

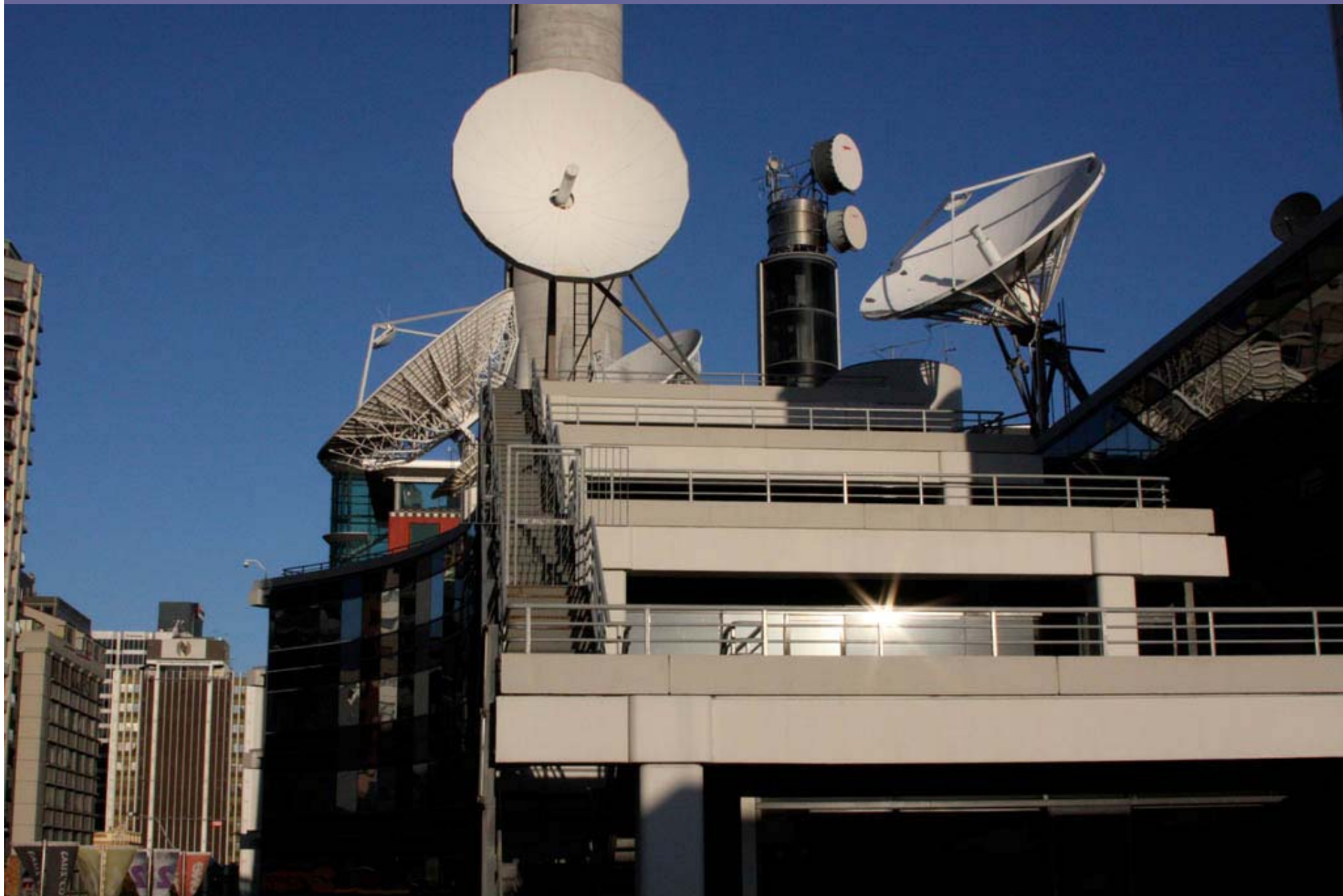
Kumeu Observatory

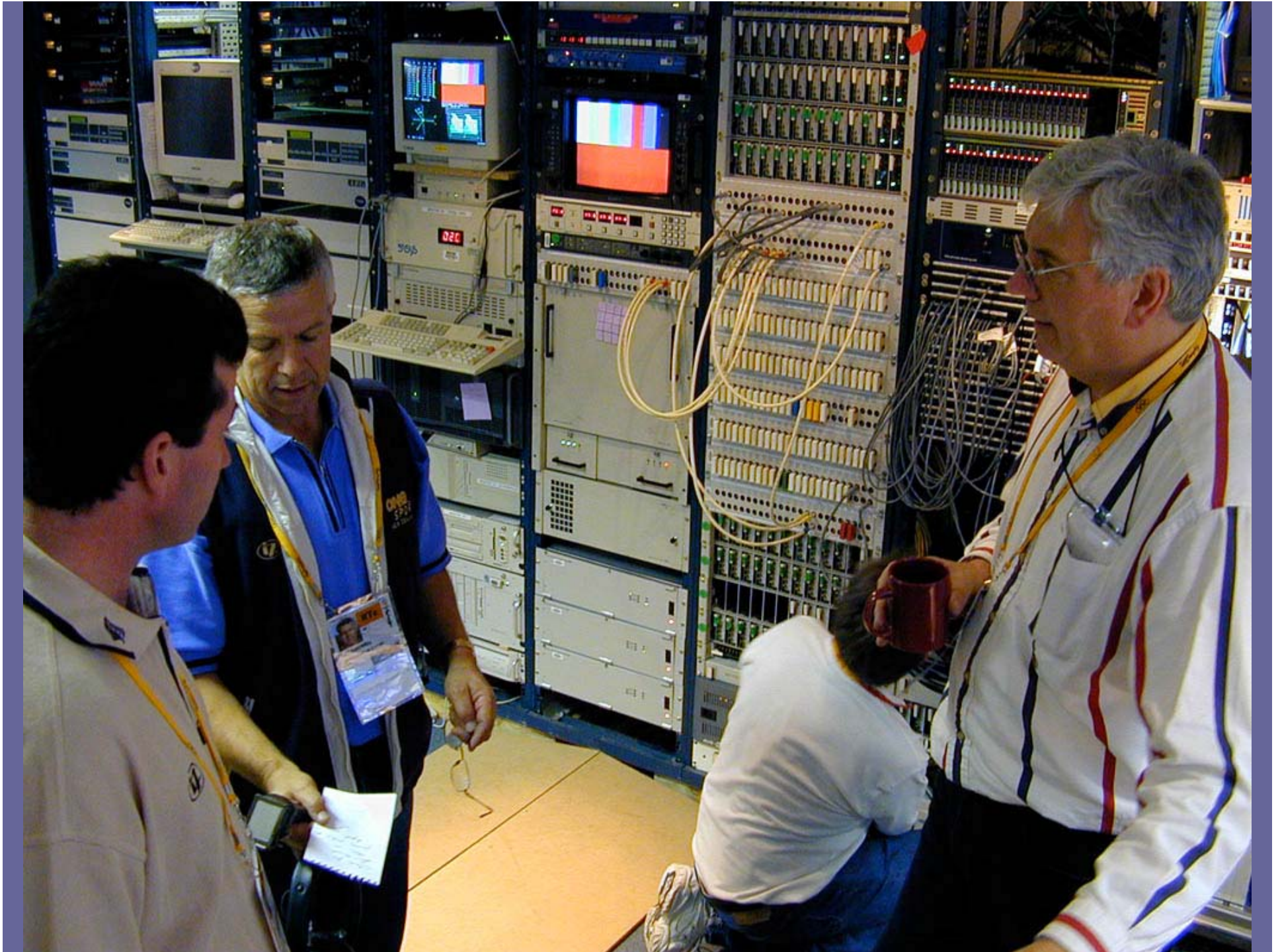
- Guy Thornley
- 28 yo
- Systems software engineer
- Experienced visual observer

Kumeu Observatory

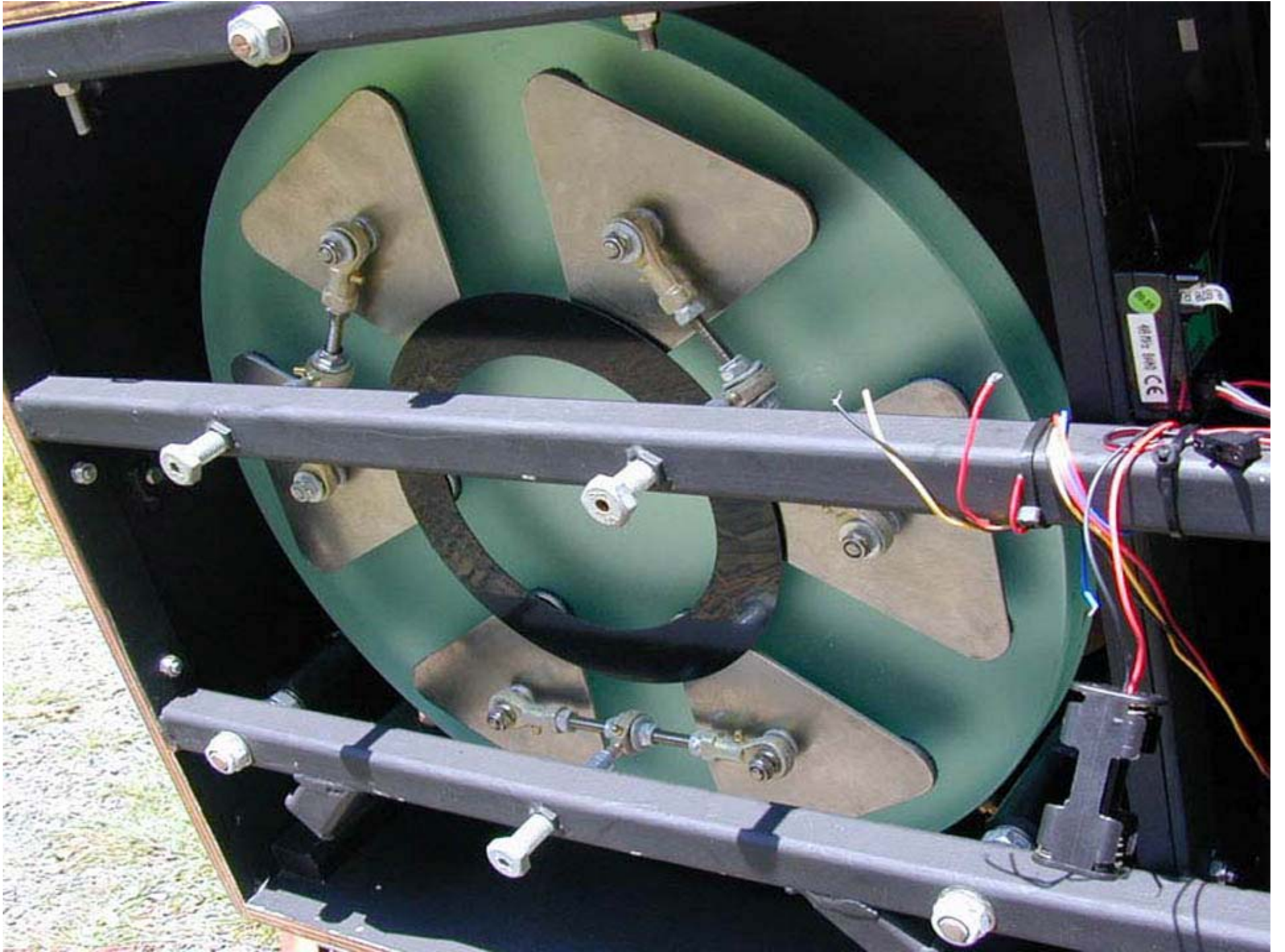
- David Moorhouse
- 28 yo
- Electronics Technician public television
- Telescope builder
- Astrophotography

TVNZ outside











Dave
at
play

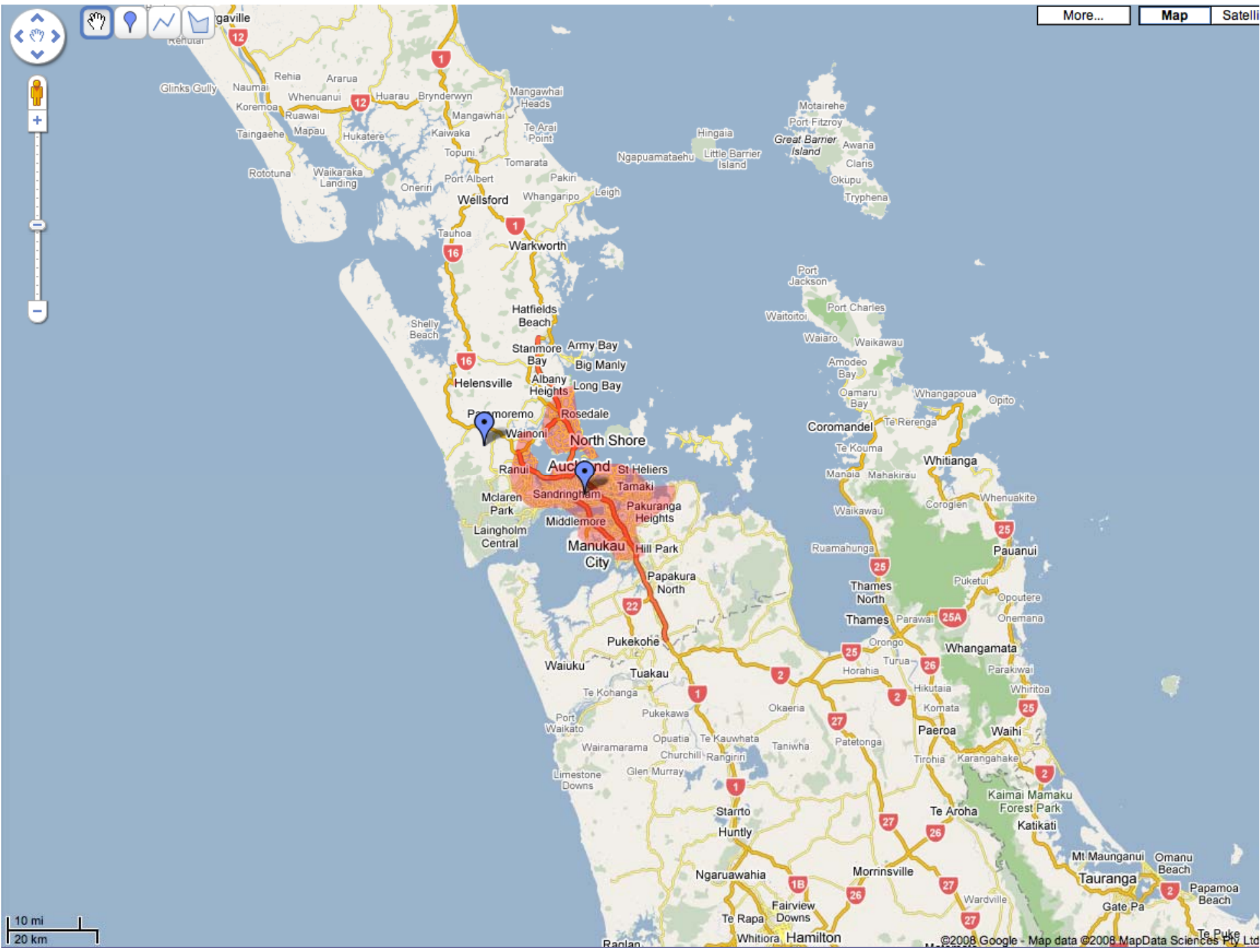




Rock on







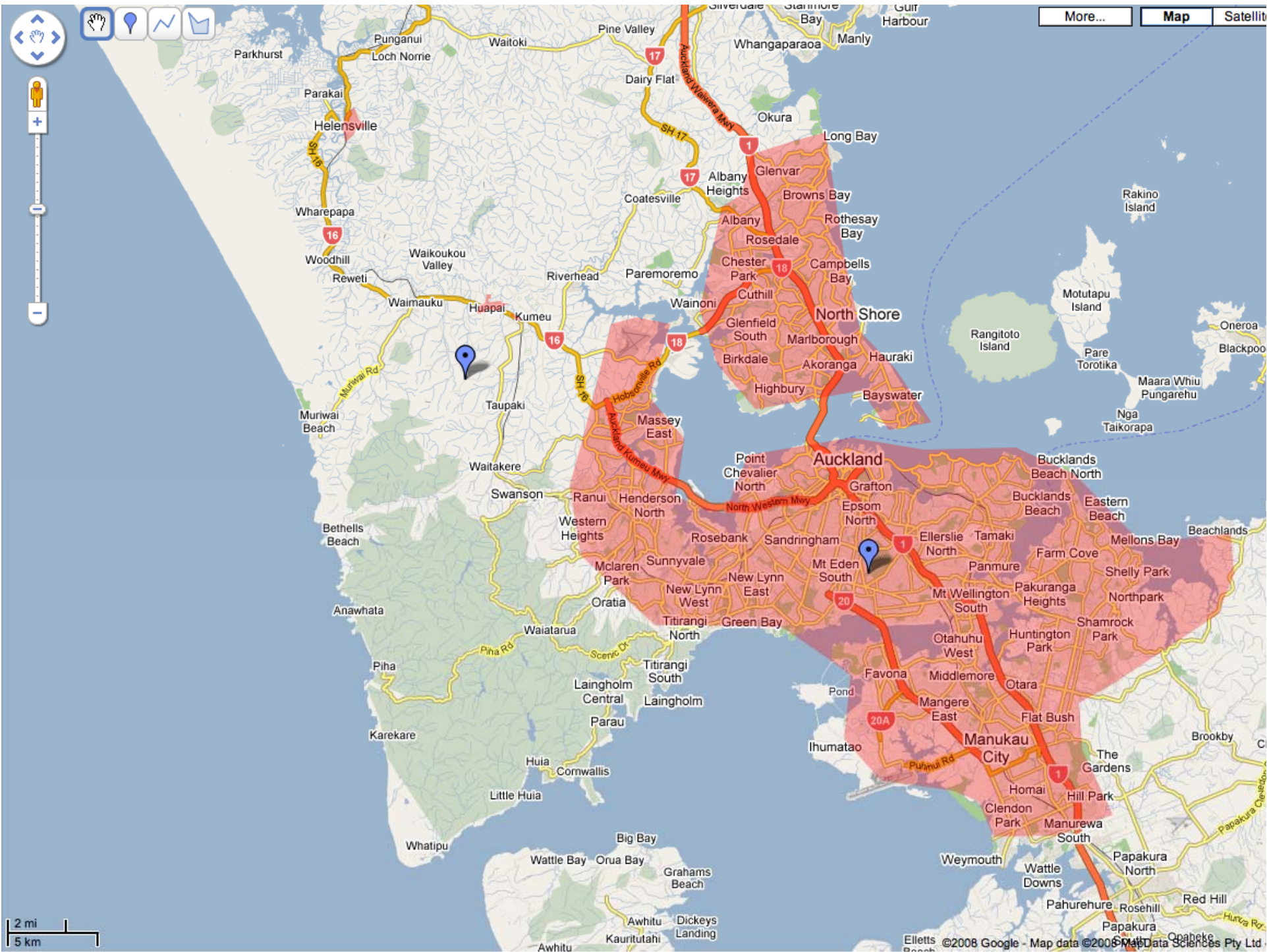
More...

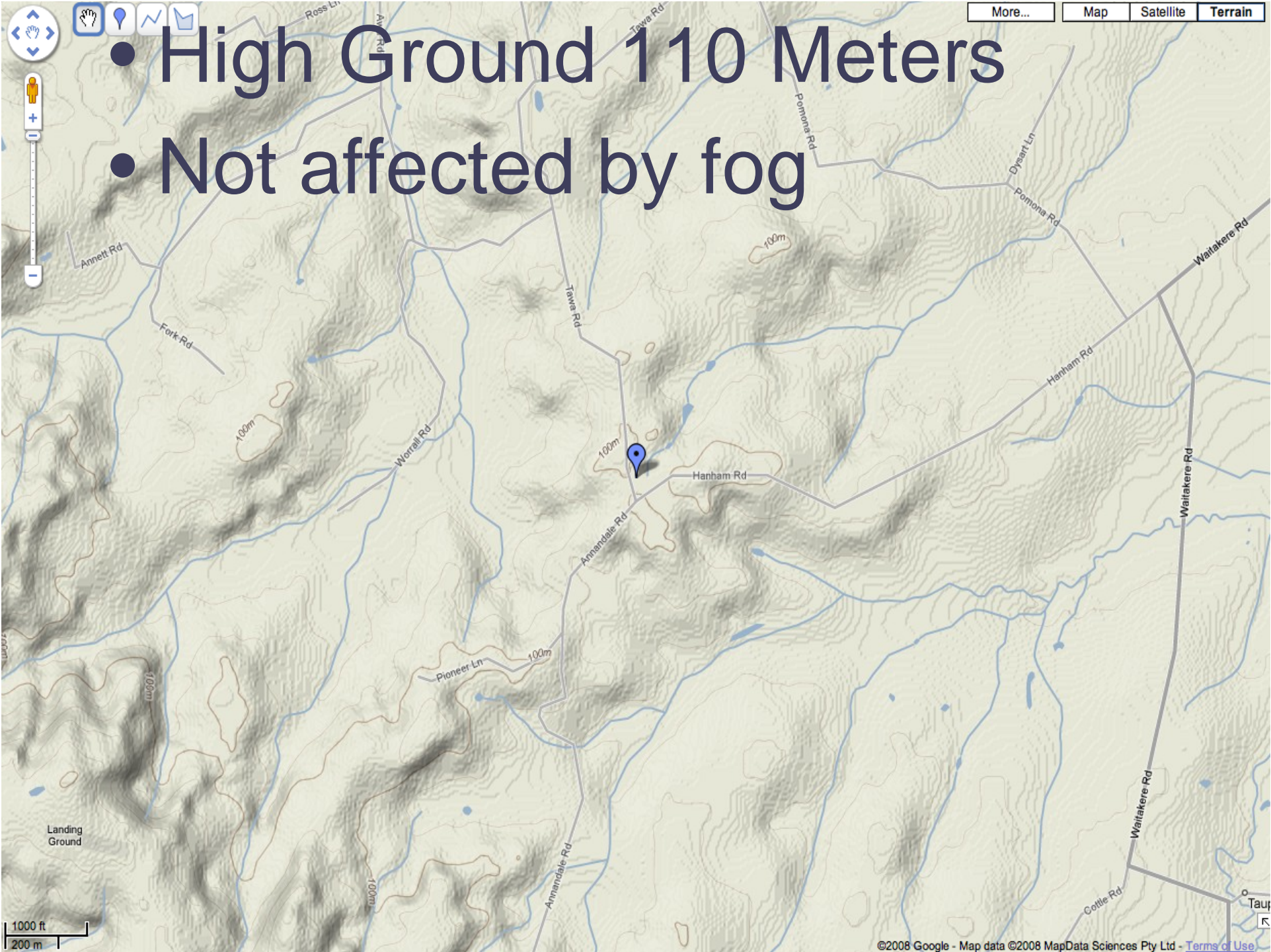
Map

Satelli

10 mi
20 km

©2008 Google - Map data ©2008 MapData Sciences Pty Ltd





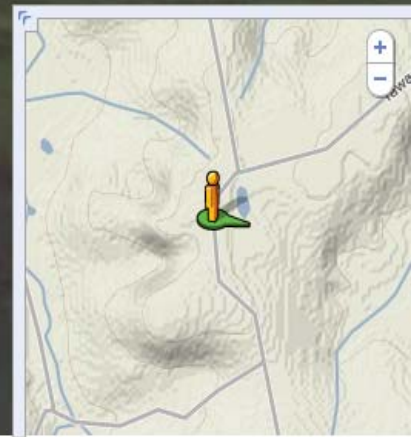
- High Ground 110 Meters
- Not affected by fog



206 Tawa Rd, Huapai, Auckland, New Zealand
Address is approximate



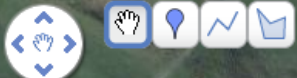
- Town Plan doesn't allow
- 10 acre blocks to be broken up





2 Annandale Rd, Huapai, Auckland, New Zealand
Address is approximate





More... Map Satellite Terrain



200 ft
100 m





Nap Time



Tea Time



Kumeu Observatory Timeline

- 1980 Main structure was built by property owner Steve Calveley
 - with old steel dome, grass roof
 - 12” Maksutov Cassegrain
- 1988 Roll off roof Mark Boss, Gordon Herdman
 - The secret weapon was developed
 - Site was underutilised for years
- 2000 new wooden dome with
 - Meade 10” LX200
- 2003 David Moorhouse, Guy Thornley, Paul Kemp
 - looking for new visual observing site
 - only doing visual work

Kumeu Observatory Timeline

- 2004 Decided to get the LX200 going
 - and failed, due to very bad periodic error (>1.5 arc-min!)
- 2005 Celestron C14 fork mount
 - moved to Kumeu fitted with 10" Meade OTA
 - Started doing work for CBA
- 2006 Wasp observatory was built for astrophotography
- 2007 Nustrini C14 OTA moved to Kumeu
 - Had first go at microlensing run hampered by cloud
- 2008 Automated dome
 - First serious microlensing season several good runs

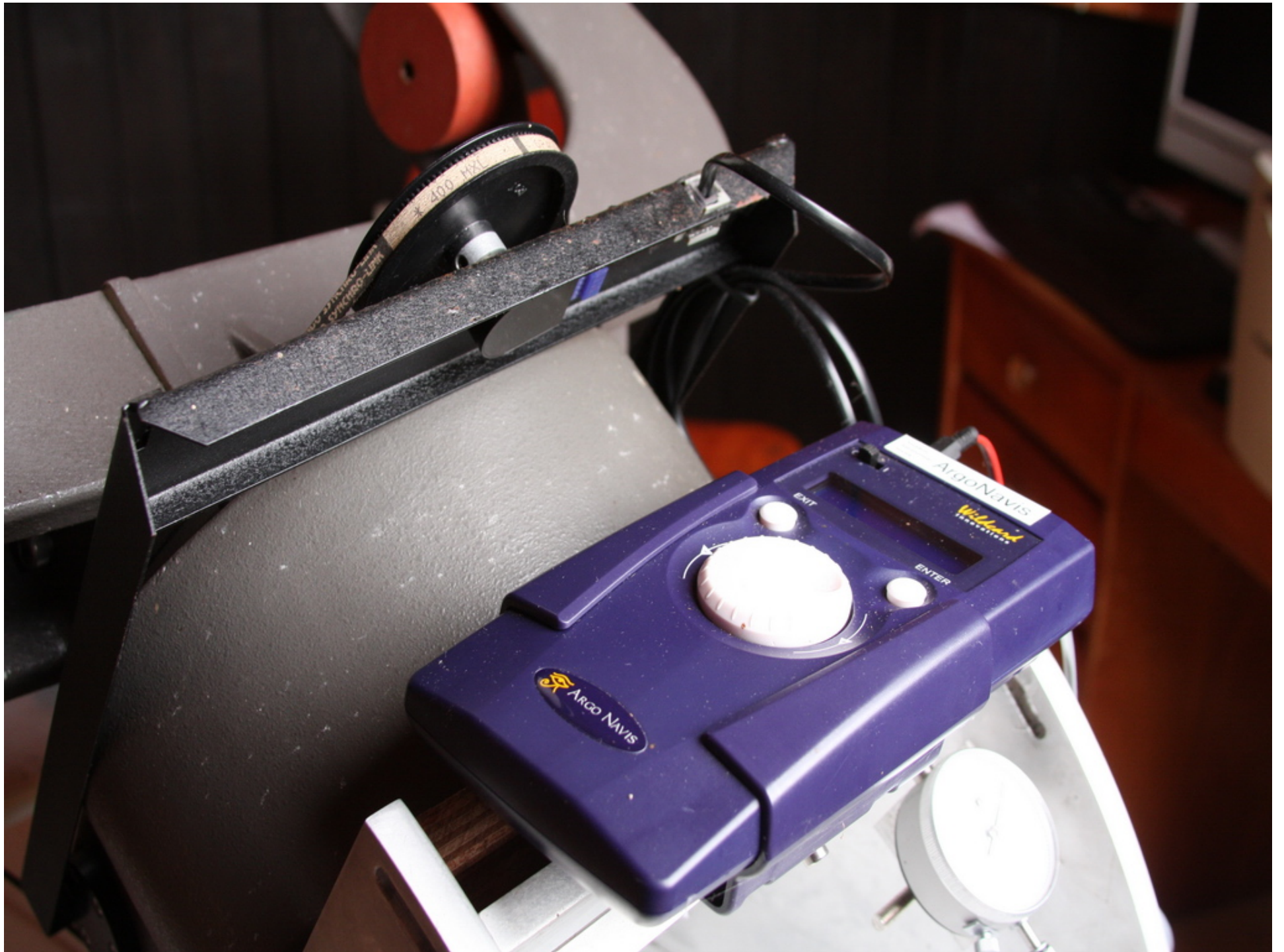


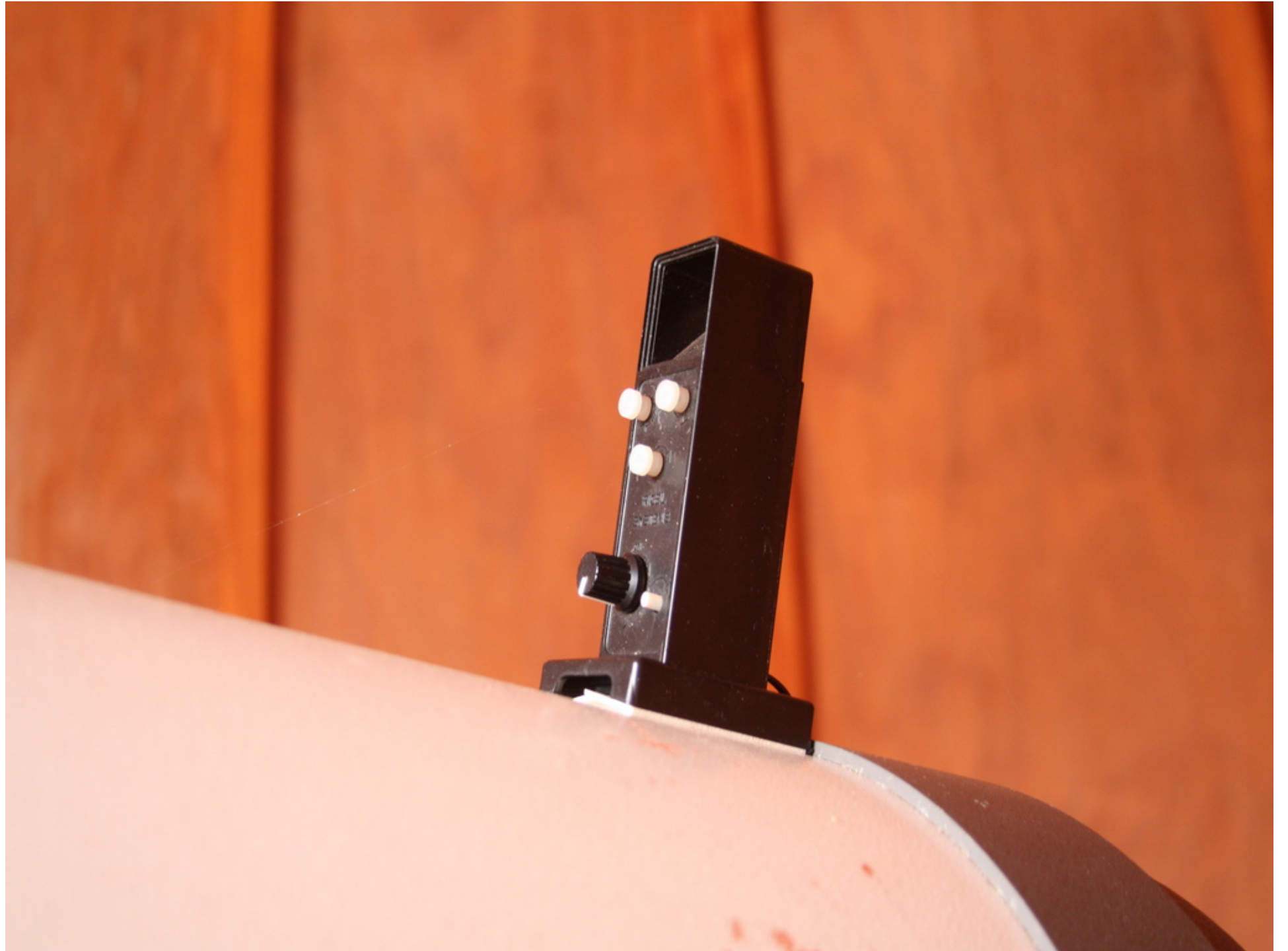
Current Equipment

- Celestron orange tube C14
 - fork mount non-goto
 - ~ 28 yo
 - On long term loan from the Nustrini family
 - Modified for autoguiding
 - Byers gears
- ArgoNavis
 - Digital setting circles
 - Provided by AAS
- Rigel Quickfinder
 - Used for one star alignment



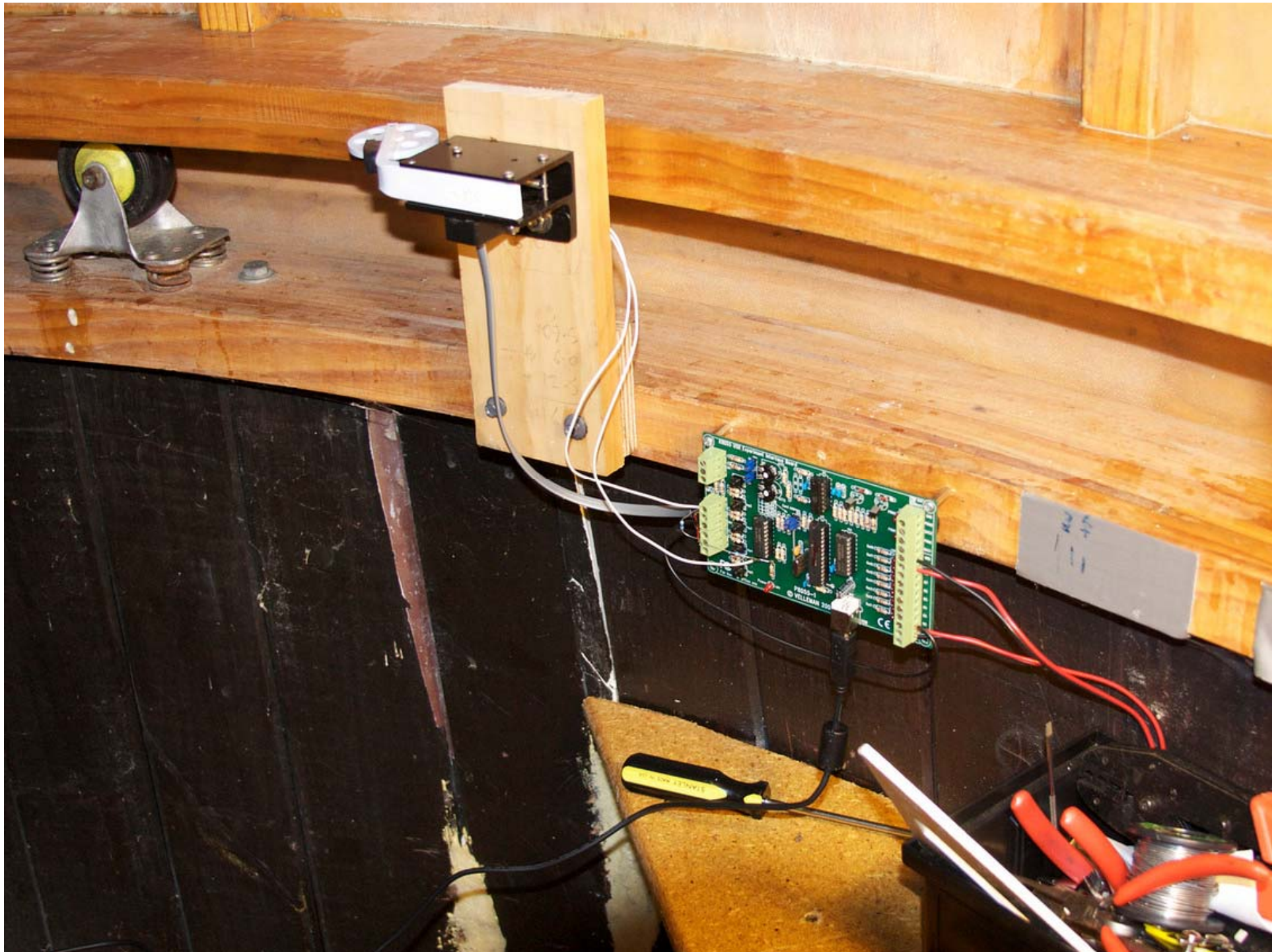






Current Equipment

- Lesve Dome
 - ASCOM compliant dome driver
 - based about cheap hardware
 - Position sensor wheel and home sensor
 - <http://www.dppobservatory.net/DomeAutomation/DomeDriver.htm>
- Boltwood cloud sensor

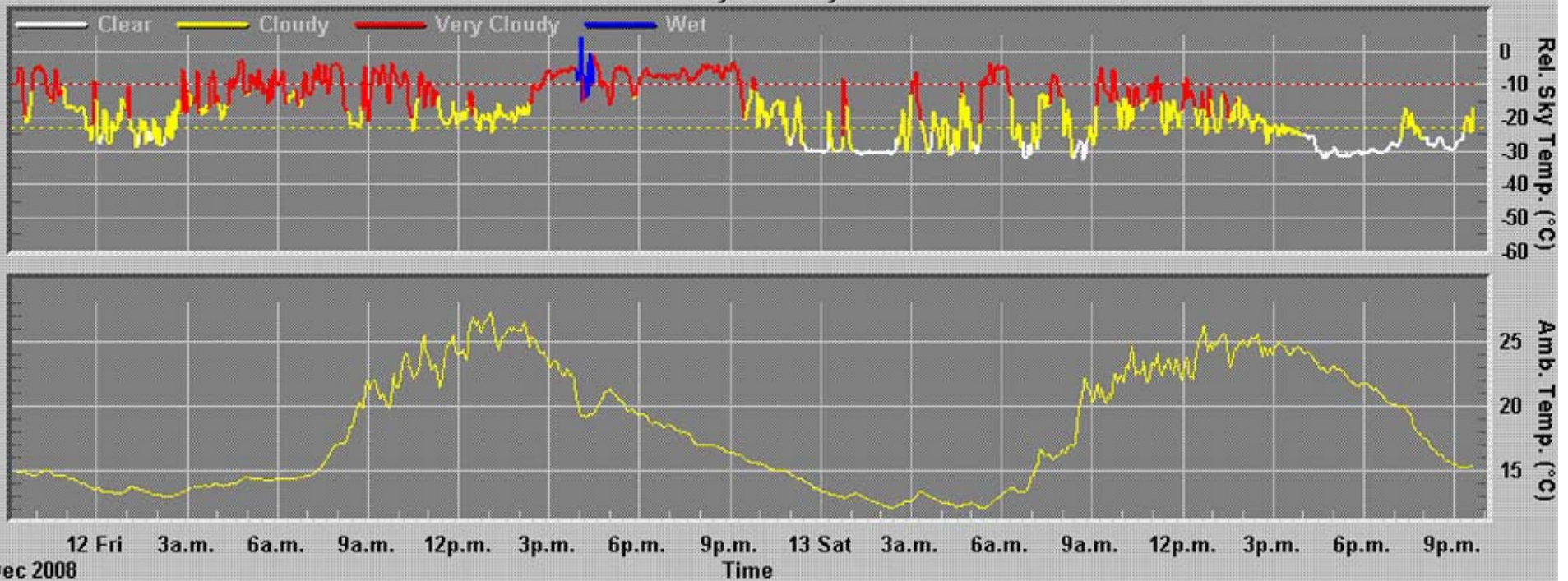




Cloud Sensor



Kumeu Cloudy Station
Sky is Cloudy.



Dec 2008

Current Equipment

- SBIG ST7
- CFW8 with V filter
- Celestron x0.63 focal reducer
- JMI motor focus
 - Semi manual, digital readout
 - Not computer controllable
- Computer
 - Various hubs, power supplies, dew heaters, cables etc
 - All supplied by Dave



CELESTRON
Model 8 304

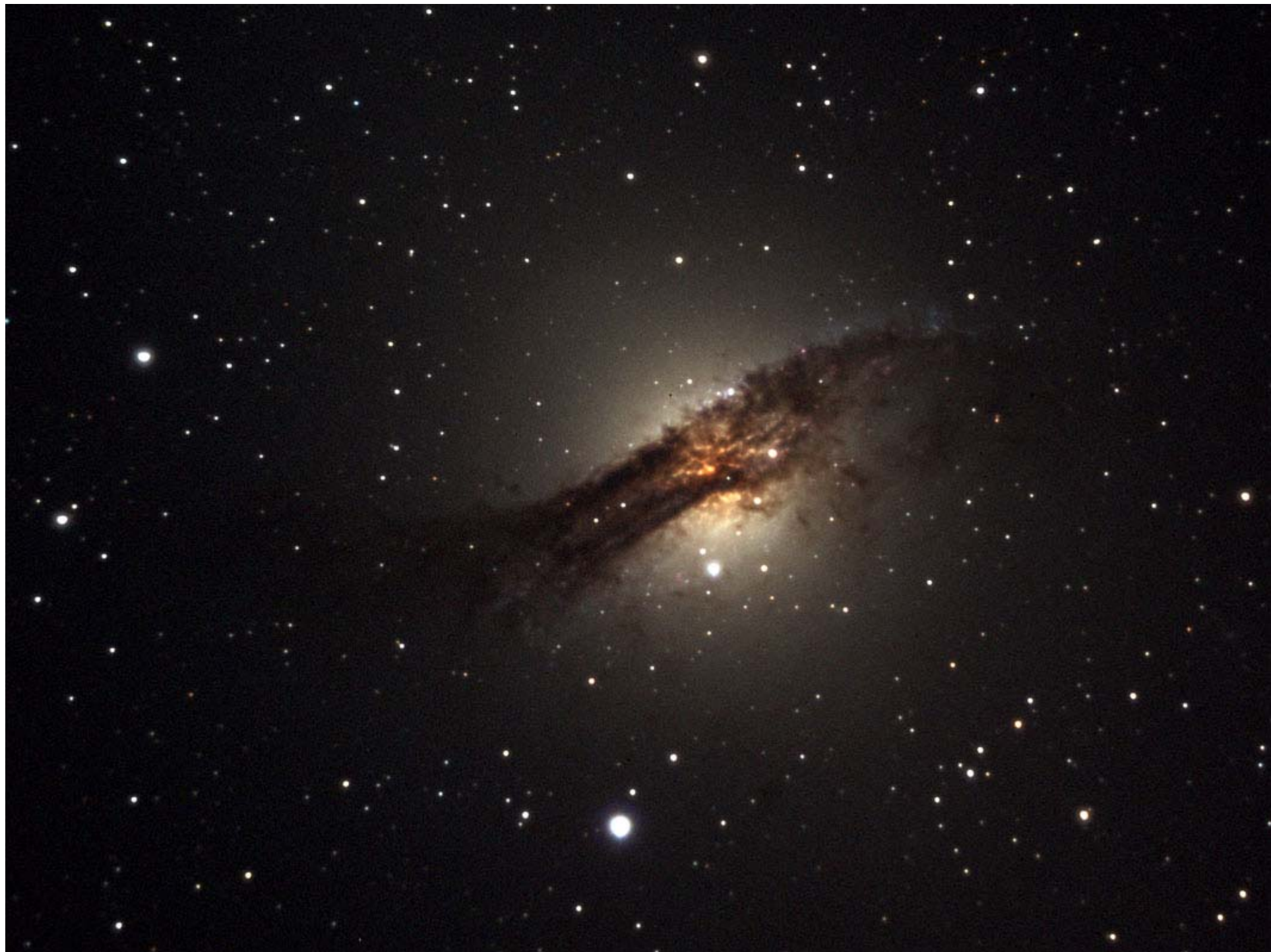
WARNING!!!
To prevent damage to exposed internal components,
tripod screw cannot be any longer than 8.25mm
(5mm).





Current Software

- MaximDL V5 Pro Suite
- GSC and UCAC2 catalog for plate solving
- ASCOM L5
- Lesve Dome driver
- PemPro
- CCD Inspector
- ACP Automation trialled in Wasp
- The Sky Six



Work flow processes

- 25 to 40 minutes typically to startup
- Every 20 min re-focus for first 2 hours
- Every hour after that (5 min each time)
- Using CCD inspector to watch focus trends

Work flow processes

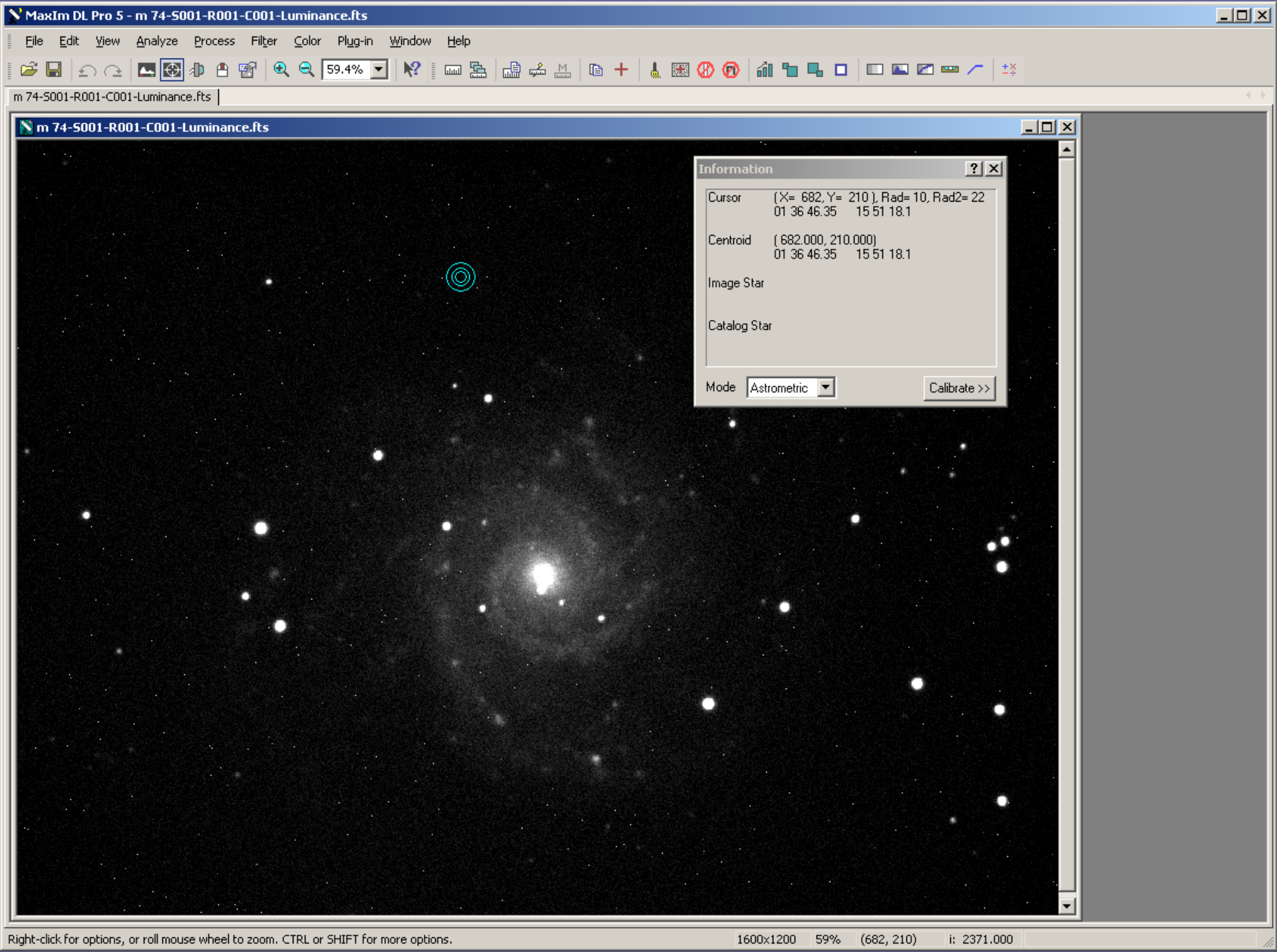
- Images are put onto ext hard drive
- Usually processing is done at home next day after sleeping
- Upload from home to FTP server

Work flow processes

- Startup
 - Starting PC, MaximDL, dome driver, mount, Argonavis
 - Manually aiming scope & dome at bright star
 - Centring star on focus window in MaximDL
 - Choosing and syncing star in Argonavis
 - If this is a new target setting up RA Dec and name in Argo

Work flow processes

- Cont
 - Doing a manual focus run
 - Push telescope to target, zeroing numbers on Argonavis
 - Taking a 30 sec pointing exposure
 - Plate solving using MaximDL
 - Changing cursor to Astrometric mode
 - Seeing where the target actually is on the plate



Work flow processes

- cont
 - Using short 5 sec exposures in focus mode
 - Centre the target using hand pad
 - Double check RA Dec and compare to image on webpage
 - Setup autoguiding
 - Setup MaximDL sequence to take 5 min exposures
 - Start sequence

Image Calibration

- Dusk flats taken when ever possible
- Dusk flats are either 1 or 2 sec
- Dusk flat darks of 1 & 2 sec taken
- Manual push of telescope between exposures during download time
- Darks of 5 min duration usually taken before or after time series run

Image Calibration

- MaximDL is used for Calibration of images
- Images are calibrated using Darks and Flats with no dark scaling needed
- MaximDL has powerful batch processing abilities

Image Calibration

- Images are autoguided so batch processing of image cropping is possible
- Animation of images for visual quality check
- Manually finding the XY star position, then setting up a crop to give me 500x500 finished images
- Entire dir is zipped using winzip

Acquisition team goals

- Max time coverage of events
- Overlapping between teams
- Technically perfect images
 - Focus
 - Tracking
 - Calibration

Acquisition team goals

- Timely uploading
- Quick response
- Collaboration with other teams
- Time management with day job



Current Obstacles

- Medium quality mount needs guiding
- Clouds cause autoguiding to fail
- Focus changes rapidly during evening
- Focusing late night is error prone
- Celestron focal reducer not optimised

Current Obstacles

- Non Goto mount causes issues
 - needs initial alignment
 - Can't auto re-centre using plate solving
 - Start-up sequence is complicated
 - Therefore it can't be done by neighbours
- Good time management is not possible as we can't begin to leverage automation products
- A single dome PC means images are taken home to process, rather than risk losing image capture time

Current Obstacles

- Quick response is difficult via irregularly checked E-Mail
- Both David and Guy work late 10pm on a regular basis
- We can't remotely run observatory even with someone else onsite (Steve or Alan)
- If it's partly cloudy we often won't go due to next day work commitments

Improving our output

- Top results need
 - Solid equipment
 - Solid repeatable processes
 - Allowing technology to improve time management

Improving our output

- Autofocus
 - Computer controlled temp compensating focuser
- Mount
 - Replace or upgrade to goto
- Focal reducer
 - Argos reducer tube to allow correct spacing
- Second PC
 - for image processing
- Automation
 - ACP allows a truly autonomous amateur observatory to be a reality and time wasting tasks to be done automatically



Improving our output

- Using 10" Meade in Wasp
- Using Skype for communication
- No Sleep is a MAJOR for everyone this can be improved with better systems and equipment

What is ACP

- Complete software solution for observatory automation
- Automates
 - Object acquisition
 - Telescope re-centring
 - Focusing
 - Autoguiding
 - Dome control
 - Weather safety
 - Entire image taking process
 - Dusk or Dawn Flats
- Either un-attended or remote operation
- Web based interface
- Enabler of better time management

Us and uFun

- It has been a pleasure to work with this group
- Andy and Subo's regular prompt feedback is a major incentive to maintain enthusiasm
- We are 110% committed to this project

Fin

