



Natural
Environment
Research Council



National
Oceanography
Centre

**Marine Facilities Advisory Board
Tuesday 6th October 2020**

Virtual meeting via Microsoft Teams

Board Members

Professor Carol Robinson, University of East Anglia (CR) - Chair

Dr Adrian Baker, Dstl (AB)

Dr Joerg Bialas, GEOMAR (JB)

Professor Mike Elliott, University of Hull (ME)

Dr Kate Hendry, University of Bristol (KHe)

Dr Kerry Howell, Plymouth University (KHo)

Dr Joanne Hopkins, National Oceanography Centre (JH)

Dr Clara Manno, British Antarctic Survey (CM)

Dr Christopher McGonigle, Ulster University (CMc)

Professor Mark Moore, University of Southampton (MM)

Dr Tim Smyth, Plymouth Marine Laboratory (TS)

Professor Nick Wright, Newcastle University (NW)

National Marine Facilities (NMF)

Colin Day, Head of Strategic Projects (CD)

Eleanor Darlington, Group Head, Programme Management (ED)

Dr Maaten Furlong, Group Head, Marine Autonomous and Robotic Systems (MARS)
(MF)

Professor Angela Hatton, Chief Scientist & Director of Science and Technology (AH)

Leigh Storey, Associate Director, National Marine Facilities (LS)

Helen Oldridge, Head of Scientific Engineering (HO)

Emmy McGarry, Engineering Technician, Scientific Engineering Group (EM)

Dr Matthew Palmer, Chief Scientist, MARS, Science Community Engagement (MP)

Dr Alex Phillips, Head of MARS Development (AP)

Juan Ward, Engineering Manager (JW)

British Oceanographic Data Centre

Dr Louise Darroch, Data Scientist (LD)

Dr Helen Snaith, Senior Data Scientist (HS)

UKRI - Natural Environment Research Council

Dr Natalie Powney, Marine Planning Officer, Natural Environment Research Council (NP)

Apologies

Julie Pringle-Stewart, Chief Operating Officer, National Oceanography Centre (JPS)
Randy Sliester, Ships Programme & Operations Manager, British Antarctic Survey (RS)
Dr Michael Webb, Senior Programme Manager, Natural Environment Research Council

Secretary

Jackie Pearson, Partnerships Office, National Oceanography Centre (JP)

Welcome

CR opened the meeting and welcomed members of the Board, NMF and BODC. NW was not able to join. ME suggested providing a list of acronyms. [*Post meeting note: Secretary will check text to avoid acronyms in meeting minutes*]. **Action: JP**

CR noted apologies from JPS, RS and MW and that TS and CM would need to leave the meeting at 14:00.

1 Actions, March and October 2019

- 1.1 CR talked about actions that Board members had contributed to off line, when the March 2020 meeting had been postponed due to COVID. These actions were: completing contributions to the TRM and ranking of the capital expenditure proposals.
- 1.2 CR reminded members about the remit of MFAB to continually assess the National Marine Equipment Pool (NMEP), in terms of:
 - What is there?
 - What state is it in?
 - What has the usage been over the past five to 10 years?
- 1.3 LS apologised that he did not have responses for all the actions 1a – g because of the issues around COVID but thanked Board members for their input.
- 1a) Handbook – *Confirmation that the Chief Scientist's handbook includes details on the number of berths and science berths that are available.* LS agreed that NMF would update this information. There is already guidance on number of berths - we have details on number of mariners so we can meet the minimum safe number on the ship. **Action: LS**

- 1b) *How has NMF raised awareness of heave compensation capability?* LS - we do this each time we speak to P.Is and have used this successfully on a number of occasions. We are updating the web pages on ship-fitted equipment. CMc queried an omission of hull-mounted equipment as it would be good to have oversight of the demand here. LS advised that NMF is updating the reporting module to highlight what equipment is being used and what isn't. MP also advised that NMF is tracking funded use of equipment against non-funded requests.
- 1c) *Is it possible to provide MFAB with a list of principal scientists with a view to highlighting the TRM?* LS - yes, we will when we can. **Action: LS/JFP**
- 1d) *Can there be a presentation about the TRM at the NERC Principal Scientists workshop every year?* LS – agreed. **Action: MF**
- 1e) *How can people checking the NMF pages advise if there is an item of equipment they would like considered for the NMEP?* LS – NMF is open to suggestions for new equipment for the NMEP and we have engineering managers and specialists in the various areas that we support. NMF is happy to receive suggestions via the Advisory Board. CR asked if some words could be added to the NMF web pages, that includes the contact details for MFAB. We need to ensure there is information available on how to make suggestions for new items.

LS explained that scientists can talk to NMF engineering managers at any point; there is then the formal route of making an application through MFAB. If there needs to be a significant change on the equipment that NMF operates, this would need to go through MFAB and then the Cruise Programme Executive Board. JP suggested she would write some words for the MFAB pages and would work with LS on the content. **Action: LS/JP**

- 1f) *NMF to provide one-page infographic on NMF investment/budget and the size of our user groups.* LS - the NMF budget has been increased by £250K for pay inflation. £1.5M goes to the NMEP every year to replace broken equipment and manage obsolescence. OCEANIDS funding feeds also into this. This will be completed for the 2021 spring meeting. **Action: LS**
- 1g) CD advised that the Marine Facilities Planning page has reporting functionality that can indicate equipment use from 2015 onwards, efficiently and quickly. CR asked about ship time and the Ship-time and Marine Equipment (SME) forms. HO showed a slide about NMEP requests ([PPT One](#)). Usage has varied this year because of the effect of COVID.
- 1.4 HS updated the Board on action 1.7.1 about the Core Store. Dr Suzanne MacLachlan (SM) of the British Ocean Sediment Core Research Facility (BOSCORF) would like a deep-sea rock laboratory to sit alongside BOSCORF store. If MFAB is supportive of this, this would be helpful in developing a proposal

to NERC. MFAB should invite SM to present a paper on this at the March 2021 meeting. **Action: SM/JFP**

2. Standing item: Update on new medium/large equipment/technologies

2.1 CR reported that there had been no new purchases made by NERC.

3. Equipment on the RRS *Sir David Attenborough*

3.1 RS had advised, via CM, that the document in the papers was complete and added that none of the equipment listed will be maintained by NMF but is the responsibility of the British Antarctic Survey to maintain and manage. JB asked whether the interfaces are comparable and interchangeable between the research vessels? JW advised that NMF is working on the underway data system and acquisition is the same on all three ships.

4a. Update from the CPEB

4a.1 LS advised that the research expedition programme had been suspended in March 2020 due to COVID-19. The RRS *James Cook* and RRS *Discovery* were both bought back alongside. NMF tried to work out what could be achieved safely in the context of COVID-19 and developed a recovery programme, prioritising the recovery of data and equipment. NMF reduced science parties and technician levels to a minimum. Expeditions have been UK port to UK port, to manage the risk. The RRS *James Cook* is heading down south later this year. ED has been working with NP to work out the 2021/22 programme and this will go to the CPEB in a couple of weeks. CPEB directed NERC Marine Planning/NMF to prioritise the recovery of data in the 2020/21 programme where there was a risk that it might be lost.

4a.2 CR thanked, on behalf of MFAB, the amazing amount of work done by the NMF team to cope with the impact of COVID.

4b. Update on impact of COVID-19

4b.1 LS explained that NMF has continued to crew the ships at a reduced level to manage the risk; this has had some impact on equipment maintenance but not the programme. There has been some impact on installing new sensors into the ships. There has also been an impact on development programmes because of the need to work in laboratories and workshops. Some staff have been back on site but working in a Covid-secure manner has had an impact. Even going into the building has necessitated extra administration which has had some impact. Some planned work has not been possible.

- 4b.2 KHe flagged the NOCA Steering Board's COVID-19 Working Group which has the remit to quantify the impacts on marine science, specifically relating to National Capability. KHe asked the Board to highlight the survey to their groups.

5. ROV Working Group

- 5.1 MF spoke to this item noting that ROV *Isis* is big and very capable. It requires seven or eight engineers for 24-hour operations so is technician hungry. HyBiS, however, requires two technicians. It uses winches that are already on the ships and ship's crew to drive the winches. Three technicians are needed. HyBiS has a substantially lower cost system and requires fewer technicians to run it. MF spoke about depth rating capability comparison across other ROVs globally. ROV *Isis* was specifically designed and is more refined for delicate operations. It is Europe's most capable deep science ROV.
- 5.2 *Isis* and HyBiS are used for one or two cruises per year. Going forward, NMF may use HyBiS more as it is a lower cost system. There is a lot of demand for both vehicles which is pleasing. NMF has been running cruises with the AUV and ROV working together. There is cross-skilling between the AUV and ROV teams by working together. Sometimes the AUV needs to be parked on the seabed. The ROV is handy in this situation as it can be used to recover the AUV if there are problems. This has only happened three times though so is not a frequent occurrence.
- 5.3 *Isis* has had a big impact on the community. NMF is working with Rovco in looking at a stereo camera system. NMF is also looking to automate the navigation and control of the vehicle. This may reduce the piloting load. A virtual control room will allow scientists at base to interact with the ROV at sea. This might also allow remote piloting. There are also some opportunities to use a combination of photogrammetry and virtual environments to create a "digital twin" of the ROV operations which would allow scientists working remotely to have a "gods eye" view of the operations thereby helping to improve the understanding of the ROV operation. There are ways to improve capability. We are now working on streaming videos back to NOC. NMF is upgrading the HyBiS Command Module. Mobile Platform underwater Systems (MPUS) and we are looking to upgrade the umbilical. Although AUV's will improve, there will still be a need for ROV *Isis* and HyBiS.
- 5.4 **Cost reduction options** - We assume NERC will want to continue to support NMF's Remotely Operated Platform capabilities. MF talked through the options that were reviewed, noting the recommended Option Three which is to continue with the status quo and continue to invest in optimising the existing world class platforms to reduce costs. CR asked the Board if there were any objections to Option Three and none were received.

- 5.5 JB thanked MF for a clear overview. Geomar has the Keil 6000 and a Ravencrest ROV. Individual surveys that provide funding rather than a central budget can be difficult. I agree with your position and would further promote HyBIS to make P.Is more aware of the capabilities so that NMF may not always need to mobilise *Isis*.

ME said to bear in mind that we are entering a period where the cost of environmental work may be considered negatively by the Treasury because of other current priorities. ME agreed with what MF had said.

CF agreed that we need to continue to be aware of what would happen if we don't have this equipment.

MFAB agrees with NMF's recommendation of the status quo.

6. Ship Users Underway Group – [PPT Two](#)

- 6.1 HO asked for MFAB's approval of the User Group. CR was pleased with this initiative and asked if anyone disagreed or if there was anything missing. LD queried whether there might be an overlap between the Data WG and the Ship Users Underway WG, suggesting that meetings could be combined for a period. CR agreed this was sensible as there is overlap. LD advised the Board that BODC has been working to harmonise the data systems so it would be good to combine the groups in one meeting whilst this work is on-going. More regular meetings would be appreciated.
- 6.2 HO noted that whilst there is cross-over, there are elements that don't overlap, so rather than concurrent meetings, perhaps there should be meetings in close succession. LD and HS agreed. HS noted the value of getting user interaction with the Data Working Group and is supportive of more regular meetings. CR agreed for the two WGs organise meetings back to back. **Action: HS, LD, HO, JP.**
- 6.3 TS added that when a committee gets too big, it can be difficult to make decisions so urged caution. To maintain focus, groups should maintain critical size. Anything over six in number is problematic. CR suggested the Chairs of the two groups devise a smaller sub-task, that would be good for a joint meeting. **Action: HS & HO.**
- 6.4 LS noted the importance of putting in place a system that supports the flow of data for PIs, however, there is only so much that NMF can do. Does MFAB see this as a priority? If not, the Board needs to say so. NMF needs a steer on priorities because resources are finite. CR suggested both groups put a cost and priority on each of the tasks needed and provide that information to the MFAB with a time scale. JH is supportive of the UG but there has been a lot of work done here already so further effort should be applied to 'joining the dots' now. JB agreed that it is wise to enhance accessibility so that databases are easy to

handle. He also agreed that committees shouldn't be too large; interfaces need to harmonise with each other. LS added there is a tendency for each task to be seen as important as every other so if there could be follow up on this, that would be welcome. The Chairs of the WGs are to prioritise the tasks. **Action: HO, HS.**

7. RNA/DNA sequencers – presented by Emmy McGarry ([PPT Three](#))

- 7.1 TS advised that the MFAB would, as a rule, look at more expensive equipment than this. This level of cost is in the realm of consumables and sea-going scientists may well bring their own kit here. CM added that it would probably be best for scientists to bring their own systems for now although this may change in the future.
- 7.2 MF advised that NMF is integrating an eDNA sensor from the Ocean Technology and Engineering Group and asked if the MinION would be relevant for that. In conclusion, it was recommended that EM talk to Dr Julie Robidart, OTE Group.
Action: EM
- 7.3 TS noted that an eDNA sampler is in the realm of autonomy although this is different to what EM is talking about. Autonomous measurement of eDNA is different to what is being talked about here and, in terms of finance, more in the realm of what should be talked about at this committee.
- 7.4 CR concluded that MFAB would not recommend buying this item through the NMEP but EM should discuss with NMF about an underway eDNA application.
Action: EM

8. Marine Facilities Planning Website update – Colin Day

- 8.1 The Marine Facilities Planning (MFP) page is the programme tool that supports the research expeditions and was made in-house. It is a series of integrated modules which came on-line in 2015. The programme construction module came on-line three months ago and is an internal tool for NMF and NERC. The Autonomous Deployment Form Programme Management capability has also been developed.
- 8.3 The MFP programme tool has always had the capability to manage staff scheduling but allocating crew has been done manually. In future, crew scheduling will be integrated. Staff skills are integrated, to be shared across NMF and within the staff scheduling module.
- 8.4 The online post-cruise assessment review process should make availability of information faster. The integrated nature of the MFP tool means that NMF can gather information from across the modules for reporting purposes. We will also be programming the expeditions of the British Antarctic Survey although it will be a while before this comes on line.

8.5 A lot of NMEP user data exists, going back some years, as it is a reporting component for the Cruise Programme Review Group (CPRG). It should be possible to report on equipment use back to 2015, efficiently and quickly. KHe thanked CD, adding that it would also be appreciated to have additional data.

9. Net Zero Oceanographic Capability ([PPT Four](#))

9.1 LS - the replacement date for the RRS *James Cook* is 2035 although the process begins in 2025. The rate of change of technology, especially around autonomy is such that the replacement for the RRS *James Cook* will probably be a step change. NERC ships generate a lot of carbon so if UKRI is to meet its emissions commitment, clear thinking is needed to understand the options and to roadmap these into something achievable. In this regard, NERC has asked for wide community engagement.

9.2 The Net Zero Oceanographic Capability scoping project has a Steering Committee that will be chaired by Professor Paul Tyler. There will be workshops, surveys and questionnaires. The report is due to be submitted in September 2021.

9.3 If the UK builds a small, semi-autonomous ship in the future, there will be carbon footprints associated with all stages of this. The procurement, build and disposal need to be considered as separate projects. NZOC will focus on the carbon footprint of the capability in use.

9.4 KHe commented that career progression is important here. e.g. some disciplines require heavy payloads. We need to try and get as many sub-disciplines in the group as possible to highlight the challenges.

9.5 AB asked if it was the intention to offset the carbon emissions from the ships. LS answered that this may be a recommendation but it was too early to comment.

10. Capital Expenditure Proposals

CR introduced this item, noting that there had been two rounds to date and that these have been graded by the Board.

10a. Update on results – ([PPT Five](#))

MFAB needs to steer how the second round fits with the first - how do we prioritise the two sets of results so far.

- **Snowcatcher** (Adrian Martin, NOC). There was going to be a trial this year but this has been postponed until 2021. We are looking to develop a trace metal variant. We need to address the safety concerns with the new design.
- **PCO₂ bid** (Sue Hartman, NOC) This item has been incorporated into the NMF Technology Roadmap. AH suggested organising a meeting and offered to chair a subgroup on this through MFAB. HO advised there had been a couple of meetings earlier this year with different opinions expressed. AH suggested giving a presentation on this to MFAB and to include external input. Although this activity is in hand, HO is happy for the offer of help from AH. This action should include experts from the Underway Working Group. **Action: Discussion HO/AH.**

[Post meeting action – meeting held with AH on November 20th]

- **Hydrophone array** (Gay Bayrakci, NOC) – to maximise the use of this for the community, we would like to buy one system that has maximum capabilities or could, for example, be incorporated into an Autosub.
- **OTEG nutrient suite (Corinne Pebody, NOC)** – to be discussed later.
- **BathySnap** (Daniel Jones, NOC) – The SMARTEx project will fund the development work by NMF to design and build an updated BathySnap system for the SMARTEx cruise. NMF will leverage this work to develop a suite of camera system that will be interoperable across the larger NMF fleet as well as build BathySnaps landers for the NMEP. Leveraging the SMARTEx funding will allow NMF to refine and develop a more interoperable systems by sharing development costs.

CR asked if a paragraph about the Capital Expenditure rounds could be written for the Challenger Wave on-line newsletter, to include a picture. **Action: HO and JFP**

- **PAM system** (Anna Bird, NOC) - this integrates easily and doesn't need to be wall-mounted. Investment will come if NERC accepts the upgrade in its entirety.

10b. NMF existing 'wish list'

- SLOCUM G3 - will be arriving end of the year and will have RBR CTDs
- Magnetometers – would like to have the capacity to deploy two.
- Container fleet – The laboratory container fleet we have is aging and approaching end of service life. The intent over the next 5 years is to gradually replace all clean chemistry laboratories, with the existing containers in the best condition to be repurposed as RN lab containers.

CR referred to the annual funding for the NMEP of £1.5m per year, noting that MFAB has reviewed applications for about half of this so far. HO explained that this funding is for replacement of lost kit and obsolescence management. After these costs have been met, then NMF can look to potentially funding items proposed by the community.

MM noted that NERC has considered replacement of seismics and asked if this was still going forward. HO advised that this has been removed for consideration for now, pending resubmission. LS added that this is a significant investment and a key capability for the UK science community, however, there are many requests for equipment at the moment.

KHe asked whether the containers would be general purpose or Radiation laboratory (RADVAN) containers. HO advised that NMF is buying fully kitted out chemistry containers.

MP commended the investment in the G3 (3rd Gen) Slocum Gliders, noting this as a welcome investment for coastal ocean research given the increased buoyancy range and shallow water capability of the G3 over the current glider fleet. Further, new investment in RBR conductivity sensors are also welcomed and are hoped to bring improvements to resolving strong density/salinity gradients that are typical in shallow shelf sea waters.

11 Scientific Engineering section of TRM ([PPT Six](#))

- 11.1 CR thanked NMF for all the on-going work and asked if any input was needed from MFAB. HO said it would be helpful if members could provide feedback on the suggestions in the TRM. CR suggested a draft document to go out early in 2021. MF mentioned inclusion of time lines and an organisational structure, also cross-cutting themes. Some of the document might need to go into appendices to as it is growing.
- 11.2 In terms of the time line, MF asked for comments from the Board before the March 2021 meeting. **Action: Board members to give feedback to the Secretary Friday 26 February 20201.**
- 11.3 HS advised that BODC is looking to develop a Roadmap which is more aligned to the NMF TRM. CR asked if BODC could provide text for the next version of the NMF TRM that will be reviewed at the March 2021 meeting. HS agreed to provide for BODC text that could be incorporated into the NMF TRM.
- 11.4 CR asked for the draft next version of the TRM to be discussed at the March 2021 MFAB with a view to getting it released to the community by May/June 2021.
- 11.5 JH asked if there is information from HO's analysis on SMEs that could be included. e.g. types of equipment requested, science aims of expeditions. MF

thanked JH for this good idea. KHe agreed that this is an excellent idea and would like to discuss SME data with HO from an NZOC point of view. **Action: KHe, HO**

- 11.6 KHo asked about video archiving. MF and HO have been discussing this around bathysnap and looking at integrating imagery into BODC. HS added that BODC would like to integrate with the [Centre for Environmental Data Analysis \(CEDA\)](#). We are trying a test case of image data going through that and could present on this at another MFAB meeting (March will be too early). **Action: HS**
- 11.7 LD – mentioned '[Read the docs](#)' which simplifies software documentation by automating building, versioning, and hosting of documents.
- 11.8 CMc – rather than restructure the TRM, how about an accompanying tool to help access the relevant sections. MF agreed - a TRM that is based on a Wiki would be great. CMc suggested subsetting information and linking to the [UK Marine Science and Technology Compendium](#). CR thought it would be good if the format could help people select the sections that they are interested in. TS agreed - great idea to put the TRM into a Wiki format.
- 11.9 MF commented that from the user's perspective, a Wiki could be linked to other data sources (e.g instrument specs, cruise reports, etc). We would need to think through how we would manage and curate the document.
- 11.10 CR considered the wiki a great idea although extra time would be needed to create this in a year when everyone is already pressured due to COVID delays. Are there volunteers who can help or should we plan this for a 2022 release rather than 2021?
- 11.11 CMc asked NMF to tag equipment based on application – e.g. under ice, deep rated etc. then this could present a truncated form of the document. Maybe link also to the [UK Marine Science and Technology Compendium](#) to see where else relevant holdings and equipment may exist across the wider network. It could also be used as a decision support tool for planning / proposal writing etc. This would be helpful for Early Career Researchers (ECRs) etc. who might be less familiar with the full suite of equipment.
- 11.12 MF suggested we should probably consider how the TRM sits with other documents. An ECR would want a number of documents above and beyond just the TRM, e.g past cruise reports, detailed specifications and guidance for sensors, how it integrates with BODC, etc. It should probably link into the MFP as well.

Section 11 suggestions for updates to the TRM. Action: MF & HO with admin support from JP.

- 12 MARS section of TRM, including data Review**
- 13 Meeting future community needs with Marine Autonomous Systems**
- 14 Development work – MAS capability – AP**
- 14.1 AH suggested inviting AP to give this presentation at the NOCA AGM.
- 15 OCEANIDS I**
- 16 OCEANIDS II Engagement, Lessons learnt**
- 16.1 MP suggested the need for a Marine Autonomous & Robotic Systems (MARS) Working Group. KHe thought yes and asked if MP had considered an autonomous Special Interest Group within the Challenger Society. MP advised that previous discussions within the UK glider community had supported this and preliminary discussions had been made with Rob Hall (University of East Anglia) however no recent progress had been made. SIGs need to be driven by individuals or teams however a suitably willing ECR had not yet been identified to take this forward for Challenger, to work with Rob Hall. MFAB has a role here too and given the need for better MARS community engagement however, MP suggested the two groups could exist as a single entity. MP identified that MARS are currently effective in meeting future commercial and defence requirements but there is a need to ensure that future developments (including those within OCEANIDS) are in line with marine science community's needs.
- 16.2 ME – the range of equipment is incredible but we need to present why we are using it - if we don't, it will look like we've got equipment that is looking for problems to address rather than the other way around. A question now is how do we get information more cheaply than we have in the past? MP agreed noting the importance of good community engagement. CMc added about the possibility of including case studies of use of the equipment and abstracted forms of the publications for a more general audience. KHe advised she is happy to help with the glider section and spread the word to her glider using colleagues. It would be helpful to also engage with the BAS glider user community. KHo offered to provide MFAB with a link into the benthic biology end user group which includes both deep and shallow water scientists. AB offered help as some of the changes needed in the TRM had been due to his feedback. **Actions: AB, Khe & KHo**
- 16.3 CR suggested that volunteers from the Board and colleagues from the wider community create a detailed proposal for the marine autonomous WG that MFAB can discuss and agree upon in March. **Action: MFAB, MP**
- 16.4 K Ho advised that there is already a user network in the benthic community ([The Big Picture Working Group](#)) who would be interested and that she would be happy to help. Action: **K Ho, MP**

16.5 CR invited other volunteers for a WG. J Ho agreed to help. **Action: J Ho**

17. OCEANIDS II

17.1 LS informed the Board that he had hoped to be talking about the continuing development but they are not at that stage because there is no funding at the moment. The first programme comes to an end in March 2021 and NERC have helpfully extended the funding for key elements of that programme for the following 12 months. There is on-going development of Oceanids C2. It may be possible to allocate some National Capability LRI funding to take forward some initiatives.

18 NMEP Trials 19/20 and those planned for 2020/2021 ([PPT Seven](#))

18.1 HO - if someone would like to conduct a trial of some piece of equipment, we would welcome their ideas. The Board is encouraged to share this opportunity with colleagues. JP suggested adding some words about this to the NMF web pages: **Action: HO, JP**

[Post meeting note: there is advice on accessing 'opportunistic ship time' on the NERC pages: <https://nerc.ukri.org/research/sites/facilities/marine/using/>

18.2 CMc asked if there is a budget to support cabling. LS responded that NMF has a remit to support NERC's marine facilities programme and to work collaboratively with the marine science community where there is spare capacity. CMc has some equipment that could interface with the ROV *Isis* so he will discuss with NMF off-line.

19 Update from NOC Communications

19.1 JP talked through the actions undertaken by the NOC Communications Team to promote the NMF TRM and invited any more ideas. None were received.

20 NOC Association Terms of Reference ([PPT Eight](#))

KHe gave a presentation on the NOCA ToRs. Carol noted the need to update the MFAB ToRs as MFAB now comes under the umbrella of the NOCA. LS said that this is a positive change and it is also beneficial that CR is on the CPEB. CR asked the Board if all were OK with this. No comments received. **Action: JP**

Any Other Business

- 1.) JB complimented NMF on its sea trials and noted the benefits of highlighting these opportunities.
- 2.) ME talked about medium and small vessels and recommended trying to make these of more use.

- 3.) MP invited members to let him know if they would like to be included on the OCEANIDS newsletter.
- 4.) The Secretary invited feedback on the meeting format.

Item	Action	Who
Welcome	Provide list of acronyms. Secretary to check text to avoid acronyms in minutes.	JP
1a	Handbook – Chief Scientist’s handbook to include details on number of berths and science berths that are available.	NMF/who?
1c	Provide MFAB with a list of principal scientists.	LS/JP
1d	Provide presentation about the TRM at the NERC Principal Scientists workshop every year.	MF
1e	Write some words for the MFAB pages about how the community can suggest items for inclusion in the NMEP.	LS/JP
1f	Provide one-page infographic on NMF investment/budget and the size of our user groups.	NMF/who?
1.4	Dr Suzanne MacLachlan (SM) to present a paper on deep sea rock laboratory at March 2021 meeting.	SM/JP
6.2	DWG and SUWUG meetings to be organised back to back.	HS, LD, HO, JP
6.3	Chairs of the two WG groups to devise a smaller sub-task, that would be good for a joint meeting.	HS, HO
6.4	Chairs of the WGs to prioritise tasks.	HO, HS
7.2	EM to talk to Dr Julie Robidart, OTE Group about the eDNA sensor. In progress	EM
7.4	EM to discuss with NMF about an underway eDNA application.	EM
10a	Discussion group PCO ₂ bid and presentation to MFAB. Include external input and experts from the Underway Working Group.	HO, AH
10a	Write paragraph about the Capital Expenditure rounds for the Challenger Wave on-line newsletter, to include a picture.	HO, JP
11	Review suggestions in section 11 for updates to the NMF TRM for presentation to March 2021 MFAB.	MF, HO, JP
11.2	Board members to provide comments and feedback on the NMF TRM to the Secretary by Friday 12 February 2021 .	All
11.5	1.) Include in the NMF TRM, information on analysis on SMEs 2.) Discuss SME data with HO from an NZOC point of view.	HO KHe, HO
11.6	Video archiving. Present update on image data integration with CEDA, at the October MFAB 2021.	HS
16.3, 16.4 & 16.5	Volunteers from the Board and colleagues from the wider community to create a detailed proposal for the marine autonomous WG that MFAB can discuss and agree to in March.	Board, MP, JH, KHe, JP
18.1	Write some words for the NMF pages about opportunities to trial equipment on the NERC ships.	HO, JP
20	Update the MFAB ToRs	JP