

Workshop Report

Standardisation of Earth Observation in Statistical Processes

Speaker: Hannes Reuter (Eurostat)

Facilitation: Mark Dowell (EC Knowledge Centre on EO)

Co-Facilitation: Rolf Maier-Bode (Design & Data)

StatEO26, May 7

ESRIN, Frascati (RM)

board columns in sequence — Current Practice → Gaps → Recommendations
ily on the one before.



Workshop · Board impressions

Fragment across policy

Document inconsistent and incomplete

INSPIRE bridges (some) metadata

Inconsistency of different Definitions

Inconsistency in Concepts in ESTAT versus EO

EO ↔ Stats

method not suitable to be public

and production scripts

Executive Summary of ATBD

Common Docs:

- ATBD
- Product User Guide
- Quality Guide

code [depository] is black box

Modeling description is missing

Describe ALL input data

Processing explained in a nutshell

METADATA ON METHODOLOGY & IF MODEL-DEPENDED ITS APPLICABILITY DOMAIN

with uncertainty + probability

EO products does not always come with uncertainty. At least not spatially explicit

Reliability of products must be available

Common, agreed Metadata Standard

existing quality framework for EO data services

Standardized documentation protocol

including

- ATBD
- PUM
- QC Guide

for statistical use [agreed]

ESTAT

NSI WG

WG

Metadata

Include in ESTAT the EO experts

in all statistical domains

INSPIRE

Develop standards and protocols (INSPIRE, ...)

LUCAS

Testing different EO application for Statistics

METHODOLOGY TO QUANTIFY INDICATORS (e.g. NRE)

Legal acts Ecosystem Services

Produce indicators to EC (B/R corp)

Regulation of high value dataset

develop Framework, share best practices in arrangements & update (IO)

European Scale product validated MS vs. Integrated National data

ESTAT

Play role in common capacity of NSIs to use EO

Lack of EU initiative in terms of dataset harmonisation e.g. IACS

EO GEO GSPM Adaption

Copernicus ensure adequate uncertainty info + level

Assessments of uncertainty layers

Standardized benchmarking

Unclear processing responsibility

Value Chain to last mile incomplete

Stakeholders Not operational linked

Define who is responsible for last mile

an the Copernicus products delivered by the Copernicus Services (starting with CLMS)

ESTAT

TO INCREASE THE TRANSMISSION OF EU-WIDE EO DATA/STATISTICS TO MEMBER STATES (ESTAT VALIDATES, NOT EO IN HANDBOOKS)

JRC & ESTAT

develop an operational PoC for crop area estimates

Horizon Europe / ESR

Develop series last mile Applications for NSI

Together with Copernicus Services for continuity

ESA-JRC-EEA

Case study to quantify minimum detectable differences (traditional, EO, traditional) + EO

Enhance GSPM with EO methodology

ESTAT - further to "annotate" GEO GSPM for EO

Copernicus should provide uncertainty estimates + analysis of their goodness

Process / provide EO in operational way / reliable

ESA-JRC-EEA-EuroSTAT

to jointly work on a number of pilot activities that define what is needed to have reliable end-to-end production of EO-informed statistics, while working

Workshop · Output in numbers

2 discussion tables, structured by guiding questions

64 post-its captured across both boards

71 votes cast on **11 recommendations**

2 agreed lines of work

Opening & Framing

Hannes Reuter (Eurostat) framed the session within ESS priorities: unlocking new data sources, keeping European statistics relevant, harnessing technologies. Two reference frameworks structured the discussion: the GSBPM v5.2 lifecycle and the 15 principles of the European Statistics Code of Practice.

The central provocation:

What would it take for an NSI to treat an EO or Copernicus product the way it treats an administrative register?

Long time series. Documented methodology. Quantified uncertainty. Comparability. Regulatory continuity. The distance between EO product specifications and these operational requirements set the agenda for both tables.

Question 1 · Quality documentation

Three clusters of findings:

Fragmented metadata. No harmonised standard bridges EO catalogues (STAC, INSPIRE, ISO/OGC) and statistical metadata frameworks (Euro-SDMX); concepts and definitions differ across providers and against Eurostat terminology.

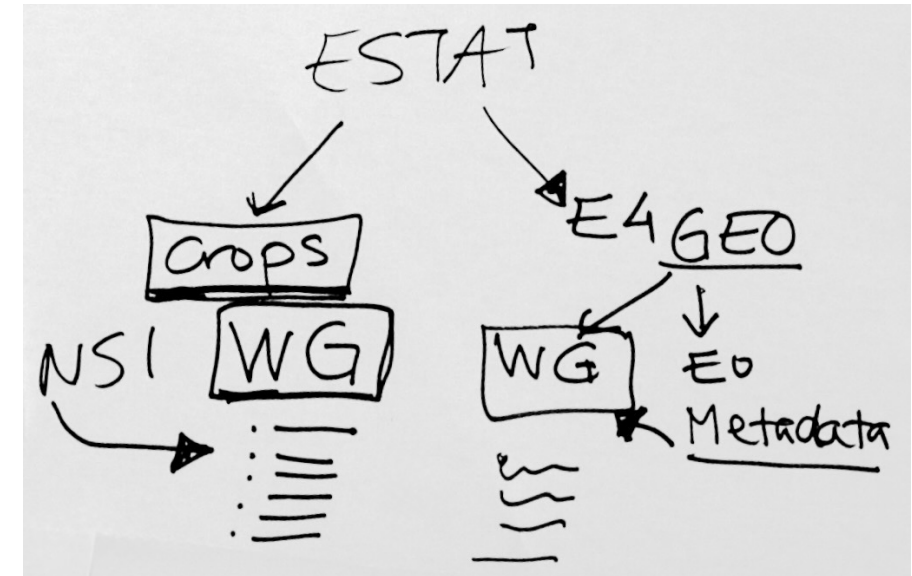
Opaque production. Processing chains and modelling assumptions are insufficiently documented; code repositories function as black boxes; production scripts are not published.

Missing uncertainty, mismatched timing. Uncertainty is rarely spatially explicit and seldom expressed in units statisticians can interpret; EO release cycles do not align with statistical reporting deadlines.

Question 1 · Recommendations

Votes Recommendation

- | Votes | Recommendation |
|-------|--|
| 14 | Change tenders to require publication of production code |
| 12 | Standardised documentation protocol for statistical use — ATBD, Product User Manual, Quality Control guide (<i>agreed</i>) |
| 8 | Include EO experts in ESTAT working groups — across all statistical domains* |
| 4 | Define and document a common, agreed metadata standard |



*Sketched at the table: where EO expertise would anchor — ESTAT domain working groups (e.g. crops) with NSI participation on one side, E4 GEO producing EO metadata on the other.

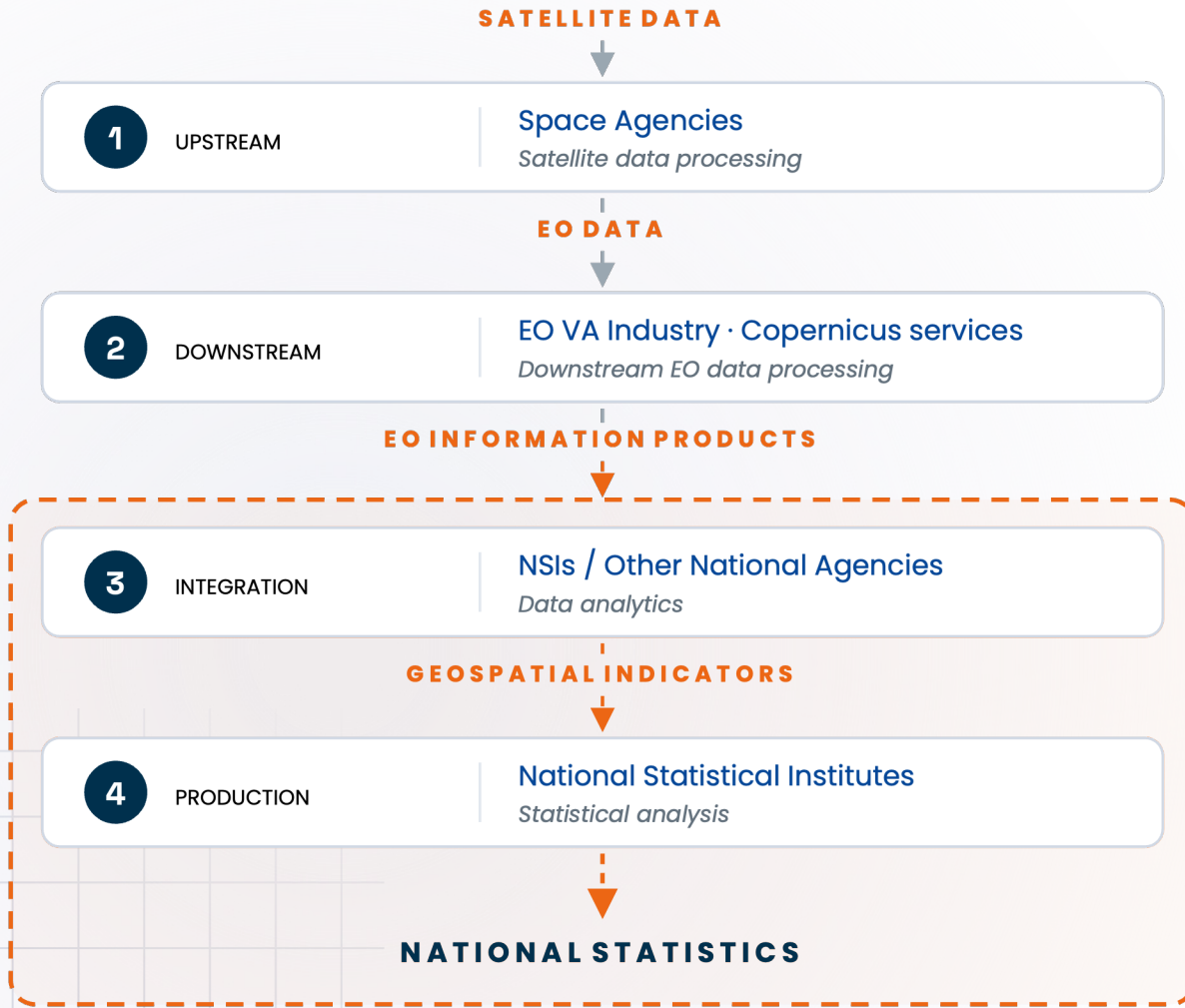
Counts and method: Appendix C

Question 1 · The scanner-data analogy

The table placed EO on a familiar curve: scanner data and web scraping each required multi-year methodological development before becoming routine sources.

EO is at an earlier stage of the same journey — and the GSBPM, useful but incomplete for EO, needs annotation at each phase: **design** (sampling vs. wall-to-wall), **processing** (classification harmonisation, reproducible change detection), **dissemination** (spatial vs. tabular outputs, geocoded microdata confidentiality).

Question 3 · Institutional arrangements



What exists: JRC prototypes bridging EO and statistics; LUCAS as in-situ validation reference; indicator methodology under the Nature Restoration Regulation; INSPIRE-type platforms and protocols.

What is missing: no certified end-to-end pipeline for EO-informed official statistics; no EU-level initiative for dataset harmonisation (IACS cited as the model); unclear responsibility for the last mile from EO product to statistical output; uncertainty information not yet a standard Copernicus product characteristic.

Question 3 · Recommendations

Votes Recommendation

- | | |
|---|--|
| 9 | Horizon Europe / ESA: develop last-mile applications for NSIs, jointly with Copernicus Services for continuity |
| 7 | Copernicus to provide uncertainty estimates plus analysis of their goodness |
| 6 | ESA, JRC, EEA, Eurostat: pilot activities defining certified end-to-end production of EO-informed statistics |
| 5 | Eurostat to further annotate the GEO GSBPM for EO |
| 3 | Eurostat to be involved in Copernicus product definition, starting with CLMS |
| 2 | JRC & Eurostat: operational proof-of-concept for crop area estimates |
| 1 | Process and provide EO in an operational, reliable way |

Counts and method: Appendix C

Recommendations · Topics

Two themes drew 59 of 71 votes. Ownership is the only theme that crossed both tables.

Documentation & transparency

3 recommendations · Question 1



Institutional ownership

6 recommendations · both questions



Uncertainty & quality

1 recommendation · Question 3



Process integration

1 recommendation · Question 3



71 votes across 11 recommendations, grouped into four themes. Thematic grouping is D&D's classification of the recommendations; raw votes summed across both boards.

Line of Work 1 · Quality documentation and data

A standardised documentation protocol per statistical domain — at minimum ATBD, PUM and QC guide — made a condition of Copernicus service contracts and procurement, aligned with ESS quality dimensions.

Line of Work 2 · Institutional cooperation

Under Horizon Europe and ESA, develop last-mile applications for NSIs jointly with Copernicus Services. In parallel, ESA, JRC, EEA and Eurostat to undertake pilot activities defining certified end-to-end production across the whole value chain.

Meta analysis · The institutional turn

Other workshops located the gap at the EO–statistics interface: make EO speak statistics.

This workshop named **who** must do the speaking.

The two most-voted recommendations are not technical fixes but procurement and programme decisions — publish the code as a tender condition, fund the last mile as a joint ESA–Copernicus commitment.

The interface problem has owners.

Meta analysis · From experiment to register

The opening provocation — *treat an EO product like a register* — doubles as a maturity test.

An administrative register offers continuity, documented methodology, known quality and legal anchoring.

Each gap named in the room — fragmented metadata, black-box processing, absent uncertainty, unclear last-mile responsibility — is one of these register properties, missing.

WHAT A REGISTER GUARANTEES

WHERE THE WORKSHOP LEFT IT

Long time series Continuity of measurement across decades	STILL OPEN
Documented methodology Published, stable, auditable production	LINE OF WORK 1
Quantified uncertainty Known, communicable quality at every output	RECOMMENDED
Comparability Harmonised concepts, NUTS-level aggregability	RECOMMENDED
Regulatory continuity Legally anchored, guaranteed production	LINE OF WORK 2

● ● agreed lines of work

● addressed by voted recommendation

○ not yet addressed

Meta analysis · The thesis

Standardisation is not paperwork — it is the price of admission to official statistics.

EO will enter statistical production not when the products improve, but when their documentation, uncertainty and institutional ownership meet the same bar as a register.

This workshop drafted that bar.

Thank You for being part of this workshop!

Special thanks to **Hannes Reuter** for the introduction
and **Mark Dowell** for the facilitation.



Got Questions / Feedback ?
Reach Out



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Current Practice

- No harmonised metadata
- Metadata different across providers
- Fragmentation across policies
- Document is inconsistent and is incomplete
- INSPIRE bridges (some) metadata
- No common quality frameworks & standards / classifications
- Inconsistency of different definitions
- Inconsistency in concepts in ESTAT versus EO

Gaps

- How to decide what is more correct of traditional and EO-derived indicators
- EC no metadata or inconsistent metadata to build catalogues
- Timeliness: EO <-> Stats
- Production method should not be public
- And production scripts
- Executive Summary of ATBD
- Common Docs: - ATBD - Product User Guide - Quality Guide
- Code [repository] is black box
- Modeling description is missing
- Processing explained in a nutshell
- Metadata on methodology & if model-derived its applicability domain
- Describe all input data
- With uncertainty + probability
- EO products does not always come with uncertainty. At least not spatially explicit
- Reliability of products must be available

Recommendations

14 votes · Change tender to publish code

12 votes · Standardised documentation protocol for statistical use [agreed]

8 votes · Include in ESTAT WG the EO experts (arrow to *drawing)

4 votes · Define + document common, agreed metadata standard

Alignment of existing quality frameworks for EO data sources

Including - ATBD - PUM - QC Guide

In all statistical domains

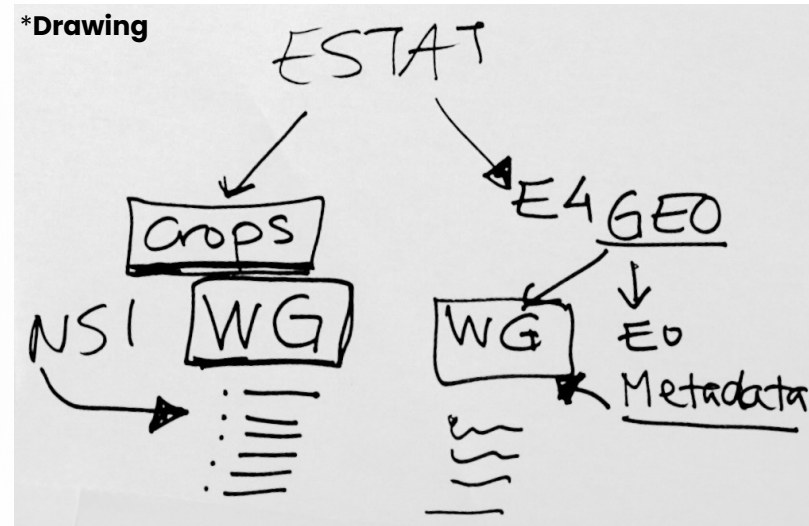
Additional Notes

Full modelling process explicitly reported (from EO prod -> proxies / stats)

OGC standards INSPIRE ISO

Harmonized indicators / variables across countries

*Drawing



Appendix B · Board 2 · Question 3

Status Quo

Platform to hold data, like INSPIRE
 JRC BRINGS BUILT PROTOTYPES TO BRIDGE EO WITH STATISTICS
 Develop standards and protocols (INSPIRE, ...)
 LUCAS
 Testing different EO application for Statistics
 METHODOLOGY TO QUANTIFY INDICATORS (e.g. NRRs)
 Legal acts Ecosystem Services
 Produce indicators for EC (EUR comp)
 Regulation of high value data set
 develop framework, share best practices in arrangements & uptake (IO)
 European Sector product validated MS vs. Integrated National data

Gaps

ESTAT Play role in common capacity of NSIs to use EO
 lack of EU initiative in terms of dataset harmonisation eg. IACS
 EO GEO GSBPM Adoption / ESTAT
 Copernicus ensure adequate uncertainty info & level
 standardized benchmarking / Rel
 Assessments of uncertainty layers / Copernicus Rel
 Unclear processing / responsibility / develop
 Value Chain to Last mile incomplete
 Stakeholders Not operationally linked
 Define who is responsible for last mile / ?

Recommendations

9 votes · Horizon Europe / ESA – Develop series last mile Applications for NSI. Together with Copernicus Services for continuity

7 votes · Copernicus should provide uncertainty estimates + analysis of their goodness

6 votes · ESA – JRC – EEA – EUROSTAT to jointly work on a number of pilot activities that define what is needed to have certified end-to-end production of EO-informed statistics, white paper / value chain

5 votes · ESTAT – further to "annotate" GEO GSBPM for EO

3 votes · EUROSTAT to be involved in the Copernicus process that defines the products delivered by the Copernicus Services (start up with CLMS)

2 votes · JRC & ESTAT develop an operational PoC for crop area estimates – Process / provide EO in operational way / reliable

1 vote · ESTAT to increase the transmission of EU-wide EO data/statistics to Member States (stats validation, EO in handbooks)

Enhance GSBPM with EO methodology

ESA – JRC – EEA Case-study to quantify minimum detectable differences (traditional, EO, traditional + EO)

Appendix C · Notes on method and counts

Counts and votes

64 post-its were captured across the two boards (Question 1: 33; Question 3: 31). 71 votes were cast in total, on 11 recommendations. Votes were recorded on recommendations only; other post-its carry no votes.

Question 1 — 38 votes on 4 recommendations (14 / 12 / 8 / 4).

Question 3 — 33 votes on 7 recommendations (9 / 7 / 6 / 5 / 3 / 2 / 1).

All vote counts were verified against the original boards.

Verbatim transcription

Appendix A and Appendix B reproduce the board content verbatim. Wording and spelling are unedited; apparent inconsistencies reflect the boards as written and have been preserved deliberately. Grammar corrections in the main report body do not apply to the appendices.