

Minutes, ATSC T3 Meeting November 15, 2000

1. Welcome, Introduction, and Determination of Quorum

Chairman Ralph Justus (CEA) called the meeting to order at 10:04 a.m., held at NAB headquarters in Washington, D.C. Those in attendance introduced themselves, followed by introductions of those on the teleconference link. The Chairman determined that a quorum was present for the meeting. The attendance list is given in Attachment 1.

2. Approval of Proposed Agenda

Chairman Justus added the following items to the agenda:

- 6.5 A/53 Ballot, A/52 Review, Craig Todd (Dolby)
- 12.e ITU Liaison Issues, Mike Dolan
- 12.f WC-3 Liaison, Glenn Adams (Gemstar)
- 15.d Report on ad-hoc Group on ATSC Vocabulary, Glenn Adams

These items were added to the agenda, and the revised agenda was approved. (Attachment 2.)

3. Approval of Minutes from the August 16 Meeting

Chairman Justus recommended deferring approval of the minutes from the May 17 and August 16, 2000, T3 meetings for further work, including implementation of submitted corrections. This request was accepted by the Committee and Chairman Justice directed T3 Secretary Jerry Whitaker (ATSC) to integrate necessary corrections to the minutes and bring back the May and August minutes for final approval at the next T3 meeting (February 13). Committee members were requested to submit any corrections directly to Mr. Whitaker for integration into the final documents.

4. Opening Remarks

Chairman Justus introduced ATSC executive director Mark Richer for opening remarks. Mr. Richer introduced Mr. Whitaker to the committee and explained his role at the ATSC, which is to support the standardization and educational efforts of the organization. Mr. Richer briefed the Committee of the results of the PSIP seminar, held near Washington November 1 and 2. Attendance of 150 was reported, along with positive comments from attendees. The next seminar in the series is set for February 21, 2001, in conjunction with the ITS technology retreat in Palm Springs, Calif. Mr. Richer also announced that ATSC will work with NIST to produce a 2-3 day seminar on DASE in June, 2001.

Mr. Richer outlined on-going efforts to refine the ATSC standardization process, including streamlining steps where possible. Mr. Richer announced that his ad-hoc group on process improvements would make recommendations on certain process changes to the ATSC Executive Committee (EC) at its November 16 meeting. One element of the suggested process changes is the establishment of a *staged* or phased approach to standardization, including the creation of a "Candidate Standard." Mr. Richer explained the concept of a Candidate Standard and outlined the benefits that such a process would afford.

Mr. Richer suggested to Chairman Justus that T3 seriously consider withdrawing ATSC Standards A/55 and A/56 because the standards are no longer in use. Mr. Richer suggested that a notice be distributed to that effect. Assuming no negative feedback from such notice, the issue would be put to a vote at T3 and ultimately to a vote of the ATSC membership, per established procedures. Mr. Richer argued that if the standards are not being used, they should be withdrawn.

Mr. Richer also questioned the continuance of ATSC Standard A/58, at least in its present form. He expressed the view that the standard either needed to be updated or withdrawn. Bernie Lecher (consultant) pointed out that both A/55 and A/56 are being used in the consumer electronics sector. William Miller (SMPTE), another commenter, brought up A/57, which he felt should be withdrawn as well because it will be replaced, not revised. Mr. Richer pointed out that ATSC rules require five year review of its standards documents, many of which are nearing the five year mark. **Chairman Justus delegated the A/57 issue to the ATSC staff, which was directed to work with Mr. Lechner to draft a ballot for withdraw of A-57, including a rationale for such action.**

With regard to A/55, A/56, and A/58, Mr. Richer suggested that T3/S8 review the issue and forward their recommendations to T3. **Chairman Justice directed Mr. Lechner, the T3/S8 chair, to study the documents in question and report back to T3 at the February 13 meeting with recommendations on how to proceed.**

Mr. Richer also briefed the Committee on a new ATSC educational initiative with the Society of Broadcast Engineers. The proposal will be presented to the EC at its November 16 meeting.

Chairman Justus announced that T3 vice chairs Richard Chernock (IBM) and Randy Hoffner (ABC) have been directed to monitor the work of the various T3 specialists groups. **Mr. Chernock has been directed to track S13, S14a, S16, and S17. Mr. Hoffner has been directed to track S6, S8, S9, and S10.**

5. Action Items From August 16 Meeting

Chairman Justus reviewed the action items from the August 16 meeting, most of which were to be covered in subcommittee reports to be delivered later in the meeting.

Chairman Justus raised for discussion the ad-hoc group on colorimetry led by Mr. Lechner, who briefed the group on the work accomplished to date. Mr. Lechner reported that following e-mail discussions, basic agreement had been reached on how to handle certain colorimetry issues specified in A/53. The document is in a first draft status, and while work remains to be accomplished, Mr. Lechner felt that considerable progress had been made. Chairman Justus asked the ad-hoc group to finish its work and come back to T3 with a recommendation on to proceed.

The question of balloting the change to A/53 was discussed and Mr. Richer recommended merging the changes identified by Mr. Lechner's group with any others to A/53 that might be required so that balloting could move forward in a time-efficient manner.

Mr. Lecher outlined the basic parameters of the planned change to A/53. Mr. Miller pointed out that the move to specify explicit colorimetry is in keeping with current MPEG practice. **Mr. Allison moved, seconded by Merrill Weiss (consultant, Tribune), to direct the ad-hoc group to finish its work and take the issue directly to ballot.** This approach was recommended by Mr. Richer as a way of speeding the process, rather than bringing the issue back to T3 and then voting it to ballot. Following additional discussion, **Chairman Justus, with the concurrence of Mr. Allison and Mr. Weiss, amended the motion to direct that the ad-hoc group's recommendations for amendment of A/53 be sent to the T3 reflector, and if no negative comments are received within a two week period, the A/53 amendment should be balloted to T3. The motion was approved by a unanimous voice vote.**

6. New Work Items for Discussion

No new work items were identified by Chairman Justus or Mr. Richer.

6.5 A/53 Ballot, A/52 Review

Mr. Todd reported on the results of balloting on the A/53 revision to increase the bit rate to 448 kbits/s in Annex B and to incorporate Amendment No. 1. Results are as follows (See Attachment 3):

- 1) Amendment to Annex B, 20 yes, 1 no
- 2) Editorial privilege, 20 yes, 2 no
- 3) Incorporate Amendment into Revised A/53, 20 yes, 1 no

Ballot comments were received from Mr. Allison, which were discussed by Mr. Todd, Mr. Miller, Mr. Weiss, and others. Mr. Richer, observing that the document was approved by T3, stated that it was appropriate to forward it to the full membership for formal vote. **Chairman Justus concluded, confirmed by a show of hands, that the issues brought up by Mr. Allison were not sufficient to withhold balloting by the full membership.**

Mr. Todd briefed the group on his initiative to revise A/52 Annex A (Attachment 4). Mr. Todd asked T3 to make the changes to A/52, and add/delete certain other Annex items. **Mr. Todd moved that the A/52 changes specified in his written report to the Committee move to T3 ballot. Mr. Miller seconded the motion.** Mr. Allison expressed concern that more time had not been allotted for review of this item. **Mr. Todd subsequently amended his motion to state that if no objections were received within a specified two week period, the A/52 changes would proceed to ballot. Mr. Miller agreed to the amendment.** Mr. Richer questioned whether any additional changes might be required to A/52; and Mr. Todd indicated he was not aware that any other changes were required. Still, Mr. Richer suggested that T3 should undertake a complete review of A/52 before balloting the proposed changes.

Chairman Justus called the matter to a vote. **Mr. Miller withdrew his second based on Mr. Richer's comments. The chair suggested that Mr. Todd conduct the review of A/52, after which Mr. Todd's recommendations would come back to T3 at its February meeting for voting to proceed to ballot.** Chairman Justus asked anyone concerned in this issue to contact Mr. Todd and provide input.

Chairman Justus, determining there was a consensus to fully review A/52, deferred this issue to the next T3 meeting.

7. Report of the Specialist Group on Data Broadcast (S13)

Regis Crinon (Intel) reported on the work of S13. Results of A/90 balloting (Implementation Guidelines) were reported to the Committee. The results are:

1. Guidelines document, 14 yes, 1 no
2. Editorial privilege, 14 yes 0 no

Comments were received from Sarnoff, Samsung, NAB, Harris, and Triveni Digital. Mr. Crinon reported that the purely editorial changes have already been addressed. Phone conferences are scheduled over the next month to address the remaining comments. Mr. Crinon estimated that this work would be completed by December 15.

Mr. Crinon briefed the Committee on IP multicast activities, with S13 deciding to recommend to T3 that the technical specification become an ATSC standard. This work will also include an Informative Annex. This document is expected to be brought to T3 for consideration at its next meeting. The current specification was drafted in July 2000. A revised version will be produced by December 20.

Regarding the transport stream file system, S13 is in the process of establishing a list of requirements to enable efficient browsing applications and selective downloading by the receiver.

Mr. Crinon also briefed the Committee on liaison work with MPEG, which he reported to be progressing well. Work was outlined regarding MPEG2-2000, specifically "Video Amendment for Content Description Data." MPEG has invited ATSC to consider this as a possible work item, presumably for S6.

The invitation to ATSC was discussed by Chairman Justus and Mr. Richer, who identified that a new chair was required for T3/S6. The question of active picture area was identified by Peter Dare (Sony) as one of the important issues to be discussed by S6 on an urgent basis.

Chairman Justus assigned this task to S6 on an expedited basis. Chairman Justus sought suggestions as to who could chair the subcommittee. Mr. Miller pointed out that a similar liaison statement had been received by SMPTE. **Mr. Miller volunteered to serve as an interim chair for the S6 effort, and Chairman Justus so appointed. Mr. Miller was charged with expeditiously addressing this issue and respond to MPEG.** Mr. Dare said that the CEA membership should also have visibility of this issue.

8. New Work Request on Standardization of Triggers (IS-DWG)

Rich Chernock (IBM) identified the work completed to date on this issue (Attachment 5). He reported that the IS group feels the trigger issues should be made into a standard, and that S13 would be appropriate body to accomplish that task. **Mr. Chernock moved that the Standardization of Triggers, as identified by IS, should be assigned to S13 for consideration of standardization by ATSC. Mr. Allison seconded motion.** Mr. Dare emphasized that whatever S13 does on the trigger issue, it must be compatible with cable. Mr. Allison agreed that it was a desired objective, however, there were other issues involved, including should we deploy a system that has growth potential or deploy a system that meets only the requirements of today.

Mike Dolan and Mr. Richer suggested that S13 should create a strong and clear resolution statement of what work was going to be done, and encourage cooperation with other organizations. Mr. Chernock reminded the group that compatibility with A/90 was very important. The possibility of MPEG standardization of triggers was identified as another reason for moving forward with this issue in an expeditious manner. Mr. Crinon voiced the opinion that cable will take a hard look at A/90 and ultimately will come to give it greater consideration.

Chairman Justus drew the discussion to a close. **The motion was approved by a unanimous voice vote.**

At 11.52 am, the meeting broke for lunch.

The meeting was reconvened by Chairman Justus at 12:45pm.

9. Report of the Specialist Group on Satellite Broadcast (S14A)

Dipak Shah (DirecTV) briefed the committee on the activities of S14A (Attachment 6). Three meetings have been held since the last T3 meeting. The subcommittee's draft document was reviewed, completing a variety of items, and adding a system overview section. Requirements have been grouped into five areas: audio, video, transport, PSIP, and other. The committee also addressed comments received so far on the document.

Some discussion of specific areas of the S14A work ensued, with Mr. Allison, Mr. Lechner, and others commenting. Because the issues in question will be addressed in S8 at a later, the discussion was drawn to a close by Chairman Justus.

A Draft Requirements document has been developed by S14A and the primary elements of the document were reviewed and discussed. Mr. Richer questioned whether 50 Hz formats will be included in the document. Mr. Shah indicated that the issue had not yet been addressed, but that they intended to do so.

The Transport Draft Requirements (Attachment 7) were also reviewed, with principle points being outlined in the printed briefing package. Questions were raised regarding the transport stream capabilities of the system. Chairman Justus suggested that further discussion should be carried on by S14 on this issue.

10. Report of the Specialist Group on RF Transmission (S9)

John Tollefson (PBS) summarized the activity of the initial S9 meeting held on Monday, November 13. The draft work plan and schedule was reviewed. The schedule was identified as being aggressive, but necessary given the needs of the industry. Input from the broadcast industry is in hand, and input from the CE industry is being worked on by CEA.

The work of the S9 testing sub group (chaired by Jim Kutzner) was outlined, including development of a Recommended Practice for field testing. Future meeting dates were identified.

Mr. Tollefson asked T3 to consider affirming the work plan and schedule as outlined by S9. Discussion of the schedule ensued. Mr. Tollefson reported that S9 was agreeable to system simulation, including data capture and analysis techniques. In response to a question, Mr. Tollefson outlined the general elements of the CEA study, which is in the form of a questionnaire-based survey.

Mr. Richer, in response to a question from Chairman Justus, stated that ATSC rules do not require T3 approval of the S9 plan, however, he encouraged that it adopt the plan and thereby provide close management of the overall effort.

The practicality of the milestone dates, specifically field testing, was the subject of some debate. Mr. Tollefson reported that this schedule would be revisited on a regular basis by S9.

Mr. Adams moved that T3 accept the S9 work plan and schedule. Seconded by Mr. Allison. After some additional discussion, Chairman Justus called the vote. **On a voice vote, the motion was carried unanimously.**

11. Report of the Specialist Group on Interactive Services (S16)

Michael Haley (IBM) provided an update on T3-S16. (Note that during the meeting, this item was taken up before the S9 report in order to accommodate Mr. Haley's schedule.) The future of the subcommittee was discussed by Mr. Haley, Mr. Chernock, Mr. Richer, and Chairman Justus. Among the issues identified were Mr. Haley's inability to devote necessary time to the effort because of business demands. The ultimate future of S16 was identified by Mr. Richer as an issue. Mr. Haley stated he was willing to help transition to a new chair to the extent possible. He reported that the goal of developing interactive services was still important, and to that end the committee had done a good job.

Mr. Richer suggested a meeting of T3-S16 be scheduled and that Mr. Chernock be asked to act as interim chair of the meeting, with the focus being future activities and, if appropriate, the terms of reference. Assuming that it is decided S16 should go forward, a permanent chair would be identified. **Chairman Justus so directed.**

12. Report of the Specialist Group on DASE (S17)

Aninda DasGupta (Philips) briefed the T3 members on the work of S17 (Attachment 8). After an overview of the architecture of the DASE system, the recommendations of the S17 committee were outlined. The subcommittee decided to divide the output document into several smaller, more specialized documents to facilitate easier understanding of the DASE Standard, and also as a way of moving forward with those elements of S17 work that are completed, rather than waiting for all elements of the work to be finished.

Mr. DasGupta proposed to T3 that five documents be authorized for letter ballot as Candidate Standards (CS):

- Introduction, Architecture and Common Facilities (S17-099)
- Procedural Applications (S17-100)
- Application Programming Interfaces (S17-108)
- Declarative Applications (S17-101)
- Fonts (S17-107)

There are three other documents that S17 expects to bring to T3 in the near future:

- Security (S17-102)
- Conformance Statement (S17-104)
- Application Reference Model (S17-103)

The specific schedule for the remaining documents was outlined for the Committee. Mr. DasGupta outlined for T3 the definition of a Candidate Standard.

The Conformance Statement Document, because of its dependence on other documents in the suite, can be completed only after all other elements have been completed.

Mr. Allison expressed concerns over the voting procedure proposed by S17, and the short timeframe allowed for putting these documents out to ballot, inasmuch as two of the documents have just been completed, and three are still undergoing final work.

Mr. Allison suggested that the Introduction/Architecture and Fonts documents should be formally submitted to T3, at which point it would be appropriate to ballot T3. Mr. Richer addressed the issue of a Candidate Standard, raised by Mr. Allison and others. Mr. Richer emphasized that the approval of a Candidate Standard meant that it would not automatically be sent to ATSC balloting, but rather the issue would return to T3 for approval of balloting of the final document.

Mr. Tanner suggested that the entire suite of S17 documents be balloted by T3 at the February 13 meeting. Mr. Miller urged review of those documents that are now available. He supported the Candidate Standard approach, even if on an informal basis. Mr. Miller said that the level of complexity involved demands that the process be moved forward. He said if we define what Candidate Standard is when the documents are released, there would be no ambiguity.

Chairman Justus repeated the recommendation of S17 for the purpose of a motion. Seconded by Mr. Dolan.

Mr. Tanner repeated his suggestion that T3 set the next meeting for a ballot, allowing time for committee review. Mr. Adams argued in favor of moving forward because of the importance of the documents. Mr. Miller suggested a possible solution; he observed that a consensus had been reached in S17, and since there seems to be dissent on the part of T3 members, it would be appropriate to announce to T3 that consensus had been reached and urge members of T3 to study the documents and comment. He suggested that T3 expects members to comment in advance of the February 13 meeting, when—presumably—a formal vote would be taken to ballot the documents to T3.

Chairman Justus again summarized the motion, and called the question for a show of hands to determine whether a roll call vote was required. The roll call vote was required, and Chairman Justus conducted the vote. The motion was defeated.

Mr. Tanner moved that T3 authorize a letter ballot for all of the main components of the DASE standard, with a normal 6 week letter ballot period to begin February 13, with the two documents ready now to be released immediately, and the others to be released to the committee on the schedule outlined. Seconded by John Henderson (Hitachi).

Chairman Justus stated there was a need to show progress on the DASE effort, and that issuing a letter ballot was the only way to get substantive comment on the proposed standards.

Mr. Allison spoke against motion because it elevated this issue to a higher level that S17 is currently comfortable with.

Chairman Justus called the question. After a hand vote, the chair determined that the motion was defeated. The Chair suggested a pre-comment review of the documents now ready and the three other documents that will be ready in December. Chairman Justus determined that the formal T3 ballot issue will be addressed at the February T3 meeting. Mr. DasGupta was asked to deliver the documents in a timely manner to ATSC staff, which will distribute them to T3 members.

Mr. Dolan reported on liaison effort with Open Cable, ITU-R, and ITU-T in the field of application environments. The S17 chairman, on behalf of S17, sent a request to T3 Chairman Justus recommending that ATSC undertake an effort to establish a liaison with, and undertake harmonization with these organizations.

Mr. Richer discussed a recent meeting with Richard Green of Cable Labs, who made it clear that he wanted to work with ATSC, but through ITU-T. Mr. Richer suggested that S17 should review the Open Cable specification and report back its recommendations.

Chairman Justus suggested that T3/S17 review the OpenCable specifications and directed ATSC staff to work toward further coordination between the groups.

Alan Mink (NIST) briefed the Committee on the spring DASE symposium planned for June in which the ATSC will participate. Planning will be done in cooperation with S17 and ATSC staff.

13. Update on MOU with Sun

Mr. Richer outlined the memorandum of understanding issue with Sun Microsystems. Mr. Richer said he is planning over the next few weeks to ask Committee members to identify any intellectual property involved in the S17 documents. A meeting is planned in January to discuss intellectual property issues with regard to DASE. Mr. Richer indicated that he was still not convinced that an MOU between the ATSC and Sun was necessary.

14. Report of the Specialist Group on Data Multiplex/Transport (S8)

Mr. Lechner reported on work to define a new UPID and the status of liaison with ISAN. On the subject of work to extend PSIP to accommodate non-alphabetic languages, Mr. Lechner reported good progress, with the subject document nearly ready for discussion by S8. He plans to bring it to T3 for balloting at the February meeting.

Mr. Lechner reported considerable work on PSIP implementation. Among the new resources are an NAB web page dedicated to PSIP and a new version of the PSIP reflector. Also, NAB is conducting a study to gather information on the status of PSIP implementation.

Regarding possible amendments to the A/65 standard, there are some ongoing efforts by an ad-hoc group. Mr. Lechner expects to bring those updates to T3, possibly by February, more likely later.

Mr. Lechner also reported on extensions to PSIP EPG capability. A new ad-hoc group, chaired by Gomer Thomas, has delivered a new document, with review now underway. Mr. Lechner expects to have something ready for consideration at the next T3 meeting.

Mr. Lechner discussed directed channel change. Balloted to ATSC and approved, a resolution task force met and resolved the comments from the no vote, where it was possible to do so with editorial changes. There were some comments concerning RRT that would require revision, and a document dealing with those substantive changes was

developed. **This change will be sent to T3 for a two week review period. If no comments are received after the review period, the change is to be balloted to T3 for a period of three weeks.**

15. Other Business

Mr. Dolan discussed the need for Guidelines for Normative References in ATSC standards documents (Attachment 9). A group has been formed to examine this issue, but has not yet met. Mr. Dolan requested that Chairman Justus assign a chair to champion this project. Following some discussion, **Chairman Justus directed that the issue be incorporated into current work on ATSC process changes.**

Mr. Adams reported on the progress of the ad-hoc group on ATSC vocabulary. He expected to have a document available for comment before the end of the year.

17. Adjournment

Chairman Justus adjourned the meeting at 4:05 p.m.

Respectfully submitted,

Jerry Whitaker
Secretary, T3

**Technology Group on Distribution (T3) Meeting
Attendance List
November 15, 2000**

| | |
|-------------------------|--|
| ABC | Randy Hoffner |
| ATSC | Mark Richer, Jerry Whitaker |
| ATTC | Charles, Einolf, Sang Gil Lee |
| Canal+ | Jian Huang |
| CBS | Greg Coppa |
| CDTV | Lou Montana |
| CEA | Ralph Justus |
| CRC | Gerald Chouinard |
| DirecTV | Dipak Shah, Mike Dolan, Bob Plummer |
| Dolby | Craig Todd |
| Eastman-Kodak | Art Cosgrove |
| Faroudja Labs | Carlos Kennedy |
| Gemstar | Glenn Adams |
| Hewlett-Packard | Lee Raguz |
| Hitachi | John Henderson |
| IBM | Rich Chernock |
| Intel | Regis Crinon |
| Mitsubishi | James Fang |
| Mixed Signals | Drake Smith |
| Motorola | Sam Narasimhan, Jeff Krauss (consultant) |
| NAB | Art Allison |
| News Corp. | Scott Hamilton |
| NIST | Alan Mink |
| OpenTV | Taylor Kidd* |
| Panasonic Broadcast | Fred Van Roessel |
| PBS | John Tollefson |
| Philips | Aninda DasGupta |
| Samsung | C.B. Patel (consultant) |
| Sarnoff (& T3/S8 Chair) | Bernie Lechner (consultant) |
| SBE | Andy Butler |
| Scientific Atlanta | Bill Wall |
| Sharp | Craig Tanner |
| Skystream | John Mick* |
| SMPTE | William Miller |
| Sony | Peter Dare |
| Thomcast | Brett Jenkins |
| Thomson | Jean-Louis Diascorn |
| Toshiba Consumer | Marc Mueller |
| Tribune | Merrill Weiss (consultant) |
| Zenus | Jae-Soo Yoon |

ATTACHMENT 2: DRAFT Agenda
ATSC Technology Group on Distribution (T3)
10:00 AM – 4:00 PM
National Association of Broadcasters
1771 N Street, Washington, DC
November 15, 2000

- 1) Welcome, Introductions and Determination of Quorum
- 2) Approval of Proposed Agenda
- 3) Approval of the draft minutes of August 16 meeting
- 4) Opening Remarks
 - a) Comments by the Executive Director Mark Richer
 - b) Status of ballots
 - c) Other
- 5) Brief Reports on Actions from the August meeting
- 6) New Work Items for Discussion
 - a) Assigned by Executive Committee
 - b) Other
- 6.5 A/53 Ballot, A/52 Review, Craig Todd (Dolby)
- 7) Report of the Specialist Group on Data Broadcast (S13) Regis Crinon
 - a) A/90 Implementation Guidelines – Ballot Results
 - b) IP Multicast Activities
 - c) Transport Stream File System
 - d) Liaison: MPEG & ITU
- 8) New Work Request on Standardization of Triggers (IS-DIWG) Rich Chernock
- 9) Report of the Specialist Group on Satellite Broadcast (S14-A) Dipak Shah
 - a) Report from Past Meetings
 - b) Review Requirements Document
 - c) Review Next S14-A Meeting Agenda
- 10) Report of the Specialist Group on RF Transmission (S9) John Tollefson
 - a) Initial report
- 11) Report of the Specialist Group on Interactive Services (S16) Michael Haley
 - a) Discussion of the future of S16
- 12) Report of the Specialist Group on DASE (S17) Aninda DasGupta
 - a) S17 presentation of major technical changes to DASE since last T3 tutorial
 - b) Introduction to DASE documents and relationships between documents
 - c) Discussion about how to ballot S17 documents
 - d) Spring DASE symposium at NIST Alan Minks
 - e) ITU Liaison Issues Mike Dolan
 - f) WC-3 Liaison Glenn Adams
- 13) Update on MOU with Sun Mark Richer
- 14) Report of the Specialist Group on Data Multiplex/Transport (S8) Bernie Lechner
 - a) Update on work to define a new UPID. Status of liaison with ISAN
 - b) Update on work to extend PSIP to accommodate non-alphabetic languages. Status of liaison with Taiwan and Korea
 - c) PSIP implementation issues. Next Corrigendum/Amendment. Possible ATSC filing with FCC
 - d) Update on copy-protection descriptor
 - e) Update on extensions to PSIP EPG capability
- 15) Other Business
 - a) Guidelines for Normative References in Standards Mike Dolan
 - b) Use of Private Fields and Ranges Rich Chernock
 - c) S group meetings in Korea, May 2001 Rich Chernock
 - d) Report on ad-hoc Group on ATSC Vocabulary Glenn Adams
- 16) Schedule of Next T3 Meetings:

Next meeting: February 13, 2001

17) Adjournment

ATTACHMENT 3: Letter Ballot Status

| T3 Letter Ballot Description APPENDIX 3 | Question | Vote |
|--|---|--|
| Data Broadcast Standard Implementation Guidelines (T3 approved on November 8, 2000) | 1) Guidelines document 2) Editorial privilege | 14 yes; 1 no; 3 abs; 34 not voting 14 yes; 2 no; 2 abs; 34 not voting |
| Revision to A/53 (T3 approved on October 19, 2000) increase bit rate to 448 kb/s in Annex B and incorporate Amendment No. 1 | 1) Amendment to Annex B 2) Editorial privilege 3) Incorporate Amendment into Revised A/53 | 20 yes; 1 no; 1 abs; 30 not voting 20 yes; 2 no; 2 abs; 34 not voting 20 yes; 1 no; 1 abs; 30 not voting |
| DASE Ballot - Petition to ballot was withdrawn | | |

To: ATSC T3
From: Craig Todd, Dolby Laboratories
Date: Nov. 9, 2000
Subject: Draft revisions to ATSC A/52 Annex A

This document proposes three revisions to the ATSC A/52, "Digital Audio Compression (AC-3)" Standard.

1. Replace A/52 Annex A with the attached new text.

Annex A specifies how AC-3 is multiplexed into MPEG-2 transport streams. The original version of Annex A was a general description of AC-3 multiplexing into both Transport and Program streams and does not accurately describe how AC-3 is multiplexed into ATSC. The new version proposed here is specific to the ATSC system and the DVB system, and does not cover general systems or systems that employ MPEG-2 Program Streams. The new text proposed is identical in technical content (but slightly different in style) to new text being put into a revision of ITU-R Recommendation BS.1196 ("Audio Coding for DTTB"). The revision to BS.1196 has been approved by both WP6D and by SG6.

2. Add the following normative reference to A/52

ISO/IEC 13818-1 MPEG-2 Systems

This document is referenced in A/52 Annex A.

3. Delete A/52 Annex B

This informative annex describes a method to carry the AC-3 data stream over the IEC958 interface. There is no longer any reason to include this information. The IEC has standardized the interface for consumer applications in IEC61937. SMPTE has standardized the interface for professional applications in SMPTE standards 337M, 338M, and 340M.

Annex A

(Normative)

AC-3 ELEMENTARY STREAMS IN THE MPEG-2 MULTIPLEX

1 SCOPE

This Appendix contains specifications on how to combine one or more AC-3 elementary streams into the ATSC (Recommendation ITU-R BT.1300 System A) or DVB (Recommendation ITU-R BT.1300, System B) MPEG-2 "Transport Stream" (ISO/IEC 13818-1).

2 INTRODUCTION

The AC-3 elementary bit stream is included in an MPEG-2 multiplex bit stream in much the same way an MPEG-1 audio stream would be included. The AC-3 bit stream is packetized into PES packets. An MPEG-2 multiplex bit stream containing AC-3 elementary streams must meet all audio constraints described in the STD model in § 3.6 (System A) or § 4.4 (System B). It is necessary to unambiguously indicate that an AC-3 stream is, in fact, an AC-3 stream (and not an MPEG audio stream). The MPEG-2 standard does not explicitly indicate codes to be used to indicate an AC-3 stream. Also, the MPEG-2 standard does not have an audio descriptor adequate to describe the contents of the AC-3 bit stream in the PSI tables.

The AC-3 audio access unit (AU) or presentation unit (PU) is an AC-3 sync frame. The AC-3 sync frame contains 1536 audio samples. The duration of an AC-3 access (or presentation) unit is 32 ms for audio sampled at 48 kHz, approximately 34.83 ms for audio sampled at 44.1 kHz, and 48 ms for audio sampled at 32 kHz.

The items which need to be specified in order to include AC-3 within the MPEG-2 bit stream are: stream_type, stream_id, AC-3 audio descriptor, and, for the ATSC system only, the registration descriptor. The registration descriptor is not required in the DVB system since the AC-3_descriptor is regarded as a public descriptor in this system. The ISO 639 language descriptor may be employed to indicate language. Some constraints are placed on the PES layer for the case of multiple audio streams intended to be reproduced in exact sample synchronism. In System A (ATSC) the AC-3 audio descriptor is titled "audio_stream_descriptor" while in System B (DVB) the AC-3 audio descriptor is titled "AC-3 descriptor". It should be noted that the syntax of these descriptors differs significantly between the two systems.

3 DETAILED SPECIFICATION FOR ATSC (SYSTEM A)

3.1 Stream_type

The value of stream_type for AC-3 shall be 0x81.

3.2 Stream_id

The value of stream_id in the PES header shall be 0xBD (indicating private_stream_1). Multiple AC-3 streams may share the same value of stream_id since each stream is carried with a unique PID value. The mapping of values of PID to stream_type is indicated in the transport stream programme map table (PMT).

3.3 Registration descriptor

The syntax of the AC-3 registration descriptor is shown in Table 1. The AC-3 registration descriptor shall be included in the TS_program_map_section.

Table 1 AC-3 registration descriptor

| Syntax | No. of bits | Mnemonic |
|-----------------------------|-------------|----------|
| registration_descriptor() { | | |
| descriptor_tag | 8 | uimsbf |
| descriptor_length | 8 | uimsbf |
| format_identifier | 32 | uimsbf |
| } | | |

descriptor_tag — 0x05.

descriptor_length — 0x04.

format_identifier — The AC-3 format_identifier is 0x41432D33 (“AC-3”).

3.4 AC-3 audio_stream_descriptor (ATSC)

The AC-3 audio_stream_descriptor, shown in Table 2, allows information about individual AC-3 elementary streams to be included in the programme specific information (PSI) tables. This information is useful to allow the appropriate AC-3 stream(s) to be directed to the audio decoder. Note that horizontal lines in the table indicate allowable termination points for the descriptor.

Table 2 AC-3 audio_stream_descriptor syntax

| Syntax | No. of bits | Mnemonic |
|---|---|---|
| audio_stream_descriptor() { descriptor_tag descriptor_length sample_rate_code bsid bit_rate_code surround_mode bsmod num_channels full_svc | 8 8 3 5 6 2 3 4 1 | uimsbf uimsbf bslbf bslbf bslbf bslbf bslbf bslbf bslbf |
| langcod | 8 | bslbf |
| if(num_channels==0) /* 1+1 mode */ langcod2 | 8 | bslbf |
| if(bsmod<2) { mainid reserved } else asvcflags | 3 5 8 | uimsbf bslbf bslbf |
| textlen text_code for(i=0; i<M; i++) { text[i] } | 7 1 8 | uimsbf bslbf bslbf |
| for(i=0; i<N; i++) { additional_info[i] } } | N×8 | bslbf |

descriptor_tag – The value for the AC-3 descriptor tag is 0×81.

descriptor_length – This is an 8-bit field specifying the number of bytes of the descriptor immediately following descriptor_length field.

sample_rate_code – This is a 3-bit field which indicates the sample rate of the encoded audio. The indication may be of one specific sample rate, or may be of a set of values which include the sample rate of the encoded audio (see Table 3).

Table 3 Sample rate code table

| sample_rate_code | Sample rate (kHz) |
|-------------------------|--------------------------|
| '000' | 48 |
| '001' | 44.1 |
| '010' | 32 |
| '011' | Reserved |
| '100' | 48 or 44.1 |
| '101' | 48 or 32 |
| '110' | 44.1 or 32 |
| '111' | 48 or 44.1 or 32 |

bsid – This is a 5-bit field which is set to the same value as the bsid field in the AC-3 elementary stream.

bit_rate_code – This is a 6-bit field. The lower 5 bits indicate a nominal bit rate. The MSB indicates whether the indicated bit rate is exact (MSB =0) or an upper limit (MSB =1) (see Table 4).

Table 4 Bit rate code table

| bit_rate_code | Exact bit rate (kbit/s) | bit_rate_code | Bit rate upper limit (kbit/s) |
|----------------------|--------------------------------|----------------------|--------------------------------------|
| '000000' (0.) | 32 | '100000' (32.) | 32 |
| '000001' (1.) | 40 | '100001' (33.) | 40 |
| '000010' (2.) | 48 | '100010' (34.) | 48 |
| '000011' (3.) | 56 | '100011' (35.) | 56 |
| '000100' (4.) | 64 | '100100' (36.) | 64 |
| '000101' (5.) | 80 | '100101' (37.) | 80 |
| '000110' (6.) | 96 | '100110' (38.) | 96 |
| '000111' (7.) | 112 | '100111' (39.) | 112 |
| '001000' (8.) | 128 | '101000' (40.) | 128 |
| '001001' (9.) | 160 | '101001' (41.) | 160 |
| '001010' (10.) | 192 | '101010' (42.) | 192 |
| '001011' (11.) | 224 | '101011' (43.) | 224 |
| '001100' (12.) | 256 | '101100' (44.) | 256 |
| '001101' (13.) | 320 | '101101' (45.) | 320 |
| '001110' (14.) | 384 | '101110' (46.) | 384 |
| '001111' (15.) | 448 | '101111' (47.) | 448 |
| '010000' (16.) | 512 | '110000' (48.) | 512 |
| '010001' (17.) | 576 | '110001' (49.) | 576 |
| '010010' (18.) | 640 | '110010' (50.) | 640 |

dsurmod – This is a 2-bit field which may be set to the same value as the dsurmod field in the AC-3 elementary stream, or which may be set to '00' (not indicated) (see Table 5).

Table 5 Dsurmod table

| surround_mode | Meaning |
|----------------------|----------------------------|
| '00' | Not indicated |
| '01' | NOT Dolby surround encoded |
| '10' | Dolby surround encoded |
| '11' | Reserved |

bsmod – This is a 3-bit field which is set to the same value as the bsmod field in the AC-3 elementary stream.

num_channels – This is a 4-bit field which indicates the number of channels in the AC-3 elementary stream. When the MSB is 0, the lower 3 bits are set to the same value as the acmod field in the AC-3 elementary stream. When the MSB field is 1, the lower 3 bits indicate the maximum number of encoded audio channels (counting the lfe channel as 1). If the value of acmod in the AC-3 elementary stream is '000' (1+1 mode), then the value of num_channels shall be set to '0000' (see Table 6).

Table 6 Num_channels table

| num_channels | Audio coding mode (acmod) | num_channels | Number of encoded channels |
|---------------------|----------------------------------|---------------------|-----------------------------------|
| '0000' | 1 + 1 | '1000' | 1 |
| '0001' | 1/0 | '1001' | ≤ 2 |
| '0010' | 2/0 | '1010' | ≤ 3 |
| '0011' | 3/0 | '1011' | ≤ 4 |
| '0100' | 2/1 | '1100' | ≤ 5 |
| '0101' | 3/1 | '1101' | ≤ 6 |
| '0110' | 2/2 | '1110' | Reserved |
| '0111' | 3/2 | '1111' | Reserved |

full_svc – This is a 1-bit field which indicates whether or not this audio service is a full service suitable for presentation, or whether this audio service is only a partial service which should be combined with another audio service before presentation. This bit should be set to a “1” if this audio service is sufficiently complete to be presented to the listener without being combined with another audio service (for example, a visually impaired service which contains all elements of the programme; music, effects, dialogue, and the visual content descriptive narrative). This bit should be set to a “0” if the service is not sufficiently complete to be presented without being combined with another audio service (e.g., a visually impaired service which only contains a narrative description of the visual programme content and which needs to be combined with another audio service which contains music, effects, and dialogue).

langcod – This is an 8-bit field which is set to the same value as the langcod field in the AC-3 elementary stream.

langcod2 – This is an 8-bit field which is set to the value of the langcod2 field in the AC-3 elementary stream.

Note that this field is not used to indicate language, as indication of language in MPEG-2 systems is done by means of the ISO 639 language descriptor. (NOTE - Since they have not been used, the meaning of the langcod and langcod2 fields in the AC-3 elementary stream could be redefined in the future.)

mainid – This is a 3-bit field which contains a number in the range 0-7 which identifies a main audio service. Each main service should be tagged with a unique number. This value is used as an identifier to link associated services with particular main services.

asvcflags – This is an 8-bit field. Each bit (0-7) indicates with which main service(s) this associated service is associated. The left most bit, bit 7, indicates whether this associated service may be reproduced along with main service number 7. If the bit has a value of 1, the service is associated with main service number 7. If the bit has a value of 0, the service is not associated with main service number 7.

textlen – This is an unsigned integer which indicates the length, in bytes, of a descriptive text field which follows.

text_code – This is a 1-bit field which indicates how the following text field is encoded. If this bit is a “1”, the text is encoded as 1-byte characters using the ISO Latin-1 alphabet (ISO 8859-1). If this bit is a “0”, the text is encoded with 2-byte unicode characters.

text[i] – The text field may contain a brief textual description of the audio service.

additional_info[i] – This is a set of additional bytes filling out the remainder of the descriptor. The purpose of these bytes is not currently defined. This field is provided to allow the descriptor to be extended in the future.

3.5 ISO_639_language_code

The ISO_639_language_code descriptor allows a stream to be tagged with the 24-bit ISO 639 language code.

3.6 STD audio buffer size

For an MPEG-2 transport stream, the T-STD model [ISO/IEC 13818-1] defines the main audio buffer size BS_n as:

$$BS_n = BS_{mux} + BS_{dec} + BS_{oh}$$

where:

$$BS_{mux} = 736 \text{ bytes}$$

$$BS_{oh} : \text{ PES header overhead}$$

BS_{dec} : access unit buffer.

MPEG-2 specifies a fixed value for BS_n (3 584 bytes) and indicates that any excess buffer may be used for additional multiplexing.

When an AC-3 elementary stream is carried by an MPEG-2 transport stream, the transport stream shall be compliant with a main audio buffer size of:

$$BS_n = BS_{mux} + BS_{pad} + BS_{dec}$$

where:

$$BS_{mux} = 736 \text{ bytes}$$

$$BS_{pad} = 64 \text{ bytes}$$

BS_{dec} may be found in Table 13 of ATSC Standard A/52. The value of BS_{dec} employed shall be that of the highest bit rate supported by the system (i.e. the buffer size is not decreased when the audio bit rate is less than the maximum value allowed by a specific system). The 64 bytes in BS_{pad} are available for BS_{oh} and additional multiplexing.

4 DETAILED SPECIFICATION FOR DVB (SYSTEM B)

4.1 *Stream_type*

The value of *stream_type* for an AC-3 elementary stream shall be 0x06 (indicating PES packets containing private data).

4.2 *Stream_id*

The value of *stream_id* in the PES header shall be 0xBD (indicating *private_stream_1*). Multiple AC-3 streams may share the same value of *stream_id* since each stream is carried with a unique PID value. The mapping of values of PID to *stream_type* is indicated in the transport stream programme map table (PMT).

4.3 *Service Information*

4.3.1 AC-3 Descriptor

The *AC-3_descriptor* identifies an AC-3 audio elementary stream that has been coded in accordance with this Standard. The intended purpose is to provide configuration information for the receiver. The descriptor is located in the PSI PMT, and used once in a program map section following the relevant *ES_info_length* field for any stream containing AC-3.

The descriptor tag provides a unique identification of the presence of the AC-3 elementary stream. Other optional fields in the descriptor may be used to provide identification of the component type mode of the AC-3 audio coded in the stream (*AC-3_type* field) and indicate if the stream is a main AC-3 audio service (*mainid* field) or an associated AC-3 service (*asvc* field).

The descriptor has a minimum length of one byte, but may be longer depending upon the state of the flags and the additional info loop.

4.3.2 AC-3 Descriptor Syntax

The AC-3 descriptor (see Table 7) shall be used in the PSI PMT to identify streams which carry AC-3 audio. The descriptor is to be located once in a program map section following the relevant ES_info_length field.

Table 7 AC-3 Descriptor Syntax (DVB)

| Syntax | No. of Bits | Identifier |
|---|--|--|
| AC-3_descriptor(){ descriptor_tag descriptor_length AC-3_type_flag bsid_flag mainid_flag asvc_flag reserved reserved reserved reserved } | 8 8 1 1 1 1 1 1 1 1 | uimsbf uimsbf bslbf bslbf bslbf bslbf bslbf bslbf bslbf bslbf |
| If (AC-3_type_flag)==1{ AC-3_type } | 8 | uimsbf |
| If (bsid_flag)==1{ bsid } | 8 | uimsbf |
| If (mainid_flag)==1{ mainid } | 8 | uimsbf |
| If (asvc_flag)==1{ asvc } | 8 | bslbf |
| For(l=0;l<N;l++){ additional_info[l] } | N x 8 | uimsbf |
| } | | |

descriptor_tag – The descriptor tag is an 8-bit field which identifies each descriptor. The AC-3 descriptor_tag shall have a value of 0x6A.

descriptor_length – This 8-bit field specifies the total number of bytes of the data portion of the descriptor following the byte defining the value of this field. The AC-3 descriptor has a minimum length of one byte but may be longer depending on the use of the optional flags and the additional_info loop.

AC-3_type_flag – This 1-bit field is mandatory. It should be set to "1" to include the optional AC-3_type field in the descriptor.

bsid_flag – This 1-bit field is mandatory. It should be set to "1" to include the optional bsid field in the descriptor.

mainid_flag – This 1-bit field is mandatory. It should be set to "1" to include the optional mainid field in the descriptor.

asvc_flag – This 1-bit field is mandatory. It should be set to "1" to include the optional asvc field in the descriptor.

reserved flags – These 1-bit fields are reserved for future use. They should always be set to "0".

AC-3_type – This optional 8-bit field indicates the type of audio carried in the AC-3 elementary stream. It is set to the same value as the component type field of the component descriptor (refer to Table 55).

bsid – This optional 8-bit field indicates the AC-3 coding version. The three MSBs should always be set to "0". The five LSBs are set to the same value as the bsid field in the AC-3 elementary stream, '01000' (=8) in the current version of AC-3.

mainid – This optional 8-bit field identifies a main audio service and contains a number in the range 0-7 which identifies a main audio service. Each main service should be tagged with a unique number. This value is used as an identifier to link associated services with particular main services.

asvc – This 8-bit field is optional. Each bit (0-7) identifies with which main service(s) this associated service is associated. The left most bit, bit 7, indicates whether this associated service may be reproduced along with main service number 7. If the bit has a value of 1, the service is associated with main service number 7. If the bit has a value of 0, the service is not associated with main service number 7.

additional_info – These optional bytes are reserved for future use.

4.3.3 AC-3 Component Types

Table 8 shows the assignment of component_type values in the component_descriptor in the case that the stream_content value is set to 0x04, indicating the reference to an AC-3 stream.

Table 8 AC-3 Component_type byte value assignments

| Component_type byte values (permitted settings) | | | | | | | | Description | |
|---|-------------------|--------------------|----|----|--------------------------|----|----|---|---|
| reserved status flag | full service flag | service type flags | | | number of channels flags | | | | |
| b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 | | |
| 1 | X | X | X | X | X | X | X | reserved | |
| 0 | X | X | X | X | X | X | X | Interpret b0-b6 as indicated below | |
| | 1 | X | X | X | X | X | X | Decoded audio stream is a full service (suitable for decoding and presentation to the listener) | |
| | 0 | | | | | | | Decoded audio stream is intended to be combined with another decoded audio stream before presentation to the listener | |
| | X | X | X | X | X | 0 | 0 | 0 | Mono |
| | | | | | | 0 | 0 | 1 | 1+1 mode |
| | | | | | | 0 | 1 | 0 | 2 Channel (stereo) |
| | | | | | | 0 | 1 | 1 | 2 Channel Dolby surround encoded (stereo) |
| | | | | | | 1 | 0 | 0 | Multichannel audio (>2 channels) |
| | | | | | | 1 | 0 | 1 | reserved |
| | | | | | | 1 | 1 | 0 | reserved |
| | | | | | | 1 | 1 | 1 | reserved |
| | 1 | 0 | 0 | 0 | X | X | X | Complete Main (CM) | |
| | 0 | 0 | 0 | 1 | | | | Music and Effects (ME) | |
| | X | 0 | 1 | 0 | | | | Visually Impaired (VI) | |
| | X | 0 | 1 | 1 | | | | Hearing Impaired (HI) | |
| | 0 | 1 | 0 | 0 | | | | Dialogue (D) | |
| | X | 1 | 0 | 1 | 0 | 0 | 0 | Commentary (C) | |
| | 1 | 1 | 1 | 0 | | | | Emergency (E) | |
| | 0 | 1 | 1 | 1 | | | | Voiceover (VO) | |
| | 1 | 1 | 1 | 1 | X | X | X | Karaoke (mono and '1+1" prohibited) | |

4.4 STD audio buffer size

The main audio buffer size (BS_n) shall have a fixed value of 5 696 bytes. Refer to ISO/IEC 13818-1 (1996) for the derivation of (BS_n) for audio elementary streams.

5 PES CONSTRAINTS

This section applies to both ATSC (System A) and DVB (System B).

5.1.1 Encoding

In some applications, the audio decoder may be capable of simultaneously decoding two elementary streams containing different programme elements, and then combining the programme elements into a complete programme.

Most of the programme elements are found in the main audio service. Another programme element (such as a narration of the picture content intended for the visually impaired listener) may be found in the associated audio service.

In order to have the audio from the two elementary streams reproduced in exact sample synchronism, it is necessary for the original audio elementary stream encoders to have encoded the two audio programme elements frame synchronously; i.e., if audio stream 1 has sample 0 of frame n taken at time t_0 , then audio stream 2 should also have frame n beginning with its sample 0 taken the identical time t_0 . If the encoding of multiple audio services is done frame and sample synchronous, and decoding is intended to be frame and sample synchronous, then the PES packets of these audio services shall contain identical values of PTS which refer to the audio access units intended for synchronous decoding.

Audio services intended to be combined together for reproduction shall be encoded at an identical sample rate.

5.1.2 Decoding

If audio access units from two audio services which are to be simultaneously decoded have identical values of PTS indicated in their corresponding PES headers, then the corresponding audio access units shall be presented to the audio decoder for simultaneous synchronous decoding. Synchronous decoding means that for corresponding audio frames (access units), corresponding audio samples are presented at the identical time.

If the PTS values do not match (indicating that the audio encoding was not frame synchronous) then the audio frames (access units) of the main audio service may be presented to the audio decoder for decoding and presentation at the time indicated by the PTS. An associated service which is being simultaneously decoded may have its audio frames (access units), which are in closest time alignment (as indicated by the PTS) to those of the main service being decoded, presented to the audio decoder for simultaneous decoding. In this case the associated service may be reproduced out of sync by as much as 1/2 of a frame time. (This is typically satisfactory; a visually impaired narration does not require highly precise timing.)

5.2 Byte-alignment

This section applies to both System A and System B.

The AC-3 elementary stream shall be byte-aligned within the MPEG-2 data stream. This means that the initial 8 bits of an AC-3 frame shall reside in a single byte which is carried by the MPEG-2 data stream.

ATTACHMENT 5

Proposed Work Item: Triggers

Background

One of the major work items within IS/DIWG has been the issue of tight synchronization between broadcast data and other streams (typically A/V). To address the problem of synchronizing complicated data in the presence of timeline discontinuities, the notion of tightly synchronized triggers has evolved. As the work progressed, it was realized that the trigger concept could be applied to more than synchronizing data, for example synchronization of events could be enabled as well (the latter is of particular interest in some of the S17 activities).

DIWG activity

DIWG has created an agreed upon set of needs for a trigger solution. In lengthy discussions, consensus has been reached on part of the trigger solution and the viable alternatives for the remainder of the solution have been examined and enumerated. It is generally felt that the trigger solution can be built upon the existing data broadcast standard (A/90), as an extension to the existing standard.

Recommendation

It is a general feeling of DIWG that the trigger should be standardized. Standardization can't take place within IS, so the recommendation from DIWG is to request a new work item within T3 to standardize triggers. Since the majority of the expertise resides within T3-S13, DIWG suggests that this would be a likely home for the activity.

ATTACHMENT 6: Satellite Broadcast T3/S14-A

Specialist Group Report November 15, 2000

Dipak Shah
DIRECTV

November 15, 2000

ATSC Non-Disclosure Applies

Report from Past Meetings

- **Report from September 12 (7th) & October 17 (8th) Meetings**
 - Items Discussed
 - Reviewed and revised Draft Requirements document
 - Completed References & Acronyms sections
 - Added System Overview section
 - Grouped Requirements in five major categories: Audio, Video, Transport, PSIP, & Other
 - Addressed comments received outside of this Specialist Group

November 15, 2000

ATSC Non-Disclosure Applies

Agenda

- **Report from Past (7th, 8th & 9th) Meetings**
- **Review Draft Requirements**
- **Review 10th Meeting (February 06, 2001) Plan**

November 15, 2000

ATSC Non-Disclosure Applies

Report from Past Meetings

- **Report from November 10 (9th) Meeting**
 - Began to develop specification
 - Reviewed requirements to ensure no major anomaly exist
 - Since, as a minimum, at least two transport streams may be allocated for a satellite transponder, the mux must multiplex two streams into a single stream by interleaving the two
 - Evaluated Program Association Table (PAT) and concluded that a combined stream can only have one PAT
 - Evaluated PMT: PID value (Audio, Video, data PID) may require a change if PIDs have been changed
 - » Add content Advisory Descriptor
 - Evaluated SDT: Re-map PID number and TAP may require re-mapping
 - Evaluated many of the PSIP tables to ensure no major conflict exist
 - Task continues and is on the next meeting's agenda

November 15, 2000

ATSC Non-Disclosure Applies

Draft Requirements Review

- Audio
 - Audio coding shall comply to A/52 (AC-3) at the maximum rate of 448kbps
 - Descriptive Audio (FCC NPRM) shall be supported
 - MPEG-1 Layer II audio can be permitted as a dual carriage option to facilitate use of legacy receivers
- Video
 - Video coding shall comply to MPEG-2 main profile
 - Video shall comply to A/53 Table 3 and additional widely used formats in cable and satellite systems
 - Coding and carriage of Closed Captions defined in EIA-708-B (including EIA-608-B Caption) shall use user data mechanism defined in A/53

November 15, 2000

ATSC Non-Disclosure Applies

Transport Draft Requirements Review

- Multi-program transport stream shall include two or more A/53 transport streams
- Multi-program transport stream shall include extension to A/53 with less constraints such as alignment of picture start code
- Multi-program transport stream may include other ISO-13818-1 compliant streams
- Evaluate and if necessary, specify requirements to handle non-MPEG transport streams
- Evaluate and if necessary, specify data rates used by the existing and future satellite delivery systems
- Evaluate requirement for ad insertion with mechanism to prevent its removal by consumers

November 15, 2000

ATSC Non-Disclosure Applies

PSIP Draft Requirements Review

- Evaluate required extensions to A/65 to facilitate items such as: two parts or one part channel numbers or one number in satellite, grouping of virtual channel- local channel decode based on geo location, etc.
- Specify method of identification of ATSC channel and non-ATSC compliant MPEG programs
- Specify satellite virtual channel table. This table shall include information such as: satellite orbital slot location & frequencies, modulation mode definition table (A/65 Table 6.5), etc. This may require use of currently reserved values in the A/65
- Specify method for carriage of multiple Rating Region Tables in the same channel
- Evaluate PSIP System Target Decoder model for satellite application. (Terrestrial PSIP does not exceed 250 kbps.) evaluate need for additional information to support multiple transport streams
- Develop method to resolve conflict within header descriptors in a multi-program transport stream. Examples: Source ID, Network ID, IP Addressing, Application Tap for data broadcast, etc.

November 15, 2000

ATSC Non-Disclosure Applies

Other Draft Requirements Review

- Support ATSC (A/90) Data Broadcast and IP Multicast specifications
- Evaluate and if necessary, develop an informative table that describes various parameters for a satellite link to assist Receiver maker
- Evaluate and if necessary, specify need for data collection and Nelson Rating type usage
- Develop and if necessary, specify syntax to support Conditional Access system. (use of A/70 will not be required)
- Evaluate and if necessary, develop methods to support proprietary Electronics Program Guide (EPG) used by existing delivery systems
- Evaluate and if necessary, develop methods to support FCC rule 15.120 for the Closed Captioning data

November 15, 2000

ATSC Non-Disclosure Applies

Plan for 10th Meeting

- **Major Discussion Topics**
 - Discuss Comments (if any) on the Draft Requirement Document
 - Begin to develop specification
 - Meeting scheduled at DIRECTV facility, Los Angeles, CA on February 06, 2001

November 15, 2000

ATSC Non-Disclosure Applies

Attachment 7
Draft Requirements
for
DTH Satellite Broadcast

FORWARD

This document was prepared by the Advanced Television Systems Committee (ATSC) Technology Group on Satellite Broadcast (T3/S14-A). This document contains requirements for Direct To Home (DTH) Satellite Broadcast, an ATSC Standard under development. The document was approved by the Members of the ATSC T3/S14-A Specialist Group on October 19, 2000.

This document was prepared for the primary benefit of the ATSC membership review, commenting, and approval. Once approved by the ATSC T3 Chair, it will serve as a base for the Satellite Broadcast Specialist Group to develop specifications meeting these requirements.

A copy of the ATSC T3 approved Terms of Reference document is included in the Annex 1 to familiarize reader of this document with the T3/S14-A Specialist Group's charter and scope.

NOTE: The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to the validity of this claim, or of any patent rights in connection therewith.

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1. SCOPE

This document describes a list of requirements developed by the Satellite Broadcast Specialist Group (T3/S14-A). Specifications developed based on these requirements will allow system developers to build conforming system components enabling Satellite Service provider to broadcast Services conforming to the ATSC approved standards.

2. REFERENCES

| | |
|-----------------|---|
| ATSC A/65 | Program and System Information Protocol for Terrestrial Broadcast and Cable |
| ATSC A/70 | Conditional Access System with Terrestrial Broadcast with Amendment |
| ATSC A/90 | Data Broadcast Standard |
| ATSC TBD | T3/S14-A Terms Of Reference Document included in the Annex |
| SMPTE 325M-1999 | For Digital Television- Opportunistic Data Broadcast Flow Control |
| SMPTE RP203 | Recommended Practice- Real Time Opportunistic Data Broadcast Flow Control in an MPEG-2 Transport Emission Multiplex |
| SMPTE RP206 | Recommended Practice- Opportunistic Data Broadcast Flow Control using Ethernet as a Control Channel in an MPEG-2 Transport Emission Multiplex |
| DVB-ASI | Asynchronous Serial Interface (Ref. DVB A010/Cenelec EN 50083-9) |
| SMPTE-SSI | Synchronous Serial Interface (Ref. SMPTE 310) |
| SMPTE-SDTI | (Ref. SMPTE 305M) |
| ATM AAL1 | ITU-T Recommendation I.363.1 |
| G.703 (10/98) | Physical and Electrical Characteristics of Hierarchical Digital Interfaces |

3. ACRONYMS

| | |
|-------|---|
| AAL1 | ATM Adaptation Layer 1 |
| ASI | Asynchronous Serial Interface |
| ATM | Asynchronous Transfer Mode |
| ATSC | Advanced Television Standards Committee |
| CA | Conditional Access |
| DTH | Direct To Home (Annex I) |
| DVB | Digital Video Broadcasting |
| DVS | Digital Video Subcommittee |
| EIA | Electronics Industry Association |
| FCC | Federal Communications Commission |
| IC | Integrated Circuits |
| ID | Identification |
| IP | Internet Protocol |
| IRD | Integrated Receiver Decoder |
| ISO | International Standards Organization |
| ITU | International Telecommunications Union |
| MPEG | Moving Pictures Expert Group |
| NPRM | Notice of Proposed Rule Making |
| NTSC | National Television Systems Committee |
| PSIP | Program System Information Protocol |
| SCTE | Society of Cable and Telecommunications Engineers |
| SI | System Information |
| SMPTE | Society of Motion Pictures and Television Engineers |
| STD | System Target Decoder |
| VCT | Virtual Channel Table |

4. SYSTEM OVERVIEW

The Satellite Broadcast System comprises of two major subsystems 1) Transmission System and 2) an Integrated Receiver Decoder (commonly referred as a Set Top Box).

4.1 Transmission System

The Transmission system comprises of an Emission Mux, a Modulator/Encoder, and a Transmitter. The Emission Mux requirements are included in Section 5. Modulation/Encoder and the Transmitter specifications were deemed not necessary and these are left for Service Provider to develop.

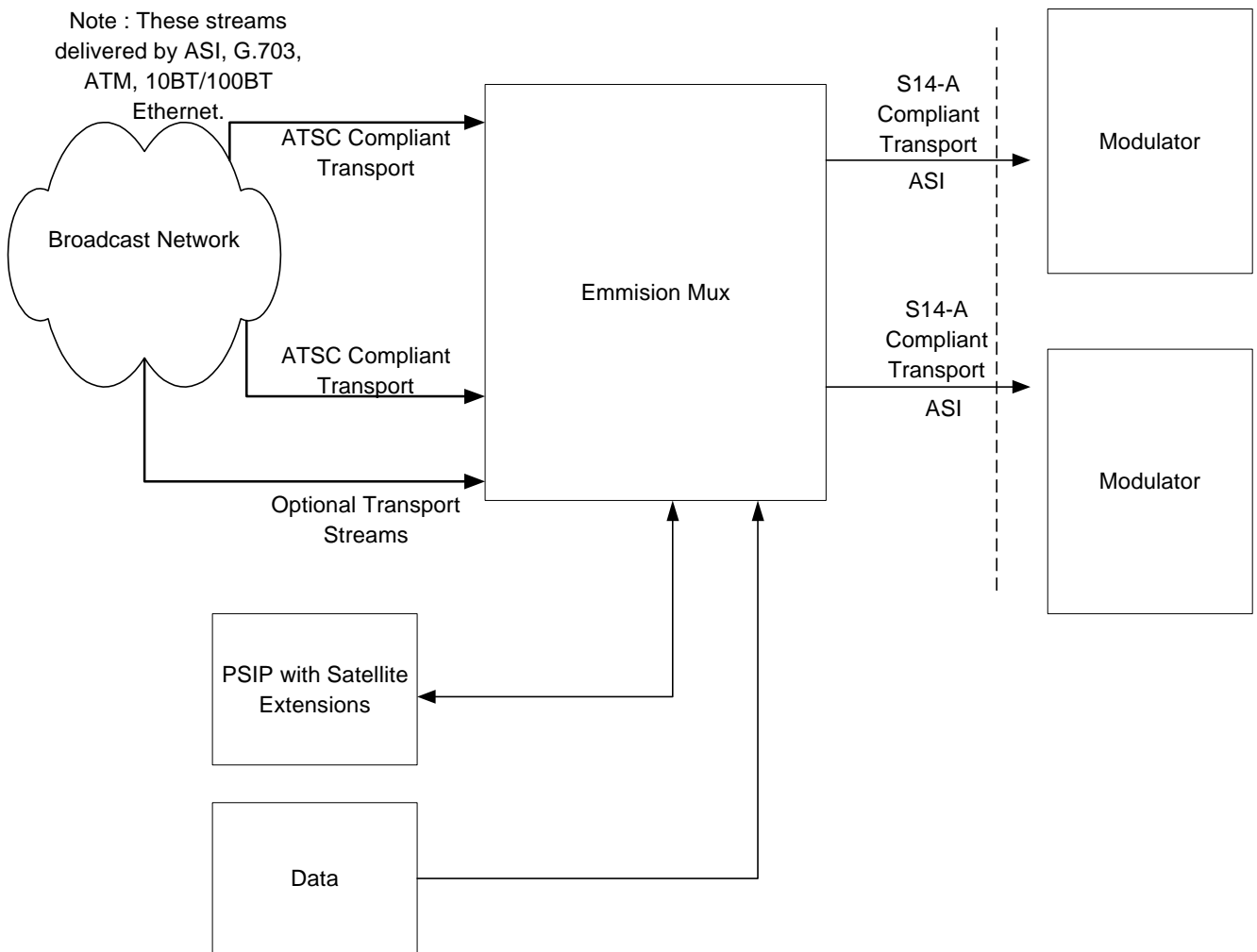


Figure 4.1-1, Transmission System

The Emission Mux (Figure 4.1-1) accepts:

- ATSC A/53, A/65, A/70, & A/90 compliant standard bit streams and protocols,
- Optional non-ATSC transport streams,
- PSIP with satellite Extensions, and

Optional data bit streams such as A/90 and DVB.

The multi-program transport stream output from the emission mux will comply to the ATSC TBD S14-A specifications. This includes the following:

- a) Programs that comply to current A/53 for transport, A/53 video formats, A/90 data streams, and EIA 608-B and/or EIA-708B captions carried using A/53 user_data syntax.
- b) Programs that comply to the transport and video format extensions defined for Satellite delivery.
- c) Programs that carry AC-3 audio which complies to A/52 and A/53 at bit rates up to 448 kbps.
- d) Programs that dual-carry AC-3 audio and MPEG-1 Layer 2 audio to support deployed receivers.

System Information at the output of emission mux shall include all the normative elements from A/65 (PSIP) and Satellite extensions such as Satellite VCT whose requirements are defined in this document.

The multi-program streams may also carry additional information to support delivery system specific needs (such as DVB-SI, control data, NTSC captions using SCTE DVS 157r1). When present, such information will not conflict with the 'code points' used in the S14-A specification.

4.2 Integrated Receiver Decoder System

Suggested Integrated Receiver Decoder (IRD) system is depicted in Figure 4.2-1. This system demodulates, decodes, and converts to Audio, Video, and Data streams compliant with the existing Industry Standards.

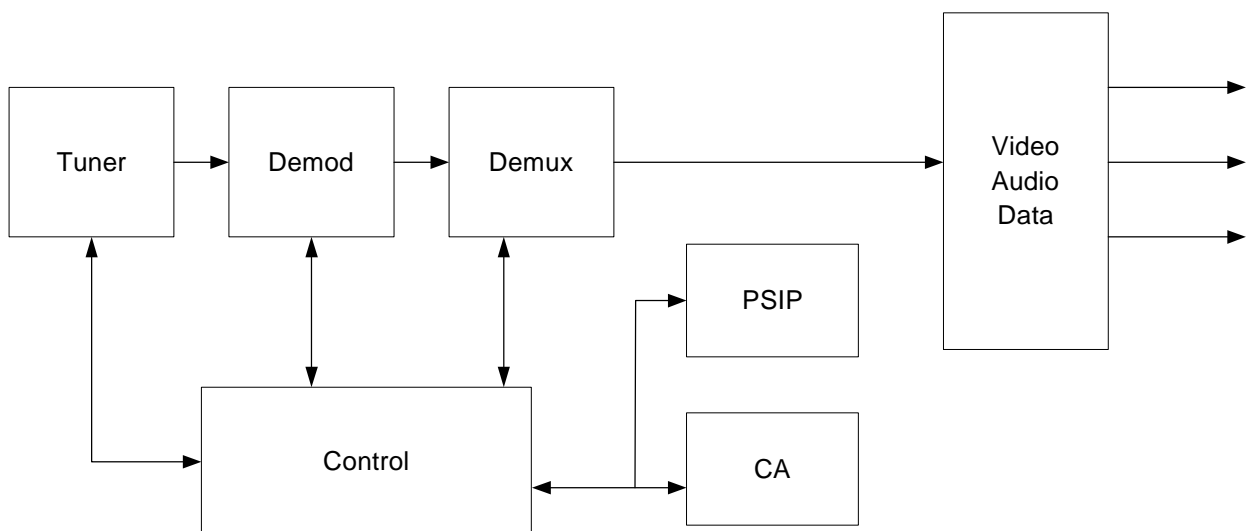


Figure 4.2-1, Suggested IRD System

5. REQUIREMENTS

This section specifies system requirements and areas of work.

5.1 Audio

- a) Audio coding shall comply to A/52 (AC-3) at the maximum rate of 448kbps
- b) Descriptive Audio (FCC NPRM) shall be supported
- c) MPEG-1 Layer II audio can be permitted as a dual carriage option to facilitate use of legacy receivers

5.2 Video

- a) Video coding shall comply to MPEG-2 main profile
- b) Video shall comply to A/53 Table 3 and additional widely used formats in cable and satellite systems
- c) Coding and carriage of Closed Captions defined in EIA-708-B (including EIA-608-B Caption) shall use user data mechanism defined in A/53

5.3 Transport

- a) Multi-program transport stream shall include two or more A/53 transport streams
- b) Multi-program transport stream shall include extension to A/53 with less constraints such as alignment of picture start code
- c) Multi-program transport stream may include other ISO-13818-1 compliant streams
- d) Evaluate and if necessary, specify requirements to handle non-MPEG transport streams
- e) Evaluate and if necessary, specify data rates used by the existing and future satellite delivery systems
- f) Evaluate requirement for ad insertion with mechanism to prevent its removal by consumers

5.4 PSIP

- a) Evaluate required extensions to A/65 to facilitate items such as: two parts or one part channel numbers or one number in satellite, grouping of virtual channel- local channel decode based on geo location, etc.
- b) Specify method of identification of ATSC channel and non-ATSC compliant MPEG programs
- c) Specify satellite virtual channel table. This table shall include information such as: satellite orbital slot location & frequencies, modulation mode definition table (A/65 Table 6.5), etc. This may require use of currently reserved values in the A/65
- d) Specify method for carriage of multiple Rating Region Tables in the same channel

- e) Evaluate PSIP System Target Decoder model for satellite application. (Terrestrial PSIP does not exceed 250 kbps.) evaluate need for additional information to support multiple transport streams
- f) Develop method to resolve conflict within header descriptors in a multi-program transport stream. Examples: Source ID, Network ID, IP Addressing, Application Tap for data broadcast, etc.

5.5 Others

- a) Support ATSC (A/90) Data Broadcast and IP Multicast specifications
- b) Evaluate and if necessary, develop an informative table that describes various parameters for a satellite link to assist Receiver maker
- c) Evaluate and if necessary, specify need for data collection and Nelson Rating type usage
- d) Develop and if necessary, specify syntax to support Conditional Access system. (use of A/70 will not be required)
- e) Evaluate and if necessary, develop methods to support proprietary Electronics Program Guide (EPG) used by existing delivery systems
- f) Evaluate and if necessary, develop methods to support FCC rule 15.120 for the Closed Captioning data

ANNEX 1

Title: Terms of Reference for T3/S14A Specialist Group, Satellite Broadcast

Document Reference: T3/S14A – Doc. 001/R3

Date: 07 March 2000

1.0 INTRODUCTION

This standing document forms the terms of reference for the Satellite Broadcast, T3/S14A Specialist Group. These terms of references establish the title, area of work, programme of work, and structure of the organization.

2.0 TITLE

ATSC Technology for Satellite Transmission

3.0 AREA OF WORK

Review what is expected of an ATSC service and identify appropriate components that are to be recommended for satellite broadcast. Also identify components which may require additional work within other ATSC Specialist Groups. Identify those functions that require extension to create a complete service. Provide recommendations to deliver these services using available and extendable future standard satellite broadcast delivery systems.

4.0 PROGRAMME OF WORK

The current project of the T3/S14A includes specifications for transmitter and receiver subsystems for Direct-To-Home (DTH) service via satellite, including but not be limited to specifications for: Modulation/Demodulation, Transport/De-multiplexing, Conditional Access, and Source coding and decoding of video, audio, and data program, services, and system information.

In developing these specifications, T3S14A will consider existing practice in satellite broadcast technologies. DTH implies Direct-To-Home (DTH), End User, and Service Provider.

5.0 SCHEDULE

| | |
|---|-----------|
| Project Description, Draft Requirements, Draft Reference Model..... | May. 2000 |
| Prepare/Issue Call for Contributions..... | Aug 2000 |
| Receive, Assess, and Harmonized Contributions..... | Nov 2000 |
| Assemble Initial Draft Specification..... | Jan 2001 |
| Draft Specification..... | Mar 2001 |
| Revised Draft Specification..... | May 2001 |
| Submit Recommended Specification to ATSC/T3..... | July 2001 |

6.0 STRUCTURE

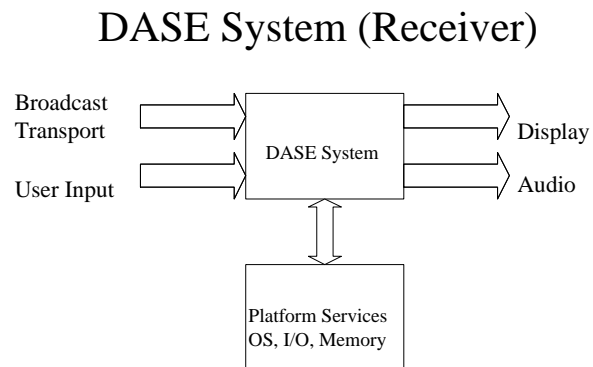
Membership: The T3/S14A Specialist Group comprises of members of the ATSC, ATSC Technology Group, ATSC Specialist Groups, and invited technical experts. The membership list is contained in standing document T3/S14A – TBD-

Chairman: Dipak M. Shah (DIRECTV)
(310) 726-4838 phone; (310) 535-5323 fax
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Secretariat: Mr. Paul Cohen (Fox Digital)
(310) 369-6611: Fax (310) 969-6188
paulco@foxinc.com

Summary of S17 Recommended Technologies

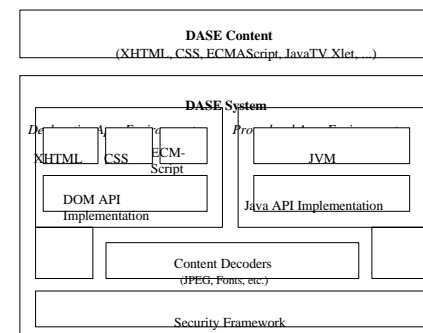
DASE ATTACHMENT 8



Some Changes in Terminology

- Former *Presentation Engine* is now referred to as the *Declarative Applications Environment* (DAE)
- Former *Application Execution Engine* is now referred to as the *Procedural Application Environment* (PAE)
- Reason for change in terminology
 - To be consistent with functions of a DASE receiver's components.

DASE System Architecture



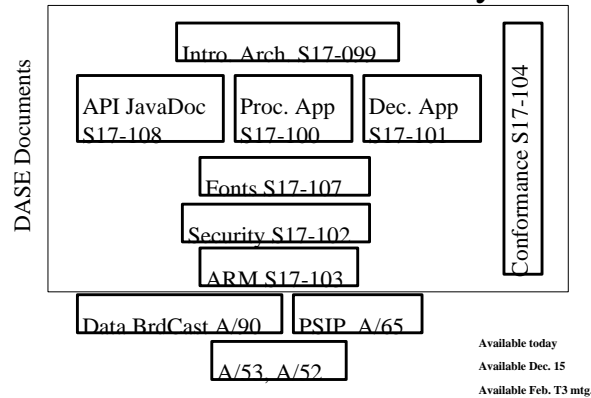
DASE System Components

- *Required parts of a DASE System (Receiver)*
 - *Procedural Application Environment*
 - Procedural Content Execution Engine: JVM
 - API implementations: pJava, Java TV, JMF, DAVIC, ATSC-specific, HAVi UI, DOM.
 - *Declarative Application Environment*
 - Interpreters for XHTML, CSS
 - ECMAScript interpreter, DOM bindings
 - Common Content Decoders
 - Fonts (downloadable), PNG, JPEG, etc.
 - Security Framework, Protocol Bindings.

Recommendations of T3/S17

DASE

S17 Document Hierarchy



S17 Recommendation

- S17 proposes the following five documents to T3 as *parts* of the ***DASE Candidate Standard***:
 - Introduction, Architecture and Common Facilities (S17-099)
 - Procedural Applications (S17-100)
 - Application Programming Interfaces (S17-108)
 - Declarative Applications (S17-101)
 - Fonts (S17-107)

S17 Recommendation (2)

- We recommend that T3 authorize a letter ballot for these parts of the DASE Candidate Standard.
- It is S17's expectation that based on T3's comments, some portions of these documents may have to change.

What is a Candidate Standard?

- A Candidate Standard has received significant technical review within the Specialist Group.
- Advancement of a document to Candidate Standard is an explicit call to those outside of the Specialist Group for implementation and technical feedback.

S17 Recommendation (3)

- There are 3 other documents that S17 expects to bring to T3 in the near future as the remaining parts of the DASE Candidate Standard.”
 - Security (S17-102)
 - Conformance Statement (S17-104)
 - Application Reference Model (S17-103)

Availability of Recommended Documents

- Introduction, Architecture and Common Facilities: Available *today*.
- Fonts: Available *today*.
- Procedural Applications: Will be available by *Dec. 15*, 2000.
- Application Programming Interfaces (JavaDoc): Will be available by *Dec. 15*.
- Declarative Applications: Will be available by *Dec. 15*.

Availability of 3 Remaining Documents

- Security: Will be available by Feb. T3 meeting.
- Application Reference Model: Will be available by Feb. T3 meeting.
- Conformance Statement: Will be available by Feb. T3 meeting.

Remaining Work (2)

- Security
 - Work finished
 - Adapted DVB security model
 - Work remaining
 - Key management and dissemination
 - Hierarchical File System dependencies (S13)
- Application Reference Model
 - Work finished
 - Bindings to A/90, State Model, Display Model
 - Work remaining
 - Buffer models, few other miscellaneous details

Remaining Work

- Procedural Application document
 - Few changes to be made
 - Clean up application state and status model text
 - Decide whether to add Java “legacy-DOM” bindings
 - Add (agreed) text regarding interaction between System and Application state models
- Declarative Application document
 - Few changes to be made
 - Resolve some outstanding comments

Harmonization

- Full SMPTE DDE-1 functional support
- OpenCable OCAP is not finished, but DASE is likely to be similar (see next slide)
- Large overlap with DVB MHP APIs
 - Differences exist due to PSIP/DVB-SI and protocol differences
 - DVB-HTML is not finished yet
- ITU-T and ITU-R have received drafts of our specifications.

OpenCable OCAP Harmonization

- OCAP Presentation Engine is partially harmonized (uses DDE-1, XHTML, ECMAScript)
- OCAP Execution Engine is almost harmonized
 - OCAP uses
 - Most DVB MHP APIs: Common with DASE APIs
 - Some DASE APIs: PSIP, Data Broadcast, etc.
- Security framework harmonized (DVB)

Please Comment

- Please review the documents and send us your comments!

Acknowledgements

- Mike Dolan, Craig Finseth-*DirectTV*
- Petr Peterka-*Motorola*
- Glenn Adams-*Gemstar*
- Edwin Heredia-*SAMSUNG*
- Art Allison-*NAB*
- Philippe Perot-*Canal+*
- Simon Gibbs-*Sony*
- Panagiotis Reveliotis-*Philips*
- Jon Courtney, Bill Foote-*Sun*
- Taylor Kidd-*OpenTV*
- Alan Goldfine-*NIST*
- Dave Catapano-*Triveni*
- ATSC Staff, T3/S17 members, NIST staff.

ATTACHMENT 9

ATSC Guidelines for Normative References in Specifications

Problem Statement:

Various questions have arisen recently within [the S17] specialist group regarding what is legal for a normative reference in an ATSC standard. For example, [S17] currently has all the following categories currently being proposed:

1. Other standards organizations' work in process.
2. Copies of private company's documents in electronic form, but no copyright or IPR statement.
3. Published books (with ISBN#'s), but no copyright or IPR statement.
4. Web links to private company's web site documentation (but not a copy of the document itself), and no copyright or IPR statement.
5. Copies of documents from defunct (or about to be defunct) standards organizations, but no copyright or IPR statement.
6. Web links to defunct standards organizations' documents, but no copyright or IPR statement.
7. Alliance (non-certified) standards bodies documents by reference.

The above all have one or more of the following problems:

- A. No copyright assignment or license.
- B. No IPR statement.
- C. References unavailable over time.

The specialist groups need some guidance on how to be able to use these and/or alternatives and/or what may be prohibited. And, further what may be acceptable in the balloting phase versus a finally approved and ATSC published specification.