Overview of ATSC Process
Broadcaster Perspective on “In-Band” Mobile/Handheld Opportunities

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NABSHOW™
Where Content Comes to Life™
Local Station Studio Facilities

• HD Content is critical
  – Cable and DBS competitors have embraced HD technology
• Continued investment in HD studio/production equipment required to complete the DTV transition
  – Network Pass Through of HD is Great…
  – Origination of HD in:
    • Local Syndicated Programs
    • Local Programming (News…etc.)
    • Local HD Production of commercials

...But...
Local Station Studio Facilities

- Requires another round of unprecedented investment in studio infrastructure, for example
  - There is nothing worth saving from an Analog plant
  - DTV drives new needs
    - PSIP, CC, AFD, audio/lip-sync, descriptive video, PRO channel, ENG/SNG, newsgathering, etc.
  - System redundancy (BEYOND transmission)
    - Encoders, multiplexers, playout, etc.
- Local Broadcasters cannot afford to become the AM radio of the 21st century
- Mobile ATSC adds an important Component to the Future of our Business
Broadcasters have a 60 year relationship with our viewers and the local businesses in our communities. We need to explain and help them through this transition.
Making it All About Local Broadcasting

• Watching your favorite over-the-air broadcast programs – “what you want, when you want, wherever you are”
  – Popular network and syndicated shows, sports or your local news, in real-time

• Being able to store those programs on your mobile media player and watch them when it is convenient for you

• The re-emergence of truly portable TV’s could put 100M sets into the market over the next 4 years
(continued)

Making it All About Local Broadcasting

• According to TBA (Television Bureau of Advertising) viewers ‘tune-in’ to watch over-the-air programs
  – 348 of the top 349 programs watched during the 2006/2007 broadcast season were over-the-air programs, not cable network programs

• This is what will set broadcasters’ mobile TV service apart from others

  – Broadcasters have the content that consumers demand
A New Reality...and an Old one!

• Broadcasters are positioned to reinvent the television broadcast paradigm

• The development of “backwards compatible” Mobile/Handheld augmentation of the ATSC digital television (DTV) standard holds the key

• This is a real challenge to an industry operating with an unchanged system & planning criteria for 60+ years

• Broadcaster capabilities and technologies must be designed to fit very different needs being identified
  – intensely dynamic mobile and portable environment
    • a sharp departure from today’s 30 foot fixed reception television model

• What’s important is – **THIS IS ABOUT WIRELESS!**
The ATSC

- ATSC Mission Statement:
  - Create and foster implementation of voluntary Standards and Recommended Practices to advance terrestrial digital television broadcasting, and to facilitate interoperability with other media.

- The ATSC DTV Standard has been adopted by:
  - United States
  - Canada
  - South Korea
  - Mexico
  - Honduras
About the ATSC

• Develops technical standards for digital television and assists in implementation activities:
  – ATSC is an open, due process organization.
  – All standards and RPs are available free of charge at www.atsc.org.

• Membership organization:
  – Founded by CEA, IEEE, NAB, NCTA, and SMPTE.
  – Approximately 150 members:
    • Broad, cross-industry participation—broadcasters, cable, satellite, motion picture, consumer electronics, computer, automotive, and professional equipment manufacturers.
  – International in scope.
ATSC Organization

ATSC Members

Board of Directors

Technology and Standards Group

TSG Specialist Groups:
S1 PMCP
S2 ACAP
S3 Digital ENG
S4 ATSC-M/H
S6 Audio/Video Coding
S8 Transport
S9 Transmission
S10 Receivers
S13 Data Broadcast

Planning Committee

PC Working Groups:
ATSC 2.0
ACAP Field Trial
Education and Training
International Participation
ATSC Approval Process

• Standards and Recommended Practices require three levels of approval before publication

Membership

Technology & Standards Group

Specialist Group
ATSC Due Process

Specialist Group Develops Specification "consensus" or vote by "2/3 rule"

Working Draft

Technology Group Elevates to Proposed Standard 2/3 majority approval, comments are considered

Proposed Standard

Membership Approval two-thirds majority approval, comments are considered

Standard

Technology Group Elevates to Candidate Standard for a Set Period; reverts back to Working Draft if not elevated to Proposed Standard or the CS period extended

Candidate Standard

Specialist Group Revises Document as Necessary
ATSC-M/H Committees/Activities

Committee

Technical Standards Group (TSG)  John Henderson (CEA)

Oversight of all of ATSC’s technical standards developments; are they on track? is the technical detail correct? is the level of detail adequate for an open standard that anyone can build to?

TSG-S4 Mobile/Handheld Mark Aitken (Sinclair)

Overall responsibility for developing the ATSC-M/H approach

S4-1 Physical Layer Mike Doerr (Coherent Logix)

Vets subgroup conclusions & decisions; collective technical expertise spans all aspects of the necessary system design

transmission system? selection criteria? analysis of OMVC IDOV report

S4-2 Management Layer Rich Chernock (Triveni)


S4-3 Presentation Layer Brett Jenkins (Ion Network)

video formats/ screen sizes? Video codec? Audio codec? Bit rate ranges?

S4-4 System Issues Art Allison (NAB)

Closed captioning? Interactivity? Return channel? Audience measurement?

What It Does

Participation

Votes to approve S-group recommendations and drafts and promote them to Draft Standard, Candidate Standard or to membership ballot (final step) Work by email; in-person meetings approx monthly (1 day, usually DC); attendance requirements to vote

Outputs to TSG require determination of consensus by Chair

Work by:

• email reflector
• in-person meetings approx monthly (1 day, usually DC); call-in allowed, but ineffective
• occasional telcon (as required)

Outputs to S4 require determination of consensus by Chair

Work by:

• email reflector
• weekly telecons (1-2 hours)
• in-person meetings approx monthly (1/2 - 1 day, usually DC); call-in allowed, but ineffective

Contributions determine the details
Technology & Standards Group

- TSG develops and recommends voluntary, international technical standards for the distribution of television programs to the public using advanced television technology.
  - Technologies considered may be improvements to current systems or entirely new systems.
  - All forms of distribution systems may be considered.
  - Sound, vision, display, conditional access, and data sub-systems may be considered.
ATSC-M/H

A standard for mobile & handheld service
ATSC-M/H

• TSG has formed a Specialist Group on Mobile and Handheld (TSG/S4):
  – Mark Aitken, Sinclair Broadcast Group, Chair
  – Dan Borowitz, ION Media, Vice-Chair
  – Jerry Whitaker, Secretary
• TSG issued a request for proposals (RFP):
  – Requirements developed by the ATSC Planning Committee
  – Approved by the Board of Directors
• Schedule for the work based on premise that broadcasters will announce new Mobile/Handheld services by February 2009
The work of TSG/S4 is divided into four primary elements:

- **Physical Layer**, which encompasses the backward-compatible additions to the DTV emissions stream to facilitate mobile and handheld reception.
- **Management Layer**, which includes signaling, announcement, file delivery, and other functions such as conditional access and content protection.
- **Presentation Layer**, which focuses on the video and audio decoding systems.
- **System Layer**, connecting the ‘layers’, establish an architectural frame work, consider dynamic provisioning framework to enable change to sub-elements enabling enhancements providing backwards compatibility.
ATSC-M/H

• Ad-hoc groups for each layer.
  – Physical Layer group is led by Michael Doerr of Coherent Logix as Chair and Bruce Franca of MSTV as Vice-Chair.
  – Management Layer group is led by Rich Chernock of Triveni Digital as Chair and Alan Moskowitz of MobiTV as Vice-Chair.
  – Presentation Layer group is led by Brett Jenkins of ION Media as Chair.
  – System Layer group is led by Art Allison of NAB as Chair
ATSC-M/H

- ATSC standard for delivery of real-time and non-real-time television content and data to mobile and handheld devices (ATSC-M/H)
  - ATSC-M/H services will be carried in DTV broadcast channels
    - Broadcasters have sufficient spectrum for Mobile/Handheld
    - Existing facilities deployed (minimal starting capital)
      - National Footprint
    - Maximized UHF facilities may be best suited
  - ATSC-M/H will be backwards compatible
    - New services will not preclude or prevent operation of current ATSC services or have adverse impact on legacy receiving equipment
ATSC-M/H System Proposals

• The following full-system proposals currently exist:
  – LG Electronics/Zenith/Harris
  – Samsung/Rohde & Schwarz/Nokia
  – Micronas/Thomson
  – Coherent Logix to support any physical layer system

• "Stand-alone" proposals include:
  – Upper Layers (Qualcomm)
  – Audio codecs (Coding Technologies and DTS)
  – Interactive TV services (MobiTV)
### ATSC-M/H - Layering

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<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
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<td><strong>Physical Layer</strong> - (S4-1)</td>
<td>Legacy Transport, FEC, RF</td>
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<tr>
<td><strong>Management Layer</strong> - (S4-2)</td>
<td>Transport-M, Signaling, Announcement, File Delivery, Streaming Delivery, Application Transport, SA (CAS), SP (DRM)</td>
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<td><strong>System Group</strong> - (S4-2)</td>
<td>Application Framework, Video Codec &amp; Parameters, Audio Codec &amp; Parameters, Text Elements, Graphic Elements</td>
</tr>
<tr>
<td><strong>Presentation Layer</strong> - (S4-3)</td>
<td>Application Framework</td>
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* Work in progress
Technical Decision Drivers?

• Physical Layer
  – Demonstrated viability in real world
  – Acceptable QoS

• Management Layer
  (Responsible for bringing system together)
  – Basic functionality
  – Interoperability with other systems

• Presentation Layer
  – Target displays
  – Listening environment
ATSC-M/H Applications

• Potential applications for ATSC-M/H include:
  – **Mobile and handheld subscription-based TV, such as:**
    • Video-on-demand (VOD)
    • Pay-per-view (PPV)
    • Electronic sell-through (EST) services
    • Carriage fee/rebroadcast consent based
  – “Free” television services (advertiser supported/platform subsidized) delivered in real-time
  – Non-real-time content download for later playback
  – Interactive television
  – Real-time navigation data for in-vehicle use
• Consideration will also be given to the need for:
  – Conditional access, content protection, and digital rights management
  – Interactive capabilities
  – Wireless return channel interface option(s)
  – Use of metadata to describe multimedia and other content

  – Techniques to ‘hand off’ a service from one broadcaster to another
  – Network augmentation capabilities such as ‘hand off’ to 802.xx and/or other wireless infrastructures
  – Power management techniques

These capabilities support business opportunities!
On Laptops, Phones, PDA’s, MP3/DM Players, etc.

- Portable Services
  - Provide multiple direct channels to users on the go…
  - Augmentation possible *(NOT required)* with other devices/networks for backchannel
    - Blue-tooth, Wi-Fi, Wi-MAX, EV-DO, HSDPA+, HSOPA, etc…
Vehicular Integration

- Integrated with vehicle entertainment, navigation and information systems
- Tied into vehicle GPS/map system for interactivity with advertisers
- NRT Video and Data services
  - Digital signage, etc…
Mobile DTV Demonstrations (NAB ‘07)

Photos courtesy of LG and Samsung
Mobile DTV Products (CES 2008)
Broadcasters can become a WIRELESS contender...
Independent Demonstration of Viability (IDOV)

- The goal of IDOV is to ensure that the technical proposals under consideration can be realized to enable Mobile/Handheld services in early 2009

- IDOV is being conducted by the Open Mobile Video Coalition
  - Sterling Davis/COX, Chairman TAWG
    - (Technical Advisory Working Group)
  - OMVC is an alliance of U.S. commercial and public broadcasters (representing ~800 stations) committed to the development of mobile digital television
  - Mission is to accelerate the development of mobile digital broadcast television
The ‘opening line’ has to be an easy story to understand...

“How would you like to watch your local TV stations on your portable device?”
This is all about Local being WIRELESS…

…with the programs people want to watch!