



# 2nd UK-ICOS Meeting

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**The Institute of Marine Engineering Science and Technology (IMarEST),  
Aldgate House, London**

*31<sup>st</sup> March 2015, 10:00 – 16:00*

**Chair: Andrew Watson**

## **Attendees:**

Andrew Watson (University of Exeter), Jennifer Riley (National Oceanography Centre), James Morisson (Forest Research), Matt Wilkinson (Forest Research), Tim Smyth (PML), Eiko Nemitz (CEH), Naomi Greenwood (CEFAS), Ute Schuster (University of Exeter), Julia Sussams (DECC), Simon O'Doherty (University of Bristol), Tom Gardiner (NPL), Stephan Matthiesen (University of Edinburgh), Amber Vatter (NERC), Grant Forster (UEA), Euan Nisbet (Royal Holloway), Dorothee Bakker (UEA)

## **Apologies:**

Richard Sanders (NOC), Anna Jones (BAS)

## **1. Welcome to the meeting**

### **1.1 An Introduction to ICOS**

Andrew Watson gave an overview and update of ICOS, including its organisation and management, legal status and the role of the UK in hosting the Ocean Thematic Centre. The presentation highlighted reasons why the UK should be a part of ICOS.

### **1.3 Aim for the meeting**

The overall aims for the meeting were to:

- Present a general message to funders, showing that there is a consensus between the UK atmospheric, oceanic and terrestrial Greenhouse Gas (GHG) communities



- Shortlist which stations (in order of preference) from the three communities will be proposed to the funding agencies for submission to ICOS.
- Brainstorm ideas for the forthcoming NERC capital call and explore whether a UK-ICOS community submission could be a possibility.

### *Discussion*

Discussion was undertaken focussing on the definition of a station, which is different between each of the thematic centres (ocean, atmosphere and ecosystem).

One goal for the UK-ICOS community should be to get instrumentation from different sectors which are mounted on the same platform (e.g. RRS James Clark Ross) to be able to talk to each other and better integrate data.

Work carried out in overseas territories (OT) can also be important for understanding global GHG budgets (e.g. atmospheric measurements carried out on Ascension Island since 2010 by Royal Holloway, Univ. of London). However it is not clear if OT stations can also be submitted to ICOS. It was felt that if there is a good scientific rationale for an OT station inclusion it should not be ruled out because of the location.

Overall the general consensus was that ICOS in the UK must work to strengthen the atmospheric, terrestrial and oceanic communities already in existence.

## **2. General overview of UK GHG research**

In order to facilitate the discussion of which stations should be submitted to ICOS, presentations were given by representatives of the three communities, describing:

- The observing systems in the UK that might be submitted to ICOS RI;
- The general benefits you see to joining ICOS;
- Possible capital and long term funding streams.

### **2.1 Ocean Stations**

Presented by Dorothee Bakker. See Appendix for list of stations presented.

Eiko Nemitz highlighted an existing sampling line with ship owners running between the UK and Zebrugge for atmospheric measurements. There is scope to extend this to marine GHG measurements as well. However collaboration would be needed with a marine institute / HEI to develop such parallel marine observations.

***ACTION:*** *New NOC staff member responsible for liaison with shipping industry to investigate marine interaction with existing VOS between UK and Zebrugge for atmospheric measurements.*

## 2.2 Atmospheric Stations

Presented by Simon O'Doherty. See Appendix for list of stations presented.

It was noted that atmospheric stations are unlikely to be able to meet ICOS class 1 requirement, but should be able to meet the class 2 requirements. Some stations will need capital investment in sensors to be able to meet the requirements.

Furthermore data from the current tall tower network gets submitted to ICOS but on an informal basis. Once the UK has officially submitted a set of stations to be included in ICOS it is unclear what will happen to this current informal data submission agreement, especially if the stations are not one of the official fully paid for stations in ICOS.

***ACTION:*** *Inquire with ICOS central office what will happen regarding the informal agreement for data submission into ICOS from UK atmospheric towers.*

## 2.3 Terrestrial Stations

Presented by Eiko Nemitz. See Appendix for list of stations presented.

It should be noted that power is needed to be able to run the terrestrial sites. Furthermore quantification of GHG fluxes from agricultural sites where there is animal grazing is very difficult to fully quantify due to difficulties in monitoring livestock carbon fluxes.

Ways in which sites could possibly be prioritised were also discussed during the presentation.

They included:

- Importance of site usage
- Length of historical record
- Scientific importance / usability
- Cost / feasibility

They could be applied to all sectors to aid in site shortlisting.

### 3. General Discussion

There was a general discussion about the different types of site that ICOS would classify within each of the three sectors. These included:

- Full sites – level 1/2 classification dependent on existing infrastructure and data outputs
- Demonstration sites – short term and free
- Associated sites – as an extra level to get prepared for ICOS submission

ICOS proposes to standardise instrumentation as much as possible, providing recommendations and calibrations for instrument usage. However different sectors have different expectations of instrument standardisation (e.g. the marine sector would struggle to have one standard instrumentation, as the choice is space dependent). In general the community chooses instrumentation based on what instruments have the longest lifetime and provide best data.

Ideally the marine community would like to be able to harmonize with atmospheric observing community as much as possible. However due to the range of instrumentation used marine data will never reach the same level of accuracy and precision as the atmospheric community. This presents a challenge in respect to cross-sectorial harmonisation, and will at some stage need to be addressed.

Currently there are only two trusted suppliers of calibration gasses – NOAA and Max Plank in Jena. Historically in the UK Andrew Manning's lab at UEA have had the capabilities to fill, spike and adjust gas cylinders. Unfortunately the lab currently doesn't have the manpower to fulfil its capabilities on a regular basis for the whole UK GHG community. Furthermore they have not been

able to calibrate, as they do not possess a calibration agreement with NOAA to propagate calibration.

If the laboratory could be classified as a calibration lab it would need ~ 2 FTE staff in order to provide this service. The costs of such staffing may be lower than the costs of full station submission into ICOS. However it would also be important not to undermine and fragment the goals and progress that ICOS is trying to make across Europe. Thus it would still be prevalent for the UK to make a minimum station submission to ICOS.

As an intermediate step the UK could become more organised over how it currently calibrates its data. Costs could be reduced if the whole community sent samples en-mass to NOAA to keep costs lower.

### Station selection

Other European countries of similar size are submitting 3-4 stations to ICOS per sector. Consequently it seems a sensible approach for the UK to put forward 3-4 stations per sector for consideration by funders for UK submission. This will also ensure that there is a robust scientific input into ICOS from the UK.

It was proposed that stations should be ranked in order so that should funding of all stations be queried the UK-ICOS community can respond to the funders requirements more easily.

**DECISION:** *Each sector will submit, in order of preference, 4 stations, which they would like to see in ICOS. See Annex 1 for station preference choices for each community.*

### Legal and Funding

The costs of the UK becoming a part of ICOS include a subscription (based on the number of member states) cost as well as an individual station cost. The station cost is per station and may also depend on the type (full, associated, demonstration etc.).

It was discussed that submission of just one main station with other associated stations would be a more practical way forwards, particularly for the ecosystem and terrestrial communities. It is unclear in the ERIC if one station submission per sector is sufficient for a member state to sign up with. A clear statement is needed from ICOS central offices on this.

**Action:** *Gain clarification of the minimum station requirements as stipulated in the ERIC.*

Associated stations do not have to meet the same rigorous standards as the full level 1 or 2 stations. However the costs, terms and conditions of submitting a station as associated are unclear.

**ACTION:** *Find out from the ICOS central office about the costs, terms and conditions linked to each of the following: Demonstration, Associated and Full ICOS stations.*

It was also unclear if additional sites could be added into member state's commitment to ICOS after the initial agreement to the ERIC; and if so how this would impact the funding commitment (e.g. if we add a site in year 3 of a 5 year agreement, do we need to extend our commitment to cover the full 5 years of the new site or can we still leave the ERIC after the first 5 years?).

**ACTION:** *Find out how additional stations could be included as part of ICOS after the initial ERIC agreement was signed. What implications would this have for the 5 year commitment to ICOS before being able to leave the ERIC agreement.*

To be submitted into ICOS all stations have to have continued funding for at least 5 years. For all communities this is difficult, as generally UK funders will only commit to a maximum of 3-4 years funding. It is likely that other countries face similar issues with short term funding. However Andrew Watson proposed that they would likely have get out clauses.

In the UK it is unlikely that any funders will take on the responsibility of guaranteeing funding for 5 years as part of the ICOS agreement as this would be too much of a risk to carry. As such it is likely that individual institutions and HEI's will have to carry the risk associated with guaranteeing the funding stream for 5 years.



It is currently unclear what the penalty will be for non-compliance with ICOS contractual agreements. Furthermore if a site is submitted as an associated station and is then later withdrawn from the ICOS programme it is unclear if there would be an associated penalty.

***ACTION:*** Find out what is the penalty for non-compliance with an ERIC if a member state defaults on membership payments or withdraws an associated site from the programme. Have there been any other precedents in previous European ERIC's?

As appropriate NERC will sign the ERIC to commit the UK to being part of ICOS and pay the subscription fee on behalf of NOC. Currently NOC is not a legal entity in and of itself and cannot sign the agreement. NERC has recently signed the EMSO ERIC and paid the €30k/year subscription fee. Consequently there is a precedent in NERC to undertake such legal duties on behalf of its centres. However with the review of the ownership and governance of the NERC institutes, the ERIC may need amending, and NOC to sign it in due course, if NOC to become a private entity.

The ICOS ERIC stipulates two different statuses; full member and observing member. It is currently unclear as to what the differences are between these two statuses. Given the uncertainties associated with the UK funding and station submission to ICOS, the UK could consider being a founding observing member of ICOS.

***ACTION:*** Find out the difference between full and observing member is from the ICOS central office.

Where work, central to ICOS or the Ocean Thematic Centre is carried in multi partner collaborations by a non-NERC institute, e.g. Higher Education Institutions (HEI), Memorandums of Understanding (MOU) will have to be signed between NERC and each HEI specifying how funding will be paid. Traditionally long term science undertaken by HEI's only constitutes a very small component of NERC budget.

With the re-bidding process that is currently underway for the National Capability money, and the potential transition in the ownership and governance of the NERC owned centres, there is no reason why long term science provided by HEIs couldn't be funded via NC in the future. The costs



to cover the long-term science activities within HEI's would likely be in the region of £100,000/year and would probably only apply to 2-3 HEI's in the UK. NERC Executive Board (NEB) would ultimately be responsible for formally enabling the reallocation of NERC funds to HEI's.

Without such a formalised process, it will be down to NERC centre directors to allocate funds from NERC finances, for example from National Capability awards to HEI's thereby funding ICOS related activities.

Currently it is assumed that NERC will pick up some or all of the ICOS funding costs. It is hoped that post election DECC will also be open to an official proposal to fund some of the UK-ICOS bid. Furthermore the SmartBuoys that CEFAS runs are paid for via Defra. Consequently if the Cefas Smart Buoys were to be included as a UK-ICOS station submission then a dialogue with Defra regarding funding would also be necessary.

There are also other potential funders across the UK. For example Marine Scotland Science may be able to cover some of the costs for Scottish stations, which they use data from. Similarly the MetOffice and NCAS may also be able to help with the funding issues.

**Action:** *Start a dialogue with other funding agencies (MetOffice, NCAS, Defra, Marine Scotland Science) about ICOS.*

## Capital Investment in stations

For the ocean observations the standards for level 1 and level 2 stations are still to be set. As such the community can have some say as to the level that they can reasonably hope to achieve and thus which stations will be suitable in their current state. The Atmospheric and Ecosystem Thematic Centres (ATC and ETC) have already defined their parameters for achieving Level 1/2 status within ICOS. As such there is less flexibility within the system as to which stations will be able to meet the required standards.



Currently NERC has a call out for capital funding ideas on the scale of £1-15 million. The UK-ICOS community could use this opportunity to submit a joint bid to get funding to help bring stations up to the right level of compliance with ICOS standards. Investment in a GHG equipment pool in the UK could be a good use of such capital funds.

***ACTION:** Draft a response to the NERC Capital funding call from the UK-ICOS community and finalise for submission on 12<sup>th</sup> May 2015.*

#### 4. National funders

Representatives from both NERC and DECC were present at the meeting.

Given the timing of the UK-ICOS meeting in the run up to the general election DECC were in purdah, meaning Julia Sussams was unable to say anything about funding or support of the ICOS programme until after the results of the election on 7<sup>th</sup> May. However she was present for the entirety of the meeting and the discussions.

Amber Vatter from NERC voiced support for a UK-ICOS submission into the capital funding ideas call. Given the cross sectorial nature of the idea and the likely scale of investment that would be needed across the community it would fit in with many of the calls aims.

From a NERC perspective, once the stations to be submitted per sector have been agreed the priority actions should be to:

- Approach the NERC centre directors involved to get agreement to fund the
- Find out what other HEIs will potentially be involved and their existing financial commitments including who potentially has to fund if the 5 year commitment.

NERC Swindon Office will need confirmation letters of support from each of the centres involved once the final plan for the number of sites submitted has been agreed and the queries over the ICOS ERIC have been answered.

## 5. Any other business

### 5.1 Website

The old ICOS website will soon go offline (date tbc). A new one is being developed. The new domain name should be similar to [www.icos-uk.org](http://www.icos-uk.org).

The design of the new website should be as interactive and cross-linked as possible.

### Date of next meeting

The next meeting should be held in October time. This will hopefully allow for the new budget post election to be filtered through the system. This will allow funders to be more specific about their ability to finance ICOS.

It would be good to have someone from ICOS central office present at the next meeting in order to provide clarification on many aspects and also speed up the decision making process.

## Appendix 1: Stations presented and shortlisted

<i>Station Name/ID number</i>	<i>Station sector (ocean, atmosphere, terrestrial)</i>	<i>Order of Preference for submission</i>
<i>Porcupine Abyssal Plain Sustained Observatory</i>	<i>Ocean</i>	<i>1=*</i>
<i>UK - Caribbean VOS line</i>	<i>Ocean</i>	<i>1=*</i>
<i>24.5N hydrographic section</i>	<i>Ocean</i>	
<i>UK to India</i>	<i>Ocean</i>	
<i>Western Channel Observatory</i>	<i>Ocean</i>	<i>1=*</i>
<i>James Clark Ross/AMT</i>	<i>Ocean</i>	<i>A</i>
<i>Warp SmartBuoy</i>	<i>Ocean</i>	<i>A</i>
<i>West Gabbard SmartBuoy</i>	<i>Ocean</i>	
<i>Dowsing SmartBuoy</i>	<i>Ocean</i>	
<i>RV Cefas Endeavour</i>	<i>Ocean</i>	<i>2</i>
<i>Marine Scotland</i>	<i>Ocean</i>	<i>A</i>
<i>Haddenham</i>	<i>Atmosphere</i>	
<i>Tilney All Saints</i>	<i>Atmosphere</i>	
<i>Earls Hall</i>	<i>Atmosphere</i>	
<i>Weyborne</i>	<i>Atmosphere</i>	<i>A</i>
<i>Glatton</i>	<i>Atmosphere</i>	
<i>Ridge Hill</i>	<i>Atmosphere</i>	<i>4</i>
<i>Tacolneston</i>	<i>Atmosphere</i>	<i>2</i>
<i>Angus</i>	<i>Atmosphere</i>	<i>3</i>
<i>Bilsdale</i>	<i>Atmosphere</i>	<i>1</i>
<i>Heathfield</i>	<i>Atmosphere</i>	
<i>Mace Head</i>	<i>Atmosphere</i>	
<i>RHUL, Egham</i>	<i>Atmosphere</i>	<i>A</i>
<i>Jersey Meteorological Office</i>	<i>Atmosphere</i>	<i>A</i>
<i>Barra Manse</i>	<i>Atmosphere</i>	
<i>Divis</i>	<i>Atmosphere</i>	<i>A</i>
<i>Alice Holt, Straits Inclosure</i>	<i>Terrestrial</i>	<i>1</i>
<i>Auchencorth Moss</i>	<i>Terrestrial</i>	<i>2</i>
<i>Crichton</i>	<i>Terrestrial</i>	<i>3</i>
<i>Harwood Forest</i>	<i>Terrestrial</i>	<i>4</i>

A = Associated site

1 – 4 = Ranking in order of preference

\* The marine community may need further discussion to further rank their 3 proposed stations



## Appendix 2: Actions

Action	Lead
New NOC staff member responsible for liaison with shipping industry to investigate marine interaction with existing VOS between UK and Zeebrugge for atmospheric measurements.	Jennifer Riley / Kevin Forshaw
Inquire with ICOS central office what will happen regarding the informal agreement for data submission into ICOS from UK atmospheric towers.	Richard Sanders / Jennifer Riley
Gain clarification of the minimum station requirements as stipulated in the ERIC.	Richard Sanders / Jennifer Riley
Find out from the ICOS central office about the costs, terms and conditions linked to each of the following: Demonstration, Associated and Full ICOS stations.	Richard Sanders / Jennifer Riley
Find out how additional stations could be included as part of ICOS after the initial ERIC agreement was signed. What implications would this have for the 5 year commitment to ICOS before being able to leave the ERIC agreement.	Richard Sanders / Jennifer Riley
Find out what is the penalty for non-compliance with ERIC if a member state defaults on membership payments or withdraws an associated site from the programme. Have there been any other precedents in previous European ERIC's.	Richard Sanders / Jennifer Riley
Find out what the difference between full and observing member is from the ICOS central office.	Richard Sanders / Jennifer Riley
Start a dialogue with other funding agencies (MetOffice, NCAS, Defra, Marine Scotland Science) about ICOS	Richard Sanders / Jennifer Riley
Draft a response to the NERC Capital funding call from the UK-ICOS community and finalise for submission on 12 <sup>th</sup> May 2015.	Andrew Watson / Jennifer Riley

## Appendix 3: Decisions

Decision
Each sector will submit, in order of preference, 4 stations, which they would like to see in ICOS. See Annex 1 for station preference choices for each community.