



**VIRTUAL EXPERIENCE
OCTOBER 11-14**



Fostering of Patent Pools Covering Cable Technology

Lessons from VVC Pool Fostering

A Technical Paper prepared for SCTE by

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1. Introduction

Patent pools are increasingly well known as a mechanism to license patents essential to a technical standard. Pools have a variety of benefits, including relative ease in licensing for both licensors and implementers (“one-stop shop”) and a lower aggregate royalty level. CableLabs had early experience when it launched in the mid-1990s the first modern day pool covering MPEG2-essential video codec patents. Since then, pools cover a variety of technologies, including video codecs that succeeded MPEG2. Other pools today encompass a wide range of standardized technologies implemented by cable operators or used in cable households. Over time, the fractured licensing environment for the video codec HEVC brought many industry players to look for greater clarity for licensing of the most recent ISO/IEC MPEG video codec, Versatile Video Coding (VVC). Earlier this year, the Media Coding Industry Forum (MC-IF) completed its fostering of pool formation covering VVC-essential patents.

When implementing a video codec in a cable network, SCTE and its members bear in mind not only the technical merits of the standard but also the overall costs, including royalties paid to patent owners by their vendors (e.g., set-top box manufacturers). Patent pool formation and licensing have a cost but provide certainty and other benefits that are attractive to the cable operator and to their vendors. Some of these benefits can be passed on to subscribers and other consumer households.

As undertaken by MC-IF, fostering is a pre-commercial activity that is intended to result in the selection of a single pool administrator that takes forward the work of pool facilitation. Once facilitation is completed (the licensors have agreed royalties and other terms, royalty split, the role of the administrator), the administrator manages the pool, including licensing, royalty collection and distribution to patent owners.

Pool formation takes time. For this reason, MC-IF recognised that it was important to launch the pooling effort soon after the adoption of the new VVC standard. This effort was based in part on the experience of the DVB Project in fostering pools essential to DVB standards. MC-IF scaled DVB’s process to meet the challenges of the VVC patent environment: dozens of holders with diverse business models drawn from the audio-visual industry, but also widely divergent industries. Some based their revenues wholly on collection of royalties; some largely on sales of devices and services (while owning one or more VVC-essential patents). In this paper, Section 2 describes patent pooling and its growing use as a tool for licensing patents essential to the implementation of a standardised technology. Section 3 sets out the experience of DVB (and other standards bodies) in fostering the formation of pools covering their standard essential patents. Then Section 4 shows how MC-IF applied DVB’s approach to pool fostering in its effort to foster a pool for VVC-essential patents, notably with the goal of the selection of a single pool administrator. Section 5 concludes, first by presenting some “lessons learned” from the VVC pool fostering activity. These lessons could inform future efforts at patent pooling. That section also offers a comparison of VVC Pool Fostering with the licensing frameworks for other next generation video codecs.

2. Patent pooling

Patent pools are increasingly well known as a mechanism to license patents essential to a technical standard. A patent pool is licensing program under which patents essential to a standardised technology are jointly administered by a licensing administrator. This model was introduced by a MPEG LA in the mid-1990s with its pool covering MPEG2-essential video codec patents. It has been adopted by other licensing administrators such as Sisvel and Via Licensing and the recent new entrant Access Advance. Very broadly, the formation of a patent pool is facilitated by a licensing administrator who calls for participation by holders of patents essential to the target technology; it manages the process for review, often by an independent expert, of patents claimed to be essential; and the administrator convenes meetings of holders to negotiate terms, for example, on the joint patent license and on distribution of royalty income among the pool participants. This first step, pool facilitation, can take well over a year to complete. When the participants have agreed on the terms, the licensing administrator launches the licensing program, encourages implementers to take up licenses, and collects and distributes royalties.

Patent pooling is an attractive alternative to other licensing models like bilateral licensing (licensing after negotiation between individual patent owner and individual implementer). Pooling offers a variety of benefits, including relative ease in licensing for both licensors and implementers (“one-stop shop”); a lower aggregate royalty level; and through its essentiality review process, greater certainty of patent quality. CableLabs had early experience when it launched in the mid-1990s the first modern day pool covering MPEG2-essential video codec patents. When CableLabs formed MPEG LA, it worked with the US Department of Justice in developing a number of safeguards to reduce the risk of anticompetitive practices. These included: only standard essential patents may be offered through the pool; the patents holders remain free to license bilaterally; the licensing administrator is independent; and sensitive market information is not communicated to the royalty recipients.¹ This well-settled regulatory framework that reduces exposure to claims of antitrust violation is another attractive feature of today’s pooling environment.

Since the launch of the MPEG2 pool, pools cover a variety of technologies. In addition to the video codecs that succeeded MPEG2, these technologies include DVB and ATSC transmission standards; mobile telephony standards; differing audio formats; Wi-Fi (802.11) and more. The success of the MPEG2 pool, and of MPEG LA as pool administrator, has encouraged other commercial entities to offer pooling services, notably Sisvel (whose first pool indeed predates MPEG LA), Via Licensing, and more recently Access Advance and Avanci.²

¹ The regulatory framework is set out in a series of Business Review Letters issued by the US Department of Justice. MPEG LA’s 1997 letter can be found at on the Department of Justice website [here](#). The framework has evolved as reflected, for example, in a recent letter, [University Technology Licensing Program](#) (13 Jan 2021).

² A list of pools currently operational and under development can be found at the websites of the licensing administrators. See Further Resources below. Until recently Access Advance was known as HEVC Advance.

As a result of over two decades of commercial activity, it's possible to identify elements of the technology marketplace that are well-suited for an intermediary to provide patent pool license administrator services and to derive profits for such services.. A licensing administrator can be useful when

- (a) ownership of standards-essential patents is widely diffused (ownership is not concentrated in few holders);
- (b) manufacturers (implementers of the technology) are numerous,
- (c) for the production of numerous implementations, notably interoperable devices (and corresponding services) for large consumer markets (for example, where the market can be measured in billions of implementing devices);
- (d) the standardised technology will not be overtaken quickly by other technological developments; and, relatedly,
- (e) the standardised technology will be a market success, ideally a blockbuster, government-mandated or otherwise compelling.³

Broadcast transmission standards have fit within the framework. For example, the ATSC pool had (at inception) some eight licensors, a number of manufacturers of ATSC-implementing devices and enjoyed a market primed by analog switch-off (replacement of analog broadcast services with digital broadcasting), mandated by government, and a government subsidy for household purchase of ATSC consumer equipment. Similar factors have influenced territories adopting DVB terrestrial transmission standards. And broadcasting has had in the past long technology development cycles, for example to reduce the risk of obsolescence of television receivers targeted by broadcasters under a public service mandate but constrained by terrestrial frequency scarcity.

Pooling can fail. Pools can fail during the facilitation phase: for example, the call for participation fails to attract the holders of a critical mass of patents, or significant holders representing the key commercial innovation for a standard remain outside the pool. Or holders may not agree on royalty split or other terms. After formal launch, the pool may not be commercially successful because implementers find the terms unattractive and they prefer to wait to see if anyone else takes a license (a form of holdout). The technology underlying the pooled patent may not be a commercial success if it's displaced by later innovation. Pooling can also fall short if there are multiple, competing pools for the same standardised

³ These factors are drawn from an unpublished study prepared by one of the authors for a standards body then considering offering commercial licensing administration services.

technology. A pool administrator can also abandon a pool if it does not enjoy the anticipated commercial success and it finds that it's more lucrative to commit its resources elsewhere.

In the case of HEVC, competing pools, offering different licensing models and royalty rates, confused the landscape for obtaining licenses of HEVC-essential patents. The confusion arguably slowed market adoption of this video codec technology. As a result of this recent, indeed ongoing, experience, many industry players looked for greater clarity for licensing of the most recent ISO/IEC MPEG video codec, Versatile Video Coding (VVC). Earlier this year, the Media Coding Industry Forum (MC-IF) completed its fostering of pool formation covering VVC-essential patents. Its effort was based in part on the experience of the DVB Project in fostering pool s essential to DVB standards. Section 3 of this paper sets out DVB's experience in pool fostering; section 4 discusses the application by MC-IF of this experience to its effort in VVC pool formation.

3. Pool Fostering

Pool fostering is generally the effort undertaken by a standards body to encourage the formation of a patent pool covering one of its standards. It is an extension of the work of the standards body after it completes development of the standard. As such it is a precommercial activity, preceding pool facilitation and administration. As a precommercial activity, it generally adheres to the antitrust rules governing standards bodies, including no exchange of market sensitive information, no anticompetitive collusion among participants, etc.⁴

Pool fostering is a response to the perceived risk of market failure of a recently adopted standard due to concern over onerous aggregate royalties or other difficulty in licensing the underlying patents. By and large, there's little need for fostering if the assessment of commercial pool administrators is that a pool is viable, and they independently take preliminary steps leading to pool facilitation. On the other hand, fostering is valuable when participants of a standards body consider that an early start in clarity in licensing for a new standard will be an advantage for market acceptance of its standard. For example, the contributors to the SDO's standard (often the holders of patents essential to these contributions) may have knowledge of the capabilities of the technology and its market potential superior to that of licensing administrators. The SDO participants are aware that a pool may enhance the attractiveness of the SDO's innovation, overcoming market "hesitation."⁵

⁴ Pool fostering is discussed extensively in Eltzroth, *Fostering by Standards Bodies of the Formation of Patent Pools* (2018) available at [SSRN](https://ssrn.com/abstract=3281111).

⁵ Other instances of "market hesitation" include: when modern pooling was relatively unknown (CableLabs fostering, leading to the MPEG LA pool); and when the commercial returns for otherwise "orphaned" standards are not evident. Fostering may be suitable as a first step to a pool to be sponsored by the standards body (AVS1 pool, sponsored by the Audio Visual coding Standard Workgroup of China; IEEE's similar activities in the 2010s).

Pool fostering can also be attractive to licensors to get an early start on pooling and to reaffirm early licensor interest in “one-stop shop” and the other benefits of pooling. This was the case for VVC pool fostering (discussed in Section 4) when many patent holders shared the market perception that confusion in HEVC licensing caused in part by multiple pools had slowed take-up of HEVC technology. Another feature of pool fostering is that it offers the opportunity for all licensing administrators, incumbents, and new entrants, to present their capabilities and expertise to licensors on a “level playing field.” This would reduce the advantages of incumbency. In addition, those new to pool licensing (and indeed new to exploitation of their patents by licensing) can engage with colleagues to discuss pooling, within a framework virtually without enduring legal commitments.

DVB’s experience with pool fostering started shortly after its inception in the mid-1990s, prompted by the provisions of the IPR policy in its Memorandum of Understanding.⁶ The initial approaches to pool fostering were not the most efficient and through trial and error, across a number of fostering efforts, DVB has developed a “toolbox” to advance a pool fostering effort. Today these include early identification of probable holders of patents essential to a recently adopted DVB standard; after completion of standards development, prompt convening of these holders to an initial meeting of holders; as guided by these participants, exchanges of information between the participants and candidate pool facilitators; formal presentations by the candidates; selection by the participants of a facilitator to take forward the work of pool completion and ultimately pool administration.

Based also on close to three decades of fostering, DVB has a set of well-settled rules for the conduct of fostering, including the basis of participation by a holder of DVB-essential patents; confidentiality; decision by consensus; and equality of treatment. Each of these is geared to be “light-touch,” that is not imposing undue burdens and costs on participants. These ground rules were largely adopted in VVC Pool Fostering (discussed in Section 4) with modifications to account for the larger number of participants and the need to hold meetings entirely remotely as a result of the COVID pandemic. In both DVB and VVC Pool Fostering, there was careful attention to adherence to antitrust rules: as with conduct within standards bodies, pool fostering is treated as a precommercial activity. In DVB’s pool fostering, commercially sensitive information was not exchanged, and participants were reminded of the constraints on their jointly decided actions.⁷

⁶ A discussion of how DVB was brought to include pool fostering in its IPR policy is included in Eltzroth, *IPR Policy of the DVB Project*, Int’l J IT Standards & Standardization Res (2008, 2009) available at dvb.org.

⁷ DVB’s toolbox is summarised in a DVB document promoting pool fostering, DVB Project, *DVB’s Fostering of early Formation of Patent Pools: Note to DVB’s Liaison Partners and to Standards Bodies that author Materials normatively referenced by DVB Standards*. See Further Resources.. DVB has other tools relating to pools, involving the use of its IPR Module as a sounding board for exchanges of views of possible licensing terms. (VVC Pool Fostering did not exclude a later meeting to discuss pool developments if circumstances warrant.) DVB also intervenes when a pool is failing. Eltzroth, *Fostering by Standards Bodies of the Formation of Patent Pools* (2018), available at SSRN.

4. Pool fostering for VVC

Media Coding Industry Forum was founded in 2018 with a goal to facilitate cross-industry discussions around the non-technical aspects of deployment of media coding standards, including patent licensing. MC-IF has become the focal point for discussions around deployment and licensing of the next-generation video coding standard, Versatile Video Coding (VVC).⁸ At the time of MC-IF's formation, VVC was on a course to complete formal standardisation within ISO/IEC by summer 2020.

In common with other industry participants, MC-IF members noted the lack of clarity in licensing of patents essential to HEVC, the predecessor standard of VVC. In a nutshell, it was claimed that market adoption of HEVC was slowed by the multiplicity of pools covering essential HEVC patents; the competitive tension between the pools; other licensing structures formed by patent holders; and still other holders that had made clear that they would license their HEVC-essential patents only bilaterally. In the face of this apparent confusion, some contributors to VVC standards development looked to MC-IF for a solution that would, for VVC, resolve the issues that have persisted for HEVC. The general view was that confusion could be reduced if a single licensing administrator for a VVC pool could be named early by the patent holders.

Several MC-IF members were familiar with DVB's model of pool fostering. In addition, DVB had recently begun "evangelising" its fostering model through contacts with sister standards bodies, including ISO/IEC.⁹ Senior leadership of both DVB and MC-IF met at IBC in Amsterdam in September 2019 for a further discussion of pool fostering, its benefits and DVB's experience. By spring 2020, MC-IF had decided to launch a pool fostering effort and engaged a specialist in pool fostering to lead the effort.¹⁰

Several weeks after the VVC standard was adopted by ISO/IEC,¹¹ MC-IF's pool fostering issued a call for participants and set an initial meeting to occur on 1 September 2020. The activity was designated

⁸ The website of MC-IF has further information on its activities and materials on its VVC pool fostering activity. www.mc-if.org Other next generation video coding standards include Low Complexity Enhancement Video Codec (LC-EVC) and Essential Video Codec. Together with VVC, both are standardised through ISO/IEC. Other recent video codecs, not developed through ISO/IEC, include AV1 (developed by the Alliance for Open Media) and AVS3 (Audio Visual coding Standard Workgroup of China). The licensing policies related to LC-EVC, EVC, AV1 and AVS3 are discussed in Section 5.

⁹ See Further Resources for a link to DVB's Note addressed to other standards development organisation on DVB's Fostering of early Formation of Patent Pools.

¹⁰ Both convenors were experienced in pool fostering. Carter Eltzroth, as DVB's Legal Director, had led its pool fostering across a range of DVB standards. He was named convenor. Co-convenor Judson Cary played an active role in pool formation for a technology for which standards were adopted by DVB and CableLabs. He was also President of MC-IF.

¹¹ The VVC standard was consented by ITU-T Study Group 16 on 3 July 2020, to be published as ITU-T Recommendation H.266. Concurrently, MPEG submitted the VVC standard for Final Draft International Standard ballot, to be published as ISO/IEC 23090-3.

“VVC Pool Fostering.” While the activity was sponsored by MC-IF, the designation was intended to indicate that fostering was pursued independently of MC-IF. It would be for the participants in VVC Pool Fostering – the VVC-patent holders – and not the board and members of MC-IF, to take decisions on its direction and final decision. The initial meeting and later meetings were all held virtually because of the COVID pandemic. This presented disadvantages but at least one benefit: because there was no travel, meeting cycles could be significantly shortened.

In addition to the call for participants and other press releases, the co-convenors actively solicited for other participants. Ultimately 49 companies joined VVC Pool Fostering. By its participation each affirmed that it had a well-founded belief that it held one or more VVC-essential patents. Among these 49 companies were nine of the top 10 companies whose contributions were accepted during the course of VVC standards development. The 49 companies represented a mix of R&D companies and non-practising entities, together with implementers (with essential patents). There was broad geographic diversity: 15 companies were US-based; eight came from the EU and UK; and 26 from East Asia. The number of Chinese companies (10) represents their increased contribution to standardisation, including the VVC standard, and the recent emphasis on patent filing in China.

As in DVB’s practice, the initial meeting of VVC Pool Fostering set out the operating rules governing participation, conduct and decision-making. The participants agreed that:

Participation by each company was based on its well-founded belief that it holds one or more patents potentially essential to VVC; consistent with the DVB model, the company’s “well-founded belief” was sufficient; there was no call for declarations of essential patents (or third-party determination of essentiality) that could have imposed unnecessary (and ultimately duplicative) costs on participants;

Each participant agreed, by its presence in VVC Pool Fostering, to treat as confidential the contents of meetings and documents (notably presentations by candidate facilitators); no formal non-disclosure agreement was proposed; the sole exception to confidentiality covered public statements agreed by participants in VVC Pool Fostering, for example press releases reporting on progress or calling for additional participants;

Any decision (including notably on candidate facilitators) was to be undertaken by consensus or, in the absence of consensus, a two-thirds supermajority; on consensus, VVC Pool Fostering followed the well-understood notion of this practice within standards bodies, including ISO/IEC;

All participants were to be treated equally; there was no favorable treatment for MC-IF members and no separate “voting block” formed by MC-IF;

There was to be strict adherence to antitrust rules and antitrust counsel was present at all meetings; and

In view of the varied business practices of participants and the need for virtual meetings, the participants adhered to a basic set of unexceptional netiquette guidelines.

The convenors also solicited the participation of licensing facilitators based on the convenors' knowledge of pooling and the suggestions of VVC Pool Fostering participants. Some eight were contacted; of these four agreed to participate as candidate facilitators. After the initial meeting, the participants drew on tools from the DVB toolbox: they solicited questions from potential candidate facilitators; once received the participants agreed on answers that were then, together with the underlying questions, circulated to all candidate facilitators. Conversely, the participants addressed questions to potential candidates. After these exchanges, VVC Pool Fostering held successive meetings to receive presentations from the candidate facilitators. As the meetings progressed, the field of candidate facilitators was narrowed progressively from four to two.

Over time, as VVC Pool Fostering continued its work, some additional process elements were added. One concern was that some participants may not fully express their views because of the difficulties in communicating in a remote setting and because of reticence (whether cultural or due to lack of familiarity with patent licensing). For this reason, the convenors redoubled their efforts at participant outreach. In addition, VVC Pool Fostering facilitated participant engagement by the use of confidential non-binding surveys, notably to solicit views on individual candidate facilitators. Anonymous comments were welcome (that is, delivered to, and anonymized by, the convenors). Moreover, an important process development was the use during meetings of the roll call, calling upon each company to express its views. This prompted colleagues to prepare a statement (but some would merely offer “not ready to express a view”).

VVC Pool Fostering progressively narrowed the field of candidate facilitators from four to two. In each case of elimination, a secret ballot was taken. The result of the vote guided the decisions taken at the next meeting; a consensus of participants was found that a candidate was to be removed from contention. MPEG LA and Access Advance remained. By the seventh meeting, it was clear that the participants would not find consensus (as “consensus” was defined by participants at their initial meeting) around a single facilitator to take forward the work of pool formation. In addition, neither would achieve the two-thirds supermajority vote to make a definitive decision. Instead VVC Pool Fostering “identified two strong pool administrators.”¹²

VVC Pool Fostering had set as its goal the selection of a single licensing administrator to form a pool of VVC-essential patents. A single facilitator was thought to be best suited to reduce the type of market confusion, recently encountered in HEVC licensing, caused by multiple licensing administrators offering patents in multiple pools. But the same contest between leading administrators of HEVC pools spilled over to the deliberations with VVC Pool Fostering and shaped the ultimate outcome. Each final candidate facilitator had a core group of participant supporters to vote and to advocate on its behalf. In

¹² The press release of VVC Pool Fostering announcing this result, together with other public statements during the course of pool fostering, are available on the MC-IF website. See Further Resources.

addition one candidate explicitly linked its existing HEVC program to its VVC proposal so that, for example, an implementer could obtain a license covering both video codecs.

VVC Pool Fostering was not writing on a clean slate; it was arguably inevitable that the turmoil of HEVC licensing would frustrate it from achieving its goal of one-stop shop for VVC licensing. On the other hand, some participants reflected that the outcome of VVC Pool Fostering had value because a “two-stop shop” was better than none at all. And the competing efforts in pool facilitation by the “two strong pool administrators” may (at the time of this writing) yet result in a single administrator.¹³

5. Conclusions

While its efforts did not result in the selection of a single licensing administrator to take forward the work on a VVC patent pool. VVC Pool Fostering was successful in bringing together more than a critical mass of VVC patent holders, drawn from a variety of industries and using diverse business models, to discuss VCC licensing arrangements in a precommercial setting. It provided a platform for presentations by several licensing administrators, including a new entrant. This was achieved in the midst of the pandemic when remote communications alone were available. Overall, the DVB model, grounded on a toolbox of arrangements for convening and advancing pool fostering, successfully scaled up to cover a standard with far more contributors.

At the same time, some lessons may be drawn from the experience of VVC Pool Fostering.

(Slightly) tightened participation test? The basis for participation in a pool fostering effort is today established as “well-founded belief that the participant holds one or more patents essential to the standard”. In VVC Pool Fostering this imposed a low threshold for those new to pooling (and indeed to patent licensing). This was welcome. At the same time, the cost for participation was low for interlopers or “peepers,” those companies with essential patents that had no intention ultimately to join a pool.

The test for participation could be changed by requiring the affirmation from the participant that it is “actively exploring joining a patent pool”.

¹³ By mid-August 2021, Access Advance had issued a press release announcing the launch of its VVC licensing program, [Access Advance Launches VVC/H.266 Video Patent Pool](#): *includes innovative Multi-Codec Bridging Agreement that Provides Substantial Royalty Savings to Licensees in both the VVC and HEVC Advance Pools* (1 Jul 2021) and (earlier) a [Royalty Rates Summary](#) (1 Jun 2021). MPEG LA has announced development of a VVC pool license and called for submission of VVC-essential patents: *MPEG LA Announces Development of VVC (Versatile Video Coding) Pool License: VVC expected to improve video compression efficiency and functionality* (27 Jan 2021).

Confidentiality. Confidentiality was based on a “gentleperson’s agreement” not to disclose. It worked well (at least the convenors were not aware of significant leaks of confidential information). At the same time it may be useful to consider, in a future pool fostering a “plain-vanilla” non-disclosure agreement, that could be adopted without significant negotiation (and without delay).

Confidentiality protected the deliberations and materials of VVC Pool Fostering. It may have negatively impacted its activities when some participants, when solicited by a candidate facilitator, entered into an NDA with that facilitator. It’s possible that these participants felt constrained in their freedom to discuss the merits of the candidate facilitators. A further pooling effort could discourage participants from agreeing to arrangements with potential candidate facilitators that undercut the fostering process

Finding consensus. During its initial meeting, VVC Pool Fostering adopted a rule that, in the absence of consensus, decisions were to be taken by a two-thirds supermajority. It was essential to have adopted this rule at initial meeting! But the value of this rule could be reconsidered when a large number of participants refuses to vote, declaring themselves “not ready,” with “no comment,” choosing “to abstain.” Other voting or tally mechanisms could be considered.

Affiliates in pooling. Participants and candidate facilitators in VVC Pool Fostering were not required to disclose any cross-ownership or other material affiliations. For example, several participants were shareholders in candidate facilitators. These links are well-known among licensing professionals, but participants new to licensing may be unaware. During meetings, they could have a sense that proceedings were gamed. For this reason, it may be suitable to require, in pool fosterings, disclosure by a participant if it has an affiliation with candidate facilitator and its pledge that it will not pass confidential information on to its affiliate.

RfP? In DVB’s experience, during the presentation phase, each candidate facilitator largely shapes its own materials and chooses what to disclose. In VVC Pool Fostering, some participants already had extensive knowledge with the candidate facilitators and drew on this background when developing questions addressed to them. Their answers were worked into the presentations (or delivered separately). In pool fostering where there are several candidate facilitators (and many participants) it may be well to specify the structure of the presentations, and the items to be covered. This could be formalized in a request for proposals issued by the pool fostering participants. Setting a more formal framework for presentations could permit the participants more easily to compare competing proposals and the respective strengths (and weaknesses) of the licensing administrators.

As a result of VVC Pool Fostering, is VVC in an advantageous position compared to other next generation video codecs? It is hard to make a definitive assessment because of the range of licensing models offered by competing codecs. In addition to VVC, two other video codec standards have been recently approved by ISO/IEC. Essential Video Coding (EVC) is an open-source codec completed by MPEG in April 2020 where the development effort was led by Samsung, Huawei and Qualcomm. The

development process has been defensive against patent threats establishing a baseline with codec tools made public more than 20 years ago. There are a further 21 tools for the main profile to be available under separate royalty-bearing negotiated licenses. In a May 2020 press release, the three companies announced that they would be announcing their respective licensing terms for these further tools within two years.¹⁴ In respect of Low Complexity Enhancement Video Codec (LC-EVC), the company responsible for its core technology foundation, V-Nova, announced licensing terms in May 2021: use of its essential patents are royalty-free for integration by device or chipset manufacturers, browsers, encoder / player vendors; but a fee is payable for usage by service operators based on service size (from \$0.01/per user per year to a cap at \$3.7 million/year).¹⁵

In addition to the codecs adopted by ISO/IEC, two other standards bodies have completed development work on competing technology solutions. The codecs previously adopted by the Audio Visual coding Standard Workgroup of China were each the subject of a patent pool characterised by a low royalty. For its AVS3, AVS has launched pool facilitation, calling for holders of AVS3-essential patents to submit declarations for an initial meeting of holders during autumn 2021. AVS has made clear that decisions on royalties and other licensing terms will be determined by the essential patent holders participating in AVS3 pool formation.¹⁶ A further codec, AV1 has been developed by the Alliance for Open Media, which, for licensing has adopted the W3C IPR policy. Its form of patent license provides for a “no-charge, royalty free” license for implementation. But this license is not free of controversy because it also provides that the implementer / licensee must make its own essential patents available under the same royalty-free terms. While this creates a genuine “eco-system” for royalty-free licensing, it arguably places some implementers, looking for royalty revenues, at a disadvantage.¹⁷

The licensing terms for each of these alternatives are associated then with special factors: EVC, with a baseline of technology subject, if at all, to expired patents; LC-EVC, a single principal owner of the core technology; AVS3, a pool structure now seeking to extend beyond East Asia; and AV1, available on a royalty-free basis, provided the licensee agrees to reciprocal RF licensing. VVC can be based on a more classic model of licensing of standards-based technology, coupled with pooling, a well-established mechanism for easier licensing administration. It can follow the structure already adopted for a long line of video codecs, MPEG2, AVC and HEVC. Fostering is the means to encourage VVC holders to take on that structure again.

As cable operators define next-generation set-top boxes and streaming services, they will need to choose video codecs that meet their technical needs for compression, efficiency, and resolution. They will also

¹⁴ Samsung et al, [MPEG-5 EVC is the next generation video codec for the media industry](#) (8 May 2020)

¹⁵V-Nova, [V-Nova LCEVC Licensing Terms announced for Entertainment Video Services](#) (21 May 2021)

¹⁶ Communication made by AVS to one of the authors (among others).

¹⁷ Information on the Alliance for Open Media and its licensing policy can be found at www.aomedia.org. Sisvel has formed a pool around AV1-essential patents not bound by the AOM licensing policy.

need to take into consideration the patent license royalties and licensing models associated with their codec of choice.

Abbreviations

AOM	Alliance for Open Media, www.aomedia.org
AV1	video codec of AOM
AVS	Audio Visual coding Standard Workgroup of China
AVS3	video codec of AVS
DVB	the DVB Project, a standards development organisation
EVC	Essential Video Coding, an ISO/IEC standard
HEVC	International Society of Broadband Experts
LC-EVC	Low Complexity Enhancement Video Codec, an ISO/IEC standard
MC-IF	Media Coding Industry Forum
VVC	Versatile Video Coding, an ISO/IEC standard

Further resources

Press release, [VVC Pool Fostering identifies Access Advance and MPEG LA as possible administrators to take forward pool formation covering VVC-essential patents](#) (MC-IF, 27 Jan 2021)

DVB Project, [DVB's Fostering of early Formation of Patent Pools: Note to DVB's Liaison Partners and to Standards Bodies that author Materials normatively referenced by DVB Standards](#) (2018)

Frequently asked questions on pool fostering, and other materials, available at [VVC Pool Fostering | MC-IF \(mc-if.org\)](#)

Information on commercial pools can be found at the websites of licensing administrators, for example, Access Advance, Avanci, MPEG LA, One Blue, Sisvel, Velos Media and Via Licensing.

For licensing of next generation video codecs, information on the progress on the pooling efforts undertaken by Access Advance and MPEG LA, as the next step following VVC Pool Fostering, can be found on their respective websites. For LC-EVC, V-Nova, V-Nova LCEVC Licensing Terms announced for Entertainment Video Services (21 May 2021); ; for EVC, Samsung et al, [MPEG-5 EVC is the next generation video codec for the media industry](#) (8 May 2020); for AV1 on the [License webpage](#) of the Alliance for Open Media ; for AVS3, through the website of AVS.

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