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| **Definition of the CRMarchaeo**  An Extension of CIDOC CRM to support the archaeological excavation process |

# Proposal for approval by CIDOC CRM-SIG

# Version 1.3

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Currently Maintained by PIN S.c.R.L.

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# Introduction <heading 1>

This document describes work which uses and extends the CIDOC Conceptual Reference Model (CRM, ISO21127). The Definition of the CIDOC-CRM document should be read before this document. References to the CRM in this document are taken from CRM version 6.2 maintained by CIDOC. <text>

# Scope

# Status

# < Current Family model> class hierarchy, aligned with portions from the <other Family model> and the CIDOC CRM class hierarchies

This class hierarchy lists:

• all classes declared in **<Current Family model>**

• all classes declared in <**other Family model/s>** and CIDOC CRM that are declared as superclasses of classes declared in the **<Current Family model>**,

• all classes declared in <**other Family model/s>** or CIDOC CRM that are either domain or range for a property declared in the **<Current Family model>**,

• all classes declared in <**other Family model/s>** and CIDOC CRM that are either domain or range for a property declared in <**other Family model/s>** or CIDOC CRM that is declared as superproperty of a property declared in the **<Current Family model>**

• all classes declared in <**other Family model/s>** and CIDOC CRM that are either domain or range for a property that is part of a complete path of which a property declared in **<Current Family model>** is declared to be a shortcut.

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<table>

# <Current Family model name> property hierarchy, aligned with portions from the <other Family model/s> and the CIDOC CRM property hierarchies

This property hierarchy lists:

• all properties declared in **<Current Family model>**,

• all properties declared in **<Other Family model/s>**, and CIDOC CRM that are declared as superproperties of properties declared in **<Current Family model>**,

• all properties declared in **<Other Family model/s>** and CIDOC CRM that are part of a complete path of which a property declared in **<Current Family model>**, is declared to be a shortcut.

<table>

# <Current CRM family model name> Class Declarations

### A1 Excavation Process Unit

Subclass of: S4 Observation

Superclass of:

Scope Note: This class comprises activities of excavating in the sense of archaeology which are documented as a coherent set of actions of progressively recording and removing matter from a pre-specified location under specific rules. Typically, an excavation process unit would be terminated if significant discontinuities of substance or finds come to light, or if the activity should be interrupted due to external factors, such as end of a working day. In other cases, the termination would be based on predefined physical specifications, such as the boundaries of a maximal volume of matter intended to be excavated in one unit of excavation.

Depending on the methodology, an instance of A1 Excavation Process Unit may intend to remove matter only within the boundaries of a particular stratigraphic unit, or it may follow a pre-declared spatial extent such as a trench. It may only uncover, clean or expose a structure or parts of it.

The process of excavation results in the production of a set of recorded (documentation) data that should be sufficient to provide researchers enough information regarding the consistence and spatial distribution of the excavated Segment of Matter and things and features embedded in it. Some parts or all of the removed physical material (S11 Amount of Matter) may be dispersed, whereas others may be kept in custody in the form of finds or samples, while others (such as parts of walls) may be left at the place of their discovery. The data produced by an instance of excavation process unit should pertain to the material state of matter at excavation time only and should well be distinguished from subsequent interpretation about the causes for this state of matter.

Examples:

* + - The activity taking place on 21.9.2007 between 12:00 and 13:00 that excavated the Stratigraphic Volume Unit (2) of Figure 4 and created the surface S1
    - The activity that excavated the first 20 cm of a spit excavation on 21.7.2007 created the surface S2 in Figure 4.

In First Order Logic:

A1(x) ⊃ S4(x)

Properties:

AP1 produced (was produced by): S11 Amount of Matter

AP2 discarded into (was discarded by): S11 Amount of Matter

AP3 excavated (was excavated by): E53 Place

AP4 produced surface (was surface produced by): S20 Physical Feature

AP5 cut (was cut by): A8 Stratigraphic Unit

AP6 intended to approximate (was approximated by): A3 Stratigraphic Interface

AP10 destroyed (was destroyed by): S22 Segment of Matter (Segment of Matter that happened to be at the Excavated Place)

# <Current CRM family model name> Property Declarations

### AP1 produced (was produced by)

Domain: [A1](#_A1_Excavation_Process) Excavation Process Unit

Range: S11 Amount of Matter

Subproperty of:

Superproperty of:

Quantification: one to many (0,n:0,1)

Scope note: This property identifies the S11 Amount of Matter,e.g., a basket, that is preserved (part or total of) from an A1 Excavation Process Unit for further examination or evidence keeping.

Examples:

* The Excavation Process Unit excavating the Stratigraphic Volume Unit (2) produced an amount of black turf with wood inclusions

In First Order Logic:

AP1(x,y) ⊃ A1(x)

AP11(x,y) ⊃ S11 (y)

Properties:

# Referred to CIDOC CRM Classes and properties

Since **< Current Family model>**  refers to and reuses, wherever appropriate, large parts of the CIDOC Conceptual Reference Model, this section provides a comprehensive list of all constructs used from CIDOC CRM, together with their definitions following the ***<CIDOC CRM ver6.2, May 2015>*** *maintained by CIDOC CRM - SIG*.

## CIDOC CRM Classes

<the following class definition is listed as an example>

### E53 Place

Subclass of: [E1](#_E1_CRM_Entity) CRM Entity

Scope note: This class comprises extents in space, in particular on the surface of the earth, in the pure sense of physics: independent from temporal phenomena and matter.

The instances of E53 Place are usually determined by reference to the position of “immobile” objects such as buildings, cities, mountains, rivers, or dedicated geodetic marks. A Place can be determined by combining a frame of reference and a location with respect to this frame. It may be identified by one or more instances of E44 Place Appellation.

It is sometimes argued that instances of E53 Place are best identified by global coordinates or absolute reference systems. However, relative references are often more relevant in the context of cultural documentation and tend to be more precise. In particular, we are often interested in position in relation to large, mobile objects, such as ships. For example, the Place at which Nelson died is known with reference to a large mobile object – H.M.S Victory. A resolution of this Place in terms of absolute coordinates would require knowledge of the movements of the vessel and the precise time of death, either of which may be revised, and the result would lack historical and cultural relevance.

Any object can serve as a frame of reference for E53 Place determination. The model foresees the notion of a "section" of an E19 Physical Object as a valid E53 Place determination.

Examples:

* the extent of the UK in the year 2003
* the position of the hallmark on the inside of my wedding ring
* the place referred to in the phrase: “Fish collected at three miles north of the confluence of the Arve and the Rhone”
* here -> <-

In First Order Logic:

E53(x) ⊃ E1(x)

Properties:

[P87](#_P87_is_identified_by (identifies)) is identified by (identifies): [E44](#_E44_Place_Appellation) Place Appellation

[P89](#_P89_falls_within_(contains)) falls within (contains): [E53](#_E53_Place) Place

[P121](#_P121_overlaps_with) overlaps with: [E53](#_E53_Place) Place

[P122](#_P122_borders_with) borders with: [E53](#_E53_Place) Place

[P157](#_P157(Px2)_is_at) is at rest relative to (provides reference space for): [E18](#_E18_Physical_Thing) Physical Thing

[P168](#_P168_place_is) place is defined by (defines place) : [E94](#_E94_Space_Primitive) Space Primitive

## CIDOC CRM Properties

This section contains the complete definitions of the properties of the CIDOC CRM Conceptual Reference Model ***<CIDOC CRM ver6.2, May 2015>***referred to by **< Current Family model>**  .

<the following class definition is listed as an example>

### P14 carried out by (performed)

Domain: [E7](#_E7_Activity) Activity

Range: [E39](#_E39_Actor) Actor

Subproperty of: [E5](#_E5_Event) Event. [P11](#_P11_had_participant_(participated i) had participant (participated in): [E39](#_E39_Actor) Actor

Superproperty of: [E8](#_E8_Acquisition) Acquisition. P22 transferred title to (acquired title through): [E39](#_E39_Actor) Actor

[E8](#_E8_Acquisition) Acquisition. [P23](#_P23_transferred_title_from (surrend) transferred title from (surrendered title through): [E39](#_E39_Actor) Actor

[E10](#_E10_Transfer_of_Custody) Transfer of Custody. [P28](#_P28_custody_surrendered_by (surrend) custody surrendered by (surrendered custody through): [E39](#_E39_Actor) Actor

[E10](#_E10_Transfer_of_Custody) Transfer of Custody. [P29](#_P29_custody_received_by (received c) custody received by (received custody through): [E39](#_E39_Actor) Actor

Quantification: many to many, necessary (1,n:0,n)

Scope note: This property describes the active participation of an E39 Actor in an E7 Activity.

It implies causal or legal responsibility. The *P14.1 in the role of* property of the property allows the nature of an Actor’s participation to be specified.

Examples:

* the painting of the Sistine Chapel (E7) *carried out by* Michaelangelo Buonaroti (E21) *in the role of* master craftsman (E55)

In First Order Logic:

P14 (x,y) ⊃ E7(x)

P14 (x,y)⊃ E39(y)

P14 (x,y) ⊃ P11(x,y)

P14(x,y,z) ⊃ [P14(x,y) ∧ E55(z)]

Properties: P14.1 in the role of: [E55](#_E55_Type) Type

# Referred to <other CRM family model >Classes and properties

Since <Current CRM family model > refers to and reuses, wherever appropriate, large parts of <other CRM family model >, this section provides a comprehensive list of all constructs used from that model, together with their definitions following the <other CRM family model version#, date >.

## <other family model> Classes

This section contains the complete definitions of the classes of the <other CRM family model version# > referred to by <Current CRM family model > .

<the following class definition is listed as an example>

**I1 Argumentation**

Subclass of: [E13](#_E13_Attribute_Assignment) Attribute Assignment

Superclass of: [S4](#_S4_Observation_1) Observation

[I5](#_I5_Inference_Making) Inference Making/S5 Inference Making

[I7](#_I7_Belief_Adoption) Belief Adoption

Scope note: This class comprises the activity of making honest inferences or observations. An honest inference or observation is one in which the E39 Actor carrying out the I1 Argumentation beliefs that the I6 Belief Value associated with resulting I2 Belief about the I4 Proposition Set is the correct value at the time that the activity was undertaken and that any I3 Inference Logic or methodology was correctly applied.

Only one instance of E39 Actor may carry out an instance of I1 Argumentation, though the E39 Actor may, of course, be an instance of E74 Group.

Properties: [J2](#_J2_concluded_that) concluded that (was concluded by): [I2](#_S2_Sample_Taking) Belief

## <other family model> Properties

<the following class definition is listed as an example>

This section contains the complete definitions of the properties of the <other CRM family model version# > referred to by <Current CRM family model >

<the following property definition is listed as an example>

**J2 concluded that (was concluded by)**

Domain: [I1](#_S1_Matter_Removal) Argumentation

Range: [I2](#_S2_Sample_Taking) Belief

Subproperty of: [P116](#_P116_starts_(is) starts (is started by)

Superproperty of:

Scope note: This property associates an instance of I2 Belief with the instance of I1 Argumentation that concluded it.