

European Network and ICOS

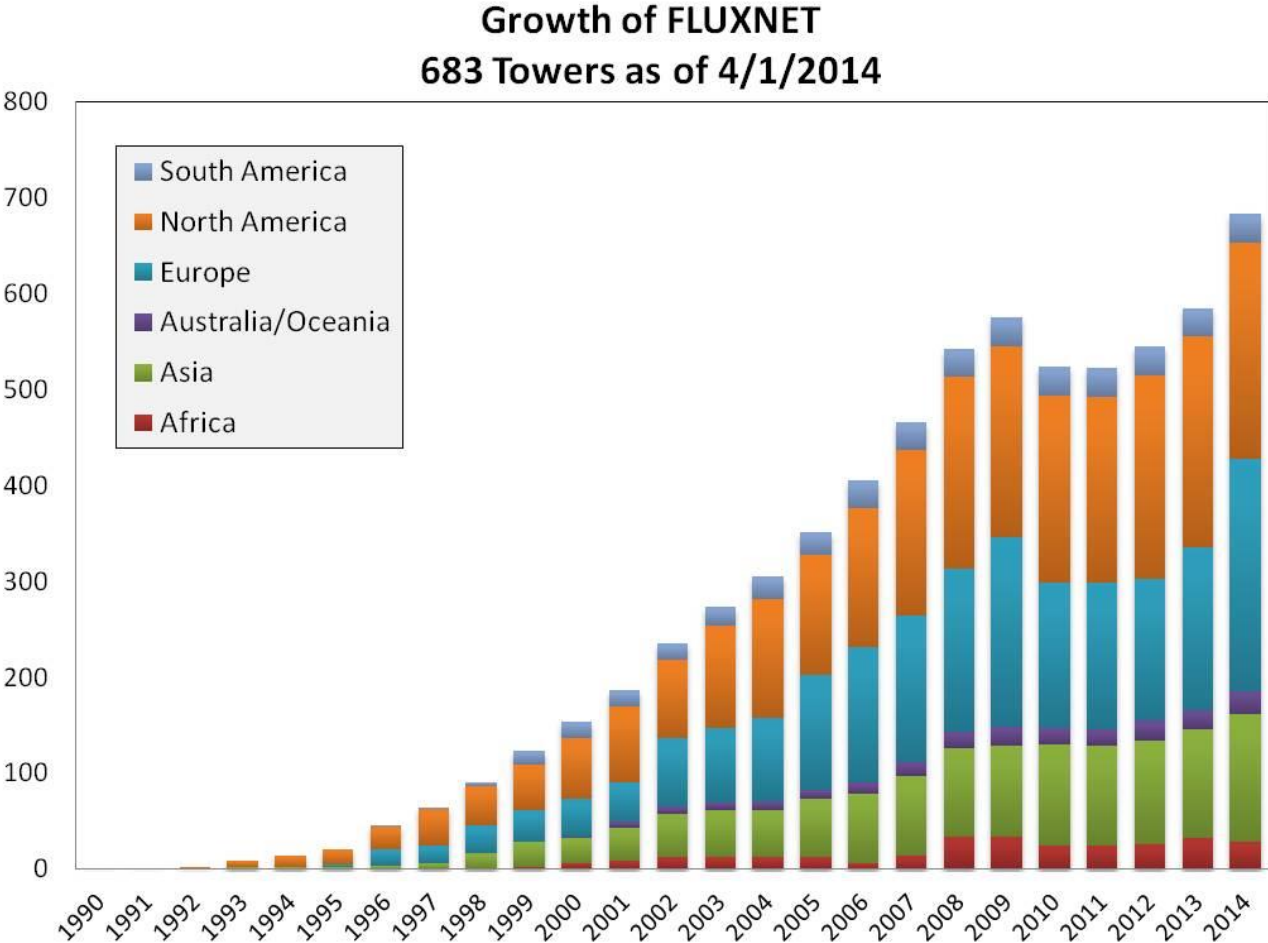
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ICOS Ecosystem Thematic Centre

Network size and trend

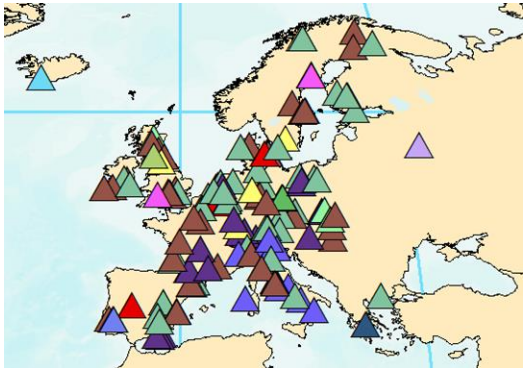
The European network had a constant growth until 2009 and then stopped, increasing again only recently.



The main reason is in the funding scheme...

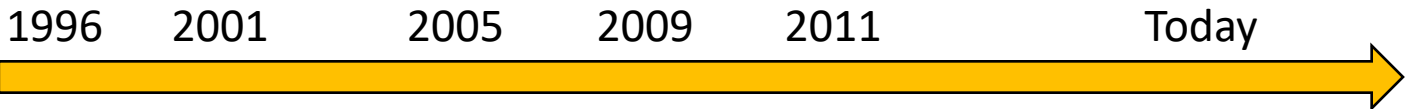
Research projects vs long term monitoring

European Union funded different research projects (3-5 years) where eddy covariance data were collected. Often same sites were involved in different projects (but not always)



ICOS

INTEGRATED
CARBON
OBSERVATION
SYSTEM



1996

2001

2005

2009

2011

Today

The European Network of sites

More than 350 sites registered, about 200 confirmed to have EC data, 180 submitted data. Thanks to EU funded projects outside Europe also data from Africa and Russia are included. But also many sites not funded by EU.



The European Network of sites

Most of the sites are however in Europe, covering all the countries except the Balkan region where only few sites exist (note: sites in Estonia are chambers + one eddy)

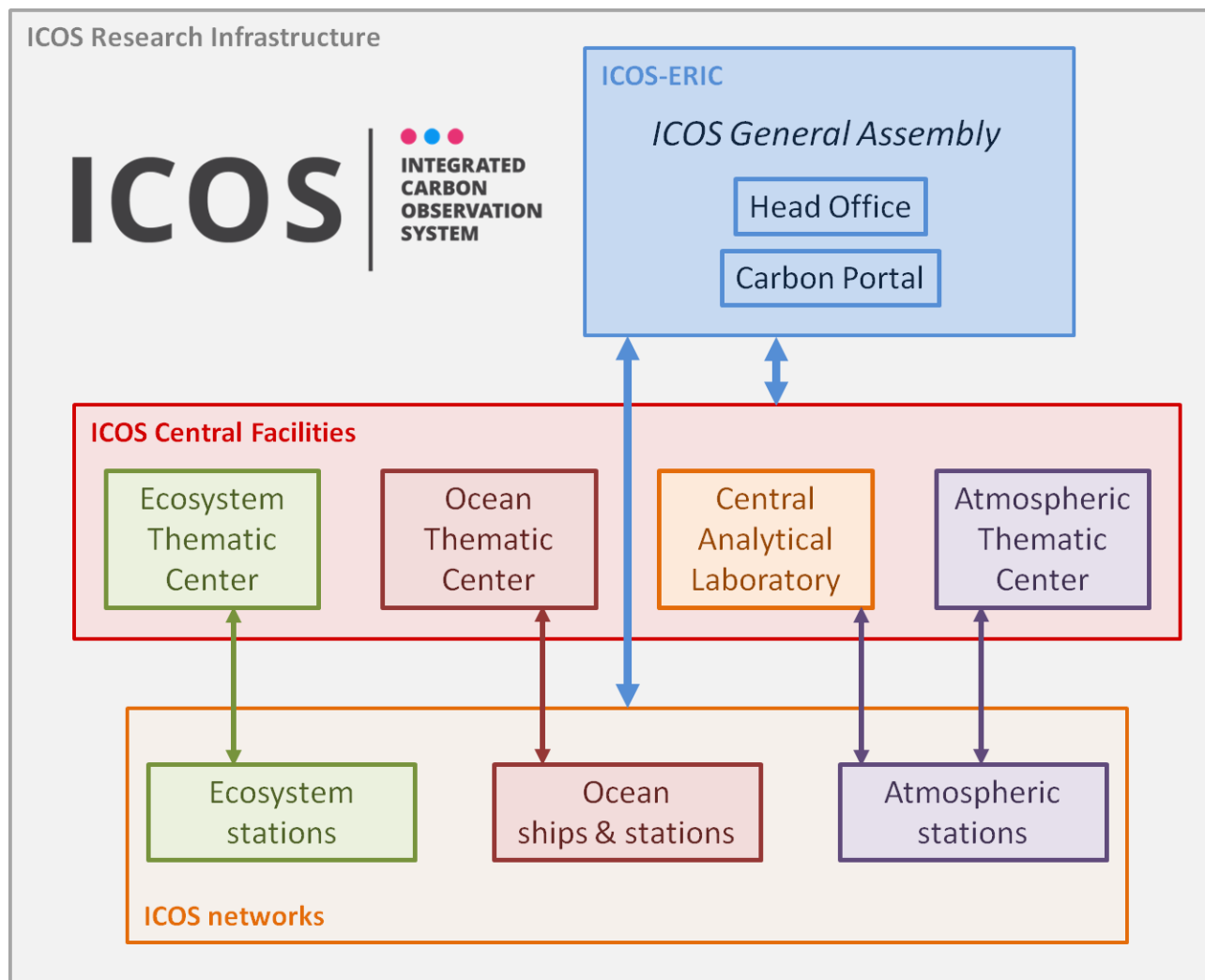


What is ICOS

www.icos-ri.eu

ICOS is:

1. A networks of sites measuring GHGs in the ecosystem, atmosphere and ocean compartments
2. Four thematic centres that coordinate the activity of the sites
3. One EU level head-office and web portal



The **ICOS Ecosystem network**: about 70 ecosystem sites measuring fluxes of CO₂, CH₄ and N₂O

The **ICOS Ecosystem Thematic Center**: coordinates the ecosystem network, does the processing, test and development of new methods and sensors. The main ETC lab is in Italy (Viterbo) with two additional offices/labs in France (Bordeaux) and Belgium (Antwerp).

Participation in ICOS

It is not enough to be interested to share data to participate in ICOS... As European Research Infrastructure there are formal and technical steps needed:

Data quality, data continuity, metadata, constant feedbacks are crucial to ensure that the data will be useful and used. All this is set-up and tested before a site is officially added to the network.

ICOS is a long term Research Infrastructure and for this reason it is important to follow protocols in order to increase comparability.

Many sites run two systems in parallel!

On open access no needed to comment.

3) The site has to apply the agreement by the ICOS data policy

4) The station has to go through

Not so different respect to other networks. The fact that is linked to each single station makes 1) explicit the importance of the work done and 2) stronger the relation between site and Thematic Centre

“chelling process” where the quality, completeness and transmission is tested by the Thematic Centre.

be difficult to understand

The ICOS Network

Not all the countries in Europe are currently members of ICOS and for this reason the distribution of stations is not homogeneous like in the European Database



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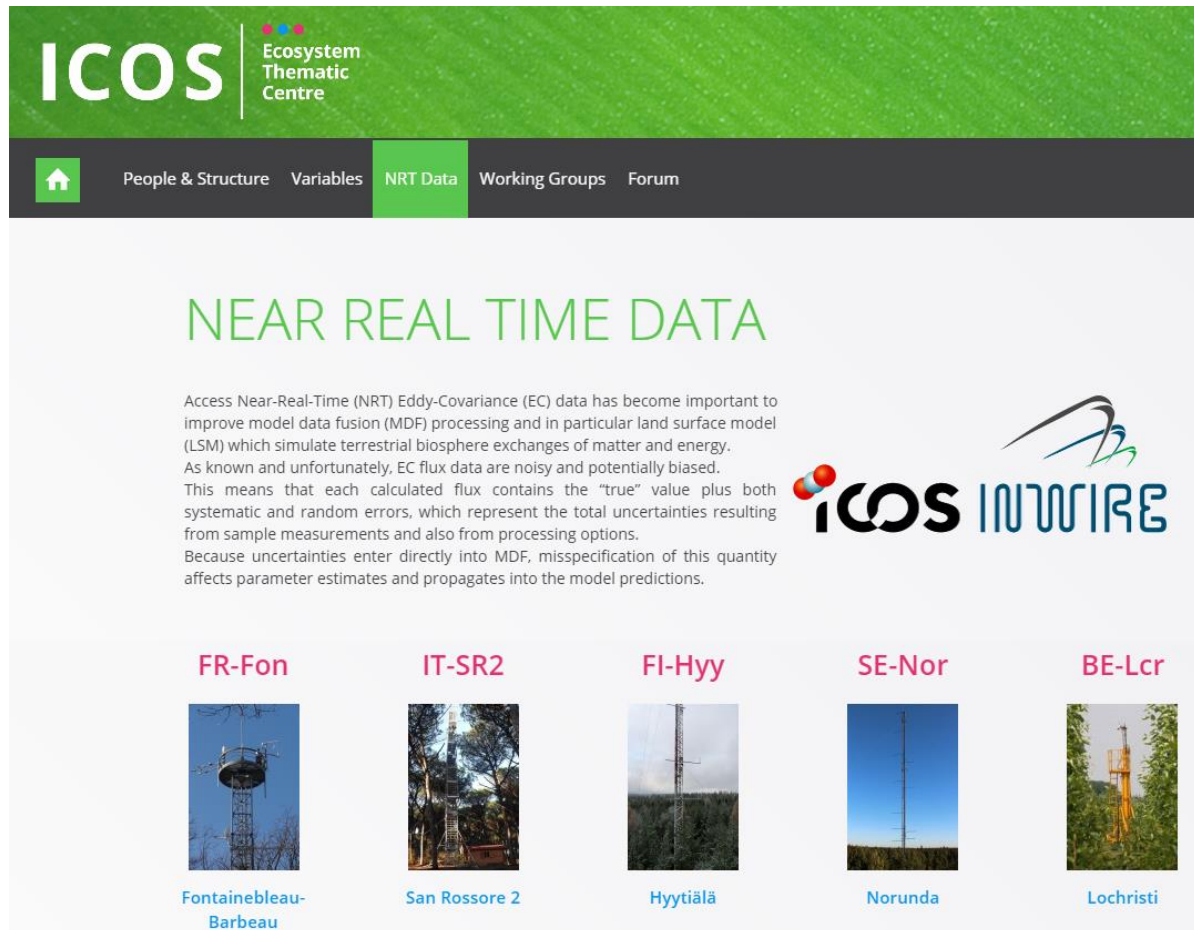


ICOS Near Real Time data submission and processing

Raw data are submitted daily to the ICOS databases.

Fluxes are computed every morning for the Near Real Time data and periodically for the data releases.

<http://www.icos-etc.eu/icos/nrt-data>



The screenshot shows the ICOS Ecosystem Thematic Centre website. The header features the ICOS logo and navigation links: Home, People & Structure, Variables, NRT Data (highlighted), Working Groups, and Forum. The main content area is titled 'NEAR REAL TIME DATA' and contains a paragraph explaining the importance of NRT Eddy-Covariance (EC) data for model data fusion (MDF) and land surface models (LSM). It notes that EC flux data are noisy and potentially biased, and that uncertainties from sample measurements and processing options affect model predictions. To the right of the text is the ICOS INTOIRE logo. Below the text are five columns, each representing a different ICOS site: FR-Fon (Fontainebleau-Barbeau), IT-SR2 (San Rossore 2), FI-Hyy (Hyytiälä), SE-Nor (Norunda), and BE-Lcr (Lochristi). Each site is accompanied by a small photograph of the measurement tower.






ICOS Ecosystem Thematic Centre

Home People & Structure Variables **NRT Data** Working Groups Forum

NEAR REAL TIME DATA

Access Near-Real-Time (NRT) Eddy-Covariance (EC) data has become important to improve model data fusion (MDF) processing and in particular land surface model (LSM) which simulate terrestrial biosphere exchanges of matter and energy. As known and unfortunately, EC flux data are noisy and potentially biased. This means that each calculated flux contains the “true” value plus both systematic and random errors, which represent the total uncertainties resulting from sample measurements and also from processing options. Because uncertainties enter directly into MDF, misspecification of this quantity affects parameter estimates and propagates into the model predictions.

ICOS INTOIRE

FR-Fon	IT-SR2	FI-Hyy	SE-Nor	BE-Lcr
				
Fontainebleau-Barbeau	San Rossore 2	Hyytiälä	Norunda	Lochristi

ICOS - Common methods to avoid errors and increase comparability

Instruction documents

21 instructions manuals (~1900 pages) written and edited by ETC based upon protocols elaborated by the scientific community (>150 scientists involved).



Provides a unique example of standard. The documents (technical) are available for everybody and will be soon online with a DOI.

The protocols (more scientific) are going to be published in a scientific journal (ask Corinna for info)

ICOS - A new database system, including templates and formats

With Near Real Time data processing and information to be submitted manually often and timely, the database system, templates and formats need to be chanted respect to the European Database.

Variable	Description	Units	database
SITE_ID	Six character site identifier	CC-xxxx	
IC_MODEL	Manufacturer and/or model, or type of instrument	LIST(IC_MODEL)	
IC_SN	Serial number or other unique text string used to identify this instrument	controlled text	
IC_TYPE	Operations, maintenance or event happening at the sensor	LIST(IC_TYPE)	
IC_HEIGHT	Meters above ground level	m	
IC_SEPTWARD_DIST	Distance SW from the site reference point. West of the reference point is negative.	m	
IC_NORTHWARD_DIST	Distance NS from the site reference point. South of the reference point is negative.	m	
IC_SAMPLING_INT	Measurement sampling interval	seconds	
IC_SA_HEAT	Report only if the sonic anemometer is heated	LIST(IC_YN)	
IC_SA_ORIENT_N	Orientation of the instrument from magnetic north (0-359 degrees)	degrees N	
IC_SA_WIND_FORMAT	Format used in reporting wind components	LIST(SA_FORMAT)	
IC_SA_ALIGN	North alignment format	LIST(SA_ALIGN)	
IC_SA_FLOW_PC	Report only if the original Gill PC is used	LIST(IC_YN)	
IC_SA_FLOW_RATE	Nominal flow rate in the SA tube	litre min-1	
IC_SA_UCODM_SN	If used, serial number of the U-CODM flow module (7200-101)	controlled text	
IC_SA_UCODM_T2_SN	Tube package number of the U-CODM SA tube mounted	controlled text	
IC_SA_UCODM_AIU_SN	Serial number of the Auxiliary Interface Unit used (U-CODM U-7550 AIU)	controlled text	
IC_SA_CAL_CO2_ZERO	The zero CO2 reading for the CO2 free cylinder in a field calibration operation	umol mol-1	
IC_SA_CAL_CO2_OFFSET	The instrument CO2 reading using the reference cylinder in the field calibration operation	umol mol-1	
IC_SA_CAL_CO2_REF	The concentration of the CO2 in the reference cylinder used in the field calibration	umol mol-1	
IC_SA_CAL_H2O_ZERO	The zero H2O reading using reference dry cylinder in the field calibration operation	mmol mol-1	
IC_SA_CAL_TA	Ambient temperature where and when the gas analyzer was calibrated	degrees C	
IC_SA_CAL_ID	ID of the logger where variable is registered	integer number	
IC_FILE	ID of the file where variable is registered	integer number	
IC_DATE	instrument operations, maintenance or event date	YYYYMMDDHHMM	
IC_DATE_START	instrument operations, maintenance or event start date	YYYYMMDDHHMM	
IC_DATE_END	instrument operations, maintenance or event end date	YYYYMMDDHHMM	
IC_DATE_UNC	uncertainty in the date	days	
IC_COMMENT	instrument operations, maintenance or event comments	free text	
IC315_SA_MODEL	Gas analyzer model that is part of the QA-3A system	LIST(IC_MODEL)	
IC315_SA_SN	Serial number of the analyzer that is part of the QA-3A system	controlled text	
IC315_SA_MODEL	Sonic anemometer model that is part of the QA-3A system	LIST(IC_MODEL)	
IC315_SA_SN	Serial number of the sonic that is part of the QA-3A system	controlled text	
IC315_SEP_VERT	Vertical separation between the SA and OA in the IC315 (negative values: SA is above OA)	m	
IC315_SEP_EASTWARD	EW separation between the SA and OA in the IC315 (negative values: SA is east of OA)	m	
IC315_SEP_NORTHWARD	NS separation between the SA and OA in the IC315 (negative values: SA is north of OA)	m	
IC315_WIND_SIZE	Center of the wind sector to be excluded in the data analysis	degrees N	
IC315_WIND_SIZE_RANGE	Size of the wind sector to be excluded in the data analysis	degrees	
IC315_DATE	Date of validity of the IC system information	YYYYMMDDHHMM	
IC315_COMMENT	Comments on the IC system information	free text	

ICOS BADM ONLINE SYSTEM

Beta version, please give feedbacks and report errors to info@icos-etc.eu

This online tool allow to check, correct and add ancillary data, metadata and all other information that are collected and stored using the BADM system. At the moment under development and allow the access to a limited number of variables that however will be increased continuously. Once you changed or added data remember to save the changes. For any question about the BADM system, the variables and the tool please don't hesitate to contact us.

Select site: BE-Lon

Please select one of following variable group to edit or insert data

TEAM MEMBER GROUP • LOCATION GROUP • UTC OFFSET • SAMPLING PLOTS • INSTRUMENT MODEL GROUP

Fields with (*) are mandatory

+ Add new record

	TEAM_MEMBER_NAME	TEAM_MEMBER_ROLE	TEAM_MEMBER_MAIN_EXPERT	TEAM_MEMBER_PERC_ICOS	TEAM_MEMBER_CONTRACT
Edit Delete	Thibaut Thyrtin	TEC-ANC	BIOMASS	80-100	LONG
Edit Delete	Henri Chopin	TEC-FLX	MICROMET	80-100	LONG
Edit Delete	Bernard Heinesch	PI	DATAPROC	<20	PERM
Edit Delete	Tanguy Manise	SCI-ANC	BIOMASS	80-100	LONG
Edit Delete	Anne De Ligne	MANAGER	DATAPROC	80-100	LONG
Edit Delete	Bernard Bodson	CO-PI	BIOMASS	<20	PERM
Edit Delete	Bernard Longdoz	CO-PI	SOIL	<20	PERM
Edit Delete	Margaux Lognoul	AFFILIATED	DATAPROC	80-100	<3

HOWEVER, always without re-inventing anything and ensuring the full compliance with the agreed international standards, in particular with AmeriFlux and the European Database. This means: BADM system, same variable names, same levels definition, same site codes, same formatting rules etc.

European Database and AmeriFlux: a story of success...



coop+
Promoting
collaboration among RIs

In the last years there have been a number of great achievements in the collaboration between these two large databases and their networks

- 1) Common centralized data processing so that the data are fully compliant. This also helped to save resources (no duplications). And you make a lot of friends.
- 2) Same variable names, codes, descriptions, units (!!!), structure. To call the same thing in the same way in USA and in Europe.
- 3) Same final products so that a user can download data from AmeriFlux and from the European Database and just use them, no additional steps needed, QC have the same meaning etc.
- 4) Same data levels definition in order to better organize the process and clearly explain to the users what they have in the hands (with limits and characteristics)
- 5) Same BADM templates, with same options and rules. In this way also the metadata and ancillary data are fully comparable and well organized.

In ICOS we worked (and we are still working) to ensure full compatibility of ICOS data with these agreed standards even if data are in some cases more complex (raw data).

European Database and ICOS – near future strategy

European Database



ICOS

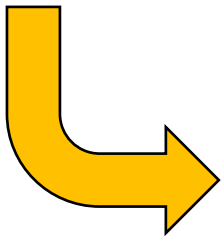
INTEGRATED
CARBON
OBSERVATION
SYSTEM

A lot of sites from all Europe, Africa, Russia
Open to everybody for participation
Strong compatibility with AmeriFlux

Low funding level
No long term plan

Long term plan
Stable (well, we hope...) funding

Not open to everybody
Sites only from participating countries
Own standards but based on existing stuff



*Find a strategy in order to take the positive aspects from both.
Viterbo coordinates both (good) but different groups involved,
different stakeholders and formal rules to be respected...*

