

# ANDS-ATNF Pulsar Data Archive

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# What to expect when expecting...

- ⊗ Me
- ⊗ *“These talks are great! I’d like to use psrchive/tempo2/dspsr with some data... But, how do I get some data?”*
- ⊗ *What* is the ANDS-ATNF pulsar data archive?
- ⊗ *How* to use the ANDS-ATNF pulsar data archive



# Who/What am I?

- ⊗ “Dui bu chi. Wo bu hui jiang zhong wen.”
- ⊗ Working at the ATNF (CSIRO, Australia) for 4 years, software development for Dick Manchester (and the pulsar group)
- ⊗ PPTA – Parkes Pulsar Timing Array (Dick Manchester)
- ⊗ Psrchive: see Willem’s talk; dspsr: folds search-mode data
- ⊗ PULSE@Parkes – a high-school educational outreach project (George Hobbs)
- ⊗ **ANDS-ATNF Pulsar Data Archive (George Hobbs) – an online access point to obtain pulsar data**
- ⊗ ASKAP computing (Tim Cornwell)

# Learn

A pulsar presentation custom...



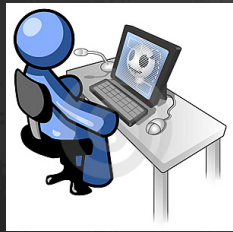
# Why use the data archive?

- ⊗ Easy to use – designed by pulsar astronomers; developed by professional software engineering team (robustness)
- ⊗ 144 044 data files in the system (since 1991): 100 000 survey files; 44 044 observations of known pulsars
- ⊗ Online – accessible from anywhere
- ⊗ Contains different data types:
  - ⊗ Search-mode data: used for studies on single pulse
  - ⊗ Fold-mode data: produce pulse profiles (e.g. Wenming's work, PPTA, etc.)
- ⊗ I worked on it

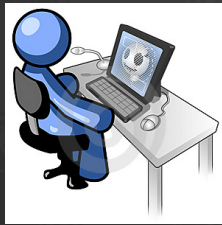
# State of play

- ⊗ Paper, Hobbs et al., has been submitted and is currently being refereed (please read if the data archive is used your project)
  - pre-prints are available now for those interested
- ⊗ In the future:
  - ⊗ more historical pulsar data will be added to the database
  - ⊗ automatic ingest of *all* pulsar data taken at Parkes

# The ANDS-ATNF pulsar data archive



Pulsar data @ Epping



- ⦿ Download *any* pulsar observation taken at Parkes (conforming to the 18-month embargo policy) - <http://datanet.csiro.au> - try it now!



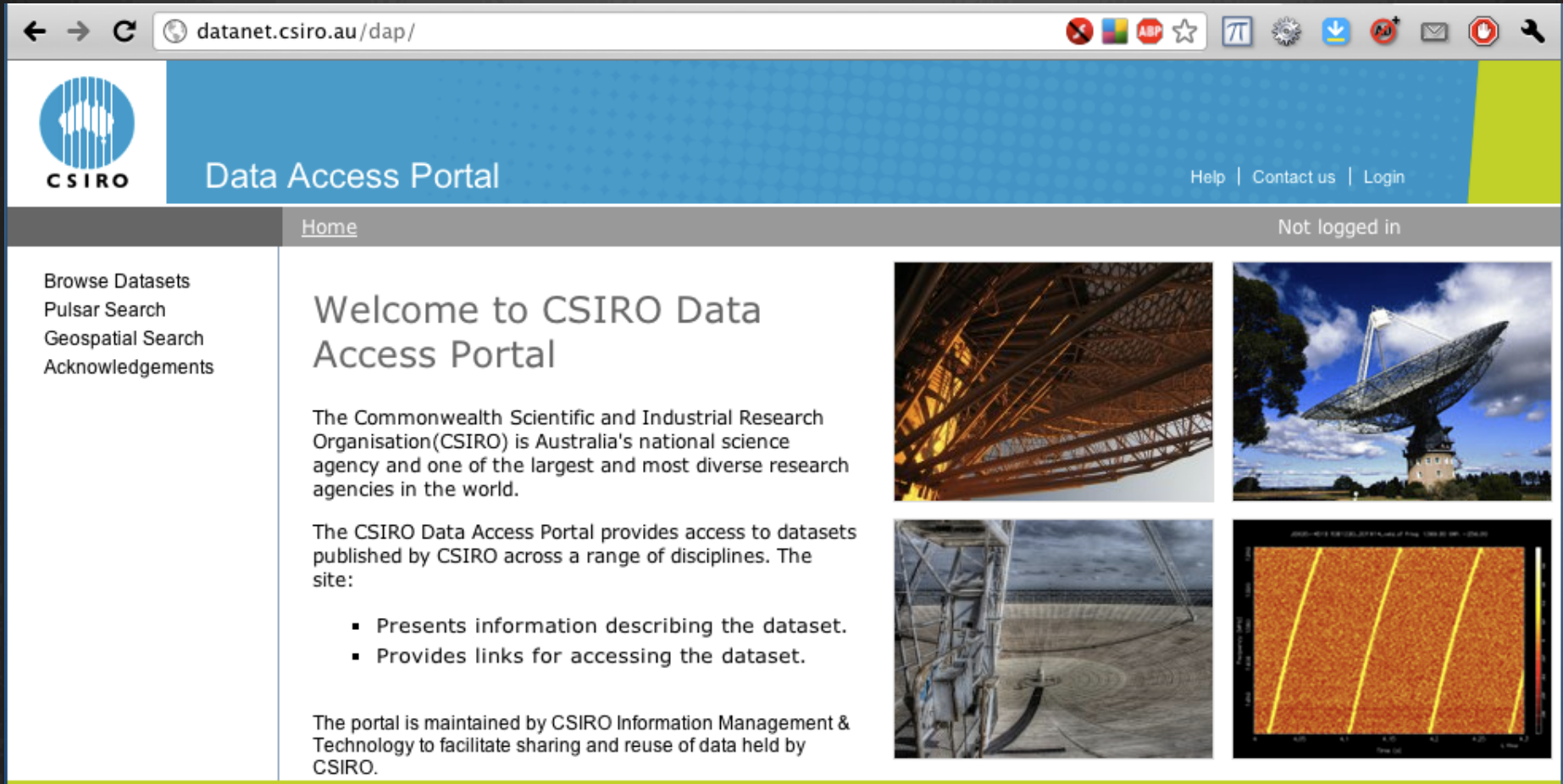
# Data Access Portal (DAP)

- ⦿ <http://datanet.csiro.au>
- ⦿ Two Australian companies (CSIRO & ANDS) working together to create a website allowing science data to be obtained
- ⦿ A 9-month *agile* project (8 x 3-week sprints), interchanging with another ANDS prototype project
- ⦿ Java (background) and zk (web interface)
- ⦿ My role: part-time software developer; core development team located in Canberra


# VO compliancy


- ⦿ Virtual Observatory format was chosen so that VO tools (programs) can be used to perform operations on the data
- ⦿ International Virtual Observatory Alliance - <http://ivoa.net>

# 1. DAP - <http://datanet.csiro.au>



The screenshot shows the CSIRO Data Access Portal (DAP) website. The browser address bar displays [datanet.csiro.au/dap/](http://datanet.csiro.au/dap/). The page features the CSIRO logo and the title "Data Access Portal". Navigation links include "Home", "Help", "Contact us", and "Login". A sidebar on the left lists "Browse Datasets", "Pulsar Search", "Geospatial Search", and "Acknowledgements". The main content area welcomes users to the CSIRO Data Access Portal, describing it as a platform for accessing datasets published by CSIRO. It includes a list of features: "Presents information describing the dataset" and "Provides links for accessing the dataset". The page also mentions that the portal is maintained by CSIRO Information Management & Technology. Four images are displayed: a close-up of a radio telescope's metal structure, a large radio telescope dish pointing towards the sky, a view of a radio telescope dish from a distance, and a scientific plot showing frequency (MHz) versus time (s) with a color scale.

← → ↻ [datanet.csiro.au/dap/](http://datanet.csiro.au/dap/) 

 **Data Access Portal** [Help](#) | [Contact us](#) | [Login](#)

[Home](#) Not logged in

**Browse Datasets**  
Pulsar Search  
Geospatial Search  
Acknowledgements

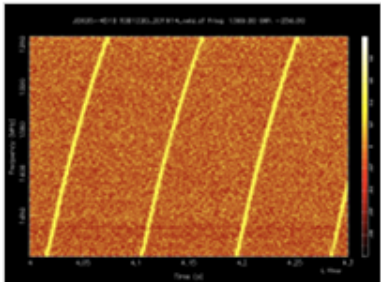



## Welcome to CSIRO Data Access Portal

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is Australia's national science agency and one of the largest and most diverse research agencies in the world.

The CSIRO Data Access Portal provides access to datasets published by CSIRO across a range of disciplines. The site:

- Presents information describing the dataset.
- Provides links for accessing the dataset.

The portal is maintained by CSIRO Information Management & Technology to facilitate sharing and reuse of data held by CSIRO.








## 2. Enter favourite pulsar name

### ATNF Pulsar Observation Search

Query pulsar observations taken at the Parkes radio telescope. Publications that make use of the data from this archive should include an acknowledgement statement. Please refer to the statements [provided here](#).

Source Name / Position		Frequency / Band	
<b>Source Name:</b>	<input type="text"/>	<b>Frequency: (MHz)</b>	<input type="text"/> to <input type="text"/>
<b>Cone Search:</b>			
<b>Right Ascension:</b>	<input type="text"/> hh:mm:ss.ss (J2000)	<b>Band Name:</b>	<div>Any</div> <div>70cm (~0.44 GHz)</div> <div>50cm (~0.66 GHz)</div> <div>20/18cm (1.2-1.8 GHz)</div>
<b>Declination:</b>	<input type="text"/> dd:mm:ss.ss (J2000)	<b>Observation Mode:</b>	<div>All</div>
<b>Search Window:</b>	<input type="text"/> arcmin	<b>Backend:</b>	<div>All</div>
		<b>Frontend:</b>	<div>All</div>
<b>Observation</b>			
<b>Project ID:</b>	<input type="text"/>		
<b>Observation Date:</b> (dd/mm/yyyy)	<input type="text"/>  to <input type="text"/> 		
<b>Observation Date:</b> (MJD)	<input type="text"/> to <input type="text"/>		
<div> <a href="#">Configure Results Columns</a></div>			
<div><input type="button" value="Search"/></div>			

# 3. View (and refine) results

Source Name

☒ J1711-4322 (22)

Project ID

☒ P262 (20)  
☒ P456 (2)

Backend

☒ AFB (20)  
☒ PDFB1 (1)  
☒ PDFB4 (1)

Observation Type

☒ preprocessed (12)  
☒ raw (10)

Frontend

☒ MULTI (20)  
☒ H-OH (2)

Frequency

☒ 1374 (18)  
☒ 1369 (2)  
☒ 1518 (2)

Calibration

Before  mins

**Cone Search:**

Right Ascension:  hh:mm:ss.ss (J2000)

Declination:  dd:mm:ss.ss (J2000)

Search Window:  arcmin

Observation

Project ID:

Observation Date:  to

Observation Date:  to

Band Name:

Any  
70cm (~0.44 GHz)  
50cm (~0.66 GHz)  
20/18cm (1.2-1.8 GHz)

Observation Mode:

All

Backend:

All

Frontend:

All

Configure Results Columns

Search

Search Results:

Found 22 records. Max 50 files can be downloaded at a time.

☒ tar ☐ zip

0 MB to be downloaded

<input type="checkbox"/>	Project ID	Filename	File Size (M)	Last Modified	Source	RA	Dec	Equinox	Backend	Frontend
<input type="checkbox"/>	<a href="#">P262</a>	f001223_011456.rf	0.10	2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	2000.0	AFB	MULTI
<input type="checkbox"/>	<a href="#">P262</a>	f010216_234708.rf	0.10	2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	2000.0	AFB	MULTI
<input type="checkbox"/>	<a href="#">P262</a>	f010302_211035.rf	0.10	2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	2000.0	AFB	MULTI
<input type="checkbox"/>	<a href="#">P262</a>	f010724_081744.rf	0.10	2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	2000.0	AFB	MULTI

# 3a. Calibration search (optional)

☒ 70CM (196)  
☒ 1010CM (72)  
☒ 50CM (20)  
☒ 5010CM (12)  
☒ METHMB (8)  
☒ 1 (2)

**Frequency**

☒ 1395 (4)  
☒ 1261 (2)  
☒ 1273 (2)  
☒ 1294 (2)  
☒ 1325 (2)  
☒ 1353 (2)  
☒ 1386 (2)  
☒ 1413 (2)  
☒ 2800 (2)  
☒ 2878 (2)  
☒ 2942 (2)  
☒ 3128 (2)  
☒ 3400 (2)  
☒ 1305 (1)  
☒ 689 (1)

**Calibration**

Before  mins

After  mins

☒ Show Cal. Files

<input type="checkbox"/>	<a href="#">P595</a>	r080430_051326.rf	48.30		2011-03-14 10:26:40	J0437-4715	04:37:15	-47:15:08	PDFB2
<input type="checkbox"/>		r080430_051033.cf	32.20		2011-03-14 10:26:40	J0437-4715_R			
<input type="checkbox"/>		r080430_051924.cf	32.20		2011-03-14 10:26:42	J0437-4715_R			
<input type="checkbox"/>	<a href="#">P595</a>	r080430_052216.rf	48.30		2011-03-14 10:26:42	J0437-4715	04:37:15	-47:15:08	PDFB2
<input type="checkbox"/>		r080430_051924.cf	32.20		2011-03-14 10:26:42	J0437-4715_R			
<input type="checkbox"/>		r080430_052826.cf	32.20		2011-03-14 10:26:43	J0437-4715_R			
<input type="checkbox"/>	<a href="#">P595</a>	r080430_053115.rf	48.30		2011-03-14 10:26:43	J0437-4715	04:37:15	-47:15:08	PDFB2
<input type="checkbox"/>		r080430_052826.cf	32.20		2011-03-14 10:26:43	J0437-4715_R			
<input type="checkbox"/>	<a href="#">P595</a>	r080522_011605.rf	40.20		2011-03-14 10:26:44	J0437-4715	04:37:15	-47:15:08	PDFB2
<input type="checkbox"/>		r080522_011317.cf	32.20		2011-03-14 10:26:44	J0437-4715_R			
<input type="checkbox"/>	<a href="#">P595</a>	r080627_025610.rf	40.20		2011-03-14 10:26:45	J0437-4715	04:37:15	-47:15:08	PDFB2
<input type="checkbox"/>		r080627_025328.cf	32.20		2011-03-14 10:26:45	J0437-4715_R			
<input type="checkbox"/>	<a href="#">P595</a>	s080813_004600.rf	32.20		2008-08-13 10:45:33	J0437-4715	04:37:15	-47:15:08	PDFB3
<input type="checkbox"/>		s080813_004316.cf	32.20		2008-08-13 10:45:33	J0437-4715_R			
<input type="checkbox"/>		s080813_005228.cf	24.20		2008-08-13 10:53:43	J0452-1759_R			
<input type="checkbox"/>	<a href="#">P595</a>	s081028_133645.rf	16.10		2008-10-29 00:35:52	J0437-4715	04:37:15	-47:15:08	PDFB3
<input type="checkbox"/>		s081028_133333.cf	32.20		2008-10-29 00:35:52	J0437-4715_R			

# 3b. Consider pre-processed files

**Observation Type**

☒ raw (7706)

☒ preprocessed (7593)

**Frontend**

☒ MULTI (5245)

☒ 1050CM (5122)

☒ H-OH (1674)

☒ MULT\_1 (1654)

☒ Unknown (1294)

☒ 70CM (196)

☒ 1010CM (72)

☒ 50CM (20)

☒ 5010CM (12)

☒ METHMB (8)

☒ 1 (2)

**Frequency**

☒ 1341 (2966)

☒ 1405 (2866)
















☒ 1369 (2657)

☒ 685 (2337)

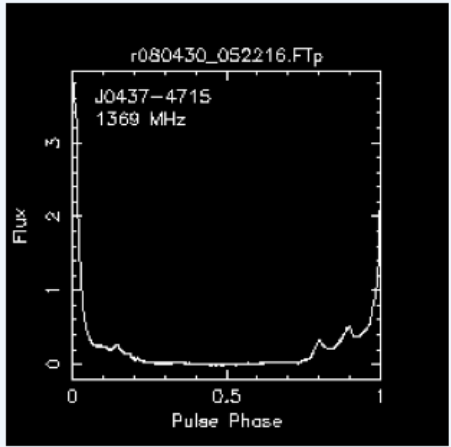
☒ 3100 (2133)

☒ 1433 (647)

☒ 0 (641)

<input type="checkbox"/>	<a href="#">P262</a>	f020703_211917.rf	0.10		2010-11-09 17:37:13	J0437-4715	04:37:15	-47:15:07	AFB
<input type="checkbox"/>	<a href="#">P262</a>	f980208_094644.rf	0.10		2010-11-09 17:37:14	J0437-4715	04:37:15	-47:15:08	AFB
<input type="checkbox"/>	<a href="#">P262</a>	f980815_163651.rf	0.10		2010-11-09 17:37:14	J0437-4715	04:37:15	-47:15:08	AFB
<input type="checkbox"/>	<a href="#">P595</a>	r080430_024526.rf	48.30		2011-03-14 10:26:30	J0437-4715	04:37:15	-47:15:08	PDFB2
<input type="checkbox"/>	<a href="#">P595</a>	r080430_051326.rf	48.30		2011-03-14 10:26:31	J0437-4715	04:37:15	-47:15:08	PDFB2
<input type="checkbox"/>	<a href="#">P595</a>	r080430_052216.rf	48.30						PDFB2
<input type="checkbox"/>	<a href="#">P595</a>	r080430_053115.rf	48.30						PDFB2
<input type="checkbox"/>	<a href="#">P595</a>	r080522_011605.rf	40.20						PDFB2
<input type="checkbox"/>	<a href="#">P595</a>	r080627_025610.rf	40.20						PDFB2
<input type="checkbox"/>	<a href="#">P595</a>	s080813_004600.rf	32.20						PDFB3
<input type="checkbox"/>	<a href="#">P595</a>	s081028_133645.rf	16.10						PDFB3
<input type="checkbox"/>	<a href="#">P595</a>	s090512_012854.rf	48.30						PDFB3
<input type="checkbox"/>	<a href="#">P595</a>	s090512_021950.rf	32.20						PDFB3
<input type="checkbox"/>	<a href="#">P595</a>	s100519_010413.rf	48.30						PDFB3
<input type="checkbox"/>	<a href="#">P595</a>	s100617_015226.rf	32.20		2010-06-17 11:56:03	J0437-4715	04:37:15	-47:15:08	PDFB3

Preview of r080430\_052216.rf



Flux

Pulse Phase

J0437-4715  
1369 MHz

# 4. Download files

**Frontend**

☒ MULTI (20)  
☒ H-OH (2)

**Frequency**

☒ 1374 (18)  
☒ 1369 (2)  
☒ 1518 (2)

**Calibration**

Before  mins  
After  mins  
☐ Show Cal. Files

## Search Results:

Found 22 records. Max 50 files can be downloaded at a time.

☒ tar ☐ zip [Download file\(s\)](#)

0.20 MB(2 files) to be downloaded

<input type="checkbox"/>	Project ID	Filename	File Size (MB)	Preview	Last Modified	Source	RA	Dec	Backend
<input type="checkbox"/>	<a href="#">P262</a>	f001223_011456.rf	0.10		2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	AFB
<input type="checkbox"/>	<a href="#">P262</a>	f010216_234708.rf	0.10		2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	AFB
<input checked="" type="checkbox"/>	<a href="#">P262</a>	f010302_211035.rf	0.10		2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	AFB
<input checked="" type="checkbox"/>	<a href="#">P262</a>	f010724_081744.rf	0.10		2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	AFB
<input type="checkbox"/>	<a href="#">P262</a>	f011005_073634.rf	0.10		2010-11-09 17:46:42	J1711-4322	17:11:07	-43:23:11	AFB
<input type="checkbox"/>	<a href="#">P262</a>	f030120_222615.rf	0.10		2010-11-09 17:46:43	J1711-4322	17:11:09	-43:22:56	AFB

2010-11-09 17:46:42

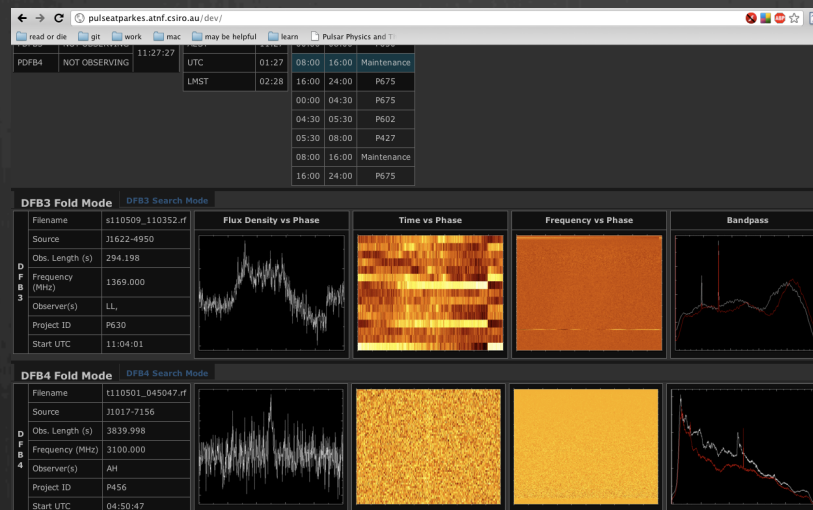
PulsarObs.tar

[Show all downloads...](#)

- Download limit: 50 files.
- Filesizes can be very large – use pre-processed files if required

# Then what?

- ❶ Psrchive and dspsr data manipulation and visualisation (see Willem's talk)
- ❷ Tempo2 data analysis (see George's talk)
- ❸ Parkes Online Monitor - <http://pulseatparkes.atnf.csiro.au/dev>





# “Xie Xie” – D. Yardley

- ⦿ Chen Ding and NAOC for the invitation to present a talk on the pulsar data archive
- ⦿ Pangfei for being very reliable (and great translator)
- ⦿ George Hobbs for the opportunity to work on the project

