

CEN Workshop “Mathematical Simulation models for real time, SIMBOTs”

Workshop description form

- PART A – Workshop Summary
- PART B – Project Plan



PART A – Workshop SUMMARY

1	WS details															
1.1.	Organization	<input checked="" type="checkbox"/> CEN <input type="checkbox"/> CENELEC <input type="checkbox"/> Joint with <input type="checkbox"/> CEN lead <input type="checkbox"/> CENELEC lead														
1.2.	Title	Mathematical Simulation models for real time, SIMBOTS (select CEN or CLC or leave CEN/CLC in case of joint WS)														
1.3.	Scope	<p>The objective of the Workshop is to develop a CWA oriented to understand the methodology of so called SIMBOTS, which are an open source, semantic expression of mathematical models of a market equipment. The mathematical model uses basic or abstract simulation components, math functions, fluids and ports. It is oriented to real time execution, and it is in agreement with the manufacturer performance description. These SIMBOT components should be “parameter free”. The CWA will include the methodology for SIMBOTS creation, its semantic representation, the practical implementation from semantics into legacy software and their integration for real time execution, in parallel with monitoring and control. The document will define key aspects of the methodology, including: (1) SIMBOT conceptualization: input, outputs and parameters for tracking; (2) How to define performance curves based on product information (usually public data sheets); (3) how to generate the semantic information to add in the knowledge Graph of SIMBOTS; (4) How to implement a library component in a legacy simulation software using the semantic information extracted from the knowledge graph; (5) How to use in practice the SIMBOTS for big models; (6) Practical details and use of simulation for real time. By addressing the current lack of standardized of market simulation components, an improved collaboration between manufacturers and software developers will reduce the time and cost of model implementation.</p>														
1.4.	Does this WS stem from an EU Research project?	<input checked="" type="checkbox"/> YES Name of the project: HYCOOL-IT Hybrid COOLing & management for IT infrastructures Grant number: 101138623 <input type="checkbox"/> End date 30thNov2026 <input type="checkbox"/> NO														
1.5.	Financial support	<input checked="" type="checkbox"/> EU Research project <input type="checkbox"/> EC/EFTA Grant reference: Type here <input type="checkbox"/> Other Specify, if needed: Type here														
1.6.	WS Proposer/Proposed Chair	<table border="0"> <tr> <td>Name:</td> <td>Pablo Vicente Legazpi</td> </tr> <tr> <td>Organization:</td> <td>Building Digital Twin Association ASBL (BDTA)</td> </tr> <tr> <td>Postal address:</td> <td>Borsbeeksebrug 34/1, 2600 Antwerpen, Belgium</td> </tr> <tr> <td>Email:</td> <td>p.legazpi@buildingdigitaltwin.org</td> </tr> <tr> <td>Phone:</td> <td>+34609137615</td> </tr> <tr> <td>Webpage:</td> <td>https://buildingdigitaltwin.org/</td> </tr> <tr> <td>Contact person (name and email):</td> <td>Pablo Vicente-Legazpi (p.legazpi@buildingdigitaltwin.org)</td> </tr> </table>	Name:	Pablo Vicente Legazpi	Organization:	Building Digital Twin Association ASBL (BDTA)	Postal address:	Borsbeeksebrug 34/1, 2600 Antwerpen, Belgium	Email:	p.legazpi@buildingdigitaltwin.org	Phone:	+34609137615	Webpage:	https://buildingdigitaltwin.org/	Contact person (name and email):	Pablo Vicente-Legazpi (p.legazpi@buildingdigitaltwin.org)
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1.7.	WS Secretariat	<table border="0"> <tr> <td>Organization:</td> <td>Spanish Association for Standardization, UNE</td> </tr> <tr> <td>Postal address:</td> <td>Calle Génova, 6. 28004 Madrid</td> </tr> <tr> <td>Email:</td> <td>Type here</td> </tr> </table>	Organization:	Spanish Association for Standardization, UNE	Postal address:	Calle Génova, 6. 28004 Madrid	Email:	Type here								
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Email:	Type here															

		Phone: Webpage: WS Secretary name: Email: Phone:	Type here https://www.une.org Esther Bermejo Núñez ebermejo@une.org Type here
1.8.	CEN and CENELEC Management Centre (CCMC) contact	Organization: Postal address: Webpage: CCMC Project Manager name: Email: Phone:	CEN and CENELEC Rue de la Science 23B - 1040 Brussels, Belgium https://www.cencenelec.eu/Pages/default.aspx Claire Van Thielen cwa@cencenelec.eu +3225500831 +32478793545
1.9.	Tentative date and place of the Kick-off Meeting	Date: 20thMay2026	Place: on-line
1.10.	Does the proposed Workshop fall within the scope of existing CEN and/or CENELEC Technical Bodies?¹	<input type="checkbox"/> <input checked="" type="checkbox"/>	YES Specify: Type here NO
1.11.	Are there other Technical Bodies or Joint Advisory and Coordination Groups potentially interested in the Workshop? ²	<input type="checkbox"/> <input checked="" type="checkbox"/>	YES Specify: Type here NO
1.12.	Are the following aspects affected?	Safety matters Management system aspects Conformity assessment aspects Security matters	YES ³ <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES ⁴ <input type="checkbox"/> 7 <input checked="" type="checkbox"/> YES ⁵ <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES ⁶ <input type="checkbox"/> NO <input checked="" type="checkbox"/> 8
		Add information/explanations if Management System aspects and Conformity Assessment aspects are affected:	
2 WS Deliverables			
2.1.	CWA #1:		
2.1.1	Title	<input checked="" type="checkbox"/> <input type="checkbox"/>	Same as WS title (1.2): Mathematical Simulation models for real time, SIMBOTs Other:
2.1.2	Scope		This CEN Workshop Agreement (CWA) aims to define a methodology for creating SIMBOTs. This methodology includes: (1) SIMBOT conceptualization: input, outputs and parameters for tracking;

¹ Part A and Part B of this form shall be sent by the WS secretary to the secretary of the Technical Bodies identified in this section to inform them about the creation of the WS and register any possible objection within 30 days (45 during the holiday period).

² Part A and Part B of this form should be sent by the WS secretary to the Bodies identified in this section to inform them about the creation of the WS.

³ Work on the proposed CEN and/or CENELEC Workshop shall not be initiated.

⁴ The CEN and/or CENELEC Workshop proposal shall be submitted to the CEN/CENELEC BT(s) for decision.

⁵ CEN-CENELEC Internal Regulations - Part 3, Clause 33 applies.

⁶ For projects dealing with security matters the security risk analysis provided in Annex I shall be carried out.

⁷ See Note 2 in CEN-CENELEC Guide 29, Clause 3.

⁸ See Note 2 in CEN-CENELEC Guide 29, Clause 3.

		<p>(2) How to define performance curves based on product information (usually public data sheets);</p> <p>(3) how to generate the semantic information to add in the knowledge Graph of SIMBOTS;</p> <p>(4) How to implement a library component in a legacy simulation software using the semantic information extracted from the knowledge graph;</p> <p>(5) How to use in practice the SIMBOTS for big models;</p> <p>(6) Practical details and use of simulation for real time.</p> <p>This methodology will help to improve the collaboration between manufacturers and software developers, reducing the time and cost of model implementation.</p> <p>The document excludes any definition of communication protocol, any particular integration with digital product passports, or any API or format exchange of models.</p>
2.1.3	<p>Does the proposed CWA conflict with a published EN</p>	<p><input type="checkbox"/> YES Specify: Type here</p> <p><input checked="" type="checkbox"/> NO</p> <p>In case the answer is 'yes', the development of the CWA shall be stopped</p>

PART B – Project Plan

Abstract

This workshop is initiated under EU project Hycool-IT, pursuing the implementation of innovative solutions for IT Server Rooms for advanced tertiary buildings. Simulation in real time would be a way to improve energy performance and supervision. In Hycool-IT the concept of SIMBOT has been tested and refined. SIMBOT is an “Open source, semantic expression of the mathematical model of a market equipment. It is oriented to real time execution, and simulation components should be “parameter free”.

The integration of market equipment into simulation software, with trustable and clear equations, would reduce the implementation cost of simulation drastically. In the side of manufactures, enabling easy integration of their equipment dynamics can improved design concept, but commissioning, supervision and performance. By the software developers’ side, they can see the value of integrating easily in their libraries the functional information of equipment’s. Both manufacturers and software developers keep their know-how safe and protected, but the integration provide benefits to all of them.

The workshop should be solving these problems:

- (1) SIMBOT conceptualization: input, outputs and parameters for tracking;
- (2) How to define performance curves based on product information (usually public data sheets);
- (3) how to generate the semantic information to add in the knowledge Graph of SIMBOTs;
- (4) How to implement a library component in a legacy simulation software using the semantic information extracted from the knowledge graph;
- (5) How to use in practice the SIMBOTs for big models;
- (6) Practical details and use of simulation for real time.

By addressing the current lack of standardized of market simulation components, an improved collaboration between manufacturers and software developers will reduce the time and cost of model implementation.

The SIMBOT concept implies the use of legacy or opensource simulation software to generate the libraries with the neutral, semantic representation of the SIMBOT. These libraries are compiled and big models can be generated. Based on that, and after defining mathematical partitions, experiments and the concept of input/outputs, a deck for real time can be generated. That deck can be running in real time interacting with SCADA systems and controls. But the CWA is only focussed in the concept of the mathematical representation of the equipment’s. And it is explicitly not defining any communication protocol, or any particular integration with digital product passports, nor any format exchange of models. The CWA won’t be describing any integration with digital twins or tracking methods (comparisons between monitoring and simulation results).

1 Status of the project plan

Draft project plan for public commenting (Version 1.0)

This draft project plan is intended to inform the public of a new Workshop. Any interested party can take part in this Workshop and/or comment on this draft project plan by sending an email to the WS secretary

All those who have applied for participation or have commented on the project plan by the deadline will be invited to the kick-off meeting of the Workshop on **2026-05-20**.

2 Workshop proposer and potential Workshop participants

2.1 Workshop proposer

The Workshop proposer is Mr. Pablo-Vicente Legazpi, manager at the BDTA, Building Digital Twin Association ASBL (BE), consortium partner of the EU project HYCOOL-IT (<https://hycoolit-project.eu/>) in charge of testing and refining the concept of SIMBOTS.

This non-profit association has an objective to develop new standards for digital twins in the built environment, with three main working groups oriented to ontologies, privacy and mathematical simulation. In the mathematical simulation working group, the BDTA has been gathering interest on developing clear and trustable mathematical basement, looking for more transparent models and getting simulations in real time.

2.2 Potential participants

This CWA will be developed in a Workshop (temporary body) that is open to any interested party.

Initially, all the partners of the HyCool-IT project will take part in the development of the CEN Workshop Agreement.

- POLIMI (Politecnico di Milano, project coordinator),
- CNR (Consiglio Nazionale delle Ricerche),
- Sorption Technologies GMBH,
- IDP Ingeniería y Arquitectura Iberia S.L.,
- COMET Global Innovation S.L.,
- R2M Solution SRL, BDTA (Building Digital Twin Association ASBL),
- EIM (European Innovation Market Place ASBL), and
- Institute Mihajlo Pupin.

Additionally, these partners of DYMAN project (GA 101161930) will be attending the CWA:

- CIBELIOS
- Energy Aware Runtime
- UNIVERSITY OF TORINO
- CNR
- INQUATTRO
- Comet Global Innovation
- Barcelona Supercomputing Center
- Ekodenge

The participation of the following organizations (software developers) would be helpful and is desired take part in the development of this CWA:

- ECOSIMPRO
- SIMULATION X, EAS
- EAE DRESDEN
- QUICKFIELD
- DYMOLA
- MODELON
- SIMCENTER AMESIM
- TRNSYS
- MODELICA ORG
- ETAP
- IES APACHE
- IDA ICE
- CADENAS
- BIMOBJECT
- HYSOPT
- PRODBIM

Furthermore, it is recommended that

- Test labs of equipment
- Engineering companies
- Equipment Manufacturers
- Research
- Academia
- Industry associations

take part in the development of this CWA.

3 Workshop objectives and scope

This workshop is initiated under EU project Hycool-IT, pursuing the implementation of innovative solutions for IT Server Rooms for advanced tertiary buildings. In this scenario there are no humans in the loop or occupancy interaction, so it is a good sand box for testing the concept of machines and equipment working in the building. Simulation in real time would be a way to improve energy performance and supervision, working in parallel to monitoring and controls, and with the possibility of being affecting all phases of construction, since conceptual works to exploitation.

Concept of the use of real time simulation in buildings was initiated in EU project SPHERE (GA #820805). In Hycool-IT the concept of SIMBOT has been tested and refined (“Open source, semantic expression of the mathematical model of a market equipment). The mathematical model uses standardized libraries of basic components, math functions, fluids and ports. It is oriented to real time execution, and it is in agreement with the manufacturer performance description. This component should be “parameter free”. In case of SIMBOTs, it may be affecting manufacturers (creator of equipment’s for the market) and software developers (creating

libraries of components to be used in their environment). To have simple and efficient equipment simulation components for real time, shared by both manufacturers and developers, and to implement simulation models much faster and safer, a new standard is needed. It could change drastically the landscape of engineering, targeting more the dynamic functional response than just the shape or cost.

In the side of software developers, they must see the value of integrating easily in their libraries the functional information of equipment's, using the same mathematical models all of them, but keeping their own developments safe.

The workshop should be solving these main problems:

1. SIMBOT conceptualization: input, outputs and parameters for tracking;
2. How to define performance curves based on product information (usually public data sheets);
3. How to generate the semantic information to add in the knowledge Graph of SIMBOTs:
4. How to implement a library component in a legacy simulation software using the semantic information extracted from the knowledge graph;
5. How to use in practice the SIMBOTs for big models;
6. Practical details and use of simulation for real time.

The neutral representation of SIMBOTs would be in the form of a Knowledge Graph, with a simple ontology aligned with digital product passport (not replicating information but including only the SIMBOTs domain). This structured information may have different ways to be available by software developers, but it must guarantee neutrality, trust and technical excellence.

The SIMBOT concept implies the use of simulation software (legacy or open source) to generate the libraries with the neutral, semantic representation of the SIMBOT. These libraries are compiled at the simulation software, and big models can be generated. Based on that, and after defining mathematical partitions, experiments and the concept of input/outputs, a deck for real time can be generated. That deck can be running in real time interacting with SCADA systems or other controls.

But the CWA is focussed only on the concept of the mathematical representation of equipment's. And it is explicitly not defining any communication protocol, or any particular integration with digital product passports, nor any format exchange of models (like FMI, see <https://fmi-standard.org/>).

The CWA won't be describing any integration with digital twins or tracking methods (comparisons between monitoring and simulation results), but in the concept of the SIMBOT some outputs could be prepared for that purpose.

The workshop has a clear orientation towards a final CWA, which may serve as initiation of a NWI in one standardization group or technical committee. But gathering the stakeholders interested in advance may incentive the participation and discussions in that group. So, it has a clear dissemination objective and to join interest around mathematical simulation in real time.

3.1 Workshop background

The fundamental need of this workshop is to have feedback from market players, in our case manufacturers and software developers of simulation software. An efficient definition of SIMBOTs could reduce drastically the cost and time of simulation models implementation, opening new possibilities in design, construction, commissioning and exploitation. This could open the door to AI agents for real time in places where there is not any operator, or places with no specialized technical help.

For standardization in simulation, we can find several initiatives. The most important is the Modelica Association and FMI (Functional Mock-up interface) standard (<https://fmi-standard.org/>). In this case, the objective of this FMI standardization is focussed in three main points: (1) to define a standardized way to store and apply parameters to simulation components (so call libraries); (2) To define a standardized format for the connection structure for a network of components; (3) the developed standard/APIs should be usable in all stages of development process (architecture definition, integration, simulation, test in MiL, SiL, HiL).

In case of the CWA, an orientation to real time, neutral semantic representation and standardization of the performance representation itself is the objective. It is not oriented to communicate simulation models or components, but to represent mathematically market equipment in the most effective way for real time simulation. The object of standardization is the functional model itself in a neutral expression, not the model interface or integration with other models.

This Workshop is initiated within the framework of the funded Hycool-IT EU project, GA # 101138623.

Mathematical simulation is quite related with design, structural analysis, energy performance and project management (programming of tasks, coordination, cost analysis or evaluation of subcontractors). In these cases, “mathematical simulation” or “simulation” meaning is not equivalent. Whereas Finite Element Analysis (FEA) or Computational Fluid Dynamics (CFD) implies geometry modelling, in case of general-purpose mathematical simulation there is no geometry (or it is not represented as a CAD model). We are speaking of so call 0-D or 1-D simulation, meaning that we use components with no geometry but mathematical equations and ports.

In complex systems, simplification using basic physical principles and equations is the only way to have reliable models. This technology, well developed in nuclear industry or aerospace, is not used in other fields, where the lack of resources or the time response may be making simulation not affordable. The SIMBOTs try to tackle this problem, reducing the time spent on preparing models, reducing the cost drastically.

The subject of the planned CWA is not at present the subject of any standard nor an existing Technical Committee. Any Technical Committee has been identified as directly affected by the scope of this CWA.

4 Workshop programme

4.1 General

The kick-off meeting is planned to take place on-line on the 20th May 2026 through Teams. A draft for public commenting will be published for 30 days.

A total of approx. 3 Workshop meetings (kick-off meeting and 2 Workshop meetings more) via web conference will be held, during which the content of the CWA will be presented, discussed and approved.

The working language (language of meetings, minutes, etc.) of the WS will be English. The CWA will be written in English.

4.2 Workshop schedule



CEN/CENELEC Workshop	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	...
Initiation	[Dark Blue]										
1. Workshop description form submission and TC response	[Light Blue]										
2. Open commenting period on draft project plan (mandatory)		[Light Blue]									
Operation			[Dark Teal]								
3. Kick-off meeting			[Light Teal]								
4. CWA(s) development			[Light Teal]				[Light Teal]				
5. Open commenting period on draft CWA(s) (optional)							[Light Teal]				
6. CWA(s) finalized and approved by Workshop participants									[Light Teal]		
Publication										[Dark Green]	
7. CWA(s) publication										[Light Green]	
Dissemination (see 7)			[Orange]						[Orange]		
Milestones				K		V		V		A	P D

- Legend
- K Kick-off
 - V Virtual Workshop meeting
 - A Adoption of CWA
 - P Publication of CWA
 - D Online distribution of CWA

5 Resource planning

Registration and participation at this CEN Workshop are free of charge, but each participant shall bear his/her own costs for travel, accommodation, and subsistence in the case of on-site meetings.

UNE will provide the Workshop Secretariat subject to formal approval of the Project Plan at the kick-off meeting. The administrative costs of the CEN Workshop Secretariat will be financed within the framework of HyCool-IT research project (grant agreement No. 101138623).

The copyright of the CWAs shall be with CEN. The CWA will be free download since HyCool-IT will cover the necessary costs.

6 Workshop structure and rules of cooperation

6.1 Participation in the Workshop

The Workshop will be constituted during the kick-off meeting. By approving this project plan, the interested parties declare their willingness to participate in the Workshop and will be formally named as Workshop participants, with the associated rights and duties. Participants at the kick-off meeting who do not approve the project plan are not given the status of a Workshop participant and are thus excluded from further decisions made during the kick-off meeting and from any other decisions regarding the Workshop.

As a rule, the request to participate in the Workshop is closed once it is constituted. The current Workshop participants shall decide whether any additional members will be accepted or not.

Any new participant in the Workshop at a later date is decided on by the participants making up the Workshop at that time. It is particularly important to consider these aspects:

- a. expansion would be conducive to shortening the duration of the Workshop or to avoiding or averting an impending delay in the planned duration of the Workshop;
- b. the expansion would not result in the Workshop taking longer to complete;
- c. the new Workshop participant would not address any new or complementary issues beyond the scope defined and approved in the project plan;
- d. the new Workshop participant would bring complementary expertise into the Workshop in order to incorporate the latest scientific findings and state-of-the-art knowledge;
- e. the new Workshop participant would actively participate in the drafting of the manuscript by submitting concrete, not abstract, proposals and contributions;
- f. the new Workshop participant would ensure wider application of the CWA.

All Workshop participants who approved the publication of the CWA or its draft will be named as authors in the European Foreword, including the organizations which they represent. All Workshop participants who did not approve the publication of the CWA will not be named in the European Foreword.

6.2 Workshop responsibilities

The Workshop Chair is responsible for content management and consensus building. The Workshop Chair is supported by the Workshop Vice-Chair (if any) and the responsible Workshop secretariat, whereby the Workshop secretariat will always remain neutral regarding the content of the CWA(s). Furthermore, the Workshop secretariat shall ensure that CEN-CENELEC's rules of procedure, rules of presentation, and the principles

governing the publication of CWA(s) have been observed. Should a Workshop Chair no longer be able to carry out her/his duties, the Workshop secretariat shall initiate the election of a new Workshop Chair. The list below covers the main tasks of the Workshop Chair. It is not intended to be exhaustive.

- Content related contact point for the Workshop
- Presides at Workshop meetings
- Ensures that the development of the CWA respects the principles and content of the adopted project plan
- Manages the consensus building process, assesses when the Workshop participants have reached agreement on the final CWA, on the basis of the comments received
- Ensures due information exchange with the Workshop secretariat
- Represents the Workshop and its results to exterior

The Workshop secretariat, provided by a CEN Member, is responsible for organizing and leading the kick-off meeting, in consultation with the Workshop proposer. Further Workshop meetings and/or web conferences shall be organized by the Workshop secretariat in consultation with the Workshop Chair. The list below covers the main tasks of the Workshop secretariat. It is not intended to be exhaustive.

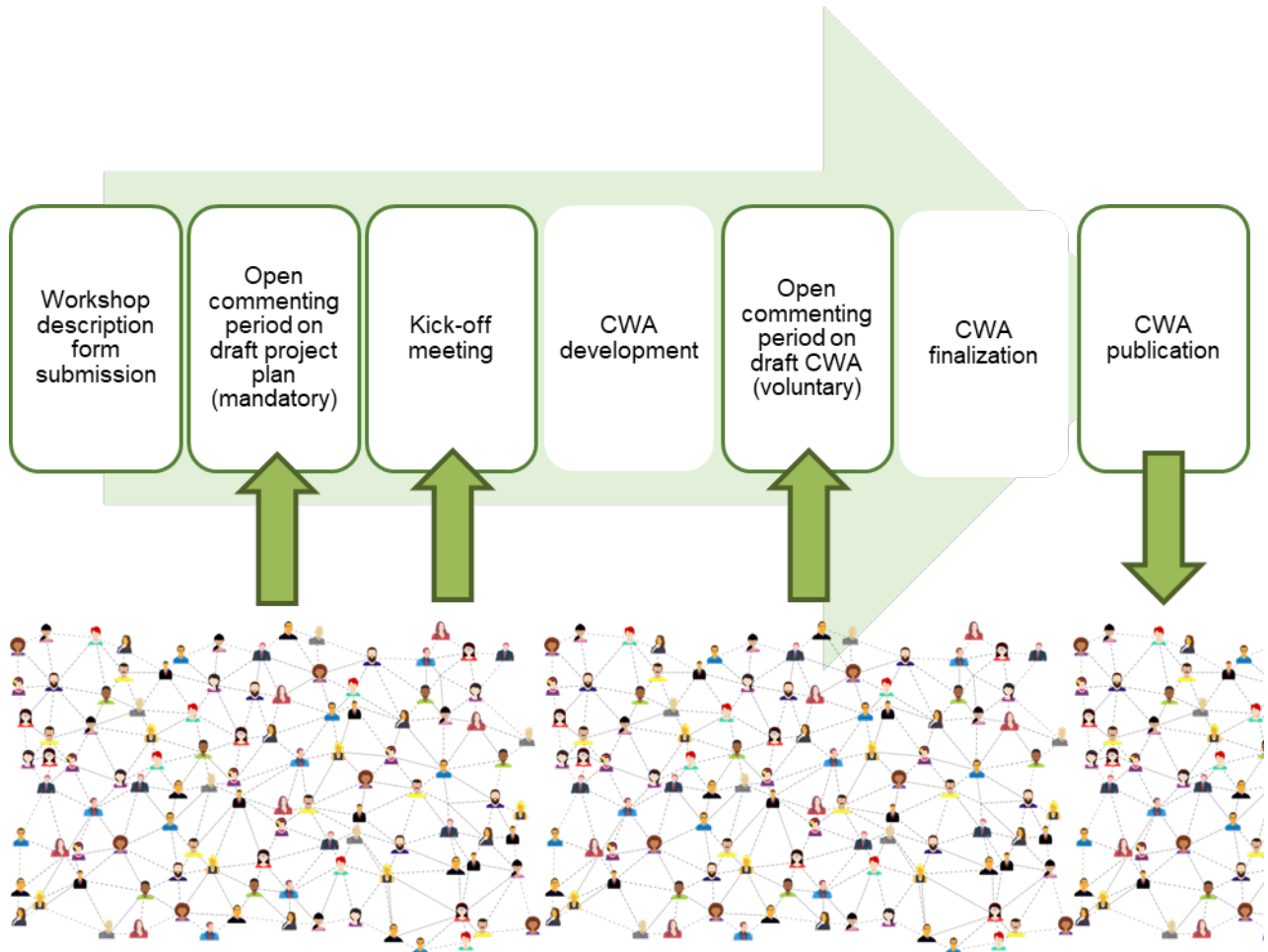
- Administrative and organizational contact point for the Workshop
- Ensures that the development of the CWA respects the principles and content of the adopted project plan and of the requirements of the CEN-CENELEC Guide 29
- Formally registers Workshop participants and maintains record of participating organizations and individuals
- Offers infrastructure and manages documents and their distribution through an electronic platform
- Prepares agenda and distributes information on meetings and meeting minutes as well as follow-up actions of the Workshop
- Initiates and manages CWA approval process upon decision by the Workshop Chair
- Interfaces with CEN-CENELEC Management Centre (CCMC) and Workshop Chair regarding strategic directions, problems arising, and external relationships
- Advises on CEN-CENELEC rules and brings any major problems encountered (if any) in the development of the CWA to the attention of CEN-CENELEC Management Centre (CCMC)
- Administrates the connection with relevant CEN or CENELEC/TCs

6.3 Decision making process

The CEN Workshop Chair is responsible for ensuring that the development of the CWA follows the principles and content of the project plan described in this document and the requirements of CEN-CENELEC Guide 29. The CEN Workshop Chair may take decisions on the conduct of the CEN Workshop on the basis of the comments expressed by the participants and of CEN-CENELEC Guide 29.

Decisions shall be taken based on consensus of the WS participants.

7 Dissemination and participation strategy



Potential participants identified in section 2.2 and potential interested stakeholders identified in Part A should be informed of the open commenting phase, if any, and of the publication of the CWA.

In addition to the CCMC website, the WS description form and the date of the kick-off meeting will be advertised on HyCool-IT website and social media channels to raise awareness. Interested parties are requested to contribute either through commenting of the project plan (short term) or through Workshop participation (long term). They will also be invited to comment on the draft CWA.

The final CWA will also be advertised on HyCool-IT website and social media channels.

Annex I – Security risk analysis

This Annex is not applicable because no security aspects are addressed by the Workshop.