



Automatic Disturbance and Oscillation Detection at SDG&E and SRP

Jared Bestebreur, SEL
Tariq Rahman, SDG&E
Matthew Rhodes, SRP

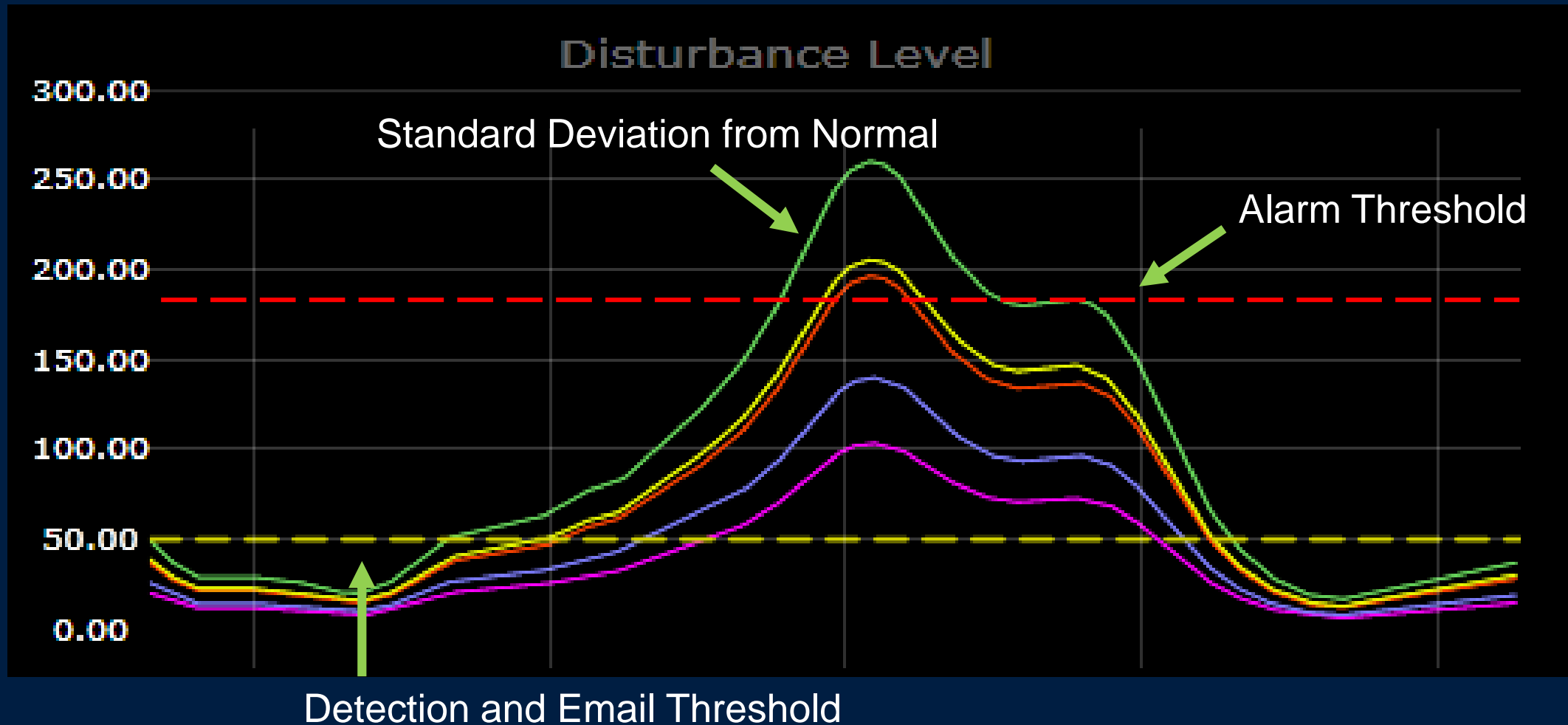


Partnership with SDG&E

Utility focused oscillation detection application

- Simple for operators
- Indication of severity
- Location of disturbance
- Notification of disturbance

Detection Methodology

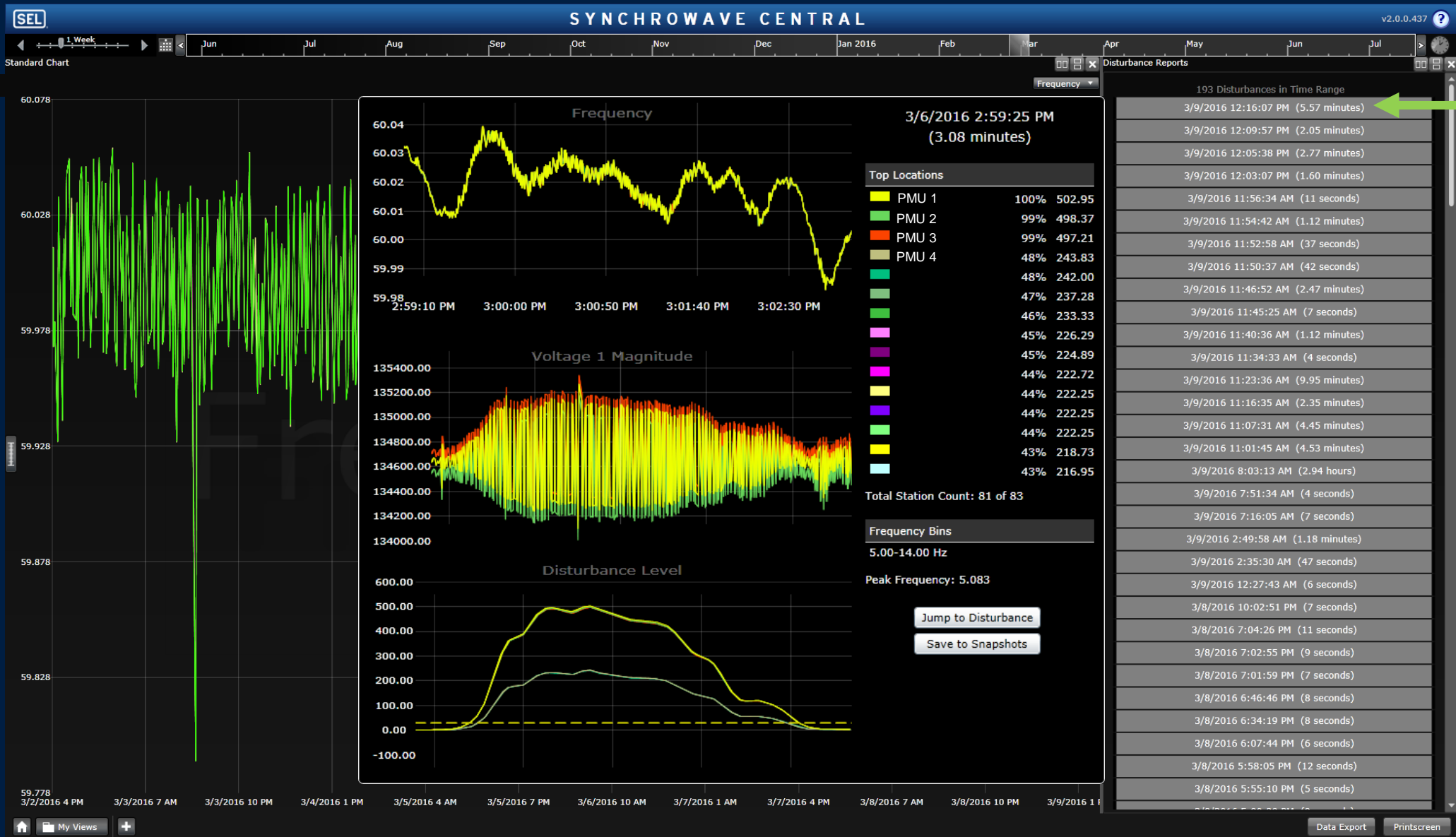


Dashboard for Detected Disturbances



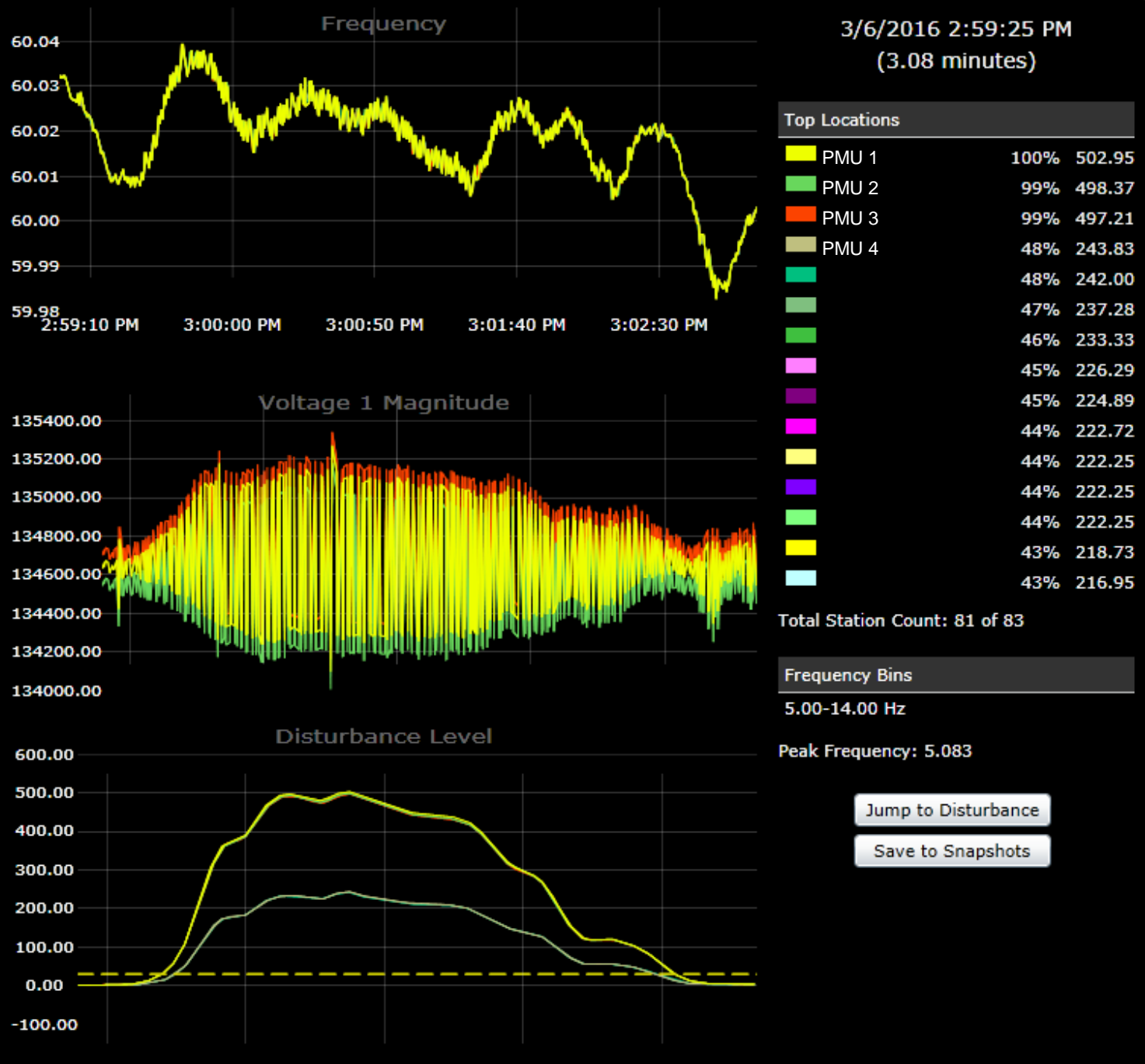
List of Detected Disturbances

Quick Access to Historical Disturbances



List of Detected Disturbances

Disturbance Analysis Details



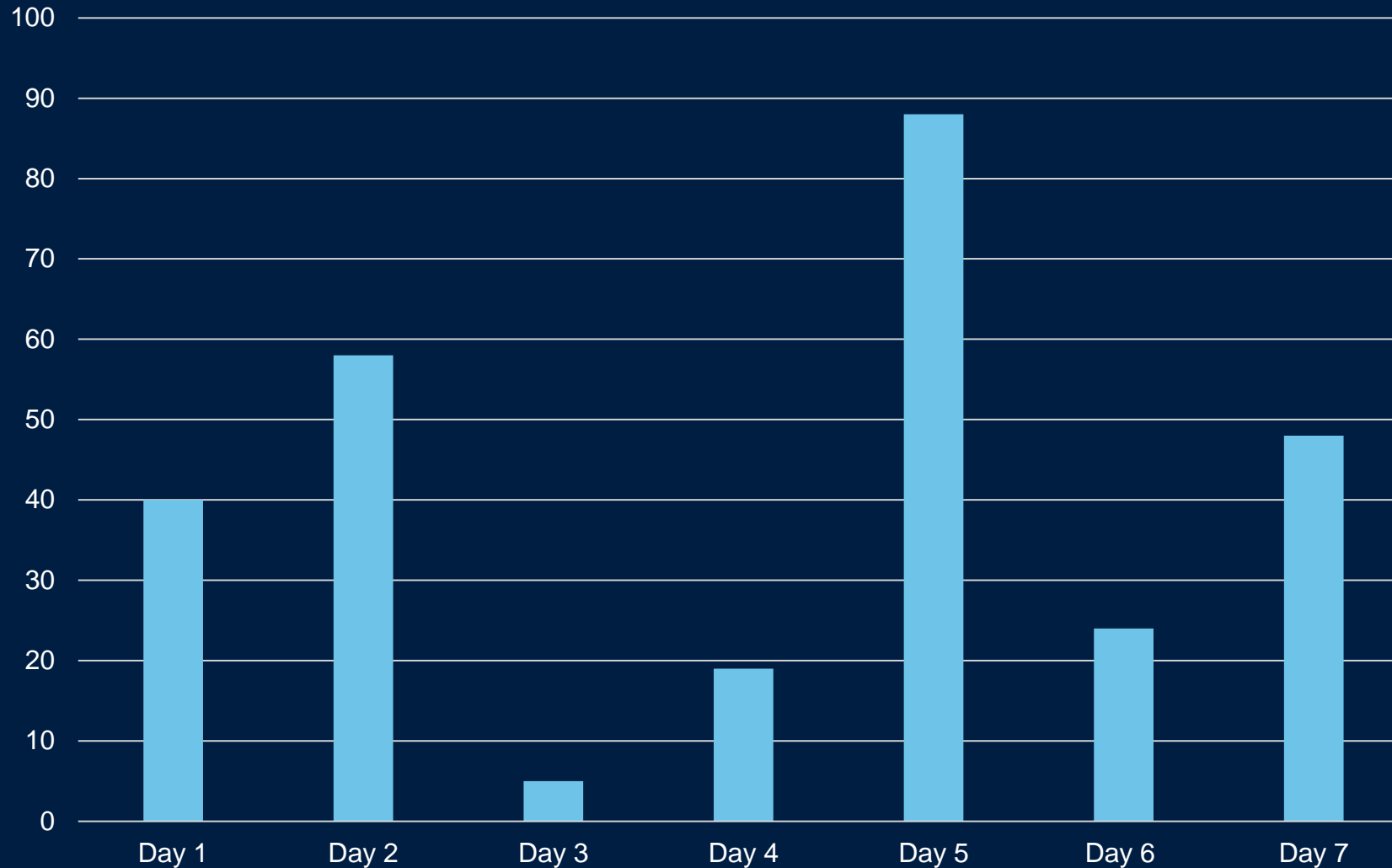
← Locations Ranked by Impact

← Detection across system

← Frequency bin

SDG&E Results

Number of disturbances per day over 1 week



Day 4 Statistics

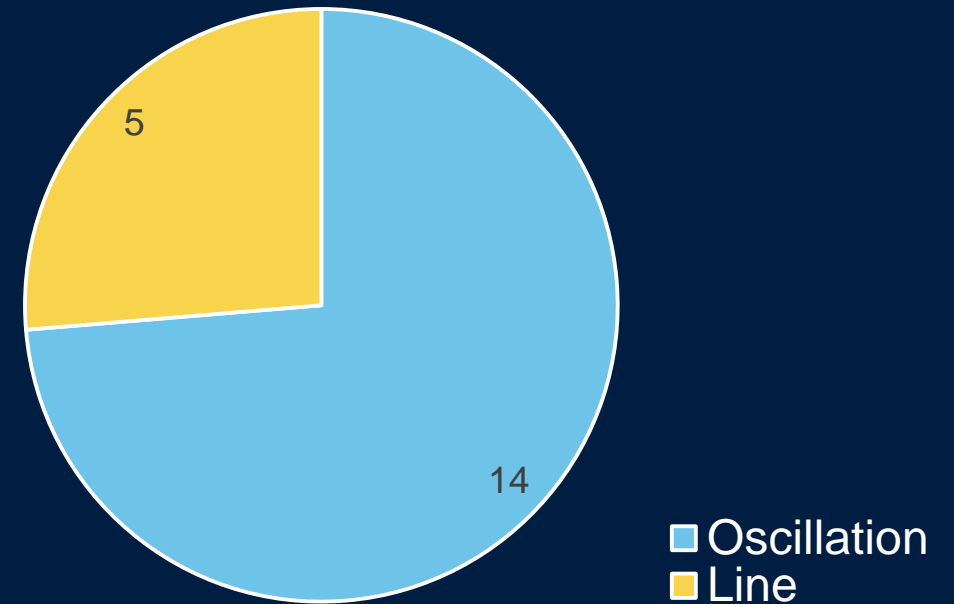
19 Disturbances

5 Unique Disturbances

100% Local Disturbances

9min Average Oscillation

Disturbance Type Breakdown



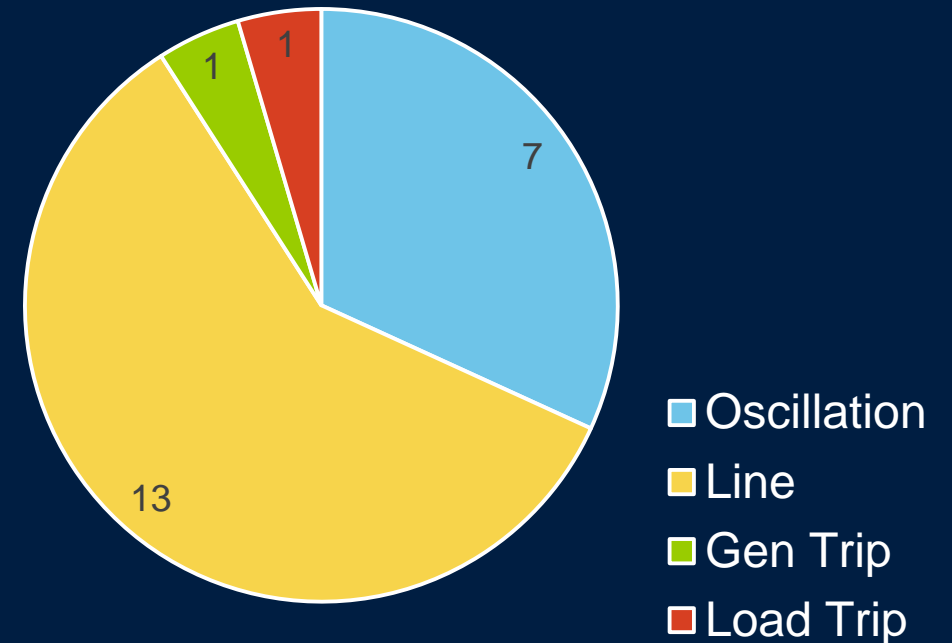
Day 6 Statistics

24 Disturbances

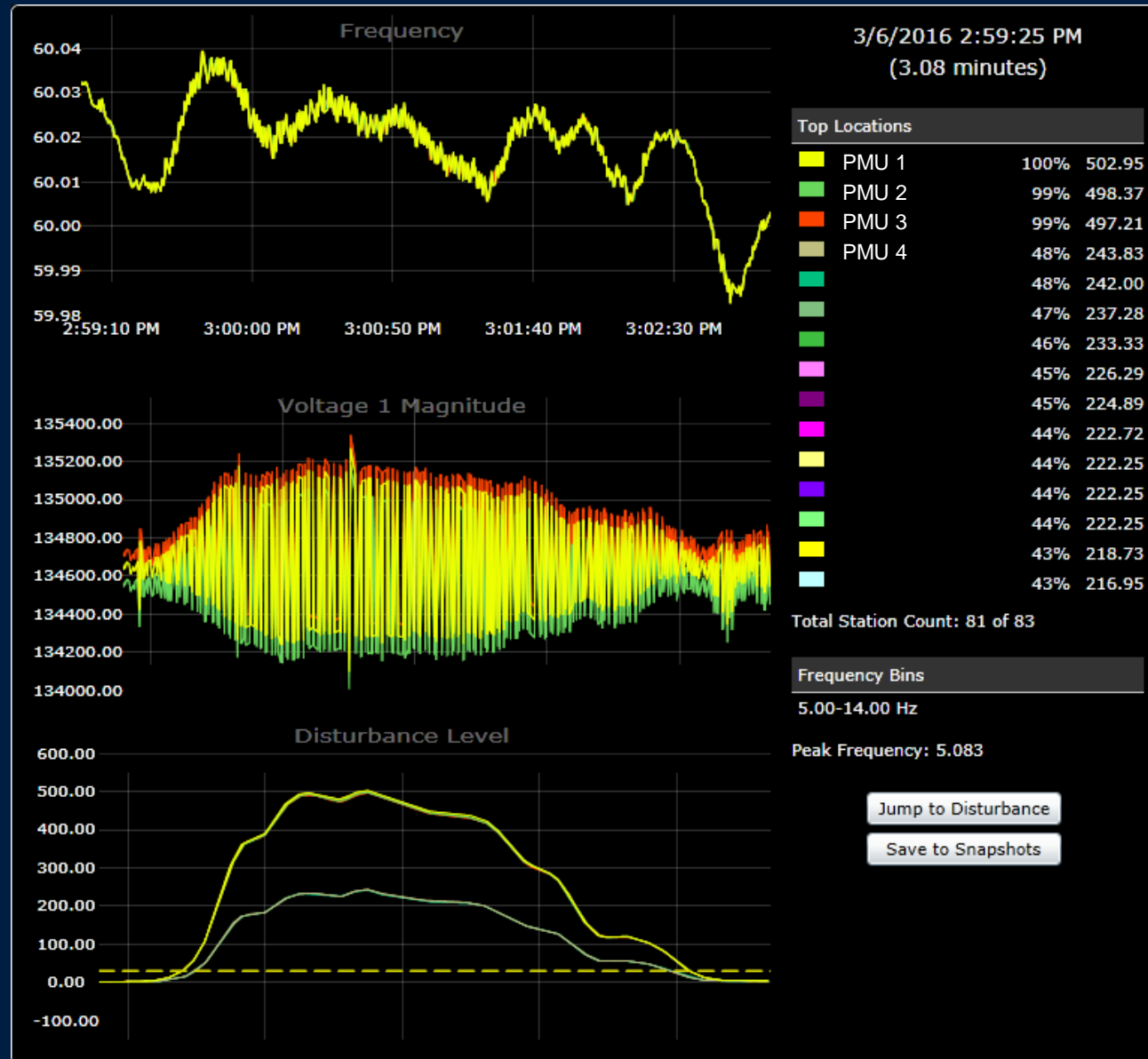
11 Unique Disturbances

91% Local Disturbances

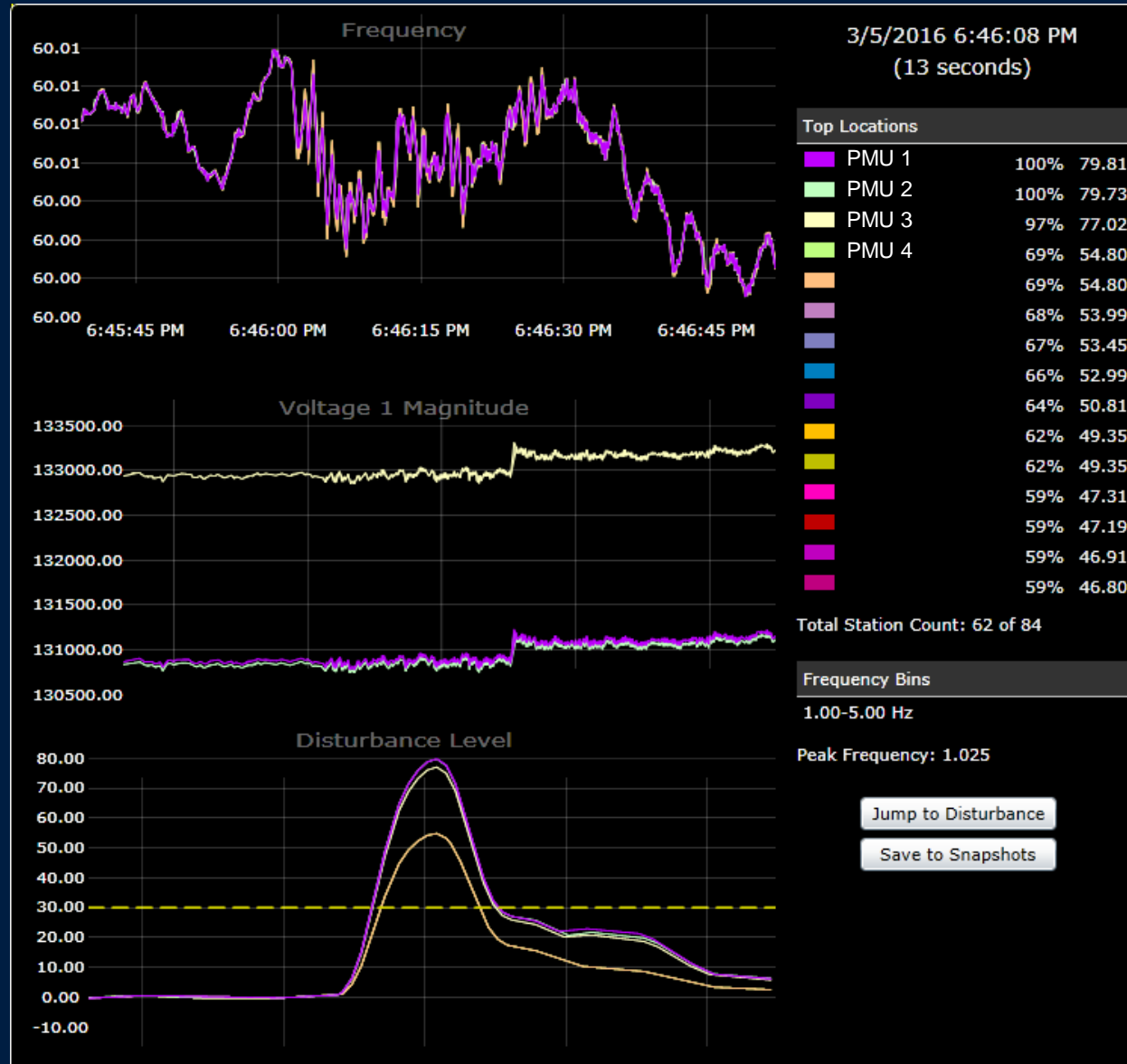
Disturbance Type Breakdown



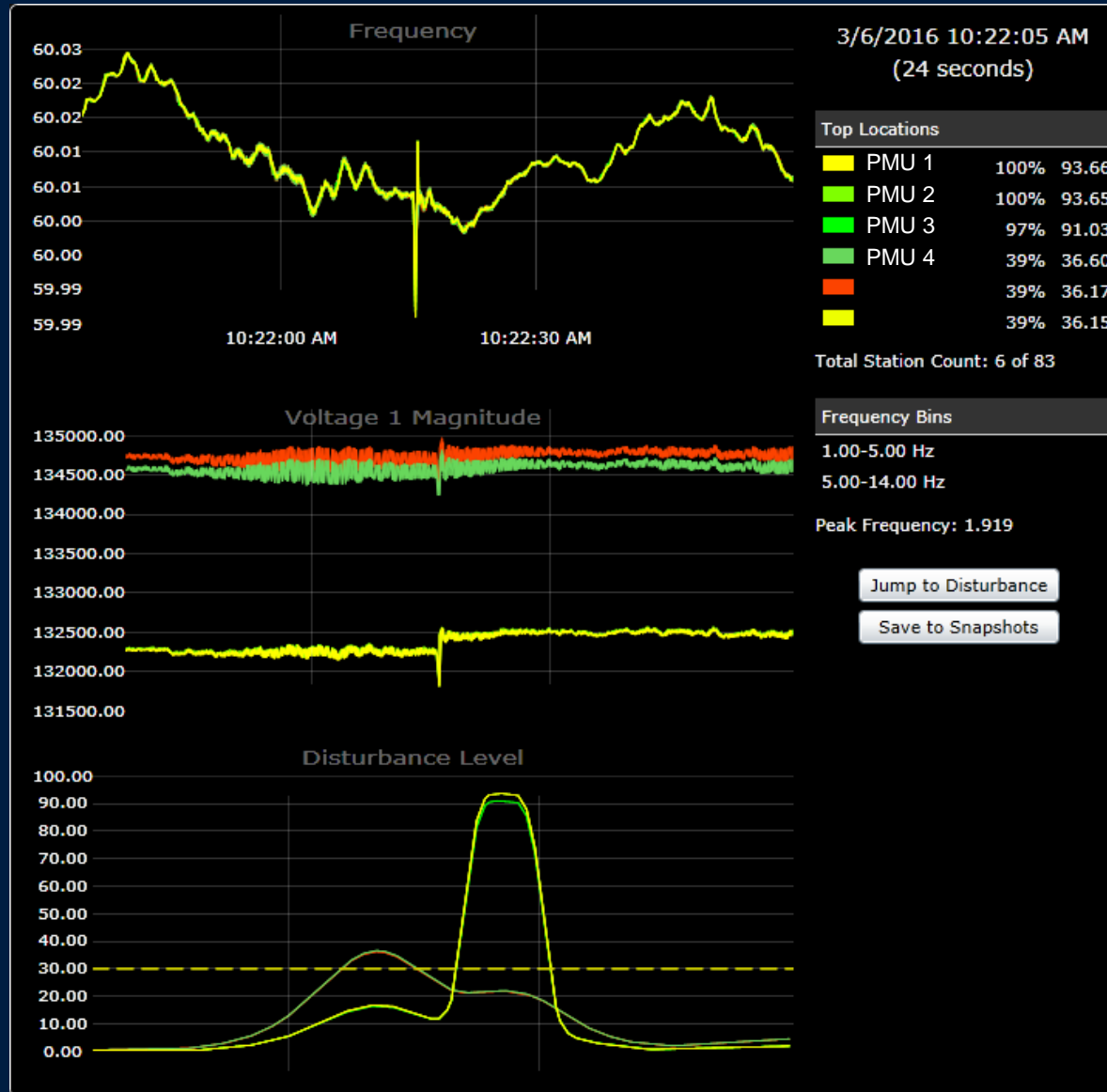
Solar Induced Oscillation



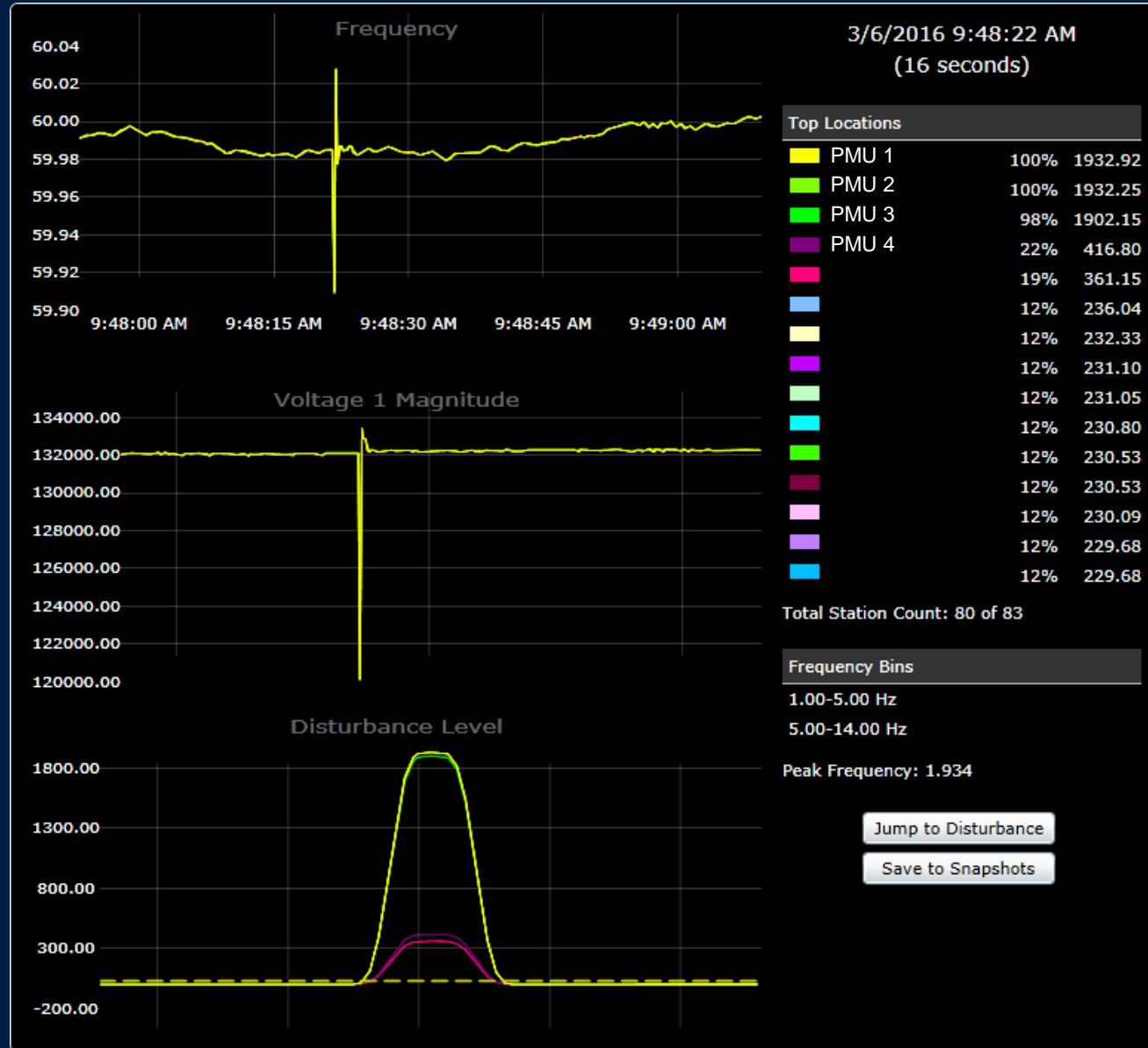
Short Oscillation



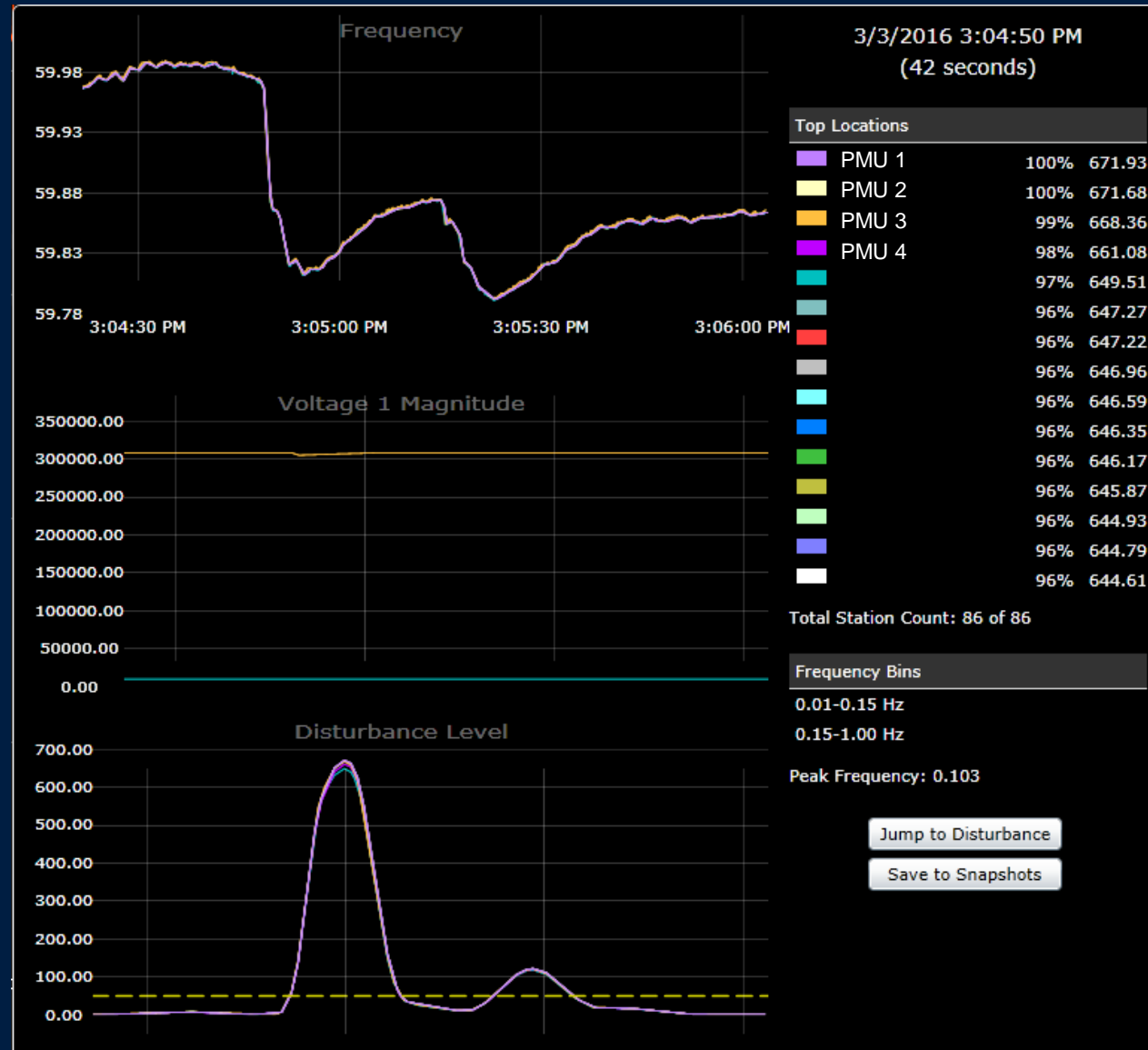
Oscillation Leading to Line Trip



Line Trip

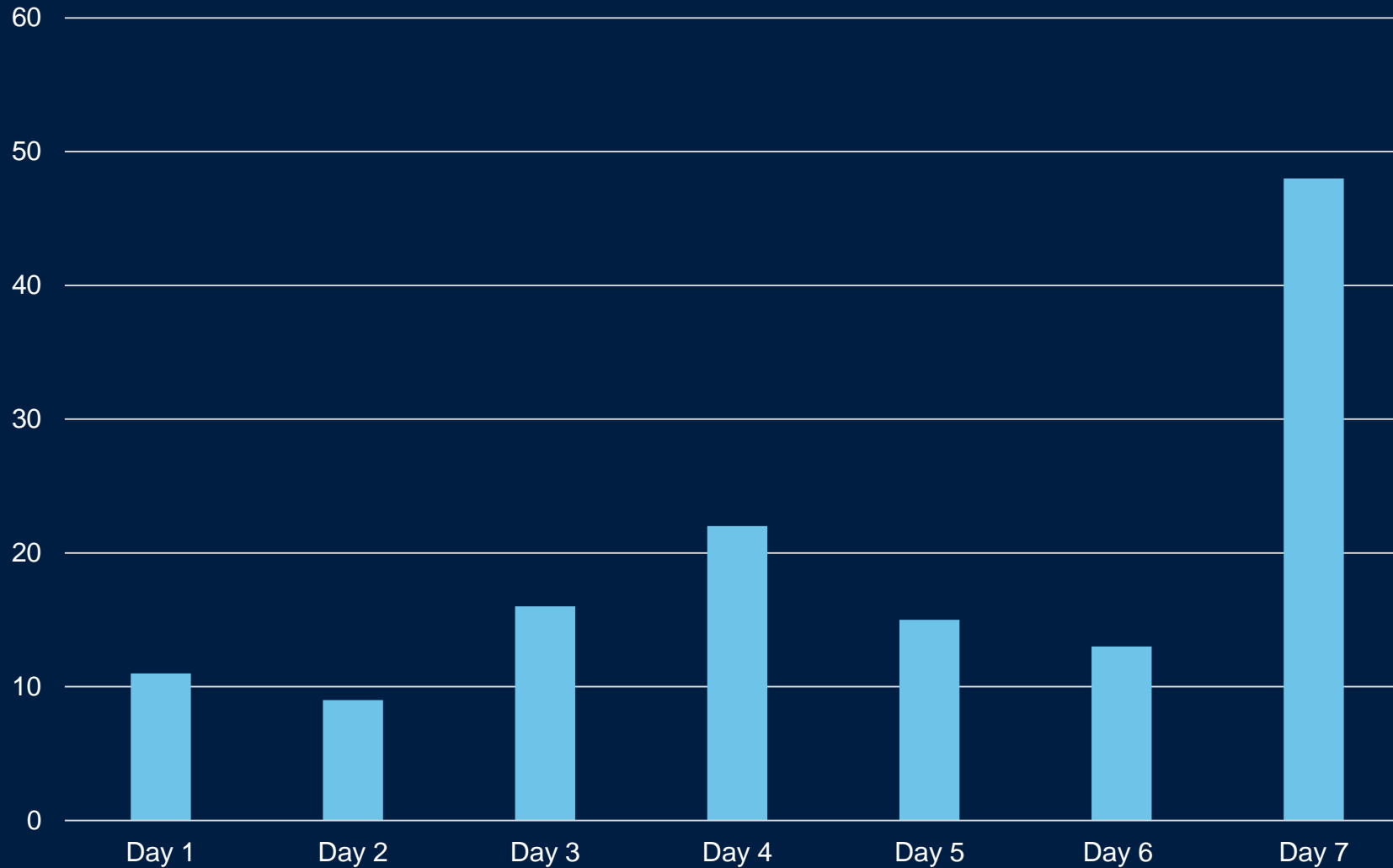


WECC Generation Trip



SRP Results

Number of disturbances per day over 1 week



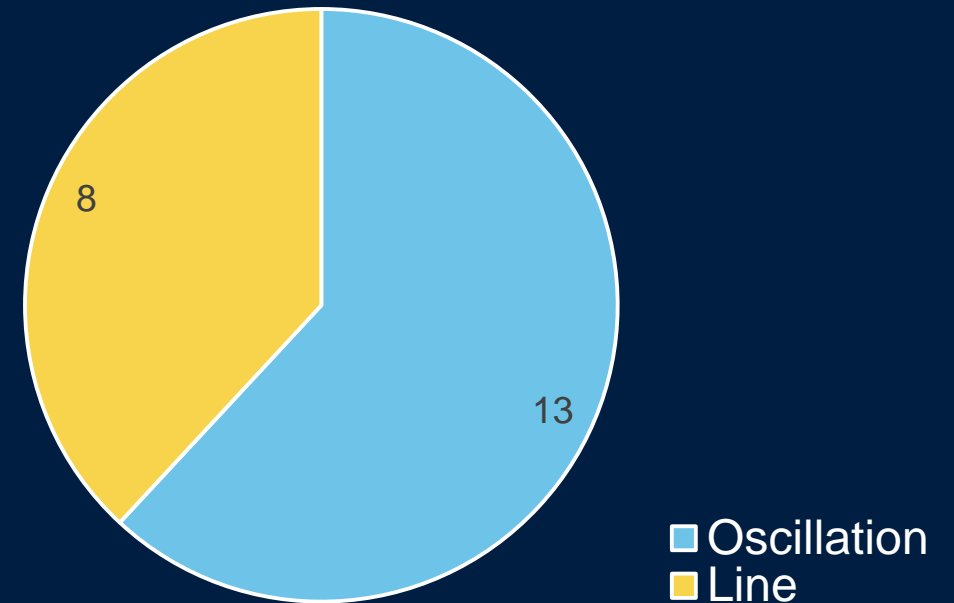
Day 4 at SRP Statistics

21 Disturbances

10 Unique Disturbances

100% Local Disturbances

Disturbance Type Breakdown



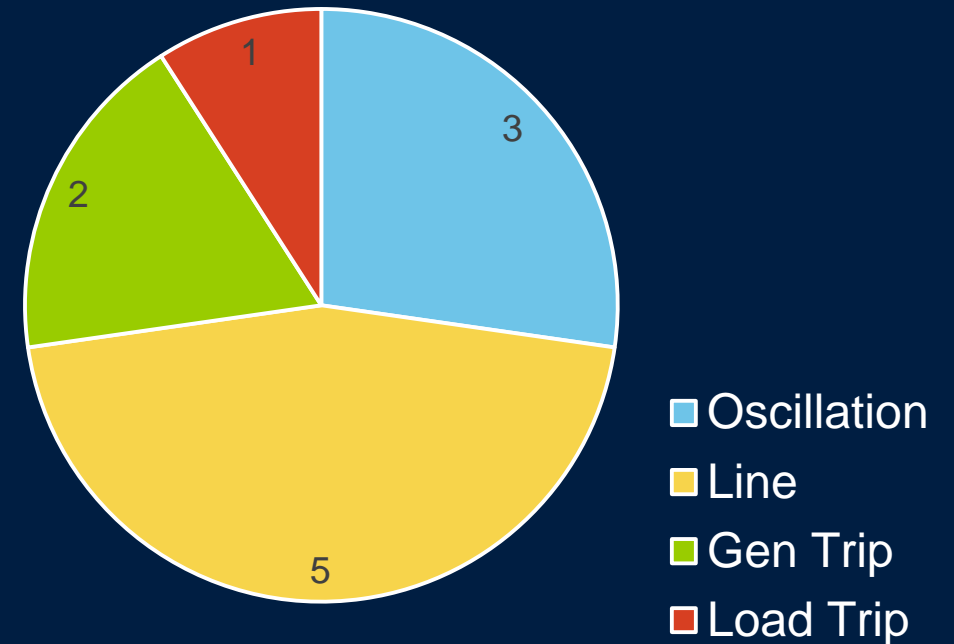
Day 6 at SRP Statistics

11 Disturbances

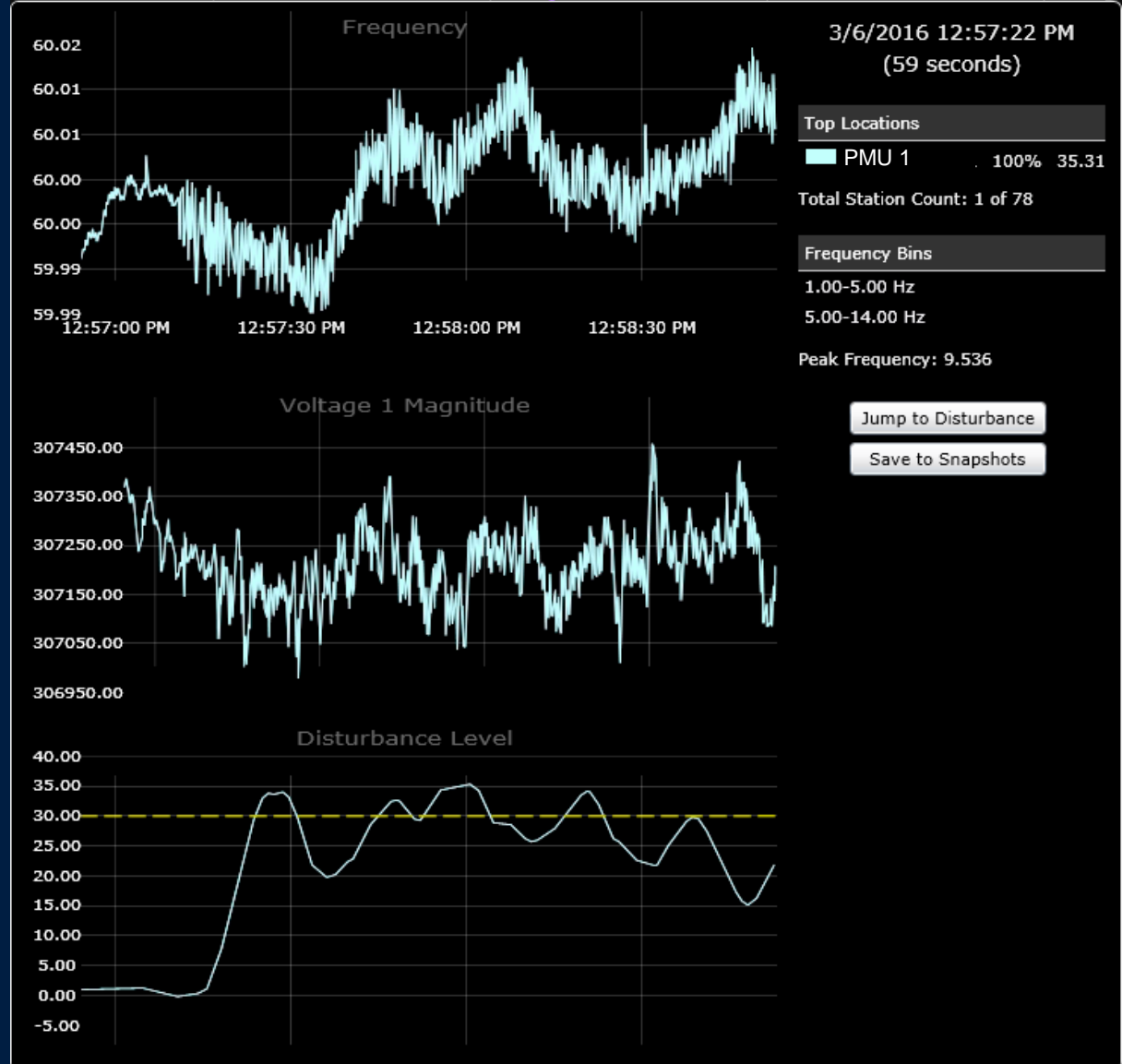
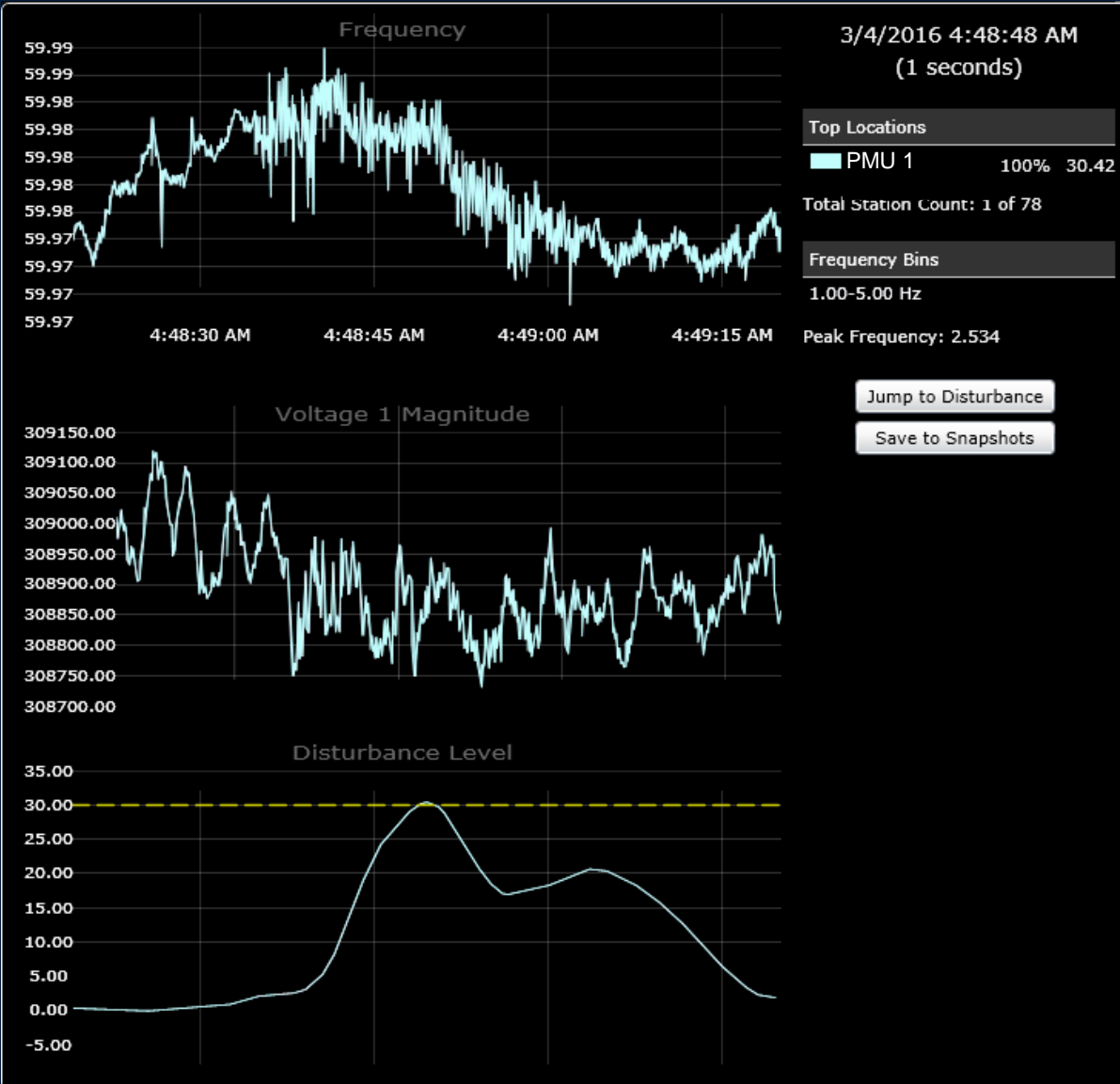
9 Unique Disturbances

72% Local Disturbances

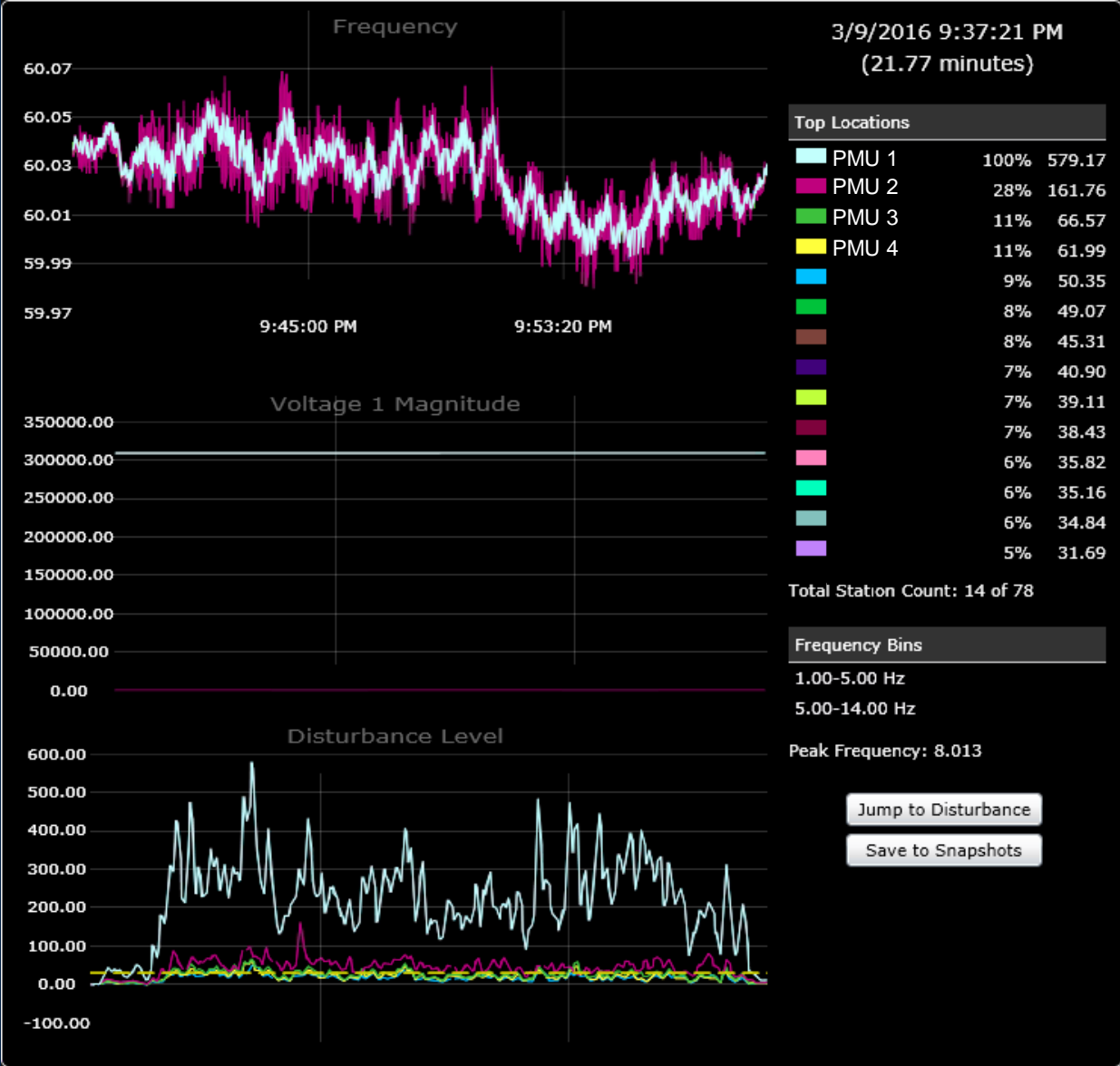
Disturbance Type Breakdown



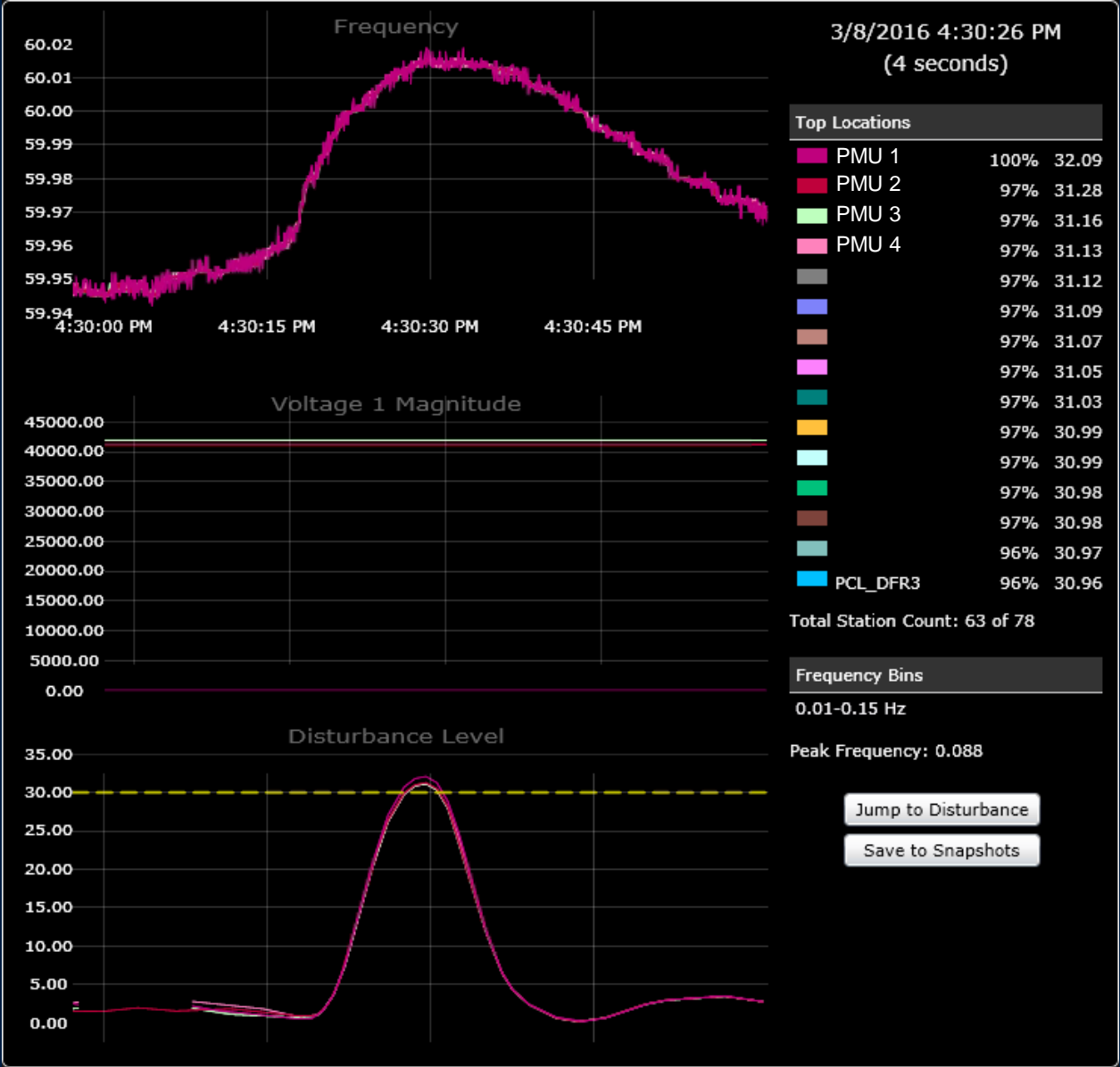
Repeating Oscillation Over Days



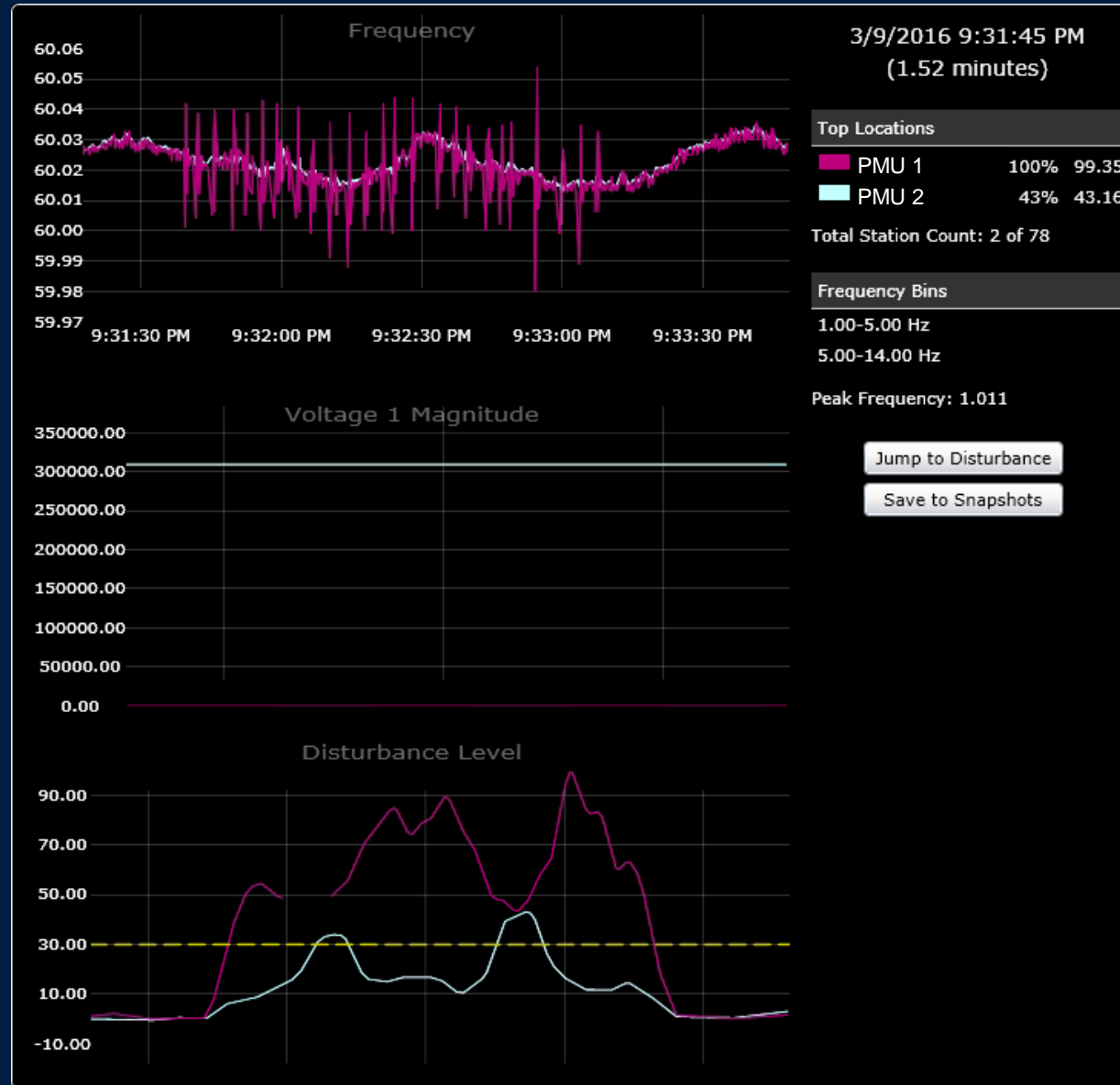
Higher Resolution Leads to Better Detection



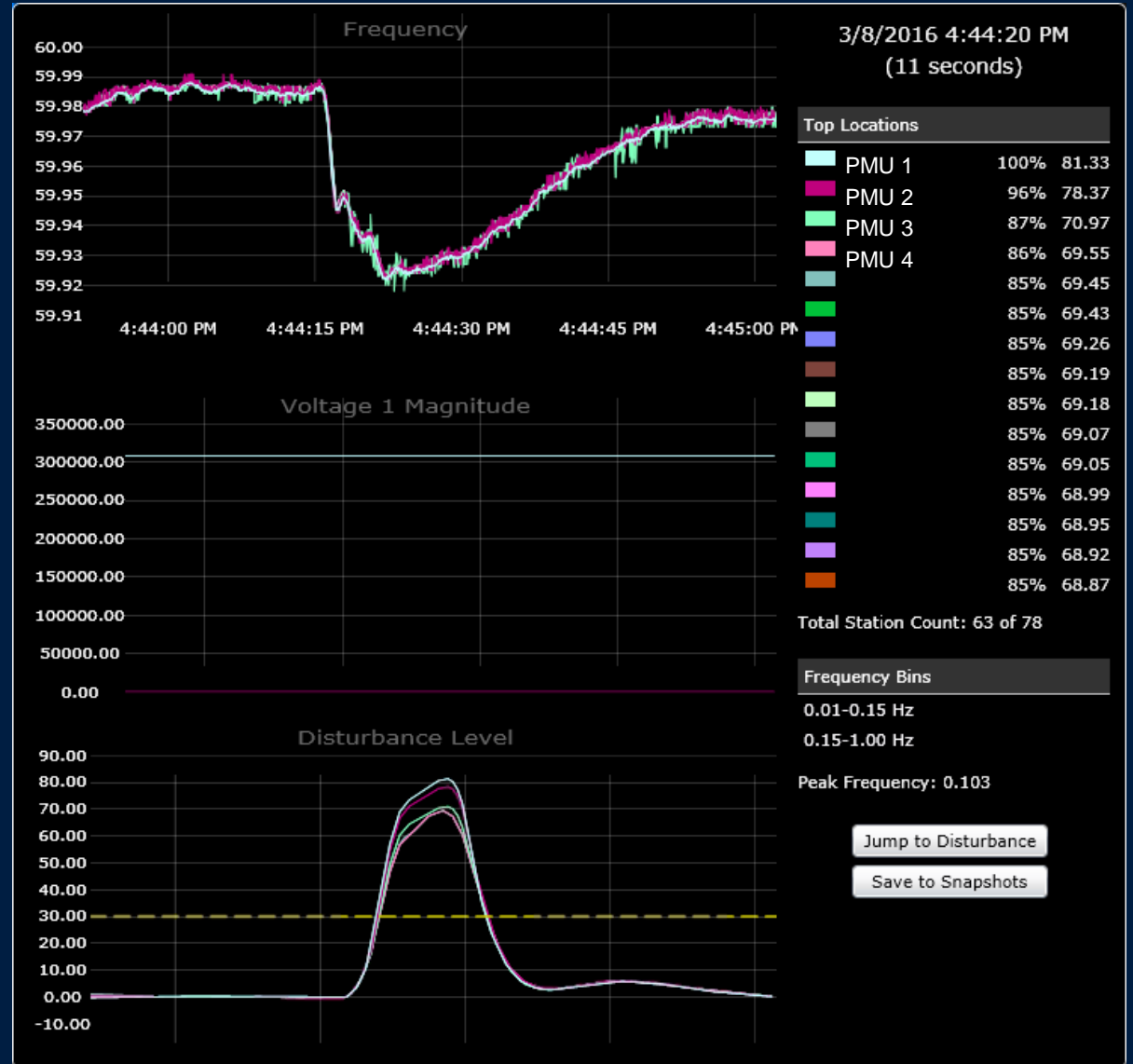
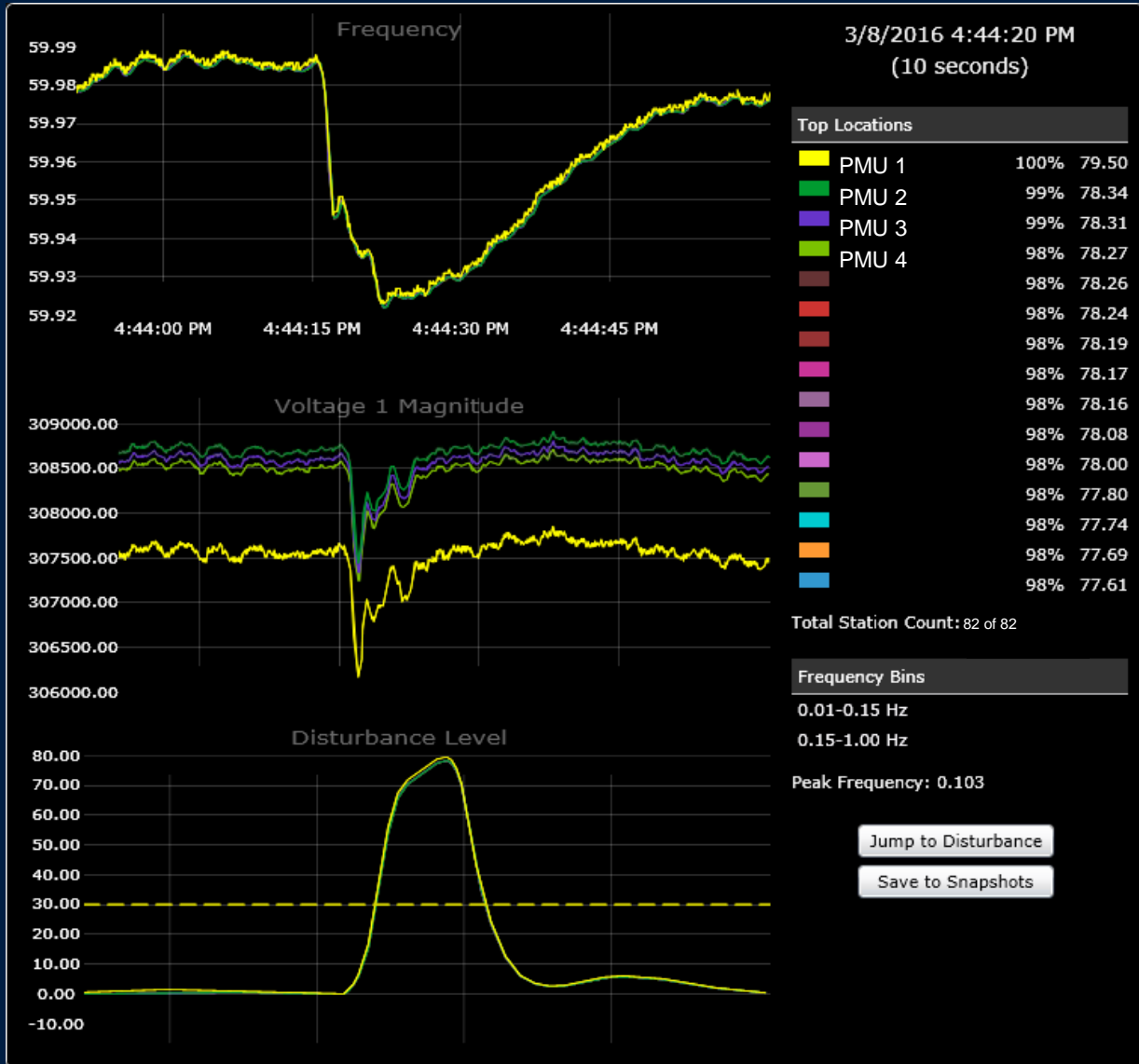
Detection of Loss of Load



Interesting Behavior



SDG&E and SRP View of WECC Gen Trip



Questions