# JCMT and the Multi Archive Query

**JJ Kavelaars**
**Canadian Astronomy Data Centre**

National Research Council Canada
Conseil national de recherches Canada
Canada

# Canadian Astronomy Data Centre (CADC)

- Data archive housing collections from multiple (+10) telescopes:
  - Currently house about 2 PB of telescope **archive** data
- Development group working on standards in data archive system via the International Virtual Observatory Alliance (IVOA) including:
  - Common Archive Observation Model (CAOM and ObsCore)
  - VOSpace - Open storage system protocol.
  - SIAP - Simple Image Access Protocol
  - Database Table Access Protocol (TAP) + Astronomy Data Query Language
  - Group Management Service Authentication and Access
- Lead development and support for the Canadian Advanced Network For Astronomical Research (CANFAR) - Cloud computing in Astronomy
- Research Astronomers investigating Dark Energy, Quasars, Galaxy Evolution, Stellar Atmosphere, the Trans Neptunian Region and Machine Learning in image and spectroscopy classification.


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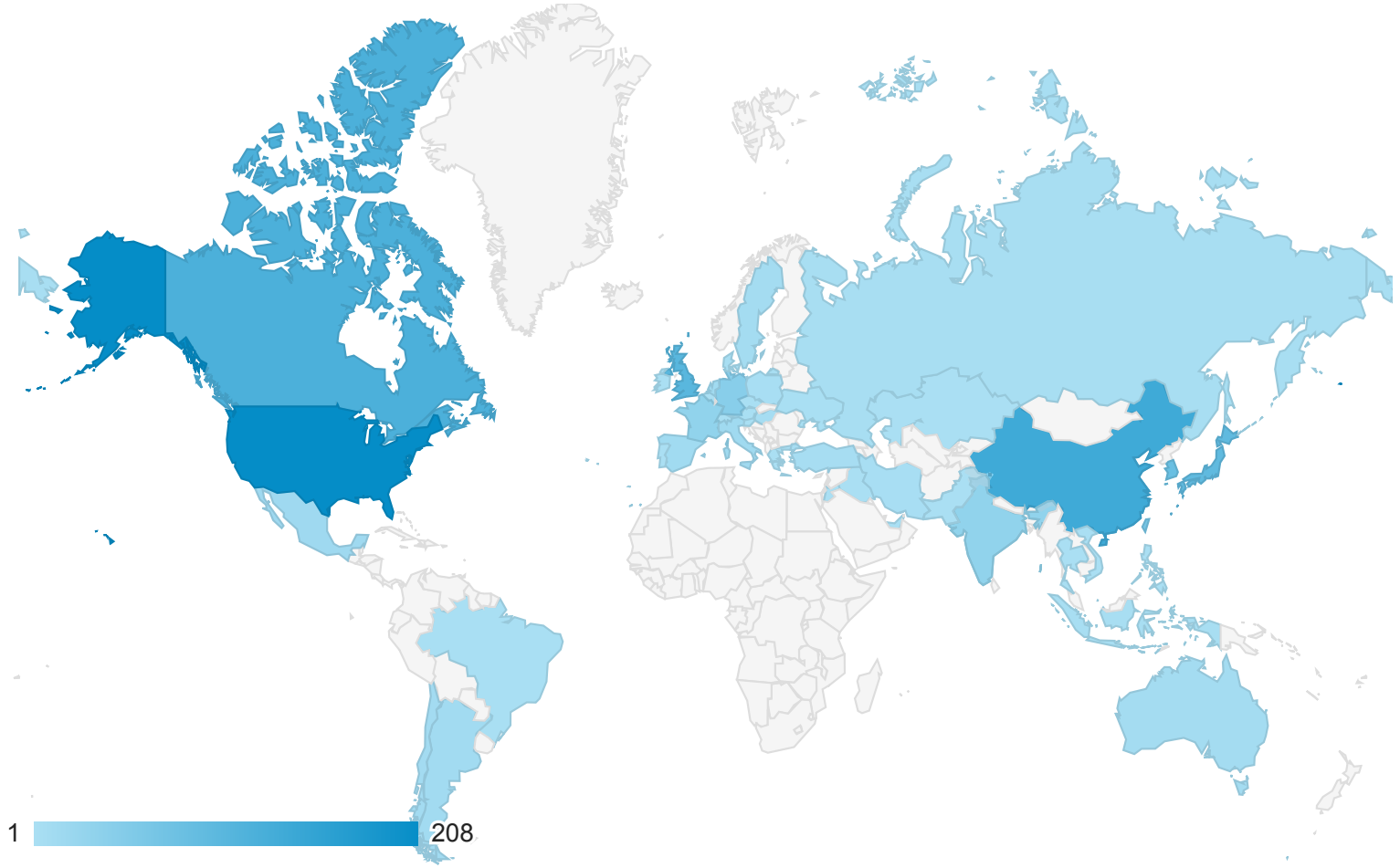
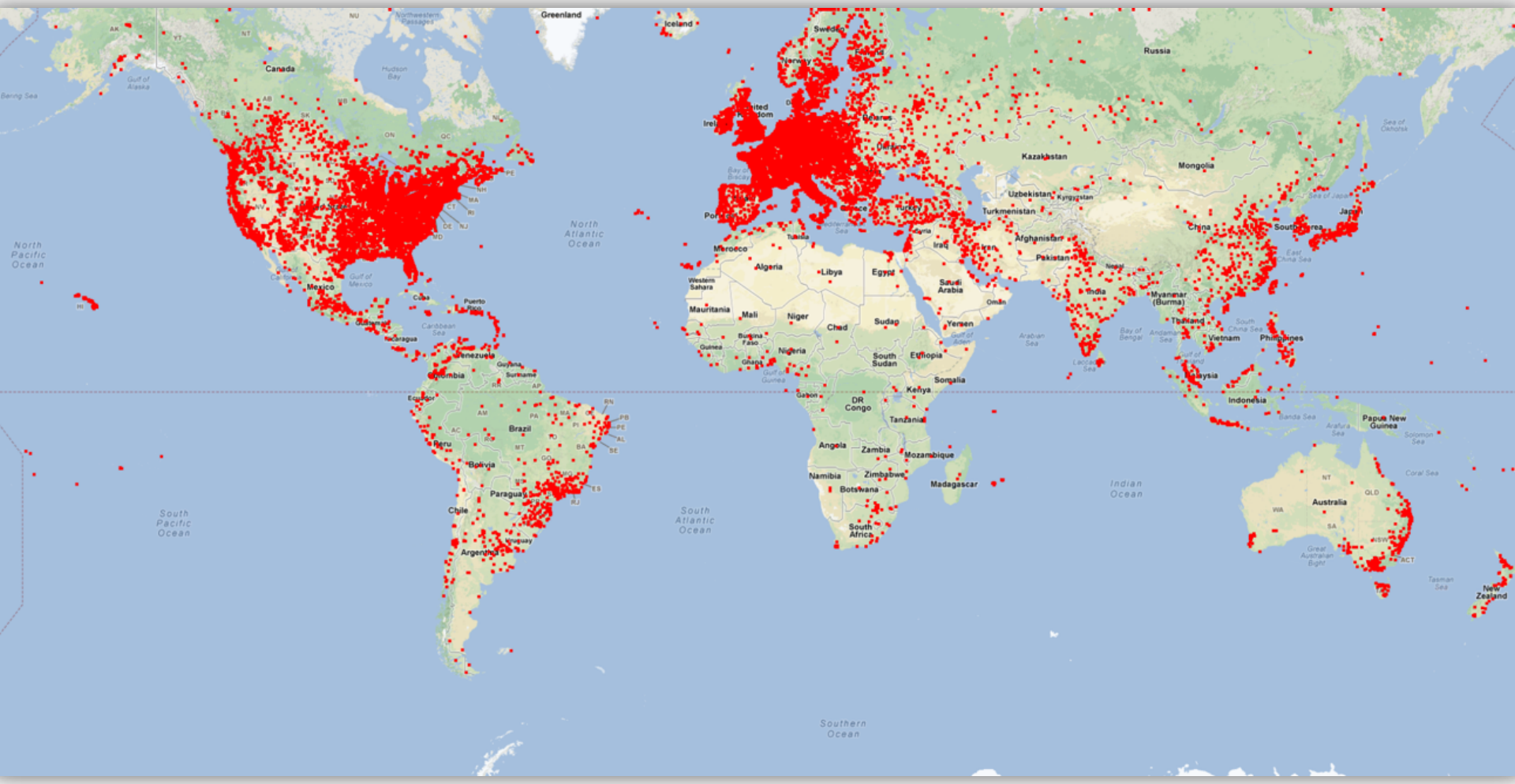
# Visits to CADC's JCMT pages in 2017



# CADC Data Delivery in 2016



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# Scale of CADC 2016

CADC

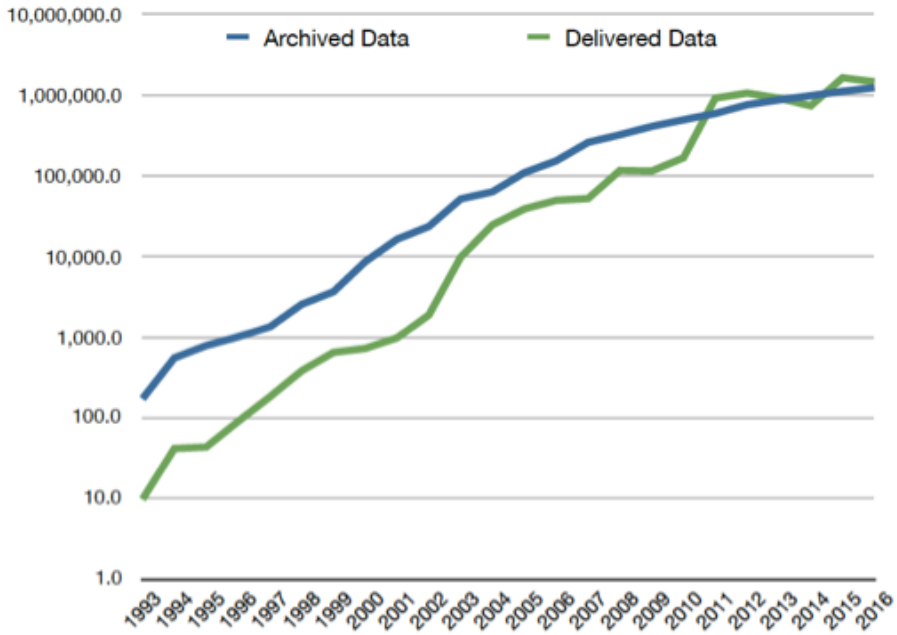
- was created in 1996 and parallels Hubble Space Telescope
- has 21 staff: scientists, programmers, operations
- 1 billion files
- 2.6 Petabytes

Data flows

- 1.4 Petabytes of data out
  - 75 million individual calls
- 300 Terabytes put back into CADC system
  - 15 million calls

Processing

- 3,671,737 jobs in batch mode
- 387 interactive Virtual Machines
- 460 core years of processing used



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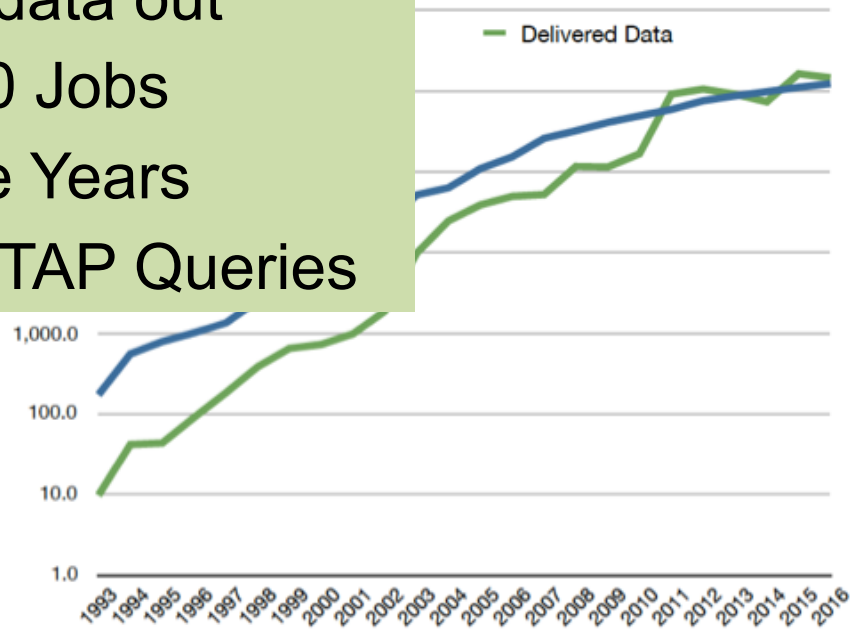
2017:

2.3 PiB of data out

13,375,570 Jobs

1,068 Core Years

4,462,433 TAP Queries




Processing

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# JCMT Data Rates in a Typical Weekly

- 20-30 Users
- 50-500 GB of data
- 30,000 - 60,000 files

- Does not include previews

# JCMT Data Rates in a Typical Weekly

- 20-30 Users

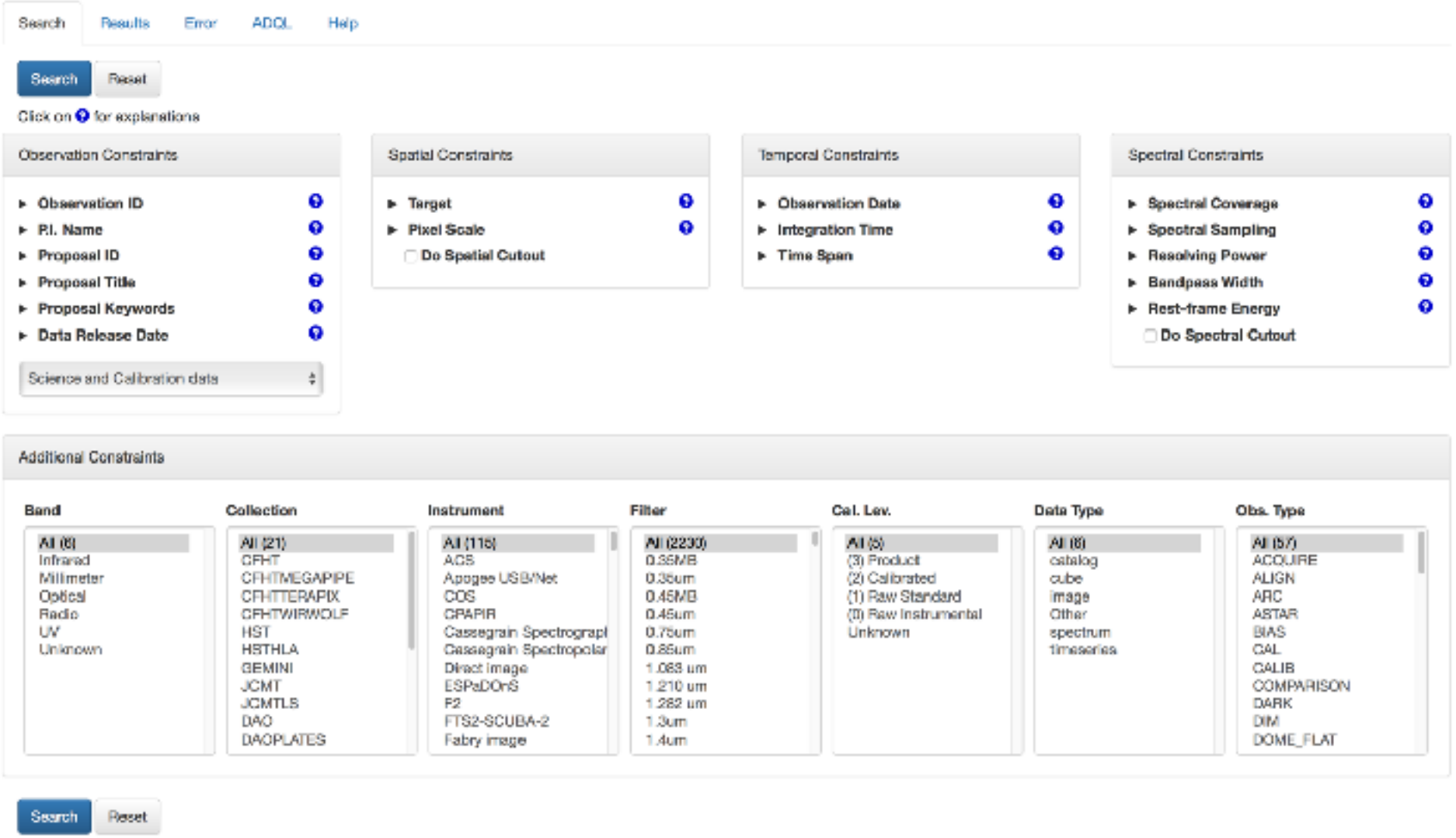
## User Meeting Rush?

January 22, 2018 - January 28, 2018

JCMT User requests:

26 JCMT users submitted requests.
raw data retrieved: 1353 files. Size: 16.3 GB
product retrieved: 181229 files. Size: 2.2 TB.

# Common Archive Observation Model



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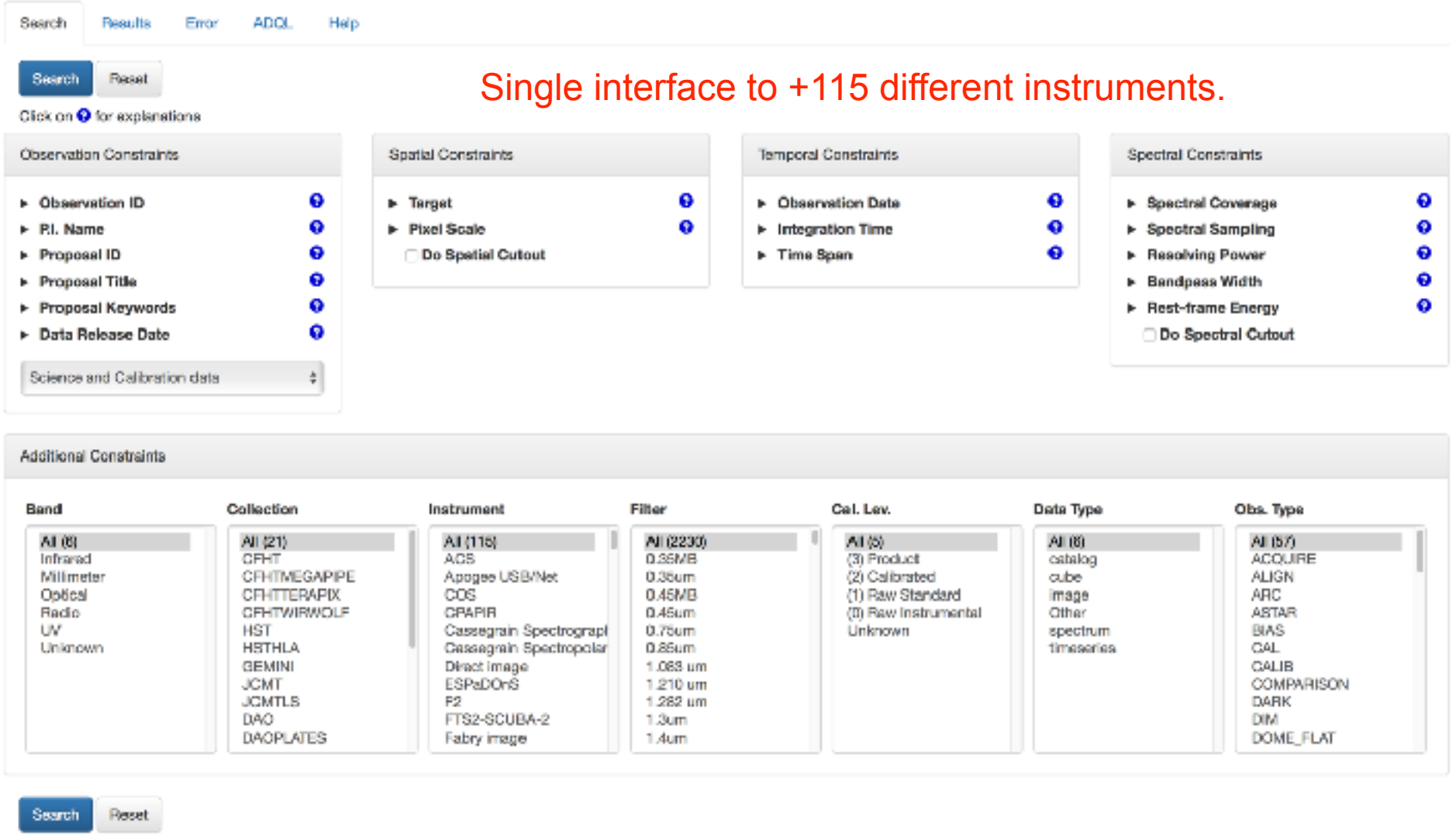
# Common Archive Observation Model



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# Multi Archive Query

Search | ObsCore Search | Results | Error | ADQL | Help

Search | Reset

Click on ⓘ for explanations

**Observation Constraints**

- Observation ID ⓘ
- P.I. Name ⓘ
- Proposal ID ⓘ
- Proposal Title ⓘ
- Proposal Keywords ⓘ
- Data Release Date ⓘ

Science and Calibration data

**Spatial Constraints**

- Target ⓘ
- Pixel Scale ⓘ
- ☐ Do Spatial Cutout

**Temporal Constraints**

- Observation Date ⓘ
- Integration Time ⓘ
- Time Span ⓘ

**Spectral Constraints**

- Spectral Coverage ⓘ
- Spectral Sampling ⓘ
- Resolving Power ⓘ
- Bandpass Width ⓘ
- Rest-frame Energy ⓘ
- ☐ Do Spectral Cutout

**Additional Constraints**

| Band | Collection | Instrument | Filter | Cal. Lev. | Data Type | Obs. Type |
|---|---|---|---|---|---|---|
| All (5) | All (9) | All (93) | All (1070) | All (4) | All (6) | All (38) |
| Infrared | HST | 90prime | *Instrument 90Prime no | [3] Product | cube | ARC |
| Optical | GEMINI | ACIS-I | -1.800 | [2] Calibrated | eventlist | BIAS |
| UV | ALMA | ACIS-S | -1.800 | [1] Raw Standard | image | CAL |
| X-ray | CHANDRA | ACS/SBC | -35.000 | Unknown | Other | COMP |
| Unknown | IRIS | ACS/WFC | 0 | | spectrum | COMPARISON |
| | NOAO | APOGEE Spectrograph | 0G530 | | timeseries | CORONAGRAPHIC |
| | SDSS | ARCOIRIS | 0G570 | | | DARK |
| | SUBARU | BOSS Spectrograph | 1 | | | DOME-FLAT |
| | XMM | Band 3 | 10 | | | DOMEFLAT |
| | | COS/FUV | 1066 | | | FLAT |
| | | COS/NUV | 1063 | | | FOCUS |

# Multi Archive Query




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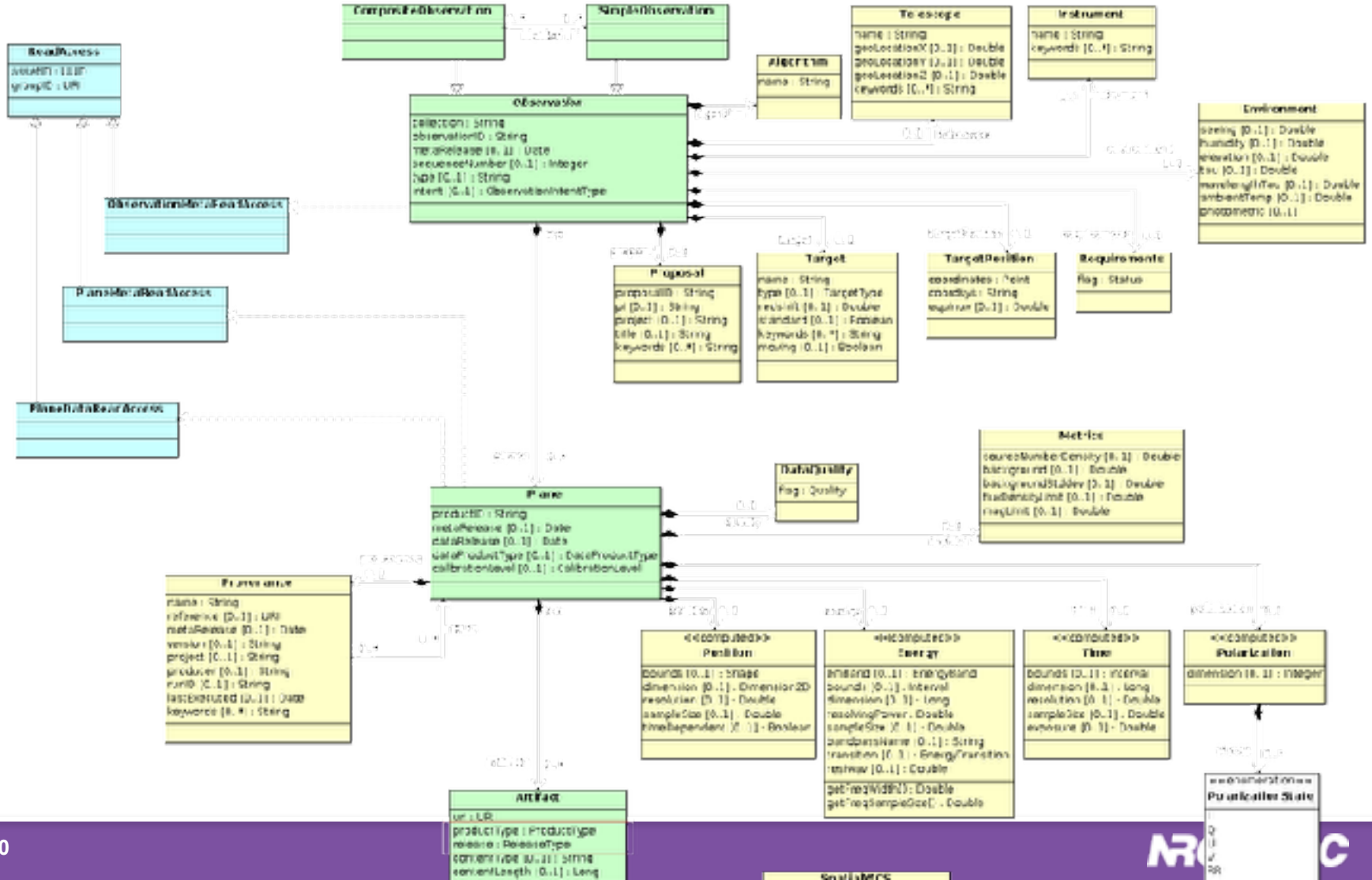

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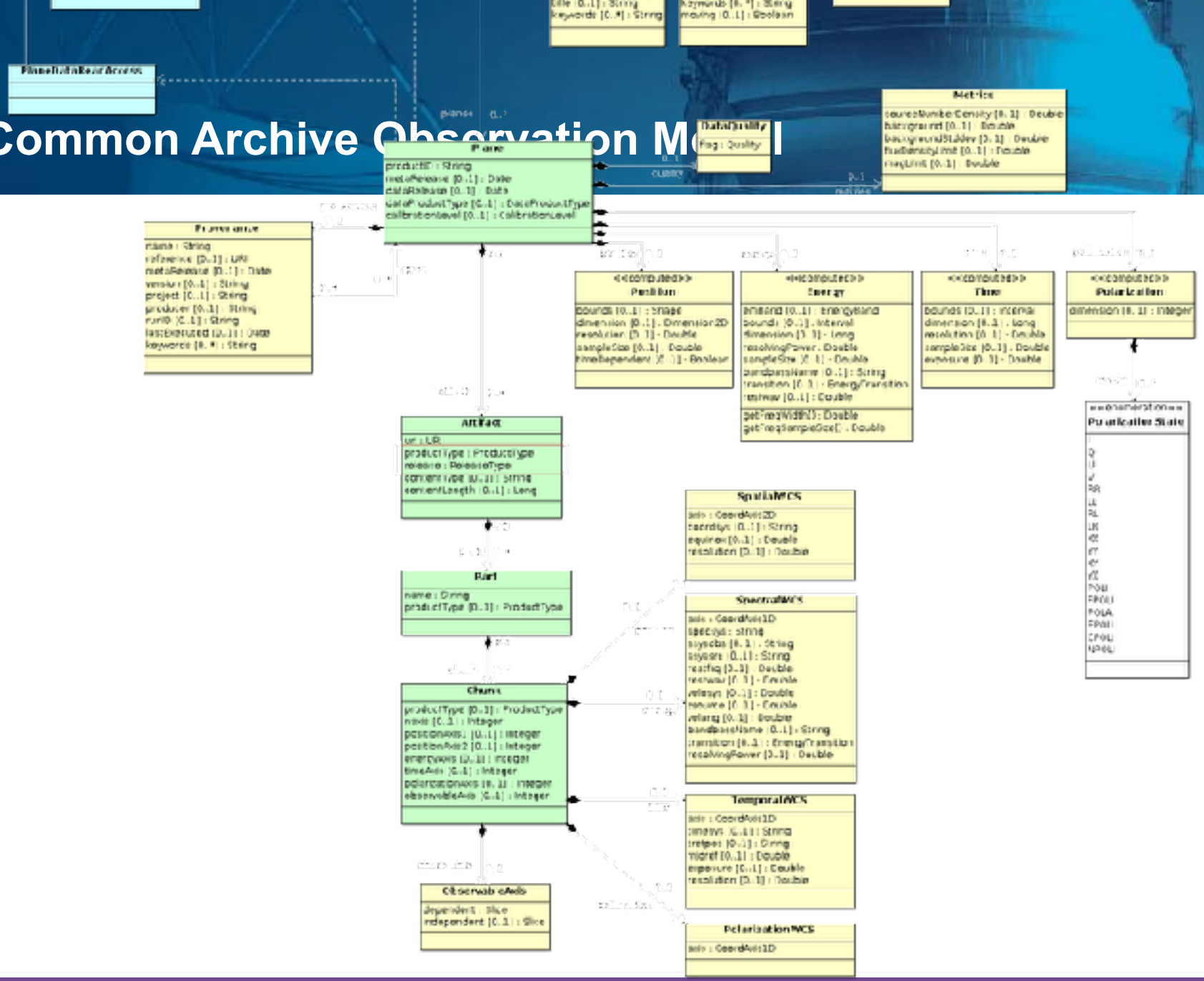

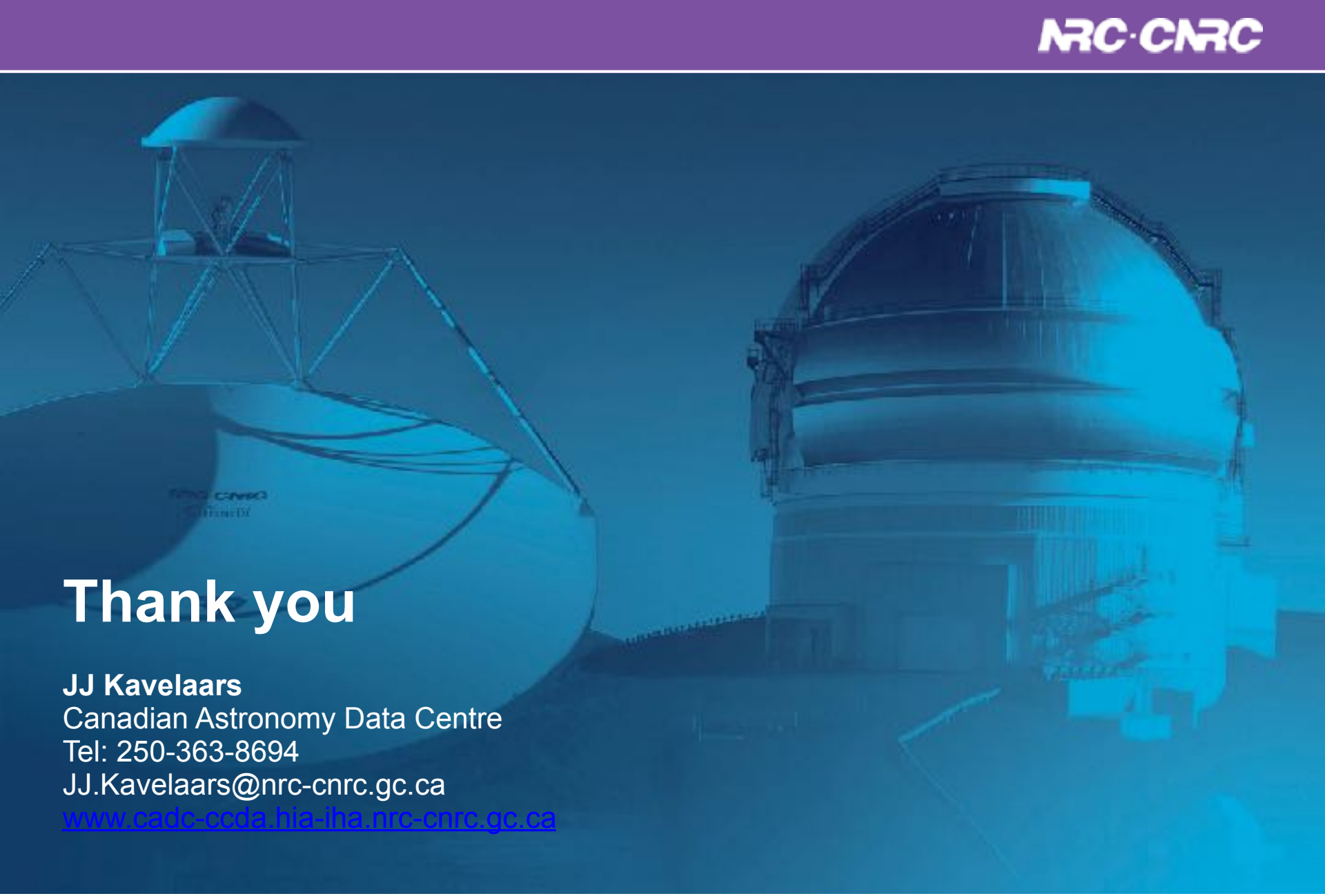

# Thank you

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