

# Historical Research meets Semantic Interoperability: The Documentation System SYNTHESIS and its Application in Art History Research

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European  
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# Outline

- Introduction
- Context
- Data documentation with *Synthesis*
  - User roles, interface, data model, functionalities, usage statistics
- Data transformation to a (CIDOC-CRM based) semantic network
- Conclusion
  - + Lessons learned and future work

# Introduction

# Historical Science and Computing

## □ Historical Science

- A vast area of research concerns the **collection, documentation** and **interpretation** of information about **cultural artefacts** and related **evidence**

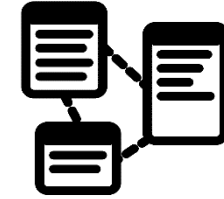
## □ Computing in the field has developed enormously over the last years

- Nevertheless, **data management problems** still exist and are still vast and varied



# Current practice and related problems

- Current practice mostly uses **spreadsheets** or simple **relational databases**



- Common **problems**:

- Difficulty in collaborative but controlled documentation
- Difficulty in representing the details from which the documented relations are inferred
- Difficulty in extending the existing data structures on demand
- Difficulty of third parties to understand and re-use the data

# Our approach: the *Synthesis* system

- Web-based and collaborative system for the **documentation** of data and knowledge in **cultural heritage** and the **humanities**
  - Can be easily **configured** for specific fields!
- Focus on **semantic interoperability**
  - Making use of **standards** for data modelling and storage (**CIDOC-CRM, RDF**)
  - Aiming at the production of **sustainable data** of **high value**
- Application in **History of Art**
  - In the context of a large European research project called **RICONTRANS** (ERC)

# Context

# Context: the **RICONTRANS** project

<https://ricontrans-project.eu/>

□ **RICONTRANS** *Visual Culture, Piety and Propaganda: Transfer and Reception of Russian Religious Art in the Balkans and the Eastern Mediterranean (16<sup>th</sup> – early 20<sup>th</sup> c.)*

- ERC Consolidator Grant (**May 2019 – April 2024**)
- Field: **Art History**
- Principal Investigator: **Dr. Yuliana Boycheva (Institute of Mediterranean studies, FORTH)**
- Research teams in **Greece, Bulgaria, Serbia, Romania, Russia**

□ **The research focus:** The **Russian religious artefacts** brought from Russia to the Balkans (16<sup>th</sup> – early 20<sup>th</sup> c.)

- What are the paths and the mediums of their transfers as well as the moving factors?
- What are the aesthetic, ideological, political and social factors that shaped the context of their reception in the various social and cultural environments?
- What is their influence on the visual culture of the host societies?

**RICONTRANS**



# RICONTRANS – The data

- Information and data about:
  - **Art objects** (icons, triptychs, crosses, ...)
  - **Object transfers** (from/to, purpose, ...)
  - Other **relevant entities**:
    - ❖ **Historical figures** (archbishops, priests, saints, ...)
    - ❖ **Events** (archbishop ordination, church erection, ...)
    - ❖ **Locations** (cities, villages, monasteries, churches, museums, ...)
  
- Primary Sources
  - Archival sources
  - Oral history sources
  - Old books / newspapers
  
- Secondary Sources
  - Bibliography
  
- Research data
  - Findings, comments, ...
  
- Digital files
  - Images, scans, docs, ...

RICONTRANS

# Data Documentation with *Synthesis*

System overview, user roles, interface, data model, functionalities, usage statistics

# Synthesis – System overview

- ❑ Web-based system for the **collaborative documentation** of data and knowledge in cultural heritage and (digital) humanities
  - Configurable, multilingual, supports versioning
  
- ❑ Utilizes **XML technology** and a multi-layer architecture
  - **Flexibility** and **extensibility** (in terms of data structures and data types)
  - **Sustainability** (XML documents readable by both humans and machines)
  - Database: **eXist-db** (native XML database)



# Synthesis – Users Roles

## □ User roles

- **System administrator** – can create new ‘organizations’ (groups of users)
  - **Organization administrator** – can create editors and guests for a particular organization
  - **Editor** – can create and document entities for a specific organization
  - **Guest** – can only view the documented entities of a specific organization
- The management of rights can be easily adjusted for any specific need
- E.g., user with edit access to all documented entities (for making corrections, etc.)

## □ **Editors** create and document **entities** organized in **entity types**

- Example: the **entity** “*Brass icon depicting the Three Hierarchs (Benaki Museum)*” is of **entity type** “*Object*”

# Synthesis – Web Interface



**RICONTRANS**

VISUAL CULTURE, PIETY  
AND PROPAGANDA:  
TRANSFER AND RECEPTION OF  
RUSSIAN RELIGIOUS ART IN THE BALKANS  
AND THE EASTERN MEDITERRANEAN  
(16TH – EARLY 20TH C.)

SEARCH ? Pavlos Fafalios



**Synthesis**  
Cultural Information Management System

*Entity types*

- Objects and Transfers**
- Objects
- Object Transfers
- Routes
- Sources**
- Archival Sources
- Books
- Newspapers and Periodicals/Reviews
- Oral History Sources
- Web Sources
- Related Bibliography**
- Bibliography
- Passages and Comments**
- Source Passages
- Collection of Source Passages
- Researcher Comments
- Related Documentation**
- Historical Figures
- Historical Events

+ 🔍 📄 📍 More ▾

🔍 Search

## Objects

Showing: All

🔄 Filter Table

Showing 10 entries

<input type="checkbox"/>	Object name (Ricontrans) ▾	Current Location ▾	Archive ▾	Creator ▾	Card Status ▾	Last Modified ↑	Id ▾ ▾
<input type="checkbox"/>	Icon with the Virgin "Vzyskanie pogubshih"	.../Location/1221, Regional Museum of History - Varna		sim.tonch	unpublished	2022-07-12	Object/2019
<input type="checkbox"/>	Icon with St. John the Baptist and life scenes	.../Location/1221, Regional Museum of History - Varna		sim.tonch	unpublished	2022-07-12	Object/2021
<input type="checkbox"/>	Composite icon in two registers	.../Location/1221, Regional Museum of History - Varna		sim.tonch	unpublished	2022-07-12	Object/2020
<input type="checkbox"/>	Icon with the Virgin Besednaya	.../Location/1221, Regional Museum of History - Varna		sim.tonch	unpublished	2022-07-10	Object/2018

# Synthesis – Entity Types

- The **entity types** in the case of **RICONTRANS**

## Objects and Transfers

Objects  
Object Transfers  
Routes

## Related Bibliography

Bibliography

## Related Documentation

Historical Figures  
Historical Events  
Collections  
Locations  
Persons  
Organizations

## Sources

Archival Sources  
Books  
Newspapers and  
Periodicals/Reviews  
Oral History Sources  
Web Sources


## Passages and Comments

Source Passages  
Collection of Source  
Passages  
Researcher Comments

## Presentation

Digital Objects  
Information Texts

# Synthesis – Inspecting the documented entities



## RICONTRANS

VISUAL CULTURE, PIETY  
AND PROPAGANDA:  
TRANSFER AND RECEPTION OF  
RUSSIAN RELIGIOUS ART IN THE BALKANS  
AND THE EASTERN MEDITERRANEAN  
(16TH – EARLY 20TH C.)

Synthesis  
Cultural Information Management System

Pavlos Fafalios

Objects and Transfers

- Objects**
- Object Transfers
- Routes

Sources

- Archival Sources
- Books
- Newspapers and Periodicals/Reviews
- Oral History Sources
- Web Sources

Related Bibliography

- Bibliography





Passages and Comments

- Source Passages
- Collection of Source Passages
- Researcher Comments

Related Documentation

- Historical Figures
- Historical Events

Filter Table  Showing 10 entries

<input type="checkbox"/>	Object name (Ricontrans)	Current Location	Archive	Creator	Card Status	Last Modified	Id
<input type="checkbox"/>	Icon with the Virgin "Vzyskanie pogubshih"	.../Location/1221, Regional Museum of History - Varna		sim.tonch	unpublished	2022-07-12	Object/2019
<input type="checkbox"/>	Icon with St. John the Baptist and life scenes	.../Location/1221, Regional Museum of History - Varna		sim.tonch	unpublished	2022-07-12	Object/2021
<input type="checkbox"/>	Composite icon in two registers	.../Location/1221, Regional Museum of History - Varna		sim.tonch	unpublished	2022-07-12	Object/2020
<input type="checkbox"/>	Icon with the Virgin Besednaya	.../Location/1221, Regional Museum of History - Varna		sim.tonch	unpublished	2022-07-10	Object/2018

**Table of documented entities  
of selected entity type**

# Synthesis – Creating a new entity for documentation

The image shows a screenshot of the Ricontrans Synthesis system interface. The main header includes the Ricontrans logo, the project title "VISUAL CULTURE, PIETY AND PROPAGANDA: TRANSFER AND RECEPTION OF RUSSIAN RELIGIOUS ART IN THE BALKANS AND THE EASTERN MEDITERRANEAN (16TH – EARLY 20TH C.)", and the Synthesis Cultural Information Management System logo. The user is identified as Pavlos Fafalios.

The interface is divided into several sections:

- Objects and Transfers:** Includes links for Objects, Object Transfers, and Routes.
- Sources:** Includes links for Archival Sources, Books, Newspapers and Periodicals/Reviews, Oral History Sources, and Web Sources.
- Related Bibliography:** Includes a link for Bibliography.
- Passages and Comments:** Includes links for Source Passages, Collection of Source Passages, and Researcher Comments.

The main content area displays a table of objects. A red box highlights the "+" icon in the top toolbar, which is used to create a new entity. The table lists the following objects:

<input type="checkbox"/>	Object name (Ricontrans)
<input type="checkbox"/>	Icon with the Virgin "Vzyskanie pogubshih"
<input type="checkbox"/>	Icon with St. John the Baptist and life scenes
<input type="checkbox"/>	Composite icon in two registers

An inset window titled "FeXML - Google Chrome" shows the FeXML editor interface. The URL is `isl.ics.forth.gr/FeXML_ricontrans/Index?type=Objects&id=Objects2022&lang=en`. The editor displays the FeXML structure for the selected object:

```
Object
├── Object Identity
│   ├── SYNTHESIS Code Number
│   │   └── Value
│   │       └── https://ricontrans-project.eu/Object/2022
│   ├── Attributed by
│   │   └── RICONTRANS Project
│   └── Attribution Date
│       └── 2022-07-13
├── Other Code / Identifier
├── Originator of Reference
├── Collection
├── Object Category
├── Object Name (Ricontrans)
│   └── Icon of | (Type:string)
├── Object Name (Official)
├── Creation/Production Date
├── General Subject
├── Topics
└── Basic material(s)
```

The "Object Name (Ricontrans)" field is currently empty, and the text "Icon of |" is visible in the input field. The editor also shows "OK" and "Cancel" buttons.



# Synthesis – Viewing an existing entity

The screenshot displays the Ricontrans website interface. The top header features the Ricontrans logo and the text: "VISUAL CULTURE, PIETY AND PROPAGANDA: TRANSFER AND RECEPTION OF RUSSIAN RELIGIOUS ART AND THE EASTERN MEDITERRANEAN (16TH - EARLY 20TH C.)".

The left sidebar contains navigation menus for "Objects and Transfers", "Sources", "Related Bibliography", "Passages and Comments", and "Related Documentation".

The main content area shows a table of objects. The first row is selected, with a red box highlighting the checkbox and the object name: "Icon with the Virgin 'Vzyskanie pogubshih'".

Overlaid on the right is the FeXML viewer window. The title bar reads "FeXML - Google Chrome" and the address bar shows "isl.ics.forth.gr/FeXML\_ricontrans/Index?type=Objects&action=view&lang=en&id=Objects2019". The FeXML viewer displays the following structure:

```
FeXML
Record: Object/2019

Object
  Object Identity
    SYNTHESIS Code Number
      Value
        https://ricontrans-project.eu/Object/2019
      Attributed by
        RICONTRANS Project
      Attribution Date
        2022-07-12
    Other Code / Identifier
      Value
        BG. VARNA. 1.36
      Category
        RICONTRANS Project Code Number
    Other Code / Identifier[2]
      Value
        Inventory number: BHM 156
      Category
        Museum collection inventory number
    Originator of Reference
      .../Organization/587, Regional Museum of History - Varna
```

# Synthesis – Editing an existing entity

The screenshot displays the Synthesis web application interface. The top header features the Ricontrans logo and the title "VISUAL CULTURE, PIETY AND PROPAGANDA: TRANSFER AND RECEPTION OF RUSSIAN RELIGIOUS ART IN THE BALKANS AND THE EASTERN MEDITERRANEAN (16TH - EARLY 19TH CENTURY)". The user is identified as Pavlos Fafalios.

The left sidebar contains navigation menus for "Objects and Transfers", "Sources", "Related Bibliography", and "Passages and Comments".

The main content area shows a table of objects. The table has a "Filter Table" set to "Deesis icon". The table lists several objects, with the first one selected:

<input checked="" type="checkbox"/>	Object name (Ricontrans)
<input checked="" type="checkbox"/>	Deesis icon with St. Zosima and St. Savvaty of Solovki
<input type="checkbox"/>	Great Deesis icon
<input type="checkbox"/>	Icon of Holy Week (Deesis with Apostles, Archangels and Saints)

The "Edit" icon (pencil) in the top toolbar is highlighted with a red box. The selected object is being edited in a modal window titled "FeXML". The modal shows the following metadata fields:

- Object Identity
- SYNTHESIS Code Number
- Other Code / Identifier
- Originator of Reference
- Collection
- Object Category
- Object Name (Ricontrans): Deesis icon with St. Zosima and St. Savvaty of Solovki
- Object Name (Official)
- Creation/Production Date: 19th century (Type:time\_span)
- General Subject
- Topics
- Basic material(s)

The "19th century" field is currently being edited, with "OK" and "Cancel" buttons visible below it.

# Synthesis – Data Model

- ❑ Specially-designed for the domain of **History of Art** and the particular needs of the **RICONTRANS** project

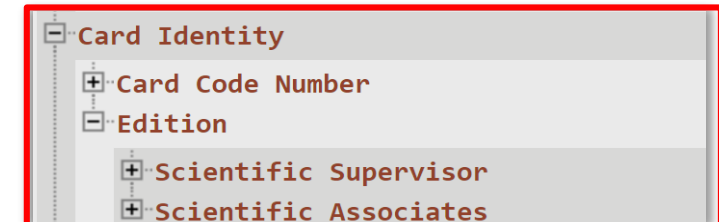
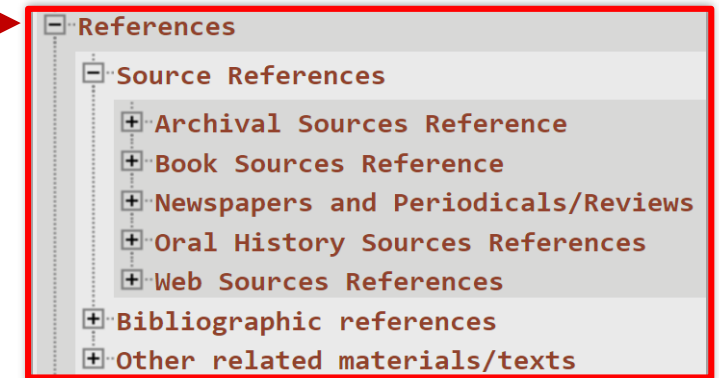
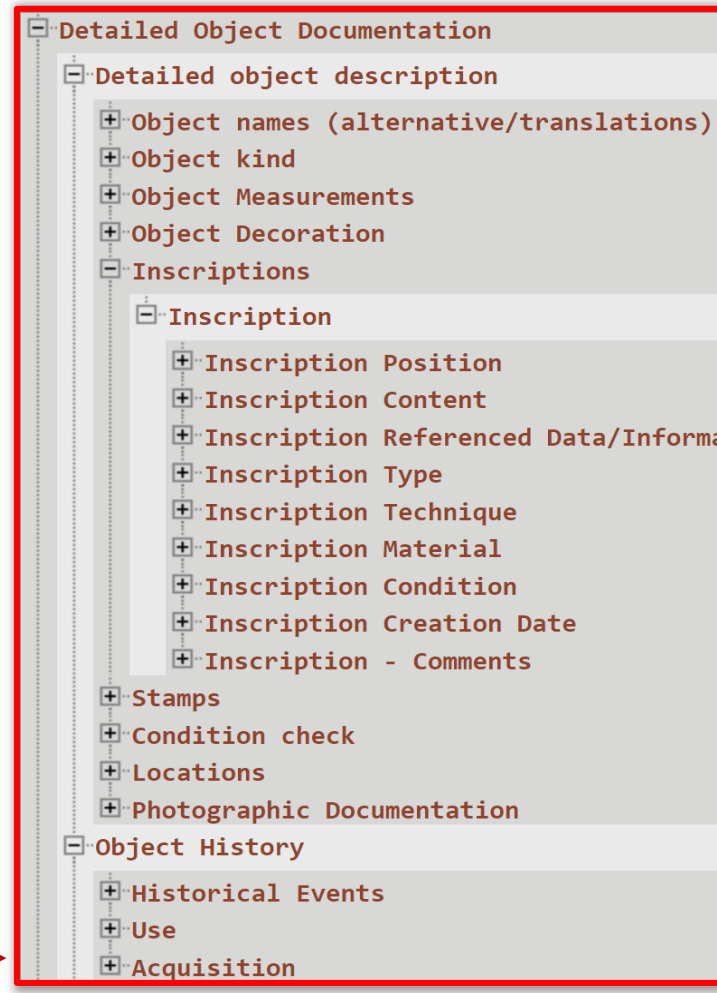
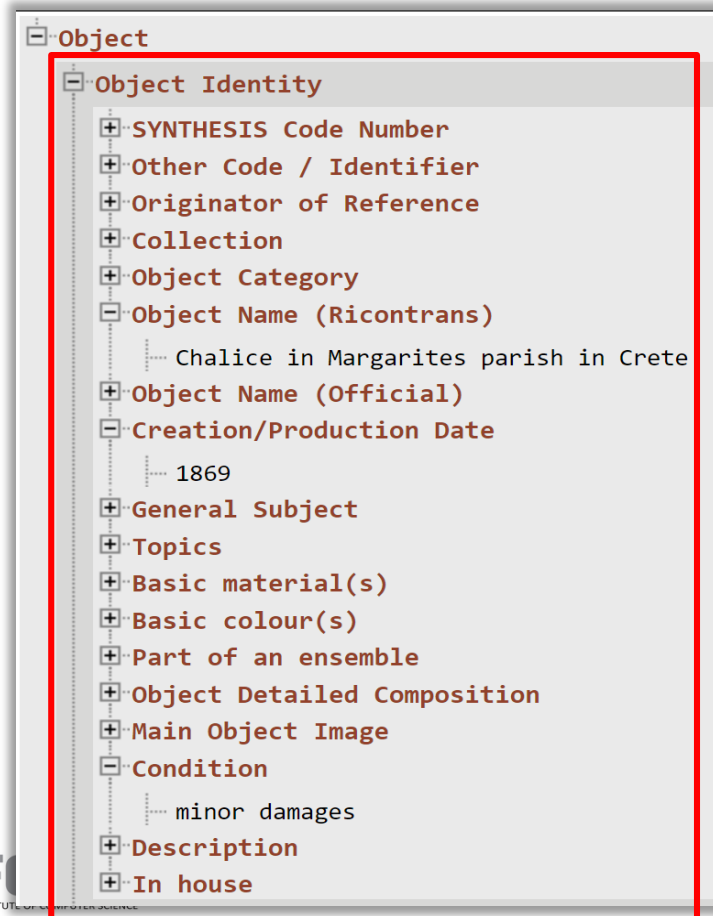
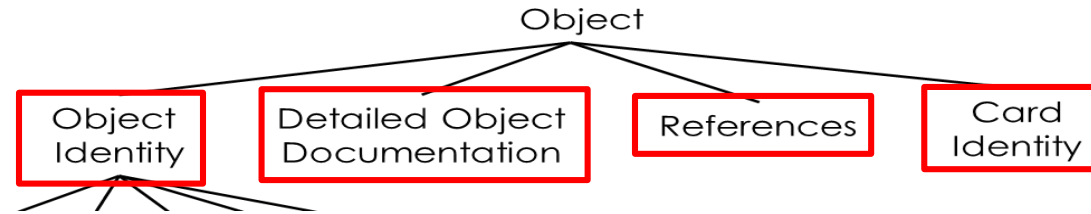
- Focus on **semantic interoperability**

- ❖ Linking each element of the data model to a **target (domain) ontology** (*more later*)
- ❖ Linking terms to controlled (shared) **vocabularies** or **thesauri of terms**
- ❖ Enabling the inclusion of rich **metadata** about the documented data

- ❑ Each **entity type** has its own data structure (**documentation schema**)
  - A documentation schema is **XML-based**, containing a set of fields organized in an **hierarchical (tree-like) structure**
  - The leaves in this tree-like structure are the **documentation fields** that are to be filled by the users

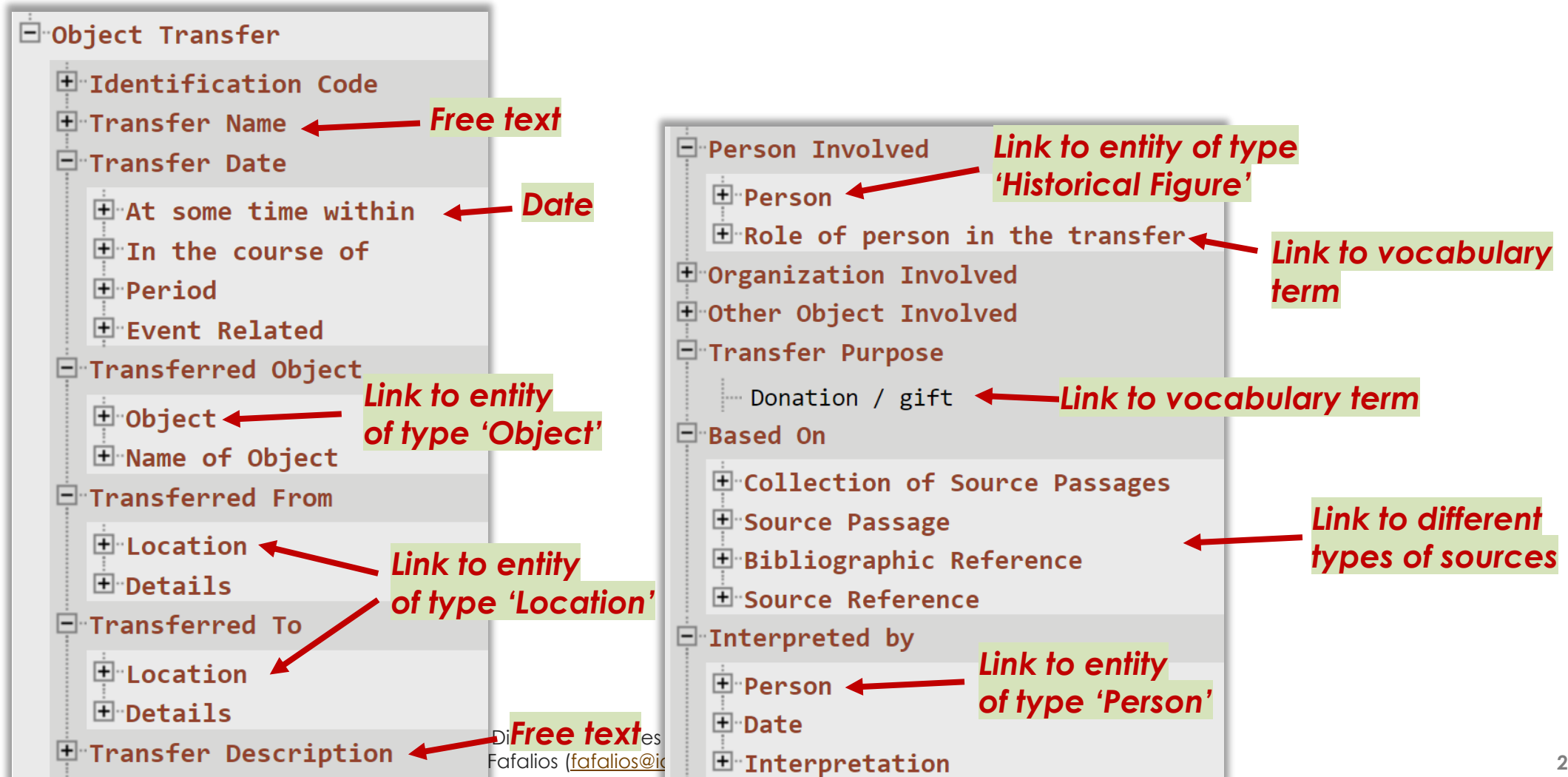
# Synthesis – Data Model

## Entity type: **Object**



# Synthesis – Data Model

## Entity type: **Object Transfer**



# Synthesis – Types of documentation fields

- ❑ Link to **entity**
- ❑ Link to (**static** or **dynamic**) **vocabulary term**
- ❑ Link to **thesaurus of terms** (managed through **THEMAS**)
- ❑ **Unformatted** free text
- ❑ **Formatted** free text
- ❑ Number
- ❑ Date expression (**date range** in an accepted format) →
- ❑ Location coordinates (**point** or **polygon**)
- ❑ Location ID (**TGN** or **Geonames**)
- ❑ Upload file(s)

<https://www.ics.forth.gr/isl/themas-thesaurus-management-system>

## Examples of accepted time expressions

- 1821 January 2
- 1996 February
- 1945
- decade of 1970
- seventh decade of 20th century
- 20th century
- 1920 - 1950
- 3rd century - 5th century
- decade of 1920 - decade of 1950
- 18th century - decade of 1850
- early 16th century
- mid 20th century
- late 19th century
- 1st half 4th century
- 3rd quarter 1st century
- ca. 1920
- 1500 BCE
- 23rd century BCE
- early 4th century BCE
- 1st half 3rd century BCE
- 1800 - 1500 BCE
- 300 BCE - 300 CE
- 7th century - 5th century BCE
- 3rd century BCE - 1st century CE
- 3rd century - 5th century

# Synthesis – Other functionalities

## Table filtering / Search

The screenshot displays the Synthesis Cultural Information Management System interface. The header includes the 'Ricontrans' logo, the title 'VISUAL CULTURE, PIETY AND PROPAGANDA: TRANSFER AND RECEPTION OF RUSSIAN RELIGIOUS ART IN THE BALKANS AND THE EASTERN MEDITERRANEAN (16TH - EARLY 20TH C.)', and the user 'Pavlos Fafalios'. The left sidebar contains navigation menus for 'Objects and Transfers', 'Sources', 'Related Bibliography', and 'Passages and Comments'. The main content area features a search bar with a red arrow pointing to it and the text 'Search considering the contents of the records'. Below the search bar is a table with a red arrow pointing to the 'Filter Table' input field containing 'Forerunner' and the text 'Table filtering'. The table has columns for Object name, Current Location, Archive, Creator, Card Status, Last Modified, and Id. Two records are visible, both for 'Icon of St. John the Forerunner'.

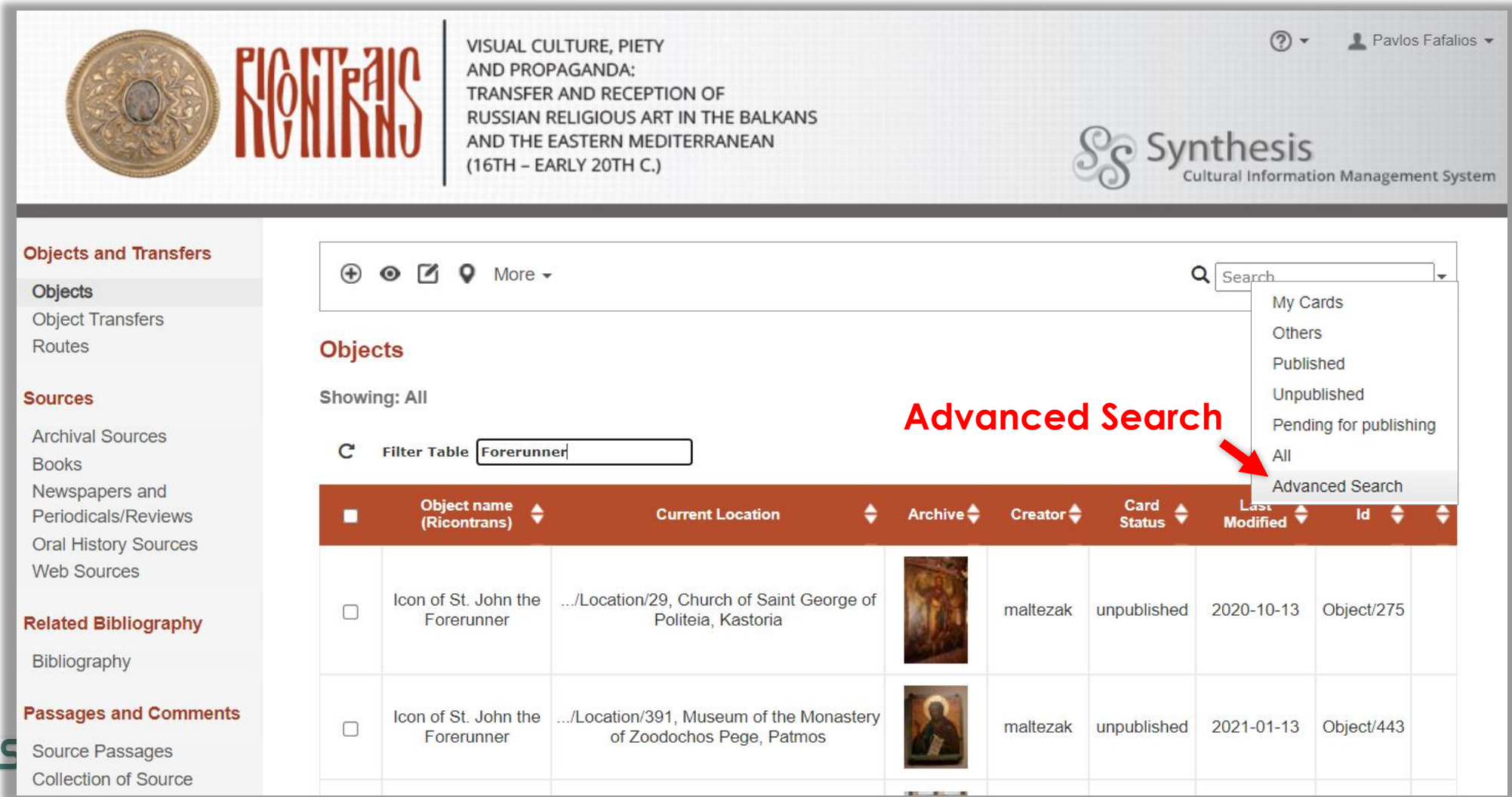
**Table filtering**

**Search considering the contents of the records**

	Object name (Ricontrans)	Current Location	Archive	Creator	Card Status	Last Modified	Id
<input type="checkbox"/>	Icon of St. John the Forerunner	.../Location/29, Church of Saint George of Politeia, Kastoria		maltezak	unpublished	2020-10-13	Object/275
<input type="checkbox"/>	Icon of St. John the Forerunner	.../Location/391, Museum of the Monastery of Zoodochos Pege, Patmos		maltezak	unpublished	2021-01-13	Object/443



# Synthesis – Other functionalities

## □ Table filtering / Search



The screenshot displays the Synthesis Cultural Information Management System interface. The header includes the Ricontrans logo, the title "VISUAL CULTURE, PIETY AND PROPAGANDA: TRANSFER AND RECEPTION OF RUSSIAN RELIGIOUS ART IN THE BALKANS AND THE EASTERN MEDITERRANEAN (16TH - EARLY 20TH C.)", and the user name "Pavlos Fafalios". The left sidebar contains navigation menus for "Objects and Transfers", "Sources", "Related Bibliography", and "Passages and Comments". The main content area shows a table of objects with a search bar and a dropdown menu open, highlighting "Advanced Search".

**Advanced Search**

	Object name (Ricontrans)	Current Location	Archive	Creator	Card Status	Last Modified	Id
<input type="checkbox"/>	Icon of St. John the Forerunner	.../Location/29, Church of Saint George of Politeia, Kastoria		maltezak	unpublished	2020-10-13	Object/275
<input type="checkbox"/>	Icon of St. John the Forerunner	.../Location/391, Museum of the Monastery of Zoodochos Pege, Patmos		maltezak	unpublished	2021-01-13	Object/443



# Synthesis – Other functionalities

## Advanced Search

The screenshot shows the Synthesis Cultural Information Management System interface. At the top, there is a header with a logo on the left, the title "CONTRASTS" in large red letters, and a subtitle "VISUAL CULTURE, PIETY AND PROPAGANDA: TRANSFER AND RECEPTION OF RUSSIAN RELIGIOUS ART IN THE BALKANS AND THE EASTERN MEDITERRANEAN (16TH - EARLY 20TH C.)". On the right, there is a user profile for "Pavlos Fafalios" and the Synthesis logo with the text "Cultural Information Management System".

The main content area is titled "Objects - Advanced Search". It features a sidebar on the left with navigation options: "Objects and Transfers" (with sub-items "Objects", "Object Transfers", "Routes"), "Sources" (with sub-items "Archival Sources", "Books", "Newspapers and Periodicals/Reviews", "Oral History Sources"), "Passages and Comments" (with sub-items "Source Passages", "Collection of Source Passages", "Researcher Comments"), and "Related Documentation" (with sub-items "Historical Figures", "Collections", "Events", "Locations", "Persons", "Organizations", "Bibliography").

The "Objects - Advanced Search" section includes a "Searching criteria" area with an "Operator" set to "AND". Below this is a table for search criteria:

Entity	Select Criteria Field	Condition	Value
Object	Creation/Production Date x	before	18th century

Below the table are sections for "Search of Referenced Ontologies" and "Additional Search Criteria".

The "Output Fields" section has radio buttons for "Default output fields" and "Change output fields". Below this is a "Select Output Fields" area with a dropdown menu showing "Official Object Name/Title x" and "Description x".

At the bottom, there are "Search" and "Clear all" buttons.

# Synthesis – Other functionalities

- Management of vocabularies (*add, delete, rename terms*)

The screenshot shows the Synthesis Cultural Information Management System interface. The header includes the project title 'VISUAL CULTURE, PIETY AND PROPAGANDA: TRANSFER AND RECEPTION OF RUSSIAN RELIGIOUS ART IN THE BALKANS AND THE EASTERN MEDITERRANEAN (16TH - EARLY 20TH C.)' and the Synthesis logo. The left sidebar contains navigation options like 'Objects and Transfers', 'Sources', 'Related Bibliography', and 'Passages and Comments'. The main content area is titled 'Vocabularies - Administration' and lists various vocabulary categories. The 'Vocabulary of Object Category' is selected and highlighted with a red box. A red arrow points to a table titled 'Administration - Vocabulary of Object Category'. The table has a 'Filter Table' input field and a 'Showing 10 entries' indicator. The table contains a list of terms, each with a checkbox in the first column.

	Term
<input type="checkbox"/>	objects in church or monastery sacristies
<input type="checkbox"/>	objects in churches or monasteries for ceremonies and rituals
<input type="checkbox"/>	objects in museum collections (for display / exhibit purposes)
<input type="checkbox"/>	objects in private collections (for display / exhibit purposes)
<input type="checkbox"/>	objects of family heirloom
<input type="checkbox"/>	objects of personal / private devotion
<input type="checkbox"/>	objects in church or monastery museum collections (for display / exhibit purposes)

# Synthesis – Other functionalities

## Map visualization

**Objects and Transfers**

- Objects
- Object Transfers
- Routes

**Sources**

- Archival Sources
- Books
- Newspapers and Periodicals/Reviews
- Oral History Sources
- Web Sources

**Related Bibliography**

- Bibliography

**Passages and Comments**

- Source Passages
- Collection of Source Passages

**Objects**

Showing: All

Filter Table

<input checked="" type="checkbox"/>	Object name (Ricontrans) ▾	Original Location
<input checked="" type="checkbox"/>	Manuscript of the three Liturgies	.../Organization/277, Monastery of Virgin Mary (Panagia) Eurytania
<input checked="" type="checkbox"/>	Icon of the Vision of St. Sergius of Radonezh	.../Organization/277, Monastery of Virgin Mary (Panagia) Eurytania
<input checked="" type="checkbox"/>	Icon of Christ Pantocrator	.../Organization/277, Monastery of Virgin Mary (Panagia) Tatarna, .../Location/200, Monastery of Virgin Mary Tatarna,

**Map Visualization:** A map of the Eastern Mediterranean region showing the locations of several objects. A red box highlights the location of the Panagia (Tatarna) icon in Eurytania, Greece. A detailed view of this icon is shown in a pop-up window.

**Object Details:**

- Object Name (Ricontrans): Παναγία η Ταταρνιώπισσα
- Current Location: Monastery of Virgin Mary (Panagia) Tatarna, Eurytania, Greece
- Creation or Production Date: 1st half 17th century
- Entity ID: 357

**Showing a set of objects in a map**

# Synthesis – Other functionalities

## Map visualization

The screenshot displays the KONTRAS website interface. At the top, there is a logo and the title "VISUAL CULTURE, PIETY AND PROPAGANDA: TRANSFER AND RECEPTION OF RUSSIAN RELIGIOUS ART IN THE AND THE EASTERN MEDITERRAN (16TH - EARLY 20TH C.)". Below this, there is a navigation menu with categories like "Objects and Transfers", "Sources", and "Related Bibliography". A sidebar on the right contains a list of "Object Transfers" with checkboxes next to each item. A red box highlights the "Map" icon in the top navigation bar and the first row of the "Object Transfers" list. The main content area shows a map of Europe and the Mediterranean region with several red location pins. A pop-up window displays an image of an icon with the text: "Transfer Name: Icon with Mother of God Smolenskaia and saints in Kastoria", "Starting Location: Russia", and "Finishing Location: Kastoria". A red arrow points from the map to the pop-up window. A text box at the bottom right of the map area reads: "Showing a set of object transfers in a map".

**Object Transfers**

Showing: All

Filter Table

<input checked="" type="checkbox"/>	Transfer Name: Icon with Mother of God Smolenskaia and saints in Kastoria
<input checked="" type="checkbox"/>	Icons from Russia to...
<input checked="" type="checkbox"/>	Three register icon with...
<input checked="" type="checkbox"/>	Icon with Mother of God Sm...
<input checked="" type="checkbox"/>	Anointing o...
<input checked="" type="checkbox"/>	Epitaph...
<input checked="" type="checkbox"/>	Silver ce...
<input checked="" type="checkbox"/>	Complete chalice

Transfer Name: Icon with Mother of God Smolenskaia and saints in Kastoria  
Starting Location: Russia  
Finishing Location: Kastoria

Showing a set of object transfers in a map

# Use in RICONTRANS

□ ~40 users (5 countries)

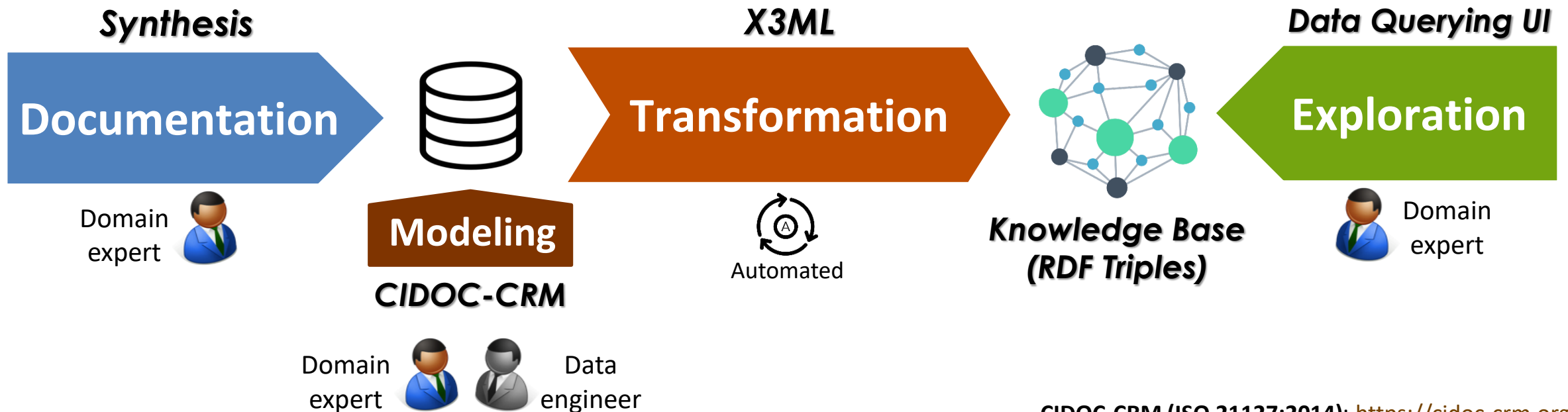
□ Current number of documented entities (as of July 2022):

- Objects: 1,928
- Object transfers: 714
- Routes: 97
- Archival sources: 230
- Books: 58
- Newspapers and Periodicals/Reviews: 155
- Oral History Sources: 3
- Web Sources: 147
- Bibliography: 497
- Source Passages: 1059
- Collection of Source Passages: 8
- Researcher Comments: 0
- Historical Figures: 259
- Historical Events: 38
- Collections: 210
- Locations: 665
- Persons: 136
- Organizations: 488
- Digital Objects: 1,880

# Data transformation to a rich **semantic network**

# Creating a Semantic Network – Process

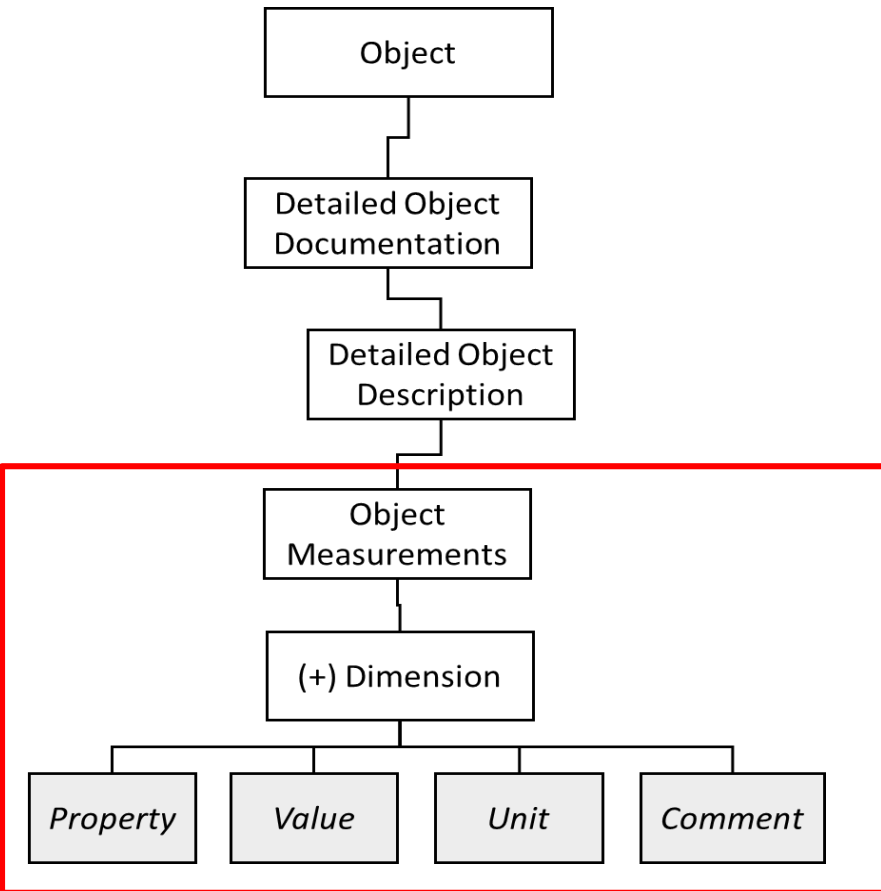
- *Synthesis* has embedded processes for transforming the data stored in the XML documents to an **ontology-based RDF dataset (Knowledge Base)**
  - It **decouples** data entry (*made by the research team*) from the ontology-based integration and creation of the KB (*supported by data engineers*)



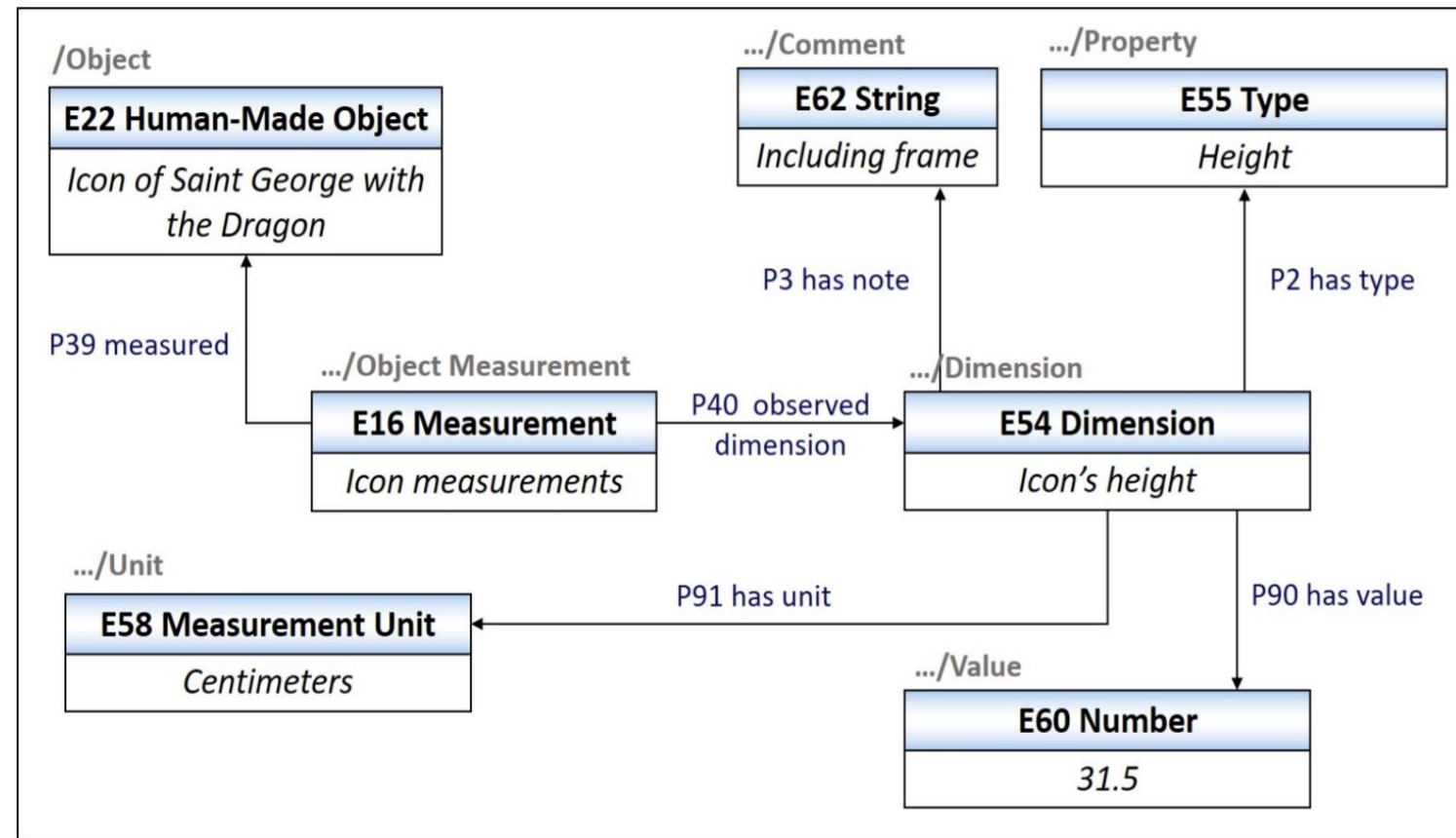
CIDOC-CRM (ISO 21127:2014): <https://cidoc-crm.org/>  
X3ML Toolkit: <https://www.ics.forth.gr/isl/x3ml-toolkit>

# Creating a Semantic Network – Example

Part of **object's** documentation schema



Modelling of **object** measurements in CIDOC-CRM





# Creating a **Semantic Network** – Why?

- Enables **semantic interoperability**

- The ability of computer systems to exchange data with unambiguous, shared meaning

- Facilitates **data integration**

- With other, external datasets that also make use of **CIDOC-CRM**

- Supports **advanced data querying**

- “Find the routes of **icons** transferred to **Mount Athos** before the **18th century** and the **purpose** of these transfers”

# Creating a **Semantic Network** – Overall philosophy

- Why not creating a Knowledge Base from the beginning?
  1. We regard as very different a KB of facts believed together as true, versus **managing and consolidating the knowledge acquisition process** of a large research team
  2. We consider a KB as an ideal tool for integrating the **latest stage of knowledge** acquired through diverse processes
  3. It allows the straightforward production of different KB versions for **different ontologies**, or **different versions** of the same ontology
    - ❖ We just need to create and maintain the corresponding **schema mappings**

# Conclusion

+ **Lessons learned** and **future work**

# Conclusion

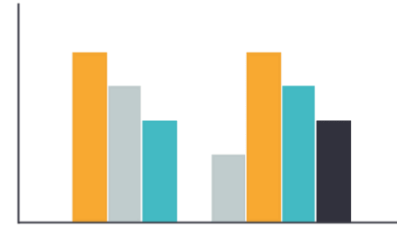
- ❑ Data documentation and management with **Synthesis**
  - Web-based and collaborative
  - Focus on semantic interoperability (compatibility with **CIDOC-CRM**)
  - **Aim:** production of **sustainable** data with **high value** and **long term validity**
- ❑ Application in a large-scale research project in **History of Art (RICONTRANS)**
  - Providing full-fledged support for the complete knowledge production life-cycle in historical research
- ❑ Configurable for use in other fields!
  - We just need to specify the **entity types** and their **documentation fields**

# Lessons Learned

- Finding the best trade-off between **documentation richness** and **usability** is challenging
  - **Example:** It is much simpler to record the dimensions of an object in a single text field (e.g., “15cm x 20cm”) than breaking it to 3 fields (property, value, unit)
  - However, the former makes very difficult, if not impossible, to make comparisons
  
- Controlling the **dynamic vocabularies** is difficult
  - Creation of new terms that already exist with different names
  - Curation is needed (which can be laborious)
    - ❖ *How could we support a better management of the dynamic vocabularies?*

# Future Work

- Additional **data visualizations** (dynamic production of **charts**)
  - E.g., group all **objects** by 'object type' and show a **bar chart**



- Creation of '**private entities**' that can be only viewed by the creator
  - For documenting data related to **ongoing (unpublished) research**



## More info:

- Pavlos Fafalios et al. “Towards Semantic Interoperability in Historical Research: Documenting Research Data and Knowledge with Synthesis”, *International Semantic Web Conference*. Springer, 2021. <https://arxiv.org/pdf/2107.13957.pdf>
- RICONTRANS project: <https://ricontrans-project.eu/>
- Synthesis-core: <https://www.ics.forth.gr/isl/synthesis-core>

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# Thank you!

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