This document outlines the setup and important maintenance guidelines for each CSIRO instrument, where not outlined elsewhere.

Written by Ruhi Humphries towards the end of the CAPRICORN voyage, 12/4/2016, but with the purpose of providing information for staff running instruments on the following voyage (Ice2Equator - IN2016\_V03).

# Air Chemistry Lab

### ToF-ACSM

For assistance with this instrument, please contact [Paul.W.Selleck@csiro.au](mailto:Paul.W.Selleck@csiro.au)

This should run by itself and only requires a daily check, hand-written in the log book. If the instrument has to be restarted or anything requires maintenance out of normal operation (unlikely), notes can be found in the green folder that is next to the instrument.

Data is backed up automatically to the ship’s servers and can be found at:  
[\\voyage\_specific\ACSM](file:///\\voyage_specific\ACSM)

Remote connection available via VNC at: 150.229.233.191

### PTRMS

For assistance with this instrument, please contact [Sarah.Lawson@csiro.au](mailto:Sarah.Lawson@csiro.au)

This instrument is extremely sensitive so great care must be taken when interacting with it. Because of networking issues between the computer and the instrument, we have decided NOT to connect it to the network which has previously caused loss of network settings to instrument. Therefore:

Data backup: done manually via USB drive setup next to computer

Time sync: Currently there is no syncing of time for the PTRMS computer. The computer is losing around 50 seconds per day. This must be logged along with a comparison time, such as the ACSM PC.

Remote connection: NOT AVAILABLE.

### VOC Sequencer

For assistance with this instrument, please contact [Sarah.Lawson@csiro.au](mailto:Sarah.Lawson@csiro.au)

The VOC Sequencer is a stable instrument that has been running well.

New Sequencer tubes, as well as sampled tubes, are located in a cooler bag in the fridge in one of the labs on the main deck.

Changing the tubes: On day 8 of the samples, change tubes 1-7 and 9 (if it has been sampled previously) and the blanks. On day 9, swap out tube 8. Do NOT change the tube that is currently being sampled. When changing out the tubes, make sure not to lose any liquid that may have formed in the tubing (i.e. orient the tube so it doesn’t spill, and put the cap on the top).

Data backup: done automatically to the ship’s servers and can be found at:  
[\\voyage\_specific\SEQ](file:///\\voyage_specific\SEQ)

Remote connection available via VNC at: 150.229.233.193

# Aerosol Lab

For assistance with any instrument in this lab, please contact either [Jason.Ward@csiro.au](mailto:Jason.Ward@csiro.au) or [Ruhi.Humphries@csiro.au](mailto:Ruhi.Humphries@csiro.au)

### APS

### GRIMM SMPS

This is a permanently installed instrument that has been reconfigured from its usual setup that has been managed by the MNF staff. The only change is the change in the DMA column from long to short. Generally this has been a stable instrument with minimal butanol consumption. If any issues arise that you can’t deal with, discuss with MNF electronics staff who usually manage this instrument.

When doing flow checks on this instrument, ensure to turn the tap off before disconnecting, and turning it back on once the inlet has been reconnected.

Data backup: automatically backed up to:  
[\\atmospheric\smps](file:///\\atmospheric\smps)

Remote connection available via VNC at: 150.229.233.141

### TSI SMPS

This is setup to run the long column and utilise the CPC 3772. To use this configuration, we must setup a make-up flow on the CPC such that 300 ccm comes through the DMA, and 700 ccm through the HEPA make-up flow, making a total of 1000 ccm through the CPC (determined by the critical orifice. This will allow for a 10:1 ratio with the SMPS running with a sheath flow of 3 LPM. For the Ice2Equator voyage, the makeup flow will be controlled by a mass flow controller (MFC).

Flow checks on this instrument must be done “inline” to avoid strange pressure effects that have been experienced during CAPRICORN.

This instrument is running on a common PC with the two CPCs.

Data backup: automatic to:  
[\\voyage\_specific\nanoSMPS](file:///\\voyage_specific\nanoSMPS)

Remote connection available via VNC at: 150.229.233.196

### CPC3776 (CN3)

This instrument is running reliably and there are no special considerations here.

This instrument is running on a common PC with the other CPC and the TSI SMPS (long column).

Data backup: automatic to:  
[\\voyage\_specific\nanoSMPS](file:///\\voyage_specific\nanoSMPS)

Remote connection available via VNC at: 150.229.233.196

### CPC3010 (CN10)

This instrument is being installed after CAPRICORN and has recently been refurbished. During this process though, technical limitations prevented proper testing of the instrument, so care must be taken when interpreting data and running the instrument.

This instrument is running on a common PC with the other CPC and the TSI SMPS (long column).

Data backup: automatic to:  
[\\voyage\_specific\nanoSMPS](file:///\\voyage_specific\nanoSMPS)

Remote connection available via VNC at: 150.229.233.196

### Nephelometer

This is a permanent instrument that is being checked by us on these voyages. Descriptions for checks should be sufficient in the log book, but if you have any questions, please contact Jason Ward or MNF staff.

### MAAP

This is a permanent instrument that is being checked by us on these voyages. Descriptions for checks should be sufficient in the log book, but if you have any questions, please contact Jason Ward or MNF staff.

### CCNC

Data backup is automatic and can be found at:  
[\\voyage\_specific\CCN](file:///\\voyage_specific\CCN)

Remote connection available via Windows Remote Desktop at: 150.229.233.189. Please limit remote connection to this instrument as the CPU on the instrument computer is old and instrument parameters (e.g. flows) go a bit wild when remote connection is occurring due to the additional load. To combat this, and minimise the time spent remotely, the log sheet for the CCNC has been put on the remote server and should be updated from there.

This instrument has had issues throughout the CAPRICORN voyage that occur after the water reservoir/drain bottles are refilled/emptied. To minimise data loss associated with this, we have installed extra large water bottles so that this change should only be required once every 20 days. Approximately 20-30 minutes after the water is changed, there is a blip in the flows, and then concentrations soon go to zero. There is no indication in any of the parameters, other than concentration and cloud droplet size distribution, that there is an issue. This occurs because the sample capillary tubing (shown in the photo below), has been filled with a droplet of water. The cause of this is yet to be determined. However, to fix this, follow the steps below:

1. Check whether there is any condensation in the sheath line (see photos below). Log observations.
2. Disconnect the instrument from the sample manifold and block the manifold line so as not to pollute other instrument samples.
3. Run a dry shutdown (this will take 6 hours) while having a dessicant tube with HEPA filter connected to the inlet (i.e. running dry clean air through it).
4. Run a dry startup (this will take an additional 6 hours) after reconnecting to sample manifold.
5. During the dry startup, particle concentrations should be observed after a few hours. If not, you may need to clear the capillary tubing.
6. To clear the capillary tubing, please follow the steps in the photo below.
   1. NOTE: once you remove the capillary tubing, particles should be observed in the software. If not, there is a blockage further up towards the column.
7. Re-install the capillary tubing.
8. Since you’ve run a dry shutdown/startup cycle, this should have removed any additional water from within the system, so the capillary shouldn’t get blocked again. However, it is possible that you’ll have to repeat steps 6 and 7 a number of times.
9. Once particle concentrations are observed again and stable for a few minutes, do a zero check with a HEPA filter.

