PlaneMon:
Airplane Detection Monitor

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Outline

- Purpose
- Modeling Airplane Signals
- Analysis Pipeline
- Sample Fit Results
- Implemented so far
- More to go…

Purpose

- An online DMT monitor to analyze microphone channel data in real-time looking for airplane signals
- Creation of logs and triggers
- Plotting trajectories over the LIGO sites (eventually)

Modeling Airplane Signals

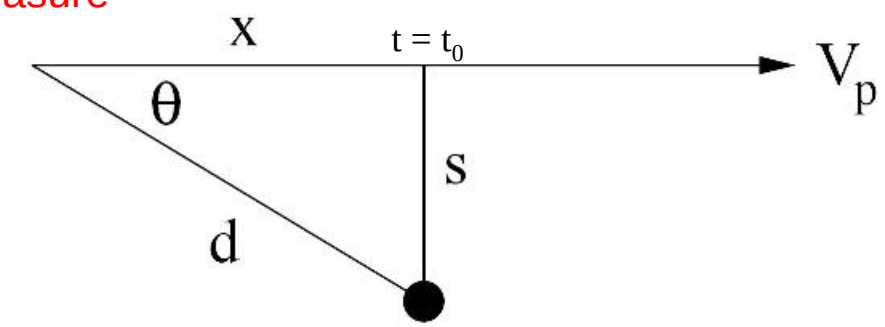
- Doppler shifted frequencies

$$\nu' = \nu \frac{v_0}{v_0 - v_p \cos\theta}$$

What microphones measure

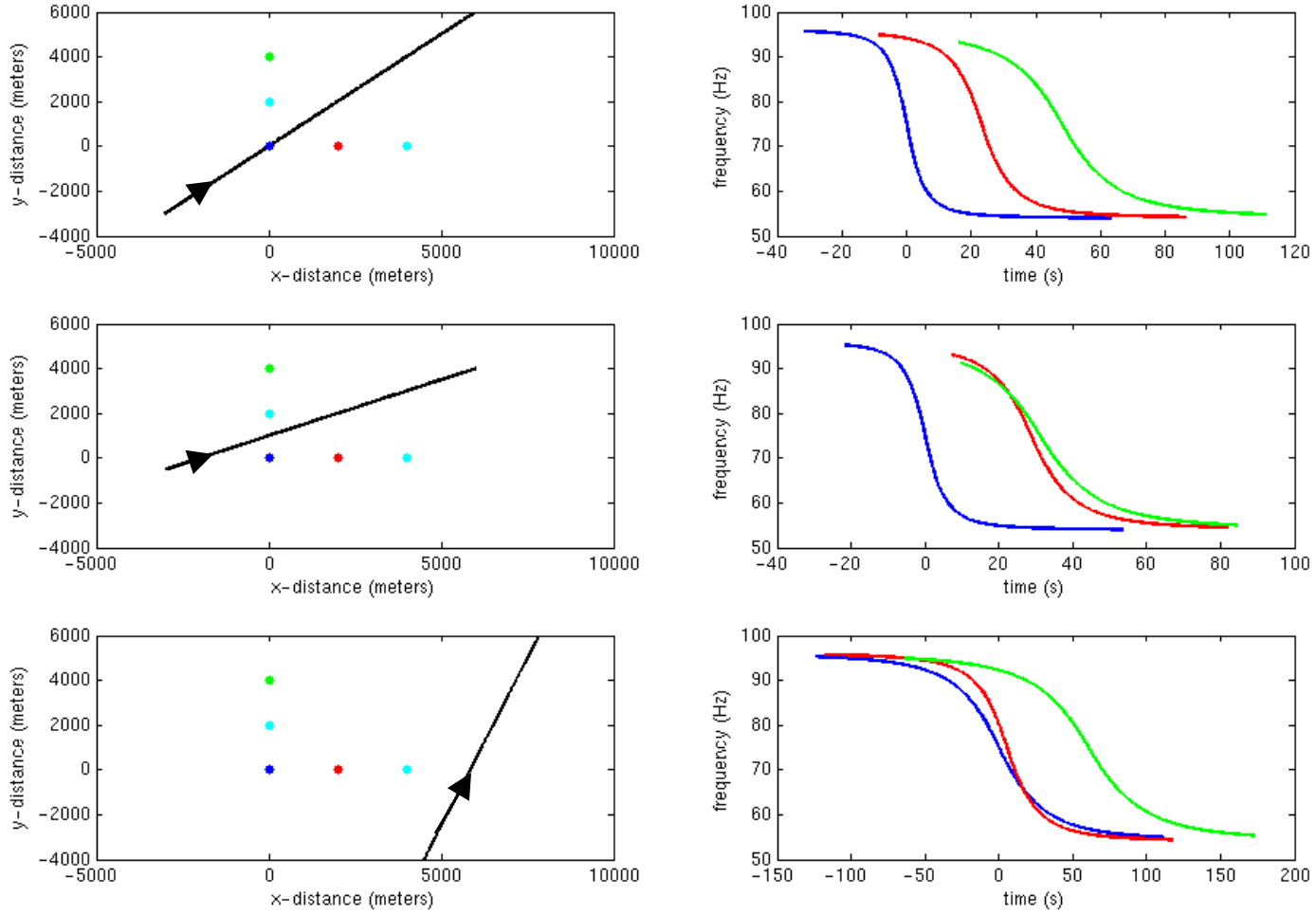
Assumptions:

- Zero acceleration
- Constant altitude
- Linear trajectories

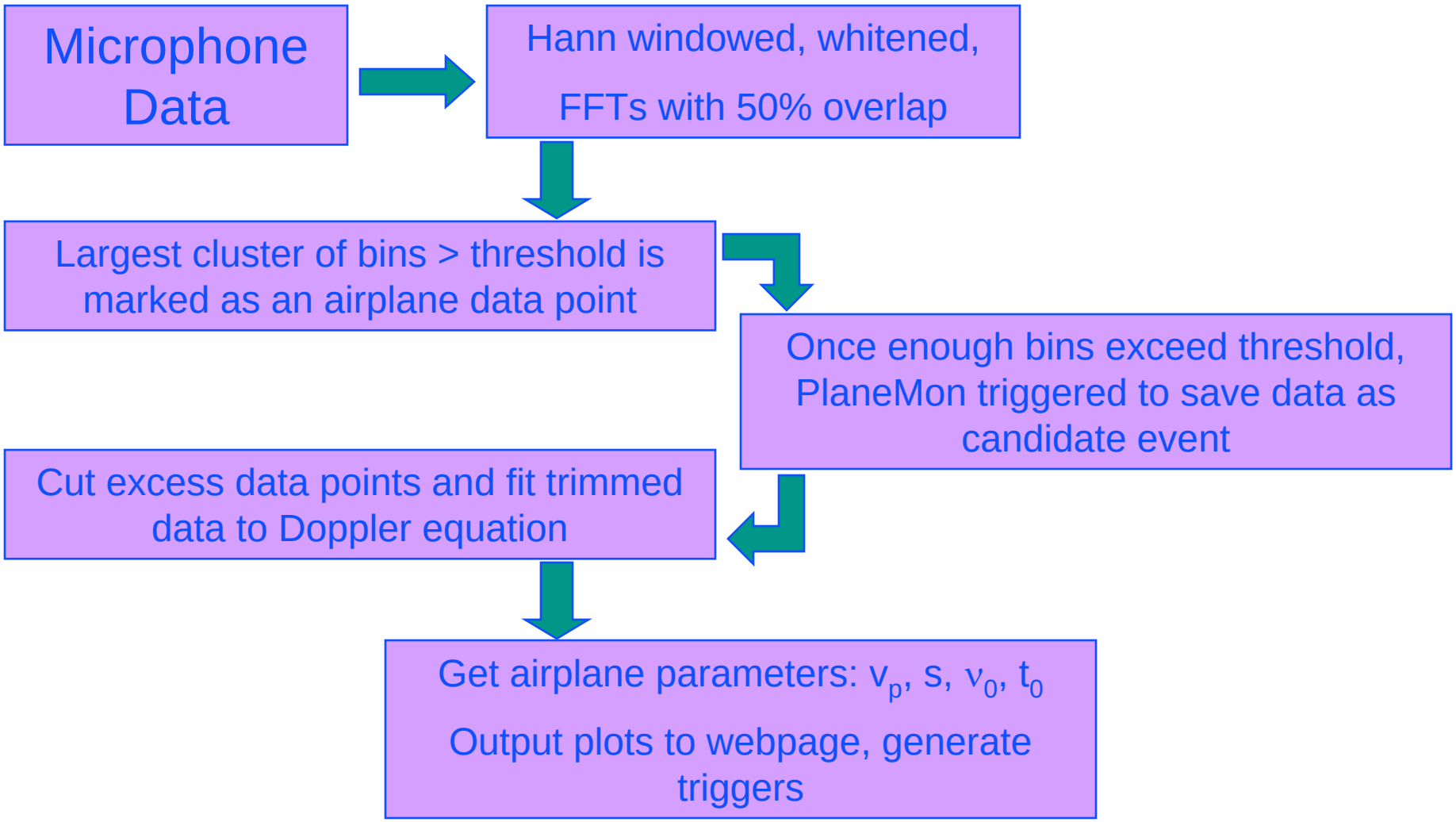


- We want to know: v_p, s, ν, t_0

Modeling Airplane Signals (cont.)



Analysis Pipeline



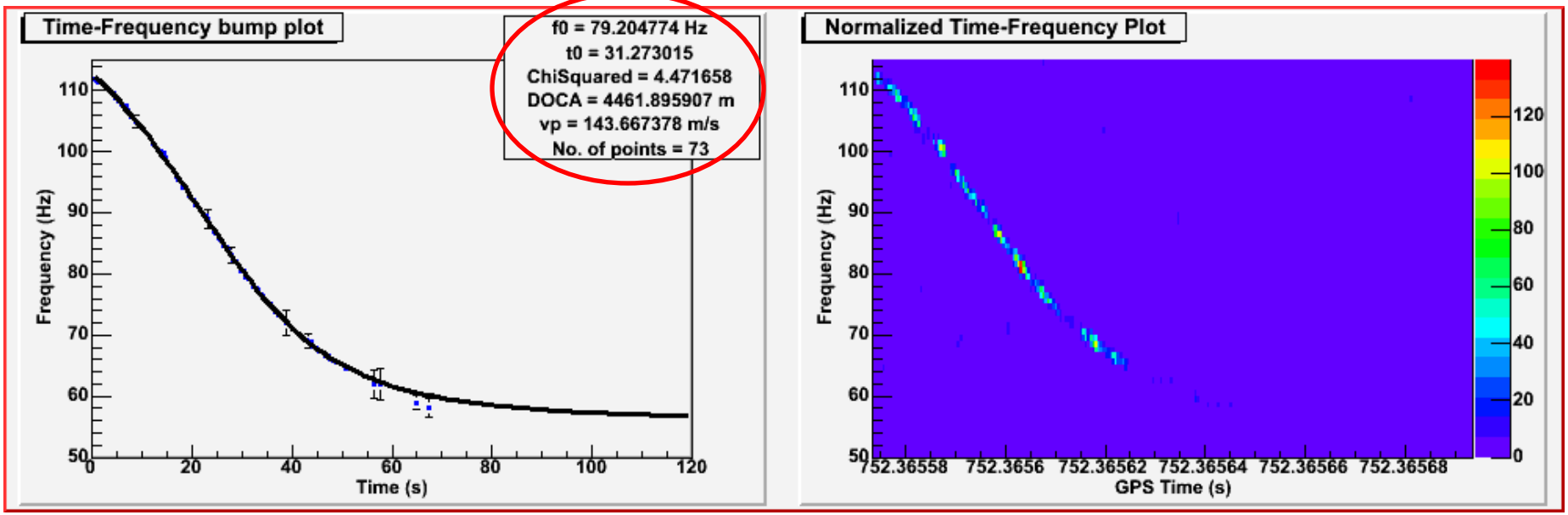
Sample Fit Results

V_p = 143.667 m/s

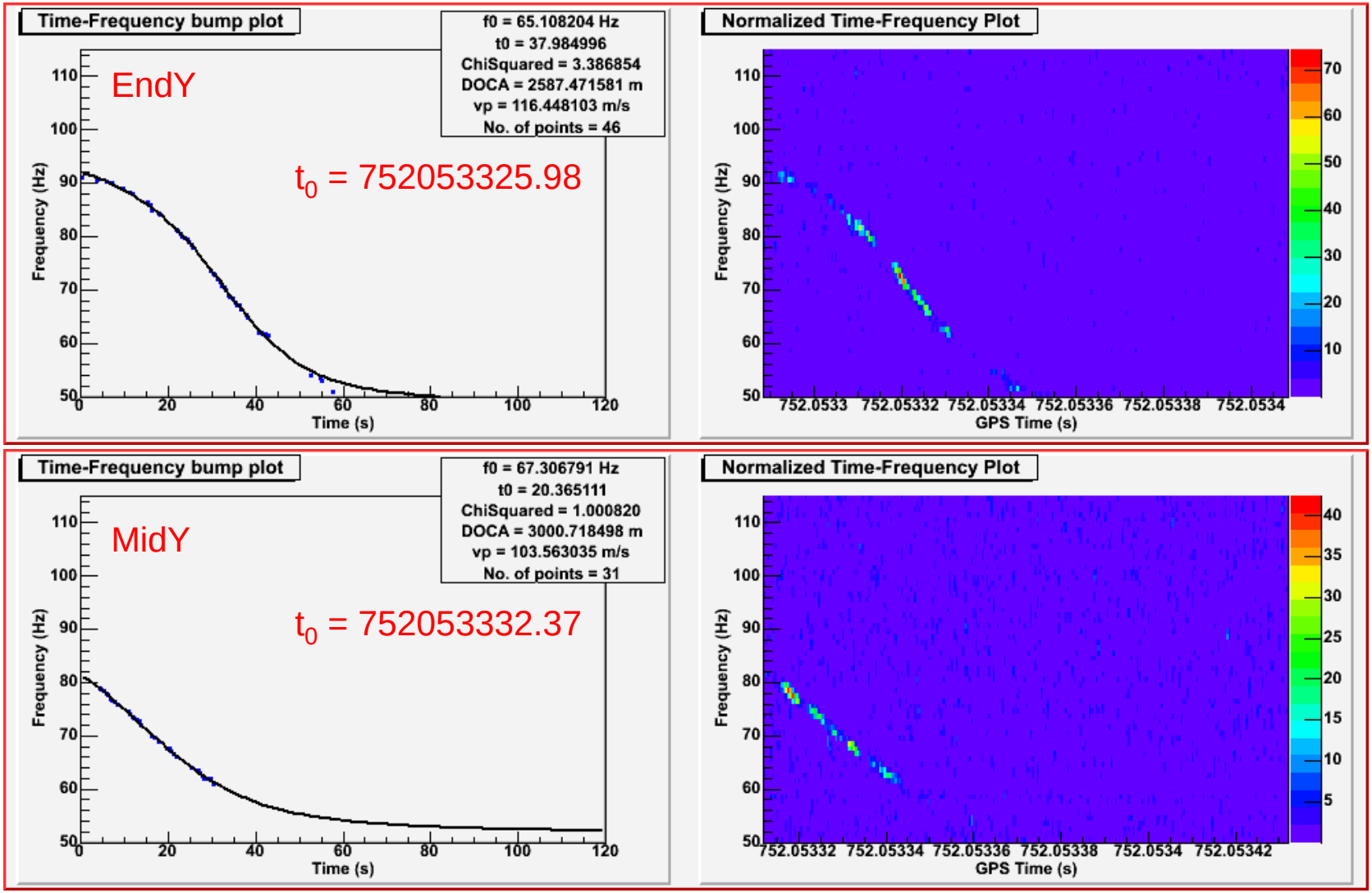
S = 4.462 km

ν = 79.205 Hz

t_0 = 752365573+31.273 GPS

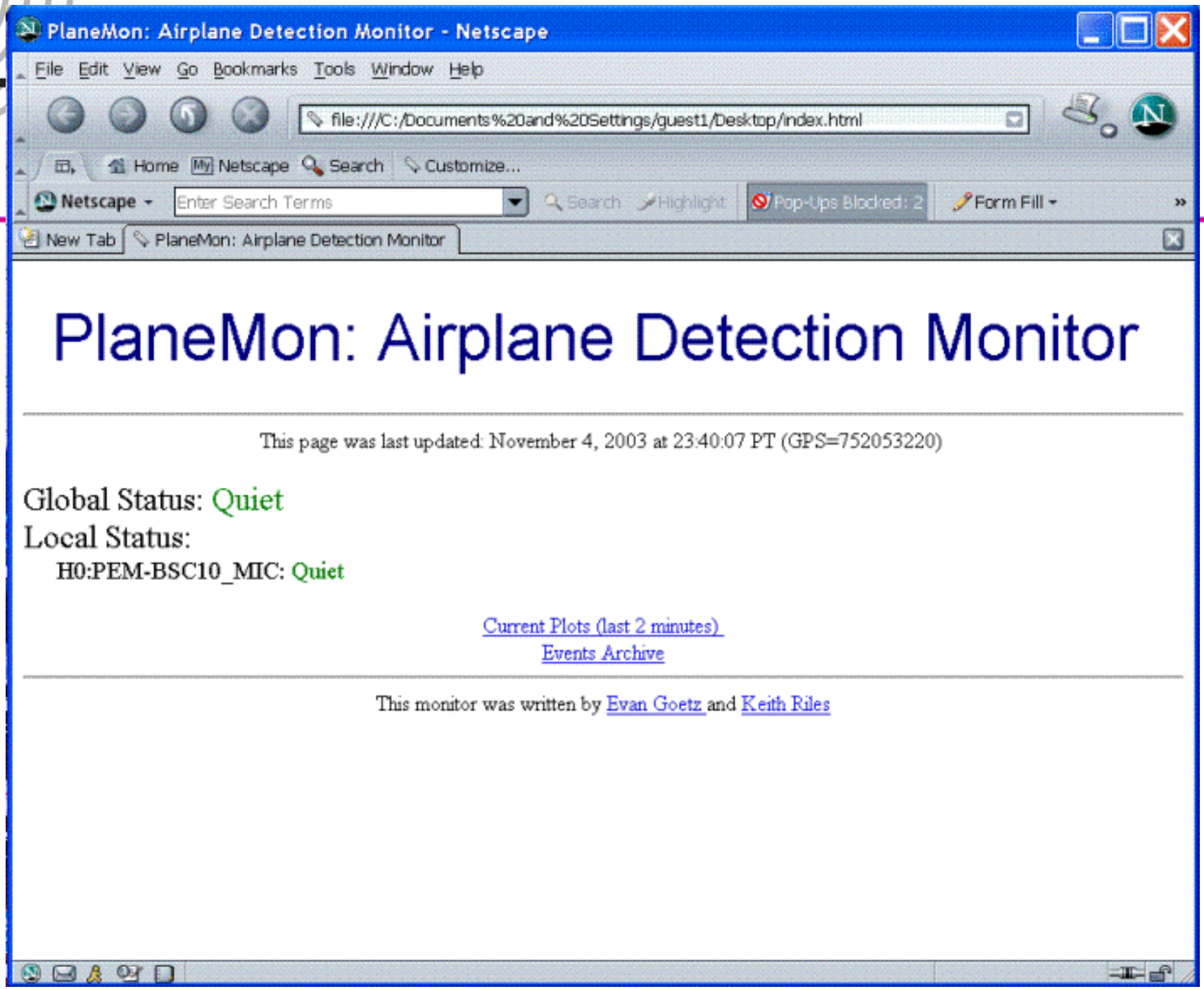


Sample Fit Results



Implemented So Far

- Single Channel Monitor
  - » Outputs ROOT plots
  - » A few minor bugs to work out
- Multi-Channel Monitor (nearly complete)
  - » Outputs GIF plots to webpage for viewing
  - » Archives airplane events


PlaneMon: Airplane Detection Monitor - Netscape
File Edit View Go Bookmarks Tools Window Help
file:///C:/Documents%20and%20Settings/guest1/Desktop/index.html
Home Netscape Search Customize...
Netscape Enter Search Terms Search Highlight Pop-Ups Blocked: 2 Form Fill
New Tab PlaneMon: Airplane Detection Monitor
PlaneMon: Airplane Detection Monitor
This page was last updated: November 4, 2003 at 23:40:07 PT (GPS=752053220)
Global Status: Quiet
Local Status:
H0:PEM-BSC10_MIC: Quiet
Current Plots (last 2 minutes)
Events Archive
This monitor was written by Evan Goetz and Keith Riles

More to do…

- Fix minor bugs in analysis code
- Complete web interface
- Generate triggers and alarms
- Add verbosity options for web summaries

Anticipate to be ready in time for S5

- Triangulation
  - » Plot trajectories over the sites