

Online webinar on moving towards SOFF implementation

12 November 2024

Training requirements for maintenance staff



WMO OMM

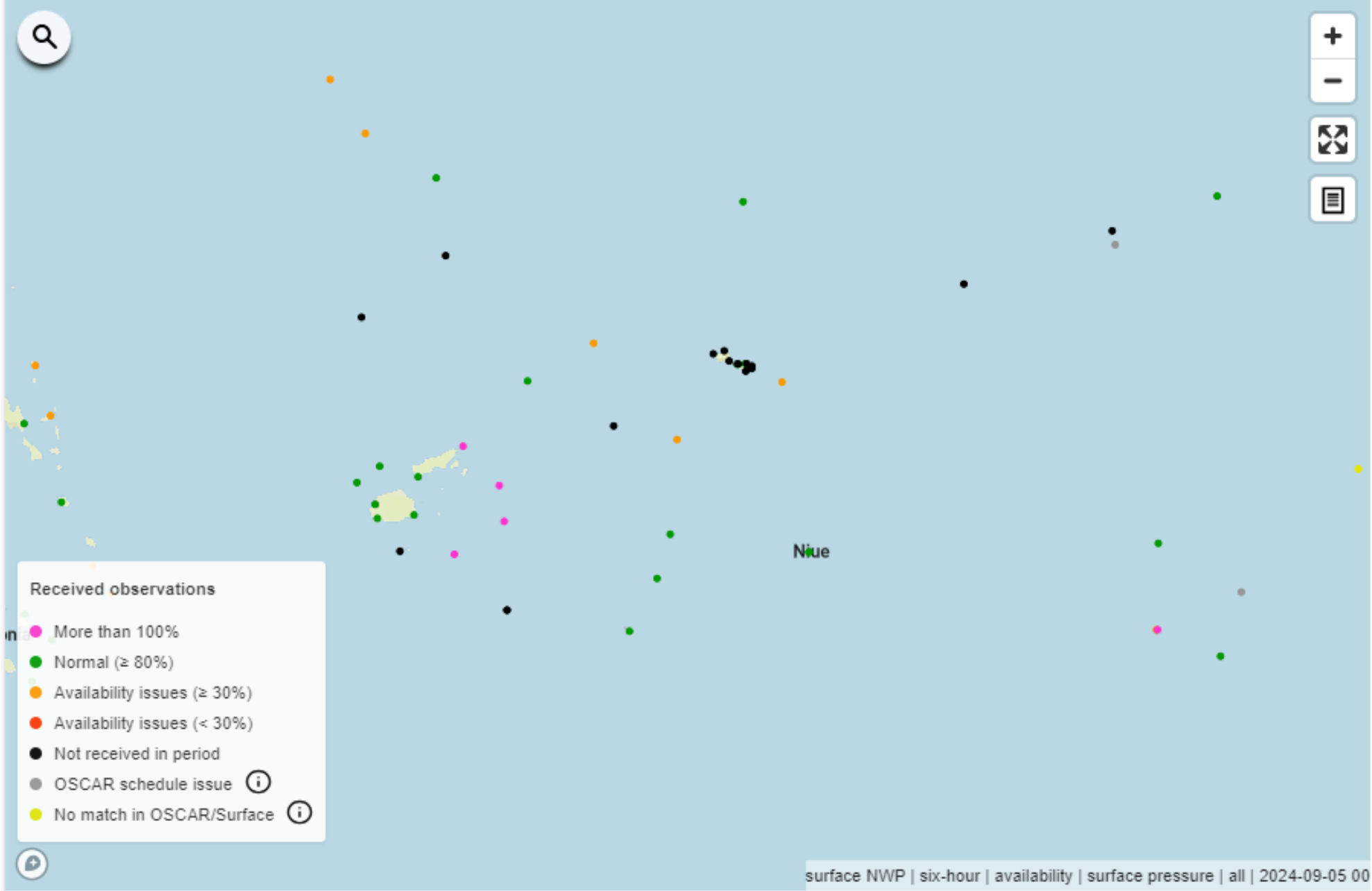
World Meteorological Organization

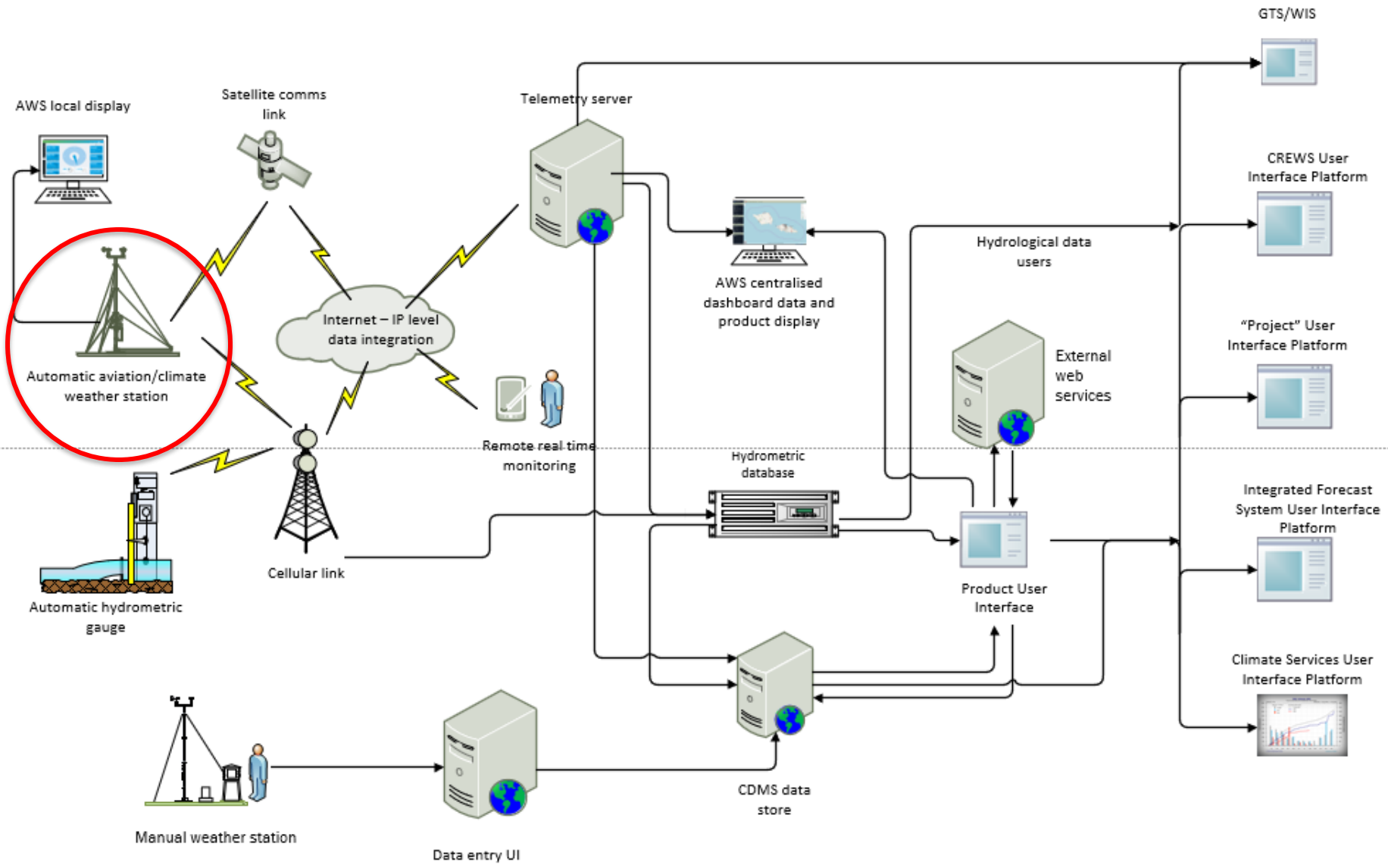
Organisation météorologique mondiale

*Andrew Harper, Chair ET-Transition to Modern
Measurements*

Outline

- Context
- ET-TMM workplan (past and present) as relates to GBON
- Training outline example and experiences
- Lessons learnt
- Existing resources / guidance





Baseline:

ce for Fiji in Q3 / 2024

ing stations: 7 (target: 6)

is: Compliant

ing stations: 1 (target: 2)

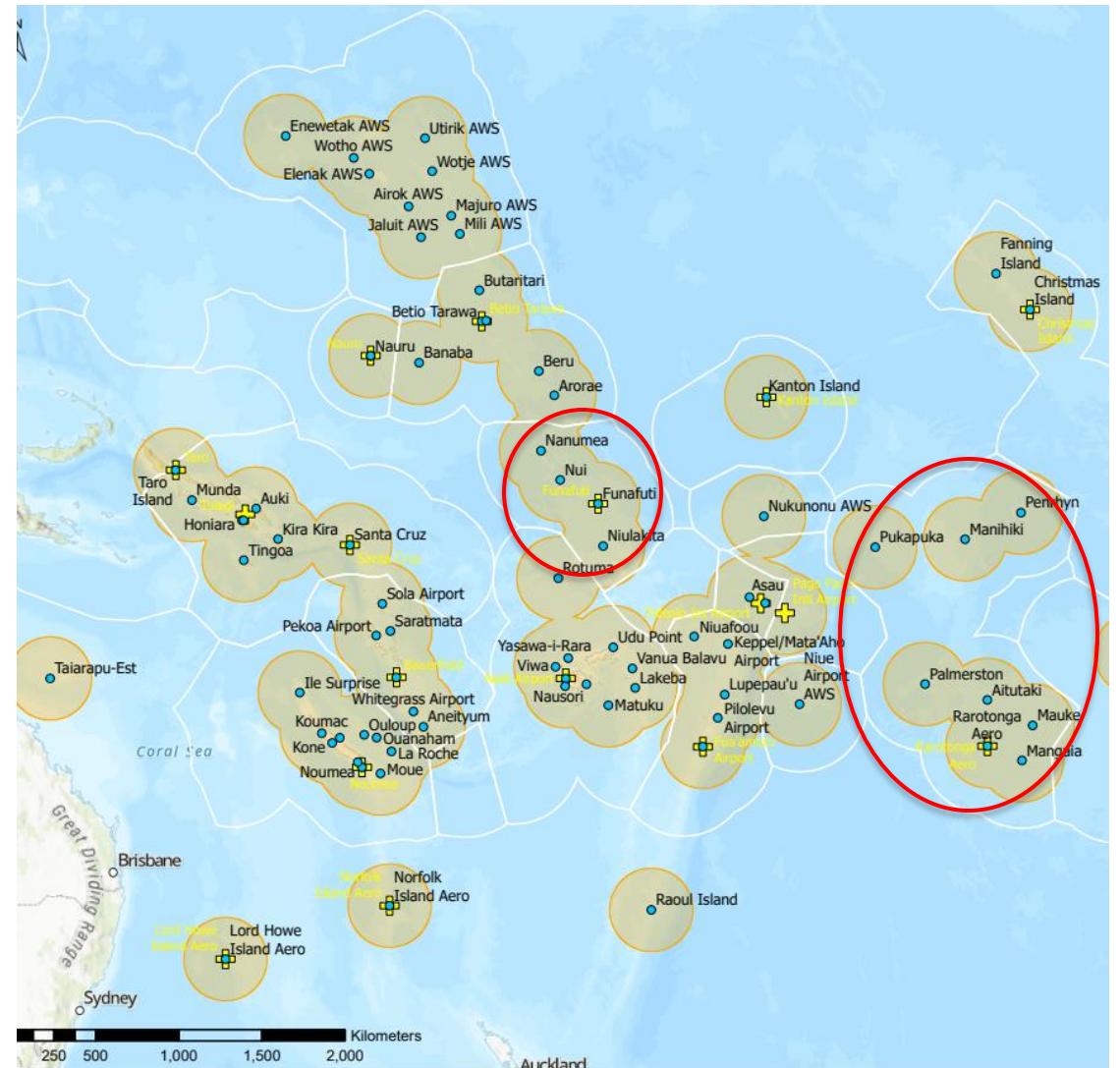
is: Non-compliant

4 compliant, Fiji could:

station(s)

Challenges to operating and maintaining AWS (SIDS)

- Significant constraints on resourcing and funding
- Small islands, large geographic area
- High cost of freight
- High cost of travel
- Moving between islands/atolls
- Limited capacity (small populations, staff numbers, high turnover)
- Communication/power systems are limited



Previous ET/TT work

- Transition to Modern Measurements workshops for RA-1 (2021, 2023 include French and Arabic translation), RA-V (2021) [Course: Transition to Automation Training Material \(Ver 2.0\) | ETRP Moodle Site](#)
- Guidance on Transition to Automated Measurements (Still to be published)
- Mapped competency framework to training requirements

Objective: Introduction to instrument upgrades, changes and transitions – preparing for success

1. Full scope of tasks needed to ensure sustained success
2. Resources/training available to plan and carry out a successful transition to automation



Workshop format

5 days – 2 hours each

1. Transition strategy
2. Network planning
3. Project planning and management
4. Generic AWS tender specifications
5. People change and change management
6. Risks
7. Options exercise/wrap-up

Element	Ordinary climate
Air temperature	•
Soil temperature	
Water temperature	
Precipitation	
Wind	
Cloud	
Pressure	
Visibility	
Humidity	
Wind speed	
Solar radiation	
Salinity	
Current	

Implementation Plan of the Global Framework for Climate Services

GFCS
Global Framework for Climate Services

Technical Regulations
Basic Documents No. 2
Volume I – General Meteorological Standards and Recommended Practices
2011 edition
Revised in 2012

Starting the discussion

- All our national observing capabilities are different
- Therefore, all our automations are different
- They are not easy (many fail) but it can be done 😊
- Integrated or multiple application areas – WIGOS Plan, GBON
- Tiered networks
- There is not a single and simple ‘How to’
- Success comes from a strategy that
 - Trains and ‘empowers’ Teams
 - Sets up well considered projects
- WMO has guidance on how to do that



People change

Training

Training in the new system is vital and will be welcomed by everyone!

How to make a good training plan and other people change plans. Not just the technical system, but how we are going to use it. It all needs planning and training

1. What people are available?

Which teams will be involved in the implementation

2. Are they prepared and trained?

Make a Skills inventory, Plan communication about change, Plan Training modules

3. Will they be needed to work same hours?

What is the spatial extend of the automation?
Are there additional stations?
Are they fully or semi-automatic?



A High-Level Strategy For Transition To Automation

The Vision

Successful delivery of long-term sustained measurements suited to needs and requirements of users.

Elements of the strategy

- Network planning
- Project management
- Specification and tendering -
- People change
- Performance Monitoring - Integration into ICT

How can WMO Assist?

- Providing well written and detailed guidance documents
- Holding dedicated workshops
- Disseminating posters and outreach material
- Organizing training sessions covering required topics

How to move forward?

Reach out to learn more :

- Use documentation prepared by WMO or HMEI members
- Technical conferences about latest experiences and meet experts
- Start preparing early to return sustained benefits



• More information available here. "



Keys for successful transition :



A Qualified and Multi-disciplinary Staff:

A major transition project is a considerable task. Skills and resources may be hard to find with small or time-constrained teams. Therefore, written guidance alone is unlikely to be sufficient.

For these projects to be a success, training for the team is required and should involve various aspects such as network planning, project management, maintenance and calibration, monitoring, and IT aspects.

A Sustainable Approach

Any new equipment, or AWS system, needs to be considered in the light of all the support to sustain it.

Existing WMO guidance resources are useful to prepare staff in wider Management and Project Management skills to enable the transition to be sustained and the full benefits delivered.

Sustained measurements from any AWS system is about good planning and budgeting. The transition project focus should be on the early work, but it is the long-term exploitation of the network that really matters.

A Cost/Benefit/Risk approach

The planning and conduct of any large-scale project, and in particular transition projects towards automation, should be based on a multidimensional analysis (cost/benefit/risk) of all its components in order to guarantee its success.

It is very important to break down the project into a set of actions and activities or orderly processes. For each of them, the evaluation of the associated costs and benefits is necessary. This assessment must consider any direct, indirect, financial and societal costs/benefits.

The prioritization of these actions will also consider the potential risk of success/failure of the entire project that may be generated by such an action.

Demonstrating the benefits of the project, mastering its costs, admitting the constraints that may arise during its execution, and knowing how to manage the intrinsic risks is a way of establishing the balance, allowing a smooth, sustainable and profitable transition for the well-being of society.

Costs	Benefits	Risks
<ul style="list-style-type: none"> • Equipment purchase • Installation costs • Support and maintenance • Staff induction and training • Testing • Integration in existing infrastructure • Required tools/facilities for calibration, maintenance and monitoring 	<ul style="list-style-type: none"> • Improved measurement • Modernised equipment • Modern data archive • 24/7 access • Unattended observations • Continuous records of data and performance • Better data consistency • Less work danger • Less-restricted site selection • More reasonable instrument layout 	<ul style="list-style-type: none"> • spares • Cost or Scope overruns • People change • Lifecycle overhead • Complexity • Technical constraints • Rising Prices • scheduled site visit/maintenance • Discontinuities in measurement series

Some shared experiences ...

- Reluctance to expand networks due to operational budget constraints.
 - CAPEX is relatively easy to get
 - Operating, maintenance and calibration costs always way under-estimated
 - Importance (and cost) of training under-estimated
- Competing with push towards low-cost options – need to maintain measurement standards
- Managing expectations – things do go wrong!

Workplan of ET-TMM

- Development of training curriculum on AWS maintenance
- Review/update Competency Frameworks for Observations, Instrumentation, Calibration and Networks
- Operations and maintenance plans
- Training material on implementation of siting classification
- Experience sharing on transition to automation (Community of Practice)
- Other capacity dev activities

Sustaining an Online Forum for Instrument Staff



WORLD
METEOROLOGICAL
ORGANIZATION

Mike Molyneux WMO - Transition to Modern Measurements
September 2024

The instrument engineering teams in the different NMHS's are small and busy, but it would be a good idea to start a sustained exchange of information on meteorological sensors, automatic weather stations and measurements.

Following up on workshops hosted by the WMO Task Team on 'Transitions to Modern Measurements', it is proposed to start a forum. This should focus on aspects of instruments, transitions to modern systems and operational experience. It will aim to improve awareness on WMO guidance, training and materials.

Creating a Sustained 'Community of Practice'



"Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly"



We will attempt to make an online forum for those working in weather instruments, initially for those who attended the WMO TMM workshop. Encouraging regular positive 'support and challenge' and increasing knowledge of WMO and HMEI best practice.

Groups of this nature can, however, be hard to start. They are best run by the people in the group. WMO Experts can help, but long-term success will come from active participation. We will start by contacting the participants from the last workshop and offer some options such as a short series of one-hour on-line seminars based on previous requests for topics.

If you have good experience of such work or good ideas and suggestions, then contact mike.molyneux@metoffice.gov.uk

- Pre-shipment - workshop assembly/test
- *Installation*
- Post installation training
- Ongoing peer to peer support



Post installation training

1. Programme overview
2. Baseline knowledge sharing/assessment
3. Development of activity for review at completion
4. Workshop / calibration
5. Sensor / instrument basics
6. Software introduction
7. Telemetry introduction
8. Sensor / instrument to data logger coupling



Post installation training

9. Build from scratch
10. Data logger and communications configuration
11. Site visit – prep, inspection, maintenance
12. Finding north
13. Metadata – post inspection documentation, CliDE
14. Post inspection instrument servicing
15. Visualization
16. Presentations and discussion



Instrument technician - 6 example tasks

1. Prepare an installation plan
2. Assemble and test an AWS
3. Complete commissioning document for assembled test AWS
4. Complete daily station checks (telemetry and status of sensors)
5. Compile a list of spares and consumables required for maintaining an AWS
6. Create a hazard register



Network management - 6 example tasks

1. Sketch a tiered network concept for NMHS
2. Prepare an annual operational budget for AWS network
3. Prepare site maintenance schedule and contract for remote stations
4. Collate metadata of all AWS for input into OSCAR
5. Review existing AWS site inspection form for relevance
6. Make recommendations for workshop/calibration facilities



Some lessons learnt

- Cleaning!
- Two weeks is not long enough!
- Repeat training required - progression
- Targeted training - not one size fits all
- Small groups allow for better interaction
- Lots of excellent material exists (WMO, HMEI, World Bank) – awareness is the challenge



Some lessons learnt

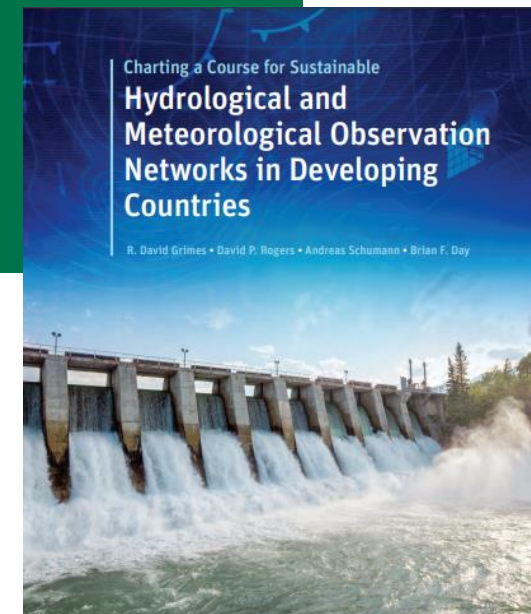
- Competency framework (WMO-No. 1209)
- Growing requirement for accredited/assessed training
- Cultural awareness
- Ongoing peer to peer support – continuous effort
- Starlink looks to be a real game changer for remote support.
- All this comes with a cost! – (including personal)



Some useful resources

<https://community.wmo.int/en/activity-areas/imop>
<https://community.wmo.int/en/capacity-development-materials-dashboard>

- Guide to Meteorological Instruments and Methods of Observation (WMO-No. 8)
 - [2023 Edition](#) available in all WMO languages
 - 2024 Edition to come soon in all WMO languages
- [Strategy for traceability assurance](#)
- [List of RICs including their contacts and capabilities](#)
- [Instruments and Observing Methods reports](#)
- [Knowledge-sharing portal](#)
- [Some courses](#) on the WMO ETR Moodle platform
- [Generic AWS tender specifications](#)
 - [Tender specifications for GBON Automatic Weather Stations](#)
 - [Tender specifications for GBON upper air stations](#)
- [Charting a course for sustainable hydromet observation networks](#)



[WMO Capacity Development Materials Dashboard](#)

More useful documents

- A Compendium of Topics to Support Management Development in National Meteorological Services (ETR-24)
- **Guide to Instruments and Methods of Observation (WMO-No. 8, Vol I, II, III and V)***
- Guide to Climatological Practices (WMO-No. 100)
- Guidance on Automatic Weather Systems and Their Implementation (WMO-No. 862)
- **Manual on the WMO Integrated Global Observing System (WMO-No. 1160)***
- **Guide to the WMO Integrated Global Observing System (WMO-No. 1165)***
- Guidelines on the Role, Operation and Management of National Meteorological and Hydrological Services (WMO-No. 1195)
- Challenges in the Transition from Conventional to Automatic Meteorological Observing Networks for Long-term Climate Records (WMO-No. 1202)
- Compendium of WMO Competency Frameworks (WMO-No. 1209)
- Guidelines on Homogenization (WMO-No. 1245)
- Guidelines for Managing Changes in Climate Observation Programmes (WMO-TD No. 1378)

WMO-No. 8, Volume I, Measurement of Meteorological Variables

Chapter 1. General

- Annex 1.A. Operational measurement uncertainty requirements and instrument performance requirements
- Annex 1.B. Strategy for traceability assurance
- Annex 1.C. Regional Instrument Centres
- Annex 1.D. Siting classifications for surface observing stations on land
- Annex 1.E. Operating equipment in extreme environments
- Annex 1.F. Station exposure description
- Annex 1.G. Measurement quality classification for surface observing stations on land

WMO-No. 8, Volume III, Observing Systems

- Chapter 1. Measurements at Automatic Weather Stations

Thank you



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