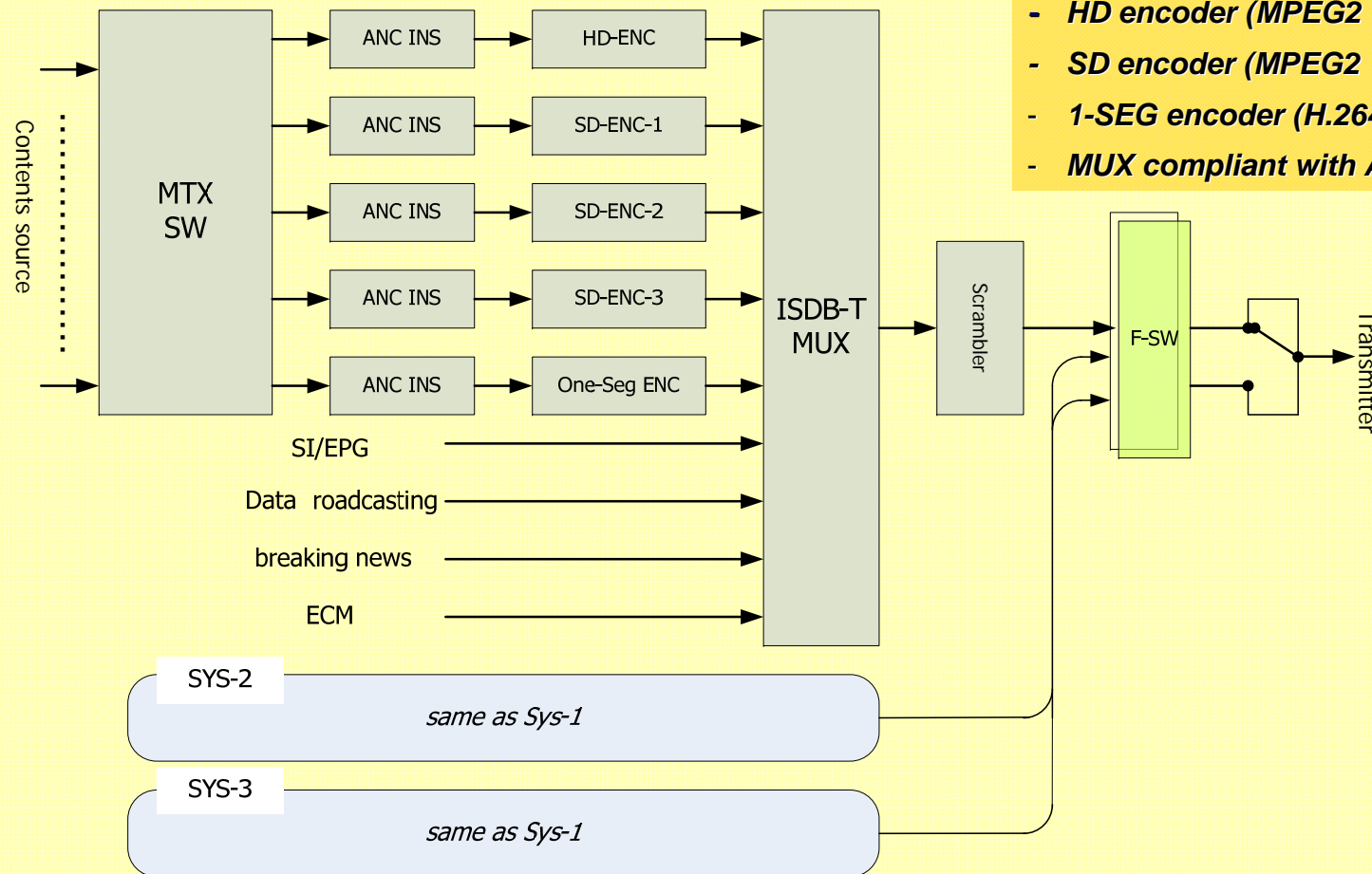


Three redundant system

Necessity of test environment

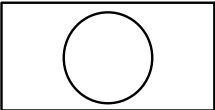
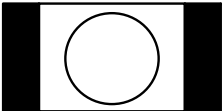
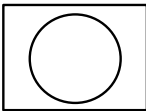
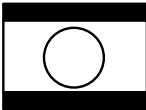


Encoder , MUX



Aspect ratio converter 1

Example of aspect converting

Input format			Output format		
Format	Aspect ratio	Sample picture	HD 1080i	Analog	
				no designation	designation
HD	16:9		No operation	D/C letter box	D/C side cut
	4:3		No operation	D/C side cut	no request
SD	4:3		U/C side panel	No operation	no request
	16:9		U/C vertical clearance	No operation	no request

Test environment is essential factor

Necessity of redundant system and test environment

In the digital broadcasting age, test environment is essential factor .

Because in contrast with analog signal performance , in TS signal performance, it is quite difficult to determine the reason of sudden failure.

Therefore redundant system is essential, in the case of sudden failure, system change from current to back up is single correct answer.

Furthermore, system 3 is utilized as test bed for verification of event ignition time.

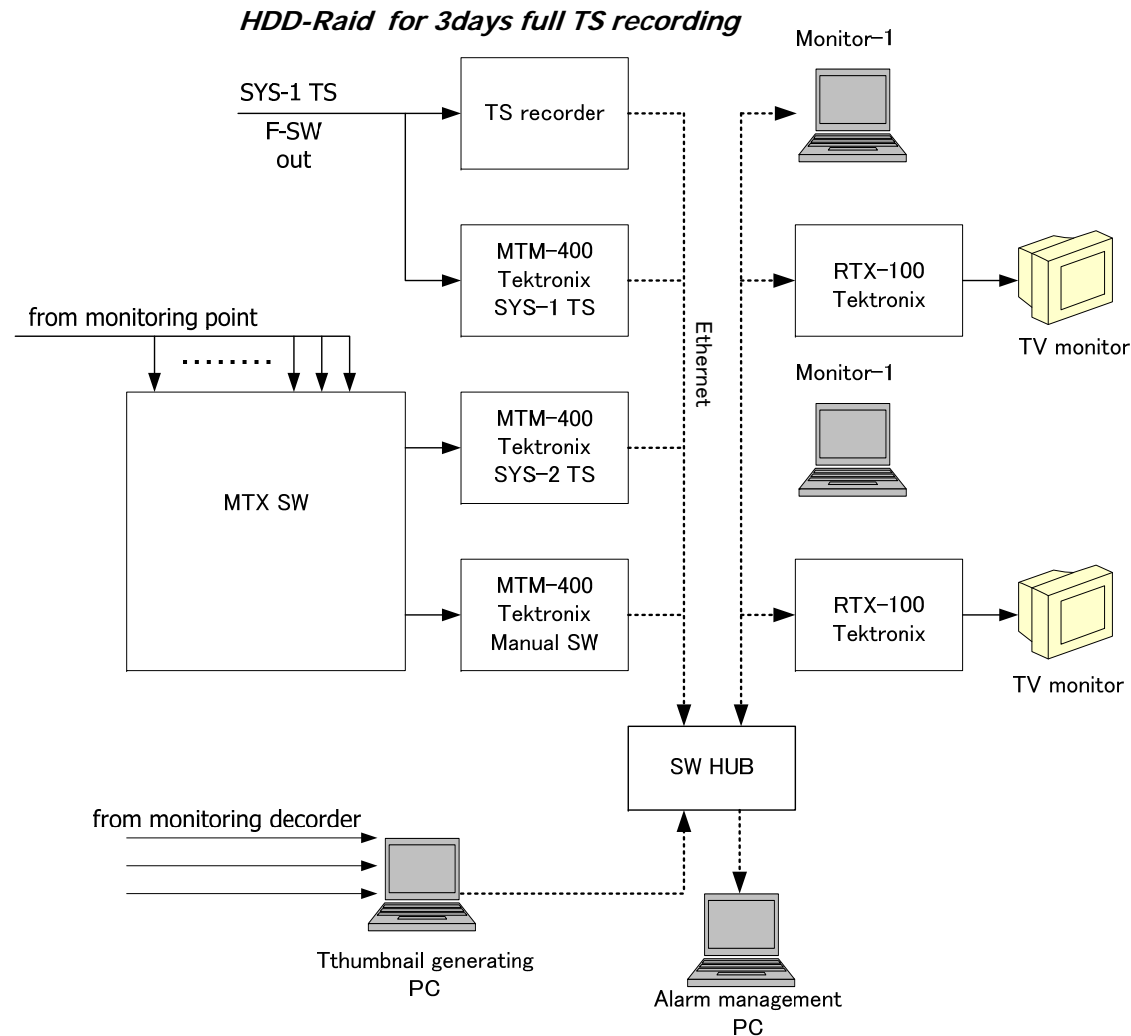
TS monitoring and recording system



MTM400



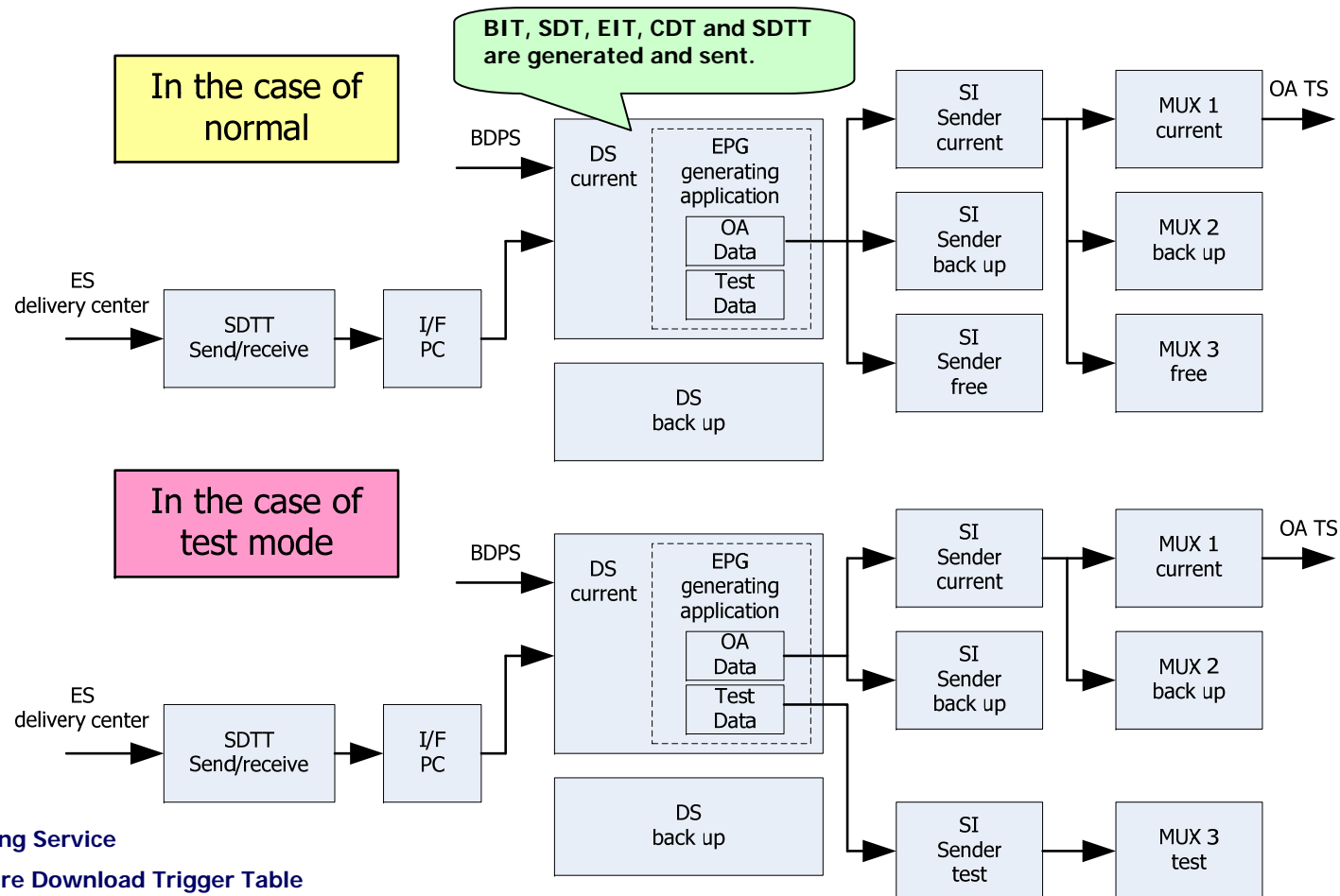
TS monitor



SI/EPG system

SI: Service Information

Various information designed to improve the convenience of program selection, specified by the ARIB standard.



STL



TV Asahi



Tokyo Tower

Microwave

For transmitting the television program from studio to transmission site, a transport stream studio-to-transmitter link (TS-STL) is primary used.

TS method is 64QAM modulated by ISDB-T format broadcasting TS signal.

This method gains the performance of less signal degradation.



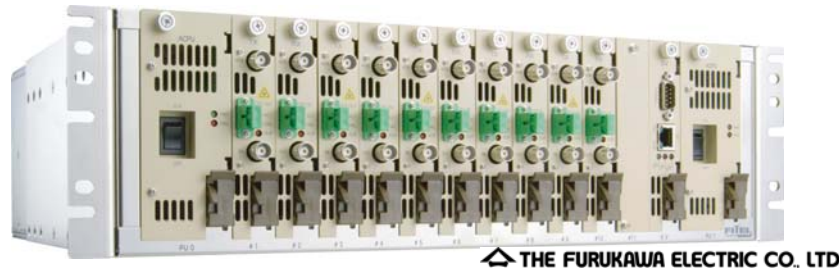
Transmitter power	0.5W/1W/2W
Frequency deviation	within $\pm 20\text{ppm}$
Occupied bandwidth	below 7.6MHz
Modulation method	64QAM
Transmission rate	below 40.2Mbps

Optical cable

STL via optical cable

Optical transmitter is available to transmit OFDM signal from studio to transmitter site via optical cable.

- 10-200MHz Bandwidth.
- QAM, PSK or OFDM signal transmission is available.
- Long haul transmission - Optical loss budget is 25dB.
- Fully manageable through Simple Network Management Protocol (SNMP).
- Having console port for setup and monitoring parameters.
- Web-GUI inside- Setup and monitoring parameters from usual Web-browser.



Requirement of SFN relay station

- *To implement SFN relay station, following requirement must be met in order to establish synchronism between station-to-station.*

- *IFFT sample frequency should be synchronized with the studio and the broadcasting station ,or among the broadcasting stations.*

- *Synchronized methods are as follows;*

1. Slave synchronization

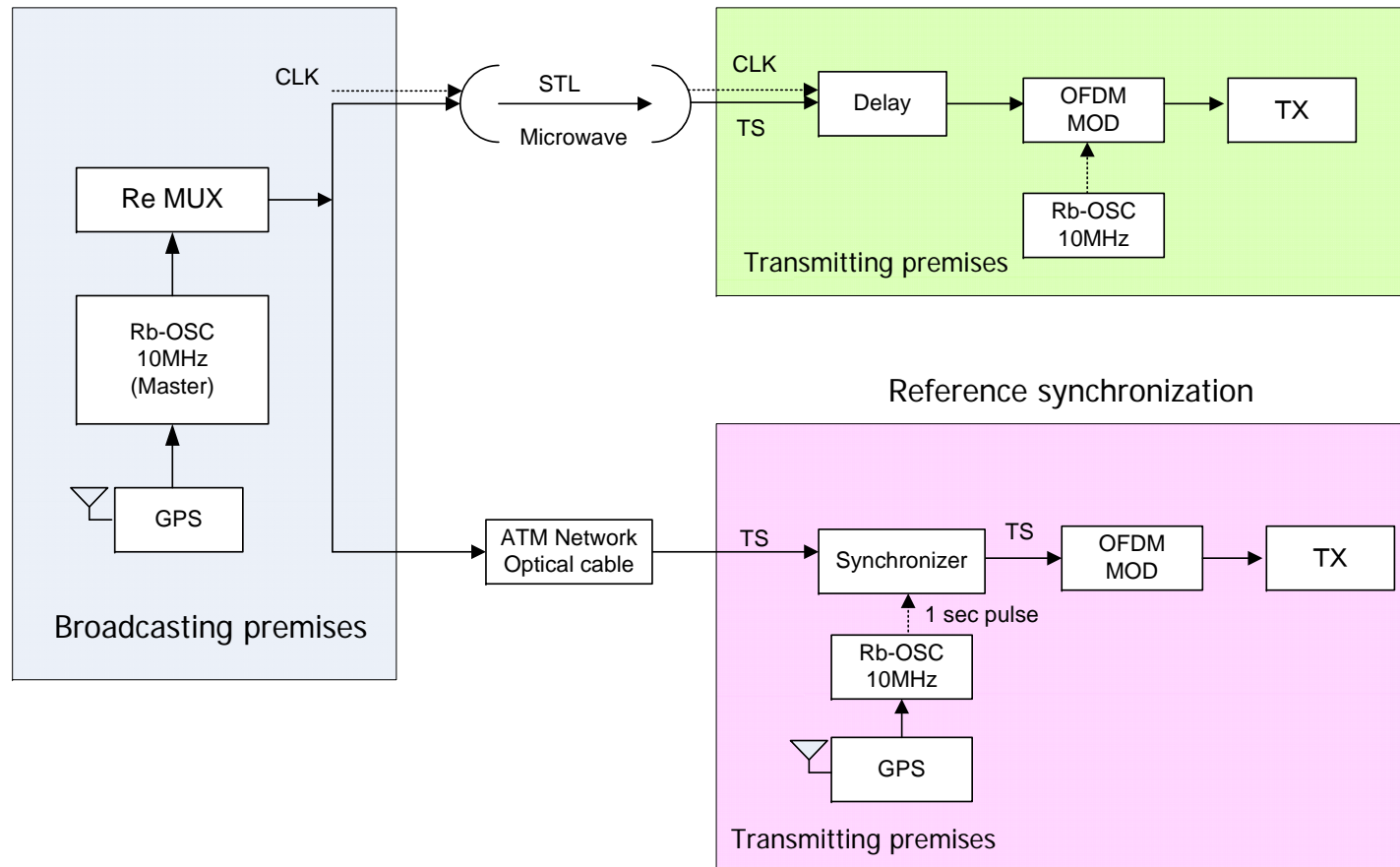
The clock of modulator in each transmitter is synchronized to the clock of MUX in studio.

2. Reference synchronization

This method synchronizes the studio and all the broadcasting stations by GPS other than the terrestrial digital broadcast wave.

Synchronized methods

Signal format: 204 byte broadcasting TS format





Transmission

Digital transmission

□ *Transmitters and antennas for digital terrestrial television broadcasting installed at Tokyo Tower in 2003.*



STL

Optic fiber line x2



backup STL

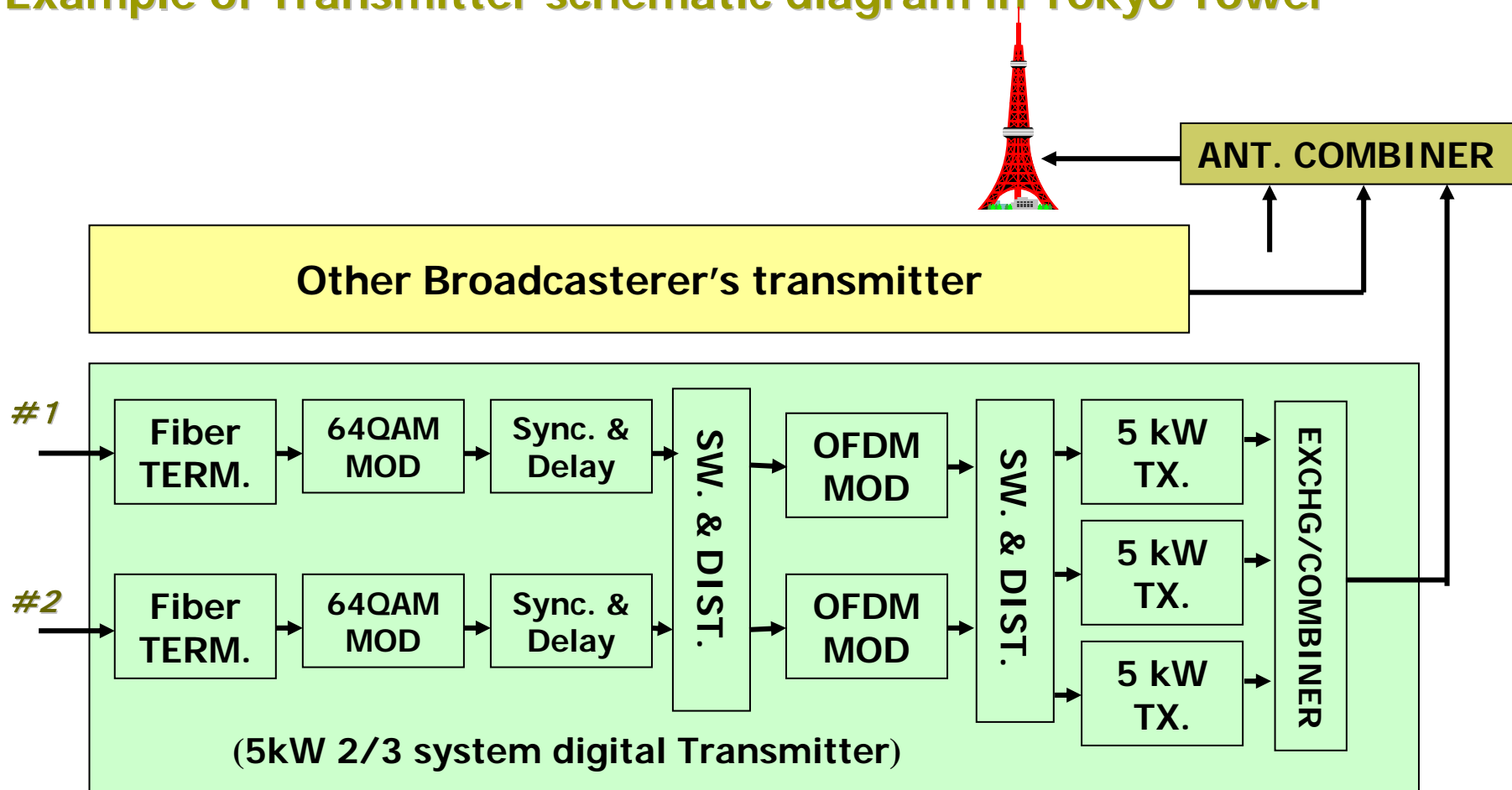


Micro wave



Digital transmitter system

Example of Transmitter schematic diagram in Tokyo Tower



Digital Transmitter system

- ❑ *Three 5kw transmitters for redundant operation.*
- ❑ *Output power is 10kW.*



TOSHIBA



NEC

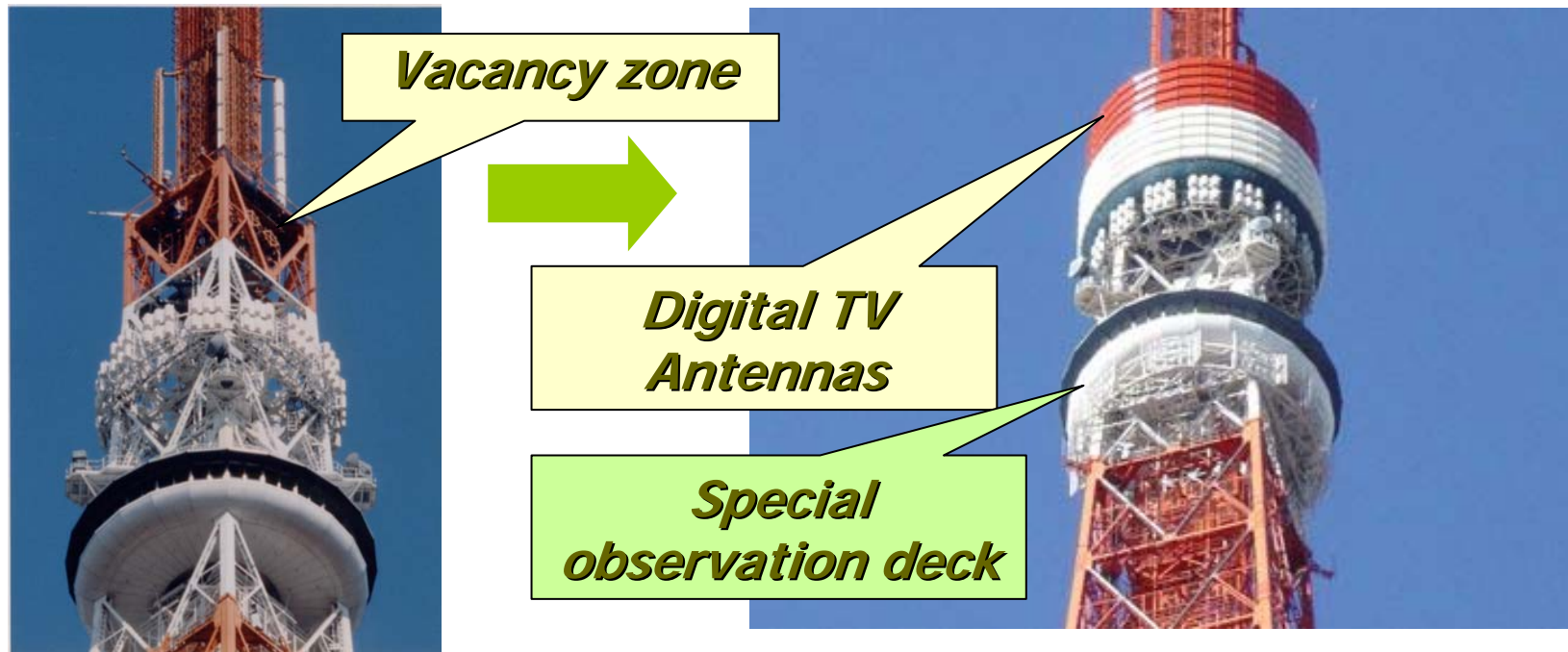
Antennas

A number of analogue TV antennas were already mounted on the ideal zone of Tokyo Tower .



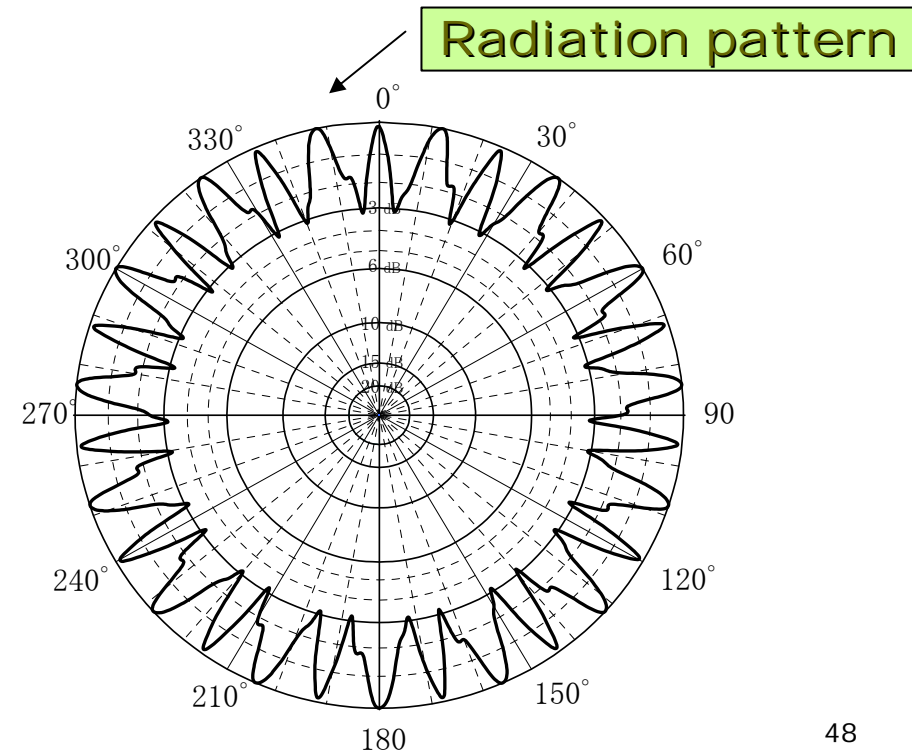
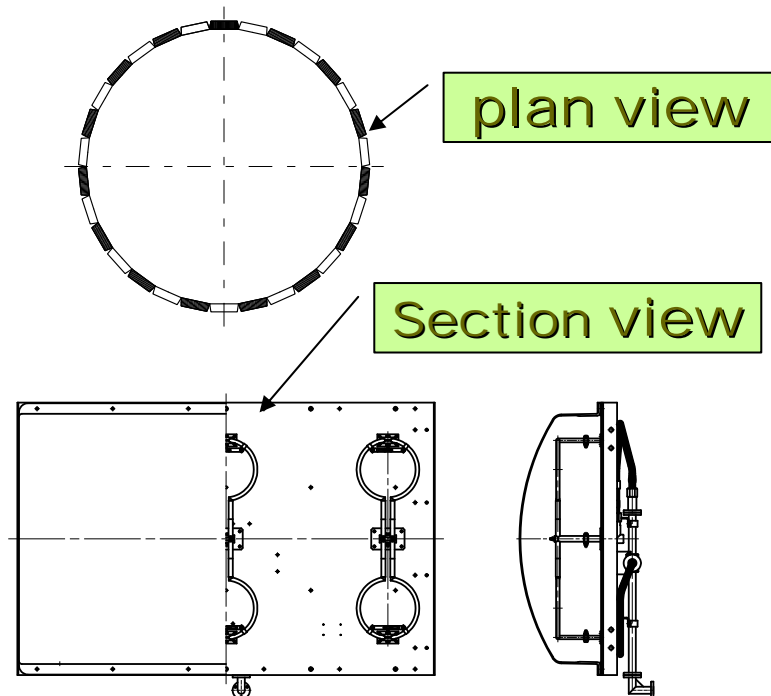
Antennas

- *Vacancy zone is around 250mH of Tokyo tower, There are no appropriate space except there. Digital antennas were designed, compact size, 6 meters in width and 12 meters in height.*



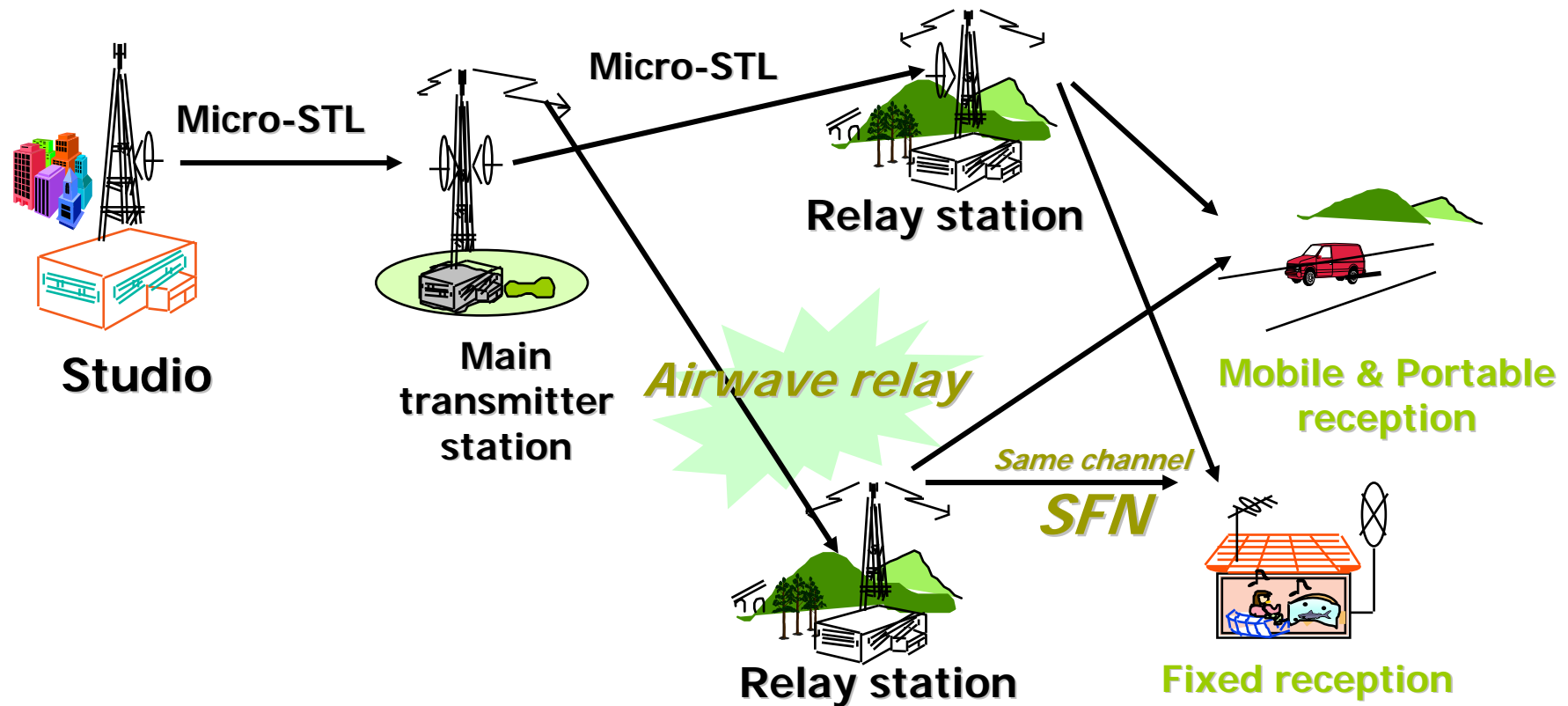
Antennas

□ *A beam pattern synthesis technology realized an omni directional radiation pattern in compact size.*



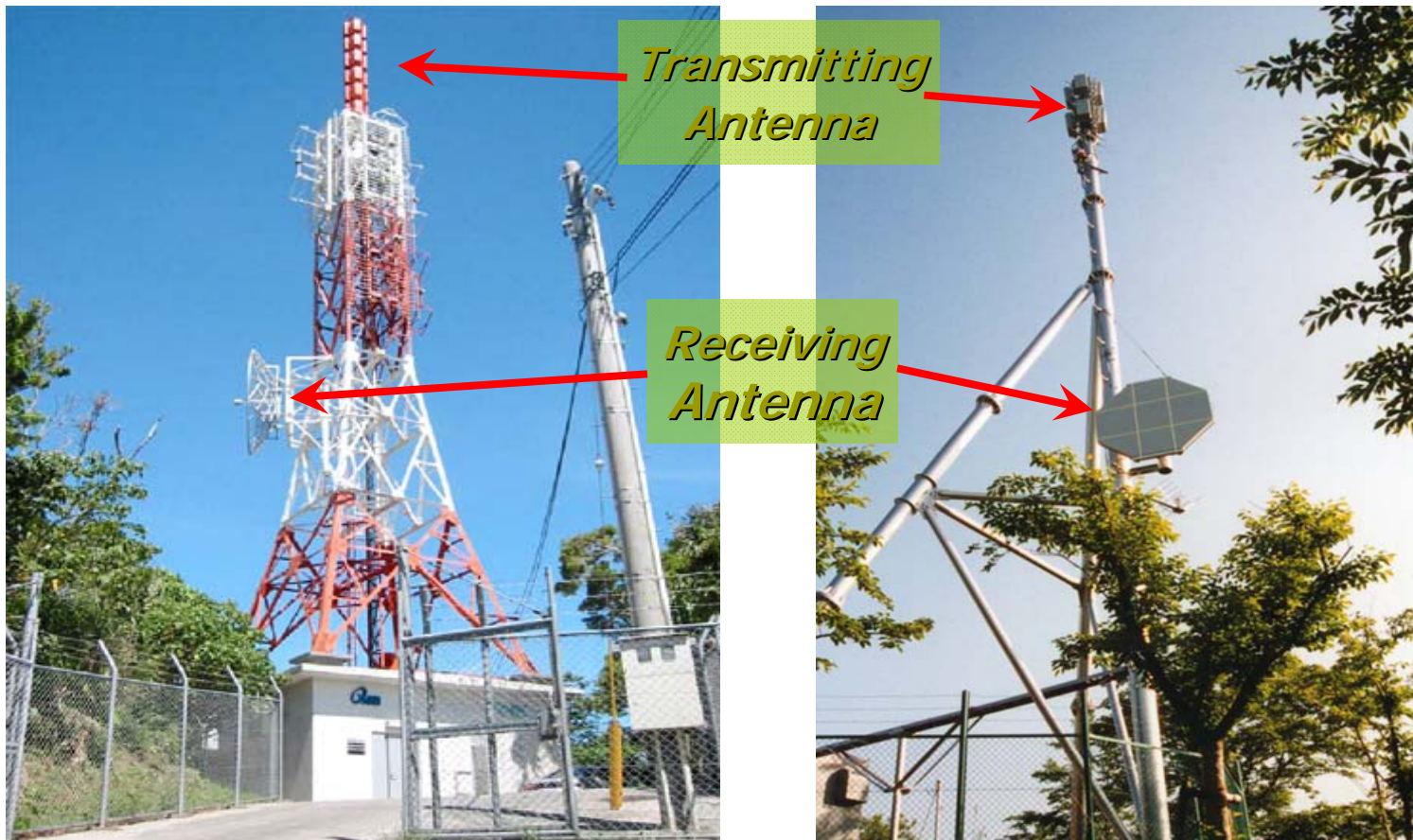
Transmission network chain

*To cover the service area all over the country,
Broadcasters have to construct many relay stations.*



Relay station

Airwave relay station



ISDB-T, the Future of Digital Television in the Philippines



*Thank you
for your attention !
END*

*Digital Broadcasting Expert Group
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