

Update on Cloud Seeding Flare Testing using the Pi Cloud Chamber



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Objective and Overview

- Use the Pi Cloud Chamber at Michigan Technological University to test Silver Iodide (AgI) cloud seeding flares.
- A flare burning and dilution system is used to ensure that the Pi Cloud Chamber is not contaminated by AgI
- The system burns flares reproducing the air flow over flares at aircraft speeds and provides particle dilution of between 10^5 and 10^6 in number concentration.
- Test the burning and dilution system to determine particles size and concentration.



Lab Building Roof

Fume Hood Blower (710 ± 200 CFM)

CCNC

Dilution

SMPS

CPC

3.0 inch Diameter, 4.0 ft Long
Aluminum Flare Burning Tube

Sampling
Ports

Air Flow into
Fume Hood
and out Top
of Building

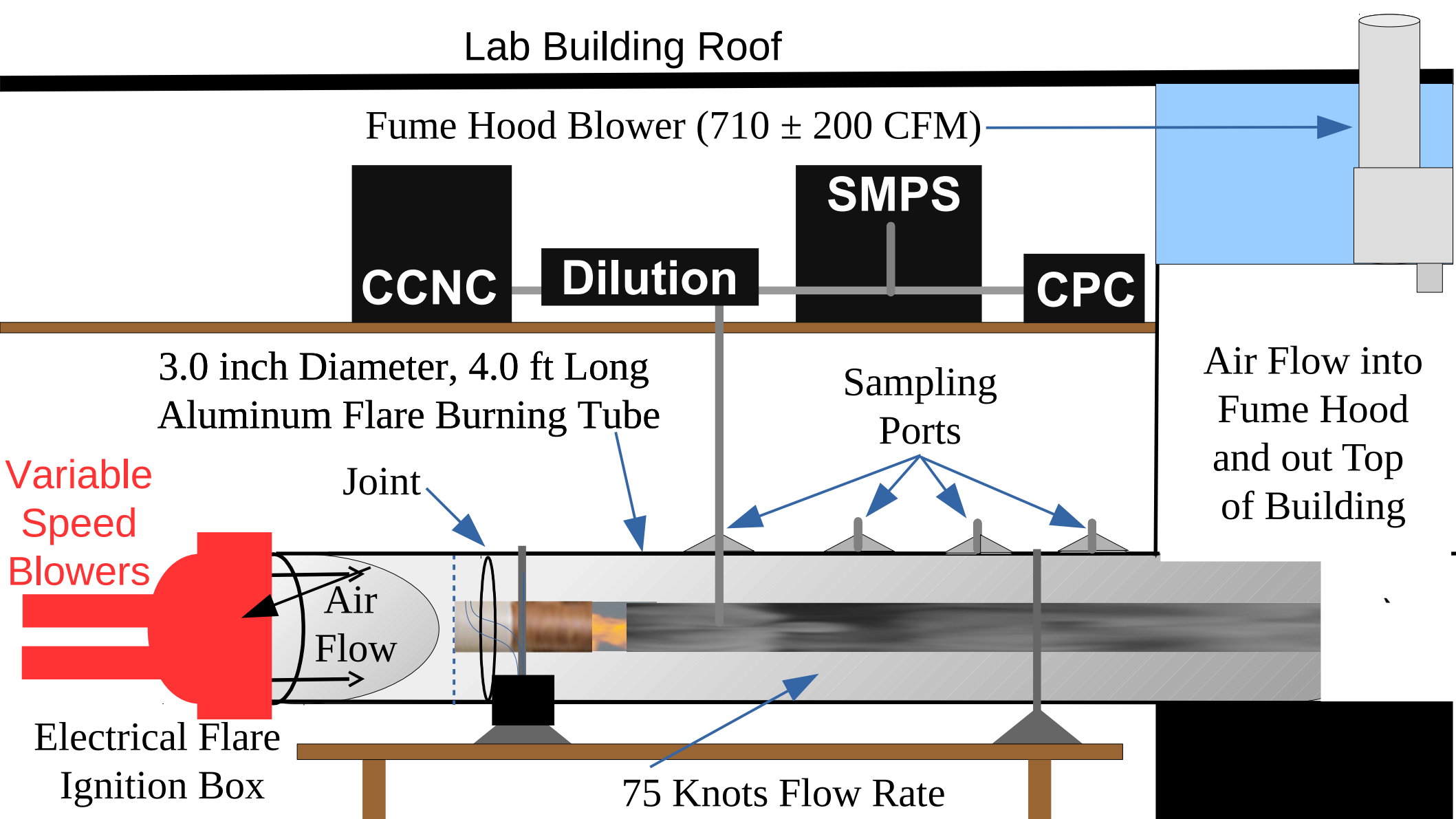
Variable
Speed
Blowers

Joint

Air
Flow

Electrical Flare
Ignition Box

75 Knots Flow Rate



Burning and Dilution Setup

First Version

Tie Down Strap

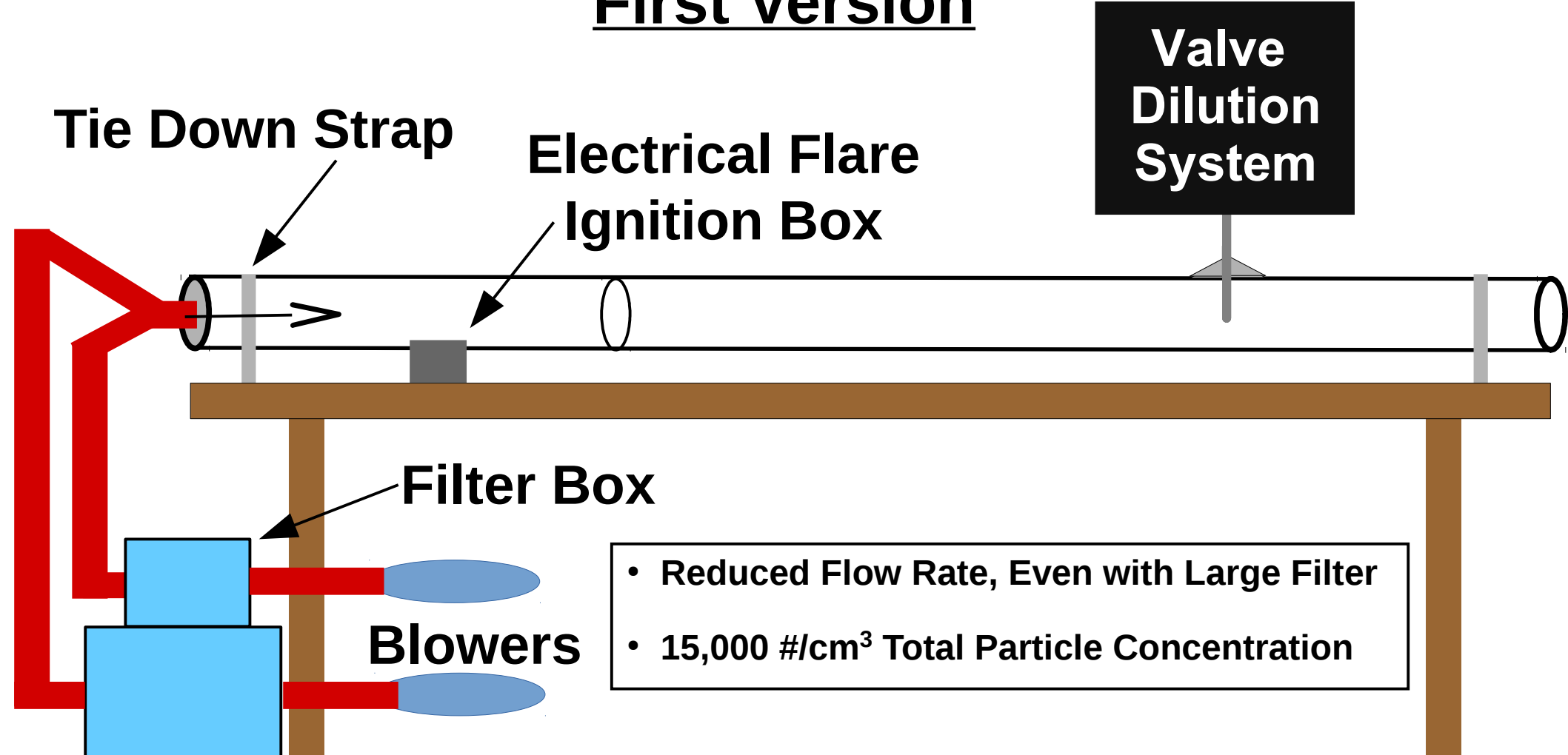
Electrical Flare
Ignition Box

Valve
Dilution
System

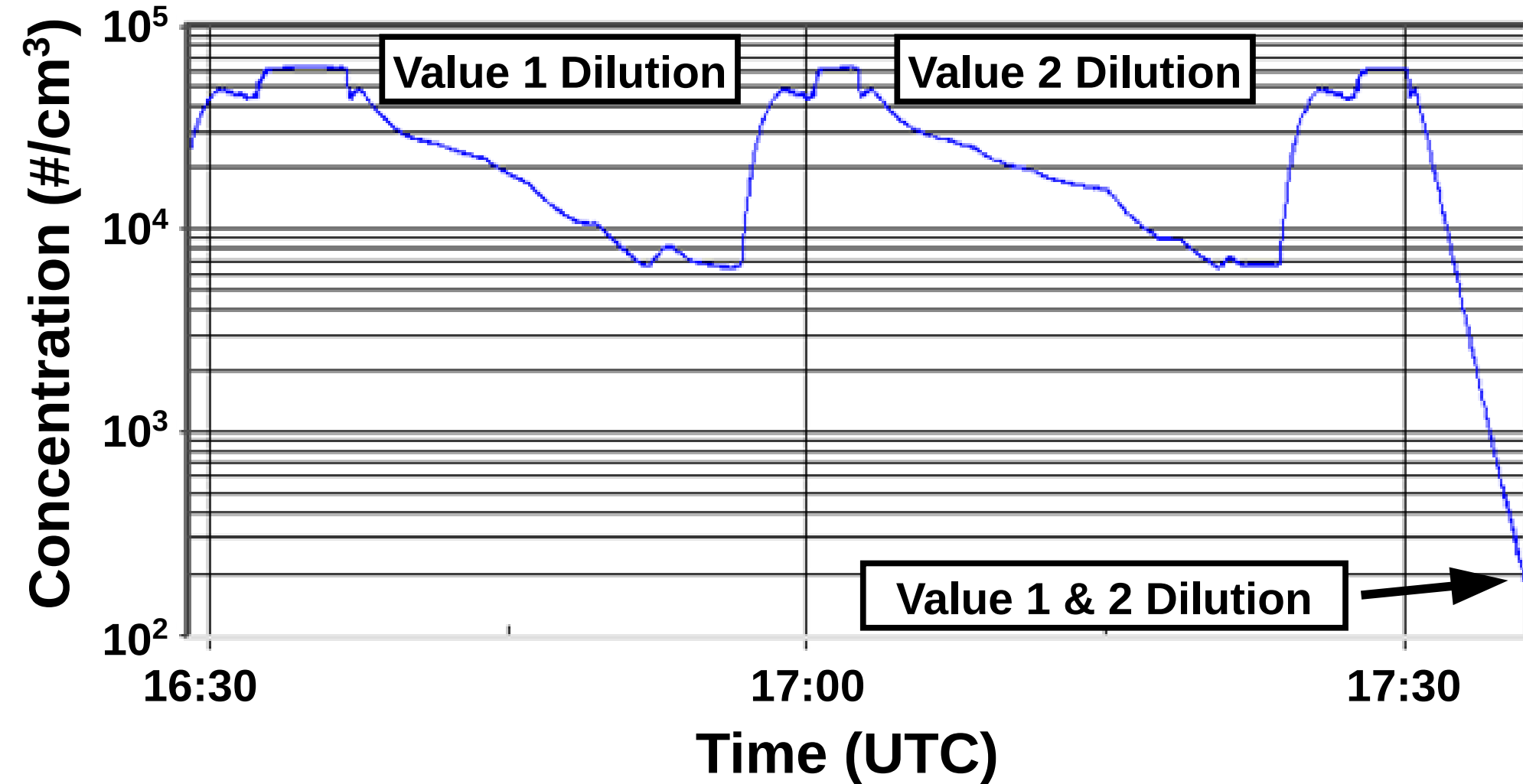
Filter Box

Blowers

- Reduced Flow Rate, Even with Large Filter
- 15,000 $\text{\#}/\text{cm}^3$ Total Particle Concentration

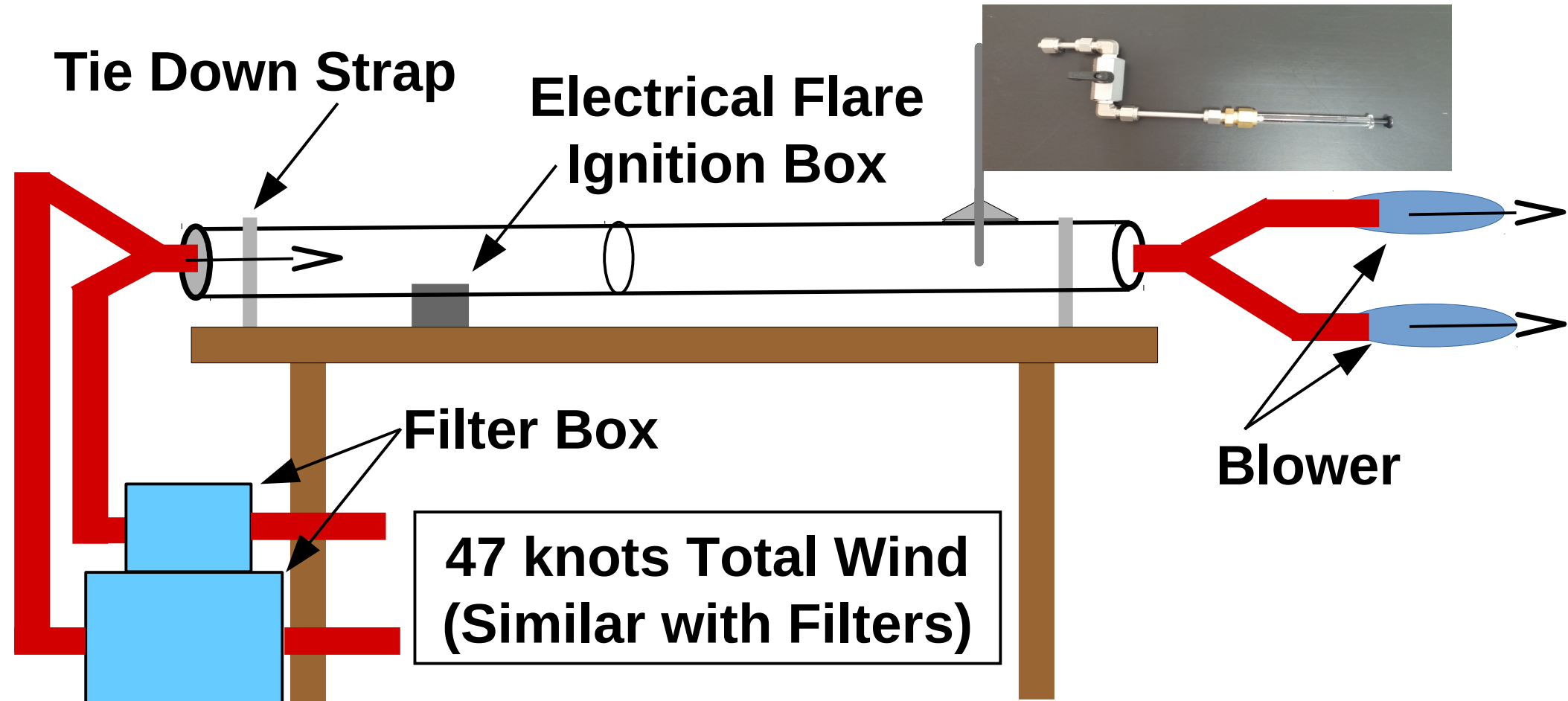


Value Dilution System Results: 2017/12/05



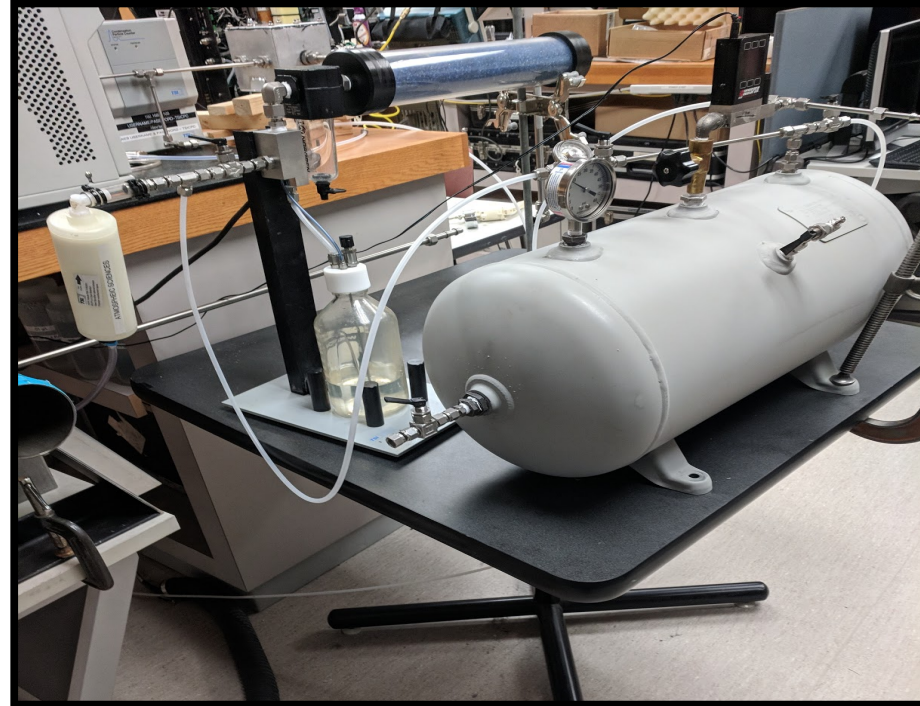
Burning and Dilution Setup

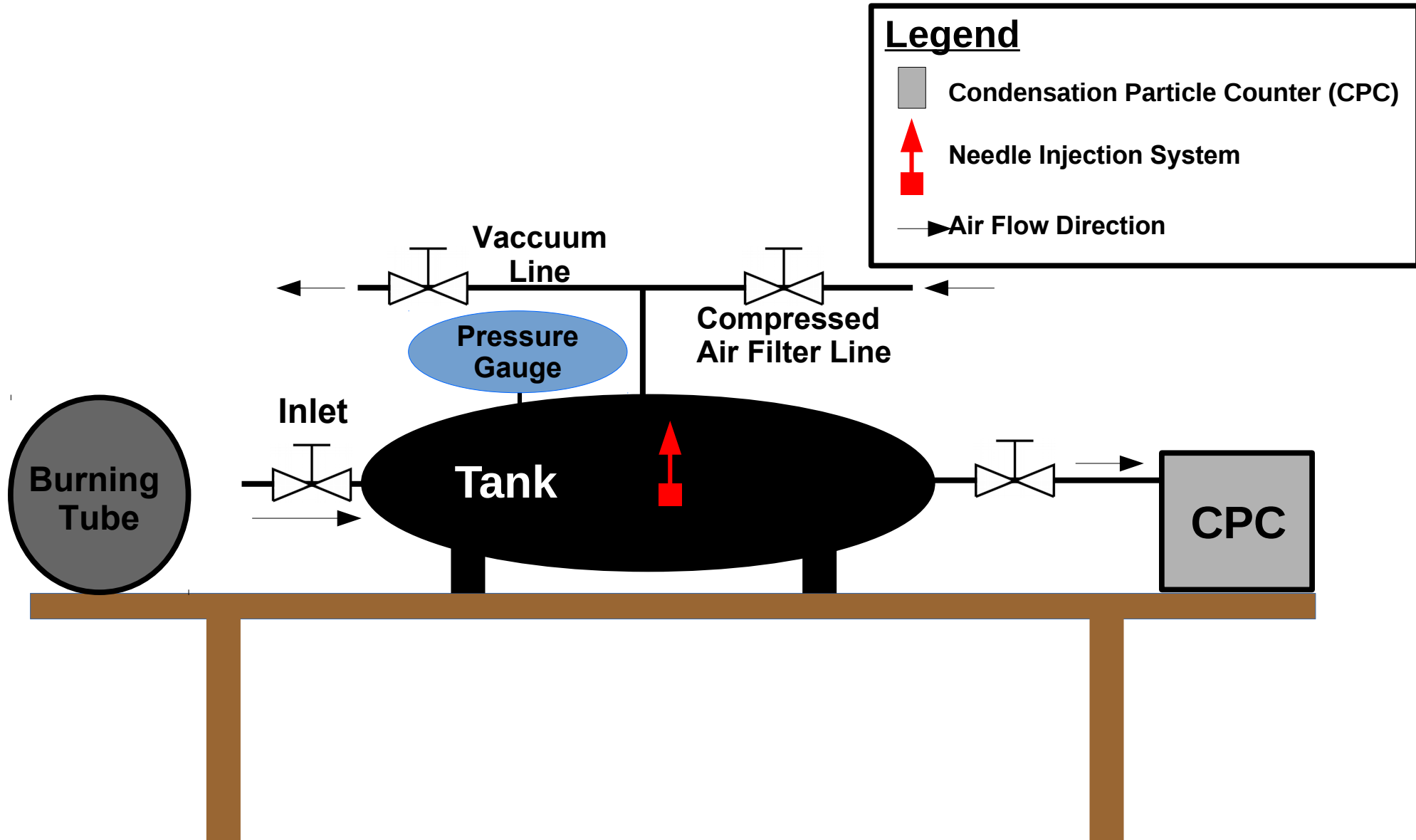
Current Version: April 2018



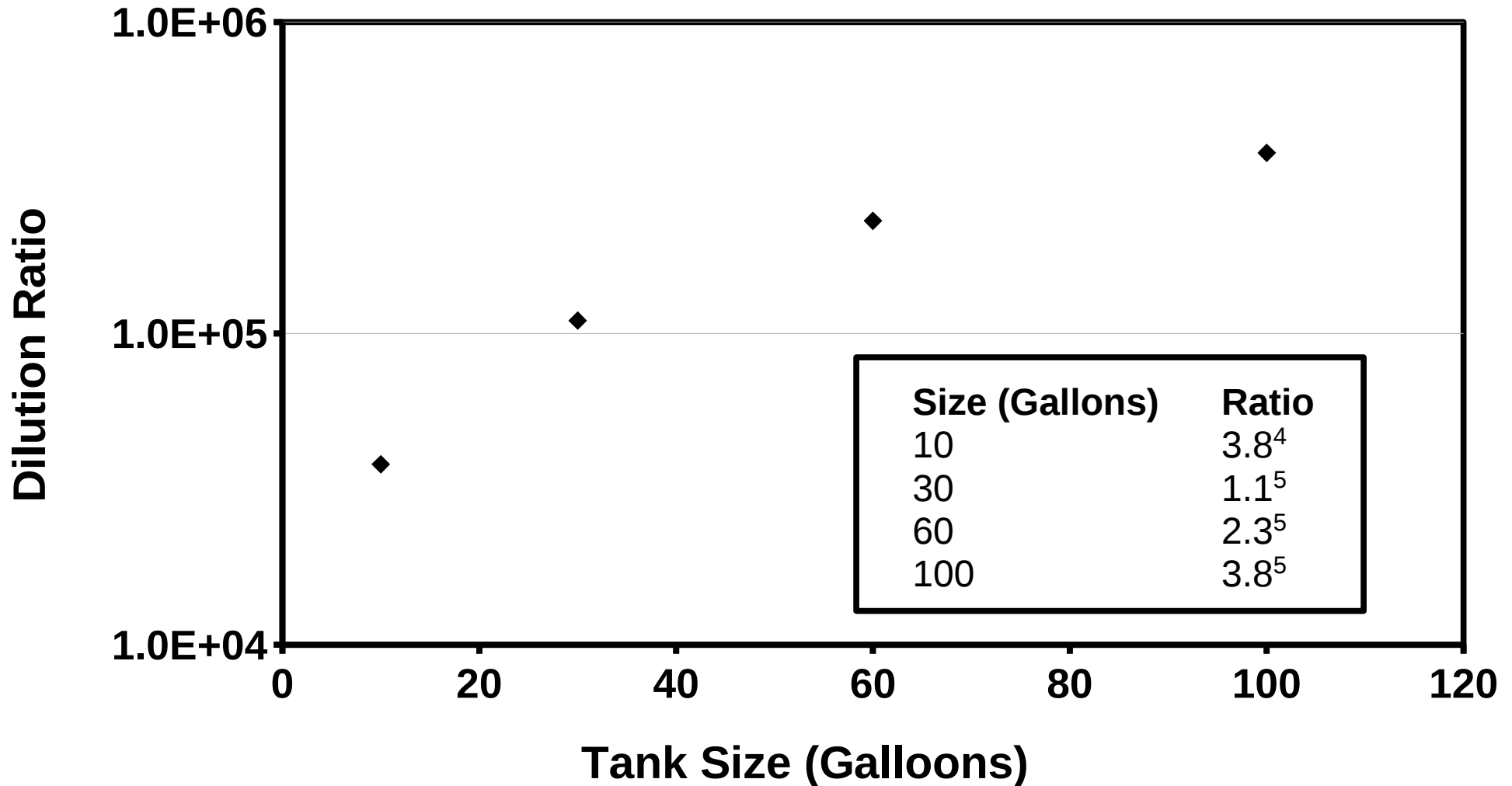
Tank Dilution System

- Initial Testing is done using a 10 gallon tank.
- A one milliliter air sample is obtained using glass syringe.
- The syringe transfers sample from flare burning system to tank.
- Tank diluted samples will be compared to valve system using CPC and SMPS to measure concentration and size distribution.





Calculated Dilution Ratios



Summary and Conclusions

- Final Check on Tank System to ensure no contamination and burning and dilution system is ready for deployment at Pi Cloud Chamber.
- The Holodeck instrument is installed in the Pi Cloud Chamber
- Two periods of setting at the Pi Cloud Chamber are planned for this summer.



Questions and Discussion

