



ADVANCED TELEVISION  
SYSTEMS COMMITTEE

# ATSC Update: New Technologies for Today and Tomorrow

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VP Standards Development  
Advanced Television Systems Committee



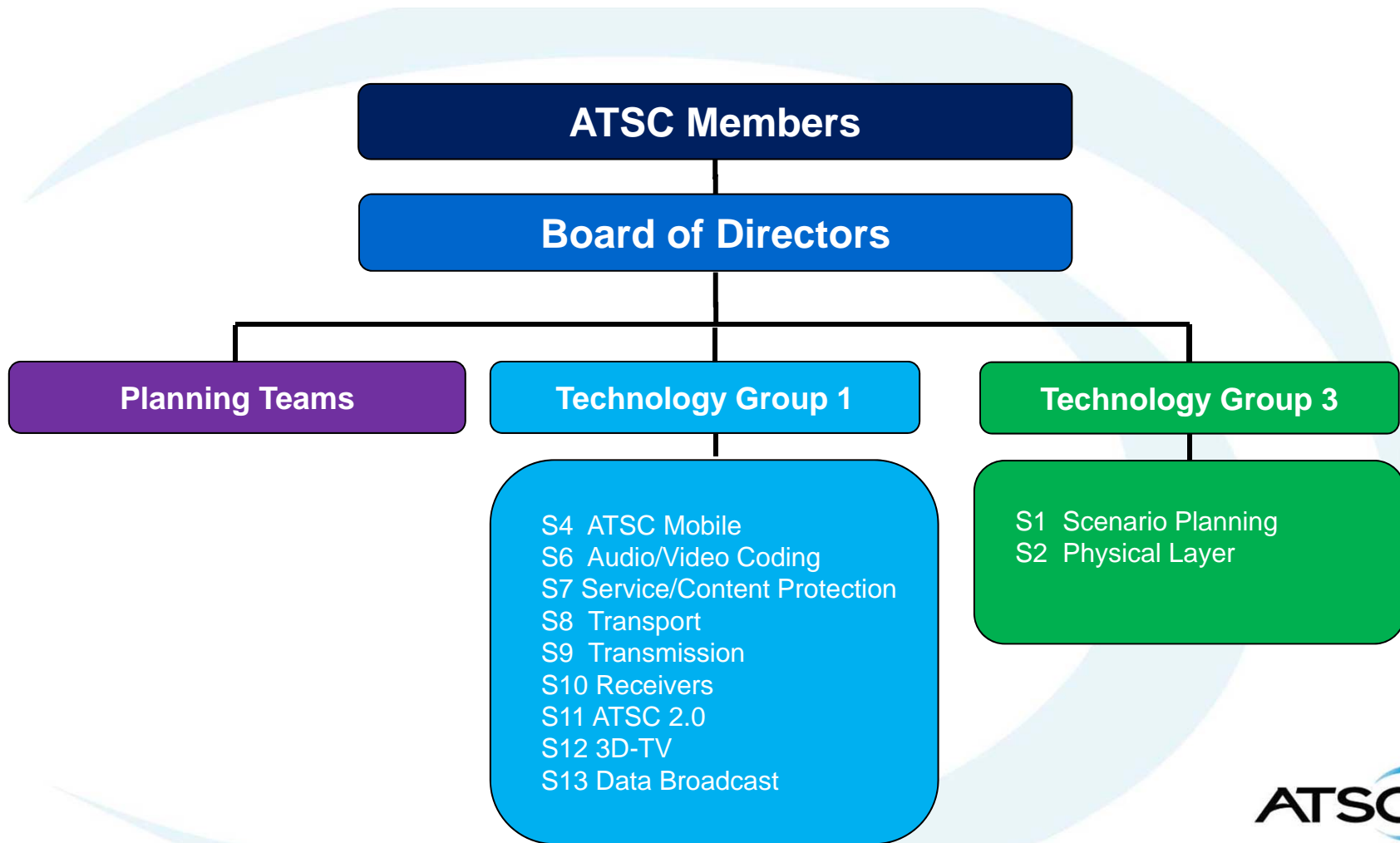
# Agenda

- **About the ATSC** — Who we are and what we do
- **ATSC Mobile DTV** — Serving viewers on the go
- **ATSC 2.0** — New services for digital television
- **3D-TV standardization** — Features and flexibility
- **ATSC 3.0** — The next generation broadcast television system
- **FOBTV** — The Future of Broadcast Television initiative
- **Final remarks** — Questions?

# About the ATSC

- Standards development organization for digital television
  - Founded in 1983 by CEA, IEEE, NAB, NCTA, and SMPTE
  - Focused on terrestrial digital television broadcasting
  - ATSC is an open, due process organization
  - Approximately 135 member organizations
    - International focus
    - Broadcasters, broadcast equipment vendors, cable and satellite system operators, consumer electronics and semiconductor manufacturers, universities

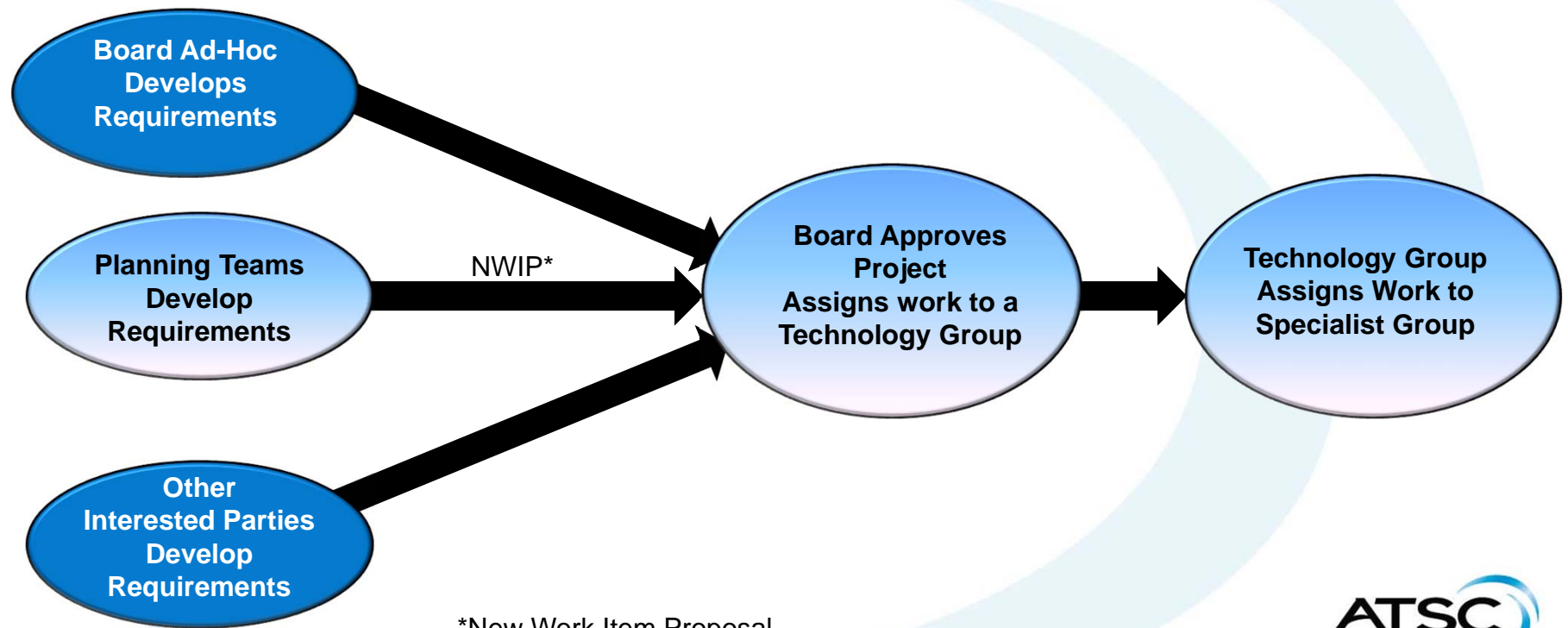




# TG1 Specialist Groups

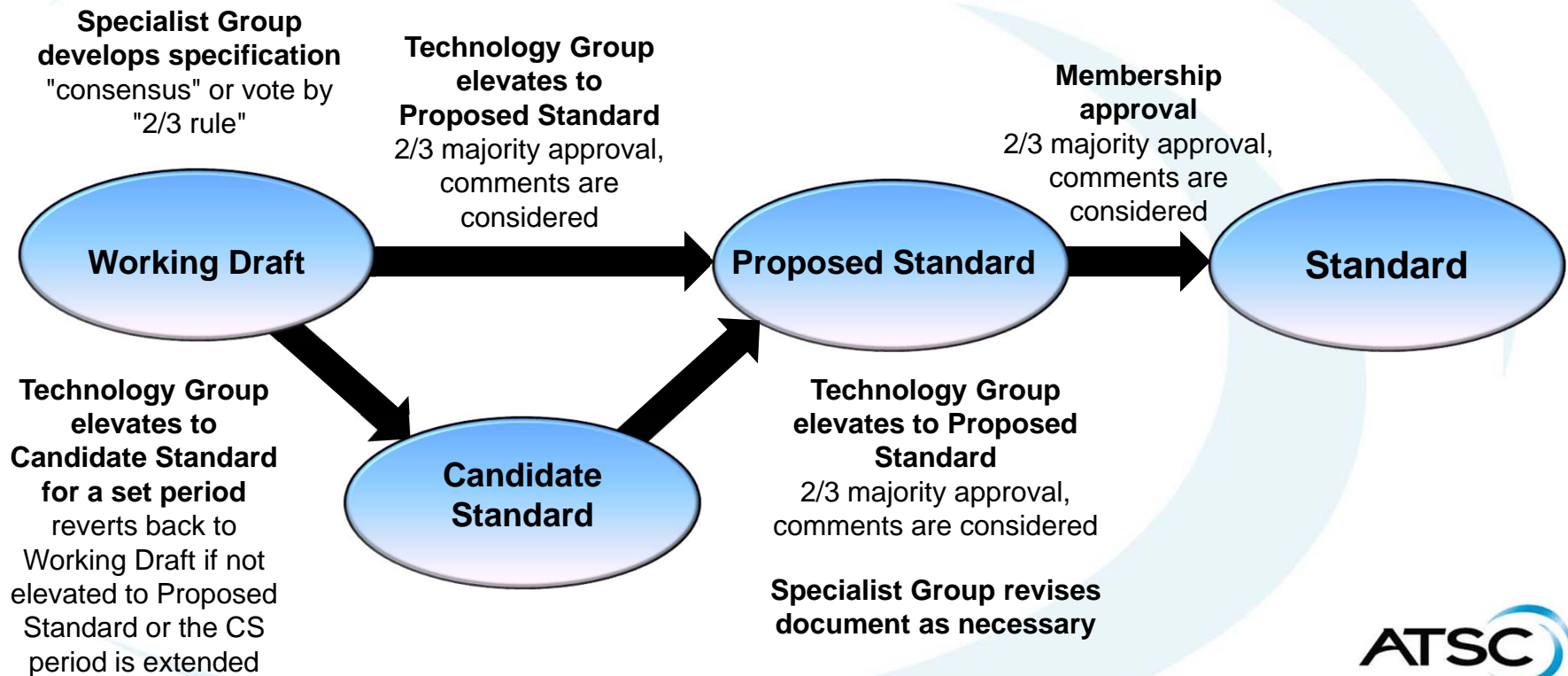
Group Number	Group Name	Chair
TG1	Technology and Standards Group	Rich Chernock, Triveni Digital
TG1/S4	ATSC Mobile DTV	Mark Aitken, Sinclair
S4-7	Mobile EAS	Jay Adrick, Harris
TG1/S5	Specialist Group on Transmission Infrastructure	Art Allison, NAB
TG1/S6	Video and Audio Coding	Pat Waddell, Harmonic
S6-3	Loudness Issues	Jim Starzynski, NBC Universal
TG1/S7	Security	Adam Goldberg, Nagravision
TG1/S8	Data Multiplex/Transport	Mark Eyer, Sony
TG1/S9	RF Transmission	Charles Einolf, CBS
TG1/S10	Receivers	John Henderson, CEA
TG1/S11	ATSC 2.0	Sam Matheny, Capitol Broadcasting
TG1/S13	Data Broadcasting	Mike Dolan, Nielsen
S13-1	NRT Services	Rich Chernock, Triveni Digital
S13-2	ATSC 2.0	Oren Williams, Dolby

# Project Approval and Assignment



\*New Work Item Proposal

# Development and Approval





# ATSC Evolution

## Mobile DTV

- Robust
- AVC video
- IP transport
- HE AAC audio
- Backward-compatible

## ATSC 2.0

- AVC/MPEG-4 video coding
- Non-real-time (NRT)
- Conditional access
- Digital rights management
- Advanced EPG
- Audience measurement

## 3D-TV

- Multimode
- Supplemental
  - Main channel
  - Mobile
  - Broadband
- Independent

## ATSC DTV

- High definition video
- Standard definition video
- Multichannel sound

# ATSC Standard A/53



## Presentation Layer (Essence)

- Video: MPEG-2 (HDTV & SDTV)      A/72 specifies use of MPEG-4/AVC coding
- Audio: AC-3 (5.1 Channel)



## Transport Layer

- MPEG-2 transport
- A/65 specifies PSIP  
A/90 specifies data broadcast  
A/70 specifies conditional access



## Physical Layer (Transmission)

- Vestigial sideband (VSB)
- 19.4 Mbits per second in 6 MHz channels

# Evolution: ATSC Mobile DTV

- ATSC Mobile DTV is a backwards-compatible standard for delivery of real time and non-real time television content to mobile and handheld devices
- Services on the air now
  - TV wherever you go
  - News, weather, sports, traffic, favorite channels

## ATSC Mobile DTV

- Robust
- AVC video
- IP transport
- HE AAC audio
- Backward-compatible
- Services on the go
- M-EAS services under development

# ATSC Mobile DTV (A/153)

- ATSC Mobile DTV services are carried in existing DTV broadcast channels along with existing services such as high-definition programming
- No adverse impact on legacy receiving equipment
- Additional spectrum is not needed to offer mobile DTV
- Mobile services are scalable in number and level of robustness
  - Flexible and efficient

# ATSC Standard A/153



## Presentation Layer (Essence)

- MPEG-4 AVC (ITU-R H.264) video coding
- MPEG-4 HE AAC v2 audio coding

Closed captioning



## Transport Layer

- IP Transport
- Streaming and non-real-time file transfer

Electronic Service Guide based on OMA BCAST



## Physical Layer (Transmission)

- Vestigial sideband (VSB)
- 19.4 Mbits per second in 6 MHz channels

RF transmission and FEC compatibility with legacy (A/53) receivers/decoders

# Capitol Hill Launch of Mobile DTV

- 20 September 2012
  - Official launch of Mobile DTV held on Capitol Hill in Washington D.C.
  - Highlighted the growing availability of ATSC Mobile DTV service and receivers to government officials, press, and the public



# Current Work on ATSC Mobile DTV

- Work is underway to draft an update A/154, “ATSC Mobile DTV Recommended Practice”
  - Provides guidance on loudness and dynamic range control
  - Could be completed before the end of 2012
- A new A/153 Part is being drafted to specify a method for emergency alerting for mobile DTV services
  - Could be finalized before the end of 2012

# Mobile EAS

- Enhancement of A/153 Mobile DTV Standard for emergency information to mobile/handheld receivers
  - Real-time
  - Non-real-time
- Common Alerting Protocol
- NRT used to provide rich media assets
- Work underway in S4-7 Working Group
  - Jay Adrick (Harris), Chair



# Broad Array of Mobile DTV Receivers



**ATSC**  
THE FUTURE OF TV

# Evolution: ATSC 2.0

- ATSC 2.0 will be a complete suite of new services for the fixed DTV receiver
- Enhancements bundled together
  - More fully exploit the capabilities of digital broadcasting
- Working Draft taking shape
  - Could be completed by Q1 2013

## ATSC 2.0

- Advanced A/V compression
- Non-real time delivery
- Conditional access
- Digital rights management
- Advanced EPG
- Audience measurement
- Hybrid TV
- “Second screen” features

# Evolution: Non-Real-Time

- The NRT Standard (A/103) makes it possible to deliver content in advance of use and store it for later consumption
  - Most broadcast programming does not need to be delivered in real time
  - File-based delivery
  - Addresses the growing desire for “everything on demand”
- Storage cost reduction/increased capacity and advanced compression technologies are driving forces that make NRT practical

# NRT Services

- Example service scenarios
  - News, weather, traffic, and sports clips
  - Long-form entertainment programming download
  - Program previews coupled with electronic guide
  - Telescoping ads
  - Targeted advertising
- NRT can be a component of mobile services and/or fixed services



# Evolution: 3D-TV

- Standard being developed for terrestrial broadcast of 3DTV
  - Multimode (Profiles) likely
- Working Draft standard on 3D-TV is being developed and one Part has been finalized
  - The standard is envisioned to be structured as a series of Parts, each covering a different although related technology

## ATSC 3D-TV

- 3D program dependent on 2D program
- 3D program independent of 2D
- Mobile 3D (glasses-free)
- Non-real-time file delivery of 3DTV



# Revolution: ATSC 3.0

- ATSC 3.0 is the next generation of broadcast television
  - Fundamental technology shift
    - Very flexible and very efficient
- ATSC 3.0 must provide performance improvement and additional functionality significant enough to warrant implementation of a non-backwards compatible system
  - Timeframe factors, regulatory (spectrum), technology, business issues
  - Greenfield approach

# Technology Group on ATSC 3.0

- Jim Kutnzer (PBS), Chair

- Scope

The ATSC 3.0 Technology Standards Group (called TG3) will develop voluntary technical Standards and Recommended Practices for the next-generation digital terrestrial television broadcast system. ATSC 3.0 is likely to be incompatible with current broadcast systems and therefore must provide improvements in performance, functionality, and efficiency significant enough to warrant implementation of a non-backwards-compatible system. Interoperability with production systems and non-broadcast distribution systems should be considered.

# Focus on Mobility

The next-generation system will likely focus on broadcasting to devices that are on-the-move...



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THE **FUTURE** OF TV



# ATSC 3.0 System Requirements

- TG3/S1, Specialist Group on System Requirements
  - Skip Pizzi (NAB), Chair
- A “Call for Input” (CFI) document has been distributed within ATSC
  - CFI requests input on use cases for the next-generation DTV system
  - To be used in the development of usage scenarios and system requirements for ATSC 3.0

# TG1/S1 Call for Input

- Initial responses are being processed by a recently formed AHG on Data Collection and Document Drafting (TG3/S1-1)
- Submitted use cases are being shared with an FOBTV AHG collecting such use cases from around the world
- An initial draft of System Requirements is planned for completion by year's end

# ATSC 3.0 Physical Layer

- TG3/S2, Specialist Group on Physical Layer
  - Luke Fay (Sony), Chair
- Focused on identifying target attributes and the evaluation process for the physical layer
  - Goal of issuing a Call for Proposals in January 2013
  - A draft Call for Proposals document is currently in review
- Confirmation with S1 physical layer related System Requirements will be completed before issuing the CFP

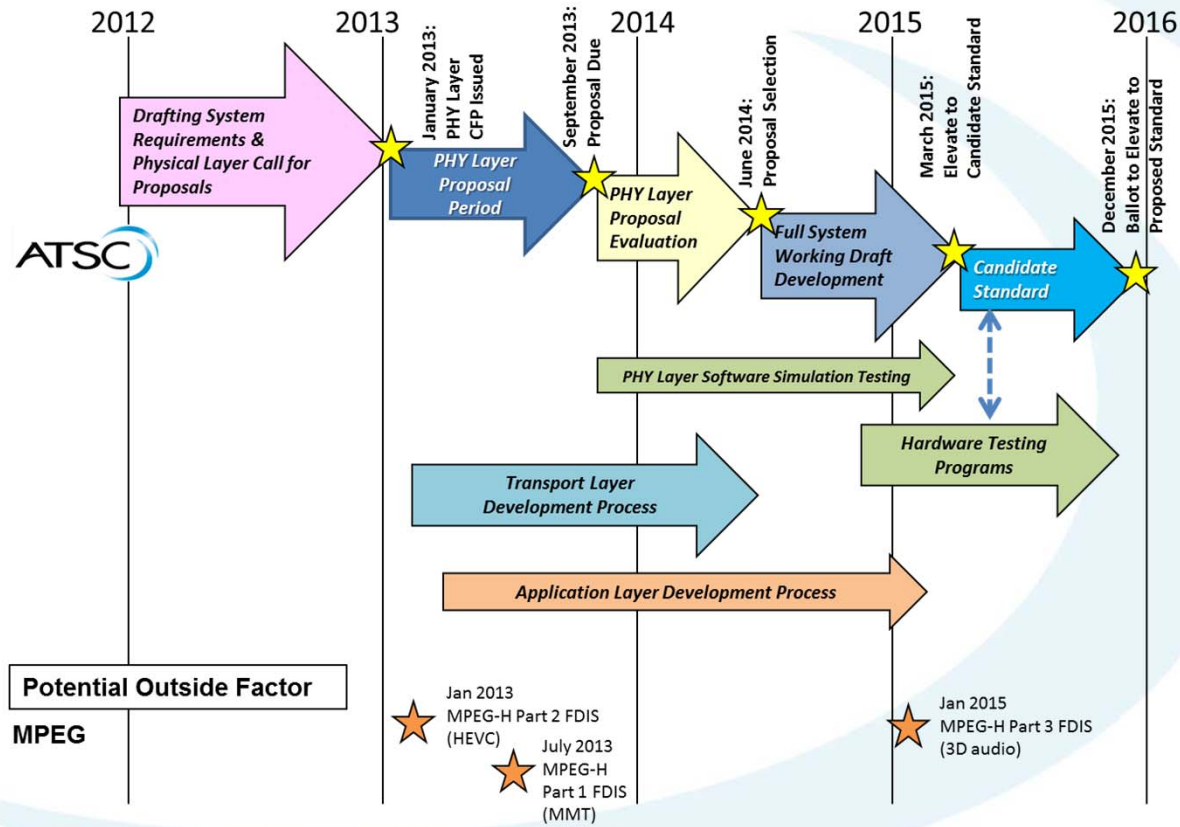
# ATSC 3.0 and UHD TV

- Growing interest to have ATSC 3.0 support delivery of Ultra High Definition video
  - At least 4K...perhaps 8K
- The lessons of HDTV adoption still remembered
  - Consumers will always be attracted to quality
  - Displays practical
- Similar interest within FOBTv

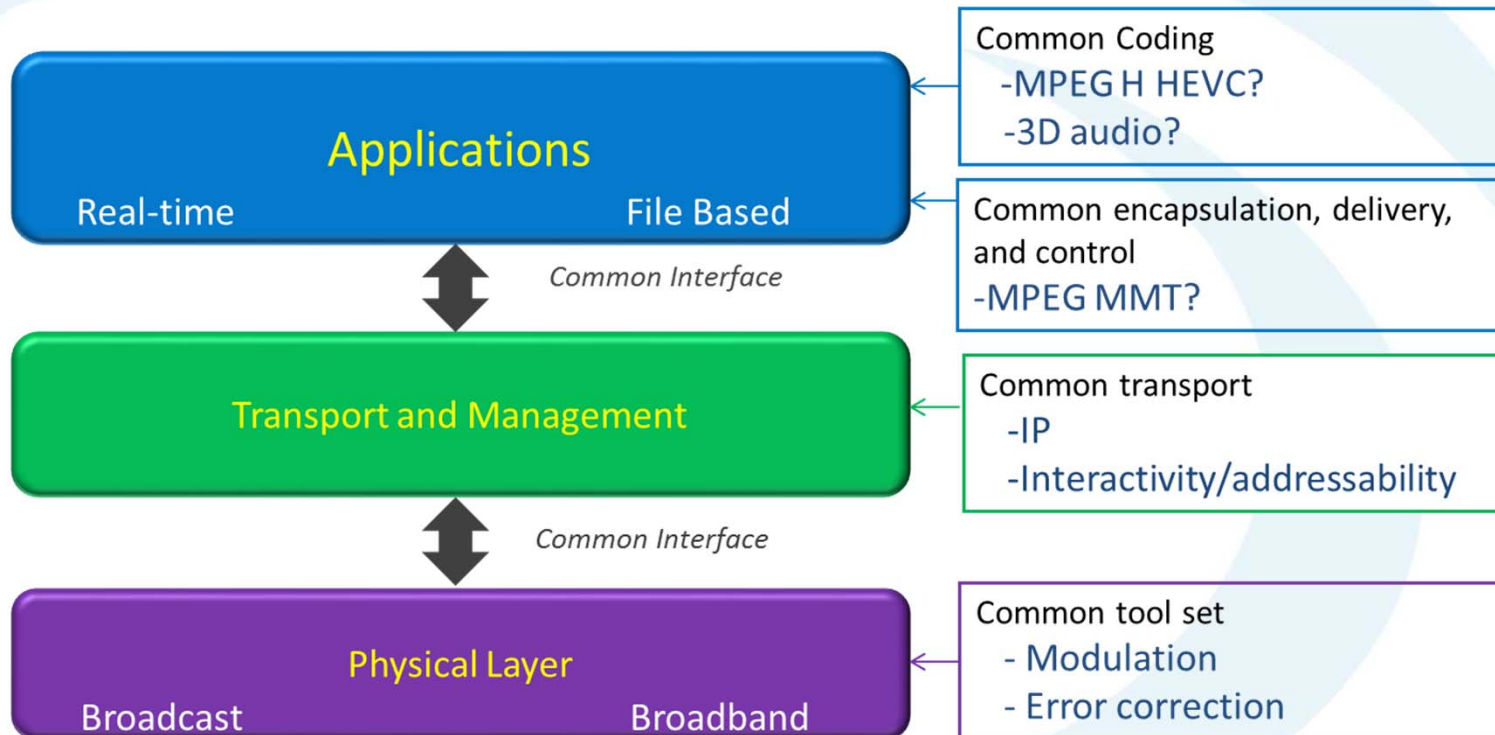
# Future Work on ATSC 3.0

- Transport layer
- Application layer
- Deployment scenarios
- Transition scenario
- Areas to watch
  - Integration of diverse connected devices
  - Integration of social networking with the television experience

# ATSC 3.0 Draft Timeline



# Independent Layer Structure



# Future of Broadcast Television

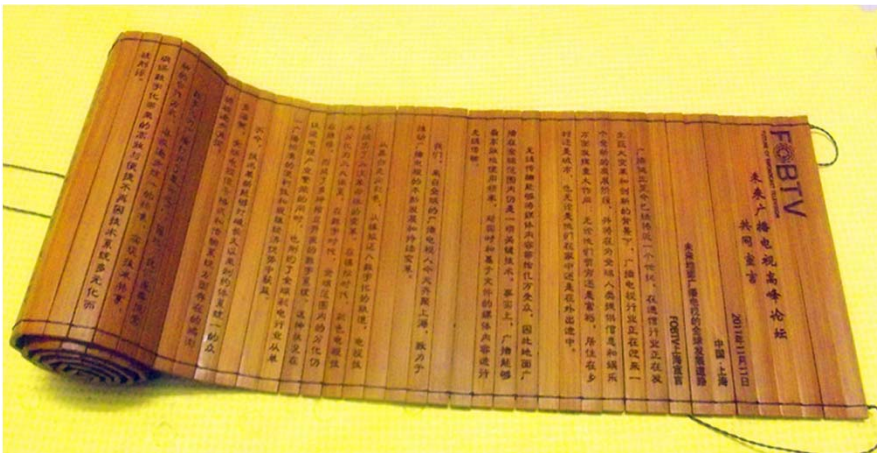
- Objectives
  - Define the requirements of future terrestrial broadcast systems
  - Explore unified terrestrial broadcast standards
  - Promote global technology sharing





# FOBTV Joint Declaration

- Signed on 11-11-11 at 11:11:11 in Shanghai, China



# Joint Declaration Signatories



# Joint Declaration: Why Broadcasting?

- Broadcasting is the most spectrum-efficient wireless delivery means for popular real-time and file-based media content
- Infinite scalability
  - Wireless delivery of media content to an unlimited number of receivers makes terrestrial broadcasting a vital technology



# Why a Global Standard?

- Mass production drives down cost
- Show the commitment of the broadcasting industry to embrace new technologies and leverage interest from global technology developers to devise next-generation products
- Handheld and mobile devices travel across borders



# Why Now?

- Broadcasters around the world face numerous challenges
- Industries are driven by new technology
- Spectrum is being sought after for broadband, putting pressure on the broadcast industry
- Next generation technology can provide a win-win-win solution



# Memorandum of Understanding

- Signed April 2012 by thirteen founding organizations
  - ATSC, CBC, CRC DVB, EBU, ETRI, Globo-TV, IEEE-BTS, NAB, NERC-DTV, NHK-STRL, PBS, SET



# MOU Goals

- To develop future ecosystem models for terrestrial broadcasting taking into account business, regulatory, and technical environments
- Develop requirements for next generation terrestrial broadcast systems
- Foster collaboration of development laboratories



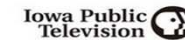
# MOU/FOBTv Goals

- Select major technologies to be used as the basis for new standards
- Request standardization of selected technologies (layers) by existing SDOs such as ATSC, ARIB, DVB, and TTA
- FOBTv is not a standards development organization (SDO)





# FOBTV Participants





## Revolution: ATSC 3.0

- This is a defining moment for terrestrial broadcasting
- Spectrum-efficient wireless delivery of media content to an unlimited number of receivers makes terrestrial broadcasting a vital technology
- Terrestrial broadcast technology must advance to be relevant in a changing world
- A global standard is clearly the preferred approach
- Ongoing liaison between TG3 and FOBTV

# Observations

- The television landscape is changing—fast
- Broadcasters must use new technologies to attract new viewers and hold their existing viewers
- A direct connection between stations and the consumer is key to success going forward—that means mobile
- Demand for increased quality and quality of services will continue to grow
- If we don't plan for the future, we will be left out of it

# Get Involved in the Work

- ATSC is working on a wide range of projects
  - Mobile DTV, Mobile EAS, 3D-TV, ATSC 2.0, Content Protection, ATSC 3.0
- Broadcast industry involvement is key to success
- Get involved
  - Your company may already be an ATSC member
  - If not, consider joining
  - Membership has its privileges

# Membership Has its Privileges



# Stay Tuned...More to come

- <http://www.atsc.org>
- [jwhitaker@atsc.org](mailto:jwhitaker@atsc.org)
  
- Questions?

