

# Experiments to Evaluated Cloud Seeding Materials using Cloud Chambers



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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 ( $710 \pm 200$  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

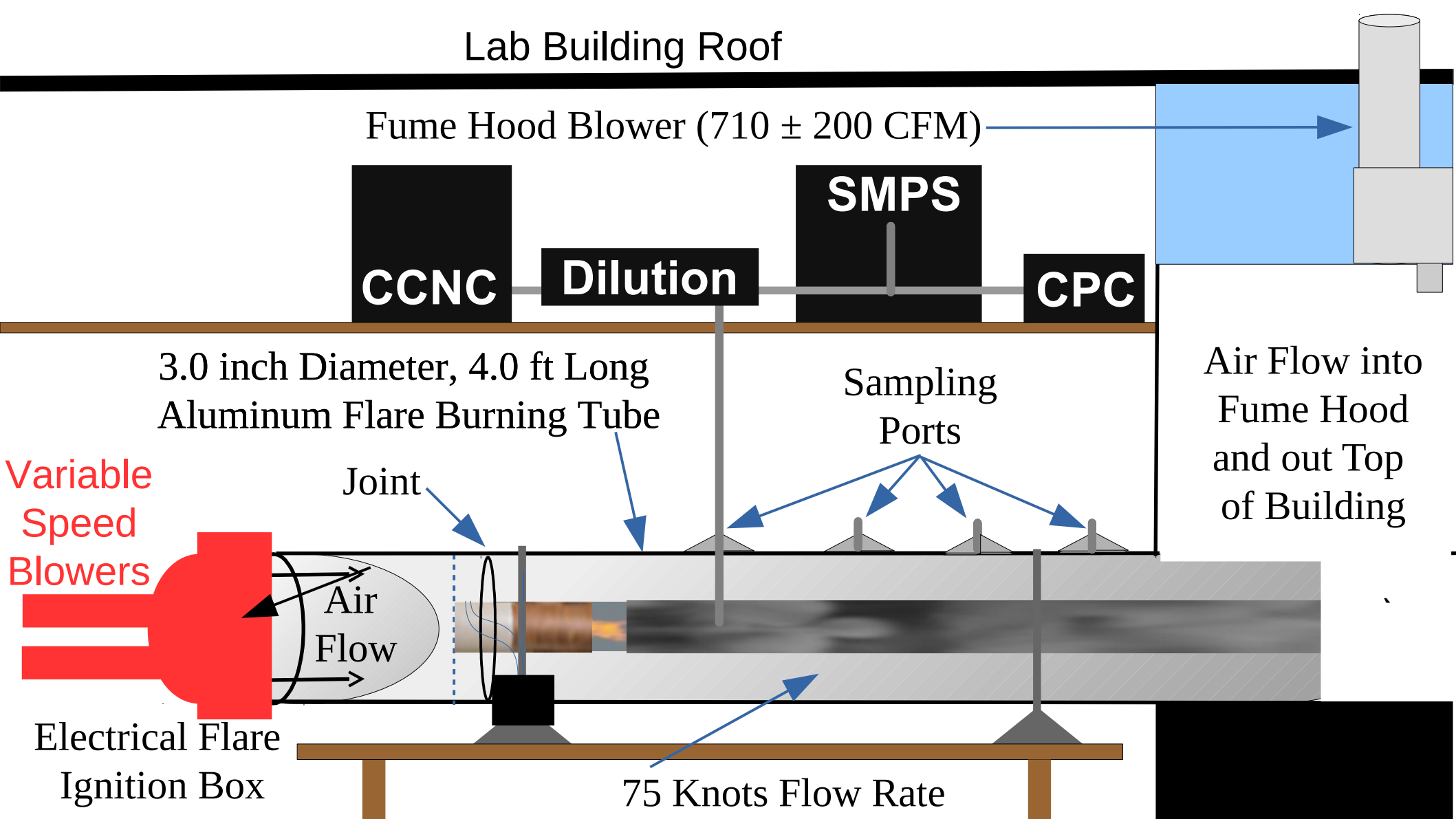
Variable  
Speed  
Blowers

Joint

Air  
Flow

Electrical Flare  
Ignition Box

75 Knots Flow Rate



# Burning and Dilution Setup

## First Version

Tie Down Strap

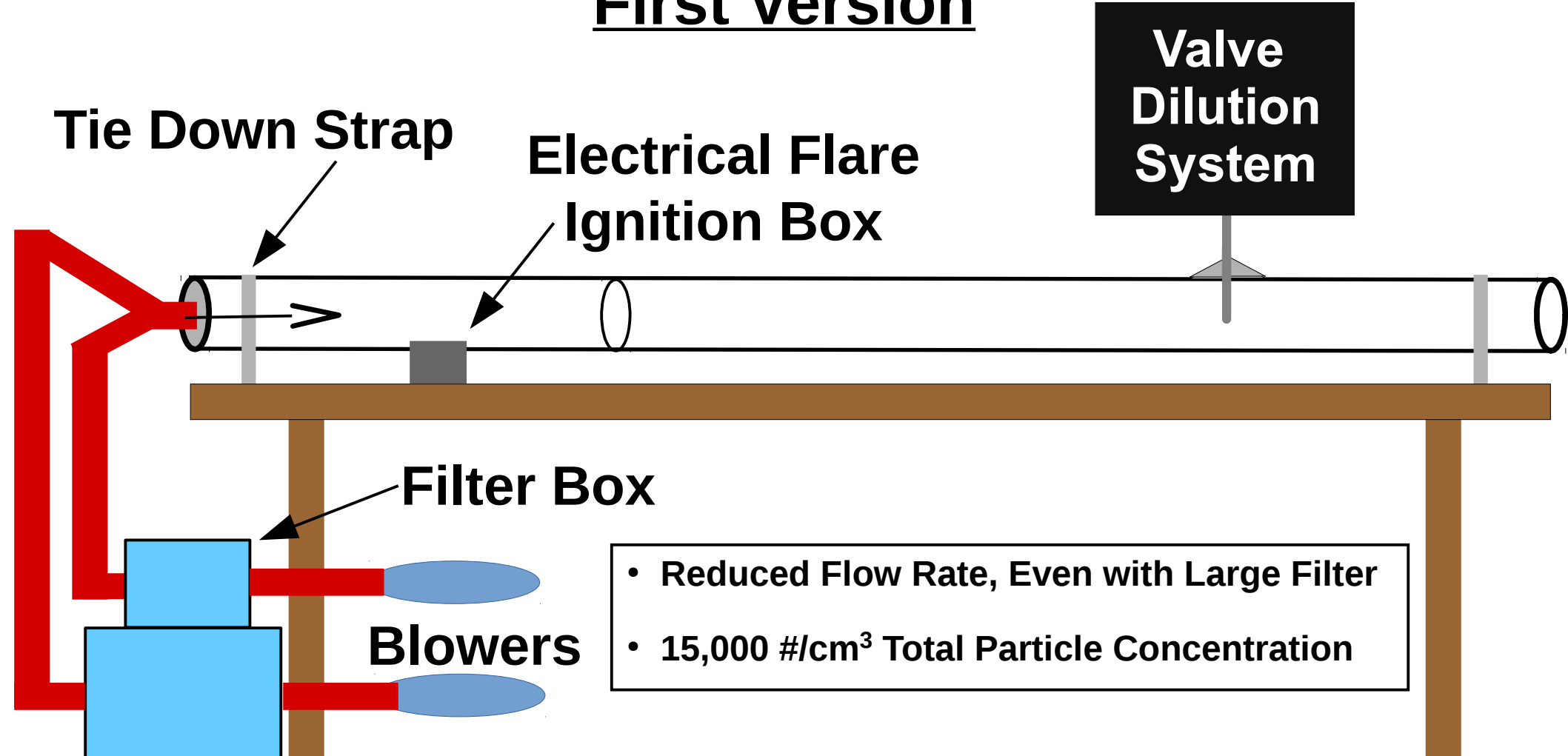
Electrical Flare  
Ignition Box

Valve  
Dilution  
System

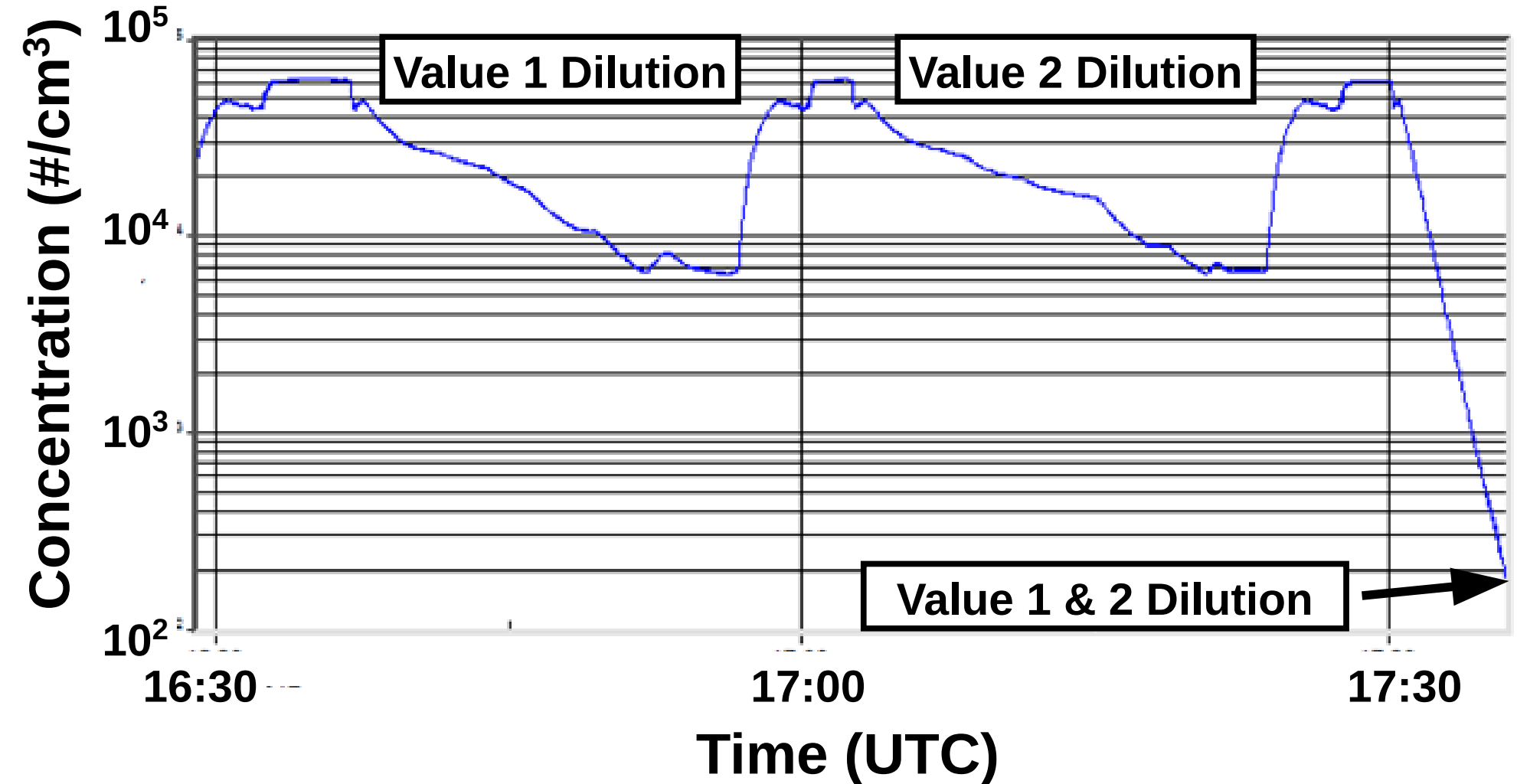
Filter Box

Blowers

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

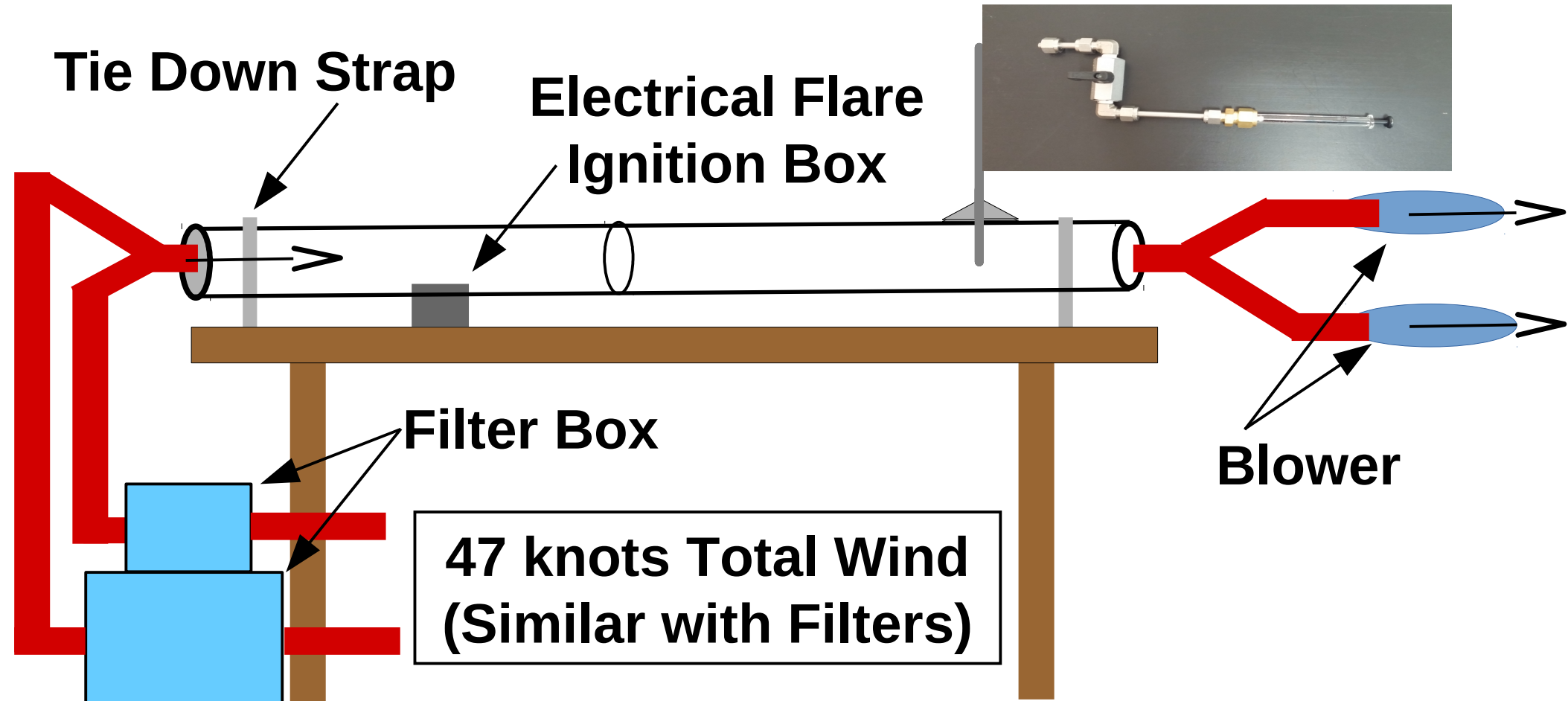


# Value Dilution System Results: 2017/12/05



# Burning and Dilution Setup

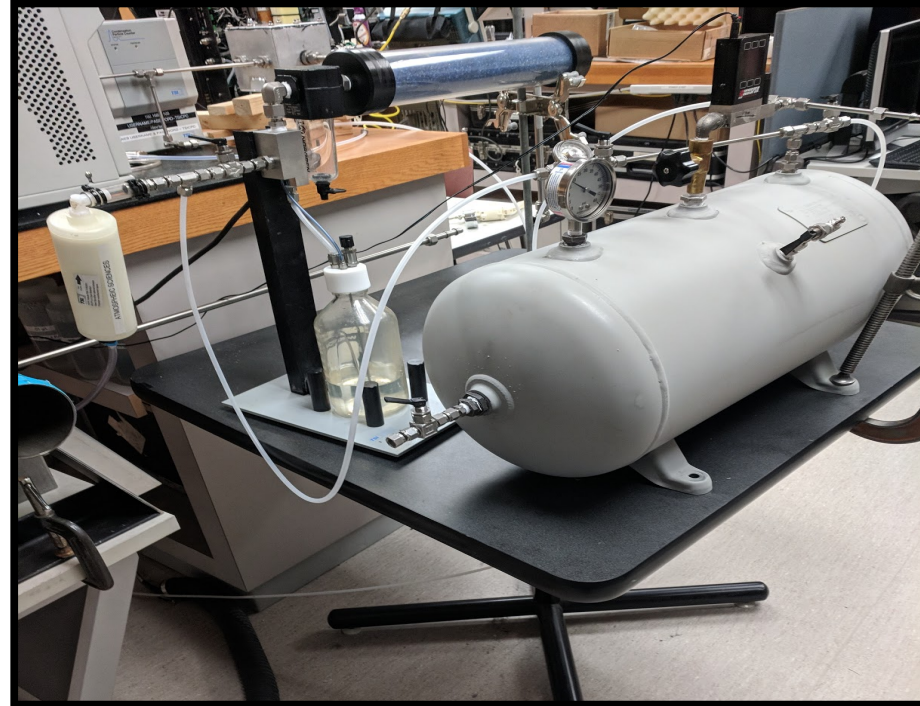
## Current Version: April 2018

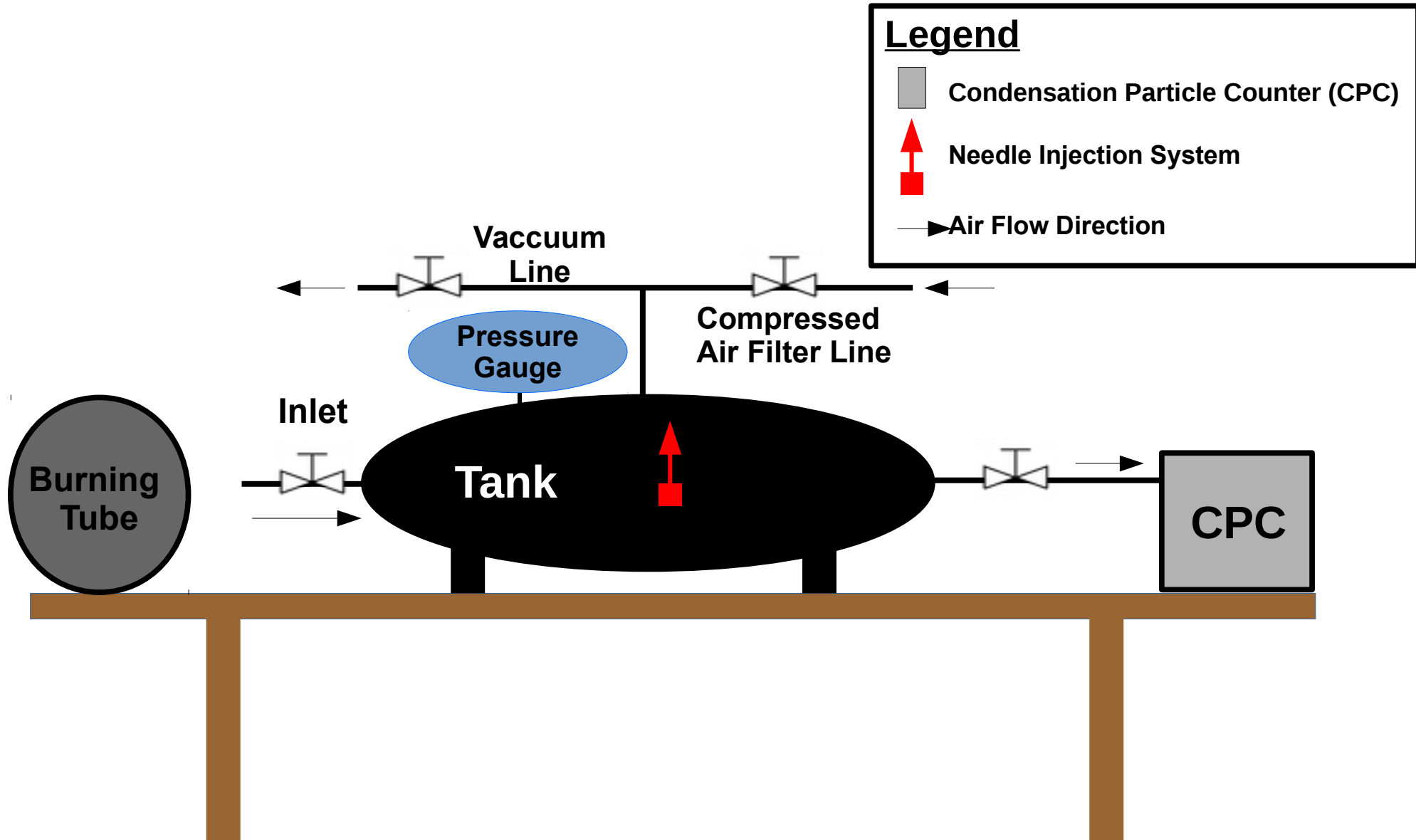




# Tank Dilution System

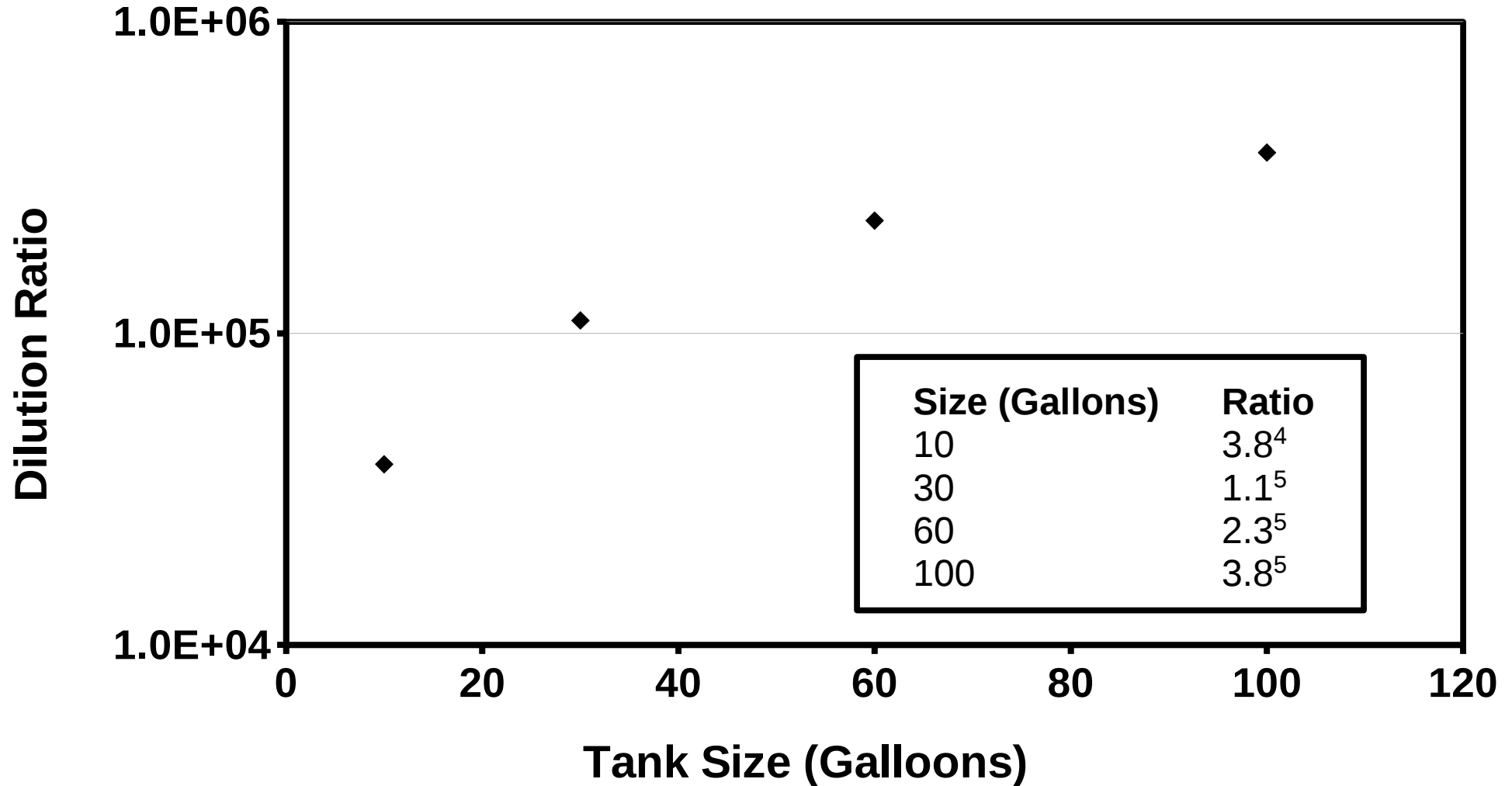
- Initial Testing is done using a 10 gallon tank.
- A one milliliter air sample is obtained using glass syringe.
- The syringe transfers sample from flare burning system to tank.
- Tank diluted samples will be compared to valve system using CPC and SMPS to measure concentration and size distribution.







# 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

