ARIADNE

D3.4: Final Report on Standards and Project Registry

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About this document

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1   Executive summary

This document is a deliverable (D3.4) of the project ARIADNE - *Advanced Research Infrastructure for Archaeological Dataset Networking in Europe*, funded under the European Community's Seventh Framework Programme. This document presents a significant update to D3.1 "Initial report on standards and on the registry". This is a deliverable of ARIADNE WP3, which was mainly concerned with the creation of a registry for integration of information concerning legacy metadata, standard schemas, services and terminological tools pertaining to the archaeological domain. The registry is conceived as an integrated central repository able to describe datasets, to drive resource discovery operations.

This deliverable is comprised of several sections, which detail the structure the data model for the registry (Section 3), an overview of the registry content and mappings (Section 4) and the standards used to create these mappings (Section 5). These standards include the ARIADNE Catalogue Data Model (ACDM), the use of the Getty Art and Architecture Thesaurus (AAT) as a single standard for subject for all partners, and participation in the PeriodO project, where partners contributed their temporal terms relative to place. This section is followed by the specific encoding diagrams and schemas describing the structure of the registry and the metadata it holds, along with the templates used by partners to create their mappings (Section 6).

The remaining half of this deliverable (Section 7) details the specific process partners undertook to map their metadata and have it ingested into the ARIADNE portal. Each partner faced different challenges and went through a different process in order to achieve this important step. In several cases this work was seen as an opportunity to introduce standards into their organisation that were not in use before, showing the importance of best practice knowledge transfer within the project. In other instances the sheer size and diversity of data held by a partner was the main challenge. During the process of making their metadata ready for inclusion within the registry, and mapping that metadata to appropriate schemas, etc. partners looked closely at their workflows and in several instances updated their practice.

Out of this joint problem solving, two key innovations emerged. First was how to deal with the myriad subject terms in use across Europe, and the many languages. This required a creative solution to be developed within the project, which resulted in the decision to map all partner subject term lists, in any language to the AAT. By focussing specifically on mapping to concepts rather than terms, and using the knowledge of the domain experts within each of the content-providing partners, subject-based searches across languages are now possible. Second was how to deal with time, as when is always relative to where in archaeology. In an attempt to help solve this issue, collaboration with the US-based PeriodO project was considered to be the best solution, and each partner contributed their period terms to the project, so that they can be incorporated back in to ARIADNE as Linked Data, alongside the rest of the temporal attributions held by the project. Section 7 outlines not only the mapping to the ACDM and the ingestion process carried out by each partner, but their participation in these important initiatives, creating further resources for the archaeological domain.

2   Introduction

This document is a deliverable (D3.4) of the project ARIADNE - *Advanced Research Infrastructure for Archaeological Dataset Networking in Europe* that has been funded under the European Community's Seventh Framework Programme. The document presents a significant update to D3.1 "Initial report on standards and on the registry". This is a deliverable of ARIADNE WP3, which was mainly concerned with the creation of a registry for integration of information concerning legacy metadata, standard schemas, services and terminological tools pertaining to the archaeological domain. The registry is conceived as an integrated central repository able to describe datasets, and drive resource discovery operations.

Integration was realised through a preliminary analysis of legacy archives, necessary for the identification of such formats, standards and services. Descriptions of these resources were then collected and encoded using the ARIADNE Catalogue Data Model standard (ACDM), developed by ARIADNE specifically to produce a detailed, formal and unambiguous representation of legacy archaeological information, and of the various standards and services used among the consortium. Integration operations took place on multiple levels and at multiple depths, mainly via a series of mapping operations between existing and legacy data and the ACDM model.

ARIADNE has devoted part of its activities to a careful analysis of these elements preceded by an appropriate reduction of the concepts to a common shared vocabulary, in order to identify key features and their proper encoding, using existing and well-accepted international standards and terminological tools.

This has constituted the basis for the creation of the registry, a core resource intended to store metadata and other valuable information concerning archaeological archives, services and tools connected to them. The registry and the detailed descriptions it contains, constitutes the "gravity centre" of the whole integration process, since it provides all the support necessary for the retrieval and analysis of integrated archaeological information and the resource discovery facilities.

In this document, Chapter 3 provides an overview of the ARIADNE Catalogue Data Model, a detailed description of the theoretical foundations it builds upon, and the ways it has been used to foster integration among the various archaeological information contributed to the project. Chapter 4 describes the registry content, especially focusing on metadata concerning the datasets, standards and services it holds; an overview of the mappings implemented within the registry is also provided, together with statistics about the various content contained in the final release of the registry . Chapter 5 focuses on standardisation and mapping activities carried out within the project and describes the general logic upon which ACDM, AAT and PariodO mappings have been performed, by describing the various entities involved. In the last two chapters, detailed information concerning the practical implementation of the mappings and descriptions of conversion techniques used to create ACDM encoded datasets are provided: Chapter 6 contains ACDM diagrams and templates used by content providers for schema matching operations, and provides examples of XSLT style sheets used to implement ACDM transformations of legacy data according with the related conceptual mappings defined; Chapter 7 reports details about the ACDM mappings performed by content providers in order to prepare information concerning their archaeological datasets and the related services and terminological resources for ingestion within the registry.

The exhaustive list of subjects mapped to the AAT thesaurus, containing the complete list of terms provided by partners and specifications of the related AAT matching for each of them, is available for consultation and download through this web page:

http://www.ariadne-infrastructure.eu/Resources/AAT.

The complete PeriodO list of periods built by content providers and made available to ARIADNE can be found and browsed here:

http://www.ariadne-infrastructure.eu/Resources/PeriodO

Complete descriptions of the services made available by content providers to ARIADNE and described in ACDM format are also included within the registry. The specific entities of the "services" section of the ACDM model have been used to describe all the functionalities each specific service provides to the users, including online features and API's for remote invocation and specific facilities to be used in combination with the datasets described within the registry itself. A list of all the available ARIADNE services can be browsed through the ARIANDE portal at:

http://portal.ariadne-infrastructure.eu/services

3   The ARIADNE Catalogue Data Model

3.1   Introduction

To collect information about the resources proposed for discovery, access and possibly integration in the ARIADNE project, the present model is defined, called the ARIADNE Catalogue Data Model (ACDM).

ACDM is an extension of the Data Catalogue Vocabulary (DCAT), a recommendation of the W3C Consortium (http://www.w3.org/TR/vocab-dcat/) that *"is well-suited to representing government data catalogues such as Data.gov and data.gov.uk."* The DCAT Vocabulary was chosen because it is proposed as a tool for publishing datasets as Open Data, and is therefore optimal for data re-use. Its adoption therefore places ARIADNE in an ideal position for publishing its resources as Open Data as well.

In addition to DCAT, the ACDM re-uses classes and properties from several other vocabularies. In particular, ACDM makes usage of the following namespaces:

Prefix	*Namespace*
dcat	http://www.w3.org/ns/dcat#
dct	http://purl.org/dc/terms/
dctype	http://purl.org/dc/dcmitype/
foaf	http://xmlns.com/foaf/0.1/
rdf	http://www.w3.org/1999/02/22-rdf-syntax-ns#
rdfs	http://www.w3.org/2000/01/rdf-schema#
skos	http://www.w3.org/2004/02/skos/core#
xsd	http://www.w3.org/2001/XMLSchema#

The present section provides a specification of the ACDM. The specification consists of a UML class diagram (Section 3.3) and of a textual description, providing basic information on each class and on each property in the Model (Section 3.4). In addition, a description of the Catalogue itself is provided (Section 3.2).

3.2   The ARIADNE Catalogue

For interoperability purposes, the ARIADNE Project makes the ARIADNE Catalogue an instance of the dcat:Catalog class, which is part of the DCAT Vocabulary. The following table provides the metadata record of the ARIADNE Catalogue, expressed in RDF through the properties defined for the dcat:Catalog class by the DCAT specification.

Attribute	Value	Note
dct:identifier	http://ariadne-infrastructure/resource/Catalogue	*The URI of the Catalogue according to the ARIADNE naming scheme*
dct:identifier	http://ariadne-infrastructure/data/Catalogue	*The present metadata record in RDF*

Attribute	Value	Note
		format, accessible as Linked Data
foaf:homepage	http://ariadne-infrastructure/page/Catalogue	*The web page of the Catalogue*
dct:title	"ARIADNE Catalogue"@en	*We may have one title for each relevant language*
dct:description	"A Catalogue describing the resources of the ARIADNE Infrastructure"@en	*We may have one description for each relevant language*
dct:issued	*Date of the launch of the* ARIADNE *portal^^*xsd:date	*To be defined*
dct:modified	*Date of last modification of the Catalogue^^*xsd:date	*To be updated after every modification*
dct:language	http://id.loc.gov/vocabulary/iso639-2/eng	*To be defined*
dct:license	http://creativecommons.org/licenses/by/1.0/	*To be defined*
dct:rights		*To be defined*
dct:spatial		*To be defined*
dct:publisher	http://ariadne-infrastructure/resource/Ariadne-project	*To be defined*

3.3 UML Diagram of ACDM

The UML diagram including the classes and the most important associations of the ACDM is provided below. For readability, the diagram does not show all associations defined on the dcat:Dataset class. Every association other than sub-class has an arrow depicted next to its name, showing the orientation of the name.

Figure 1: UML Diagram of the ACDM

3.4 Description of the ACDM

The central notion of the model is the class ArchaeologicalResource that has as instances the main resources described in the Catalogue. These resources are categorized in:

- **services**, representing the services created by the ARIADNE partners and used by the project for discovery and access;
- **language resources**, representing vocabularies, ontologies, metadata schemas, mappings (between language resources in general) and gazetteers. As language resources of new types (*e.g.*, subject heading systems, thesauri and so on) are introduced into the Catalogue, the model will be extended to accommodate them;
- **data resources**, representing the various types of data *containers* owned by the ARIADNE partners and lent to the project for discovery, access and possibly integration. Data resources are categorized in collections, datasets, databases and GIS. As data resources of new types are introduced into the Catalogue, the model will be extended to accommodate them.

An important class of the model is that of formats, called DataFormat, whose instances represent the formats that realise metadata schemas, or define the structure of the records of datasets. Analogously, the ACDM includes the class DBSchema to represent the instances of database schemas.

Finally, there is the class MetadataRecord for representing collection or dataset-level metadata records, which are stored in the catalogue for documentation, discovery and assessment of similarity between data resources.

A definition of each class is given in the following section, along with the attributes that pertain to the class, and the associations that have the class as domain. For each attribute the obligation is specified, through one of the following values:

- Mandatory: meaning a value *must* be provided for the attribute
- Recommended: meaning it is strongly *recommended* that a value be provided for the attribute
- Optional: meaning a value for the attribute *may* or *may not* be provided

For associations, cardinality constraints are given in both directions and, when applicable, it is indicated whether a value is recommended.

3.4.1 ArchaeologicalResource

ArchaeologicalResource is the main class of the ARIADNE catalogue, as it has as instances the resources described in the catalogue. These resources are represented by the subclasses of *ArchaeologicalResource*, which are:

* DataResource
* LanguageResource
* Service

Associations:

dct:isPartOf associates any archaeological resource in the catalogue with the catalogue. An archaeological resource is part of at least one catalogue. A catalogue comprises at least one archaeological resource.

dct:publisher: associates any archaeological resource with an agent responsible for making the resource publicly accessible (via download, or API, or other). An archaeological resource has exactly one publisher and an agent can publish zero, one or more archaeological resources.

dct:contributor: associates any archaeological resource with an agent primarily responsible for describing the resource in the Catalogue. An archaeological resource has exactly one contributor and an agent can be the contributor of zero, one or more archaeological resources.

dct:creator: associates any archaeological resource with an agent primarily responsible for creating the resource. An archaeological resource has exactly one creator and an agent can be the creator of zero, one or more archaeological resources.

owner: associates any archaeological resource with an agent that is the legal owner of the resource. A resource has exactly one owner and an agent can own zero, one or more archaeological resources.

legalResponsible: associates any archaeological resource with a person holding the legal responsibility of the resource. A resource may have zero or one person who is legally responsible, and a person may be legally responsible of zero, one or more archaeological resources.

scientificResponsible: associates any archaeological resource with a person holding scientific responsibility for the resource. It is the person who conceived the service or gathered the data. A resource may have zero or one person who is scientifically responsible, and a person may be scientificlly responsible for zero, one or more archaeological resources.

technicalResponsible: associates any archaeological resource with a person holding technical responsibility for the resource and is the contact person. It is the person who wrote the code for the service or implemented the dataset; choosing the technology and using it to create the dataset. A resource has exactly one person who is technicalyl responsible, and a person may be technically responsible for zero, one or more archaeological resources.

hasAttachedDocuments: associates any archaeological resource with the documents that are attached to the resource for further illustration. A resource can have zero, one or more documents, and a document can be attached to one or more archaeological resources.

3.4.2   DataResource

This class specialises the class *ArchaeologicalResource*, and has as instances the archaeological resources that are data containers such as databases, GIS, collections or datasets. The class is created for the sole purpose of defining the domain and the range of a number of associations, given below. It is therefore an abstract class, it does not have any instances, it only inherits instances form its sub-classes.

The *DataResource* class defines the properties common to its subclass, mostly using the terms of the DCAT vocabulary, to which it adds properties for specifying:
- the access policy of the resource, and;
- the original identifier of the resource.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:title		M	input text	
dct:description		R	textarea	
dct:issued	Date of formal issuance (e.g., publication) of the resource.	M	*date picker*	***2013-04-24***
dct:modified	Most recent date, on which the resource was changed, updated or modified. If not provided the issued date will be used.	M	*date picker*	***2013-04-24***
originalId	The original identifier of the resource supplied by the content provider	M	*input text*	
dct:identifier	The ARIADNE identifier that will be computed from the original. This could look like: www.ariadne.eu + prefix of the provider + ID of the resource	O	*input text*	***Automatically computed by the original***
dcat:keyword		O	*input text*	
dct:language	If the resource is multilingual, more than one value must be given for this property	M	*input text (autocomplete)*	
dcat:landingPage	A Web page that can be navigated to in a Web browser to gain access to the dataset, its distributions and/or additional	O	*input text*	

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
	information.			
dcat:contactPoint	Link an Archaeological Resource to relevant contact information which is provided using VCard [vcard-rdf].	O	dialog window	**VCard [vcard-rdf].**
accessPolicy	URI to statement of policy (typically, on an organization's website)	O	*input text*	
dct:accessRights	A statement of any access restrictions on the data resource	M		**Creative Commons 2.0 Licence**
dct:rights	Information about rights held in and over the data resource	R		
dct:audience	The primary audience(s) of the resource	O		
dct:temporal	See temporalRegion	R	dialog window	
dct:spatial	See spatialRegion	M	dialog window	
dct:accrualPeriodicity		O	*input text*	
dct:extent	The size of the data resource (i.e., number of items in a collection, number of records in a dataset, etc.)	O		
archaeologicalResourceType	Associates any archaeological resource with one or more categories (types), drawn from the following list: • Fieldwork archives • Event/intervention resources, such as grey literature reports • Sites and monuments databases or inventories • Scientific datasets, such as databases of radiocarbon dates • Artefact databases, or image collections • Burial databases	M	*Select box*	

Associations:

dct:isPartOf a data resource can be part of zero, one or more collections. The inverse association dct:hasParts applies for collections (see below).

dcat:distribution: associates a data resource with the distributions of a resource. A resource can have one or more distributions and a distribution is the distribution of exactly one resource.

hasItemMetadataStructure: associates a data resource with the format of the metadata of the members (or items) of the data resource (e.g. metadata of each record in a dataset, or of each item in a collection). A data resource may have zero or more metadata formats associated with its members (items). Item metadata formats can be used by one or more data resources.

hasMetadataRecord: associates a data resource with the metadata of the resource as created by the organisation holding the resource (for instance, the record describing a dataset in the organization holding the dataset). A data resource may have zero or more metadata records, but the specification is recommended. A metadata record can be used by one or more data resources.

ariadne-subject associates any data resource with a subject from the Getty Art and Architecture Thesaurus (AAT). A resource has at least one ariadne-subject. The ariadne-subject is associated with the AriadneConcept class. We further specialize this property into:
- **provided-subject** associates any data resource with zero, one, or more manually specified subjects drawn from the Getty AAT;
- **derived-subject** associates any data resource with zero, one, or more subjects, automatically derived from mapping local vocabularies to the Getty AAT.

At least one (or both) of the above elements must be provided.

native-subject associates any data resource with a subject from a vocabulary in use by the original owner of the resource. The native-subject is associated with the skos:Concept class.

Collection

This class is a specialisation of the class DataResource, and has as instances collections in the archaeological domain. In order to be as general as possible, we define an archaeological collection as an aggregation of resources, termed the 'items in the collection'. Being aggregations, collections are akin to datasets, but with the following important difference: the items in a dataset are data records of the same structure (see definition of Dataset below). In contrast, the items in a collection are individual objects different from records (e.g., images, texts, videos, etc.) or are themselves data resources such as collections, datasets, databases or GIS; for instance, a collection may include a textual document, a set of images, one or more datasets and other collections.

For convenience, collection items that are textual documents are explicitly represented in the Catalogue as instances of the class TextualDocuments and associated to the collection where they belong.

To the best of our knowledge, no vocabulary provides a term for the class of archaeological collection, so this has been made a class within the ARIADNE vocabulary.

For interoperability, Collection is a sub-class of dcmitype:Collection. For interoperability with Europeana, we can be more specific and make Collection a subclass of the collection class defined by Europeana.

Associations:

dct:hasParts associates a collection with the data resources that are in the collection. This association can be used only for stating membership of data resources in a collection. A collection may have one or many data resources as parts. A data resource can be in zero, one or many collections.

Database

This class is a specialisation of the class DataResource, and has as instances databases, defined as a set of homogeneously structured records managed through a Database Management System, such as MySQL.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dbms	The database management system used	M		MySQL

Associations:

hasSchema associates a database with the schema defining the structure of the data in the database. This schema is an instance of the class DBSchema. A database has exactly one schema, and one schema can be the schema of one or many databases.

Dataset

This class is a specialisation of the classes DataResource. It has archaeological datasets as instances. An archaeological dataset is defined as a set of homogeneously structured data records, consisting of fields carrying data values.

Associations:

hasRecordStructure: associates a dataset with a data format defining the structure of its records. This format is an instance of the class DataFormat. A dataset has exactly one data format, and a data format can be the format of the records of one or more datasets.

GIS

This class is a specialization of the class DataResource, and has as instances data records, consisting of fields carrying data values, which are not managed through a Geographical Information Systems (GIS).

The attributes of this class are given in the following table.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
systemName	Name of the GIS system described.	R	*input text (autocomplete)*	

3.4.3   TextualDocument

This class comprises texts, such as books, articles, reports, and the like. Its attributes are taken from the DataResource class, excluding those that pertain to data containers and as such do not make sense for textual documents, namely: accrualPeriodicity, extent, distribution and hasItemMetadataStructure.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:title		M	input text	
dct:description		R	textarea	
dct:issued	Date of formal issuance (e.g., publication) of the textual document.	M	*date picker*	***2013-04-24***
dct:modified	Most recent date on which the textual document was changed, updated or modified. If not provided the issued date will be used.	M	*date picker*	***2013-04-24***
originalId	The original identifier of the textual document supplied by the content provider	M	*input text*	
dct:identifier	The ARIADNE identifier that will be computed from the original.	O	*input text*	***Automatically computed by the original***
dcat:keyword		O	*input text*	
dct:language	If the textual document is multilingual, more than one value must be	M	*input text (autocomplete)*	

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
	given for this property			
dcat:landingPage	A Web page that can be navigated to gain access to the document, its distributions and/or additional information.	O	*input text*	
dcat:contactPoint	Link the textual document to relevant contact information which is provided using VCard [vcard-rdf].	O	dialog window	**VCard [vcard-rdf].**
accessPolicy	URI to statement of policy (typically, on an organization's website)	O	*input text*	
dct:accessRights	A statement of any access restrictions on the textual document	M		**Creative Commons 2.0 Licence**
dct:rights	Information about rights held in and over the textual document	R		
dct:audience	The primary audience(s) of the textual document	O		
archaeologicalResourceType	Associates the textual document with one or more categories (types), drawn from the following list: • Fieldwork archives • Event/intervention resources, such as grey literature reports • Sites and monuments databases or inventories • Scientific datasets, such as databases of radiocarbon dates • Artefact databases, or image collections • Burial databases	M	*Select box*	
dct:temporal	Gives the temporal	R	dialog	

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
	coverage of the document		window	
dct:spatial	**Gives the spatial coverage of the document**	**M**	**dialog window**	

Associations:

dct:isPartOf associates a textual document with a collection where the document belongs. A textual document can be part of zero, one or more collections; a collection can have zero, one or more textual documents.

dct:hasParts associates a collection with the textual documents within the collection. A collection may have zero, one or more textual document as parts. A textual document can be in zero, one or many collections.

hasMetadataRecord associates a textual document with a native metadata record. A textual document can have at most one metadata record, and a value is recommended; a metadata record belongs to at least one textual document.

ariadne-subject associates any data resource with a subject from the AAT. A resource has at least one ariadne-subject. The ariadne-subject is associated with the AriadneConcept class. We further specialise this property into:

- **provided-subject** associates any data resource with zero, one, or more manually specified subjects drawn from the Getty AAT;
- **derived-subject** associates any data resource with zero, one, or more subjects, automatically derived from mapping local vocabularies to the Getty AAT.

At least one (or both) of the above elements must be provided.

native-subject associates any data resource with a subject from a vocabulary in use by the original owner of the resource. The native-subject is associated with the skos:Concept class.

3.4.4   LanguageResource

This is the class of all language resources described in the Catalogue for the purposes of re-use or integration within the ARIADNE community. A language resource is a resource of a linguistic nature, whether in natural language (such as a gazetteer) or in a formal language (such as a vocabulary or a metadata schema). It also includes mappings, understood as associations between expressions of two language resources that may be of a formal (e.g., sub-class or sub-property links) or an informal (e.g., natural language rules) nature.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:title		M	input text	
dct:description		R	textarea	
dct:issued	Date of formal issuance (e.g., publication) of the resource.	M	*date picker*	*2013-04-24*
dct:modified	Most recent date on which the resource was changed, updated or modified. If not provided the issued date will be used.	M	*date picker*	*2013-04-24*
originalId	The original identifier of the resource supplied by the content provider	M	*input text*	
dct:identifier	The ARIADNE identifier that will be computed from the original.	O	*input text*	*Automatically completed*
dcat:keyword		O	*input text*	
dct:language	If the resource is multilingual, more than one value must be given for this property	M	*input text (autocomplete)*	
dcat:landingPage	A Web page that can be navigated to in a Web browser to gain access to the dataset, its distributions and/or additional information.	O	*input text*	
dcat:contactPoint	Link an Archaeological Resource to relevant contact information which is provided using VCard [vcard-rdf].	R	dialog window	VCard [vcard-rdf].
accessPolicy	URI to statement of policy (typically, on an organisation's website)	O	*input text*	
dct:accessRights	A statement of any access restrictions on the data resource	M		Creative Commons 2.0 Licence

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:rights	Information about rights held in and over the data resource	R		
dct:audience	The primary audience(s) of the resource	O		

Associations:

ariadne-subject associates any language resource with a subject from the AAT. A resource has at least one ariadne-subject. The ariadne-subject is associated with the AriadneConcept class. This property is specialised further into:

- **provided-subject** associates any language resource with zero, one, or more manually specified subjects drawn from the Getty AAT;
- **derived-subject** associates any language resource with zero, one, or more subjects, automatically derived from mapping local vocabularies to the Getty AAT.

At least one (or both) of the above elements must be provided.

native-subject associates any language resource with a subject from a vocabulary in use by the original owner of the resource. The native-subject is associated with the skos:Concept class.

3.4.5   MetadataSchema

This is a subclass of LanguageResource having as instances metadata schemas used in the archaeological domain. This is one of the main classes in the metadata registry of ARIADNE (see UML graph on Annex 6).

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
standardUsed	the standard upon which the schema is based, if any	O	*input text (autocomplete)*	Dublin Core, MAG, ICCD, MARC, EAD
foaf:homepage	an HTTP URI pointing to the web page describing the schema	O	input text	dublincore.org/documents/dces/
proprietaryFormatDesc	if the format is proprietary, this attribute describes the format in an	O	TextArea	

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
	informal way			

Associations:

isRealizedBy associates a metadata schema with a data format that realises it in some specific encoding language. A Metadata Schema may be realised by one or many data formats. A data format can be the realisation of exactly one Metadata Schema.

hasElements: associates a metadata schema with its metadata elements. A schema has at least one metadata element. One element belongs to exactly one MetadataSchema.

hasVersion: associates a metadata schema with a version. A schema might have one or more versions. A version can be the version of exactly one metadata schema.

usedby: associates a metadata schema with the organisations using it. A schema is used by at least one organization (including the organisation that submits it to the registry); an organisation uses at least one schema.

dcat:theme: According to ISO 11179, each MetadataSchema should be associated with a category of a taxonomy or another knowledge organization schema.

Gazetteer

This is the class of gazetteers, i.e. geographical indexes or dictionaries.

Mapping

An instance of this class represents a mapping between two language resources.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
name	The name of the mapping	M	Input text	
foaf:homepage	The HTTP URI to the web resource giving or describing the mapping	O	Input text	

Associations:

from: associates a mapping to the source language resource. A mapping has exactly one source language resource and a language resource can be the source of zero, one, or many mappings.

to: associates a mapping to the target language resource. A mapping has exactly one target language resource and a language resource can be the target of zero, one, or many mappings.

Vocabulary

This is a subclass of LanguageResource. An instance of this class represents a vocabulary or authority file, used in the associated structure. The instances of this class define the ARIADNE vocabulary registry. The data model of the registry is depicted in section 6.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(**andatory**) R(**ecommended**) O(**ptional**)	UI control	Example
status	The current status of the vocabulary	M		draft, reviewed, approved
foaf:homepage	Uri to the vocabulary homepage	O		

Associations:

hasConcept: the concepts of a vocabulary. A vocabulary has at least one concept.

hasVersion: A vocabulary has at least one version.

usedby: A vocabulary should be used by at least one organisation (including the organisation which submits it to the registry).

3.4.6   Distribution

This class represents an accessible form of an ARIADNE resource; for example, a downloadable file, an RSS feed or a file accessible via a web service. It extends the class dcat:Distribution by adding two attributes (numOfRecords, platformDescription).

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:title		M	input text	*ARIADNE datasets inventory*
dct:description		R	text area	
dct:issued	Date of formal	M	date picker	*2013-04-24*

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
	issuance (e.g., publication) of the distribution.			
dct:modified	Most recent date on which the dataset was changed, updated or modified.	M	date picker	*2013-04-24*
dct:rights	Information about rights held in and over the data resource	R		
dct:format		R	input text (autocomplete)	
dcat:byteSize		O	input text	
numOfRecords		O	input text	
platformDescription		O	text area	

Associations:

hasLicense: associates a distribution with the class of licenses. A distribution may have zero or one licences, but it is recommended that the existing ones are specified, while a licence might be associated with one or more distributions.

dct:publisher: associates any distribution with an agent responsible for making the resource available. A distribution has exactly one publisher and an agent can make zero, one, or more resources available.

accessibleVia: associates any distribution to a service through which the distribution is accessible. A distribution is accessible through at least one service and a service makes accessible at most one distribution.

3.4.7 DataFormat

An instance of this class describes the structure of a *Dataset,* of a *MetadataSchema*, or of a *MetadataRecord*.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:description	describes the format in an informal way	R	text area	
characterSet	the used character set	M	*input text (autocomplete)*	
XSD	a URI giving, if any, the XML schema of the record structure	R	input text	

Associations:

usesVocabulary: associates a data format with the vocabularies that are used in the instances of the data format. A data format can use zero, one, or more vocabularies, but it is recommended the existing ones are specified; and a vocabulary can be used by one or more data formats.

hasAttachedObject: associates a data format with the types of digital objects that are attached to its instances. A data format can have zero, one or more digital object types attached, and a digital object type can be attached to one or more *DataFormat*. This association applies to datasets with a complex record structure.

hasSimpleDigitalType: associates a data format with the type of the objects that make up an instance of the format, in case the data format is simple media object (text, image, video, audio, and so on). *DataFormat* can have zero, or one digital object types attached, and a digital object type can be attached to one or more *DataFormat*.

expressedIn: a data format may be expressed in one or more encoding languages and one language can encode one or more DataFormats. For instance a Dublin Core metadata schema may be encoded in XML or in XML:RDF.

3.4.8   DBSchema

An instance of this class describes the structure of a *Database*.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
type	describes if the database is simple or hybrid	M	Hybrid/simple	
description	describes in a informal way the entities (table)	R	*input text*	

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
	and the associations of the Database			

Required Documentation:

The logical schema of the record and a sample of a record are required. These can be provided in several ways, *e.g.*, as a screenshot of the fields, as a document in Excel / XML Schema, etc.)

3.4.9 EncodingLanguage

An instance of this class is an encoding language.

3.4.10 DigitalObjectDesc

An instance of this class represents a digital object type.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:description		R	text area	
dct:format (MIME)		M	*input text (autocomplete)*	
originalId	the original ID of the object by the content provider	R	input text	
dct:identifier	the ARIADNE identifier that will be computed from the original. This could look like: www.ariadne.eu + prefix of the provider + ID of the object	M (automatic)	input text	
persistentIdentifier	Boolean value indicating whether or not the identifier is persistent	R	*Boolean*	

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
identifierType		O	*Input text*	*NBN, DOI, PURL*

3.4.11 MetadataRecord

An instance of this class is a metadata record, typically associated with a data resource.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
XMLdoc	The metadata record in XML format	M	text area	

Associations:

conformsTo: associates a MetadataRecord with a DataFormat. A MetadataRecord may conform to zero, one, or many DataFormats, but it is recommended the existing ones are specified. A DataFormat may have one or many records that conform to it.

usesVocabulary: the vocabularies that are used in the MetadataRecord. A MetadataRecord can use zero, one, or more vocabularies, but it is recommended the existing ones are specified. A vocabulary can be used by one or more MetadataRecord.

Required Documentation

A complete sample of a metadata record. When controlled vocabularies are used for certain fields, a document that present the entries - if necessary in hierarchical order - to allow a proper mapping with ARIADNE documentations is required.

3.4.12 MetadataElement

An instance of this class describes the features of a metadata element, according to ISO 11179.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:identifier	a URI, if any, giving the element description	R	Input text	**http://iflastand ards.info/ns/isb d/elements/P1 004**
dct:title	the name of the element	M	Input text	**Title_proper**
rdf:domain	If it is a property, its domain is denoted	O	Input text	
rdf:range	If it is a property, its range is denoted	O	Input text	
dct:description		R	Text area	
dct:source	The XML schema to which the element belongs	O	Input text	
skos:scopeNote	The context of using the element	O	Text area	
published	The current status of the element	M	Boolean	
cardinality	the cardinality of the element	M	Input text (numeric)	**>=1 means that it is mandatory and it could be repeated**
render	The category of its representation	O		**Barcode, graphic**
datatype	The data type of the element	M	Input text (numeric)	**integer**
minValue	The minimum value of the element	O	Input text (numeric)	
maxValue	The maximum value of the element	O	Input text (numeric)	
allowValues	The values allowed for this element	O	Select box	**Red, Blue, Green**
proprietaryFormatD esc	if the format is proprietary, this attribute describes the format in an informal way	O	Text area	
characterSet	**the character set** used	**M**	**Input text**	

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example

Associations:

hasSubelement: An element might be of simple or complex type. If it is of complex type, it should have at least a sub-element. Also an element might be sub-element of different elements.

hasAttribute: An element might have zero or more XML Attributes.

dcat:theme: According to ISO 11179, each data element should be associated with a category of a taxonomy or another knowledge organisation schema.

hasRelation: An element might be related to zero or more other elements. According to ISO 11179 the relationship types can be described by the following vocabulary: qualifier of, qualified by, subject of, physical condition, part of, external reference, etc.

hasVersion: A structure defined by an element, its sub-elements and XML attributes might have a version.

usedby: An element should be used by at least one organisation (including the organisation which submits it to the registry).

dct:creator: An agent primarily responsible for the creation of the metadata element. A metadata element has exactly one creator and an agent can be the creator of one or more schemas.

dct:publisher: An agent responsible for making the metadata element available. A metadata element has exactly one publisher and a publisher can publish one or more elements

3.4.13 TemporalRegion

An instance of this class is a temporal region of one of two forms:
1. a temporal interval (*e.g.*, from 155 B.C. to 243 A.C.)
2. a named period (*e.g.*, Neolithic)

In the former case, the extremes of the interval are given as values of the *from* and *to* attributes.

In the latter case, the named period is given as value of the *periodName* attribute.
- In the case where BC dates have to be supplied, a minus (-) sign could be used as indicated in the expanded Year representation of ISO 8601 (http://www.iso.org/iso/catalogue_detail?csnumber=40874).
- In the case where reduced precision must be applied (e.g. where no day information is available) the respective part could be omitted (according to ISO 8601 reduced precision guidelines).

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
periodName	name for this period	M	Select box	
from	a date (indicating start date for this temporal region)	R	Date picker	1800-?-?
until	a date (indicating end date for this region)	R	Date picker	

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
placeName	a name describing the place	M	Input text	
coordinateSystem	the coordinate system used to encode coordinates (e.g. EPSG 2763). If not specified, EPSG 4326 will be implied	O	Input text	
lat	the latitude	R	Input text (numeric)	
lon	the longitude	R	Input text (numeric)	
boundingBoxMinLat	the minimum latitude of the bounding box area	O	Input text (numeric)	
boundingBoxMinLon	the minimum longitude of the bounding box area	O	Input text (numeric)	
boundingBoxMaxLat	the maximum latitude of the bounding box area	O	Input text (numeric)	
boundingBoxMaxLon	the maximum longitude of the bounding box area	O	Input text (numeric)	
address	the address name	O	Input text	

numberInRoad	the number in road	O	Input text	
postcode	postcode	O	Input text	
country	the country of the place	M	Input text (autocomplete)	

3.4.14 SpatialRegion

An instance of this class is a spatial region, which can take one of four forms:
1. a region identified by latitude and longitude expressed via the lat and lon attributes, respectively;
2. a bounding box identified by four vertices (expressed via the boundingBoxMinLat, boundingBoxMinLon, boundingBoxMaxLat and boundingBoxMaxLon attributes);
3. a postal address (expressed via the address, numberInRoad, postcode and country attributes);
4. a named place (expressed via the placeLabel attribute).

3.4.15 MetadataAttribute

An instance of this class describes an XML attribute a metadata element.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) O(ptional)	UI control	Example
dct:identifier	a URI giving, if any, the attribute description	O	Input text	
dct:title	the name of the attribute	M	Input text	type
dct:description		M	Text area	
dct:source	the namespace to which the attribute belongs	O	Input text	
contextInfo	the context of using the attribute	O	Text area	
published	the current status of the attribute	M	Boolean	
cardinality	the cardinality of the attribute	M	Input text (numeric)	>=1 means that it is mandatory and it could be repeated
minValue	the minimum value of the attribute	O	Input text (numeric)	
maxValue	the maximum value of the attribute	O	Input text (numeric)	

Attribute	Usage Notes	Obligation M(andatory) O(ptional)	UI control	Example
allowValues	the values allowed for this attribute	O	Select box	Red, Blue, Green
characterSet	the character set used	M	Input text	

3.4.16 Version

An instance of this class provides information about a version of a vocabulary, concept, metadata schema or metadata element.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(**andatory**) O(**ptional**)	UI control	Example
dct:title	the name of the version	M	Input text	
dct:modified	the Date of modification of a metadata schema, metadata element, vocabulary or concept	M(automatic)	Date picker	
skos:changeNote	a note on the made modifications	O	Text area	

Associations:

dct:publisher: An agent responsible for making the version available. A version has exactly one publisher and a publisher can publish one or more versions.

3.4.17 AriadneConcept

An instance of this class represents a term (concept) used in a vocabulary or authority file.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(**andatory**) R(**ecommended**) O(**ptional**)	UI control	Example
dct:identifier	A URI that identifies the concept	R	Input text	

Attribute	Usage Notes	Obligation M(**andatory**) R(**ecommended**) O(**ptional**)	UI control	Example
skos:prefLabel	The descriptor of the concept (prefered term)	M	Input text	
skos:scopeNote		R	Texarea	
skos:definition		R	Textarea	
dct:source	The vocabulary within which the concept exists	M	Input text	
skos:collection	The facet to which the concept belongs	R	Input text	
published	The current status of the vocabulary	M	Boolean	
dct:language	The language of the descriptor	M	Select box	
provided	If the concept is provided (true) or derived (false)	M	Boolean	

Associations:

hasRelation: A concept might be related to zero or more other concepts. The SKOS vocabulary is used for the definition of the relationships between concepts: skos:narrower, skos:broader, skos:related, skos:member, skos:inScheme.

hasVersion: A concept might have zero or more versions.

3.4.18 Licence

An instance of this class represents a Licence.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(**andatory**) R(**ecommended**) O(**ptional**)	UI control	Example
name	The name of the mapping	M	Input text	
dct:description		R	select box	
URI	The URI of the license website	R	select box	

3.4.19 Service

While for the description of the ARIADNE datasets it was possible to adopt a standard vocabulary (DCAT), regarding the description of the services to be surveyed for ARIADNE, the situation was somewhat more complicated, as several vocabularies exist, none of which stand out as a *de facto* standards.

Deliverable D13.2 provides an exhaustive list of services that will be made available through the ARIADNE infrastructure. Based on the evidence collected in this deliverable, services are classified into the following categories, reflecting the way a service is accessed:

- tools to be downloaded and installed on one's machine; these will be termed *stand-alone services*;
- web accessible services with an API: these are called *web services*, and the services developed by the ARIADNE project fall in this category;
- web accessible services with a GUI only: these are called *services for humans*;
- services offered by an institution, negotiated via a personal interaction with representatives of that institution in order to be accessed; these are called *institutional services*.

Correspondingly, we introduce in the model a generic Service class, which is abstract and gathers the properties in common to all services, and four sub-classes, which have one-to-one relationships with the above four categories. These classes are described in the rest of this Section.

Furthermore, Section 7.1 in D13.2 points out some inadequacies exhibited by the **applyTo** associations and calls for a representation of item-level information in relation to Services. In response to these observations, the **applyTo** association has been dropped and four attributes are introduced to represent the media type and format of the items consumed and produced by a service.

The class Service is introduced in the ARIADNE Catalogue in order to represent services offered by ARIADNE partners for use within the ARIADNE infrastructure. This class is abstract in the sense that all its instances are instances of some of its subclasses.

Service is a sub-class of ArchaeologicalResource and inherits the associations defined for the latter, namely:

- dct:isPartOf: the catalogue the service is described in (included the ARIADNE Catalogue)
- dct:publisher: the agent making the service accessible
- dct:contributor: the agent responsible for describing the service in the ARIADNE Catalogue
- dct:creator: the agent that created the service
- owner: the agent that is the legal owner of the service
- legalResponsible: the agent that is legally responsible for the service
- scientificResponsible: the agent that is scientifically responsible for the service
- technicalResponsible: the agent that is the technicalyl responsible for the service
- native-subject: a subject from a vocabulary in use by the original owner of the service
- hasAttachedDocuments: the documents attached to the service for illustration purposes (including videos).

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dct:title	This is the name of the service	M		
dct:description	Contains a description of the service	M		
rdfs:comment	Notes and comments	O		
foaf:homepage	URL to the service homepage	R		
dct:issued	Date of formal issuance (e.g., publication) of the service.	M		*2013-04-24*
dct:modified	Most recent date on which the service was changed, updated or modified. If not specified, the issued date will be used automatically.	M		*2013-04-24*
functionality	A multivalued property to classify the service	O		3D visualization, preservation
exportFacility	If the service provides export functionality for the datasets on which it operates, supply a list of format.	O		csv
consumedMedia	The media type of the objects handled by the service. The list of possible mediaType is open	M		**"image", "audio", "video", "text", "3D model", "2D model", etc.**
producedMedia	The media type of the objects created by the service. Same values as consumedMedia	M		
consumedFormat	The MIME type of the objects handled by the service	M		
producedFormat	The MIME type of the objects created by the service	M		
supportedLanguage	The languages supported by the service	O		
accessURL	URL to the service access page. This *may* be the same as the	M		

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
	foaf:homepage			

Associations:

hasTechnicalSupport: The agent offering technical support on the service, if any

developer: The agent who developed the service

StandAloneService

The class StandAloneService is introduced in the ARIADNE Catalogue in order to represent services that must be downloaded and installed on one's machine in order to be used.

As already mentioned, this is a sub-class of Service, therefore it inherits all attributes and associations defined for the latter.

The following table gives the specific attributes of this class, mostly drawn from the DBPedia software ontology (http://dbpedia.org/ontology/Software).

An exemplification of the use of this ontology can be found at http://dbpedia.org/page/Lucene.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
dbpedia-owl:operatingSystem	The OS platform required by the service	M		dbpedia:Cross-platform
dbpedia-owl:programmingLanguage		M if source code is available		dbpedia:Java_(programming_language)
dbpedia-owl:status		M		InProgress, available,
dbpedia-owl:latestReleaseVersion		R		
dbpedia-owl:license		M		
dcat:downloadURL		R		
dcat:byteSize		O		
installationRequirements		**O**		

Associations:

isInRepository: indicates whether the source code is available in a repository URI and other information like credential to access the repository are supplied.

hasAPI: indicates whether the service provides an API, a textual description must be supplied.

hasComponents: the components required for the Service to be installed and used.

WebService

The class WebService is introduced in the ARIADNE Catalogue in order to represent services that are web accessible and have an API. They may or may not have also a GUI.

As already mentioned, this is a sub-class of Service, therefore it inherits all attributes and associations defined for the latter.

Associations:

hasAPI: a textual description of the service API.

ServiceForHumans

The class ServiceForHumans is introduced in the ARIADNE Catalogue in order to represent services that are web accessible only via a GUI.

As already mentioned, this is a sub-class of Service, therefore it inherits all attributes and associations defined for the latter.

Associations:

No other association defined.

InstitutionalService

The class InstitutionalService is introduced in the ARIADNE Catalogue in order to represent services that are offered by some institution and that must be negotiated via a personal interaction with representatives of that institution in order to be accessed.

This is also a sub-class of Service, therefore it inherits all attributes and associations defined for the latter.

Associations:

contactPerson: the Agent to be contacted in order to access the service.

3.4.20 foaf:Agent

This class is used in this schema to model the institutions that make a resource available.

The following table gives the attributes of this class.

Attribute	Usage Notes	Obligation M(andatory) R(ecommended) O(ptional)	UI control	Example
foaf:name	name of the organisation	M	input text	
foaf:phone		O	input text	
foaf:mbox		M	input text	
foaf:skypeID		O	input text	

Associations:

dct:isPartOf: associates any foaf:Agent with another foaf:Agent where the former belongs (*e.g.,* a person with the organisation they work for).

4   The ARIADNE Registry

4.1   ARIADNE Registry Content

The number of records provided by the ARIADNE partners is presented in the following table. The number of records listed for each partner corresponds to the number of collection-level resources provided, not the extent of the resource. For example a partner with many records may have hundreds of reports that each have collection-level metadata and therefore have their own record, or only a single database that is a rich and complex resource, but might have only one collection-level record. Hence the differences in the number of records provided do not indicate some partners provided resources of lesser value than others.

Provider name	Records
ADS	1550082
SND	450
KNAW-DANS	30480
Fasti Online/AIAC	6310
MNM NOK	1884
MiBACT - CulturaItalia	40472
ZRC SAZU	10638
CyI-STARC	17
INRAP	20681
Incipit CSIC	1
OEAW	in progress
ARUP-CAS	1
NIAM-BAS	1
DISCOVERY	140864
DAI	39857
ARHEO	106
SUM	**1841844**

In total, 1,841,844 records have been ingested in the registry. The majority of them have been provided by ADS. Regarding the type of material provided, most records correspond to datasets and textual documents, but this disguises the fact that the registry holds many thousands of bibliographic records (see the table in Section 4.3), and a significant set of collection descriptions.

A few records concern services. After publishing the last version of the ACDM schema, which updated the services description, many records have been registered and their specifications are now available. There exist around 25 descriptions of services, which have been inserted manually in the Registry (see http://portal.ariadne-infrastructure.eu/services).

4.2   ARIADNE Registry Mappings

The content-providing ARIADNE partners mapped descriptions of their content to the ACDM. The mapping process was completed in a number of ways:

(i)   The providers mapped their metadata locally (descriptions of their resources (databases, collections, bibliographies, datasets, etc.) to the ACDM and sent their data to the ARIADNE

technical partners in MS Excel format. The MS Excel files were transformed to XML format and ingested into the ARIADNE registry. They were then harvested by the MORe aggregator to be enriched and published to the ARIADNE portal.

(ii) The providers locally mapped the descriptions of their resources (databases, collections, bibliographies, datasets, etc.) to the ACDM and sent their data in XML format, validated by the ACDM schema. The XML documents were either downloaded as .zip files or harvested using the OAI-PMH protocol by the MORe aggregator. The data in the MORe aggregator was then enriched and published to the ARIADNE portal.

(iii) The providers provided large volumes of native data in XML format that were not valid in the ACDM schema. In such cases a stylesheet in XSLT format was created by the Digital Curation Unit, ATHENA RC (DCU) for the automated transformation of the native metadata into XML documents compatible with the ACDM schema. When the native metadata were downloaded as .zip files or harvested by the MORe aggregator, the appropriate XSLT stylesheet transformed the native XML records to ACDM records. Finally the data in the MORe aggregator were enriched and published to the ARIADNE portal. All the mappings in XSLT stylesheets are stored in the registry and can be re-used by users of the the ARIADNE infrastructure.

4.3 Content and Mapping Statistics

The content of the ARIADNE registry per partner and type is presented in the following table.

Provider name	Datasets	Databases	TextualDocuments	Collections	Records
ADS	1519246	0	30127	709	1550082
SND	0	0	0	450	450
KNAW-DANS	0	0	0	30480	30480
Fasti Online/AIAC	0	0	0	6310	6310
MNM NOK	0	0	0	1884	1884
MiBACT - CulturaItalia	40470	0	0	2	40472
ZRC SAZU	10635	2	0	1	10638
CyI-STARC	16	0	0	1	17
INRAP	0	0	20680	1	20681
Incipit CSIC	1	0	0	0	1
OEAW					in progress
ARUP-CAS	1	0	0	0	1
NIAM-BAS	0	1	0	0	1
DISCOVERY	140860	0	0	4	140864
DAI	0	26192	13663	2	39857
ARHEO	104	0	0	2	106
TOTAL	**1711333**	**26195**	**64470**	**39846**	**1841844**

Five (5) mappings in XSLT stylesheets were developed by DCU for ADS, Fasti Online/AIAC and MiBACT – CulturaItalia, which chose the alternative (iii) to ingest data in ARIADNE registry. The remaining partners provided ACDM records directly in XML or MS Excel format. It should be noted that most of the records (1,596,864) were ingested by utilising the XSLT-based mappings, while only 244,653 records were ingested directly as ACDM records.

5   Standardisation and Mapping in ARIADNE

5.1   ACDM Mappings

As mentioned in sections 4.2 and 4.3, XSLT stylesheets were created in order to ingest 1,596,864 records in ARIADNE registry. Moreover, samples of indicative native and ACDM records can be found at the following addresses.

A. Archaeology Data Service (ADS)

1.   Collection

Native: http://more.locloud.eu:8080/objects/4467/19138216/ADS_ARCHIVE/content

ACDM: http://more.locloud.eu:8080/objects/4467/19138216/eACDM/content

2.   Textual Document

Native: http://more.locloud.eu:8080/objects/2864/10398981/GLL/content

ACDM: http://more.locloud.eu:8080/objects/2864/10398981/eACDM/content

3.   Dataset

Native: http://more.locloud.eu:8080/objects/3025/11426361/Archsearch/content

ACDM: http://more.locloud.eu:8080/objects/3025/11426361/eACDM/content

B. MiBACT - CulturaItalia

4.   Dataset (named PICO)

Native: http://more.locloud.eu:8080/objects/4108/18364935/PICO/content

ACDM: http://more.locloud.eu:8080/objects/4108/18364935/ACDM/content

C. AIAC Fasti Online

5.   Collection

Native: http://more.locloud.eu:8080/objects/4703/23554802/OAI_DC/content

ACDM: http://more.locloud.eu:8080/objects/4703/23554802/eACDM/content

In the cases where data were provided in MS Excel format, an MS Excel template was created by the DCU and distributed to the partners. Partners prepared their data according to the template and sent the MS Excel file(s) to DCU. DCU developed a Java-based application, customized for the native MS Excel file(s). The Java-based application processed the MS Excel files, transformed them to XML format and ingested them into the ARIADNE registry. As mentioned in section 4.2 the data in the ARIADNE registry were harvested by the MORe aggregator in order to be enriched and published to the ARIADNE portal.

5.2 AAT Mappings

The subjects to which the various datasets relate (e.g. excavations and archaeological surveys, monuments, burials, pottery, etc.), are described using terms drawn from the Art and Architecture Thesaurus (AAT) of the Getty Research Institute. The AAT formed the spine for the whole framework of terms in ARIADNE, not only with regard to the general subjects, but also for every other typological, morphological and functional description of archaeological objects and activities connected to them.

The use of a shared thesaurus required a mapping of each terminological resource already in use by content providers, to the AAT concepts; a fundamental activity through which it was also possible to demonstrate the semantic and conceptual similarity between the different archives. The mapping activities were undertaken by domain experts assisted by various mapping tools developed specifically to establish correspondences between concepts coming from different vocabularies.

Two different tools were developed to support the domain experts doing the mapping between vocabulary concepts, oriented to different contexts for the vocabularies. An interactive mapping tool was developed for ARIADNE, oriented to major vocabularies already expressed as Linked Data via local or national initiatives. The mapping tool generates SKOS mapping relationships in JSON and other formats between the source vocabulary concepts and the corresponding AAT concepts. To assist the production of quality mappings, the mapping tool displays the source concepts and the AAT concepts side by side, together with contextual evidence and allows the person making the mappings to browse related concepts in either vocabulary to fine tune the mapping. The mapping tool is a browser-based application working directly with Linked Data, querying external SPARQL endpoints directly [Binding and Tudhope 2016]. The mapping tool is open source and will be made available via the ARIADNE Portal. A pilot mapping exercise was performed by the ADS on UK Heritage Data vocabularies. Analysis of results informed an iteration of the mapping guidelines and the mapping tool user interface. The mapping guideline revisions included recommendations on the appropriate SKOS mapping relationship to employ in different contexts and when appropriate to specify more than one mapping for a given concept.

The second mapping tool was oriented to cases where the source vocabularies were not expressed as Linked Data and included simpler 'flat list' vocabularies. Since many of the simpler vocabularies were already available or easily expressed in spreadsheet format, the most flexible solution was to design a standard spreadsheet with example mappings that domain experts could use to specify the mappings. A CSV transformation produced the RDF/JSON format required by the Catalogue. The spreadsheet was accompanied by a set of guidelines informed by the pilot mapping exercise (together with support from the vocabulary team on problematic mappings or precedents from other partner mappings). In some cases, data cleansing was required before the mapping exercise could proceed. The mapping template contained a tab to record metadata for the mapping. In future work, making the mappings available as outcomes in their own right, with appropriate metadata for the mappings would be desirable, as more than one mapping may be produced for large vocabularies.

Figure 2: Mapping workflow for use of the AAT within ARIADNE.

The information from the mapping tool is passed to MORe, which associates it with the provider of the vocabulary. It updates the property *derived-subject* and enriches an ACDM record, adding a broader term, or a skos:altLabel to correlate a term using the 'use for' relationship, or adds multilingual labels (skos:prefLabel and skos:altLabel) in order to facilitate multilingual search.

Prototype experiments have shown the potential of working with the URI identifiers of AAT concepts rather than ambiguous strings of term labels. Using the URI identifier for the concept avoids the problem (discussed above) common with multilingual data of terms that are homographs in different languages. Working at the concept level also makes possible hierarchical semantic expansion, making use of the broader generic ("IS-A") relationships between concepts in a hierarchically structured knowledge organization system, such as the AAT. Thus a search expressed at a general level can (if desired) return results indexed at a more specific level, for example a search on *settlements* might also return *monastic centres*.

In some cases, ARIADNE has contributed to updated or even new subject vocabularies. One example is the ongoing initiative to develop a multilingual SKOS vocabulary to be used for documenting data resulting from dendrochronological analysis. In other collaborations, ARIADNE has assisted with the generation of SKOS representations for national vocabularies. Detailed descriptions of the various AAT mappings performed within ARIADNE are provided on the official AAT ARIADNE webpage http://www.ariadne-infrastructure.eu/Resources/AAT.

 The Table below provides overall statistics on the AAT mappings.

Partner	Vocabularies mapped to AAT	No match	skos:exactMatch	skos:closeMatch	skos:broadMatch	skos:narrowMatch	skos:relatedMatch	Totals
ADS	Archaeological Objects (subset)	0	197	96	118	0	0	**411**
ADS	Building Materials (subset)	0	8	4	0	0	0	**12**
ADS	Monument Types (subset)	0	141	107	141	0	1	**390**
ADS	Components Thesaurus (subset)	0	7	1	1	0	0	**9**
ADS	Maritime Craft (subset)	0	13	8	3	0	0	**24**
DAI	ARACHNE - books	0	13	4	0	0	0	**17**
DAI	ARACHNE - collections	0	8	2	1	0	0	**11**
DAI	ARACHNE - inscriptions	0	18	1	0	0	0	**19**
DAI	ARACHNE - buildings and structures	0	81	37	44	14	0	**176**
DAI	ARACHNE - multi-part monument	0	51	35	22	0	0	**108**
DAI	ARACHNE - topographic objects	0	46	7	2	0	0	**55**
DANS	DCCD vocabulary	0	245	9	82	0	0	**336**
DANS	EASY - Complextypen	3	3	59	34	0	15	**114**
Discovery	Irish Monument Types	0	168	69	249	0	0	**486**
IACA	FASTI Monument Types	2	23	80	24	0	0	**129**
ICCU	ICCD RA and PICO thesauri (subset)	0	642	94	310	258	0	**1304**
INRAP	PACTOLS thesaurus (subset)	0	1161	121	346	6	0	**1634**
MNM-NOK	Site Types	0	0	34	7	0	0	**41**
OEAW	DFMROE DB	0	4	0	0	3	0	**7**
OEAW	Franzhausen Kokoern DB	0	5	2	2	1	0	**10**
OEAW	UK Material Pool DB	0	7	0	4	5	0	**16**
OEAW	UK Thunau DB	0	3	1	0	0	0	**4**
SND	Combined terms list	5	71	156	144	11	0	**387**
ZRC-SAZU	ZBIVA vocabulary	0	0	25	5	0	0	**30**
ZRC-SAZU	ARKAS vocabulary	0	0	76	17	0	0	**93**
Partner Totals								
ADS	**5**	**0**	**366**	**216**	**263**	**0**	**1**	**846**
DAI	**6**	**0**	**217**	**86**	**69**	**14**	**0**	**386**
DANS	**2**	**3**	**248**	**68**	**116**	**0**	**15**	**450**
Discovery	**1**	**0**	**168**	**69**	**249**	**0**	**0**	**486**

Partner	Vocabularies mapped to AAT	No match	skos:exactMatch	skos:closeMatch	skos:broadMatch	skos:narrowMatch	skos:relatedMatch	Totals
IACA	1	2	23	80	24	0	0	129
ICCU	1	0	642	94	310	258	0	1304
INRAP	1	0	1161	121	346	6	0	1634
MNM-NOK	1	0	0	34	7	0	0	41
OEAW	4	0	19	3	6	9	0	37
SND	1	5	71	156	144	11	0	387
ZRC-SAZU	2	0	0	101	22	0	0	123
Totals:	25	10	2915	1028	1556	298	16	5823
	Proportion in %:	0.17	50.06	17.65	26.72	5.12	0.27	100

5.3 PeriodO Mappings

The user requirements for the ARIADNE portal specified that chronological searching of the ARIADNE catalogue by archaeological period should be regarded as essential. However, this introduced two problems, which the project needed to overcome. Firstly, each data provider partner used his own list of periods, many of which were non-standardised. Secondly, even when the same period terms are used they are not independent variables, but are specific to country and region and specific spatial polygons. For example, though it is a ubiquitous archaeological period throughout Europe and much of Africa, the Iron Age has very different start and end dates according to region. Therefore, the approach adopted needed to support two types of period searching: by start and end date in absolute calendar years (e.g. 2500-1800 BC), and by cultural period (e.g. Early Bronze Age).

In order to resolve these problems, it was agreed to collaborate with the North American-based PeriodO project (http://perio.do). PeriodO is a gazetteer of scholarly definitions of historical, art-historical, and archaeological periods. It eases the task of linking among datasets that define periods differently. It also helps scholars and students see where period definitions overlap or diverge.

5.3.1 Definitions

The PeriodO period gazetteer documents definitions of historical period names. Each entry of the gazetteer identifies the definition of a single period. To be included in the gazetteer, a definition must

- give the period a name;
- impose some temporal bounds on the period;
- have some implicit or explicit association with a geographical region, and;
- have been formally or informally published in some citable source.

Much care has been put into giving period definitions stable identifiers that can be resolved to RDF representations of period definitions. PeriodO models period definitions as SKOS concepts. These are

grouped into concept schemes sharing the same bibliographic source. Temporal extent is expressed via a direct textual quotation from the source, as well as via a structured approximation of this expression modelled using the OWL-Time ontology. Similarly, spatial extent is represented both by a textual quote (where one was given) and a set of identifiers referring to spatial entities in external resources such as DBpedia.

Examples:

- http://n2t.net/ark:/99152/p05krdxmkzt identifies the "Dark Age" as defined by Davis and Alcock on page 97 of Sandy Pylos: an archaeological history from Nestor to Navarino (see the JSON representation).
- http://n2t.net/ark:/99152/p06v8w4 identifies all the period definitions from the FastiOnline database of archaeological excavations (see the JSON representation).

5.3.2   Identifiers

Each period definition is given its own Web-based, resolvable Uniform Resource Identifier (URI) in the form of an Archival Resource Key (ARK), minted through the EZID system of the California Digital Library. These ARKs are resolvable to structured, machine-readable representations of individual period definitions.

Wherever possible bibliographic sources are identified with WorldCat URIs or CrossRef DOIs, and creators are identified with Virtual International Authority File URIs.

5.3.3   Data Serialization

Period definitions in the PeriodO gazetteer are published as JSON-LD, a serialised form of the Resource Description Format (RDF) used to describe Linked Data. The entire dataset is available for download as a single JSON file, so that it can be more easily reused by other projects.

5.3.4   User Interface

A browser-based client provides search, visualisation, and data entry tools. It also provides an interface for managing distributed versioning and collaborative development of the PeriodO dataset. The entire editorial history of the PeriodO gazetteer is published as a separate dataset using the PROV ontology.

5.3.5   Implementation by ARIADNE

All ARIADNE data provider partners completed a spreadsheet defining the native period terms used in describing their resources in the ARIADNE registry. For each record they recorded:

- Source
- Language
- Script
- Source Zotero id (where available)
- Source LinkedDdata URI (where available)
- Source locator (URL)
- Label (original)
- Label (English)
- Label (alternative) where applicable

- Start date

- End date

- Data type (e.g. BP)

- Spatial coverage (country or region name)

This data could then be used within the Registry to provide a start and end date in absolute years, facilitating timeline searching, as well as search by native period label. All the period definitions were published as the ARIADNE collection on the PeriodO website: http://n2t.net/ark:/99152/p0qhb66 Each ARIADNE period term therefore has a permanent URI which could be cited within the catalogue as well as within linked data implementations.

Additional project documentation is available at:

http://www.ariadne-infrastructure.eu/Resources/PeriodO/documentation

6   ACDM Encoding: Diagrams and Schemas

In this section, some of the most relevant ACDM class are described using UML-graph, along with the mapping templates used by partners, and example mappings using the XSLT template. This sets out the basic structure followed by all partners, in combination with the AAT and PeriodO, set out in Section 5. How these were implemented by each partner is set out in Section 7.

6.1   Diagrams

6.1.1   Service

6.1.2   Vocabulary

6.1.3 MetadataSchema

6.1.4 AriadneConcept

6.2 Templates

6.2.1 General template for all services

Attribute	Usage Notes	Obligation	Example
dct:title	the name of the service	M	
dct:description	contains a description of the service	M	
rdfs:comment	notes and comments	O	
dct:publisher	the agent making the service accessible, if any	O	
dct:contributor	the agent responsible for describing the service in the ARIADNE Catalogue	O	
dct:creator	the agent that created the service	O	
owner	the agent that is the legal owner of the service	O	
legalResponsible	the agent that is legally responsible for the service	M	
scientificResponsible	the agent that is scientiflly responsible for the service	O	
technicalResponsible	the agent that is technically responsible for the service	O	
native-subject	a subject from a vocabulary in use by the original owner of the resource	M	
hasAttachedDocuments	the documents attached to the service for illustration purposes (including videos)	O	
developer	The agent who developed the service	O	
functionality	A multivalued property to qualify the service in addition to the AAT terms	O	3D visualisation,
foaf:homepage	URL to the service homepage	R	
dct:issued	Date of formal issuance (e.g., publication) of the service.	M	*2013-04-24*
dct:modified	Most recent date on which the service was changed, updated or modified. If not specified, the issued date will be used automatically.	M	*2013-04-24*
exportFacility	If the service provides export functionality for the datasets on which it operates, supply a list of format.	O	CSV
hasTechnicalSupport	The agent offering technical support for the service, if any	O	

Attribute	Usage Notes	Obligation	Example
consumedMedia	The media type of the objects handled by the service. The list of possible mediaType is open	M	**"image", "audio", "video", "text", "3D model", "2D model"**
producedMedia	The media type of objects created by the service. Same values as consumedMedia	M	
consumedFormat	The MIME type of the objects handled by the service	M	
producedFormat	The MIME type of the objects created by the service.	M	
supportedLanguage	The languages supported by the possible GUI	O	
accessURL	**URL to the service access page**	**M**	

6.2.2 Additional template for standalone services

Attribute	Usage Notes	Obligation	Example
dbpedia-owl:operatingSystem	The OS platform required by the service	M	dbpedia:Cross-platform
dbpedia-owl:programmingLanguage		M if source code is available	dbpedia:Java_(programming_language)
dbpedia-owl:status		M	InProgress, available
dbpedia-owl:latestReleaseVersion		R	
dbpedia-owl:license		M	
dcat:downloadURL		R	
dcat:byteSize		O	
isInRepository		O	
hasAPI	a textual description of the service API; if any	O	
hasComponents	the components required for the	O	

Attribute	Usage Notes	Obligation	Example
	Service to be installed and used, if any		

6.2.3   Additional template for web services

Attribute	Usage Notes	Obligation	Example
hasAPI	a textual description of the service API; if any	O	

6.2.4   Additional Template for institutional services

Attribute	Usage Notes	Obligation	Example
contactPerson	The Agent to be contacted in order to access the service	R	

6.2.5   Mapping of ADS records to ACDM in XSLT

This is an example of the XSLT template used for data conversion from the legacy ADS format to ACDM is provided.

```xml
<?xml version="1.0" encoding="utf-8"?>
<xsl:stylesheet version="2.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
xmlns:dcterms="http://purl.org/dc/terms/"
xmlns:oai_dc="http://www.openarchives.org/OAI/2.0/oai_dc/"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:dcat="http://www.w3.org/ns/dcat#"
xmlns:foaf="http://xmlns.com/foaf/"
xmlns:dcmitype="http://purl.org/dc/dcmitype/"
xmlns:dbpedia-owl="http://dbpedia.org/ontology/"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
xmlns:sch="http://purl.oclc.org/dsdl/schematron"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:vcard="http://www.w3.org/2006/vcard/ns#"
xmlns:aat="http://vocab.getty.edu/aat/"
xmlns:acdm="http://registry.ariadne-infrastructure.eu/"
xmlns:owl="http://www.w3.org/2002/07/owl#"
xsi:schemaLocation="http://archaeologydataservice.ac.uk/advice/archiveSchema">
<xsl:strip-space elements="*" />
<xsl:output method="xml" version="1.0" encoding="utf-8" indent="yes"/>
        <xsl:template match="/">
                <acdm:ariadne>
```

```xml
<acdm:ariadneArchaeologicalResource>
    <xsl:element name="acdm:collection">
    <!--PUBLISHER-->
    <xsl:element name="acdm:publisher">
    <xsl:element name="foaf:name">Archaeology Data Service</xsl:element>
    <xsl:element name="acdm:typeOfAnAgent">Organization</xsl:element>
    </xsl:element>
    <!--CONTRIBUTOR-->
    <xsl:for-each select="//Actors/actor">
            <xsl:if test="@type='creator'">
                    <xsl:if test="name">
                            <xsl:element name="acdm:contributor">
                            <xsl:element name="foaf:name">
                            <xsl:value-of select="name/text()" />
                                            </xsl:element>
                            <xsl:element
name="acdm:typeOfAnAgent">Person</xsl:element>

                            </xsl:element>
                    </xsl:if>
                    <xsl:if test="organisation">
                    <xsl:element name="acdm:contributor">
                    <xsl:element name="foaf:name">
                    <xsl:value-of select="organisation/text()"/>
                    </xsl:element>
                    <xsl:element
name="acdm:typeOfAnAgent">Organization</xsl:element>

                    </xsl:element>
                    </xsl:if>
            </xsl:if>
    </xsl:for-each>
    <!--NATIVE SUBJECT-->
    <xsl:for-each select="//Coverage/subjects/subject">
            <xsl:element name="acdm:nativeSubject">
                    <xsl:element name="skos:Concept">
                            <xsl:element name="skos:prefLabel">
                                    <xsl:value-of select="text()" />
                                    </xsl:element>
                            </xsl:element>
                    </xsl:element>
            </xsl:for-each>
    <!-- TITLE -->
    <xsl:for-each select="//archive/title">
            <xsl:element name="dcterms:title">
                    <xsl:value-of select="text()" />
                    </xsl:element>
            </xsl:for-each>
    <!-- DESCRIPTION -->
    <xsl:for-each select="//description">
            <xsl:element name="dc:description">
                    <xsl:value-of select="text()" />
            </xsl:element>
            </xsl:for-each>
    <!-- ISSUED DATE -->
            <xsl:for-each select="//published/firstReleased">
            <xsl:element name="dcterms:issued">
                    <xsl:value-of select="text()" />
            </xsl:element>
            </xsl:for-each>
    <!-- MODIFIED DATE -->
            <xsl:for-each select="//published/lastUpdated">
                    <xsl:element name="dcterms:modified">
                            <xsl:value-of select="text()" />
                    </xsl:element>
            </xsl:for-each>
            <!-- ORIGINAL ID (ID) -->
```

```
<xsl:for-each select="//id">
        <xsl:element name="acdm:originalId">
                <xsl:value-of select="text()" />
        </xsl:element>
</xsl:for-each>
<!-- LANGUAGE -->
<xsl:element name="dc:language">en</xsl:element>
<!-- LANDING PAGE -->
<xsl:for-each select="//doi">
        <xsl:element name="dcat:landingPage">
                http://dx.doi.org/<xsl:value-of
select="text()"/>
        </xsl:element>
</xsl:for-each>
<!-- ACCESS POLICY -->
<xsl:element
name="acdm:accessPolicy">http://archaeologydataservice.ac.uk/advice/termsOfUseAndAccess</xsl:element>
<!-- ACCESS RIGHTS -->
<xsl:element name="dcterms:accessRights">ADS Terms and
Conditions</xsl:element>

<!-- TEMPORAL -->
<xsl:for-each select="//Coverage/periods/period">
        <!--periodName-->
        <xsl:element name="acdm:temporal">
                <xsl:element name="acdm:periodName">
                        <xsl:element
name="skos:Concept">
                                <xsl:element
name="skos:prefLabel">
                                        <xsl:value-of
select="text()" />
                                </xsl:element>
                        </xsl:element>
                </xsl:element>
        </xsl:element>
</xsl:for-each>
<xsl:for-each select="//Coverage/temporal/dateRange">
        <xsl:element name="acdm:temporal">
                <!--acdm:from-->
                <xsl:for-each select="startYear">
                        <xsl:element name="acdm:from">
                                <xsl:value-of
select="text()" />
                        </xsl:element>
                </xsl:for-each>
                <!--acdm:to-->

                <xsl:for-each select="endYear">
                        <xsl:element name="acdm:until">
                                <xsl:value-of
select="text()" />
                        </xsl:element>
                </xsl:for-each>
        </xsl:element>
</xsl:for-each>

<!-- SPATIAL -->
<xsl:element name="acdm:spatial">
        <!--placeName-->
        <xsl:for-each select="//Coverage/locations/location">
                <xsl:choose>
                        <xsl:when test="@type = 'TGN'">
                                <xsl:element
name="acdm:placeName">
```

```
                                                        <xsl:value-of
select="text()"/>
                                            </xsl:element>
                                        </xsl:when>
and contains(text(), 'World')">                         <xsl:when test="@type = 'None'

name="acdm:placeName">                                      <xsl:element

select="text()"/>                                               <xsl:value-of
                                            </xsl:element>
                                        </xsl:when>
                                        <xsl:otherwise/>
                                    </xsl:choose>
                            </xsl:for-each>
                            <!--coordinateSystem-->
                            <xsl:for-each select="//Coverage/coordinates/world">
name="acdm:coordinateSystem">           <xsl:element

                                            <xsl:value-of select="@type" />
                                        </xsl:element>
                            </xsl:for-each>
                            <!--latitude-->
                            <xsl:for-each
select="//Coverage/coordinates/world/latitude">

                                    <xsl:element name="acdm:lat">
                                            <xsl:value-of select="text()" />
                                        </xsl:element>
                            </xsl:for-each>
                            <!--longitude-->
                            <xsl:for-each
select="//Coverage/coordinates/world/longitude">

                                    <xsl:element name="acdm:lon">
                                            <xsl:value-of select="text()" />
                                        </xsl:element>
                            </xsl:for-each>
                            <!--boundingBoxMinLat-->
                            <xsl:for-each
select="//Coverage/coordinates/boundingBox/southLatitude">
                                        <xsl:element
name="acdm:boundingBoxMinLat">

                                            <xsl:value-of select="text()" />
                                        </xsl:element>
                            </xsl:for-each>
                            <!--boundingBoxMinLon-->
                            <xsl:for-each
select="//Coverage/coordinates/boundingBox/westLongitude">
                                        <xsl:element
name="acdm:boundingBoxMinLon">

                                            <xsl:value-of select="text()" />
                                        </xsl:element>
                            </xsl:for-each>
                            <!--boundingBoxMaxLat-->
                            <xsl:for-each
select="//Coverage/coordinates/boundingBox/northLatitude">
                                        <xsl:element
name="acdm:boundingBoxMaxLat">

                                            <xsl:value-of select="text()" />
                                        </xsl:element>
                            </xsl:for-each>
                            <!--boundingBoxMaxLon-->
                            <xsl:for-each
select="//Coverage/coordinates/boundingBox/eastLongitude">
                                        <xsl:element
name="acdm:boundingBoxMaxLon">
```

```
                                                                        <xsl:value-of select="text()" />
                                                                    </xsl:element>
                                                                </xsl:for-each>
                                                            </xsl:element>
                                                        <!-- ARCHAEOLOGICAL RESOURCE TYPE -->
                                                        <xsl:for-each select="//acdmType">
                                                            <xsl:element
name="acdm:archaeologicalResourceType">
                                                                    <xsl:value-of select="text()" />
                                                                </xsl:element>
                                                            </xsl:for-each>
                                                        </xsl:element>
                                            </acdm:ariadneArchaeologicalResource>
                                        </acdm:ariadne>
                                </xsl:template>
</xsl:stylesheet>
```

6.2.6   Mapping of Fasti Online/AIAC records to ACDM in XSLT

This is an example of the XSLT template used for data conversion from the legacy AIAC format to ACDM is provided.

```
<?xml version="1.0" encoding="utf-8"?>
<xsl:stylesheet version="2.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
xmlns:dcterms="http://purl.org/dc/terms/"
xmlns:oai_dc="http://www.openarchives.org/OAI/2.0/oai_dc/"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:dcat="http://www.w3.org/ns/dcat#"
xmlns:foaf="http://xmlns.com/foaf/"
xmlns:dcmitype="http://purl.org/dc/dcmitype/"
xmlns:dbpedia-owl="http://dbpedia.org/ontology/"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
xmlns:sch="http://purl.oclc.org/dsdl/schematron"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"
xmlns:vcard="http://www.w3.org/2006/vcard/ns#"
xmlns:aat="http://vocab.getty.edu/aat/"
xmlns:acdm="http://registry.ariadne-infrastructure.eu/"
xmlns:owl="http://www.w3.org/2002/07/owl#"
xmlns="http://archaeologydataservice.ac.uk/advice/archiveSchema"
xmlns:dct="http://purl.org/dc/terms"
xmlns:geo="http://www.w3.org/2003/01/geo/wgs84_pos#"
>
<xsl:strip-space elements="*" />
<xsl:output method="xml" omit-xml-declaration="yes" version="1.0" encoding="utf-8" indent="yes"/>

        <xsl:template match="/">
                <acdm:ariadne>
                        <acdm:ariadneArchaeologicalResource>
                                <xsl:element name="acdm:collection">
                                        <!--PUBLISHER-->
                                        <xsl:for-each select="//dc:publisher">
                                            <xsl:if test="text() !=''">
                                                <xsl:element name="acdm:publisher">
                                                    <xsl:element name="foaf:name">
                                                        <xsl:value-of select="text()" />
                                                    </xsl:element>
                                                    <xsl:element
name="acdm:typeOfAnAgent">Organization</xsl:element>
                                                </xsl:element>
                                            </xsl:if>
```

```xml
            </xsl:for-each>
            <!--OWNER-->
            <xsl:for-each select="//dc:owner">
                    <xsl:if test="text() !='''">
                            <xsl:element name="acdm:owner">
                                    <xsl:element name="foaf:name">
                                            <xsl:value-of select="text()" />
                                    </xsl:element>
                                    <xsl:element
name="acdm:typeOfAnAgent">Organization</xsl:element>
                            </xsl:element>
                    </xsl:if>
            </xsl:for-each>
            <!--TECHNICAL_RESPONSIBLE-->
            <xsl:for-each select="//*[local-name()='technicalResponsible']">
                    <xsl:if test="text() !='''">
                            <xsl:element name="acdm:technicalResponsible">
                                    <xsl:element name="foaf:name">
                                            <xsl:value-of select="text()" />
                                    </xsl:element>
                                    <xsl:element
name="acdm:typeOfAnAgent">Organization</xsl:element>
                            </xsl:element>
                    </xsl:if>
            </xsl:for-each>
            <!--SCIENTIFIC_RESPONSIBLE-->
            <xsl:for-each select="//*[local-name()='scientificResponsible']">

                    <xsl:if test="text() !='''">
                            <xsl:element name="acdm:scientificResponsible">
                                    <xsl:element name="foaf:name">
                                            <xsl:value-of select="text()" />
                                    </xsl:element>
                                    <xsl:element
name="acdm:typeOfAnAgent">Person</xsl:element>
                            </xsl:element>
                    </xsl:if>
            </xsl:for-each>
            <!-- TITLE -->
            <xsl:for-each select="//dc:title">
                    <xsl:if test="text() !='''">
                            <xsl:element name="dcterms:title">
                                    <xsl:value-of select="text()" />
                            </xsl:element>
                    </xsl:if>
            </xsl:for-each>
            <!-- LANDING PAGE -->
            <xsl:for-each select="//dc:identifier">
                    <xsl:if test="text() !='''">
                            <xsl:element name="dcat:landingPage">
                                    <xsl:value-of select="text()" />
                            </xsl:element>
                    </xsl:if>
            </xsl:for-each>
            <!-- DESCRIPTION -->
            <xsl:for-each select="//dc:description">
                    <xsl:if test="text() !='''">
                            <xsl:element name="dc:description">
                                    <xsl:value-of select="text()" />
                            </xsl:element>
                    </xsl:if>
            </xsl:for-each>
            <!-- ISSUED DATE -->
            <xsl:for-each select="//dc:issued">
                    <xsl:if test="text() !='''">
```

```xml
                                        <xsl:element name="dcterms:issued">
                                                <xsl:value-of select="text()" />
                                        </xsl:element>
                                </xsl:if>
                        </xsl:for-each>
                        <!-- MODIFIED DATE -->
                        <xsl:for-each select="//dc:modified">
                                <xsl:if test="text() !=''">
                                        <xsl:element name="dcterms:modified">
                                                <xsl:value-of select="text()" />
                                        </xsl:element>
                                </xsl:if>
                        </xsl:for-each>
                        <!-- ORIGINAL ID-->
                        <xsl:for-each select="//*[local-name()='originalId']">
                                <xsl:if test="text() !=''">
                                        <xsl:element name="acdm:originalId">
                                                <xsl:value-of select="text()" />
                                        </xsl:element>
                                </xsl:if>
                        </xsl:for-each>
                        <!-- LANGUAGE -->
                        <xsl:for-each select="//dc:language">
                                <xsl:if test="text() !=''">
                                        <xsl:element name="dc:language">
                                                <xsl:value-of select="text()" />
                                        </xsl:element>
                                </xsl:if>
                        </xsl:for-each>
                        <!-- ACCESS RIGHTS -->
                        <xsl:for-each select="//dc:accessRights">
                                <xsl:if test="text() !=''">
                                        <xsl:element name="dcterms:accessRights">
                                                <xsl:value-of select="text()" />
                                        </xsl:element>
                                </xsl:if>
                        </xsl:for-each>
                        <!-- TEMPORAL-->
                        <!--acdm:form-->
                        <xsl:variable name="countTemporal">
                                <xsl:value-of select="count(//dc:coverage/dc:temporal)"/>
                        </xsl:variable>
                        <xsl:for-each select="//dc:coverage/dc:temporal">
                                <xsl:element name="acdm:temporal">
                                        <!--acdm:from-->
                                        <xsl:for-each select="from">
                                                <xsl:element name="acdm:from">
                                                        <xsl:if test="contains(text(), '+')">
                                                                <xsl:value-of
select="substring-after(text(), '+')" />
                                                        </xsl:if>
                                                        <xsl:if test="contains(text(), '-')">
                                                                <xsl:value-of
select="text()" />
                                                        </xsl:if>
                                                </xsl:element>
                                        </xsl:for-each>
                                        <!--acdm:to-->

                                        <xsl:for-each select="until">
                                                <xsl:element name="acdm:until">
                                                        <xsl:if test="contains(text(), '+')">
                                                                <xsl:value-of
select="substring-after(text(), '+')" />
                                                        </xsl:if>
```

```xsl
                                                                <xsl:if test="contains(text(), '-')">
                                                                        <xsl:value-of
select="text()" />
                                                                </xsl:if>
                                                        </xsl:element>
                                                </xsl:for-each>
                                        </xsl:element>

                                </xsl:for-each>
                                <!-- SPATIAL -->
                                <xsl:for-each select="//dc:spatial/geo:Point">
                                        <xsl:if test="//geo:lat/text() !='' or //geo:lon/text() !=''">
                                                <xsl:element name="acdm:spatial">
                                                        <!--latitude-->
                                                        <xsl:for-each select="//geo:lat">
                                                                <xsl:element name="acdm:lat">
                                                                        <xsl:value-of
select="text()" />
                                                                </xsl:element>
                                                        </xsl:for-each>
                                                        <!--longitude-->
                                                        <xsl:for-each select="//geo:lon">
                                                                <xsl:element name="acdm:lon">
                                                                        <xsl:value-of
select="text()" />
                                                                </xsl:element>
                                                        </xsl:for-each>
                                                </xsl:element>
                                        </xsl:if>
                                </xsl:for-each>
                                <!--NATIVE SUBJECT  -->
                                <xsl:for-each select="//skos:Concept">
                                        <xsl:if test="text() !=''">
                                                <xsl:element name="acdm:nativeSubject">
                                                        <xsl:element name="skos:Concept">
                                                                <xsl:element
name="skos:prefLabel">
                                                                        <xsl:value-of
select="text()"/>
                                                                </xsl:element>
                                                        </xsl:element>
                                                </xsl:element>
                                        </xsl:if>
                                </xsl:for-each>
                                <!-- ARCHAEOLOGICAL RESOURCE TYPE-->
                                <xsl:element
name="acdm:archaeologicalResourceType">Event/intervention resources</xsl:element>
                                <!--dcterms:isPartOf-->
                                <xsl:element
name="dcterms:isPartOf">www.fastionline.org</xsl:element>
                                <!--<xsl:for-each select="//dct:isPartOf">
                                        <xsl:element name="dcterms:isPartOf">
                                                <xsl:value-of select="text()" />
                                        </xsl:element>
                                </xsl:for-each>-->
                        </xsl:element>
                </acdm:ariadneArchaeologicalResource>
        </acdm:ariadne>
</xsl:template>

</xsl:stylesheet>
```

7   ARIADNE Mapping Details

This chapter presents a detailed description, for each partner, of the various mappings carried out to encode legacy information concerning datasets, standards and services, in the ACDM format and in the other formats used to foster integration within the project.

7.1   ADS datasets

Three broad categories of ADS resources corresponding to six ARIADNE **ArchaeologicalResourceTypes** were uploaded into the ACDM registry:
1. Fieldwork archives – derived from ADS archives
2. Event/intervention resources, such as grey literature reports – derived from the ADS library of unpublished fieldwork reports
3. Sites and monuments databases or inventories – derived from ADS ArchSearch catalogue
4. Scientific datasets, such as databases of radiocarbon dates – dervied from ADS archives
5. Artefact databases, or artefact image collections – derived from ADS archives
6. Burial databases – derived from ADS archives

All ADS archives are described in an internally developed collections management system. The ADS ArchSearch catalogue and the library of unpublished fieldwork reports are described in separate Oracle databases. All of these ADS resources are described in Dublin Core compliant metadata, with specific schema generally drawn from MIDAS Heritage (the UK Historic Environment Data Standard). MIDAS is a British cultural heritage standard for recording information on buildings, archaeological sites, shipwrecks, parks and gardens, battlefields, areas of interest and artefacts. The data standard suggests the minimum level of information needed for recording heritage assets and covers the procedures involved in understanding, protecting and managing these assets. It also provides guidelines on how to support effective sharing of knowledge, data retrieval and long-term preservation of data. MIDAS Heritage is freely available to anyone interested in recording historic environment information. It is used by national government organisations, local authorities, heritage sector organisations, amenity groups and societies, the research community and professional contractors.[1]

As an example, the ADS Library of Unpublished Fieldwork Reports was described as a single Collection within the ACDM, although it is comprised of thousands of **textualDocuments**. The collection is encoded in a schema called "archiveSchema" while the **textualDocument***s* are encoded in a customised Dublin Core. Examples of native and ACDM records, as well as the mapping between them, are given below.

7.1.1   ADS Collection level record mappings

ACDM Term	ADS archiveSchema
acdm:nativeSubject	archive.Coverage.subjects.subject
acdm:publisher	Archaeology Data Service
acdm:contributor	archive.Actors.actor[type="creator"].name OR archive.Actors.actor[type="creator"].organisation

---

[1] https://historicengland.org.uk/images-books/publications/midas-heritage/

ACDM Term	ADS archiveSchema
acdm:typeOfAnAgent	Person / organization
dcterms:title	archive.title
dc:description	archive.description
dcterms:issued	archive.published.firstReleased
dcterms:modified	archive.published.lastUpdated
acdm:originalId	archive.id
dc:language	en
dcat:landingPage	"http://dx.doi.org/" + archive.doi
acdm:accessPolicy	http://archaeologydataservice.ac.uk/advice/termsOfUseAnd Access
dcterms:accessRights	ADS Terms & Conditions
acdm:archaeologicalResourceType	archive.acdmType
acdm:periodName	archive.Coverage.periods.period
acdm:placeName	archive.Coverage.locations.location[type=TGN]
acdm:coordinateSystem	archive.Coverage.coordinates.world[type]
acdm:lat	archive.Coverage.coordinates.world.latitude
acdm:lon	archive.Coverage.coordinates.world.longitude
acdm:boundingBoxMinLat	archive.Coverage.coordinates.boundingBox.southLatitude
acdm:boundingBoxMinLon	archive.Coverage.coordinates.boundingBox.westLongitude
acdm:boundingBoxMaxLat>	archive.Coverage.coordinates.boundingBox.northLatitude
acdm:boundingBoxMaxLon	archive.Coverage.coordinates.boundingBox.eastLongitude

7.1.2   ADS Mappings for individual textual documents

ACDM Term	Extended DC (GLL)
acdm:nativeSubject	dc:subjectMonuments, dc:subjectFinds

ACDM Term	Extended DC (GLL)
dcterms:isPartOf	numberOfCollection – originalId
dcterms:title	dc:title
dcterms:issued	dc:published
acdm:originalId	dc:identifier
dc:language	en
dcat:landingPage	"http://dx.doi.org/" + dc:identifier
acdm:accessPolicy	http://archaeologydataservice.ac.uk/advice/termsOfUseAndAccess
dcterms:accessRights	ADS Terms & Conditions
acdm;archaeologicalResourceType	Event/intervention resources

7.1.3   ADS terminological mappings

The mappings from ADS native subject terms to the Getty AAT were undertaken using the USW mapping tool by a member of ADS staff with a degree in Archaeology, and checked by a senior archaeologist. Native terms in the ADS catalogue are described according to a number of MIDAS-compliant thesauri, which are approved by the UK Forum for Information Standards in Heritage (FISH) and all of which are available at heritagedata.org. The primary thesauri from which ADS subject terms are drawn are:

- FISH Thesaurus of Monument Types
- FISH Archaeological Objects Thesaurus
- FISH Maritime Craft Types Thesaurus
- FISH Buildings Materials Thesaurus
- FISH Components Thesaurus

All matches were described as Broad, Exact, or Close. Section 5.2 provides the numbers of matches of each type. As might be expected given the similarity of content, the highest proportion of Exact Matches was for the Archaeological Objects Thesuarus, with a lower number of Exact Matches for Monument Types.

7.2   AIAC – Fasti Online

The Fasti data model is structured around a concept of 'Season', which is a scheme of archaeological work. Each of these must take place on a site in a particular year. The site record has a location, a name, a monument type and a date range. The date range will be related to a period dependent on the location of the site. The data is held in a complex relational database, and made available through the Fasti Online web portal. The data can be viewed in several formats, including an XML representation using the OAI-PMH, which was used to ingest the data into the ARIADNE Portal. The following table explains the mappings.

ACDM Term	Fasti Mapping Explanation
dct:title	This was created using a combination of the site name and the season year e.g 'Baccano 2004'
dct:description	This used a standard phrase constructed using the site name and the season year e.g 'Fasti record for interventions in the year 2000 at Baccano'
dct:issued	The date from the database of when the season record was registered
dct:modified	The date that the most recent summary was registered on the database
dct:originalId	The Fasti season code, joined with Fasti and the itemkey from the database in this case the code for season is sea_cd e.g. fasti.sea_cd.AIAC_1
dct:identifier	The URL for this season resource on Fasti e.g. http://www.fastionline.org/season/AIAC_1
dct:language	Summaries in Fasti are stored in two languages, each of these is added to the record
dct:accessRights	All data in Fasti is under the https://creativecommons.org/licenses/by-sa/4.0/ license
dct:spatial	The latitude and longitude of each site are stored as numbers in the database, these are presented as geo:lat and geo:lon in the xml representation of the Fasti dataset
ariadne:archaeologicalResourceType	The excavation records in Fasti are all of the type "Event/intervention resource"

The FASTI portal is available as a service, and was uploaded to the registry. The specifications are in the table below.

ACDM Term	Fasti Mapping Explanation
dct:title	This was created using a combination of the site name and the season year e.g 'Baccano 2004'

ACDM Term	Fasti Mapping Explanation
dct:title	Fasti Online
dct:description	The aim of the site is to provide a database of excavations since 2000, providing a record in English and in the local language for each season. We do not pretend to offer information on all sites being excavated, and certainly not on those excavated in the past, or never excavated. Each participating country is responsible for uploading the data it gathers: some countries' records are more complete than others.
foaf:homepage	http://www.fastionline.org
dct:issued	2006-09-07
acdm:exportFacility	CSV
acdm:consumedMedia	image, text, video
acdm:producedMedia	HTML
acdm:consumedFormat	text/html, application/pdf
acdm:producedFormat	text/html
acdm:supportedLanguage	English, Romanian, Slovenian, Macedonian, Bulgarian, Serbian, Croatian, Italian, French, Arabic, Albanian, Spanish, Montenegrin, Ukrainian, Catalan
acdm:accessURL	http://www.fastionline.org

The complete Fasti concept model was mapped to the CIDOC CRM, which is presented in the following figure. The terms are colour coded according to Fasti item keys, light blue for site information, turquoise for season information, green for actor information, yellow for bibliographic information, pink for Fasti FOLD&R information, red for volunteer information. The purple

information is presented on the Fasti portal, but is stored in GeoNames. The latitude and longitude are used to query the live GeoNames database. The information in the orange boxes is stored as 'Events' in the Fasti model, these are combinations of actors, activities and times. These can be unpacked into the CIDOC CRM model, but for this representation they have been left as entities, to prevent this illustration from being repetitive. The relationships of these mappings are not currently viewable for our users in the Fasti Online Portal.

Figure 2: Fasti conceptual mapping to CIDOC CRM.

7.2.1   Fasti Terminology Mappings

The mappings from Fasti monument types to the Getty AAT were completed in collaboration with USW. These mappings were then imported into the Fasti database and presented in the service, andthen checked manually. The mappings were stored in the Fasti database as links between a Fasti concept URI e.g. http://www.fastionline.org/concept/attribute/castle and an AAT URI http://vocab.getty.edu/aat/300006891. These mappings can be viewed through the Fasti Concepts Pages. For the OAI-PMH representation, the AAT URI's were resolved to the xl:prefLabel, and then incorporated into the ARIADNE portal.

A detailed description of the PeriodO mappings of the temporal entities recorded in Fasti archives were used for time integration within the ARIADNE Portal. The Fasti period data has been fully incorporated into the PeriodO dataset. For PeriodO, with http://www.fastionline.org as source,it was possible to establish direct mappings between the Fasti period data and the PeriodO data of the same name.

7.3 ARHEO

In order to integrate its datasets in the ARIADNE Registry, ARHEO has delivered datasets describing archaeological sites from the Historical Monuments List. The National Archaeological Repertoire format, from which the delivered information was extracted, and the ACDM format, used to encode registry information, coincided to a large extent. The term **dct:title** was filled with the general title of the dataset, that is, "List of Historical Monuments Sites"; the rest of the fields were filled with specific information taken from the database itself.

In particular, the **dct:description** field was filled information coming from the "Description" field of the source database, containing short information regarding the archaeological site. The field **dct:identifier** presents alphanumerical data specific only to the archaeological sites contained in the Archaeological Monuments List; this is also a unique identifier and it is specified within the source in the field "Cod LMI". The archaeological sites that are not included in Historical Monuments List (LMI) do not hold such an indicator, being distinguished exclusively by the **dct:origicalId** field. The field **dct:language** field, specifying the language in which the information is registered, was filled using newly created string, having no correspondences within the source fields. The field **dct:temporal** is referring to the archaeological site chronology and within the source this is corresponding to the records from the field called "Descoperiri in cadrul sitului" and the subfield "Epoca(Datare)". New textual information was created also for the **dct:accrualPeriodicity** field, referring to the rhythm in which updates are made within the native documents. Source records do not provide exact matching information for this field; values have been derived indirectly by gathering information in "Data ultimei modificari a fisei" field, which is numerical type data representing a calendar data. The dct:landingPage field was derived from the URL of each record in the original dataset. The fields **dct:creator**, **dct:contributor**, **dct:owner** and **dct:legalResponsible** hold newly created textual information, referring to the person responsible for creating, administrating and holding of the data. The **technicalResponsible** field contains information on the administrators of the legacy database, independently from the archaeological site records fields.

Table below shows the ARHEO mappings in detail.

Original Field	Field Description	ACDM Field	Comment
	name of the record	**dcterm:title**	
		dcterms:isPartOf	
Descriere	*The field is text type offering short information about the archaeological site who is refering to*	**dcterms:description**	

Original Field	Field Description	ACDM Field	Comment
	entry date	**dcterms:issued**	*ussually is the same date as dcterms:modified*
Data ultimei modificări a fişei	*the field is numerical type, indicating the last update of the sheet*	**dcterms:modified**	
		dcterms:accrualPeriodicity	
Cod RAN	*numerical type data, representing the unique number given to each archaeological site registered in the database*	**acdm:originalId**	
Tip	*text type data, offering information about the nature of the archaeological site (eg. Fotificatie)*	**dcat:keyword**	
N/A	*not a field in the database*	**dcterms:language**	*default "Romanian"*
Epocă (Datare)	text type data, indicating the period/age of the archaeological site	**acdm:temporal**	
N/A	not a field in the database	**acdm:country**	defaul *"Romania"*
N/A		**acdm:from**	
N/A		**acdm:to**	

Original Field	Field Description	ACDM Field	Comment
Localizează pe harta Romaniei	*the field is a link (URL) which goes to Romania's map where the archaeological sites are located. From there information like spatial coordinates can be colected. The coordinates are expressed in degrees, decimals (eg. 21.50501)*	**acdm:spatialLon**	http://map.cimec.ro/Mapserver/?layer=ran&cod=157709.16
Localizează pe harta Romaniei	*the field is acctually a link (URL) who goes to Romania's map ehere the archaeological sites are located. From here there can be colected information like spatialcoordinates. The coordinates are expressed in degrees, decimals (eg. 46.06483)*	**acdm:spatialLat**	http://map.cimec.ro/Mapserver/?layer=ran&cod=157709.16
	it is not a field in the database, this info can be taken from the browser	**dcat:landingPage**	ex. http://ran.cimec.ro/sel.asp?descript=alios-masloc-timis-situl-arheologic-de-la-alios-valea-aliosu-s-cod-sit-ran-157709.16

Original Field	Field Description	ACDM Field	Comment
Instituţia	*a text type field where the institution who delivered the information to cIMEC is specified in order to build the RAN sheet*	**dcterms:publisher**	
		dcterms:contributor	
N/A		**dcterms:creator**	cIMEC - creating, administration and responsability of the RAN sheets who constitute the database are regulated by law
N/A		**acdm:owner**	cIMEC - creating, administration and responsability of the RAN sheets who constitute the database are regulated by law
N/A		**acdm:legalResponsible**	cIMEC - creating, administration and responsability of the RAN sheets who constitute the database are regulated by law
Colectiv	*this field has another three subfields: Name, Surname and Role*	**acdm:scientificResponsible**	

Original Field	Field Description	ACDM Field	Comment
N/A		**acdm:technicalResponsible**	*The technical person responsible is mentioned in the lower part of the webpage, there is no specific field within the sheet*
		acdm:archaeologicalResourceType	
		acdm:nativeSubject	
N/A		**acdm:accessPolicy**	*is regulated by law/copyright of the Ministry of Culture. The content of the app is held and administered by cIMEC/Heritage Institute accordingly to OMCC no.2458/21.10.2014*
N/A		**acdm:accessRights**	*it is regulated by law/copyright of the Ministry of Culture. The content of the app is held and administered by cIMEC/Heritage Institute accordingly to OMCC no.2458/21.10.2014*
		dcterms:rights	
		dcterms:extent	
		dcterms:audience	

7.4 ARUP-CAS database

ARUP-CAS contribution to ARIADNE concerned a database of aerial photographs (AAP) used for archaeological investigation. The AAP database contains more than one thousand images of archaeological sites. The AAP containsa large number of aerial images (c. 20,000) collected during the intensive aerial survey which began immediately after being allowed by the state system and lasts until today. Most of the photographs come from the Prague CAS Institute´s survey activities conducted with its own aircraft. The photographs exist in both analogue and digital form. In 2012-2015, a systematic catalogue of existing photos and corresponding sites was created as part of the Archaeological Map of the Czech Republic project and other collaborating projects on aerial archaeology. Photographs from several other archaeological institutions in Bohemia have also been included. Sites identified from the air as specific marks on crops or soil and many standing historical monuments have been recorded. Aerial photographs can be described and linked to other database objects by means of the specialized AMCR module. The rectification, geo-referencing and vectorisation of selected aerial photos is currently being carried out independently of AMCR activities. A schema of the AAP database is provided in figure below.
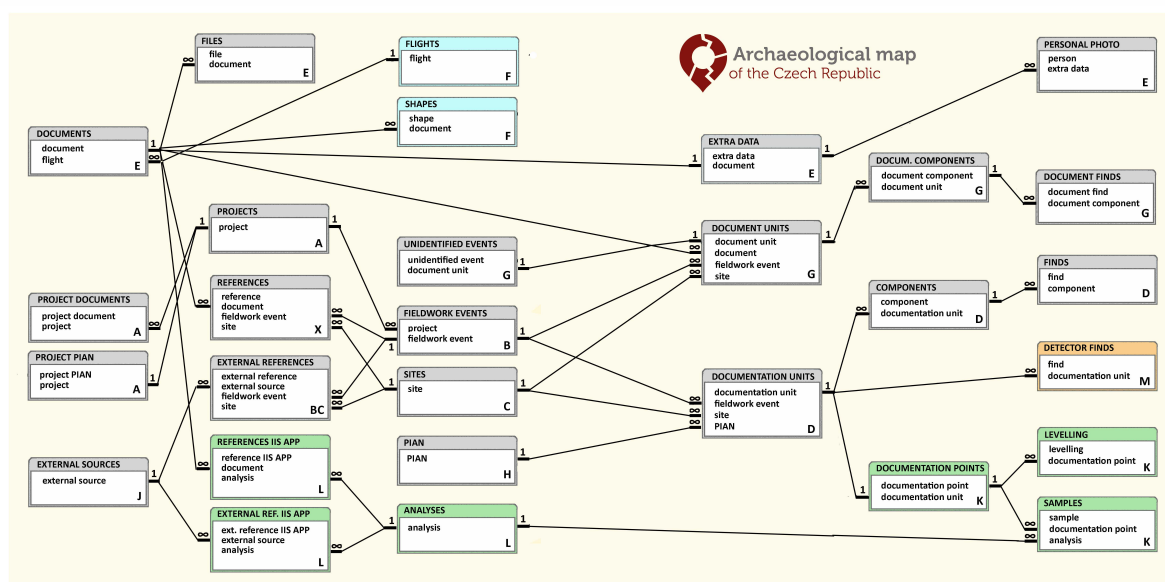

Figure 3: ARUP-CAS IAP Aerial Images database schema

Details of the IAP database fields and the way they were mapped to ACDM are provided in the table below.

ACDM	Aerial_Images Database Fields
dcterm:title	LOKALITA.NAZEV (name of site)
dcterms:ispartof	Archive of Aerial Images
dc:description	DOKUMENT.IDENT_CELY (document ID)
	LOKALITA.KATASTR (cadaster)
	LOKALITA.DRUH (type of site)

ACDM	Aerial_Images Database Fields
dcterms:issued	EXTRA_DATA.DATUM_VZNIKU (date of acquisition)
dcterms:modified	DOKUMENT.DATUM_VLOZENI (date of entry)
dcterms:accuralPeriodicity	n/a
acdm:originalID	DOKUMENT.IDENT_CELY
dcat:keyword	LOKALITA.DRUH (type of site)
	TVAR.TVAR (type of shapes – eg. circular cropmarks etc.)
	KOMPONENTA_DOK.AREAL (type of activity area)
dc:language	DOKUMENT.JAZYK_DOKUMENTU
acdm:temporal	KOMPONENTA_DOK.OBDOBI (period/culture)
acdm:country	Czech Republic
acdm:From	Derived from period (KOMPONENTA_DOK.OBDOBI)
acdm:To	Derived from period (KOMPONENTA_DOK.OBDOBI)
acdm:SpatialLon	PIAN.CENTROID_E (WGS-84 decimal degrees)
acdmSpatialLat	PIAN.CENTROID_N (WGS-84 decimal degrees)
dcat:landingPage	Digital archive (in progress)
acdm:publisher	Institute of Archaeology CAS, Prague
acdm:contributor	DOKUMENT.ODPOVEDNY_PRACOVNIK_VLOZENI (person responsible for data entry)
acdm:creator	DOKUMENT.AUTOR (author)
	DOKUMENT.ORGANIZACE (author organisation)
acdm:owner	DOKUMENT.ORGANIZACE (author organisation)
acdm:legalResponsible	DOKUMENT.ORGANIZACE (author organisation)
acdm:scientificResponsible	DOKUMENT.AUTOR (author)
	DOKUMENT.ORGANIZACE (author organisation)
acdm:technicalResponsible	DOKUMENT.ODPOVEDNY_PRACOVNIK_ARCHIVACE (responsible archiver)
acdm:archaeologicalResourceType	Sites and monuments databases or inventories
acdm:nativeSubject	aerial archaeology images
acdm:accessPolicy	Digital archive (in progress)
acdm:accessRights	DOKUMENT.PRISTUPNOST (user access rights)
dc:rights	Digital archive (in progress)
dcterms:extent	Number of associated files (in the class SOUBORY)
dcterms:audience	professional

7.5 CSIC - Incipit

CSIC has always emphasized the integrated treatment of information. For this reason, standalone datasets have rarely been created; rather, the information generated by most of its projects and work go into a central information system which is linked with previous information, and from where it may be reused by future activities. This central information system is called the SIA+ (Archaeological Information System, enhanced version).

The dataset is stored as a single Microsoft Jet 4 database, which is shared on a file server and used by a collection of server-side software components and client applications, most of which have been developed in house. So far, the dataset has been for internal use at Incipit CSIC only, and as a consequence it is not exposed to the web in any manner. There is no way in which it can be accessed through regular HTTP interfaces. However, CSIC has the infrastructure to build and host them, so this would not be a difficult change to implement, at least from the technical point of view. From a structural point of view, each entity in the SIA+ has a unique code that remains unique across the whole system. The oldest information in the dataset dates back to the late 1980s. The dataset is live, being updated in an ongoing basis. Total current size in its usual format is over 134 MB. Information comes mostly from Galicia (North-West Spain) and surrounding areas, although there is some information from other areas of Spain as well as overseas (e.g. Uruguay). The free text fields of a descriptive nature are written in Spanish. Bits of Galician and other local languages appear now and then as quotations.

CSIC has applied powerful abstraction management techniques from the very beginning, so that end users do not need to worry about data implementation details, focusing instead on information at the conceptual level. For example, most users at Incipit CSIC do not know or care how their data is stored on the computer in terms of tables, fields or data types, or whether there is a relational database or an object-oriented storage engine behind the user interface.

Finally, we often convert subsets of data from the SIA+ for various research or reporting purposes, using XML and other intermediary formats. It was very easy to export or convert parts of the dataset into any XML-based schema once the structure is clearly defined. CSIC has defined a single ACDM record for describing its database, whose details are provided in the table below. Using general knowledge about the database itself rather than specific database fields and values created most of the ACDM information.

Original Field	Field Description	ACDM Field	Comment
PlaceName		**dcterm:title**	
	Database is a unique resource	**dcterms:isPartOf**	
Description	"Archaeological sites of North-West Spain documented by Incipit CSIC during fieldwork in the 1990s and 2000"	**dcterms:description**	
	Last modification date	**dcterms:modified**	

Original Field	Field Description	ACDM Field	Comment
Code		**acdm:originalId**	
	es	**dcterms:language**	
CCA		**acdm:temporal**	
	Spain	**acdm:country**	
UtmX		**acdm:spatialLon**	
UtmY		**acdm:spatialLat**	
		dcat:landingPage	
	CSIC	**dcterms:publisher**	
	Various content providers	**dcterms:contributor**	
	CSIC	**dcterms:creator**	
	CSIC	**acdm:owner**	
		acdm:legalResponsible	
	Cesar Gonzalez-Perez	**acdm:scientificResponsible**	
	Cesar Gonzalez-Perez	**acdm:technicalResponsible**	
Type		**acdm:archaeologicalResourceType**	

7.6 Cyprus Institute - STARC repository

CyI-STARC repository (http://public.cyi.ac.cy/starcRepo) currently contains 16 datasets, which are constantly updated and growing in number. The heterogeneity of the data collection, that includes archaeological sites, museum items, architectural structures and inscriptions, made us to adopt different metadata schema according to the specific needs. In particular we adopted 3 metadata schemas:

1.   STARC metadata schema

2.   Customized LIDO

3.   CyInscription metadata schema.

7.6.1   STARC metadata schema

The majority of available metadata schema standards have not been developed to describe digital media files, such as 3D objects. Datasets produced by STARC team refer mostly to 2D and 3D archaeological data. To fully describe the data produced and respond to the needs of the STARC research group, an internal metadata schema (STARC metadata schema) was developed.

The schema is mostly based on LIDO (www.lido-schema.org) and CARARE (www.carare.eu) and is CIDOC-CRM compliant.

The STARC metadata schema has a global wrapper named PROJECT, sub-divided into four conceptual areas:

1. General Information: it gives synthetic information about administrative data, language and date of creation of the metadata entry, as well as a short description, including the source area and dating of the cultural heritage it refers to.

2. Cultural Heritage Asset: this area contains detailed information about the cultural heritage that the metadata refers to, namely precise source location (coordinates) and dating, a description of its appearance and history, and the rights of the resource.

3. Digital Resource Provenance Data: it gives detailed information on the digital data acquisition process. It provides information about the operators and the device employed (e.g. camera model, serial number, etc.). Also, it describes the acquisition procedure including the instrumentation settings (e.g. focal length, exposure time etc.).

4. Digital Resource: it describes the post-processing methods, including the software used, the data format and weight, and the rights of the digital product.

7.6.2   Customized LIDO

STARC repository also stores the collection of icons of the Byzantine Museum in Nicosia, the collection of artworks of the Art Gallery in Nicosia, the IX-XX century photographic dataset from the private collection Der Avedissian-Hawley and a collection of ancient books.

The items in this case are described through a customized LIDO metadata schema. The artefacts are described through title, ID number, date, technical details (e.g. dimension, material etc.), location, short description and rights as well as the link to the page in which the digital resource is stored, together with its rights. The schema supports multilingual resources (specifically English and Greek).

7.6.3   CyInscription metadata schema

CyI-STARC has developed a metadata schema to describe the corpus of Ancient Cypriot literary inscriptions. Traditional schemas, like EpiDoc, the most used by the epigraphist community, are focused on the epigraph itself. Instead, the CyInscription metadata schema, integrates multidisciplinary information regarding the objects and also their digital "surrogate" (3D models, photographic documentation, digital texts, transliterations, videos, audios, etc.). The schema is organized in groups corresponding to different research domains divided in wrappers and sub-wrappers.

1. Project Information: gives information about the administrative data of the project, language and date, as well as a short description.

2. Real World Object collection: this wrapper contains detailed information about the cultural heritage the metadata refers to. Specifically, it describes the inscription along with all the information related (the description of the inscription as text and the support of the inscription), location (coordinates) and dating, and the rights of the resource.

3. Digital Resource Provenance: it gives detailed information on the digital data acquisition process, the data processing and the description of the digital outcome (2D and 3D) along with its description and rights.

4. Activity: it gives information about all the activities which have occurred and the relations with other resources of the collection.

Details on the ACDM mappings performed by Cyprus Institute are shown in the following table:

Original Field	Field Description	ACDM Field	Comment
General Information / Collection	nome of the collection	**dcterm:title**	
		dcterms:isPartOf	
General Information / Description	description of the dataset and of the specific item	**dcterms:description**	
General Information /creation_date	date of the creation of the entry	**dcterms:issued**	
		dcterms:modified	
		dcterms:accrualPeriodicity	
		acdm:originalId	
		dcat:keyword	This field was filled according to the dataset contents
General Information / Language	language of the dataset	**dcterms:language**	
Cultural heritage asset / start_date and end_date	dating of the cultural heritage	**acdm:temporal**	
Cultural heritage asset / Location_name	geographical position of the cultural heritage	**acdm:spatial**	
		acdm:from	
		acdm:to	
Cultural heritage asset / x	coordinate of the cultural heritage	**acdm:spatialLon**	

Original Field	Field Description	ACDM Field	Comment
Cultural heritage asset / y	coordinate of the cultural heritage	**acdm:spatialLat**	
Cultural heritage asset / IsShownAt	link to the landing page	**dcat:landingPage**	
General Information / Source		**dcterms:publisher**	
General Information / Rights		**dcterms:contributor**	
General Information / Source		**dcterms:creator**	
Cultural heritage asset / Rights		**acdm:owner**	
Digital resources / Rights		**acdm:legalResponsible**	
Digital resources / Rights		**acdm:scientificResponsible**	
Digital resources / Rights		**acdm:technicalResponsible**	
		acdm:archaeologicalResourceType	This field was filled in according to the dataset contents
		acdm:nativeSubject	This field was filled in according to the dataset contents and to the Getty Research Institute, Art & Architecture Thesaurus Online [http://www.getty.edu/research/tools/vocabularies/aat/]
		acdm:accessPolicy	
Digital resources / Rights		**acdm:accessRights**	

Original Field	Field Description	ACDM Field	Comment
General Information / Rights		**dcterms:rights**	
		dcterms:extent	

7.6.4   Mappings to CIDOC-CRM

A mapping of STARC metadata to CIDOC-CRM was attempted within the project. A first version of the mapping was presented at the Annual Conference on Computer Applications and Quantitative Methods in Archaeology in Oslo (CAA2016).

7.6.5   CyI services for ARIADNE

The ARIADNE portal makes it possible to access the STARC repository. It is possible to directly access all the datasets by searching through various fields available in the source collection:

•   Identication number

•   Language

•   Resource type

•   Keywords

•   Date

•   Place

•   Publisher

•   Issued date (this field is missing in the items of the "Byzantine Museum collection")

•   Creator

•   Contributors

All the datasets are shortly described.

The datasets are also divided and identified by different icons according to the group they belong to:

•   fieldwork archives,

•   artefact databases or image collections,

•   sites and monuments databases or inventories

All resources are precisely located on a map and time-line.

7.7   DAI datasets

The German Archaeological Institute (DAI) maintains a large aracheological database called iDAI.obejcts Arachne. We have mapped datasets from several Arachne categories to ARIADNE, namely:

- Topographie (eng. Topography, http://arachne.dainst.org/category/?c=topographie): Arachne's most granular object unit, which is the superior context for all related classes, which includes landscapes, sites, and part of sites.

- Bauwerke (eng. Buildings): This class comprises buildings and monuments, which forms a context for single object records and could be part of a larger site.

- Mehrteilige Denkmäler (aka Gruppen, eng. Multipart monuments): All kinds of groups, which are not buildings and topographic units, are subsumed into multipart monuments, e.g. groups of statues, graveyards, hoards.

- Sammlungen (eng. Collections): Private and museum collections belong to this class.

- Bücher (eng. Books): Digital reproduction, characterisation and context of classical study prints from the 16th to 19th century.

- Inschriften (eng. Inscriptions): This class contains inscriptions and epigraphs depicted on objects.

Since the datasets in Arachne are contextualised and highly connected, the best correspondences for these categories in the ACDM data model were:

- Bauwerk, Gruppen, Topographie: Sites and monuments databases or inventories
- Buch, Inschrift, Sammlungen: Artefact databases or image collections

For inscriptions and digitised books DAI has created two separate umbrella collections in the ARIADNE registry.

The mapping process was mainly straightforward. A problem on the Arachne side was that the most complete data for digitised books comes in a different format than the other categories. A problem on the ACDM side was the very specific date format where the precise day needed to be specified, and this information was simply not available for DAI data.The mapping blueprints for the categories and the corresponding conversion script can be found at https://github.com/dainst/arachne-oai-pmh-scripts/tree/master/ariadne.

DAI mapping activities are detailed in the following table.

Original Field	Field Description	ACDM Field	Comment
KurzbeschreibungBauwerk etc., InschriftOhneKlammern		**dcterm:title**	books: separate titles
"Arachne"		**dcterms:isPartOf**	inscriptions: the carrier
"database of objects that are part this group" etc., Inschrift		**dcterms:description**	books: separate descriptions
creation		**dcterms:issued**	
last_modified		**dcterms:modified**	
		dcterms:accrualPeriodicity	
http://arachne.dainst.org/entity/[ArachneEntityID]		**acdm:originalId**	
"Archaeology"		**dcat:keyword**	

Original Field	Field Description	ACDM Field	Comment
"de"		**dcterms:language**	books: separate language info
		acdm:temporal	
->ort.Country		**acdm:country**	ort connected via Gazetteerid
->datierung.[date from several fields], sammlungen.EntstehungDatum		**acdm:from**	Datierung connected via foreign key
->datierung.[date from several fields]		**acdm:to**	Datierung connected via foreign key
		acdm:spatialLon	
		acdm:spatialLat	
http://arachne.dainst.org/entity/[ArachneEntityID]		**dcat:landingPage**	
"German Archaeological Institute"		**dcterms:publisher**	
KorrektorBauwerk etc.		**dcterms:contributor**	
BearbeiterBauwerk etc.		**dcterms:creator**	
"German Archaeological Institute"		**acdm:owner**	
"German Archaeological Institute"		**acdm:legalResponsible**	
"German Archaeological Institute"		**acdm:scientificResponsible**	
"German Archaeological Institute"		**acdm:technicalResponsible**	
		acdm:archaeologicalResourceType	
buch.classification, bauwerk.Gebaeudetyp, TopographieTypus, Sammlungskategorie, ArtDerGruppe		**acdm:nativeSubject**	default is the category name
"http://arachne.dainst.org/info/order"		**acdm:accessPolicy**	
"CC BY-NC-ND 3.0"		**acdm:accessRights**	
"German Archaeological Institute"		**dcterms:rights**	

Original Field	Field Description	ACDM Field	Comment
(number of objects)		**dcterms:extent**	
		dcterms:audience	

7.7.1 CIDOC CRM mapping

Arachne has a detailed CIDOC CRM mapping for most of its categories (see https://arachne.dainst.org/categories). The mapping is available via an OAI-PMH interface (http://arachne.uni-koeln.de/OAI-PMH/oai-pmh.xml?verb=Identify).

In addition, DAI pursued an experiment on the tight integration of detailed descriptions of single items of research. We describe a practice-oriented approach to dealing with heterogeneous data with the help of Semantic Web technologies, and presented a specific use case about sculptures and integrating archeological finds from various databases, including Arachne.

7.7.2 iDAI.objects Arachne

Arachne is the central Object database of the DAI and the Archaeological Institute of the University of Cologne.

Arachne is intended to provide archaeologists and Classicists with a free internet research tool for quickly searching hundreds of thousands of records on objects and their attributes. This combines an ongoing process of digitising traditional documentation (stored on media which are both threatened by decay and largely unexplored) with the production of new digital object and graphic data. Wherever possible, Arachne follows a paradigm of highly structurized object-metadata which is mapped to the CIDOC-CRM, to address machine-readable metadata strategies of the Semantic Web. This "structured world" of Arachne requires large efforts in time and money and therefore is only possible for privileged areas of data. While on the ever-increasing range of new, digitally born data, in reality only a small effort-per-object ratio can be applied. It therefore requires a "low-threshold" processing structure which is located in the "unstructured world" of Arachne. All digital (graphic and textual) information is secure on a Tivoli Storage System (featuring long-term multiple redundandancy) and distributed online through the Storage Area Network in Cologne via AFS.

Homepage: http://arachne.dainst.org

7.7.3 iDAI.vocab

The new DAI Thesaurus of Archaeological Concepts was designed from the onset as a thesaurus of German words and phrases with massive multilingual support. The core of our thesaurus is a list of concepts related to the domain of archaeology (nouns, verbs, less frequently adjectives, but also complex phrases that point to a specific object, such as "carrarischer Marmor") all linked to the corresponding translations in a wide spectrum of different languages; we also purposed to establish a minimal set of relations between the German terms (synonyms, direct hyper- and hyponyms), and to group the equivalent terms together; whenever it is possible, we intended also to resolve equivalent terms by selecting one preferred concept. In addition we connect our terms and concepts by SKOS-links to external thesauri like the Arts & Architecture Thesaurus of the Getty Institution.

Homepage: http://archwort.dainst.org/thesaurus/de/vocab/index.php

7.7.4   IDAI.gazetteer

The DAI, together with the Cologne Digital Archaeology Laboratory is developing the iDAI.gazetteer - a web service connecting toponyms with coordinates. It was initially built as an authority file / controlled vocabulary for any geo-related information in information systems of the DAI. Furthermore it is meant to link these data with other worldwide gazetteer-systems.

Homepage: http://gazetteer.dainst.org/

7.7.5   DAI subjects

The IT infrastructure of the DAI contains many different subject specific information systems, e.g. for excavations and surveys (iDAI.field), objects and publication of data (Arachne), bibliographical information (Zenon) and digitised books (iDAI.bookbrowser). While places are already centralised structures within the iDAI.gazetteer (http://gazetteer.dainst.org/) and all information systems refer to the gazetteer, each of the systems has their own vocabulary for describing the stored objects. At the moment work is ongoing to harmonise the different DAI thesauri into one common standard in iDAI.vocab (http://archwort.dainst.org/).

For the mapping activities in ARIADNE, the relevant vocabulary categories of the object database Arachne were chosen, as Arachne contains, in contrast to iDAI.field, with more than 3.6 million datasets, a large amount of data which is openly available. The vocabulary of the following categories were mapped to Getty AAT:

- Topographie: 55 values mapped to Getty AAT from 2 different value lists
- Bauwerke: 176 values mapped to Getty AAT from 4 different value lists
- Mehrteilige Denkmäler: 108 values mapped to Getty AAT from 6 different value lists
- Sammlungen: 11 values mapped to Getty AAT from 2 different value lists
- Bücher: 17 values mapped to Getty AAT from 3 different value lists
- Inschriften: 19 values mapped to Getty AAT from 1 value list.

7.8   DANS datasets

7.8.1   DCCD top level collection

The following table shows details concerning the mapping between DANS DCCD Dendrochronology data model and the ACDM, both for automatic mapping via OAI-PMH and for 'manual' entry into the registry. In particular, the table describes the top level collection valid for all DCCD datasets. Specific usage notes and detailed comments for each DCCD entity mapping are provided in the related columns.

Attribute	Usage Notes	DCCD	Comment
dct:title		DCCD: Digital Collaboratory for Cultural Dendrochronology	
dct:description		DCCD stands for Digital	

Attribute	Usage Notes	DCCD	Comment
		Collaboratory for Cultural Dendrochronology and is an initiative of DANS (Data Archiving and Networked Services) and the RCE (Cultural Heritage Agency of the Netherlands). This international digital data library of annual growth ring data contains digital growth ring series and mean chronologies, as well as their descriptive and interpretative metadata. The content is developed by research from archaeological sites (including old landscapes), shipwrecks, buildings, furniture, paintings, sculptures and musical instruments. The archive contains data from European institutes.	
dct:issued	Date of formal issuance (e.g., publication) of the resource.	*2009*	*The date DCCD repository started?*
dct:modified	Most recent date on which the resource was changed, updated or modified.	*2015-11*	*The date this information is modified, and not about the content of the collection*
acdm:originalId	The original identifier of the resource supplied by the content provider	*dccd*	*use this in content isPartOf*
dct:identifier	The ARIADNE identifier that will be computed from the original. This could look like: www.ariadne.eu +		*Generated by the registry*

Attribute	Usage Notes	DCCD	Comment
	prefix of the provider + ID of the resource		
dcat:keyword		*Dendrochronology, Archaeology, Climatology, Wood, Dating*	
dct:language	If the resource is multilingual, more than one value must be given for this property	*nl, en, du, fr*	*Multiple entries, for the main languages of our datasets*
dcat:landingPage	A Web page that can be navigated to in a Web browser to gain access to the dataset, its distributions and/or additional information.	*http://dendro.dans.knaw.nl*	*No https needed*
dcat:contactPoint	Link an Archaeological Resource to relevant contact information which is provided using VCard [vcard-rdf].	*Prof.dr. E. Jansma (project leader)* *Cultural Heritage Agency (Rijksdienst voor het Cultureel Erfgoed)* *PO Box 1600* *NL-3800 BP Amersfoort* *The Netherlands* *E-mail: e.jansma@cultureelerfgoed.nl*	*Use contact info from website.* *Vcard?*
acdm:accessPolicy	URI to statement of policy (typically, on an organization's website)	http://dendro.dans.knaw.nl/termsofuse	
dct:accessRights	A statement of any access restrictions on the data resource	The metadata which is free for use and open access is visible to any user who is not logged in. To get access to deeper information levels, user registration is necessary and different levels of access are applicable.	
dct:rights	Information about	http://dendro.dans.kn	

Attribute	Usage Notes	DCCD	Comment
	rights held in and over the data resource	aw.nl/termsofuse	
dct:audience	The primary audience(s) of the resource	Dendrochronologists, Archaeologists, Historians	Focus on the Cultural Heritage.
dct:temporal	See temporalRegion	ALL AAT periods	Note: did use Holocene from AAT, but that is not archaeology proof!
dct:spatial	See spatialRegion	Placename: World, Europe Boundingbox; bounding box of Europe Country: NA Then all countries separate without bounding box? Belgium, Denmark, France, Germany, Latvia, Lithuania, Netherlands, Poland, Spain, United Kingdom	
dct:accrualPeriodicity		NA	
dct:extent	The size of the data resource (i.e., number of items in a collection, number of records in a dataset, etc.)	More then fifty thousand series of tree-ring measurements	Approximate number; at the time of describing this
acdm:archaeologicalResourceType	Associates any archaeological resource with one or more categories (types), drawn from the following list: • Fieldwork archives • Event/intervention resources, such as grey literature reports • Sites and	Scientific datasets	used to be ariadneSubject

Attribute	Usage Notes	DCCD	Comment
	monuments databases or inventories		
	• Scientific datasets, such as databases of radiocarbon dates		
	• Artefact databases, or image collections		
	• Burial databases		

Below are listed associations having the DCCD class as domain:

- **dct:publisher:** DANS (acdm:agentType). Although DANS is not the publisher of each individual dataset, it is nevertheless the publisher of the archive, because it made it available within the catalogue.

- **dct:creator, dct:contributor, acdm:owner:** DANS

- **acdm:nativeSubject:** Dendrochronology

- **acdm:derivedSubject:** AAT http://vocab.getty.edu/aat/300054715

- **dcat:distribution:**

    o **title**: DCCD Archive

    o **issued, modified:** Same as top level collection

    o **dcat:accessURL**: http://dendro.dans.knaw.nl

    o **oai-pmhServerURI**: http://dendro.dans.knaw.nl/oai

    o **publisher**: DANS

7.8.2 DCCD TRiDaS datasets

The table below shows details concerning mapping at dataset level between DANS DCCD Dendrochronology data model the ACDM model. In particular, the table reports all the mappings valid for each DCCD dataset within the TRiDaS (Tree Ring Data Standard) project and the corresponding ACDM entities. Specific usage notes and detailed comments for each DCCD entity mapping are provided in the related columns.

Attribute	Usage Notes	DCCD	Comment

Attribute	Usage Notes	DCCD	Comment
dct:title		title	
dct:description		NA	TRiDaS project description was not open access
dct:issued	Date of formal issuance (e.g., publication) of the resource.	*stateChanged*	*The last modification was when it was archived/publi shed?*
dct:modified	Most recent date on which the resource was changed, updated or modified.	*stateChanged*	*The last modification was when it was archived/ published?*
acdm:originalId	The original identifier of the resource supplied by the content provider	*Sid* *Our internal id that we also use in the URL of the landingpage: the one that starts with "dccd:"* *The record identifier is also our repository specific identifier.* *Also add the TRiDaS project identifier, but that ione is non-prefered!* *ACDM now only allows one! Put the others in keywords!*	*Note that this is original from the ARIADNE viewpoint.* *Where to put the TRiDaS identifiers?* *Maybe in the keywords.* *Could add those, and make them non-preferred!*
dct:identifier	The ARIADNE identifier that will be computed from the original. This could look like: www.ariadne.eu + prefix of the provider + ID of the resource		
dcat:keyword		*Text that we can't map otherwise: identifiers etc. etc*	*Maybe all information we cannot*

Attribute	Usage Notes	DCCD	Comment
			map otherwise
dc:language	If the resource is multilingual, more than one value must be given for this property	*language*	*TRiDaS language, mainly for vocabularies*
dcat:landingPage	A Web page that can be navigated to in a Web browser to gain access to the dataset, its distributions and/or additional information.	*Use sid=* originalId http://dendro.dans.knaw.nl/project/{sid}	*Human readable (html) page, using the persistent identifier and resolver*
dcat:contactPoint	Link an Archaeological Resource to relevant contact information which is provided using VCard [vcard-rdf].	*NA*	*Note that we won't put a person here.*
acdm:accessPolicy	URI to statement of policy (typically, on an organization's website)	Same as for whole collection: http://dendro.dans.knaw.nl/termsofuse	
dct:accessRights	A statement of any access restrictions on the data resource	The permission.defaultLevel	Dataset specific, Note that also restricted to registerred users of the DCCD
dct:rights	Information about rights held in and over the data resource	Same as policy: http://dendro.dans.knaw.nl/termsofuse	Note that the rights holders should be set as owners organisation
dct:audience	The primary audience(s) of the resource	Same as fro whole collection: Dendrochronologists, Archaeologists, Historians	
dct:temporal	See temporalRegion	periodName = We don't have it; instead of 'Not available' use the textual	*We have astro years*

Attribute	Usage Notes	DCCD	Comment
		representation of the period in years: start – end, with BC and AD if needed Note that strictly this is WRONG and we should be able to specify that we don't have it! Better not specify something we don't have, because it depends on the location as well as on th eyeasrs and for dendro we have data from lots of different regions in Europe	
dct:spatial	See spatialRegion	placeName We don't have it but instead of 'Not available' put here a textual reprecsentation of the coordinates; lat, lng Note that strictly this is WRONG and we should be able to specify that we don't have it!	*WGS84*
dct:accrualPeriodicity		NA	
dct:extent	The size of the data resource (i.e., number of items in a collection, number of records in a dataset, etc.)	NA	What would 'records' be in TRiDaS. Maybe number of series. But anyway it is not easily accessible!
acdm:archaeologicalResourceType	Associates any archaeological resource with one or more categories (types), drawn from the following list: • Fieldwork archives	Scientific datasets	used to be ariadneSubject

Attribute	Usage Notes	DCCD	Comment
	• Event/intervention resources, such as grey literature reports • Sites and monuments databases or inventories • Scientific datasets, such as databases of radiocarbon dates • Artefact databases, or image collections Burial databases		

Below are listed associations having the DCCD class as domain:

- **dct:isPartOf:** dccd, the identifier within ACDM for DANS top level collection

- **acdm:publisher:** DANS

- **acdm:owner:** ownerOrganizationId

- **acdm:nativeSubject:** Dendrochronology

- **acdm:derivedSubject:** AAT http://vocab.getty.edu/aat/300054715

- **dcat:distribution:** RESTfull TRiDaS file download URL (non-public)

    o **title***: DCCD Archive*

    o **issued, modified***:* same as toplevel collection

    o **dcat:accessURL***:* the URL with the SID in it

    o **publisher***:* DANS

- **acdm:hasItemMetadataStructure:** TRiDaS metadata format: http://tridas.org/1.2.2/tridas-1.2.2.xsd

- **acdm:hasMetadataRecord:** TRiDaS download URL (the same for data and metadata)

7.8.3   DCCD temporal entities

Temporal intervals and named periods (i.e. acdm:temporalRegion subnodes) for DCCD collection and datasets, with the related usage notes and comments, are provided in the table below.

Attribute	Usage Notes	DCCD	Comments
:periodName		Not available	
:from		timeRange. firstYear	Convert to xs:date
:until		imeRange.lastYear	Convert to xs:date

7.8.4   DCCD spatial entities

Spatial region information (i.e. acdm:spatialRegion subnodes) for DCCD collection and datasets, with the related usage notes and comments, are provided in the table below.

Attribute	Usage Notes	DCCD	Comments
:placeName	A name describing the place	Not available	
:coordinateSystem	The coordinate system used to encode coordinates (e.g. EPSG 2763)	http://www.opengis.net/def/crs/EPSG/0/4326	WGS84
:lat	The Latitude	Location.lat	
:lon	The Longtitude	Location.lng	
:boundingBoxMinLat	The min Lat of the bounding box area	NA	
:boundingBoxMinLon	The min Lon of the bounding box area	NA	
:boundingBoxMaxLat	The max Lat of the bounding box area	NA	
:boundingBoxMaxLon	The max Lon of the bounding box area	NA	
:address	The address name	NA	
:numberInRoad	The number in road	NA	
:postcode	Postcode	NA	
:country	The country of the place	Not available	We have coordinates to lookup in geonames?

7.8.5 DCCD services and schemas in the registry

Services

- ***ServiceForHumans:*** DANS online repository where users can deposit, search and download datasets and related information

WebService

- DANS OAI-PMH endpoint, (via the "'hasAPI' = OAI-PMH" relationship).

StandAloneService

- Source code for the repository, can be downloaded, build and installed from DANS website.

TRiDaS metadata schema

- **title** = TRiDaS

- **description** = The Tree Ring Data Standard

- **dct:identifier** = schema:35 (automatically generated)

- **dct:language** = en

- **dct:landingPage** = http://tridas.org/1.2.2/tridas-1.2.2.xsd

- **foaf:homepage** = http://tridas.org/

- **:standardUsed** = other

TRiDaS data format

- **title** = TRiDaS

- **description** = The Tree Ring Data Standard

- **:characterSet** = UTF-8

- **:XSD** = http://tridas.org/1.2.2/tridas-1.2.2.xsd

- **:expressedIn** = XML

7.8.6 EASY top level collection

The following table shows details concerning mapping between the DANS archaeological information encoded using the EASY Metadata model (EMD, available at https://easy.dans.knaw.nl/schemas/md/emd/2013/11/emd.xsd) and the ACDM model for ingestion into the registry. In particular, the table describes the top level collection valid for all EASY datasets. Specific usage notes and detailed comments for each DCCD entity mapping are provided in the related columns.

Attribute	Usage Notes	DANS	Comment
dct:title		DANS: Data Archiving and	

Attribute	Usage Notes	DANS	Comment
		Networked Services	
dct:description		The e-depot for Dutch archaeology is accommodated at DANS, the national digital research data archive for the Netherlands. A wealth of digital archaeological excavation data such as maps, field drawings, photographs, tables and publications is accessible via EASY, DANS' online archiving (deposit, preservation and reuse) service. DANS operates according to the OAIS model for digital archives and holds the Data Seal of Approval, the internationally recognized quality mark for trusted digital repositories.	
dct:issued	Date of formal issuance (e.g., publication) of the resource.	*2006*	*The date easy started*
dct:modified	Most recent date on which the resource was changed, updated or modified.	*2015-11*	*The date this information is modified, and not about the content of the collection*
:originalId	The original identifier of the resource supplied by the content provider	*easy-collection:4*	*use this in content isPartOf*
dct:identifier	The ARIADNE identifier that will be computed from the original. This could look like: www.ariadne.eu + prefix of the provider + ID of the resource		*Generated by the registry*
dcat:keyword		*Archaeology, Excavation, Survey, Report*	
dct:language	If the resource is multilingual, more than one value must be given	*nl, en*	*Multiple entries, for the main languages of our datasets*

Attribute	Usage Notes	DANS	Comment
	for this property		
dcat:landingPage	A Web page that can be navigated to in a Web browser to gain access to the dataset, its distributions and/or additional information.	*http://easy.dans.knaw.nl*	*No https needed.* *Note that it would be nice if we could restrict to archaeology with the url.*
dcat:contactPoint	Link an Archaeological Resource to relevant contact information which is provided using VCard [vcard-rdf].	*Data Archiving and Networked Services (DANS)* *PO Box 93067 | 2509 AB Den Haag The Netherlands* *E-mail:* info@dans.knaw.nl	Use contact info from website. vcard?
:accessPolicy	URI to statement of policy (typically, on an organization's website)	http://dans.knaw.nl/en/about/organisation-and-policy/legal-information	
dct:accessRights	A statement of any access restrictions on the data resource	Metadata (the content of all fields under the "Description" tab in every dataset in EASY, the online archiving system of DANS) is free for use and open access. However the data itself has conditions for use and license agreements. The user should, particularly upon distribution or disclosure, respect any copyrights and/or database rights on the dataset. This does not apply to data files deposited under the CC Zero Waiver.	
dct:rights	Information about rights held in and over the data resource	http://dans.knaw.nl/en/about/organisation-and-policy/legal-information	
dct:audience	The primary audience(s) of the resource	Archaeologists, Researchers, Policy makers and General public	
dct:temporal	See temporalRegion	Sequence of ALL ABR main Periods!	
dct:spatial	See spatialRegion	Placename: World, Europe, The Netherlands.	

Attribute	Usage Notes	DANS	Comment
		Boundingbox: Netherlands bounding box Country: The Netherlands	
dct:accrualPeriodicity		NA	
dct:extent	The size of the data resource (i.e., number of items in a collection, number of records in a dataset, etc.)	Thousands of Reports and Excavation archives	Approximate number; at the time of describing this
archaeologicalResourceType	Associates any archaeological resource with one or more categories (types), drawn from the following list: • Fieldwork archives • Event/intervention resources, such as grey literature reports • Sites and monuments databases or inventories • Scientific datasets, such as databases of radiocarbon dates • Artefact databases, or image collections • Burial databases	*= Fieldwork databases, Event/interventions*	used to be ariadneSubject

Below are listed associations having the EASY collection as domain:

- **dct:publisher, dct:contributor, dct:creator, acdm:owner, acdm:technicalResponsible:** DANS
- **acdm:nativeSubject:** Archaeology
- **acdm:derivedSubject:** AAT http://vocab.getty.edu/aat/300054328

- **dcat:distribution (issued, modified):** *same as top level collection*

- *dcat:accessURL: https://easy.dans.knaw.nl*

- *oai-pmhServerURI: https://easy.dans.knaw.nl/oai*

7.8.7   EASY archaeological datasets

The next table contains details concerning mapping at dataset level between the DANS EASY archaeological data model and the ACDM model. EASY datasets are heterogeneous "collections" of files containing reports about archaeological excavations. Many correspond to acdm:textualDocument and others have a specific structure. The field acdm:textualDocuments are detected by inspecting the emd:type/dc:type fields (with eas:scheme='DCMI' and text()='Text') to identify excavation reports. Other datasets not matching these criteria (mostly excavation archives) have been mapped as collections.

Attribute	Usage Notes	DANS	Comment
dct:title		emd:title/dc:title	Also want subtitle as dcterms:alternative. Meanwhile we could map it to dct:description. Appending to the title (wit a colon) gives long titles.
dc:description		emd:description/dc:description And also dcterms:abstractdcterms:tableOfContents	
dct:issued	Date of formal issuance (e.g., publication) of the resource.	*emd:date/*:created*	*Use date Created, because that it the publication date!*
dct:modified	Most recent date on which the resource was changed, updated or modified.	*emd:date/*:created* *Note: was* *emd:date/eas:dateSubmitted*	*Should be date published, but that is date created, see above!*
:originalId	The original identifier of the resource supplied by the content provider	*emd:identifier/dc:identifier* *Only the one with eas:scheme='DOI' or ' DOI_OTHER_ACCESS'. This is the most important, persistent, and therefore preferred one.*	*We also have a lot of other ids like ISSN.*

dct:identifier	The ARIADNE identifier that will be computed from the original. This could look like: www.ariadne.eu + prefix of the provider + ID of the resource		
dcat:keyword		*Text that we can't map otherwise.* *Subjects:* *not in the Vocabulary* *=> Not @eas:scheme='ABR' and @eas:schemeId='archaeology.dc.subject'* *Spatial:* *Without coordinate that we can map =>* *not(emd:coverage/eas:spatial/eas:point/@eas:scheme='RD* *Identifiers:* *Non-DOI=>* *not(@eas:scheme='DOI' or @eas:scheme='DOI_OTHER_ACCESS')*	
dc:language	If the resource is multilingual, more than one value must be given for this property	*emd:language/dc:language*	
dcat:landingPage	A Web page that can be navigated to in a Web browser to gain access to the dataset, its distributions and/or additional information.	*Use the PID, see* originalId *and the resolver URL* *Should be DOI resolver!!!!*	*AANPASSEN* *Human readable (html) page, using the persistent identifier and resolver*
dcat:contactPoint	Link an Archaeological Resource to relevant contact information which is provided using VCard [vcard-rdf].	*Data Archiving and Networked Services (DANS)* *PO Box 93067	2509 AB Den Haag The Netherlands* *E-mail:* info@dans.knaw.nl	*Same as for DANS toplevel collection*

:accessPolicy	URI to statement of policy (typically, on an organization's website)	Zelfde als voor de hele collective: http://dans.knaw.nl/en/abo ut/organisation-and-policy/legal-information	
dct:accessRights	A statement of any access restrictions on the data resource	emd:rights/dcterms:accessRi ghts Note that the codes (like GROUP_ACCESS) are translated to a human readable text	Dataset specific, maybe a URL, would be better?
dct:rights	Information about rights held in and over the data resource	Same as for the whole collection. Note that it was: emd:rights/dc:rights	Note that the rights holders are presented as owners
dct:audience	The primary audience(s) of the resource	Archaeologists	
dct:temporal	See temporalRegion	emd:coverage/dcterms:tem poral With ABR, map to years and period name	*Map to from- to years, as specified by ABR-Period,* *And if it's not in the ABR, put in keywords*
dct:spatial	See spatialRegion	emd:coverage/eas:spatial map eas:point and eas:box to coordinates in WGS84	*Map address names etc. in emd:coverage/dcterms:spati al to keywords!*
dct:accrualPeriodic ity		NA	
dct:extent	The size of the data resource (i.e., number of items in a collection, number of records in a dataset, etc.)	NA	Maybe number of files is in the EMD (internally), but not exposed via OAI. But anyway it is not easily accessible!
archaeologicalReso urceType	Associates any archaeological resource with one or more categories (types), drawn from the	emd:type/dc:type if eas:scheme='DCMI' and text()='Text' then 'Event/interventions' otherwise 'Fieldwork	

	following list: • Fieldwork archives • Event/intervention resources, such as grey literature reports • Sites and monuments databases or inventories • Scientific datasets, such as databases of radiocarbon dates • Artefact databases, or image collections • Burial databases	databases' (most likely Dataset)	

Below are listed associations having the EASY datasets as domain:

- **acdm:publisher:** DANS

- **acdm:contributor:** emd:contributor/dc:contributor

- **acdm:creator:** emd:creator/dc:creator and emd:creator/eas:creator

- **acdm:owner:** emd:rights/dcterms:rightsHolder

- **acdm:nativeSubject:** emd:subject/dc:subject with eas:scheme='ABR' and eas:schemeId='archaeology.dc.subject'

- **acdm:derivedSubject:** AAT http://vocab.getty.edu/aat/300054328

- **dcat:distribution:**

    o **title**: *DANS Easy Archive*

    o **dcat:accessURL**: *the URL with the specific DOI*

    o **publisher**: *DANS*

- **acdm:hasItemMetadataStructure:** http://easy.dans.knaw.nl/schemas/md/emd/2012/11/emd.xsd

- **acdm:hasMetadataRecord:** https://easy.dans.knaw.nl/ui/?wicket:interface=:3:tabs:panel:downloadPanel:download_xml ::IResourceListener::

7.8.8   EASY temporal entities

In the table below, EASY temporal entities are represented. An instance of this class is a temporal region of one of two forms: a temporal interval (*e.g.*, from 155 BC to 243 AD) or a named period (*e.g.*, Neolithic). In the former case, the extremes of the interval are given as values of the :from and :to attributes. In the latter case, the named period is given as value of the :periodName attribute.

- In the case where BC dates have to be supplied, a minus (-) sign could be used as indicated in the expanded year representation of ISO 8601 (http://www.iso.org/iso/catalogue_detail?csnumber=40874).

- In the case where reduced precision must be applied (e.g. where no day information is available) the respective part could be omitted (according to ISO 8601 reduced precision guidelines).

Attribute	DANS	Comments
:periodName	skos:Concept with the about attribute referring to the RCE URI and the prefLabel sldo from the ABR+	*Map to from- to years, as specified by ABR-Period,* *And if it's not in the ABR, just copy the string?*
:from	Use ABR	Convert years to xs:date
:until	Use ABR	Convert years to xs:date

7.8.9   EASY spatial entities

The next table shows EASY Spatial entities. An instance of this class is a spatial region of one of four forms: a region identified by latitude and longitude expressed via the :lat and :lon attributes, respectively; a bounding box identified by four vertices (expressed via the :boundingBoxMinLat, :boundingBoxMinLon, :boundingBoxMaxLat and :boundingBoxMaxLon attributes); a postal address (expressed via the :address, :numberInRoad, :postcode and :country attributes); a named place (expressed via the :placeLabel attribute). Most of the original information was is in RD format and converted to WGS84.

Attribute	Usage Notes	DANS	Comments
:placeName	A name describing the place	Concatenate all values of emd:coverage/ dcterms:spatial	
:coordinateSystem	The coordinate system used to encode coordinates (e.g. EPSG 2763)		WGS84
:lat	The Latitude		
:lon	The Longtitude		
:boundingBoxMinLat	The min Lat of the bounding box area		
:boundingBoxMinLon	The min Lon of the bounding box area		
:boundingBoxMaxLat	The max Lat of the bounding box		

Attribute	Usage Notes	DANS	Comments
	area		
:boundingBoxMaxLon	The max Lon of the bounding box area		
:address	The address name		
:numberInRoad	The number in road		
:postcode	Postcode		
:country	The country of the place	Defaults to 'The Netherlands'	This is NOT always correct!

7.8.10 EASY services and schemas

Services:

- **ServiceForHumans***:* This is DANS online repository where deposit, search and download can be performed

- **WebService***:* 'hasAPI' = OAI-PMH

Metadata Schema

- **title**: EMD

- **description:** easymetadata

- **dct:identifier:** schema:36 (automatically generated)

- **dct:language**: en

- **dct:landingPage:** https://easy.dans.knaw.nl/schemas/md/emd/2013/11/emd.xsd http://easy.dans.knaw.nl/easy/easymetadata/ https://easy.dans.knaw.nl/schemas/index.xml

- **:standardUsed**: Dublin Core

Vocabulary

- **ArcheoComplexTypes**

- **Uploaded SKOS:** ArcheoComplexTypes.xml

- **dct:identifier**: voc:35 (automatically generated)

- **status**: draft

- **dct:language**: nl

- **URL:** https://easy.dans.knaw.nl/schemas/vocab/2012/10/abr-type.xsd

Vocabulary

- **ArcheoPeriods**

- **status**: draft

- **dct:language:** nl

- **Uploaded SKOS**: ArcheoPeriods.xml

Distribution (Service)

- **DANS Web Portal**

- **Title** = DANS Web Portal

- **dct:description** = EASY online archiving system

- **dcat:accessURL** = https://easy.dans.knaw.nl/

EASY OAI-PMH (Service)

- **Title** = EASY OAI-PMH

- **dct:description** = EASY OAI-PMH Endpoint

- **dcat:accessURL** = http://easy.dans.knaw.nl/oai/

7.9 Discovery datasets

Datasets contributed to the ARIADNE registry by the Discovery Programme were ingested using MS Excel files, or manually through the registry web tool. The majority of the datasets were originally recorded using the Qualified Dublin Core metadata schema. For those in other formats (e.g. INSPIRE) the Discovery Programme undertook mapping to the ACDM. Datasets were prepared manually for each collection using the Excel template available via the ARIADNE registry. In most cases some additional metadata had to be supplied for the specific demands of the ACDM model.

7.9.1 DataResource – Collection

The Leo Swan Aerial Photographic Archive, the Discovery Programme Image Collection and the Hanson/Oltean Archaeological Aerial Archive of Romania are collections available online which use the Omeka content management and web publishing system. Although the system allows an OAI-PMH harvest for individual records, these datasets were considered more suitable to be ingested at collection level to the ARIADNE registry. The collections conformed to the Qualified Dublin Core metadata schema and were ingested using the web registry tool manually before being harvested to the MORe aggregation tool. The table below describes Dublin Core mapping of a DataResource – Collection to ACDM. Since DCAT (on which ACDM is based) borrows extensively from Dublin Core, mapping was relatively straightforward.

Dublin Core	ACDM
dc:title	**dct:title**
dc:description	**dct:description**
dcterms:issued	**dct:issued**

Dublin Core	ACDM
dcterms:modified	**dct:modified**
dc:identifier	**acdm:originalid**
[Defined by Discovery at ingestion time]	**dct:identifier**
dc:subject	**dcat:keyword**
dc:language	**dct:language**
dcterms:temporal	**dct:temporal**
dcterms:spatial	**dct:spatial**
dcterms:accrualPeriodicity	**dct:accrualPeriodicity**
[Defined by Discovery at ingestion time]	**dct:landingPage**
dc:publisher	**dct:publisher**
dc:creator	**dct:creator**
dcterms:rightsHolder	**acdm:owner**
dcterms:rightsHolder	**acdm:legalResponsible**
dcterms:rightsHolder or dc:creator	**acdm:scientificResponsible**
dcterms:rightsHolder or dc:creator	**acdm:technicalResponsible**
[Defined by Discovery at ingestion time]	**acdm:archaeologicalResourceType**
dc:subject	**dct:subject**
[Defined by Discovery at ingestion time]	**acdm:accessPolicy**
dcterms:accessRights	**dct:accessRights**
dc:rights	**dct:rights**
dcterms:extent	**dct:extent**
dcterms:audience	**dct:audience**
[Defined by Discovery at ingestion time]	**acdm:hasItemMetadataStructure**
[Defined by Discovery at ingestion time]	**acdm:hasMetadataRecord**
dcterms:isPartOf	**dct:isPartOf**
[Defined by Discovery at ingestion time]	**acdm:Distribution**

7.9.2 Archaeological Survey of Ireland (ASI)

This dataset was received as a CSV file from the National Monuments Service, and contained the dataset of the Archaeological Survey of Ireland. The dataset conforms to the EU INSPIRE directive.[2] As such the dataset was largely concerned with spatial data, which was then supplemented by the Discovery Programme for conformance to the ACDM specification. The CSV file had been exported

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[2] For the Irish INSPIRE geoportal see https://www.geoportal.ie/geoportal/catalog/main/home.page.

from the ArcGIS mapping software and contained the following fields, which could be mapped to the ACDM.

FEATURE CLASS [ArcGIS]	ACDM
ENTITY_ID	**acdm:originalid**
NAT_GRID_E (Irish National Grid- eastings)	**dct:spatial**
NAT_GRID_N (Irish National Grid- northings)	**dct:spatial**
ITM_E (Irish Transverse Mercator-eastings)	**dct:spatial**
ITM_N (Irish Transverse Mercator-northings)	**dct:spatial**
CLASSDESC	**acdm:nativeSubject**
SMRS (Sites and monuments record number)	**acdm:originalid**
TLAND_NAMES (Townland name)	**dct:spatial <acdm:placeName>**
Lat	**dct:spatial <acdm:lat>**
Lon	**dct:spatial <acdm:lon>**
Link	**dct:landingPage**

For the purposes of mapping to the ACDM, it was decided to only use **acdm:placeName**, **acdm:lat** and **acdm:lon** for the **dct:spatial** values as the other spatial references would not be configurable. Once the collection-level record was ingested into the web tool, child records were ingested using an MS Excel file. Most of the additional fields were repeatable, although the title field needed to be concatenated from other fields before ingestion in order to make it clearer to the end user.

7.9.3   3D Icons Project - CARARE

The 3D Icons Project metadata was structured using the CARARE metadata schema. This collection was ingested into the registry using the web tool, as no collection-level record for the dataset existed. When this collection is made available in the registry as a dataset, the collection will likely be ingested using an XML file. The Discovery Programme is currently developing a workflow for mapping the CARARE records to the ACDM, using a service such as the MINT mapping and aggregation tool.

7.9.4   WODAN, MAPPING DEATH and TII Excavation Reports

The Discovery Programme is currently configuring two further databases, WODAN and Mapping Death, for ingest into the ARIADNE registry. In addition to this, the Discovery Programme is collaborating with Transport Infrastructure Ireland [TII] to include a collection of grey literature (mainly excavation reports) in the ARIADNE registry. Metadata has been recorded in Qualified Dublin Core and is available in both MS Excel and XML files.

7.9.5   Irish Monuments vocabulary AAT mapping

The most detailed classification system available for Irish Monument types is the class list developed by the National Monuments Service [NMS]. This is a flat/simple hierarchical list which was used in the classification of sites and monuments that formed part of the Archaeological Survey of Ireland [ASI], which was established to compile an inventory of the

known archaeological monuments in the State. The information is stored in a database and a series of paper files that collectively form the ASI Sites and Monuments Record (SMR). Each site/monument has a unique SMR number which greatly facilitates the creation of Linked Data and each site/monument is given a classification based on the NMS class list. The class list consists of a site or monument classification (e.g. armorial plaque) with an associated scope note which details the site/monument features (For example: 'A stone tablet or slab bearing a coat of arms, sometimes accompanied by a date and/or inscription. This term is not used for memorials of the dead found in churches, for which see 'Wall monument'. or These date from the late medieval or post-medieval periods (c. 1400-1600 AD) onwards.') The development of the list was an organic and evolving process and the list is subject to review with amendments made on an on-going basis.

This was undertaken by the Discovery Programme in order to map the subject classifications in the NMS list to the Getty AAT. This was done for each term by comparing the scope notes of the NMS class list to the notes field of the AAT Online. This automatically introduces a level of subjectivity which was countered by using an appropriate SKOS mapping property when linking to the target vocabulary [AAT]. Where there was any ambiguity about the term, broader mapping properties were always used.

In certain cases where mappings were difficult and could be more closely related to the FISH Thesaurus of Monument Types, the Vocabulary Matching Tool developed by USW was first used to identify matching terms, which was in turn mapped to the AAT (i.e. a two stage mapping process).

The nature of the classification list of the NMS presented occasional difficulties:

- Some classifications contained highly detailed elements e.g. object terms were refined at term level by their present location [Cist(present location)] or were developed in order to classify idiosyncratic sites [turf stand; watchman's hut-burial ground]

- There was greater congruence between the FISH Monument Type vocabulary and the Irish subject terms enabling greater possibilities to find an exact or close match. In some cases terms had clearly been based on the FISH vocabulary. This was to be expected due to geographical/historical contiguity. For example bullaun stone, for which there are over 1000 currently documented in the ASI, relates more closely to a 'cup-marked stone' in FISH but can only be satisfactorily mapped using two (or more) terms in the Getty AAT [ceremonial objects; mortaria].

- Some terms are not clearly defined in the NMS class list [e.g. settlement platform: 'A raised area, often surrounded by waterlogged or boggy land, which has evidence of former human habitation] which made mapping, even at a high level, difficult.

- Subject definitions often included broad period classifications within the scope note, therefore it was decided not to take this into consideration as period terms could be covered by the Irish Periods Vocabulary. Occasionally terms contained period terms in their term name (e.g. House-16th century; House-16th/17th century) as well as a refining subject element (e.g. House-fortified house) This necessitated both the use of the Irish Periods Vocabulary and/or additional terms from the AAT.

- Some classifications were subdivided (but not hierarchically) into more specific elements (e.g. Ringfort-cashel; Ringfort-rath; Ringfort-unclassified). The granularity of

the terms was conserved by using the appropriate mapping property, in some cases by mapping terms to multiple terms in the target vocabulary.

The mapping process attempted to balance the pressing need to implement Linked Data with the reality that the available vocabulary was rich in detail but lacked a structure that was easily reconciled with standard concepts of controlled vocabularies and indexing. This was largely achieved by multiple mappings to the target vocabulary as well as utilising an intermediate vocabulary which more closely reflected the particular nuances of Irish Monument types.

7.9.6   PeriodO mappings

The within Ireland there is no formally prescribed vocabulary for time period, therefore the Discovery Programme utilised an extended version of the period classification scheme utilised internally by the national monuments services (NMS) of Ireland (NMS time period list ends at 200BP so an additional modern period was added). All time periods have relatively generic names e.g. Early Bronze Age and have dating ranging applicable to Ireland.

The discovery Programmes time period vocabulary was mapped to PeriodO's English-language vocabulary with start_labels and end_labels for each record created and all spatial coverage set to Ireland.

7.10 INRAP

DOLIA [http://dolia.inrap.fr/inrapgestdoc/jsp/index.jsp] is an online system used by INRAP to manage and disseminate scientific documentation. The system, based on the Decalog content management system, Flora (v. 3.1.0), was set up for INRAP between 2008 and 2009. DOLIA employs international library standards, specifically the UNIMARC format. UNIMARC is a European version of MARC standard, a format for the description of items catalogued by libraries, such as books or grey literature. Each field in a MARC record provides particular information about the item the record is describing, such as the author, title, publisher, date, language, media type, etc. This is both a description of a bibliographical object and its contents via a summary of the work and a chronological, thematic and geographical indexation. It is a metadata transmission standard, easily transferable and easily encodable, for example, in Dublin Core format.

DOLIA's data conforms to the ISO2709 standard and can be also easily exchanged via the Z3950 protocol.

The mapping with ACDM was easily done, and an export framework was developed by INRAP to provide content to the ARIADNE registry. The following table documents the various mappings between UNIMARC and ACDM performed by INRAP to make its content available within the ARIADNE infrastructure.

UNIMARC Field	Description	ACDM Field	Type
UNIMARC 200 [$a + $e]		**dcterm:title**	1
"Dolia"		**dcterms:isPartOf**	
UNIMARC 330 [$a]		**dcterms:description**	0 - 1

UNIMARC Field	Description	ACDM Field	Type
UNIMARC 210 [$d]		dcterms:issued	1
UNIMARC 5 (AAAAMMJJhhminminss)		dcterms:modified	1
NULL		dcterms:accrualPeriodicity	
UNIMARC 991 [$a]		acdm:originalId	
UNIMARC 610 [$a]		dcat:keyword	0 - ∞
UNIMARC 101 [$a]		dcterms:language	
UNIMARC 634 [$5]		acdm:temporal	1 - ∞
UNIMARC 102 [$a]		acdm:country	
Mapping PeriodO		acdm:from	
Mapping PeriodO		acdm:to	
Geocoding IGN Lon UNIMARC 901 [$a + $d]		acdm:spatialLon	1 - ∞
Geocoding IGN Lat UNIMARC 901 [$a + $d]		acdm:spatialLat	
URI (http://dolia.inrap.fr/flora/ark: + UNIMARC 991 [$a])		dcat:landingPage	
"Institut national de recherches archéologiques préventives"		dcterms:publisher	1
UNIMARC 210 [$c]		dcterms:contributor	
UNIMARC 700 [$a] + 701 [$a] + 702 [$a]		dcterms:creator	1 - ∞
UNIMARC 801 [$b]		acdm:owner	
UNIMARC 801 [$b]		acdm:legalResponsible	
UNIMARC 700 [$a]		acdm:scientificResponsible	
UNIMARC 700 [$a]		acdm:technicalResponsible	
"Event/intervention resources"		acdm:archaeologicalResourceType	
UNIMARC 606 [$5]		acdm:nativeSubject	1 - ∞
http://www.inrap.fr/Dolia/Annexes/p-17075-Conditions-d-utilisation.htm		acdm:accessPolicy	
"Free access except for attached documents"		acdm:accessRights	
"Scientific"		dcterms:audience	

7.10.1 Terminological resources

The terminological resources mapped to the AAT by Inrap are the PACTOLS thesauri (http://frantiq.mom.fr/thesaurus-pactols)   produced by the archaeological network FRANTIQ (Fédération et ressources sur l'Antiquité) [http://frantiq.mom.fr/] supported by the Centre National de la Recherche Scientifique (CNRS). Inrap used four of the six PACTOLS thesauri for a chronological, geographical and thematic indexing.

The reports, stored in PDF format, are indexed with native subjects inherited by the PACTOLS "Sujets/Subjects" thesaurus. The Dolia catalogue currently uses 1573 terms in the subject metadata on 5149 present in the PACTOLS thesaurus. So the mapping concerns only the indexed terms of the Dolia catalogue. The alignment has been done between those terms and the AAT thesaurus http://vocab.getty.edu/ by using a source term from PACTOLS, a source URI, a target term from AAT and a target URI, specifying the SKOS match. Mapping examples follow:

PACTOLS **term**: Archéologie

PACTOLS **URL:** http://ark.frantiq.fr/ark:/26678/pcrty05M9SVnLu

SKOS match: exactMatch

AAT term: archaeology

AAT URL: http://vocab.getty.edu/aat/300054328

PACTOLS **term:** amphore gauloise

PACTOLS **URL:** http://ark.frantiq.fr/ark:/26678/pcrtiUhJYvi7PG

SKOS match: broadMatch

AAT term: amphorae (storage vessels)

AAT URL: http://vocab.getty.edu/aat/300148696

7.11 MiBACT-ICCU information

This sections documents the activity carried out by ICCU-MiBACT, in particular through the CulturaItalia Portal, the official portal for the Italian cultural heritage world developed by the Italian Ministry of Cultural Heritage. CulturaItalia was developed to promote interoperability of digital content by ensuring the integration, independence and availability of cultural resources. Accessibility of information is realised through its architecture based on international standards such as Dublin Core (DCMI) for interoperability of metadata from the various sectors, OAI-PMH and HTTP for the distribution of information from the integrated databases, XML for data representation, RDF for the publication of Linked Open data. Thanks to these standards CulturaItalia manages and organises heterogeneous information from different cataloguing systems and metadata resources, and makes them accessible via indexes, thematic and geographic query features.

7.11.1 PICO mappings

For compatibility with the choices made in the international arena, and in accordance with the guidelines of the CulturaItalia project for the realisation of the CulturaItalia Portal, metadata integration of external data sources is done by a mapping to a single schema: the PICO Application Profile. This schema is expressed according to the Qualified Dublin Core standard, which has been further extended to define the Application Profile designed for the Portal. Qualified Dublin Core is a

derived version of Simple Dublin Core, encoded by the Dublin Core Metadata Initiative. It includes a set of basic elements with which you can describe any kind of resource. A resource is "anything that has identity." Its basic elements are: Title, Creator, Subject, Description, Publisher, Contributor, Date, Type, Format, Identifier, Source, Language, Relation, Coverage, Rights, to which the other three elements have been added recently: Audience, Provenance and RightsHolder. Qualified Dublin Core, in addition to 18 basic elements, also includes 33-refinement elements and a series of encoding schemas, (ontologies or controlled vocabularies) for interpreting the value of each item on formal or grammatical notations. The PICO Application Profile and schema are accessible through at the following links:

Pico Application Profile:
http://www.culturaitalia.it/opencms/export/sites/culturaitalia/attachments/documenti/picoap/pico ap1.0.xml

PICO XSD Schema:
http://www.culturaitalia.it/opencms/export/sites/culturaitalia/attachments/schemas/1.0/pico.xsd

In general, it was always possible to find one-to-one direct correspondences between PICO and ACDM entities, with some notable exceptions:

In the PICO, the **dc:subject** element can specify:

- A subject or scene represented on or by a given artefact (according, for instance, to traditional iconographic definitions, such as: "Birth of Aphrodite")

- The description of the items in question, i.e. the analytical and literal description of the subject of the item under consideration through the use of standardised iconographic categories and / or decorative apparatus, for example: "CHARACTERS: Aphrodite")

- The topic of the resource in association with specific concepts of the PICO Thesaurus, for example: http://culturaitalia.it/pico/thesaurus/4.1#reperti_archeologici (this is one of the mandatory requirements for the publication of data on the Portal)

For the **dc: title** element the rule for the creation of values in the tag is as follows (ordered by priority):

- Name / dedication, i.e. the historic or traditional name of the artifact, for example: "Amphora of Baratti")

- Title given by the author or traditional name of the subject, for example: "Apollo Belvedere"

- Definition, i.e., word or phrase that identifies the artefact based on the functional and morphological connotations, for example: "urn / cineraria, cover"

Finally it is important to specify that for some elements it was not possible to define one-to-one mappings, in particular for ACDM elements associated with two elements within the PICO Profile, for instance the **dcat:landingPage** and **acdm:temporal** entities, obtained from PICO as follows:

ACDM dcat:landingPage

dc:relation[xsi:type="pico:Anchor" URL=@@resourcelandingPage	A related resource. Recommended best practice is to identify the related resource by means of a string conforming to a formal identification system.

dcterms:isReferencedBy [xsi:type="pico:Anchor"]	The described resource is referenced, cited, or otherwise pointed to by the referenced resource. Must be used to point to the web page where the data provider publishes the harvested resource, using the encoding scheme 'pico:Anchor'.

ACDM acdm:temporal

dcterms:temporal	Temporal characteristics of the intellectual content of the resource.
dcterms:created	Date of creation of the resource.

For PICO elements associated with two elements within the ACDM model, for instance **dc:contributor**, **dc:format** and **dc:coverage**, built as shown below:

PICO dc:contributor

An entity responsible for making contributions to the resource. Examples of a Contributor include a person, an organization, or a service. Typically, the name of a Contributor should be used to indicate the entity.	**dcterms:contributor** **acdm:scientificResponsible**

PICO dc:format

The file format, physical medium, or dimensions of the resource. Examples of dimensions include size and duration. Recommended best practice is to use a controlled vocabulary such as the list of Internet Media Types - MIME.	**dcterms:format** **expressedI**n

PICO dc:coverage

The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant. Spatial topic may be a named place or a location specified by its geographic coordinates. Temporal period may be a named period, date, or date range. A jurisdiction may be a named administrative entity or a geographic place to which the resource applies. Recommended best practice is to use a controlled vocabulary such as the Thesaurus of Geographic Names (TGN). Where appropriate, named places or time periods can be used in preference to numeric identifiers such as sets of coordinates or date ranges.	**placeName** **address**

Table below contains detailed information concerning the PICO Application Profile mapping to ACDM.

Original Field	Field Description	ACDM Field	Comment
dc:title	A name given to the resource. Typically, a Title will be a name by which the resource is formally known. It is recommended to specify the language.	**dcterm:title**	
dcterms:isPartOf	The described resource is a physical or logical part of the referenced resource.	**dcterms:isPartOf**	
dc:description	An account of the resource. Description may include but is not limited to: an abstract, a table of contents, a graphical representation, or a free-text account of the resource.	**dcterms:description**	
dcterms:issued	Date of formal issuance (e.g.: publication) of the resource.	**dcterms:issued**	
dcterms:modified	Date on which the resource was changed.	**dcterms:modified**	
dcterms:accrualPeriodicity	The frequency with which items are added to a collection.	**dcterms:accrualPeriodicity**	
dc:identifier	An unambiguous reference to the resource within a given context. Recommended best practice is to identify the resource by means of a string conforming to a formal identification system.	**acdm:originalId**	
dc:language	A language of the resource. Recommended best practice is to use a controlled vocabulary such as RFC 3066.	**dcterms:language**	
dcterms:temporal	Temporal characteristics of the intellectual content of the resource.	**acdm:temporal**	dcterms:temporal ? The element acdm:temporal map with two elements of PICO
dcterms:created	Date of creation of the resource.		
	"Italy"	**acdm:country**	
dcterms:spatial	Spatial characteristics of the intellectual content of the resource.	**dcterms:spatial**	

Original Field	Field Description	ACDM Field	Comment
dc:relation [xsi:type="pico:Anchor" URL=@@resourcelandingPage	A related resource. Recommended best practice is to identify the related resource by means of a string conforming to a formal identification system.	**dcat:landingPage**	The element dcat:landingPage map with two elements of PICO
dcterms:isReferencedBy [xsi:type="pico:Anchor"]	The described resource is referenced, cited, or otherwise pointed to by the referenced resource. Must be used to point to the web page where the data provider publishes the harvested resource, using the encoding scheme 'pico:Anchor'.		
dc:publisher	An entity responsible for making the resource available. Examples of a Publisher include a person, an organization, or a service. Typically, the name of a Publisher should be used to indicate the entity.	**dcterms:publisher**	
dc:contributor	An entity responsible for making contributions to the resource. Examples of a Contributor include a person, an organization, or a service. Typically, the name of a Contributor should be used to indicate the entity.	**dcterms:contributor**	The PICO element dc:contributor map with two elements of ACDM
		acdm:scientificResponsible	
dc:creator	An entity primarily responsible for making the resource. Examples of a Creator include a person, an organization, or a service. Typically, the name of a Creator should be used to indicate the entity.	**dcterms:creator**	
dcterms:rightsHolder	A person or organisation owning or managing rights over the resource. Recommended best practice is to use the URI or name of the Rights Holder to indicate the entity.	**acdm:owner**	

Original Field	Field Description	ACDM Field	Comment
pico:responsible	Any dead or alive physical person, any corporate body or institution, responsible for the management, organisation, administration, etc. of the resource or of a part of it. In some cases it coincides with the contact person, whose contacts are indicated for people who are looking for information about the resource. e.g. the person responsible for a project or of one of its work packages, a museum director, the director of a university or a department, etc.	**acdm:legalResponsible**	
pico:isManagedBy	The described resource is managed with different responsibilities (scientific, administrative, technical, etc.) by the referenced resource.	**acdm:technicalResponsible**	
		acdm:archaeologicalResourceType	
dc:subject [xsi:type="pico:Thesaurus"]	The topic of the resource. Typically, the topic will be represented using keywords, key phrases, or classification codes. Recommended best practice is to use a controlled vocabulary. To describe the spatial or temporal topic of the resource, use the Coverage element.	**acdm:nativeSubject**	N.B.: Pico Thesaurus is organized by categories of objects and doesn't contain the individual entries of the "object definition" (specific vocabularies). To enable semantic search in ARIADNE Portal has been necessary to modify individual XML files by inserting in dc: subject to the following additional information, Eg.: acdm:nativeSub

Original Field	Field Description	ACDM Field	Comment
			ject xmlns:acdm = "http://registry. ariadne-infrastructure.e u/"> <skos:Concept xmlns:skos = "http://www.w 3.org/2004/02/s kos/core#"> <skos:prefLabel >lama</skos:pr efLabel> </skos:Concept > </acdm:nativeS ubject> The value 'lama' matchs with the mapping ICCD-RA Thesaurus / AAT.
dcterms:license	A legal document giving official permission to do something with the resource. Recommended best practice is to identify the license using a URI. Examples of such licenses can be found at http://creativecommons.org/licens es/.	**acdm:accessPolicy**	
dcterms:accessRig hts	Information about who can access the resource or an indication of its security status. Access Rights may include information regarding access or restrictions based on privacy, security or other regulations.	**acdm:accessRights**	dcterms:accessR ights?
dc:rights	Information about rights held in and over the resource. Typically, rights information includes a statement about various property rights associated with the resource, including intellectual property	**dcterms:rights**	

Original Field	Field Description	ACDM Field	Comment
	rights.		
dct:extent	The size or duration of the resource.	**dcterms:extent**	
dcterms:audience	A class of entity for whom the resource is intended or useful. A class of entity may be determined by the creator or the publisher or by a third party.	**dcterms:audience**	
dc:relation	A related resource. Recommended best practice is to identify the related resource by means of a string conforming to a formal identification system.	**dcat:contactPoint**	
pico:distributor	Any dead or alive physical person, any corporate body or institution, responsible for the distribution of an edited or published resource. The usage of this term is recommended for resources as music records and movies.	**dcat:distribution**	
dcterms:hasPart	The described resource includes the referenced resource either physically or logically.	**dcterms:hasParts**	
dc:format	The file format, physical medium, or dimensions of the resource. Examples of dimensions include size and duration. Recommended best practice is to use a controlled vocabulary such as the list of Internet Media Types - MIME.	**dcterms:format** **expressedIn**	The PICO element dc:format map with two elements of ACDM
dc:source	The resource from which the described resource is derived. The described resource may be derived from the related resource in whole or in part. Recommended best practice is to identify the related resource by means of a string conforming to a formal identification system.	**dcterms:source**	
dc:coverage	The spatial or temporal topic of the	**placeName**	The PICO

Original Field	Field Description	ACDM Field	Comment
	resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant. Spatial topic may be a named place or a location specified by its geographic coordinates. Temporal period may be a named period, date, or date range. A jurisdiction may be a named administrative entity or a geographic place to which the resource applies. Recommended best practice is to use a controlled vocabulary such as the Thesaurus of Geographic Names (TGN). Where appropriate, named places or time periods can be used in preference to numeric identifiers such as sets of coordinates or date ranges.	**address**	element dc:coverage map with two elements of ACDM
pico:contact	Information about contacts related to the resource. Examples of Contact include: telephone number, fax, address, e-mail address, etc. It can't be used for indicating contacts of people which contribute to the resource.	**contactPerson**	

7.11.2 Terminological services

A SKOS encoded version of the RA (Archaeological Artefacts) model of the ICCD Central Institute for Cataloguing and Documentation of the Italian Ministry of Culture, derived from an RA to AAT mapping, have been released as service and is now available at:

http://vast-lab.org/thesaurus/ra/vocab/index.php

7.12 MiBACT – SITAR

This section presents the two mappings to ACDM carried out by SITAR (Archaeological Territorial Informative System of Rome) starting from their "Information Source" and "Archaeological Partition" datasets. The "Information Source" (OI) is an archive of archaeological activities (mostly archaeological excavations, surveys and other activities related with archaeological investigations) under the supervision of SITAR. The archive also contains administrative and scientific information for every single archaeological excavation, geophysical/geological survey, topographical study and so forth. "Archaeological Partition" (PA) datasets contains the scientific description of the archaeological findings even if fragmentary, identified by chronological or functional criteria. OI and PA datasets have some internal relationships, e.g.: each OI record usually *hasPart* and forms one or

many PA records. Both datasets have Est and Nord coordinates encoded in EPSG:3004, longitude and latitude in EPSG:4326.

The following table reports a comparative and detailed mapping of each OI and PA field to ACDM and the criteria upon which every mapping was defined.

ACDM Entities	SITAR Information Source Class	SITAR Archaeological Partition Class
dct:title	st_information_source.name	*concat* (st_archaeo_part.objective_definition || ' *pertinente/i a:*' || st_archaeo_part.specific_definition)
dct:description	st_information_source.description	st_archaeo_part.description
dct:issued	st_information_source.created_at	st_archaeo_part.created_at
dct:modified	st_information_source.updated_at	st_archaeo_part.updated_at
originalId	st_information_source.sitar_code	st_archaeo_part.id
dct:identifier	assigned by ARIADNE	assigned by ARIADNE
dct:language	Italian	Italian
dcat:landingPage	http://webais.archeositarproject.it/webgis/	http://webais.archeositarproject.it/webgis/
dcat:contactPoint	adt.andrea.detommasi@gmail.com	adt.andrea.detommasi@gmail.com
accessPolicy	URI to policy web page to be defined	URI to policy web page to be defined
dct:accessRights	Data access and use will be granted in full compliance with MiBACT data/open data policies and licenses	Data access and use will be granted in full compliance with MiBACT data/open data policies and licenses
dct:rights	The institution owner of data is MiBACT - Special Superintendence for Archaeological Heritage of Rome	The institution owner of data is MiBACT - Special Superintendence for Archaeological Heritage of Rome
dct:audience	archaeologists, geologists, urban development professionists, scholars, public administrations, and in future the wider public.	archaeologists, geologists, urban development professionists, scholars, public administrations, and in future the wider public.
dct:temporal	st_information_source.start_da	st_phase.start_year

ACDM Entities	SITAR Information Source Class	SITAR Archaeological Partition Class
	te st_information_source.end_dat e	st_phase.end_year
dct:spatial	est_epsg3004 / nord_epsg3004 long_epsg4326 / lat_epsg4326	est_epsg3004 / nord_epsg3004 long_epsg4326 / lat_epsg4326
dct:extent	total amount: 801 records of Information Source + 5506 document references	total amount: 2475 records of Archaeological Partition + 136 document references
archaeologicalResourceType	Fieldwork archives; Event/intervention resources, such as grey literature reports; Sites and monuments databases or inventories	Fieldwork archives; Event/intervention resources, such as grey literature reports; Sites and monuments databases or inventories
dct:isPartOf	ArcheoSITAR Project	ArcheoSITAR Project
dcat:distribution	http://webais.archeositarproject.it/webgis/	http://webais.archeositarproject.it/webgis/
dct:hasParts	Reference to an external table to establish the 1:N relationships	NO
native-subject	References from two external tables: IS_native-subject AND IS_native_subject_AAT_mappin g	References from two tables: st_archaeo_part.objective_defini tion AND AP_native_subject_AAT_mappin g
dct:publisher	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma
hasSchema	Relational database	Relational database
dct:contributor	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma
dct:creator	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma
owner	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma
legalResponsible	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma	MiBACT - Soprintendenza Speciale per il Colosseo e i Beni Archeologici di Roma
scientificResponsible	Mirella Serlorenzi	Mirella Serlorenzi
technicalResponsible	adt.andrea.detommasi@gmail.c	adt.andrea.detommasi@gmail.co

ACDM Entities	SITAR Information Source Class	SITAR Archaeological Partition Class
	om	m
hasAttachedDocuments	References from an external IS_Documents table	References from an external AP_Documents table
accessibleVia	http://webais.archeositarproject.it/webgis/	http://webais.archeositarproject.it/webgis/
usesVocabulary	References from the IS_vocabolaries supplied in the CIDOC-SITAR mapping technical report	References from the AP_vocabolaries supplied in the CIDOC-SITAR mapping technical report
expressedIn	NO; otherwise an RDF format is available for the CIDOC-mapped version of the Information Source dataset	NO; otherwise an RDF format is available for the CIDOC-mapped version of the Information Source dataset
placeName	Località (public_st_italian_locality.name)	NO
contactPerson	adt.andrea.detommasi@gmail.com	adt.andrea.detommasi@gmail.com

7.12.1 CIDOC CRM Mapping

A CIDOC CRM mapping of SITAR information has also been carried out within the ARIADNE project. The new CRMarchaeo extension has been also used to create a semantic representation of the various SITAR entities. The goal of this work was twofold: on one hand the mapping between the SITAR database schema and the concepts of the CIDOC CRM and CRMarchaeo semantic model was defined, in order to check the feasibility of this work and test the last release of CRMarchaeo (under development also with the contribution of ARIADNE). On the other hand, to produce a semantic encoding of SITAR information, to be used within the Linked Data Cloud infrastructure and the other experimental activities ongoing among WP14 and WP15: for this purpose, the data contained in SITAR database have been extracted and represented in RDF using the XML language.

Information concerning CIDOC CRM mapping and encoding of SITAR database can be browsed via the FORTH Mapping Memory Manager tool at http://www.ics.forth.gr/isl/3M/.

7.13 MNM-NOK database

This section provides ACDM descriptions for the Hungarian Magyar Nemzeti Muzeum database of archaeological sites. The MNM-NOK database was created by collecting and aggregating all the necessary data from the other participating departments of the Hungarian National Museum - National Heritage Protection Centre (http://www.mnm-nok.gov.hu/) for the purpose of the ARIADNE project. The table below reports detailed descriptions of mappings between legacy fields in the original database and the corresponding ARIADNE data model entities, necessary for ingestion of legacy information into the project registry. Information concerning intermediate mappings on DublinCore and DCAT schemas for legacy entities is also reported within the "Original Field" column, when available.

Original Field	Field Description	ACDM Field
:originalid (KÖH azonosító)	ID	**acdm:originalID**
dct:title (lelőhely neve)	Site name	**dcterms:title**
dct:description (dokumentáció rövid leírása)	Description	**dcterms:description**
dct:issued (dokumentum dátuma)	Date of the creating of documentation	**dcterms:issued**
	documentation_type	**dcterms:issued**
dct:modified (változtatás dátuma)	Modification date of the documentation	**dcterms:modified**
dcat:keyword (kulcsszavak)	Keywords	**dcat:keyword**
dct:temporal (lelőhely kora)	age	**acdm:nativeSubject**
dct:temporal (lelőhely kora)	period	**acdm:nativeSubject**
dct:temporal (lelőhely kora)	subperiod	**acdm:nativeSubject**
dct:temporal (lelőhely kora)	culture	**acdm:nativeSubject**
dct:temporal (lelőhely kora)	phase	**acdm:nativeSubject**
dct:spatial/EOV X	Spatial coordinates: X	**acdm:spatial**
dct:spatial/EOV Y	Spatial coordinates: X	**acdm:spatial**
dct:creator (személy(ek) akik készítették a dokumentációt)	Creator of documentation	**acdm:contributorPerson**
dct:isPartOf	project	**dcterms:isPartOf**
	Lead archeologist	**acdm:creator**
dct:languAge (dokumentáció nyelve, ez végig hu lesz)	documentation_language	**dcterms:language**
dct:spatial(földrajzi terület, megye)	county	**acdm:placeName**
dct:publisher (dokumentációt készítő intézmény)	documentation_publisher	**acdm:publisher/Organisation**
:legalResponsible (jogi felelős)	legal responsible institution	**acdm:legalResponsible/Organisation**
	scientific responsible archaeologist	**acdm:scientificResponsible/Person**
dct:accessRights (hozzáférés típusa)	access_rights	**dcterms:accessRights**
dct:rights (milyen jogunk van a dokumentációhoz)	documentation_rights	**dc:rights**
dct:extent (dokumentáció mennyisége. Pl. ez a kollekció áll: 30 db word, 13xls, 26 dwg, 1456 JPG stb)	file formats in the documentation	**dcterms:extent**

7.14 NIAM-BAS database

The National Institute of Archaeology and Museum at the Bulgarian Academy of Sciences (NIAM-BAS) participated in ARIADNE with a specific data export of their "Archaeological map of Bulgaria" (AIS AKB) information system. The AIS AKB is a database storing information for archaeological sites in Bulgaria, protected by the Bulgarian Ministry of Culture[3]. AIS AKB is a site-based database, where one record (one registration card number) corresponds to a specific place on the surface in which archaeological materials are found.

For the purposes of the ARIADNE catalogue an XML data export in English of the system was created that consists of registration cards of famous archaeological sites. Separately, a record is created for the each entry of the whole database.

The following table details the various mappings to the ACDM carried out by NIAM BAS within ARIADNE.

Original Field names in AIS AKB	Field Description	ACDM Field	Comment
Име	title of the site	dcterm:title	
	title of the database	dcterms:isPartOf	
Особености, Допълнителна информация и коментар	description of the site	dcterms:description	a combination of two fields
Създадено (дата)	date when a card is issued	dcterms:issued	
Променено (дата)	date when a card is modified	dcterms:modified	
	actuality	dcterms:accrualPeriodicity	
Регистрационна карта №	registration card number	acdm:originalId	
Вид	keywords	dcat:keyword	one-to-many relationship
	language	dcterms:language	one-to-many relationship
Хронология	periods	acdm:temporal	one-to-many relationship
	country	acdm:country	
	years	acdm:from	

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[3] An issue released in 2011 that strictly defined its structure, support and limited access (http://www.lex.bg/laws/ldoc/2135726967)

Original Field names in AIS AKB	Field Description	ACDM Field	Comment
	years	**acdm:to**	
Longitude	longitude	**acdm:spatialLon**	
Latitude	latitude	**acdm:spatialLat**	
	webpage	**dcat:landingPage**	
	publisher (organisation)	**dcterms:publisher**	
	contributor (organisation)	**dcterms:contributor**	
Автор	creator (person)	**dcterms:creator**	
Собственик	owner (person)	**acdm:owner**	
	responsible for the legal part (organisation)	**acdm:legalResponsible**	
Автор	responsible for the scientific part (person)	**acdm:scientificResponsible**	
Собственик	responsible for the technical part (person)	**acdm:technicalResponsible**	
	type of the database	**acdm:archaeologicalResourceType**	
Вид, хронология, съоръжения, находки	subject to be mapped to AAT vocabulary with the corresponding chronological periods as well as findings and structures	**acdm:derived (or provided) Subject**	one-to-many relationship, a combination of four fields
Вид	original subjects	**acdm:nativeSubject**	one-to-many relationship
	policy of access	**acdm:accessPolicy**	
	policy of rights	**acdm:accessRights**	
	rights	**dcterms:rights**	
	extent	**dcterms:extent**	
	audience	**dcterms:audience**	

7.14.1 Terminological resources

The terminological resources mapped to AAT from AIS AKB are internally-produced lists (with the exception of one) which are used to manage for data management purposes.

AIS AKB's Bulgarian terminology is in the process of mapping to AAT using an MS Excel file. The file consisted of three tabs: ReadMe, Mappings, and Lookups.

The Readme tab consisted of metadata for the mapping exercise – basic information about the dataset, creator, dates, etc. The Mappings tab contained the actual vocabularies and its mappings. The fields included in the tab are:

- sourceLabel – term in Bulgarian

- matchURI – match type (exactMatch; closeMatch; broadMatch; narrowMatch)

- targetLabel – AAT mapping

- TargetURI – AAT mapping URI

- Source-En – Best English-language translation (in some cases more exact than AAT mapping)

- Translation, matching, issues and output.

Mapping is going to be done in two steps. This was due to NIAM-BAS receiving the output mapping template after a translation took place. All terms were first translated to English using a variety of resources, including technical lexicons, dictionaries, archaeological texts, and online resources.

Translations produced this way were often better matches than AAT mappings. This is due to several factors: AAT is not strictly archaeology—oriented, it takes an American approach to terminology does not always coincide with the Bulgarian approach, and language and cultural differences can affect the ontology of a term.

7.14.2 PeriodO mappings

AIS AKB used and internal time period vocabulary for documentation and data management purposes. All time periods used are used within a Bulgarian context, which means that some generic names (like Iron Age), have local datings.

AIS AKB's internal time-period vocabulary has been mapped to PeriodO's English-language vocabulary. Start and end dates for each period have been provided, as well as spatial coverage (Bulgaria) and alternate labels (English).

7.15 OEAW databases

OEAW datasets provided three datasets to the ARIADNE project: dFMROe, a collection of information concerning coins; UK MaterialPOOL, a collection on late Bronze Age sites descriptions; and Franzhausen-Kokoron, a cemetery excavation database. All of them are legacy datasets which were created individually without using existing metadata standards.

The dFMROe dataset was created based on standards of numismatics while UK MaterialPOOL and Franzhausen-Kokoron are archaeological datasets, which were created for the requirements of individual projects. The definitions of field names and metadata were recorded in Word files.

Exporting to the ACDM model was simple because matches could be made for most of the required fields and new information was gathered when it was not covered in the datasets (e.g. spatial coordinates, copyright, etc.).

Exporting these three datasets to the ACDM provided OEAW with the incentive to use metadata standards for future projects for good practise. Details about the OEAW dFMROe coins database mappings to ACDM are provided below.

Original Field	Field Description	ACDM Field	Comment
		dcterm:title	information collected from texts about collection
		dcterms:isPartOf	information collected from texts about collection
		dcterms:description	information collected from texts about collection
		dcterms:issued	information collected from texts about collection
		dcterms:modified	information collected from texts about collection
		dcterms:accrualPeriodicity	information collected from texts about collection
FIND_SPOT_ID	unique ID of find spot	**acdm:originalId**	
		dcat:keyword	created based on information available in individual dataset
		dcterms:language	information collected from texts about collection
AUTHORITY	Primary areas (Greek, Roman, ..)	**acdm:temporal**	The primary areas are also the period of the coins
COUNTRY	in dFMRÖ there are coins from Austria & Romania	**acdm:country**	
DATE_FROM	start date of the coins	**acdm:from**	
DATE_TO	end date of the coins	**acdm:to**	
FIND_SPOT	place name of the findspot	**acdm:placeName**	
		acdm:spatialLon	created with GPSvisualizer based on place Name
		acdm:spatialLat	created with GPSvisualizer based on place Name
		dcat:landingPage	from provided information on collection, no unique links could be provided for the collection due to the programming of the site
		dcterms:publisher	information collected from texts about collection

Original Field	Field Description	ACDM Field	Comment
		dcterms:contributor	information collected from texts about collection
		dcterms:creator	information collected from texts about collection
		acdm:owner	information collected from texts about collection
		acdm:legalResponsible	information collected from texts about collection
		acdm:scientificResponsible	information collected from texts about collection
		acdm:technicalResponsible	information collected from texts about collection
		acdm:archaeologicalResourceType	information collected from texts about collection
		acdm:nativeSubject	information collected from texts about collection
		acdm:accessPolicy	information collected from texts about collection
		acdm:accessRights	information collected from texts about collection
		dcterms:rights	information collected from texts about collection
		dcterms:extent	created based on information available in individual dataset
		dcterms:audience	information collected from texts about collection

Two OEAW datasets were also mapped to CIDOC CRM:

- The dFMROe coins collection with the 3M tool by OEAW and FORTH http://139.91.183.3/3MEditor/Index?type=Mapping&action=view&lang=en&id=Mapping209

- The Franzhausen-Kokoron database (conceptual mapping only, via an Excel file).

7.15.1 Terminological resources

The terminological resources mapped to the AAT are standard numismatic vocabularies[4] in the case of dFMROe and project-specific controlled vocabularies on finds and findspot types for UK MaterialPOOL and Franzhausen-Kokoron. The language used in these vocabularies is German. The

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[4] Bernhard Prokisch, Thesaurus Nummorum Romanorum et Byzantinorum Band 10, Die römischen Münzen des Oberösterreichischen Landesmuseums in Linz (Generalsammlung), Wien 1998.

terminology of the three OEAW datasets was mapped to AAT using the provided Excel file which consisted of three tabs: Metadata, Mappings, and Lookups.

The mapping metadata was provided in the metadata tab and the mapping to the AAT was done in the Mappings tab.

- sourceLabel: term translated to English

- SourceURI: No source URI was available, so source label was provided

- matchURI: match type (exactMatch; closeMatch; broadMatch; narrowMatch)

- targetLabel: Name of the AAT mapping

- TargetURI: AAT mapping URI

- Translation, matching, issues and output

For the mapping, terms used as keywords in the ACDM were first translated from German to English with the help of dictionaries, archaeological texts, online resources and discussion with colleagues to find terminology that was as close to the German meanings as possible, and also in use in English archaeological literature.

Then AAT was searched for terms that would match the translations and the definitions of the controlled vocabulary as closely as possible. In some cases the terms were too specific to find an exact match in the AAT. In such cases the archaeological terminology provided by the AAT was not as rich as what was required (e.g. findspot types). The use of broad matches were only necessary in 17.4% of cases.

The draft version of the mapping was discussed within the work group until a final version was achieved. The MS Excel file of the final version was then sent.

7.15.2 PeriodO mappings

OEAW has not used a standardised time period vocabulary until the creation of the Austrian Period Table in 2015, which was created for the ARIADNE project data collection in PeriodO (ARIADNE Consortium. ARIADNE Data Collection. 2015.)[5]

The period vocabulary of the three submitted datasets follows numismatic or archaeological standards established in numismatic or archaeological literature.   UK MaterialPOOL and Franzhausen-Kokoron are mapped to PeriodO. In the case of dFMROe one entry could span several periods, so the acdm:From and acdm:To fields were used to provide the start and end dates available in the source dataset. The DEFC collection with information on Neolithic and Early Bronze Age periods in Greece and Anatolia will be uploaded to PeriodO in the future. http://defc.digital-humanities.at/

7.16 SND datasets

SND uses an internally developed metadata management system to work with data resources and descriptions of them. The system is heavily influenced by the DDI[6] metadata standard, and especially version 3.2 thereof, although the system is also compatible with earlier versions. Other formats/standards supported by the system natively are MARC-XML and DataCite, although, its very

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[5] http://n2t.net/ark:/99152/p0qhb66

[6] Data Documentation Initiative (http://www.ddialliance.org/)

objectified data model can support many other standards supported if needed. One example of this would be ACDM where no changes to the underlying model needed to be done to develop an export routine to the ACDM model (details provided in table below).

During later years the DDI standard stems from Social Sciences, and descriptions of quantitative data have developed to better facilitate descriptions of qualitative data and geographical material. DDI has incorporated features influenced by other standards like Dublin Core and DC Terms, which are fully supported, SDMX[7], ISO11179[8], and parts of the ISO19xxx series. Other influences have come from the GSBPM model[9].

SND has members in several committees in the DDI Alliance and are actively participating in developing new features and extensions of the standard.

DDI 3.2	ACDM Field
/DDIInstance/StudyUnit/Citation/Publisher	acdm:publisher
/DDIInstance/StudyUnit/Citation/Contributor	acdm:contributor
/DDIInstance/StudyUnit/Citation/Creator	acdm:creator
/DDIInstance/StudyUnit/Citation/Contributor	acdm:owner
/DDIInstance/StudyUnit/Citation/Contributor	acdm:legalResponsible
/DDIInstance/StudyUnit/Citation/Contributor	acdm:scientificResponsible
/DDIInstance/StudyUnit/Citation/Contributor	acdm:technicalResponsible
/DDIInstance/StudyUnit/Coverage/TopicalCoverage/Subject	acdm:providedSubject
/DDIInstance/StudyUnit/Coverage/TopicalCoverage/Subject	acdm:derivedSubject
/DDIInstance/StudyUnit/Coverage/TopicalCoverage/Subject	acdm:nativeSubject
/DDIInstance/StudyUnit/Coverage/TopicalCoverage/Subject	acdm:hasAttachedDocument
/DDIInstance/StudyUnit/Citation/Title | /DDIInstance/StudyUnit/Citation/title	dcterms:title
/DDIInstance/StudyUnit/Abstract | /DDIInstance/StudyUnit/Citation/description	dc:description
/DDIInstance/StudyUnit/Citation/Publicationdate | /DDIInstance/StudyUnit/Citation/issued	dcterms:issued
/DDIInstance/StudyUnit/@versionDate | /DDIInstance/StudyUnit/Citation/modified	dcterms:modified
/DDIInstance/StudyUnit/Archive/ArchiveSpecific/Collection/CallNumber	acdm:originalId
/DDIInstance/StudyUnit/Coverage/TopicalCoverage/Keyword	dcat:keyword
/DDIInstance/StudyUnit/Citation/Language |	dc:language

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[7] Statistical Data and Metadata eXchange (https://sdmx.org)

[8] ISO11179 (http://metadata-standards.org/11179/)

[9] Generic Statistical Business Process Model
(http://www1.unece.org/stat/platform/display/metis/The+Generic+Statistical+Business+Process+Model)

/DDIInstance/StudyUnit/Citation/language	
/DDIInstance/StudyUnit/Archive/ArchiveSpecific/Collection/URI	**dcat:landingPage**
/DDIInstance/StudyUnit/Archive/ArchiveSpecific/Collection/OriginalArchiveOrganizationReference	**dcat:contactPoint**
/DDIInstance/StudyUnit/Archive/ArchiveSpecific/Access/AccessPermission	**acdm:accessPolicy**
**/DDIInstance/StudyUnit/Archive/ArchiveSpecific/Access/AccessConditions	/DDIInstance/StudyUnit/Citation/accessRights**	**dcterms:accessRights**
**/DDIInstance/StudyUnit/Citation/Copyright	/DDIInstance/StudyUnit/Citation/rights**	**dc:rights**
/DDIInstance/StudyUnit/Citation/audience	**dcterms:audience**
/DDIInstance/StudyUnit/Coverage/TopicalCoverage/Subject	**acdm:archaeologicalResourceType**
/DDIInstance/StudyUnit/Coverage/TemporalCoverage	**acdm:temporal**
/DDIInstance/StudyUnit/Coverage/SpatialCoverage	**acdm:spatial**
/DDIInstance/StudyUnit/Citation/accrualPeriodicity	**dcterms:accrualPeridocity**
**/DDIInstance/StudyUnit/Archive/ArchiveSpecific/Collection/DataFileQuantity	/DDIInstance/StudyUnit/Archive/ArchiveSpecific/Collection/CollectionCompleteness	/DDIInstance/StudyUnit/Citation/extent**	**dcterms:extent**
/DDIInstance/StudyUnit/Archive/ArchiveSpecific	**acdm:distribution**
N/A	**acdm:hasItemMetadataStructure**
N/A	**acdm:hasMetadataRecord**

7.16.1 AAT mappings

The terminological resources mapped to AAT by SND are internally-produced lists (with the exception of one) which are used for data management purposes. The vocabularies are the following:

- Archaeological investigation type (arkeologisk undersökningstyp)
- FMIS word list (produced by the Swedish National Heritage Board and used internally by SND)
- SND keywords (Archaelogy and History)
- SND keywords (Time Periods)
- Mapping methodology

SND's Swedish terminology was mapped to AAT using an ad hoc MS Excel file. The file consisted of three tabs: ReadMe, Mappings, and Lookups.

The Readme tab consisted of metadata for the mapping exercise – basic information about the dataset, creator, dates, etc. The Mappings tab contained the actual vocabularies and its mappings. The fields included in the tab are:

- sourceLabel – term in Swedish

- SourceURI – URI of term on SND's website

- matchURI – match type (exactMatch; closeMatch; broadMatch; narrowMatch)

- targetLabel – AAT mapping

- TargetURI – AAT mapping URI

- Source-Hierarchy – Category of term in Swedish (which category/vocabulary is it in?)

- Source-ScopeNote – Notes describing mapped terms (usually available only for FMIS terms)

- Source-En – Best English-language translation (usually more exact than AAT mapping)

- Translation, matching, issues and output.

Mapping was done in two steps. This was due to SND receiving the output mapping template after l translation had commenced. All terms were first translated to English using a variety of resources, including technical lexicons, dictionaries, archaeological texts, and online resources.

Translations produced this way were often better matches than AAT mappings. This is due to several factors: AAT is not archaeology—oriented, it takes an American approach to terminology that does not always coincide with the Swedish approach, and language and cultural differences can affect the ontology of a term.

That said, in the majority of cases AAT terms were found to be sufficiently precise to allow for an exact match or a close match (ca. 63% of all terms).

The resulting MS Excel file containing a draft version of the mapping was bounced back and forth until a final version was achieved. The mapping template was then automatically transformed to an RDF expression of the mappings, ready for upload.

7.16.2 PeriodO mappings

SND used an internal time period vocabulary for documentation and data management purposes. All time periods used are used within a Swedish context, which means that some generic names (like Iron Age), have local datings.

SND's internal time-period vocabulary has been mapped to PeriodO's English-language vocabulary. Start and end dates for each period have been provided, as well as spatial coverage (Sweden) and alternate labels (English).

At time of writing not all terms are present in the 2015 ARIADNE PeriodO Data Collection. The list must be updated before the Swedish vocabulary can be deemed complete.

7.17 ZRC SAZU:

7.17.1 ZRC Zbiva database

The table below summarises the conceptual mappings between the ZRC-SAZU Zbiva database fields and the ACDM entities, and provides also a short description of the meaning of each field in the original archive. Additional mandatory ACDM entities (such as the **dcterms:isPartOf**, **acdm:archaeologicalResourceType** and **acdm:country**), not explicitly mentioned in any field of the legacy archive but having general validity to the whole scope of the database, have been subsequently added to the ACDM metadata records at conversion time, in order to enrich the ACDM description and make it suitable for publication on the ARIADNE Portal.

Original Field	Field Description	ACDM Field
Arkas_ID	ID	**acdm:originalID**
Arkas	Database Name	**dcterms:title**
Opis	Description	**dcterms:description**
Datum_vnosa	Entry date	**dcterms:issued**
Datum_vnosa	Last update	**dcterms:modified**
Najdba	Find	**dcat:keyword**
Ime_datacije	Chronological definition	**acdm:temporal**
koorX	Spatial coordinates: X	**acdm:spatial**
koorY	Spatial coordinates: X	**acdm:spatial**
Omemba	Mentioned	**acdm:contributorPerson**
Vnašalec	Data entry responsible	**acdm:technicalResponsible**
Opredelitev	Find classification	**acdm:nativeSubject**

7.17.2 ZRC SAZU: Arkas database

The table below summarises the conceptual mappings between the ZRC-SAZU Arkas database fields and the ACDM entities, and provides a short description of the meaning of each field in the original archive. Additional mandatory ACDM entities (such as the **dcterms:isPartOf**, **acdm:archaeologicalResourceType** and **acdm:country**), not explicitly mentioned in any field of the legacy archive but having general validity to the whole scope of the database, have been subsequently added to the ACDM metadata records at conversion time, in order to enrich the ACDM description and make it suitable for publication on the ARIADNE Portal.

Original Field	Field Description	ACDM Field
Sifra	Code	**acdm:originalID**
Zbiva	Database Name	**dcterms:title**
Opombe	Description	**dcterms:description**
Datum_vnosa	Entry date	**dcterms:issued**
Datum_vnosa	Last update	**dcterms:modified**

Original Field	Field Description	ACDM Field
Najdba	Find	**dcat:keyword**
Datacija	Period	**acdm:temporal**
Najprej	From	**acdm:from**
Najkasneje	To	**acdm:to**
Država	Country	**acdm:country**
lat	Latitude	**dcterms:spatial**
lon	Longitude	**dcterms:spatial**
Najdba	Find	**acdm:nativeSubject**

8 Conclusions

This report presents the process of creating the ARIADNE registry in detail, and describes the standards, metadata systems, thesauri descriptions, and services it contains in its final phase of development. The registry is an important tool for archaeologists and constitutes a valid tool for supporting their activities, as it provides them with the ability to discover data sets, standards and other similar resources useful for their research. First the report analysed the ACDM model, developed specifically for the creation of the registry, and the implementation carried out by the partners to contribute to a common information-sharing platform, and provide interoperability for their information within a complete ecosystem, from which archaeological information can be selected, extracted and reused in order to extend the horizon of archaeological research, by spreading archaeological queries across different international repositories.

The ACDM model was one of the main vehicles for this integration. Developed from well-established international standards, it has proved to be a flexible and capable tool able for adapting itself to the different facets of the various standards used by content providers to encode their data. A careful initial analysis was the key to building a solid and reliable data model, able to interact with high-level terminology resources, such as the AAT thesaurus and spatiotemporal entities provided by Geonames and PeriodO, and to foster interpretation of knowledge concerning various datasets of ARIADNE in an unambiguous way to minimise the loss of information resulting from the mapping and conversion operations.

The solidity of ACDM model has definitely helped the activities to be carried out by the content providers, as documented in this report, to find correspondences between the entities used in their legacy archives and the entities provided by the model itself. The support of well-known and well-established standards, such as the Getty Thesaurus, has also pushed the integration beyond the limits imposed by the heterogeneity of the archaeological data and to overcome the undoubted differences in origin between the different information held by partners. The mapping operations, enrichment, conversion carried out through a set of tools provided by the ARIADNE infrastructure, have been completed in an optimal way and this has allowed ingestion into the registry of all the

archaeological information provided to the project, and its publication in the ARIADNE portal, the true heart of integration where interoperability has become real.