# Issue 536\_HW MD

“In the 49th CIDOC CRM and 42nd FRBR CRM sig meeting (virtual), given the decision to reduce the range of P39 measured from E1 CRM Entity to E18 Physical Thing (issue 511), the SIG decided to start a new issue where to discuss the introduction of properties for assigning dimensions to places and temporal entitites (now excluded by P39). Proposed properties are:

 Pxx has dimension [D: E53 Place, R: E54 Dimension]

 Pxx has dimension [D: E2 Temporal Entity, R: E54 Dimension]

Whether they will be placed in CIDOC CRM or another family model (f.i. CRMgeo or CRMsci) should also be part of the discussion.

HW: MD, RS, MaDo to formulate the definitions and examples.

March, 2021”

**In Issue 388 we had formulated:**

“Sxxx Position Measurement

Subclass of: E16 Attribute Assignment

Scope note: This class comprises activities of measuring positions in space and time. The measured position is intended to approximate a part or all of the extent of the presence (instance of E93 Presence) of an instance of E18 Physical Thing or E4 Period of interest, such as the outer walls of an excavated settlement, the position of a ship sailing or the start and end of athlete’s run in a competition. Characteristically, a theodolite or GPS device may be positioned on some persistent feature. Measuring the position of the device will yield an approximation of the position of the feature of interest. Alternatively, some material item may be observed moving through a measured position at a given time.

A position measurement is an evaluation of a combination of measurement of multiple associated distances and/or angles (instances of E54 Dimension) from a particular spot to certain reference points of previously known position in the same reference space. A particular role plays the magnetic field and the Earth’s rotational axis as reference for an angle or direction. Often, the observed constituting dimensions are not documented, or hidden in an electronic device software.The measured position is given as an E94 Space Primitive corresponding to a declarative place. Together with the measured time-span covering the time-critical observations it forms a spacetime volume, which should normally overlap with the spatiotemporal extent of the thing or phenomenon of interest.

Properties:

Oxx1 determined position (was determined by): E94 Space Primitive

Oxx2 has validity time-span (is position validity for): E52 Time-Span

We may now formulate the approximation to the things of interest, e.g.

Oxx3 overlaps with presence: E93 Presence.”

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**position measurement** consists of triangulation, either with two more things, or one thing and a direction from it. GPS is multiple triangulation with Greenwich and the rotational axis of earth as ref frame. Normally, directions are defined by two things present.

So, position measurement is multiple measurements of an observable situation and implicit evaluation of the coordinates relative to the ref frame.

Basically, the position measurement makes sense as a declarative place within the presence of a thing or event at the time of measurement, or covering it. “overlaps” may be precise enough.

**Consequently,**

**I propose:**

A place cannot be measured, but only a Material Substantial.

The instance of Place produced is an approximation of the real one.

Therefore, *Pxx has dimension* [D: E53 Place, R: E54 Dimension] has a mathematical substance, and is the result of evaluation. It is independent from dimensions of observable entities and situations.

Equally, distances between features that do not coexist in time, or did not exist at the time of determining the distance, and other geometric “multi-place” properties are mathematical constructs. The question is how to model them. This should be defined in the OGC standards! **To be looked up**.

Similarly, Spacetime Volumes need a mathematical dimension, not an observable one.

Time-spans do have only one kind of dimension: the duration, which exists already in the model.