ITU-T Workshop on
Bridging the Standardization Gap
and Interactive Training Session

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Implementation of DTT System Software Upgrade & Terrestrial 3DTV Trial Service in Korea

SeongTae Kim
Manager
Office of New Media Platform
New Media & Technology Division

International Telecommunication Union

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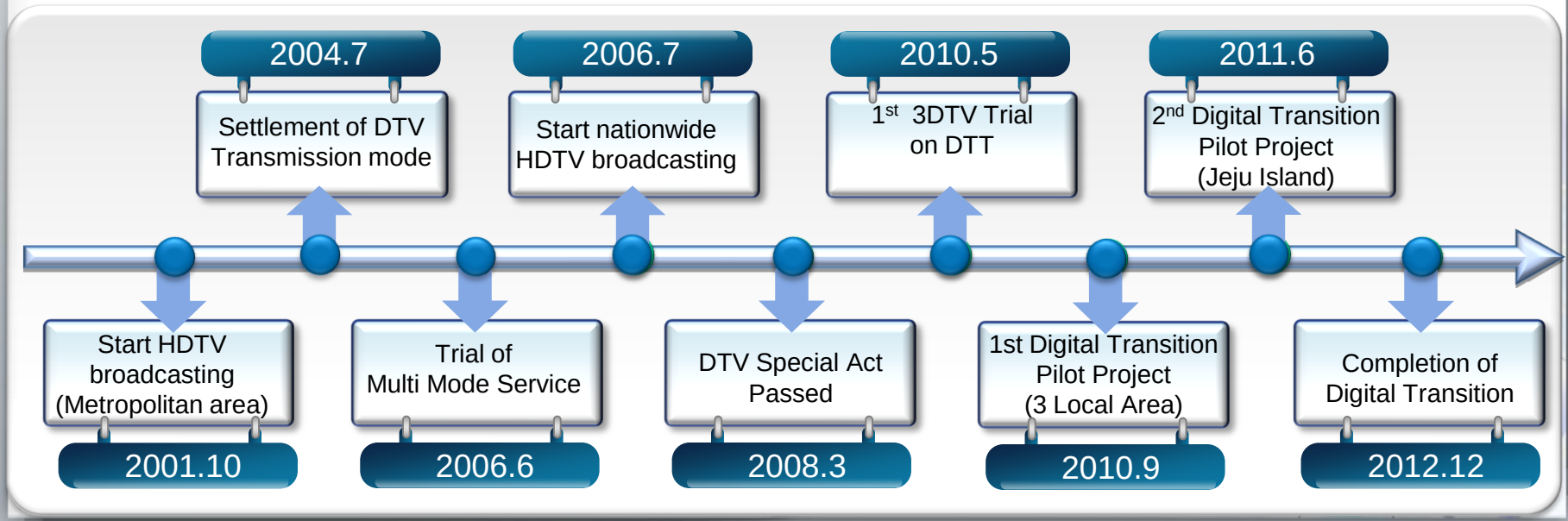
  - Terrestrial 3DTV Trial Service
  - Plans for Terrestrial 3D HDTV Trial Service

Digital Terrestrial Broadcast in Korea

- In 2001, started HDTV
- In 2006, Multicasting(Multi Mode Service) Trial Service
- In 2010, 3DTV Trial Service
- In 2012, Complete Digital Transition



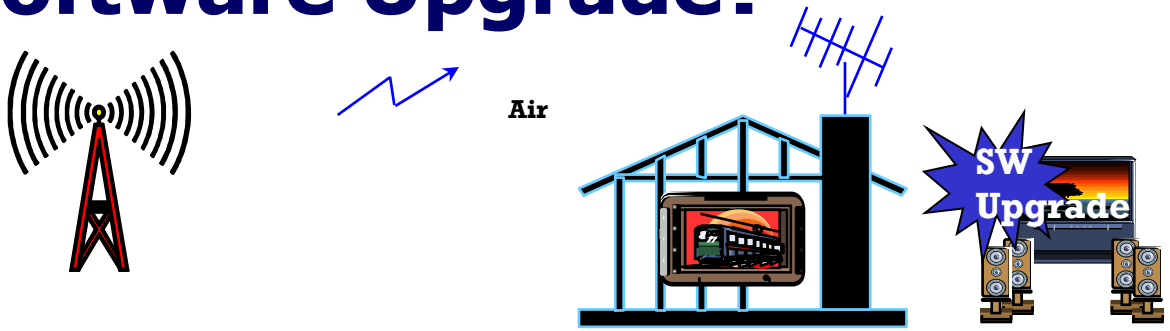
System Software Upgrade Standards I

- **DVB SSU(System Software Update)**
  - Simple Profile
    - Based on ETSI standard TS102 006
  - Enhanced Profile
    - Also based on ETSI standard TS102 006, includes simple profile.
    - Additional usage of UNT (Update Notification table).
    - Receivers get SSU-schedule information before real update.
- **UK OAD(over the air download)**
  - Developed before DVB-SSU specification was final
  - Software upgrade mechanism is in use until now in UK.
  - UK is migrating to DVB-SSU due to trouble of too many models in market

System Software Upgrade Standards II

- **NorDig Unified Receiver specification**
  - Nordig Members developed there own specification reffered to as “bootloading” when DVB-SSU standard did not exist at the time
- **Proprietary Update Systems**
  - Various private data formats are known.
  - Not recommended because of :
    - Possibly bad side effects on other receivers in market
- **ATSC A/97 SDDS(Software Download Data Service)**
  - ATSC Standard : a data service that may be used to download software to a terminal device using an MPEG-2 Transport Stream via an appropriate physical layer

What is the Terrestrial System Software Upgrade?



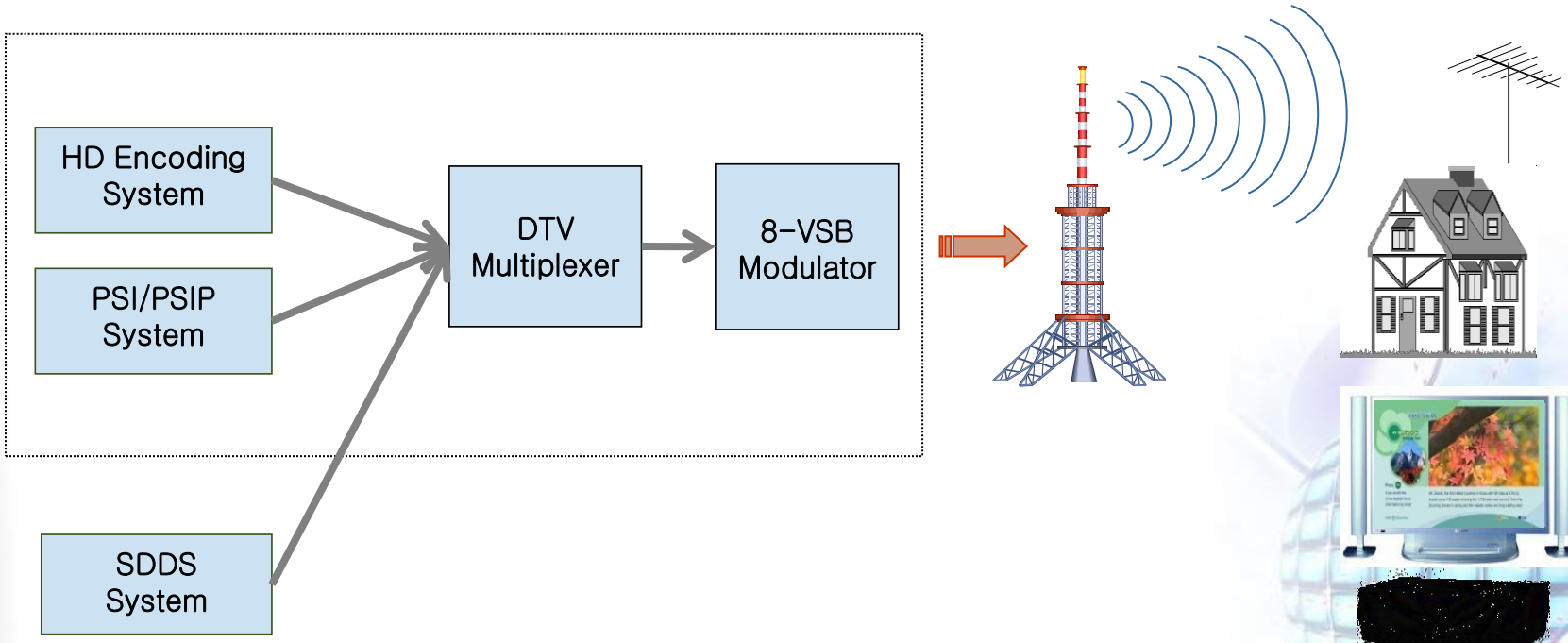
- using the DTT Network for DTT Receivers
- to update and upgrade of firmware, operating system software, device driver software, native application software, middleware and other types of software residing in devices, such as consumer DTV receivers
- to allow receiver manufacturers to dynamically upgrade their products in the field.

Benefits of System Software Upgrade?

- **For CE Manufacturers**
  - eliminate the need for an expensive product recall
  - chance for manufacturers to update receivers in case of emergency
- **For Broadcasters(also Network Operators in Korea)**
  - easy to launch new services
  - chance for broadcasters to add new features
  - eliminate the blocks to launch new services because of legacy product
- **For Viewers**
  - benefit from new service offerings and functionality
  - can fix their products automatically

ATSC A/97 SDDS

- **ATSC standards to download software using ATSC MPEG-2 Transport Stream.**



DTV System

Upgrading DTT Receivers

SDDS Specifications

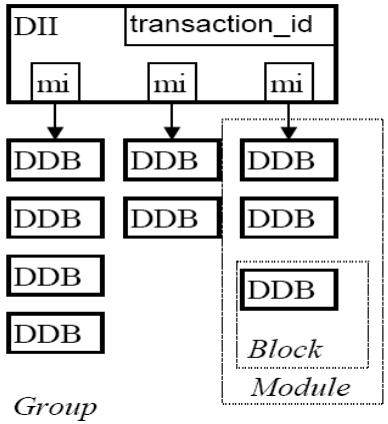
- **Based on the 2-layer download carousel scenario covered in the A/90 Data Broadcast standard, which was derived from ISO DSM-CC**
- **Top level signaling is accomplished by a new service type (0X05) in the Virtual Channel Table(VCT).**
- **Stream Type : 0x0B**
- **SDDS is signaled and contained within a special "virtual channel"**
  - KBS2 7-99(hidden, hide guide Channel)
  - Not to be shown to Viewers

SDDS technology

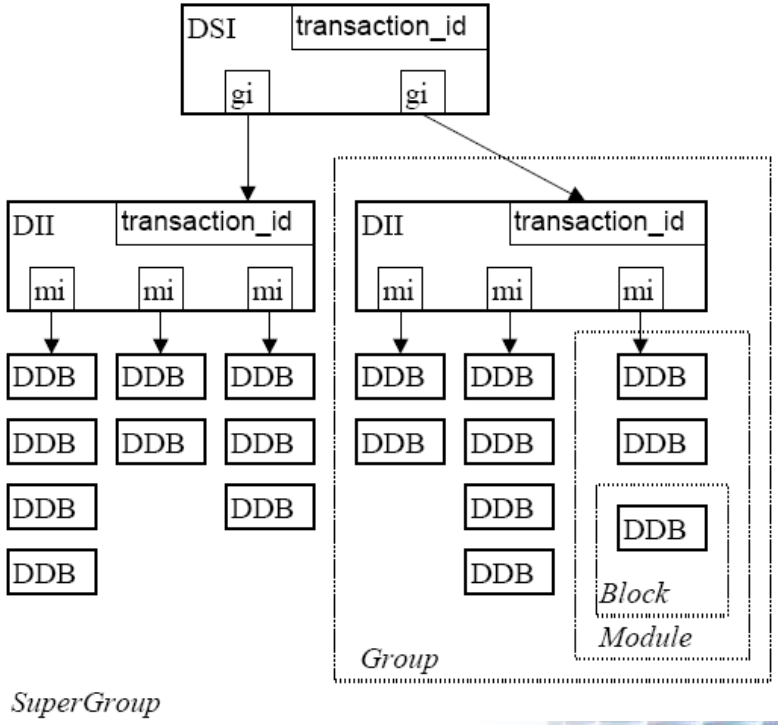
- **Announcement**
  - the signaling of future times for the download
- **Signaling**
  - the indication of what is being carried in the transport "now"
- **Encapsulation**
  - the binding of the download payload to the transport

Protocol of SDDS Download

2-Layer Download Carousal



1-layer Data Carousel



2-layer Data Carousel

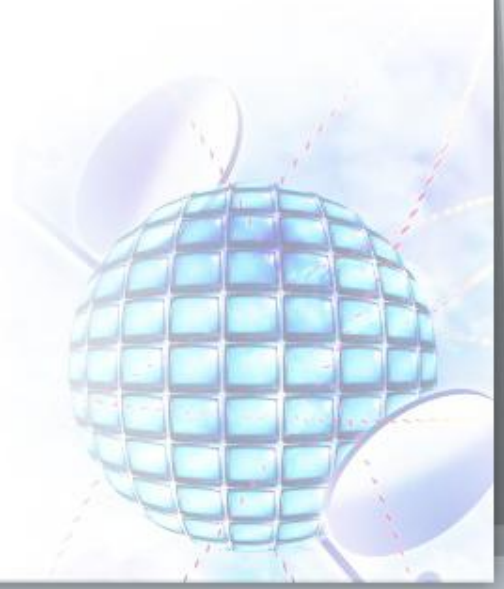
DSI: DownloadServerInitiate
gi: GroupInfoBytes
DII: DownloadInfoIndication
mi: ModuleInfoBytes
DDB: DownloadDataBlock
→: Location reference (transaction_id)

SDDS Service Scenario

- **Scenario 1:** A carousel broadcasts modules targeting a single device
  - Typically used in an environment where there is no aggregator and a single manufacturer is creating a carousel to support only one hardware/software model.
  - The carousel targets a single hardware/software version at a time.
  - Additional hardware/software versions would be supported by terminating the carousel and restarting with new announcement, signaling, and data.
  - This is the simplest model.
- **Scenario 2:** A carousel broadcasts modules targeting a multiple devices
  - Typically used in an environment where there is an aggregator supporting multiple manufacturers or where a single manufacturer would like to support multiple hardware/software versions on a single carousel.
  - The carousel targets multiple hardware/software versions at a time.
  - Announcements are a critical part of the functionality of this scenario.

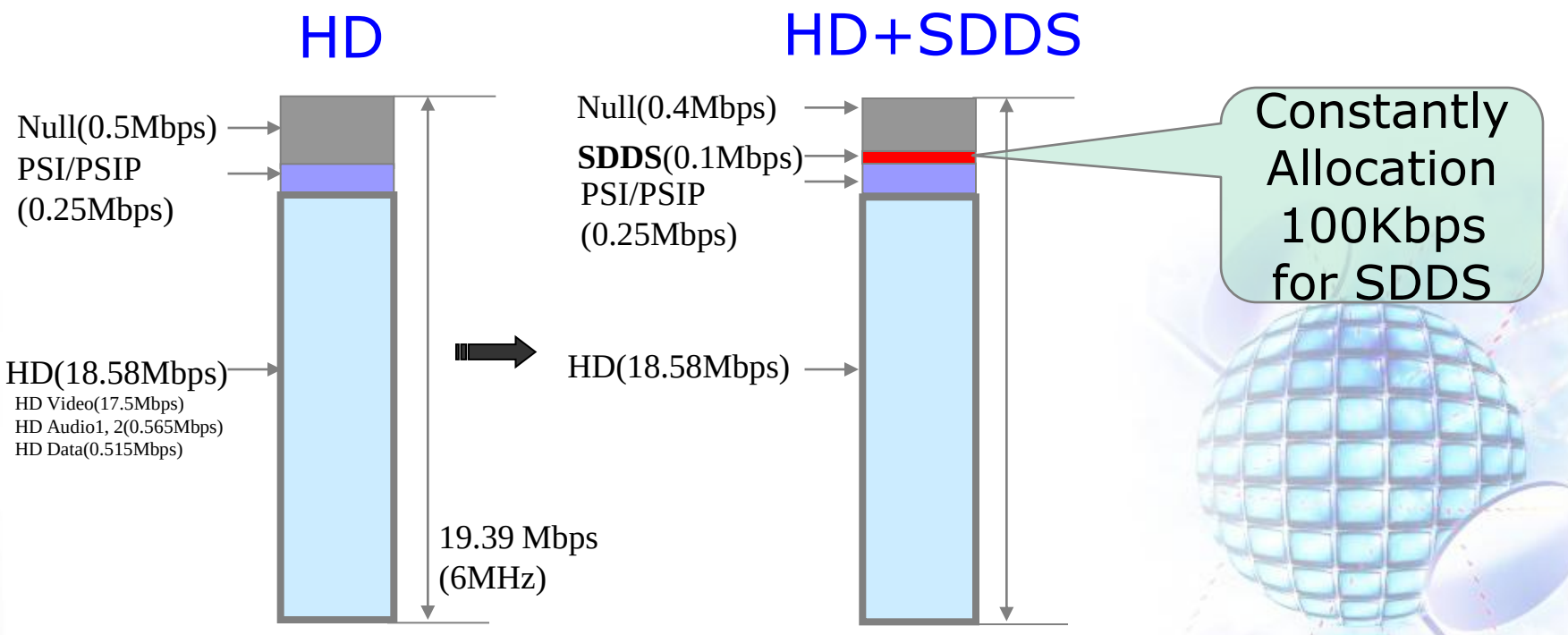
SDDS Service Scenario

- **Scenario 3** : Multiple Carousels
  - Typically used in an environment where there is a combination of aggregators and/or individual manufacturers all creating carousels for a single transport.
  - Each virtual channel may contain carousel(s) of Scenario 1 or Scenario 2.
  - Multiple Virtual Channels containing carousels for software downloads may exist on a single transport



SDDS Bandwidth Allocation

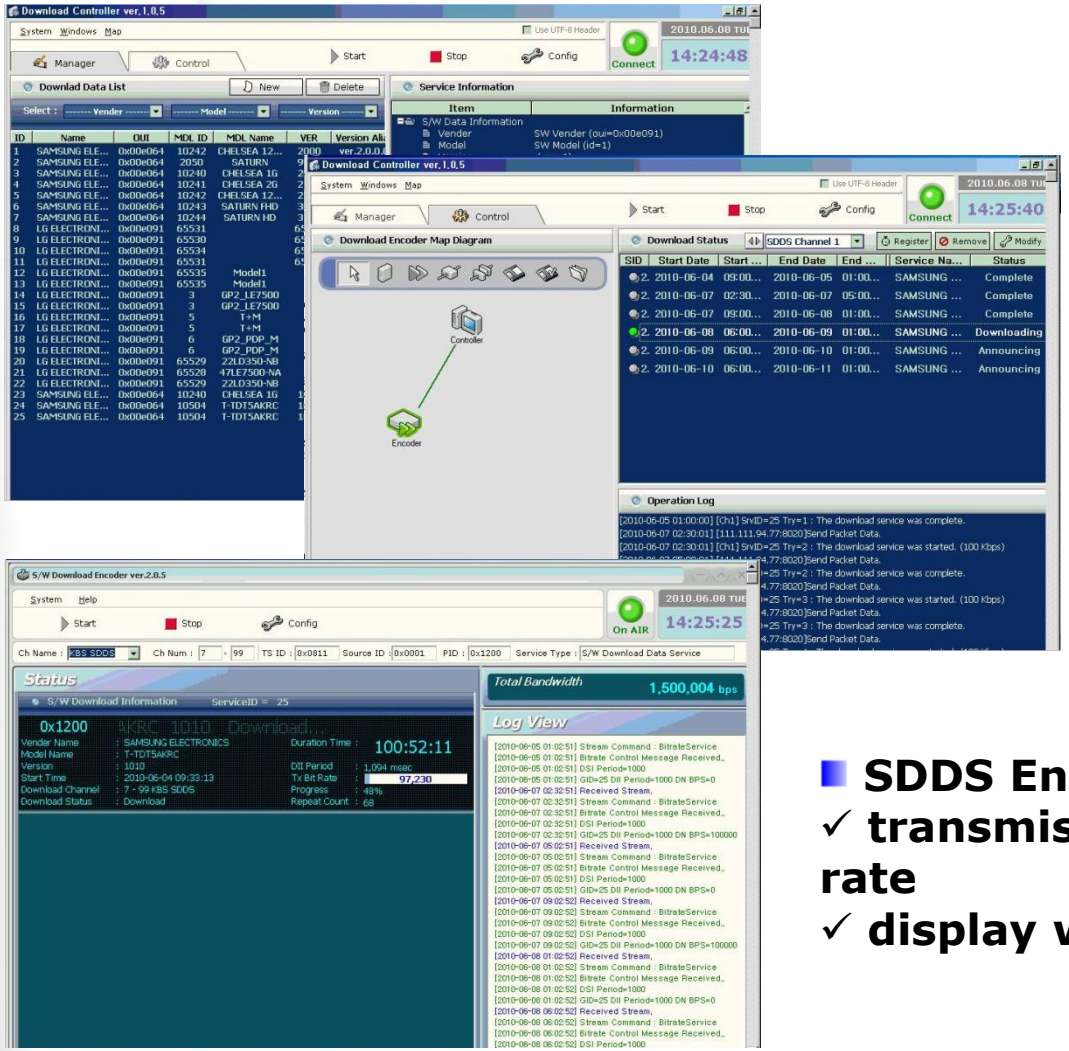
- **A various of bandwidth allocation for System Software Upgrade**
  - ➢ 20Kbps for France, 200Kbps for Sweden
- **allocate100Kbps for SDDS in Korea**



Test Facility

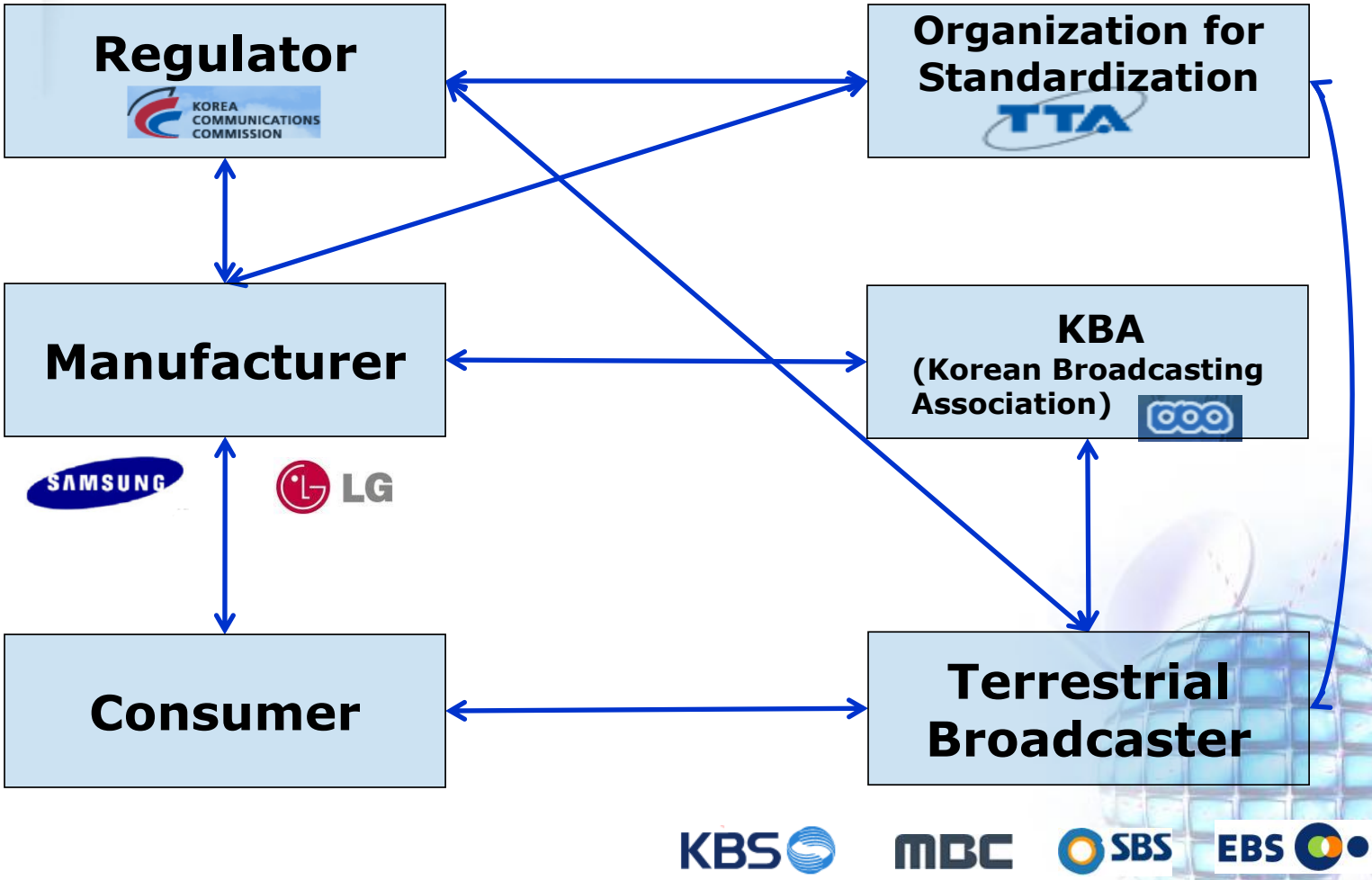
- Test facility at KBS in Korea
- Take a test when manufacturers develop new models
- Certification is not yet settled in Korea
- Use same circumstances with real transmission facility

Transmission Facilities



- **SDDS Controller(Manager)**
  - ✓ registration of software
    - vender, model, version
    - data file, H/W descriptor, S/W descriptor
- **SDDS Controller(Control)**
  - ✓ registration of download schedule
    - select the data and register the schedule
- **SDDS Encoder**
  - ✓ transmission of data with a fixed bit rate
  - ✓ display which data is transmitted

SDDS Eco System in Korea



Recommendation for System Software Upgrade Service

- **Adopt standard for System Software Upgrade**
- **Build up relationship between broadcasters, regulator and manufacturers**
  - **Agreement is Essential**
- **Find a solution to nationalize with a low cost**

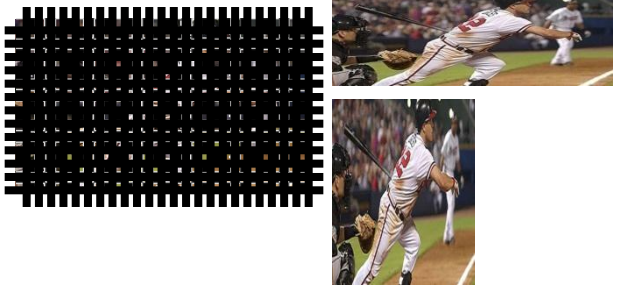
Terrestrial 3DTV Trial Service

- 3DTV Delivering Technology
- First Terrestrial 3DTV Trial Service in Korea
- Plans for Terrestrial 3D HDTV Trial Service in Korea

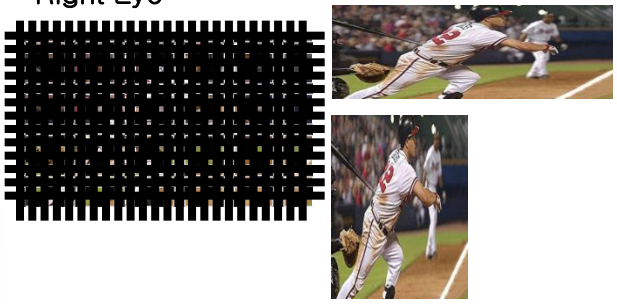
3DTV Delivering Technology

SPATIAL COMPRESSION

Left Eye



Right Eye



Top & Bottom

Left Eye

Side-by-Side

Right Eye

Line Interleave

Column Interleave

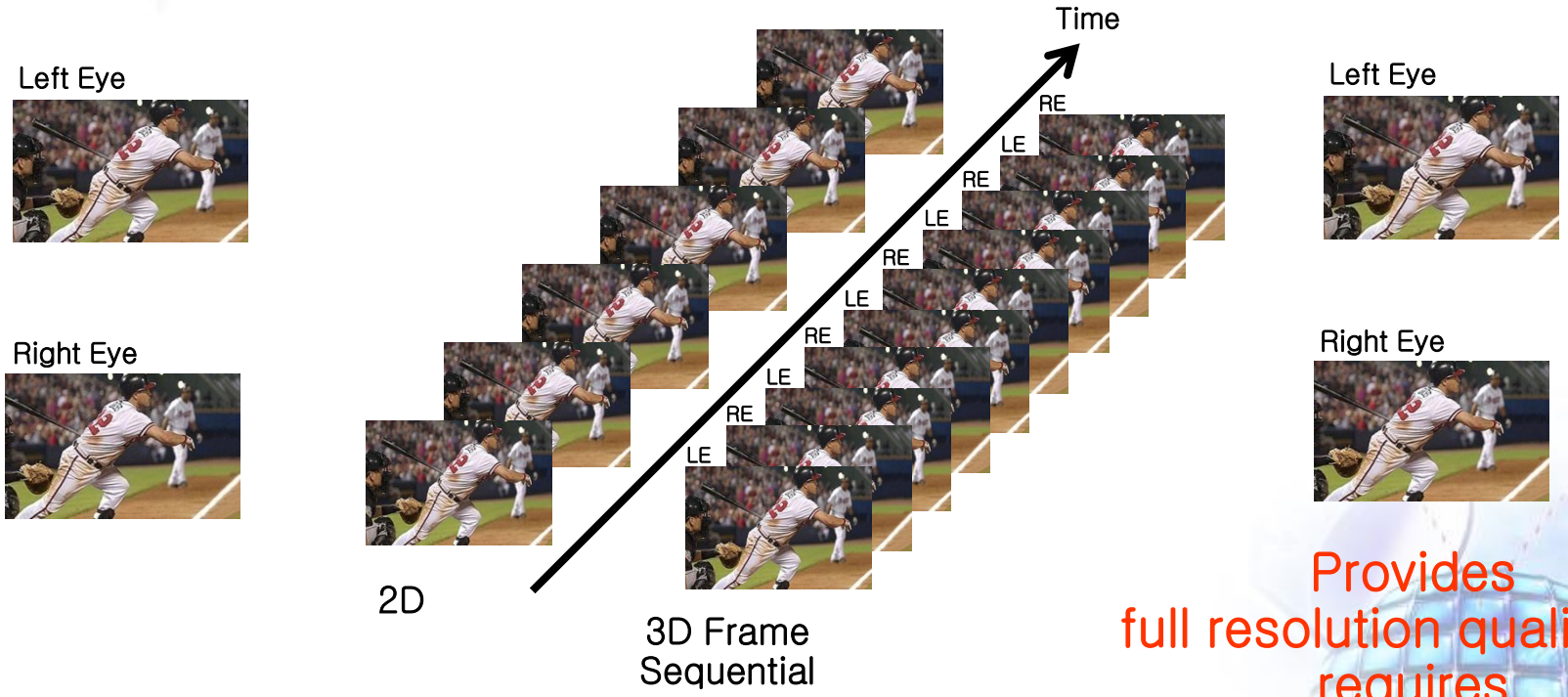
Checkerboard

Provides legacy channel compatibility but reduced picture resolution!

Source : ATSC Annual Meeting 2009

3DTV Delivering Technology

TEMPORAL COMPRESSION

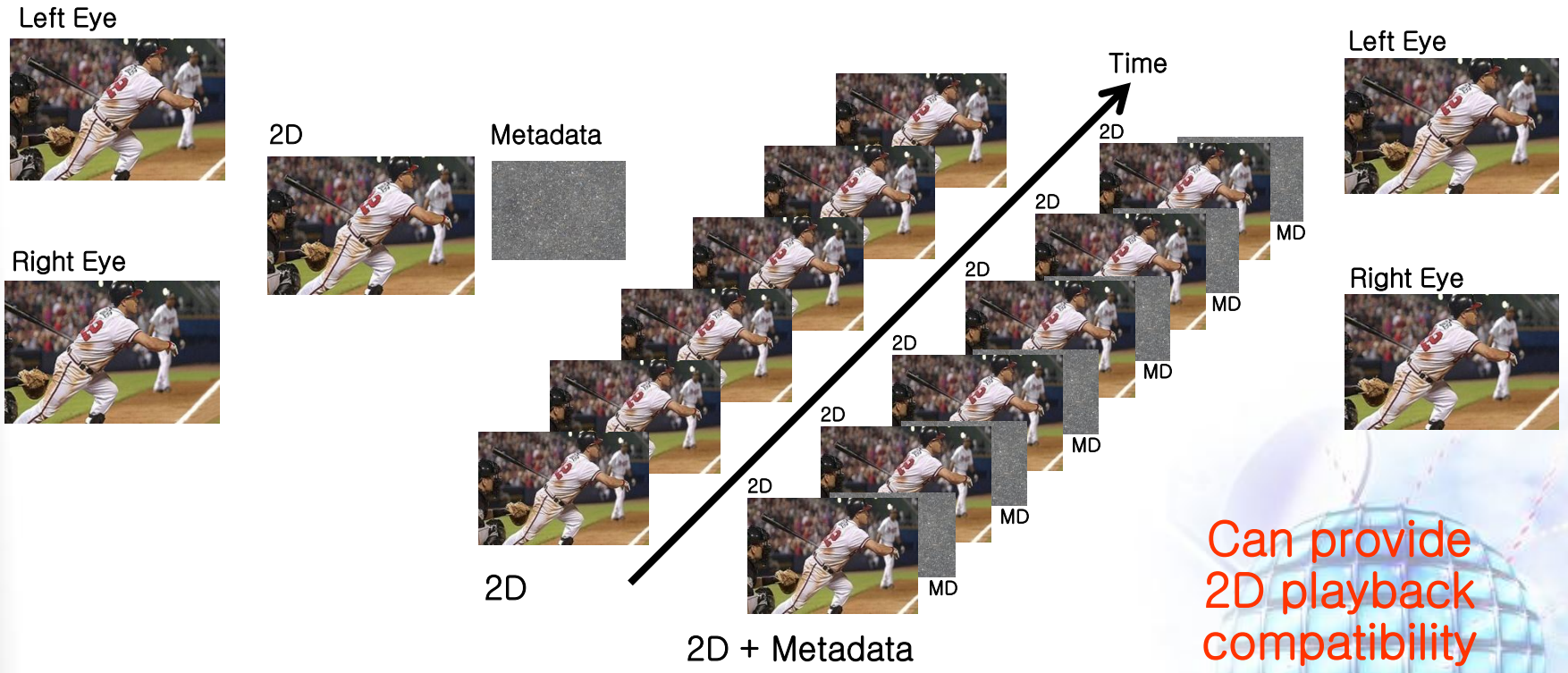


Provides
full resolution quality but
requires
increased channel
bandwidth and storage!

Source : ATSC Annual Meeting 2009

3DTV Delivering Technology

2D + METADATA



Can provide
2D playback
compatibility
in legacy devices!

Source : ATSC Annual Meeting 2009

3DTV Delivering Technology

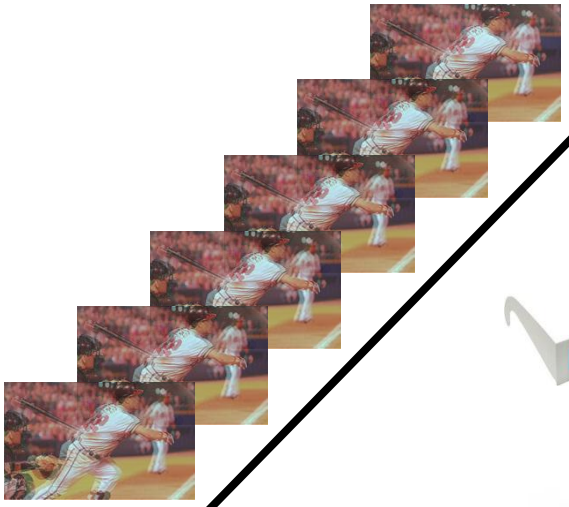
CORLOR CODING

Left Eye

Right Eye

Left Eye

Right Eye



Provides channel compatibility but with a less than compelling 3D experience!

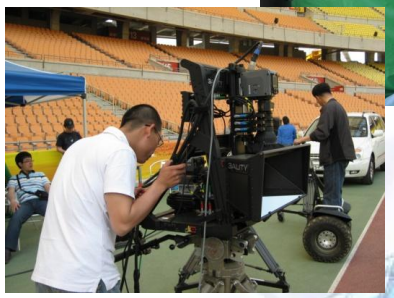
Source : ATSC Annual Meeting 2009

Terrestrial 3DTV Trial Service in Korea

- **World's first terrestrial 3DTV trial service by KBS on May 19th, 2010**
  - IAAF World Pre-Championship Meeting
  - FIFA2010 World Cup Game on June 2010

Terrestrial 3DTV Trial Service in Korea

- **Production(IAAF World Pre-Championship Meeting)**
  - Facilities : 3D stereoscopic cameras (KBS 1, 3ality 3, redrover 1)
  - Specialist : 12 Stereographer
  - Production mode : Side-by-side
  - Live broadcast

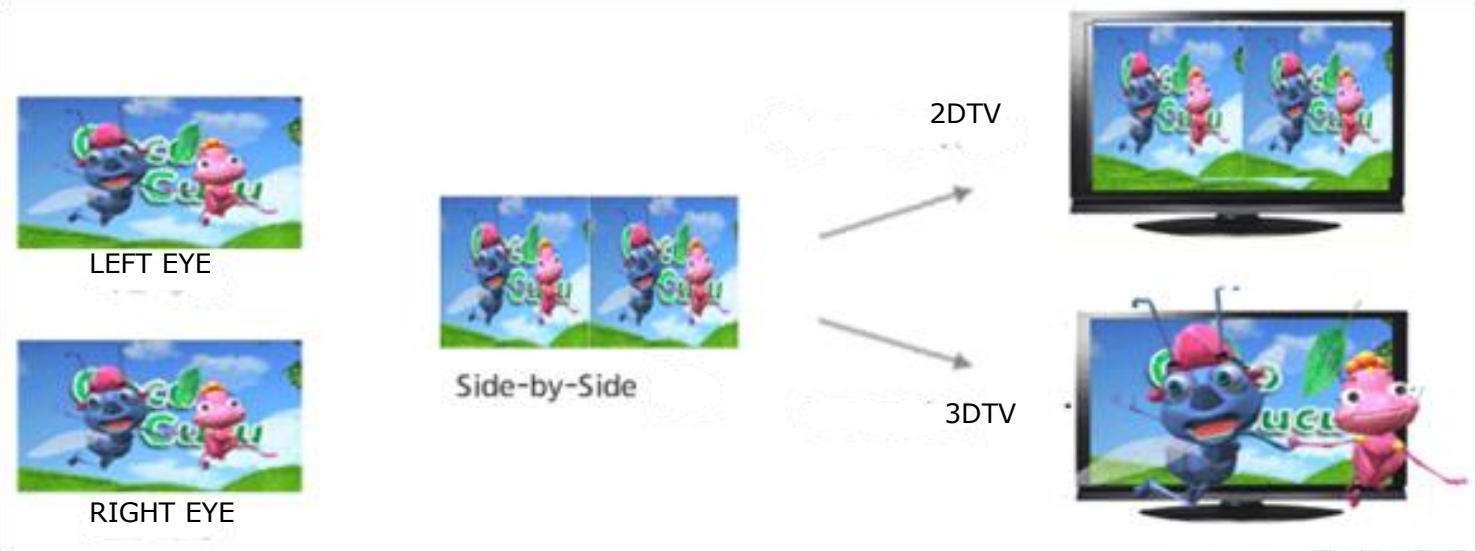


Terrestrial 3DTV Trial Service in Korea

- **Schedule of 3DTV broadcast**
  - May 20th – June 10th : every day 3 hours
    - 7:00 pm – 10:00 pm
    - Begin on May 19th with IAAF World Pre-Championship Meeting
  - June 11th – July 12th : every day 19 hours
    - 6:00 am – 1:00 am
    - During 2010 FIFA World Cup Game

Terrestrial 3DTV Trial Service in Korea

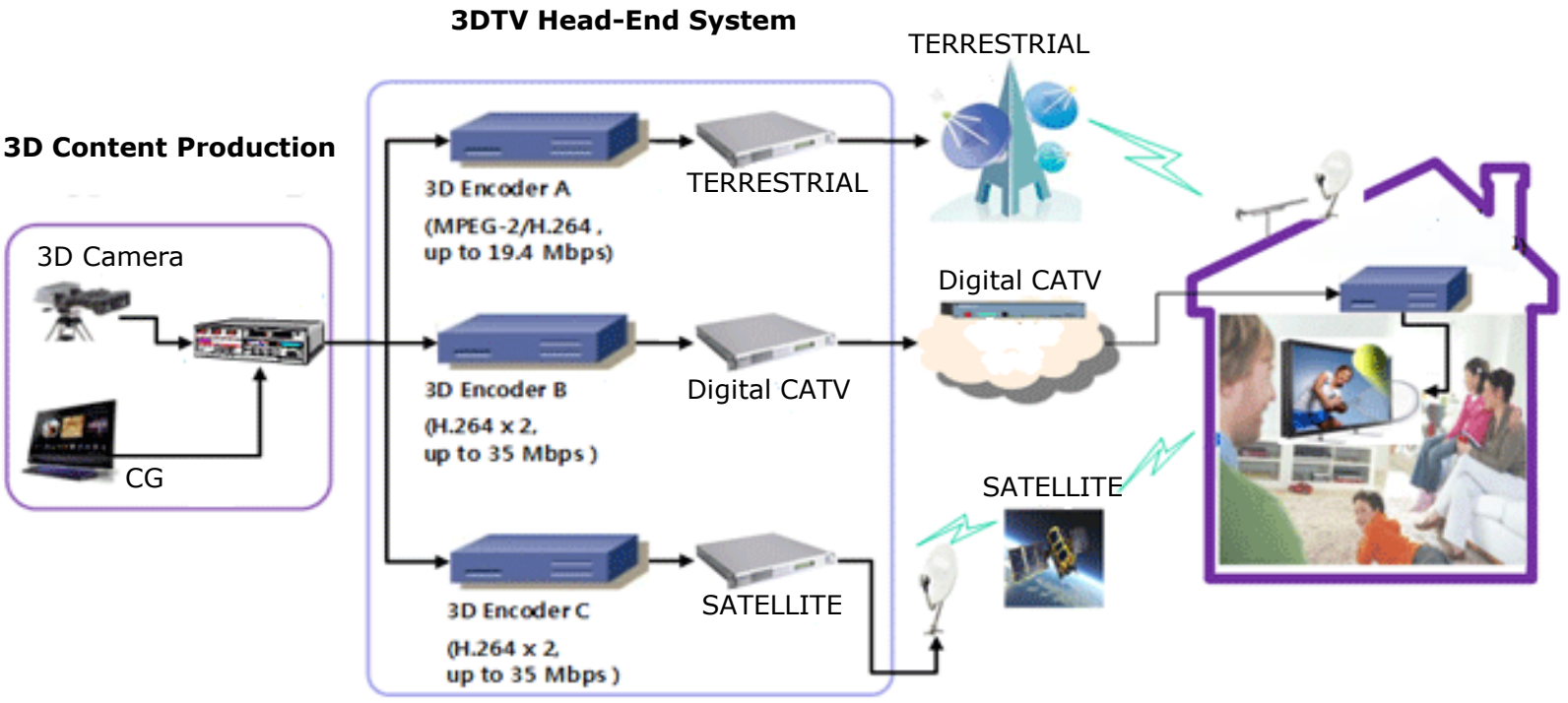
- **Transmission**
  - Need additional channel(Ch66)
  - can use same transmitter system
  - Not compatible with 2D DTV Receiver
  - Side by side : Half resolution



Source : 3DTV Broadcasting Promotion Center in Korea

Plans for Terrestrial 3D HDTV Service in Korea

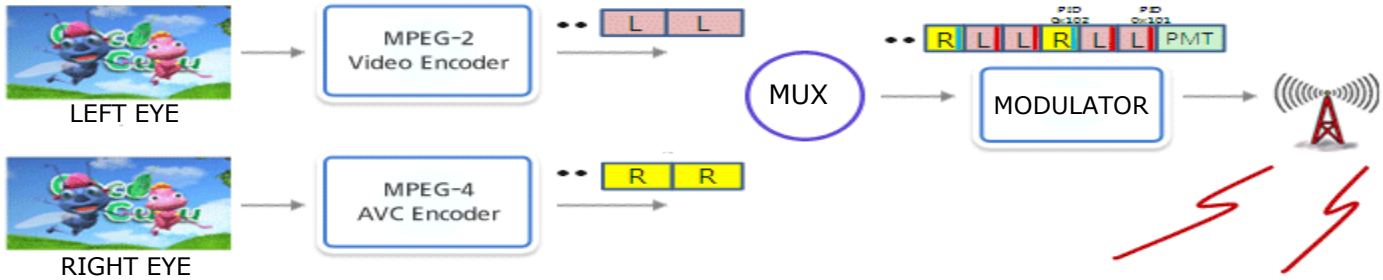
- **Planning to do 3D HDTV trial on Oct. 2010**
- **Terrestrial broadcaster, Cable broadcaster, Satellite broadcaster will be together**

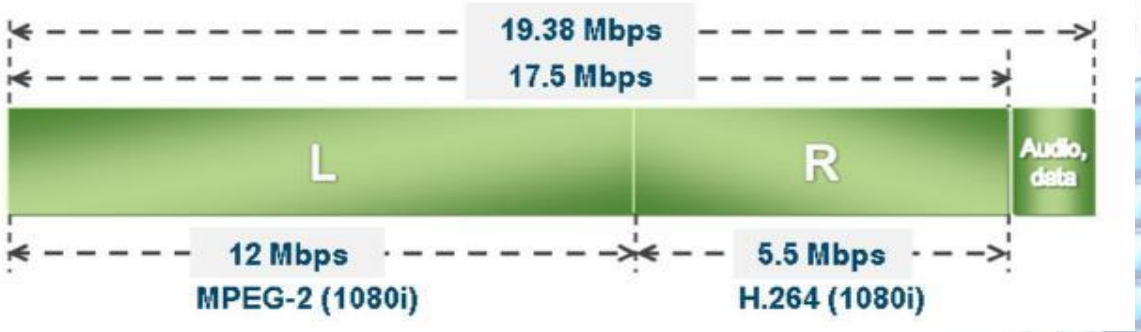


Source : ETRI (Electronics and Telecommunications Research Institute)

Plans for Terrestrial 3D HDTV Service in Korea

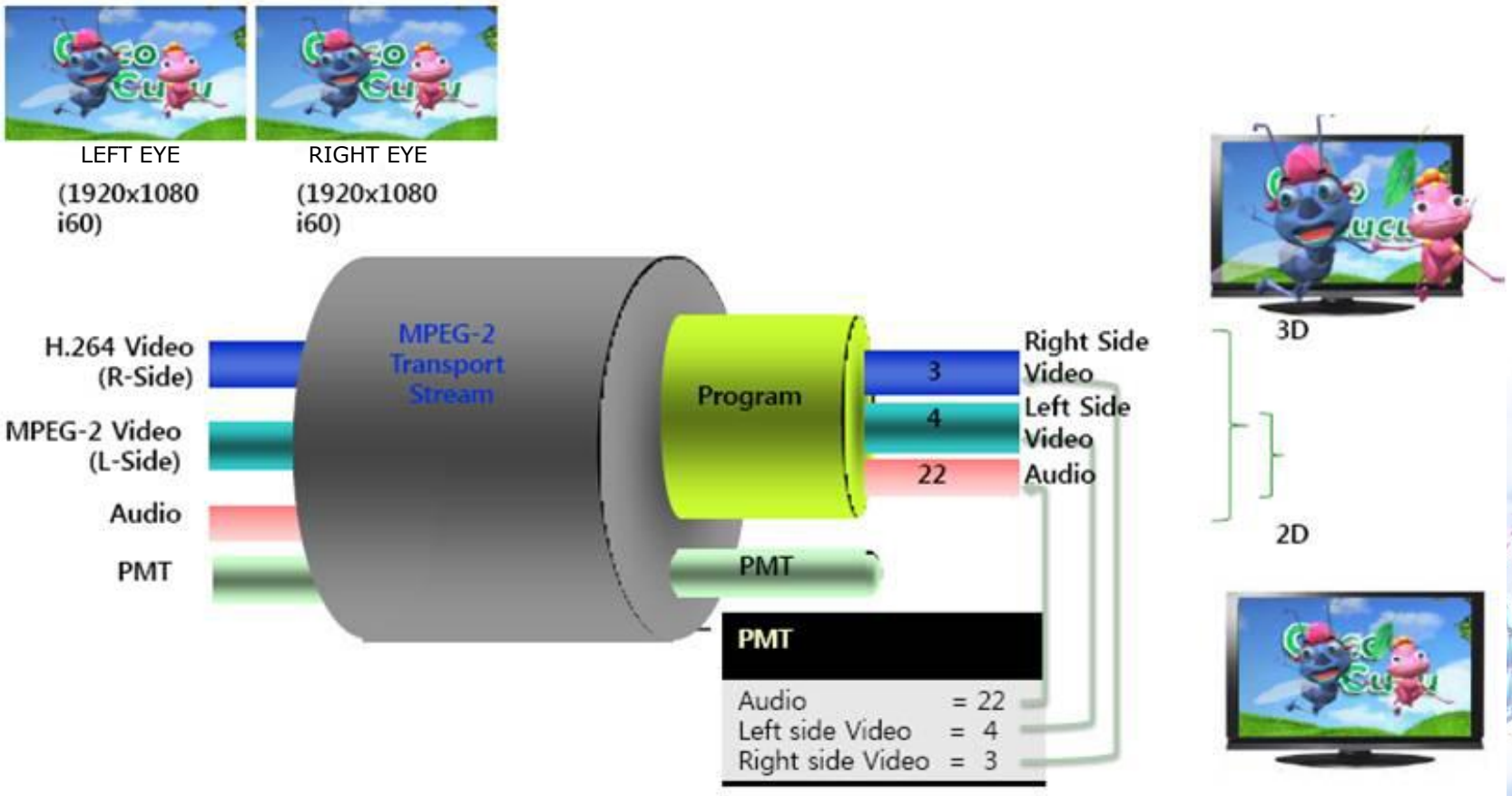
- **Compatible with 2D DTV receivers**
- **Possible to Broadcast 3D HDTV service**





Source : 3DTV Broadcasting Promotion Center in Korea

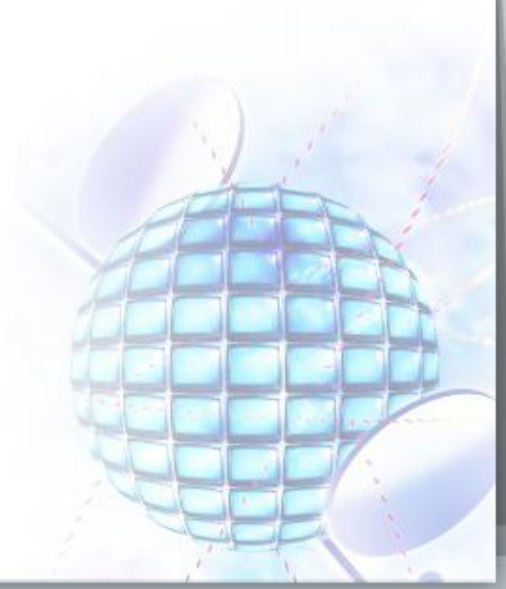
Plans for Terrestrial 3D HDTV Service in Korea



Source : ETRI (Electronics and Telecommunications Research Institute)

In Conclusion

- **Digital Terrestrial Broadcast Service is constantly evolving .**
- **Increasing needs for fixing the software of products**
- **System Software Upgrade Service is Essential in Digital Era**
- **Low cost, High effect**



KBS

Thank You

Email: kst999@kbs.co.kr