



FIZ Karlsruhe – Leibniz-Institut für Informationsinfrastruktur

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## **RADAR:**

**Building a FAIR and community tailored  
Research Data Repository**

Felix Bach, Kerstin Soltau | FIZ Karlsruhe  
CoRDI, 12.-14.09.2023 in Karlsruhe

# RADAR – ReseArch DAta Repository

- Cross-disciplinary research data repository for **academic institutions** in Germany
- Allows **archivation, publication** and **peer-review** of research data from completed scientific studies and projects
- Developed as a cooperation project funded by DFG (2013-2016)
- Operated since 2017 by FIZ Karlsruhe as **“All-in-One” cloud service**
- Cooperation partners:
  - Operator & software development: FIZ Karlsruhe
  - Data storage (3 copies): KIT and TU Dresden
  - DOI registration: TIB (DataCite Member)




# RADAR – Core Functions

## Data Archival

- Secure Storage without publication
- Retention period: 5, 10 or 15 years
- Flexible access options

## Data Publication:

- Unlimited retention period (25+ years)
- DataCite-, reservation option
- Embargo option (1-12 months or unlimited)
- Indexing of metadata (RADAR, DataCite, Harvesting via OAI-PMH\*)

## Peer Review:

- Access to RADAR datasets via secure link

## Storage of data:

- All disciplines
- All formats
- Bitstream Preservation (geo-redundant, also metadata)

\* e.g. by B2Find, BASE, Google



Quelle: Wikimedia Commons/Simon A. Eugster. CC 3.0 BY SA

# RADAR Portal

[www.radar-service.eu](http://www.radar-service.eu)

Data providers login and access workspaces in order to

- archive or publish data
- access archived data

All data publications are:

- listed on portal
- can be accessed via DOI

The screenshot shows the RADAR Portal interface. At the top right, there is a language selector (DE, EN) and a search icon. A green arrow points from the text 'Data providers login' to a 'LOGIN ->' button in the top right corner. Below the header, the RADAR logo and 'FIZ Karlsruhe - Leibniz Institute for Information Infrastructure' are displayed. The main banner features the text 'RADAR Research Data Archive. Share. Publish.' and a 'More information >>' button. A search bar is located below the banner. The main content area is titled 'Latest data publications' and includes a filter sidebar on the left, a 'Show number of entries' dropdown (set to 10), and a 'sort by: Publication date' dropdown. Three data publication entries are listed, each with a 'RADAR 4KIT' logo. The first entry is 'Model results of solar extreme scenarios with the KASIMA model' by Reddmann, Thomas. The second is 'Repository-data\_\_Radar4Chem\_\_for-DOI\_10.1002-adfm.202211880.zip' by Heinke, Lars. The third entry is 'Distance between plots within the same quadrant for 179 Landklif plots in Landklif Project'. A 'verfügbar auf:' button is visible at the bottom right of the list.

DE EN

LOGIN ->

RADAR  
FIZ Karlsruhe - Leibniz Institute for Information Infrastructure

ABOUT RADAR FEATURES RADAR VARIANTS AGREEMENTS & PRICES SUPPORT

**RADAR**  
Research Data  
Archive. Share. Publish.

More information >>

SEARCH Enter search term

**Latest data publications**

Filter by

- Creators >
- Publishers >
- Production year >
- Language >
- Subject areas >
- License >
- Rights holders >

Show number of entries 10

sort by: Publication date

**Model results of solar extreme scenarios with the KASIMA model**

Publikationsdatum: 2023-06-16  
Fachgebiet: Environmental Science and Ecology / Physics / Atmospheric physics / Space science / Health physics  
Ersteller/in: Reddmann, Thomas

**Repository-data\_\_Radar4Chem\_\_for-DOI\_10.1002-adfm.202211880.zip**

Publikationsdatum: 2023-06-13  
Fachgebiet: Chemistry  
Ersteller/in: Heinke, Lars







**Distance between plots within the same quadrant for 179 Landklif plots in Landklif Project**

verfügbar auf:

# RADAR Landingpage

You are here: [Model results of solar extre...](#)

## Dataset: Model results of solar extreme scenarios with the KASIMA model

RADAR Metadata	Content	Statistics	Technical Metadata
Creator/Author:	Reddmann, Thomas  <a href="https://orcid.org/0000-0003-1733-7016">https://orcid.org/0000-0003-1733-7016</a>  <a href="#">Karlsruhe Institute of Technology</a>		
Title:	Model results of solar extreme scenarios with the KASIMA model		
Publishers:	Reddmann, Thomas  <a href="https://orcid.org/0000-0003-1733-7016">https://orcid.org/0000-0003-1733-7016</a>  <a href="#">Karlsruhe Institute of Technology</a>		
Production year:	2022-2023		
Subject areas:	Environmental Science and Ecology Physics Atmospheric physics Space science Health physics		
Resource type:	Model		
Publication year:	2023		
Rights holders:	Reddmann, Thomas  <a href="https://orcid.org/0000-0003-1733-7016">https://orcid.org/0000-0003-1733-7016</a>  <a href="#">Karlsruhe Institute of Technology</a>		

DOI: [10.35097/1104](https://doi.org/10.35097/1104)  
Publication date: 2023-06-16

### Download Dataset

[DOWNLOAD \(379.7 MB\)](#)

### Download Metadata

[RADAR](#)  [DOWNLOAD](#)

### Statistics

104 Views      1 Downloads

### Rights statement for the dataset

This work is licensed under

[CC BY-NC 4.0](#)



### Cite Dataset

[RADAR](#)  [COPY](#)

Reddmann, Thomas (2023): Model results of solar extreme scenarios with the KASIMA model. Reddmann, Thomas; Karlsruhe Institute of Technology. DOI: 10.35097/1104

← DOI

← Download data (.tar)  
acc. BagIt specification

← Download metadata

← Statistics

← Rights statement

← Citation

# RADAR – Metadata Annotation




- at the level of dataset (mandatory), folders and files (optional)
- via form-based editor, XML upload, RADAR API
- RADAR MD Schema: generic, bases on DataCite MD kernel
- Interfaces to ORCID, ROR, Crossref Funder Registry, GND, Open Street Map
- supports custom subject-specific MD schemas

## 10 mandatory parameters

Identifier\* (DOI / RADAR-ID)  
Creator\*   
Title\*  
Publisher\*   
Production year or time span  
Publication year\*  
Subject area  
Resource\*  
Rights\*  
Rightsholder 



## 13 optional parameters

Additional title  
Description\*  
Keyword   
Contributor\*   
Language\*  
Alternate identifier\*  
Related identifier\*  
Geo location\*  
Data source  
Software type  
Data processing  
Related information  
Funder information\* 

RADAR Metadata Schema v9.1  
bases on DataCite MD Kernel 4.4\*  
<https://radar.products.fiz-karlsruhe.de/en/radarfeatures/radar-metadatenschema>



# Who are the USERS ?





# RADAR – figures and operating variants



**RADARCloud**

used by 17 institutions



**RADARLocal**



**HERDER-INSTITUT**  
für historische Ostmitteleuropaforschung  
INSTITUT DER LEIBNIZ-GEMEINSCHAFT



used by 4 institutions  
on their own,  
institutional IT.

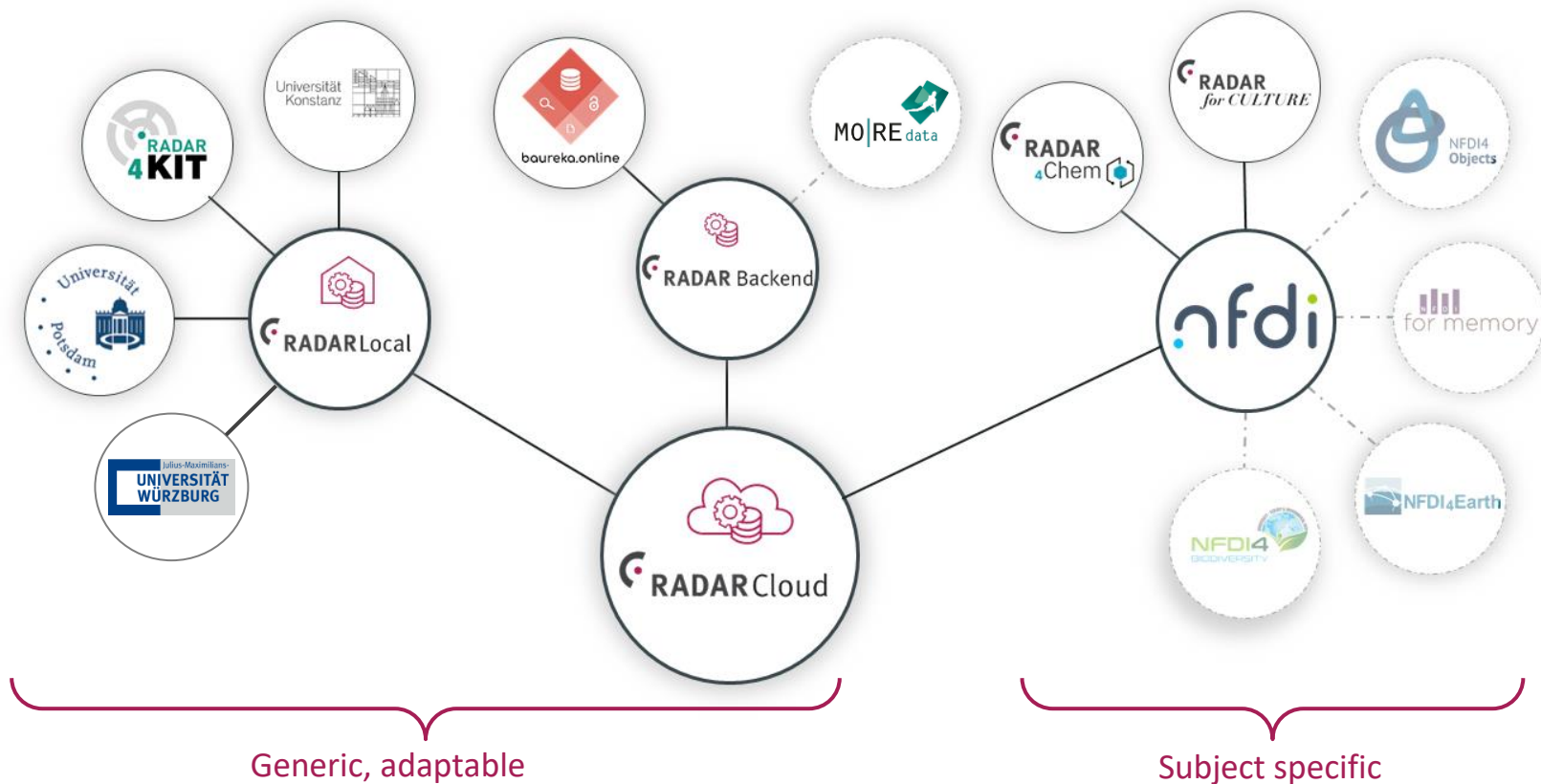


**HOCHSCHULE  
HANNOVER**  
UNIVERSITY OF  
APPLIED  
SCIENCES  
AND ARTS

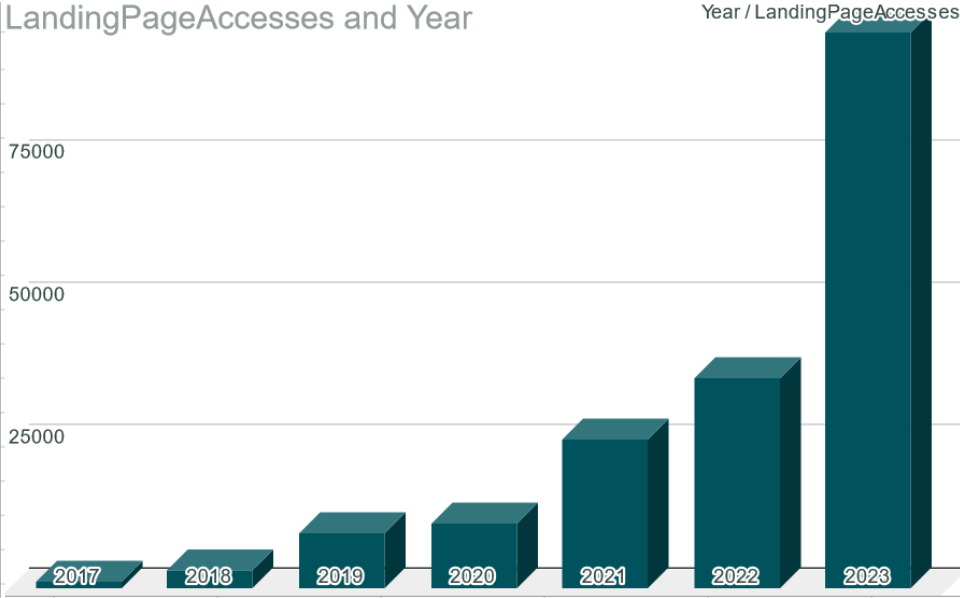
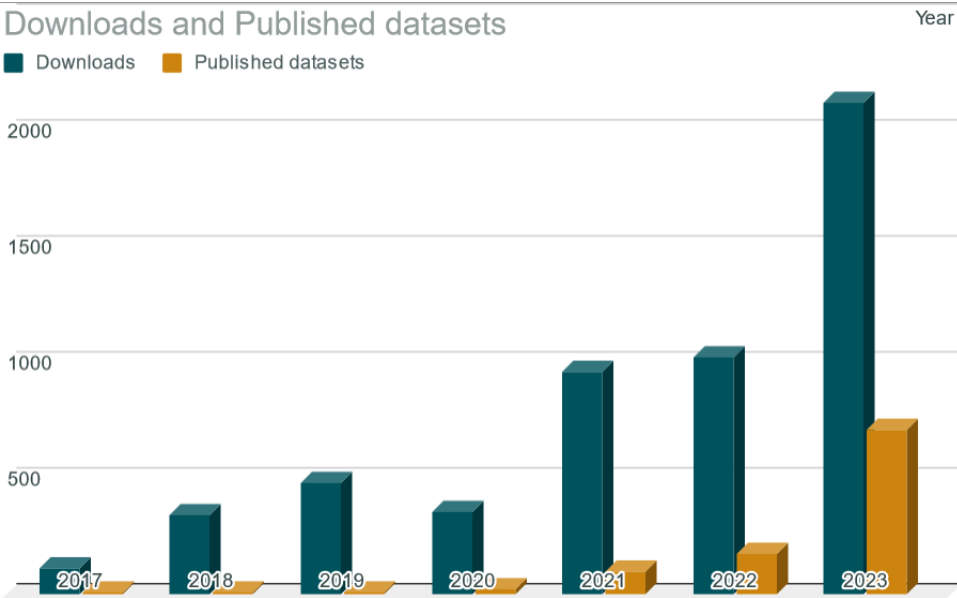




# RADAR – Diverse Offers



# RADAR statistics – increasingly used!



<b>Landingpage Accesses</b>	<b>186.596</b>
<b>Downloads</b>	<b>5.505</b>
<b>Published Datasets</b>	<b>1.017</b>

\* numbers from 07.09.2023

# Many users => requirements from many stakeholders

Serving the interests from different stakeholders - many new ones (e.g. NFDI...)

- **institutional**: RADAR's user advisory board, representatives of institutions
- **scientific communities**
  - Functional requirements - viewers, special data access techniques
  - Subject specific metadata
  - Terminologies & ontologies
- steadily optimise **FAIR**ness - see our implementation of FAIR measures  
[https://radar.products.fiz-karlsruhe.de/sites/default/files/radar/docs/info/RADAR\\_FAIR\\_Principles.pdf](https://radar.products.fiz-karlsruhe.de/sites/default/files/radar/docs/info/RADAR_FAIR_Principles.pdf)
  - Current focus: Machine readability, Machine actionability
  - FAIR impact call: Goal: Better FAIR metrics of datasets (RADAR4Chem)

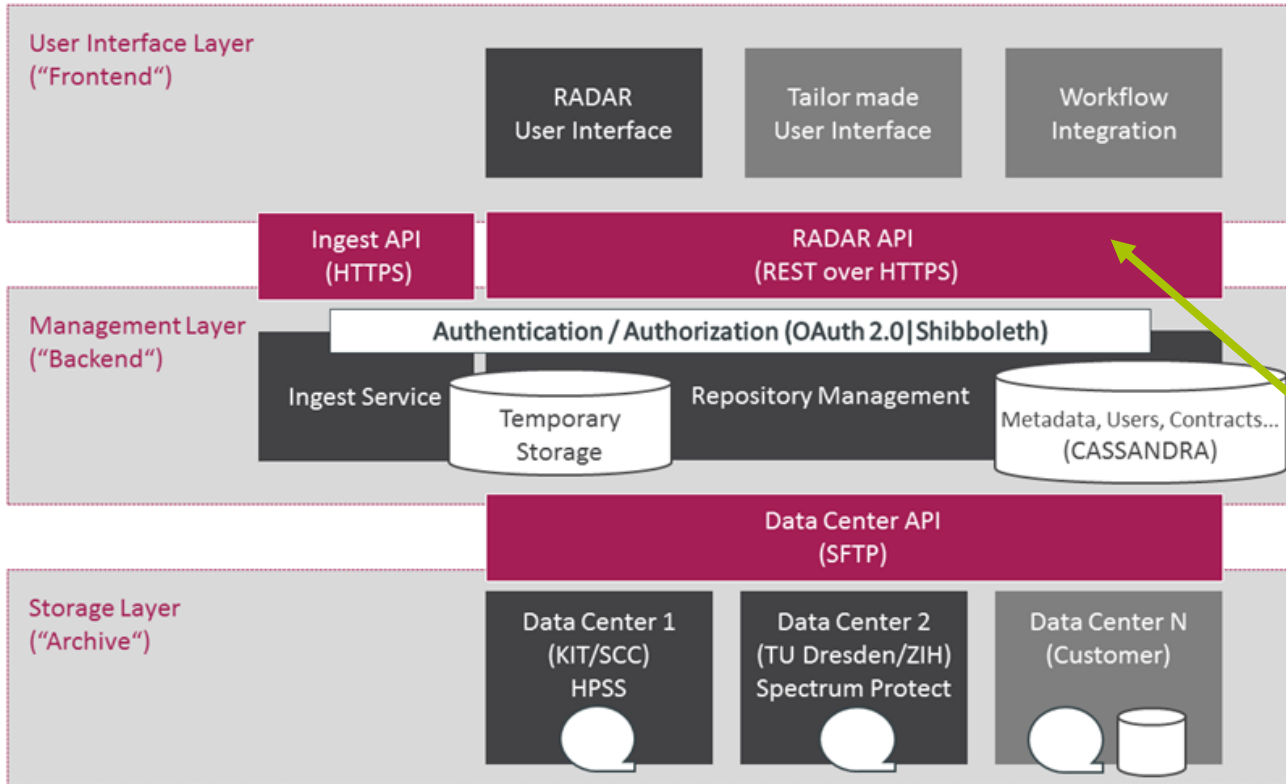


RADAR implementation of FAIR

# RADAR – modular, open System Architecture (l)

&

# Flexible Deployment (r)



- Deployed as Containers



- Orchestration

- Docker Swarm
- Config Mgmt using Ansible



- soon



**kubernetes**

- REST API for
  - Frontend
  - Backend

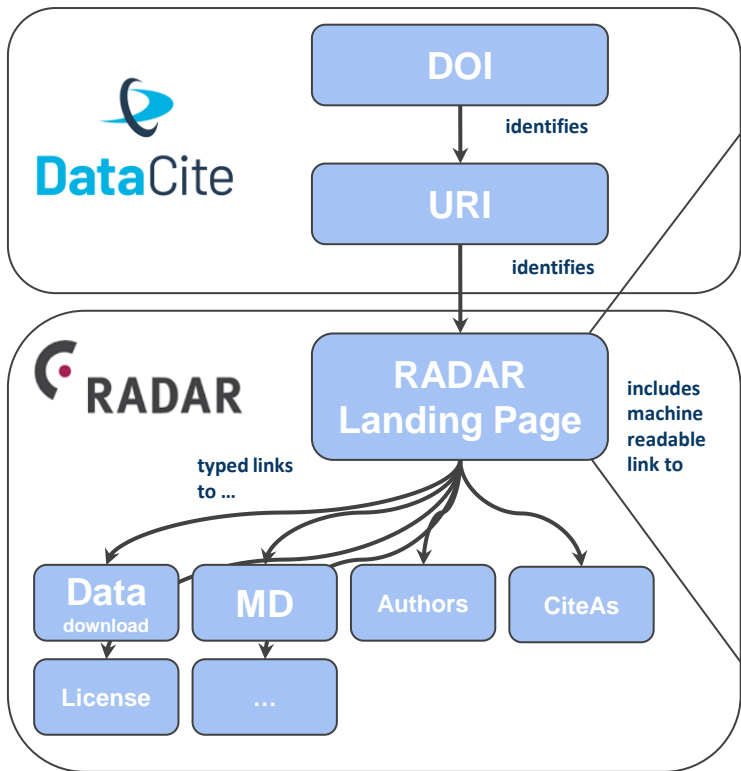
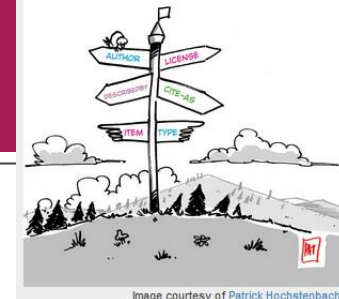


# RADAR – recent improvements

- Disciplinary MD allowed
  - upload as XML, including validation
- Unlimited embargo
- Update of RADAR MD schema, e.g.
  - Integration of further normdata
    - GND via [lobid.org](https://lobid.org), (for now in keywords)
    - additional PIDs (e.g. ROR for institutions)
  - added software licenses
- Machine-readability and -actionability of dataset landing pages (details on next slide)
  - “FAIR Signposting” - typed links to find data sections without parsing HTML
  - improved Schema.org embedded

# Machine-friendly Landingpages

## 1) FAIR Signposting & 2) embedded Schema.org MD



### 1) FAIR Signposting for machines using typed links in header

- Link: <<https://doi.org/10.35097/946>> ; rel="cite-as"
- Link: <<https://creativecommons.org/licenses/by/4.0/deed.de>> ; rel="license"
- Link: <<https://orcid.org/0000-0002-7148-7210>> ; rel="author"
- Link: <<https://www.radar-service.eu/radar-backend/archives/ckPELTywdlqHnNxe/versions/1/content>> ; rel="item" ; type="application/x-tar"
- Link: <<https://www.radar-service.eu/radar/de/export/ckPELTywdlqHnNxe/exportdatacite>> ; rel="describedby" ; type="application/vnd.datacite.datacite+xml"
- Link: <<https://www.radar-service.eu/radar/de/export/ckPELTywdlqHnNxe/exportbibtex>> ; rel="describedby" ; type="application/x-bibtex"
- Link: <<https://www.radar-service.eu/radar/de/export/ckPELTywdlqHnNxe/exportradarmetadata>> ; rel="describedby" ; type="text/xml"

RADAR is listed as early adopter of FAIR Signposting!  
See <https://signposting.org/adopters/>

### 2) embedded Schema.org

→ see example on next slide...

soon also "Bioschemas" in RADAR4Chem?



# Schema.org example: MD in turtle format

→ Easy to consume for agents, reusable in KGs, Searches, ...

```
<https://radar.kit.edu/id/FodZctMCRdFP0rXu>
  a
    <http://schema.org/Dataset> ;
    <http://schema.org/copyrightHolder>
      [ a
        <http://schema.org/Person> ;
        <http://schema.org/name> "Loewe, Axel" ;
        <http://schema.org/sameAs> "https://orcid.org/0000-0002-2487-4744"
      ] ;
    <http://schema.org/creator> [ a
      <http://schema.org/Person> ;
      <http://schema.org/affiliation>
        [ a
          <http://schema.org/Organization> ;
          <http://schema.org/name> "Institut für Biomedizinische Technik"
        ] ;
      <http://schema.org/familyName> "Dössel" ;
      <http://schema.org/givenName> "Olaf" ;
      <http://schema.org/name> "Dössel, Olaf"
    ] ;
    <http://schema.org/datePublished>
      "2023-06-24" ;
    <http://schema.org/description>
      "This dataset contains about 1.8 million body surface potentials (BSPs) simulated using 1000 heart models generated usi..." ;
    <http://schema.org/distribution>
      [ a
        <http://schema.org/DataDownload> ;
        <http://schema.org/contentSize>
          "189706600448 bytes" ;
        <http://schema.org/contentUrl> "https://www.radar-service.eu/radar-backend/archives/FodZctMCRdFP0rXu/versions/1/conten..." ;
        <http://schema.org/encodingFormat>
          "application/x-tar"
      ] ;
    <http://schema.org/identifier> "https://doi.org/10.35097/1573" ;
    <http://schema.org/isAccessibleForFree>
      "true" ;
    <http://schema.org/keywords> "extrasystoles" , "Engineering" , "ECG" , "in silico" ;
    <http://schema.org/license> "https://creativecommons.org/licenses/by-nc-sa/4.0/deed.en" ;
```



# Machine-friendliness

## New dedicated URIs and endpoints for MD in different formats

1. **URL** in EN and DE (embedding Schema.org JSON-LD for Google etc.)  
<https://www.radar-service.eu/radar/de/dataset/FodZctMCRdFPOrXu>

2. **URL** returning **Schema.org** as **turtle** <https://www.radar-service.eu/radar/de/dataset/FodZctMCRdFPOrXu.ttl>

3. New: **URI**  
<https://www.radar-service.eu/id/FodZctMCRdFPOrXu>  
redirecting to old dataset url  
<https://www.radar-service.eu/radar/de/dataset/FodZctMCRdFPOrXu>

4. New: **URI** returning **MD** as **turtle**  
<https://www.radar-service.eu/id/FodZctMCRdFPOrXu.ttl> → the example I showed...

5. New: **URI** returning **MD** as **JSON-LD**  
<https://www.radar-service.eu/id/FodZctMCRdFPOrXu.jsonld>

# RADAR – Outlook

- Integration of
  - additional PIDs for Normdata
  - Vocabulary- and Ontology services (like the offerings of TIB)
- Disciplinary MD
  - Interoperability with MD schema editors (like CEDAR)
  - Integration of editors for custom MD schemes
- Management of Big Data (in the TB range)
  - Optimisation of Web Uploader
  - Data import workflows - via WebDav (in development)
  - architectural improvements (minimize data moving, link existing archived data)
- Single file access within datasets, copy on disk?
- => Integration of previews and editors
- => Versioning of datasets
- Increase FAIRness scores of data sets (fine tuning)

- RADAR participates in a support measure by the FAIR-IMPACT Project\*  
**“FAIRness assessment challenge for datasets and semantic artefacts”**
- Goal: further improve FAIRness of RADAR research datasets.
- Increasingly, evaluation tools and methods are used to evaluate the FAIRness of research data.
- Starting Sept. 2023: RADAR will be supported by FAIR-IMPACT mentors and project partners to use some of these tools ([F-UJI](#), [O’FAIRe](#) and [FOOPS](#)) and methods (FAIR Data Maturity Model ([FDMM](#)) and [Ten simple rules for FAIR vocabularies](#)).

\* successfull application in Open Call together with 16 other applicants.



CoRDI Slides RADAR Repository

Slides



Link to RADAR Repository, FIZ Karlsruhe

[www.radar-service.eu](http://www.radar-service.eu)

Thank you  
for your kind attention!

## **RADAR**

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 @RADAR\_Service



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