

What is Aircraft Icing?

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#COSISciFest
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When do you ice?

Icing happens
when you fly
through cold
clouds

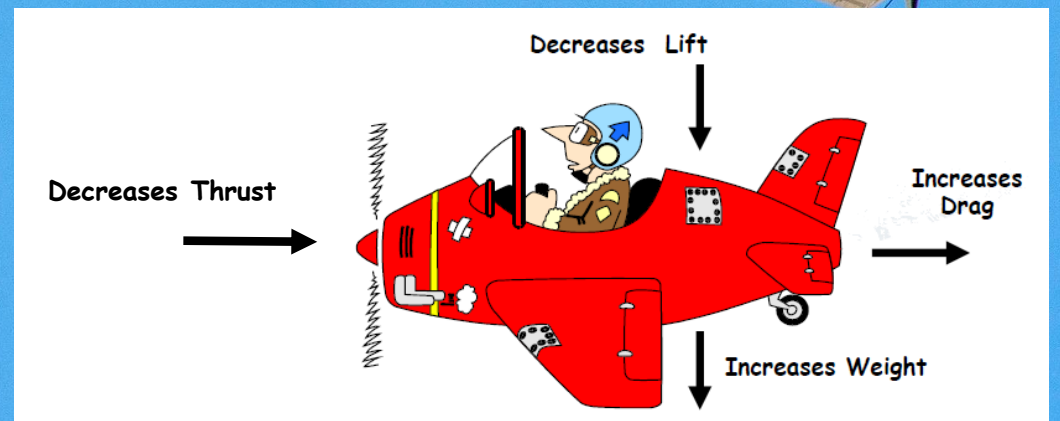
Stratus – Small Drops



Cumulus – Large Drops



High Clouds – Ice Crystals



Flight Testing





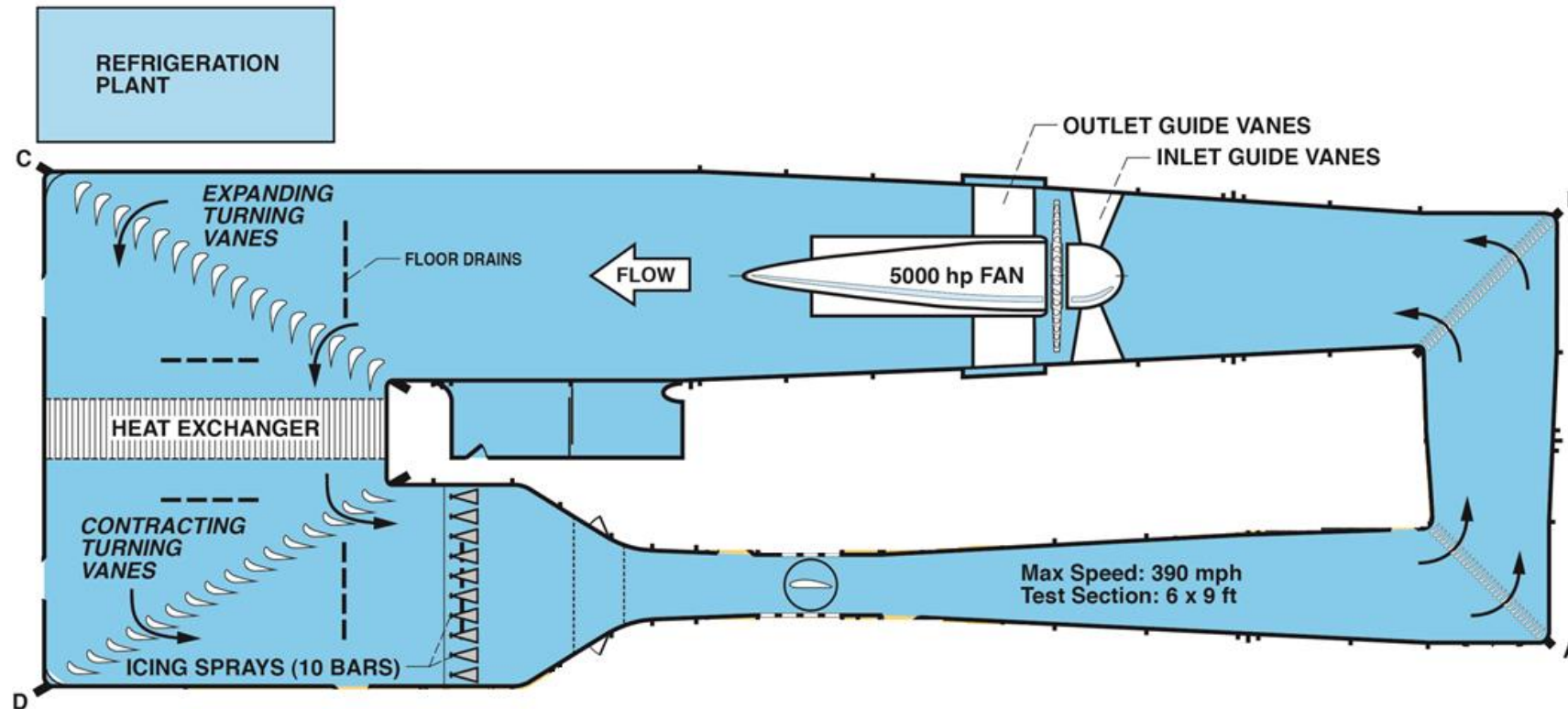


2003/11/30
VIAS=121
AOA= 0.5
19:54:50.0

TT=-7.02 TS=-9.41
KLWC=0.002 ALT= 8.7



Icing Research Tunnel



To simulate flight through an icing cloud, the engineers needed to make it Windy, Cold and Wet in the Test Section







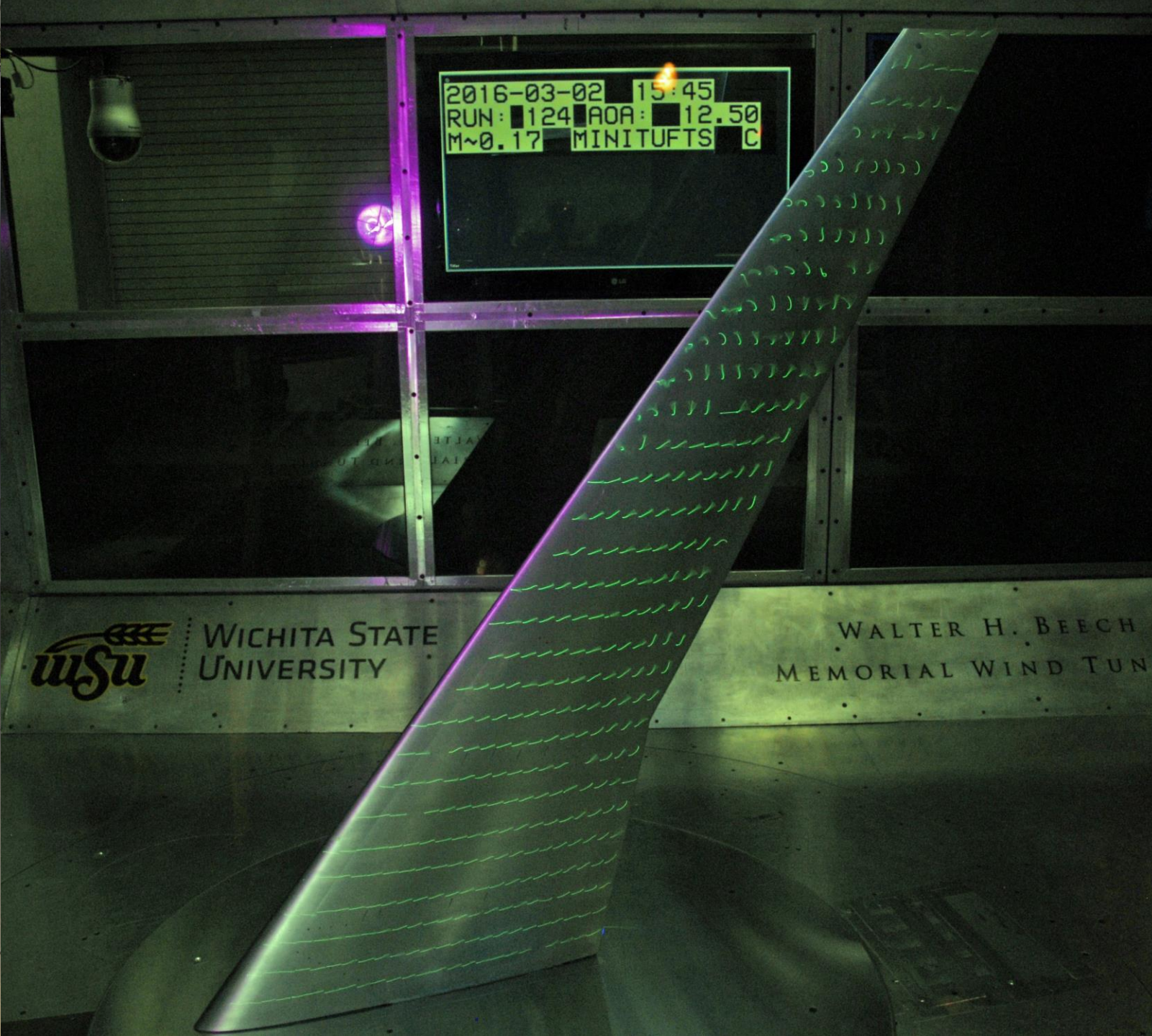


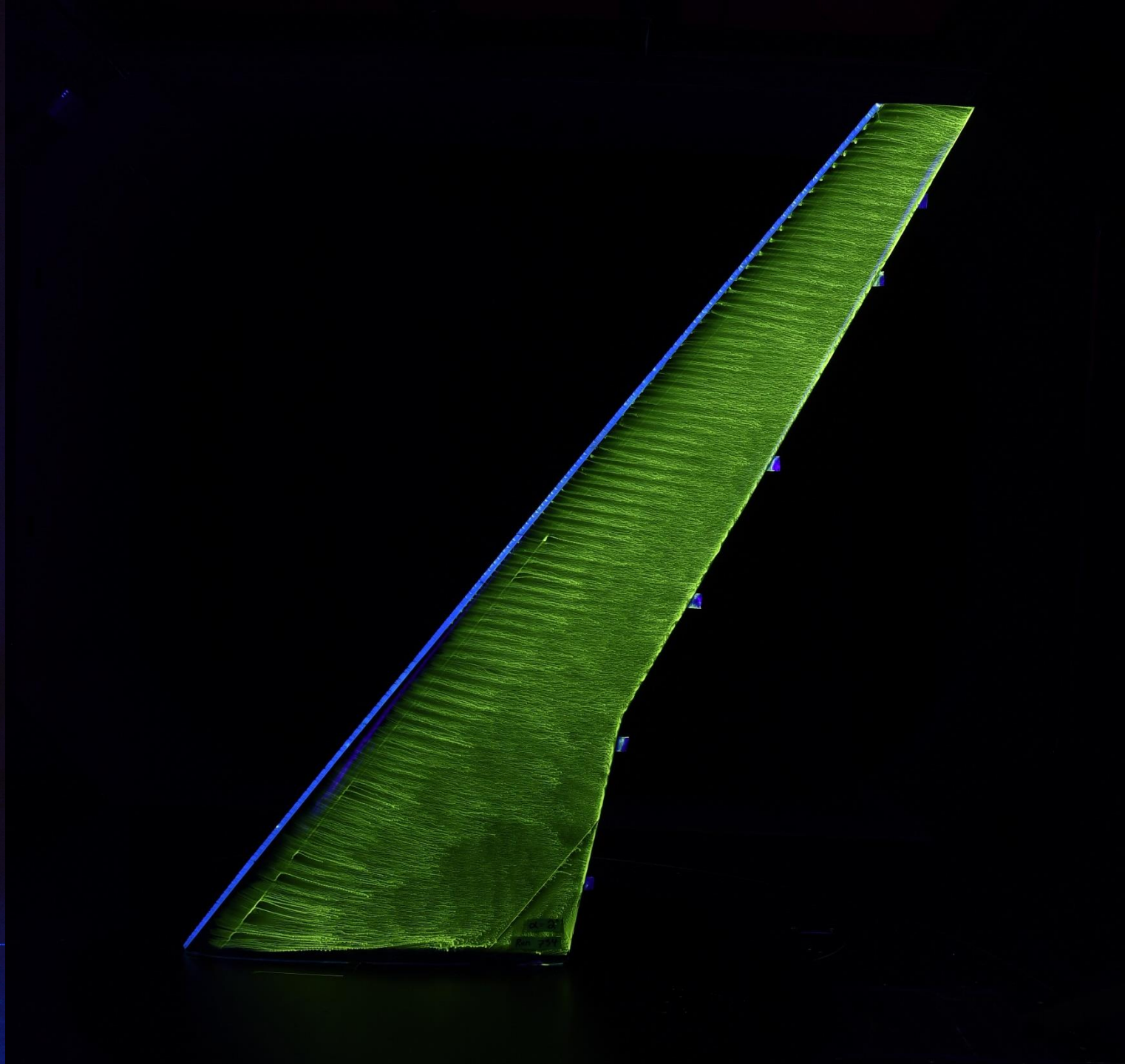




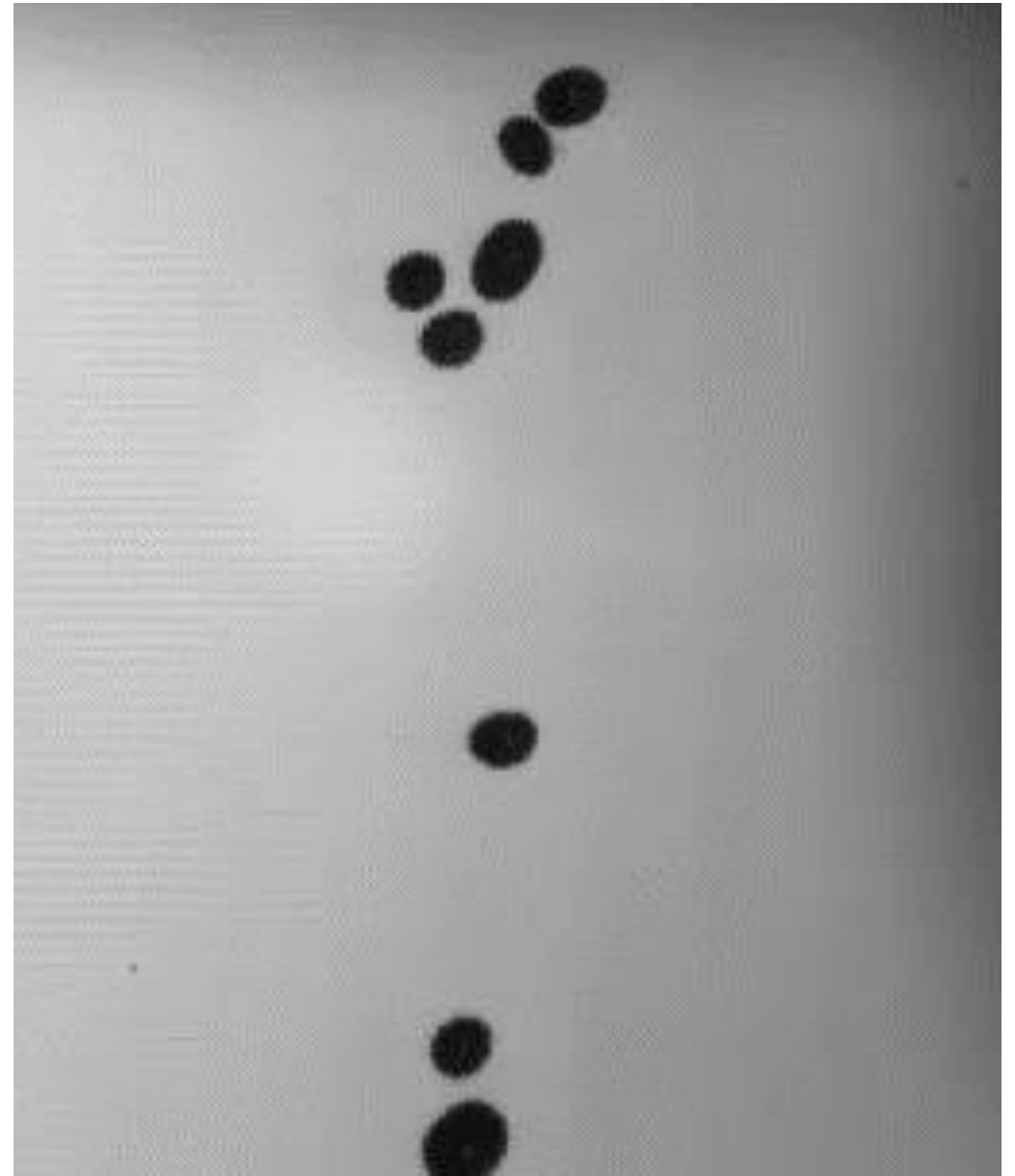
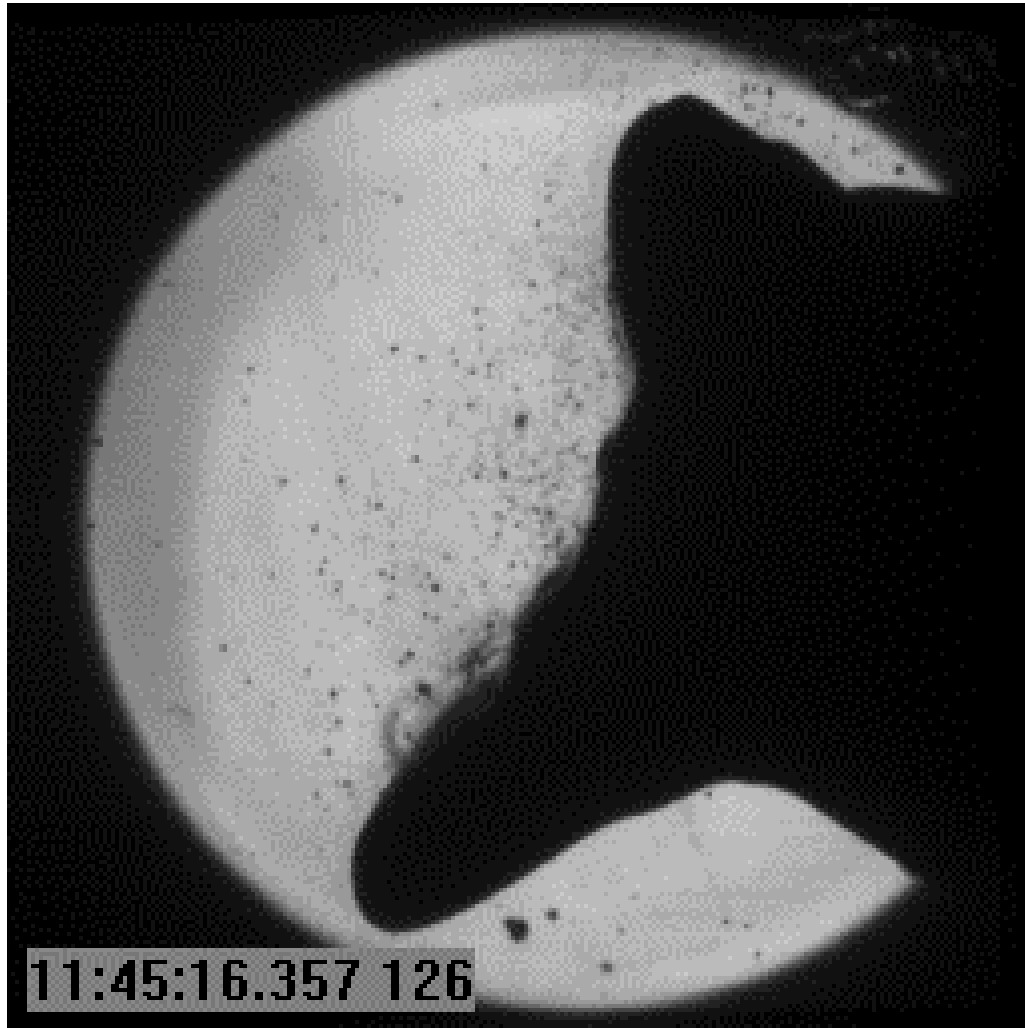
Icing Videos

- <https://www.youtube.com/watch?v=TDyeJ3hcCZY>
- https://www.youtube.com/watch?v=_ifKduc1hE8
- See many NASA videos here:
- <https://www.youtube.com/user/NASAgovVideo>





Droplets

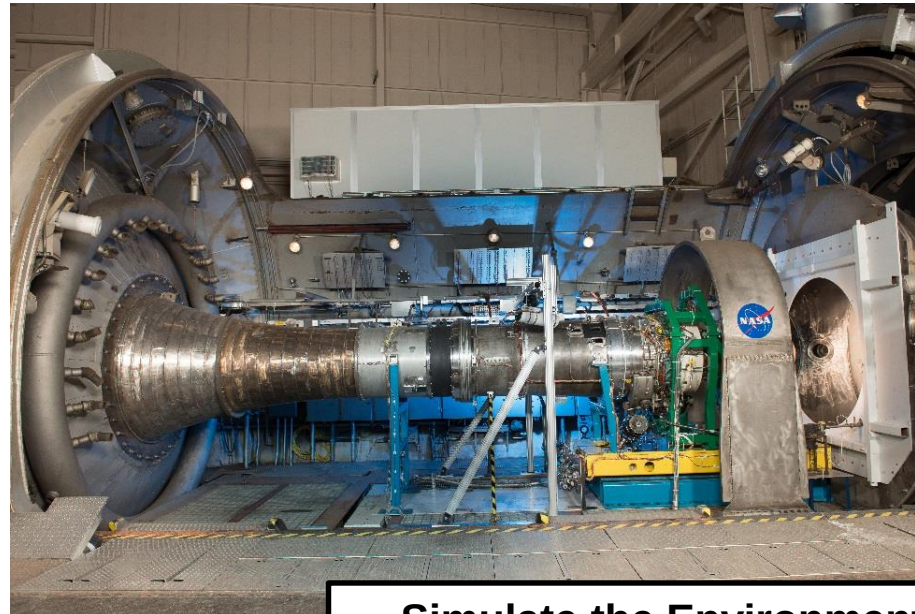
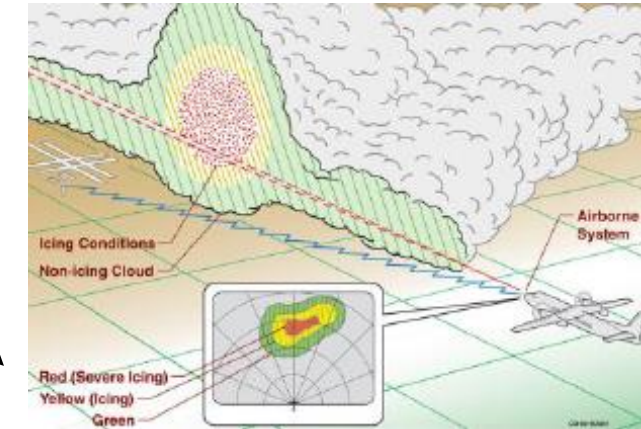


Engine Icing

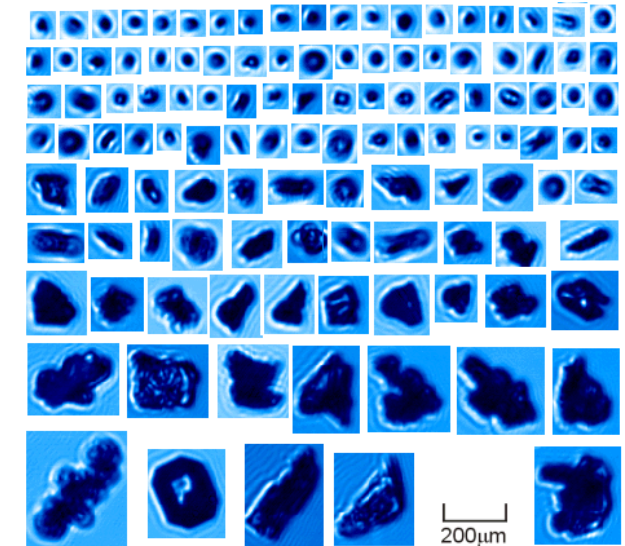
Flight Research

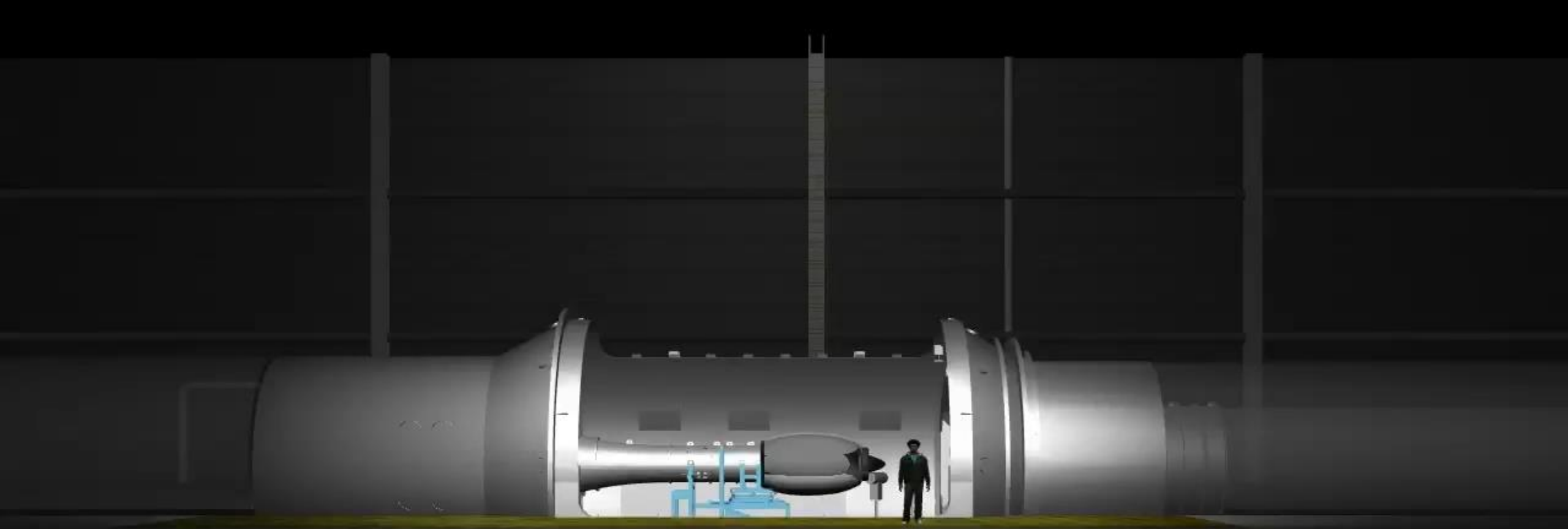


Understand the Environment



Simulate the Environment





G-VIS
Graphics Visualization Lab

ATP
Aeronautics Test Program



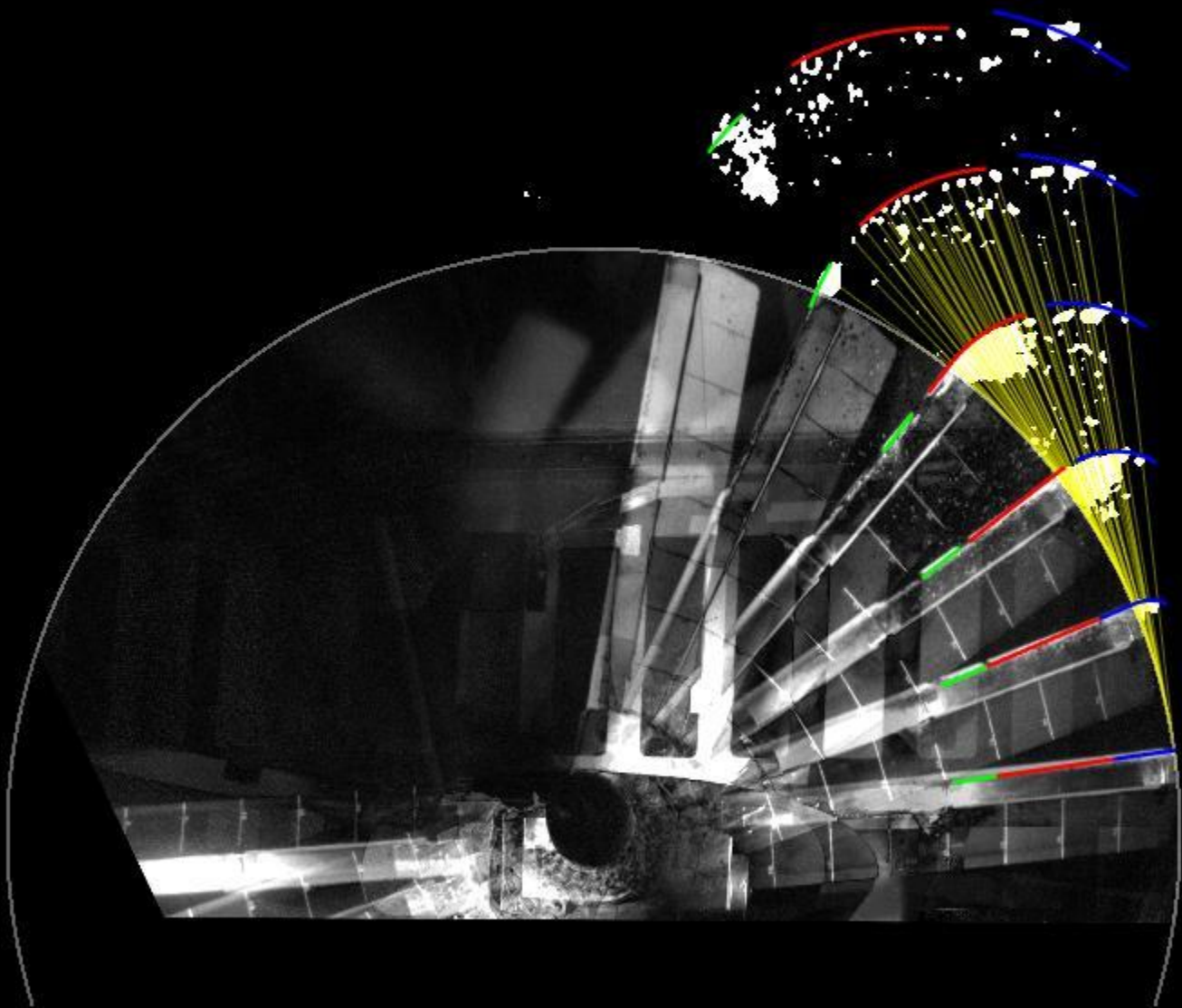
Glenn Research Center

U.S. Army Redstone Test Center/Collin Magonigal, RTC Photographer; A V-22 Osprey flying behind the Helicopter Icing Spray System, or HISS, while conducting artificial icing testing.
Source: <https://www.uppermichiganssource.com/>

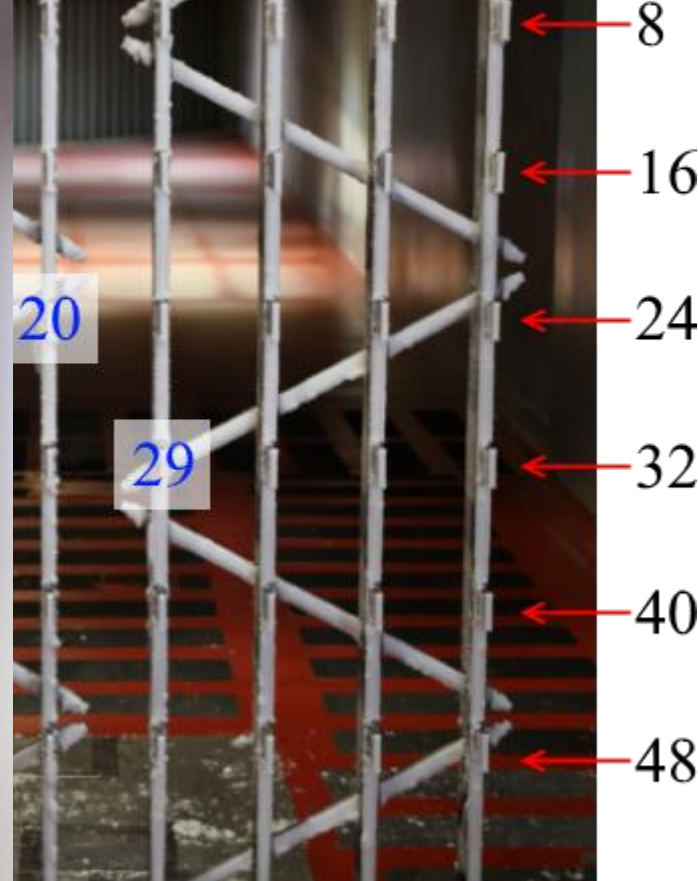
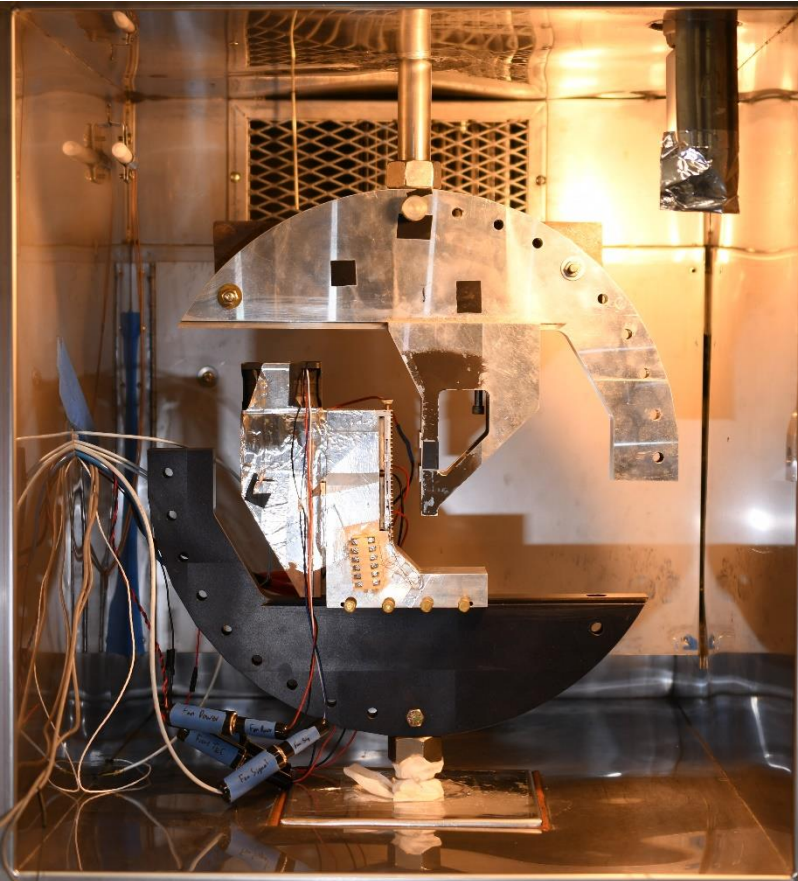








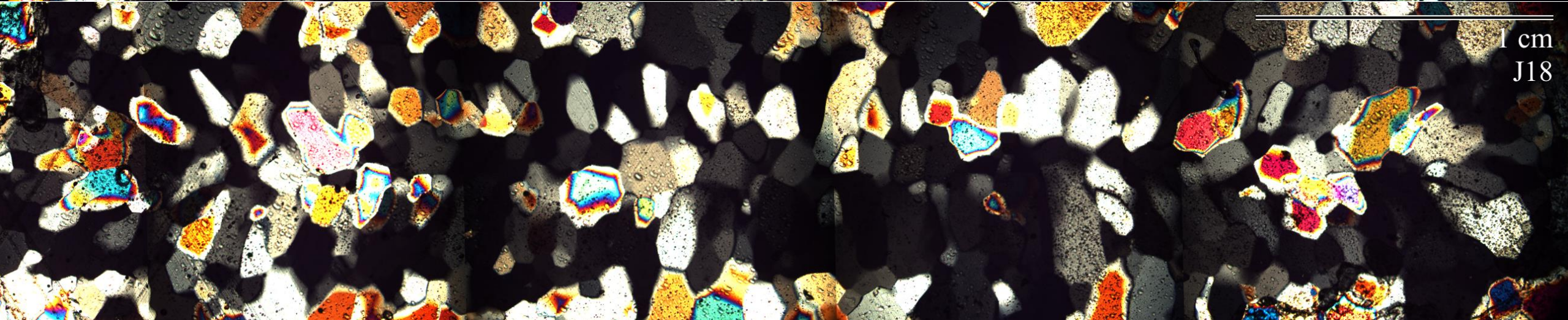
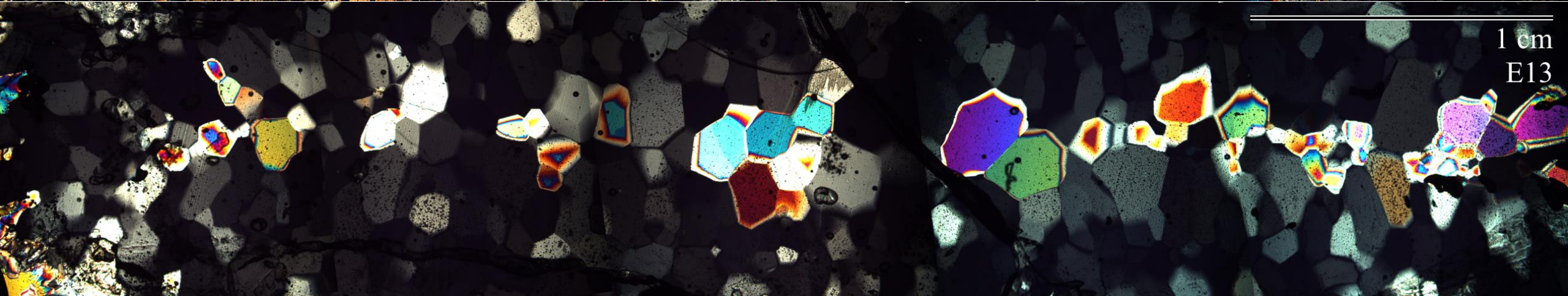
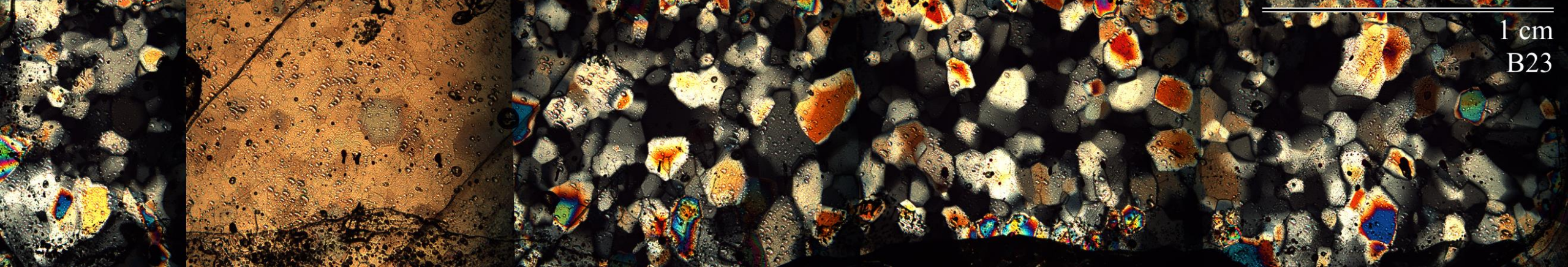
Adhesion Testing



Can you guess problems with my test?

Work, A., *The Measurement of the Adhesion of Glaze Ice*, in *Mechanical Engineering*. 2018, University of Louisville. p. 268.

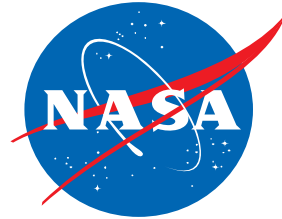
Work, A.H., et al. *An Experimental Study of the Adhesion Strength of Impact Ice*. in *2018 Atmospheric and Space Environments Conference*. 2018.



Cross-Polarized Light - At Home Experiment

- Do you have polarized glasses or a polarized camera filter?
- Put a white screen up on your TV/monitor, and look through your glasses. Rotate your glasses, and if the screen goes dark, they're polarized.

Questions?



Thanks to NASA RVLT project for funding support

