A Reverse Venturi Atomization Chamber

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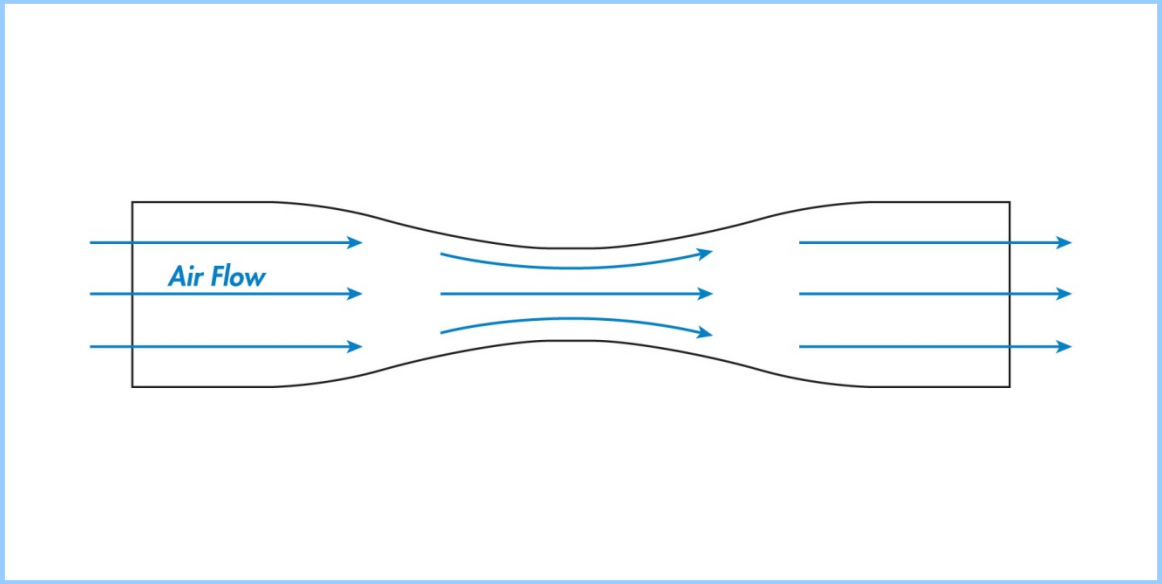
N8347K

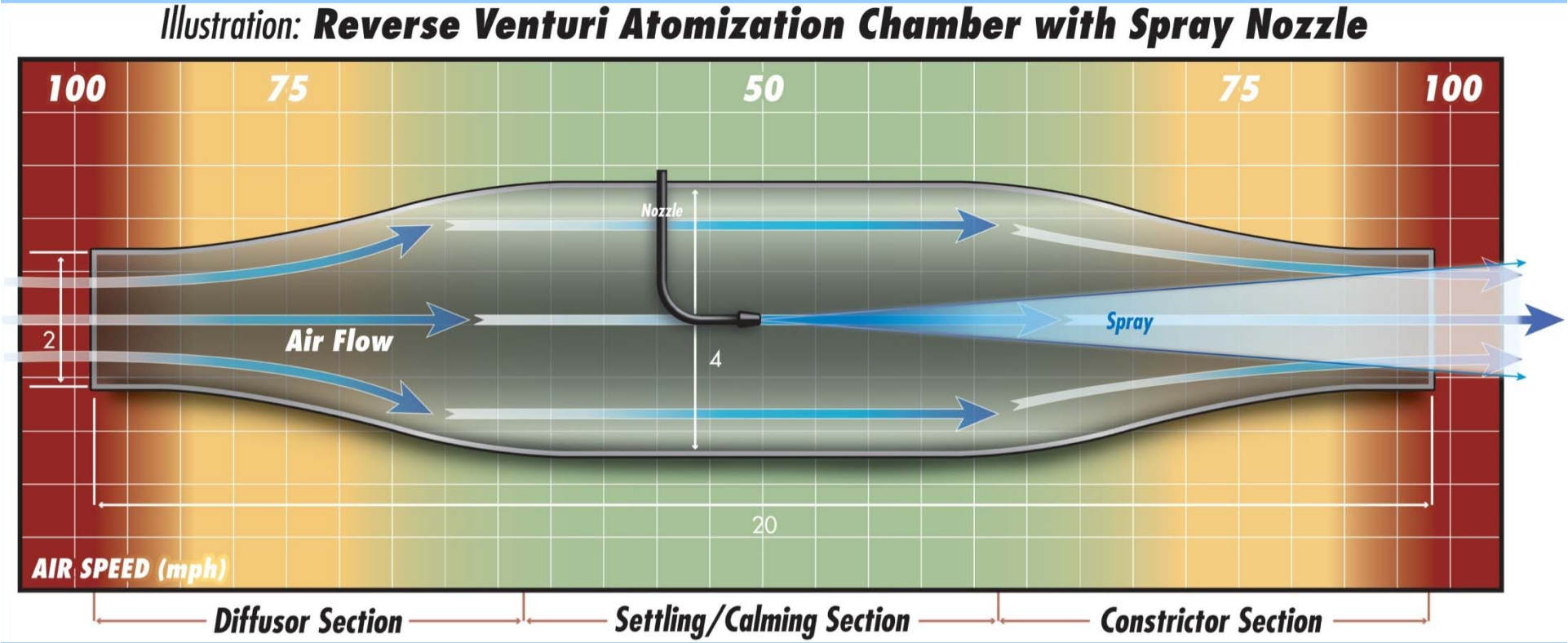
Critical Air Velocities

Critical Velocity, (km/h / mph)	Drop Size (microns, μ)
80.5 / ~ 50 mph	1500
105 / ~ 65 mph	900
137 / ~ 85 mph	535
161 / ~ 100 mph	385
241 / ~ 210 mph	170

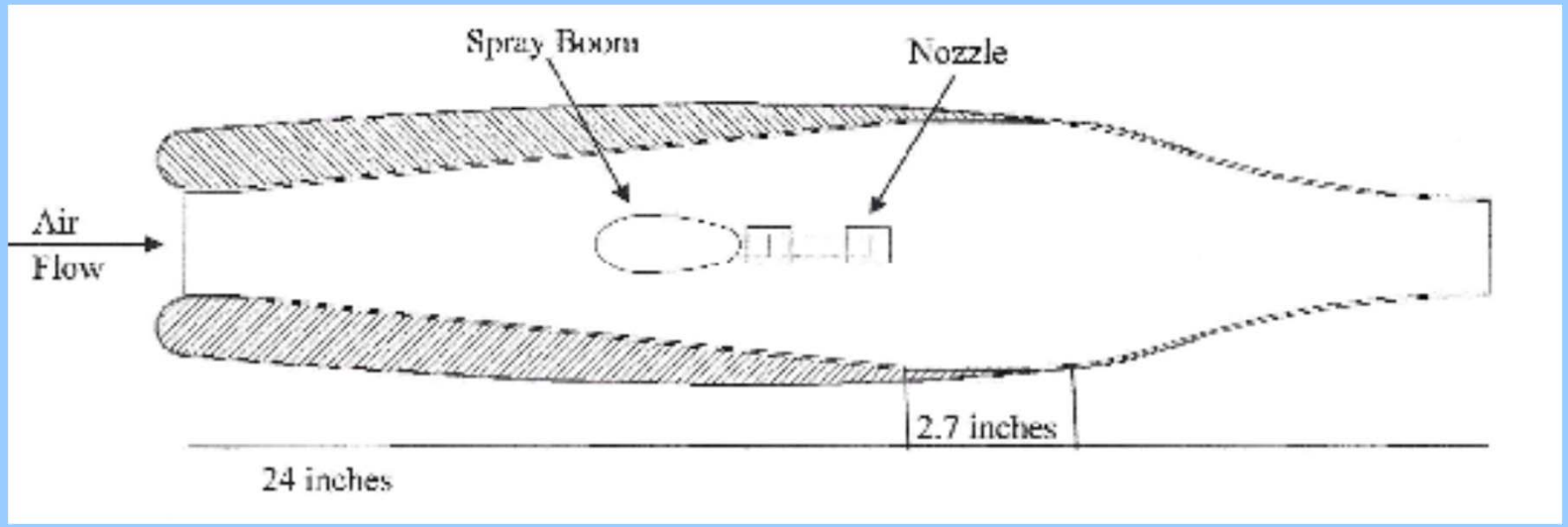
Venturi



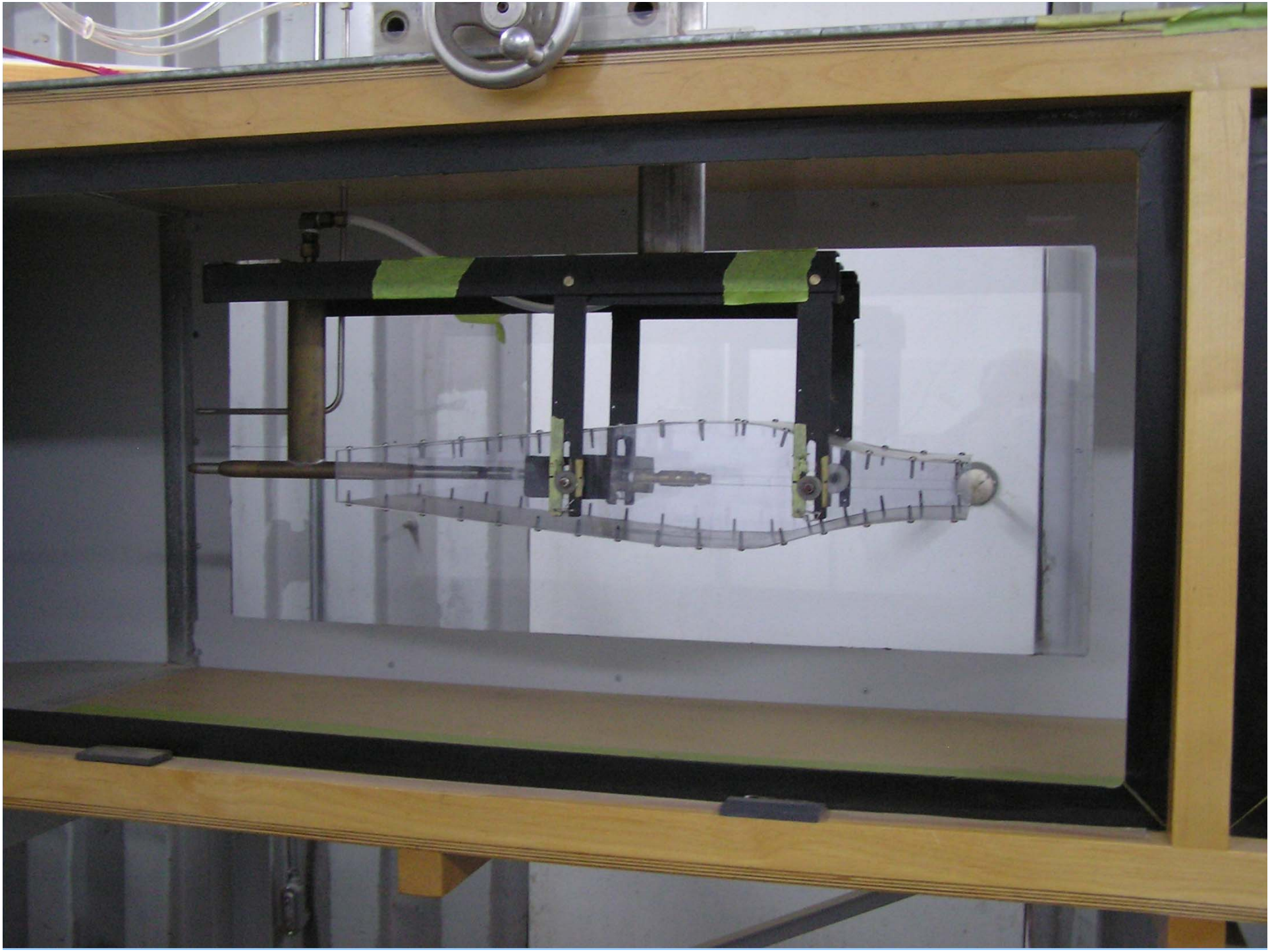
Reverse Venturi

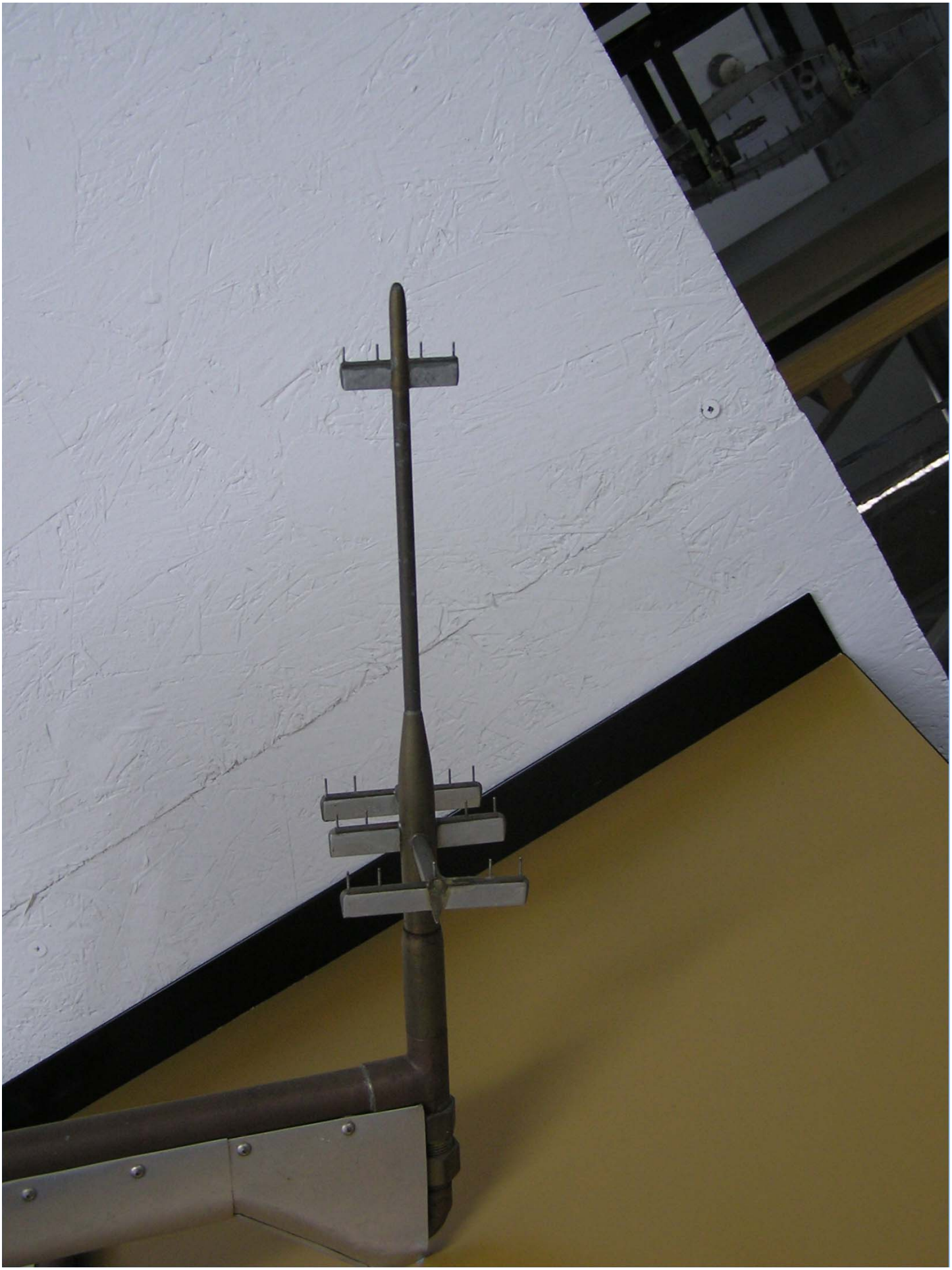


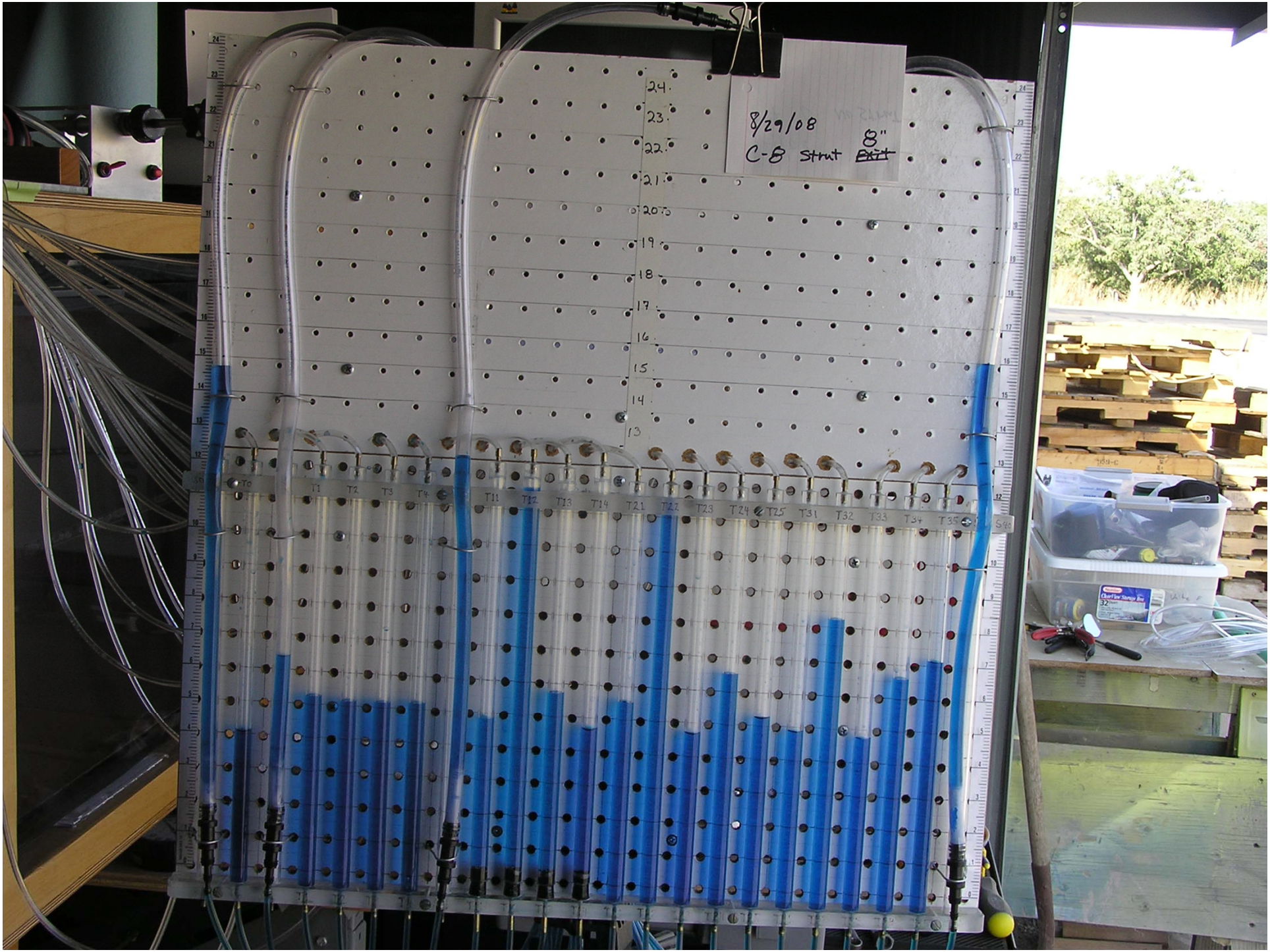
Reverse Venturi Chamber



WERNER



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C-8 Strut
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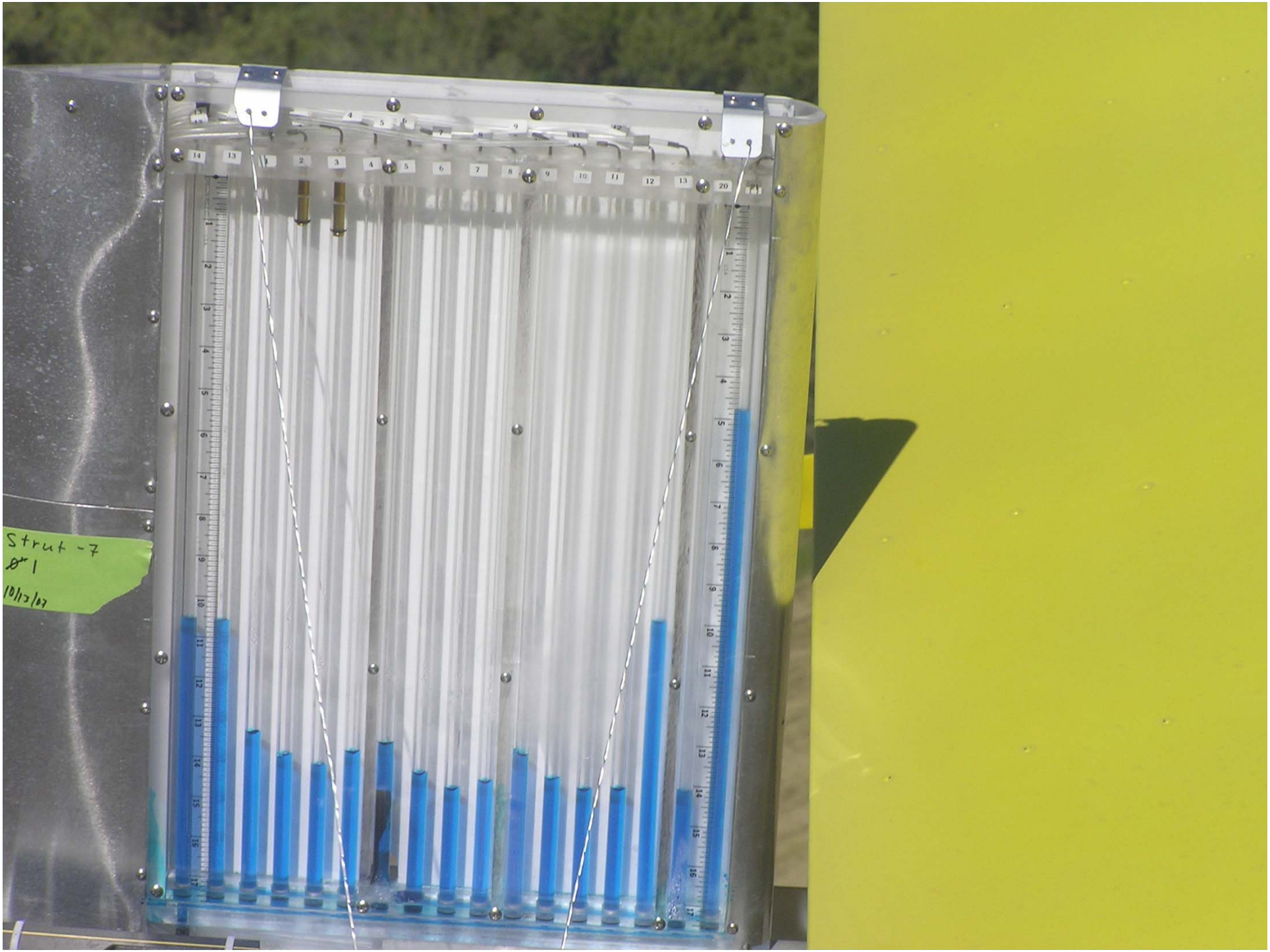
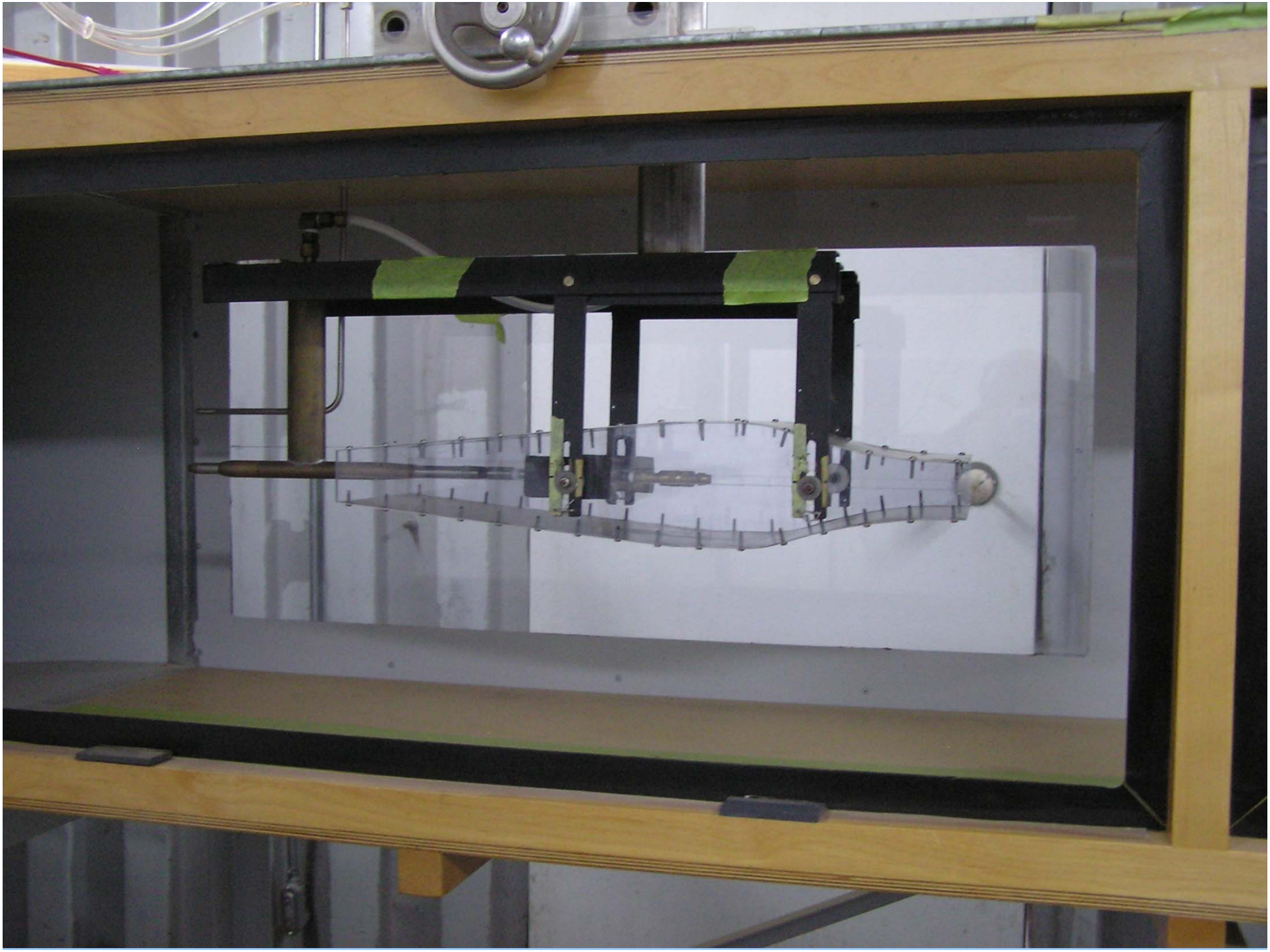

Strut -7
#1
10/13/07

Chamber air Velocities

	Inlet	**Settling Section**	**Exit**
Air Velocities	148 mph	49.5 mph	141 mph
Recovery Ratios		.34	.90



Atomization Results

Percent fines produced in free air stream (no chamber) with Spraying Systems 2505 nozzle					
50 mph		100 mph		150 mph	
20 psi	50 psi	20 psi	50 psi	20 psi	50 psi
0.5	2.4	6.9	4.8	22.9	16.9

Percent fines produced with nozzle in RVA chamber with Spraying Systems 2505 nozzle					
Distance from chamber exit (inches)		100 mph		150 mph	
Boom	Nozzle	20 psi	50 psi	20 psi	50 psi
9.75	7.0	1.87	2.75	13.78	11.98
9.75	8.0	0.96	1.97	11.26	9.34
10.75	7.0	1.38	2.30	13.40	11.21
10.75	8.0	0.75	2.04	10.98	8.73
10.75	9.0	0.53	2.07	8.90	6.24
11.75	7.0	1.52	2.13	12.62	10.74
11.75	8.0	0.62	2.04	10.62	7.97
11.75	9.0	0.49	2.02	8.58	5.37
11.75	10.0	0.49	2.23	7.68	4.38
12.75	9.0	0.56	2.14	8.35	5.44
12.75	**10.0**	**0.45**	**2.18**	**7.34**	**4.30**
12.75	11.0	0.48	2.34	7.47	3.65
13.75	9.0	0.61	2.29	8.39	5.85
13.75	10.0	0.53	2.62	7.55	4.32
13.75	11.0	0.52	2.39	7.48	4.37
13.75	12.0	0.55	2.49	7.67	4.22
14.75	9.0	0.47	2.14	8.32	5.40
14.75	10.0	0.51	2.50	7.69	4.12
14.75	11.0	0.55	2.44	7.44	4.20
14.75	12.0	0.50	2.55	7.63	4.66
14.75	13.0	0.55	2.41	7.68	4.78

Reduction in fines when boom 12.75 inch and nozzle 10.0 inch from exit of chamber

Airspeed mph	Pressure	% Fines In Free Air stream	% Fines in RVA	% Reduction in fines
100	20	6.9	0.5	92.4
100	50	4.8	2.2	54.2
150	20	22.9	7.3	68.1
150	50	16.9	4.3	74.6

828S

SATLOC
SYS
GPS
DIFF
AREA
SATLOC
MAN
RPM
AIR SPEED
FUEL
L.H. MAIN
R.H. MAIN
WARNING
LOW FUEL
PRESSURE
ON
OFF INST. AND FLAP LITES
CB ALT
CB WORKING LIGHTS
CB START
OFF DOME
CB FUEL IND.
CB STROBE LITES
CB INST.-LITES-NAV.
FUEL WARN
OFF BATT.
OFF ALT.
STALL WARN
GPS SPRAY
CB AUTO FLAG
DO NOT TURN ALTERNATOR OFF IN FLIGHT EXCEPT IN CASE OF AN EMERGENCY.

SATLOC
SYS
GPS
DIFF
AREA
SATLOC
MAN
FUEL
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L.H. MAIN
R.H. MAIN
FUEL QUANTITY
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CB
FUEL
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ON
OFF
BATT.
ON
OFF
ALT.
CB
STALL
WARN
GPS SPRAY

Amount of lift lost by RVA

Method used to determine loss of lift	**Amount of lift lost**
2-D model loss of lift (calculated)	635 lbs
Static Tube loss of lift (actual measurement)	312 lbs

Weight and hose power required

	Weight in lbs	Drag in lbs	Loss Hp
Chamber 115 mph	244	156	48
Chamber 150 mph	244	265	106
Spreader 115 mph	218	205	63
Spreader 150 mph	218	349	144

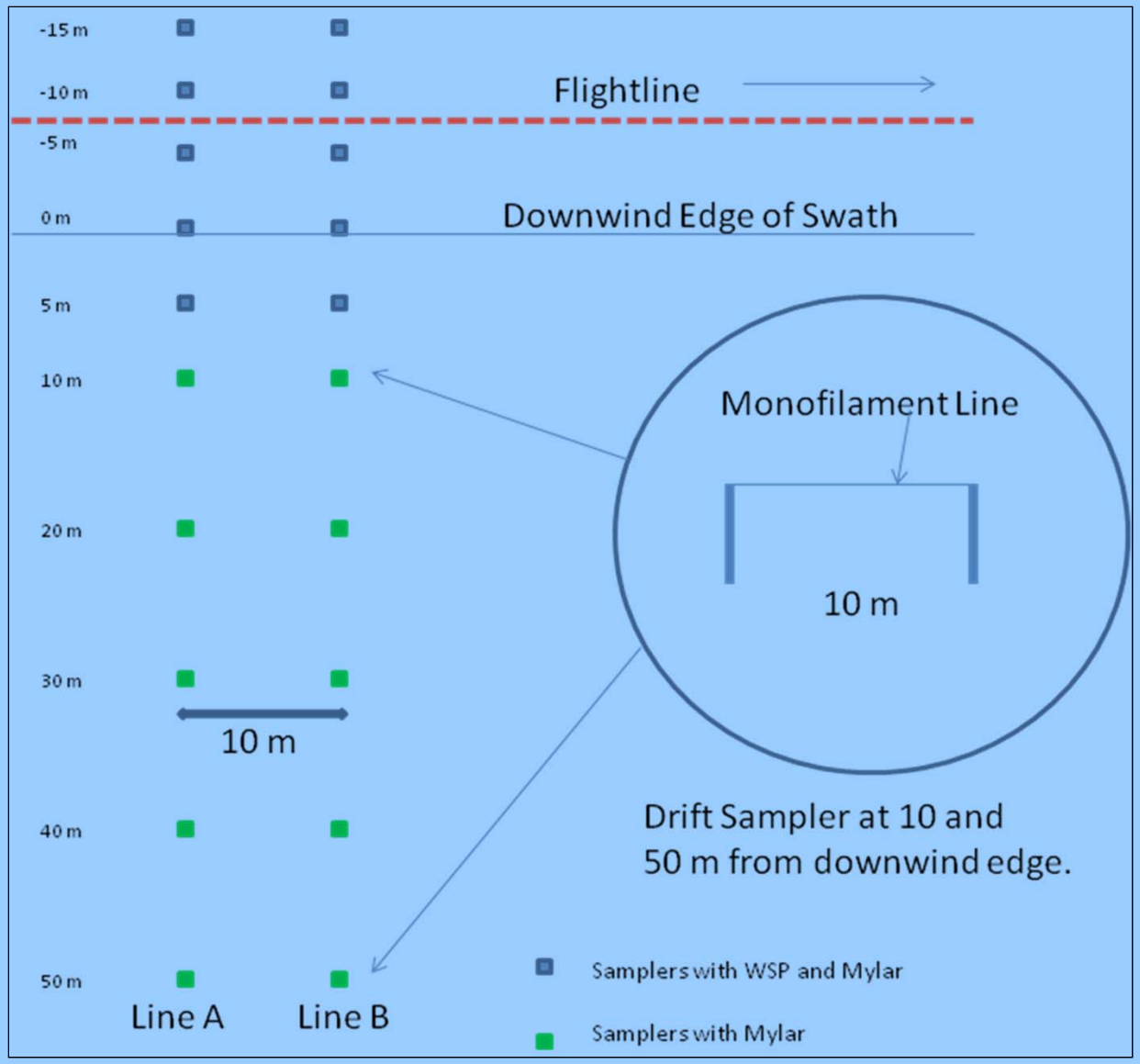
RVA and Conventional drop size

SYSTEM	VMD	DV 0.1	DV 0.9	%<200μ
Conventional	406	238	553	5.0
RVA	456	287	647	3.7

RVA spray system performance

Type	**Back-To-Back C.V.**	**Racetrack C.V.**
Conventional	11	19
RVA	13	13

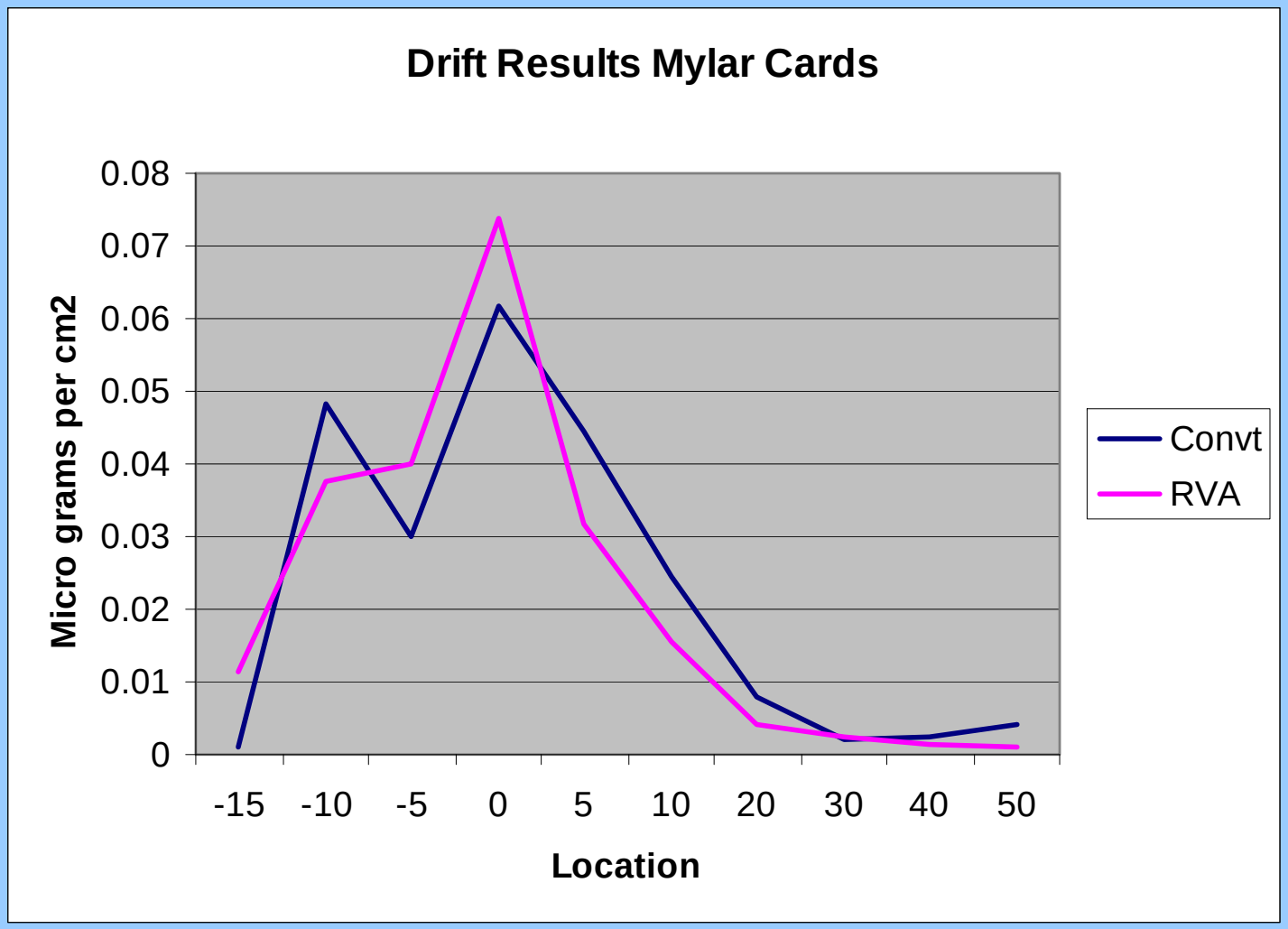
Drift study layout



Drift study drop comparison

SYSTEM	VMD	DV 0.1	DV 0.9
Conventional	389	231	539
RVA	441	300	591

Drift results Mylar cards



Monofilament Collectors

Sample Location	Conventional	RVA	% Reduction
10 Meter	0.073896 µg/cm2	0.043758 µg/cm2	40.8
50 Meter	0.009984 µg/cm2	0.006055 µg/cm2	39.4

Acknowledgements

- USDA, SBIR Program, grant # 2005-33610-16463
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Thank You

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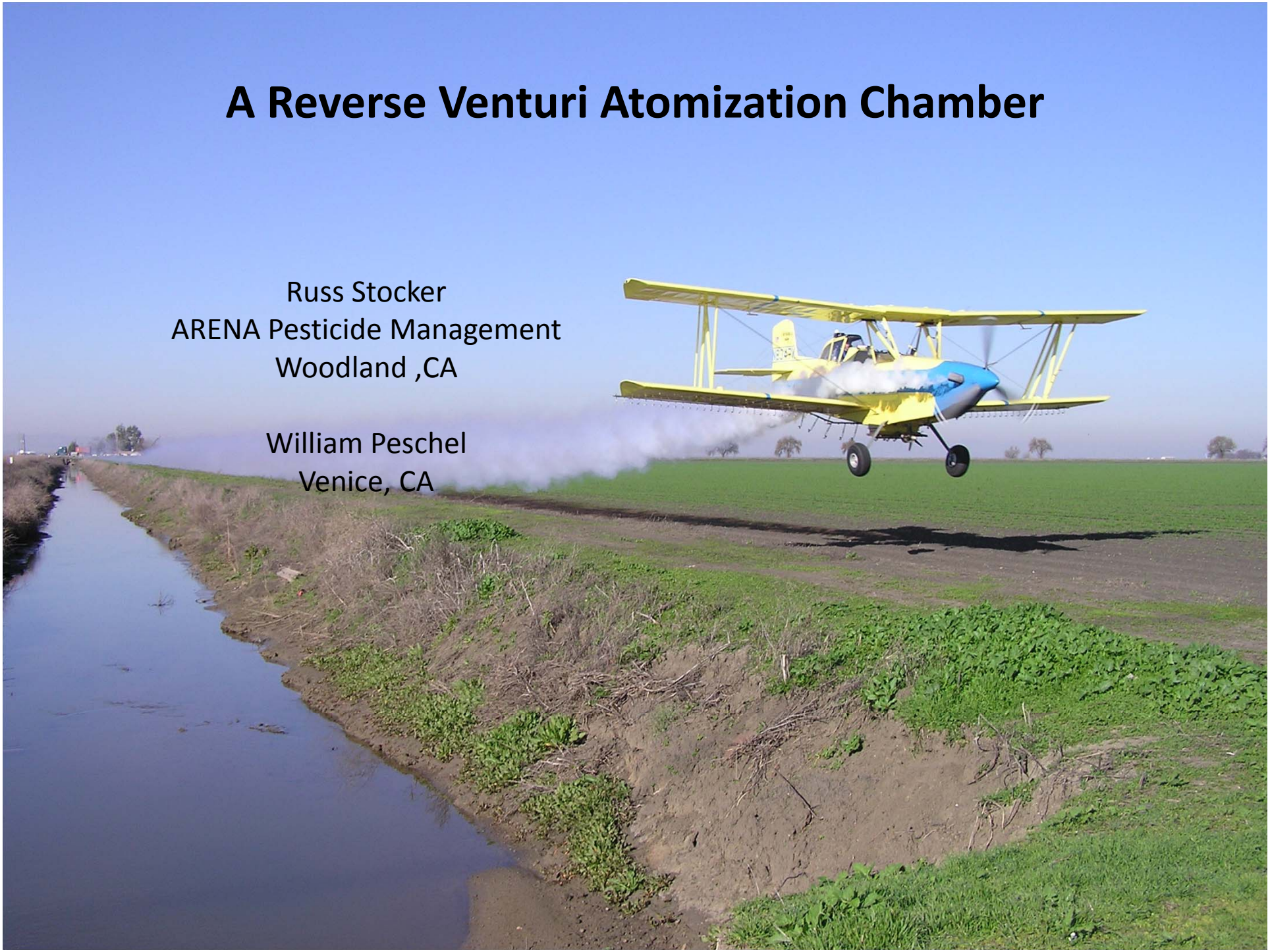
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