|  |
| --- |
| ToR STF 687 (Ref. TC ATTM) |
| Version: 1.1 |
| Author: Didier BALAGUER – Date: 2024-04-21 |
| Last updated by: ETSI Secretariat – Date: 2024-06-24 |
| page 1 of 12 |

Terms of Reference – Specialist Task Force Proposal

STF 687 (Ref. TC ATTM)

Initialisation of opendthX**[[1]](#footnote-1)** standardisation for data/application interoperability

Summary information

|  |  |  |  |
| --- | --- | --- | --- |
| Approval status | Approved by TC ATTM18 april 2024(doc ref:ATTM(24)035002 meeting report ATTM#35 paragraph 4.2 and 13.2) | | **YES** |
| Approved by Board#148 (5-7 June 2024) | | **YES** |
| Reference Body | TC ATTM | | |
| ETSI Funding | **Maximum budget : 54 940 EUR** | | |
| Minimum of 4 ETSI Members Support | **YES** | | |
| Time scale | **From** | 2024-09-02 | |
| **To** | 2025-06-30 | |
| Work Items | **D1** [**DES/ATTM-0020013**](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=71762): Meta model opendthX entities/relationships interoperability data/applications | | |
| Board priority | [ETSI STF funding criteria](https://portal.etsi.org/STF/STFs/Funding/ETSIbudget.aspx)   |  |  | | --- | --- | | **Priority Criteria** | **X** | | Maintenance of standards in mature domains |  | | Innovation in mature domains | **X** | | Emerging domains for ETSI | **X** | | Horizontal activities (quality, security, etc.) | **X** | | Societal good / environmental | **X** | | | |

Part I – STF Technical Proposal

# Rationale & Objectives

## Rationale

The activity proposed within the framework of this STF is the creation of a first series of ETSI standards to standardise the ‘opendthX’ data format, a format which is being used to introduce data into computer applications used by construction stakeholders throughout the design-construction-operation cycle of the building, thereby ensuring data interoperability with applications. This involves standardising the data input into the applications and allowing the enrichment of objects as the project progresses thereby establishing a digital continuity which adds value and serves as a source of innovation to help construction meet the environmental and competitiveness challenges.  
This standardisation work makes it possible to change the paradigm: from app-centrism to open data-centrism. The digital language is becoming common just as natural languages ​​are for exchanges between humans. Software development costs as well as content creation costs are greatly reduced by pooling interoperable software building blocks. Freedom of use is encouraged, avoiding any form of dependence, and the regulations on interoperability, which is a right, can in fact be more easily applied, in particular to the benefit of SMEs.

## Objectives of the work to be executed

The work consists of writing a first ‘opendthX’ meta standard, ETSI (ES), introducing the concepts that will be presented in a second phase through documents dealing with the 3 aspects of interoperability: semantics (formalisation of a methodological guide to produce a semantic responding to a use case), organisational (BIM CiQO process, Collaboration In, Quality Out) and technical (format specification and development of open source interoperability software bricks). This writing will be made on the basis of position paper GR OEU 035 published by ISG OEU ETSI in 02/2024.  
  
One of the objectives of this work is to highlight the complementarity of the ‘openthX’ standardisation work with the SAREF standardisation work and in particular SAREF4BLDG developed by TC SMART M2M. The aim of the standardisation of ‘openthX’ is to facilitate the production of digital twins of buildings whose operating use cases using IOT can be implemented more easily using SAREF4BLDG/IFC.  
  
This first step of opendthX standardization will begin on 1st September 2024 with the delivery of the first document in final version of an ES on 30th June 2025.

## Previous funded activities in the same domain

None

## Market impact

The costs induced by interoperability defects for the construction sector are estimated according to various studies at more than 20 billion euros per year in France, which on a European scale represents 120 billion euros per year.  
It is also a brake on innovation by artificially creating a barrier for SMEs that do not have the necessary resources to manage the complexity induced by these interoperability defects.  
This standardisation work will benefit all stakeholders in the sector, first and foremost the building owners but also the project managers, construction companies and manufacturers while strengthening the sovereignty of the European zone and its capacity to meet societal challenges such as improvement of the energy performance of buildings, the reduction of construction waste and the capacity to improve collaborative efficiency, of a very fragmented and diversified sector.

## Consequences if not agreed

A refusal of this STF will extend the time for standardisation with a risk for ETSI of losing leadership on this aspect of data interoperability with applications and synergies with SAREF for the exploitation of the buildings and their technical installations through the use of IOT.

# Relation with ETSI strategy and priorities

|  |  |
| --- | --- |
| **Priority Criteria** | **Rationale** |
| Maintenance of standards in mature domains |  |
| Innovation in mature domains | From app-centrism to open data-centrism. |
| Emerging domains for ETSI | OpendthX's ETSI standardisation work will reduce software development and content creation costs by pooling interoperable software building blocks for all players, particularly SMEs and to support the development of the use of SAREF for smartbuildings and campuses. |
| Horizontal activities (quality, security, etc.) | Ease of exchange of information strengthens the quality and safety of workers on site. |
| Societal good / environmental | More collaboration to enable the industry to embrace new requirements. Use of a format that minimises the amount of data exchanged, shared, processed and stored to minimise the environmental impact of digital technology for construction. |

# ETSI Members Support

Note: This support is not the same as for the Work Item. ETSI Members listed here are supporting that ETSI invests financial resources for an STF to produce the Work Item(s).

|  |  |  |
| --- | --- | --- |
| **#** | **ETSI Member** | **Supporting delegate** |
| 1 | eG4U | Dominique ROCHE |
| 2 | ORANGE | Olivier BOUFFANT |
| 3 | AIRBUS | Jean-Marc ALBEROLA |
| 4 | RATP | Moustapha KERMOUNE |
| 5 | SBS AISBL | Georgi BABINOV |

# Deliverables

## Base documents

|  |  |  |
| --- | --- | --- |
| **Document** | **Title** | **Status** |
| ETSI GR OEU 035 | Data interoperability format with applications for  connected buildings V1.1.1 | Publication |
| SAREF ETSI TS 103 264 | SmartM2M ; Smart Applications ; Reference Ontology and oneM2M Mapping"  D4 : Smart Applications ; Reference Ontology and oneM2M Mapping v3.2.1 | Publication |
| SAREF ETSI TS 103 410-3 | SmartM2M ; Extension to SAREF ; Part 3 : Building Domain" (SmartM2M ; Extension to SAREF ; Part 3 : Building Domain) v1.1.2 | Publication |

## New deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliv.** | **Work Item code**  **Standard number** | **Working title**  **Scope** | **Expected date for publication** |
| [D1](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=71762) | DES/ATTM-0020013 | Working title: Meta model opendthX entities/relationships interoperability data/applications Scope : Standardisation of the opendthX format to produce the digital twin applied to the operation of connected buildings. | 30/06/2025 |

# Maximum budget

## Task summary/Manpower Budget

|  |  |
| --- | --- |
| **Task short description** | Budget (EUR) |
|
| Project management | 7.040,00 |
| Writing ES META model opendthX | 22.080,00 |
| Communication and reporting | 21.120,00 |
| **TOTAL** | 50.240,00 |

## Travel budget

3 meetings organized at ETSI with the participation of the project team made up of 3/4 people.  
1 ETSI board presentation  
1 ITU presentation  
1 event presenting the work organized at ETSI scheduled for s1 2025   
For a budget of € 4.700,00 excluding tax

Part II – Details on STF Technical Proposal

# Tasks, Technical Bodies and other stakeholders

## Organization of the work

A steering group (SG) will be created and set up by the TC ATTM to ensure the steering of the STF, check progress during periodic meetings and guide the STF.  
  
The participants in this SG are:  
**SG: TC ATTM Chair, TC SmartM2M Chair, oneM2M delegate, TC ATTM WG SDMC Chair, other organisations**

Relations with other reference organisations and stakeholders will be managed within the framework of the project by ensuring their participation in the SG or their contribution in the consultation/validation phases.

The presentation of the work will be carried out in cooperation with the Technical Committees ATTM, SmartM2M, ETSI Partnership Project oneM2M as well as at the ITU.

## Tasks for which the STF support is necessary.

The required digital expertise related to BIM.

## Other interested ETSI Technical Bodies

The list of other ETSI reference bodies that must be involved in this activity are **SmartM2M,** for consultation, dissemination, review/approval and **oneM2M for information**

## Other stakeholders

**CINOV DIGITAL (FR)**  
**BUILDING ALLIANCE (FR)**  
**Techlink (BE)**  
**EG4U (FR)**  
**BUILDWISE (BE)**  
**ITU (CH)**  
  
for consultation, distribution, review/approval.

Part III: Execution of Work

# Work plan, time scale and resources

## Task description

|  |  |
| --- | --- |
| **Task #0** | **Project management** |
| **Objectives** | Recruit and facilitate the expertise required to produce the targeted deliverables within the set deadlines. |
| **Input** | Position paper GR OEU 035 v1.1.1 (2024-02) and normative road map opendthX |
| **Output** | STF progress report (for approval) to the Steering Committee and the ETSI TC ATTM (at each of the 3 stages T1-T2-T3) |
| **Interactions** | TC ATTM for approval. TC SmartM2M for consultation and ETSI PartnershipProject oneM2M for information.. |
| **Resources required** | Project management for the standardisation of digital exchanges in the construction industry |

|  |  |
| --- | --- |
| **Task #1** | **Writing ES META model opendthX** |
| **Objectives** | Write the ES normative documents specifying the context of use of the opendthX format |
| **Input** | Position paper GR OEU 035 v1.1.1 (2024-02) and normative road map opendthX |
| **Output** | 1 normative document : **D1** [**DES/ATTM-0020013**](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=71762)    An umbrella standard ES META model opendthX entities/data/applications interoperability relationships presenting the application of the 3 aspects of interoperability (organisational, semantic and technical) intended for decision-makers in the construction industry |
| **Interactions** | Production of the project group in interaction with the organisations representing the different components of construction (engineering, project management, companies, manufacturers) cited in 6.4. |
| **Resources required** | BIM expertise, architecture and software development, linked data, digital infrastructure, security, knowledge, systemic, construction profession, standardisation |

|  |  |
| --- | --- |
| **Task #2** | **Dissemination of the works** |
| Objectives | Make the results of the work known to the public and in particular to the users of the construction sector and developers of digital applications and content. |
| Input | Normative documents produced: ES META opendthX and TS open API opendthX v2 JSON : **D1** [**DES/ATTM-0020013**](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=71762) |
| Output | Steering group presentation. Press release 1 Cinov Digital webinar, 1 full conference with the contribution of the professional or associative organisations involved cited in 6.4. |
| Interactions | TC ATTM, TC SmartM2M, EPP oneM2M, ETSI Board. ETSI for information |
| Resources required | Event organisation, communication. |

## Milestones

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **A** | ES META model opendthX | 2024-10-15 |
| TC ATTM Deliverable | D1 Early Draft approved by TC ATTM |
| ETSI Deliverable | Progress Report#1 approved by TC ATTM |

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **B** | ES META model opendthX | 2025-02-28 |
| TC ATTM Deliverable | D1 Stable Draft approved by TC ATTM |
| ETSI Deliverable | Progress Report#2 approved by TC ATTM |

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **C** | ES META model opendthX | 2025-06-30 |
| TC ATTM Deliverable | D1 Final version approved by TC ATTM |
| ETSI Deliverable | Final report to be approved by TC ATTM |

## Task summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Code** | **Task / Milestone** | Target Date | | Estimated Cost (EUR) |
| From | To |
|  | Start of the works | 01/09/2024 | 30/06/2025 |  |
| T0 | Project management | 01/09/2024 | 30/06/2025 | 7.040 |
| T1 | Writing ES META model opendthX | 01/09/2024 | 28/02/2025 | 22.080 |
| Milestone A | D1 Early draft approved by TC ATTM  Progress report#1 to be approved by TC ATTM | 01/09/2024 | 15/10/2024 |  |
| Milestone B | D1 Stable draft approved by TC ATTM  Progress report#2 to be approved by TC ATTM | 15/10/2024 | 28/02/2025 |  |
| Milestone C | D1 Final draft approved by TC ATTM  Final report to be approved by TC ATTM  Closure of the STF | 28/02/2025 | 30/06/2025 |  |
| T2 | Dissemination of the works | 01/09/2024 | 30/06/2025 | 21.120 |
|  | | | | **50.240** |

Gant Chart

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **2024** | | | | | | | | | | | |  | **2025** | | | | | | | | | | | |
| **Task/ Mil.** | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** |  | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** |
| T0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MA |  |  |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MB |  |  |  |  |  |  |  |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |  |  |  |
| MC |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | x |  |  |  |  |  |  |
| T2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# Expertise required

## Team structure

Up to 4 participants to ensure the following combination of skills:

|  |  |
| --- | --- |
| **Priority** | **Qualifications and competences** |
| High | Digitalisation: architecture/development/security |
| High | BIM-methodology |
| Low | Project management |
| Low | Construction |
| Low | Normalisation/English |

Part IV: STF performance evaluation criteria

# Performance Indicators

|  |  |
| --- | --- |
| **Select relevant Performance indicators applicable for these ToR (X)** | |
| Contribution from ETSI Members to STF work | |
| Direct financial contribution (co-funding) | 20% |
| Support to the STF work (e.g., provision of test–beds, organization of workshops, events) | 1 alliance-batiment.org demonstration platform, 1 Cinov Digital webinar, organization of 1 event in S1 2025 |
| Steering Group meetings (number of meetings / participants / duration) | 3 meetings /4 participants /5 days |
| Number of delegates directly involved in the review of the deliverables | 3 |
| Contributions/comments received from the reference Bodies | Reviews and assessments of the reference bodies cited in 6.3 |
| Contributions/comments received from other Reference Bodies | Reviews and assessments of the reference organisations cited in 6.4 |
|  |  |
| **Contribution from the STF to ETSI work** | |
| Contributions to Reference Body meetings (number of documents / meetings / participants) | 2 documents /3 meetings/2 participants |
| Contributions to other Reference Bodies | Presentation ITU |
| Presentations in workshops, conferences, stakeholder meetings | 1 webinar/ 1 conference |
|  |  |
| **Liaison with other stakeholders** | |
| Stakeholder participation in the project (category, business area) | Number of participating organisations: 6 |
| Cooperation with other standardization bodies | ITU |
| Potential interest of new members to join ETSI |  |
| Liaison to identify requirements and raise awareness on ETSI deliverables | TC SMARTM2M, Partnership ONEM2M |
| Comments received on drafts (e.g. on WEB site, mailing lists, etc.) | Number of comments recorded following consultations with other TCs and reference organisations |
|  |  |
| **Quality of deliverables** | |
| Approval of deliverables according to schedule | Score 0 to 5 (100% compliance) |
| Respect of time scale, with reference to start/end dates in the approved ToR | Score 0 to 5 (100% compliance) |
| Comments from Quality review by Reference Body | Evaluation form |
| Comments from Quality review by ETSI Secretariat | Evaluation form |
|  |  |

Time recording

For reporting purposes, the STF experts shall fill in the time sheet provided by ETSI with the days spent for the performance of the services

During the activity, the STF Leader shall collect the relevant information, as necessary to measure the performance indicators. The result will be presented in the Final Report.

# Document history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 1.1 | 2024-06-24 | ETSI Secretariat | Final | Update before CL publication |
| 1.0 | 2024-06-06 | DBR | FD | W1.0 –Review after Board#148 comments |
| 0.1 | 2024-05-17 | DBR | FD | W0.9 |
| 0.1 | 2024-05-13 | DBR | SD | V0.8 |
| 0.1 | 2024-04-28 | DBR | ED | V0.7 |
| 0.1 | 2024-04-21 | DBR | ED | V0.6 |
| 0.0 | 2024-04-17 | DBR | ED | V0.5 |

Annex I Response to the Request for Proposals  
CfE – STF 687 (REFERENCE BODY TC ATTM) Deadline: 08 August 2024

**If you are an ETSI Member \***

**ETSI membership status (Indicate your status):**

 Full

 Associate

 Observer

**If you are not an ETSI Member \***

Please indicate:

**Full name of the ETSI member supporting the application (list of ETSI members on etsi.org):**

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Official contact name of the ETSI member supporting the application:**

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Note: A formal confirmation of the support from the Official contact is required (e.g. by e-mail sent to STFLINK@etsi.org) and an “ETSI Member Support Letter” will be required if you are selected.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Contractor information \*** | | | | |
|  | | | | |
| **Contractor name \*:**  *Indicate the Company/Organization Name* | |  | | |
|  | | | | |
| **Contact person for the technical aspects** | | **Contact person for Decision on ETSI financial offer to this project (if any)** | | |
| Title |  | Title |  | |
| First name |  | First name |  | |
| Last name |  | Last name |  | |
| Role |  | Role |  | |
| e-mail |  | e-mail |  | |
| Phone |  | Phone |  | |
|  | | | | |
|  | | **Yes** | | **No** |
| Do you or any employee of your Company/Organization hold an elected or appointed position in the Reference Body requesting the STF 687 creation? | | o  Indicate in which position:  ----------------------------------- | | o |
| **If you are self-employed candidate:**  Do you currently have other contracts in progress with ETSI? | | o | | o |

All fields marked with an asterix (\*) are mandatory

**1.1 Introduction**

A short presentation of the technical structure responsible for this activity, e.g.:

* Business area, number of employees, link to WEB site,
* Department(s)/team(s)/experts in charge of the technical activities related to this Project,
* Reference to products/services of your Company/Organization or supporting Member to which the standards developed by this Project will apply,
* Motivation for your Company/Organization or supporting Member to participate in this Project.

**1.2 Proposed approach**

**Proposed contribution to tasks & related cost**

Identify the tasks to which your Company/Organization is proposing to contribute by filling-in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tasks\_No** | **Tasks\_Description** | **Max\_Budget\_Allocated\_in\_Euro** | **Amount\_in\_Euro\_(mandatory)** | **%\_of\_whole\_Task\_(mandatory)** |
| 00 | Project management | 7040 | . | . |
| 01 | Writing ES META model opendthX | 22080 | . | . |
| 02 | Dissemination of the works | 21120 | . | . |
|  | Total | **50240** |  |  |

**Amount in Euro (mandatory)**: Indicate the price offered for your contribution to the task(s)

**% of whole task (mandatory)**: Indicate to which percentage of the execution of the whole task your offer corresponds

Provide a description of the proposed approach, competences, reference to related activities:

* Explain which part of the task is corresponding to the requested percentage that your Company/Organization will handle,
* Explain the scope that your Company/Organization will cover,
* Explain your approach to the management of the quality and,
* Explain your approach to the management of the risks and their mitigation,
* Describe and justify the proposed costs to achieve this project objectives.

Annex II Terms and Conditions  
CfE – STF 687 (REFERENCE BODY TC ATTM) Deadline: 08 August 2024

**2.1 Submission of Proposals**

All proposals in response to this CfE shall be submitted before the deadline indicated in thisCollective Letter, using exclusively the WEB application on the ETSI Portal at the following address: <https://portal.etsi.org/cfe>.

Proposals shall be composed of Curriculum Vitae of the proposed service providers’ personnel and the Annex I of this CfE duly filled-out.

Proposals that will be partial or incomplete at the deadline will not be accepted.

The Terms and Conditions in this Annex will apply.

**2.2 Modification and Withdrawal of Proposals**

Applicants may, without prejudice to themselves, modify or withdraw their proposal by written request, provided that the request is received by ETSI prior to the due date and time, at the address to which their proposal was submitted. The applicant may submit a new proposal provided that such new proposal is received prior to the deadline for responding which is specified in this Collective Letter.

**2.3 Assessment of Proposals**

The ETSI Director-General, in consultation with the Reference Body Chairman, is responsible for the selection of the service providers that will be contracted to perform this Project work. The ETSI Director-General and the Reference Body Chairman may be assisted by a Selection Panel to assess the applications received and make the final decision.

As per article 1.10.4 of the ETSI Directives, the Director-General may discard proposals that could be identified as creating potential conflict of interest.

The ETSI Secretariat will only communicate to the applicants the result of the selection (accepted or not accepted). Should applicants need more information on the rationale for the selection, they must address a formal request to the ETSI Director-General.

The following evaluation criteria will be applied to all proposals, in order of priority:

* Evidence that the applicant has the necessary structure and expertise to ensure delivery
* Reference to current or previous activities in the specific technical domain of this project
* Critical review of the most efficient way to achieve the objectives in this Project ToR
* Effective proposed approach/methodology for the execution of the tasks
* Implementation schedule
* Clear pricing policy

Compliance with the first two (2) criteria is mandatory.

Proposals that are not considered compliant with these criteria will be discarded.

Priority will be given to technical quality of the proposals. Pricing considerations will be taken into account to ensure that the best value for money is achieved. Compatibility with the maximum budget allocated to this Project will be verified before placing a Service Contract.

Following the assessment process, ETSI reserves the right to grant contracts to other than the cheapest proposals, to accept or reject any offer completely or in part, or to reject all proposals, without providing the reasons. If no offer is accepted, ETSI may decide to abandon the work or proceed in any other manner ETSI may select.

**2.4 IPR and confidentiality Agreements**

The information provided in this CfE, as well as the fact that the applicant has received the CfE, is considered confidential and protected under copyright laws. The applicant may not discuss, share, or use the information in this CfE for any purpose other than the response to this CfE.

ETSI will not disclose the content of any proposals to other applicants or any other party, with the exception of the persons involved in the assessment process described in §2.3 above.

However, ETSI reserves the right to make use of the information provided in this proposal to improve this project definition for the purpose of this CfE or any other manner in which ETSI may decide to proceed to select the service providers.

If successful, the applicant will be required to sign a Service Contract, which includes IPR and Confidentiality clauses aligned with the relevant policies in the ETSI Directives.

**2.5 Preparation cost**

ETSI will not be responsible for any costs or expenses that the applicant may incur in preparing and/or submitting the proposal.

**2.6 Service Contract**

A Service Contract will be proposed to the applicants that will be selected to perform the work.

Details on the Terms and Conditions of this contract can be found on the ETSI Portal, at the following address: <https://portal.etsi.org/STF/STFs/Contracts.aspx>

1. To find out more about the opendthX project, you can download the GR OEU 035 position paper: https://www.etsi.org/deliver/etsi\_gr/OEU/001\_099/035/01.01.01\_60/gr\_OEU035v010101p.pdf [↑](#footnote-ref-1)