

Compliance tools in INSPIRE: The Reference Validator

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**The European Commission's
science and knowledge service**
Joint Research Centre



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European
Commission

INSPIRE Directive



DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 14 March 2007










establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

- Aims to create a **European SDI** for the purposes of EU **environmental policies**
- Provides a comprehensive framework for **interoperability of spatial data**:
 - inventory (monitoring of implementation)
 - **data** & service sharing
 - data & service discovery (**metadata**)
 - **network services**
 - data interoperability
- based on the SDIs established and operated by the EU Member States

INSPIRE Directive – Spatial focus

- INSPIRE addresses 34 spatial data themes for environmental applications:

ANNEX: 1

 Addresses	 Administrative units
 Cadastral parcels	 Coordinate reference systems
 Geographical grid systems	 Geographical names
 Hydrography	 Protected sites
 Transport networks	

ANNEX: 2

 Elevation	 Geology
 Land cover	 Orthoimagery

ANNEX: 3

 Agricultural and aquaculture facilities	 Area management / restriction / regulation zones & reporting units
 Atmospheric conditions	 Bio-geographical regions
 Buildings	 Energy resources
 Environmental monitoring facilities	 Habitats and biotopes
 Human health and safety	 Land use
 Meteorological geographical features	 Mineral resources
 Natural risk zones	 Oceanographic geographical features
 Population distribution and demography	 Production and industrial facilities
 Sea regions	 Soil
 Species distribution	 Statistical units
	 Utility and governmental services

Implementing Rules (IR), Technical Guidelines (TG) and tools

“What Member States must implement”
(abstract specification)

legally binding

Directive

Commission Regulation

not legally binding

Technical Guidelines

“How Member States might implement it”
(implementation specification)

Tools implementing INSPIRE requirements

INSPIRE Directive 2007/2/EC

Implementing Rules

TG – Network Services

TG – Data Specifications

TG – Metadata

INSPIRE Validator

INSPIRE Reference Validator

- Reasons to develop an INSPIRE validator:
 - help Member States data providers **test resources** (metadata, data sets and network services) against INSPIRE requirements
 - help INSPIRE coordinators (DG ENV, JRC & EEA) and national coordinators **check INSPIRE implementation progress** in Member States & across Europe
 - support Monitoring and Reporting
 - help solution providers **check their software solutions** against INSPIRE requirements
- Supported by **ARE3NA & ELISE actions** under ISA/ISA² programmes

INSPIRE Reference Validator – Components

INSPIRE Reference Validator – Components



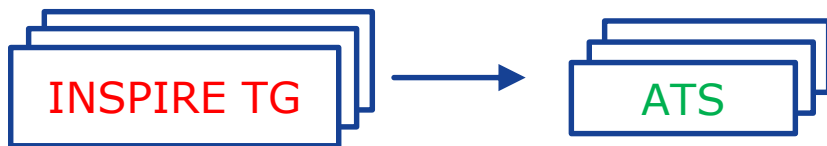
INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

INSPIRE Reference Validator – Components

Abstract Test Suites (ATS)

high-level descriptions of test cases



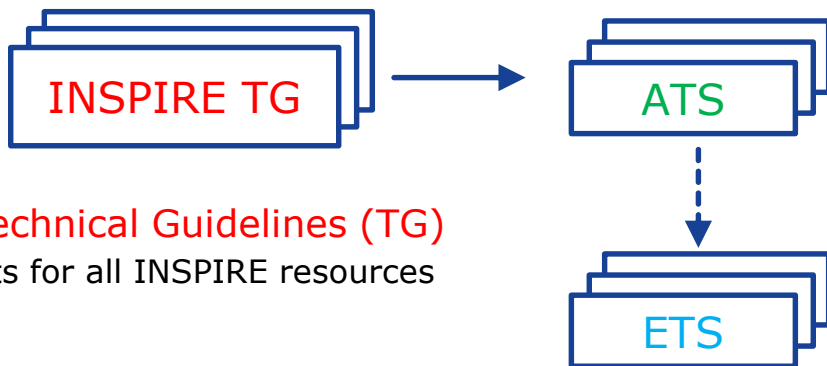
INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

INSPIRE Reference Validator – Components

Abstract Test Suites (ATS)

high-level descriptions of test cases



INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

Executable Test Suites (ETS)

lower-level descriptions of test cases

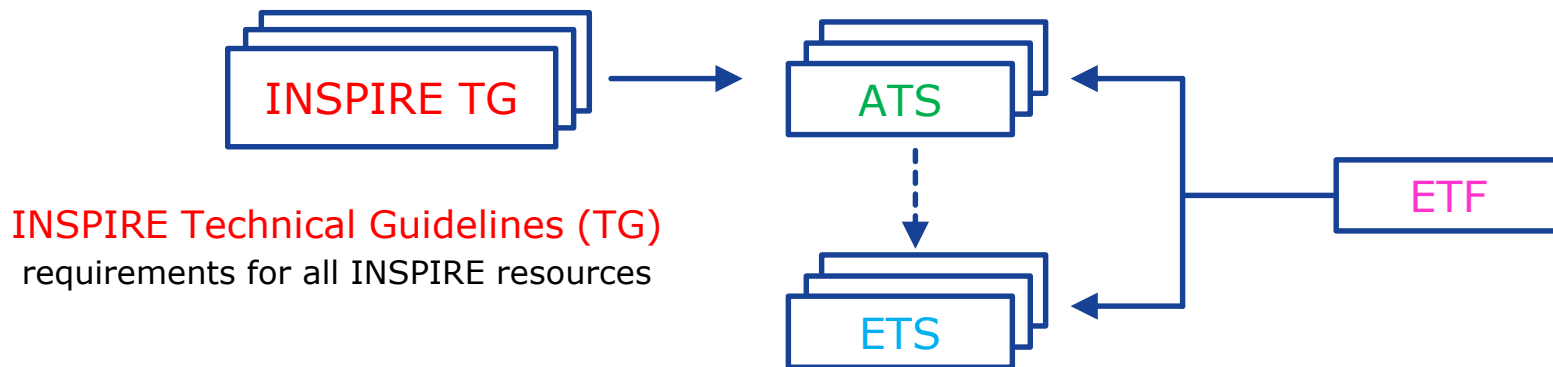
INSPIRE Reference Validator – Components

Abstract Test Suites (ATS)

high-level descriptions of test cases

Testing Framework (ETF)

software where ETS are run



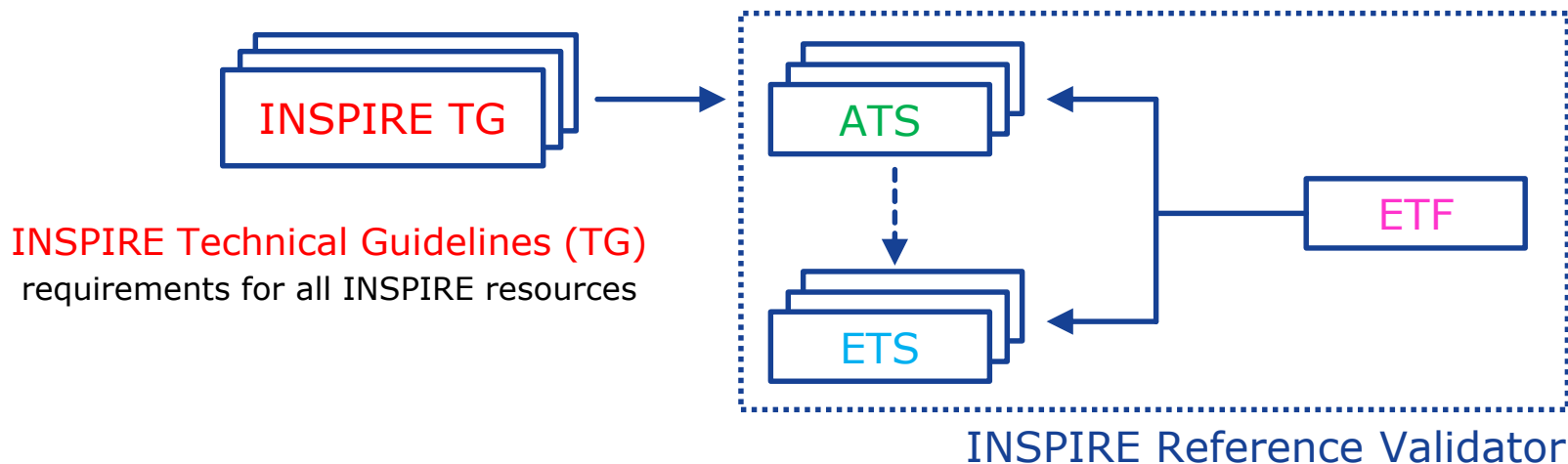
INSPIRE Reference Validator – Components

Abstract Test Suites (ATS)

high-level descriptions of test cases

Testing Framework (ETF)

software where ETS are run



Executable Test Suites (ETS)

lower-level descriptions of test cases

Abstract & Executable Test Suites (ATS & ETS)



INSPIRE Validation & conformity testing

Workspace for INSPIRE action 2017.4 on validation & conformity testing

<https://webgate.ec.europa.eu/fpfis/wikis/x/9JqgE>

Repositories 25 Packages People 14 Teams 3 Projects

metadata

Abstract Test Suite for the Technical Guidelines for INSPIRE Metadata based on EN ISO 19115 and EN ISO 19119

CC0-1.0 11 2 12 (1 issue needs help) 0 Updated 18 days ago

discovery-service

Abstract Test Suite for the Technical Guidance for INSPIRE Discovery Services

CC0-1.0 1 0 34 2 Updated 19 days ago

view-service

Abstract Test Suite for the Technical Guidance for the implementation of INSPIRE

View Services

CC0-1.0 3 0 4 0 Updated on Jun 26

download-service

Abstract Test Suite for the Technical Guidance for the implementation of INSPIRE

Download Services

CC0-1.0 4 1 11 0 Updated on Jun 11

- Agreed with the [MIG sub-group 2017.4](#) on validation and conformity testing
- Maintained on [GitHub](#):
 - Metadata (TG v.1.3 & 2.0)
 - Discovery Services (CSW)
 - View Services (WMS, WMTS)
 - Download Services (Atom, WFS, WCS, SOS)
 - Cross-cutting Data Specifications
 - Annex I Data Specifications

<https://github.com/inspire-eu-validation>

Testing Framework (ETF)



- INSPIRE Validator makes use and further extends ETF:
 - a testing framework to validate data, metadata & web services in SDIs
 - developed since 2010, open source under EUPL v1.2
- Any ETF deployment is composed of:
 - a database, one or more test engines & a servlet container
- Currently supported test engines to execute ETS are:
 - SoapUI for testing web services
 - BaseX for testing sets of XML documents
 - TEAM Engine – the tool used by the OGC CITE tests
- ETF can be used through a responsive web application and a REST API
- The easiest way to deploy ETF is a Docker container, available on Docker Hub.

INSPIRE Validator – Web application

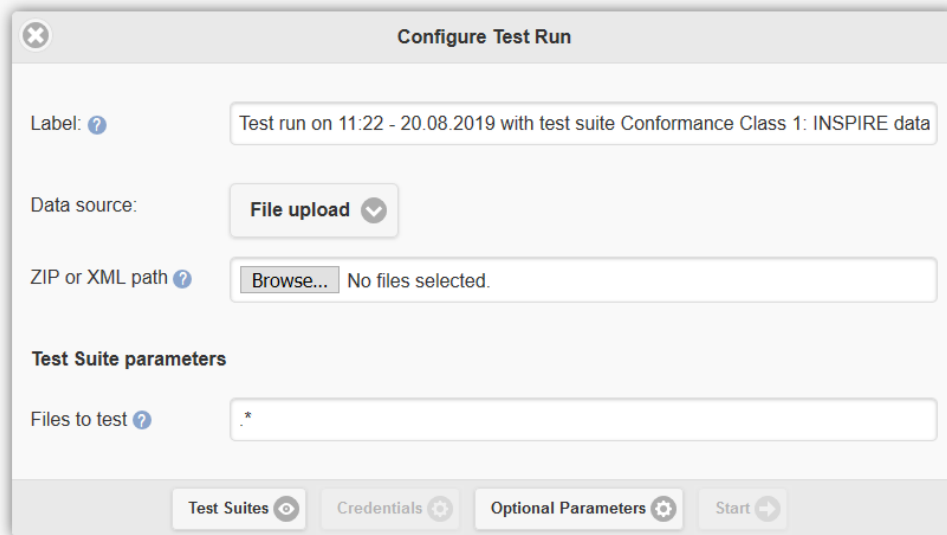
- Select the Conformance Class(es) to test:

The screenshot displays the 'Start test' tab of the INSPIRE Validator web application. The interface includes a top navigation bar with links for 'Start test', 'Status', 'Test reports', 'Help', and 'About'. The main content area is titled 'Metadata (TG version 1.3)' and lists several conformance classes. A 'Start' button is visible in the top right corner of the main area.

Conformance Class	Status
Conformance class: INSPIRE Profile based on EN ISO 19115 and EN ISO 19119	<input type="button" value="Start"/>
Conformance class: Metadata for interoperability	<input type="button" value="use"/>
Metadata (TG version 2.0) - BETA	
Common Requirements for ISO/TC 19139:2007 based INSPIRE metadata records.	<input checked="" type="checkbox"/>
Conformance Class 1: INSPIRE data sets and data set series baseline metadata.	<input checked="" type="checkbox"/>
Conformance Class 2: INSPIRE data sets and data set series interoperability metadata.	<input type="button" value="use"/>
Conformance Class 3: INSPIRE Spatial Data Service baseline metadata.	<input type="button" value="use"/>
Conformance Class 4: INSPIRE Network Services metadata.	<input type="button" value="use"/>
Conformance Class 5: INSPIRE Invocable Spatial Data Services metadata.	<input type="button" value="use"/>
Conformance Class 6: INSPIRE Interoperable Spatial Data Services metadata.	<input type="button" value="use"/>
Conformance Class 7: INSPIRE Harmonised Spatial Data Services metadata.	<input type="button" value="use"/>

INSPIRE Validator – Web application

- Upload/link the resource to test:




The screenshot shows a 'Configure Test Run' dialog box with the following fields and controls:

- Label:** A text field containing 'Test run on 11:22 - 20.08.2019 with test suite Conformance Class 1: INSPIRE data'.
- Data source:** A dropdown menu currently set to 'File upload'.
- ZIP or XML path:** A text field with a 'Browse...' button and the text 'No files selected.'.
- Test Suite parameters:** A section header.
- Files to test:** A text field containing a wildcard '*'.
- Footer:** Four buttons: 'Test Suites' (with an eye icon), 'Credentials' (with a gear icon), 'Optional Parameters' (with a gear icon), and 'Start' (with a right arrow icon).

INSPIRE Test Framework – Web application

- Access the HTML test report:


Test run on 11:22 - 20.08.2019 with test suite Conformance Class 1: INSPIRE data sets and data set series baseline metadata.

Status Failed
Started 20/08/2019 09:27:30 GMT
Duration 26 s


	Total	Count	Skipped	Failed	Warnings	Manual
Test suites	2	0	1	0	0	
Test cases	6	0	1	0	0	
Assertions	31	0	1	0	0	

Show
☒ All
☐ Only failed
☐ Only manual

Level of detail
☐ All details
☐ Less information
☒ Simplified

 Common Requirements for ISO/TC 19139:2007 based INSPIRE metadata records.

Failed: 1 / 3

 Conformance Class 1: INSPIRE data sets and data set series baseline metadata.

3

Report generated by ETF

INSPIRE Testing Validator – Web application

- Access the HTML test report:

Common Requirements for ISO/TC 19139:2007 based INSPIRE metadata records. Failed: 1 / 3

This is a draft version. It has limitations and is expected to contain errors. Please report any issues or problems [in GitHub](#).

Known limitations are documented in the description of the applicable test case or test assertion.

There is a general limitation in all assertions that polymorphism and containment by reference (see the [Technical Guidance](#), sub-clauses A.3, A.4 and A.5) are not supported. However, the current Abstract Test Suite does not support polymorphism and references either (all XPath expressions do not support polymorphism or references; in addition, schema validation is only executed against the ISO/OGC schemas without extensions). It is therefore unclear if this is really a limitation or if the sections in the technical guidance are outdated.

Source: [Common Requirements for ISO/TC 19139:2007 based INSPIRE metadata records](#)

Status Failed
Duration 23 s
Version 0.1.1

General requirements Failed: 1 / 5

Execute tests that apply for all metadata records on elements that are directly child elements of the root node of the XML document: MD_Metadata node.

Status Failed
Duration 23 s


- + md common req C.1: XML Schema
- ✓ md common req C.2: Root Element
- md common req C.5: Language Code


Test that a resource language is given pointing to one of the official languages of the Community expressed in conformity with ISO 639-2

More information: [Metadata Language](#)

INSPIRE Validator – REST API

- Documented using OpenAPI:

 **swagger**

default (/v2/api-docs) 

Explore

ETF Web API

This is an interactive documentation and a web user interface for interacting with the Web API version 2 of the test framework [ETF](#). This semi-automatic generated documentation covers basic functionality, but consulting the [API Documentation](#) may be required to get a deeper understanding of the ETF model and further procedures. Issues can be reported in [GitHub](#).

Content negotiation is not supported and therefore JSON is always returned for endpoints without file extension. For most operations, a link to the XML response schema is provided in the implementation nodes. JSON responses are derived from XML the response schema, based on this [stylesheet](#).

[Back to user interface](#)

Created by ETF Team
See more at <http://www.etf-validator.net>
[Contact the developer](#)
[European Public License 1.2](#)

1. Service Status : Monitor service workload and health	Show/Hide	List Operations	Expand Operations
2. Service Capabilities : Retrieve test framework metadata	Show/Hide	List Operations	Expand Operations
3. Manage Test Objects : Define Test Objects and upload test data	Show/Hide	List Operations	Expand Operations
4. Manage Test Runs : Start and control test runs	Show/Hide	List Operations	Expand Operations
5. Test Run Results : Retrieve test results	Show/Hide	List Operations	Expand Operations
GET /v2/TestRuns.json			Get multiple Test Results as JSON
GET /v2/TestRuns.xml			Get multiple Test Results as XML
DELETE /v2/TestRuns/{id}			Cancel and delete a Test Run
GET /v2/TestRuns/{id}			Get a single Test Result as JSON
HEAD /v2/TestRuns/{id}			Check if the Test Run exists
GET /v2/TestRuns/{id}.html			Generate a HTML Test Report

Testing Framework (ETF) – Governance



- **Steering Group (SG):** Project Governance
 - very significant contributions: Organizations and Developers
 - voting system: consensus of all members (where possible)
- **Technical Committee (TC):** Technical management
 - proven technical capacity over time
 - TC analyzes and propose candidates
 - SG assesses and accepts/rejects new TC members proposal
- **Developers:** Project Contributions
 - regulated by EUPL & Developer Certificate of Origin (DCO)

Testing Framework (ETF) – Governance



Repositories 19 People 5 Teams 2 Projects 3 Settings

ETF Improvement Proposals (EIPs)
Updated 28 days ago

Filter cards

Filter cards

15

Proposer: draft/refine EIP

1

Add new result status

governance#24 opened by jonherrmann

EIP

2

Refresh BaseX DB at given intervals, but not during startups

governance#45 opened by michellutz

EIP

3

Performance optimisations of the geometry validation module (GmlGeoX) [DRAFT]

governance#57 opened by jonherrmann

EIP-draft

4

New module for testing topological errors in spatial data [DRAFT]

governance#59 opened by jonherrmann

EIP-draft

5

Schema validation cache [DRAFT]

governance#49 opened by jonherrmann

EIP-draft

6

Web interface for organization-internal workflows

governance#27 opened by jonherrmann

EIP-draft

7

Separate automatic from manual checks

governance#61 opened by MarcoMinghini

EIP

1

SG: discussion

1

Simplify the customization of the ETF header/footer

governance#67 opened by MarcoMinghini

EIP

5

TC: analysis

1

Adding support for SOS ETS

governance#65 opened by carlospzurita

EIP-draft

2

Adding support for WCS ETS

governance#66 opened by carlospzurita

EIP-draft

3

Load (at least) the most used Test Suites in memory

governance#44 opened by michellutz

EIP

4

Test reports: Support printable version

governance#31 opened by michellutz

EIP

5

Visual improvement of test reports

governance#60 opened by MarcoMinghini

EIP

7

TC: in release planning

1

Reusable Test Objects

governance#26 opened by jonherrmann

EIP-approved

2

Test Run Templates

governance#28 opened by jonherrmann

EIP-approved

3

Open log view in new tab

governance#34 opened by michellutz

EIP-approved

4

Add a Rerun button

governance#18 opened by jonherrmann

EIP-approved

5

Introduce a parameter to control the maximum number of threads

governance#48 opened by michellutz

EIP-approved

6

Support to cloud deployment

governance#13 opened by robsgnao

EIP-approved

7

Show ETS dependencies in user view

governance#30 opened by michellutz

EIP-approved

1

TC: scheduled for release

1

Custom properties in test model items

governance#25 opened by jonherrmann

EIP-approved

0


Implemented

Automated as Done Manage



INSPIRE Validation Community

- The central place of interaction for the INSPIRE community:
 - changelog & release planning
 - helpdesk to
 - report problems
 - propose new features
 - open discussions



INSPIRE Validation & conformity testing

Workspace for INSPIRE action 2017.4 on validation & conformity testing

<https://webgate.ec.europa.eu/fpfis/wikis/x/9lqgE>

Repositories 25

Packages

People 15

Teams 3

Projects

Settings

community

Community discussion forum for INSPIRE validation issues

7 8 65 2 Updated 16 days ago

inspire-eu-validation / community

Unwatch 34 Star 8 Fork 7

Code Issues 65 Pull requests 2 Projects 0 Wiki Security Insights Settings

Community discussion forum for INSPIRE validation issues

Manage topics

95 commits 2 branches 0 releases 6 contributors

Branch: master New pull request

Create new file Upload files Find File Clone or download

fabiovin NetworkService-WMS Metadata 2.0 example Latest commit 414c908 22 days ago

.github/ISSUE_TEMPLATE	Update problem.md	11 months ago
examples	NetworkService-WMS Metadata 2.0 example	22 days ago
README.md	Update README.md	2 months ago
changelog.md	Update changelog.md	2 months ago
release_planning.md	Update release_planning.md	29 days ago

README.md

IMPORTANT - Please read carefully!

The old instance of the Validator has been just replaced by [the new cloud instance](#), where you can test additional resources (please refer to the [release planning](#) for details).

INSPIRE Validation Community

This space is used for discussions and announcements around INSPIRE validation & conformity testing.

Use the issue tracker to

- [report a problem](#) with the INSPIRE validator or test results,
- [propose a new feature](#) or [an improvement](#) to the existing functionality of the INSPIRE validator, or
- [start a discussion or raise a question](#) on the INSPIRE validator

See the [changelog](#) and the [release planning](#) for the current features and the future development/release plans for the ATS & ETS development corresponding to the [Staging instance](#) and the [Production instance](#) of the INSPIRE Reference Validator. For the roadmap of the ETF software, refer to the [project board](#) of the ETF-Validator project.

<https://github.com/inspire-eu-validation/community>

INSPIRE Validator – Current & future work

- Use of the INSPIRE Validator to test metadata conformity within Monitoring and Reporting
- Development of **new ATS/ETS** on:
 - Annex II/III Data Specifications
 - coverage data sets
 - **new validation requirements** emerging from INSPIRE MIWP
 - alternative encodings (GeoJSON)
 - simplification of data-service linking
- **Workshop** on the INSPIRE Validator:
 - October 1-2, 2019 with separate sessions for users & developers
 - material available at
<https://github.com/inspire-eu-validation/community/tree/master/training%20material>

Thank you!

Questions?

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Stay in touch



EU Science Hub: ***ec.europa.eu/jrc***



Twitter: ***[@EU_ScienceHub](https://twitter.com/EU_ScienceHub)***



Facebook: ***[EU Science Hub - Joint Research Centre](https://www.facebook.com/EU_Science_Hub_-_Joint_Research_Centre)***



LinkedIn: ***[Joint Research Centre](https://www.linkedin.com/company/joint-research-centre)***



YouTube: ***[EU Science Hub](https://www.youtube.com/EU_Science_Hub)***