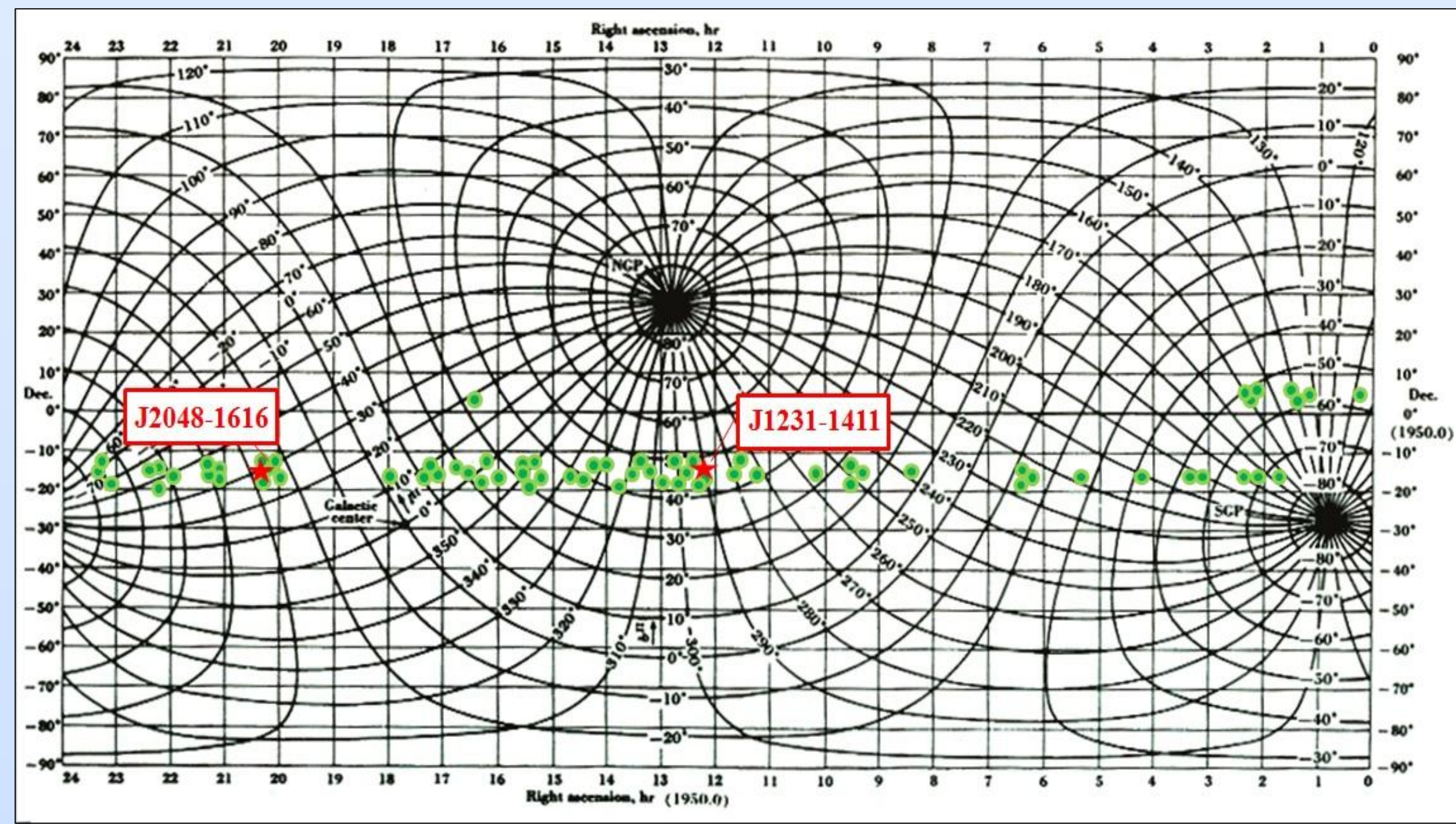# Spaced Out:
Pulsar Data Analysis with Multi-Disciplinary Connections
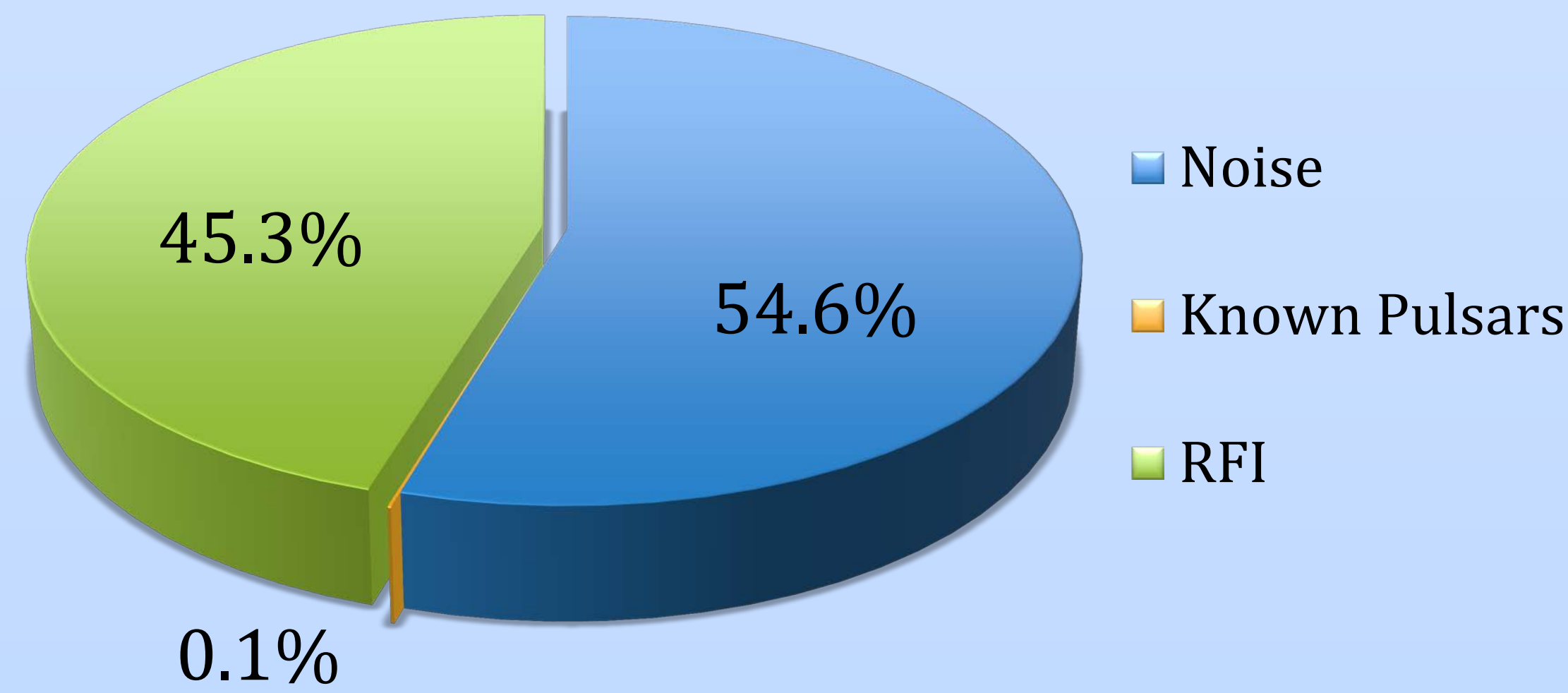
Alexander Nguyen, Yekaterina Gilbo
George C. Marshall High School

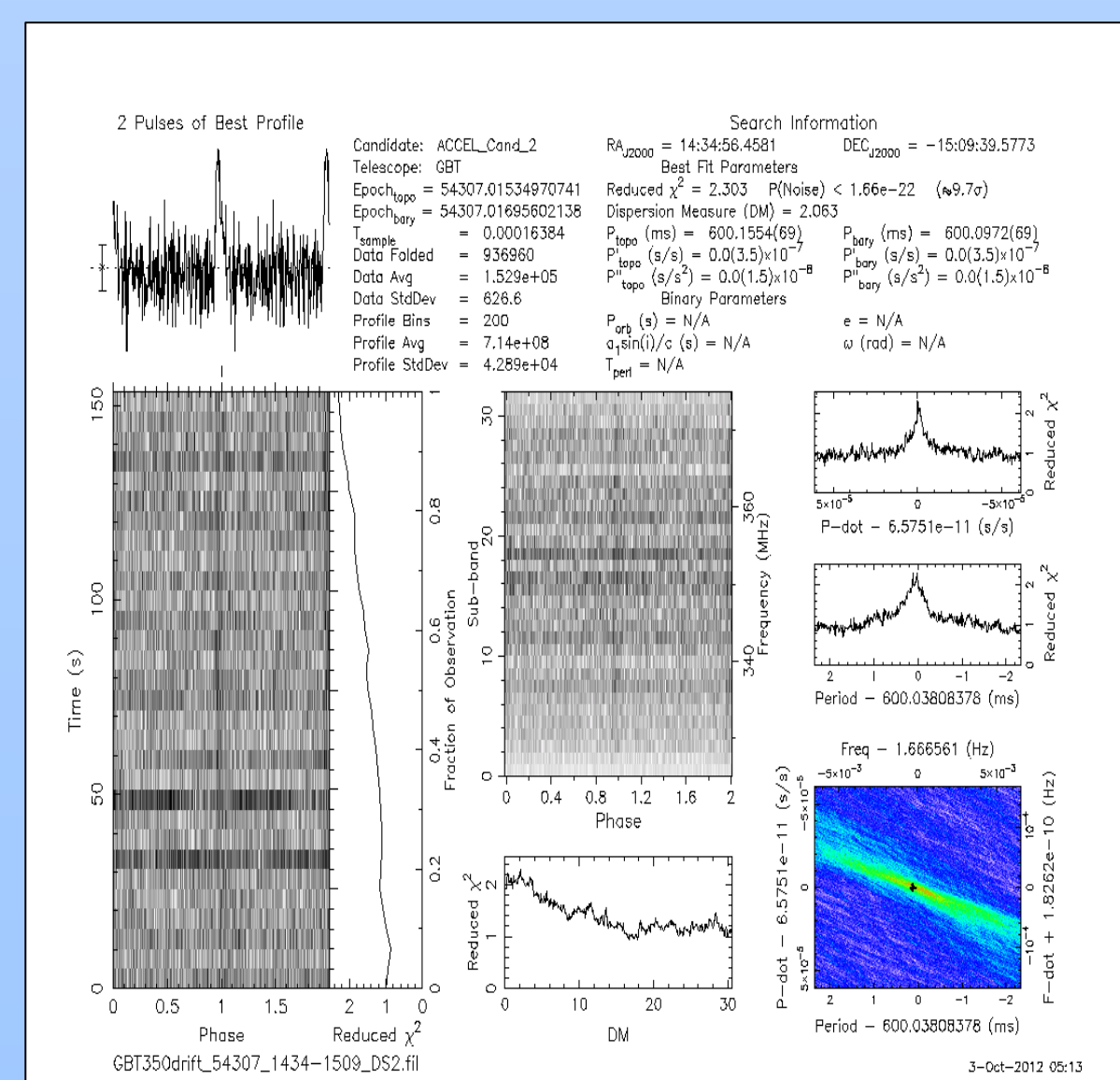## Analysis & Optimization I
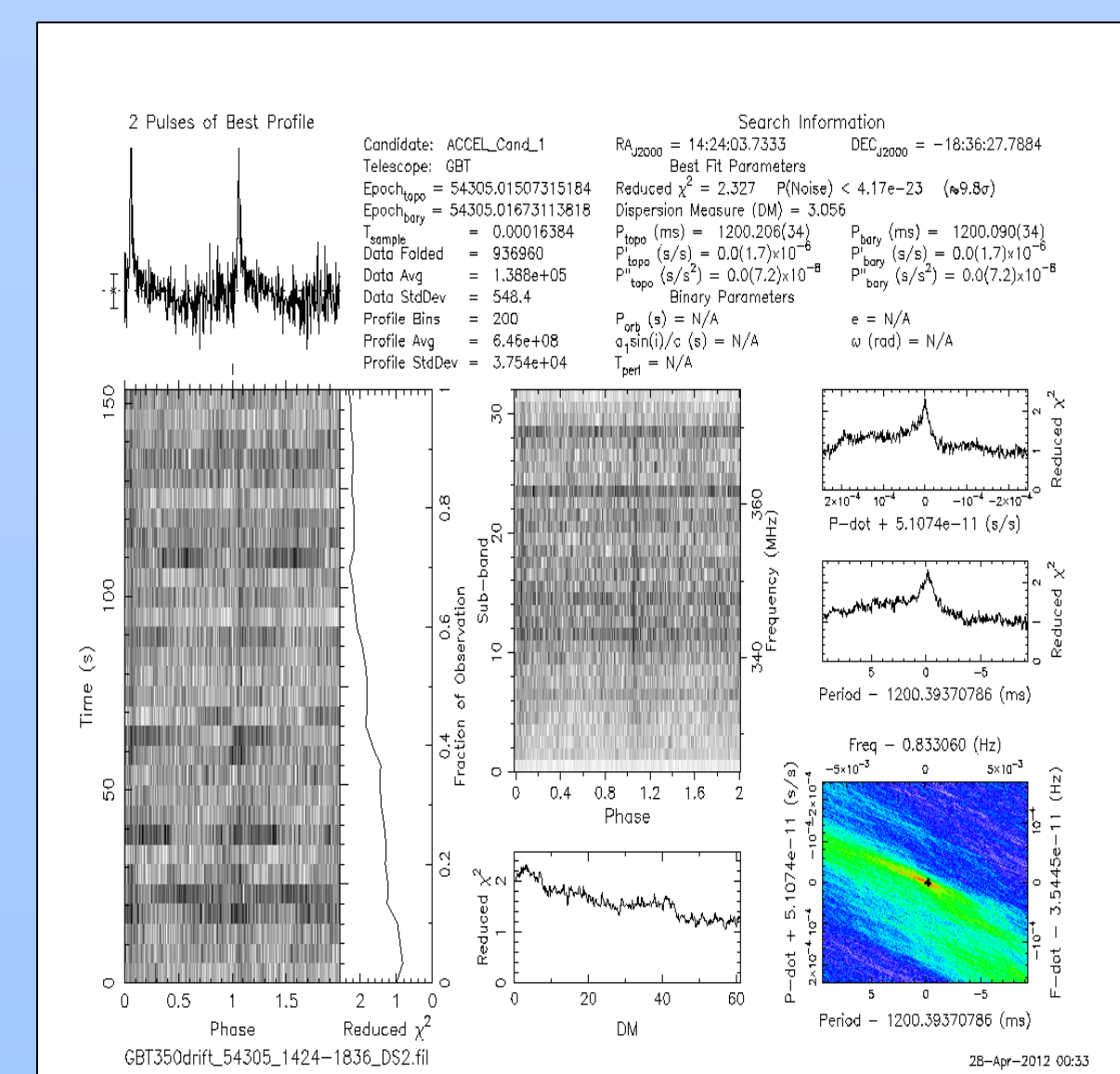

Per cent Spread of Personal Data 2012-2013

- 45.3% (RFI)
- 54.6% (Noise)
- 0.1% (Known Pulsars)

Datasets Analyzed (4,025)	
Noise	2,202
RFI	1,823
Known Pulsars	6
Undiscovered Pulsars	0

### Potential Candidate I : RFI

Potential Candidate II : RFI



Physics Motivation/ Applications

- PSC teaches the critical scientific skill of understanding and interpreting data, which empowers students to develop ideas based on meticulous observation of the natural (uncontrolled/non-laboratory) world. By focusing on pulsars with their most extreme magnetic, gravitational, and chemical properties, PSC is the manifestation between theory and experimentation enabling students to realize seemingly futuristic ideas: .

- In April 2013, Dr. Ting and his Alpha Magnetic Spectrometer team published results suggesting that the detected excess of positrons are a result of (so far) undetected dark matter. However, pulsars may be the source; accelerating particles with energies 10^{19} electronvolts.

- This leads to questions on how these particles affect earth's atmosphere, our electrical infrastructure, and other matters of space weather. Such high energies could also make the confirmation of the string theory possible. The question is: how can radio data indicate the string theory phenomena? (particle formation, new dimensions, etc).

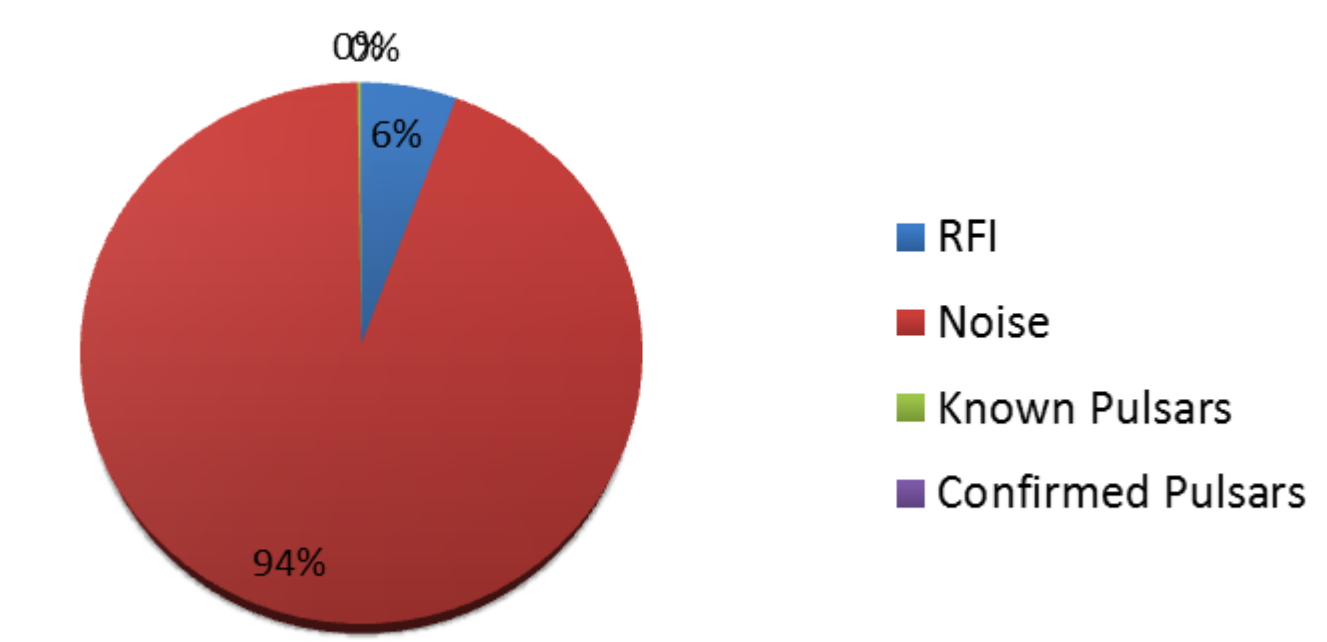## Confirmation of 2013 Pulsar Discovery
RA: 19:30:55 DEC: -18:39:35
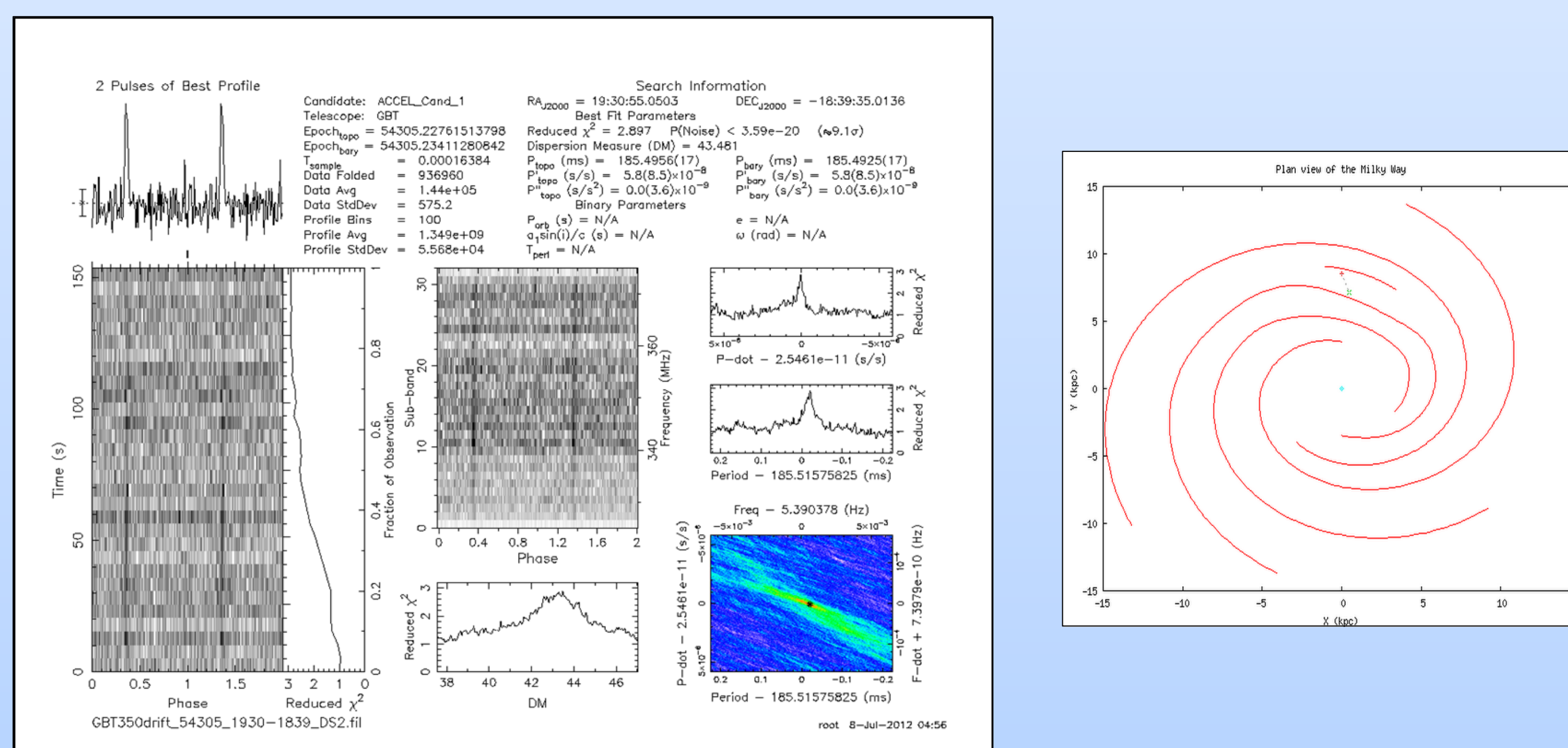
The x^2 is low. This is not found in the ATNF database. The RA and DEC distance checker estimated this signal source to be 1.5 kpc away, and the DM fits within the model range (under the maximum of 126 cm^-3pc.
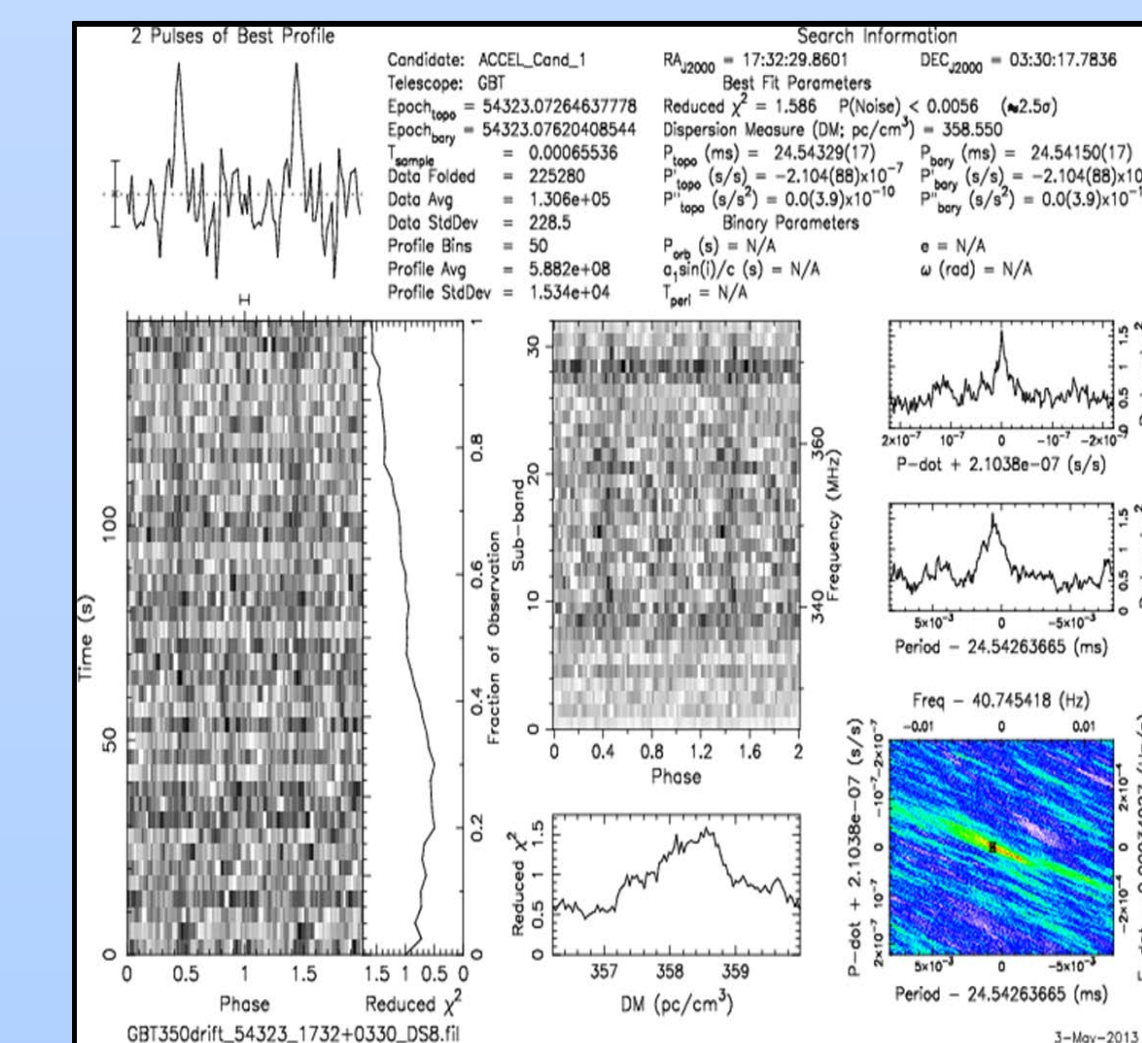
Analysis & Optimization II

- Confirmed Pulsar
- Known Pulsar
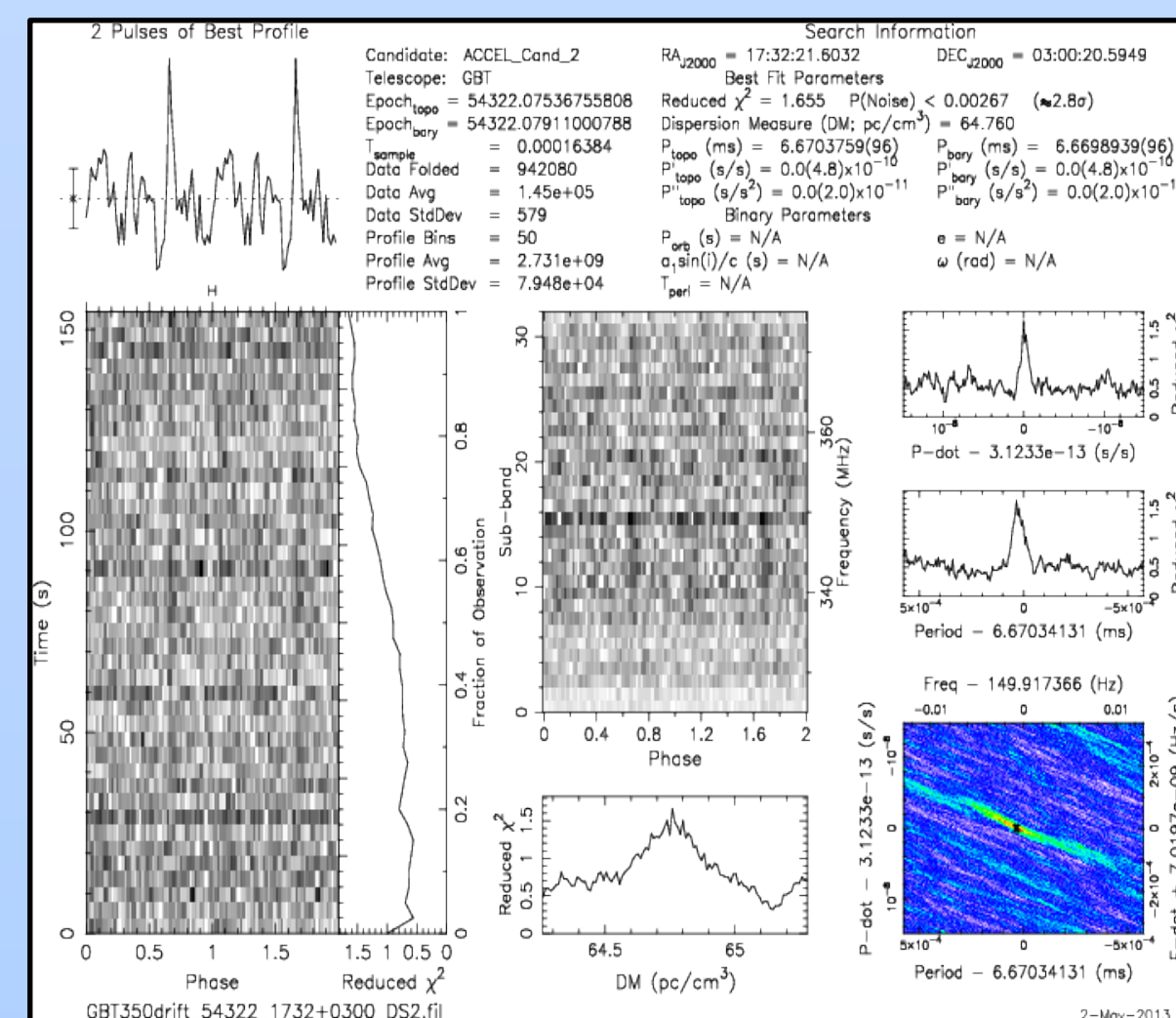- Dataset Location
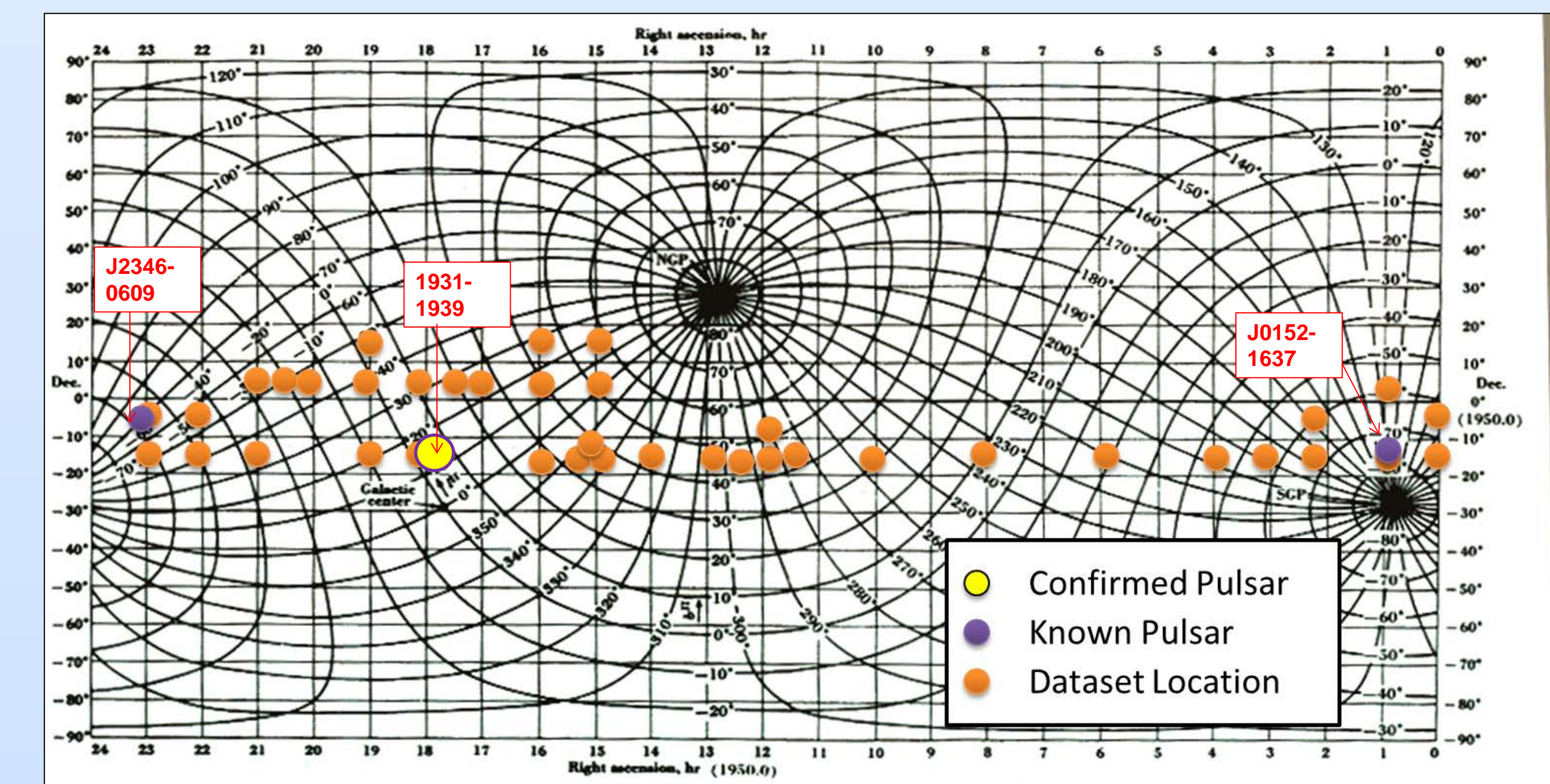
2011-2013 Personal Data Summary

- 6% RFI
- 94% Noise
- 0% Known Pulsars
- 0% Confirmed Pulsars

Datasets	
RFI	200
Noise	3327
Known Pulsars	7
Confirmed Pulsars	1

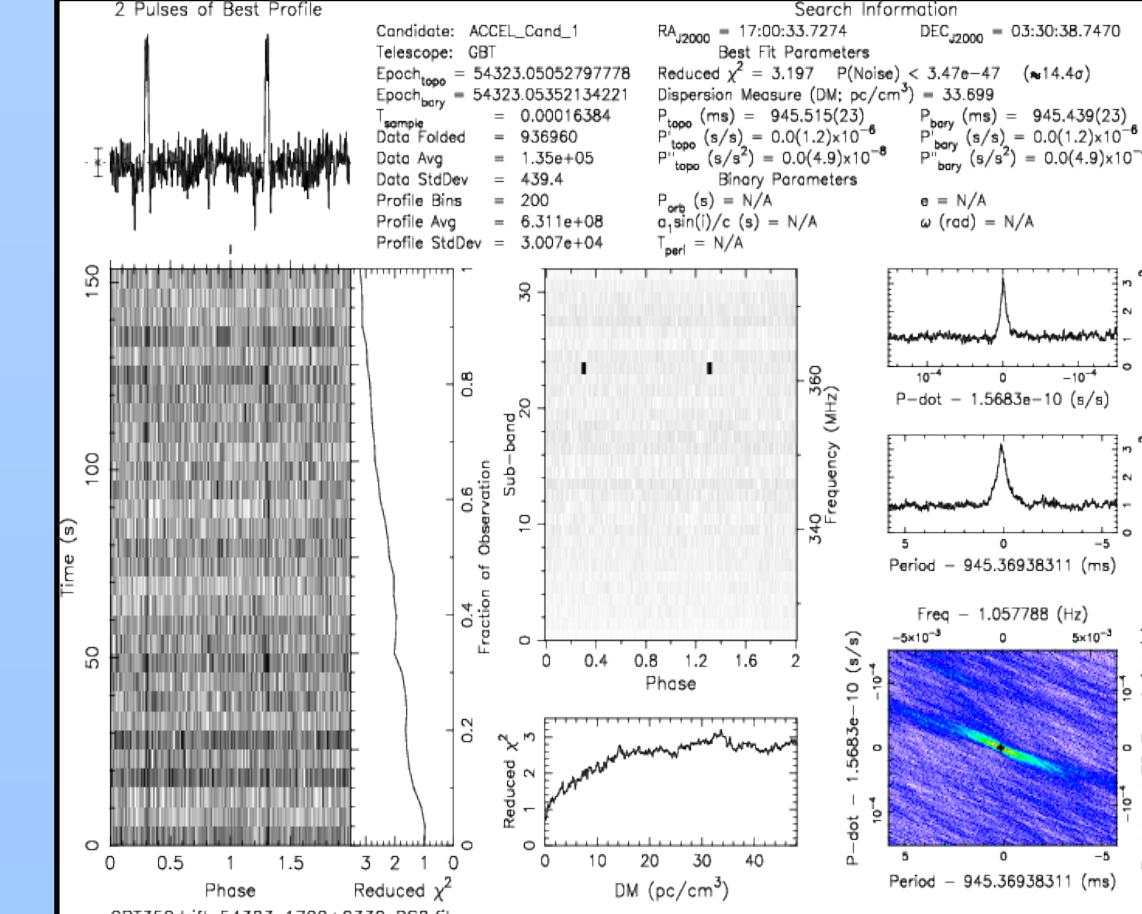## Plot Surveying/Methods

Potential Candidate I

Potential Candidate I (b)

Potential Candidate I : RFI

Potential Candidate II