



# StandICT.eu 2023

ICT STANDARDISATION OBSERVATORY AND SUPPORT FACILITY IN EUROPE

## **FOLLOWING THE FELLOWS**

**IMPACT REPORT FROM  
FUNDED APPLICANTS TO  
THE STANDICT.EU 2023  
FELLOWSHIP PROGRAMME**

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### **NINTH OPEN CALL**

*Editors:*

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Gabriele Quattrocchi, Maria Giuffrida,  
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## Disclaimer

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## About StandICT.eu

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The StandICT.eu 2023 Coordination and Support Action project has received funding from the European Union's Horizon 2020 - Research and Innovation programme – under grant agreement no. 951972. The project is coordinated by [Trust-IT Srl](#) (IT), supported by its partners from the [Dublin City University](#) (IE) and [AUSTRALO](#) (ES).

## Acknowledgements

Our consortium, formed by **Trust-IT as the coordinator, Dublin City University and AUSTRALO Marketing Lab**, is grateful to all experts of our StandICT.eu 2023 community for their competent work. This booklet is a tangible reflection of your continuous dedication in ICT Standardisation - Thank you!

StandICT.eu 2023 would also like to thank Carlos López Rodríguez, StandICT.eu 2023 Project Officer & Policy Officer in ICT Standardisation at DG Connect European Commission, for his leadership and guidance. The **External Advisory Group (EAG)** provided invaluable support throughout the course of the project. Our appreciation for their effort and commitment goes to: **Ray Walshe (EAG Chair), Stefan Hallensbellen, Brian McAuliffe, Lindsay Frost, Jens Gayko, Karl Grun, Enrico Scarrone, Nuria de Lama, Tom de Block, Martin Chapman, Fergal Finn, Ana Garcia Robles, Stefan Weisgerber, Jochen Friedrich, Antonio Conte, Omar Dhaher, Barbora Greplova, and Stefano Nativi**. Finally, we would like to thank all our EUOS Technical Working Groups (European Observatory for ICT Standardisation) chairs and members for the investment in gathering expertise and producing outstanding landscape reports of the standardisation status across different ICT sectors. We warmly thank the TWG chairs guiding this work: **Lindsay Frost, Ismael Arribas, Matthias Pocs, Dimosthenis Kyriazis, Jeroen Broekhuijsen, Antonio Kung, Claude Baudoin, Joel Myers, Arkopaul Sarkar, Georgios, Karagiannis, Brian McAuliffe and Fiona Delaney**.





# ■ Foreword

The European Green Deal & the New Industrial Strategy for Europe call for a strong EU presence in international Standardisation development. The recent significant shifts in the geopolitical environment call for increasing the intensity of the EU presence in international standardisation committees. Building up a strong and sustainable pool of European Standardisation competent professionals who are ready to engage in European and International Standardisation is crucial. With this we are pleased to contribute to this

already engaged community through the “Following the Fellows” series Impact Reports, now in its 9th edition, proving a tangible testimony of the impact generated by European ICT experts working in collaboration with international Standardisation Developing Organisations (SDOs), thanks to the financial support provided through the StandICT.eu 2023 Fellowship Programme, as paramount part of the broader mission of the StandICT.eu 2023 Coordination and Support Action, funded by the European Commission’s H2020 Framework Programme.

The main purpose of these regular publications is to display the work carried out by our fellows and illustrate the demonstrable outcomes that excellent research can make to both society and to the economy (SMEs or industry at large). Therefore, we attempt to substantiate how each effort on which the fellows are engaged provides a potential benefit to society and contributes to the achievement of specific, desired, societal outcomes because of the ICT Standardisation efforts.

Special thanks in putting together these regular publications go to our External Advisory Group who provide high-level input to fine-tune the topics covered by the Open Calls, as well as the dedicated work of our External Pool of Evaluators who scrupulously vet the numerous applications received in response to this call, to our Partners, Dublin City University and AUSTRALO Marketing Lab key to the monitoring activities, our project officers at the European Commission of DG Connect for their relentless support and, of course, to our fellows for the strenuous months of work behind each activity and reporting to help deliver the results herein.

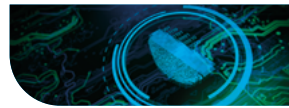
## **Silvana Muscella**

StandICT.eu 2023 Project Coordinator  
& CEO, Trust-IT Srl



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# ■ Introduction

This report marks the conclusive batch (9<sup>th</sup> Open Call) of the funded fellows under the StandICT.eu 2023 Programme. It shares perspectives of fellows that were selected and funded under this final Open Call.

Our team is delighted to showcase the ninth series of StandICT.eu 2023 fellowship stories of the funded experts detailing the addressed standards and landscapes, how these will fill in the identified gaps as well as impact the related stakeholders and society. The results obtained by our fellows fully respond to many of the objectives set out in the EU Strategy on Standardisation. They mainly prioritise and address standardisation needs in strategic ICT areas, enhance European leadership in global standards, support innovation and, lastly, improve the overall integrity of the European standardisation system.

Standards are at the core of the EU Single Market and global competitiveness and play a fundamental (even if sometimes invisible) function in our daily life. They can ensure the interoperability of products and services, reduce costs, improve safety, and foster innovation.

At the same time, standards act as powerful drivers for innovation and growth by helping researchers bring their innovation to the market and spread technological advances, as standards make their results transparent and ensure high quality. One of the key purposes of StandICT.eu 2023 is to support the activity of European ICT experts to contribute to the modernisation and consolidation of the European standardisation system as well as to the valorisation of their research outputs, with a view to efficiently respond to the EU's ambitions towards different thematic ICT areas, such as IoT, Edge and Clouds, which were the major focus of the 9<sup>th</sup> Open Call.

The primary purpose of this document is to share the results attained through the work carried out by the funded experts, and to showcase the most relevant outcomes, creating awareness of the potential impact and repercussions of such impact on commerce, industry, governmental policies and strategies and the society. This open call is the last one out of 9 StandICT.eu 2023 Open Calls. Each Open Call has a dedicated impact report demonstrating the key findings, contributions, and observations within StandICT.eu community, the European Commission Multi-Stakeholder Platform for ICT Standardisation, international and European Standard Developing Organisations, and even beyond, with all interested actors of our ever-growing StandICT.eu community.

In this funding batch, **in total 40 fellowships** have been granted, tackling the five policy areas as defined in the ICT Rolling plan 2023<sup>1</sup>:

- ▶ **Foundational drivers:** 8 fellowships focusing on cybersecurity (5 fellowships) and on e-identification / e-Privacy (3);
- ▶ **Key enablers and security:** 12 fellowships focusing on Artificial Intelligence (6 fellowships), 5G/6G (3), Cloud (2), open source (1);
- ▶ **Societal challenges:** 5 fellowships focusing digital product passport (1), circular economy (1), eHealth (1), e-learning and skills (1), justice (1);
- ▶ **Innovation for Digital Single Market:** 7 fellowships focusing on blockchain and distributed ledger technology (4), semantic interoperability (2) and building trust (1);
- ▶ **Sustainable growth:** 8 fellowships focusing on Smart Cities (2), Global standards governance (1), Intelligent transport systems (1), Smart grids (1), Robotics and autonomous systems (2), ICT Environmental impact (1).

1 <https://joinup.ec.europa.eu/collection/rolling-plan-ict-standardisation/rolling-plan-2023>

## Overview of the Open Call #9

The ninth StandICT.eu 2023 Open Call<sup>2</sup> was launched on the 15<sup>th</sup> of December 2022 and closed on the 15<sup>th</sup> of February 2023. The StandICT.eu Open Calls targeted European ICT standardisation experts contributing to the international SDOs, working groups and/or technical committees at any of the priority topics, as taken from the Rolling Plan for ICT Standardisation. This Open Call identified the areas of IoT, Cloud and Edge as priority areas, in line with the StandICT.eu 2023 EUOS engagement in providing two standards landscape reports<sup>3</sup> in these areas. The Open Call was, however, completely open for applications tackling a broad range of ICT domains (as encompassed in the ICT Rolling Plan for Standardisation) and treated as equally valid.

## Fellowship Profiles

This ninth Open Call totalled 70 eligible applications received out of which 41 were selected for funding, with an overall 374,000 Euro granted. Once more, this open call confirmed the excellent quality of most of the submitted proposals, marking a noticeably high average quality score (the minimum threshold to access funding was 7,20 score in a 1 to 10 scoring scale). Moreover, one grant application withdrawn as the funded fellow had reached the maximum admissible cap of 60K€ of funding received under StandICT.eu. The funded applications provided an extensive geographical coverage with 16 different EU or associated countries (with most representatives from France, Spain, and the United Kingdom). 12,5% of

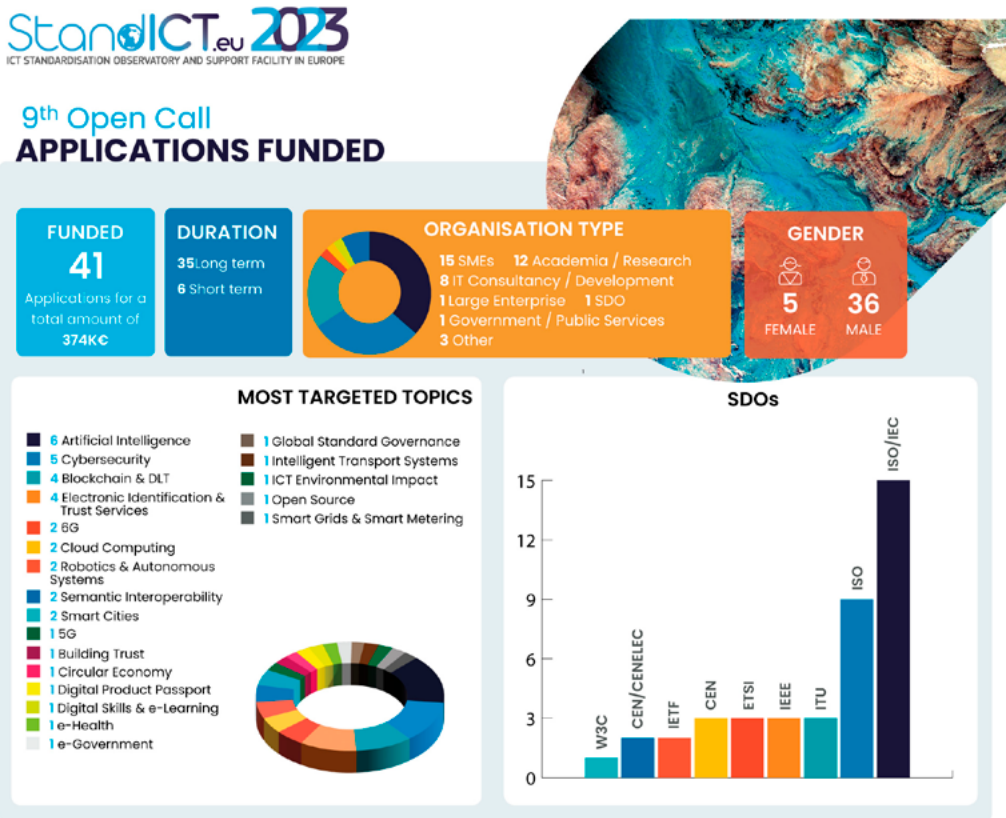


Figure 1 - Overview of the #9 Open Call key results and insights

<sup>2</sup> [www.standict.eu/standicteu-2023-9th-open-call](http://www.standict.eu/standicteu-2023-9th-open-call)

<sup>3</sup> [www.standict.eu/landscape-analysis-report/landscape-internet-things-iot-standards](http://www.standict.eu/landscape-analysis-report/landscape-internet-things-iot-standards)  
[www.standict.eu/landscape-analysis-report/landscape-edge-computing-standards](http://www.standict.eu/landscape-analysis-report/landscape-edge-computing-standards)

the funded experts were female, which is below the average rate of 20% of funded female experts across the StandICT.eu Programme.

The retained fellowships represented a satisfying balance across the key technologies, and with a wide spectrum of SDOs that will benefit of the competence and expertise of the applicants. As outlined in Figure 1, major part of the granted fellows has chosen their focus across a varied range of horizontal and vertical ICT areas; the most popular areas in this batch include artificial intelligence, cybersecurity, blockchain and DLT as well as e-Identification. This funding batch is marked by a great variety of vertical ICT areas covered by the fellowships, namely cloud computing and cloud federation that were the targeted areas of the announced call.

## Engaged SDOs, Organisations and European Projects

80% of the fellows' activity contribute to the activities of Committees or Working Groups operating in global SDOs, namely in ISO, IEC, ISO/IEC, ITU, IEEE, IETF, W3C while the remainder works with European Standardisation Organisations (ESOs), namely in ETSI, CEN, CEN/CENELEC. Finally, 20 European funded and innovation research projects (see Table 1) are related to the activities of the corresponding ninth Open Calls' fellows, with a focus on different horizontal and vertical technologies.

Table 1. Projects related to OC9 Fellowships

Project	ICT Area	Funding Programme	Related StandICT.eu Fellow
<b>CircThread</b>	Circular Economy	H2020	Rembrandt Koppelaar
<b>LeadingEdge</b>	Edge Computing	ChistERA	Leandro Navarro
<b>NetZeroCities</b>	SmartCities	H2020	Monika Heyder
<b>DIH HERO</b>	Healthcare robotics	H2020	Jan Veneman
<b>HARPOCRATES</b>	Federated Learning	HEurope	Nicolae Paladi
<b>GIFT</b>	Smart Energy / Grids	H2020	Olivier Genest
<b>SENDER</b>		H2020	
<b>MAESHA</b>		H2020	
<b>ENERGICA</b>		H2020	
<b>ENERSHARE</b>		HEurope	
<b>SCALE</b>		HEurope	
<b>IntNET</b>		HEurope	
<b>InterConnect</b>	HEurope	Amelie Gyrard	
<b>TRACE4EU</b>	e-Finance	HEurope	Markus Sadabello
<b>ActiVas</b>	eHealth	FEDER	João Manuel Leitão Quintas
<b>ORACIA</b>		AAL	
<b>TEF-Health</b>		Digital Europe Programme	



Project	ICT Area	Funding Programme	Related StandICT.eu Fellow
<b>5G-LOGINNOV</b>	5G	5G-PPP	Eusebiu Catana
<b>5GMETA</b>		H2020	
<b>TRIPS</b>	eHealth	H2020	Christian Galinski

At this point, we are delighted to share with you the insights from our granted fellows' work – and we truly hope that these results might encourage you get involved in our StandICT.eu community and to join our Fellowship Programme, moving now toward a brand new series of nine StandICT.eu 2026 Open Calls<sup>4</sup>, the European Observatory for ICT Standards (EUOS)<sup>5</sup> - via the Technical Working Groups (TWGs) delivering up-to-date landscape and gap analysis<sup>6</sup>, and finally the “EUOS Standards Academy”<sup>7</sup> with the ambitious objective to contribute to the training future experts in ICT Standardisation. Together we shape and reinforce the European and international ICT standardisation arena!

4 [www.standict.eu/standict.eu-2026-1st-open-call](http://www.standict.eu/standict.eu-2026-1st-open-call)

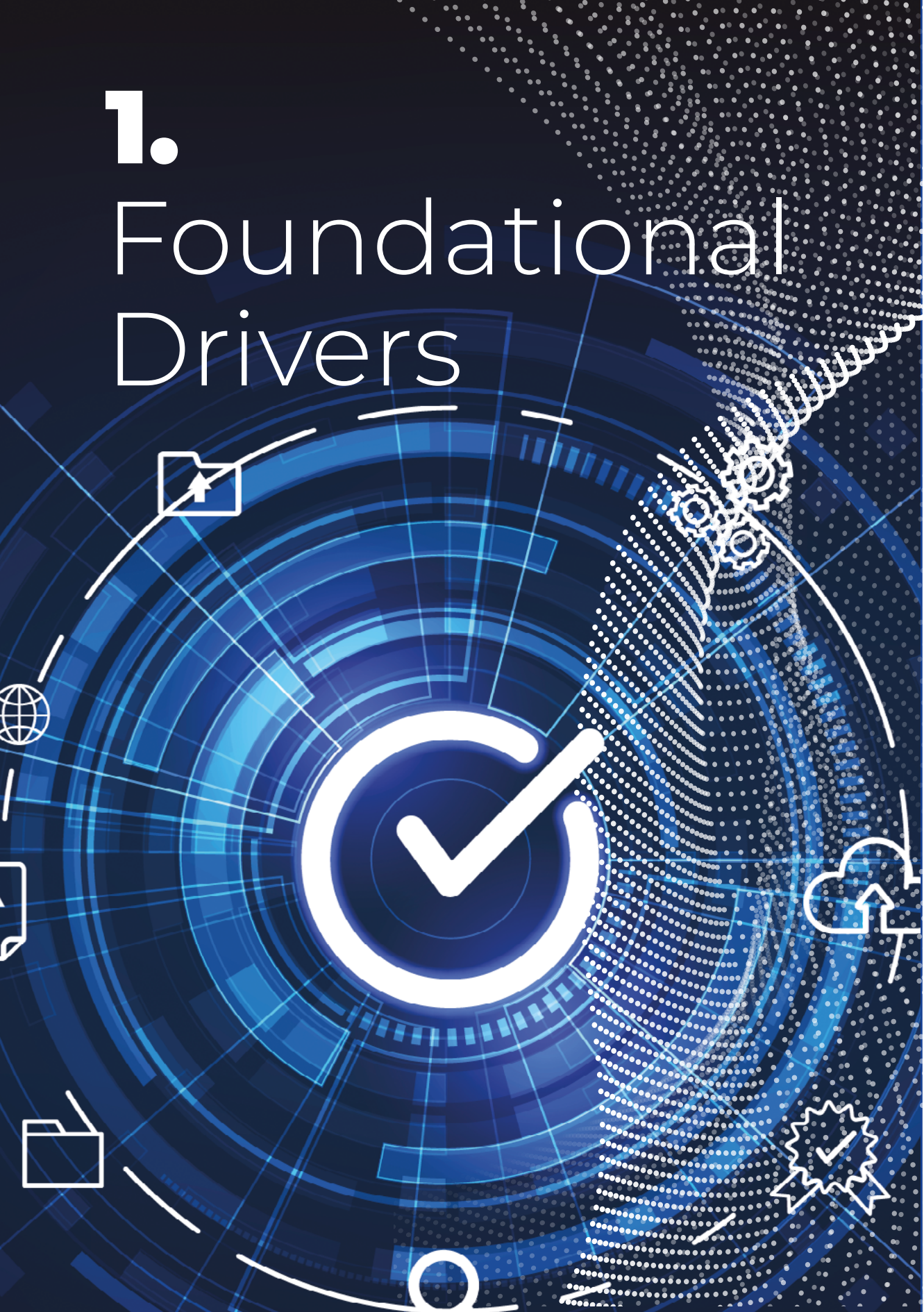
5 [www.standict.eu/euos](http://www.standict.eu/euos)

6 [www.standict.eu/landscape-analysis-reports](http://www.standict.eu/landscape-analysis-reports)

7 [www.standict.eu/euos-academy](http://www.standict.eu/euos-academy)

**1.**

# Foundational Drivers



# Trusted Cyber Threat Intelligence-Sharing framework “Trusted CTI-Sharing” - P3 Standard development



**David Montero**  
*Independent Expert*

Sector

Cybersecurity

Engaged SDOs, WGs and TCs



UNE CTN320/SC4 Cybersecurity  
ISO/IEC JTC1/SC 27/WG 4

## Role

President of UNE CTN320/SC4

## Addressed EU standardisation priorities and gaps

My fellowship contributes to the development of a new standard that is oriented towards the field of cybersecurity, specifically Cyber Threat Intelligence. From the point of view of the gap that currently exists in the related regulations, different working documents and very specific guidelines have been generated in Europe oriented towards the technical aspects of cyber threat intelligence, for example, the definition of the different intelligence sharing formats, but it has never been defined how this cyber threat intelligence should be shared and managed at the global level. This standard aims to address this current gap and improve interoperability in cyber threat intelligence (CTI) sharing between public and private companies; finally, it aims to provide better security alert management capabilities, using meta-alerts, alerts that summarise many threats and incidents to understand the overall threat landscape, provide better context awareness and improve existing cyber threat intelligence sharing capabilities through automation, while remaining GDPR compliant.

## Concerned ICT Standards and contribution to the related landscape

The development of this standard based on a Cyber Threat Intelligence Sharing Management System will cover a very relevant regulatory niche that will have an impact on the standardisation of threat intelligence sharing communities and ecosystems. This fellowship is the continuation of a fellowship project that I have started under a previous StandICT.eu grant, and it has supported developing the necessary framework for the generation of the management system and close the document of the standard.

Among the international standards linked to this standard are ISO/IEC 27001, ISO/IEC 27000, ISO/IEC 27002, ISO 31000, and ISO/IEC 27035.

## Impact

### Impact on SMEs

This future standard represents an evolution of the current documents generated by different entities in the field of CTI sharing, but oriented exclusively to the technical field, not to the management field, going on to see the CTI exchange system as a management system.

SMEs will benefit directly from the European adoption of this standard, since one of the main weaknesses in cybersecurity of this segment is the lack of trust and resources when



companies try to acquire quality intelligence elements at low cost. This standard will make it possible to standardise the creation of intelligence sharing communities, lowering costs, and improving the availability of intelligence elements.

### **Impact on Society**

The emergence of intelligence sharing communities and ecosystems, such as FIRST or CIRCL, have encouraged the exchange of threat intelligence between entities, using technological platforms such as MISP. CIRCL alone has more than 1,100 entities connected to the network to share intelligence, but other private and public intelligence-sharing communities have appeared throughout the world, which have been born from private initiatives, interest groups or sectoral initiatives.

The communities that currently exist in the market are directed by the entities that have led the initiative, but they do not have community governance and management mechanisms. The absence of measurement indicators, management, and validation controls, in addition to criteria for defining the participation of the entities in the ecosystem, causes a lack of security and trust on the part of the participating entities, and generates a failure to fully exploit the sharing capacity of the ecosystem.

The generation of this standard, that supports a management system for the exchange, will have a very important societal impact on the global and local communities and ecosystems for the exchange of threat intelligence, standardising the management and government of these communities.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Yes, I have contributed in the development of a new international standard related to Cyber Threat Intelligence.

### Have the standardisation activities in your project led to specific deliverables?

Yes, I have drafted a technical report on a development of a new standard.

### What future efforts or activities are still necessary for your area of application?

In this final phase, the necessary framework structure was created at the level of definitions, controls, risks, architecture, and indicators to generate the standard that it will be published for Trusted Architectures for the Sharing of Cyber Threat Intelligence.

### Online references related to the fellowship work

 [www.en.une.org/la-asociacion/sala-de-informacion-une/notas-de-prensa/une-publica-el-primer-estandar-mundial-sobre-intercambio-de-inteligencia-de-ciberamenazas/](http://www.en.une.org/la-asociacion/sala-de-informacion-une/notas-de-prensa/une-publica-el-primer-estandar-mundial-sobre-intercambio-de-inteligencia-de-ciberamenazas/)

# Contribution to e-identification and e-authentication at CEN/CLC/JTC 13 & ISO/IEC JTC1/SC 27 WG5's



**Christophe Stenuit**  
CEO, Viewconcept.be  
Belgium

## Sector

Cybersecurity  
e-Identification

## Engaged SDOs, WGs and TCs



CEN/CLC/JTC 13 WG5  
ISO/IEC JTC 1/SC 27 WG5

## Role

Editor

## Addressed EU standardisation priorities and gaps

This fellowship aims to positively influence the European market and its infrastructures by benefiting from international contributions (e.g. ISO/IEC) in the controlling of civil security and the protecting of e-identity and e-privacy. The proposed activity enhanced existing references and encouraged promoting the use of these references through adoption at the European market.

## Concerned ICT Standards and contribution to the related landscape

With this fellowship, I intend to contribute to a better harmonisation of e-identity and privacy protection standardisation support in Europe. With my engagement in two different WGs, I have contributed to ease the implementation of e-identity and e-privacy developments. The scope of this activity includes proposing/revising/amending/reviewing standards. Progress was made on the following ICT standards:

- ▶ ISO/IEC 24760-1 about identity management terminology and concepts
- ▶ ISO/IEC 24760-2 about identity management architecture
- ▶ ISO/IEC 24760-3 about identity management practices
- ▶ ISO/IEC 24760-4, about identity management and credentials, authenticators and authentication
- ▶ ISO/IEC 29146 about access management amendment
- ▶ ISO/IEC 29184 about online privacy notices and consent
- ▶ Integration of the referred standards with their amendments
- ▶ Adoption of the referred standards as prEN
- ▶ Furthermore, I continue supporting other standardisation activities in relation to, as part of the ISO JTC1 SC27 WG5:
  - ▶ AG5 on strategy
  - ▶ Development of threats associated with authentication and possible controls
  - ▶ Development of Data Privacy threats and Controls

- ▷ Analysis of identification and authentication processes
- ▷ And as part of the CEN/CLC/JTC 13/WG 5:
- ▷ Participation to a CEN CLC ETSI Coordination group on eIDAS
- ▷ Establishment of a Liaison Statement of ISO/IEC JTC 1/SC 27 WG 5 to CEN-CENELEC JTC13.

## Impact

### Impact on SMEs

SME are better aware of risks and of controls required in IT and information protection. Recent EU GDPR, eIDA2 regulations and NIS directives developments impose a different view on IT risks, information security, data privacy protection and identity management controls, and by this a different awareness of the consequences that may fall improper compliance to good practices. Good standard references help confidence establishment and maturity improvement in matter yesterday far from SMEs' concerns.

### Impact on Society

My contributions help to foster the societal sector from three stand points:

1. Firstly, it fosters secure societies; by protecting freedom and security of Europe and its citizens: Supporting standards on e-identity and e-privacy information management ensures identity information lifecycle, identification, bound proofed identity information and authentication of citizen and societies are in place before authorized accesses to services is provided without compromising their privacy.
2. Secondly, it endorses cybersecurity, network, and identity information security; Standards on reference architectures around e-identity and e-privacy management ensure information infrastructure has the required controls in place to protect citizen and societies while accessing and using provided services.
3. Thirdly, it improves e-Privacy protection; data protection good practice ensures any risk on identity information is mitigated during the processing of the information.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Part of the objectives of the project is to support systematic reviews, revisions, and amendments of existing work items, and another is to support the adoption and the publicity of these work items at EU market, and by this guaranteeing the sustainability of existing references in a changing world.

## Have the standardisation activities in your project led to specific deliverables?

Yes, I have drafted technical reports on common terminology, on recommendations for new and revised standards, on reference material and on development of a new standard.

## What future efforts or activities are still necessary for your area of application?

Most developed texts are achieving maturity. The referred work items are being more and more used or referred in the industry. Some efforts are still required to achieve publications. This could take up to 18 or 24 months. This activity will continue over 2023, and achieve a publication during 2023 and 2024.

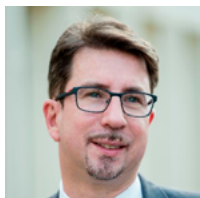
## Online references related to the fellowship work

[https://standards.cenelec.eu/dyn/www/f?p=205:7:0:::FSP\\_ORG\\_ID:2307986&cs=1BFE244DDA2A68D1B5C93795034A8DD05](https://standards.cenelec.eu/dyn/www/f?p=205:7:0:::FSP_ORG_ID:2307986&cs=1BFE244DDA2A68D1B5C93795034A8DD05)

[www.iso.org/committee/45306.html](http://www.iso.org/committee/45306.html)



# Enhancing coordination between AI&IoT focussed Cybersecurity & Privacy standards with SC27 AhG's



## **François Lorek**

*Partner and Expert in cybersecurity, TRAX Solutions France*

### Sector

Cybersecurity

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1 SC27  
ISO/IEC JTC1 SC40 IT  
ISO/IEC JTC1 SC41  
ISO/IEC JTC1 SC42  
CEN/CENELEC JTC21  
CEN/CENELEC JTC13

## Role

Convenor of SC27 Adhoc Group 3 Security and privacy in AI and Big Data (BD)  
Convenor support of SC27 Adhoc Group 2 Security and privacy in IoT and Digital Twin  
Convenor support of WG4 Security Controls & Services  
HoD France CEN/CENELEC JTC21

## Addressed EU standardisation priorities and gaps

With this fellowship, I contributed to the coordination and synchronisation between technical committees and working groups in one of the biggest challenges to face with lots of meetings on various interdependent topics (cybersecurity & privacy, artificial intelligence) with several initiatives with different schedules at different international, European and national scales. Priorities are given mostly by European Commission, the SDO's directives, the market's expectations, and the maturity of consensus between experts. Hopefully, lots of experts (especially European) are taking part to several cross work across TC's, SC's and WG's especially between AI (CEN/CENELEC JTC 21 & ISO/IEC JTC1 SC42), Cybersecurity and Privacy (CEN/CENELEC JTC13 & ISO/IEC JTC1 SC27). At SC27 level, it is the reason of the establishment of Adhoc Group3 to ensure coordination on Artificial Intelligence (AI) and Big Data (BD) related security and privacy projects.

## Concerned ICT Standards and contribution to the related landscape

This fellowship support allows to take part to all meetings concerning Cybersecurity & Privacy as well as Artificial Intelligence, whilst being able to keep delivering standard based consulting especially for SME's which need to comply for ISO 27001 certifications mostly. It also allows me to take part to some important workshops which last sometimes a full day.

## Impact

### **Impact on SMEs**

Many small and mediums companies are about to be impacted by Cybersecurity and Privacy standards or Artificial Intelligence or they are concerned by Cybersecurity & Privacy within

Artificial Intelligence with a need to make their market and potential customers confident, especially in the context of forthcoming regulations at European level as well as European standardisation requests to be received by SDO's.

### **Impact on Society**

As per its business plan, ISO/IEC JTC1 SC27 states to contribute with 23 standards to the following Sustainable Development Goals (SDG) of the United Nations related to: good health and well-being, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production as well as peace, justice and strong institutions.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Within SC27 WG4, there are currently 68 projects listed within SC27 WG4 ISO Projects including 45 published standards, 11 PWIs on going (one on Security and Privacy for IoT and one for Big Data Security and Privacy), 3 projects in Proposal phase 1 project in Preparatory phase (27090, 27404, and 5181), 1 project in Committee phase (CD : 27035-4), 4 projects in enquiry phase (DIS : 27402, 27403, 27033-7, 27031), 3 projects in approval phase (FDIS : 27071, 27040, and 24392), 4 published standards (27036-3, 27035-1, 27035-2 and 27032).

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have contributed to several International Standards, Technical Reports and Technical Specifications.

### What future efforts or activities are still necessary for your area of application?

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Being convenor or vice-convenor of Working Group is a "never-ending" work but one focus is to support editors to ensure their project might progress following their timeline but when mature enough and another focus on ensuring coordination across TC's/SCs to "synchronise" projects and experts especially for Cybersecurity & Privacy (SC27/AHG3) and AI (SC42/AHG4)

### Online references related to the fellowship work

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 [www.iso.org/committee/5013818.html](http://www.iso.org/committee/5013818.html)

 [www.iso.org/committee/6483279.html](http://www.iso.org/committee/6483279.html)

 [www.iso.org/committee/6794475.html](http://www.iso.org/committee/6794475.html)

# Development of the Guidelines on Sectoral Cybersecurity Assessment (EN Project) - next phase



**Elzbieta Andrukiewicz**

*Project Leader, National Institute of Telecommunications  
Poland*

Sector

Cybersecurity

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC27  
ISO/IEC JTC1/SC27/WG3  
CEN/CLC/JTC13

## Role

Project Leader

## Addressed EU standardisation priorities and gaps

More EU regulatory acts address the certification issue (NIS 2 Directive, Cyber Resilience Act, RED, to name a few). In response to growing needs of various cybersecurity certification schemes emerging under the cybersecurity certification framework, a unified approach to assurance, both in horizontal and vertical (i.e., sectoral) schemes is essential.

To achieve time and cost-effectiveness of the framework of cybersecurity certification, a unified approach to defining conditions for re-using the evaluation results obtained under various certification schemes is the area of standardisation. This gap is covered by the proposal which includes practical guidelines for preparation and then the drafting the cybersecurity certification schemes under the framework given in the EU Regulation Cybersecurity Act. However, it can be applied to any certification scheme as it provides the sound basis to apply security and assurance requirements in consistent way.

## Concerned ICT Standards and contribution to the related landscape

The standardisation project where I contribute with this fellowship has reached the public i.e., Enquiry stage (CEN/CLC JTC13/W3 N314).

The project offers a concept of internal risk, security, assurance, and attack potential reference levels. If commonly used, they will support consistency in the definition of risk, cybersecurity, and assurance. The methodology provides the option to integrate sectoral, product, process and potentially also ISMS-based cybersecurity certification schemes and it can support and integrate ICT product certification schemes, beyond Common Criteria or other ISO/IEC 15408-based schemes. The risk information obtained by an ISO/IEC 27005-conformant approach at sectoral level can be transferred to ISO/IEC 15408-based environments. By applying two different standards the risk-based definition of cybersecurity and assurance requirements can be supported.

## Impact

### Impact on SMEs

The landscape, the CSA deals with, encompasses schemes that are currently in operation

e.g., SOG-IS MRA, or set of schemes dedicated to the telecommunication market, and offered by the GSMA, and new potential candidate schemes for key industry verticals such as IoT, cloud, communications, payments, automotive, and more. If cybersecurity certification is mandatory as foreseen in the Cyber Resilience Act for critical products these certification schemes will have impact on SMEs which reflect their presence in the market of these specific product categories.

### **Impact on Society**

One of the objectives of CSA is to increase confidence in cybersecurity. It relates both to the market and society. In long term perspective, a mark or a label on certified products would indicate the product has been evaluated against specified cybersecurity requirements and its robustness to the attackers with specified skills and resources has been verified. Such labels would play similar roles as the safety-dedicated labels currently serve the society.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Yes, I contribute to developing a standardisation item CEN/CLC JTC13/WG3 N314 entering the ballot phase.

### Have the standardisation activities in your project led to specific deliverables?

The project has been upgraded to the next stage i.e., 5-month Enquiry ballot of Member States which is expected to start Autumn 2023.

### What future efforts or activities are still necessary for your area of application?

It would be necessary to address all comments submitted during the ballot and prepare the text for the Final ballot of the European Standard draft (prEN).

### Online references related to the fellowship work

 [www.iso.org/committee/45306.html](http://www.iso.org/committee/45306.html)

 [www.cenelec.eu/areas-of-work/cenelec-sectors/digital-society-cenelec/cybersecurity-and-data-protection/](http://www.cenelec.eu/areas-of-work/cenelec-sectors/digital-society-cenelec/cybersecurity-and-data-protection/)



# Support of ETSI TC Cyber Work Item on Design practices against technology enabled coercive control



## **Alex Cadzow**

Senior Cybersecurity and Human Factor Researcher, Cadzow Communications Consulting Ltd.

United Kingdom

## Sector

Cybersecurity

## Engaged SDOs, WGs and TCs



ETSI TC CYBER

## Role

Expert Member

## Addressed EU standardisation priorities and gaps

This in-development document is an informative ETSI Guide that recommends initial design practices to minimise the potential of coercive control using consumer Internet of Things (IoT) devices. The diversity and proliferation of consumer IoT devices provide new mechanisms that attackers might misuse, and this is a risk that must be addressed by the industry.

The in-development document provides emerging design practices through examples and explanatory text for organisations involved in developing and manufacturing Consumer IoT devices and associated services. The intent of the guide is to identify design practices to minimize potential misuse of Consumer IoT devices and associated services for coercive control whilst not limiting the intended functionality of the device by the user. Although this guide is focused on design practices for Consumer IoT devices, the guidance also applies to multiple other types of smart technologies including but not limited to Smart TVs, alarm systems, stereos etc.

## Concerned ICT Standards and contribution to the related landscape

With my fellowship, I contribute to the ETSI Cyber work item on ETSI EG 203 936 "*Design Practices to Mitigate Consumer IoT-Enabled Coercive Control*" renamed from "*Design practices against technology-enabled coercive control*" builds upon previous work conducted in ETSI TC Cyber. The work in question includes a clause 'on the consideration of domestic abuse in the consumer IoT environment' as part of 'ETSI TR 103 621 Guide to Cyber Security for Consumer IoT'. It is anticipated this work will help companies consider what measures they might need to take to meet stronger requirements for online safety which have recently come to the fore with recently passed and upcoming legislative acts within the EU and globally.

These include a non-exhaustive list of the; UK Online Safety Bill, intended to improve internet safety; the EU Digital Services Act, to modernise the e-Commerce Directive regarding illegal content, transparent advertising, and disinformation; the Australian Online Safety Act 2021, which expands protections against online harm, to keep pace with abusive behaviour and toxic content; France's Law no. 2022-300 (through the publication of the Decree no. 2022-1212), intended to protect minors and make it easier for parents to block online access.

As this work item is an ETSI Guide (EG) it is used for guidance to ETSI in general on the

handling of specific technical standardisation activities. In this case, the design practices guide the development of measures that allow some degree of mitigation in both the devices themselves and in the services that the devices support against coercive control. When this work item has been finalised, it will be submitted to the whole ETSI membership for approval and if approved it will then be published.

## Impact

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### **Impact on SMEs**

This guide is intended to aid SMEs who design, develop, and sell consumer IoT devices by providing them with the information when developing their product to minimise the risk of it being misused to inflict coercive control.

### **Impact on Society**

ETSI hopes with the publication of this guide awareness of coercive control will lead to measures being implemented to prevent or minimise its impact.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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As an ETSI guide, it is only an informative document, not a normative standard but if the legislative and regulatory landscape changes this guide can serve as a basis for a harmonised standard in the future.

## Have the standardisation activities in your project led to specific deliverables?

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The target date for the final publication of this ETSI guide is April 2024.

## What future efforts or activities are still necessary for your area of application?

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Additional support would be useful in aiding in the completion and the final publication of this work.

## Online references related to the fellowship work

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 [https://docbox.etsi.org/cyber/CYBER/Open/Latest\\_Drafts/DRAFT\\_EG\\_203\\_936\\_Design\\_Practices\\_to\\_Mitigate\\_Consumer\\_IoT-Enab.pdf](https://docbox.etsi.org/cyber/CYBER/Open/Latest_Drafts/DRAFT_EG_203_936_Design_Practices_to_Mitigate_Consumer_IoT-Enab.pdf)

# Sharing Interoperable Cybersecurity Playbooks Across EU Authorities Entrusted with Cybersecurity



**Vasileios Mavroeidis**

*Cybersecurity Scientist, University of Oslo*

Sector

Cybersecurity

Engaged SDOs, WGs and TCs



OASIS Collaborative Automated Course of Action Operations (CACAO) for Cybersecurity Technical Committee

## Role

Standards Technical Committee Chair and Secretary

## Addressed EU standardisation priorities and gaps

With this fellowship, I have contributed to the development of Collaborative Automated Course of Action Operations (CACAO) framework, which:

- ▶ allows exchanging and sharing cybersecurity operations playbooks using a standardised format.
- ▶ mitigates vendor lock-in pertinent to utilizing proprietary playbook formats and their associated execution technologies (i.e. orchestrators/SOAR).
- ▶ will permit the establishment of interoperable European knowledge bases of playbooks where trusted groups and actors can share their tactics, techniques and procedures, including their tradecraft.
- ▶ is designed to enable cross-functional, cross-organizational, and cross-border cybersecurity operations.
- ▶ enables coordinated/collaborative incident response, a capacity that is deemed necessary for a cyber-secure EU. For example, see Commission Recommendation on Coordinated Response to Large Scale Cybersecurity Incidents and Crises (C(2017) 6100 final) and its annex (Blueprint for Coordinated response to large-scale cross-border cybersecurity incidents and crises).
- ▶ is designed to be both for human and machine consumption/execution.
- ▶ supports security orchestration and automation; it can support creating a path to automation.

## Concerned ICT Standards and contribution to the related landscape

This fellowship supported the development of the OASIS Collaborative Automated Course of Action Operations (CACAO) for Cybersecurity specification. My role, aside from contributing directly to the standard and serving as the secretary of the technical committee (TC), is to be the liaison between the OASIS TC and different EU-funded projects that aim to utilize CACAO playbooks. Consequently, support for adoption and continuous feedback that result in incremental updates to the specification is part of the liaison; per the EU requirements pertinent to cybersecurity playbooks, including their exchange.

## Impact

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### **Impact on SMEs**

Elucidating the commercial perspective, developing a common language and schema for creating and exchanging cybersecurity playbooks creates a market for developing CACAO-oriented tools, including marketplaces and services pertinent to playbooks. On the other hand, from a cybersecurity perspective, a standard playbook format can comprise high-level guidelines and support SMEs with their cybersecurity and privacy approaches and methodologies.

### **Impact on Society**

The use of CACAO will enhance the cybersecurity capability of authorities entrusted with cybersecurity, OES, and SMEs, and to perform joint/collaborative incident response and exchange knowledge using a common interoperable approach, also in support of the implementation of NIS2 that requires a high common level of cybersecurity across the European Union and collaboration among member states. The use of CACAO will enhance cybersecurity operations with decreased detection and response times and, as a result, minimize the impact a cyber-attack can have on organisations.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, with my active participation in the working sessions, I contributed directly to the development of the standard.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have drafted technical specifications.

### What future efforts or activities are still necessary for your area of application?

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The CACAO standard is in a mature state. The next step is developing tools that use CACAO and receive feedback on the specification.

### Online references related to the fellowship work

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 <https://github.com/cyentific-rni/cacao-json-schemas>



# Advance extensible finger minutiae data standard ISO/IEC 39794-2



## **Dr. Robert Mueller**

*Consultant, Dr. Robert Mueller IT Consulting  
Germany*

### Sector

e-Identification

Engaged SDOs, WGs and TCs



ISO/IEC SC37

### Role

Editor and expert contributor to ISO/IEC 39794-2

### Addressed EU standardisation priorities and gaps

The data format and compliance standards developed in ISO/IEC SC37 WG3 are used in Europe and world-wide for storing and transferring biometric data. Standardised formats enable interoperability across countries and industrial organisations. The currently published standards from ISO/IEC 19794 series have several flaws with respect to forward and backward compatibility as well as XML and ASN.1 compliance. SC37 therefore decided to develop the ISO/IEC 39794 series specifying extensible formats that are future proof. Part 2 specifically covers finger minutiae as one of the most prominent biometric data formats. With this fellowship, I contribute actively to this work.

### Concerned ICT Standards and contribution to the related landscape

This is a continuation of an ongoing activity funded by my previous StandICT.eu fellowships. The ISO/IEC 39794 series of standards specify an extensible format for storage and exchange of biometric data. This series complements and replaces the widespread ISO/IEC 19794 series of inter-industry standards. ISO/IEC 39794-2 covers fingerprint minutiae and is designed for various applications including government ID. The standard is currently at DIS stage and needs to be advanced to become published in the timeline of ISO business plan. Target is publication as International Standard in Q4/2023. This project is a continuation of the development of ISO/IEC 39794-2 successfully progressed through 2022 and supported by StandICT.eu fellowship programme.

### Impact

#### **Impact on SMEs**

The standard ISO/IEC 39794-2 developed during this project enables interoperability for biometric solutions. This is of particular importance to SMEs delivering only one component to such a solution like e.g., the fingerprint algorithm or biometric capture device. Larger corporations typically deliver the entire solution and may use proprietary data formats which is not possible for SMEs. Advancing the standard means being able to replace components without the need to switch entirely to a different (large scale) provider.

#### **Impact on Society**

Biometric data of citizens is stored in machine readable travel documents like passports and in other devices. The interoperability between different vendors and industrial groups achieved with this data format standard eventually benefits the end user. It allows transparency and

enables cooperation between different entities from academic, governmental, and industrial sectors.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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This project has not led to new work item proposals, but during the development, some errors in other published standards have been identified and revisions launched including ISO/IEC 39794-1 framework.

### Have the standardisation activities in your project led to specific deliverables?

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Yes. ISO/IEC 39794-2 DIS has been developed plus a reference implementation.

### What future efforts or activities are still necessary for your area of application?

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The document ISO/IEC 39794-2 should be self-contained and include the on-card format for finger minutiae with all details as specified in ISO/IEC 19794-2. An amendment to ISO/IEC 39794-2 is required to cover some aspects of the on-card format that were not included in the current publication.

### Online references related to the fellowship work

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 [www.iso.org/committee/313770.html](http://www.iso.org/committee/313770.html)

 [www.iso.org/standard/72153.html](http://www.iso.org/standard/72153.html)

# Continue chairing the W3C RDF Dataset Canonicalization and Hash Working Group



**Markus Sadabello**

CTO, Danube Tech GmbH  
Germany

Sector

Identity Management and Anonymisation

## Engaged SDOs, WGs and TCs



W3C RDF Dataset Canonicalization and Hash Working Group

## Role

Chair

## Addressed EU standardisation priorities and gaps

This technology is a core building block of the growing Self-Sovereign Identity (SSI) ecosystem, with many companies and governments investing in it. It is closely connected to Verifiable Credentials (VCs).

These technologies are used by the “*European Self-Sovereign Identity*” (ESSIF) project, which is part of the “*European Blockchain Services Infrastructure*” (EBSI). ESSIF is aimed at building next-generation digital identity infrastructure that has European values built-in. Completing the deliverables of the RDF Dataset Canonicalization and Hash Working Group will be a requirement for being able to advance ESSIF into a production service. More generally speaking, the ability to canonicalise and hash an RDF dataset is important for being able to establish security, authenticity, provenance, and trust of that data.

The current gap in the relevant ICT standards is the fact that Verifiable Credentials (and other RDF-based data) by themselves only define a data model, but no way of securing it with signatures or other types of proofs. Even though this step has already been implemented in various ways by many companies and projects, it has not actually been standardised yet (which is unfortunately something that many developers are not even aware of). That’s where the work of the RDF Dataset Canonicalization and Hash WG plays an important role, since the ability to canonicalise and hash data is a prerequisite for signing it or attaching other proofs, and having a standard for doing this is very important. Besides EBSI and ESSIF, GAIA-X also benefit from this work since its vision of a secure and trusted data infrastructure for Europe also requires the ability to attach proofs to RDF datasets.

## Concerned ICT Standards and contribution to the related landscape

The deliverables of the W3C RDF Dataset Canonicalization and Hash Working Group are related to many other standards that are either already completed or are still being worked on. Some of those other standards include Verifiable Credentials Data Model 1.0, VC HTTP API, Presentation Exchange, Self-Issued OpenID Connect Provider v2.0, Well Known DID Configuration, DIDComm Messaging, and others. These technical building blocks are used by EBSI/ESSIF and various members of the growing European Self-Sovereign Identity ecosystem. They are also used by GAIA-X, another major European initiative. It is also noteworthy to point out that another W3C Working Group for Verifiable Credentials Data Model 2.0 is progressing well, and that the deliverables of that WG will depend on deliverables of the activity in this Fellowship Project. Besides Verifiable Credentials, other major communities that will benefit

from this work are Linked Data Spaces, and the broader Semantic Web movement, since they heavily use RDF and various related technologies.

## Impact

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### Impact on SMEs

Many European SMEs are currently working on decentralised identity technologies. The work of the W3C RDF Dataset Canonicalization and Hash Working Group impacts the technologies they typically use, including Decentralized Identifiers (DIDs), Verifiable Credentials (VCs), and others. Several of these SMEs have received European grants as well, e.g. through the NGI ESSIF-Lab or NGI TRUSTCHAIN programs.

### Impact on Society

The work is relatively low-level and not something that end-users would experience directly, however, RDF Canonicalization is an important prerequisite for high-level functionality such as the ability to apply cryptographic hashing and signing operations to RDF data, which in turn is useful for efforts to build a more secure and trustworthy web, as well as enabling various digital identity technologies such as Verifiable Credentials.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, I have supporting completing the deliverables of the RDF Dataset Canonicalization and Hash Working Group providing technical specifications.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have drafted technical specifications.

## What future efforts or activities are still necessary for your area of application?

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The specification is almost complete at this point, only a few small editorial changes and administrative steps are needed. We expect that we will vote on this specification during the September 2023 W3C Technical Plenary and Advisory Committee (TPAC) meeting.

## Online references related to the fellowship work

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 [www.w3.org/services/meeting-minutes?channel=rch&num=200](http://www.w3.org/services/meeting-minutes?channel=rch&num=200)

 <https://w3c.github.io/rdf-canon/tests/>

 <https://github.com/w3c/rdf-canon/wiki/List-of-available-implementations>



# European Requirements for Face Biometric Products



**Raul Sanchez-Reillo**

*Professor, University of Carlos III De Madrid  
Spain*

## Sector

e-Identification

## Engaged SDOs, WGs and TCs



CEN TC224

## Role

Contributor and Standard Editor

## Addressed EU standardisation priorities and gaps

The standard here proposed will help service providers and Administrations in defining their own requirements. Also, it will reduce the need of multiple evaluations from manufacturers.

There have been previous works that are being used as the basis for this work, but when coming to the world of biometrics, and in particular face recognition, some important gaps are detected:

- ▶ Current technical standards are typically generic, covering all biometric modalities, but not going into the specific needs of a certain biometric modality (e.g., face recognition).
- ▶ In international standards (i.e., ISO/IEC), the definition of passing criteria is really challenging, as the impact is worldwide, and many local interest and needs do not allow them to be defined.
- ▶ Industry in the biometric sector is not used to certify their products, but only to carry self-assessments, which some service providers or Administrations do not consider as a guarantee.
- ▶ The few initiatives currently available for certifying these products, have been developed independently, without considering a potential interoperability. The good news is that they do not differ too much among each other, and they can even be considered complementary among each other.

Within CEN/TC 224 WG18, the above-mentioned PWIs were approved, and now the target is to address the following challenges:

- ▶ Generate European standards or Technical Specifications, with the specifications and criteria.
- ▶ Generate European standards or Technical Specification, with the evaluation methodology and criteria.

Obviously, these challenges will be accomplished after several years, but within this fellowship, the work will be focussed in achieving a first full draft of each of the PWIs launched. The work will cover all main aspects required for a reliable biometric facial recognition, such as Performance, Conformance, Quality and Presentation Attack Detection (PAD).

## Concerned ICT Standards and contribution to the related landscape

Both industry and society require to have a guarantee that the products they are building/using, conform to certain levels of service/quality/robustness. This assure the Society the use of reliable products, building trust in them, and industry benefit from manufacturing products that will be demanded by society. My previous StandICT.eu OC#8 fellowship entitled "*ConformityAssessment*

of *Biometric Solutions*" was covered the creation of 4 WDs for the definition of conformity assessment mechanisms that will lead, in the future, to the creation of a certification scheme for biometric products. These 4 WDs are being prepared once the relevant PWI proposals were approved in CEN/TC 224 and assigned to be developed in CEN/TC 224/WG 18. During these last months, it has been noted the need of extending the content, as to include more tests and more application profiles, from the remote identification, to even Border Control. Also, it is expected to cover the use of facial recognition for identity proofing in the scope of the revision of eIDAS (also known as eIDAS2), considering the very recently published ARF.

Therefore, this fellowship focus to increase the effort to be applied, as to add application profiles, increasing the number of tests (and defining them), as required by those application profiles. All this work will be done targeting a wide consensus and compatibility among the currently existing local initiatives.

## Impact

### Impact on SMEs

This fellowship's contributions provide a solution in the field of electronic identification, as is based on the identification of users through biometric means. Many final solution integrators are SMEs, and they are the ones having to convince the final customer with the benefits of using their products. This is typically a challenge of these SMEs, compared to multinational enterprises. This certification scheme will allow SMEs to provide the convincing certification, to all different customers, through a single evaluation, closing the gap with big enterprises, and improving their market ratio.

### Impact on Society

When these requirements are fulfilled, as well as the testing methods and application profiles, society will benefit for being able to distinguish between those products that are robust and accurate (i.e., those having passed those tests), and those products that may not have such guarantees (i.e., those that did not went through a certification scheme following the defined requirements). In other words, society will benefit from having better, safer, and more accurate face recognition products.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

The work is currently in Preliminary Work Item status, waiting for achieving a mature state enough to launch the New Project on standardising the face recognition products.

## Have the standardisation activities in your project led to specific deliverables?

Currently a 4<sup>th</sup> version of a Working Draft has been circulated among WG18 members. It is expected that in less than one year, the New Project will be launched, and in 2 more years, the standard will be published.

## What future efforts or activities are still necessary for your area of application?

There is a need for, at least, a couple of more drafting cycles to reach a status mature enough to start the New Project.

## Online references related to the fellowship work

📄 CEN TC224 Workplan: [https://standards.cencenelec.eu/dyn/www/f?p=205:22:0:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:6205,25&cs=1BEC25E62B2D3FAE470A24A21A7315A0B](https://standards.cencenelec.eu/dyn/www/f?p=205:22:0:::FSP_ORG_ID,FSP_LANG_ID:6205,25&cs=1BEC25E62B2D3FAE470A24A21A7315A0B)

📄 CEN TC224 WG18 Workplan: [https://standards.cencenelec.eu/dyn/www/f?p=205:22:0:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:6205,25&cs=1BEC25E62B2D3FAE470A24A21A7315A0B](https://standards.cencenelec.eu/dyn/www/f?p=205:22:0:::FSP_ORG_ID,FSP_LANG_ID:6205,25&cs=1BEC25E62B2D3FAE470A24A21A7315A0B)

# 2. Key Enablers and Security

The background is a complex digital landscape. It features glowing blue and green circuit traces, binary code (0s and 1s) scattered throughout, and a prominent, glowing blue fingerprint scan pattern on the right side. Several concentric blue arcs are visible on the left, suggesting a circular interface or data flow. The overall aesthetic is high-tech and secure.



# Standardization works in TC ISO/IEC JTC 1 SC 42 of Artificial Intelligence: WG-3 and WG-4



## **Ramiro Bueno Martínez**

*Standardization Expert in Artificial Intelligence and Electronic Design, UNE / COITT*

*Spain*

### Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



ISO /IEC JTC1 SC 42  
ISO /IEC JTC1 SC 42  
ISO /IEC JTC1 SC 42.  
UNE CTN71 SC 42

## Role

Expert

## Addressed EU standardisation priorities and gaps

As Telecommunication Engineer, Consultant and Researcher, I try to provide support to technical issues and working methods. As part of this fellowship, my aim has been to make more consistent the technical specifications and technical reports on AI systems, while considering societal and professional concerns related with the development of this emerging technology. With my work, I want to address the question related with liability of public administrations, producers of manufacturers of technology over consumers and final clients and transparency issues or reliability of systems (controllability, oversight). As a part of this fellowship, I participated in the specific WG meetings and collaborating as expert technical contributor in the redaction of standardisation projects.

Also, I collaborate as normative expert with UNE / Spanish National Body of Standardisation representing to my professional College of Telecommunication Engineers where I am a member of the Executive Direction of the Professional Association in the Demarcation of Castilla-La Mancha.

## Concerned ICT Standards and contribution to the related landscape

In the framework of this fellowship, I have provided technical support in the redaction of the following standards:

- ▷ ISO/IEC AWI TS 25058 - Guidance for quality evaluation of AI systems
- ▷ ISO/IEC AWI TS 8200 - Controllability of automated artificial intelligence systems
- ▷ ISO/IEC AWI 12792 - Transparency taxonomy of AI systems
- ▷ ISO/IEC 25059 - Quality model for AI systems
- ▷ ISO/IEC FDIS 24029-2 - Assessment of the robustness of neural networks-2
- ▷ ISO/IEC CD TR 5469 - Functional safety and AI systems
- ▷ ISO/IEC TR 24027 - Bias in AI systems and AI aided decision making
- ▷ ISO/IEC PWI 18966 - Oversight of AI systems
- ▷ ISO/IEC PWI 17866 - Best practice guidance for mitigating ethical and societal concerns

- ▷ ISO/IEC CD TS 12791 - Treatment of unwanted bias in classification and regression machine learning tasks
- ▷ ISO/IEC TR 24030:2021 - Information technology — Artificial intelligence (AI) — Use cases
- ▷ ISO/IEC AWI TR 21221 - Information technology – Artificial intelligence – Beneficial AI systems
- ▷ ISO/IEC 5339 - Guidance for AI applications
- ▷ ISO/IEC 5338 - Life-Cycle

## Impact

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### Impact on SMEs

I have attended as observer and supporter to the new creation of work task groups in CEN/ CENELEC JTC21 to start the harmonisation tasks of AI standards to the European Union regulation proposal of EU AI Act. All these tasks are related to the adoption of standards related with AI and the elaboration of conformity procedures. In relation to this, in the context of the Spanish Sandbox of AI and through my National Body of Standardisation, we are collaborating with the review and elaboration as experts of Guidelines of Good Practices related to the adoption of AI, elaborated by SEDIA (State Secretary of Digital Transformation and AI of the Spanish Government).

### Impact on Society

Different standardisation projects where I am contributing, such as ISO/IEC AWI 12792 - Transparency taxonomy of AI systems, have a real societal impact related to societal advances, right protection of final customers, AI ethical issues and adoption of AI systems. Furthermore, the environmental impact is related to the achievement of global targets in the fight against the climate change, such as the carbon footprint or energy efficiency of AI systems, considering the high dependency of the emerging technology with transversal issues like hardware and semiconductor devices.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, as mentioned here above, with this fellowship, I have contributed to several standardisation projects related to AI.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have drafted a technical report on common terminology.

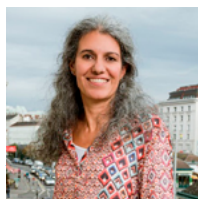
### What future efforts or activities are still necessary for your area of application?

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I consider that additional EU experts are needed to better support the EU position. Their support is needed to address some technical aspects when defining principles, methods and processes AI standards, which helps to obtain a broad consensus of developers and to be widely adopted. Moreover, a broader spectrum of stakeholders should be encouraged to take part in the AI standardisation covering notably, associations of civil society, professional schools, and SMEs), which would help to assure a complete inclusiveness and better effective answer to new needs of digital market.



# Preparing a Taxonomy for the Transparency of AI Systems



**Rania Wazir**

Co-funder, leiwand AI gmbh  
Austria

Sector

Artificial Intelligence

Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC42  
CEN/CENELEC JTC21

Role

Project Editor

Addressed EU standardisation priorities and gaps

My fellowship addresses the following priorities:

- ▷ standards for trustworthy AI: transparency
- ▷ in support of future regulations (draft AI Act): transparency is one of the key requirements for high-risk AI systems (and to a lesser extent, also medium-risk AI systems).

I aim to bring a new framework to the table, by examining AI systems at different levels of granularity (a high level of abstraction, in which the system is considered in its societal and environmental context; next considering the AI system as a whole, and examining its uses, limitations, and its composition; and finally, drilling down to its fundamental AI components - the model and the data). The addressed standardisation gap concerns the fact that there is currently not an international standard describing the different ways for an AI system to be transparent, providing an extensive taxonomy of items that can be included in AI system transparency considerations, or considering how such transparency requirements can vary not just with the stakeholders involved, but also with the AI system life cycle stage. As such, this standard builds the foundation for future standardisation efforts, that could include targeted transparency requirements for different types of AI systems, and varying contexts of use.

Concerned ICT Standards and contribution to the related landscape

This fellowship project was geared towards progressing the ISO/IEC project on the transparency taxonomy of AI systems to the next development stage, to ensure timely completion of the standard. The transparency project breaks transparency requirements down into specific information elements that can be disclosed/required; it provides AI stakeholders with a common terminology and understanding about different elements of transparency and their applicability in different use cases and for varying target audiences. Furthermore, it lays the groundwork for transparency standards that would include normative transparency requirements on types of AI systems, or for specific use cases. The ICT Standards I am dealing with is ISO/IEC CD12792.

## Impact

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### Impact on SMEs

Establishing a taxonomy for transparency of AI systems provides the framework for communicating about AI systems among various stakeholders. European SMEs benefit in both their roles as AI systems providers as well as AI system users from clearer terminology. Being able to break high-level transparency requirements down into elements that can be requested at different phases of the AI system life cycle and from various stakeholders within the AI value chain, will simplify the process of compliance and assessment.

### Impact on Society

Transparency is a fundamental requirement of trustworthy AI (see, for example, the EU HLEG requirements on trustworthy AI). Furthermore, the draft EU AI Act, as well as the draft standardisation request submitted to CEN/CENELEC, all include transparency requirements on AI systems. This project thus supports the development of trustworthy AI, as well as future regulatory requirements.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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The project was specifically in support of the existing ISO/IEC JTC1/SC42 WG3 standardisation project "*Transparency taxonomy of AI systems*." During this fellowship, the standardisation project has successfully moved into CD ballot stage. Additionally, during this period, it was approved for parallel development under Vienna Agreement by CEN/CENELEC JTC1 and has been taken up into their work program.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have drafted technical specifications.

### What future efforts or activities are still necessary for your area of application?

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More EU experts can help add content that is particularly relevant to SMEs, and to societal and environmental considerations.

### Online references related to the fellowship work

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 [www.iso.org/standard/84111.html](http://www.iso.org/standard/84111.html)

# Standards on data spaces, and on trustworthy AI integrating IoT and digital twins



**Antonio Kung**

CEO, Trialog

France

## Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC 27  
ISO/IEC JTC1/SC41  
ISO/IEC JTC1/SC42

## Role

Chair of ISO/IEC JTC1/AG25 and ISO/IEC JTC1/AG31

## Addressed EU standardisation priorities and gaps

My fellowship tackles the lack of standards concerning data spaces focusing on architecture and interoperability aspects. This is a barrier for industry, for SMEs. Also, there is no guidance to shape the creation of interoperability standards on the IoT-edge-cloud continuum. This is a barrier for IoT-edge-cloud pilots when they wish to promote their work to standardisation and create an impact. And finally, there is a need to provide guidance on how to ensure trustworthiness in artificial intelligence. This is a barrier for industry on how they will comply with the AI act.

## Concerned ICT Standards and contribution to the related landscape

The objective of this fellowship is to lead the completion and the creation of standards related to European projects, continuing the work carried out in my three previous StandICT.eu 2023 fellowships, including:

- ▶ Start edition of ISO/IEC PWI 27568 security and privacy of digital twins in ISO/IEC JTC 1/SC 27, and ISO/IEC 27091 Artificial intelligence privacy protection in ISO/IEC JTC 1/SC 27.
- ▶ Completion of ISO/IEC 27563 security and privacy in AI use cases: based in ISO/IEC JTC 1/SC 27.

In addition, I pursue edition of:

- ▶ ISO/IEC PWI “IoT Behavioral and policy interoperability” in ISO/IEC JTC 1/SC 41
- ▶ ISO/IEC PWI “Guidance on IoT and digital twin use cases” in ISO/IEC JTC 1/SC 41
- ▶ ISO/IEC PWI 5896 Cybersecurity assurance of complex system in ISO/IEC JTC 1/SC 27
- ▶ The above-mentioned standards contribute to the ICT standards landscape in the area of privacy, AI, cybersecurity, data spaces and digital twins. They leverage results from European research in contributing to a family of data space standards. In parallel, I chair JTC 1/SC 41/AG 31 renamed external liaison management and propose work on data spaces, with liaison with SC38, SC42, ITU-T in ISO/IEC JTC 1/SC 41.

## Impact

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### Impact on SMEs

The proposed standards on architecture and interoperability will enable SMEs to provide technology solutions. Also, these standards will provide a stable business environment where SMEs can provide specific building blocks and know-how.

### Impact on Society

Finally, my fellowship activity contributes to the following impact from a standardisation viewpoint:

- ▷ Architecture standards in line with European priorities (data space platforms from Europe).
- ▷ IoT standards considering European results (interoperability based on SAREF, use cases from European applications).
- ▷ Standards on AI trustworthiness (including security and privacy) in line with European stakeholders and regulation.

The activity is consistent with the following actions of the 2022 MSP rolling plan (Action 4 on big data, Action 3 and 8 on IoT, and Action 5 on AI).

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, I have contributed to three standards that are published or to be published (namely, 27563, 30194, 27561), and to two new standardisation projects (namely 27091 and 27115).

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have drafted technical specifications as well as a technical report on development of a new standard.

## What future efforts or activities are still necessary for your area of application?

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In collaboration with AIOTI and BDVA, a series of initiatives has led to the creation of SC41/AG3, as well as the initialisation of two preliminary work items on data spaces (integration of IoT and digital twins in data spaces, and data component extractions in data spaces). A coordination is also to take place with ISO/IEC SC38 which also started a PWI on data spaces.

## Online references related to the fellowship work

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 [www.iso.org/committee/45306.html](http://www.iso.org/committee/45306.html)

 [www.iso.org/committee/6483279.html](http://www.iso.org/committee/6483279.html)

 [www.iso.org/committee/6794475.html](http://www.iso.org/committee/6794475.html)

 [www.iec.ch/dyn/www/f?p=103:14:302927768918844:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:28900,25](http://www.iec.ch/dyn/www/f?p=103:14:302927768918844:::FSP_ORG_ID,FSP_LANG_ID:28900,25)

# AI standardisation in ISO/IEC and CEN/CENELEC



## **Adam Smith**

*CTO, Standardisation expert, R&D Dragonfly  
Spain*

### Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



ISO/IEC SC 42  
CEN-CENELEC JTC 21

### Role

Expert

## Addressed EU standardisation priorities and gaps

This fellowship includes the project leadership of 12791 and management of 29119-11 and 17847. 12791 addresses the gap of shortage of normative standards relating to AI bias now. It has also supported adoption of ISO/IEC work on quality models and bias into the European standards world - this helps address a gap in the work programme relating to the AI standardisation request from the Commission. The work on 29119-11 and 1787 addresses a gap in verification and validation. As one of only two verification and validation specialists in officer roles in SC 42, this addresses a skills gap in the committee. Additionally, I am one of very few representatives of an SME.

## Concerned ICT Standards and contribution to the related landscape

My fellowship is contributing significantly to the development of ISO/IEC TS 12791 (Information technology — Artificial intelligence — Treatment of unwanted bias in classification and regression machine learning tasks) and ISO/IEC TS 29119-11 (Software and systems engineering — Software testing — Part 11: Testing of AI systems). It is also starting to contribute to ISO/IEC 17847 (Information technology — Artificial intelligence — Verification and validation analysis of AI systems), which is an earlier stage project. Additionally, I have supported the successful European adoption of 25059 (Quality model for AI) and 24027 (Bias technical report).

## Impact

### **Impact on SMEs**

I am one of the small number of SMEs represented in ISO/IEC and CEN/CENELEC AI committees, my viewpoints are often different to most participants, particularly the consideration of SME requirements. SMEs themselves have a lot of variety, but usually want to see greater clarity and clearer requirements.

### **Impact on Society**

The work on bias in AI conducted in ISO/IEC is world leading and provided the best consensus globally on the requirements for different stakeholders as part of the process of using or developing AI. By providing these requirements, the impact of bias in AI on wider society should ultimately be reduced.



## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, now ISO/IEC 25059 has been published, various reasons for update are emerging already. AI is a fast-moving technology area, and we will soon look to launch a proposal for the next edition.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have contributed to technical specifications on a development of a new standard.

## What future efforts or activities are still necessary for your area of application?

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The work on bias is a technical specification, which means it is valid for just two years and needs to be replaced by a full international standard. This activity isn't being planned yet, but will need to be taken into account.

## Online references related to the fellowship work

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 [https://standards.cencenelec.eu/dyn/www/f?p=205:7:0:::FSP\\_ORG\\_ID:2916257&cs=11D701467243B7C63DEF4702C86E0138A](https://standards.cencenelec.eu/dyn/www/f?p=205:7:0:::FSP_ORG_ID:2916257&cs=11D701467243B7C63DEF4702C86E0138A)

 [www.iso.org/committee/6794475.html](http://www.iso.org/committee/6794475.html)

# Consolidating AI standardization (ISO/IEC JTC1/SC42 and CEN/CENELEC JTC21)



## **Francisco Medeiros-Filho**

*Expert, FM Tech Consult BV  
Belgium*

### Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



CEN/CENELEC JTC21  
CEN/CENELEC JTC21 WG1  
Belgian delegations to ISO/IEC JTC1/SC42 and CEN/CLC JTC21

## Role

Co-convenor of CEN/CLC JTC21 WG1 Strategic Advisory Group

Head of the Belgian delegations to CEN/CLC JTC21 and ISO/IEC JTC1/SC42

Co-convenor of JTC21 WG1

## Addressed EU standardisation priorities and gaps

In the course of this fellowship, and in my role as Co-Convenor of the JTC21 WG1 SAG, I have participated in multiple meetings to draft the CEN/CENELEC Work programme in response to the EC standardisation requests in the context of the proposed AI Act. Also attended seven JTC21 WG1 (SAG) meetings in preparation for the forthcoming EC standardisation request and the 7th JTC21 plenary meeting. These SAG meetings were held on 07/03, 14/03, 31/03, 11/04, 18/04, 17/05, 22/05, 01/06, 09/06, 15/06, 21/06, 28/06. JTC21 management team also meets regularly for coordination (16/03, 11/05, 08/06). The Belgian AI mirror committee met five times (12/04, 03/05, 23/05, 13/06, 07/07) in the period. The mirror committee has now grown to 33 representatives from academia, large industry, public sector, and SMEs. I continue leading the Belgian delegation at ISO/IEC JTC1/SC42 and CEN/CENELEC JTC21. In this capacity, I have contributed to the regular EC-ESOs Dialogues. The most recent Dialogues were held on 27 March, 18 April, and 12 June 2023.

Since JTC21 WG1 is responsible to draft the CEN/CENELEC Work Programme in response to the EC AI standardisation request, I have attended the training offered by CEN/CENELEC on the HAS consultant system on 16 May 2023. I have also attended the Digital Europe event on the EU-US TTC on 17 May 2023 and the EC-JTC21 workshop on 7 June 2023.

## Concerned ICT Standards and contribution to the related landscape

This StandICT.eu fellowship has allowed me to serve as Co-Convenor of the WG1 (Strategic Advisory Group) of CEN/CENELEC JTC21 since its inception in June 2021 and as Chair of the Belgium mirror committee for AI standardisation. In this context, I am dealing with most AI standards that fall under the scope of the EC standardisation request addressed to CEN/CENELEC. I have also offered to co-chair the recently created JTC21 WG1 Task Group on Cybersecurity for AI Systems. Cybersecurity for AI Systems is a pioneer area, which relies on state-of-the-art technologies. These are being researched by the Joint Research Centre of the European Commission. The EU Cybersecurity Agency (ENISA) has just started a feasibility study on cybersecurity of AI systems.

## Impact

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### **Impact on SMEs**

I have succeeded in bringing together stakeholders and create a critical mass in Belgium, powerful enough to contribute to AI standardisation at European level, and achieve a measurable impact at international level, having in mind the interests of innovative SMEs. The membership of the Belgium AI mirror committee now includes four highly innovative SMEs working at the forefront of AI and actively involved in standardisation activities.

### **Impact on Society**

The impact on society is not evident yet. However, it will become evident as soon as the proposed AI Act (European legislation) enters into force early in 2025.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, I am co-leading the activities of the recently created Task Group on cybersecurity for AI systems towards a gap analysis and the subsequent development of standards for cybersecurity of AI systems.

### Have the standardisation activities in your project led to specific deliverables?

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No specific standards have been delivered yet.

### What future efforts or activities are still necessary for your area of application?

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As mentioned above, cybersecurity standards for AI systems are indeed a pioneer field of work. Hence, future efforts are still necessary.

### Online references related to the fellowship work

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 [www.cencenelec.eu/areas-of-work/cen-cenelec-topics/artificial-intelligence](http://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/artificial-intelligence)

# Exploration on Standardisation of Event based cameras



## **Antonio Pinheiro**

*Professor, U.B.I. - Universidade da Beira Interior & Instituto de Telecomunicacoes  
Portugal*

### Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



ISO/IEC JTC 1/ SC 29  
ITU -T SG16

### Role

Expert

## Addressed EU standardisation priorities and gaps

Event based vision systems have no standard, that allows interoperability between different systems. Currently, these visual information acquisition systems are gaining popularity because of their wide applications in learning-based systems, notably those based on deep learning technology. Nowadays, there are a significant number of event-based systems developed by different companies, a number that is likely to grow because of the demand for these technical solutions. Because of that, a standard on event-based representation would be of interest to the different parts, notably those that produce event-based solutions, and those that require this type of technology for their systems. Moreover, currently, there is no standardised format for event-based sensors. Each vendor adapts the existing models to their own solutions, resulting in a lack of compatibility between the different systems.

## Concerned ICT Standards and contribution to the related landscape

With this fellowship, my objective is to prepare a call for proposals and the definition of associated use case and requirements, and common test conditions. JPEG XE is one of the undergoing projects of ISO/IEC JTC 1/SC 29/WG 1. In addition, I contribute in two AHG to: 1 - Ad Hoc Group on Event-based Imaging, where the aim is to:

- ▷ Create scope and relevant definitions.
  - ▷ Collect use cases and associated requirements.
  - ▷ Investigate role of JPEG for this data modality.
  - ▷ Propose a plan for potential standardisation.
- 2 - Ad Hoc Group on Event-based Vision where the focus is to:
- ▷ Create scope and relevant definitions.
  - ▷ Collect use cases and associated requirements.
  - ▷ Investigate role of JPEG for this data modality.
  - ▷ Propose a plan for potential standardisation (timeline).

## Impact

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### Impact on SMEs

Currently three European SMEs are collaborating on this activity, although it is its earlier development. Basically, they find important to have a representation format standardised as it will make their solutions open to a wider consumer market. The three companies have a different market, notably, acquisition devices manufacturing, coding hardware solutions and vision solutions provider, revealing the importance of this activity might have for the future of multiple SMEs. It is expected that a future call for proposals will produce interest of multiple SMEs.

### Impact on Society

Throughout its history, the JPEG Committee and its members have received several awards, such as the Emmys, for the relevance of their standards in defining multimedia technology.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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No, as with this fellowship, I focus creating a call for proposals, expected for January 2024, on event-based format, named JPEG-XE. With this fellowship, I aim to define a call for proposals and its supporting documents, notably the use cases and requirements, and the common test conditions.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have created documentation related to the call for proposal and the common test conditions demanding the creation of a testing dataset, and the definition of the response to the call for proposals evaluation procedure based on the use cases and requirements.

### What future efforts or activities are still necessary for your area of application?

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I will continue working on the call for proposals launched by my WG (ISO/IEC JTC 1/ SC 29 WG1 JPEG) at the start of 2024.

### Online references related to the fellowship work

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 [www.iso.org/committee/45316.html](http://www.iso.org/committee/45316.html)

 [www.itu.int/en/ITU-T/studygroups/2017-2020/16/Pages/default.aspx](http://www.itu.int/en/ITU-T/studygroups/2017-2020/16/Pages/default.aspx)



# Evolution as a Service for Autonomous 5G and 6G Networks



## **Paul Harvey**

Lecturer in Autonomous Networked Systems, University of Glasgow  
United Kingdom

## Sector

5G

## Engaged SDOs, WGs and TCs



ITU-T FGAN  
ITU-T SG13

## Role

Expert

## Addressed EU standardisation priorities and gaps

The work within this fellowship is addressing the challenge of autonomous operation of 5G and beyond networks. Concretely, the demands and pressures on telecommunication networks is only increasing and is growing beyond the capability of humans to meaningfully operate them. The use of ML technologies to enable telecommunication use cases is well documented, however, this requires human effort design how to apply (and subsequently update) such technologies to a use case. In contrast, this work seeks to standardise an alternative approach based on software-centric design. By bringing automation to design of network control software, this work directly addresses the challenge of scalability of human involvement in 5G and beyond network management in a clear and inter-operable manner.

## Concerned ICT Standards and contribution to the related landscape

My fellowship contributions support the generation of a standard in the description of a software architecture to enable the autonomous operation of telephone networks. This is being done through the ITU-T's SG13, where I am contributing to the draft recommendation "*Architecture framework for Autonomous Networks*".

## Impact

### **Impact on SMEs**

While not directly, the creation of standards in this space will enable new incumbents to enter the field by providing solutions, algorithms, simulations, and data to fulfil elements of the architecture, and ultimately, network autonomy. The standardisation of an architectural approach to network autonomy, coupled with the reduced barrier for entry to the market provided by programmability in the network, will enable SMEs of different likes to provide interoperable technology.

### **Impact on Society**

As telecommunication networks sit at the heart of our societies, ensuring their continued high-quality operation is paramount. At the same time, the pressures faced by such networks increases as new and growing number of users coupled with new operational behaviours

makes this a challenging task. Standards that support autonomous operation of the network contribute towards managing these pressures. Also, by creating an interoperable ecosystem of technologies, new approaches and innovation can come from various sectors to ensure that emergency services can be contacted, business deals can be closed, online lectures can be heard, and media can stream.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Yes – a draft of the Autonomous Network Architectural Framework (Y.AN-Arch-fw) is progressing in the ITU-T SG13. This effort is a collaboration with other contributors and the ITU-T Focus Group on Autonomous Networks.

### Have the standardisation activities in your project led to specific deliverables?

Yes – there have been contributions to SG13 on the topic of autonomous network architecture; a published article on the mapping of autonomous operation to ORAN technologies.

### What future efforts or activities are still necessary for your area of application?

After the acceptance of Y.AN-Arch-fw, the next step will be to study and work upon the detailed aspects of the architecture, with particular emphasis on a) the technical enablers for the various components, b) the mapping of the architecture to other SDO relevant works, and c) domain specific use case PoCs.

### Online references related to the fellowship work

📄 Draft Recommendation: [www.itu.int/ITU-T/workprog/wp\\_item.aspx?isn=18587](http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18587)

📄 Focus Group on Autonomous Networks: <https://www.itu.int/en/ITU-T/focusgroups/an/Pages/default.aspx>

📄 Publication: [www.itu.int/pub/S-JNL-VOL4.ISSUE2-2023-A19](http://www.itu.int/pub/S-JNL-VOL4.ISSUE2-2023-A19)

# CCI: Congestion control invariants for next generation cellular networks



**Marcelo Bagnulo**

Associate Professor, Universidad Carlos III de Madrid  
Spain

Sector

6G

## Engaged SDOs, WGs and TCs



IETF CONGestion RESponse and Signaling WG

## Role

Participant

## Addressed EU standardisation priorities and gaps

In my previous related research, it has been shown that both BBR and LEDBAT++ implement mechanisms for periodic slow-downs that serve the purpose of emptying the queue of the buffer of the bottleneck link and in that way, allow the endpoint to have visibility of the base Round-Trip-Time (RTT) of the path. They both then use this information to determine the length of the queue in the bottleneck link, which is then used to determine the congestion onset and react accordingly. However, the slow-down mechanisms used by LEDBAT++ and by BBR are different. One key feature that slow down mechanism must have been synchronisation, i.e., all the flows competing for the bottleneck capacity must slow down at the same time, so the queue is emptied and the real base RTT is exposed. Each of the two slow down mechanisms manage to synchronize the slowdowns for all flows if they are using the same slow down mechanism. However, due to the differences between the mechanisms used by the two CCAs, they fail to synchronize the slowdowns when LEDBAT++ and BBR flows compete for the same bottleneck. This implies that both fail to expose the base RTT when LEDBAT++ and BBR traffic compete for the same bottleneck.

The slowdown mechanism should be invariant across all CCAs standardised on the Internet. By using a common slow down mechanism, one can guarantee the correct behaviour across all CCAs that require to slow down. In this fellowship, I have proposed to standardise congestion control algorithms invariants, that is, mechanisms that multiple CCAs implement and that can benefit from a uniform implementation across the multiple CCAs to guarantee a smooth interaction between them. The slow mechanism described above is one of such CCA invariants.

## Concerned ICT Standards and contribution to the related landscape

Over the last decade, congestion control research has been flourishing, resulting in several novel congestion control algorithms (CCAs) that are being used on the Internet. Indeed, in addition to the traditional congestion control algorithms such as New Reno and Cubic, the following algorithms are being used in parts of the Internet:

- ▷ BBR (Bottleneck Bandwidth and Round-trip propagation time) was originally developed by Google in 2016 and the goal is to reduce the latency and/or increase the throughput of Internet communications.
- ▷ LEDBAT/LEDBAT++ (Low Extra Delay Background Transport) is a CCA that implements a less-than-best-effort (LBE) traffic class.

- ▷ DCTCP (Data-Center TCP) is a CCA developed by Microsoft to reduce the latency for data center communications.
- ▷ MPTCP (MultiPath TCP) is an extension to TCP to support multiple concurrent paths in a single TCP connection.

Each of these novel CCAs were designed independently and the main interoperability constraint honoured during their respective design was to be fair when competing with (traditional) TCP. This concept of TCP-fairness essentially meant that if we have two TCP flows competing for the capacity of a bottleneck, one of them using New Reno CCA and the other one using a novel CCA, then the resulting split should be like the one obtained if both used New Reno CCA, at least within New Reno's operation range. This TCP-fairness/TCP-friendliness criteria was used in the design of Cubic; it is now being used to design BBRv2.

However, given that all these new CCAs are recent, little effort has been devoted to understanding the interaction of these new CCAs. This fellowship investigates into the interoperability of different CCAs. Specifically, several of these CCAs implement similar functionalities in different ways which pose challenges to the correct interaction between these CCAs.

## Impact

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### Impact on SMEs

The work done in the CCI project is designed to correct unwanted interactions between both existent proposal for new congestion control algorithms, namely, BBR and LEDBAT++ and also for new algorithms that may be proposed in the future. Specifically, the proposed solution defines the behaviour of the algorithms when performing certain functions, so their interactions behave as expected when interacting, e.g. that LEDBAT++ yields against BBR. This benefits most entities communicating through the Internet, including content provider companies and content distribution companies. In case of SMEs, most SMEs present on the Internet would benefit from the congestion control algorithms used by their servers and the other endpoints they are communicating with in the Internet behaving as expected, and hence they would benefit from the results of the CCI project.

### Impact on Society

The results of the CCI project also benefits any other party relying on the Internet to communicate, including end-users, governments and other institutions and companies. All these parties currently rely on both BBR and LEDBAT++ on a day-to-day basis, and if new congestion control algorithms are defined and deployed, they are most likely to rely on these new algorithms. All these parties would then benefit from currently proposed and future congestion control algorithms, such as BBR and LEDBAT++, to interact as expected. Failing to do so, would result in unexpected behavior and most likely unpredictable performance, which is unlikely to be satisfactory for most users. The solution proposed by the CCI project addresses these problems, by proposing congestion control invariants that will guarantee predictable interactions between new congestion control algorithms.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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The work done in the CCI project is being proposed in the CONGRESS WG at the IETF for its discussion and adoption. As the CONGRESS WG is the venue for standardisation of new congestion control algorithms, and the input provided by CCI will help guiding the design of new congestion control algorithms currently under definition (such as LEDBAT+++ and BBR) and future ones to be discussed.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have drafted a conference paper about this research (M. Bagnulo, Congestion Control Invariants, Internet-Draft, draft-bagnulo-congress-cci-00, 2 July 2023).

## What future efforts or activities are still necessary for your area of application?

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It is foreseen that the proposed document to be discussed for adoption in the upcoming months and affect ongoing and future standardisation efforts.

## Online references related to the fellowship work

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 <https://datatracker.ietf.org/doc/draft-bagnulo-congress-cci/>

 <https://www.ietf.org/archive/id/draft-bagnulo-congress-cci-00.txt>

## Efficient low latency networking for 6G



### **John Grant**

*Standards individual expert  
United Kingdom*

### Sector

6G

## Engaged SDOs, WGs and TCs



ETSI ISG NIN  
ETSI TC DECT TDE  
IEC TC100 WG11

## Role

Chair of group ETSI ISG NIN

Co-leader of IEC TC100 project

## Addressed EU standardisation priorities and gaps

Mobile network operators have estimated that with current (TCP/IP-based) protocols half the bits transmitted over the radio interface are overheads such as packet headers. ISG NIN's technology reduces these overheads by an order of magnitude, thus making much better use of the radio spectrum, which is a scarce and expensive resource. Current satellite systems avoid this problem by using proprietary protocols on the links to the earth stations, but with the advent of open systems and direct-to-handset communication an efficient standard protocol is needed.

Internet Protocol was not designed for conveying real-world time-critical signals such as the audio and video for a videoconference, or audio from a performer's microphone to a mixing desk and back to their headphones, or where a control loop in an industrial process includes a connection across a network, or for remote robotic surgery. ISG NIN's technology natively provides the lowest possible latency without needing any special configuration or provisioning. With this fellowship, I contribute to the IEC projects to provide important advances in this area.

## Concerned ICT Standards and contribution to the related landscape

ETSI is developing various standards to address the need for more efficient networking protocols in IMT-2020, including to support low-powered IoT devices and applications needing guaranteed low latency. The group ISG NIN (Non-IP Networking), which I chair, is standardising the concept of a flow, including control plane protocols for managing flows and appropriate frame and packet formats. This builds on the output of the ETSI NGP (Next Generation Protocols) Group including ETSI GS NGP 0.13 v.1.1.1 (2018-2019) "*Flexilink efficient deterministic packet forwarding in user plane*". ETSI GS NIN 004 (Carriage of Flexilink flows over DECT-2020 New Radio) is currently under development, and work is beginning on the use of Flexilink in satellite links, in 5G radio, and in 6G core networks. Also, in ETSI, I am the editor of TR 103 884 (DECT-2020: guide for implementers).

In IEC TC100 (audio, video, and multimedia systems and equipment) I am co-leader of project 100-44 (User's Quality of Experience on Multimedia Conferencing Services) which is writing the multi-part Technical Report IEC TR 63478 and contribute to IEC 63448 (Low and ultra-low latency communication and control system) and IEC 63455 (Line code with error correction).



## Impact

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### Impact on SMEs

The new networking technology is significantly simpler to implement and to use than IP-based systems, thus reducing barriers to entry and providing them with an opportunity to disrupt a market that has been dominated by large multinationals.

### Impact on Society

As the technology that currently underlies the Internet and mobile networks has evolved, it has become increasingly complex, adding new potential failure modes and attack surfaces, and making it more difficult to control performance parameters such as latency. At the same time, it is increasingly relied on to support mission-critical applications as well as functions such as videoconferencing where latency affects the user QoE and indeed the usability of the system.

ISG NIN's technology has fewer component protocols, with cleaner and simpler interfaces between them and built-in facilities for authenticating communication partners. It also natively supports much lower latency and makes more efficient use of radio spectrum. Thus, the system becomes safer and more robust and provides much better support for latency-critical applications such as video-conferencing.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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ISG NIN is starting work on GR NIN 010 Guidance for implementing non-IP networking over satellite access. IEC 63448 and IEC 63455 are new standards, and IEC TR 63478 is a new Technical Report.

Have the standardisation activities in your project led to specific deliverables?

Drafts of the above-mentioned deliverables have been produced. Publication of the final text in each case is likely to be after the project has finished.

### What future efforts or activities are still necessary for your area of application?

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The technology has been prototyped over gigabit Ethernet, and this version is proposed to be installed in a campus network to demonstrate its use for remote musical performance. The next step will be to implement and demonstrate it over other media, including wireless. Additional standards will be needed, to specify details of implementation over other media and to add support for different applications (e.g., specify data formats or add application-specific optional elements to control messages).

### Online references related to the fellowship work

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[www.etsi.org/technologies/non-ip-networking](http://www.etsi.org/technologies/non-ip-networking)

<https://portal.etsi.org/tb.aspx?tbid=887#/>

[www.iec.ch/dyn/www/f?p=103:23:210961547578664:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:129725](http://www.iec.ch/dyn/www/f?p=103:23:210961547578664:::FSP_ORG_ID,FSP_LANG_ID:129725)

[www.iec.ch/dyn/www/f?p=103:38:210961547578664:::FSP\\_ORG\\_ID,FSP\\_APEX\\_PAGE,FSP\\_PROJECT\\_ID:22351,23,109192](http://www.iec.ch/dyn/www/f?p=103:38:210961547578664:::FSP_ORG_ID,FSP_APEX_PAGE,FSP_PROJECT_ID:22351,23,109192)

# Data Space Governance for Edge and Cloud Federation



## **Muslim Elkotob**

*Principal Solutions Architect and Standardization Expert,  
Vodafone  
Germany*

### Sector

Cloud Federation

## Engaged SDOs, WGs and TCs



World Class Standards



ETSI TC INT  
ETSI AFI  
ITU-T FG-TBFxG  
IEEE INGR Security  
IEEE INGR SBB  
IEEE INGR  
IEEE INGR Testbeds

## Role

Chairman of ETSI AFI

Vice Chairman of ETSI TC IN

Vice Chairman of ITU-T FG-TBFxG

## Addressed EU standardisation priorities and gaps

This fellowship mainly addresses two gaps. Firstly, non-leveraged business models and use-cases that would otherwise have profited from Federation of their IT and Network assets to increase performance, improve efficiency or energy footprint, or foster collaboration among their respective stakeholders. Secondly, the absence of any governance model for data sharing among federated cloud and edge entities in Beyond 5G. When telco-cloud based networks and edge (e.g. MEC) entities engage in a Federation scenario to share or swap assets, a governing model is essential to ensure sovereign and consistent data sharing backed by a solid meta-model. This project will close this gap as largely as possible.

The two related challenges are: Firstly, capturing the right dynamics of Beyond 5G ecosystem tiers such as RAN, Edge, Transport, X-Haul, and Core and defining datasets and structures that reflect those dynamics to enable sharing and exchange in Federation scenarios is the key challenge I see in this project. Also, identifying the right interactions among stakeholders to collectively form a Federation-based ecosystem, and properly setting the assets and datasets that add value to the target use cases is another key challenge in this project.

Finally, the key priorities that I am addressing include:

- ▶ Leveraging the Cloud Federation and Data Governance standardisation to benefit use cases in various verticals.
- ▶ Enabling green, energy efficient, and intelligent applications to be easily built and bootstrapped based on a reference model with data (and its respective governance) and to profit from Cloud Federation in the ecosystem.

## Concerned ICT Standards and contribution to the related landscape

I have contributed to several ICT Standards that serve as a boost and foundation for this work, especially when it comes to Service Federation, Architectural Bits and Pieces (e.g. APIs, layered models, closed control loops) serving the project:

- ▶ ITU-T Recommendation Q.4068: Open APIs for interoperable testbed federations this specification supports the project work with Federation principles and API architecture-related aspects.
- ▶ ETSI Technical Report TR: INT Artificial Intelligence (AI) in Test Systems and Testing AI models; Testing of AI with definition of quality metrics; this specification supports the project work via AI-based interactions in the eco-system to provide ideas and foundations for the green energy-saving use-cases of this fellowship project.

Telco Data Sharing is another key foundational area in ICT Standardisation that plays an important role in this project. This area is known, but what it lacks is a standardised mechanism and ideally a framework for data sharing among interacting stakeholders and leveraging data and data-driven services. ICT standards and pre-standards based on initiatives in this respective area include:

- ▶ Gaia-X: an open, transparent, and secure digital ecosystem, where data and services can be made available, collated, and shared in an environment of trust.
- ▶ IDSA: The International Data Spaces Association is on a mission to create the future of the global, digital economy with International Data Spaces (IDS), a secure, sovereign system of data sharing in which all participants can realize the full value of their data.
- ▶ Regulative Directives and Standards such as General Data Protection Rules (GDPR) (EU), European Cloud Act.

## Impact

### Impact on SMEs

The inclusive and open ecosystem trend that is strongly supported by Cloud Federation and Data Governance enables SMEs of different types (as Independent Software Vendors ISVs and AISVs) to take part and lowers the bar for their entry and participation.

### Impact on Society

The work in this fellowship project on Data Space Governance for Edge and Cloud Federation impacts society positively in several ways including:

- ▶ Increasing inclusion and collaboration among stakeholders of all types, especially SMEs and ISVs (Independent Service Vendors) by allowing them to take part in the standardized service-architecture for Data Sharing and Telco Data Space usage. Previously, an SME (e.g. ISV) had an ambiguous situation and a higher hurdle/bar to join a Data Sharing ecosystem or value chain. Data Space Governance in Federated Cloud and Edge environments allows data space management and governance to enable asset sharing via Federation and including stakeholders in an ecosystem with a low bar.
- ▶ The work done bridges the gap and shortens the distance between stakeholders of various types if they have data assets to share. Today, the technical (IT, Telco) pillar is a key to societal development and evolution; this work allows for more interactions and matching stakeholders to enable more value-added services and monetisation that is crucial especially to smaller players (SMEs, etc)

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

This project is one of several projects and initiatives that are paving the way towards mature standards for Data Governance in Federated Environments. Those initiatives are converging bottom up, with examples in Green Energy-Saving Use Case with Data Space Leveraging standardisation activities (predominantly ETSI Technical Report (TR) documents).

Furthermore, certain recommendations as the ITU-T Q.4068: Open application program interfaces (APIs) for interoperable testbed federations. It has served as a foundation for a lot of work in this area will require follow-up recommendations of more mature character and that reflect the achieved progress in this area especially when it comes to reference architecture models, interfaces, and supported use cases.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, the standardisation activities in the project have led to:

- ▶ Significantly enhancing the ETSI TR: Energy Saving Use Cases Standardisation and PoC Requirements using Telco Data Sharing in Data Driven Ecosystems that has recently been launched in an early draft version.
- ▶ An upgrade of the existing PoC series in ETSI AFI is taking place to have a new phase of the series that focuses on Data Spaces, Data Sharing and Governance, and Federation of Testbeds and Assets.

## What future efforts or activities are still necessary for your area of application?

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The areas of Data-Driven Services, Data Spaces Leveraging for Federation, and Data Governance for such use cases and scenarios are all relatively new and still have a long way to go. This project, building on the interworking of those trends faces the challenge of being new in a very impacting way. So, with initial benefits and synergies taking shape with this work, and the pre-standardisation work in ETSI, TM Forum, and ITU-T gaining pace, there is still work to do in this area in various SDOs, and this work will build on the already accomplished work in this project. The core of future efforts will focus on sharpening the governance model for data spaces and data sets to offer a set of policies and templates that enable easy bootstrapping of value-adding business scenarios and community-benefitting procedures. The ETSI TR on Energy Saving Use Case Standardisation using Telco Data Sharing and Data Space Governance, which is currently in an early draft state, is maturing further with work produced in this project and its successors.

## Online references related to the fellowship work

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[www.itu.int/rec/T-REC-Q.4068-202108-l/en](http://www.itu.int/rec/T-REC-Q.4068-202108-l/en)

[https://portal.etsi.org/webapp/WorkProgram/Report\\_WorkItem.asp?WKI\\_ID=59456](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=59456)

[www.data-infrastructure.eu/GAIA/Navigation/EN/Home/home.html](http://www.data-infrastructure.eu/GAIA/Navigation/EN/Home/home.html)

<https://docbox.etsi.org/INT/AFI/70-Draft/AFI11v1.1>

[https://intwiki.etsi.org/index.php?title=PoC\\_Topics#AFL\\_PoC\\_Topics](https://intwiki.etsi.org/index.php?title=PoC_Topics#AFL_PoC_Topics)

# Interoperable configuration and security attestation of Confidential Computing workloads

## Nicolae Paladi



CEO, CanaryBit.eu and Affiliated researcher at Lund University Sweden

### Sector

Cloud Computing

Engaged SDOs, WGs and TCs



IETF RATS  
IETF TEEP  
Confidential Computing Consortium  
Cloud Security Alliance – Confidential Computing WG

### Role

Convener, member

### Addressed EU standardisation priorities and gaps

Throughout this fellowship, I primarily focus on the fragmentation of Trusted Execution Environment (TEE) architectures. Already today, TEEs can change the paradigm of security for data in use and enable new services such as confidential data sharing. However, architectural fragmentation makes it difficult to compare the security claims from different hardware platforms through a process called *attestation*. As a result, end-users cannot obtain a consistent, comparable, and measurable way to assess the security guarantees of the infrastructure they use. Ongoing work supported by StandICT.eu helps address gaps in three areas:

- 1. First**, we take a step in addressing the fragmentation challenge, by defining the interaction models to obtain attestation results and formats and to define principles for assessing the trustworthiness of endpoints that produce the attestation results.
- 2. Second**, we address a core challenge for end-users, where attestation results from competing vendors are inconsistent and incomparable, leading to a situation of “comparing apples and oranges”. This challenge is addressed by defining methods to compare the security guarantees communicated by attestation results from competing vendors.
- 3. Third**, the governance of attestation services is so far not addressed by any standard. Once confidential computing becomes more widely adopted, governance of attestation services will become equally important as the governance of certificate authorities for the public key Infrastructure.

### Concerned ICT Standards and contribution to the related landscape

This fellowship is directly supporting my contributions to the standardisation work within the IETF RATS and IETF TEEP workgroups. I am particularly focusing on several highly relevant IETF RFC (request for comments) documents, namely Remote Attestation Procedures Architecture, Attestation Results for Secure Interactions and Reference Interaction Models for Remote Attestation Procedures. Furthermore, in a related effort I recently became involved in a related industry standardisation work group within the Confidential Computing Consortium, which is currently focusing on governance patterns for trust attestation services. This effort is also being translated into cloud security controls defined by the Cloud Security Alliance (CSA), through my work in the CSA Confidential Computing Work Group.

## Impact

### Impact on SMEs

My contribution to interoperable Confidential Computing shapes a new technical landscape that European SMEs can use for innovation. Such standardisation work will pave the way for innovative solutions in the areas of cloud and infrastructure security, network security, trust services and data sharing. To further highlight this point, I co-founded CanaryBit, a privacy enhancing technologies start-up enabling cloud infrastructure security and confidential data collaboration. These services are enabled through new capabilities for extracting, verifying and sharing information about the trustworthiness of computing platforms. Several other European SMEs are active in this space and will directly benefit from an interoperable and comparable format for trustworthiness attestation used by competing hardware vendors.

### Impact on Society

Data security, control over the use of data and the capability to technically enforce the scope of data sharing with third parties are becoming increasingly important as our societies digitalise. While there is a growing understanding about the value of data, we need mechanisms to enforce intellectual property rights over data and other digital assets. The emergence of large language models trained on swaths of user data from social networks and Internet services - such as ChatGPT, Google's BART and others - only highlight the need to control the scope of secondary data use. Ability to assess the trustworthiness of platforms where data is processed and scope the limit of this processing can be enabled through technologies such as Trusted Execution Environments and Confidential computing.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Work done together with colleagues from IETF and the Confidential Computing Consortium leads to creating a confidential computing work group in the Cloud Security Alliance. The goal of this work group will bring the TEE standardisation concepts to the cloud control matrix that can be applied by practitioners. Another result is the ongoing definition of governance patterns for attestation services. This will likely become an industry standard once completed.

### Have the standardisation activities in your project led to specific deliverables?

Yes, so far the activities in my project led to updates to (i) several IETF RFCs and (ii) a work-in-progress document defining governance patterns for attestation services for TEEs.

### What future efforts or activities are still necessary for your area of application?

Immediate future efforts still necessary in confidential computing standardisation is to complete the already ongoing work and further enable the compatibility of TEE architectures. Other future efforts that I would suggest is to bring the security properties of TEEs into the cloud security frameworks and guidelines. Examples targets are the frameworks, and guidelines defined by organizations and initiatives on the international or national levels, such as ENISA in the EU, NIST in the US, eSAM in Sweden, BSI in Germany, and others.

### Online references related to the fellowship work

<https://datatracker.ietf.org/doc/draft-ietf-rats-architecture/>

<https://datatracker.ietf.org/doc/draft-ietf-rats-ar4si/>

<https://datatracker.ietf.org/doc/draft-ietf-rats-reference-interaction-models/>

<https://cloudsecurityalliance.org/research/topics/confidential-computing/>

<https://docs.google.com/document/d/1k166YZY1IIVTPpOP-LcS1O9rma8ei0RsJyibxm7vWqs/edit#>



## ■ Be convinced by Internet of Things standard



### **Thierry Monteil**

*Independent IoT expert – Professor, INSA Toulouse  
France*

### Sector

Open Source

## Engaged SDOs, WGs and TCs



ETSI TC smartM2M  
oneM2M SDS

## Role

Member

### **Addressed EU standardisation priorities and gaps**

This fellowship concerns standardisation in the field of IoT and how to increase the impact and deployment of this European standard. EU is carrying out actions to disseminate the oneM2M standard within Europe and more generally in the world (for example by financing the Indian EU ICT standardisation project in India). Most of those events are done to give based understanding of the functionalities of the standard and to start to develop a first example through hackathons. This dissemination work is struggling to reach industrialists in the field. However, solving the major energy, environmental, industrial, food, etc. challenges that are before us and that have been identified by Europe necessarily involves massive digital solutions. The latter will need to deploy connected, controlled sensors and actuators that produce massive data that will be used at different levels. These IoT solutions must be interoperable and must be able to connect different vertical domains. Standards are one of the essential solutions to achieve this and in the world of IoT, the oneM2M standard is the only one that is positioned at this level of interconnection, security, and service.

A constructed, well-argued argument are a way of helping the industry to project itself on the impacts of choosing a standard like oneM2M. Go beyond simple examples of oneM2M code to real comparison of code developed with and without oneM2M on several important problems that you faced on when you deploy an IoT cross domain solution, is a way to convince the developers. At the level of the services offered by the standard, it is necessary to show of it can address and facilitate the problems that companies need to solve when they wanted to create and deploy an IoT system.

## Concerned ICT Standards and contribution to the related landscape

The standardisation of architecture, service, representation and communication on the Internet of Things domain continues, notably with the activities of the WG smartM2M at ETSI or of the oneM2M consortium. The various releases of the oneM2M standard have made it possible to complete its technological interoperability, its connectivity with 3GPP for example and its ability to represent and process the information collected.

Despite the maturity of the oneM2M standard, its appropriation by the companies and its deployment in several fields remain limited in 10 years of existence. Documents such as “*ETSI TR 118 501 oneM2M Use case collection*” explain the possibilities of using the oneM2M standard in many use cases, however they do not highlight the benefits of using an IoT stack built on the oneM2M standard. The approaches to testing and certification tools (or the study of performance and planning tools in the new working group on ETSI TTF019 are positive points but they do not cover the financial benefits, commercial and resilience of the use of a

standard. In this fellowship project, I contribute to raising awareness of companies, teaching institute of benefits to use oneM2M on several aspects on the one hand to managers in term of commercial, financial, community, resilience, etc and on the other hand to developers in term of code source to simplify real IoT problem like interoperability or capability to use multi-vendors IoT stacks.

## Impact

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### Impact on SMEs

The objective of this fellowship project is to go further to create two specific messages for managers and developers. Most of presentation on oneM2M includes one or two slides about benefits of this standard, it seems to not enough to convince small company to invest in this technology. So, we think that a real study on benefits and drawbacks will help to the dissemination of oneM2M. After, managers and commercial department are interested in deploying the standard, one needs to convince technical staff. This the second part of my fellowship will demonstrate with real small code applications what is the gain in term of development when an application becomes more complex compared to other solutions of the market.

### Impact on Society

Concerning the Internet of Things, Europe in particular through ETSI and its WG smartM2M supports the development of the oneM2M standard with contributions in various fields: representation of information via ontologies, integration of AI in the IoT, etc. Special assistance is also being given to disseminate the oneM2M standard beyond the borders of Europe with targeted European projects such as INDICO or Indian EU-ICT standardisation with the creation of workshops or hackathons to explain and use the oneM2M standard, particularly at the political, industrial and training level. The objective of the project is to help to accelerate the dissemination of oneM2M standard in society through universities and companies.

A synthesis of advantages and drawback of oneM2M standard and demonstration with opensource implementation will help to convince the community of IoT standardisation and increase the impact on future release of the standard.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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No.

## Have the standardisation activities in your project led to specific deliverables?

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Three deliverables have been produced in the project:

- Benefits and drawbacks report: this report will give the survey build with industrial of the IoT domain. It will develop and argued the benefits and the drawbacks of oneM2M standard.
- Code examples: several examples of codes will be accessible as opensource.
- Slides for dissemination: the slides will show benefits and drawbacks of oneM2M standard and explanation of concrete examples.

## What future efforts or activities are still necessary for your area of application?

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Developing tools necessary for the adoption of the oneM2M standard remains necessary, for example around assistance in the design of oneM2M architecture, rapid generation of prototypes, assistance in the creation of compatible oneM2M equipment, etc.

## Online references related to the fellowship work

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 [www.onem2m.org/using-onem2m/list-of-deployments](http://www.onem2m.org/using-onem2m/list-of-deployments)

 [www.onem2m.org/using-onem2m/what-is-onem2m](http://www.onem2m.org/using-onem2m/what-is-onem2m)

 <https://onem2m.globalcertificationforum.org/all-certifications.html>

 <https://indico-ictstandards.eu>

# 3. Sustainable Growth





# Navigating ISO/TC 268 (ISO 37101 Management system for sustainable development), IEC SyC for Smart Cities (IEC/AWI 63205 Smart Cities Reference Architecture) and the upcoming work in CEN/TC 465



## **Monika Heyder**

Senior Officer at ICLEI -Europe  
Germany

### Sector

Global Standard Governance

### Engaged SDOs, WGs and TCs



ISO/TC 268  
CEN/TC 465  
CEN/CENELEC-ETSI SSCC SF TG Local Digital Twin

### Role

Chair to German Mirror in ISO/TC 268 and CEN/TC 465

### Addressed EU standardisation priorities and gaps

With this fellowship, I address the following gaps that ISO/TC 268 and IEC work tackles:

- ▷ Addressing sustainable development in ICT standards: Sustainable development is agreed on highest levels as the underlying objective of our work in standardisation. However, the links and connections are yet to be more widely established. The work undertaken in this project aims at bridging this gap by blending the ISO 37101 and the SCRAM to create a vital contribution to the green and digital transformation of cities and communities.
- ▷ Good governance – The new European standardisation strategy underlines the need for wider stakeholder engagement. Standards often become challenging to understand because stakeholders are not engaged early in the process. Including relevant partners at the initial stages can help clarify standards, identify potential synergies, and ensure a more comprehensive understanding. Including city representatives into standardisation is often challenging due to the high workload in daily operations.
- ▷ European leadership in global standards - through the High-Level Forum, the Commission will set up a new mechanism with EU countries and national standardisation bodies to share information, coordinate and strengthen the European approach to international standardisation.
- ▷ Support innovation will require easier access and navigation of complex standards: transforming societal needs into innovation through standards cities can play an important role as they are the location where innovation, technology and societal needs meet. However, cities and communities find it challenging to navigate the multitude of overlapping standards in smart cities. The parallelism of the workstream and the overlaps in topics are adding to the complexity hindering effective integration, application and implementation.



By identifying and addressing these gaps, the process of standardisation for smart, sustainable cities can become more efficient, inclusive, and effective.

## Concerned ICT Standards and contribution to the related landscape

The green digital transition is an opportunity for communities to achieve environmental sustainability, address climate change, and meet the UN Sustainable Development Goals. The transition leverages digital technology to enhance energy efficiency, foster circular economy, reduce emissions, and boost resilience.

The green digital transformation relies on integrating processes, interfaces, data, and technology to improve city life and resilience. This includes collecting and analysing real-time data to understand a territory better and improve community welfare. Standards facilitate harmonious interactions and enable unrestricted information flow across city systems. However, this digital integration poses challenges, such as privacy, data security, social equity, and resource management. These require careful planning, stakeholder engagement, and sound policies. The ISO 37101 standard supports sustainable development by enhancing municipalities' resilience and smartness, aiding transparent, effective transformations by introducing the necessary stakeholder engagement as well.

Meanwhile, the International Electrotechnical Commission's (IEC) SyC for Smart Cities addresses complex urban systems. SRD 63188:2022 provides a methodology for creating the Smart Cities Reference Architecture (SCRA), a versatile city systems architecture template. The SCRAM outlines desirable Smart Cities traits, SCRA perspectives, and model types, encouraging uniformity across architectures. Linking ISO 37101 with SRD 63188:2022 and SCRA can drive green and digital transformation.

## Impact

### Impact on SMEs

ISO 37101, a versatile management standard, can be utilised by diverse organisations. A case study in France since 2018 demonstrates its potential. France has consistently adopted this standard, published resources and aligned national projects with it, spearheaded by the French Ministry of Ecological Transition. From 2021-2023, new uses have emerged. Its European origins connect to the European Green Deal, and a potential link to Smart Cities Reference Architecture Methodology (SCRAM) could yield new SME support opportunities. The SCRAM-ISO 37101 connection underscores sustainability and resilience in developing smart city architecture.

### Impact on Society

Cities' trust in technology and data-driven approaches increases, and citizens are becoming interested and ready for smart technologies adoption. With this in mind, we have an opportunity to create a more sustainable, equitable future for all blending sustainable development with new technologies. Cities have unique needs and different levels of maturity for action, making it imperative to tailor our approach to each individual location, standards as blue-prints can become a game changer when integrating the needs and knowledge of cities and communities. With careful planning, stakeholder engagement, and policy development, we can ensure that we reap the rewards of this technological shift without compromising on these essential values. The green digital infrastructure should help address the societal and environmental challenges of today.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Yes. The revision of ISO 37101 and EN ISO 37101 may profit from my fellowship contributions. As well as, it impacts the development of the SCRAM in IEC SyC for Smart Cities and the joint work in the JWG 1 Smart Cities Reference Architecture.

## Have the standardisation activities in your project led to specific deliverables?

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The project will lead to a publication that will be shared open access.

## What future efforts or activities are still necessary for your area of application?

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The continued exchange between the different experts should learn from each other and exchange should breach the different SDOs and ESO. Further, increasing the integration of cities and communities in standardisation will be vital for the achievement of a single market strategy. Dedicated mentor programmes, awareness raising and dedicated support mechanisms should be considered.

## Online references related to the fellowship work

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 [www.iso.org/committee/656906.html](http://www.iso.org/committee/656906.html)

## ■ Lifts and Escalators in Smart Cities



### **Gero Gschwendtner**

*Professor Mechanical Engineering (HTL St. Pölten) &  
Independent Consultant  
Austria*

### Sector

Smart Cities and Communities

### Engaged SDOs, WGs and TCs



ISO/TC 178  
CEN/TC 10  
CEN/TC 10/WG 2

### Role

Chairman ISO/TC 178

Convenor CEN/TC 10/WG 2

### Addressed EU standardisation priorities and gaps

Until last year, the lift and escalator sector lacked any specific ICT standard, except for the cybersecurity standard. Initially, the philosophy driving the standardisation efforts within ISO/CEN was to incorporate all subjects into the core product standards, referred to as the “product bible” ISO 8100-1/2 and EN 115-1 (soon to be published as ISO 8103-1, currently undergoing voting processes). Over the years, as specific topics grew increasingly complex, supplementary standards were developed to support the main product standards.

It became evident that ICT was lacking in comprehensive coverage, given its rapid advancement. Consequently, a decision was made to analyse this situation, formulate a future strategy, address this issue, and bridge the gap. The creation of these new standards and technical specifications is of utmost priority. Simultaneously, the main product standards (referred to as the “product bible”) must be maintained, and certain general ICT aspects need to be incorporated within them. Furthermore, a significant challenge faced by ISO/TC 178 and the entire lifts and escalator sector pertains to the ongoing situation in China. Currently, China is undertaking several local standardisation projects at a notably rapid pace. Their release process involves fewer parties and is considerably faster than the CEN and ISO process. This underscores the utmost importance of ensuring that SAC continues its active participation in ISO and takes over all ISO standards as local standards. Consequently, additional cooperations have been established, and regular exchange meetings are being conducted to exert the greatest possible influence in this matter.

### Concerned ICT Standards and contribution to the related landscape

Lifts, escalators and moving walks are essential elements in providing safe access to buildings. There is a strong emphasis on safety, accessibility, energy & environment and highly relevant for the future ISO/TC 178 activities are also focusing now to a strong extend to ICT.

ISO/TC 178/WG 12 “Cybersecurity” was found in 2019. Within 3 years they published the new ISO 8102-20 Electrical requirements for lifts, escalators and moving walks - Part 20: Cybersecurity. This WG is now preparing ISO TS 8102-21 “*On-site and Off-site software updates*” for Lifts and escalators including information and operational technology (IT/OT) viewpoints and an Annex for Technical safety requirements for remote software and parameter-updates of the lifts, escalators and moving walks. The first draft is now complete, and the ballot begun in

June 2023. In addition, ISO/TC 178/WG 13 “New Technologies” have been found end 2022 as a result of the work initiated by ISO/TC 178/AHG1 in 2019. This AHG conducted a study in the field of new technologies to be used within lifts and escalators and how to deal with this topic in the future. This mission has been accomplished and accordingly in the ISO/TC 178 plenary meeting 2022 WG 13 then been found. In addition to the above-mentioned agreed project on ISO/NP TS 8100-10 it was also decided to develop a technical specification for Building Information Modelling considering ISO 19650-1:2018 impact (ISO/NP TS 8100-10).

Finally, the ongoing work for the lift and escalator product standards, energy standards and risk analysis standard are continuing, where the current focus is on the following standards: ISO/WD 8100-1, ISO/WD 8100-2, ISO/WD TS 8100-3, ISO/DIS 25745-1, ISO 25745-2:2015/CD Amd 1, ISO/PWI 14798-1, ISO/PWI TR 14798-2, EN-115-1.

## Impact

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### Impact on SMEs

ISO/TC 178 has a liaison with the following organisations:

- ▷ ELA European Lift Association and
- ▷ SBS - Small Business Standards with EFESME (European Federation for Elevator Small and Medium-sized Enterprises aisbl) as an expert member for lifts.

Both associations demonstrate a keen interest in this subject matter and actively engage in ISO/TC 178 meetings, as well as the corresponding working group (WG) meetings. The standards developed within this technical committee are crucial for the lift and moving walk sector, as they ensure product compliance, safety, and functionality throughout their entire lifespan. Participating in these working groups guarantees access to the latest technological advancements. Additionally, ensuring that those liaisons are given sufficient time in the meeting to express their concerns and raise relevant issues is vital, and it constitutes an integral part of my leadership responsibilities within ISO TC/178.

### Impact on Society

Lifts, escalators and moving walks are considered as means of transport and therefore represent an essential component of the functionality of the buildings they are installed in. Ensuring safe access and accessibility for all is of utmost importance. Contrary to most public means of transport, they are intended for free use and operation by their passengers, thus necessitating a strong emphasis on integrating safety measures. The primary benefit of these standards lies in prioritising passenger safety. By establishing a baseline for safety within the broadest context, these standards provide immeasurable value. Furthermore, this work encompasses both accessibility and energy efficiency and adherence to the United Nations' sustainability goals. These goals, namely 7, 8, 9, 10, 11, 12, and 13, are integral components of the standards, emphasizing a dedicated focus on sustainability.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, within this fellowship we initiated under my ISO/TC 178 chairmanship the start of the new development projects for ISO TS 8102-21 “*On-site and Off-site software updates*” and ISO TS 8100-10 “*Lifts for the transport of persons and goods — Part 10: Building Information Modelling*”.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, within this fellowship ISO/TC 178/WG 13 “New Technologies” was founded under my ISO/TC 178 chairmanship as well as the above-mentioned projects have been started. Furthermore, all other standard development projects are progressing as scheduled. As TC Chairman / WG Convenor, apart from the specific deliverables, you have many additional administrative deliverables to ensure the whole work and decisions can be done and implemented.

## What future efforts or activities are still necessary for your area of application?

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Those ICT projects have just started, and it is imperative to sustain this effort until completion and publication. Additionally, it is essential to maintain progress on all other standard development projects within ISO/TC 178, ensuring alignment with the expectations of our stakeholders and the agreed-upon plan.

## Online references related to the fellowship work

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 [www.iso.org/committee/53970.html](http://www.iso.org/committee/53970.html)



## Green Mobility Standardisation



### **Dr. Eusebiu Catana**

*Innovation Consultant, EC-ITS BV  
Belgium*

### Sector

Smart Cities and Communities

### Engaged SDOs, WGs and TCs



| ISO TC 204 ITS

### Role

Project editor of ISO 23795-1:2022

### Addressed EU standardisation priorities and gaps

With this fellowship, I target to harmonise the data exchanges and standardise the intelligent transport system (ITS) messages and data structures with the future roadside ITS station. I will also endorse the variety of the use cases related with ITS based road safety applications focusing on vehicle itself. The goal is to improve road safety of VRUs by expanding the use of the nomadic device based on V2X communication. Finally, a new concept of the roadside ITS station is needed: future smartRSU.

### Concerned ICT Standards and contribution to the related landscape

I am the coordinator of the Horizon Europe 5G-LOGINNOV project which will optimise freight and traffic operations at ports, port-cities, and logistics hubs by using new innovative concepts, applications and devices supported by 5G technologies, Internet of Things (IoT), data analytics, next generation traffic management, Cooperative, Connected and Automated Mobility (CCAM) and the 5G logistics corridor. My fellowship contributes to prepare the ISO/TC 204/WG 17 Intelligent transport systems document. I led the team that developed and prepared the ISO 23795-1:2022 standard.

This standard specifies a method for the determination of fuel consumption and resulting CO<sub>2</sub> emissions to enable fleet managers to reduce fuel costs and greenhouse gas (GHG) emissions in a sustainable manner. The fuel consumption determination is achieved by extracting trip data and speed profiles from the global navigation satellite system (GNSS) receiver of a nomadic device (ND). My activities during this fellowship allowed me to revise any relevant patent rights and any supporting documentation. It also helped start the harmonisation with the SAE & other SDOs.

The standards participated within this work are:

- ▷ ISO/TC 204/WG 14: Vehicle/roadway warning and control systems;
- ▷ ISO/TC 204/WG 16: Communications;
- ▷ ISO/TC 204/WG 17: Nomadic devices in ITS Systems;
- ▷ ISO/TC 204/WG 18: Cooperative systems;
- ▷ ISO/TC 204/WG 19: Mobility integration;
- ▷ ISO/TC 204/WG 20: Big Data and Artificial Intelligence supporting ITS.

## Impact

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### Impact on SMEs

In 5G-LOGINNOV project an open call was launched to select 5 innovative start-ups/ SMEs able to integrate in the 5G-based solutions developed in Hamburg, Athens, and Luka-Koper. The main target was the interoperability and use the same standards across of the pilot sites.

All 5 SMEs deployed and validated its ICT solution (prototype) in the physical context and infrastructure of one of the three Living Labs of the project to increase the efficiency and optimise land-use, while being interoperable and financially viable, respecting circular economy principles and being of service to the urban environment. 5G-LOGINNOV by opening the market to the innovative high-tech SMEs will also boost economic development and business innovation in ports & ports-cities areas.

### Impact on Society

Through 5G-LOGINNOV, ports will minimise their environmental footprint to the city and will decrease disturbance to the local population through a significant reduction in the congestion around the port. The solutions developed by the project are being deployed and validated in three Living Labs in the ports (or neighbouring city areas) of Athens (Greece), Hamburg (Germany) and Koper (Slovenia), addressing challenges taken by the mega-vessel era as well as those relevant for medium-sized ports with limited investment funds for 5G infrastructure and automation. **Moreover, the approved ISO-23795-1 standard will now allow companies and market players to develop further applications based on the proposed methodology and to reduce CO<sub>2</sub> emissions and fuel costs worldwide, urgently needed on the political agenda towards low carbon mobility solutions.**

The **ISO-23795-1 standard as a global standard can** drive competition and enable cost-effective introduction of new technologies related to green mobility. It facilitates the interoperability, compatibility, reliability, and efficiency of operations on a global scale by stimulating industry innovation and further assure a greater resource efficiency for a more circular economy, sustainable and responsible supply chains.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, it has developed the *ISO standard ISO 23795-1:2022 "Intelligent transport systems — Extracting trip data using nomadic and mobile devices for estimating CO2 emissions — Part 1: Fuel consumption determination for fleet management."*

The 5G-LOGINNOV Hamburg Living Lab proposed to demonstrate the potential of leveraging positive environmental impacts by using 5G for sustainable traffic management in order to develop and implement a methodology to capture the effect of the traffic infrastructure on regional emissions, thus making them comparable by quantifying relevant factors (driver profile, vehicle profile, loading, etc.) in the context of Traffic Management System (TMS) measures. By quantifying automatically of micro-scale traffic dynamic to the context (vehicle, load, driver, infrastructure, TMS situation, etc.) it was introduced a Traffic Light Forecast (TLF) service to be used in vehicle applications. This chain enables a cooperative micro-manoeuve behaviour of vehicles, avoiding unnecessary energy spending and reducing pollutants to a considerable degree. Thus, we have managed to develop and get approved the new **ISO standard ISO 23795-1:2022.**

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have contributed to drafting a technical report on development of a new standard.

## What future efforts or activities are still necessary for your area of application?

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To improve the road safety of VRUs by expanding the use of the nomadic devices based on V2X communication is needed to harmonise the work across ISO/TC 204 WG14-ISO/TC 204 WG 20. The common plan is to develop a new concept – such as smartRSU- of the roadside ITS station. As soon as the use cases related with ITS based road safety applications will be collected the first common draft text will be generated.

## Online references related to the fellowship work

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 [www.iso.org/standard/76971.html](http://www.iso.org/standard/76971.html)

 [www.iso.org/committee/54706.html](http://www.iso.org/committee/54706.html)

 <https://5g-loginnov.eu/open-call/>

 <https://5g-loginnov.eu/assessing-future-6g-technologies-for-cooperative-its-standards-and-vertical-implementation-in-cities-and-port-cities/>

 <https://5g-loginnov.eu/5g-loginnov-achievements-on-standardisations-at-ertico-focus-on/>

 <https://5g-loginnov.eu/5g-loginnov-coordinator-in-the-new-iso-working-group/>

 <https://fenix-network.eu/workshop-on-6g-and-iso-tc204/>

 <https://fenix-network.eu/fenix-achievements-on-standardisation-at-erticos-focus-on-event/>

# Development of ITS geographic data standardisation for highly automated driving - Phase 2



## **Loïc Blaive**

*Expert, Loïc Blaive ITS Mobilités Conseils EIRL  
France*

## Sector

Intelligent Transport Systems

## Engaged SDOs, WGs and TCs



CEN/TC 278  
ISO/TC 204  
ISO/TC 211

## Role

Expert contributor in ISO/TC 204/WG 3 and ISO/TC 211/JWG 11

Convenor of CEN/TC 278/WG 7

## Addressed EU standardisation priorities and gaps

The objective of this fellowship is to consolidate participation in international organisation which is yet too limited. About international developments the priority has been set to the finalisation/consolidation of the ISO 22726 series. Especially it has paved the way for preparing the revision of its Part 1 which should start soon. Also, with this fellowship, I support the preliminary work items adopted in May 2023 by ISO/TC 204 about map updates in a satisfying way and I help in the revision work of ISO 14296 (of 2016) mainly focused on map data structures for cooperative ITS (C-ITS) that is a basis for the ISO/TS 22726 series. The challenge for this revision is to fit the requirements from the latest developments.

Globally, my aim is to reinforce the European influence on development to meet the European needs and specificities, and thus to counterbalance the influence of the non-European country leading the works in ISO/TC 204.

## Concerned ICT Standards and contribution to the related landscape

My fellowship has continued the development of several technical specifications and other initiatives about geographic information applied to ITS and specially to automated driving (MHAD), including:

- ▷ ISO/TS 22726-1 and CEN ISO/TS 22726-2.
- ▷ Preparatory work to develop the future version of GDF ("Geographic data files) (PWI 5974).
- ▷ New joint task force between ISO/TC 204/WG 3 and CEN/ISO/TC 278/WG 7 about map updates (in association with the TN-ITS Platform and Sensoris ASBL).

## Impact

### **Impact on SMEs**

The impact is only indirect as standardisation is a convenient way for SMEs to access markets more easily, avoiding expensive and non-interoperable proprietary solutions that would be imposed by big international companies.

## Impact on Society

Standardisation of maps for connected and automated driving (CAD) systems is a cornerstone for the deployment of vehicles using these technologies. One can identify several possible impacts:

- ▷ Impact of the greenhouse gas (GHG) emissions allowed by a better use of engines.
- ▷ Impact on road safety (reduction of fatalities and casualties as it is a well-known fact that road accidents are due to human errors in a very wide scale).
- ▷ Impact on societal inclusion of elderly and/or disabled people by keeping their ability to move.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Yes, I have supported the creation of a PWI within ISO/TC 204 as well as the start revision of ISO/TS 22726-1 within ISO/TC 204/WG 3.

## Have the standardisation activities in your project led to specific deliverables?

Yes, I have contributed to the publication of ISO 22726-1 in June 2023. As well, I have supported developing a stable version of ISO/TS 22726-2 that has circulated in ISO/TC 204 and CEN/TC 278 for comments, this document ready for DTS ballot by October 2023.

## What future efforts or activities are still necessary for your area of application?

This activity should be continued with the starting revision of ISO/TS 22726-1, which will be a huge task considering the number of comments received during the DTS ballot and this of delayed topics for the first version. Another important activity will be about the new TS about map updates (possibly under the Vienna Agreement between CEN and ISO).

## Online references related to the fellowship work

 [www.iso.org/fr/committee/54706.html](http://www.iso.org/fr/committee/54706.html)

 [www.iso.org/committee/54904.html](http://www.iso.org/committee/54904.html)



# Bridging the gap between EU R&I ecosystem and worldwide standardization on Smart Energy



**Olivier Genest**  
Director, Trialog  
France

## Sector

Smart Grids and Smart Metering

## Engaged SDOs, WGs and TCs



JWG3 IEC SyC Smart Energy  
ISO/IEC JTC1/SC41

## Role

Co-Convenor of JWG3

## Addressed EU standardisation priorities and gaps

My application contributes to the several priorities of the Rolling Plan for ICT standardisation namely related to three sectors:

- ▶ Public sector information, open data and big data: within my TC, we bridge the gap between the EU R&I ecosystem and IEC standardisation, outreach of the vertical areas in the energy sector, BRIDGE and IntNET will foster the cooperation between the 5 Energy Data Spaces projects;
- ▶ Smart grids and smart metering: Incorporation of SAREF into the full demand-side flexibility chain; SAREF is considered in BRIDGE and in IEC TS 63417 project. BRIDGE and IntNET where I contribute, are supporting the Energy Dataspace projects;
- ▶ Electric vehicles (EVs): my work is related to IEC TS 63460 that will support the grid integration of EV charging infrastructure.

From IEC SyC Smart Energy perspective, I contribute to tackle the following challenges:

- Integration of new challenges (such as virtualisation, digital twin, ...) into the smart energy roadmap (IEC 63097);
- Alignment of the e-mobility and grid perspectives to enable EV-based grid support functions (IEC 63460).

## Concerned ICT Standards and contribution to the related landscape

With this fellowship, I continue working in the IEC System Committee Smart Energy that deals with systems level standardisation, coordination, and guidance in the areas of Smart Grid and Smart Energy. Moreover, JWG3 “Smart Energy Roadmap” is a joint Working Group between the IEC SyC Smart Energy and the ISO/IEC JTC1/SC41 which focuses on Internet of Things and Digital Twin. The purpose of this JWG is to map the existing standards with the relevant systems architectures, identify the standardisation gaps and recommend the development of new standards by TCs. With its systemic approach, the JWG also supports the introduction of IoT and Digital Twin concepts into the smart energy domain and coordinate their integration into Smart Energy standardisation.

In this WG, we have two main standards under development/revision:

- ▷ IEC TR 63097 Smart Energy Roadmap: the on-going work aims to update this standard (dated 2017) the mapping and gap analysis, include novel technology trends such as virtualisation or digital twin, and identify new required standardisation efforts for smart energy;
- ▷ IEC TS 63460 Architecture and use-cases for EVs to provide grid support functions: the purpose of this new standard is to define a common end-to-end architecture for EVs as DER/DESS, consistently with on-going activities from TCs such as TC69/120/57/, and then to specify grid support functions to map them to existing standards and to identify standardisation gaps.

As being co-Convenor of this JWG3, I am leading the work on IEC TR 63097 update and following the work on IEC TS 63460. I have also been appointed by France as expert to contribute to IEC TS 63460 project. In addition, I am making sure that the EU R&I results/experience from BRIDGE, ETIP SNET, OPEN-DEI and IntNET are considered at worldwide standardisation level, and I am disseminating the relevant on-going standardisation activities to the three abovementioned initiatives.

## Impact

### Impact on SMEs

The impact on European SMEs is twofold: firstly, my company Trialog is a European SME, which is impacted by my contribution. My activities in IEC SyC Smart Energy and ISO/IEC JTC1/SC41 allow to be aware of on-going standards development in the field of IoT and Smart Energy, which is crucial for a company providing consulting and expertise on innovation. Furthermore, my activities in the EU R&I ecosystem allow to share experience based on our R&I projects and to learn from the experience of other projects and actors. Secondly, the European SMEs from the smart energy sector, those involved in EU R&I projects, are impacted as the worldwide standards are better aligned with the EU R&I ecosystem, making it easier for Europeans SMEs to make business at worldwide level (less specific development). Furthermore, the EU R&I ecosystem, including SMEs, is better aware of the standards, so its players can develop solutions which are already aligned to worldwide practices.

### Impact on Society

My work supports the development of smart energy grids, allowing to integrate a high share of renewable energy sources and to support new usages such as transports electrification (e-mobility). Smart energy grids also enable a more efficient operation of the energy systems (i.e., less energy losses) and foster an active commitment of grid users (i.e., consumers or prosumers) towards the energy transition.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

My activities aimed to: (1) Update IEC 63097 Smart Energy roadmap; (2) Develop IEC 63460 Architecture and use-cases for EVs to provide grid support functions.

## Have the standardisation activities in your project led to specific deliverables?

No.

## What future efforts or activities are still necessary for your area of application?

The cross-fertilisation between EU R&I ecosystem and worldwide standardisation on Smart Energy needs to be pursued. BRIDGE has launched in 2021 an action on "BRIDGE contribution to standardisation": the continuation of my work will allow to support the newly created BRIDGE Standards User Group, both by pushing EU R&I results to standardisation and by ensuring that EU R&I is aware of worldwide standardisation activities and results.

Regarding the two on-going projects:

- ▷ Update of IEC 63097: the work is on-going, based on a methodology and supporting tools defined to enable iterative writing, validation, and publication of the updated content. Two first batches have already been completed and published. This work should be continued.
- ▷ Development of IEC 63460: the work has started in september 2022 and discussions are on-going to align the EU approach together with the US and JP perspectives. The CD is planned at the end of 2023.

For both projects, the EU R&I contribution will for sure be helpful.

## Online references related to the fellowship work

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 [www.iec.ch/dyn/www/f?p=103:14:204261071240084:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:12621,34](http://www.iec.ch/dyn/www/f?p=103:14:204261071240084:::FSP_ORG_ID,FSP_LANG_ID:12621,34)

 <https://syc-se.iec.ch/iec-63097-smart-energy-roadmap/>

# Contributing and adopting new standards for autonomous robotic systems



**João Manuel Leitão Quintas**

*Principal Researcher, Instituto Pedro Nunes  
Portugal*

Sector

Robotics and Autonomous Systems

## Engaged SDOs, WGs and TCs



IEEE SA P1872.2  
IEEE SA P 1872.3  
IEEE EPPC WG on ICT

## Role

Expert

## Addressed EU standardisation priorities and gaps

The EU Priorities & Gaps identified that will benefit from the work conducted with this fellowship include Sustainable Growth/Robotics and autonomous systems and Societal Challenges / eHealth, healthy living, and ageing. Nowadays AI, IoT, Cloud and Edge Computing, and Robotics are highly interrelated and cannot be dissociated from each other. Additionally, systems using such technologies are pervasive and ubiquitous; they are moving more and more from structured to unstructured environments, to work closely with humans in daily real-world tasks. Several applications require a closer interaction between robots and humans, and their environment.

When integrated into MedTech, Digital Medicine or Assistive technologies (for example in the field of Active and Assisted Living - AAL), the capabilities required to deliver Human-Machine interaction functionality motivate the integration of features associated with several technological challenges, including active perception features, mobility in unstructured environments, understanding human actions, detecting human behaviours and predict human intentions, access to large repositories of personal and social-related data, adapt to changing context.

## Concerned ICT Standards and contribution to the related landscape

This fellowship aims to contribute to three ongoing efforts related to standardisation and European policy advising on topics related to mainly with ICT, artificial intelligence, IoT and edge computing and autonomous robotic systems. My key objective is to contribute to the discussions and creation of resources that can support and facilitate the dissemination and adoption of standards, policy and guidelines proposed by key opinion leaders involved in the IEEE P1872.2 Standard for Autonomous Robotic (AUR) Ontology standard working group, the new IEEE P1872.3 Standard for Ontology Reasoning on Multiple Robots and IEEE EPPC Working Group on ICT. My focus will be given to AI, Edge Computing and Autonomous Robotic Systems applied in ICT for Healthcare and eHealth, healthy living, and ageing usage scenarios.

## Impact

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### Impact on SMEs

SMEs related to robotics and/or developing artificial agents with a certain degree of autonomy can be impacted by this contribution, as the standard being developed aims to bring added value for integration and interoperability in solutions based on robotic and autonomous systems.

### Impact on Society

This work is supporting the continuous effort to build solutions that address the societal impact related to demographic change challenges. Solutions integrating robotics and autonomous systems that adhere to the standard should result in more interoperable, intelligent, sustainable, and cost-effective technologies.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, I am directly involved in the proposal and approval to the new IEEE P1872.3, which will extend IEEE 1872.2 with specific sub-domain ontologies. While IEEE 1872.2-2021 can be considered still a top-level ontology, which is useful to describe system architectures, the case for IEEE P1872.3 will consider standardisation for ontology reasoning on multiple robots.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have drafted technical reports on recommendations for news or revised standards.

### What future efforts or activities are still necessary for your area of application?

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The overall standardisation in terms of knowledge representations for Robotics and Autonomous Systems (RAS) are not sufficiently addressed, hence the motivation and need to continue creating new standardisation projects (e.g., IEEE P1872.3). Moreover, in spite of the existing active standards we can still observe a lack of adoption. Possibly because some RAS applications did not become yet mainstream, but this may be changing within the next 5 to 10 years, as other related fields evolve and societal challenges pressing demand for new technology-based solutions to be developed. Hence, it is my opinion that the state of maturity for the topic I am addressing is still in preliminary stage and requires a continuation of action.

### Online references related to the fellowship work

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 [https://standards.ieee.org/project/1872\\_2.html](https://standards.ieee.org/project/1872_2.html)

 <https://standards.ieee.org/jieee/1872.3/11037>

 <https://github.com/joaquintas/aurora>



# Standards for Robotics and Autonomous Systems: Reasoning, Tasks, Semantic Maps, HRI.



**Paulo Gonçalves**

*Professor, Instituto Politécnico de Castelo Branco  
Portugal*

## Sector

Robotics and Autonomous Systems

## Engaged SDOs, WGs and TCs



IEEE WG 1872.3  
IEEE WG 1872.1  
IEEE WG 3140  
IEEE WG 3107  
IEEE WG 3108

## Role

Chair of IEEE standardisation WG 1872.3

Vice-chair of the IEEE RAS Portuguese Chapter

Member of the ontology team for IEEE standardisation WG 1872.1

## Addressed EU standardisation priorities and gaps

ICT standards for robots and autonomous systems, concerning semantic interoperability issues are needed for the healthcare and industrial application domains due to the increasing usage of autonomous systems and machines, e.g., robots, working together with humans. Such agents, humans, and machines, need to cooperate in any industrial, social, or healthcare environment to achieve human's well-being and safety. All the projects related to this fellowship aim to develop domain-level ontologies for robots, that can be further developed for the specified applications domains within robotics, that also involve humans in the loop.

To obtain a proper and formally defined interoperability amongst robotic agents, is needed a systematic way of representing knowledge and a common set of terms and definitions, ranging from the ICT, industry 4.0, industry 5.0, which includes social sciences and humanities (SSH), ethics, healthcare, IoT, and autonomous systems domains. These allow for unambiguous knowledge transfer among humans, robots, and other AI systems, as well as provide a foundational basis for the definition of the tasks that each robotic agent must perform, in each environment that should be semantically represented for interoperability, semantic maps. Moreover, HRI formal terminology concepts and its relationships are key to proper interactions with multiple robots and humans (HRI and multiple robots).

The already published standards IEEE 1872-2015, IEEE 1872.2-2021, IEEE 7007-2021, tackled basic definitions, and missed other core concepts such as the tasks, semantic maps, HRI, multiple robots, robot affordances, for example. These concepts need to be tackled in the future, worldwide, and specially within the EU, that needs to keep envisioning the application of AI based robotic and autonomous systems. The stated five IEEE WGs (1872.1, 3140, 3107, 3108, 1872.3) will fill the gap on these series of IEEE 1872 ontology driven standards.

## Concerned ICT Standards and contribution to the related landscape

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My fellowship is related to the development of five standards:

- ▶ IEEE P1872.1 Robot Task Representation;
- ▶ IEEE P1872.3 "Standard for Ontology Reasoning on Multiple Robots";
- ▶ IEEE WG 3140 Semantic Map for Autonomous Robots Working Group;
- ▶ IEEE WG 3107: Human-Robot Interaction Terminology;
- ▶ IEEE WG 3108: Recommended Practice for Human-Robot Interaction Design of Human Subject Studies.

The activity is, in the first three parts, related to IEEE standards, that are defined using ontologies for task representation for robotics systems, multiple robots and semantic mapping, e.g., that include basic definitions on tasks, actions, resources, communication, behaviour, semantic mapping, etc. The activity, in the fourth and fifth parts, aims to represent the agreed concepts, within the community and working groups, for human and robot interaction, as well to provide a recommended practice for HRI design of studies involving humans. These two activities are related in the sense that some concepts and relationship identified in P3108, will feed P3107.

## Impact

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### Impact on SMEs

My contributions are related to robotics, HRI, and knowledge representation, based on ontologies. Many renowned robotic companies are based in EU. An increasing number of state-of-the-art Robotics and autonomous systems use AI based systems to reasoning, mainly because of the increasing complexity of such systems. Nowadays, knowledge representation for robotics services and tasks are currently being regulated worldwide, to which EU SMEs must also comply. As such, knowledge representation for robotics standards will have a huge impact on future robotic and autonomous systems developed by companies.

### Impact on Society

The impact of formal knowledge representation for robotic and autonomous systems will lead to a better understating on the AI based reasoning of such systems by the Society at large, i.e., common people. As such will enhance the acceptability of those systems, also because robot tasks can now be represented in a standardised way with the finished IEEE 1872.1 standard for Robot Task Representation.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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With this fellowship, my contributions were directly involved in the IEEE 1872 ontology based standard series. A new standard was finished by the working group, namely the 1872.1 standard for Robot Task Representation. Also, I supported the start of a new working group, the IEEE 1872.3 "*Standard for Ontology Reasoning on Multiple Robots*".

## Have the standardisation activities in your project led to specific deliverables?

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The first main deliverable was the draft standard for the new IEEE standard 1872.1 Robot Task Ontology. Along with the standard was developed an open-source ontology to be published at the IEEE Standards open-source repository. The second main deliverable was the organisation of the International Workshop on Working towards Ontology-based Standards for Robotics and Automation - WOSRA 202 (June 2nd, London, United Kingdom). There, several works were presented, which included the presentation of some working groups related to the project, and the application use-case of ontology-based standards to the healthcare, elderly care, domain.

## What future efforts or activities are still necessary for your area of application?

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The envisioned needs relate to:

- ▷ develop application guides to roboticists for a proper applicability of the standards;
- ▷ develop standards for robot learning and intelligence in robotics;
- ▷ develop standards related to reasoning and its explainability within AI, Data and Robotics.

## Online references related to the fellowship work

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📄 The website for the organised workshop on standards for Robotics and Automation:  
<https://wosra.github.io/wosra/>

The online official presence of the working groups presented above, is:

📄 <https://standards.ieee.org/ieee/1872.1/6993/>

📄 <https://standards.ieee.org/ieee/1872.3/11037/>

📄 <https://standards.ieee.org/ieee/3140/10851/>

📄 <https://standards.ieee.org/ieee/3107/10709/>

📄 <https://standards.ieee.org/ieee/3108/10710/>

# Guidance (ISO 19770-10) for implementing IT asset management



**Stéphane Joret**  
Founder and CEO, Liscience  
France

## Sector

ICT Environmental Impact

## Engaged SDOs, WGs and TCs



| ISO JTC1 / SC7

## Role

Editor of ISO 19770-10

## Addressed EU standardisation priorities and gaps

My fellowship successfully addressed the following three priorities:

- ▶ Collect and dispose the comments raised by ISO SC7/WG21 experts about ISO 19770-10 draft to release a draft submitted to national standardisation bodies for a first ballot;
- ▶ Ensure the transition from the editor of the ISO 19770-10 project (David Bicket) to me is done appropriately and confirmed with an SC7 resolution, to keep the project going and make it sustainable;
- ▶ Collect the comments raised by national standardisation bodies in the ballot after they are consolidated by ISO, ideally before the plenary meeting in June 2023 to let me dispose the comments in two work sessions with participants.

The main challenge was related to this third priority: getting before the plenary meeting from ISO the consolidated comments raised by national standardisation bodies during the first ballot. I received this in the middle of the plenary meeting in Japan, without any comment to be disposed. Therefore, I presented there the content of ISO 19770-10 in my two sessions, ensured coordination with related initiatives, and released the new draft for the second ballot.

## Concerned ICT Standards and contribution to the related landscape

With this fellowship, I contribute to ISO 19770 family of standards for IT asset management (ITAM) that have been developed since 2004, initially for software assets, now for all types of IT assets. ISO 19770 standards help managing the IT asset lifecycle to maximise value, control costs, manage risks, support decision-making about purchase, re-use, and retirement of assets, and meet regulatory and contractual requirements. It supports many IT related management practices, financial optimisation, and sustainability. It is a core enabler for the digital transformation of our society as IT assets are its building blocks. ISO 19770 is closely related to ISO 20000, ISO 55000, ISO 27000 and WEEE EU rules on eWaste.

Because of its intrinsic complexity and close integration with other domains, ITAM implementation is difficult. In addition, the lack of standard detailed guidance has been a difficulty for ITAM solution vendors who need to propose ready-for-use and interoperable products. As a result, most organisations have a low ITAM maturity, with severe consequences (on security, environment, finance ...) for them, their country, the European Community, and

the society. The ITIL<sup>®</sup> 4 practice I wrote for AXELOS gives ITAM implementation details to address these difficulties. However, because of editorial choices, it is not sufficiently detailed and does not provide any guidance for ITAM related ISO standards. Therefore, I have joined ISO SC7/WG21 in 2020 to develop ISO/IEC 19770-10 that aims to provide more detailed guidance for ITAM implementation fully integrated with ISO 19770 family of standards and related ISO standards. The editor of the ISO 19770-10 project (David Bicket) announced his retirement. I invested a lot in this project as I'm amongst the people who created and reviewed most of the content. Nobody was seriously volunteer to become editor so the transition between David Bicket and me occurred naturally working on the project.

## Impact

### Impact on SMEs

ISO 19770-10 target audience is made of organisations that want to improve their IT asset management. This includes SMEs such as practitioners and improvers in public and private organisations, ITAM consultants, ITAM trainers and training providers. The document notably includes an annex that describes an ITAM training curriculum that I created and reviewed with most ITAM training organisations around the world. The goal is to encourage ITAM best practice adoption thanks to appropriate education and trustworthy professional certifications. At the SC7/WG21 plenary conference at Okayama (Japan) in June 2023, very positive discussions with an end-user led ITAM non-profit organisation revealed the need for an ISO 19770-10 based training with certification. We agreed to discuss further toward the development of an educational programme, and to get feedback from the members of this non-profit organisation as input for the second edition of ISO 19770-10.

### Impact on Society

The first edition of ISO 19770-10 should be released by the end of 2023 or the beginning of 2024. It is therefore too soon to measure its impact on society. However, implementation of ITAM best practice usually leads to:

- ▶ Increased reuse of IT assets, inside organisations and after they dispose assets, so the environmental impact should be very positive thanks to longer digital product lifecycle and, by the way, reduced electronic waste;
- ▶ Optimised expense for software, hardware, cloud services and related maintenance contracts, so the financial impact should be significant for organisations, and for European trade balance as most vendors are non-European companies;
- ▶ Trustworthy and up-to-date IT asset related data to better support cybersecurity, expenditure traceability, management of IT enabled services and digital transformation.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Yes, my project directly led to the writing, the review with many SMEs and the approval of ISO 19770-10 edition 1 by national standardisation bodies at the first ballot (19 yes, 0 no, and 19 abstentions). A country (Netherlands) approved the deliverable and suggested that it is updated when a new or changed ISO 19770 document is published, which was already on my roadmap for next years. I also contributed to the review of ISO 19770-5 (ITAM overview and vocabulary) to ensure alignment with ISO 19770-10. In June 2023, I provided to ISO a new draft of ISO 19770-10 with few minor adjustments to quickly trigger the next ballot.

I also recommended:

- ▶ New partnerships to develop ISO 19770-7 (ITAM tagging standards) with support from solution vendors;
- ▶ Development of Operational Technology (OT) standard protocols with solution vendors as part of ISO 19770-6 (Inventory).



## Have the standardisation activities in your project led to specific deliverables?

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Yes, I wrote a significant part of ISO 19770-10 and reviewed all its content in co-construction with many ITAM experts.

## What future efforts or activities are still necessary for your area of application?

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Since June 2023, as editor, I am officially in charge of managing this publication in time. Consequently, after the second ballot, I will have to work on the last stage before publication with the ISO editor.

At the SC7 / WG21 plenary conference, I also identified further development for ISO 19770-10 edition 2 with the:

- ▷ Inclusion of Operational Technology (OT) to better support growing operational usage of digital technology in all industry sectors;
- ▷ Edition 4 of ISO 19770-1 (ITAM system);
- ▷ Development of ISO 19770-13 (ITAM and sustainability).

## Online references related to the fellowship work

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<https://itamstandards.org>

<https://genorma.com/en/project/show/iso:proj:86588>

<https://standardsdevelopment.bsigroup.com/projects/9023-08290#/section>

[www.softwareone.com/en/blog/articles/2022/11/14/iso19770-10-implementing-an-itam-best-practice-framework](http://www.softwareone.com/en/blog/articles/2022/11/14/iso19770-10-implementing-an-itam-best-practice-framework)

[www.liscience.com/17/index.php/fr/evenements/95-conference-pleniere-iso-sur-la-gestion-des-actifs-informatiques-au-japon](http://www.liscience.com/17/index.php/fr/evenements/95-conference-pleniere-iso-sur-la-gestion-des-actifs-informatiques-au-japon) (in French)

<https://itassetmanagement.net/2021/06/15/19770-implementation/>

[www.itam.org/isoiec-19770-updates/](http://www.itam.org/isoiec-19770-updates/)

# 4. Innovation for Digital Single Market



# Harmonising Terminologies in Decentralised Identity Standards at ISO/TC307 and CEN-CENELEC/JTC-19



## **Jérôme Pons**

*Founder & CEO / Blockchain Standardisation Manager*

*Music won't stop*

*France*

## Sector

Blockchain and DLT

## Engaged SDOs, WGs and TCs



ISO/TC307  
ISO/TC307/JWG4  
CEN-CENELEC/JTC19

## Role

Expert

## Addressed EU standardisation priorities and gaps

My fellowship tackles harmonisation of terminologies and architectures at ISO/TC307/JWG4 and CEN CENELEC/JTC19/WG1. The challenges in this work were related to the work items in these two groups that at ISO/TC307/JWG4, the ISO/AWI 7603 was running out of time (DIS was expected end of 2023), then it was cancelled and replaced by ISO/PWI “Decentralized Identity” whereas at CEN-CENELEC/JTC19 announcement was made that reference to “electronic ledger” and “standard for smart contract” was removed from eIDAS2 thus impacting the work in progress at CEN-CENELEC/JTC19/WG1.

## Concerned ICT Standards and contribution to the related landscape

My fellowship addressed blockchain & distributed ledger technology (DLT) and their application domains to identifier/identity management and identification. With my contribution, we proposed a set of 36 decentralised identifier and identity terms (prepared in the scope of my previous StandICT.eu 2023 fellowship) for the terminology sections of ISO/AWI 7603 led by ISO/TC307/JWG4 and CEN-CLC TS “*Decentralised Identity Management Model*” led by CEN-CENELEC/JTC19/WG1.

ISO/TC307 cancelled ISO/AWI 7603, and ISO/PWI “Decentralized Identity” was created, which will help to harmonise terminologies between ISO/TC307/WG1, JWG4 and WG6 standards. I contributed to the outline proposing terminology (based on previous set of 36 terms) and architectures sections.

During CEN-CENELEC/JTC19 plenary meeting on March 28th 2023, announcement was made that reference to “electronic ledger” and “standard for smart contract” was removed from eIDAS2. Indeed, in February 2023, “the ITRE Committee adopted a version of the eIDAS/2 proposal that no longer contains section 11 on Electronic Ledgers as a regulated trust service”. This impacted the work in progress at CEN-CENELEC/JTC19/WG1.



## Impact

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### **Impact on SMEs**

As European SMEs are subject to stronger regulation (e.g. eIDAS, GDPR, Copyright), harmonising terminologies and architectures in worldwide standards is key to avoid the fragmentation of terminologies between international standards (e.g., ISO, W3C), European standards (e.g., CEN-CENELEC) and national standards (e.g., UNE, AFNOR). Harmonising terminologies in decentralised identity standards is key at ISO/TC307 and CEN-CENELEC/JTC19 before these terminologies are derived in European regulation (initially eIDAS2) and infrastructures (e.g., EBSI). All European SMEs will take advantage of such harmonisation.

### **Impact on Society**

ISO/TC307 technical committee contributes with 16 standards to the Sustainable Development Goals (SDGs) defined by the United Nations related to No Poverty, Quality Education, Industry, Innovation and Infrastructure, Reduced Inequalities, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action as well as Peace, Justice, and Strong Institutions.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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This contribution helped securing the continuity of work within ISO/TC307/JWG4, which is now the relevant standardisation body for harmonising terminologies and architectures in decentralised identity standards through ISO/PWI.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have drafted a technical report on common terminology.

### What future efforts or activities are still necessary for your area of application?

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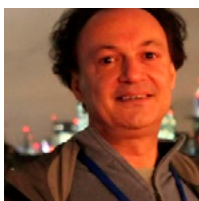
The harmonisation of terminologies and architectures in decentralised identity standards should be pursued and consolidated at ISO/TC307/JWG4 in the scope of ISO/PWI “Decentralised Identity” and re-launched at CEN-CENELEC/JTC19/WG1 even if reference to “electronic ledger” and “standard for smart contract” was removed from eIDAS2 regulation. Harmonised standards between ISO and CEN-CENELEC, would give European SMEs a competitive advantage (quality of standard) thus reinforcing the European sovereignty on blockchain (including self-sovereign identity and EBSI infrastructure).

### Online references related to the fellowship work

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 [www.iso.org/committee/6266604.html](http://www.iso.org/committee/6266604.html)

# Decentralised Media Rights Application Format



## **Panos Kudumakis**

*Senior advisor, Independent Consultant  
United Kingdom*

### Sector

Blockchain and DLT

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC29/WG03 MPEG

### Role

Chair of ISO/IEC JTC1/SC29/WG03 MPEG

Head of UK delegation to ISO/IEC JTC1/SC29

## Addressed EU standardisation priorities and gaps

Copyright legislation has continuously evolved so that fair, timely and transparent revenues are returned to artists and rights holders, e.g., US Music Modernisation Act and EU Digital Single Market Copyright Directive. Meanwhile, several key artists and media companies have turned their hopes for resolving these issues to blockchain, e.g., Open Music initiative by Berklee ICE in US and Mycelia by Imogen Heap in UK. The EC Rolling Plan for ICT Standardisation (2023) also reveals that the most critical areas of blockchain standardisation for IPR management are interoperability, identity, and smart contracts.

In line, the recently published ISO/IEC 21000-23 Smart Contracts for Media has already enriched DLT environments with inference and reasoning capabilities inherently associated with ontologies bridging the interoperability gap towards a semantic media blockchain. This standard will greatly assist the media stakeholders in achieving effective interoperability for the exchange of verified contractual data between different DLTs. Such a process in turn will increase trust among the stakeholders for sharing high-value data (e.g., music rights) in the ecosystem. Moreover, work has been initiated on ISO/IEC 23000-23 Decentralised Media Rights Application Format with aim to provide the means (e.g., APIs) towards enabling a fairer marketplace for rights holders and remuneration of authors and performers based on widely deployed MPEG technologies (e.g., audio-visual codecs, file formats, streaming protocols, and smart contracts) and non-MPEG technologies (e.g., DLTs, content and creator IDs). Such a decentralised media ecosystem has the potential to unlock the Semantic Web and in turn the creative economy; drive a shift of power in the media value chain (e.g., from intermediaries to artists and rights holders); and facilitate greater fan interactivity and engagement, e.g., fans could be a partial owner of new works and even become creators of new derivative works.

## Concerned ICT Standards and contribution to the related landscape

The MPEG Systems Smart Contracts for Media Subgroup, that I chair, has already published ISO/IEC 21000-23 Smart Contracts for Media in November 2022. The latter supported by rich semantic copyright models can be handy when data-based decisions need to be derived by evidence and logic, leading to new business models that can be efficiently deployed on decentralised digital media platforms. But what about interoperability of such platforms beyond smart contracts? Thus, work has been initiated on ISO/IEC 23000-23 Decentralised Media Rights Application Format with scope to provide the means (e.g., APIs) towards enabling



a fairer marketplace for rights holders based on MPEG technologies (e.g., audio-visual codecs, file formats, streaming protocols, and smart contracts) and non-MPEG technologies (e.g., DLTs, content and creator IDs).

Its components will include:

- ▷ smart contracts and DLTs (e.g., ISO/IEC 21000-23 Smart Contracts for Media);
- ▷ rights metadata management (e.g., ingestion, conflicts and queries);
- ▷ content and creator IDs (e.g., ISCC – Content Codes and ISNI – Name Identifier);
- ▷ file formats and streaming protocols (e.g., Tech Emmy® award winning ISO/IEC 14496-12 ISO Base Media File Format and ISO/IEC 23009 Dynamic Adaptive Streaming over HTTP). The focus will be on ISO/BMFF derived and widely deployed ISO/IEC 23000-23 Interactive Music Application Format and ISO/IEC 23000-19 Common Media Application Format for decentralised music and video applications, respectively.

That is, ISO/IEC 21000-23 Smart Contracts for Media has bridged the interoperability gap towards a semantic media blockchain. As such, it has the potential to unlock both the Semantic Web and in turn the creative economy. While ISO/IEC 23000-23 Decentralised Media Rights Application Format building around DLT-agnostic ISO/IEC 21000-23 Smart Contracts for Media is envisaged to drive a shift of power in the media value chain (e.g., from the intermediaries to artists and rights holders).

## Impact

### Impact on SMEs

EU Digital Single Market Copyright Directive aim to facilitate a fairer marketplace for rightsholders. Effective IP rights management in the digital environment is key to support the competitiveness of creative industries. Most of the internet traffic is around creative content, thus creative industries are key to generating economic value for all the stakeholders involved in the creative value chain. Therefore, creative SMEs need to be empowered to make better decisions and deploy more advanced solutions based on insights gleaned from data. ISO/IEC 21000-23 Smart Contracts for Media supported by rich semantic copyright models can be handy when data-based decisions need to be derived by evidence and logic, leading to new business models that can be efficiently deployed on decentralised digital media platforms. However, the interoperability of such platforms is addressed by ISO/IEC 23000-23 Decentralised Media Rights Application Format which its advancement is the focus of this fellowship project.

### Impact on Society

ISO/IEC 23000-23 Decentralised Media Rights Application Format building around DLT-agnostic ISO/IEC 21000-23 Smart Contracts for Media has the potential to unlock both the Semantic Web and in turn the creative economy. The latter is not only one of the most rapidly growing sectors of the world economy, but also a highly transformative one in terms of income-generation, job creation, export earnings, quality of life and social cohesion. Recent studies have shown that the creative sector is contributing 4.4 % to the EU GDP, while providing quality jobs to 8.3 million people across EU27. However, the creative economy sector is highly mobile, representing both a risk and an opportunity. With the right investment, policy, regulatory and immigration regime, EU could leap the rewards as leader in this field. Get it wrong and swathes of this highly internationalised workforce will relocate to Canada and US whose governments are working hard to create attractive conditions for growth.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

This fellowship project, towards enabling a fairer marketplace for rights holders and remuneration of authors and performers, initiated work on a new standard ISO/IEC 23000-23 Decentralised Media Rights Application Format which is currently at Working Draft (WD) stage.

## Have the standardisation activities in your project led to specific deliverables?

At the 140th MPEG meeting, Mainz (DE), 24-28 Oct. 2022 a revised Technologies under Consideration (TuC) for ISO/IEC 23000-23 Decentralised Media Rights Application Format document has been published including motivation, scope, use cases, architecture, and technologies. At the 141st MPEG meeting, Online, 16-20 Jan. 2023 studied and solicited the first contributions in the areas: 1) smart contracts and DLTs, 2) rights and metadata management, 3) content and creator IDs, and 4) file formats and streaming protocols. At the 142nd MPEG meeting, Antalya (TR), 24-28 Apr. 2023 a preliminary Working Draft (WD) has been published. At the 143rd MPEG meeting, Geneva (CH), 17-21 July 2023 a revised Working Draft (WD) is expected to be published.

The latter currently includes:

- ▶ NFTs co-working with legacy and emerging content and creator IDs for IP entities and associated deontic expressions based on DIDs.
- ▶ a preliminary demo that uses ISO/IEC 21000-23 Smart Contracts for Media in content transactions (for video streaming using dash.js) within blockchain systems. It facilitates the issuance, transfer, and monetisation of assets and enforces rights and royalties for stakeholders.
- ▶ a methodology on actions (create, manage, distribute, stream and play) vs entities (users, IP entities and deontic expressions) for further APIs identification and workflows needed for the interaction of the technologies involved in ISO/IEC 23000-23.

## What future efforts or activities are still necessary for your area of application?

ISO/IEC 14496-12 ISO Based Media File Format (ISO/BMFF) and ISO/IEC 23009 Dynamic Adaptive Streaming over HTTP (DASH) are widely deployed and Tech Emmy® Award winning standards. ISO/IEC 23000-23 Decentralised Media Rights Application Format is focusing on co-working of these standards with DLT-agnostic ISO/IEC 21000-23 Smart Contracts for Media, towards enabling a fairer marketplace for rights holders and remuneration of authors and performers. Thus, the future activities of the MPEG Systems Smart Contracts for Media Subgroup are concentrated on:

- ▶ Solicit further industry participation and contributions in the areas: 1) smart contracts and DLTs, 2) rights and metadata management, 3) content and creator IDs, and 4) file formats and streaming protocols.
- ▶ Enhance collaboration with liaisons (e.g., ISO/TC 307/WG3, ITU-T Q.22/SG16, INATBA, W3C DIDs, ISO/TC46/SC9/WG18 ISCC and the European Commission) and conduct further dissemination activities (e.g., Digital Asset Management WG - Metaverse Standards Forum).

Of course, the competition is fierce (e.g., de jure vs de facto standards) and such efforts and activities require both media industry consensus and significant investments.

## Online references related to the fellowship work

### Resources for ISO/IEC 23000-23 Decentralised Media Rights Application Format

- 📄 Standard Specification: <https://www.iso.org/standard/86437.html> (Under development)
- 📄 Preliminary Working Draft (WD): <https://tinyurl.com/4ea5ybn>
- 📄 Join MPEG Systems Smart Contracts for Media Subgroup: <https://tinyurl.com/2bbukxfs>

### Resources for ISO/IEC 21000-23 Smart Contracts for Media

- 📄 Standard Specification: <https://www.iso.org/standard/82527.html>
- 📄 Reference Software: <https://tinyurl.com/mrdfzs9t>
- 📄 Demonstration (incl. videos): <https://tinyurl.com/476dnrfj>
- 📄 White paper (incl. slides): <https://tinyurl.com/2ne769wn>
- 📄 Short article: <https://tinyurl.com/57tmxcd4> (StandICT.eu success story)

# Contribution to ISO/TC 307 - ISO/IEC JTC 1/SC 27 WG



## **Ljupcho Antovski**

*Professor, Faculty of Computer Science and Engineering  
Macedonia*

### Sector

Blockchain and DLT

### Engaged SDOs, WGs and TCs



ISO/TC 307  
ISO/IEC JTC 1/SC 27  
European DIGITAL SME Alliance Task Force

### Role

Member

### Addressed EU standardisation priorities and gaps

With this fellowship, I contribute to the joint ISO/TC 307 - ISO/IEC JTC 1/SC 27 WG4, which works in one of the priority areas that has been recently added to the EC ICT Standardisation Rolling plan. This plan calls standard developing organisations to identify potential standardisation needs, and I support this action within ISO TC 307 for future standardisation in blockchain.

### Concerned ICT Standards and contribution to the related landscape

In the joint WG where I am contributing to, the aim is to identify potential standardisation needs. Since the Commission has established a liaison with ISO TC 307, this activity supports the planned EC RP - BLOCKCHAIN AND DISTRIBUTED LEDGER TECHNOLOGIES Actions 1,3,5,6.

### Impact

The participation in the Joint ISO/TC 307 - ISO/IEC JTC 1/SC 27 WG 4 will help the EC to identify potential standardisation needs. In addition, my dissemination participation in the new European DIGITAL SME Alliance Task Force will be to liaison with the progress on the work in the ISO standardisation area to network and discuss blockchain-related opportunities and challenges and shape the European blockchain ecosystem. In general terms, the participation in this high-profile standardisation bodies will enable fair representation of European members in the areas of interest and will make sure that the European interest is well represented.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

No directly, but with continuous engagement within the joint ISO/IEC WG, I participate in voting standards ballots.

## What future efforts or activities are still necessary for your area of application?

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I will continue my engagement in the above-mentioned work groups and TCs beyond this fellowship to represent the European interests in the development of international standards in Blockchain and DLT.

## Online references related to the fellowship work

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 [www.iso.org/committee/6266604.html](http://www.iso.org/committee/6266604.html)

 [www.digitalsme.eu/](http://www.digitalsme.eu/)

# Pathway to standardise the Blockchain Governance and Interoperability nomenclature (Path2Block)



**Soumya Kanti Datta**

CEO and Standardisation Manager, Digiotech  
Estonia

Sector

Blockchain and DLT

Engaged SDOs, WGs and TCs



IEEE Blockchain Governance Standards Working Group  
AIoTI

Role

Member of IEEE P2145 and AIoTI

Addressed EU standardisation priorities and gaps

My fellowship addresses specific priorities of the above mentioned SDOs contributing to the overall EU standardisation priorities and gaps in Blockchain and Distributed Ledger Technology (DLT). Both IEEE P2145 and AIoTI are working towards resolving the current gaps on blockchain governance and interoperability of nomenclature to meet the needs of the blockchain and distributed ledger technology industry. This is one of the main European priorities not only in blockchain, but also for interoperable (research and industrial) platforms.

Concerned ICT Standards and contribution to the related landscape

I have contributed to conception and early development of governance and semantic interoperability implementations which will pave the way for a standardised lexicon in blockchain and DLT implementations and industries. By contributing to ongoing efforts to form a standardised a uniform lexicon, my project Path2Block will effectively reduce ecosystem fragmentation, promote semantic interoperability, and improve governance design patterns of blockchain systems in the long run upon adoption of the standards.

Impact

**Impact on SMEs**

The current rapid growth in blockchain market is largely fuelled by the European SMEs and start-ups. According to Business Market Insights, a market research company<sup>9</sup>, the European blockchain market is estimated to grow from US\$ 1,234.08 million in 2021 to US\$ 59,142.33 million by 2028 at a massive CAGR of 73.8% from 2021 to 2028. Western Europe is the second largest region in terms of blockchain spending worldwide, after the USA<sup>10</sup>. These European SMEs will be positively impacted, especially when adopting IEEE P2145 on blockchain governance and nomenclature interoperability. Blockchain governance has emerged as a constraint on adoption and wider use of the technology across the blockchain and DLT communities. Due to the open-source nature of the standard, the adoption will be seamless and without a significant effort.

9 <https://www.businessmarketinsights.com/reports/europe-blockchain-market>

10 <https://www.cbi.eu/market-information/outourcing-itobpo/blockchain>

## Impact on Society

Path2Block envisions to be rapidly adopted as a reference by innovative European SMEs and start-ups which builds upon open source, free, and reusable software, specifications and services. Such uniform lexicon for blockchain governance and semantic interoperability will ultimately bring a lot of benefits to the EU citizens using cross-border or national public services and national public administrators.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

Yes, I have contributed to the proposal to conceptualise and develop an early version of the Standard for Framework and Definitions for Blockchain Governance.

### Have the standardisation activities in your project led to specific deliverables?

My activities are a part of the ongoing deliverables of IEEE P2145 and AIoTI.

### What future efforts or activities are still necessary for your area of application?

Blockchain and DLT standardisation is in its infancy and further support is still necessary.

### Online references related to the fellowship work

 <https://opensource.ieee.org/oscom/projects>

 <https://ieeexplore.ieee.org/document/10147060>

 <https://standards.ieee.org/ieee/2145>



# ISO/CD 24138 – ISCC – International Standard Content Code



## **Sebastian Posth**

*Convenor and Expert, ISCC Foundation  
Netherlands*

### Sector

Blockchain and Distributed Ledger Technologies

## Engaged SDOs, WGs and TCs



ISO/TC 46/SC 9/WG 18 – ISO/CD 24138  
DIN NID 09 NA 009 - 00 09 AA

## Role

Convenor and Expert of ISO/CD 24138

## Addressed EU standardisation priorities and gaps

Decentralised content identification represents a significant innovation for the media industries and the creative communities. The ISCC stands out from existing media identifiers due to its unique feature of being generated directly from the media file itself. This allows anyone with access to the media file to create an ISCC without relying on centralised registries or external authorities for manual management and assignment of identifiers. By being a content-derived identifier, the ISCC effectively bridges the gap between manually managed higher-level content identifiers, such as work and product identifiers, and their associations with digitally encoded manifestations of content. In essence, the ISCC complements other content identifiers and plays a crucial role in supporting the discoverability of additional identifiers and metadata based on digital content. Notably, the ISCC is currently the only decentralised, content-derived identifier standard for digital media assets with lightweight fingerprinting capabilities. This means that it possesses the ability to perform content matching efficiently and effectively.

## Concerned ICT Standards and contribution to the related landscape

During this fellowship, my primary focus has been on ISO/CD 24138, the International Standard Content Code. As part of “*ISO/TC 46/SC 9 Identification and description*”, the ISCC is poised to become a sister standard alongside well-established media identifiers, such as ISBN, DOI, ISSN, ISRC, ISWC, ISAN, and others. The development of the ISCC involved close collaboration with experts from registration authorities responsible for existing ISO standards, who actively contributed their valuable insights to the working draft as members of WG 18.

## Impact

### **Impact on SMEs**

The digital media sectors are witnessing a rapid expansion, primarily controlled by large, predominantly US-based corporations. In the absence of a unified international standard, these companies resort to their proprietary content identifiers, such as Amazon ASIN, Google GKey/Content-ID, and Apple-ID, to manage both creator and user-generated content. This approach proves to be highly inefficient, costly, and fosters a troubling vendor lock-in situation. To address these challenges, the ISCC emerged as an open identifier standard specifically designed to streamline the management of digital content within decentralised

media environments. The ISCC's core objective is to establish a fundamental prerequisite for efficient and automated content licensing transactions in the online realm. By providing a robust framework for content identification, the ISCC empowers small and medium-sized enterprises (SMEs), including creators, media organisations, retailers, platforms, collecting societies, and other stakeholders across various media sectors in Europe. With its open and standardised approach, the ISCC contributes to a healthier digital content ecosystem, enabling seamless collaboration, fair competition, and enhanced protection for creators and their creations.

### **Impact on Society**

Embracing the ISCC standard allows creators and rightsholders to assert their rights to copyright-protected works with greater ease and effectiveness. It plays a crucial role in preventing misappropriation and abuse of digital content in the online space. Furthermore, the ISCC facilitates the provision of essential metadata and rights management information, ensuring transparency and accountability in content ownership and usage. Another critical aspect the ISCC addresses is the support it provides for the identification and authentication of original content. In an era plagued by fake news, disinformation, and a flood of AI-generated content, the ISCC serves as a powerful tool to counter such harmful practices, promoting accuracy and authenticity.

### Have the standardisation activities in your project led to specific deliverables?

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The standardisation activities were successful. The draft international standard (DIS) is expected to be registered in September 2023.

### What future efforts or activities are still necessary for your area of application?

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After the final ballot, ISO 24138 can be published in 2024.

### Online references related to the fellowship work

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📄 ISO/TC 46/SC 9 [www.iso.org/committee/48836.html](http://www.iso.org/committee/48836.html)

📄 ISO/CD 24138 [www.iso.org/standard/77899.html](http://www.iso.org/standard/77899.html)

# Danish participation in the ISO/IEC JTC 1/SC 32 WG 3 Database languages (SQL and GQL)



**Thomas Frisendal**

*Database Standards expert, TF Informatik  
Denmark*

## Sector

Semantic Interoperability

## Engaged SDOs, WGs and TCs



ISO IEC/JTC1/ SC32/WG3

## Role

Danish expert in the ISO/IEC 39075

## Addressed EU standardisation priorities and gaps

Since graph database technology is a key for meaningful and explainable machine learning and AI, it is evident that these standards will have positive impact on applications in our societies. Key aspects of using graph technology and query language are very important. The SQL universe was/is somewhat technical, but graph database concepts have a lower learning curve and thus are accepted more rapidly (by users of ICT solutions), also in the SME world.

With the support of this fellowship, I am participating in the WG3 meetings by reading the papers, commenting as necessary and contribute to the decisions. I am also preparing some additional discussion papers (besides the two that I already contributed) and change proposals for GQL 1.x: a discussion of designing the basic temporal support (in accordance with later extensions for more advanced temporal support). I also follow research in the following areas, intended for forthcoming discussion papers and change proposals for the standard: Advanced temporal support (user-defined multiple timelines and user-defined life-cycles of database elements). Improved accordance between the database functionality of GQL and ISO/IEC standards for records management, and the importance of easy interoperability between property graphs and semantic (RDF) graphs.

## Concerned ICT Standards and contribution to the related landscape

I am the Danish national expert to: ISO/IEC/JTC 1/SC 32 Information technology — Database languages — SQL, Parts 1 through 16 & ISO/IEC CD 39075 Information Technology — Database Languages. Recently the ISO working group has initiated a cooperation with the Linked Data Benchmark Council (PDBC) for the creation of proposals concerning GQL schema definitions in the closed world assumption contexts. I also follow the LDBC working group and contribute to that important development.

## Impact

### Impact on SMEs

New ICT technologies are making inroads today. Not least graph databases, machine learning and artificial intelligence. Their impact on democratic governance, culture and society must be expressed explicitly by the EU and in my home country, Denmark. There are only 7 EU countries actively participating in ISO/IEC JTC 1/SC 32: Denmark, Finland, Germany, Italy, Netherlands, Poland and Sweden. With the contribution of this (and my previous) fellowship, I am putting a European fingerprint on the GQL standard by also considering the human

and business aspects of applied database technologies. I am contributing discussion paper areas such as human perception, intuition, temporality, records management, accountability, reliability, and ease of use. The SQL universe is somewhat technical, but graph database concepts have a lower learning curve and thus are accepted more rapidly (by users of ICT solutions), also in the SME world.

### **Impact on Society**

I believe the impact is high, since graph databases and knowledge graphs in particular are favoured solutions in relation to the much-debated generative AI opportunities supported by Knowledge Graphs.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, the work on GQL is now in Draft International Standard Status as a collective committee effort.

### What future efforts or activities are still necessary for your area of application?

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The current version of the GQL standard only has partial solutions for the graph schema definition challenges, cf. above. The ambition is to reach consensus for broader functionality in 2024.

### Online references related to the fellowship work

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 [www.dataversity.net/author/thomas-frisendal](http://www.dataversity.net/author/thomas-frisendal)

# IoT Semantic Interoperability - Specialisation to Energy and relationship to AI



**Amelie Gyrard**

*Principal Research & Innovation Consultant, Trialog  
France*

**Sector**

Semantic Interoperability

## Engaged SDOs, WGs and TCs



ISO/IEC SC 42  
ISO/IEC SC 41

## Role

Expert

## Addressed EU standardisation priorities and gaps

In the framework of this fellowship, my contributions concern three different standardisation priorities: 1) energy standards (IEC SRD 63417: Guide and plan to develop a unified IEC Smart energy Ontology, and ETSI SmartM2M SAREF4GRID specification), 2) Standardisation of IoT Interoperability by ensuring integration of SAREF and other European contributions, and 3) Standardisation of AI architecture by ensuring integration of European contributions on AI and interoperability (e.g. BDVA, IDSA, AIOTI, and H2020 projects such as IoT large-scale projects) into ISO/IEC JTC1/SC42 AI.

## Concerned ICT Standards and contribution to the related landscape

With this fellowship, I have contributed to IEC SyC Smart Energy/WG 6, and especially to Generic Smart Grid Requirements related to IEC SRD 63417 ED1: Guide and plan to develop a unified IEC Smart energy Ontology. Moreover, I have done numerous contributions by providing paragraphs or sharing knowledge about linked data, W3C SSN ontology, interconnect ontology, SAREF4ENER, FAIR principles, terms and definition, state of the art on existing energy ontologies, European interoperability framework, validation/evaluation of an ontology, etc.

In addition, I have contributed to ETSI SmartM2M SAREF4GRID specification, especially by introducing IEC 63417: Guide and plan to develop a unified IEC Smart energy Ontology which was missing and contributed to the section on ontologies by mentioning the LOV4IoT energy ontology catalogue). Also, I have mentioned the development of SAREF-Compliant Knowledge Discovery for Semantic Energy and Grid Interoperability IEEE World Forum on Internet of Things (WF-IoT) 2021.

## Impact

### Impact on SMEs

My company Trialog is a SME, so we are directly impacted by my contributions. In addition, the standards under consideration will benefit to all the Smart Energy ecosystem, including SMEs, as they can develop tools, applications compliant with those standards.



## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, within IEC TC57 I have contributed to a new work item on smart energy ontology (the work is carried through contributions via the joint working group JWG3 “*IEC Smart Energy Roadmap Managed by SyC Smart Energy*” of SC41). SyC Smart Energy: WG 6: Generic Smart Grid Requirements SRD 63417: Guide and plan to develop a unified IEC Smart energy Ontology.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have contributed to a technical report on the development of a new standard.

## What future efforts or activities are still necessary for your area of application?

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The forecast publication date of the new standard IEC SRD 63417 is in September 2024.


## Online references related to the fellowship work

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 [https://iec.ch/dyn/www/f?p=103:214::::FSP\\_ORG\\_ID:11825](https://iec.ch/dyn/www/f?p=103:214::::FSP_ORG_ID:11825)

 <https://lov4iot.appspot.com/?p=lov4iot-energy>

 <https://hal.archives-ouvertes.fr/hal-03336052>

 [https://iec.ch/dyn/www/f?p=103:214::::FSP\\_ORG\\_ID:11825](https://iec.ch/dyn/www/f?p=103:214::::FSP_ORG_ID:11825)

# 5. Societal Challenges





# CircThread Standardisation for Digital Product Passports



## **Rembrandt Koppelaar**

*Head of Circular Economy, EcoWise Ekodenge Ltd  
United Kingdom*

### Sector

Digital Product Passport

## Engaged SDOs, WGs and TCs



ISO TC/323 WG5  
SRAHG CEN/CENELEC

## Addressed EU standardisation priorities and gaps

The gaps being addressed cover firstly the interoperability of Digital Product Passports from multi-actor perspectives, and secondly the lack of standardised common ICT infrastructure associated information and governance mechanisms to exchange critical information across supply chains to calculate performance indicators that can be used in Digital Product Passports.

## Concerned ICT Standards and contribution to the related landscape

This fellowship contributes to the standard under development in ISO/TC 323/WG 5 - Product Circularity Data Sheet covers the development of product statements. The aim is for the standard to be used for business-to-business exchange between suppliers and manufacturers, as well as for verification/compliance of market surveillance authorities and/or third-party verifiers. The details of this are not worked out and new specific ICT related standardisation works are needed for specifying ICT systems for business-to-business data exchanges. The work has contributed by proposing a standard that links the upstream (supply chain) with the downstream (product life cycle), to define the requirements for a Data Space system for business-to-business data exchanges across the supply chain, with the potential for linkages to Digital Product Passports that operate in the product life cycle.

A new proposed Joint CEN and CENELEC Technical Committee (CEN-CLC/JTC) on Digital Product Passport (DPP) for which a ballot has started that will be closed on 19 September 2023, with a broad remit for the DPP system with a need for 5-10 new standards (to be determined when TC is formed). The work has contributed by proposing a standard for requirements of DPP interfaces to ensure interoperability within different usage contexts, for purposes of proposed standard to ensure usability across DPPs for operators within different contexts. This is especially beneficial for operators that need to work with a wide range of brands/products, such that a minimum unified landscape is needed; for example, a recycler that processes small and large appliances of dozens of brands and thousands of models.

## Impact

### **Impact on SMEs**

Standards need to be developed with European SMEs and their operations in mind, such that the developed standards can be utilised by SMEs, mid-caps, and large corporates. A standardisation development for business-to-business data exchanges of circularity information is critical for SMEs. Equally the standardisation development is critical for the success of Product Passports which is heavily reliant on SMEs being able to work with ICT

systems that are used to create, manage, and govern Digital Product Passports. With the added challenge that many SMEs will not have in-house software capabilities but work with external software providers that need to deliver their DPPs and associated data exchange systems, either traditional cloud-based approaches or innovate approaches such as Data Spaces. The availability of ICT standards to ensure interoperability in working with Digital Product passports and associated data exchanges is key.

### **Impact on Society**

The societal impacts supported by the work are linked to the aim to help advance the implementation of Digital Product Passports faster than otherwise possible. The societal impacts of this are to make it possible to shift behaviour to more greener and circular products with more transparent lifespan, repair, and recycling information available to consumers, and similar impacts when enabling information exchanges using Digital Product Passports between economic actors including manufacturers, repairers, refurbishes, remanufacturers and recyclers. At this level it relates to societal impacts to make greener circular business models possible such as Product as a Service (e.g., new offering for product rental), Product repair contracts (currently in place but too costly).

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

My fellowship is resulting in a recommendation for a standard on Digital Product Passport user interfaces that will be included in the broader standardisation roadmap of the CircThread project (supported under Horizon2020).

### Have the standardisation activities in your project led to specific deliverables?

Yes, I have drafted a technical report on recommendations for a new standard.

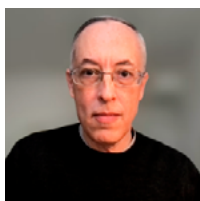
### What future efforts or activities are still necessary for your area of application?

The field of ICT standard for circularity is highly challenging due to the interconnected disciplinary needs across various domains within ICT, and their connection to both upstream (supply chain management), manufacturing, and downstream (product life cycle management). Key expertise is needed for standardisation for augmenting ICT systems of many small SMEs to connect to Dataspaces or other advanced ICT systems for provisioning of process data, in a way that it is interoperable so that manufacturers can more easily obtain tier 1 to tier 6 supply chain data, interoperability across trade borders and uptake within and beyond the EU of interoperability of information across supply chains, such as decentralised-centralised linkages through data and meta-data management with meta-data travelling across supply chains. Few experts are currently engaged in thinking how to create a truly global system for Digital Product Passports driven by the EU position, to enable cross-border upstream, manufacturing, and downstream interactions across borders. More EU experts are needed to ensure standardisation developments for Digital Product Passports in this global context, to work on aspects including DPP Data Spaces, Decentralised IDentifiers (DID) systems, and global trade ICT management with DPPs.

### Online references related to the fellowship work

 <https://circthread.com/standardization-toolkit/>

# An information model for digital product information on sustainability and circularity



**Leandro Navarro**

*Professor, Universitat Politècnica de Catalunya  
Spain*

## Sector

Circular economy

## Engaged SDOs, WGs and TCs



ITU-T Q7/SG5  
ETSI EEPS

## Role

ITU-T SG5 Q7 co-rapporteur

## Addressed EU standardisation priorities and gaps

Regarding the standardisation of the Digital Product Passport for ICT products, the aim in this fellowship work is to identify information items that relate to the objectives of environmental sustainability and specifically regarding the circular economy. These information items, to be represented in digital format about ICT product information, relate to individual product items, or collective products, all product items that are part of a model or manufacturing batch that share the same characteristics represented in a DPP. The information details should represent products at any time of their circular lifespan: design, manufacturing, through the usage phases and changes over the lifespan, until final recycling as e-waste.

An information model can help inform relevant actors involved with ICT products to be informed, to check details, and take decisions regarding extending product lifespan or making informed choices that contribute to more circular and environmentally sustainable products. Many of these decisions are taken in the product design phase. However, many effects that contribute to more durable, better repaired, maintained, used and reused, remanufactured or recycled products are taken by actors in the use stage, informed by information items reported in DPPs. Furthermore, many existing standards that regulate diverse aspects of circularity and environmental sustainability, result in information that can be encoded in the DPP, and the goal is to identify these information details as candidates for inclusion in a DPP for ICT product.

## Concerned ICT Standards and contribution to the related landscape

This fellowship is helping in my role as co-rapporteur of Q7/5 in ITU-T and editor of a standardisation work item to develop a standard for an information model for digital product passport information on sustainability and circularity. The work item in ITU-T is called L.D4PI and in ETSI the name of the work item is EE EEPS 64. The standardisation activity is joint ITU-ETSI work to develop a technically aligned standard.

## Impact

### Impact on SMEs

The DPP has the challenge to lower, not raise (avoid additional burden) the barriers to participation to SMEs. It is particularly important to ensure European SME are included and



supported. It is particularly important that European SME find DPPs a way to communicate better the sustainability advantages of their products, and that producing a DPP and digitalising product information becomes an advantage and not an additional obstacle to SMEs. One of the advantages of ITU and ETSI over other standards development organisations is the fact that these standards will be free access, and we aim at releasing any tools developed as open-source software.

### **Impact on Society**

The digitalisation of product-related information has the aim to contribute to a transition to more environmentally sustainable and circular products. The market is huge: billions of ICT devices are produced every year. Having ready access to precise and verifiable product information in digital form allows many efficiencies across the interactions among businesses, public administrations and citizens, usually called B2B, B2G, B2C, C2C.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, I contribute to L.D4PI ITU-T work item and corresponding ETSI EE EEPs work item.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have contributed to drafting a technical report on recommendation for new standard.

### What future efforts or activities are still necessary for your area of application?

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This engaged action should be continued, as there is still work to do, mainly in the precise definition of additional information items that can report on environmental sustainability and circularity properties according to existing global and European standards. This is even more important in the context of the recent EC standardisation draft request made to CEN-CENELEC and ETSI and discussed in the last ETSI face-to-face meeting in Sophia-Antipolis in June 2023.

### Online references related to the fellowship work

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 [www.itu.int/md/T22-SG05-230613-TD-GEN-0899/en](http://www.itu.int/md/T22-SG05-230613-TD-GEN-0899/en)

 [www.itu.int/en/ITU-T/Workshops-and-Seminars/2023/0615/Pages/default.aspx](http://www.itu.int/en/ITU-T/Workshops-and-Seminars/2023/0615/Pages/default.aspx)

# Participation in IEC TC 62/SC 62D/JWG 35/36 and TC 62/SC 62A/JWG 9 (Medical Robots and Medical AI)



## **Jan Veneman**

*Technical project lead, Hocoma AG  
Switzerland*

### Sector

eHealth

### Engaged SDOs, WGs and TCs



ISO TC299/JWG5 - IEC TC 62/SC 62D/JWG 36: Medical Robots for Rehabilitation

ISO TC299/JWG5 - IEC TC 62/SC 62D/JWG 35: Medical Robots for Surgery

ISO TC299/JWG5 - IEC TC 62/SC 62A/JWG 9 Medical electrical equipment and systems using robotic technology

### Role

Expert

### Addressed EU standardisation priorities and gaps

The existing standardisation for basic safety and essential performance for medical electrical equipment and medical electrical systems cover the specific aspects of medical robotics, with attention to additional standards for surgical robots and for rehabilitation robots.

My fellowship contributes to address a gap related to these existing standards that are not written with specific characteristics of robotic technology in mind. Therefore, new specifications must be considered in terms of safety when deploying robotics in a medical context. More specifically, this concerns robotic devices employing a degree of autonomy, the interaction between autonomy, risk management, and situation awareness.

### Concerned ICT Standards and contribution to the related landscape

This funding allowed me to participate in the renewed work cycle of the following working groups:

- ▷ ISO TC299/JWG5 - IEC TC 62/SC 62D/JWG 36: Medical Robots for Rehabilitation, maintaining the standard: IEC 80601-2-78 Medical electrical equipment — Part 2-78: Requirements for basic safety and essential performance of medical robots for rehabilitation, assessment, compensation or alleviation.
- ▷ ISO TC299/JWG5 - IEC TC 62/SC 62A/JWG 9 Medical electrical equipment and systems using robotic technology, maintaining the standard: Medical electrical equipment — Part 4-1: Guidance and interpretation — Medical electrical equipment and medical electrical systems employing a degree of autonomy.
- ▷ And passively following ISO TC299/JWG5 - IEC TC 62/SC 62D/JWG 35: Medical Robots for Surgery, maintaining the standard: IEC 80601-2-77 Medical electrical equipment — Part 2-77: Requirements for the basic safety and essential performance of robotically assisted surgical equipment.

## Impact

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### Impact on SMEs

A substantial number of European Start-Ups and SMEs market Rehabilitation Robots, ie. robots to relearn functional movement after neurological injury or disease. Under the MDR (Medical Device Regulation), companies are obliged to follow the state of the art for safety, which for these devices has materialised in the standard IEC 80601-2-78, if their products are in scope of this standard. After the publication of the first edition of this standard in 2019, the JWG that drafted the standard, has initiated the work to update this standard based on the first experiences in applying it as well as on advances in the state of the art. Eventually, this will lead to an amendment or a new version of this standard at the end of the now started revision cycle, and thus define the new standard to be followed by companies in this field.

### Impact on Society

Rehabilitation robotics are an early and established application of robotic devices in the field of healthcare, and thus are a forerunner in the ongoing uptake of robotics in healthcare and daily living environments interacting with patients and vulnerable people. Proper definition of safety and of adequate safety testing is essential to assure safety of users, and protection of manufacturers. Therefore, such standards support innovation in the field of healthcare.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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My project was directly connected to preparation of and participation in meetings of the JWG 9 / JWG 36, especially supporting the definition of the scope of the rework of IEC 80601-2-78 (signalling and prioritisation of issues with the current version, checking these with manufacturers in the field) as well as preparing proposals for discussion in the recent and next meeting regarding a redefinition of the scope of the standard, as well as adaptation of examples and concepts.

## Have the standardisation activities in your project led to specific deliverables?

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A presentation was made on the history of the work in the JWG 36 to discuss with stakeholders in the field, to facilitate collection of issues and to increase active participation and awareness. Further documentation was prepared for discussion in the JWG meeting.

## What future efforts or activities are still necessary for your area of application?

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The ongoing update of IEC 80601-2-78 reported on here, has just started and is a multi-year project. Also, this standard is formulated in the context of the current standard for medical electrical equipment IEC 60601-1 v3.2, for which also future revisions are in the making, to stay aligned with the progressing state of the art in medical technology, such as introduction of AI technology. Altogether, a solid basis in standards is required to not hamper innovation in the field of advanced healthcare technology.

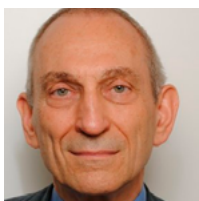
## Online references related to the fellowship work

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 [www.iec.ch/dyn/www/f?p=103:14:0:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:12533,25#](http://www.iec.ch/dyn/www/f?p=103:14:0:::FSP_ORG_ID,FSP_LANG_ID:12533,25#)

 [www.iec.ch/dyn/www/f?p=103:14:0:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:7896,25](http://www.iec.ch/dyn/www/f?p=103:14:0:::FSP_ORG_ID,FSP_LANG_ID:7896,25)

# Identification of database standards as a prerequisite to reach content interoperability



## **Christian Galinski**

CEO and Senior researcher, International Information Centre for Terminology (Infoterm)

Austria

## Sector

Digital Skills and e-Learning

## Engaged SDOs, WGs and TCs



ISO/TC 37  
ISO/TC 37/SC 2  
ISO/TC 37/SC 2/JWG 7  
ISO/TC 37/SC 2/WG 1  
ISO/TC 37/SC 3  
ISO/TC 37/SC 3/WG 1  
ISO/TC 37/SC 4  
ISO/TC 37/SC 4/WG 5  
ISO/TC 37/SC 5  
ISO/IEC JAG  
IEC/ISO/ITU-T/SPCG  
ISO/IEC-JTC 1/SC 32  
ISO/IEC-JTC 1/SC 35  
ISO/IEC-JTC 1/SC 36

## Role

Convenor and project leader in ISO/TC 37 WGs on language coding and language varieties

## Addressed EU standardisation priorities and gaps

ICT-related standardisation activities are scattered over many TCs of (formal) standards developing organisations (SDOs) including ISO/IEC-JTC 1 and hundreds of SDOs developing consortium standards. This is particularly detrimental to R&D in the fields of the assistive technologies (AT), which is extremely fragmented, but increasingly important for society (incl. fields like eHealth, eLearning, etc. – and the respective certification systems). When it comes to content interoperability, there is still a big “semantic interoperability” gap between technical interoperability standards and what users are confronted with at user interfaces. Something like “*comprehensive content interoperability*” is needed – especially at the level of microcontent (i.e., structured content at the level of lexical semantics). Here comprehensive content interoperability is more likely to be achievable than with larger content entities.

For the sake of eAccessibility & eInclusion, human communication (HC) modalities beyond spoken and written and the respective ‘content presentations’ of this HC must become comprehensively interoperable, reusable, and re-purposable across systems and platforms. More AT experts are needed, and more of them should engage in standardisation activities.

Comprehensive content interoperability of microcontent is also of greatest importance for microlearning objects (microLOs) in eLearning. In combination with the FAIR (findability, accessibility, interoperability, reusability) guiding principles comprehensive content interoperability would facilitate the integration (in terms of reuse and repurposing) of microcontent entities (microCEs) into various applications. One of the potentially largest

application field is education and training – both in the public and in the private sector. Given the manifold applications of microcontent, a generic approach becomes necessary.

## Concerned ICT Standards and contribution to the related landscape

With this fellowship, I am primarily engaged in the development of methodology standards concerning structured content (also called database standards) as enablers of the FAIR guiding principles. These methodology standards are based on:

- ▷ ISO/IEC 11179 series Information technology – Metadata registries (MDR);
- ▷ ISO 639:2013 Code for individual languages and language groups;
- ▷ ISO 21636 series Language coding — A framework for language varieties;
- ▷ ISO 24495 series Plain language;
- ▷ ISO/IEC DIS 4944 Information technology — User interfaces — Framework for evaluating the usability of a natural user interface;
- ▷ ISO/TS 29002-5 Industrial automation systems and integration – Exchange of characteristic data – Part 5: Identification scheme;
- ▷ ISO/IEC 13066 series Information technology — Interoperability with assistive technology (AT);
- ▷ ISO/IEC TR 20007 Information technology — Cultural and linguistic interoperability — Definitions and relationship between symbols, icons, animated icons, pictograms, characters and glyphs.

Furthermore, I am delegated from 3 Austrian standardisation committees, as well as from ISO/TCs to other committees and to organisations in cooperation with ISO. Given the importance of microcontent regarding standards information, management and marketing there is also an interest at headquarter level of the formal SDOs about the microcontent approach.

## Impact

### Impact on SMEs

Interhuman communication is increasingly supported – sometimes even replaced – by ICTs, whether used for private (incl. the role as customer of SMEs) or professional purposes (at the workplace or as provider of services). ICT applications from eBanking to eLearning nudge users towards using “controlled language” or structured content of one sort or the other. Same linguistic elements (or communicative features) are used across a multitude of application user interfaces. As ICTs tend to be without borders, linguistic or other communicative elements should be multilingual and multimodal from the outset. Not least due to the EU’s FAIR guiding principles, standards concerning structured content elements and their methodologies are increasing. Using non-standardised linguistic elements (or communicative features) severely hampers doing business via the internet. A generic approach to microcontent for the sake of comprehensive content interoperability improves the quality of all content dealt with in companies (incl. master data management), used for data exchange (e.g. for trade and logistics purposes), as well as for training purposes.

### Impact on Society

The impact on society – especially on education and training – would be enormous. The generic approach to microcontent for the sake of comprehensive content interoperability would curb the huge duplications of efforts by teachers and students alike in eLearning. It would help to make high-quality microlearning objects better findable, easier to translate into other languages (or convert into other communication modalities), etc. Pertinent methodology standards would have a positive impact on content management systems development – especially on learning system design.

## Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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The present activities are based on former high-level recommendations and have directly led to standardisation activities concerning fundamentals of microcontent (incl. microcontent terminology, a microcontent typology <incl. the respective communicative roles>, microcontent metadata and core metadata); and applications regarding the metadata referring to the didactic categories of microlearning objects.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have contributed to drafting documents and presentations on the topic of “a generic approach to microcontent (for the sake of enhanced content interoperability and reusability)”. I am the Project Leader for these standardisation efforts. I also have led the effort of ISO/TC 37 to submit a use case for applying the approach to the IEC/ISO SMART standards initiative (in coordination with ISO/TC 46).

## What future efforts or activities are still necessary for your area of application?

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Future standards about the generic approach to microcontent (for the sake of enhanced content interoperability and reusability) will trigger modifications in many standards throughout ISO and IEC when they are up for revision. It will also trigger new standards in several fields of standardisation. This will require promotion activities in SDOs on the one hand and promotion activities in scientific and technical communities so far underrepresented in standardisation on the other hand. This fellowship is a great support for achieving the planned standards about the generic approach to microcontent.

## Online references related to the fellowship work

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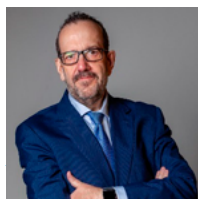
 [www.iso.org/fr/committee/48104.html](http://www.iso.org/fr/committee/48104.html)

 [www.iso.org/committee/45342.html](http://www.iso.org/committee/45342.html)

 [www.iso.org/committee/45382.html](http://www.iso.org/committee/45382.html)



# LegalPPDE Phase III: Productivity Model Proof of Concept & New Standard Publication



## **Javier Peris**

*Chief Knowledge Officer, Business&Co.  
Spain*

### Sector

Justice

## Engaged SDOs, WGs and TCs



ISO/IEC JTC 1/SC 40  
UNE CTN 71  
UNE CTN 71/SC 40

## Role

UNE-SC40 President

## Addressed EU standardisation priorities and gaps

My fellowship addresses several gaps and challenges related to justice that is a regulated sector; therefore, it is more complex to introduce changes in habits and processes. It has a technological gap that can only be solved with professionals, teams and ICT departments having highly productive working models. This is related notably to the abundance of the deployed ICT frameworks that overload of their workers, and hence, it is necessary to generate a simple working model easy to be understood by everyone. Also, in my work I underline that in standardisation we need to focus on human values: productivity can be understood negatively as an attempt to turn professionals into robots. The new standard that I am working on is about being more human and respectful of people, helping them to make work more organised and efficient.

## Concerned ICT Standards and contribution to the related landscape

My fellowship is focused on developing a new series of ICT standards related to capture human factor existing best practices related to productivity and efficiency in ICT. This standard will combine aspects of time management, productivity, and the value they provide from ICT professionals, teams, and departments. By tackling productivity problems in the ICT sector, it aims to support developing value-creation and transformational potential in ICT organisations. These have special interest in the justice ICT area that is only starting its digital transformation.

The proposed Productivity standards open a new field of standardisation for ISO/IEC, in three focus areas covering people, teams and departments. The aim is to make productivity become a new discipline in the enterprise management, along with quality, governance, service management, security, etc. The new standard is Justice and ICT focused. In addition, this field could be extended to other sectors, departments, or organisations beyond ICT.

## Impact

### **Impact on SMEs**

This creation of a management system standard that helps ICT professionals, teams, and departments to be more productive, focused on value creation and with better time management will help European SMEs to be more efficient. This standardisation projects

starts on justice sector, which is one of the most backward in its digital transformation. However, the standard will also be applicable for any ICT area in any SME. It enables to enhance ICT performance levels of workers, which also allow SMEs to accelerate their digital transformation.

### **Impact on Society**

There are no standards dedicated directly on helping ICT professionals to better organise their goals and work, which will improve work-life balance. As professionals improve their organisational and productivity skills in ICT areas, this improvement will spread to other areas of the company.

### Has your project directly involved or led to a specific recommendation or proposal for developing new or revised standards?

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Yes, two national standards have been created:

- ▶ UNE 71402-IN Technical Report on professional productivity state of the art.
- ▶ UNE 71404 Technical Specification on reference model for professional productivity.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, I have developed technical reports and technical specifications.

### What future efforts or activities are still necessary for your area of application?

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The created (2) new standards are published, and the work carried out showed the importance of the Productivity Management System Standard.

### Online references related to the fellowship work

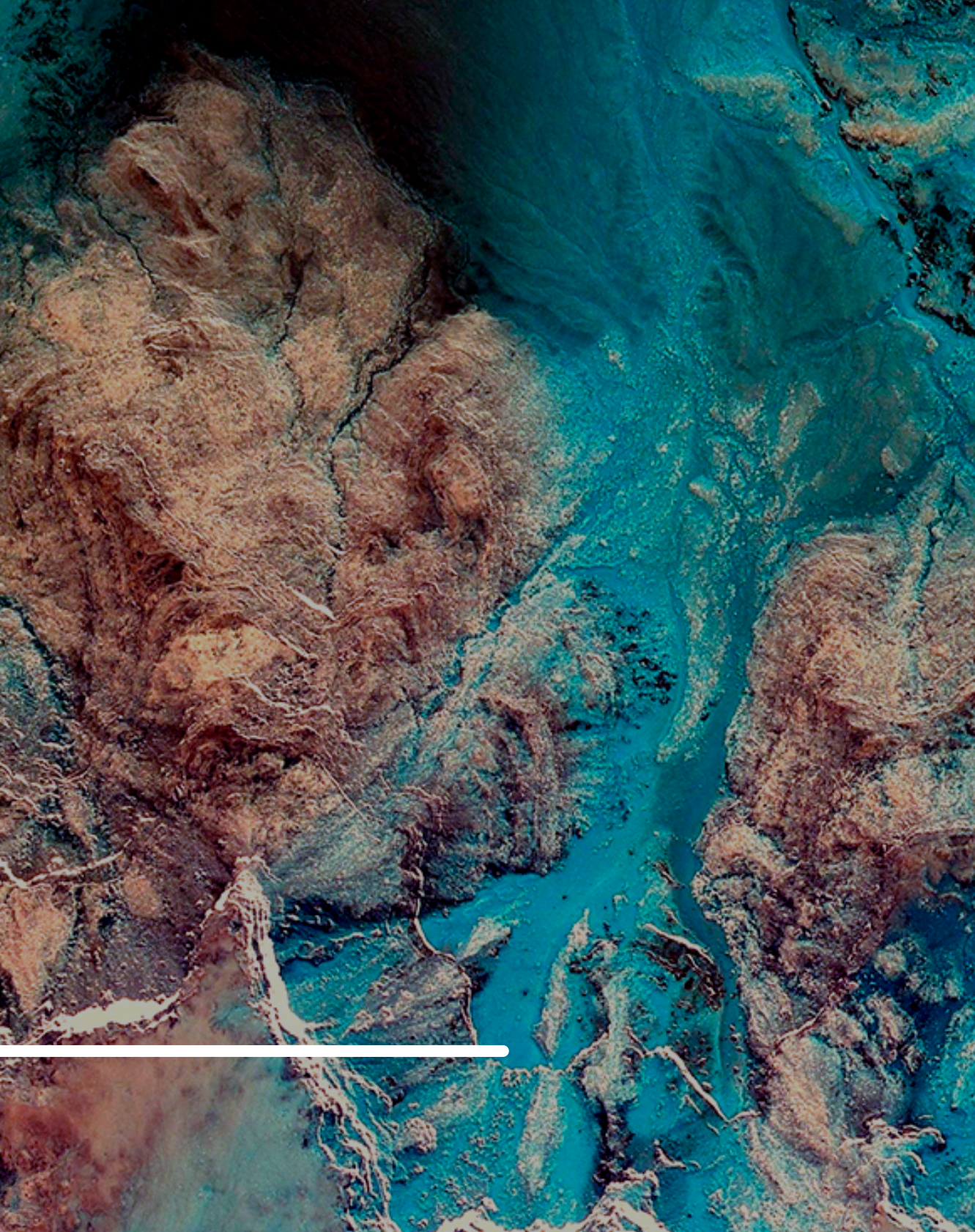
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