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FOR IMMEDIATE RELEASE

## 3DATX ANNOUNCES SUCCESSFUL COMPLETION OF FIELD EMISSIONS TESTING BY LEADING GLOBAL TRANSPORTATION RESEARCH GROUPS

3DATX, an emerging leader of the development of portable emissions measurement systems, (PEMS), introduces the next generation of field emissions testing equipment. Most recently, the company has completed the successful and independent verification using diesel vehicles provided by the California Air Resources Board (CARB). CARB is a recognized global leader in advanced mobile emissions testing and vehicle emissions solutions, and are based in Sacramento, CA.

3DATX has introduced the parSYNC® and parSYNC® PLUS. These next-gen emissions testing and measurement devices represent the most important breakthroughs for on-road / in-field emissions testing for the global transportation industry. The principal advantages of the 3DATX "integrated" PEMS (iPEMS) innovations include: *unified design, user-friendly, airline "carry-on" = quickly/easily deployable, 3.3kg weight, high accuracy, easily calibrated, and replaceable sensor cartridges.*

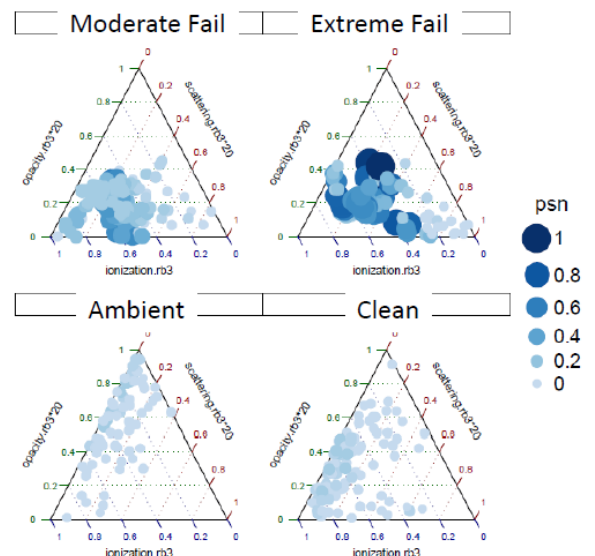
The actual field tests were conducted by emissions testing industry leaders & independent third parties, including Leeds University, UK and InfoWedge Systems, Sacramento, CA. The results of the test were confirmed and reported via presentations made at two recent California conferences: The 26<sup>th</sup> CRC Real World Emissions Workshop, Newport Beach and the 6<sup>th</sup> Annual 2016 International CE-CERT PEMS Conference and Workshop at UC Riverside.

Results clearly demonstrated the superiority of the parSYNC® unit to identify varying degrees of a Diesel Particulate Filter failure, due to the patents-pending sensor design (right):

3DATX CEO and company founder David Miller remarked, *"With the successful field test results and performance confirmations we received last month at CARB, 3DATX is firmly positioned to assume an important leadership position in all phases of the transportation industry, including commercial, OEM, inspection/maintenance and research-based organizations. We are thrilled with the results, and look forward to getting the parSYNC® equipment into the global marketplace."*

The successful field-testing recently conducted at CARB is the culmination of two years of research and development efforts conducted at 3DATX Global Testing Facilities in Buffalo, NY. The company is in the process of introducing the parSYNC®, parSYNC® PLUS, and CA/GE™ System equipment to a broad spectrum of global transportation industry leaders and industry research experts. 3DATX CEO Dave Miller commented, *"Our near term goal is to secure an important leadership position in the development of next wave of global emissions testing and measurement systems. This result is validation and a critically important step in that process."*

## Identifying Fail Type



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# NEXT GENERATION PEMS: IDENTIFYING A PM “HIGH EMITTER” USING A MULTIPLEXED SENSOR MEASUREMENT

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David Miller, 3DATX

# Outline of Presentation

- ▶ Background
- ▶ Current Diesel I/M
- ▶ Description of System
- ▶ Combining Signals into PSN
- ▶ Blind Test and Results

# Background

- ▶ Now that most diesel engines have exhaust aftertreatment systems, identifying excessive diesel emitters with broken emissions controls is important.
  - 90+% emissions reductions means a partially functioning control system can emit many times more pollution than a fully functioning one.
- ▶ The old methods of identifying excessive PM emitters are inadequate for diesels with DPFs.
  - Excessive relative to what?
- ▶ If they can be cost-effectively adapted to the single-purpose inspection/maintenance market, “next generation” PEMS could provide a basis for I/M measurement equipment with the required sensitivity for PM.

# Current I/M Methods for PM

## ▶ Opacity

- Pilot program to develop pass/fail cutpoints
- SAE-J1667

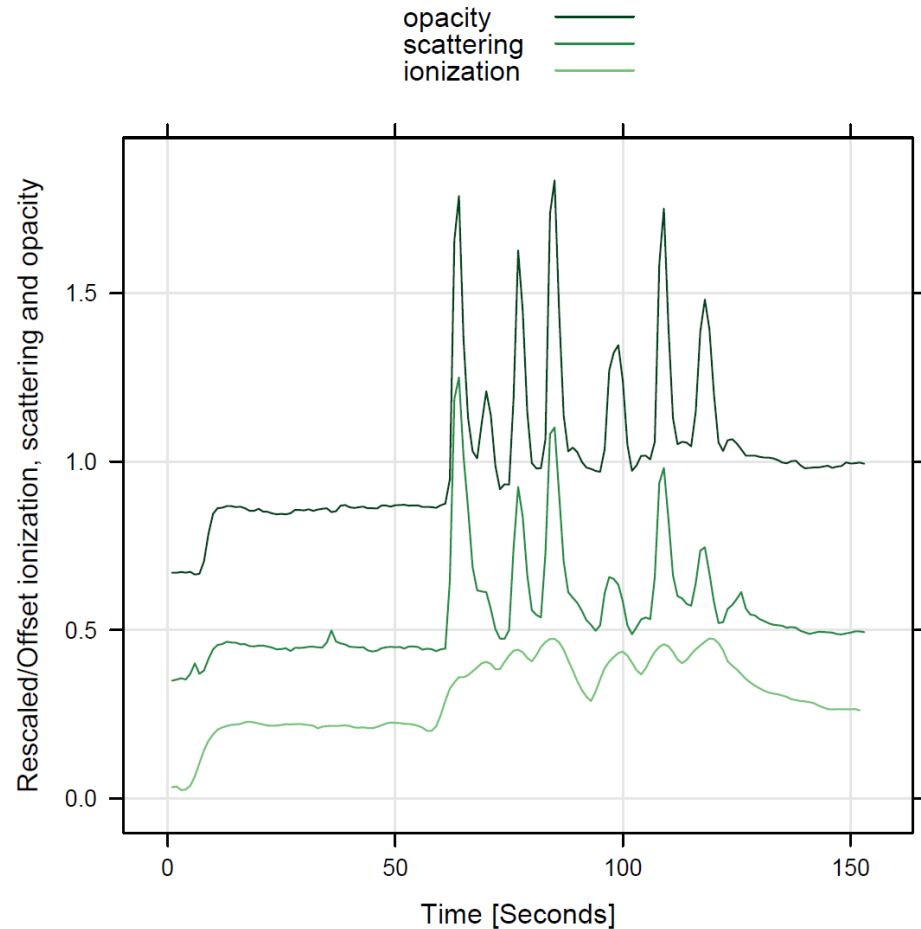
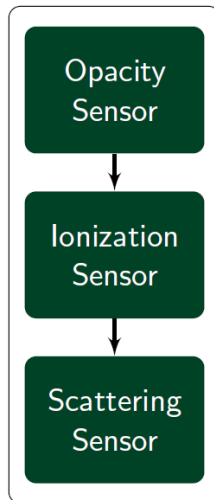
## ▶ Filter Smoke Number (FSN)

- Aethalometer approach

## ▶ Visual

- Any visible plume

# Description of Next Generation PEMS: parSYNC



# parSYNC Number (PSN)

- ▶ PSN combines the three PM signals into a single analog of PM emissions.

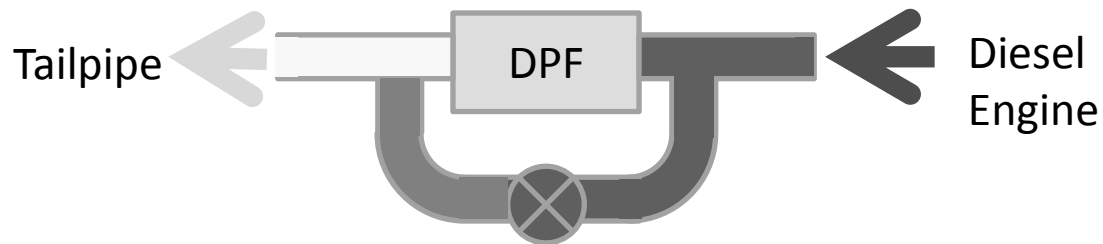
$$\text{PSN} = C_b + (C_i * I) + (C_s * S) + (C_o * O)$$

*where I is ionization, S is scattering and O is opacity.*

- Coefficients scale the outputs to specifically identify DPF engines that are excessive PM emitters.

# Exhaust DPF Bypass

- ▶ DPF bypass can be set to mimic 12 emissions levels, from fully functioning DPF to no DPF.
  - Vehicle owner has already determined what settings represent passing (normal emitter) versus failing (excessive emitter).



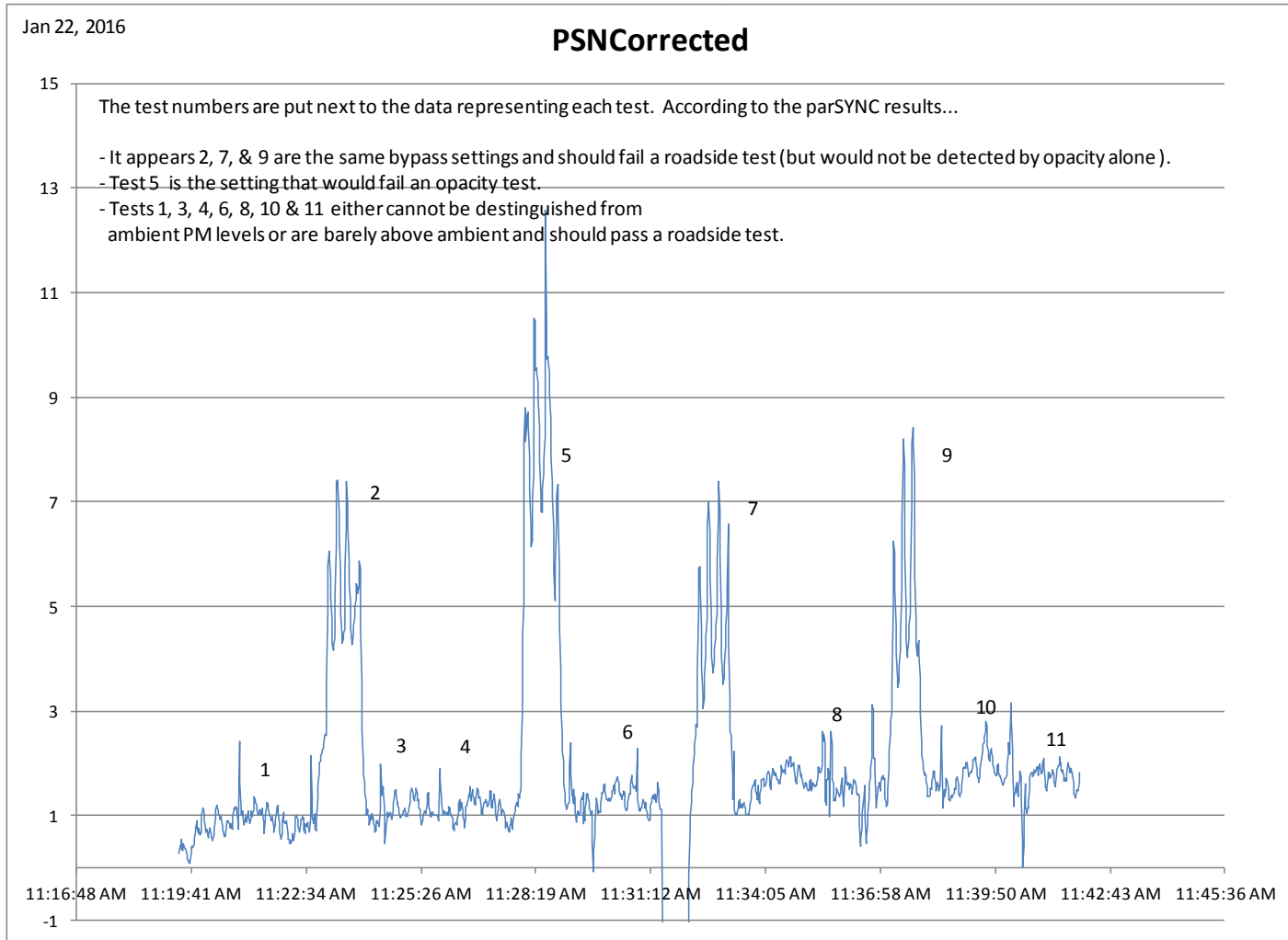
12-position  
Bypass Valve



# Blind Test Approach

1. Vehicle owner adjusts DPF bypass to setting unknown to testers.
2. Testers give signal when ready for test measurement.
3. Vehicle owner performs “snap acceleration” while testers monitor result.
4. Repeat steps 1, 2, & 3 for a total of 11 tests.

# Resulting PSN



# Going Forward

- ▶ Test additional vehicles with DPF and/or SCR “failures.”
- ▶ Begin looking at how the three signals can be analyzed to identify types of failure and possible repairs.
- ▶ Consider pilot program on a larger scale to develop optimal coefficient values to identify normal versus excessive emitters.

# The Authors Thank

3DATX: for supplying equipment, operation training and fast responses to questions

Many others: who anonymously supplied vehicles, expertise, labor, and parallel data.

Q? → A!

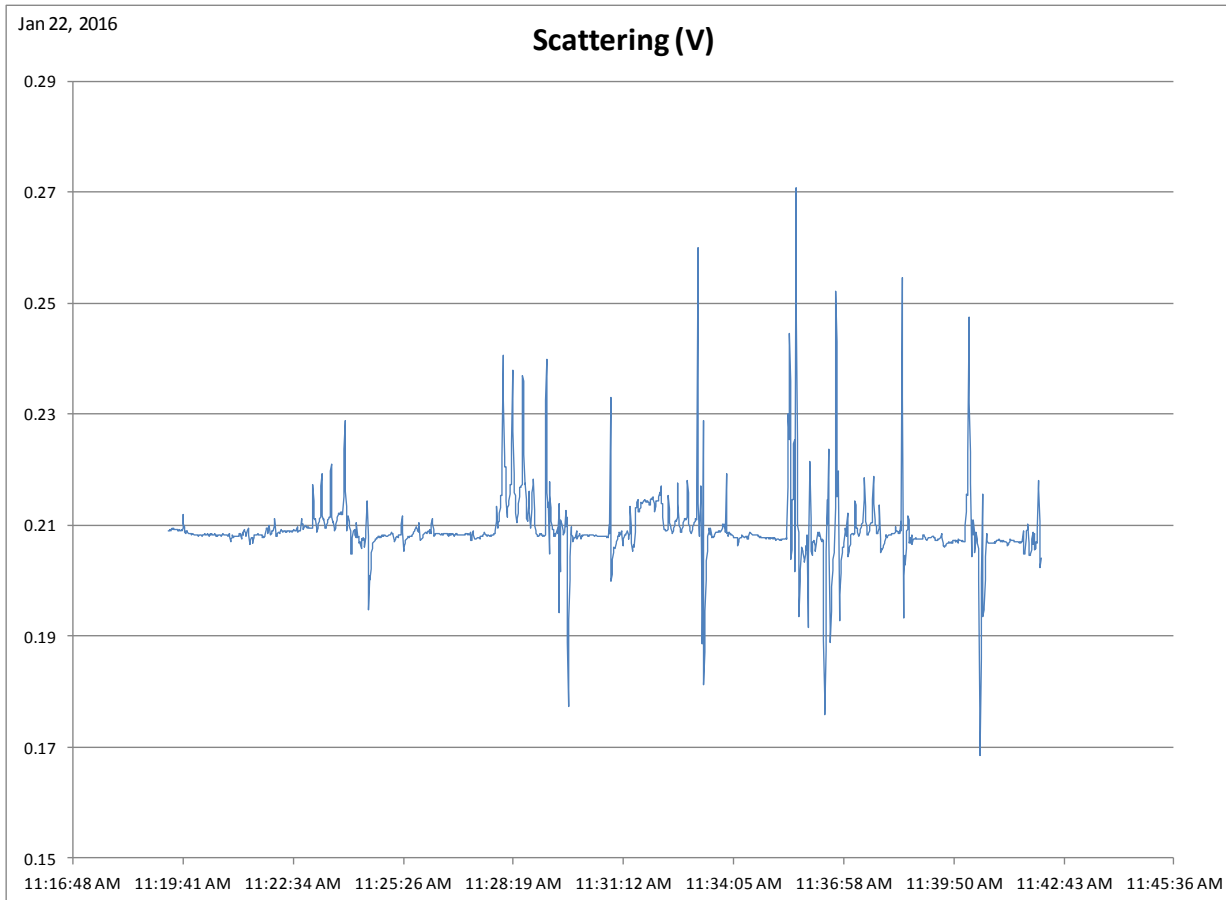
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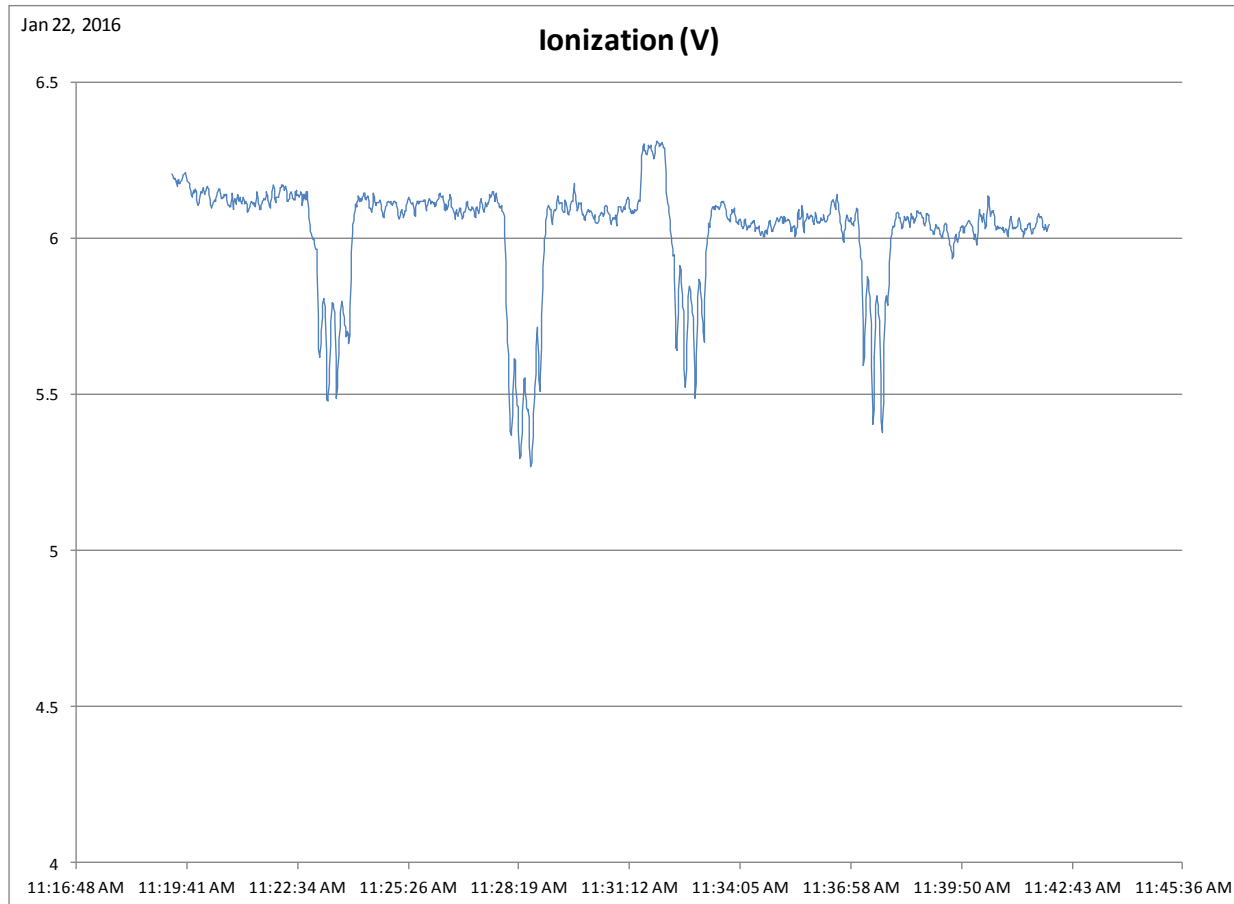
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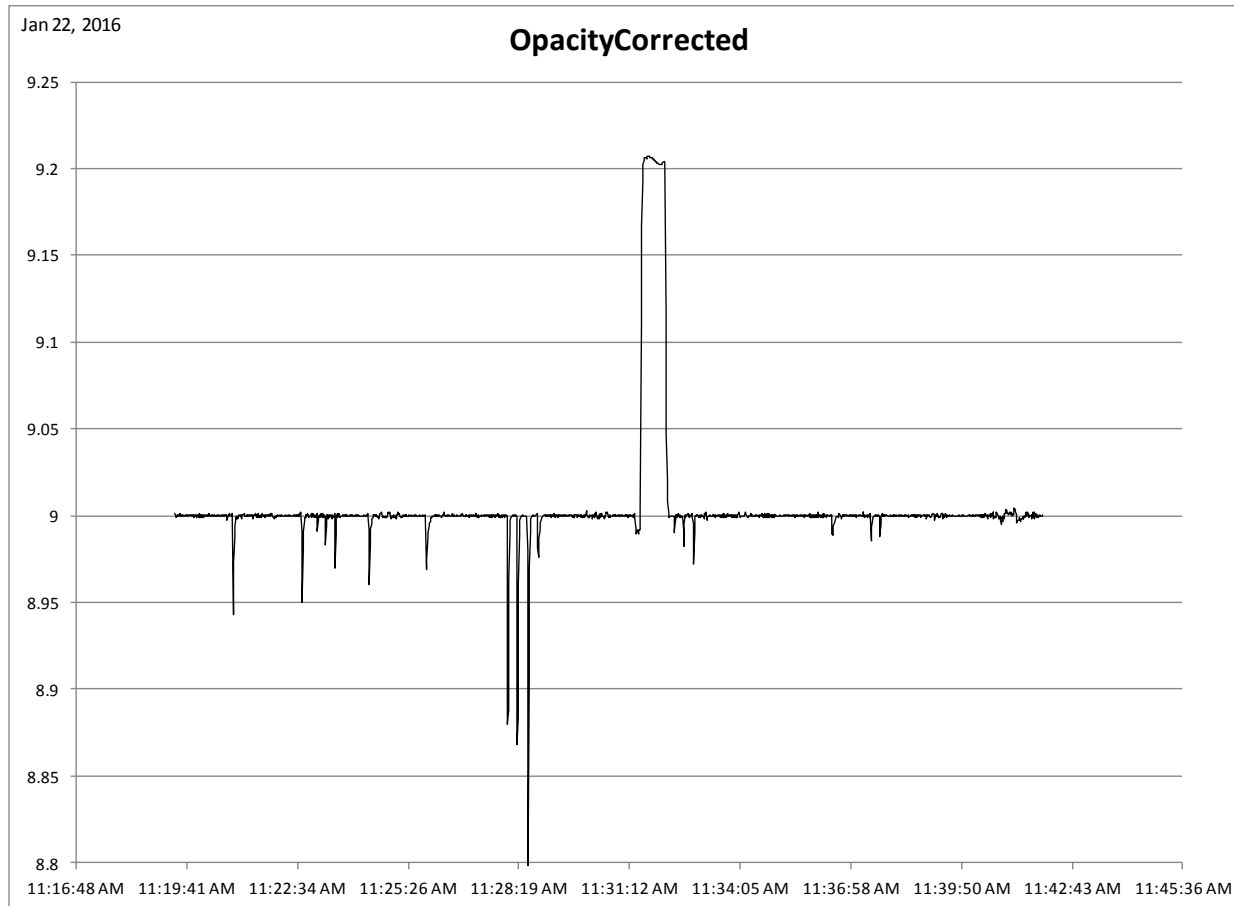
# Scattering from Blind Test



# Ionization from Blind Test



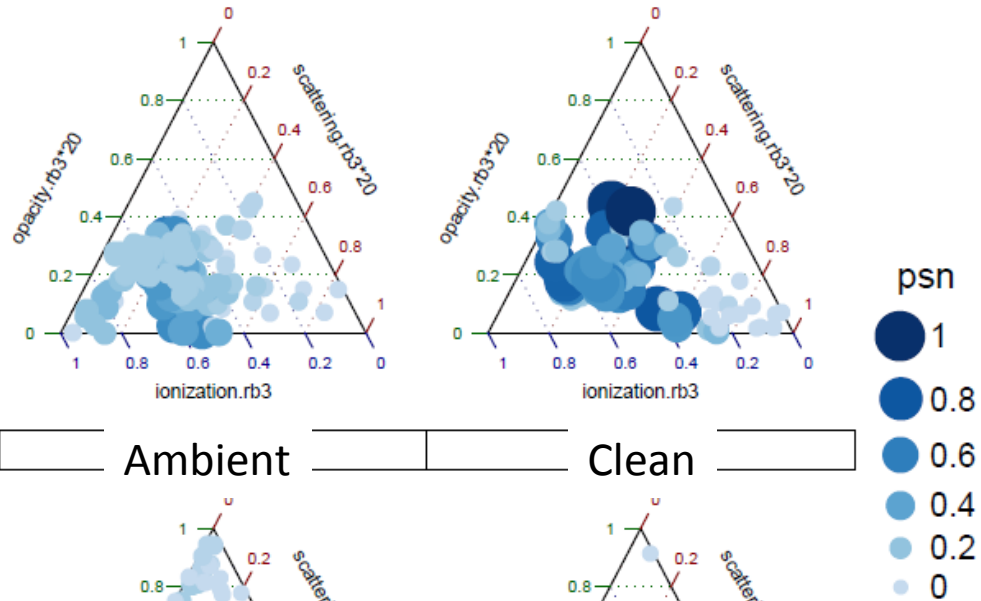
# Opacity from Blind Test





# Identifying Fail Type

Moderate Fail  Extreme Fail



Ambient  Clean