TAICS

Taiwan Association of Information
and Communication Standards

2021 Annual Report

TAICS
Taiwan Association of Information and Communication Standards

6F., No.30-2, Beiping E. Rd.,
Zhongzheng Dist., Taipei City 100, Taiwan
+886-2-2356-7698
http://www.taics.org.tw

2021 Annual Event

○ Seminiar ● Workshop ● Lecture ● Activity

01 January

02 February

02/22
Beyond 5G (B5G) Technology Workshop – [Nokia] 3GPP RAN Release 18 themes and future of TSG RAN

03 March

03/15
The Latest International Standardation Sharing-NR NTN and Idle Mode

03/22
The 7th Meetings of the Second Board of Supervisors

04 April

04/14
3GPP 5G communication standard introduction

05 May

06 June

06/07
[On-line] The Latest International Standardation Sharing-3GPP (NR IIoT)

07 July

07/08.09
Webinar for 5G V2X and O-RAN Development Status

08 August

08/04
Webinar for 5G Open RAN Interworking and Information Security Certification and Verification

08/05
[On-line] ICT Standards Training

09 September

09/01
Webinar for EU Cybersecurity Act & Cybersecurity Certification Framework

09/06
The Latest International Standardation Sharing - 3GPP(5G Information Security Framework)

09/09
3rd TAICS-TTA Joint Workshop – 5G-Advanced and Beyond

09/23
2021 TAICS Standards Forum-Information Security Standards and Applications

09/27
The 1st Meetings of the Third Board of Supervisors
The 1st General Meeting of the Third General Assembly

10 October

10/13
MTSFB-TAICS 5G Forum Webinar-Exploration for 5G Implementation Challenges and Opportunities

10/14
Information and Communication International Standards Workshop

10/27
[2021 Global Standard Forum] Low Earth Orbit Satellite Communications

11 November

11/12
Webinar for 5G Open RAN Development Trend Sharing

12 December

12/09
The 2nd Meetings of the Third Board of Supervisors

A Message from the Chairman

We thank all sectors for their support and care. Although many physical conferences and exchanges were moved online due to the pandemic, we were still able to organize 53 meetings for technical standards in 2021 thanks to the active participation of our members. We also published 26 industry standards, specifications, and research reports. The results of these standards and specifications serve as a reference for industry development, and were also utilized by related government agencies (the National Communications Commission, the National Development Council, the Ministry of the Interior, the Ministry of Transportation and Communications, and the Bureau of Standards, Metrology and Inspection) as reference standards for installation grants and procurement.

In late September last year, we also successfully held a member conference to elect new directors and supervisors. We are very grateful to all members for their support. Now, I would like to share some of my expectations and thoughts regarding the future of TAICS:

- **Implement industrial standards and improve industrial efficiency:** TAICS has entered its seventh year since founding. In view of the good foundation that was laid, various industrial standards should be gradually implemented into industrial applications, such as cybersecurity certification and verification systems (marks), field trials, technical test points, etc. In the future, we will also strive to lobby and promote policies, exerting industrial influence and driving government units to adopt recognized industrial standards, thereby improving industrial efficiency.

- **Connect with international organizations and exert international influence:** TAICS has signed memorandums of cooperation with major international standards organizations to effectively connect with each other. TAICS is committed to maintaining regular visits and international exchanges with all parties, and to assemble Taiwan's information and communication companies together to become a key force among the few global manufacturers. I hope that the key features of the TAICS platform will continue to play a pivotal role.

In the future, I sincerely hope that TAICS will reach new heights, build consensus internally, speak out together externally, and walk at the forefront of international standards. I also hope that everyone will continue to support the association and be proud of being a member of TAICS!

Chairman of TAICS

Jyuo Min Shyu

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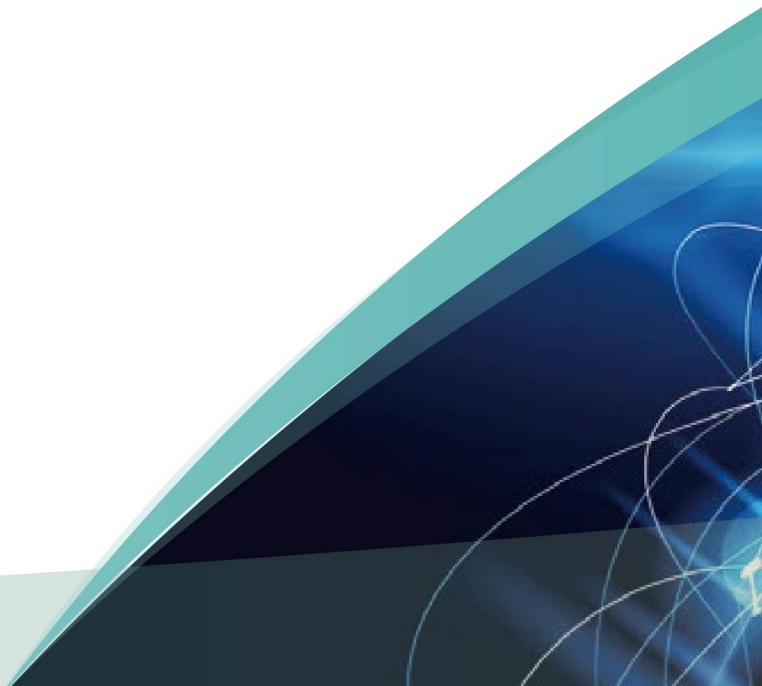
1 Overview



2 Achievements of the TAICS

1 Overview

1.1 Mission

Taiwan Association of Information and Communication Standards (TAICS) is an industry organization founded in June 2015, with the objectives of developing information and communication technology (ICT) standards among Taiwan's industries and engaging them with related international standards to enhance the competitiveness of Taiwan's industry. To achieve such goals, TAICS performs the following tasks

1. **Establish a platform:** Establish a platform to facilitate collaborative development of ICT standards among domestic vendors to meet Taiwan's industrial needs.
2. **Connect International Standards Organizations:** Act as an intermediary for Taiwan in international standardization affairs and strengthen the connections between regional, international standards development organizations.
3. **Promote industry standards:** Promote the adoption of Taiwan's ICT industry standards by local, regional or international standards bodies.

1.2 TAICS Organizational Structure

The Taiwan Association of Information and Communication Standards (TAICS) is organized and operated by key companies of Taiwan's information and communication industry. We have nearly 100 members from industry, academia, and research organizations.

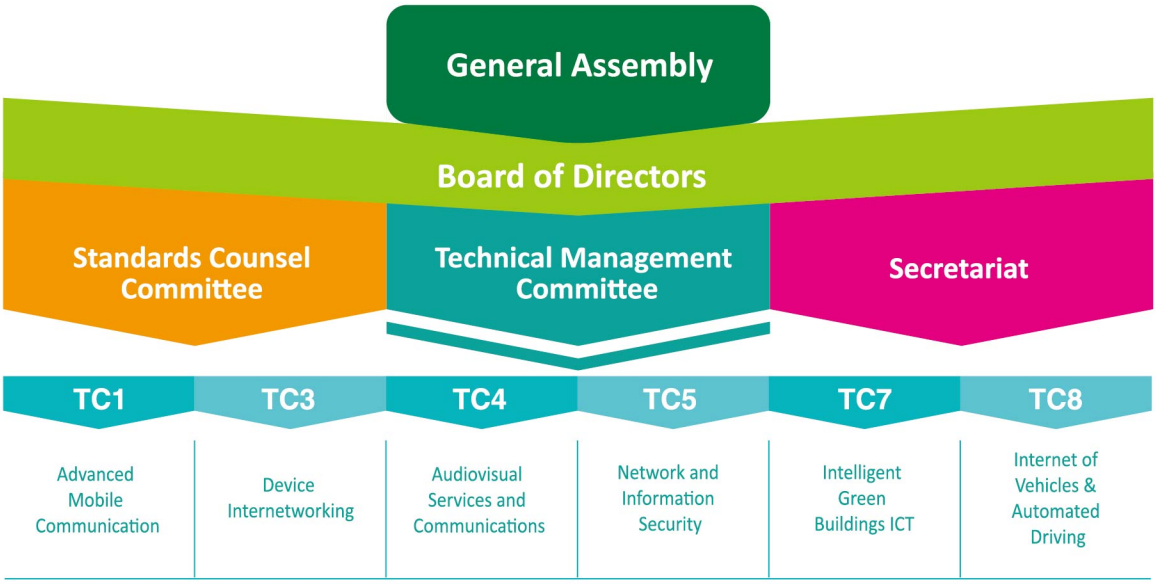


Fig 1. TAICS Organizational Structure

Representatives of various companies participated enthusiastically in the elections during the member conference and elected the Board of Directors for the current term (3rd term). Jyuo-Min Shyu, Research Fellow of the Industrial Technology Research Institute, will serve as the Chairman; Tsu-Chin Lee, Director of Inventec Corporation, and Pei-Zen Chang, Executive Vice President of the Industrial Technology Research Institute, will serve as the Vice Chairmen; and Shyue-Ching Lu, Honorary Professor of National Yan Ming Chiao Tung University,will serve as Executive Supervisor.

Chairman of TAICS Jyuo Min Shyu

• Board of Directors

Position in TAICS	Name	Company	Position
Chairman& Managing Director	Jyuo Min Shyu	Industrial Technology Research Institute	Research Fellow
Vice Chairman& Managing Director	Richard Lee	Inventec Corporation	Board of Director
Vice Chairman& Managing Director	Pei-Zen Chang	Industrial Technology Research Institute	Executive Vice President
Director	Cheng-Te Chuang	Media Tek Inc.	Corporate Executive Vice President, Wireless Technology Group
Director	Shun-I Chu	Zyxel Communications Corp.	Chairman
Director	Jason Yi-Bing Lin	National Yang Ming Chiao Tung University	Chair Professor
Director	JK Chen	Chunghwa Telecom Laboratories	Vice President
Director	Henry Yeh	ASUSTek Computer Inc.	Corporate Vice President, Technology Innovation Office
Director	Wei-Bin Lee	Hon Hai research Institute	CEO
Director	James Hsu	AMPACS Corporation	Vice Chairman
Director	Karen Chang	Egis Technology Inc.	Vice Chairman
Director	Daniel Chang	Auden Techno Corp.	Chairman
Director	Gary Chen	HwaCom Systems Inc.	Chairman
Director	Steve Lai	ECOLUX Technology Co., Ltd.	Chairman
Director	Alice Chou	Taiwan Institute of Economic Research	Vice President
Alternate Director	Herman Rao	Far Eastone Telecommunications Co.,LTD	Executive Vice President
Alternate Director	Morgan Hong	Onward Security Corporation	General Manager

• Board of Supervisors

Position in TAICS	Name	Company	Position
Executive Supervisor	Shyue Ching LU	National Yang Ming Chiao Tung University	Emeritus Professor
Supervisor	Show-Ling Wen	Taiwan Intelligent Building Association	Honorary President
Supervisor	HT Lin	Telecom Technology Center	CEO
Alternate Supervisor	Albert Chen	Inventec Co.	Senior Vice President

Three units are established under the Board of Directors: the Technical Management Committee (TMC), the Standard Counsel Committee (SCC), and the Office of the Secretariat.

The Technical Management Committee (TMC), chaired by Albert Chen, Senior Vice President, Inventec Co.,is to review the tasks, productivity, personnel appointments, and formation of the technical committees (TC). Also, the TMC coordinates the work among the TCs in the standardization process of the TAICS.

TMC Chair Albert Chen

SCC Chair Shyue Ching Lu

The Standard Counsel Committee(SCC)is to provide concrete recommendations for drafts of standards, standardization plans, and the promotion of standard counseling for TAICS. Dr.Shyue-Ching Lu, Honorary Professor of National Yang Ming Chiao Tung University, is the chair and Dr.Ming-Whei Feng, Vice President and Director General of Smart System Institute (SSI), at Institute for Information Industry (III), is the vice chair.

The Secretary General of the Office of the Secretariat is Sheng-Lin Chou, Chief of Venture Officer, Information and Communications Research Laboratories (ICRL) at Industrial Technology Research Institute (ITRI). The Office of the Secretariat deals with international affairs, partner relations, promotion of achievements, project management, and other administrative tasks. They also provide support for the operation of the TMC and SCC.

Secretary General Sheng-Lin Chou

In addition, 6 Technical Committees (TCs) have been established under the TMC in certain fields in Taiwan according to the urgency of the need to develop technical standards. TCs is where the industry come together to develop ICT industry standards in technical fields.

1.2.1 TC1 Advanced Mobile Communication Technical Committee

The primary focus of TC1 is the new generation of key industry technology in wireless communications, including access technology, network technology, the frequency spectrum of the future, and industry applications. The purpose of this Technical Committee is: The TC1 concentrates the research resources of the domestic industry, academia, and research institutes, and build a consensus, all for the purpose of developing of a new generation of wireless communication technologies. TC1 will become the single channel of communication for Taiwan in related international standard development organizations, e.g. 3GPP, and will thereby promote a connection to related international and regional standards as a precursor to establishing core intellectual properties in the future of international mobile.

In 2021, TC1 defined the development vision and requirements of next-generation wireless communication technology based on the characteristics and demands of Taiwan's industries. Based on the applications and technology evolution of next-generation wireless communications, TC1 conducts applicable spectrum studies to provide a reference for policy formulation and for the development of key technologies and system specifications for next-generation wireless communications, in order to influence future B5G/6G standards and technologies. At the same time, TC1 serves as an intermediary of international partnerships for Taiwan's next-generation wireless communication technologies. TC1 facilitated international partnerships and business matching, drove international marketing, and strengthened the connection with international/regional standards.

Looking forward to 2022, TC1 has already collected information and studied 6G, conducted a spectrum study for B5G mobile communication, and gathered opinions from Taiwan's industries in 2021. TC1 plans to complete the Vision, Requirements, and Technology Trends of 6G White Paper in the fourth quarter of 2022 to express Taiwan's requirements and vision of 6G and B5G to the world to eventually exert influence in the development of international standards for 6G/B5G.

TC1 will continue to share the latest information obtained from meetings about international standards and liaise with 3GPP in a timely manner to provide the opinions of Taiwan's industry to influence the development of international standards and even integrate Taiwan's capabilities with the 3GPP standards organization. TC1 will also strive to be re-elected as the RAN2 chairman to increase the exposure and acceptance of Taiwan's proposals and improve B5G standards in the future to continue to exert Taiwan's influence in the development of international standards for 5G.

1.2.2 TC3 Device Internetworking Technical Committee

Develop universal industry standards for device internetworking applications such as smart environment protection monitoring, smart grid, smart lighting, and other fields to improve competitiveness across the industry in Taiwan.

The Automatic Clean Water Monitoring System Field Deployment Guidelines were published in 2021. The guidelines propose solutions and cases based on location, power, and network communications restrictions of water-quality monitoring equipment of different sites. With help from the Department of Industrial Technology (DoIT), Ministry of Economic Affairs (MOEA) in promoting the guidelines and support from the industry, more than 50 sites are currently referencing these guidelines.

Looking forward to 2022, a seminar on the standard and application of smart agriculture will be held to obtain industry consensus and plan for the subsequent formulation of smart agriculture standards. TC2 expects to produce the Data Format Standard and Test Specification for Agricultural IoT by the fourth quarter of 2022.

1.2.3 TC4 Audiovisual Services and Communications Technical Committee

The goal of TC4 is to consolidate audiovisual services and communications technologies, establish a content-service integration platform, enrich specialty audiovisual channels and content, facilitate development of innovative value-added audiovisual operating and service modes, and drive the development of Taiwan's digital audiovisual software and hardware industry chain.

To establish 5G broadcast industry technical standards that are in line with Taiwan's situation, TC4 started developing the Study on the Development of Taiwan's 5G Broadcasting Industry in 2021. The goal of the study is to promote the experimental program for the next-generation digital wireless TV and 5G broadcasting to accelerate the development of Taiwan's 5G broadcast industry. The study is expected to be published in 2022. At the same time, TC4 will continue to participate in the development and activities of 5G broadcast standards and technologies.

In terms of international connections, TC4 will continue to participate in events related to MPEG video standards, such as H.266 and point cloud compression (PCC), regularly update the status of the development of MPEG-related video standards, and obtain and share firsthand video standards information and technology trends as a reference for the technology development blueprint of Taiwan's video industry . TC4 will continue to reference and attend conferences of the relevant standards of the ECI collaboration platform to accelerate the formulation of industry standards for content protection and copyright management of emerging media in Taiwan.

1.2.4 TC5 Network and Information Security Technical Committee

TC5 promotes the development of industry standards according to the security needs of Taiwan's information communication industry. TC5 keeps track of the latest trends in the region and in the world to promote the development of safe and trustworthy products and services, bolster the influence of Taiwan in international organizations, and facilitate the industry's global market strategy.

- The IoT cybersecurity work group (WG1): researches specifications and standards for interface security, vulnerability testing, and security compliance of IoT devices and systems. The Video Surveillance System Security Standard and Test Specification - Part 1: General Requirements v2, Video Surveillance System Security Test Specification - Part 2: IP Camera v3, Cybersecurity Standard and Test Specification for Consumer IP Cameras, Cybersecurity Standard and Test Specification for Wireless Broadband Routers, and Cybersecurity Standard and Test Specification for Consumer IoT Products were approved in 2021.
- The identify verification and identification work group (WG2): researches biometric identification with FIDO technology. WG2 discusses the technical specifications of cybersecurity technology combined with the PKI framework and connects with foreign countries.

- The mobile cybersecurity work group (WG3): researches and analyzes future development trends and cybersecurity requirements of the new generation of mobile communication technologies, and builds consensus on mobile cybersecurity through cybersecurity analysis and studies, as well as the formulation of cybersecurity test specifications. The Cybersecurity Test Specification for gNodeBs and the Infocom Security Test Specification for Embedded Software on Smartphone Systems V1.1 were approved in 2021.

Looking forward to 2022, in order to solve the cybersecurity issues of 5G Open RAN, the team will refer to the standard specifications and technical reports of the O-RAN Alliance and 3GPP, and propose relevant research reports and test specifications to help manufacturers understand the threats they will face and potential countermeasures.

Connecting production systems to networks, corporate management, and cloud services are invertible trends as Industry 4.0 continues to replace traditional manufacturing processes. However, this causes potential internal and external cybersecurity threats to production systems. These threats may impact the security of production systems, the integrity of production commands, and the availability of continuous production, and even operational parameters and data. For this reason, TC5 proposed to formulate the Cybersecurity Specification Guidelines for Industrial Automation and Control Systems and the Cybersecurity Test Specification for Smart Manufacturing, Industrial Automation, and Control Systems to comprehensively promote the protection abilities of the domestic industrial control and cybersecurity industry, and provide a stable and safe industrial environment.

Building a secure and reliable communication network is an important cornerstone for ensuring the development of the digital economy. Cyber threats multiply as networking functions and applications increase, including media services and online shopping services. Therefore, TC5 will develop the Cybersecurity Standard and Test Specification for Set-top Boxes and the Cybersecurity Standard and Test Specification for Modems to ensure consumer safety and help the industry improve cybersecurity capabilities and product competitiveness in 2022.

1.2.5 TC7 Intelligent Buildings ICT Technical Committee

The mission of TC7 is to develop and promote information communication standards for intelligent buildings. The purpose of TC7 is to act as a platform for communication among industry, government, academia, and research institutions, and for developing and promoting standards with consideration of intelligent buildings information communication standards; to represent Taiwan in activities hosted by the international intelligent building standards alliance and facilitate the development of the intelligent building industry in Taiwan. Data format test specification for intelligent building energy management system v2 were approved in 2021.

In the future, TC7 will continue to build a dialogue platform for the intelligent buildings industry to provide a foundation for cross-industry dialogue. Looking forward to 2022, TC7 will start formulating the Data Format Standards and Test Specification for Intelligent Building Facility Management Systems to provide standard interfaces for facility management systems made by different manufacturers to reduce the complexity of integrating facility management systems and improve the overall efficiency of building operations, maintenance, and management. For global connections, TC7 will continue to participate in APIGBA events and help with the participation of Taiwan's excellent intelligent green buildings and system products to promote Taiwan as Asia's bellwether of intelligent green buildings.

1.2.6 TC8 Internet of Vehicles (IoV) & Automated Driving Technical Committee

TC8 was established with the purpose to improve industry competitiveness by developing a common industry standard that follows the global trend in next generation intelligent transportation and the development of automated driving and V2X initiated by the IoV. By creating specifications that is on par with international standards, TC8 can provide Taiwanese companies a reference specification when manufacturing and marketing products. The committee will also serve to introduce foreign technologies that can serve as a reference for the industry, government, academia, and research sectors as they formulate their strategy for the future.

In terms of developing standards, TC8 focused on the research of the communication interface of connected vehicles (WG1), safety warning data formats of connected two-wheeler vehicles (WG2), and high-precision maps (WG3) in 2021. To base the research of the communication interface of connected vehicles (WG1) on European and American IoV standards, TC8 included the ETSI TC ITS of Europe and IEEE 1609 of the United States, and added the C-V2X IoV technology defined by the 3GPP standard to explain the protocols and services of the IoV network and communication layers. TC8 published the Connected Vehicle Communication Interface Standard Research Report V2.0 in 2021.

Research on the data format for connected vehicles (WG2) is based on global message standards related to V2X and two-wheeler vehicles. TC8 defined and completed the Data Format Standard for Connected Two-Wheeler Safety Warning to serve as the first step in promoting a standard safety warning system for electric scooters in Taiwan. TC8 also referred to the concept of international standards related to intelligent driving cars and defined the Standard and Test Specification for Intelligent Driving Car Sensing Data Format for the types and formats of data output by smart cars to help manufacturers by simplifying the interface between various equipment and platforms, and accelerating the benefits of research and development as they invest in intelligent driving cars.

In terms of high-precision maps (WG3), TC8 completed the Operation and Verification Guidelines for HD Maps Updating - Permanent Static Data, where (1) changes in objects of the original high-precision maps can be detected and (2) high-precision map geographic information is updated (if the information complies with relevant inspection and verification standards) through the collection of data by autonomous cars or vehicles of equal specification. High-precision maps are continuously updated through technologies such as result verification and data fusion to ensure timely updates and mapping efficiency, and improve accuracy and reliability to continuously enhance the value and usefulness of high-precision maps.

For IoV technology in 2022, TC8 will further explore developments related to two-wheeler vehicles and formulate the Safety Warning Application Standards for Connected Two-Wheeler Vehicles v2 and the Assistance and Events Data Standards for Self-Driving Vehicles to integrate the latest information on international standards development, providing reference for domestic industry development.

For participating in the development of international standards, TC8 will continue to attend international standards conferences, including those organized by SAE (U.S.), ETSI (Europe), ARIB (Japan), and the ITS Forum. TC8 will share the information obtained from the conferences in the working meetings to provide Taiwan's industry a plan for future product output to help Taiwan's manufacturers develop products that are globally connected.

2 Achievements of the TAICS

2.1 Standards Development

With members' eager participation, in 2021 we reached consensuses in various sectors through technical committees, establishing industry standards and specifications, completing a total of 26 formulations and publications, namely 10 standards, 10 specifications,2 study reports, and 4 guidelines . The results of these standards and specifications serve as a reference for industry development and were also utilized by related government agencies as reference standards for installation grants and procurement.

In terms of device internetworking, the Automatic Clean Water Monitoring System Field Deployment Guidelines were completed. The guidelines consider the location, power, and communication restrictions of different sites for installing water-quality monitoring equipment, and propose solutions and cases based on systematic and scientific analyses, and inventories. We hope that these guidelines will serve as a reference for deployment by monitoring companies and system integrators in Taiwan, thereby effectively reducing operations and maintenance costs and enhancing competitiveness.

In network and cybersecurity, the following research reports, standards, and test specifications were completed. A summary is as follows:

- Cybersecurity Study Report for Multi-access Edge Computing in 5g Non-public Networks: For 5G private network system integrators, server manufacturers, and telecom operators to understand the threats they will face by using multi-access edge computing (MEC) in 5G non-public networks and the countermeasures.
- Cybersecurity Test Specification for gNodeBs: Specifies the test items, test conditions, test methods, and test results of the cybersecurity tests for base station manufacturers, system integrators, and 5G cybersecurity test labs to use as the test requirements for related product testing technologies.
- Security Assessment Guidelines of System-level IoT-enabled Applications Part 1: General Requirements: Conduct IoT cybersecurity assessments for IoT applications through threat modeling, vulnerability detection, penetration testing, and impact analysis.
- Cybersecurity Standard and Test Specification for Wireless Broadband Routers: The cybersecurity standard for wireless broadband routers is defined according to the availability, identification, encryption, and security functions of wireless broadband routers.
- Cybersecurity Standard and Test Specification for Consumer IoT Products: Taiwan's consumer IoT cybersecurity standard is defined in accordance with the actual product status of the domestic consumer IoT industry, and serves as the basis for cybersecurity quality requirements for consumer IoT products.

For intelligent buildings, the Data Format Standard and Test Specification for Intelligent Building Energy Management Systems v2 was completed. The data format standard and test specification covers electricity, air conditioning, lighting, plumbing, environmental data, renewable energy, and power integration and monitoring subsystems for use by intelligent building safety monitoring and energy management systems integration monitoring platforms. The hope is to reduce the cost of building and maintaining the system by strengthening the commonality of the data format of the systems, which would also ensure information security and expandability.

For IoV and autonomous driving, the following research reports, standards, and test specifications were completed. A summary is as follows:

- Connected Vehicle Communication Interface Standard Research Report V2.0: Based on v1, this report includes IEEE-1609 and ETSI ITS, C-V2X information on V2N and V2V, a comparison of DSRC and V2X technologies, and existing domestic project information to provide a reference for the industry and serve as the basis for defining domestic vehicle communication industry standards in the future.
- Operation and Verification Guidelines for HD Maps Updating - Permanent Static Data: Changes in objects of the original high-precision maps are detected and high-precision map geographic information is updated through the collection of data by autonomous cars or vehicles of equal specification. High-precision maps are continuously updated through technologies such as result verification and data fusion to ensure accuracy and reliability to continuously enhance the value and usefulness of high-precision maps.
- Standard and Test Specification for Intelligent Driving Car Sensing Data Format: It specifies the content and format of relevant information as the vehicle is moving, including various sensor data such as satellite positioning devices, inertial measurement units, speedometers, lidars, radars, cameras, and statuses of the vehicle body, and standardizes the content and format of the data according to the driving operations, safety, self-driving state, and body state for sending the data to the cloud.
- Data Format Standard for Connected Two-wheeler Safety Warning: Its purpose is to improve the safety of two-wheelers and promote the development of the smart two-wheeler and smart roadside industries. The standard is a key step in establishing Taiwan's two-wheeler vehicle safety standards. The content covers format specifications of two-wheelers as the main body to ensure the consistency of the data format.

2.2 TAICS Standards Adoption

▶ Cumulative results of the IoT cybersecurity mark system

Since the promotion of the IoT cybersecurity mark system in 2018, a total of 9 laboratories have been approved and 137 products (or series of products) were certified, including 98 video surveillance systems, 14 digital set-top boxes (San Da Catv Co., Ltd., Chunghwa Telecom, Homeplus Digital, Taipeinet, TFN Media, Taiwan Infrastructure Technology, TBC(Taiwan Broadband Communications) and Kbro), 6 mobile signal boosters (Coiler, Universal Mobile Technical Services, and Remotek),10 intelligent streetlights (3J Iot Technology Co., Ltd, Delta Electronics, Oma-lighting Co., Ltd., Lite-on Technology Corporation, Lyds Technologies Inc., Insynerger Technology Co., Ltd., Oring Industrial Networking Corp. and Far Eastone Telecommunications Co., Ltd.), 4 on board units (Baoruh, Vacron, Telenet and Bolymin, Inc.), 2 intelligent bus stops (MaxWin Technology and New Light Opto), and 4 wireless routers (Arcadyan, Oring Industrial Networking Corp., Tecom Co., Ltd. and Billion Electric Co., Ltd.).

Table: Statistics of cumulative number of items (2018-2021)

Product Category	Accredited Laboratory	Qualified Product
Wired IP CAM	9	96
Wireless IP Camera	2	0
Digital Set Top Box	2	14
Mobile Communication Repeater	2	6
Intelligent Streetlight System- Intelligent Lighting	2	40
Intelligent Bus Telematics System- On Board Unit	1	5
Wireless Local Area Network Access Point	1	0
Wireless Router	1	4

The products tested and passed by the 9 TAICS approved laboratories are listed in the following table. Interested members are welcome to contact them directly. Please check the TAICS' website for the contact information.

Table: Statistics of cumulative number of items (2018-2021)

Cardinal	1	2	3	4	5	6	7	8	9
Name of the laboratory / Product category	Telecom Laboratories/ Chunghwa Telecom Co., Ltd./Testing Center	TUV Rheinland Taiwan Ltd./Taipei Testing Laboratories	Onward Security Corporation/Security Assessment Laboratory	Gapertise Mobile Vetting Service Co., Ltd/Smart IoT Security Vetting Laboratory	Taiwan Testing and Certification Center/Information and Communications Testing Laboratory	Telecom Technology Center/Info-Com Security Testing Laboratory	Deloitte & Touche/Analytics & Forensics Lab	PricewaterhouseCoopers Taiwan/Information Security and Forensic Science and Technology Laboratory	Information Security Service Digital United Inc./Information and Communication Security Detection Laboratory.
Wired IP CAM	V	V	V	V	V	V	V	V	V
Wireless IP Camera	V					V			
Wireless Local Area Network Access Point						V			
Wireless Router						V			
Digital Set Top Box	V					V			
Intelligent Bus Telematics System-Intelligent Bus Stop			V						
Intelligent Streetlight System-Intelligent Lighting		V	V						
Mobile Communication Repeater	V					V			
Smart Speakers									

▶ 2021 Verification and certification results

In 2021, a total of 76products (including a series of products) were approved and listed on TACIS website. Interested members may visit the website.

Product Category	Main Product	Series of Products	Total
Wired IP CAM	18	35	53
Intelligent Streetlight System-Intelligent Lighting	8		8
Digital Set Top Box	11		11
Wireless Router	2		2
Mobile Communication Repeater	2		2
Total	41	35	76

There were a total of 61 IoT devices, 53 wired IP cameras and 8 smart streetlights. The statistics of each device are described below:

Item			Main Product	Series of Products	Total
Devices of internet of things (total in 53 items)	Wired IP Camera		18	35	53
	1	Vivotek Inc.	3	15	18
	2	Vital Resources Co., Ltd.	1	3	4
	3	Merit Lilin Ent. Co., Ltd	1	12	13
	4	Geovision, Inc.	1		1
	5	Hi Sharp Electronics Co., Ltd.	1	2	3
	6	Hunt Electronic Co., Ltd	1		1
	7	Jeaway Cctv Security Ltd.	2		2
	8	Hypertech Advance Co., Ltd.	1		1
	9	Acti Corporation	5		5
	10	Everfocus Electronics Corp.		1	1
	11	Giantech Systems Company	1		1
	12	A-Mtk Co., Ltd.		2	2
	13	Sercomm Corporation	1		1
	Intelligent Streetlight System-Intelligent Lighting		8	0	8
	1	3J Iot Technology Co., Ltd	1		1
	2	Delta Electronics	2		2
	3	Oma-lighting Co., Ltd.	1		1
	4	Far Eastone Telecommunications Co., Ltd.	1		1
	5	Lite-on Technology Corporation	1		1
	6	Lyds Technologies Inc.	1		1
	7	Insynerger Technology Co., Ltd.	1		1

There were a total of 16 Netcom devices, 11digital set top box, 2 wireless router and 3Mobile Communication Repeater. The statistics of each device are described below:

Item			Main Product	Total
Netcom devices (total in 16 items)	Digital Set Top Box		11	11
	1	Homeplus Digital	3	3
	2	Taipeinet	1	1
	3	TFN Media	1	1
	4	Taiwan Infrastructure Technology	2	2
	5	KBRO	3	3
	6	San Da Catv CO., LTD.	1	1
	Wireless Router		2	2
	1	Tecom Co., Ltd.	1	1
	2	Billion Electric Co., Ltd.	1	1
	Mobile Communication Repeater		3	3
	1	Coiler Corporation	2	2
	2	Remotek Corporation	1	1

2.3 TAICS Events

▶ 3rd TAICS-TTA Joint Workshop (September 9, 2021)

TAICS and TTA hosted the 3rd TAICS-TTA Joint Workshop on September 9, 2021 to welcome the next-generation 5G standards. The Workshop focused on 5G-Advanced and Beyond. Dr. Kyoung Cheol Koo, Vice-President, Telecommunications Technology Association (TTA), and Dr. Hyeon Woo LEE, 5G Technical Committee Chair, TTA, from Korea led the online seminars and exchanges. Speakers included representatives from LG, Samsung, and KT. Taiwan was represented by TAICS, Chunghwa Telecom, MediaTek, Spectacular, and National Taiwan University. Participants shared and exchanged views on the latest progress of current 5G/6G standards.

In addition to presenting the Rel-18 standard and establishing work items for future standards organizations, this event also invited representatives from telecom operators of Taiwan and South Korea to introduce and share information about 5G/6G technologies and 5G commercialization. This event was co-organized by ITRI and sponsored exclusively by Chunghwa Telecom. A total of 125 representatives from companies in Taiwan and South Korea participated.

Caption: An online group photo of the event's guest speakers, representatives, and participants from Taiwan and South Korea.

▶ [2021 TAICS Standards Forum] Cybersecurity Standard and Application (September 23, 2021)

Recently, cybersecurity issues have drawn much attention. The scope of this event covered personal information privacy, trade secrets, industrial production chains, and national cybersecurity defenses. Therefore, the forum was titled the Cybersecurity Standard and Application Forum, from a chip security perspective. Industry pioneers were invited to share information about security design technologies for chips, and extend it to related IoT applications.

Han-Ming Li, member of the National Security Council, delivered a keynote speech at the opening of the event, mentioning that cybersecurity is national security. He added that Taiwan must strengthen its independent industries from organization, legal, and talent aspects, and must be committed to the implementation of laws and regulations and to the improvement of human resources to develop industries related to cybersecurity. Cybersecurity relies on the cooperation between public and private sectors. Efforts must be made to strengthen and implement cybersecurity laws and standards.

Next, representatives from Winbond Electronics, eMemory Technology, Egis Technology, and the Institute for Information Industry made their remarks. The forum was full of rich and exciting content and participants gained deep insights. This event was held online, with an average of more than 90 participants. Engagement for the event was high.

▶ The 1st Meetings of the Third Board of Supervisors (September 27, 2021)

On September 27, 2021, TAICS held the 1st member conference of term 3 and the 1st board of directors and supervisors meeting of term 3, where the election of the Chairman and Vice Chairmen of term 3 took place. Jyuo-Min Shyu, Research Fellow of the Industrial Technology Research Institute, will serve as the Chairman; Tsu-Chin Lee, Director of Inventec Corporation, and Pei-Zen Chang, Executive Vice President of the Industrial Technology Research Institute, will serve as the Vice Chairmen for the term. Jong-Chin Shen, Vice Premier of the Executive Yuan; Mei-Hua Wang, Minister of Economic Affairs; Jang-Hwa Leu, Director General of the Industrial Development Bureau; and Te-Sheng Lin, Deputy Director-General of DoIT, were invited to witness the handover ceremony.

Caption: Group photo of TAICS' directors and supervisors, injecting vitality and momentum into TAICS.

▶ [2021 Global Standard Forum] Low Earth Orbit Satellite Communications (October 27, 2021)

In response to the growing development of the space industry, low earth orbit satellite communication systems will bring next-generation 5G applications to a new level. TAICS organized a special Webinar for Low Earth Orbit Satellite Communications on October 27 to share the latest developments and trends of current international and domestic low earth orbit satellites.

In his speech, Sheng-Lin Chou, Secretary General of TAICS, mentioned that low earth orbit satellites in the space industry will bring many business opportunities to companies in Taiwan. This event aims to share the trends of latest technologies and standards from the aspects of policy, international standards, professional manufacturers of various fields, and R&D design or radio spectrum. He also thanked the Board of Science and Technology, the National Space Organization of NARLabs, and professional manufacturers (MediaTek, Rapidtek, Rafael Micro, MTI, Keysight, and Rohde & Schwarz) for their help and sponsorship. More than 100 people participated in this webinar. In the future, TAICS will deepen its efforts to gather 5G and low earth orbit satellite manufacturers to jointly develop communication system technologies and standards.

▶ Beyond 5G (B5G) Technology Workshop (February 22, 2021)

This year's international exchange events were held online. On February 22, 2021, TAICS invited Matthew Baker, a senior technical expert from Nokia who was the Chairman of 3GPP RAN1, to deliver a presentation titled 3GPP RAN Release 18 Themes and Future of TSG RAN. During his presentation he introduced new technology trends for B5G and talked about the expectations for the 3GPP Rel-18 standard. The event was widely praised by the members.

▶ Professional Training (July 8 to 9, 2021)

To help members better understand the trend of 3GPP 5G communication standards, 5G O-RAN, and technologies related to 5G V2X, TAICS offered the "Introduction to 3GPP 5G Communication Standards" course in April 2021. The course is a step-by-step introduction beginning from Rel-15, Rel-16, and Rel-17, leading the students to fully understand the evolution, development, and application of 3GPP 5G communication standards. In July 2021, TAICS offered "5G O-RAN Development" and "5G V2X" courses to teach the development status of 5G IoV V2X and 5G open architecture base stations, and explore future 5G development trends. More than 50 people attended these courses.

Appendix: Membership

NO.	Company Name	Website
1	MEDIATEK INC.	http://www.mediatek.com/zh-TW/
2	WISTRON NEWEB CORPORATION	http://www.wnc.com.tw/index.php?lang=tw
3	ACER INCORPORATED	http://www.acer.com.tw/ac/zh/TW/content/home/
4	HON HAI PRECISION IND. CO., LTD.	https://www.honhai.com/zh-tw/
5	ARCADYAN TECHNOLOGY CORPORATION	http://www.arcadyan.com/home.aspx
6	ASUSTEK COMPUTER INC.	https://www.asus.com/tw/
7	CHUNGHWA TELECOM CO., LTD.	http://www.cht.com.tw/
8	KEYSIGHT TECHNOLOGIES INC.	https://www.keysight.com.cn/cn/zh/home.html
9	BUREAU VERITAS CONSUMER PRODUCTS SERVICES (HONG KONG) LIMITED, TAOYUAN BRANCH	https://ee.bureauveritas.com.tw/BVInternet/Default
12	AUDEN TECHNO CORP.	http://www.auden.com.tw/
13	INVENTEC CORPORATION	http://www.inventec.com/
14	NATIONAL CHUNG-SHAN INSTITUTE OF SCIENCE AND TECHNOLOGY	http://www.ncsist.org.tw/csistdup/main/Default.aspx
18	ACCTON TECHNOLOGY CORP.	http://www.accton.com.tw/
21	GEMTEK TECHNOLOGY CO., LTD.	http://www.gemtek.com.tw/
22	ROHDE&SCHWARZ	http://www.rohde-schwarz.com.tw
24	TATUNG CO.	http://www.tatung.com.tw/b5/index.asp
25	ACBEL POLYTECH INC.	https://www.acbel.com.tw/
27	UNITECH ELECTRONICS CO., LTD.	https://www.ute.com/tw/?rbu=2
29	HWACOM SYSTEMS INC.	http://www.hwacom.com/
33	SATELLITE TELEVISION BROADACSTING ASSOCI-ATION R.O.C	http://www.stba.org.tw/
36	TAIWAN DIGITAL TELEVISION COMMITTEE	http://www.dtvc.org.tw/index.aspx
37	TREND MICRO INC.	http://www.trendmicro.tw/tw/index.html
39	ONWARD SECURITY CORPORATION	http://www.onwardsecurity.com/
43	SPORTON INTERNATION INC.	http://www.sporton.com.tw/
44	DEKRA TESTING AND CERTIFICATION CO., LTD.	https://www.dekra.com.tw/tc/home/
48	INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE	https://www.itri.org.tw/
49	INSTITUTE FOR INFORMATION INDUSTRY	http://www.iii.org.tw/Default.aspx
53	TAIWAN MOBILE CO., LTD.	https://www.taiwanmobile.com/index.html
62	TAIWAN INTELLIGENT BUILDIN G ASSOCIATION	http://www.tiba.org.tw/
68	PEGATRON CORP.	http://cht.pegatroncorp.com/
70	ZYXEL COMMUNICATIONS CORP.	http://www.zyxel.com/tw/zh/homepage.shtml
74	SERCOMM CORPORATION	http://www.sercomm.com/home.aspx
75	NATIONAL CHIAO TUNG UNIVERSITY	http://www.nctu.edu.tw/
76	TAIWAN SECOM CO. , LTD.	http://www.secom.com.tw/
78	NATIONAL CHUNG CHENG UNIVERSITY	http://www.ccu.edu.tw/
79	INFORMATION SERVICE INDUSTRY ASSOCIATION OF R.O.C	http://www.cisanet.org.tw/
81	ELECTRONICS TESTING CENTER, TAIWAN	http://www.etc.org.tw/default.aspx

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NO.	Company Name	Website
84	NRITSU COMPANY INC.	http://www.anritsu.com/zh-TW/Home.aspx
90	TAIWAN INSTITUTE OF ECONOMIC RESEARCH	http://www.tier.org.tw/
93	FAR EAS TONE TELECOMMUNICATIONS CO., LTD.	http://www.fetnet.net/cs/Satellite/Corporate/coHome
94	TELECOM TECHNOLOGY CENTER	https://www.ttc.org.tw/
97	NATIONAL TAIWAN UNIVERSITY	https://www.ntu.edu.tw/
98	NATIONAL CHENG KUNG UNIVERSITY	http://web.ncku.edu.tw/bin/home.php
100	ASIA PACIFIC TELECOM CO., LTD.	http://www.aptg.com.tw/my/index.htm
101	TAIWAN TELEMATICS INDUSTRY ASSOCIATION	http://www.ttia-tw.org/
103	TAIWAN ELECTRICAL AND ELECTRONIC MANU-FACTURERS' ASSOCIATION	http://www.teema.org.tw/index.aspx
104	SENAO NETWORKS, INC.	http://www.senao.com/Taiwan/
110	NATIONAL CENTRAL UNIVERSITY	http://www.ncu.edu.tw/
113	NAN YA PLASTICS CO.	http://www.npc.com.tw
114	EGIS TECHNOLOGY INC.	https://www.egistec.com/
116	TAIWAN-CA. INC.	https://www.twca.com.tw/Portal/Portal.aspx
117	SYNOLOGY INC.	https://www.synology.com/zh-tw
118	GAPERTISE INC.	http://www.gapertise.com/
119	TAIWAN TELECOM INDUSTRY DEVELOPMENT ASSOCIATION	http://www.ttida.org.tw/
120	ICP DAS CO., LTD.	http://www.icpdas.com.tw/index_tc.php
123	NATIONAL TAIPEI UNIVERSITY	https://new.ntpu.edu.tw/
125	NATIONAL DONG HWA UNIVERSITY	https://www.ndhu.edu.tw/
126	SGS TAIWAN LTD.	https://campaigns.sgs.com/zh-tw/taiwan/sgs-in-taiwan
127	TÜV RHEINLAND TAIWAN LTD.	https://www.tuv.com/taiwan/tw/
128	CHICONY POWER TECHNOLOGY CO., LTD.	https://www.chiconypower.com/zh-tw/
129	AUTOMOTIVE RESEARCH TESTING CENTER	https://www.artc.org.tw/
132	DELOITTE TOUCHE TOHMATSU LTD.	https://www2.deloitte.com/tw/tc.html
134	ASKEY COMPUTER CO.	http://www.askey.com.tw/
136	ESSEN PATENT AND TRADEMARK OFFICE	http://www.essenptl.com/
138	WISTRON CORPORATION	https://www.wistron.com/
140	SPECTACULAR Co.,Ltd.	https://www.linkedin.com/company/spectacular/?originalSubdomain=tw
142	EZ TRANSCEND INNOVATION TECHNOLOGY COMPANY LIMITED	https://www.ezplus.com.tw/
143	HP TAIWAN INFORMATION TECHNOLOGY LTD.	https://www8.hp.com/tw/zh/home.html
144	NEMKO AS, TAIWAN BRANCH (NORWAY)	http://www.nemko.com
145	AEONMOTOR CO.,LTD.	https://www.aeonmotor.com.tw/
146	CHT SECURITY CO., LTD.	https://www.chtsecurity.com/
147	AESOPOWER, INC.	http://www.aesopower.com/
148	ECOLUX TECHNOLOGY	https://ecolux.tech/
149	AU OPTRONICS CORPORATION	https://www.auo.com/zh-TW
150	AMPACS CORPORATION	http://www.ampacscorp.com/zh-tw/
151	TRON FUTURE TECH	https://tronfuture.com/product/t-radar-overview/
152	AUTHME	https://authme.com/