SnT 2021
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

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PREPARATORY COMMISSION

Activities to improve Data Availability by the IMS Maintenance Unit

Nicholas Mascarenhas (CTBT IMS/MFS Head Maintenance Unit)

O4.4-528

ORAL PRESENTATION

Outline

Improvements to Station Infrastructure

- Ensure Clean Reliable Station Power
- Measure and Service station grounding as required
- Ensure Adequate Lightning Protection (Surge arrestors/Powerconditioners)
- Ensure Adequate Climate control (test /regular maintenance/replace)
- Ensure working Backup Generator (mandatory at RN P/NG)

Dual split A/Cs, RN39 Kiribati

Power conditioner installed,
RN53 Ponta Delgada, Portugal

Verifying grounding resistance, RN40 Kuwait

Dual air cooled Gensets, RN39 Kiribati

Improve Sparing

- Maintenance Officers (RISMs) check DOTS inventory every 4 months (and order/ship spares as needed)
- Critical Sparing policy (Digitizer, Station Computer, X-Cooler, HV filter, preamp are spared onsite tT STATIONS for RN stations (to meet strict 7 day annual downtime))
- Established Regional Depots: HQ, Equipment vendors and at key regional states (e.g. USA, France, Canada, RF, Australia to reduce supply time)
- Assess supply chain (LSA)

Spare Lynx MCA

Spare detector and shield, RN39 Kiribati

Summary Sparing Analysis: MB2000 Microbarometer

Summary

The MARTEC-TEKELEC Systemes MB2000 microbarometer has been in use in the IMS network since certification of the first infrasound stations in 2001. There are currently 181 examples in use at 30 stations, with a further 69 spare examples (including 19 which are currently Faulty or In Repair).

With a Mean Time Between Failure (MTBF) of 208,000 hours (approx. 24 years), we should expect to see 7 to 8 failures per year from a population of 181 examples.

The summary sparing analysis (VMetric) indicates that the PTS has significantly more spare MB2000 microbarometers than the nine (9) calculated to be sufficient to meet the mission capability requirements of these stations.

Part	Current In Use	Current Spares	Recommended Spares
MB2000	181	69	9

Table 1 Sparing Summary

Instead of the current practice of holding at least one (1) spare part at each station, the VMetric analysis recommends placing forward spare parts only for the largest and most remote stations, with a smaller number of spares held at regional station operator depots (France, Russia) and at PTS headquarters.

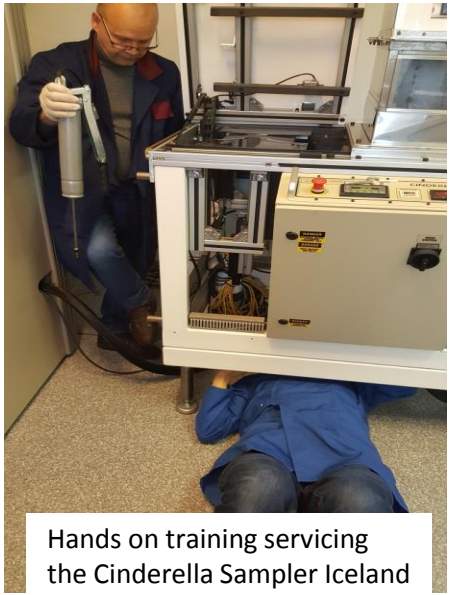
Improve Station Operator Technical Training

- Provide custom hands on training to targeted Staff/Station operators in need
- Strengthen technical content of existing trainings.
- Focus on Hands on, listen, evaluate station operator skills, improve, develop relationships

RN Hands on training Cinderella in Reykjavik, Iceland

Technical Training Dubna Russia

Training Onsite Kiribati



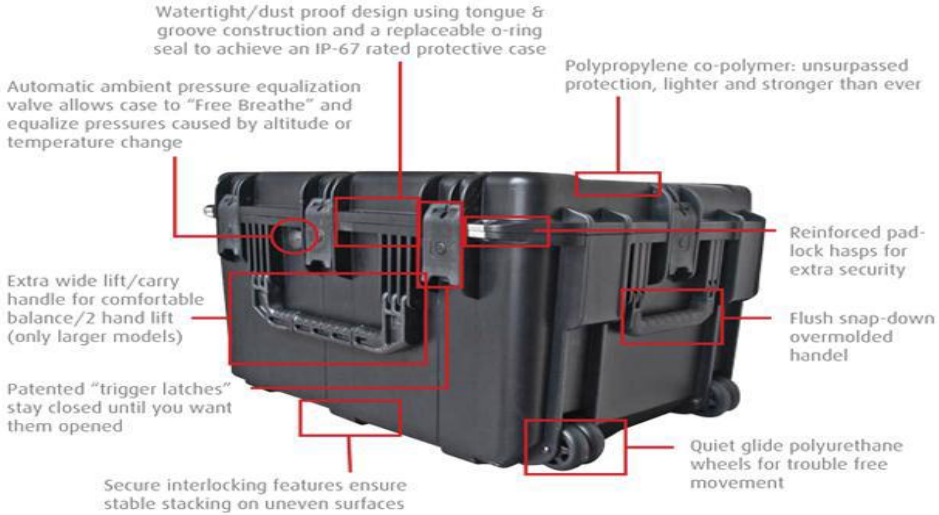
Hands on training servicing the Cinderella Sampler Iceland

RN detector vacuum restoration

- Monitor SOH for detector temperature (Ortec), increasing temp -→Alarm
- Monitor for SOH Cooler power (Canberra)– increasing power =➔Alarm
- Maintenance has Turbo pump kits and trained in vacuum restoration
- Reduce station down time, eliminate long turnaround times (>3 months)
- Successes: RN26 Fiji, RN34 Iceland, RN18 Chile, RN53 Portugal, RN33 Germany, RN13 Cameroon

Secure shipping and transport of RN detectors

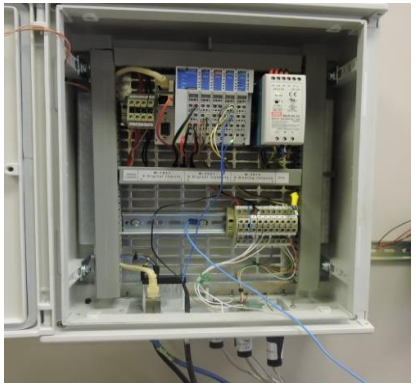
- Identified: Detectors dead / damaged. In most cases with reduced life due to loss of vacuum
- Worked with Canberra to develop custom ruggedized case for HPGe detectors and shipping handling procedures
- Include shipping/handling in technical training

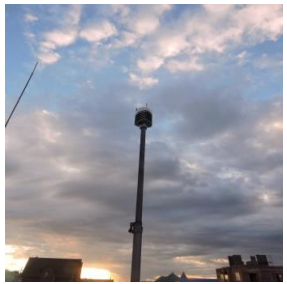


Rugged cust

Equipment Standardization , Upgrades and Recaps

Standardized WMDAS
(Wall mount Data Acquisition System)



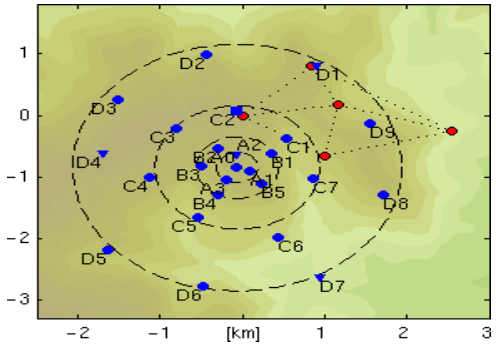


Vaisala All in One
WXT536 weather station

- New Power system for InfraSound stations

Power supply and communication box: MPPT charge controller, monitoring unit, Ethernet switch, DC/DC converters, surge protection devices, switches and distribution terminals

PS19 Germany after Recap



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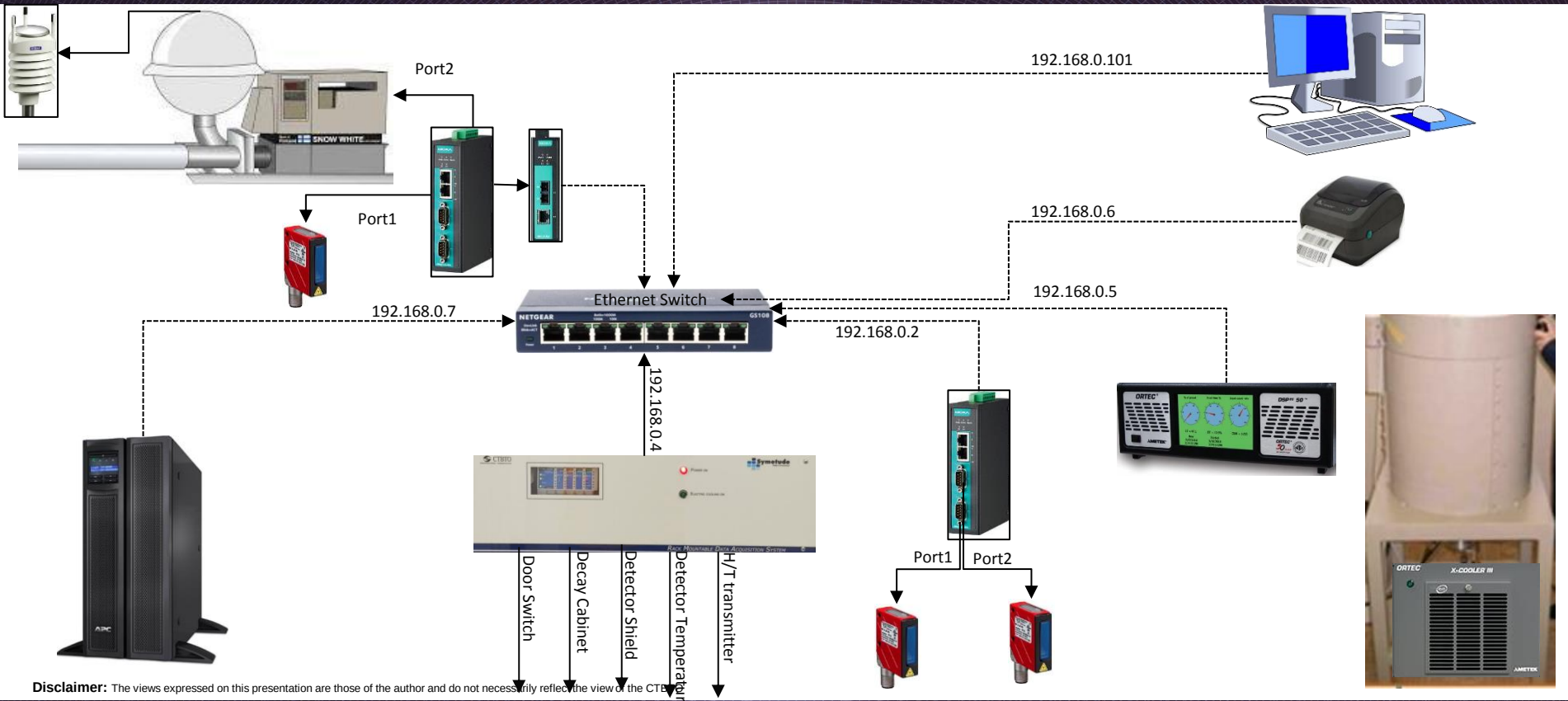
Equipment standardization at a RN Manual Particulate Station



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IMS Testbed at the TeST centre in Seibersdorf

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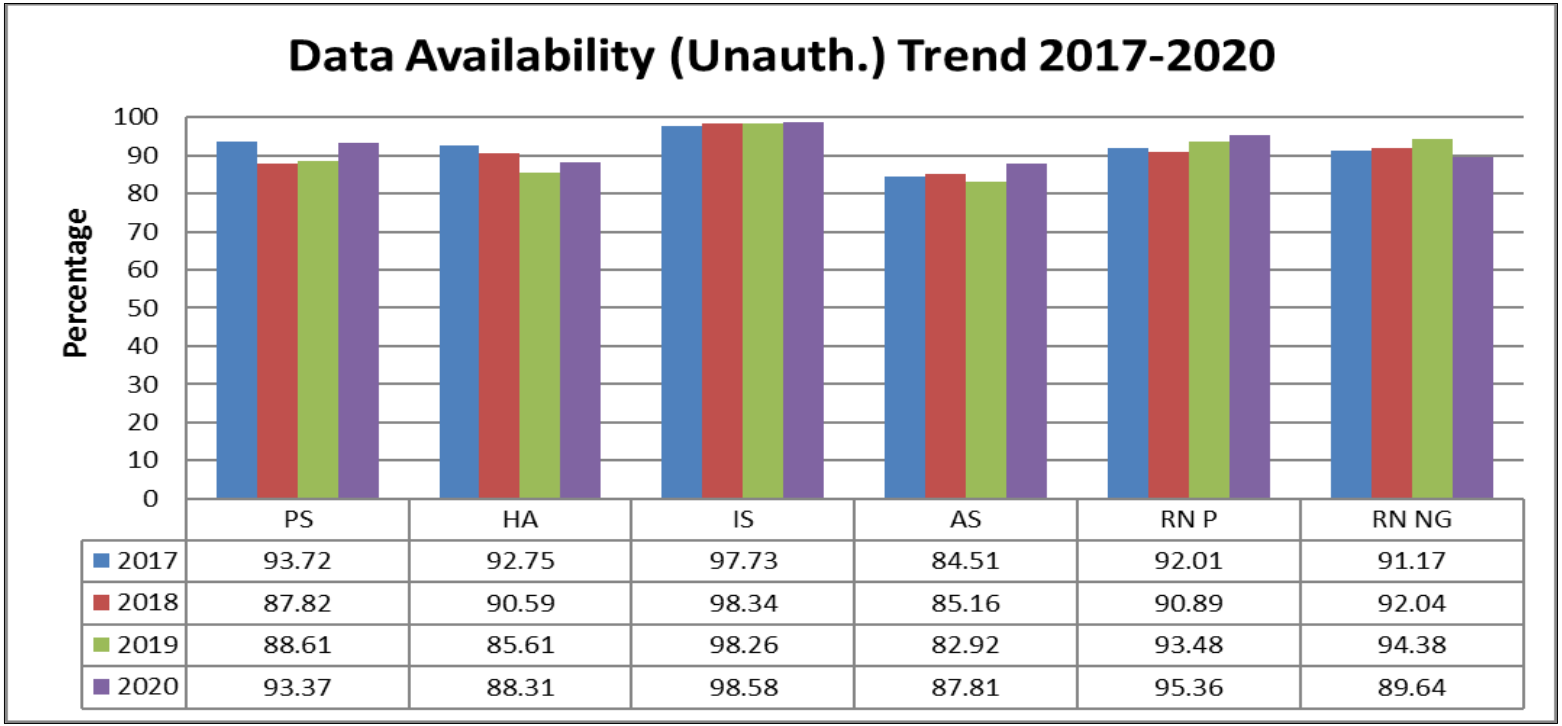
- Snow White and RASA installed at the Test Centre.
- RN Test Bed supports equipment validation and maintenance troubleshooting.
- Supports hands on technical training.

DA improvement



	PS	HA	IS	AS	RN P	RN NG
2017	93.72	92.75	97.73	84.51	92.01	91.17
2018	87.82	90.59	98.34	85.16	90.89	92.04
2019	88.61	85.61	98.26	82.92	93.48	94.38
2020	93.37	88.31	98.58	87.81	95.36	89.64

Results

- Data Availability (DA) has improved for RN network / steady or improving for SHI (excluding AS)
- RN DA was **84% in 2014**
- After improvements were implemented **RN DA is 94% end 2020**

Challenges:

- IMS network is aging
- IMS network is expanding
- Staff is constant
- Funding is constant
- Include Predictive Maintenance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