# Issue 583

**S4 Observation**

Subclass of: E13 Attribute Assignment

Superclass of: S21 Measurement

S19 Encounter Event

Scope note: This class comprises the activity of gaining scientific knowledge about particular states of physical reality through empirical evidence, experiments and measurements.

We define observation in the sense of natural sciences, as a kind of human activity: at some place and within some time-span, certain physical things and their behavior and interactions are observed by human sensory impression, and often enhanced by tools and measurement devices.

Observed situations or dimensions may pertain to properties confined to a single instance of S15 Observable Entity or pertain to constellations of multiple instances and relations between them, in particular distances between them.

The output of the internal processes of measurement devices that do not require additional human interaction are in general regarded as part of the observation and not as additional inference. Primary data from measurement devices are regarded in this model to be results of observation and can be interpreted as propositions believed to be true within the (known) tolerances and degree of reliability of the device.

Measurements and witnessing of events are special cases of observations. Observations result in a belief that certain propositions held at a time within the time-span of the observation. In this model, the degree of confidence in the observed properties is regarded to be “true” by default, but could be described differently by adding a property P3 has note to an instance of S4 Observation.

Examples:

The excavation of unit XI by the Archaeological Institute of Crete in 2004.

The observation (S4) of the density (S9) of the X-Ray image of cupid's head from the painting “Cupid complaining to Venus” (S15) as “high density” (E1), on the 19th of March 1963 (Cranach Digital Archive, http://lucascranach.org/UK\_NGL\_6344).

The observation (S4) of visible light absorption (S9) of the painting “Cupid complaining to Venus” (S15) as “having red pigment”, in 2015 (Foister, S., 2015).

In First Order Logic:

S4(x) ⊃ E13(x)

Properties:

O8 observed (was observed by): S15 Observable Entity

O9 observed property type (property type was observed by): S9 Property Type

O16 observed value (value was observed by): E1 CRM Entity

O? observed: Situation?

## Observable Situation

Scope note:

An Observable Situation can be perceived as the focus of an observer, by human senses or

enhanced or mediated by technical instruments, on a constellation, an interaction or a dynamic

behavior of instances of S15 Observable Entity or sections of these instances within a particular time-

span and spatial extent in the past. The observer may themselves be directly involved, or be receiving

respective signals from these instances. The focus of the observer determines the model they overlay on

the observed reality in order to describe it in terms of distinct properties and value ranges of

parameters. The latter selection and projection from reality constitutes the content of a particular

observable situation. Multiple observers may select different models, details and value systems to the

same spatiotemporal area (i.e., views they pay attention to). Consequently, the observed situations may

differ, but should, in principle, be compatible with a common reality in their overlaps

(categorical) Examples:

* Sun rising over the horizon at a particular spot.
* A car passing by another car.
* A lightning bolt.
* An air temperature and wind speed at a certain point and time.
* People being in a city, a house.
* Someone showing symptoms of sickness.
* A vegetation cover of a field.
* Someone eating.
* Two mountains being at a certain distance.
* Cars in a starting position for a race.
* The direction a compass needle shows at a particular spot.

All **parthood** of physical things for an uninterrupted period of observation is an observable situation.

***P12 occurred in the presence of (was present at)*** is observable.

**E93 Presence** of physical things for an uninterrupted period of observation is an observable situation.

The location of things present and events happening are observable with respect to physical features or objects unmoved.

The presence **of two** physical things for an uninterrupted period of observation each within a given space, or the presence of one thing and an event or two events within an uninterrupted period of observation allow for observing a spatial distance in this “situation”.

* P164 is temporally specified by (temporally specifies): E52 Time Span
* P167 was within (includes): E53 Place
* P195 was a presence of (had presence): E18 Physical Thing

**I propose:**

**Sxxy Spatial Distance**

Subclass of Sxxx Observable Situation

properties:

Oxxx is distance between: Observable Entity (cardinality 2!

Oxxx has dimension:

as an observed situation, it could per default inherit the temporal bounds of the observation/measurement. As a result of evaluation, it could exceed any limitations of single observation..

We can define **a temporal distance** of events as another observable situation.

Open questions: how to define a situation of passing by a feature (“destination mark”).

**Generally,**

one can observe

1. static properties of a Physical Thing or Material Substantial and events.
2. Situations when affairs involving observable entities stay within some boundaries for some time, such as presence, parthood, P12 was present at, location
3. Dynamic processes involving sub-situations of things going from A to B etc, such as runners in a competition. We have no construct of following a road in the CRM, but we can specify an observable situation in a more general sense, within which the Marathon runner had first a presence at Marathon, if not explicitly a “starting event”, and then at various road mark, and then in Athens (“dying”).

Question, can these all be subsumed under “observable situation”, or is this overstretching the concept?

Observable Situation clearly needs **a parthood property.**

**Observable Situation may be described by a Proposition Set**, but it “commits” to the statements themselves; it is **not** just **an information object**. **Specializations** of Observable Situation may **restrict** possible propositions appearing in the Situation, **NOT add** new ones.

**Issue 388:**

**We had formulated:**

“Sxxx Position Measurement

Subclass of: S4 Observation

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 is played by the Earth’s magnetic field and 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.”

**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.