

# UoM Ontology Standard - Proposed OASIS TC Charter - final draft (228I)

Editor: [HowardMason](#) (228J)

(1)(a) The name of the TC, such name not to have been previously used for an OASIS TC and not to include any trademarks or service marks not owned by OASIS. The proposed TC name is subject to TC Administrator approval and may not include any misleading or inappropriate names. The proposed name must specify any acronyms or abbreviations of the name that shall be used to refer to the TC. [\(22CV\)](#)

- Quantities and Units of Measure Ontology Standard (QUOMOS) [\(22CO\)](#)

(1)(b) A statement of purpose, including a definition of the problem to be solved. [\(22CP\)](#)

Ontologies allow the explicit specification of the multiple possible meanings of concepts so that people can recognize commonalities and differences in the semantics of the concepts that they use. [\(22E1\)](#)

Ontologies can be used to improve the quality of standards, leading to more robust implementations of the standards and the semantic integration of multiple standards. The axiomatization of formal ontologies can also support automatic conformance-checking. [\(22E2\)](#)

Measurement units and dimensions (or dimensionality) are essential for the meaningful communication of measurements, design specifications, scientific data, medical data, environmental data and regulations, and many commercial transactions. Confusion over measurement units can lead to disasters such as the demise of the Mars Climate Observer satellite. An ontology of measurement units and dimensions would have wide utility in many IT standards. [\(22DV\)](#)

A number of standards projects and other large-scale projects are currently developing some kind of ontology for quantities and measurement units. This will quickly lead to a proliferation of formal models for quantities and units that are not quite comparable. That in turn will impede consistent specifications of quantities for publication and information exchange in many industries. A standard ontology for quantities and units, adopted at this time, can be incorporated into such projects, or used as a reference for the symbols they define, thus promoting consistent interpretation and interworking of specifications and measurements. [\(2462\)](#)

Measurement units include metres, feet, inches, etc. all of which have the dimension of "length", i.e., length is the "property" of which "metre" is the unit of measure. In the International System of Quantities (Units) (also called the metric system or SI) the base dimensions (units) are: length (metre), mass (kilogram), time (second), electric current (ampere), thermodynamic temperature (kelvin), amount of substance (mole) and luminous intensity (candela). Derived (or composite) dimensions are constructed by multiplying or dividing the dimensions when multiplying or dividing the corresponding quantities. Hence speed has dimension of length / time. In practice the various base dimensions may have exponents of -3 to +3. Thus the space of derived dimensions has size of 7 to the 7th power - approx. 800K possible dimensions. For each dimension there are often several alternative measurement units - thus the space of all possible measurement units is huge. [\(22DW\)](#)

Thus it is clear that there is need to specify a framework for constructing derived dimensions / units from base dimensions and units. [\(22E3\)](#)

It is therefore proposed to develop an ontology which would specify the basic concepts of quantities, systems of quantities, and systems of measurement units and scales, the various base dimensions and units of the SI system, the various metric prefixes (nano-, micro-, milli-, kilo-, ...), the rules for

constructing various derived units, and the designations of the most common derived units such as joules, watts, ... The ontology should also address non-metric base and derived units that are commonly used across multiple industries. [\(22E4\)](#)

The ontology will be represented in multiple formats, to allow exploitation via various tools - CLIF (ISO 24707) is currently proposed as the reference normative form, along with a derived OWL2/DL representation, although this may not be able to accommodate all CLIF concepts. It will also be important to construct canonical URIs to reference the various measurement units and dimensions. Furthermore, the ontology should be linked to standard representations (names, abbreviations) for the various measurement units / dimensions, e.g., meters, m, joules, etc., as expressed in sources such as the OASIS [UnitsML](#) project, and the Healthcare Level 7 Uniform Code for Units of Measure (UCUM). [\(22DX\)](#)

There are some anomalies which need to be addressed, notably in the area of "dimensionless units" and derived units that involve them, such as measurements of concentration, energy v. torque. Non-linear scales will also be a concern. [\(22DZ\)](#)

(1)(c) The scope of the work of the TC, which must be germane to the mission of OASIS, and which includes a definition of what is and what is not the work of the TC, and how it can be determined when the work of the TC has been completed. The scope may reference a specific contribution of existing work as a starting point, but other contributions may be made by TC Members on or after the first meeting of the TC. Such other contributions shall be considered by the TC Members on an equal basis to improve the original starting point contribution. [\(22CQ\)](#)

The objective is to develop the draft of an international ontology standard for expressing "Quantities and Units of Measure" which will be publicly available, free of charge. The reference normative form of the ontology will be expressed in the CLIF language, with derived normative representations in OWL 2.0 DL, and UML. [\(22DS\)](#)

The work shall include the development of a core set of ontology modules covering quantities, units, scales, dimensions, base and derived SI units and their relationships, and extension mechanisms to allow the later inclusion of non SI units and other measurement systems. The ontology shall be independent of industry sector and applications, and based on available specifications and standards, particularly the VIM. Where ambiguities and contradictions arise between different specifications and standards, these shall be referred back to the originating organizations for resolution. [\(2463\)](#)

Later ontology modules may include basic concepts for measurements and uncertainties, and for quantity specifications and tolerances. While all applications of quantities are one or the other of these, these disciplines are more complex and may have industry-specific characteristics. [\(22DT\)](#)

The TC will liaise and strive to coordinate its development with the work of BIPM (International Bureau of Weights and Measures), ISO/IEC 80000, VIM (International Vocabulary of Metrology), [UnitsML](#), UCUM (Unified Code for Units of Measure) and UNECE Recommendation 20, and take into account existing quantities and units ontologies based on VIM, such as Sweet, QUDT and the QUDV component of [SysML](#). It is expected that the scope of the QUOMOS ontology with respect to specific units will be influenced by the relationship to [UnitsML](#) and UCUM. [\(22DU\)](#)

Consideration will be given to ensuring that the methodology used to construct the ontology can be exploited in the construction of other definitive ontologies. [\(2464\)](#)

(1)(d) A list of deliverables, with projected completion dates. [\(22CW\)](#)

The TC will produce a core set of ontology modules covering quantities, units, scales, dimensions, base and derived SI units and extension mechanisms to allow the later inclusion of non SI units and other

measurement systems. The reference normative ontology will be expressed in CLIF, with other normative representations may be derived in OWL 2.0 DL, and supported by equivalent UML diagrams. [\(23EA\)](#)

Further extensions may be generated using the specified mechanisms. [\(23ED\)](#)

(1)(e) Specification of the IPR Mode under which the TC will operate. [\(22CX\)](#)

- Non-Assertion [\(22DP\)](#)

(1)(f) The anticipated audience or users of the work. [\(22CY\)](#)

The proposed ontology will be applicable to any developer or user of information models or applications that require an unambiguous definition of units in a digital form that can be utilised by a wide range of applications, including document markup and data exchange. It will also highlight logical inconsistencies and ambiguities that need to be addressed. [\(22E7\)](#)

(1)(g) The language in which the TC shall conduct business. [\(22CZ\)](#)

- English [\(22DO\)](#)

(2) Non-normative information regarding the startup of the TC, which includes: [\(22D0\)](#)

(2)(a) Identification of similar or applicable work that is being done in other OASIS TCs or by other organizations, why there is a need for another effort in this area and how this proposed TC will be different, and what level of liaison will be pursued with these other organizations. [\(22D1\)](#)

The only relevant work in OASIS is the [UnitsML](#) activity to provide a markup language for units. The QUOMOS work should be complementary, in providing an ontological representation for Units of Measure, and may provide resolution of ambiguities in the definition of units adopted from elsewhere. [\(22E8\)](#)

The work needs to be based on the fundamental internationally agreed definitions from BIPM and the agreed understanding of derived units, as defined in the ISO/IEC 80000 series of standards. Additional derived units from efforts such as UCUM and known requirements from other groups may also be taken into account. Existing agreements on international trade from the UN should also be taken into consideration. [\(22E9\)](#)

Requirements are being actively sought from prospective user organisations in ISO, IEC and UNECE, and the TC welcomes other relevant contributions. [\(22EA\)](#)

In order to obtain the broadest possible perspective, the initiative has been reported to the Management Group of the MoU on eBusiness between ISO/IEC/ITU/UNECE, at its 12-13 October meeting, with a request for contributions. [\(22EB\)](#)

(2)(b) The date, time, and location of the first meeting, whether it will be held in person or by telephone, and who will sponsor this first meeting. The first meeting of a TC shall occur no less than 30 days after the announcement of its formation in the case of a meeting held exclusively by telephone or other electronic means, and no less than 45 days after the announcement of its formation in the case of a meeting held face-to-face (whether or not a telephone bridge is also available). [\(22D2\)](#)

The first meeting will be held by teleconference on Thursday 21 January 2010, from 18.30-20.30 UTC, or as soon thereafter as is feasible within the OASIS procedures. [\(23EE\)](#)

(2)(c) The projected on-going meeting schedule for the year following the formation of the TC, or until the projected date of the final deliverable, whichever comes first, and who will be expected to sponsor these meetings. [\(22D3\)](#)

The TC will meet by teleconference every two weeks or as decided by the group after it is launched. Additional face-to-face meetings may be held by consensus. [\(23EF\)](#)

(2)(d) The names, electronic mail addresses, and membership affiliations of at least Minimum Membership who support this proposal and are committed to the Charter and projected meeting schedule. [\(22D4\)](#)

- Ed Barkmeyer (edbark-at-nist.gov) NIST [\(23EH\)](#)
- Jerry Smith (jerry.smith-at-disa.mil) US DoD [\(23EL\)](#)
- Frank Olken (folken-at-nsf.gov) LBNL [\(23EM\)](#)
- Peter Yim (peter.yim-at-com3.com) CIM3 (associate member) [\(23EN\)](#)
- Howard Mason (howard.mason-at-baesystems.com) BAE Systems [\(246A\)](#)
- Pat Hayes (phayes-at-ihmc.us) IHMC (to become associate or individual member) [\(247X\)](#)

(2)(e) For each OASIS Organizational Member listed in (2)(d), the name, electronic mail address, membership affiliation, and statement of support for the proposed Charter from the Primary Representative. [\(22D5\)](#)

- Dr David Flater (dflater-at-nist.gov) NIST [\(247O\)](#)

Ed Barkmeyer: NIST has formally approved our participation, that is, both the NIST OASIS principal and my management. [\(247P\)](#)

- Jerry Smith (jerry.smith-at-disa.mil) US DoD [\(247Q\)](#)

We've reviewed the draft and concur. [DoD](#) is a member of OASIS, I am the voting representative, and we want to participate in this new TC. [\(247R\)](#)

- Mary Ann Piette (mapiette-at-lbl.gov) LBNL [\(247S\)](#)

Frank (Olken) - Sounds ok to me! In the buildings area there are tremendous measurements issues, measurement of energy, measurement of services building systems provide, measurement of satisfaction, measurement of indoor air quality and many more! - Mary Ann [\(247T\)](#)

- Howard Mason (howard.mason-at-baesystems.com) BAE Systems [\(247U\)](#)

BAE Systems supports the development of the proposed ontology standard, which should form part of our overall standards toolbox. [\(247V\)](#)

(2)(f) The name of the Convener who must be an Eligible Person. [\(22D6\)](#)

- [HowardMason](#) (BAE Systems) [\(23EB\)](#)

(2)(g) The name of the Member Section with which the TC intends to affiliate, if any. [\(22D7\)](#)

- None [\(22D1\)](#)

(2)(h) The TC anticipates evaluating the following sources as potential contributions to the proposed ontology [\(22D8\)](#)

- BIPM (International Bureau of Weights and Measures) [\(22EC\)](#)
- VIM (international Vocabulary for Measurement) [\(22EE\)](#)
- [UnitsML](#) [\(22EF\)](#)
- UCUM (Unified Code for Units of Measure) [\(22EG\)](#)
- UNECE Recommendation 20 [\(247W\)](#)

- Sweet ([22EI](#))
- QUDT ([22EJ](#))
- QUDV component of [SysML](#) ([23EC](#))

(2)(i) Optionally, a draft Frequently Asked Questions (FAQ) document regarding the planned scope of the TC, for posting on the TC's website. ([22D9](#))

- None ([22DJ](#))

(2)(j) Optionally, a proposed working title and acronym for the specification(s) to be developed by the TC. ([228K](#))

- Quantities and Units of Measure Ontology Standard (QUOMOS) ([22DR](#))

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Source: [http://ontolog.cim3.net/cgi-bin/wiki.pl?action=browse&id=UoM\\_Ontology\\_Standard\\_OASIS\\_TC\\_Charter\\_Draft&revision=42](http://ontolog.cim3.net/cgi-bin/wiki.pl?action=browse&id=UoM_Ontology_Standard_OASIS_TC_Charter_Draft&revision=42)