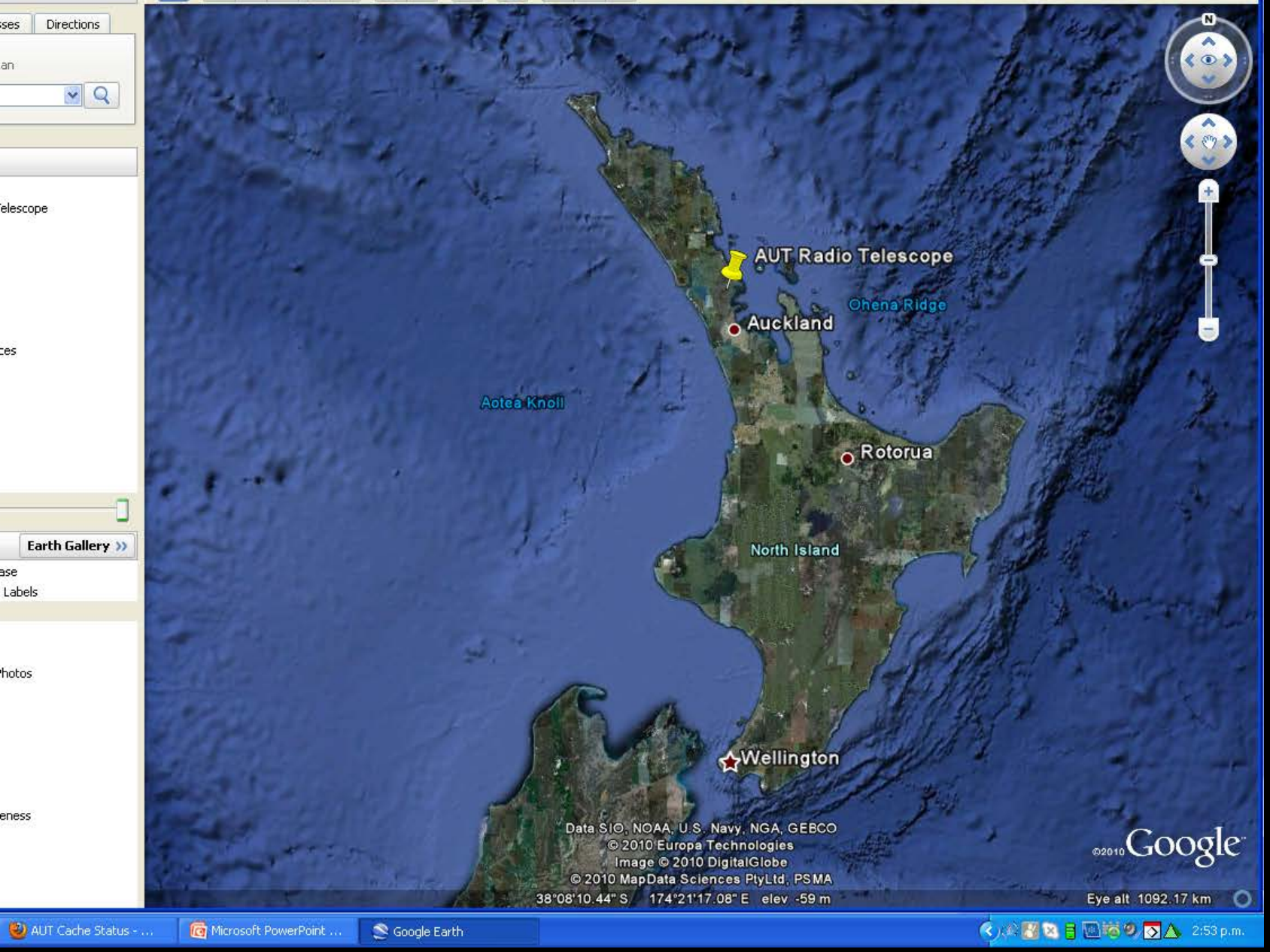
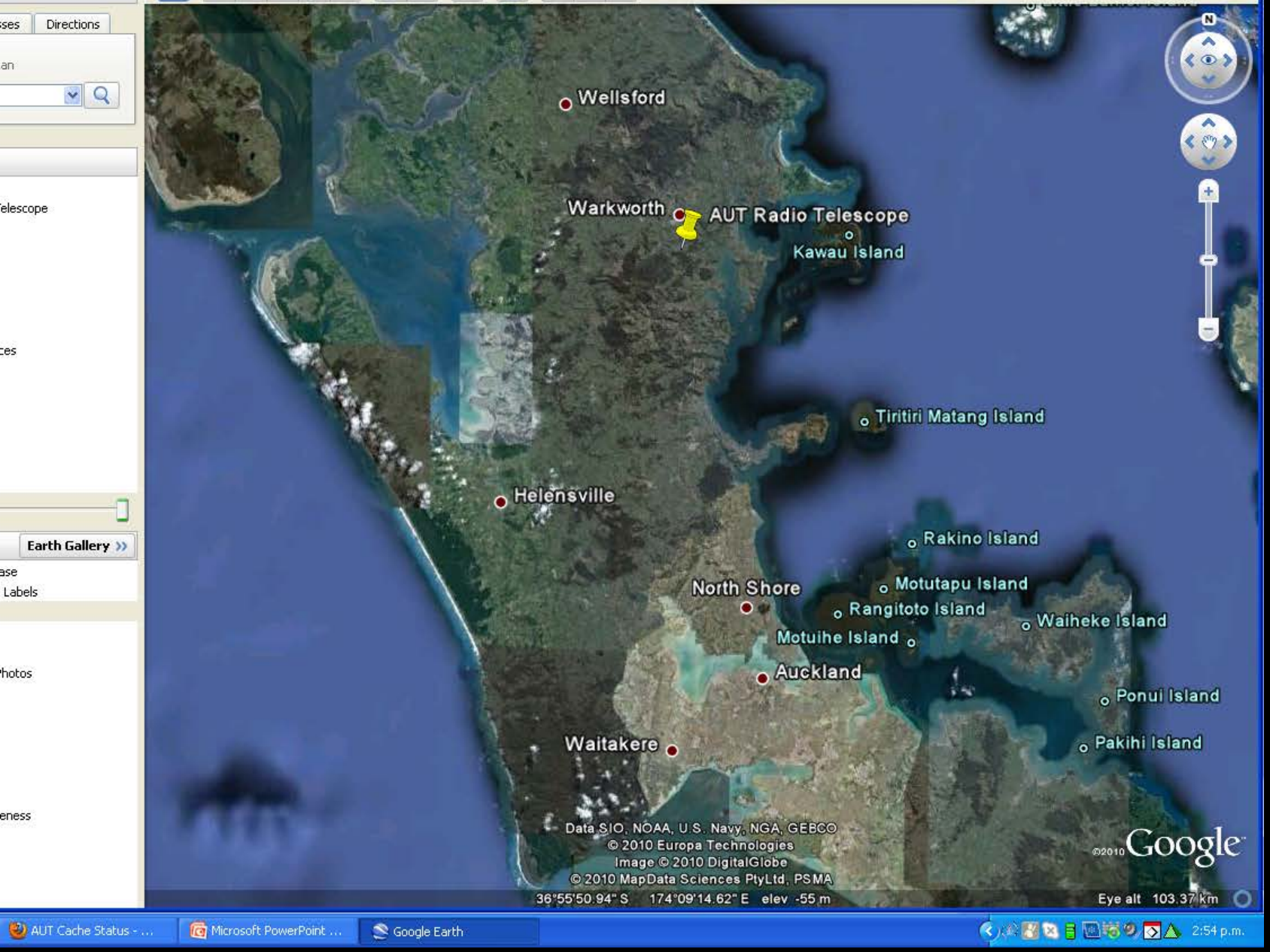
INSTITUTE FOR
RADIO ASTRONOMY & SPACE RESEARCH
AN INSTITUTE OF AUT UNIVERSITY

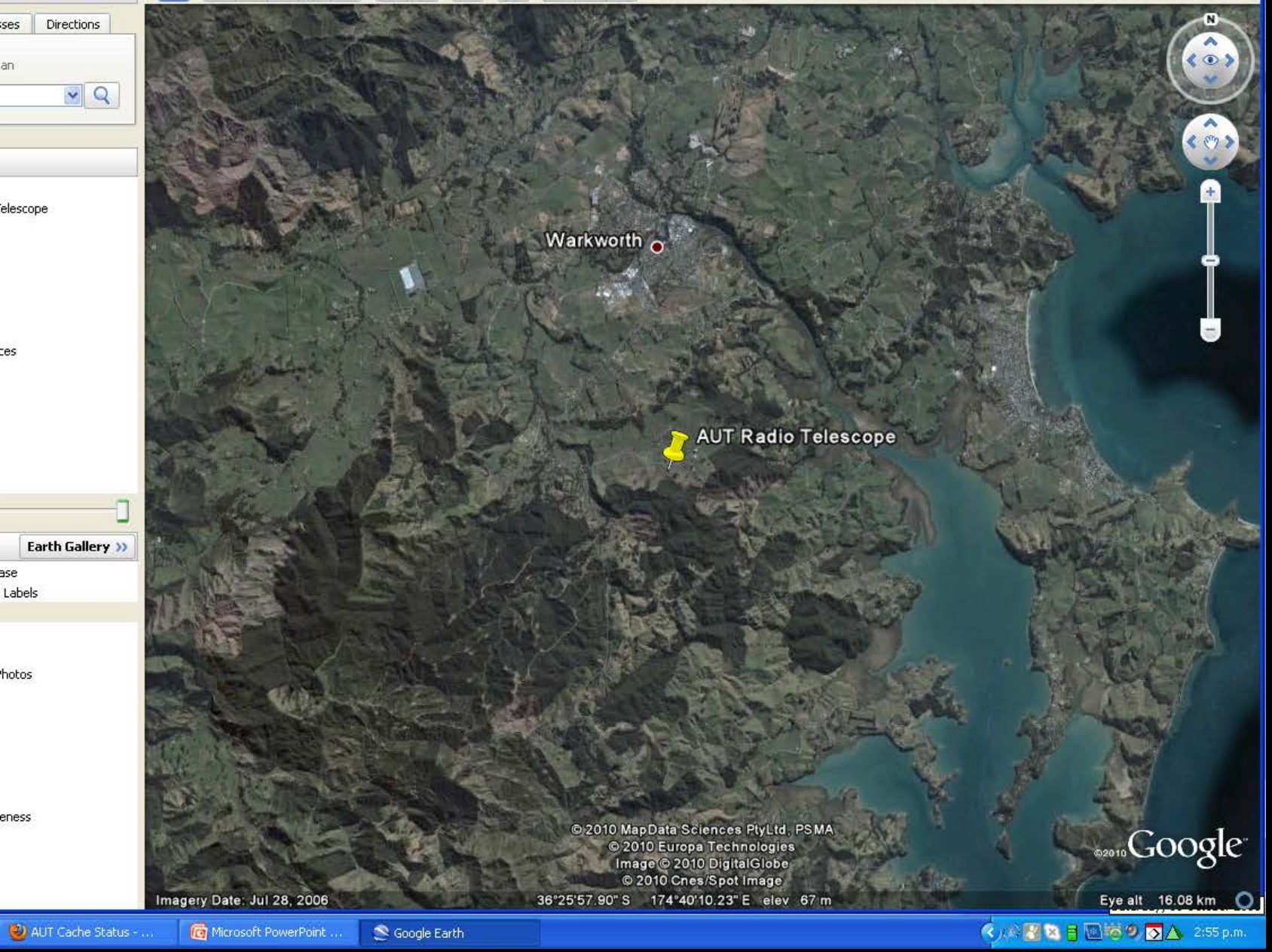
Activities at Warkworth, New Zealand

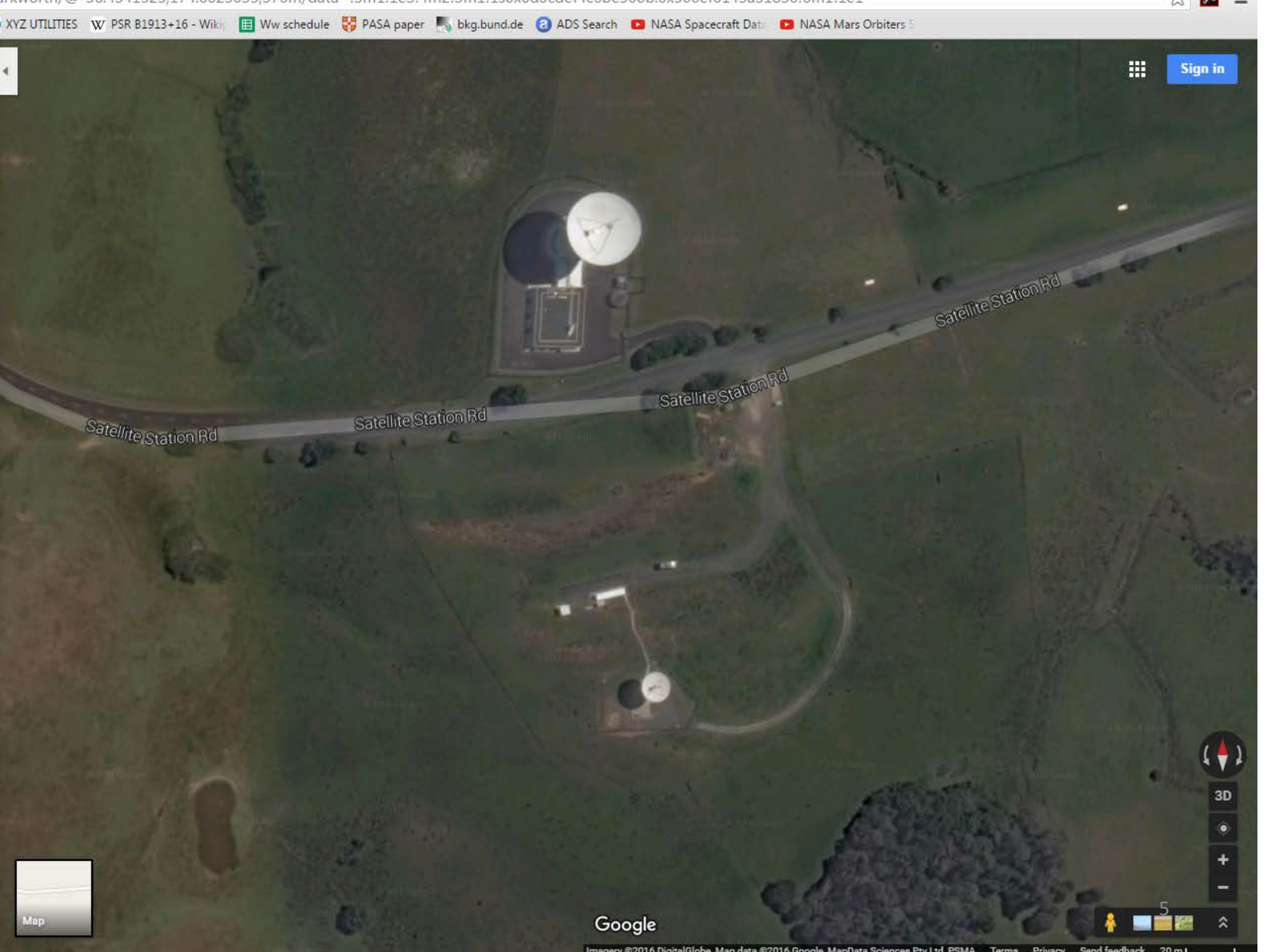
Sergei Gulyaev (on behalf of IRASR team)

AOV, Canberra, 10 November 2018


Directions
Earth Gallery
Labels
AUT Radio Telescope
Ohena Ridge
Auckland
Aotea Knoll
Rotorua
North Island
Wellington
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2010 Europa Technologies
Image © 2010 DigitalGlobe
© 2010 MapData Sciences Pty Ltd, PSMA
38°08'10.44" S 174°21'17.08" E elev -59 m
Eye alt 1092.17 km
©2010 Google
AUT Cache Status - ...
Microsoft PowerPoint ...
Google Earth
2:53 p.m.


Directions
Earth Gallery
Wellsford
Warkworth
AUT Radio Telescope
Kawau Island
Tiritiri Matang Island
Helensville
Rakino Island
North Shore
Motutapu Island
Rangitoto Island
Waiheke Island
Motuihe Island
Auckland
Ponui Island
Pakihi Island
Waitakere
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2010 Europa Technologies
Image © 2010 DigitalGlobe
© 2010 MapData Sciences PtyLtd, PSMA
©2010 Google
36°55'50.94" S 174°09'14.62" E elev -55 m
Eye alt 103.37 km
AUT Cache Status - ...
Microsoft PowerPoint ...
Google Earth
2:54 p.m.


Directions
Earth Gallery
Labels
Warkworth
AUT Radio Telescope
© 2010 MapData Sciences PtyLtd, PSMA
© 2010 Europa Technologies
Image © 2010 DigitalGlobe
© 2010 Cnes/Spot Image
©2010 Google
Imagery Date: Jul 28, 2006
36°25'57.90" S 174°40'10.23" E elev 67 m
Eye alt 16.08 km
AUT Cache Status - ...
Microsoft PowerPoint ...
Google Earth
2:55 p.m.


XYZ UTILITIES
PSR B1913+16 - Wiki
Ww schedule
PASA paper
bkg.bund.de
ADS Search
NASA Spacecraft Dat
NASA Mars Orbiters
Sign in
Satellite Station Rd
Satellite Station Rd
Satellite Station Rd
Satellite Station Rd
3D
Map
Google

12-m RT

- Manufacturer: Patriot/Cobham
- Shaped Cassegrain
- Slewing: 5 deg/s Az, 1 deg/s El
- Surface: 0.35 mm (rms)
- S/X (dual circular pols) SEFD~3500 Jy
- L (1.1-1.8 GHz; prime focus), SEFD~5500 Jy
- DBBC2 (4 IFs) / FILA10G
- Mk5B+ , Mk5C, FlexBuff, VDIF format
- Allows us to go up to 4 Gbps recording rate
- H-maser (Symmetricom MH2010)
- 10 Gbps network connectivity, can upgrade to 100 Gbps (NZ REN – REANNZ), but no need at the moment.

30-m RT

- Beam-waveguide Cassegrain tele-communications antenna built 1984
- Slewing rate:0.36 deg/s (both El and Az)
- Surface with laser scanner:
  1.1 mm (rms) – at El = 90 deg
  1.7 mm (rms) – at El = 6 deg
  (gravitational deformation)
- C band 5.8~6.8 GHz (~650 Jy SEFD)
- RadioAstron 4.7~4.9 GHz (~1200 Jy SEFD)
- X band 8~9 GHz ~(900 Jy SEFD)
- RCP + LCP available on all bands
- H-maser signal via cable
- Cryogenically cooled C-band receiver

Observational programmes

- Spacecraft tracking
- Pulsars/Magnetars
- Radio Spectroscopy (RRL, Masers)

Single dish mode

- Scintillations
- Astrometry

RINZ (12m + 30m)

RINZ

Observational programmes

- Spacecraft tracking
- Pulsars/Magnetars
- Radio Spectroscopy (RRL, Masers)

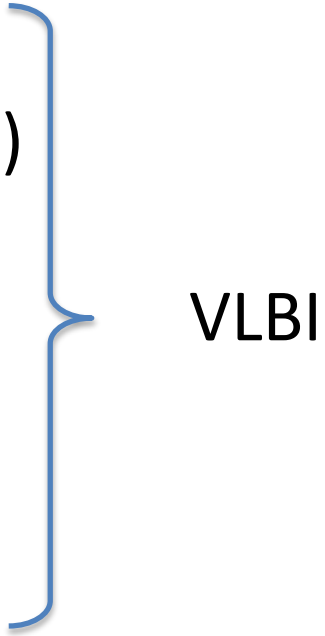
Single dish mode

- Scintillations
- Astrometry

RINZ (12m + 30m)

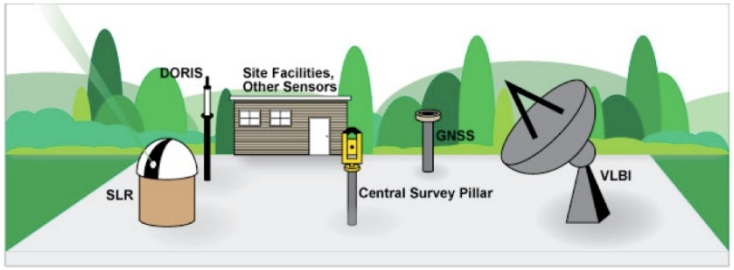
Observational programmes

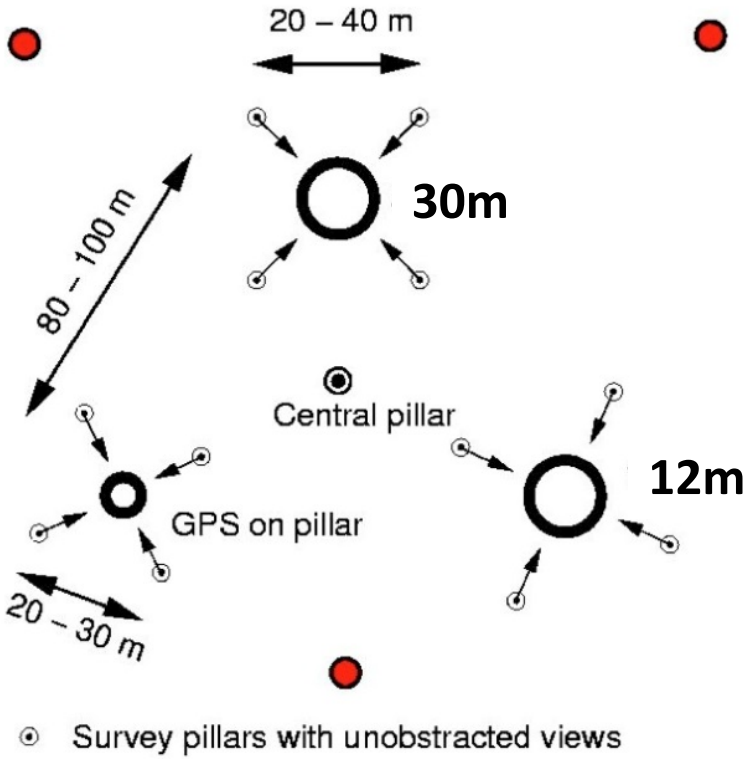
- LBA
- Follow-ups (GW, FRB)
- AOV
- RadioAstron
- IVS
- AUSTRAL



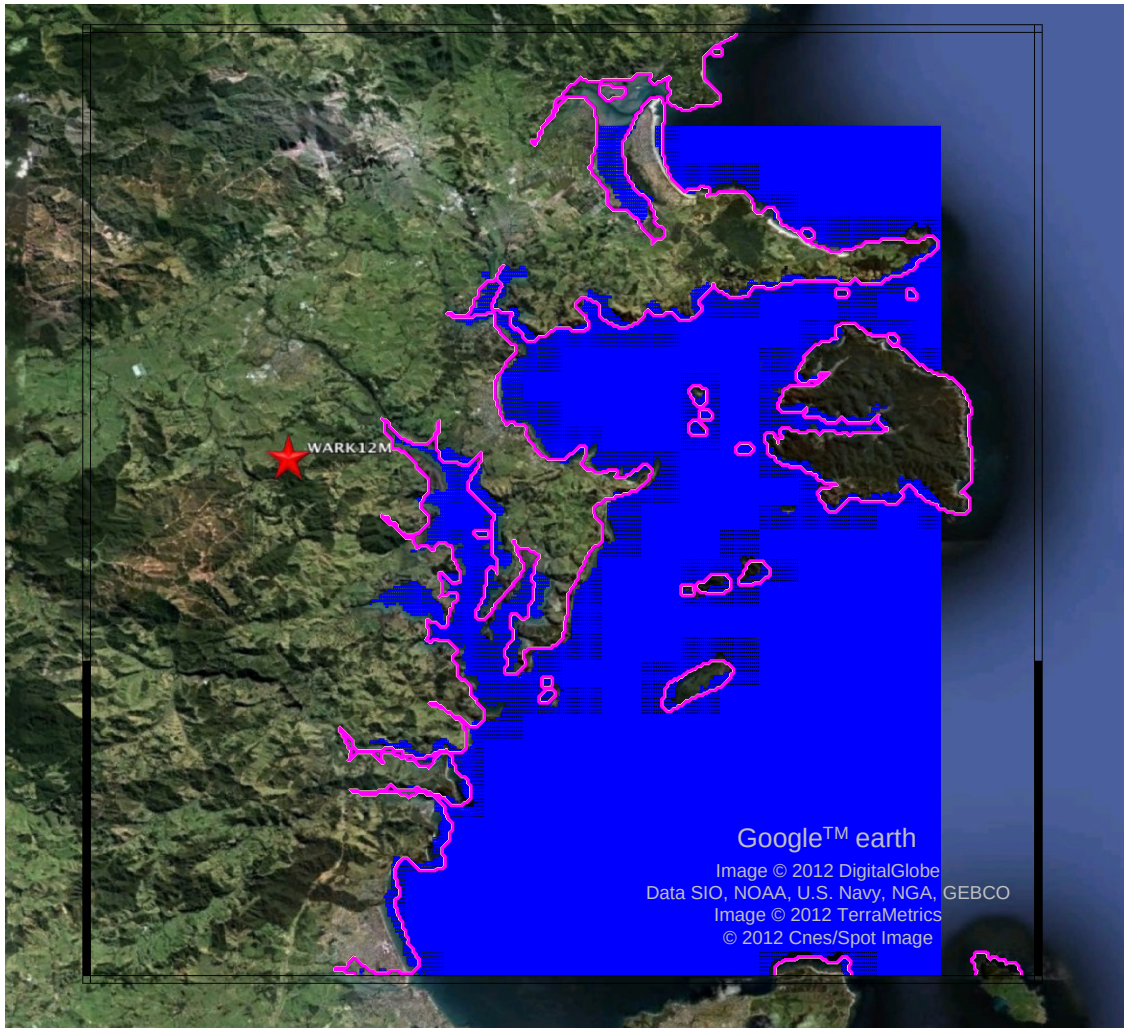
To make a GGOS core site

- Stable results
  - Make an appropriate model
    - atmospheric delay
    - ocean tide loading
    - environmental loads, etc
  - assistance observation
    - Groundwater,
      Soil moisture, etc.
  - Cooperation with LINZ
    - periodical local survey
      - to realize the local tie between VLBI and GPS
      - LINZ and GNS Science





Land-sea data for Warkworth



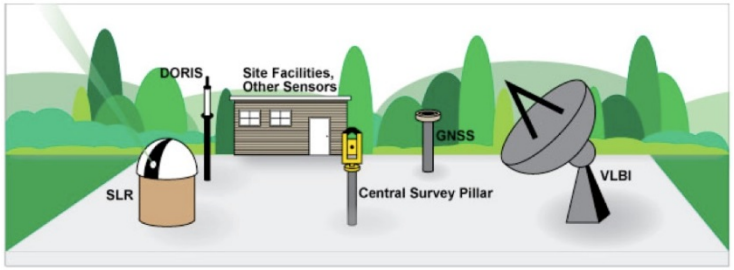
full resolution coastline
of GMT package

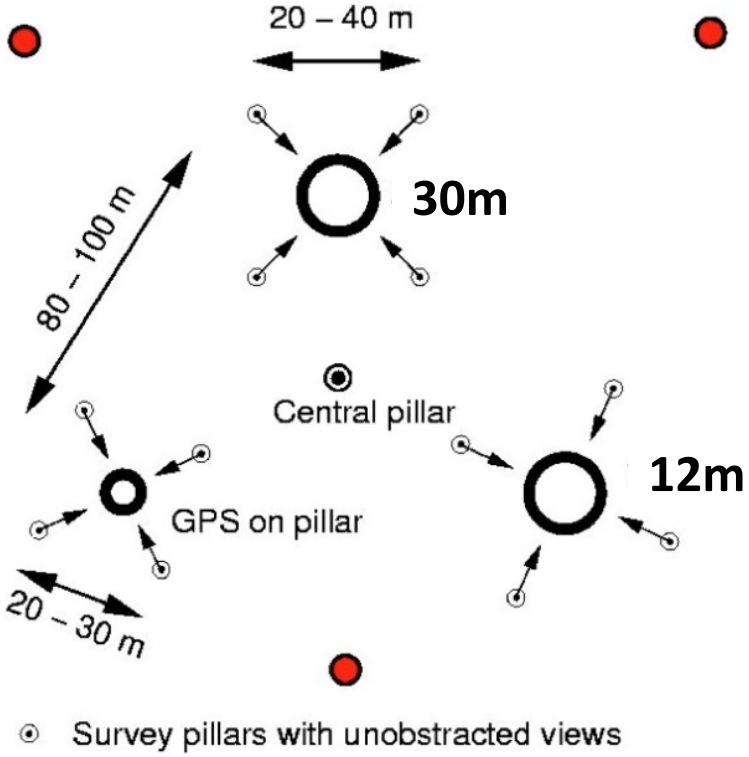
Shuttle Radar Topography Mission
The Mission to Map the World

Version 2 : SRTM3
World 3 arc-seconds
(90m)

To make a GGOS core site

- Stable results
  - Make an appropriate model
    - atmospheric delay
    - ocean tide loading
    - environmental loads, etc
  - assistance observation
    - Groundwater,
      Soil moisture, etc.
  - Cooperation with LINZ
    - periodical local survey
      - to realize the local tie between VLBI and GPS
      - LINZ and GNS Science





The 2012 Warkworth Observatory Local Tie Survey

Land Information New Zealand
Record A1387321

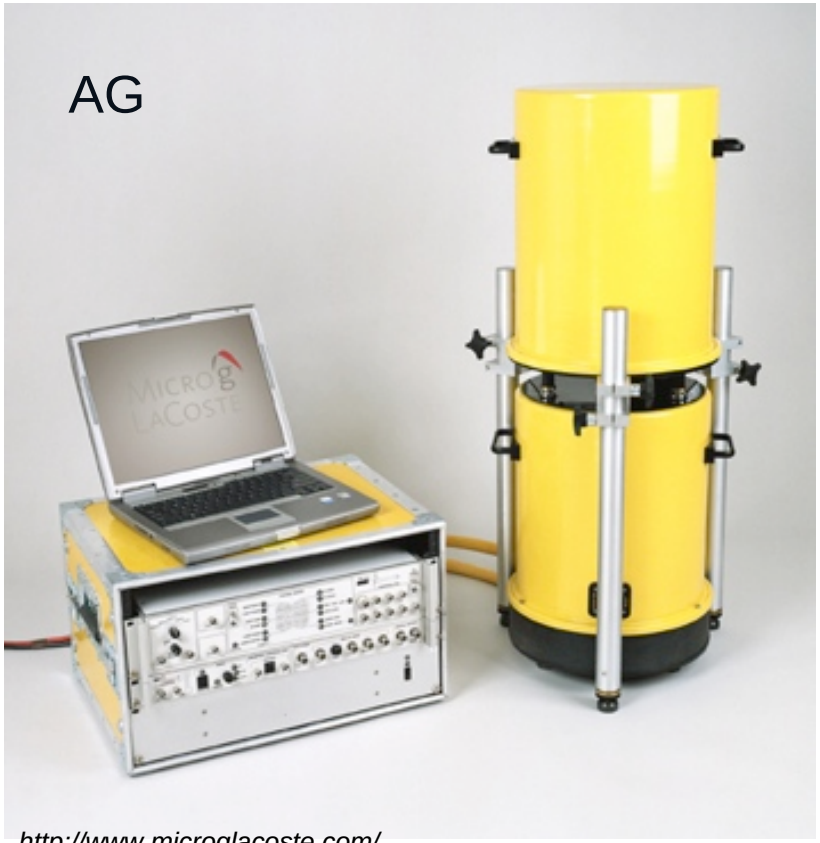
Land Information New Zealand
Toitū te whenua

Department of Sustainability and Environment

Australian Government
Geoscience Australia

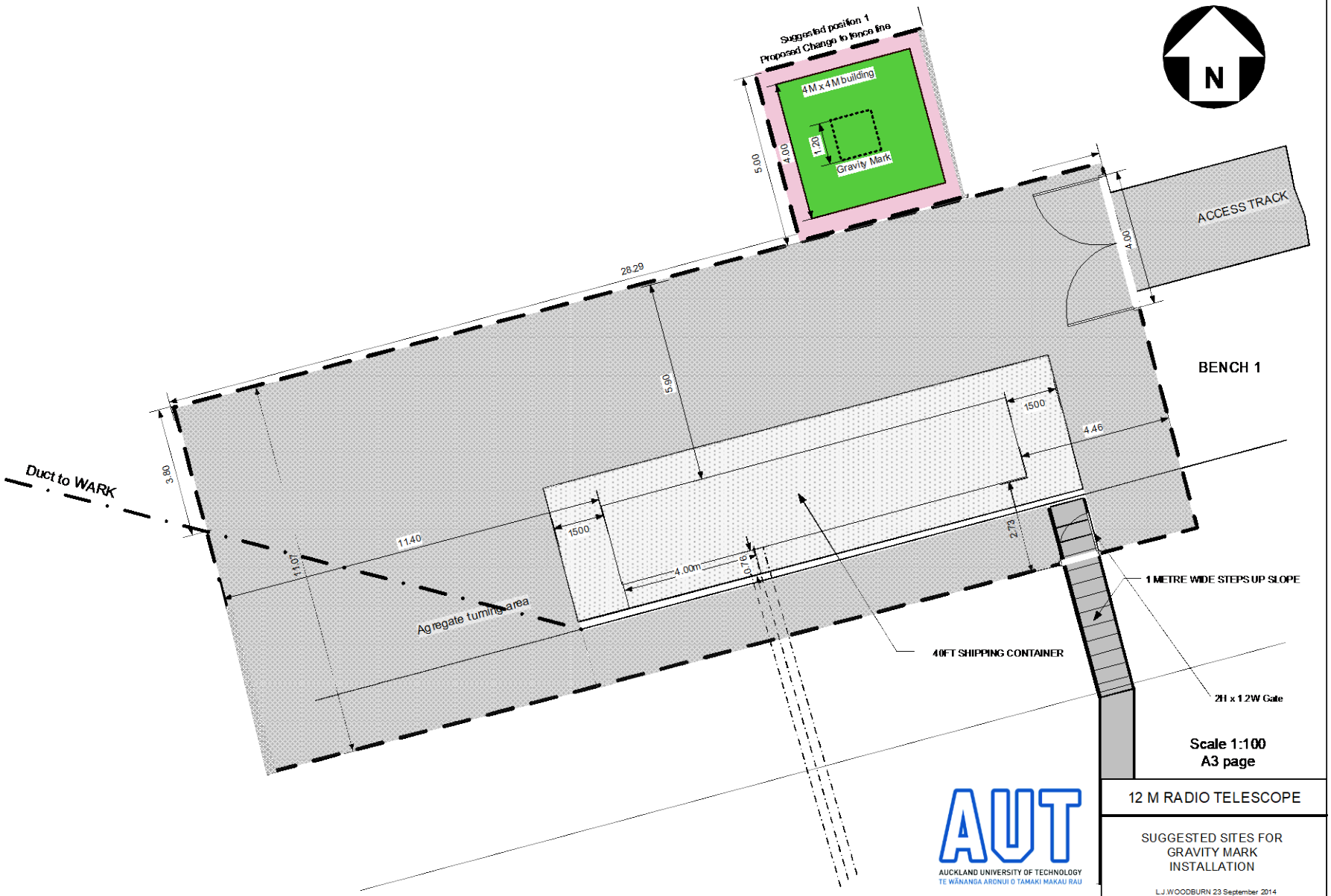
AUT UNIVERSITY
AUCKLAND, NEW ZEALAND

Gravity

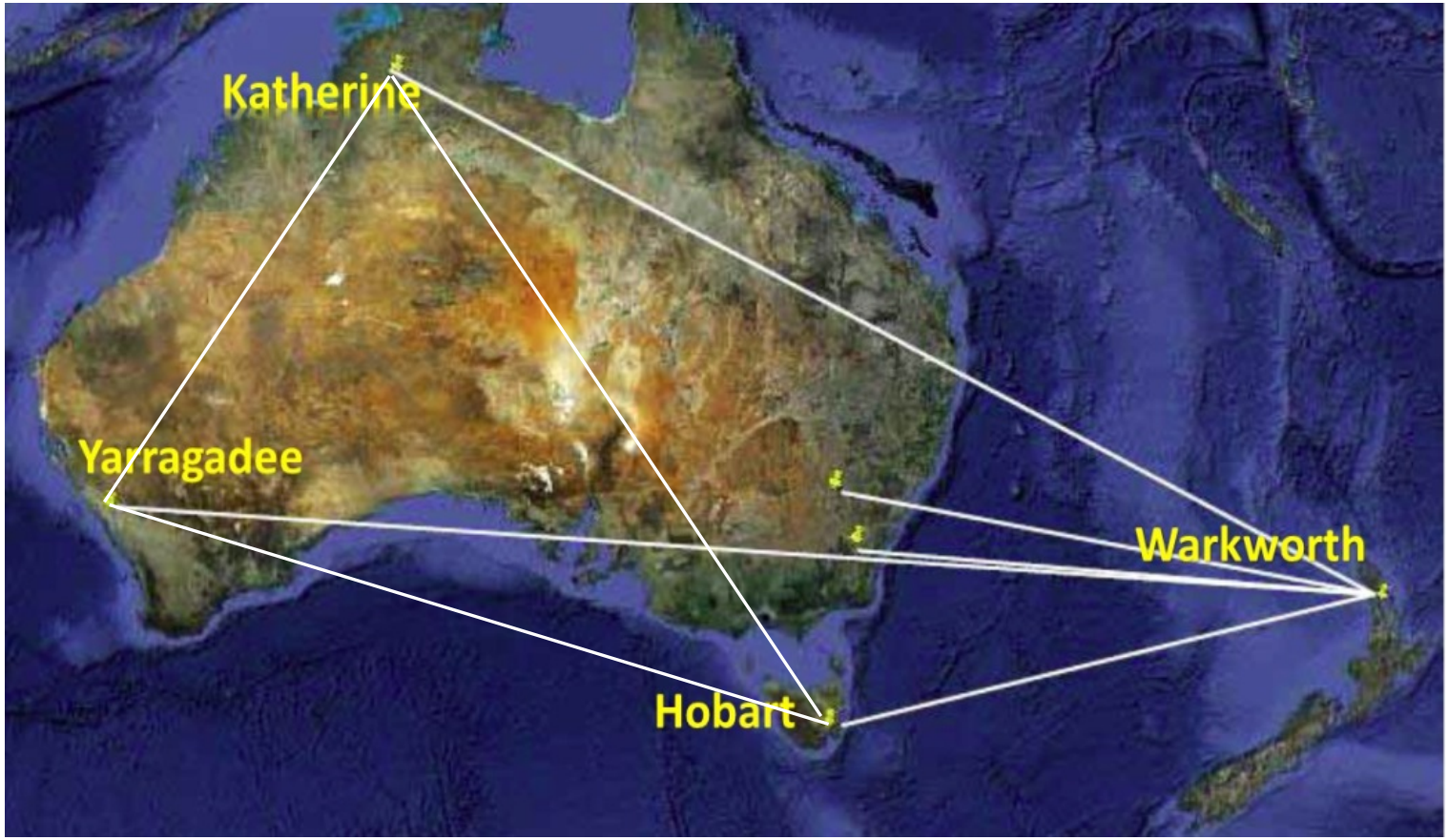


http://www.microglacoste.com/

http://www.gwrinstruments.com/

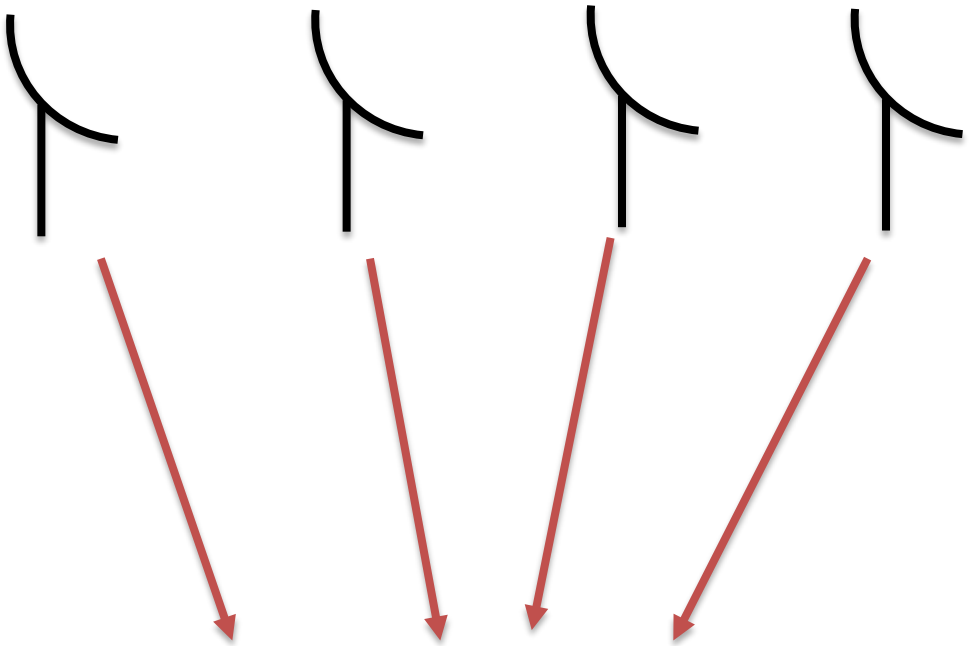

Suggested position 1
Proposed Change to fence line
4M x 4M building
Gravity Mark
1.20
4.00
5.00
N
ACCESS TRACK
4.00
28.29
BENCH 1
5.90
1500
4.46
Duct to WARK
3.80
11.40
11.07
1500
4.00m
0.76
2.73
Agregate turning area
40FT SHIPPING CONTAINER
1 METRE WIDE STEPS UP SLOPE
2H x 1.2W Gate
Scale 1:100
A3 page
12 M RADIO TELESCOPE
SUGGESTED SITES FOR
GRAVITY MARK
INSTALLATION
L.J.WOODBURN 23 September 2014
AUT
AUCKLAND UNIVERSITY OF TECHNOLOGY
TE WĀNANGA ARONUI O TĀMAKI MAKAU RAU

AuScope



GGOS stations in Australasia.

Networking and Cloud Correlation



Stations

High-speed Network

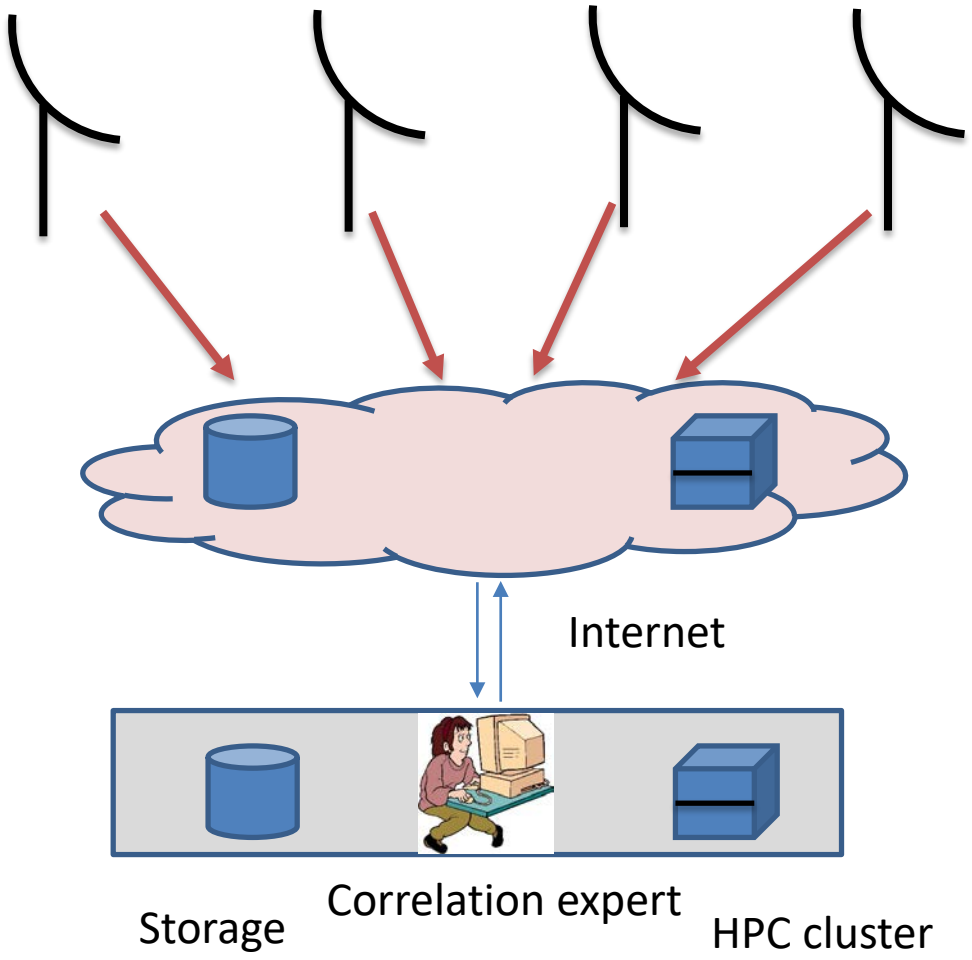
Correlation Centre

Storage

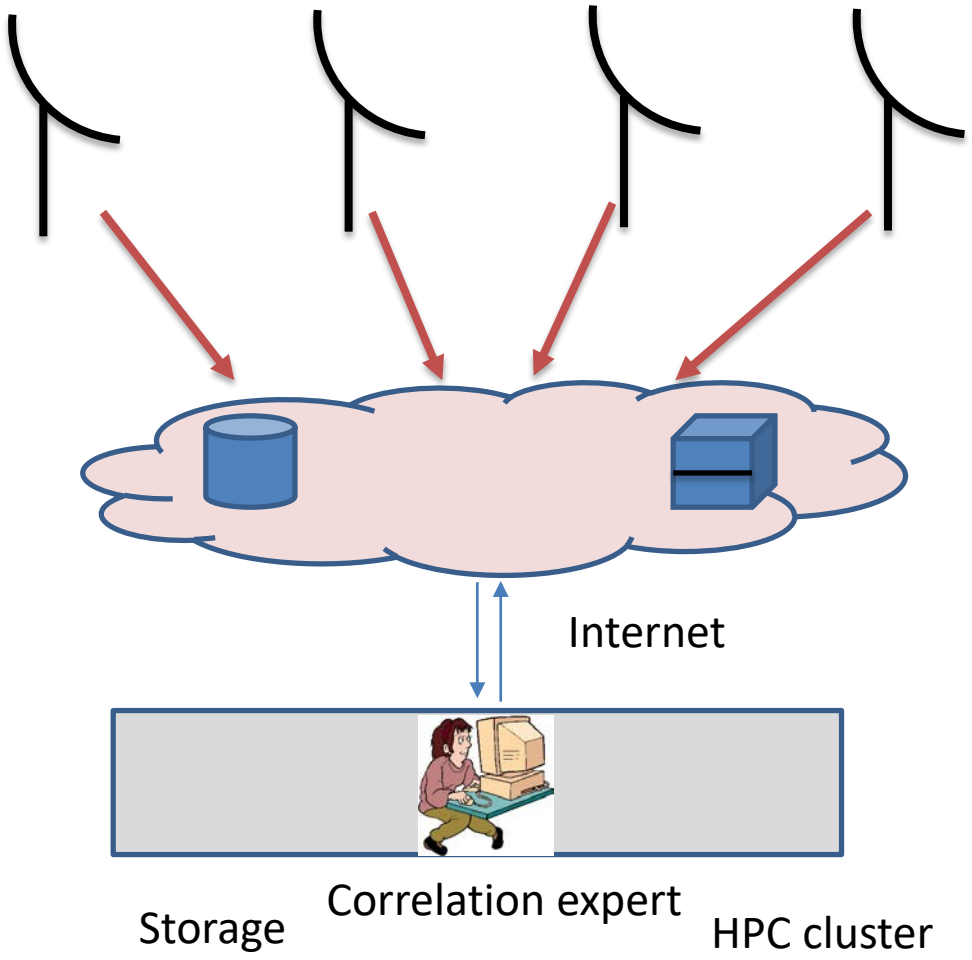
Correlation expert

HPC cluster

Networking and Cloud Correlation



Networking and Cloud Correlation



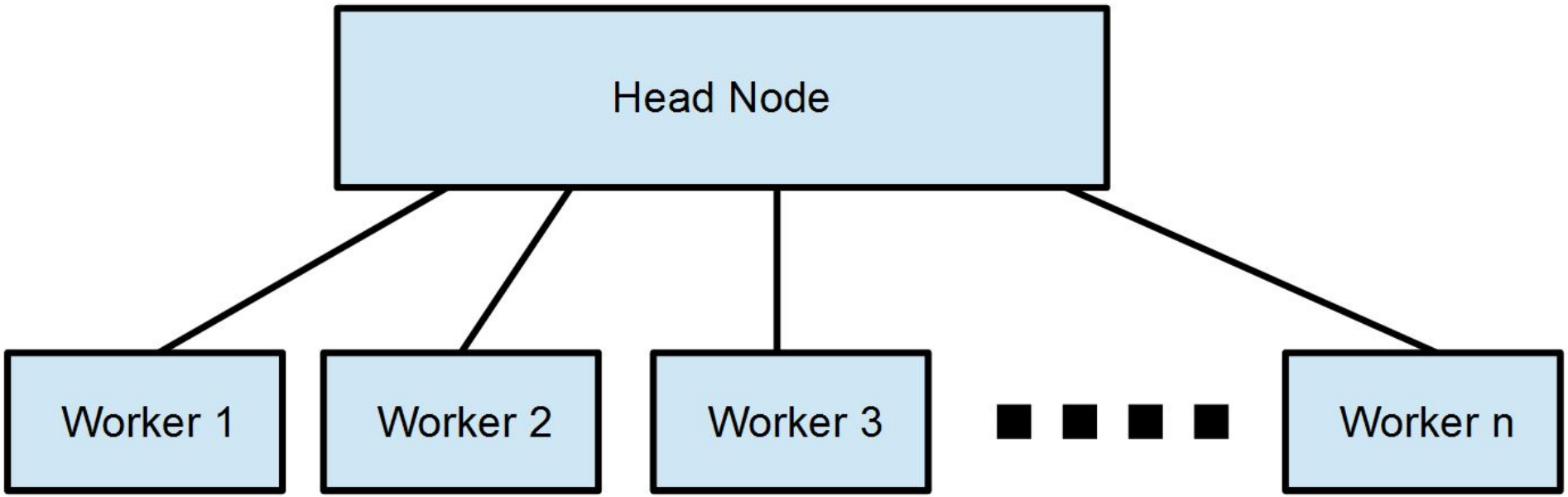
Stations

High-speed Network

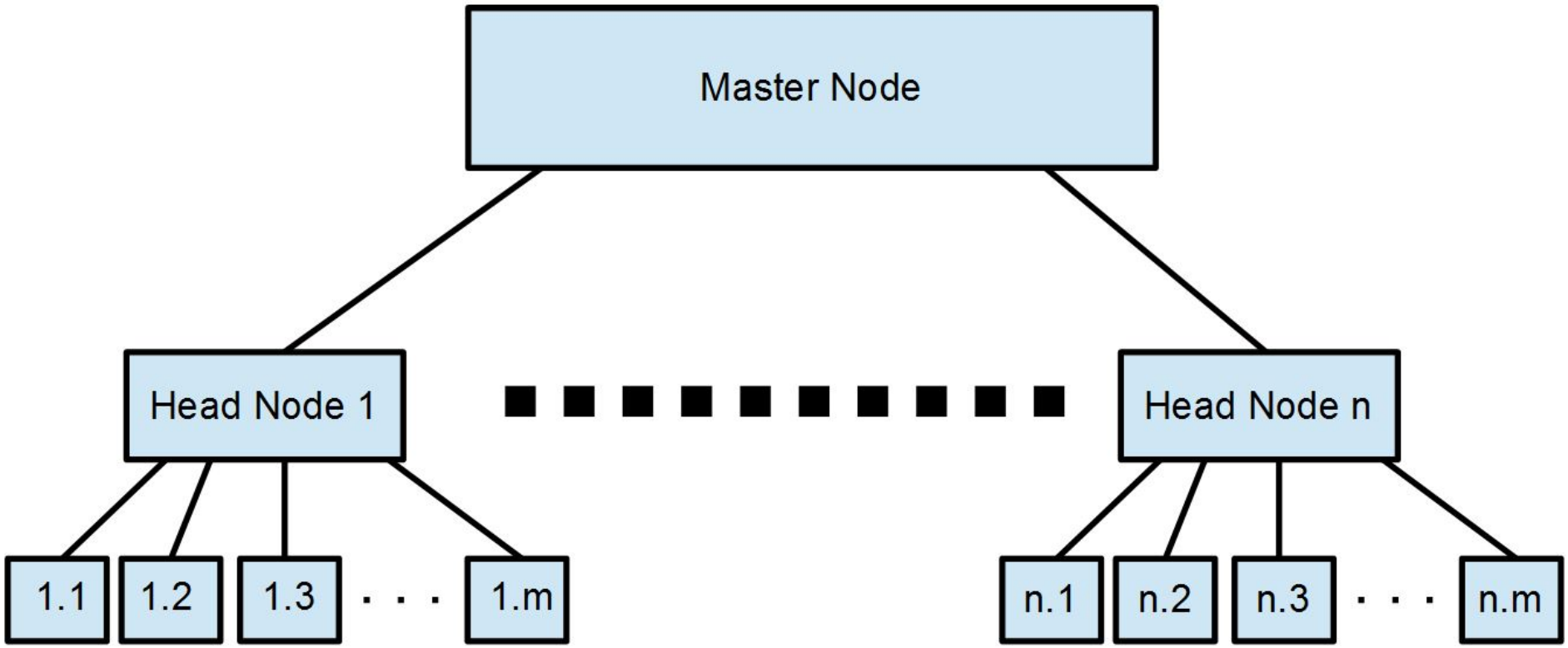
Cloud

Correlation Centre

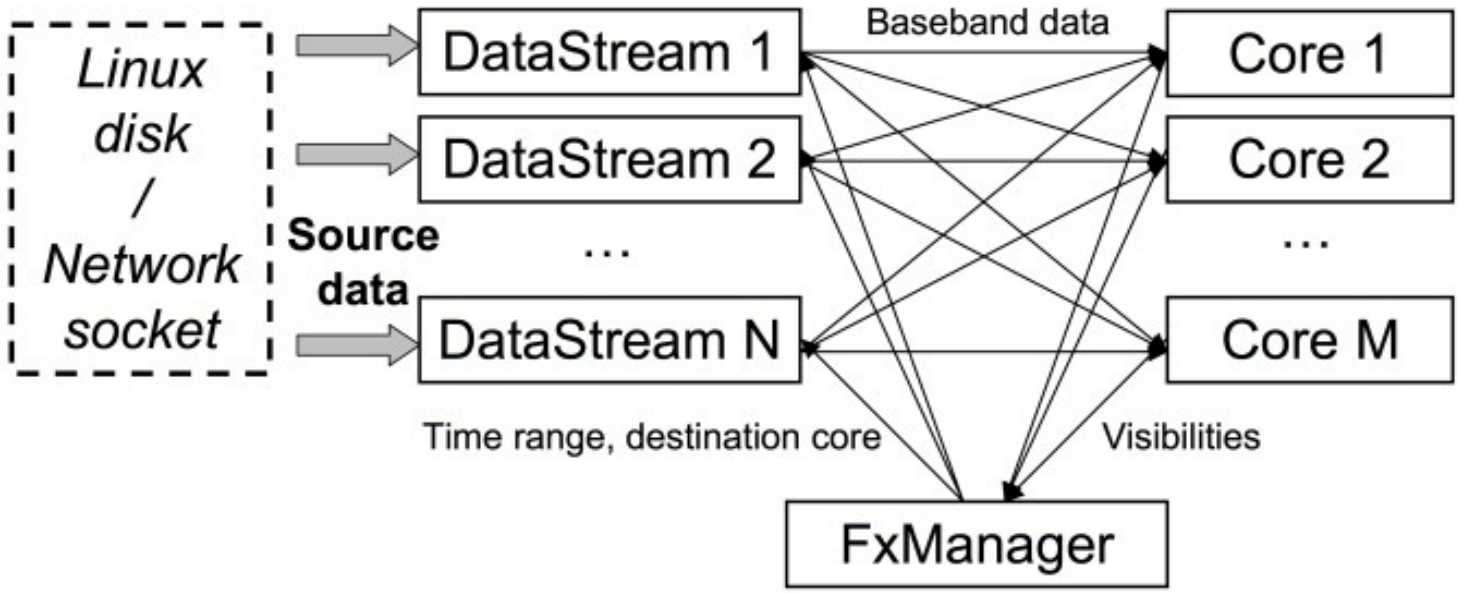
Networking and Cloud Correlation



Networking and Cloud Correlation



Networking and Cloud Correlation



Networking and Cloud Correlation

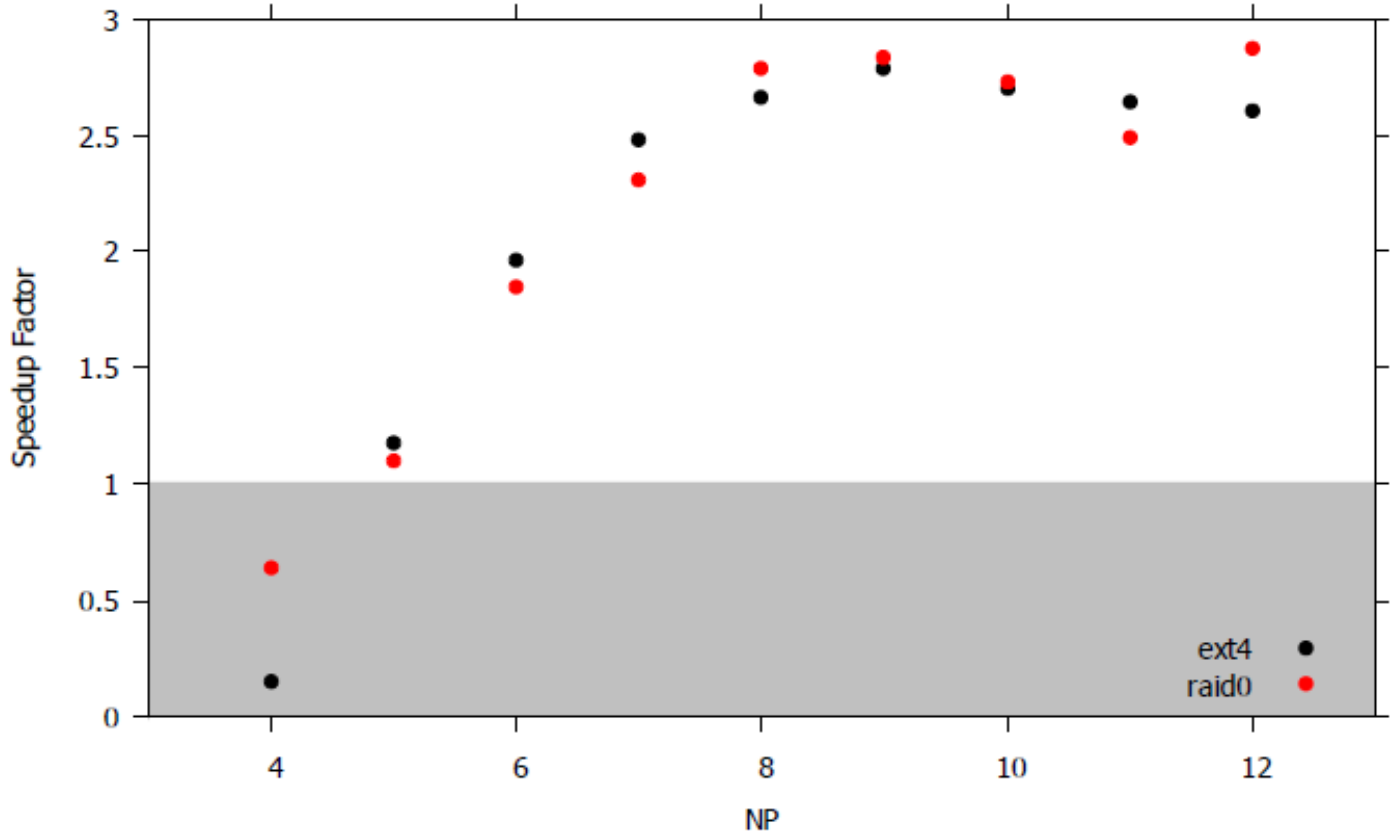


Figure 3: The Speedup factor (SF) vs. NP in the one-baseline experiment (hw03) with the Catalyst Cloud.

Networking and Cloud Correlation

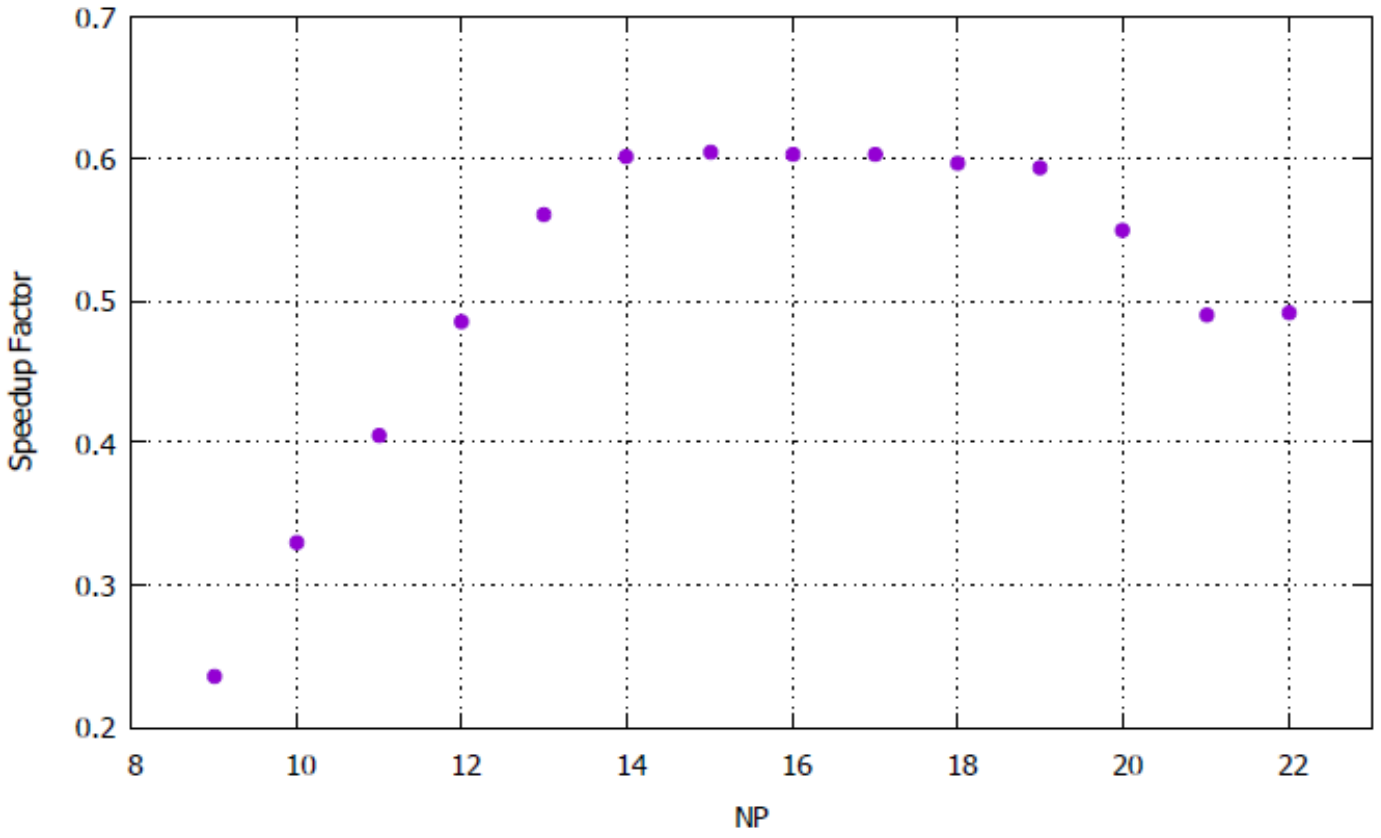


Figure 4: The Speedup factor (SF) vs. NP in the 15-baseline experiment (v534a) with the Catalyst Cloud.

THANK YOU !