

Harnessing the power of Natural Science Collections



DISCO

Distributed System of Scientific Collections





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DiSSCo in a nutshell
14 key-messages

DiSSCo **enables** the construction of an integrated knowledge base on top of data from Natural Science Collections

DiSSCo, a pivotal research infrastructure

The Distributed System of Scientific Collections (DiSSCo) is a new world-class Research Infrastructure (RI) for Natural Science Collections (NSCs). The DiSSCo RI works towards the digital unification of all European natural science assets under common curation and access policies and practices. These aim to make collections data easily *Findable*, more *Accessible*, *Interoperable* and *Reusable* (**FAIR**).

As such, DiSSCo enables the transformation of a fragmented landscape of essential natural science collections into an integrated knowledge base that provides interconnected hard evidence of the natural world.

DiSSCo represents the largest ever formal agreement between natural history museums, botanical gardens and collection-holding universities in the world.



Why do we need DiSSCo?

Natural Science Collections are essential resources that enable scientists to discover and document the world's bio- and geodiversity. Moreover, biodiversity and geodiversity data when pooled together, rendered accessible and managed properly, have the power to inform cross-domain efforts tackling societal and global challenges.

As a NSC-based infrastructure, DiSSCo is helping **to map out a sustainable future for the natural world.**

Data derived from European Natural Science Collections are crucial to understand life on Earth, analyse its history, and predict future alterations. These data provide baseline evidence of the natural world that informs policy decisions to mitigate climate change and halt biodiversity loss, contributing to the sustainable and healthy growth of our societies. DiSSCo becomes the digital repository of Natural Science Collections that are foundational to innovations worldwide, supports new breakthrough scientific discoveries and facilitates decision-making and legislative processes.



DiSSCo unites Natural Science Collections

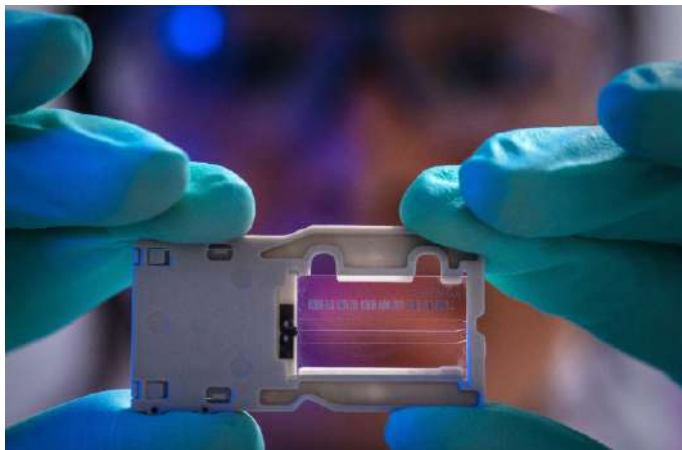
DiSSCo facilitates innovation, scientific discovery and decision-making ■

Through an unprecedented agreement, more than 120+ institutions across 21 European countries have joined DiSSCo. In Europe, a continent that holds 1.5 billion specimens representing almost 80% of the species diversity described worldwide, these institutions host an invaluable heritage whose digitisation will make these collections accessible worldwide.



DiSSCo promotes European excellence in science





DiSSCo **drives** a transformative change among research communities in the way they address global challenges by providing access to open and FAIR data

DiSSCo is a data-driven infrastructure with natural science research at its heart.

DiSSCo is deeply rooted in the ambition to generate open and FAIR data used in multi-disciplinary geo- and biodiversity research that will inform European and global environmental related policies such as the EU's Green Deal and the Biodiversity Strategy 2030.

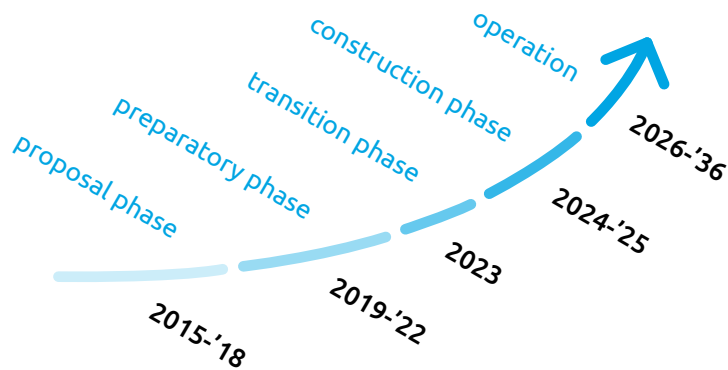
Using a *Digital Extended Specimen* as a foundational research data unit will result in a profound transformation and paradigm shift in the way research is conducted.

DiSSCo provides data at an unprecedented scale and precision, empowering first-class research on biological and geological collections that supports a more sustainable future for European citizens.





How do we build DiSSCo from today?



What are DiSSCo's contributions?

DiSSCo transforms a fragmented landscape of NSCs into a comprehensive, accurate and sustainable knowledge base for bio- and geodiversity data with an holistic approach by linking all data classes. From that, DiSSCo:

- **Creates a one-stop e-science infrastructure** providing discovery, access, interpretation, and analysis of complex linked data, as well as services such as collection digitisation on demand, research support and training activities;
- **Optimises collection access, curation and management practices in individual institutions**, enabling monitoring, specialisation and prioritisation strategies under a common research agenda;
- **Permanently links representations of digital specimens to their attributes** across distributed digital resources (allocated in different platforms and initiatives such as GBIF, GenBank, MorphoBank, GeoCAsE), creating a technical environment for robust science whose assertions can always be validated or reproduced;
- **Reduces the global carbon footprint with digital collections access** that will reduce the current 25,000 annual international trips and 800,000 global shipments of specimens;
- **Improves efficiency**, facilitates economies of scale, makes natural science research more responsive and resilient to urgent needs, and accelerates biodiversity discovery.



DiSSCo entered the ESFRI Roadmap in 2018 thanks to a mature research community gathered around the *Consortium of European Taxonomic Facilities* (CETAF).

From that successful step, DiSSCo aims to become **operational by 2026**.

As of 2021, DiSSCo is in its **Preparatory Phase**, which is a pan-European effort, aided by a series of EU-funded projects: from **producing the blueprint** for what the DiSSCo RI could be (ICEDIG project) to developing the technical infrastructure, standards and pilot services that make DiSSCo tangible (SYNTHEsys+), through the DiSSCo Prepare Project under which DiSSCo aims to improve institutional readiness in their data, technology, scientific, financial and governance, in preparation for a **smooth transition into the Implementation Phase (construction and operation)** of the research infrastructure. In summary, the preparatory phase is working to raise the DiSSCo RI's overall maturity, enhancing its ability to successfully take on and construct services based on clear and actionable guidelines across **five dimensions**:

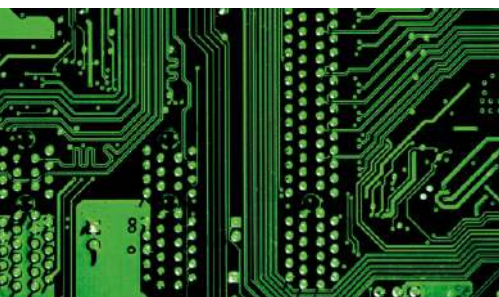


Scientific readiness will inform decisions around DiSSCo's future based on the needs of its science-driven user base and data providers;



Data readiness to provide and enrich FAIR data in a consistent, harmonised manner across the distributed facilities;

Technical readiness will establish sustainable and comprehensive data architecture and technical specifications of its future digital services;



Financial readiness to develop a robust and comprehensive financial framework supported by accurate and detailed calculations of costs and contributions;

Organisational readiness will facilitate setting up its overall legal and organisational (governance and management) structures, along with the strategic and operational plan.



By delivering a comprehensive Construction Master Plan DiSSCo is ensuring alignment with follow-up projects to minimise inconsistencies and gaps, and to improve efficiencies and synergies while reducing costs of implementation towards securing political and financial commitments from national partners.

An aerial photograph of a dense forest, likely a coniferous forest, is shown on the right side of the image. The left side of the image is covered by a large, curved teal overlay that contains white text. The text is arranged in five blocks, each with a different font weight and size to emphasize key statistics and goals.

An agreement among **120+ institutions**

Across **21 European countries**

Participating in over
**100 European
funded projects**

Reducing the **25,000
annual international
trips** currently
required to access
physical collections

Dropping the number
of specimens (**currently
800,000**) annually
shipped worldwide



Involving **5,000 scientists**

Working with **1.5 billion specimens** that represent **80%** of the world's described species biodiversity

Towards one digital collection

Saving **70M €** annually from reduced travel and shipping

DiSSCO

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"DiSSCo represents the largest ever formal agreement between Natural History museums, Botanic gardens and collection-holding universities in the world."

partner organisation

Consortium of European Taxonomic
Facilities (CETAF AISBL)

national partners

Austria

Naturhistorisches Museum Wien

Belgium

Agentschap Plantentuin Meise
Flanders Marine Institute (VLIZ)
Instituut voor Natuur- en Bosonderzoek (INBO)
Royal Belgian Institute of Natural Sciences
Royal Museum for Central Africa
Royal Zoological Society of Antwerp
Université Libre de Bruxelles
University of Namur

Bulgaria

Bulgarian Academy of Sciences (NMNHS-BAS)
Institute of Biodiversity and Ecosystem Research
Bulgarian Academy of Sciences (IBER-BAS)
National Museum of Natural History, Sofia

Czech Republic

Charles University, Faculty of Science
Czech National Museum
Institute of Botany of the Czech Academy of Sciences
Institute of Vertebrate Biology, Czech Academy of Sciences
Masaryk University
Nature Conservation Agency of the Czech Republic

Denmark

Natural History Museum of Denmark
Naturhistorik Museum Aarhus
The Science Museums, Aarhus University





Estonia

Estonian Museum of Natural History

Estonian University of Life Sciences

Tallinn University of Technology

University of Tartu

Finland

Biodiversity Unit, University of Oulu

Biodiversity Unit, University of Turku

Digitarium, SIB Labs Research Infrastructure

Unit, University of Eastern Finland

Finnish Museum of Natural History, LUOMUS,

University of Helsinki

Kuopio Natural History Museum

Open Science Centre/Museum, University of Jyväskylä

France

Conservatoire botanique national Alpin

Muséum national d'histoire naturelle

Centre de coopération internationale en recherche
agronomique pour le développement

Centre Informatique National de l'Enseignement
Supérieur

Institut Recherche et Développement

Le Jardin Botanique de la Ville de Lyon

Muséum d'histoire naturelle Philadelphie-Thomas de
Gaillac

Muséum d'histoire naturelle de Dijon

Muséum d'histoire naturelle de La Rochelle

Musée d'histoire naturelle de Lille

Muséum d'histoire naturelle de Marseille

Muséum Aquarium de Nancy

Muséum d'histoire naturelle de Toulouse

Société National des Sciences Naturelles et

Mathématiques de Cherbourg

Sorbonne Université

Tela Botanica

Université Aix-Marseille

Université de Bourgogne

Université Clermont Auvergne

Université Claude-Bernard Lyon 1

Université de Grenoble

Université Lille 1 – Sciences et Technologies

Université de Lorraine
Université de Montpellier
Université de Rennes 1
Université de Strasbourg
Université de Toulouse III-Paul Sabatier

Germany

Bavarian Natural History Collections (Staatliche
Naturwissenschaftliche Sammlungen Bayers [SNSB])
Botanischer Garten und Botanisches Museum,
Freie Universität Berlin
Centrum für Naturkunde, Universität Hamburg
Institute for Evolution and Biodiversity Science, Berlin
Museum für Naturkunde, Leibniz
Naturkundemuseum Stuttgart
Senckenberg Gesellschaft für Naturforschung
Zoological Research Museum Koenig-Leibniz Institute for
Animal Biodiversity

Greece

Botanical Museum and Herbarium, National and Kapodistrian
University of Athens
Botanical Museum, University of Patras
Department of Geology, University of Patras
Goulandris Natural History Museum
Mediterranean Agronomic Institute of Chania
Mineralogy and Petrology Museum, National and Kapodistrian
University of Athens
Museum of Zoology, Aristotle University of Thessaloniki
Museum of Geology-Palaeontology-Palaeoanthropology, Aristotle
University of Thessaloniki School of Geology
Museum of Geology and Palaeontology, National and Kapodistrian
University of Athens
Museum of Zoology, National and Kapodistrian University of Athens
Natural History Museum of Crete – University of Crete
Natural History Museum of the Lesvos Petrified Forest
Zoological Museum, University of Patras



Hungary

Hungarian Natural History Museum

Italy

Accademia Nazionale di Entomologia

Accademia Nazionale delle Scienze

Associazione Nazionale dei Musei Scientifici

Consiglio Nazionale delle Ricerche - CNR

Museo di Storia Naturale dell'Università degli Studi di Firenze

Società Botanica Italiana

Società Geologica Italiana

Società Italiana di Biogeografia

Società Paleontologica Italiana

Luxembourg

Musée national d'histoire naturelle (MnhnL)

Netherlands

Natural History Museum Rotterdam

Naturalis Biodiversity Center

Natuurmuseum Brabant

Natuurmuseum Fryslân

Natuurmuseum Maastricht

NIOZ - Royal Netherlands Institute for Sea Research

NLBIF - Netherlands Biodiversity Information Facility

Stichting De Bastei (Natuurmuseum Nijmegen)

Stichting De MuseumFabriek

Stichting Museon

Teylers Museum

University of Amsterdam, LifeWatch NL

Utrecht University Museum

Westerdijk Fungal Biodiversity Institute

Norway

Arctic University Museum of Norway, UIT The Arctic

University of Norway

Natural History Museum, University of Oslo

NTNU University Museum, Norwegian Museum of Science and Technology

University Museum of Bergen, University of Bergen

Poland

Museum and Institute of Zoology, Polish Academy of Sciences
University of Warsaw

Portugal

Universidade de Coimbra (MUC-UC)
Universidade de Lisboa (MUHNAC- ULisboa)
Universidade do Porto (MHNC-UP)

Slovakia

Centrum biológierastlína biodiversity,
Botanickýústav Slovenskej akademievied
Univerzita Komenského v Bratislave
Univerzita Pavla Jozefa Šafárik v Košiciach

Spain

Instituto Geológico y Minero de España (IGME)
Agencia Estatal Consejo Superior de
Investigaciones Científicas (CSIC)
Universidad de Navarra (UNAV)

Sweden

Bergius Foundation
Department of Biological and Environmental Sciences,
University of Gothenburg
Department of Biology, Lund University
Department of Ecology and Environmental Science, Umeå University
Gothenburg Botanical Garden
Swedish Museum of Natural History
Uppsala University, Museum of Evolution
Västarvet, The Gothenburg Museum of Natural History

United Kingdom

Natural History Museum
Royal Botanic Garden Edinburgh
Royal Botanic Gardens Kew

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#DiSSCoEU #DiSSCoPrepare #allhandsonDiSSCo
#DiSSCoReady

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