Brewer tutorial. The basics.

EUBREWNET & WMO GAW BREWER OPERATOR COURSE

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Overview

- Setting up the Brewer spectrophotometer
- Leveling the tracker and the optics
- Checking the optics after Brewer relocation
- Setting up the Brewer software
- Connecting the Brewer to a PC
- Sighting and running initial tests
- Internal lamps replacement practices

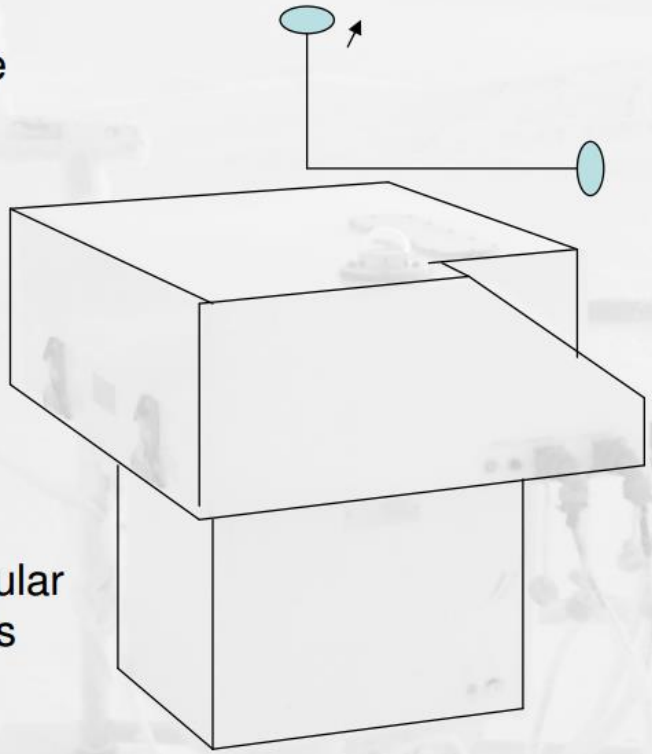
Setting up the Brewer

- Solid surface for the tripod. Anchoring.
- Orient the “Equator” mark towards the equator. (Or “North” away from the equator)
- Put fresh desiccant inside the Brewer to keep the instrument dry
- Do not connect the power and the data cables to the Brewer until all checks are done

Leveling the tracker

Tracker

Azimuth
Rotational
Axis Must Be
Vertical



Software Correction
From Mechanical
Zero to Earth
Coordinates

Pointing Accuracy
Required ~0.1°

Elevation Axis
Must be Perpendicular
To the Azimuth Axis

Internal Screws in
Tracker Base are
Used to Make the
Axes Normal Using
Liquid Reflection

3 Feet == Kinematic Connection to Earth

Leveling the tracker

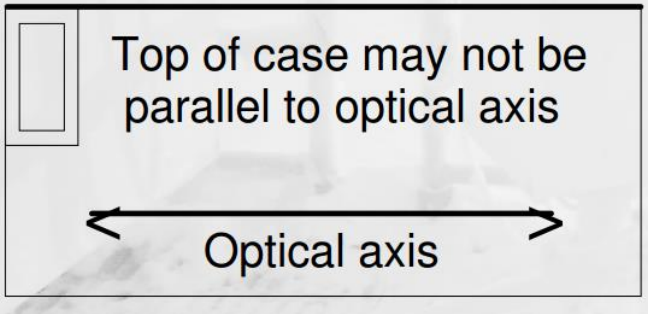
Leveling the tracker

When is it Right?

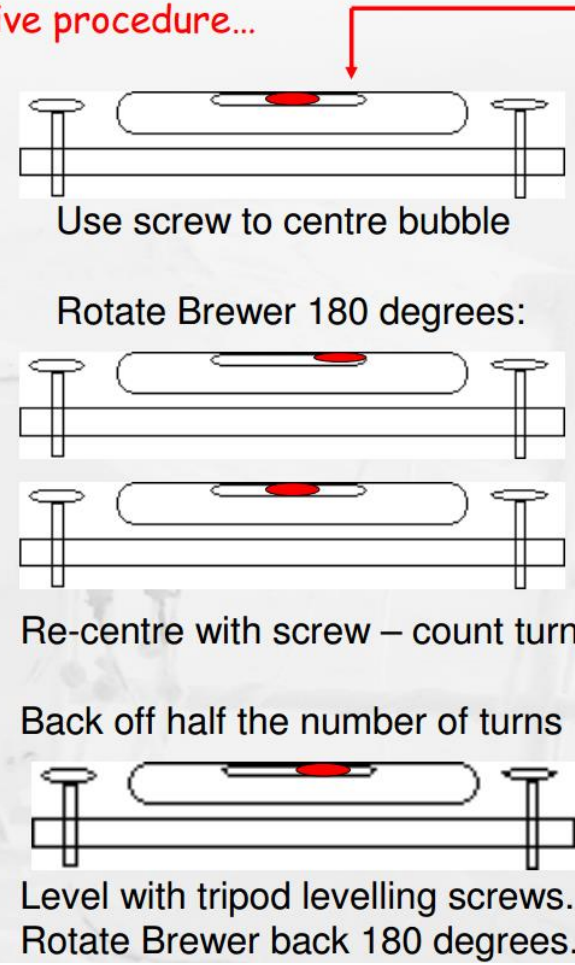
- With the bubble in the level showing 'level'-
- Rotate the instrument through +/-180 degrees
- The instrument should be level at all angles
- If not:
  - Level on along a line between a pair of feet first
  - Adjust level to show level
  - Rotate 180 degrees
  - Adjust level half way, adjust leg(s) the rest of the way - iterate back and forth until stable
  - Do the perpendicular axis

Leveling the tracker

Levelling one Axis



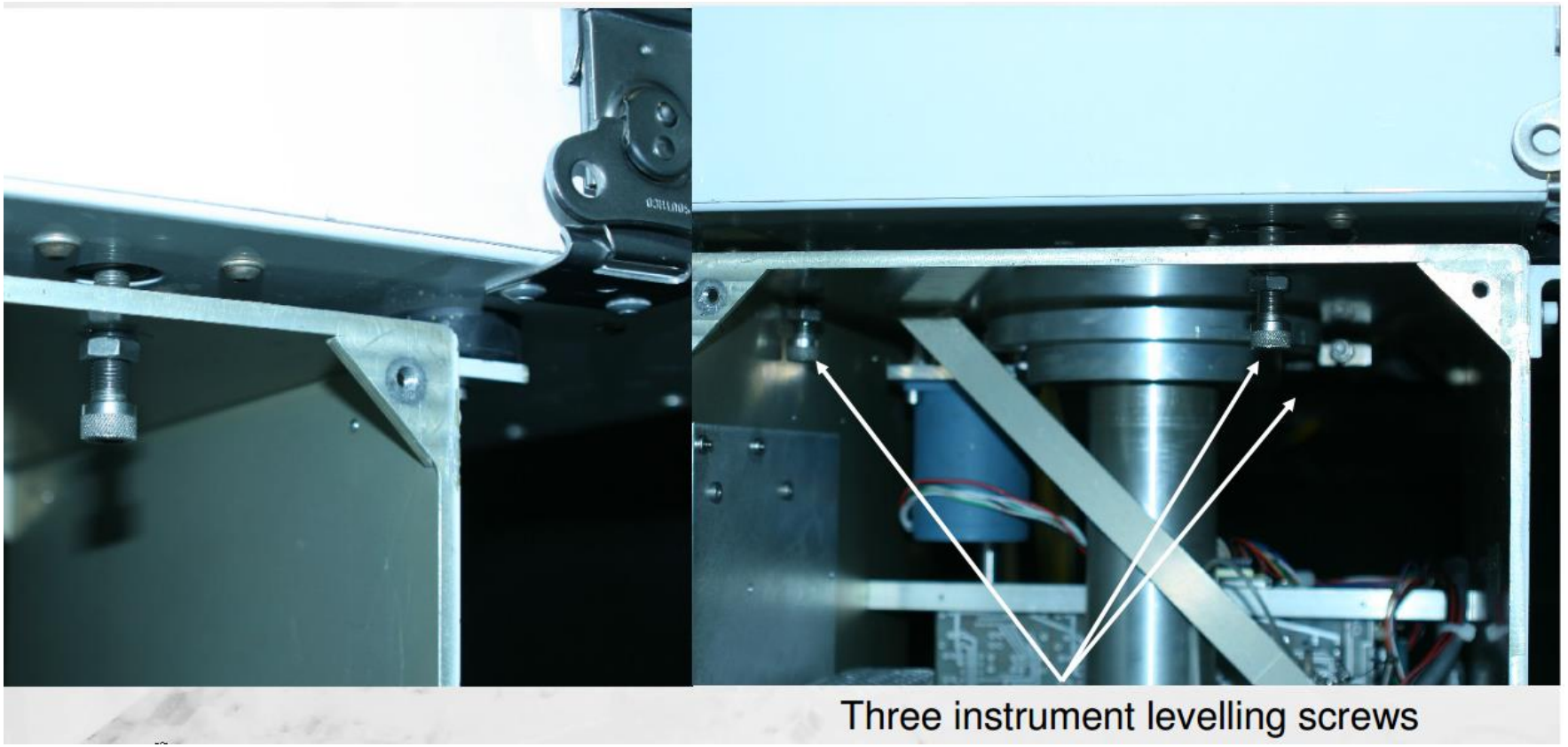
An iterative procedure...



Leveling the optics

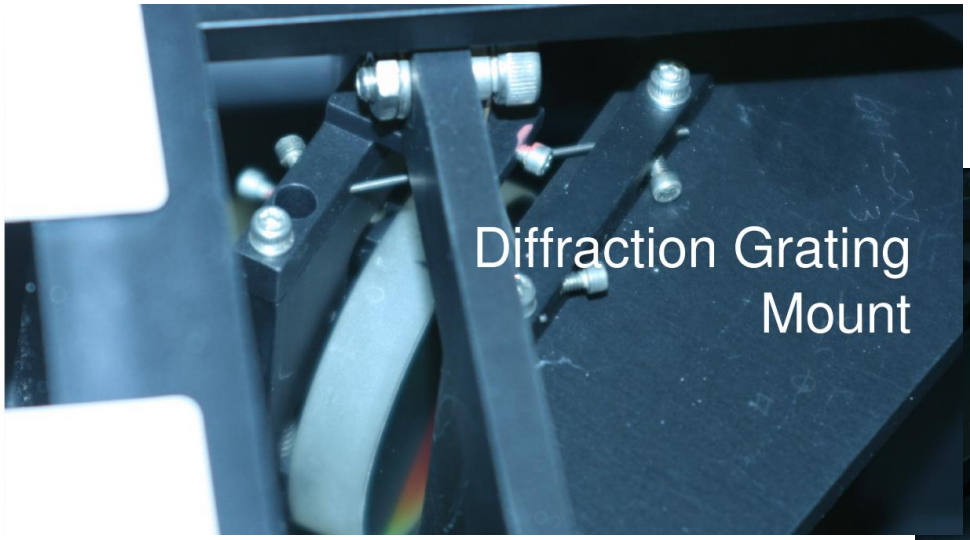
- Set zenith prism to look upward
- Use a circular bubble level
- Place bubble level on prism surface
- Rotate prism to centre bubble laterally
- Adjust centre levelling screw inside tracker to level longitudinal axis

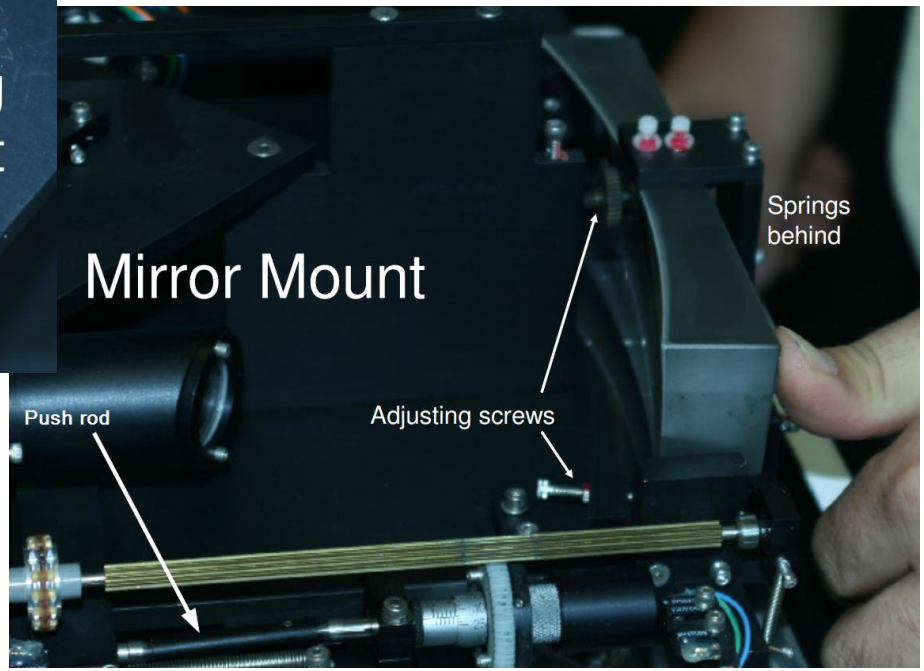
Leveling the optics



Three instrument levelling screws

Checking the optics after transporting the Brewer to a new location





V.Savastiouk and T.McElroy

Setting up the Brewer operating software

- GWBasic script controls the Brewer
- GWBasic is a 16 bit application with only 64 KB of memory for the code and all variables
- 32 bit Microsoft Windows is ok
- If the computer runs under 64 bit OS or Lunix then DosBox is the best solution

Brewer software directory structure

- Program directory
  - Code
  - Op_st.fil file pointing to data directory and keeping the instrument number (###)
  - Schedule files
- Data directory
  - Data collected with the program
  - ### subdirectory
    - the Brewer's constant files
    - Op_st.### file contains the status of the instrument
  - DSP-### subdirectory
    - JJJYY folders contain dispersion test files

Brewer operating software

- Maintained by International Ozone Services (IOS)
- Current version is 3.79 and is available from www.io3.ca
- Version 3.80 is ready and will be posted soon. This version works under DosBox as well as DOS

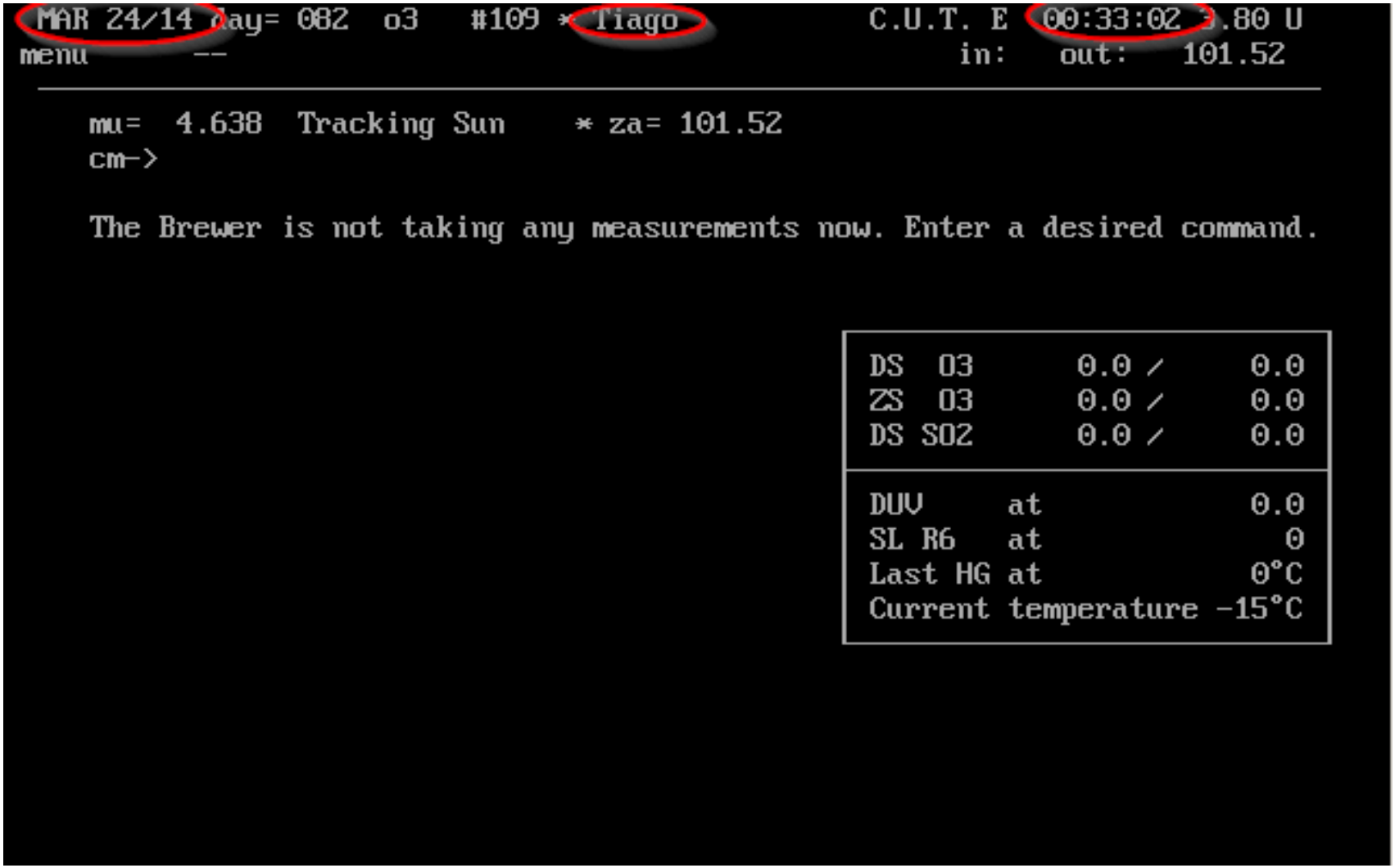
Brewer.bat

```
d:
cd \program
set brewdir=d:\program
dpakbd.com /D30
setdate
REM set NOBREW=1
gwbasic main.asc /f:10
set BREWDIR=
REM set NOBREW=
```

Connecting the Brewer to the computer

- There are two distinct serial protocols that Brewers use: RS232 and RS422
  - Slightly different cables
  - Different serial-to-computer adapters
- Due to GWBasic limitations only COM1 and COM2 ports can be accessed

Running the brewer.bat



Running the brewer.bat

- ll - to set the location
- lf - to add/edit location information
- da - to set the date
- te - to set the time
- td - to synch the time and date with computer clock

Running initial tests

- AP - to check important voltage readings
- FR - to set the micrometer position(s) close to operational
- HP/HG - to set the correct ozone operating wavelength
- RS - to verify the counting system works and does it in sync with the movement/positioning of the slit mask
- DT - to verify the linearity of the counting system
- SL - to check if the internal lamp reading is same as last time (spectral sensitivity)

Most common tasks

- Cleaning the quartz window and the dome
- Cleaning the Al azimuth tracker plate
- Replacing desiccant
  - Best do it whenever RH% goes above 10%
- Replacing the internal Hg and halogen bulbs
  - Best do it before they burn out