DAVIC

Digital Audio-Visual Council
Rationale and goals

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In this article, the author gives the reasons for the founding of the Digital Audio-Visual Council (DAVIC).

Its structure, the way it operates and the nature of the specifications it produces are described.

Also, the contents of Version 1.0 of the specification are explained and the programme of work for 1996 is outlined.

1. Introduction

For a long time, the audio-visual world has been highly fragmented. Today, it encompasses many different strands including two-way speech communication, audio and television broadcasting, audio and video distribution via packaged media (CDs, videos, etc.) and audio and video distribution via cable. The business players operating within these strands have developed intertwined relationships; some have taken on the role of operators of an infrastructure, others have become producers of content and yet again others have developed overlapping roles with their counterparts in other strands.

This complicated pattern used to be the excuse, if not the justification, for the existence of a plurality of incompatible systems. Information was supposed to flow from source to destination using just one delivery medium; flow of information across the various media was not intended.

This arrangement is now being shaken to its roots by the advent of digital technologies. Because "bits are bits", any delivery medium can be used to carry audio-visual information in digital form. However, if the current paradigm of incompatible systems were to transfer to the digital domain (so that every digital delivery medium had its own independent technical specifications), the user would end up with a multiplicity of sources of information. Systems incompatibility – in addition to being irrational because of the underlying common nature of digital audio and video – would run counter to the interests of the different players, in particular the end users.

This issue ought to be settled outright by means of appropriate standards. Unfortunately, however, the standards bodies are still organized along traditional vertically-integrated lines, and have objective difficulties in addressing any cross-system issues. This major constraint is occurring at a time when the speed of technological evolution is such that decisions have to be taken very fast – or not at all.

There is no time to lose. Either an effective means of defining a horizontal standard – which cuts across the fragmented strands of the audio-visual world – is found, or the opportunity of putting things right will be lost forever.

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This article is about the bold initiative that was taken to create the Digital Audio-Visual Council (DAVIC), an organization working with the goal of providing specifications that maximize *interoperability* across countries and across different applications and services.

2. Interoperability

In the last few years, several areas of communications have witnessed remarkable technological advances that seem to promise, but still do not deliver, the advent of a new world. Some of the most important are:

- the development of very efficient standard ways to represent audio-visual information in digital form, such that the very high bit-rate needed is reduced to acceptable values without introducing impairments, e.g. MPEG standards (see the article starting on *page 12* [1]);
- progress in the area of signal-processing techniques, which has enabled high bit-rate transmission on existing analogue delivery media (unshielded twisted pairs, coaxial cable, satellite broadcasting channels, etc.);
- the development of standard ways to carry high bit-rate data in packeted form (Asynchronous Transfer Mode);
- the development of several protocols designed to support the dialogue between different distribution environments (Q.2931, TCP/IP. DSM-CC).

These remarkable technological advances – more the result of uncoordinated efforts than of a universal plan – have led operators to believe that the provision of digital audio-visual services is achievable. This has already happened in the USA where a new satellite broadcasting service started more than a year ago, using available technologies. In the full tradition of high fragmentation within the audio-visual world, this system has been built by making proprietary choices that other operators, even on the same satellite delivery system, are not necessarily willing to endorse; there are even cases of given operators using different delivery systems!

Awareness of the benefits to be gained from interoperability – in terms of technological commonalities and the reach of services – has gradually increased over the last few years among the majority of players in the audio-visual domain. However, putting together the different components and building complete and coherent systems is a very difficult task. Interoperability, of necessity, requires the existence of common standards to be used by the different implementers and this, in turn, requires a *normative environment* which promotes the development of unified standards. At present, such an environment does not exist, because the three main branches of worldwide international standardization – namely the IEC, the ISO and the ITU[1] – define their systems in a vertically-integrated way. Interoperability, on the other hand, needs an end-to-end, horizontal approach to standards development.

An attempt to provide solutions to this dilemma has been made by some industry consortia, established to promote the development of specifications. The limitation of those efforts has been their regional focus and their old, vertically-integrated approach to system specification development. Some fresh ideas were urgently needed.

3. The DAVIC solution

The absence of an environment that was able to address interoperability issues across different applications, services and countries was at the root of the creation of the Digital Audio-Visual Council. It was conceived at the end of 1993 and a first meeting was convened in Geneva, Switzerland, in March 1994. By August 1994, DAVIC had already been formally established in Geneva as a non-profitmaking Association. Its purpose, as set out in the Statutes, is to favour the success of emerging digital audio-visual applications and services, by the timely availability of internationally-agreed specifications of open interfaces and protocols that maximize interoperability across countries and across applications/services.

DAVIC has been established with the goal of overcoming the current limitations of standardization, as already outlined above, and has established its own philosophy of work.

3.1. Openness of the specification process

Although only DAVIC members are allowed to take part in DAVIC meetings, the specification development process foresees total openness at two critical moments:

- when a request for technologies is issued;

1. ISO = International Organisation for Standardisation
IEC = International Electrotechnical Commission
ITU = International Telecommunication Union.

– when specifications have reached sufficient maturity.

Anybody is allowed to submit a response to a Call for Proposals, just as anybody is allowed to propose modifications to specifications which have been made publicly-available for comments. Of course, DAVIC reserves the right to accept or reject a proposed technology or a modification to a specification.

3.2. Not systems but tools

Standardization by professional societies has tended to produce vertically-integrated systems with little or no attention to similar systems in other domains. DAVIC's philosophy of developing "components" (tools) that are *non-system-specific* guarantees interoperability. Typically, the process of tool specification is carried out as follows:

- analysis of target systems;
- breakdown of systems into components;
- identification of the common components across systems;
- specification of all the necessary components (tools);
- verification that the tools so defined can be used to assemble the target systems.

3.3. Relocation of tools

An added requirement is that tools should not only be usable in a variety of different systems, but also in different parts of the same system. This is required because DAVIC specifications have to satisfy the business and service models of multiple industries. Therefore, DAVIC defines its tools in such a way that they can be relocated, whenever this is technically feasible.

3.4. Each tool is unique

Tools should be unique. This principle is sometimes hard to enforce but compliance with it gives substantial benefits in terms of interoperability and the availability of the technology; critical mass is more readily achieved because of the wider field of applications for the technology. Sometimes tools can contain normative improvements to specifications that do not affect backwards compatibility.

What constitutes a tool is not always obvious. Tools may depend on the particular technological situation: for example, a video decoder today can only be implemented in dedicated silicon but, in a few year's time, it will be possible to have programmable processors where the decoding algorithms are "downloaded".

3.5. Minimum requirements for interoperability

It seems obvious that a standard should specify the minimum requirements that are necessary for interoperability, but it was not always so. When standards were produced by professional societies, it was natural to add to the minimum requirements, those elements that bring a standard nearer to a product specification. The region which bordered this "minimum" then became blurred. This approach was fostered by the concept of "guaranteed quality" – so dear to public-service broadcasters and telecommunication operators alike, because of their "public service" nature. A multi-industry environment like DAVIC does not have a single constituency to satisfy, but tens of them, so it has to specify the very minimum that is needed for interoperability.

4. The structure of DAVIC

Membership of DAVIC is open to any corporation and individual firm, partnership, governmental body or international organization. By joining

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In 1971, Leonardo Chiariglione joined CSELT, the corporate research centre of the IRI/STET telecommunications group. He is now the head of the Multimedia and Video Services Research Division of CSELT.

During his career, Dr. Chiarglione has led several European collaborative projects: IVICO (RACE), COMIS (ESPRIT) and VADIS (EUREKA). In 1986, he set up the HDTV Workshop and, in 1988, he was the originator of the ISO MPEG standards group, of which he is now the Convenor. Then, in 1989, he originated "Image Communications", a EURASIP journal for the development of the theory and practice of image communication, of which he is Editor in Chief.

In 1994, Leonardo Chiariglione set up the Digital Audio-Visual Council (DAVIC) where he is the President and Chairman of the Board.

DAVIC, each Member agrees – both individually and collectively – to adhere to open competition in the development of digital audio-visual products, technologies or services. Associate Member status is usually chosen by those entities, mostly government organizations, who want to be members of the Council, but who don't wish to play an active role in the precise technical content of the specifications.

DAVIC Members have no restrictions imposed on them when designing, developing, marketing or procuring digital audio-visual hardware, software, systems, technology or services. Members are not bound to implement or use specific digital audio-visual standards, recommendations and DAVIC specifications, by virtue of their participation in DAVIC.

The DAVIC membership of 200 corporations (in September 1995) represents 25 countries from all over the world, and virtually all business communities with a stake in the emerging field of digital audio-visual applications and services.

DAVIC intends to make the results of its activities available to all interested parties on reasonable terms, applied uniformly and openly, and to contribute the results of its activities to the appropriate formal standards bodies. DAVIC has decided to adhere to the established policy adopted by the IEC, ISO and ITU in matters relating to Intellectual Property Rights (IPR). In cases where an IPR item has to be resolved before a part of the DAVIC specification can be implemented, the owner of the relevant IPR has to declare his intention to either give free use of the patented items, or to license them on fair and reasonable terms and on a non-discriminatory basis.

Fig. 1 gives the current organizational structure of the DAVIC Council. All DAVIC members are represented in the General Assembly (GA). The GA elects the Board of Directors (BD). Besides the Finance and Audit (FA) and the Membership and Nominating (MN) Committees, there are three more Advisory Committees: Standardization (ST), Strategic Planning (SP) and Management (MC). The technical work is carried out by Techni-

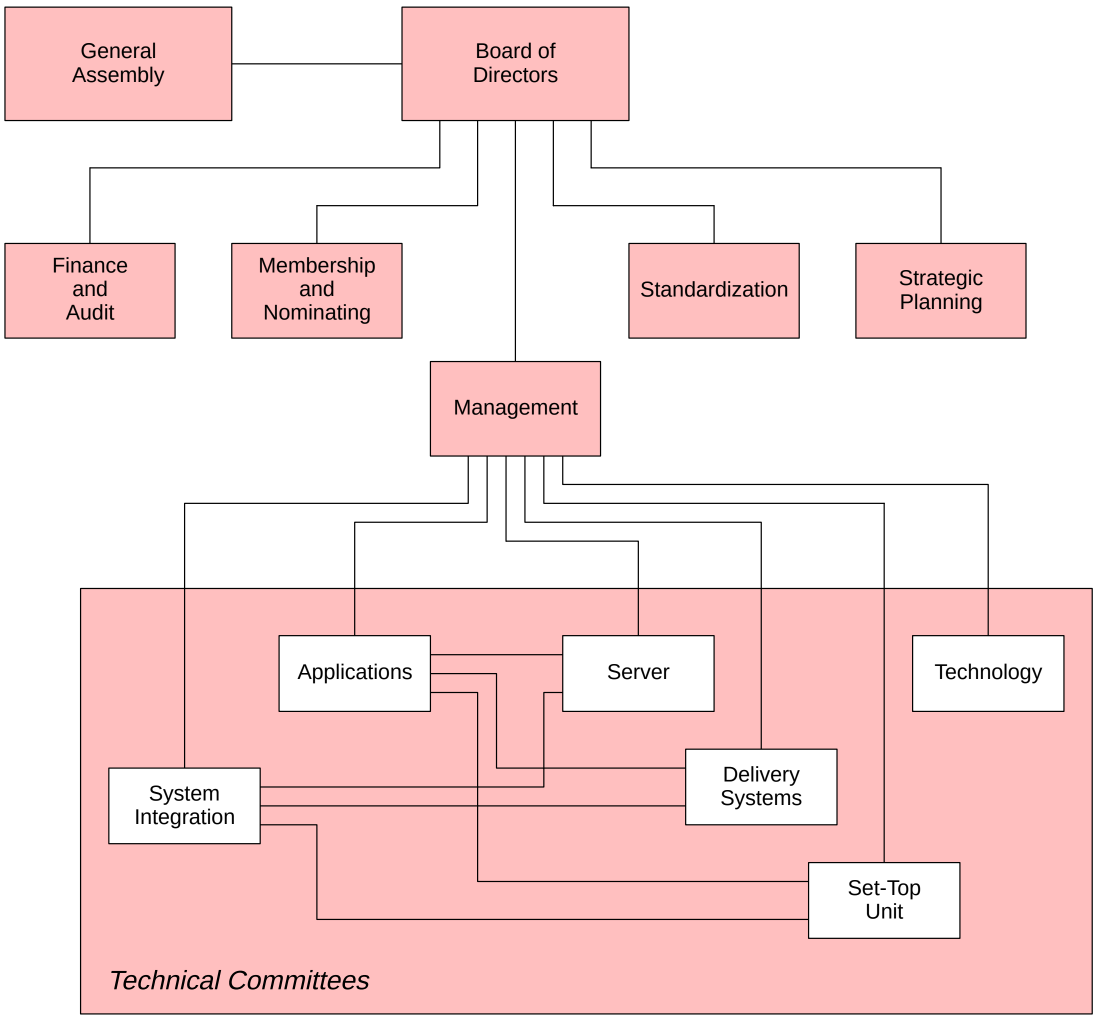


Figure 1
Structure of the DAVIC Council.

cal Committees (TC), under the supervision of the MC. Six TCs have been established: Applications, System Integration, Server, Delivery Systems, Set-top Unit and Technology.

5. The DAVIC procedures for technical work

DAVIC has substantially innovated the way that specification work is defined, approved and executed.

As with other standardization bodies, DAVIC operates on the basis of work items. The DAVIC workplan is a collection of all active and planned work items. It indicates which new systems, tools, profiles and reference points need to be added to the DAVIC specifications, and when they are needed.

The DAVIC workplan is drawn up by the Board of Directors using a draft proposed by Strategic Planning. The workplan is submitted to the membership for comments and a final workplan, taking their comments into account, is approved by the General Assembly. Complementary to the workplan is the "Inventory of Standards and Specifications of potential interest to DAVIC", produced by the Technology TC using information coming from standards bodies, industry consortia and individual Members.

When a new work item is to be activated, a Call for Proposals (CFP) is produced and made known to the membership and all interested parties. Submissions are screened to identify whether, for any of the items requested in the CFP, sufficient technology is available either through submissions or from available standards. If, for any item, insufficient technology is available, another call for these items is issued or a decision is made to develop internally the necessary technology.

Submissions retained for consideration, and standards identified to be relevant to the work item, are assigned to the appropriate TCs. On this occasion, existing TCs may be disbanded and new TCs may be established to provide a better match between the kind of technologies to be specified for a particular new work item and the organization of that work. TCs are given a precise timescale to produce the version of the DAVIC specifications which correspond to the current work item.

A TC produces progressive revisions of the DAVIC specification part(s) assigned to it. In the development of specifications, a TC is driven by the basic requirement of delivering specifications of the highest possible quality within the given deadline. A TC Chairman will usually assign sufficient time to clarify an issue, and will resort to membership voting when consensus cannot be reached. Of course, only one tool may be specified for each particular *functionality*. As a principle, specifications draw elements from existing standards but the TCs, in making their decisions, also balance other criteria such as technical merit, cost and wide usage.

When specifications have reached a sufficient degree of maturity, they are "frozen". The meaning of "frozen" is that all multiple choices for a DAVIC tool have been reduced to just one. When this is achieved, the document is made public, i.e. is made known also outside the DAVIC membership, and comments are solicited from all parties.

DAVIC holds regular quarterly meetings which typically last five working days. DAVIC weeks usually involve all TCs and the MC. All work is done by Member representatives, physically present at the meeting. The work of a DAVIC week is coordinated by the General Assembly meeting in plenary sessions. Plenaries are usually held three times – at the beginning of the first day, on the third day, and at the end of the fifth day. MC meetings are held every day at different times of the day; however, at the end of every working day, TC Chairmen and Vice-Chairmen are usually asked to join the MC. In advance of the first plenary, the MC meets with the TC Chairmen and Vice-Chairmen to coordinate and organize the work of the week and to discuss any issues currently needing resolution.

The main purpose of a DAVIC week is to produce either the initial version or the next revision of the DAVIC specifications currently under development. The main purpose of the opening plenary is to agree on the workplan of the week.

Using the procedure described above, the TCs work towards the goal of producing either the initial version or the next revision of the part(s) of the specifications they are responsible for. The TCs attempt to reach a consensus on a sequence of issues and on rare occasions they may need to resort to TC membership voting. Because of the complexity of some of the issues, a TC may decide to establish subgroups whose validity spans, at most, the week. Subgroups do not have special decision powers; any conclusion reached by the subgroups needs to be endorsed by the parent TC.

Even though there are joint TC meetings on certain issues, the component parts of the specifications are usually so interrelated that daily harmonization and coordination meetings are called at the initiative of the MC and are attended by TC Chairmen and Vice-Chairmen as required. This process is usually repeated every day of the meeting.

A further synchronization and consensus-building point, involving all delegates, occurs at the mid-week plenary where short reports are made by the different TC Chairmen on the progress of work of their TCs.

In the general case, because of the many synchronization meetings, the recommendations proposed by the different TCs at the final plenary meeting are accepted, possible modifications being agreed upon by consensus. On certain rare occasions during the final plenary, an issue already resolved by one or more TCs during that week may be the subject of reconsideration if two or more Members request a membership vote. When the Chairman of the General Assembly is satisfied that the issue has been sufficiently debated, a vote can be taken of all the Members present.

The results of a DAVIC meeting are summarized in a set of approved resolutions, including the recommendations produced by the TCs.

6. *The nature of DAVIC specifications*

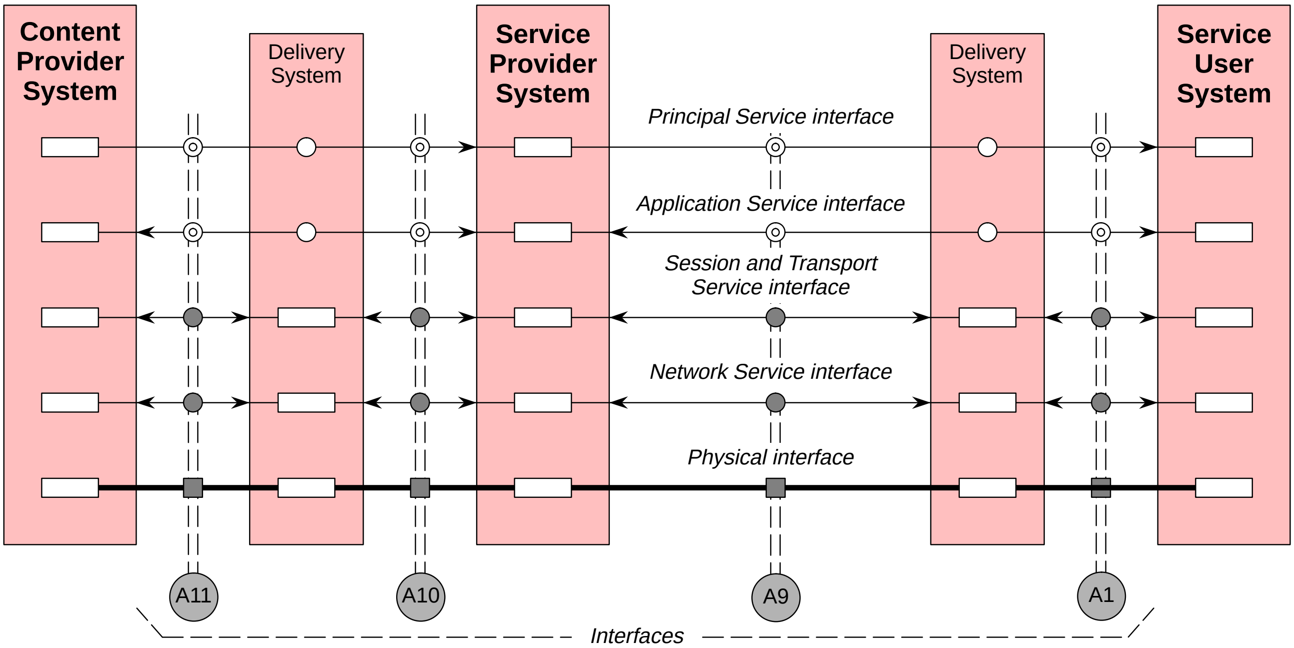
In the current phase of work, DAVIC is concentrating on digital audio-visual applications and services of the broadcast and interactive type. *Fig. 2* is a very general representation of the system being addressed. It comprises three main entities – the *Content Provider System*, the *Service Provider System* and the *Service User System* – connected together by two *Delivery Systems*. The interfaces between each entity in the system are labelled A0, A1, A2, etc. In the diagram, only four of the system interfaces are shown: A1, A9, A10 and A11.

As a rule, DAVIC specifications contain *normative* and *informative* parts. Normative parts have to be implemented as per the specifications, in order to claim conformity of a subsystem to the DAVIC specifications. Informative parts are included as well, for the purpose of clarifying the normative parts of the specifications, and to give general assistance to implementers of specifications.

DAVIC specifications contain the reference model of the DAVIC system and its subsystems. DAVIC specifications also define reference points, i.e. points of particular interest in the system. These points have a normative value if they are accessible. Therefore a digital audio-visual subsystem will conform to DAVIC specifications, if its accessible reference points do. This means that a subsystem can be considered as a black box; conformity to a DAVIC specification is only assessed at the external reference points.

DAVIC specifications define the technical "tools" whose use allows the provision of "functionalities" required by the DAVIC system, and the applications that make use of it. Tools are usually associated with grades that determine the level of performance of a given tool, e.g. mono-stereo-multichannel audio, TV-HDTV, bandwidth of a return channel, etc.

Figure 2
The general DAVIC system.



DAVIC specifications are issued in versions: DAVIC 1.0, DAVIC 1.1, etc. The current DAVIC 1.0 version defines a first set of tools, enabling the deployment of systems that support initial applications such as TV distribution, near-video-on-demand, video-on-demand and some basic forms of teleshopping. Each future DAVIC version will specify different grades of previously-defined tools or more tools in addition to the previously-specified tools.

Even if DAVIC defines only one tool per functionality, the toolkit nature of DAVIC specifications would lead to too many incompatible instances of subsystems. It is therefore necessary to define groupings of tools with associated grades which are deemed to have a particular value in the application domain. These groupings serve as a guidance to manufacturers and application providers; they are called *profiles* and have normative value.

DAVIC specifications are developed by making use of the best available technologies, or combinations thereof, and as far as feasible they are validated by technical interoperability tests. Because of the toolkit nature of the specifications, however, no claim can be made as to the suitability of DAVIC specifications (or any of its parts) for any intended purpose.

As a rule, DAVIC specifications are accompanied by documents specifying methods to test the conformity of reference points to the specifications.

7. Outline of DAVIC 1.0.

Table 1 briefly describes the content of the DAVIC 1.0 specifications currently under development. Of its eleven parts, part 6 is not assigned at present and is reserved for future use.

Part no.	Title	Major sections
1	Description of DAVIC System functions	Functions required to support DAVIC applications Generic aspects of application and service requirements Descriptions of example applications
2	System reference models and scenarios	Abstract System Reference Model DAVIC System Reference Model DAVIC System transaction flow scenarios Supplementary definitions, acronyms and abbreviations
3	Service Provider System architecture and interfaces	Service Provider System architecture Service Consumer System to Service Provider System interfaces Content Provider System to Service Provider System interfaces
4	Delivery System architecture and interfaces	Core and Access Networks (including satellite delivery systems) Network and service related control Delivery System management
5	Service Consumer System architecture and interfaces	Set Top Unit architecture High Level application APIs Peripheral User Interface
6	*Reserved for future use*	
7	High-layer and Mid-layer protocols	Service elements Presentation Level and Session Level Session control protocols Connection control protocols Interface A0 local session and initialisation protocols, and interface packets Resource allocation protocols Management protocols Remote Procedure Call (RPC) protocols Session and Transport Layer and Network Layer protocols AAL and ATM Co-ordination structure protocols Addressing Management Information Base

Table 1
Content of DAVIC 1.0 parts
(continued over).

DAVIC

Part no.	Title	Major sections
8	Lower-layer protocols and physical interfaces	Core Network Infrastructure Physical Access Network interfaces Hertzian Access Network interfaces (satellite) Network Interface Unit to Set Top Unit interfaces
9	Information representation	Content architecture Monomedia components Multimedia information
10	Security	Generic security services Security tools Security system architecture Access control
11	Usage information protocols	Usage information Functions supported Architecture Event Data Manager Event Data Collection Element Event Data object interface External data transfer interface
12	Dynamics, reference points, and interfaces	Instance Development Tool Defined DAVIC System instances Physical Instance #1 Physical Instance #2 Physical Instance #3 Profiles System dynamics Context-specific system performance and configuration requirements

Table 1 *(continued)*
Content of
DAVIC 1.0 parts

Part no.	Title
	Group 1: DAVIC 1.0 tools
7	High-layer and Mid-layer protocols
8	Lower-layer protocols and physical interfaces
9	Information representation
10	Security
11	Usage information protocols
	Group 2: DAVIC subsystems
3	Service Provider System architecture and interfaces
4	Delivery System architecture and interfaces
5	Service Consumer System architecture and interfaces
	Group 3: System-wide issues
1	Description of DAVIC System functions
2	System reference models and scenarios
12	Dynamics, reference points, and interfaces

Table 2
Classification of the
DAVIC 1.0 parts.

The eleven parts of DAVIC 1.0 can be arranged in three groups, as indicated in *Table 2*. The parts in group 1 identify all the tools that are necessary to build DAVIC-conforming systems. The parts in group 2 describe how the three main DAVIC sub-systems can be assembled using the tools of group 1. The parts in group 3 address system-wide issues.

8. Security, downloadability and tool relocatability

A possible model of a DAVIC Service Consumer System (SCS) is shown in *Fig. 3*. The named blocks correspond to tools specifically selected by DAVIC. The SCS, in general, is composed of four subsystems:

– Network Interface Unit (NIU);

– Set-Top Unit (STU);

– Human or Machine Service Consumer (HMSC);

– Security.

The Security subsystem is very important because it controls the way information is consumed. It may happen, therefore, that a network operator is willing to be the guarantor of secure delivery of information to the final user. In this case some of the tools, typically "Security Filter" and "Descrambler" will be resident in the NIU (which is likely to be owned by the network operator), while "Security Management" is likely to be resident in the STU. In other cases, all of the Security subsystems will be resident in the STU.

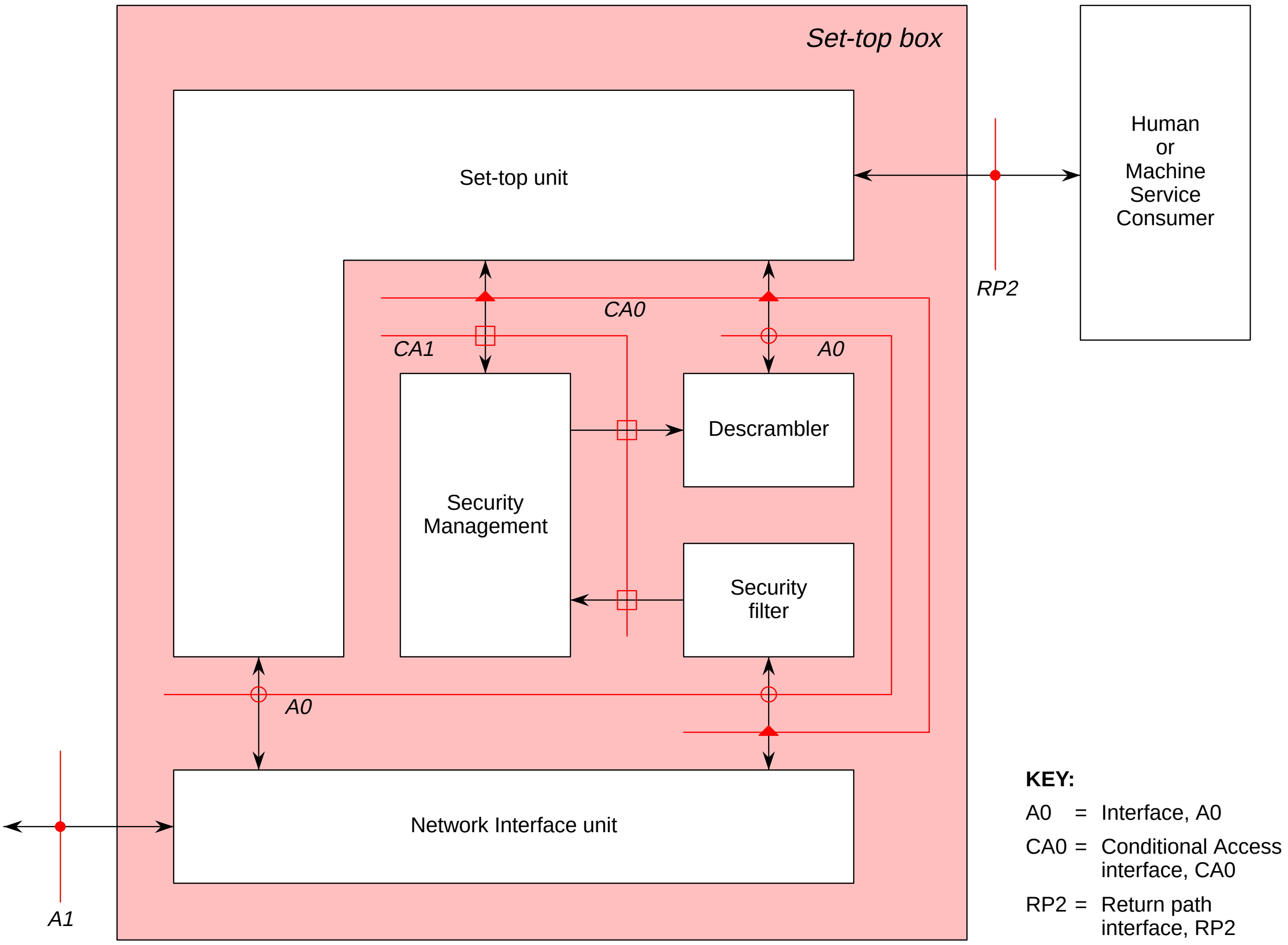
It should be noted that DAVIC does not issue specifications where the location of a tool (which can have multiple locations) is determined *a priori*.

DAVIC 1.0 part 10 (Security) will be published in December 1995. It will not be normative in the sense that the specifications will not appear there yet; these specifications are planned to be developed in version DAVIC 1.1.

The following guidelines for the development of DAVIC 1.1 security tools have been agreed:

1. In general a security system requires the use of several tools. Tools may have different grades.
2. DAVIC needs to specify a set of tools each with different grades that can be used to assemble security systems capable of supporting a wide range of applications.
3. DAVIC will define security tools and their grades by means of the following process:
   - identification of services/applications of interest to DAVIC members;
   - identification of functionalities needed by each application;
   - identification of common functionalities across applications;
   - definition of a set of tools with appropriate grades supporting the identified functionalities.
4. In this process, grade minimization is strongly demanded

Figure 3
Model of a Set Top Unit.

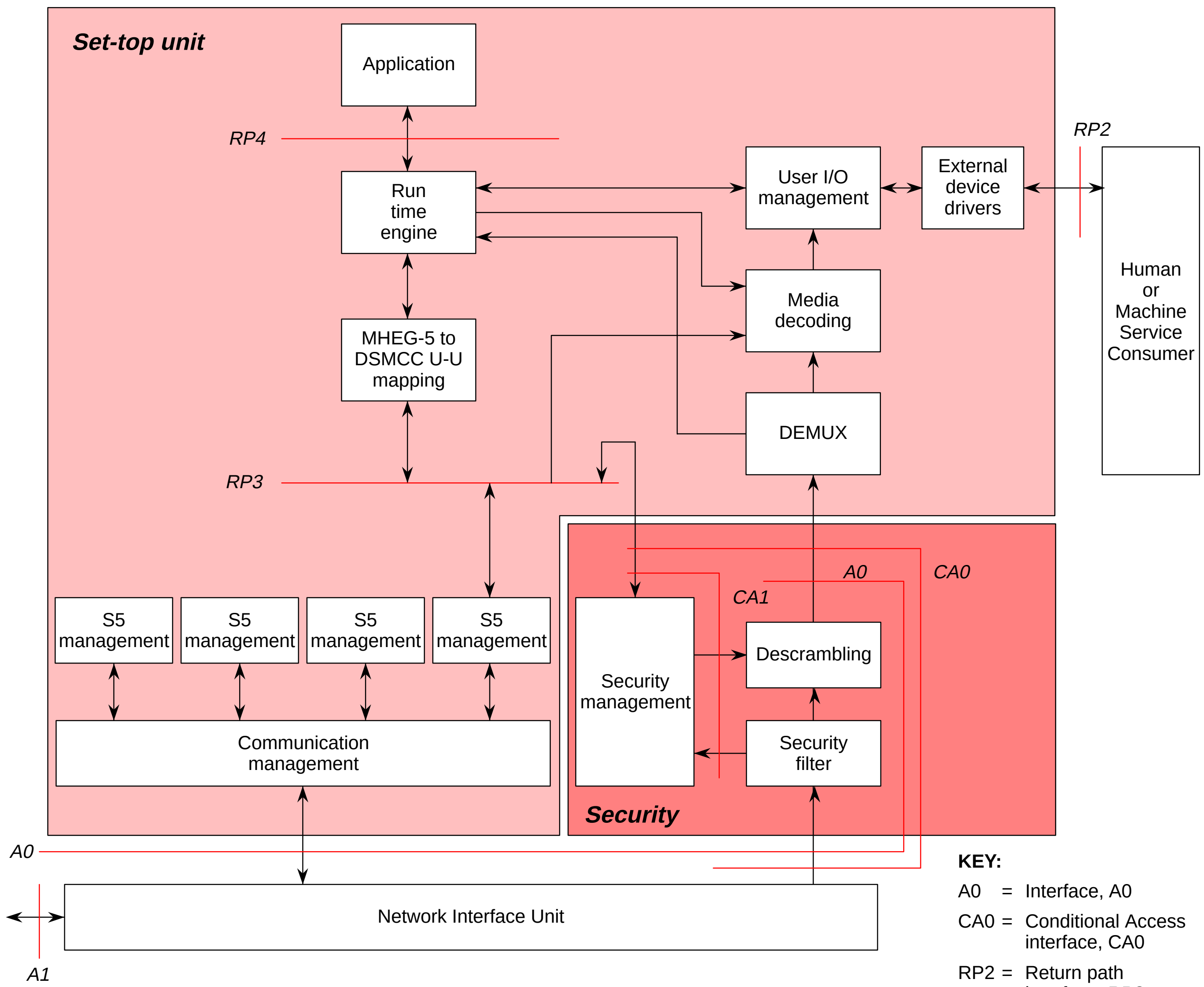


5. DAVIC may want to describe some typical assembly of tools for some typical applications as an informative annex.
6. DAVIC will specify its recommended security tools and grades.
7. DAVIC will specify a mechanism by means of which a Content/Service Provider and a User can negotiate the appropriate tools and grades.
8. DAVIC will specify a mechanism for replacement/augmentation of its recommended tools.
9. DAVIC does not want to prevent people from using the mechanisms above for other purposes.

Fig. 4 shows in more detail the functional blocks that may be present in a Set-Top Unit. The figure may also help to explain the role of *downloadability* which is another, more subtle, form of tool *relocatability*. Downloadability is becoming more and more important because the progress of microelectronics is such that even complex algorithms can be executed on generic programmable processors. Modules, such as those identified in *Fig. 4* may be implemented in either hardware or software, or a mix of both technologies. They can be grouped in different ways and need not be physically or logically identifiable. Furthermore, they can be split into submodules and these can be grouped to produce other modules which have functions different to those shown in the figure.

It should be noted that a Service Consumer System whose software modules are partly or wholly downloaded can only claim conformity to this DAVIC 1.0 specification if, after software downloading, it can successfully execute DAVIC 1.0 applications, i.e. applications built using tools which have been defined in part 9, "Information representation".

Figure 4
Model of a Service Consumer System.



Part no.	Title	Major sections
1	Description of DAVIC System functions	Functions not supported in 1.0
2	System reference models and scenarios	Reference model for distribution systems
3	Service Provider System architecture and interfaces	A10 interface: API for content-related data, navigation tools, executable code, etc.
4	Delivery System architecture and interfaces	
5	Service Consumer System architecture and interfaces	STU Reference Decoder Model Internet access
6	*Reserved for future use*	
7	High-layer and Mid-layer protocols	Server MIB Server + DS + STU management Protocol stacks for return channels (real time/non-real time) Protocols to achieve dynamic channel allocation in a multi-access cable systems
8	Lower-layer protocols and physical interfaces	Technologies for physical layer and lower-layer protocols for satellite return channel Technologies for transmission to the A1 interface via MMDS (Multichannel Multipoint Distribution System) Technologies for the transmission of digital information upstream in cable systems operated in multi-access mode and sufficient capacity to serve the needs of multiple two-way services Connectors for the A0 and A1 interfaces Data ports for STU including connectors
9	Information representation	Additional Service Information tools and associated technologies to enable intermediate switching nodes to become capable of correctly routeing the multi-program streams Interfaces and protocols necessary to reduce the possibility of unauthorized copying as well as providing the ability to trace ownership in the event of unauthorized copying and in order to properly assign IP rights
10	Security	Full specification of tools for a DAVIC security system, including technologies for: – scrambling algorithms – key management – authentication – security devices – In particular grades of technologies sufficiently strong to secure financial transactions
11	Usage information protocols	Completion of User Data Protocol
12	Dynamics, reference points and interfaces	More detail for the A4 interface Other Profiles/Levels Documenting backwards 1.0 compatibility Scenarios for distribution systems
13	Conformance testing	Conformance testing tools for DAVIC 1.0

Table 3
Classification of the DAVIC 1.1 parts.

Part no.	Title	Major sections
1	Description of DAVIC System functions	Functionalities for high-bandwidth symmetrical digital connectivity Functionalities for limited bandwidth multimedia mobile wireless systems Functionalities for home network
2	System reference models and scenarios	Reference model for high-bandwidth symmetrical digital connectivity Reference models for limited bandwidth multimedia mobile wireless systems Reference model for home networks
3	Service Provider System architecture and interfaces	High-capacity storage subsystems
4	Delivery System architecture and interfaces	
5	Service Consumer System architecture and interfaces	
6	Content acquisition and production systems	
7	High-layer and Mid-layer protocols	End-to-end protocols for high-bandwidth symmetrical digital connectivity User-to network protocols for high-bandwidth symmetrical digital connectivity End-to-end protocols for multimedia mobile wireless systems User-to-network protocols for multimedia mobile wireless systems Network management protocols to provide roaming capability in multimedia mobile wireless systems Protocols for distributed servers/distributed services Service Management protocols Home network protocols Protocols for peripheral ports for STU Protocols for extending the capacity of video servers through arrays or juke boxes of tapes and magnetic and optical discs
8	Lower-layer protocols and physical interfaces	Modulation and associated technology to transmit digital audio-visual information over terrestrial UHF and VHF TV channels Modulation and associated technology to transmit digital audio-visual information over 28-40 GHz (LMDS) Definition of A1 and A0 interfaces for high-bandwidth symmetrical digital connectivity A4 interface for multimedia mobile wireless delivery systems A1 interface for multimedia mobile wireless delivery systems A1* interfaces for different delivery media Peripheral ports for STU including connectors Interfaces for extending the capacity of video servers through arrays or juke boxes of tapes and magnetic and optical discs
9	Information representation	Representation of computer-generated audio information Representation of 3-D computer-generated visual information Information representation for higher quality video and audio Audio-visual information representation for high-bandwidth symmetrical digital connectivity Subsets or extensions of current information representation tools for multimedia mobile wireless application Extension of information representation for content acquisition and production
10	Security	
11	Usage information protocols	

Table 4
Classification of the DAVIC 1.2 parts *(continued on next page)*.

Part no.	Title	Major sections
12	Dynamics, reference points, and interfaces	Definition of STU profiles supporting audio only or audio which is enhanced by data and/or graphic and/or visual subchannels Scenarios for high-bandwidth symmetrical digital connectivity Backwards 1.0 and 1.1 compatibility
13	Conformance testing	Conformance testing tools for DAVIC 1.1
14	Software tools	Software technologies associated with application and systems software portability: – version/configuration control – software integrity – software safety (e.g. virus protection) Search agents

Table 4 *(continued)* Classification of the DAVIC 1.2 parts.

9. The DAVIC workplan

The DAVIC workplan is divided into three sections:

Section 1 Items for DAVIC 1.1;

Section 2 Items for DAVIC 1.2;

Section 3 Future items.

Table 3 lists the items that have already been allocated to the various "parts" of DAVIC 1.1. *Table 4* lists the items that have already been allocated to the various "parts" of DAVIC 1.2.

The items which will be specified in Section 3 include:

– agent communication;

– service scalability;

– media conversion protocols (e.g. PAL to NTSC, text to graphics, text to speech);

– guaranteed quality of services (delivery, delay, integrity);

– methods to evaluate end-to-end quality of service;

– domestic multimedia information infrastructure.

When this article was being prepared, DAVIC 1.0 was expected to be published in December 1995. A Call for Proposals was issued in September 1995 and the corresponding specifications will be published in June 1996. A fourth Call for Proposals was expected to be issued in December 1995 and the corresponding specifications will be published in December 1996.

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EBU wins a Technical Emmy award

The EBU was awarded a "Technical Emmy" by the National Academy of Television Arts and Sciences (NATAS) in the United States during October 1995. The award – which honours the AES/EBU serial digital audio interface – was presented to the EBU by Mr. John Cannon, President of NATAS, at a ceremony held in the Sheraton Hotel, New York, on 12 October 1995.

Accepting the award on behalf of the EBU, Technical Director, Dr. George T. Waters *(left)*, paid tribute to all the EBU Members involved in the development of the interface. In a separate presentation at the same ceremony, the AES received a Technical Emmy for its part in the development of the interface.

This is the third Emmy for Technology that the EBU has won. The first was awarded in 1982/3 for work towards a European and a worldwide agreement on a digital component video studio specification. The second, in 1986/7, was awarded to the EBU for work towards a world standard for digital component video tape recording.