ISO/IEC JTC 1 "Information technology"
Secretariat: **ANSI**
Committee manager: **Rajchel Lisa Mrs.**

JTC 1/SC 42 Business Plan 2022

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Project / Other	Meeting: Tokyo (Japan) 14 Nov 2022	2022-09-26	**COMMENT**/**REPLY** by 2022-10-17

Description

This document is circulated for review and consideration at the November 2022 JTC 1 Plenary.

SC 42 Strategic Business Plan
Artificial Intelligence

Period Covered: November 2021 through September 2022

1   Executive Summary

Background and Overview

At the 32nd ISO/IEC JTC 1 Plenary in Vladivostok, Russia, Resolution 12 established SC 42 as a system integration entity for Artificial Intelligence subject to ISO TMB and IEC SMB approval. The resolution also appointed Mr. Wael William Diab (US) as Chair of the committee. ISO was assigned as the administrator of the committee. Ms. Heather Benko (ANSI) was appointed as the Committee Manager.

The inaugural meeting was held in Beijing, China, 18th – 20th April 2018, during which resolutions were adopted to address comments from the ISO TMB review. The resolutions and associated contributions were ratified by JTC 1 and provided to the ISO TMB and IEC SMB, who then completed the ratification and establishment of SC 42 in May of 2018. Specifically, a resolution (SC 42 N078 Beijing Resolution 2) for the inclusion of societal concerns in SC 42 program of work was passed. This resolution was approved by ISO TMB resolution 53/2018.[1]

Further, a resolution (SC 42 N078 Beijing Resolution 1) to endorse the JTC 1 resolution (JTC 1 Vladivostok Resolution 13) to transfer the Big Data work program from JTC 1/WG 9 to SC 42 was passed. Based on the two resolutions and in consultation with the TMB Secretary, the JTC 1 Secretary transferred the Big Data program of work to SC 42 on May 7th 2018 and JTC 1/WG 9 was disbanded (SC 42 N088 and JTC 1 N13712).

The second, third and fourth plenary meetings were held in Sunnyvale, Dublin, and Tokyo. The fifth through the ninth plenary meetings were held virtually in response to the global COVID-19 pandemic. At the end of the plenary meetings a number of projects were approved and an updated structure for the program of work was established to reflect the approvals.

The scope of SC 42 is:

Standardization in the area of Artificial Intelligence

- Serve as the focus and proponent for JTC 1's standardization program on Artificial Intelligence
- Provide guidance to JTC 1, IEC, and ISO committees developing Artificial Intelligence applications

Scope of the Business Plan

This business plan focuses on the output of the committee since the last version submitted in 2021.

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[1] IEC indicated that no further action is needed on their part as the original approval included societal concerns

2 Chairman's Remarks

2.1 Market Requirements, Innovation

Fueled by technologies like AI, the digital transformation promises to change how we live, work and play for the better. Nonetheless, this transformation has also changed the landscape for standardization as the underlying technologies become ubiquitous in their use. For instance

- Emerging non-technical requirements such as ethical and societal considerations and the ability to design trustworthy systems are key aspects
- Stakeholder diversity has increased considerably (e.g. regulatory, social science, economic etc.)
- Early engagement by the various stakeholders has become the norm
- The application domains and associated use cases have increased dramatically
- Understanding uses, proving business cases and developing standards are now concurrent
- The "data ecosystem" is as important as hardware, software and operational technologies
- Enabling certification, 3rd party audit and increasing end-user confidence increasingly important

In response to the changing landscape and in an effort to address barriers to adoption while simultaneously dealing with emerging challenges, SC 42 has adopted a holistic ecosystem approach. This approach takes into account the context of use of the technology to develop technical requirements by looking at both technology capability and emerging non-technical trends and requirements. Moreover, the horizontal and foundational deliverables that SC 42 produces can bridge innovation communities such as application SDOs, research, and open-source communities. The diagram below summarizes SC 42's novel approach.
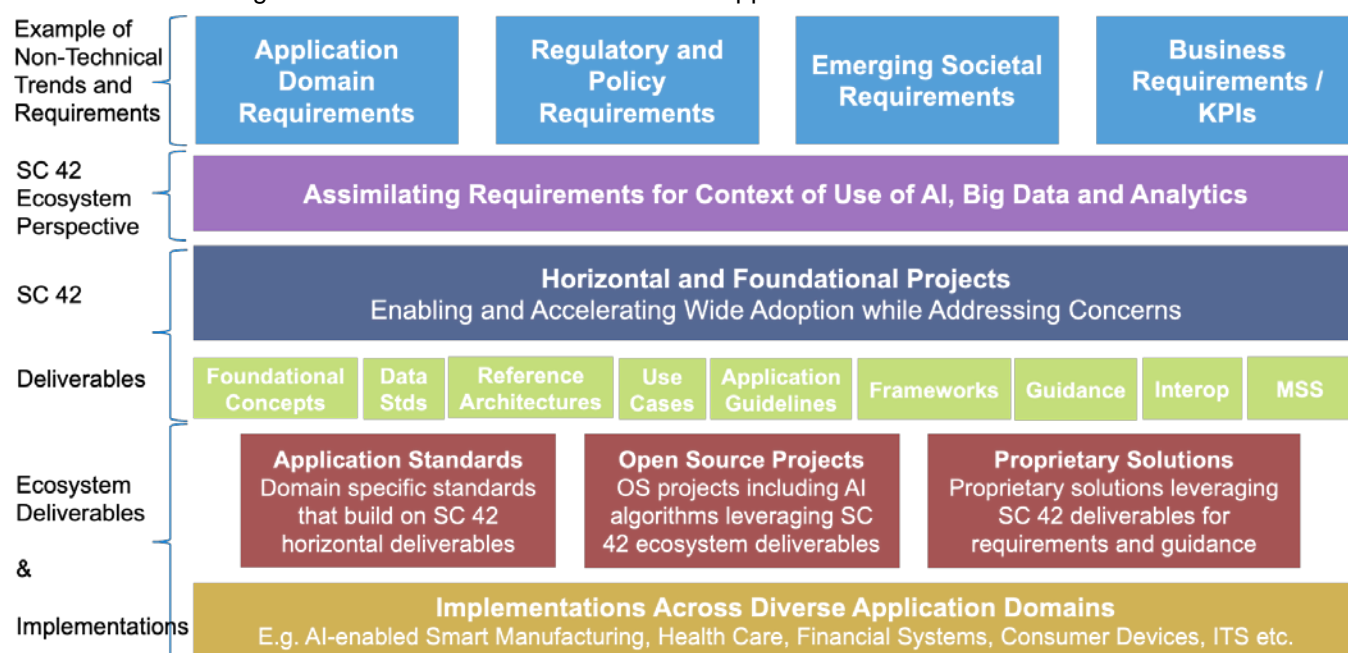

Figure 1: Bridging the Gap – An Ecosystem Approach

The promise of digital transformation coupled with the continued and rapid innovation in AI has also changed the dynamic of how AI systems are being deployed. Traditionally, AI had been focused on large-scale problems that were either too hard/complex to solve with traditional compute methods or were in specialized emerging areas. This is no longer the case. AI is one of the key enablers of the digital transformation driven by a demand for services and more intelligent analytics. Examples include:

- AI expert systems are helping healthcare professionals make better decisions for patients with proper trustworthiness measures designed into the system,
- AI deployment in the industrial manufacturing sector where it is driving higher efficiencies by allowing robots to work alongside human workers with the proper safety measures designed into the system,
- AI deployment in the financial ecosystem where it is enabling applications that range from asset mgmt that takes into account factors such as the clients risk to fraud detection that reduces false-positives
- Emerging applications are numerous and diverse e.g. consumer, retail, digital assistants, expert systems such as smart grid, marketing intelligence tools, enterprise etc.

Thus, it is not surprising that IDC estimates **that 75% of enterprise applications will use AI.** The market is forecast to accelerate further in 2022 with 18.8% growth and remain on track to break the $500 billion mark by 2024.[2] The AI ecosystem continues to be ripe for standardization.

In addition to producing horizontal deliverables, SC 42 collaborates with committees and liaisons to enable AI apps.

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[2] https://www.idc.com/getdoc.jsp?containerId=prUS48127321

2.2 Accomplishments

Since the last report, SC 42's key accomplishments and highlights include

- Publications
  - o Progress across **program of work** including**: Foundational** ISO/IEC 22989 **AI concepts and terminology**, ISO/IEC 23053 **Framework for AI Systems using ML**; **Trustworthiness** ISO/IEC 24027 **Bias**; **Governance** ISO/IEC 38507 (jointly developed with SC 40); **Ethics** ISO/IEC 24368; **Computational** ISO/IEC 24372 Overview; anticipated publication of ISO/IEC 4213 **Assessment of ML Classification Performance**
- Growth by the numbers
  - o **Projects**: **14** published (**7** since last update). **29** active of which **11** new projects added to the work program since last update
  - o **Participation**: **50** NBs (33P/17O) despite economic headwinds. **>250** people at virtual. **50+** liaisons (**13** Cat A). **2** new JWGs. **1** new AG
- Growth in the diversity of the work program and ecosystem coverage
  - o **Extension** of existing areas across including: **MSS** related projects to **enable certification/audit**; **data quality governance**; **transparency** taxonomy, treatment of **unwanted bias**, **oversight of AI systems**; guidance for mitigating **ethical** issues; **use cases** revision; computational **ML computing devices**
  - o **New areas** include **AI Testing, Verification and Validation** (jointly with SC 7); **AI-enabled Health Informatics** (jointly with ISO TC 215)
  - o Healthy **pipeline of new ideas** for additional projects and roadmap planning at the **SC and WG** levels and **through a road-mapping AG**
- Launch of ISO/IEC Workshop Series
  - o Bi-annual workshop series bringing AI luminaries to discuss AI ecosystem including emerging trends, technology, requirements, applications and the role of standards. May inaugural workshop had 500 registrations per session and avg 300 attendance. Registration for second workshop in November is open
- Extensive outreach activities, media/comms coverage and collaborations (internal and external)
  - o Over a dozen IEC articles and multimedia engagements. Collaboration with the ISO Comms on key articles and outreach plans
    - ▪ **Thank you to IEC Comms (Mike, Laura, Yusra, Gabriella), ISO Comms (Liz, Clare, Vivienne, Catherine, Barnaby, Roxanne), IEC Academy (Ian, Giulia)!**
  - o Support of IEC and ISO AI related initiatives such as **IEC Workshop** on AI with Trust and **ISO Foresight** on AI and ethics of technology
  - o Progress on existing and new collaborations: IEC SC 65A, ISO 215, ISO SMCC, liaison (SC 7, 27, 29, 32, 38, 39, 41), OECD, EC, UNESCO
- Meeting hosts planned through 2026

The membership of the committee has experienced a healthy and steady growth every year since its inception. SC 42 has 35 P-members and 15 O-members. In addition, the attendance at physical plenaries is ~150 attendees and over 250 attendees at virtual plenaries.

The committee's leadership team that consists of the committee chair and committee manager, the subgroup convenors and secretariats, and the editors, has worked proactively to implement the agreed upon work program.

2.3 Opportunities and Challenges

The last business plan readout for SC 42 identified a number of challenges. In this section, the challenges identified from 2021 are reviewed, an overview of challenges for the upcoming year is presented along with opportunities and plans.

Key challenges identified in the 2021 business plan successfully resolved
- ▪ 2021 challenge: Balancing the expansion of the work program and executing on existing projects efficiently
  - ➢ Resolution: Interest in SC 42's work continues to be high. Procedurally, continued enhancement of processes for reporting on existing work and discussing new work (e.g. anticipated actions for closing plenary) and close coordination via convenor calls. Establishment of AG for road-mapping
- ▪ 2021 challenge: Broader engagement with ISO and IEC application focused committees
  - ➢ Resolution: Bi-annual workshop series launched that includes focus on applications and guest speakers from IEC and ISO TCs. In addition, keynote speakers have been invited to SC 42 plenaries (e.g. IEC SMB chair, ISO SMCC chair). New activities underway in support of system integration mission that include the full toolset from liaison input (e.g. SC 65A) to new JWGs (e.g. with TC 215). Enhanced liaison established withing JTC 1 with SC 27
- ▪ 2021 challenge: Opportunity to engage additional interest categories such as consumer segments,

academic/research and other interest areas
> Resolution: Workshops and keynotes have helped bring in new ideas, identified trends and stakeholders. In addition targeted leadership outreach (e.g. startups, UNESCO). In addition, new ideas and insights developed that will draw new stakeholders (e.g. beneficial AI)
- 2021 challenge: Addressing emerging AI-specific needs and challenges with international standards
  > Resolution: Requirements continue to be identified organically via road-mapping and via outreach insights. New areas identified and existing extended
- 2021 challenge: COVID implications on our work program, meetings and call fatigue / overlap
- Resolution: Returning to face to face with best effort virtual. Continued to refine virtual meeting plenary template

Unique challenges last year
- Applicability of Vienna and Frankfurt agreements w.r.t. CEN/CENELEC
  > Resolution: Established applicability and invited updates via representatives

Challenges looking forward
The challenges identified and addressed over the past cycle may continue to persist as the committee and program of work continues to grow, SC 42 recognizes that some of these challenges like continuing to expand stakeholder diversity, collaboration and balancing high quality efficient output with growth of the program are not one time issues and may evolve as the committee work grows.

In addition, COVID and/or economic headwinds may also persist. SC 42 will continue with the approaches highlighted above that have worked and do a regular assessment throughout the year to refine as needed.

SC 42 thus far has been fortunate to have high interest in its work with a flow of new project proposals. Nonetheless, this does create a few unique challenges
- Scaling: As the program of work continues to grow, training new editors and ensuring quality across all the deliverables while maintaining efficient execution presents its own set of challenges
- Identifying gaps in the work program especially relative to emerging areas not already covered in the existing work program / WGs

Future Planning
Looking forward, the scope of the artificial intelligence committee and its focus on the entire ecosystems for AI and related data issued for AI, Big Data and analytics, offers a lot of opportunity for continued expansion of the work program, membership and collaboration. As this is an area of tremendous interest, the time is ideal to continue to act on these areas.

Operational
- Committee: Meeting dates / hosts established through 2026 pending COVID
- Projects: Anticipate completion of a second set of AI projects
- Groups: Ensure new JWGs setup, effective and operational. Identify cross-WG issues. Refine metrics for brainstorming

Strategic
- Program of Work
  > Maintenance: As program of work matures, we will have some maintenance type work to look after
  > New: New topics already being identified at the SC and WG levels
  > Anticipate more projects of interest to other ISO, IEC and JTC 1 groups to be initiated
- Outreach and communications
  > ISO/IEC AI **workshop** series to derive **insights** for SC 42 program of work
  > Work with ISO and IEC communications on targeted outreach
- Collaboration
  > Liaisons
  > Continue to identify committees within ISO, IEC and JTC 1 with interest in AI
    ✓ Call for action for any JTC 1 committee interested in collaborating with SC 42
- SC 42 ISO hosted website establishment to complement existing channels (e.g. JTC 1, LinkedIn)

From a strategic point of view, it is also important to continue to look at ways to enhance the program and its deliverables. In addition, as interest continues to pickup across ISO and IEC TCs looking to build AI application standards, complementing the portfolio of horizontal standards with outreach guidance on how to leverage the SC 42 deliverables and scale it becomes of increasing importance. Finally, complementing the outreach initiatives with SC 42 hosted workshops can amplify the outreach and help identify gaps in the program of work.

2.4   Resources

SC 42 has decided on a meeting cadence of two plenaries per year. In addition, all face-to-face meetings of its subgroups are during the plenary week. The current resources and structure sufficiently address the program of work of SC 42.

During the COVID-19 crisis, SC 42 has developed a virtual plenary footprint that balances progression of work with a reasonable call schedule while minimizing any overlapping calls. The minimizing of overlapping calls has also been extended to the regular calls in between plenary meetings. As COVID conditions improve, we plan to return to the face to face cadence with a best effort remote participation.

Moreover, as artificial intelligence and associated data topics relating to AI, analytics and Big Data have a number of application areas and due to the system integration nature of the committee, SC 42 will continue try to leverage as much as possible the resource of other JTC 1, ISO and IEC entities as well as SDO's through cooperative work.

2.5   Competition and Cooperation

SC 42 collaborates with a number of committees and organizations that are both internal as well as external. For a complete current list of liaisons, please refer to the ISO website: https://www.iso.org/committee/6794475.html. As of this business plan write-up, there are over 50 liaisons of which 13 are category A.

It is anticipated that the liaison partnerships will continue to grow over the next year.

3   Work Program

Structure
SC 42 set its initial structure at the inaugural plenary meeting and updated at subsequent plenaries. SC 42 has and will continue to utilize AGs and ad-hoc groups as needed.

A summary[3] of the current structure appears in the table below

SC 42 Subgroup	Title	Notes
SC 42/WG 1	Foundational standards	Formed at the 1st plenary
SC 42/WG 2	Data	Formed at 2nd plenary Updated at 5th
SC 42/WG 3	Trustworthiness	Formed at the 2nd plenary
SC 42/WG 4	Use cases and applications	Formed at the 2nd plenary
SC 42/WG 5	Computational approaches and computational characteristics of AI systems	Formed at the 3rd plenary
SC 42/SC 40 JWG 1	Governance implications of AI	Confirmed by JTC 1 Resolution – November 2018. Disbanded April 2022
SC 42/SC 7 JWG 2	Testing of AI-based Systems	Confirmed by JTC 1 Resolution
SC 42/TC 215 JWG 3	AI-enabled Health Informatics	Confirmed by resolutions of ISO TC 205 (July 2022) and SC 42 (Aug 2022)

SC 42 will continue to evaluate its structure in response to the work program.

Membership
As of this report, SC 42 has 35 P-members and 15 O-members. For a complete current list of membership, please refer to the ISO website: https://www.iso.org/committee/6794475.html.

35 Participating Members
- Australia (SA)
- Austria (ASI)
- Belgium (NBN)
- Canada (SCC)
- China (SAC)
- Congo, The Democratic Republic of the (OCC)
- Cyprus (CYS)

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[3] For simplicity and brevity, the SC 42 working groups are listed. AGs and AHGs are not listed here. For a complete list please refer to the ISO committee website: https://www.iso.org/committee/6794475.html.

- Denmark (DS)
- Finland (SFS)
- France (AFNOR)
- Germany (DIN)
- India (BIS)
- Ireland (NSAI)
- Israel (SII)
- Italy (UNI)
- Japan (JISC)
- Kazakhstan (KAZMEMST)
- Kenya (KEBS)
- Korea, Republic of (KATS)
- Luxembourg (ILNAS)
- Malta   (MCCAA)
- Netherlands (NEN)
- Norway (SN)
- Philippines (BPS)
- Portugal (IPQ)
- Russian Federation (GOST R)
- Saudi Arabia (SASO)
- Singapore (SSC)
- Spain (UNE)
- Sweden (SIS)
- Switzerland (SNV)
- Uganda (UNBS)
- United Arab Emirates (MoIAT-STR)
- United Kingdom (BSI)
- United States (ANSI)

15 Observing Members
- Argentina (IRAM)
- Benin (ANM)
- Brazil (ABNT)
- Côte d'Ivoire (CODINORM)
- Hong Kong Special Administrative Region of China (ITCHKSAR)
- Hungary (MSZT)
- Indonesia (BSN)
- Lithuania (LST)
- Mexico (DGN)
- New Zealand (NZSO)
- North Macedonia (ISRSM)
- Poland (PKN)
- Romania (ASRO)
- South Africa (SABS)
- Ukraine (DSTU)

Summary of Current SC 42 Officers and Editors

Officers

Position	Officer Name	Originating National Body
SC 42 Chair	Wael William Diab	USA (ANSI)
SC 42 Committee Manager	Heather Benko	USA (ANSI)
SC 42/WG 1 Convenor	Paul Cotton	Canada (SCC)
SC 42/WG 2 Convenor	Wo Chang	USA (ANSI)
SC 42/WG 3 Convenor	David Filip	Ireland (NSAI)
SC 42/WG 3 Secretary	Aditya Mohan	Ireland (NSAI)
SC 42/WG 4 Convenor	Fumihiro Maruyama	Japan (JISC)
SC 42/WG 4 Secretary	Nobuhiro Hosokawa	Japan (JISC)
SC 42/WG 5 Convenor	Ning Sun	China (SAC)
SC 42/JWG 2 co-Convenor (SC 42)	Adam Smith	United Kingdom (BSI)
SC 42/JWG 2 co-Convenor (SC 7)	Stuart Reid	United Kingdom (BSI)

Editors

- ISO/IEC 42001: Marta Janczarski (Canada)
- ISO/IEC 42005: Peter Deussen (Germany)
- ISO/IEC 24668: Gautam Banerjee (India)
- ISO/IEC 5259-1: Suwook Ha (Korea)
- ISO/IEC 5259-2: Kyoung-Sook Kim (Japan)
- ISO/IEC 5259-3: Matthis Eicher (Germany)
- ISO/IEC 5259-4: Wanzhong Ma (China)
- ISO/IEC 5259-5: Gyeung-Min Kim (Korea)
- ISO/IEC 8183: Colin Crone (United Kingdom)
- ISO/IEC 24029-2: Arnault Ioualalen (France)
- ISO/IEC 23894: Peter Deussen (Germany)
- ISO/IEC TR 5469: Takashi Egawa (Japan), Riccardo Mariani (Italy)
- ISO/IEC 25059: Adam Leon Smith (United Kingdom)
- ISO/IEC TS 6254 Jaeho Lee (Korea)
- ISO/IEC TS 5471 Olivier Blais (France)
- ISO/IEC TS 8200 Xiaoqi Cao (China)
- ISO/IEC 12791: Adam Leon Smith (United Kingdom)
- ISO/IEC 12792: Rania Wazir (Austria)
- ISO/IEC PWI 17866: Viveka Bonde (Sweden)
- ISO/IEC PWI 18966: Takashi Egawa (Japan)
- ISO/IEC 24030:2021 Revision: Yuchang Cheng (Japan)
- ISO/IEC 5338: Yuchang Cheng (Japan)
- ISO/IEC 5339: Shrinkat Bhat (India)
- ISO/IEC TS 4213: Lingzhong Meng (China), Michael Thieme (United States)
- ISO/IEC 5392: Ruiqi Li (China)
- ISO/IEC TR 17903: Xiaoqi Cao (China)
- ISO/IEC 29119-11: Jonghong Jeon (Korea), Stuart Reid (United Kingdom)
- ISO/IEC TS 17847: Srinivasa Rao (India)
- ISO/IEC TR 18988: Peter Williams (Australia)

3.1 Working Group 1 – Foundational standards (Current)

SC 42 established Working Group 1 on foundational standards at its inaugural plenary meeting. At the second plenary meeting, SC 42 assigned the following TOR to WG 1:
- Development of foundational standards for Artificial Intelligence

Officers
- Convenor: Paul Cotton (Canada) was appointed as Convenor of SC 42/WG 1
- Project editors:
  - Current:
    - ISO/IEC 42001: Marta Jenczarski (Canada)
    - ISO/IEC 42005: Peter Deussen (Germany)
  - Previous
    - ISO/IEC 22989: Wei Wei (Germany)
    - ISO/IEC 23053: Milan Patel (United Kingdom)

3.2 Working Group 2 –Data (Current)

SC 42 established Working Group 2 on big data at its second plenary meeting. At the second plenary meeting, SC 42 assigned the following title and TOR to WG 2:
- Title: Big Data
- TOR: Standardization in the area of Big Data

At the fifth plenary meeting, SC 42 expanded the scope of WG 2 updating its title and TOR:
- Title: Data
- Standardization in relation to data in the context of artificial intelligence, big data, and data analytics

Officers
- Convenor: Wo Chang (United States) was appointed as Convenor of SC 42/WG 2
- Project editors:
  - Current:
    - ISO/IEC 24668: Gautam Banerjee (India)
    - ISO/IEC 5259-1: Suwook Ha (Korea)
    - ISO/IEC 5259-2: Kyoung-Sook Kim (Japan)
    - ISO/IEC 5259-3: Matthis Eicher (Germany)

- ISO/IEC 5259-4: Wanzhong Ma (China)
- ISO/IEC 5259-5: Gyeung-Min Kim (Korea)
- ISO/IEC 8183: Colin Crone (United Kingdom)
  - o Previous:
    - ISO/IEC 20546 David Boyd (United States)
      - Phase 1: Nancy Grady (United States)
    - ISO/IEC 20547-1 David Boyd (United States)
    - ISO/IEC 20547-2 Ray Walshe (Ireland)
    - ISO/IEC 20547-3 Ray Walshe (Ireland)
    - ISO/IEC 20547-5 David Boyd (United States)

3.3   Working Group 3 – Trustworthiness (Current)

SC 42 established Working Group 3 on trustworthiness at its second plenary meeting. At the second plenary meeting, SC 42 assigned the following TOR to WG 3:
- Standardization in the area of AI Trustworthiness

Officers
- Convenor: David Filip (Ireland) was appointed as Convenor of SC 42/WG 3
- Secretariat: Aditya Mohan (Ireland)
  - o Previously: Barry Smith (Ireland), Coleen Naden (Ireland)
- Project editors:
  - o Current:
    - ISO/IEC TR 24029-2 Arnault Ioualalen (France)
    - ISO/IEC 23894 Peter Deussen (Germany)
    - ISO/IEC TR 5469 Takashi Egawa (Japan), Riccardo Mariani (Italy)
    - ISO/IEC 25059 Adam Leon Smith (United Kingdom)
    - ISO/IEC TS 6254 Jaeho Lee (Korea)
    - ISO/IEC TS 5471 Olivier Blais (France)
    - ISO/IEC TS 8200 Xiaoqi Cao (China)
    - ISO/IEC 12791: Adam Leon Smith (United Kingdom)
    - ISO/IEC 12792: Rania Wazir (Austria)
    - ISO/IEC PWI 17866: Viveka Bonde (Sweden)
    - ISO/IEC PWI 18966: Takashi Egawa (Japan)
  - o Past:
    - ISO/IEC TR 24027 Adam Leon Smith (UK)
    - ISO/IEC TR 24028:2020 Orit Levin (United States)
    - ISO/IEC TR 24029-1:2021 Arnault Ioualalen (France)
    - ISO/IEC TR 24368 Viveka Bonde (Sweden)
      - Phase 1 – Mikael Hjalmarson (Sweden)

3.4   Working Group 4 – Use cases and applications (Current)

SC 42 established Working Group 4 on use cases and applications at its second plenary meeting. At the second plenary meeting, SC 42 assigned the following TOR to WG 4:
- Use cases and applications for AI Standardization

Officers
- Convenor: Fumihiro Murayama (Japan) was appointed as Convenor of SC 42/WG 4
- Secretariat: Nobuhiro Hosokawa (Japan)
- Project editors:
  - o Current:
    - ISO/IEC TR 24030:2021 Revision Yuchang Cheng (Japan)
    - ISO/IEC 5338 Yuchang Cheng (Japan)
    - ISO/IEC 5339 Shrikant Bhat (India)
  - o Previous:
    - ISO/IEC TR 24030 Yuchang Cheng (Japan)

3.5   Working Group 5 – Computational approaches and computational characteristics of AI systems (Current)

SC 42 established Working Group 5 on computational approaches and computational characteristics of AI systems at its third plenary meeting. At the third plenary meeting, SC 42 assigned the following TOR to WG 5:
- Standardization in the area of computational approaches and computational characteristics of AI systems

Officers

- ▪ Convenor: Ning Sun (China) was appointed as Convenor of SC 42/WG 5
  - ○ Previously: Tangli Liu (China) 2019-04-12 to 2022-04
- ▪ Secretariat:
  - ○ Previously: Qun Zhang (China), Ning Sun (China)
- ▪ Project editors:
  - ○ Current:
    - ▪ ISO/IEC TS 4213 Michael Theime (United States), Lingzhong Meng (China)
    - ▪ ISO/IEC 5392 Ruiqi Li (China)
    - ▪ ISO/IEC TR 17903: Xiaoqi Cao (China)
  - ○ Previous:
    - ▪ ISO/IEC TR 24372 Wanzhong Ma (China)

3.6   Joint Working Group 1 – Governance Implications of AI (Completed)

SC 42 recommended the establishment of a joint working group with SC 40, with the administrative lead held by SC 42, to JTC 1 on the governance implications of AI at its second plenary meeting. JTC 1 subsequently affirmed the SC 42 recommendation at its November 2018 plenary. The following TOR was assigned to JWG 1:

- ▪ Governance Implications of AI

Officers
- ▪ Convenor: Yonosuke Harada (Japan, SC 42)
  - ○ Previously: Janna Lingenfelder (Germany, SC 42) was appointed as Convenor of SC 42/JWG 1 2018-11-09 (SC 42 resolution 2018-10-12)
- ▪ Co-Convenor: Gyeung-min Kim (Republic of Korea, SC 40) was appointed as Co-Convenor of SC 42/JWG 1
- ▪ Secretariat:
  - ○ Previously: Katharina Sehnert (Germany, SC 42), Subhi Mahmoud (Germany, SC 42)
- ▪ Project editors:
  - ○ Previous:
    - ▪ ISO/IEC 38507 Peter Brown (UK)

3.7   Joint Working Group 2 – Testing of AI-based Systems (Current)

JWG 2 is a joint working group with JTC 1/SC 7 and is administered by SC 42. The following TOR was assigned to JWG 1:

- ▪ Testing of AI-based systems

Officers
- ▪ Co-Convenor: Adam Smith (United Kingdom, SC 42)
- ▪ Co-Convenor: Stuart Reid (United Kingdom, SC 7)
- ▪ Project editors:
  - ○ Current
    - ▪ ISO/IEC 29119-11: Jonghong Jeon (Korea), Stuart Reid (United Kingdom)
    - ▪ ISO/IEC TS 17847: Srinivasa Rao (India)

3.8   Joint Working Group 3 – AI-enabled Health Informatics (Completed)

JWG 3 is a joint working group with ISO/TC 215 and is administered by SC 42.

Officers
- ▪ Co-Convenor: TBD
- ▪ Co-Convenor: TBD
- ▪ Project editors:
  - ○ Current:
    - ▪ ISO/IEC TR 18988: Peter Williams (Australia)

3.9   Published Projects

Big Data
- ▪ ISO/IEC 20546:2019 Information technology -- Big Data -- Overview and Vocabulary
  - Publication date: 2019-02
  - Description: This document provides a set of terms and definitions needed to promote improved communication and understanding of this area. It provides a terminological foundation for big data-related standards. This document provides a conceptual overview of the field of big data, its relationship to other technical areas and standards efforts, and the concepts ascribed to big data that are not new to big data.
- ▪ ISO/IEC TR 20547-1:2020 Information technology -- Big data reference architecture -- Part 1: Framework and application process

- Publication date: 2020-08
- Description: This document describes the framework of the big data reference architecture and the process for how a user of the document can apply it to their particular problem domain.
▪ ISO/IEC TR 20547-2:2018 Information technology -- Big data reference architecture -- Part 2: Use cases and derived requirements
  - Publication date: 2018-01
  - Description: ISO/IEC TR 20547-2:2018 provides examples of big data use cases with application domains and technical considerations derived from the contributed use cases.
▪ ISO/IEC 20547-3:2020 - Information technology -- Big data reference architecture -- Part 3: Reference architecture
  - Publication date: 2020-03
  - Description: This document specifies the big data reference architecture (BDRA). The reference architecture includes concepts and architectural views.
▪ ISO/IEC TR 20547-5:2018 Information technology -- Big data reference architecture -- Part 5: Standards roadmap
  - Publication date: 2018-02
  - Description: ISO/IEC TR 20547-5:2018 describes big data relevant standards, both in existence and under development, along with priorities for future big data standards development based on gap analysis. ISO/IEC TR 20547-2:2018 : Information technology -- Big data reference architecture -- Part 2: Use cases and derived requirements
  - Status: 60.60

Artificial intelligence
▪ ISO/IEC TR 24368:2022 Information technology — Artificial intelligence — Overview of ethical and societal concerns
  - Publication date: 2022-08
  - This document provides a high-level overview of AI ethical and societal concerns.
    In addition, this document:
    — provides information in relation to principles, processes and methods in this area;
    — is intended for technologists, regulators, interest groups, and society at large;
    — is not intended to advocate for any specific set of values (value systems)
▪ ISO/IEC 23053:2022 Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)
  - Publication date: 2022-06
  - This document establishes an Artificial Intelligence (AI) and Machine Learning (ML) framework for describing a generic AI system using ML technology. The framework describes the system components and their functions in the AI ecosystem. This document is applicable to all types and sizes of organizations, including public and private companies, government entities, and not-for-profit organizations, that are implementing or using AI systems.
▪ ISO/IEC 22989:2022 Information technology — Artificial intelligence — Artificial intelligence concepts and terminology
  - Publication date: 2022-07
  - This document establishes terminology for AI and describes concepts in the field of AI. This document can be used in the development of other standards and in support of communications among diverse, interested parties or stakeholders. This document is applicable to all types of organizations (e.g. commercial enterprises, government agencies, not-for-profit organizations).
▪ ISO/IEC 38507 -- Information technology -- Governance of IT -- Governance implications of the use of artificial intelligence by organizations
  - Publication date: 2022-04
  - This document provides guidance for members of the governing body of an organization to enable and govern the use of Artificial Intelligence (AI), in order to ensure its effective, efficient and acceptable use within the organization.
    This document also provides guidance to a wider community, including:
    — executive managers;
    — external businesses or technical specialists, such as legal or accounting specialists, retail or industrial associations, or professional bodies;
    — public authorities and policymakers;
    — internal and external service providers (including consultants);
    — assessors and auditors.
    This document is applicable to the governance of current and future uses of AI as well as the implications of such use for the organization itself.
    This document is applicable to any organization, including public and private companies, government entities and not-for-profit organizations. This document is applicable to an organization of any size irrespective of their dependence on data or information technologies.

- ISO/IEC TR 24029-1:2021 Artificial Intelligence -- Assessment of the robustness of neural networks -- Part 1: Overview
  - Publication date: 2021-03
  - This document provides background about existing methods to assess the robustness of neural networks.
- ISO/IEC TR 24030:2021 Information technology -- Artificial Intelligence -- Use cases
  - Publication date: 2021-05
  - Description: This document provides a collection of representative use cases of AI applications in a variety of domains.
- ISO/IEC TR 24029-1:2021 Artificial Intelligence -- Assessment of the robustness of neural networks -- Part 1: Overview
  - Publication date: 2021-03
  - Description: This document provides background about existing methods to assess the robustness of neural networks.
- ISO/IEC TR 24028:2020 - Information technology — Artificial intelligence — Overview of trustworthiness in artificial intelligence
  - Publication date: 2020-05
  - Description: This document surveys topics related to trustworthiness in AI systems, including the following:
    — approaches to establish trust in AI systems through transparency, explainability, controllability, etc.;
    — engineering pitfalls and typical associated threats and risks to AI systems, along with possible mitigation techniques and methods; and
    — approaches to assess and achieve availability, resiliency, reliability, accuracy, safety, security and privacy of AI systems.

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Annex: Additional Links and Information

Committee Information Online
The following committee information is updated regularly and is available on ISO's website, ISO Online.

Click on the links below to find the following information:
- About (Secretariat, Secretary, Chair, Date of creation, Scope, etc.)
- Contact details
- Structure (Subcommittees and working groups)
- Liaisons
- Meetings
- Work program (published standards and standards under development)

- SC 42 Committee website
- ISO/IEC AI LinkedIn page
- ISO/IEC AI Workshop Series website
- Press Coverage Related to SC 42 Overview and Program of Work
    - IEC e-tech International standards for artificial intelligence (August 16th 2022)
    - IEC e-tech Foundational building blocks for AI systems (July 19th 2022)
    - IEC video A governance framework for organizations deploying AI systems (June 7th 2022)
    - IEC news SC 42 plenary: bringing stakeholders together to address the challenges of artificial intelligence (June 3rd 2022)
    - IEC e-tech IEC and ISO work on artificial intelligence – Covering the entire AI ecosystem (May 20th 2022)
    - IEC news A governance framework for organizations deploying AI systems (Apr 29th 2022)
    - IEC news New report focuses on convergence of AI and Industrial IoT (Mar 10th 2022)
    - ISO innovation article on Information technology growth and the role of AI and associated AI standards (Jan 2022)
    - IEC e-tech Computational approaches for AI systems (Jan 25th 2022)
    - ISO news Enabling An AI-Ready Culture - SC 42's Novel MSS Approach (Nov 2021)
    - IEC e-tech Standards help address bias in artificial intelligence technologies (Nov 8th 2021)
    - IEC news Growing AI standards committee concludes plenary (Oct 22nd 2021)
    - IEC news IEC and ISO artificial intelligence plenary begins (Oct 22nd 2021)
    - ISO publication White Paper on Smart Manufacturing (Oct 2021)
    - RAPS Article Enabling the digital transformation of industry: The roles of AI, big data, analytics, and related data ecosystem (June 1st 2021)
        - IEC news International standards instill confidence in artificial intelligence technologies (July 22nd 2021)
    - IEC news IEC and ISO artificial intelligence committee broadens standards work programme (May 17th 2021)
    - IEC e-tech IEC and ISO publish over 130 emerging AI use cases (May 17th 2021)
    - IEC news IEC/ISO standards committee for artificial intelligence begins spring plenary (Apr 30th 2021)
    - IEC e-tech New standard to enhance trustworthiness of artificial intelligence systems (March 15th 2021)
    - ISO news article on Getting Big on Data (Nov 5th 2020)
    - IEC e-tech article on International standards committee for AI ecosystem expands into new areas (Sep 15th 2020)
    - IEC e-tech article on IEC and ISO publish TR which provides overview of big data framework and reference architecture (Aug 24th 2020)
    - IEC e-tech article on Achieving trustworthy AI with standards (June 8th 2020)
    - ISO news SC 42 virtual plenary as an example of standards innovation during COVID-19 (May 15th, 2020)
    - IEC news announcing the key outcomes of the 5th plenary and added focus on data ecosystem (May 7th, 2020)

- ▪ [IEC e-tech](#) article on SC 42's holistic ecosystem approach to AI standardization (Feb 2020)
- ▪ [IEC e-tech](#) article on New IEC and ISO Standard will enable big data adoption across industry sectors (Feb 15th 2020)
- ▪ [IEC e-tech](#) article on IEC and ISO AI committee (SC 42) expands programme of work (Jan 2020)
- ▪ [ISO focus](#) Nov/Dec 2019 magazine on AI and the SC 42 program of work (November 2019)
  - ▪ [ISO focus](#) landing page for edition including links to download PDF (above in English) in various languages and individual articles
- ▪ [IEC news](#) AI standards help accelerate digitalization of smart manufacturing (Dec 2019)
- ▪ [IEC news](#) announcing the key outcomes of the 4th plenary (Nov 11th, 2019)
- ▪ [IEC e-tech](#) article on Establishing trustworthiness is vital in our human-machine world (July 15th 2019)
- ▪ [IEC e-tech](#) article on Artificial intelligence and big data: a paradigm shift in healthcare (May 15th 2019)
- ▪ [IEC news](#) announcing the key outcomes of the 3rd plenary (April 23rd, 2019)
- ▪ [IEC news](#) announcing the start of the 3rd plenary (April 9th 2019)
- ▪ [ISO news](#) article (18th October 2018)
- ▪ [JTC 1 press committee](#) article (30th May 2018)
- ▪ Press Coverage Related to SC 42 Formation
  - ▪ [IEC e-tech](#) article (17th May 2018). Additional circulations
    - ▪ ISO [retweeted](#) the article (September 2018)
    - ▪ [Published](#) on ANSI (US National Body) website
    - ▪ [Published](#) on UNE (Spain National Body) website (September 2018)
    - ▪ [Published](#) on ILNAS (Luxemburg National Body) website (27th April 2018)
      - ▪ Note: not a direct reprint but used the photo
    - ▪ [Published](#) on Robotics Automation and News [Magazine](#)
  - ▪ [ANSI news](#) article on the formation of SC 42 (16th January 2018)
  - ▪ Introduction of SC 42 in the IEC MSB [White Paper](#) on Artificial Intelligence
- ▪ Press Coverage Related to SC 42 Participation at Key Industry and International Events
  - ▪ IEC Medium Publications
    - ▪ [IEC news](#) on How standardization can contribute to an international framework for AI (Oct 20th 2021)
    - ▪ [IEC news](#) Young Professionals learn about international standards for artificial intelligence (Oct 15th 2021)
    - ▪ [IEC blog](#) on Webinar on regulations and artificial intelligence technologies (Dec 10th 2020)
    - ▪ [IEC blog](#) on AI standards on the agenda at IOT Solutions World Congress (Dec 8th 2020)
    - ▪ [IEC blog](#) on IEC and ISO present AI standardization work during event by European Commission (Oct 28th 2020)
    - ▪ [IEC blog](#) on Trustworthiness is key to services and products using AI and IoT technologies (Mar 3rd, 2020)
    - ▪ [IEC blog](#) on AI standards on the agenda at IOT Solutions World Congress (Nov 21st 2019)
    - ▪ [IEC blog](#) on AI and IoT industry leaders to consider a digital trust framework at Berlin forum (May 15th 2019)
  - ▪ Global Standards Collaboration (GSC-22) 2019 Session on Artificial Intelligence
    - ▪ [ISO news](#) on Standards cooperation is key to making AI and smart cities a reality (April 4th 2019)
    - ▪ [IEC blog](#) on 22nd Global Standards Collaboration meeting discusses need for standards to accelerate AI technology innovation and adoption (April 3rd 2019)
  - ▪ JTC 1 Info
    - ▪ [JTC 1 info article](#) on IEC and ISO present on the AI Ecosystem Standardization Program at the European Commission Workshop (Oct 16th 2020)
  - ▪ Industrial Internet Consortium (IIC)
    - ▪ [IIC blog](#) on from IEC on Standards for AI on the Agenda at IoT Solutions World Congress
  - ▪ IoT Solutions World Congress (IoTSWC)
    - ▪ [IoTSWC promotion](#) of the IEC blog on AI standards on the agenda at IOT Solutions World Congress
- ▪ Other media coverage
  - ▪ Twitter
    - ▪ ISO (@[isostandards](#))
      - ▪ [Tweet Chat](#) on standards on Artificial Intelligence with Chair of SC 42 (25th October). Hashtags: #ISOchat #Standards4AI
    - ▪ IEC (@[IECStandards](#))
      - ▪ [Article](#) on New international standard will help organization boards and executive managers ask and answer key questions about AI technologies (12th February

2019)
- Article on International standards play a key role in addressing the ethical, technical, safety and security aspects (6th February 2019)
- Article and video on Standardization can help eliminate data bias in AI (4th February 2019)
- Article and video on Chair of SC 42 explains the growing influence of AI in Smart Manufacturing (4th February 2019)
- Article on Chair of SC 42 will lead a session at the CEN/CENELEC workshop on Trustworthy Artificial Intelligence (10th Aug 2018)
- IEC Medium Publications
  - IEC blog on New IEC and ISO Standard will enable big data adoption across industry sectors (Mar 30th, 2020)
  - IEC blog on Important questions around AI technologies in smart manufacturing (Jan 8th, 2020)
  - IEC blog on New IEC and ISO Standard will enable big data adoption across industry sectors (Mar 30th, 2020)
  - IEC blog on Trustworthiness is key to services and products using AI and IoT technologies (Mar 3rd, 2020)
  - IEC blog on How standards help people trust AI (Jan 15th, 2020)
  - IEC blog on Important questions around AI technologies in smart manufacturing (Jan 8th, 2020)
- IEC Medium Publications
  - IEC blog on Establishing trustworthiness is vital in our human-machine world (Sep 9th 2019)
  - IEC blog on The need for Big Data Standards (April 24th 2019)
  - IEC blog on New international standard will offer risk management framework for AI (March 18th 2019)
  - IEC blog on Helping organization boards and executives ask and answer key questions about AI technologies (Feb 12th 2019)
  - IEC e-tech article on AI in healthcare: keeping data safe and building trust (January 25th 2019)
  - IEC blog on Making AI safe (January 23rd 2019)
  - IEC e-tech article on Healthcare needs doctors and machines (December 10th, 2018)
  - IEC e-tech article on Eliminating data bias from machine learning systems (November 13th 2018)
  - IEC e-tech article on Smart homes are getting smarter (November 6th 2018)
  - IEC e-tech article on Machine learning is not a synonym for AI (October 17th 2018)
  - IEC e-tech article on Rethinking the healthcare ecosystem (reference to SC 42)
  - IEC e-tech article on Standards development organizations play key role in enabling remote daily life
- Publications referencing SC 42 work
  - IEC e-tech on Luxembourg highlights role of technical standardization in adoption of artificial intelligence (Sep 21st 2021)
  - ILNAS white paper on AI and technical standardization
  - IEC e-tech article on How Standards Australia contributes to the global artificial intelligence ecosystem (Jan 20th 2021)
- ISO Multimedia
  - ISO video interview with Chair of SC 42 on Standards and Artificial Intelligence (November 14th 2018)
    - Artificial Intelligence and the role of International Standards in the implementation of this technology
  - ISO video interview with Chair of SC 42 on Standards and Artificial Intelligence Continued (November 14th 2018)
    - Artificial Intelligence and easing the mind of end-users including AI trustworthiness, ethics and societal concerns
- IEC Multimedia
  - IEC video A governance framework for organizations deploying AI systems (June 7th 2022)
  - IEC video interview with SC 42 Chair, SC 42/WG 3 Connvenor and ISO/IEC 24368 Editor on AI Ethics (Nov 2019)
  - IEC video interview with Chair of SC 42 on How can we ensure AI is safe for Healthcare? (April 6th 2019)
  - IEC video interview with Chair of SC 42 on Is it too early to use machine learning for cybersecurity? (April 5th 2019)

- IEC [video interview](#) with Chair of SC 42 on To what extent is AI ready for standardization? (April 5th 2019)
- IEC [video interview](#) with Chair of SC 42 on What are some of the challenges you see with AI? (March 26th 2019)
- IEC [video interview](#) with Chair of SC 42 on How to Define Artificial Intelligence (March 26th 2019)
- IEC [video interview](#) with Chair of SC 42 on Why do we need standards for AI? (March 26th 2019)
- IEC [video interview](#) with Chair of SC 42 on Artificial Intelligence (February 4th 2019)
    - The growing influence of AI in Smart Manufacturing and the important role of standards
- IEC [video interview](#) with Chair of SC 42 on Artificial Intelligence (February 4th 2019)
    - Standardization can help eliminate data bias in AI

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Revision History

The following is the history of this document
- Initial version created by Wael William Diab (SC 42 Chair)
- Initial version reviewed and amended by Heather Benko (SC 42 Committee Manager)
- Submitted to SC 42 for review at the third plenary
- Concurrently submitted to JTC 1 for the November 2020 plenary based on the earlier deadlines and to SC 42 for review at its October plenary
- Concurrently submitted to JTC 1 for the November 2021 plenary based on the earlier deadlines and to SC 42 for review at its October plenary
- Updated by Wael (September 2022). Concurrently submitted to JTC 1 for the November 2022 plenary based on the earlier deadlines and to SC 42 for review at its October plenary