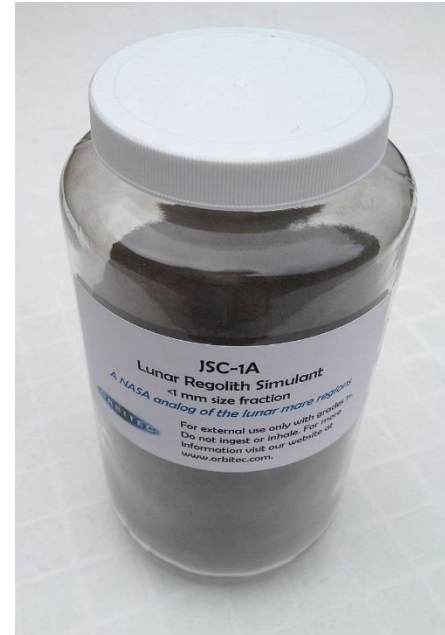


Use of Analogue
materials in *some* JSC
Curation labs
Mike Zolensky

I don't have much to say
about these

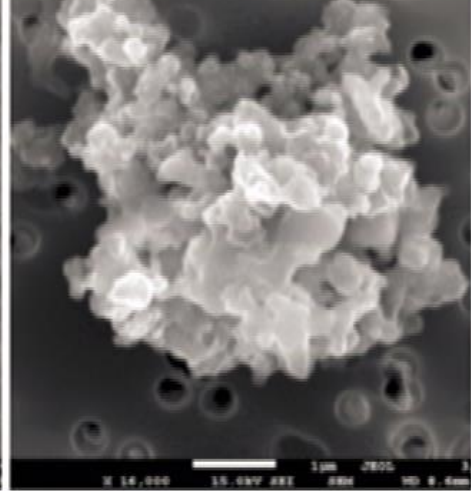
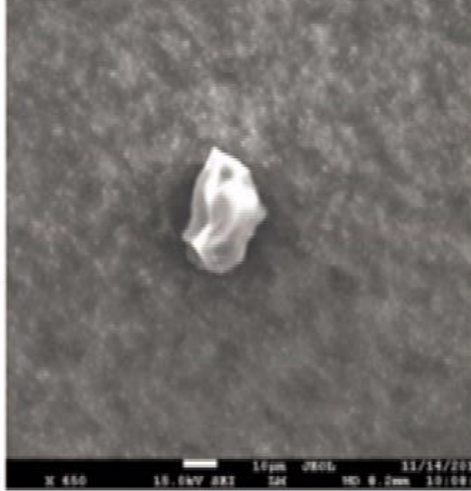
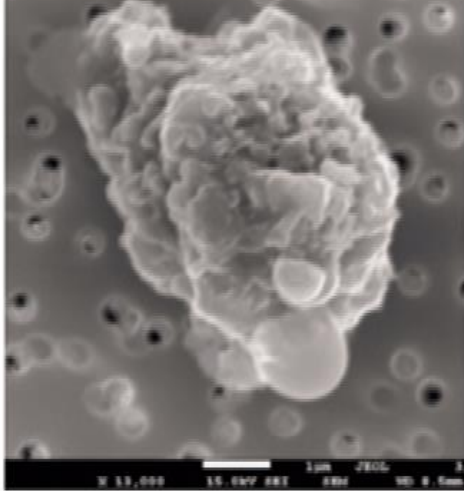


Lunar Lab



Antarctic Meteorite Lab





National Aeronautics and Space Administration



Cosmic Dust Catalog Volume 19

Particles from Collectors U2153, U2158, and U2160



WB57



ER-2

A Perseid from the Space Station, 2011



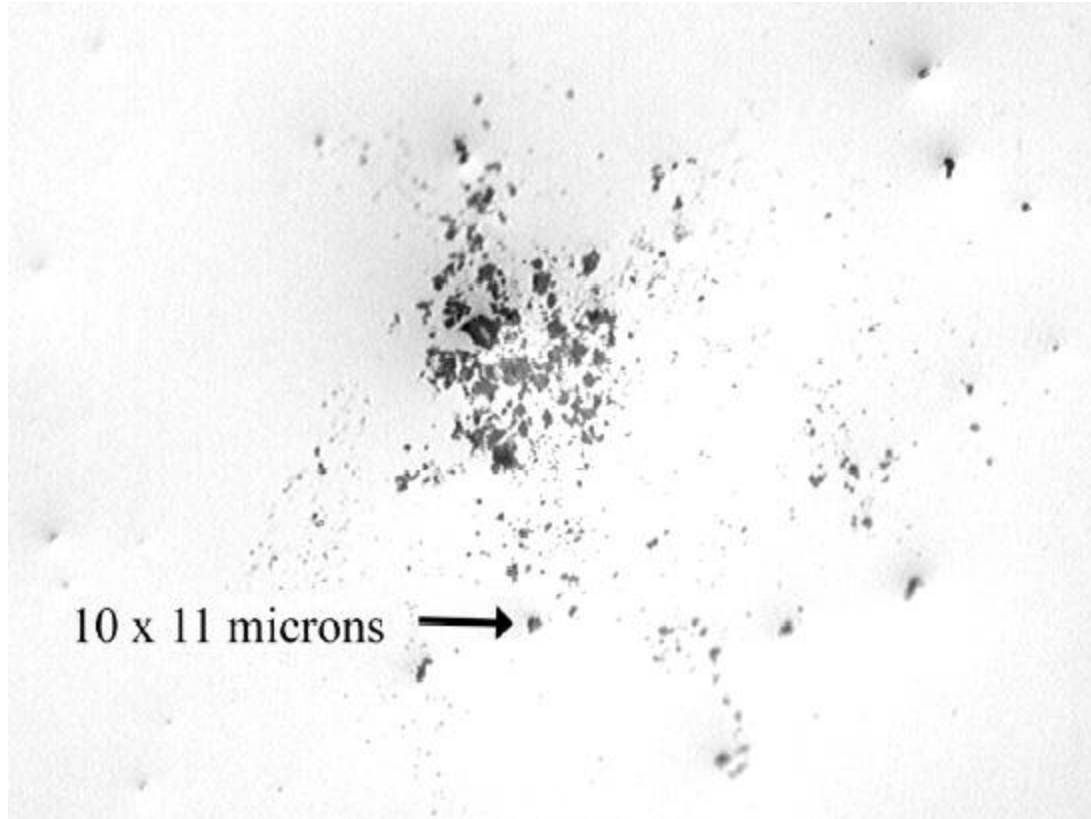
Cosmic Dust Lab











Murchison



Other good options are ALH 83100, and LON 94101

Mars



Toxic?
Dust inhalation
concerns

Martian Samples

Lunar and Planetary Science XXXV (2004) 1606.pdf
Morris et al. (2004)

Palagonitic tephra from certain areas on Mauna Kea Volcano (Hawaii) are well-established spectral and magnetic analogues of high-albedo regions on Mars.palagonite is “a yellow or orange isotropic mineraloid formed by hydration and devitrification of basaltic glass.” ... the best Martian spectral analogues contain allophane-like materials and not crystalline phyllosilicates. ..



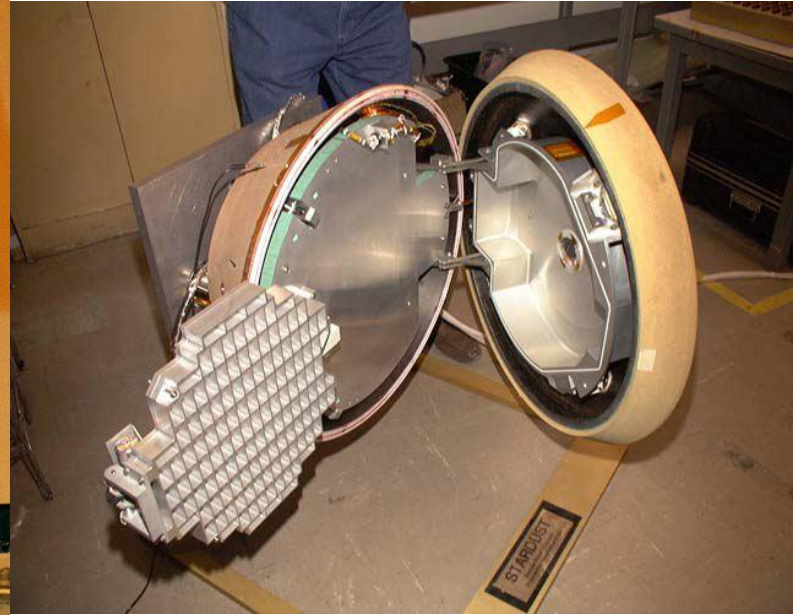
Mauna Kea basaltic tephra: poorly xline silicates, aluminous basalts

JGR Planets 113, 2008

Victoria E. Hamilton, Richard V. Morris, John E. Gruener, Stanley A. Mertzman

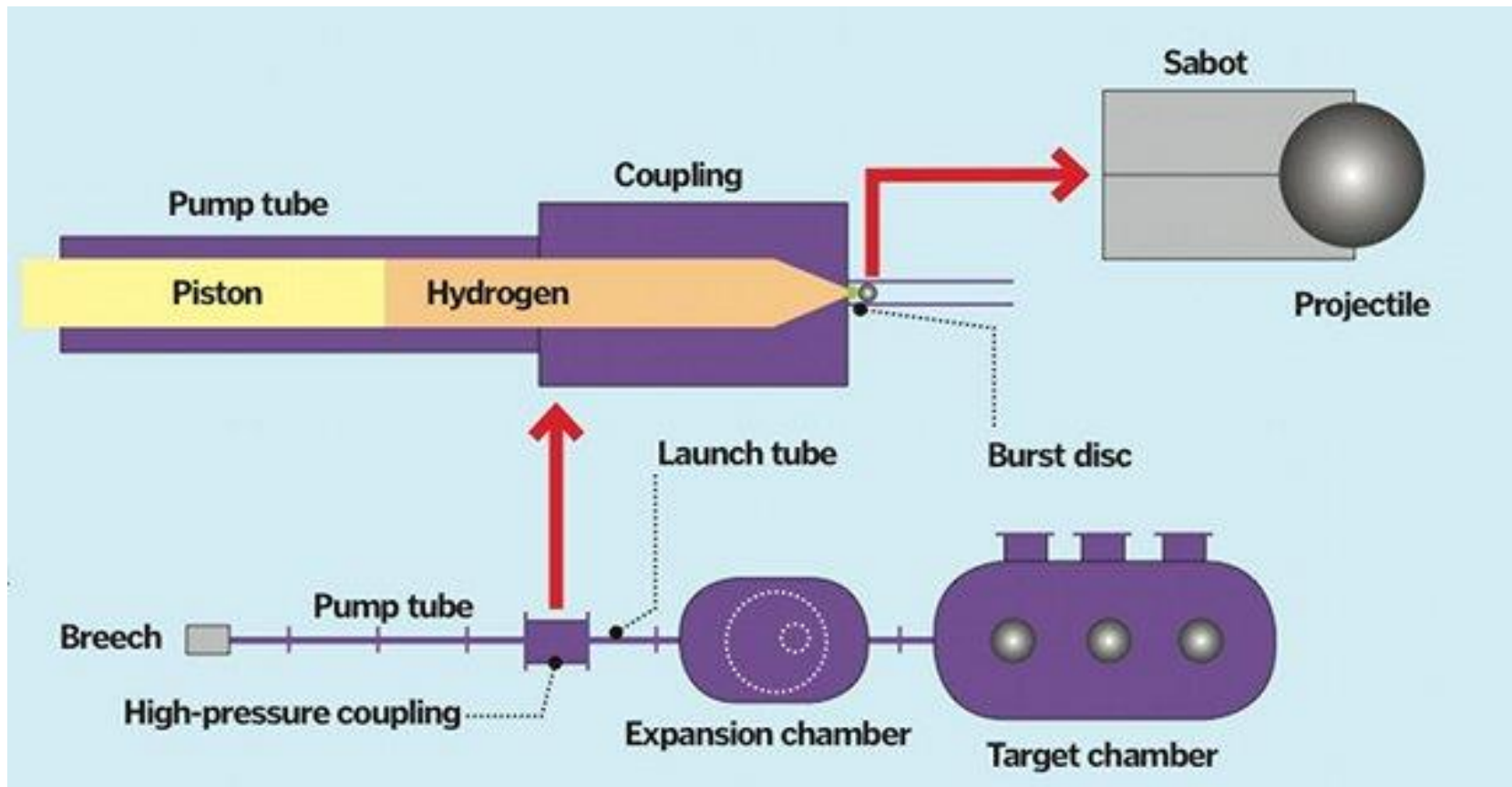
“Although **Mauna Kea palagonitic tephra** is considered a VNIR analog to Martian dust, comparison of MIR altered tephra spectra (<45 μm fraction) to dust spectra retrieved from Mars Global Surveyor and Mars Exploration Rover instruments do not provide good spectral matches. The best MIR match is a tephra that has a strong plagioclase feldspar transparency feature and was altered under dry, high-temperature, oxidizing conditions. This sample is not a VNIR analog and is not a process analog, but it emphasizes the mineralogical importance of plagioclase feldspar in Martian dust. ***No single tephra is a good spectral analog across the VNIR and MIR.*** “

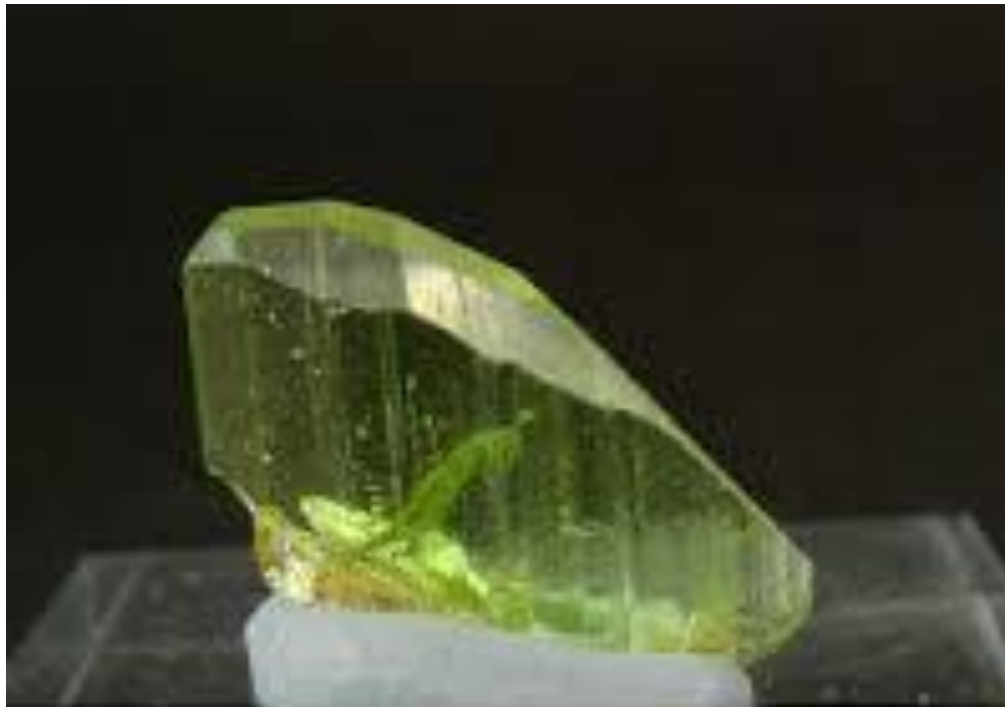
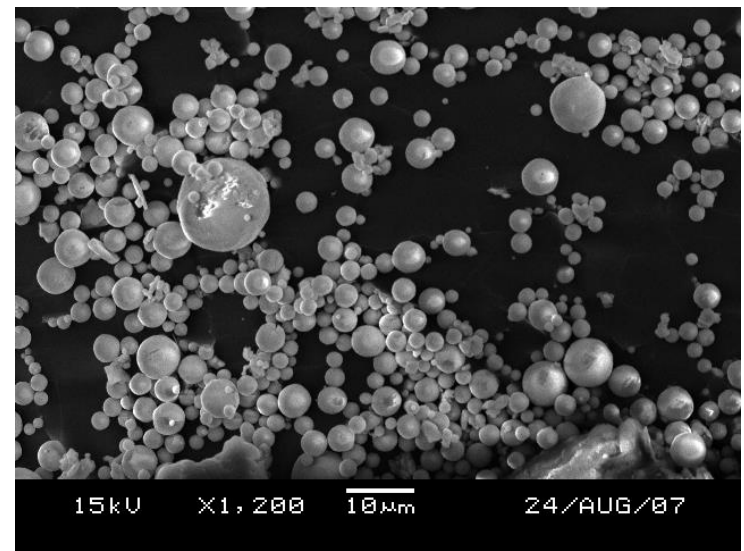
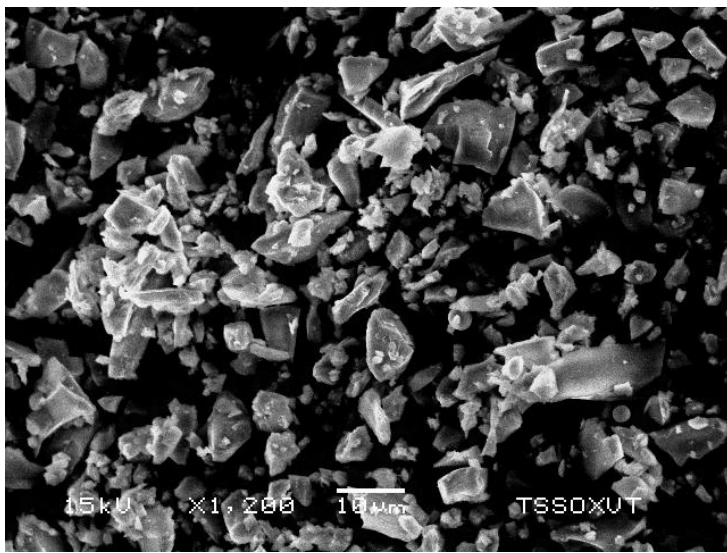
Stardust and other Comet sample missions



Fred Hörz's (now Mark Cintala's) Gun Lab at JSC

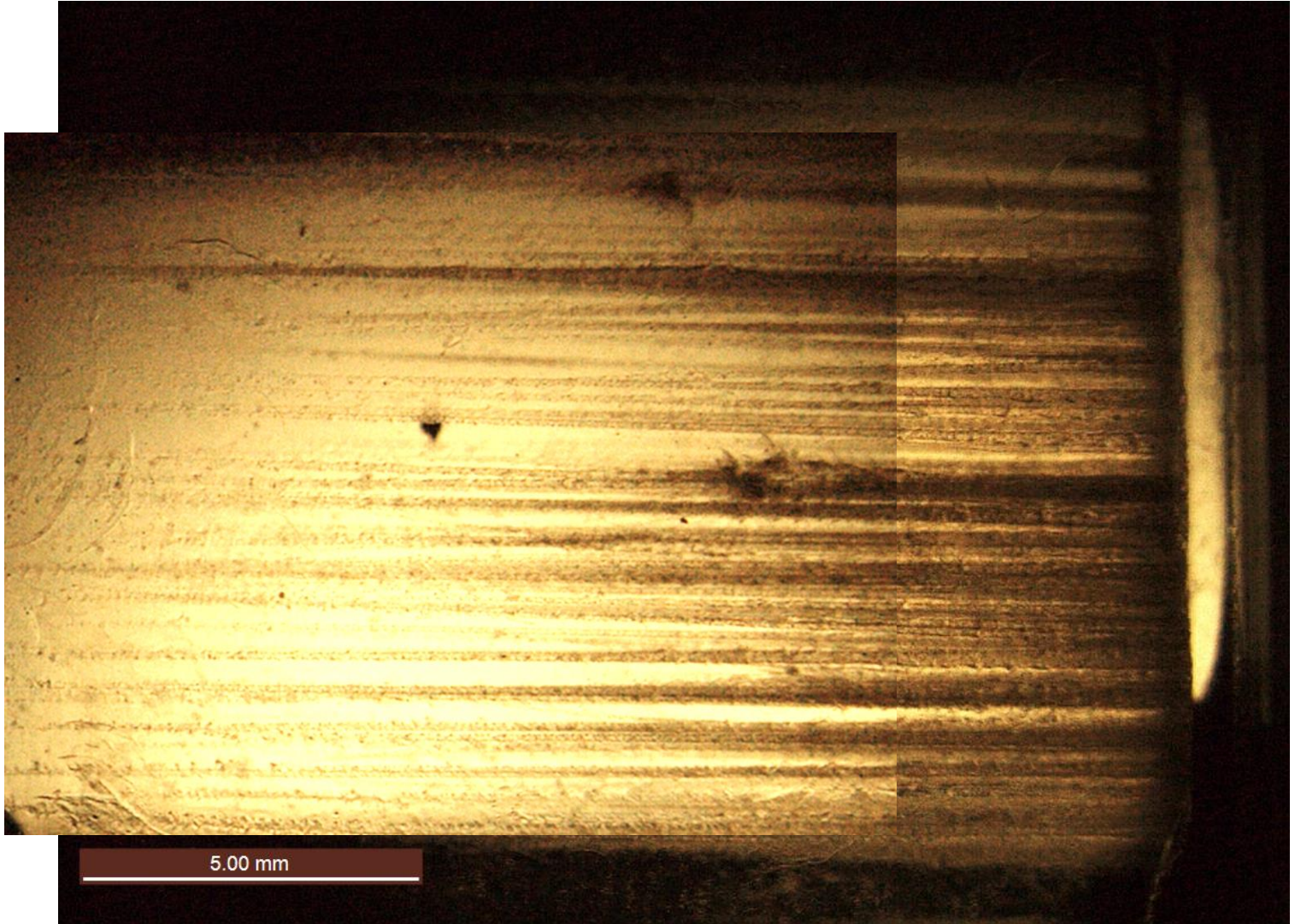






Zabargat Island
forsterite





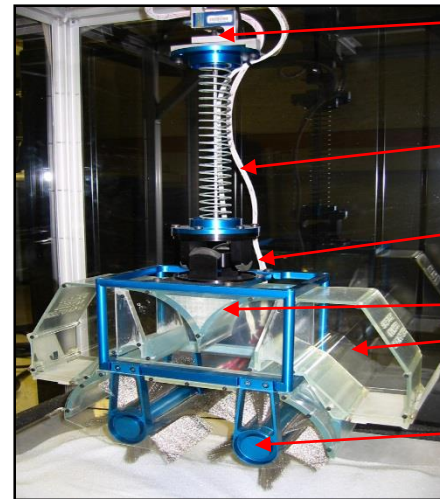
5.00 mm



5.00 mm



Brush Wheel Sampler



Normal Force Load Cell
at S/C Interface

Flexible Boom Analog to
Mimic S/C interaction
during a Touch-and-Go
Event

Compliant Joint Allows
the Sampler to Conform
to Local Regolith
Topography

Material Deflector

2x Clear Sample
Containers Allow
Visualization of Sampling
Process

Counter-rotating
Compliant Brush Wheels



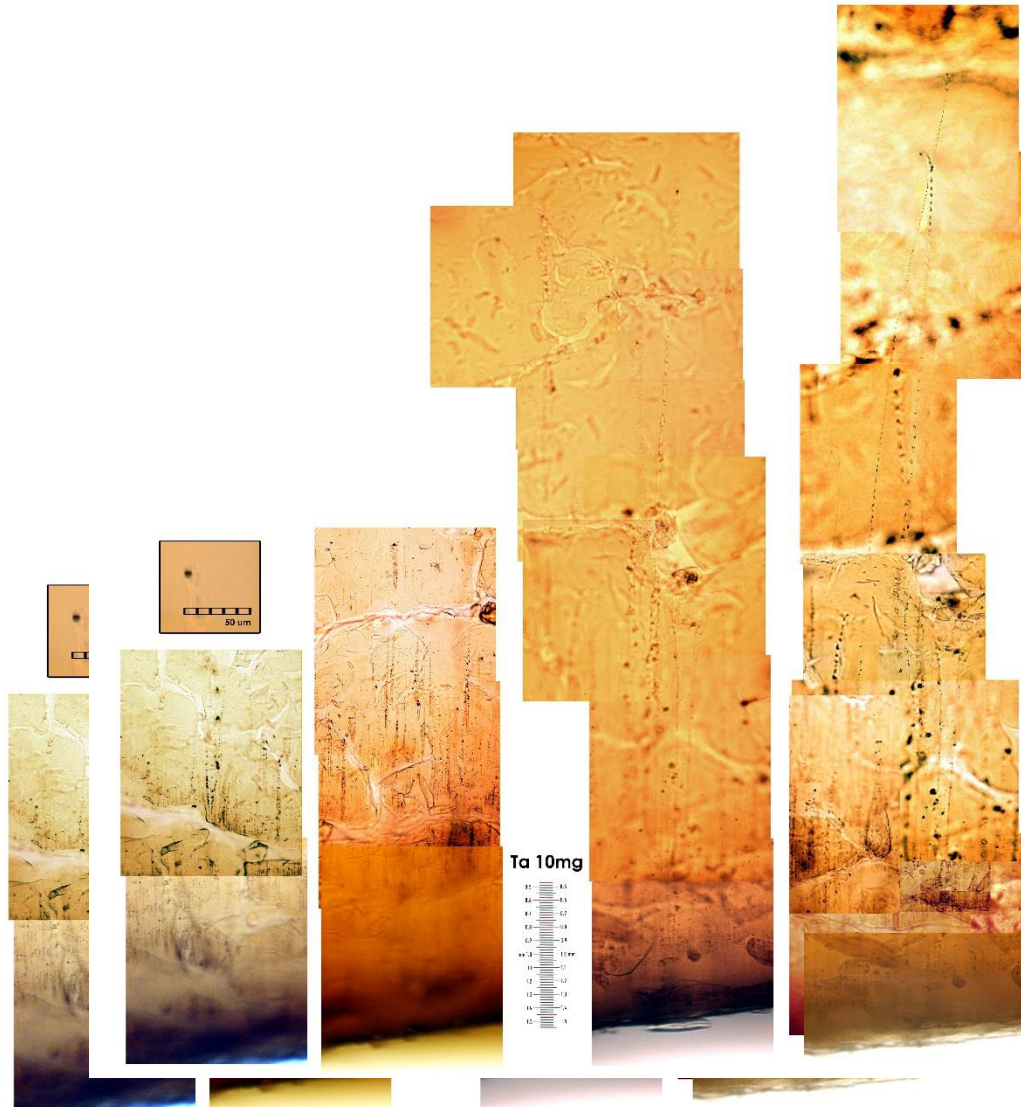
BANDELIER TUFF –
VALLES CALDERA

Dacites/rhyolites



Correct physical properties, but completely
incorrect mineralogy

Shots into tantalum aerogel



Stardust Landing site (Utah Test and Training Range) materials



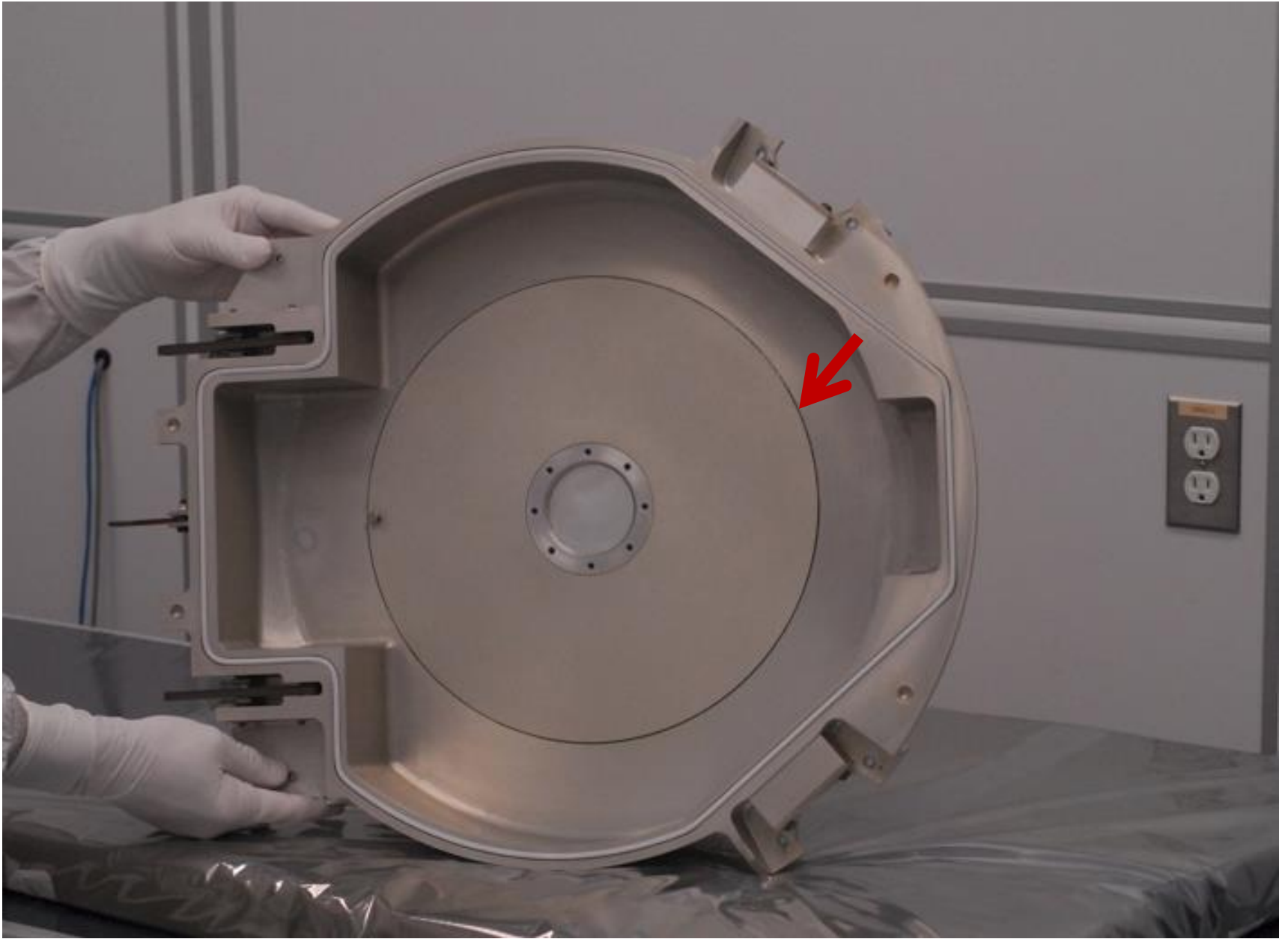


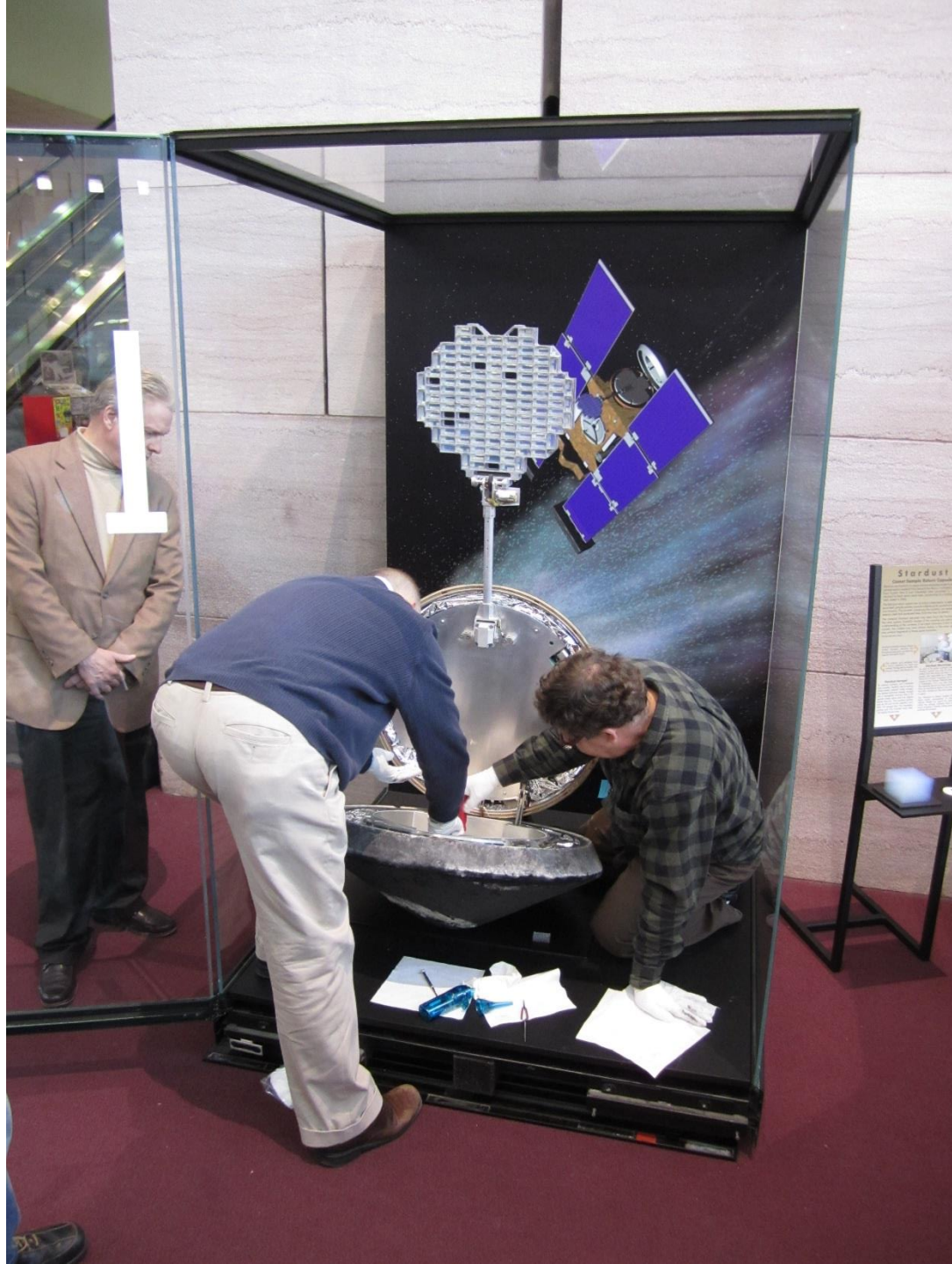
Stardust Lab



Contamination Documentation Samples







1

Stardust
Small Science Mission

Hayabusa Lab at JSC



Hayabusa Sample Glovebox

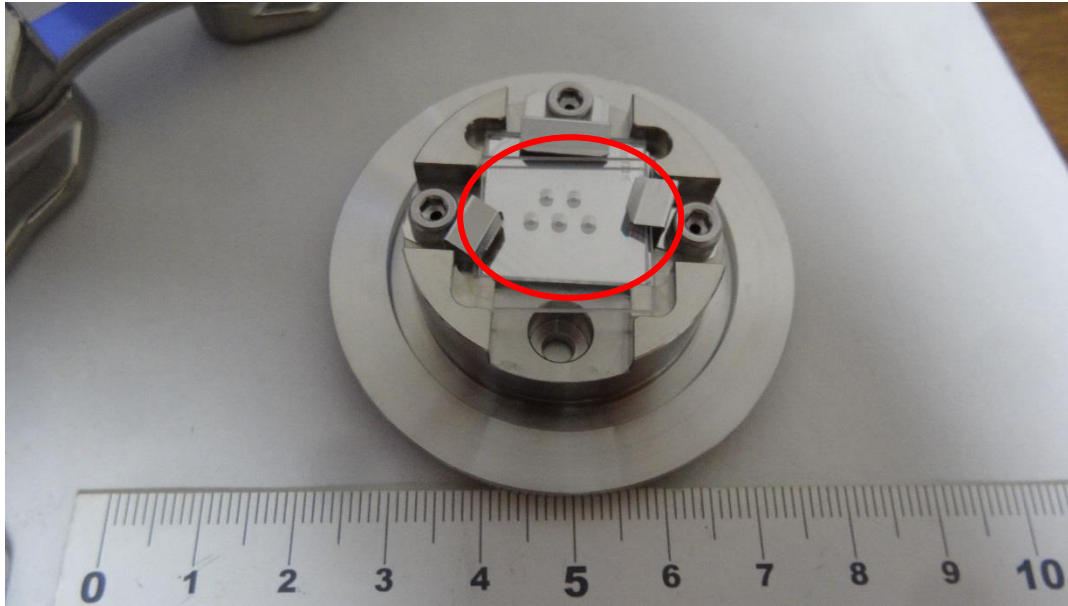


Technical Specifications:

- ❖ Stainless steel construction
- ❖ Hypalon gloves
- ❖ Viton seals
- ❖ Constant purge of Curation grade nitrogen gas
- ❖ Purgable sample pass-throughs
- ❖ Sensors to measure the ppm levels of O₂ and H₂O in the nitrogen environment
- ❖ Microscope and camera mounted outside
- ❖ We may install an electrostatic particler manipulation system inside the glovebox
- ❖ Laptop with software for logging glovebox environmental conditions and sample data
- ❖ Spare wall penetrations for ease of future modifications

Hayabusa landing site (Woomera) soil and rocks





We use LL4 chondrite grains as analogues for our tests of new PIs