PWS Assurance Group 16th Meeting (PAG-16) Agenda
Microsoft Teams Video Meeting
29 March 2021
09:00-16:00

Attendees

Attendees
Duncan Potts (DP)	PWSCG Chair
Kim Shillinglaw (KS)	Independent Member
Andrew Wells (AWe)	Civil Aviation Authority
Tammy Newey (TN)	Maritime and Coastguard Agency
Mark Vartan (MV)	Ministry of Defence
Sarah Davies (SD)	PWSCG Secretariat (BEIS)
Eli Johnson (EJ)	PWSCG Secretariat (BEIS)
Richard Orrell (RO)	Met Office
Stuart Goldstraw (SG)	Met Office
Ian Belcher (IB)	Met Office
Alison Wood (AW)	Met Office
Lisa Martin (LM)	Met Office
John Harrison (JH)	Met Office
Ken Mylne (KM)	Met Office
Jon Petch (JP)	Met Office
Mathew Dagnall (MD)	Met Office
Sarah Jackson (SJ)	Met Office
Samantha Adams (SA)	Met Office
Albert Klein Tank (AKT)	Met Office
Mark Hunt (MH)	Met Office

Apologies

Jonathan Taylor (JT)	Met Office

Actions

	Owner	Action
1	RO	Met Office to confirm if there has been an impact on forecasting due to the loss of components of the maritime network.
2	IB / RO	Met Office to provide KS with direct Met Office/BBC comparison of accuracy.
3	IB	Met Office update on COP26 to be added to an upcoming CG meeting.
4	BEIS	Secretariate to invite MH to the April 2022 PWSCG for an update
5	SD	SD to develop a revised PAG structure based on feedback from this meeting, to be shared with the PWSCG prior to the April PWSCG meeting.
6	SD	SD to add risk reflecting that surveys are impacted by COVID-19 and spending in OGDs.

Decisions

	Decision
1	**PPM5 sign off approved by PAG**
2	**PPM6 sign off approved by PAG**

1. **In camera session – PWSCG members only (09:00-09:30)**

2. **Welcome & Introductions – Duncan Potts (09:30-9:40)**
   - DP welcomed Met Office colleagues and opened the meeting. He reiterated that during this meeting we want to focus on the detailed reflections for this group and sign off milestones.

3. **Observations – Stuart Goldstraw presented on behalf of Jonathan Taylor, Associate Director Business Services (9:40-10:10)**
   - SG presented the slides to the group (see associated slide pack). COVID-19 has had an impact on weather data from aircraft, as well as the radar network. Due to COVID-19, failures over the winter took longer to recover due to COVID-19 and weather impacts. The main impact was on offshore network of data points, which in its nature is a limited network of observation assets. 4/12 data assets were not working for significant periods, and they were unable to be serviced which meant that our network was not able to meet requirements specified within the CSA during this time. Although significant the marine network of observations are less substantive from a numerical weather prediction perspective than compared to aircraft observations, which add significant value to forecasts through data assimilation.
   - In response to question iii above, the concern regarding maintenance of radar sites and some marine assets was the potential to transmit COVID-19 from the mainland to the Scottish Islands, and tensions around this
   - The group asked if, given the downturn in aircraft observations, satellite data was able to fill the gaps? This was covered in item 4, but SG noted the parameters being measured are not easily calculated from satellite signal. RO added that it is very difficult to understand the exact impact of missing observations (in response to question iv above), but the system is designed to cope with some network outage and there is currently not a significant signal that there is an impact.
   - DP asked if there is a robust plan moving forward given that we are likely to face ongoing restrictions due to COVID-19? SG said that there is a plan in terms of mobilising as many people as possible within safe limits.

4. **Weather Science – Jon Petch, Associate Director Weather Science** (**10:10-10:40**)
   - JP presented the slides covering Weather Science. He covered the R&I strategy, model upgrade highlights, the impact of COVID-19 and COVID-19 related work and a summary of the MOSAC meeting. JP said that there is an indirect response to the customer needs on the underlying science; and the Met Office take note of what priorities the customers would like them to improve.
   - JP noted that there had been an increase in the use of GPS-type observations from satellites to cater for the reduction in aircraft observations
   - KS asked if spend on post-processing changed during the year? JP said that he does not think there has been a difference in spend across the year. The science of IMPROVER began many years ago and is now manifesting itself in the roll out. KS offered a session on Improver for the secretariat and DP/KS
   - The group wanted to understand if there was an impact of the loss of maritime network? JP and KM were not aware of a significant impact. RO added that marine forecasts are verified against model background rather than directly from marine observations, so likely to be an indirect impact but that the Met Office team would look into this.
   - The group discussed the relationship between academic research and Met Office research. It tends to be collaborative, working with academic researchers to extract the best value from partners. It is very difficult to pull-through work done by others into your own systems. KM also added that universities

have contributed a lot to improve individual aspects of the system, with the MO then pooling that into an operational system that universities do not have the infrastructure to do.

Action: Met Office to confirm if there has been an impact on forecasting due to the loss of components of the maritime network.

Action: Met Office PWS team to arrange session on IMPROVER – potential option to include in the accuracy deep dive?

5. **Discussion on End of Year Forecast Accuracy – Led by Duncan Potts (11:00-11:30)**
   - KM shared slides covering performance in accuracy measures.
   - Aside from ECMWF, the Met Office are the next best global modelling centre in the world for deterministic modelling. The Met Office are moving towards a new KPI that looks at tracking performance using the same metric over a period of time in ensemble performance, this can also be done for comparative accuracy.
   - PWS measures are scored over 3 year periods due to sensitivity to short-term weather factors. We are looking for sustained development over time. 20/21 target has been met – (>80% targets met) . Maximum temperature at day 4 amber and at day 7 red. This will be noted in the end of year report to the PWSCG.
   - DP reiterated that accuracy is of utmost importance for the PWSCG. The comparison between the forecast and what actually happens is the key issue for PWSCG. Improvements in model forecasts have not been translated into the same level of improvement in the public facing forecasts.
   - KS asked if there is a known reason why accuweather and Global Weather Corporation perform better than MO on some instances? KM said that most of those providers use the same models, but different post-processing systems. A lot of the investment is trying to improve post-processing system, such as IMPROVER. IMPROVER gives a spread of uncertainty surrounding temperature predictions so in future uncertainty can be communicated with a forecast, recognising that communication of this will be key. There is research being undertaken to try and understand the communication of 'range'.
   - IMPROVER will be used for operational production from mid-2022. Met Office hope to see immediate benefit in quality of the weather symbols and in temperatures at MOST sites across the UK - but that is difficult to demonstrate due to lack of observations. Important for the PAG to be aware that we would expect greater improvements across sites that do not have observations. RO also added that the tool we use to measure comparative accuracy is extremely useful, and it does provide an indication of the number of forecast 'busts' where temperature predictions go wrong.
   - KS asked if Met Office could be directly compared to BBC at some point and look at this in detail at some point. Met Office offered to do this.

Action: Met Office to provide KS with direct Met Office/BBC comparison of accuracy.

6. **Operational Technology – Mat Dagnall, Associate Director Operational Technology (11:30-12:00)**
   - MD covered a series of slides about Operational Technology. 2020 performance has been above target despite COVID-19 issues, and the MO performance on operational technology has had a number of successes in 2020 (see slides for detail). There was a large power outage and because there is a resilient IT system the impact of this on services were not large. There were also some issues during the year caused by problems with the cooling system, but the new supercomputer will help to resolve these issues caused by an aging system. MD covered an action point from the PAG meeting on 23rd September 2020 (ACTION 4: PE to provide update on data standards and integrity once the processes are designed), describing the data and security standards.
   - DP said that the speed and ease with which business continuity was rolled out last March was impressive and we are very grateful to MD and his team for that.

7. **International Commitments – Sarah Jackson, Head of International (12:00-12:30)**
   - SJ gave an overview of the International Commitments. The MO reached 91% of commitments (target 80%) but it is worth noting that the MO represents one member state at these meetings and thus have limits on control in these situations. DP wanted to confirm the lower WMO rate (50%) and can we confirm if the main aims were met? SJ confirmed that the issues were around access to Finance info - we have been promised more detail this year, but this is something SJ is continuing to push and will be discussing this pm with US, CAN, AUS and DE.
   - Regarding EU exit, SJ said that for WMO it is not an issue. Within Europe, the leadup to Brexit was probably more damaging. There are new European programmes that are provoking quite a lot of discussion and new alliances are being developed. For example, between the UK and Switzerland. Things are settling, although there are likely to be some more bumps in the road.

- SJ said that the VCP work (£800,000 of PWS funds) counts as Official Development Assistance (ODA). It will potentially have impacts on Met Office colleagues in international business. The Met Office are unable to tell if this is souring relationships because in person meetings with international partners are not happening. JH also wanted to add that there might be a broader question on the impacts of reduced ODA funding on the Met Office work. MO are still awaiting settlements from FCDO, and it is likely that these settlements will have impacts. Balanced against that, a lot of ODA aims are aligned with Climate Change aims due to COP26 so this may be helping the Met Office aims.
- KS was pleased to hear JH mention COP26 and asked about MO presence? JH said that they are currently working on plans for COP26, and we can provide the GC with an update on this closer to the time.

Action: Met Office update on COP26 to be added to an upcoming CG meeting.

Decision: SD asked if the group were happy to sign of PPM5 and PPM6 based on the morning's presentations? The GC had no further comments and questions and signed off the metrics.

8. **Strategic Actions (Data Science) Update – Albert Klein-Tank, Associate Director Climate Science & Data Science SRO, Samantha Adams. Science Systems Manager - Informatics Lab (13:30-14:15)**
   - AKT and SA presented on data science.
   - Improving accuracy is a primary aim of the PWS. Recently, machine learning has become a much more significant element of weather forecasting because it offers new opportunities for rapidly and cheaply improving forecasts based on datasets and has become a new focal point for work. SA presented on machine learnings via case studies. Much of this work is developed in case studies with the aim of implementing it to wider areas of work within the Met Office. Machine learning has enabled better results from IMPROVER.
   - A lot of these techniques are now translated into BAU activities but that the Met Office need to continue to work with partners and stakeholders to develop more detailed solutions, for example linking heat data to vulnerability data within cities. SA reiterated that the pilot projects are about exploring and building capabilities, bringing data scientists together with domain scientists. JH added that the Met Office are trying to understand user needs and develop solutions to this, and it is hoped that the new Met Office Structure will help to unify this across the organisation.
   - MV asked about expertise to fill Metadata and if the Met Office are working with the UK hydrographic office? SA said that currently this is an internal programme but important to recognise these potential collaborators.
   - SD asked about the unusually high predicted temperatures for late March, as it is understood that these predictions arose via machine learning. AKT said that this arose from historical data that influenced this year's prediction too much. Switching off the tool resolved the situation, and the reiterated the importance of understanding the model and the science behind it. Human input is still required in these situations. SA added that for these methods to work well, there need to be extensive historical data and if models are updated then they need to be retrained. RO added that relatively few forecasts were impacted because the model is only applied to a subset of data currently. Need to ensure the right trade-offs on these models, particularly with extreme weather.

9. **Supercomputer update - Mark Hunt, Associate Director of Future Technology (14:15-14:45)**
   - MH presented a detailed update on the supercomputer procurement process and expected timeline.
   - DP asked if, given the length of the contract, are there mechanisms for agility and flexibility to adjust the service without financial repercussions? MH said that we are committed to the overall spend, but we have mechanisms that allow us to dictate how that spend is used.
   - MV added that he had no further questions, and concerns that existed at the beginning of this PAG have been satisfied, the assurances are welcomed. DP added that the group were reassured by MH's words on the maintenance of service during switch-over.

Action: Secretariate to invite MH to the April 2022 PWSCG for an update

10. **Long term role of the PAG – Duncan Potts / PWS Secretariat (15:00:15:25)**
    - SD and KS chaired a discussion on the future role and function of the PAG. A reformulated PAG structure has been proposed in line with the new CSA. This proposal will also be discussed with the CG.
    - The assurance groups will be aligned with the themes for the next CSA, with each theme having an assurance group.

- The group agreed that there is merit in aligning with the new CSA. TN said that a timeline map might help to understand this at the next GC meeting, which SD said will be provided soon by BEIS.
- The group asked if PAG 2 and PAG 4 should be combined. SD agree that PAG 2 and PAG 4 would be quite challenging to separate, and so agrees that they could be combined. The first year would contain an additional PAG 2 meeting to finalise accuracy measures.
- The group said that the proposed structure may result in too many meetings, although AW flagged that spacing meetings out helps the Met Office team due to the number of briefings.
- KS summarised that there is a lot of positivity regarding a new PAG process, however some further thought on the sequencing and overlap between meetings, along with the number of meetings. Spreading number of meetings along the year may make meeting attendance challenging. KS recognised AW's point about resourcing and reassured that this will be considered. Need to ensure that the solution works for the Met Office and the PWSCG.

Action point: SD to develop a revised structure based on feedback from this meeting, to be shared with the PWSCG prior to the April PWSCG meeting.

11. Review of Risk Register – PWS Secretariat (15:25 – 15:35)
- SD covered the updated risk register. Funding is still not confirmed and this results in a risk, but JH said that currently MO are working on the assumption that funding will be similar to 2020/2021 and that work can be adjusted if needed.
- AW said that COVID-19 impact could be raised to high, given that we are seeing impact on observations and surveys? SD will add a specific risk to cover surveys. RO also asked if the risk register should also reflect spending in other government departments that may impact MO?

Action: SD to add risk reflecting that surveys are impacted by COVID-19 and spending in OGDs.

12. Any Other Business and Topics for Next Meeting – Duncan Potts (15:35)
- None raised

13. In camera session – PWSCG members only 15:40-16:00