



Research Equipment in CroRIS in Support of Open Research Infrastructure in Croatia

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Croatian Research Information System **CroRIS**

- national-level Current Research Information System in Croatia
- supports evidence-based decision-making, research evaluation, and strategic planning at the national level
- created as part of a strategic project, led by the Ministry of Science and Education and co-funded by the European Union with the **University of Zagreb University Computing Centre (SRCE)** as the partner
- in 2021, the **Ruđer Bošković Institute** formally joined the the development of CroRIS



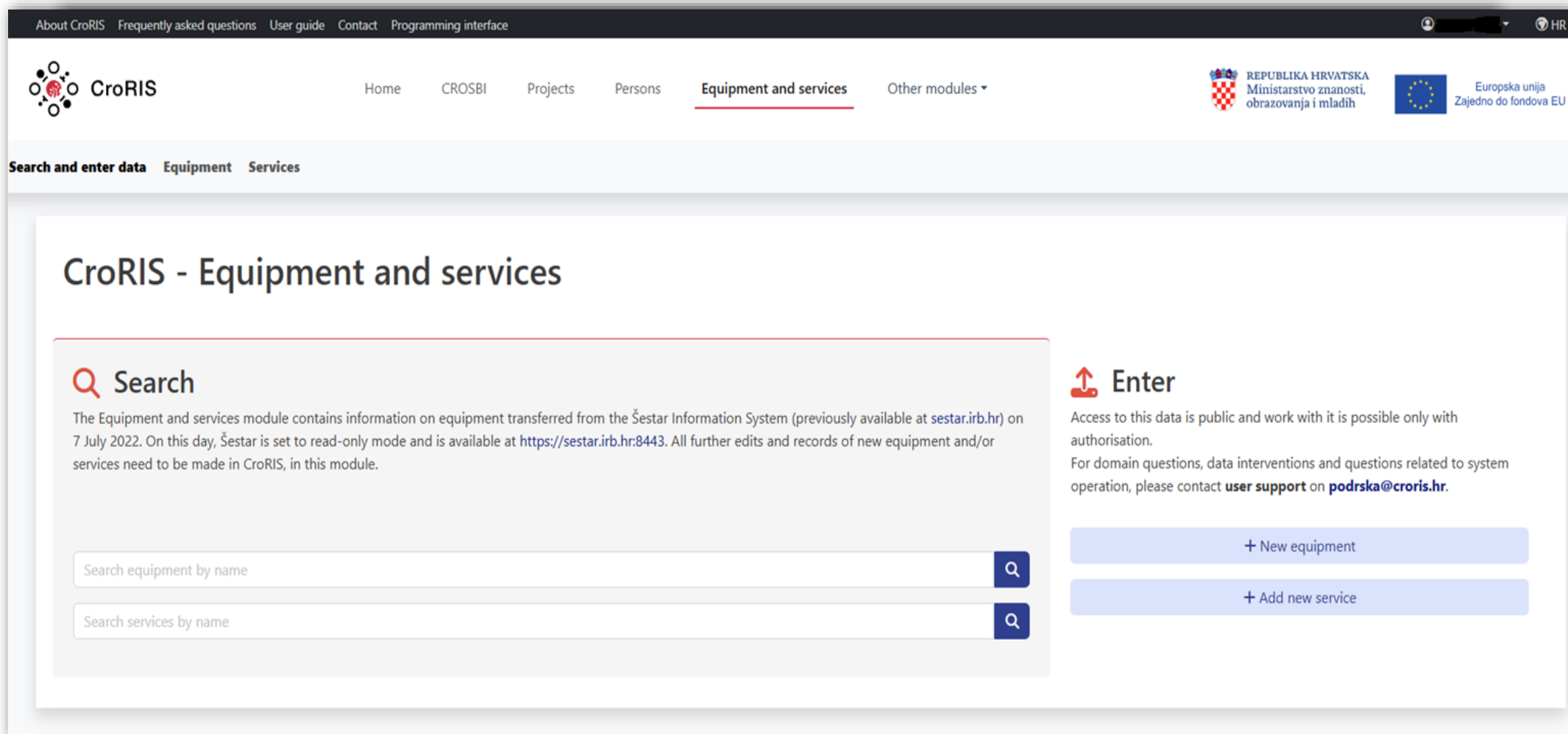
Croatian Research Information System **CroRIS**



- centralized user authentication and authorization through single sign-on (SSO) service, facilitated via the **AAI infrastructure**
- all registered CroRIS users are authorized to create new entries*
- data verification process -> module editors ensure the credibility of the information
- introduced to the research community through workshops, CroRIS website, and direct institutional communication

*except for new entries in these modules: Persons or Organisational Units

Croatian Research Information System **CroRIS**



The screenshot displays the CroRIS web application interface. At the top, a navigation bar includes links for 'About CroRIS', 'Frequently asked questions', 'User guide', 'Contact', and 'Programming interface'. The main header features the CroRIS logo, a menu with 'Home', 'CROSB', 'Projects', 'Persons', 'Equipment and services' (which is underlined), and 'Other modules'. On the right, there are logos for the Republic of Croatia's Ministry of Science, Education and Youth and the European Union.

Below the header, a sub-navigation bar shows 'Search and enter data', 'Equipment', and 'Services'. The main content area is titled 'CroRIS - Equipment and services' and is divided into two sections:

- Search:** This section contains a paragraph explaining that the module contains information transferred from the Šestar Information System on July 7, 2022, and is now in read-only mode. It provides a URL for the Šestar system. Below the text are two search input fields: 'Search equipment by name' and 'Search services by name', each with a magnifying glass icon.
- Enter:** This section explains that access to the data is public but requires authorization. It provides contact information for user support at podrska@coris.hr. Below the text are two buttons: '+ New equipment' and '+ Add new service'.



The **equipment** sub-unit

- structured recording and monitoring of scientific and research equipment
- **increased transparency** of available research infrastructure
- more efficient use of resources
- **facilitates collaboration** among research organisations
- every registered CroRIS user is authorized to create new equipment entries

Database of Instruments for Scientific Research – Šestar

- developed in 2006 by the Centre for Scientific Information (former Library) of Ruđer Bošković Institute
- transparent information on the existence and availability of scientific research instruments at Croatian public institutions
- better planning for the acquisition of new equipment and the financing of maintenance of existing equipment
- metadata descriptions not compliant with international metadata standards
- when RBI joined the development of CroRIS -> existing equipment data from Šestar was agreed to be mapped into CroRIS



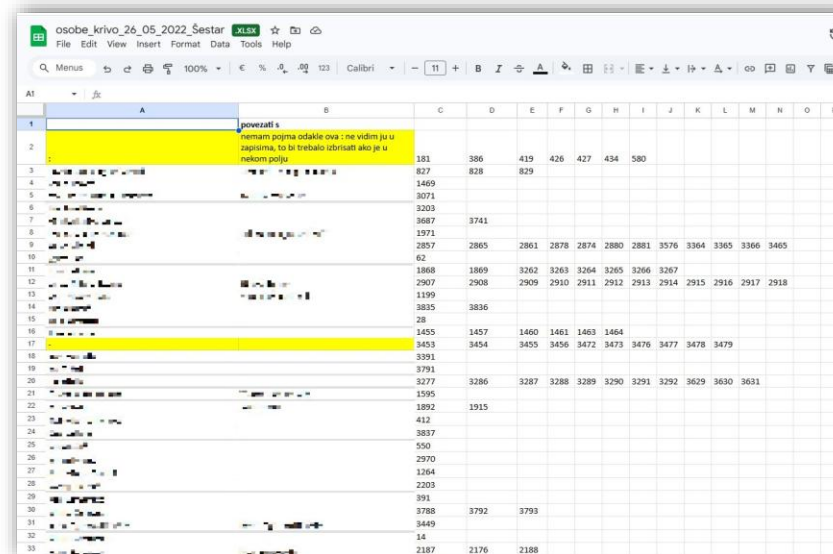


Data migration process

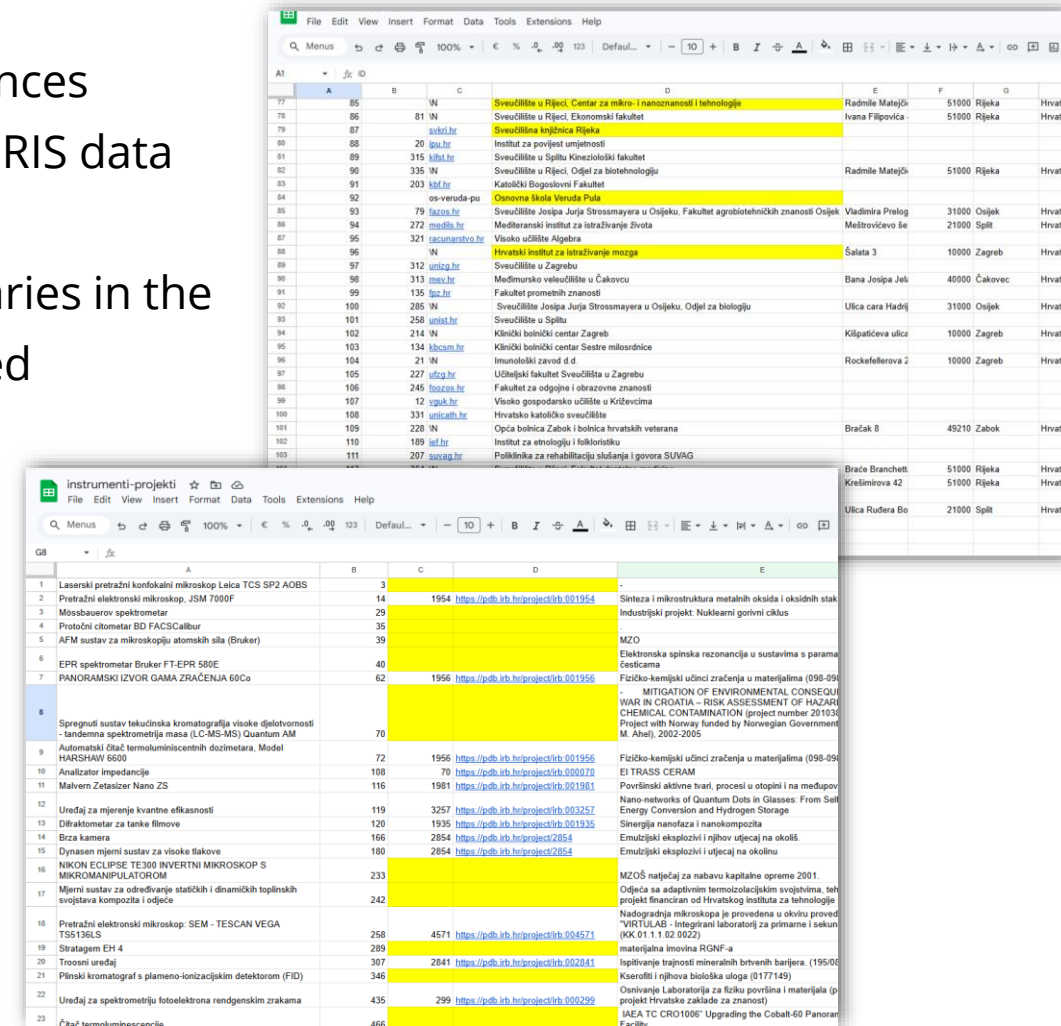
- > 3000 records in Šestar
- data were migrated into the CroRIS database in 2022 and are available through the newly developed Equipment and Services module
- integration aligned with CERIF principles, with extensions reflecting the needs of the Croatian research community
- structural and semantic **interoperability**, standardized **metadata**, and clear **connections** between different types of research information within a national CRIS

Metadata mapping (1)

- specification of metadata elements in the legacy database
- detailed data mapping to identify differences between the source systems and the CroRIS data model
- reimplementation of controlled vocabularies in the form of classification schemes and related categories

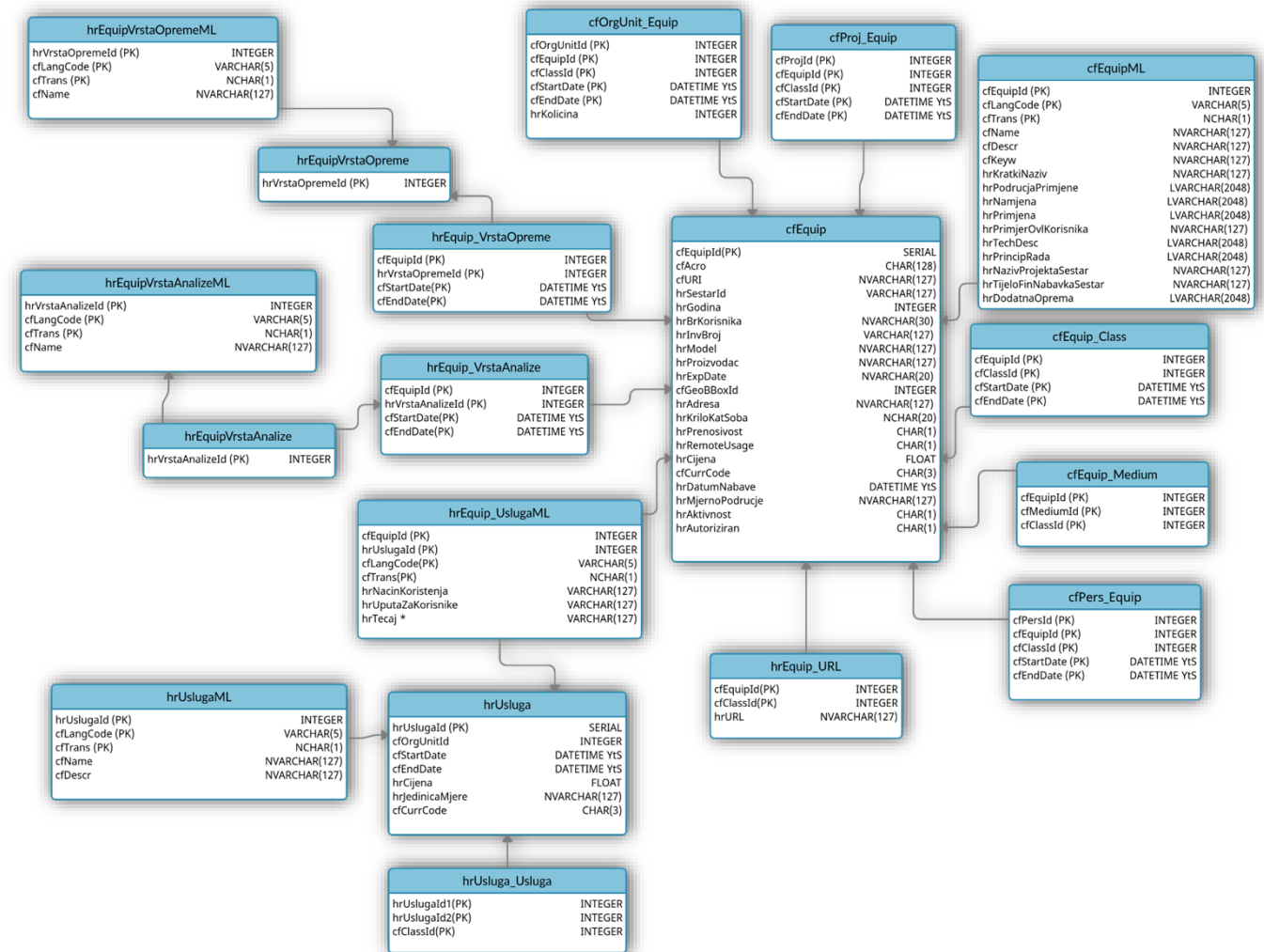


A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	poslati s														
2	nemam pojma odakle ova : ne vidim ju u zapisima, to bi trebalo izbrisati ako je u nekom pojmu	381	386	419	426	427	434	580							
3		827	828	829											
4		1469													
5		3071													
6		3203													
7		3687	3741												
8		1971													
9		2857	2865	2861	2878	2874	2880	2881	3576	3364	3365	3366	3465		
10		62													
11		1868	1869	3262	3263	3264	3265	3266	3267						
12		2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918		
13		1199													
14		3835	3836												
15		28													
16		1455	1457	1460	1461	1463	1464								
17		3453	3454	3455	3456	3472	3473	3476	3477	3478	3479				
18		3391													
19		3791													
20		3277													
21		1595	3286	3287	3288	3289	3290	3291	3292	3629	3630	3631			
22		1892	1915												
23		412													
24		3837													
25		550													
26		2970													
27		1264													
28		2203													
29		391													
30		3788	3792	3793											
31		3449													
32		14													
33		2187	2176	2188											



A	B	C	D	E
1 Laserski pretražni konfokalni mikroskop Leica TCS SP2 AOB	3			
2 Pretražni elektronski mikroskop JSM 7000F	14	1954 https://pib.hr.hr/project/ib.001954		Sinteza i mikrostruktura metalnih oksida i oksidnih stak
3 Masenbauerov spektrometar	29			Industrijski projekt Nuklearni gorivni ciklus
4 Protokni citometar BD FACSCalibur	35			MZO
5 AFM sustav za mikroskopiju atomskih sila (Bruker)	39			Elektronska spinska rezonancija u sustavima s parama
6 EPR spektrometar Bruker FT-EPR 500E	40			česticama
7 PANORAMSKI IZVOR GAMA ZRAČENJA 60Co	62	1956 https://pib.hr.hr/project/ib.001956		Fizičko-kemijski učinci zračenja u materijalima (199-09)
8 Spretni sustav tekućinska kromatografija visoke djelotvornosti - tandemna spektrometrija masa (LC-MS-MS) Quantum AM	70			MITIGATION OF ENVIRONMENTAL CONSEQUENCES OF WAR IN CROATIA - RISK ASSESSMENT OF HAZARDOUS CHEMICAL CONTAMINATION (project number 201034)
9 Automatski čitač termoluminiscentnih dozimetara, Model HARSHAW 6600	72	1956 https://pib.hr.hr/project/ib.001956		Project with Norway funded by Norwegian Government (M. Ahti), 2002-2005
10 Analizator impedancije	108	70 https://pib.hr.hr/project/ib.000970		Fizičko-kemijski učinci zračenja u materijalima (199-09)
11 Malvern Zetasizer Nano ZS	116	1981 https://pib.hr.hr/project/ib.001981		EI TRASS CERAM
12 Uređaj za mjerenje kvantne efikasnosti	119	3257 https://pib.hr.hr/project/ib.003257		Površinski aktivne tvari, procesi u otopenj i na međupov
13 Difrakcijski spektrometar za tanke filmove	120	1935 https://pib.hr.hr/project/ib.001935		Nano-networks of Quantum Dots in Glasses: From Self Energy Conversion and Hydrogen Storage
14 Brza kamera	166	2854 https://pib.hr.hr/project/ib.002854		Sinergija nanofaza i nanokompozita
15 Dynascan mjerni sustav za visoke frekvencije	180	2854 https://pib.hr.hr/project/ib.002854		Emulzijski eksploziv i njihov utjecaj na okoliš
16 NIKON ECLIPSE TE300 INVERTNI MIKROSKOP S MIKROMANIPULATOROM	233			Emulzijski eksploziv i njihov utjecaj na okoliš
17 Mjerni sustav za određivanje statičkih i dinamičkih toplinskih svojstava kompozita i odjece	242			MZOŠ natječaj za nabavu kapitalne opreme 2001.
18 Pretražni elektronski mikroskop SEM - TESCAN VEGA TS5136LS	258	4571 https://pib.hr.hr/project/ib.004571		Odjeca sa adaptivnim termoluminiscentnim svojstvima, teh projekti financirani od Hrvatskog instituta za tehnologije
19 Strategem EH 4	269			Nastodgradnja mikroskopa je provedena u okviru proved "VIRTUALAB - Integrirani laboratorij za primarne i sekund (JK 01.1.1.02.0022)
20 Troosni uređaj	307	2841 https://pib.hr.hr/project/ib.002841		Materijalna inovacija RQNF-a
21 Plinski kromatograf s plameno-ionizacijskim detektorom (FID)	346			Ispitivanje trajnosti mineralnih brtvenih barijera (195-06)
22 Uređaj za spektrometriju fotoelektrona rendgenskim zrakama	435	299 https://pib.hr.hr/project/ib.000299		Kerofiti i njihova biološka uloga (0177-145)
23 Čitač termoluminiscentne	466			Osnivanje Laboratorija za fiziku površina i materijala (p projekti Hrvatsko zaklade za znanost)

- more than 50% of the attributes adopted directly from the CERIF data model (attributes with the “cf” prefix)
- the remaining attributes developed to address the needs of the Croatian research community and to support the migration and preservation of data from Šestar (attributes with the “hr” prefix)



*** Metadata mapping from the first phase of CroRIS development; some alterations added later on

Metadata mapping (3)

- a comprehensive analysis of existing data was conducted
- completing missing values
- correcting or removing invalid or inconsistent records
- cleaning and disambiguation of personal name data (Authorized Users, Instrument Manager, Contact Persons)
- in CroRIS, the association of equipment records with institutions limited to institutions listed in the official institutional registry
- instrument records linked to sub-entities reassigned to their parent institutions
- information about sub-entities related to the equipment preserved through the CroRIS location section

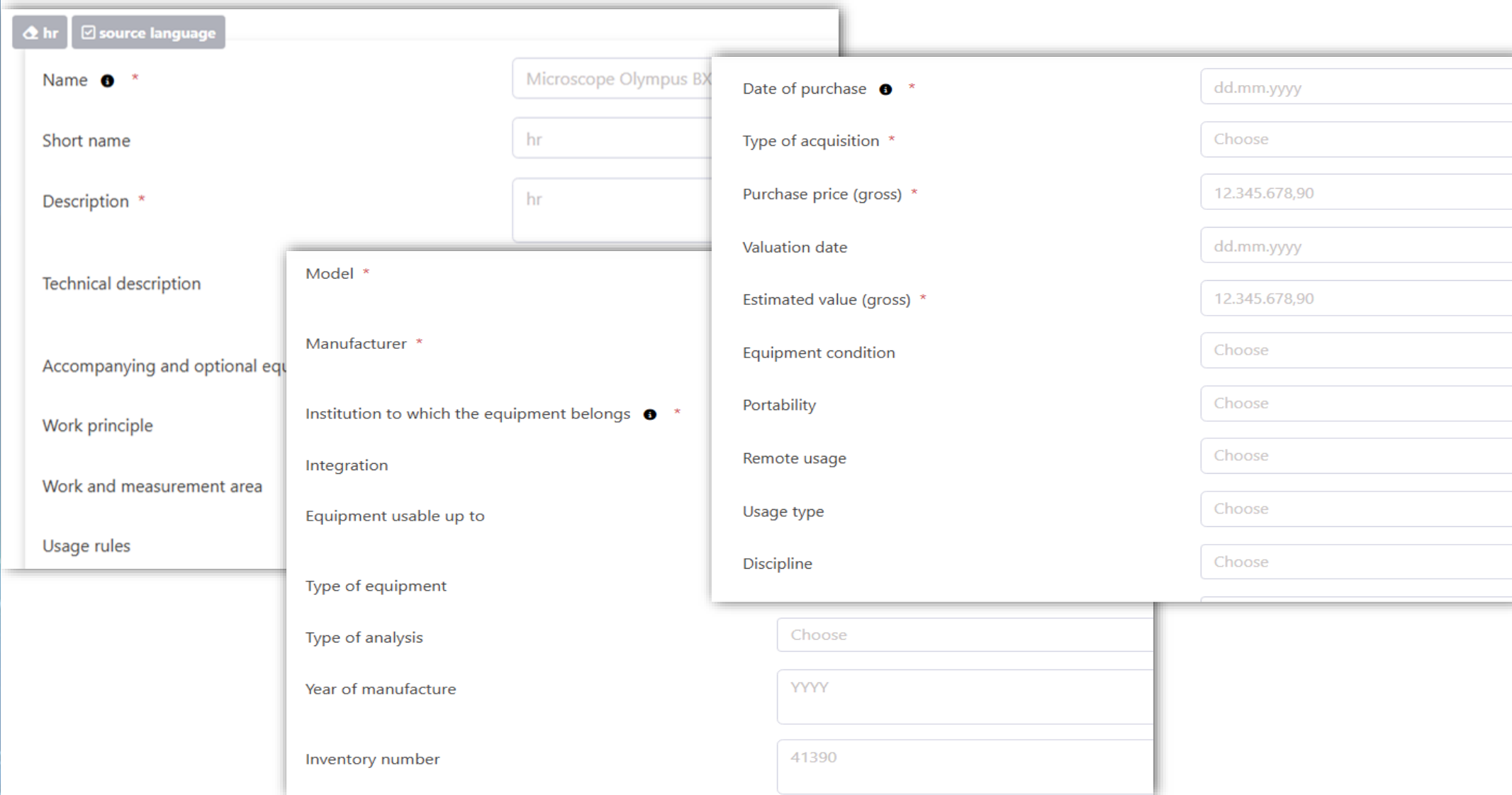
Metadata mapping (4)

- in Šestar, the project name during which an instrument was acquired stored as a free-text field -> inconsistent naming practices and incomplete references
- data aligned with authoritative project records from the POIROT database
- explicit linking between equipment and project entities within CroRIS enabled
- ŠestarIDs retained in a separate attribute
- to preserve historical linkage and enable a permanent record of the original entries imported from Šestar

Inclusion criteria

- equipment of a higher value, more specific and rare in the Croatian scientific and research community
- equipment which the institution offers for use to users from other institutions
- systematic record-keeping and improved transparency for the institution's internal needs
- no clearly defined monetary threshold
- not designed for logging consumables or office supplies, or standard work equipment (e.g., personal computers, small laboratory items, etc.)
- equipment included in different types of official reports for different CroRIS stakeholders (ministries, state agencies, universities etc.)
- an increasing number of project funders (e.g. Croatian Science Foundation) require equipment to be entered into CroRIS when applying for financing
- when applying to public calls issued by the Ministry for repairs, maintenance, or upgrades of research equipment, the equipment must be registered in CroRIS
- data about equipment used in the reaccreditation process of higher education institutions and research institutes carried out by the Agency for Science and Higher Education

Metadata Schema in CroRIS (1)



The screenshot displays the CroRIS Metadata Schema form for a microscope. The form is organized into several sections, each with a specific label and a corresponding input field. The 'Name' field is pre-filled with 'Microscope Olympus BX'. The 'Short name' and 'Description' fields are both pre-filled with 'hr'. The 'Technical description' field is empty. The 'Accompanying and optional equipment' field is empty. The 'Work principle' field is empty. The 'Work and measurement area' field is empty. The 'Usage rules' field is empty. The 'Model' field is empty. The 'Manufacturer' field is empty. The 'Institution to which the equipment belongs' field is empty. The 'Integration' field is empty. The 'Equipment usable up to' field is empty. The 'Type of equipment' field is empty. The 'Type of analysis' field is empty. The 'Year of manufacture' field is empty. The 'Inventory number' field is empty. The 'Date of purchase' field is empty. The 'Type of acquisition' field is empty. The 'Purchase price (gross)' field is empty. The 'Valuation date' field is empty. The 'Estimated value (gross)' field is empty. The 'Equipment condition' field is empty. The 'Portability' field is empty. The 'Remote usage' field is empty. The 'Usage type' field is empty. The 'Discipline' field is empty.

hr ☒ source language

Name ⓘ * Microscope Olympus BX

Short name hr

Description * hr

Technical description

Accompanying and optional equipment

Work principle

Work and measurement area

Usage rules

Model *

Manufacturer *

Institution to which the equipment belongs ⓘ *

Integration

Equipment usable up to

Type of equipment

Type of analysis Choose

Year of manufacture YYYY

Inventory number 41390

Date of purchase ⓘ * dd.mm.yyyy

Type of acquisition * Choose

Purchase price (gross) * 12.345.678,90

Valuation date dd.mm.yyyy

Estimated value (gross) * 12.345.678,90

Equipment condition Choose

Portability Choose

Remote usage Choose

Usage type Choose

Discipline Choose

Metadata Schema in CroRIS (2)

Contact persons

* At least one user in charge must exist

Add contact person:

Choose

Add new person

	Title before name	Email	Phone	Fax	Function	
Testni User	—	—	—	—	Choose	

Related projects

* It is necessary to enter either project or funder

Add related project:

Choose

Relation to equipment

No results

Funders

* It is necessary to enter either project or funder

Add funder to equipment

Funder type

Funder

No results

← Back

Submit

Metadata **Schema** in CroRIS (3)

data source: šestar ✓

Automatski čitač termoluminiscentnih dozimetara, Model HARSHAW 6600 (CroRIS ID: 54)

General and technical information Projects Funders Services Links and documents Contact Location

Institution **RUĐER BOŠKOVIĆ INSTITUTE**

Sub-entity level 1 no data

Sub-entity level 2 **Laboratorij za radijacijsku kemiju i dozimetriju**

Location

Address

Wing/Floor/Room

← Back

Automatski čitač termoluminiscentnih dozimetara, Model HARSHAW 6600 (CroRIS ID: 54)

General and technical information Projects Funders Services Links and documents Contact Location

Links

+ Add new link

Link type	URL
No results	

Submit

Documents

+ Add document

No uploaded documents

Images

+ Add image

No uploaded photos



Interconnection with other types of records

- Services (within module Equipment and services)
 - can be connected with equipment/instrument (from Equipment sub-unit) ; offered for different groups of users under certain terms; increases usability of equipment
 - metadata description aligned with EOSC (European Open Science Cloud) - April 2026 → Croatia candidate for national EOSC Node
- module Equipment and services → other modules: Organizational units (fields: Institution to which the equipment belongs; Funder; Location), Persons, Projects
- module CROSB (publications) → module Equipment and services



Positioning CroRIS within Emerging PID Infrastructures

- primarily aligned with the CERIF data model, but ongoing developments in the international research information landscape are being closely monitored
- Research Data Alliance Persistent Identification of Instruments Working Group
-> the growing importance of persistent identifiers (PIDs) for research equipment
- CroRIS -> at present, internal identifiers
- **different approaches** to introducing globally resolvable PIDs under consideration: established PID providers (DataCite) or assigning DOIs to equipment records directly within the CroRIS infrastructure?
- technical and governance questions, including metadata requirements, registration workflows, and long-term sustainability

Alignment of CroRIS Equipment Metadata with PIDINST Schema

- substantial alignment with PIDINST core properties
- richer and more structured metadata through controlled vocabularies and entity relationships
- relational linking of entities instead of identifier-based referencing
- certain PIDINST elements (e.g. external identifiers for entities such as manufacturers) not explicitly captured

PIDINST Property	CroRIS Equivalent	Alignment
Identifier	Internal ID	Partial
SchemaVersion	N/A	N/A
LandingPage	Record URL	Partial
Name	Name	Full
Owner	Institution	Full
Manufacturer	Manufacturer	Partial
Model	Model	Full
Description	Description	Full
InstrumentType	Controlled vocabularies	Partial
MesuredVariable	Work principle/Work and measurement area	Partial
Date	Date of purchase	Partial
RelatedIdentifier	Linked entities	Different approach
AlternateIdentifier	Inventory number	Partial



Conclusion

- from legacy database to interoperable CRIS module
- improved data quality, metadata harmonization, and standardization
- substantial alignment with PIDINST schema
- standardized metadata, controlled vocabularies, authoritative records, and clearly defined relationships between entities - FAIR
- increased visibility and transparency of Croatian research equipment
- contribution to data governance, interoperability, and the development of an open and sustainable research infrastructure landscape
- establishing sustainable workflows for persistent identification and metadata interoperability could further enhance the role of CroRIS in supporting open research infrastructures

Thank you!

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