# Issue 531

## S4 Observation

Vote to update the definition of **S4 Observation** (keep the isA E13 Attribute Assignment):
Nb: Substituting O9 and O16 with Oxx observed situation is not part of the vote.

**Decision**: the definition of S4 Observation to be updated as proposed. Details [below](#_S4_Observation).
**HW**: AK to check and format the first example according to the template (The excavation of unit XI by the Archaeological Institute of Crete in 2004).

### S4 Observation

The definition changed

#### FROM (old)

**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.

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. Manual recordings may serve as additional evidence. Measurements and witnessing of events are special cases of observations. Observations result in a belief about certain propositions. 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, or by reification of the property *O16 observed value*.

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.

Observations represent the transition between reality and propositions in the form of instances of a formal ontology, and can be subject to data evaluation from this point on. For instance, detecting an archaeological site on satellite images is not regarded as an instance of S4 Observation, but as an instance of S6 Data Evaluation. Rather, only the production of the images is regarded as 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?

#### TO (new)

**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).

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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?

## S15 Observable Entity

Vote to update the definition of **S15 Observable Entity**:
**Decision**: the definition of S15 Observable Entity to be updated as proposed. Details [below](#_S15_Observable_Entity).

### S15 Observable Entity

The definition changed

#### FROM (old)

**S15 Observable Entity**

Subclass of: E1 CRM Entity

Superclass of: E2 Temporal Entity

 E77 Persistent Item

Scope note:

This class comprises instances of E2 Temporal Entity or E77 Persistent Item, i.e. items or phenomena, such as physical things, their behavior, states and interactions or events, that can be observed by human sensory impression, often enhanced by using tools and measurement devices.

Conceptual objects manifestthrough their carriers such as books, digital media, or even human memory. Attributes of conceptual objects, such as number of words, can be observed on their carriers.  If the respective properties between carriers differ, either they carry different instances of conceptual objects or the difference can be attributed to accidental deficiencies in one of the carriers. In that sense even immaterial objects are observable. By this model we address the fact that frequently, the actually observed carriers of conceptual objects are not explicitly identified in documentation, i.e., they are assumed to have existed but they are unknown as individuals.

Examples:

The domestic goose from Guangdong/1/1996 (H5N1) (S15) that was identified in 1996 in farmed geese in southern China as circulating highly pathogenic H5N1 (Wan, 2012).

The crow flight he observed over the waters of Minamkeak Lake during the summer of 2015

The eruption of Krakatoa volcano at Indonesia in 1883 (F.A.R., Archibald and Whipple, 1888).

The density of the cupid head area in the X-Ray of the painting “Cupid complaining to Venus” (<http://lucascranach.org/UK_NGL_6344>).

 In First Order Logic:

 S15(x) ⊃ E1(x)

Properties:

 O12 has dimension (is dimension of): E54 Dimension

#### TO (new)

**S15 Observable Entity**

Subclass of: E1 CRM Entity

Superclass of: E5 Event

 O10 Material Substantial

Scope note:

This class comprises instances of E5 Event or O10 Material Substantial (i.e. items or phenomena, such as physical things, their behavior, states and interactions or events), that can be observed by measurement or detection devices or by human sensory impression including when enhanced by tools.

In order to be observable, instances of E5 Event must consist of some interaction or action of material substance. In some cases, the spatiotemporal confinement of the event itself, such as a flash, a car stopping etc. marks the limits of a documented observation of an event. In other cases, such as the situation of a car passing by a certain object, the spatiotemporal limits of the event of observing itself, as well as the direction of attention or the orientation of used instruments, may constrain the observed detail of a larger process, e.g., noticing the sight of a car passing by; a light emission, etc.

Conceptual objects manifest through their carriers such as books, digital media, or even human memory. Attributes of conceptual objects, such as number of words, can be observed on their carriers. If the respective properties between carriers differ, either they carry different instances of conceptual objects or the difference can be attributed to accidental deficiencies in one of the carriers. In that sense even immaterial objects are observable. By this model we address the fact that frequently, the actually observed carriers of conceptual objects are not explicitly identified in documentation, i.e., they are assumed to have existed but they are unknown as individuals.

Examples:

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 In First Order Logic:

 S15(x) ⊃ E1(x)

Properties:

 O12 has dimension (is dimension of): E54 Dimension

## Observable Situation

Outline of what counts as an instance of Observable Situation-HW by MD. For the text see below

The SIG reviewed MD’s HW and noted the following:

* It is not too clear whether Observable Situations only apply to things that have, in fact, been observed (any situation that has been observed, can in principle be observed). The observable parameters need not have already materialized in all instances of Observable Situations.
* Defining the parameters precedes actual observations, but we need to formulate constraints on how the observable entities will appear in the properties that Observable Situation can consist of.

**Proposal**: MD to continue working on the list of situations that are (or are not) eligible for observation. GH to contribute with examples from excavation records (where they have modelled stratigraphic units using S4 Observation). Begin with material things and then move to topological relations and dynamic (speed, events etc.) relations.

**HW**: MD and GH to work as proposed. TV to supply with examples from risk assessment

### Observable Situation –scope and examples

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 things or sections of things of  material nature within a particular time-span and spatial extent. The observer him/herself may be directly involved in the latter or be receiving respective signals from these things of material nature. The focus of the observer determines the model he/she overlays over the observed reality in order to describe it in terms of distinct properties and value ranges parameters. The latter selection and projection from reality constitutes the content of a particular observable situation. Multiple observers may select different model, i.e. views, thing they put attention to, details and value systems to the same spatiotemporal area. 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. 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.

**To be formulated:** how Obsevable entities must appear in models of observable situations.

# Overall decision:

Close the issue once AK has updated the example of S4