Dust Measurements

Jim Spann
NASA/MSFC
with input from Paul Greenberg, Tony Colaprete, Larry Taylor, and others

OBJECTIVE

- to inform engineering solutions to mitigate dust contamination - robotic, astronauts, instruments
- we don't really understand the nature of the dust environment
- therefore - need to make measurements that are practical and fundamental

DUST MEASUREMENT FOCUS

- geotechnical
  - bulk/regolith
  - levitated
- biological

GEOTECHNICAL

- adhesion
- coverage
- abrasion
- magnetic
- charge
- mass
- size
- number density

Biological

- size
- sampling
- reactivity

ISSUES

- size resolution of biological measurement requirement
- sensitivity of charge measurement
- location of sensors relative to lander
- arm/no arm
- LIDAR possibility/sensitivity

STRAWMAN PAYLOAD

payload element	objective	mass (kg) + 30%	power (W) + 30%	dimension	heritage
magnets	magnetic susceptability	0.7		45x45x1	MER
langmuir probe/	charge/field	3.9	6.5	20x20x10	groundbased and flight
particle counter	# density/ size/mass	9.1	9.1	20x30x30	groundbased and flight
sample processing (EPR)	reactivity	6.5	6.5	20x20x15	
QCM	# density/ mass	.5	.5	5x5x2	groundbased and flight