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Advanced
Television
Systems
Committee
Inc.

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Software Data Download Service

The new ATSC standard that makes cumbersome updates a thing of the past.

by Mike Dolan, Chair T3/S13

The Software Download Data Service (SDDS) defines specifications for downloading software to terminal devices using an MPEG-2 transport stream. This new ATSC standard, known as A/97, enables updates and upgrades of firmware, operating system software, device driver software, native application software, middleware and other types of software residing in devices, such as consumer DTV receivers. The primary use of SDDS is to allow receiver manufacturers to dynamically upgrade their products in the field.



A/97 was developed, and is maintained, in the ATSC T3 Data Broadcast Specialist Group chaired by Mike Dolan.

SDDS includes the specification of standardized announcement, signaling, and encapsulation for modules containing the software. Through the signaling, modules are targeted for specific manufacturers and models of equipment. However, the content and format of the software download data in the module itself is not specified. This is to allow manufacturer variation and flexibility in scrambling and other manufacturer-specific properties not needing standardization across all manufacturers.

There are a couple of scenarios for using SDDS. The simplest use is to broadcast a single module to a single manufacturer/model at a time. Multiple modules and manufacturers are supported by spreading them over time. That is, one download is stopped and then another one is started. A slightly more complex use is to broadcast multiple modules to multiple manufacturers concurrently. This is slightly more efficient and services all devices during the same time period. Finally, one could broadcast multiple SDDS services. This would be unusual, but might be necessary if the number of manufacturers and modules exceeds the limits of the signaling.

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“A/97 specifies the mechanisms for announcement, signaling and encapsulation for the delivery of a download data service in the ATSC transport, while allowing the specific details of the software download payload to be defined by each manufacturer.”

– Mike Dolan

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Software Data Download Service

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The Virtual Channel that carries the SDDS is hidden. That is, it explicitly signaled in the VCT to be hidden from the viewer in any EPG that the receiver might assemble from the PSIP. This is done to not confuse the viewer, although the receiver internally recognizes its presence. SDDS services would typically be done by either scheduling a burst of time in the middle of the night, or a low bitrate stream 24-7, or some combination.

The design basis of SDDS is Digital Storage Media - Command and Control (DSM-CC) Download "2-layer carousel scenario". The basic use and design details are found in the main ATSC data broadcast standard, A/90. SDDS builds on this using the three core DSM-CC Download messages – Download Server Initiate (DSI), Download In-

formation Indication (DII) and Download Data Block (DDB). Top level signaling and connection to PSIP is accomplished with a new VCT service type 5. This new service type indicates that the DSM-CC messages are present, but no video, audio or other data is. The single PID listed in the PMT for this Virtual Channel contains all the messages. The DSI and DII messages can then be examined for more information about the content of the service – items such as which manufacturer(s) and which receiver models. Announcement, the information about future downloads, is accomplished via schedule information (start times and durations) added to the DSI. Thus, the DSI is used for both signaling and announcement. Encapsulation of the modules is provided in the DDB message. More technical details can be found in A/97 and A/90, both available for download from www.atsc.org.



A welcome reception...

Recommended Practice: DTV Receiver Performance

by Jerry Whitaker, ATSC

A concerted, cross-industry effort has led to the publication by ATSC of a Recommended Practice on DTV receiver performance. A/74, "Recommended Practice: Receiver Performance Guidelines," is the result of a collaborative effort of broadcasters, consumer electronics manufacturers, semiconductor manufacturers, and other ATSC members. This Recommended Practice provides performance guidelines for receiver sensitivity, multiple signal overload, phase noise, selectivity, and multipath. The document also suggests the use of the antenna control interface developed by the Consumer Electronics Association (CEA-909), which facilitates automatic control of antenna parameters.

About A/74

Recommended Practice A/74 addresses the front-end portion of a DTV receiver. The recommended performance guidelines contained in the document are intended to assure that reliable reception will be achieved. Guidelines for interference rejection are based on the FCC

planning factors that were used to analyze coverage and interference for the initial DTV channel allotments. Guidelines for sensitivity and multipath handling reflect field experience accumulated by testing undertaken by ATTC, MSTV, NAB, and receiver manufacturers.

A/74 does not discuss optional means by which receivers might attempt to conceal or otherwise mitigate the visible or audible consequences of uncorrected bit stream errors. Although most receivers include circuits that accomplish some degree of error concealment, the results are subjective and not quantified so easily as the performance of the other circuits listed above.

Response from the various industry segments that comprise the broadcast-to-reception chain has been quite positive to publication of A/74. Supporting bit streams have been distributed to various organizations for testing and study. In addition, the ATSC Specialist Group on Receivers, T3/S10, continues to look for and document unique and interesting reception sites that may be useful in the design of new receiving devices.

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Welcome Reception...

(continued from page 2)

The circuits whose performance contributes to meeting the A/74 guidelines are:

- ◆ Antenna and antenna control interface (CEA-909)
- ◆ Tuner, including radio frequency (RF) amplifier(s), associated filtering, and the local oscillator (or pair of local oscillators in the case of double conversion tuners), and mixer(s) required to bring the incoming RF channel frequency down to that of the intermediate frequency (IF) amplifier/filter.
- ◆ Intermediate frequency (IF) amplification (with automatic gain control) and filtering, including the major portion of pre-decoding gain, channel selectivity, and at least a portion of the desired-channel band-shaping.
- ◆ Digital demodulation, including in-band interference rejection, multipath cancellation, and signal recovery.
- ◆ Forward error correction, wherein errors in the demodulated digital

stream caused by transmission impairments are detected and corrected for incoming signals with signal-to-impairment ratios above a threshold. Packets with uncorrectable errors are “flagged” for possible mitigation in the video and audio decoders.

The recommended performance guidelines are divided into four general categories:

- ◆ Sensitivity
- ◆ Selectivity
- ◆ Interference rejection
- ◆ Multipath handling ■

Bob Rast leads the way

Bob Rast, Micronas, stepped into his role as the new chairman of the ATSC board of directors on January 19 at the first 2005 meeting of the board. On his election to the new post, Rast commented, “Of the key organizations that got us the DTV standard, the Advisory Committee, the Grand Alliance, and the ATSC, only the ATSC is left to witness DTV’s success, and to keep the ball rolling. I’m pleased to be a part of the ATSC leadership team, especially in 2005, the 10th anniversary of the ATSC DTV standard.”

The Board elected Lynn Claudy, NAB, and Brian Smith, Phillips, as vice chairmen of the Board of Directors. In his first major actions as chairman, and approved the appointment of ATSC’s new T3 chairman, Bill Miller, ABC (see story on page 4).

“I’m pleased to have the support of Lynn and Brian as vice chairs – ensuring a balance of interests between broadcasting and consumer electronics – as we consider major issues of importance to both industry segments.”

After an introduction of the newly elected board members, Wayne Luplow, Zenith; Brian Smith, Phillips; Ed Barrett, Sony; and Mike McEwen, Canadian Digital Television (CDTV), Rast led the board through a vast array of agenda items including the ATSC goals for 2005.

“2005 promises to be an eventful year for digital television as the transition continues to accelerate, key transition issues get resolved, and we position ATSC for the next phase of our digital journey.” ■



Lynn Claudy, NAB, returning board member, treasurer and vice chairman



Brian Smith, Phillips, newly elected board member and vice chairman.



Bob Rast, Micronas

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Bill Miller appointed chair of T3



"It is our good fortune to have Bill Miller as chairman of our Technology Group... Bill's extensive experience in the development of technical standards for the television industry is a great benefit for the ATSC." – Mark Richer, President, ATSC

Appointed by the ATSC board in January 2005, Bill Miller, General Manager, Digital Television Planning and Standards, ABC-TV Broadcast Operations and Engineering division, officially took his place at the head of the Technology Group on Distribution (T3) table on Wednesday, February 9 at the first T3 meeting of the new year. He replaces outgoing T3 Chair, Ralph Justus, CEA.

"Ralph's shoes are hard to fill... but I thought the meeting went very well," said Miller. "I was moved by the welcome given me by the T3 members, and we accomplished everything that was on the agenda... there was free and open discussion but no acrimony. Perhaps the best indication of the spirit of cooperation that prevailed was that we finished at 2:40 rather than the scheduled 4 PM. It's always a good sign when we're able to finish early. I'm looking forward to a very productive year."

Miller's first order of business was the appointment of Rich Chernock, Triveni and John Henderson, Hitachi (chairman T3/S10) as T3 vice chairmen. "I am extremely gratified that John Henderson and Rich Chernock have accepted the post of vice Chairmen of T3," commented Miller. "Their superb technical skills and proven record of accomplishment within ATSC, and in the industry as a whole, will

be an enormous help to me in moving T3's work forward."

"The Technology Group is the part of ATSC that writes standards and recommended practices for broadcasters, and its chair is a key ATSC position," said Bob Rast, ATSC Chairman. "Bill has been tested and proven through years of service, is a great choice, and we all look forward to his continuing contributions." ■



(l to r) Bob Rast, Micronas; Rich Chernock, Triveni, vice chairman; John Henderson, Hitachi, vice chairman; Mark Richer, President, ATSC; Bill Miller, ABC, T3 Chairman; and Ralph Justus, CEA, outgoing chairman of the T3 at the February 2005 T3 meeting at NAB.

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DigiKnow?

Dr. Oded Bendov receives the 2005 NAB Television Engineering Achievement Award

Dr. Bendov is currently President of TV Transmission Antenna Group, Inc., a company dedicated to the development of new technologies, design, and consulting services to broadcasters and television set manufacturers. In 2004, the Metropolitan TV Alliance (MTVA), the umbrella group of New York City broadcasters, awarded Dr. Bendov a contract to design the master antenna tower atop the Freedom Tower, the new building to be built on the site of the World Trade Center. Planned to be completed in 2009, the main digital TV transmission facilities will serve the New York metropolitan area from the top of the Freedom Tower in lower Manhattan, with an overall height, including antenna, exceeding 2,000 feet.

Profile: Dr. Charles Einolf, IEEE

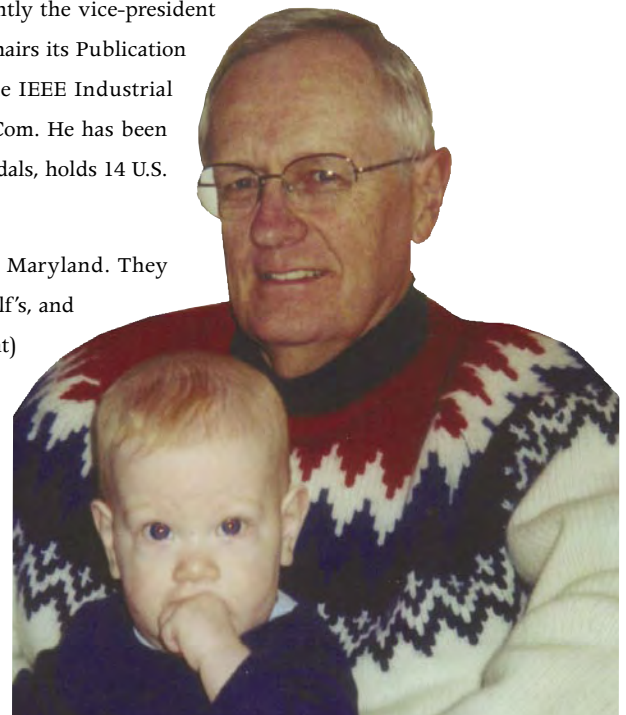
"I feel like a new-comer to broadcasting, having only started in television when Westinghouse created Group W Cable in 1983," stated Charlie Einolf, when reflecting upon his first foray into realm of television as the Technology Manager for Advanced Electronic Systems at the Westinghouse Science and Technology Center, responsible for engineering and research support for Westinghouse's venture into cable television. "I can remember being impressed with digital television at that time, but not expecting it to become a reality for consumers for another ten years... I was pretty close."

Charlie worked for Westinghouse for over twenty-seven years, including two years at the Westinghouse Wireless Solutions Company (now iBiquity Digital), and was responsible for the design and development of the advanced electronic systems incorporating sensor, computer, communication and signal processing techniques. In 1996, Charlie took advantage of the opportunity to become involved in digital television, and joined the Advanced Television Technology Center (ATTC) as Deputy Executive Director. He was responsible for its technical programs until the completion, in 2003, of its mission to facilitate the transition to digital television in the United States. During his tenure at ATTC, Charlie became actively involved in the technical aspects of the digital television broadcast industry, including RF, propagation, and reception analysis.

Currently, Charlie participates in a variety of ATSC specialist and ad hoc groups, including serving as chair of the ATSC T3/S9 Specialist Group on RF Transmission. He also participates in the standards activities of the International Telecommunications Union – Radiocommunications (ITU-R), and is chair of the United States ITU-R Working Party 6P on Content Production and Postproduction.

Dr. Einolf holds a Ph.D. and M.S. degree in Electrical Engineering from the University of Rochester, and a B.S. degree in Electrical Engineering from the Massachusetts Institute of Technology. He is a Fellow of the Institute of Electrical and Electronics Engineers. He is currently the vice-president of the IEEE Broadcast Technology Society and chairs its Publication Committee. Charlie is also president-elect of the IEEE Industrial Electronics Society and a life member of its AdCom. He has been awarded the IEEE Centennial and Millennium medals, holds 14 U.S. patents and has published over 30 papers.

Charlie and his wife, Susanna, reside in Bowie, Maryland. They enjoy four adult children, including two Dr. Einolf's, and four grandsons – the youngest, Caleb (shown right) is eight months. Charlie's leisure time is spent with model railroading (HO-scale) and gardening, and he is currently the secretary of the Bowie-Crofton Garden Club. An avid swimmer, he recently qualified for the National Senior Olympics and is looking forward to being a competitor in the breaststroke swimming events. ■



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May Meetings:

- ☞ **Monday – May 9**
T3 Meeting
Annual Meeting Cocktail Reception
- ☞ **Tuesday – May 10**
Annual Meeting
- ☞ **Wednesday, May 11**
Board Meeting
AS Meeting

RSVP from the meetings calendar at www.atsc.org.

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Please contact Lisa Hester at lhester@atsc.org or visit: www.atsc.org/am2005/sponsor_am.html for details and benefits of sponsorship. ■



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The ATSC is an international, non-profit organization developing voluntary standards for digital television. The ATSC has member organizations representing the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries.

Welcome Wagon

ATSC would like to welcome its newest members, TTE Technologies, Inc. and Broadcast Microwave Services, Inc. to the ATSC team. We eagerly anticipate the contributions of TTE and BMS to the DTV standards currently being developed in the ATSC, and we know their participation will have an immeasurable effect on the future of digital television. ■

Join ATSC at NAB2005

April 16-21 • Las Vegas Convention Center • Las Vegas, Nevada

Take a cruise through the digital future...

Experience breathtaking scenery, incredible sounds and plenty of action as the Advanced Television Systems Committee (ATSC) and the National Association of Broadcasters take you full speed ahead to the hottest technologies on the DTV horizon. ■

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