SCTE · ISBE STANDARDS

25TH ANNIVERSARY

25 Years of VALUE CREATION

Essential Knowledge for Cable Professionals™

SCTE · ISBE
Society of Cable Telecommunications Engineers
International Society of Broadband Experts

scte.org • isbe.org | scte.org/standards

SCTE • ISBE
STANDARDS

SCTE•ISBE STANDARDS: 25 YEARS OF VALUE CREATION

Since its initial formation in 1987, the SCTE•ISBE Standards Program has been the technical foundation for more than $1.1 trillion[1] in cable industry revenue. Through its ability to drive consistency and commoditization of cable products and practices, SCTE•ISBE Standards has helped to power huge growth in customers and reliability, as well as revenue.

SCTE•ISBE Standards have supported all areas of cable, but has especially been a catalyst for growth in the areas of ad monetization, broadband services, voice/telephony, and commercial services.

Standards has:

:: Enabled interoperability across equipment to optimize service performance.

:: Freed the industry from reliance on standards developed for competitive industries.

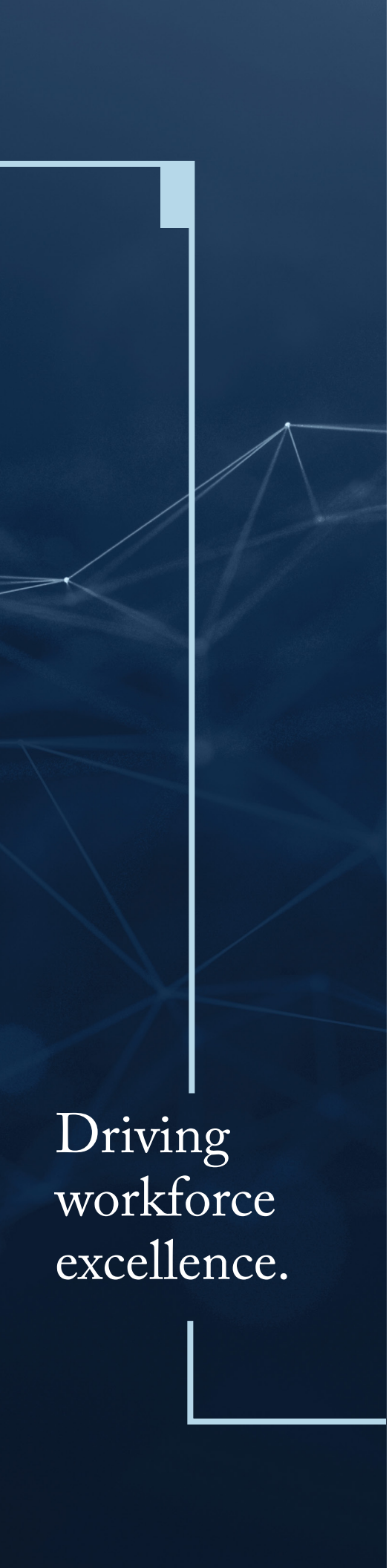
:: Commoditized equipment to keep costs low and accelerate deployment.

Importantly, SCTE•ISBE has been able to help drive workforce excellence by serving as the single hub for standards, best practices and training. SCTE•ISBE Standards has resulted in increased industry ROI, lower capex and opex costs, and worldwide growth of cable TV.

Standards History

This year, the SCTE•ISBE Standards program is celebrating the 25th anniversary of its accreditation by the American National Standards Institute (ANSI) in 1995. The program actually began in 1987 with the formation of a technical committee that is now known as the Interface Practices Subcommittee (IPS). The group created standards for basic network hardware that is still the core of modern broadband communications networks. Among other organizational milestones have been creation of the Engineering Committee (EC) in 1990 to oversee all SCTE technical committees; of the Standards program into new areas; and receipt of a Technical Emmy Award in 2012.

The addition of new subcommittees helped the industry to quickly and cost effectively adopt new technologies. The Digital Video Subcommittee (DVS) and the Data Standards Subcommittee (DSS) both were created in 1996, when digital video and broadband were nascent. The Energy Management Subcommittee (EMS) was created as the Sustainability Management Subcommittee in 2010 to help the industry manage current and future energy needs. The newest subcommittee, the Network Operations Subcommittee (NOS) was formed in 2011 to support the implementation and operation of cable networks. Each of the five subcommittees include working groups that address specific and often emerging technology areas; SCTE•ISBE earlier this year announced seven new "Explorer" working groups that are intended to foster development of applications that will run on cable's 10G platform.



Driving workforce excellence.

2020

Seven New Explorer Working Groups

AI and Machine Learning, Smart Cities, Aging in Place and Telehealth, Telemedicine, Autonomous Transport, Extended Spectrum Passives, and Human Factors Affecting Network Reliability

2012

Award

Receipt of a Technical Emmy® Award.

2011

NOS Subcommittee

Creation of Network Operations Subcommittee (NOS)

2010

EMS Subcommittee

Creation of the Energy Management Subcommittee (EMS)

1996

DVS and DSS Subcommittee

Creation of the Digital Video Subcommittee (DVS) and the Data Standards Subcommittee (DSS)

1995

ANSI Accreditation

Accreditation from the American National Standards Institute (ANSI)

1990

EC Committee

Creation of the Engineering Committee (EC)

1987

The Beginning

SCTE•ISBE Standards Program began.

SCTE·ISBE STANDARDS

The ANSI-accredited SCTE•ISBE Standards Program accelerates the deployment of new and improved technology.

ANSI/SCTE 01 – The F Connector

IPS drove the creation of the first ANSI/SCTE•ISBE standard, the F connector, approved in 1996. Invented by Jerrold Electronics' Eric Winston in the 1950s, the F Connector has been deployed by the billions around the world. It has supported, without modification, the industry's evolution from 12-channel analog systems operating up to 216 MHz to 3 GHz services coming this year, as well as such other television and telecommunications installations as satellite, terrestrial TV, and cable modems. As cable enters the 10G era, the flexibility of the F Connector will allow operators to deliver transformative applications – including aging in place, telemedicine, and others – using the basics of the home infrastructure that are already in place.

IPS: Supporting the Move to 3 GHz

Many other IPS-created standards have ensured interoperability across cabling and field products, which has been critical to the growth and maintenance of cable network infrastructures. ANSI/SCTE 91 and ANSI/SCTE 92 define the specifications for the elements essential to RF and AC powering: female 5/8-inch equipment ports and the male trunk, and distribution connectors. Universally adopted through much of the world, SCTE 91 and 92 have assured that cables and connectors of many sizes and construction types from any manufacturer can be mated seamlessly with all types of outside plant equipment, from taps and passives to amplifiers and nodes. Both standards are undergoing the latest in a series of periodic updates, in this case, to assure optimal operation to 3 GHz.

Other IPS standards help the industry reduce costs and increase service quality by defining hardline cable, connectors, drop cable, drop splitters, ground blocks, powering requirements, shielding effectiveness, and test procedures to standardize how to make repeatable measurements. Most recently, IPS is creating Generic Access Platform (GAP) standards for interoperable nodes and node modules. The standards define the physical, thermal, mechanical, and electrical interfaces for the internals of a node housing, focusing innovation on the service-generating modules inside the enclosure. IPS is also currently standardizing 3 GHz taps and passives in cooperation with CableLabs® and other industry partners to assure full support of DOCSIS® 4.0 and other 10G initiatives.

DVS: Bringing Order From Chaos

For 24 years, DVS has identified digital video and audio needs and trends and taken steps to reduce operational complexity, lower costs, and increase the efficiency of bringing new products to consumers. But in the early years, its main contribution was just getting digital video on cable to work! In those days, different vendors had different customer alignments on the operator side – encoder A would work great with set-top A, but not so much with set-top B. MPEG-2 wasn't finished, but direct-to-consumer digital satellite was already launching without it – as a closed-system. Cable compression couldn't be local and even moderate-sized digital headends were impractical – costing more, in some cases than the capital worth of the entire plant. Satellite programming could only practically be in one format, chips for STBs wouldn't scale for cost reduction, and operators that were merging and interconnecting could not afford in-home box-swaps to align digital vendor technologies.

DVS' rolled-up-sleeve approach resolved the technological differences, beginning with interoperability across vendor equipment. Then enhancements such as multiplex grooming, digital ad-insertion, video on demand, emergency alerts, and the big leap into high definition.

...a transformative effect on industry ROI...

Key standards developed to accomplish this include ANSI/SCTE 7 *Digital Transmission Standard for Cable Television*, ANSI/SCTE 26 *Home Digital Network Interface Specification with Copy Protection*, ANSI/SCTE 30 *Digital Program Insertion Splicing API*, and ANSI/SCTE 40 *Digital Cable Network Interface Standard*. SCTE 40 was developed in cooperation with the consumer electronics industry to standardize the interface to digital-ready TV sets and is referenced in FCC regulations.

Driving ROI Through DPI Ad Monetization

DVS' Digital Program Insertion (DPI) working group has focused on the development of standards and practices that support an important monetization stream for the cable industry. The concept of DPI emerged with the shift from analog to digital and involves the insertion of one digital stream into another digital stream (i.e., the advertising or other non-program content into a digitally distributed television show). Affecting both the content providers and the operators themselves, advertising revenue continues to grow in importance and the variety of programming vehicles has expanded beyond "spot" ads on traditional QAM-based "linear television" to include IP distribution, On Demand, and TV Everywhere, as well as addressable and interactive "advanced advertising." Since 1996, the industry has generated more than $465 billion in advertising revenue[2]. DPI also has helped the industry adapt to changes in transport, compression, and related technology by ensuring that content splicing adheres to stringent television standards for frame accuracy, seamless transitions, and audio balance.

One of the greatest accomplishments of DPI and DVS was receipt of a 2012 Technical Emmy® Award for ANSI/SCTE 35 *Digital Program Insertion Cueing Message for Cable* and its companion standard, ANSI/SCTE 104. SCTE 35 had a transformative effect on industry ROI: it eliminated the need for manual ad insertion, reduced operational costs, increased ad insertion reliability, and made ad monetization practical across a broader range of channels. Today, SCTE 35 is used by broadcasters and digital streaming providers as well as cable, to identify ad breaks, ad content, and programming content. It also works with other standards to complete advertising, digital program insertion, and alternate content decisioning ecosystems.

More recently, ANSI/SCTE 224 *Event Scheduling and Notification Interface* (ESNI) and ANSI/SCTE 250 *Real-time Event Signaling and Management API* standards extend traditional signaling to manage ad insertion in mobile devices while being governed by business rules and laws that control distribution practices. ESNI informs details regarding regional blackout/alternate content selection, market protection, or other content restrictions and communicates advertising breaks, availability for addressable ad insertion, network PVR record times and restrictions, and program information for electronic program guides. ESNI also supports an audit method that allows the provider to query the status of policy execution and verify the execution result. In addition, the ANSI/SCTE 130 "family" of standards is used to manage addressable ad insertion into On Demand streaming content. Canoe Ventures uses SCTE 130 to deliver 49 billion ad insertions across 90,000 VOD programs in 38 million homes, generating revenue of more than $1.5 billion per year.

DSS: Making Broadband Possible

The Data Standards Subcommittee (DSS) creates standards and operational practices for the delivery of digital service supporting high-speed data, video, VoIP, and other services over cable networks. For most of its history, DSS has been responsible to assure that CableLabs® specifications related to voice and data over cable became ANSI standards so that they would have recognition by government agencies. As part of that effort, SCTE•ISBE staff has supported adoption of CableLabs® specifications in Europe through ETSI and internationally in the ITU-T. Standards families such as SCTE 24 (*IPCablecom*) and SCTE 135 (*DOCSIS® 3.0*) have helped the industry to create residential and commercial data and voice revenues exceeding $645 billion since 1996[2].

In 2016, the EC created an Internet of Things (IoT) working group to be managed as part of DSS. The IoT working group creates standards and operational practices to be deployable and manageable for service providers, to facilitate communication between service providers and industry partners, to standardize new IoT based services, and to identify and adapt use cases available in the IoT community to service provider's business objectives. The first standard produced by this group is SCTE 256 *IoT Security Considerations and Recommendations for Operators*, which contains considerations and recommendations for operators with regards to the security aspects of deploying hardware, software, and services in the IoT space.

NOS: Helping to Optimize Network Performance

The Network Operations Subcommittee (NOS) is responsible for standards, operational practices, and related documents and information that provide support for the implementation and operation of cable networks. NOS focuses on network testing, measurements, business continuity, disaster recovery, and other topics relevant to the performance and operational management of cable networks.

NOS is responsible for *SCTE•ISBE Measurement Recommended Practices for Cable Systems*, the "bible" for measurements of impairments in cable networks, and the authoritative source of measurement techniques to demonstrate compliance with FCC regulations. Referenced by FCC §76.601 and FCC §76.605, the book is the successor to *NCTA Recommended Practices for Measurements on Cable Television Systems* and enables cable to define its own techniques rather than having a regulatory agency write requirements for them.

The NOS Business Continuity Planning and Disaster Recovery working group creates standards and operational practices to prepare for and respond to natural and man-made disasters that may result in widespread service outages. This working group also manages the cable industry's involvement in the Department of Homeland Security (DHS) SHARES project. SHARES is a program for using high-frequency (HF, or 3 MHz to 30 MHz) radios as a communications method of last resort in the event of a disaster. Other NOS working groups address wireless and in-home Wi-Fi, the source of most customer service complaints, and proactive network maintenance, which significantly improves operational efficiency.

EMS: Tackling the Power Foundation

The Energy Management Subcommittee works closely with the cable industry's Energy 2020 program to support the industry's need for energy efficiency and cost effectiveness, as well as assurance that absence of power is never an obstacle to business growth. SCTE•ISBE estimated in 2014 that the industry was consuming more than $1.2 billion in power costs as it converts electrical energy to subscriber value. During the past six years EMS has published 25 valuable standards that specifically address energy management approaches.

SCTE 184 *Energy Management Operational Practices for Cable Facilities* was the first operational practice to help operators deal with the unpredictability of energy cost and availability, providing insights into more energy-efficient ways of operating, heating and cooling mission-critical hub site or headend facilities. SCTE 184's benefits include: Determination of the most efficient utilization of available power and identification of power consumption and waste; optimization of power usage effectiveness (PUE); and guidelines for integration of alternative power sources.

ANSI/SCTE 216 *Adaptive Power System Interface Specification (APSIS™)* enables cable operators to implement traffic-based energy controls that align power consumption with usage, particularly within the hubs and access networks that are responsible for 83% of the industry's energy draw. SCTE 216 supports: integration of energy measurement and optimization applications within cable systems; consistent and reliable reporting metrics at the device level; and fine tuning of service delivery patterns to optimize reliability, customer experience, and energy consumption. It has spawned open-source development activity within the OpenDaylight™ community, as well as innovation that is estimated to be able to reduce access network energy consumption by 20% or more.

Standards Investment Made It "Work"

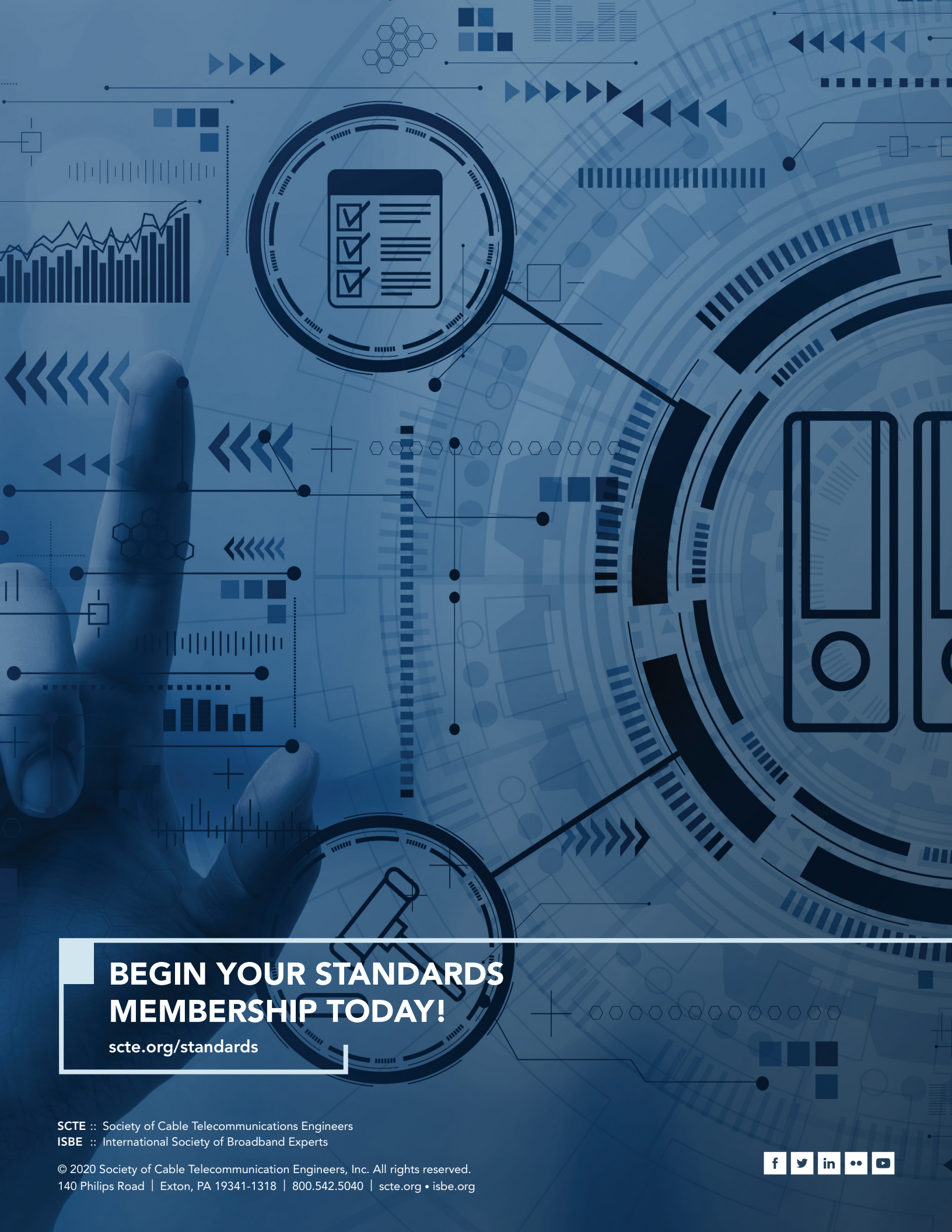
To look back on the evolution of SCTE•ISBE Standards today, one would be tempted to presume – of course it works. However, none of today's baselines should be taken for granted. Nor should one make assumptions about the future being smooth as new technologies emerge from multiple, competing vendors. In video alone, programmers, cable operators, and the consumer are more tightly integrated than ever. Set-top boxes are now customer owned and managed; Netflix is integrated to play on operator boxes; program networks are now distributed via OTT; and cable operators have their own TV Everywhere and OTT offerings.

The need for standards development is as important as ever. There is no time like the present to remember how the investments of the past identified needs and prevented train wrecks. SCTE•ISBE Standards, the Engineering Committee, and the subcommittees continue to be worth the investment in making information and entertainment services relevant and cost-effective to produce and distribute.

[1]Includes broadband, advertising, voice and commercial services revenue,1996-2019. Source: NCTA.

[2]Source: NCTA

SCTE•ISBE serves as the single hub for standards, best practices and training.



BEGIN YOUR STANDARDS MEMBERSHIP TODAY!

scte.org/standards

SCTE :: Society of Cable Telecommunications Engineers
ISBE :: International Society of Broadband Experts

140 Philips Road | Exton, PA 19341-1318 | 800.542.5040 | scte.org • isbe.org