

***THE NASA DISCOVERY
STARDUST MISSION***

by

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Developed by T. Duxbury for T. Duxbury National and International Presentations

STARDUST

- ***4th NASA Discovery Project***
 - ***Mars Pathfinder, NEAR, Lunar Explorer prior Missions***
- ***1st NASA Unmanned Planetary Sample Return Mission***
- ***NASA, Univ of WA, JPL and LMA Partnership***
- ***Prof. Donald Brownlee, University of Washington, PI***
 - ***Co-I's***
 - Drs. Martha Hanner, JPL, Fred Horz, JSC,***
 - Marcia Neugebauer, JPL, Ray Newburn, Jr., JPL,***
 - Scott Sandford, ARC, Zdenek Sekanina, JPL, and***
 - Mike Zolensky, JSC***
 - ***Payload Instruments***
 - Aerogel Collector - Dr. Peter Tsou, Deputy PI - JPL, and Co-I Team***
 - CIDA - Dr. Jochen Kissel, MPI fur Kernphysik, and Team***
 - DFMI - Dr. Anthony J. Tuzzolino, U of Chicago, and Team***
 - NavCam - Facility Instrument for Co-I Team (Newburn - Lead)***
 - Radio Science - Dr. John Anderson, JPL, and Team***
 - High Rate Attitude - Dr. Benton Clark, LMA, and Team***

STARDUST SCIENCE OBJECTIVES

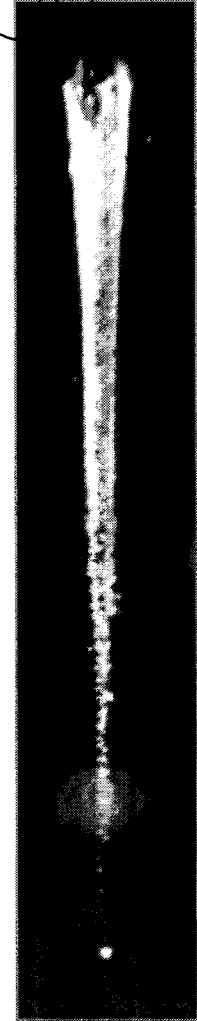
- Primary Requirement:** Collect 1000 Comet particles $>15 \mu\text{m}$ at encounter velocity < 6.5 km/sec and return to Earth
- Secondary Requirements:** Collect 100 Interstellar particles $>0.1 \mu\text{m}$ and return to Earth.
Provide ≥ 65 images of P/Wild 2, having a resolution of at least $67 \mu\text{rad}$ per pixel, taken within 2000 km of the comet nucleus through selected filters;
Provide in situ particle analysis for comet coma flythrough capable of resolving abundant elements in cometary solids
- Tertiary Requirements:** Provide in situ particle analysis for interstellar and interplanetary dust;
Collect comet coma molecules and return to Earth;
Measure dust mass fluence, large particles and comet mass upper limit
Provide dust flux measurement of 10^{-9} g to 1 g particles

AREOGEL

Coma & Interstellar Dust Collection



To collect the particles without damaging them, STARDUST will use an extraordinary substance called aerogel - a silicon-based solid with a porous, sponge-like structure in which 99 percent of the volume is empty space. Aerogel is 1,000 times less dense than glass, another silicon-based solid. When a particle hits the aerogel, it will bury itself in the material, creating a carrot-shaped track up to 200 times its own length, as it slows down and comes to a stop - like an airplane setting down on a runway and braking to reduce its speed gradually. Since aerogel is mostly transparent - sometimes called blue smoke - scientists will use these tracks to find the tiny particles.



Images taken from STARDUST Web Site and approved for use by T. Duxbury in national and international presentations.

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Sharon C. Duxbury STARDUST Project Manager (ACT)
5/15/00

CIDA

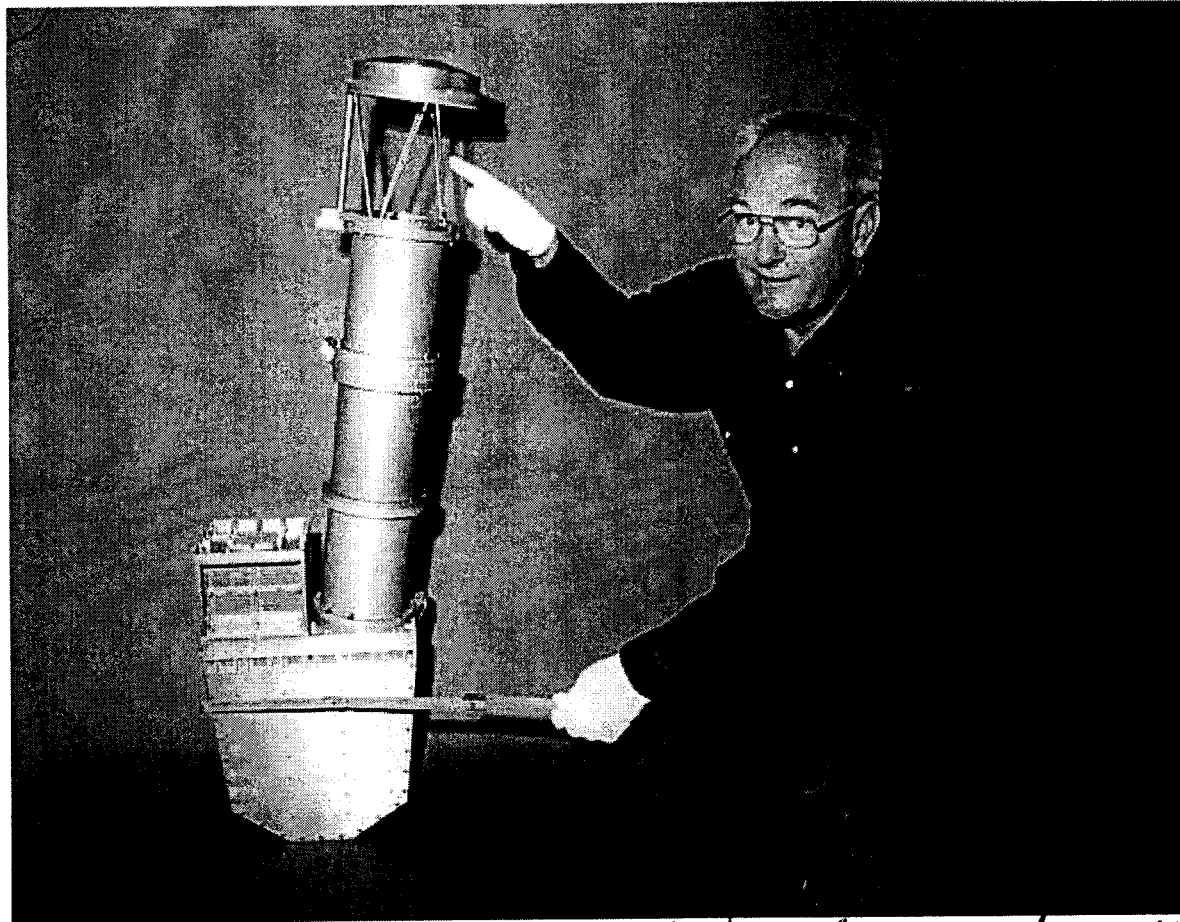
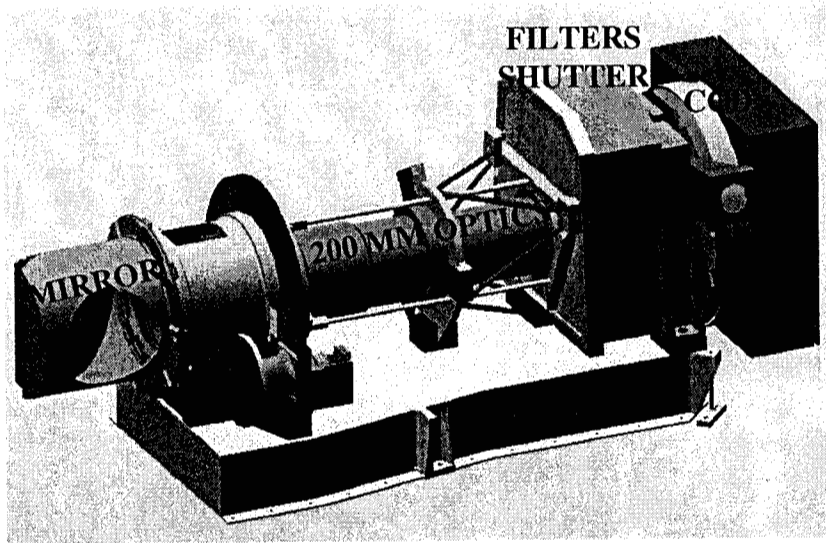


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— Thomas Duxbury STARDUST Project Manager (ACT)

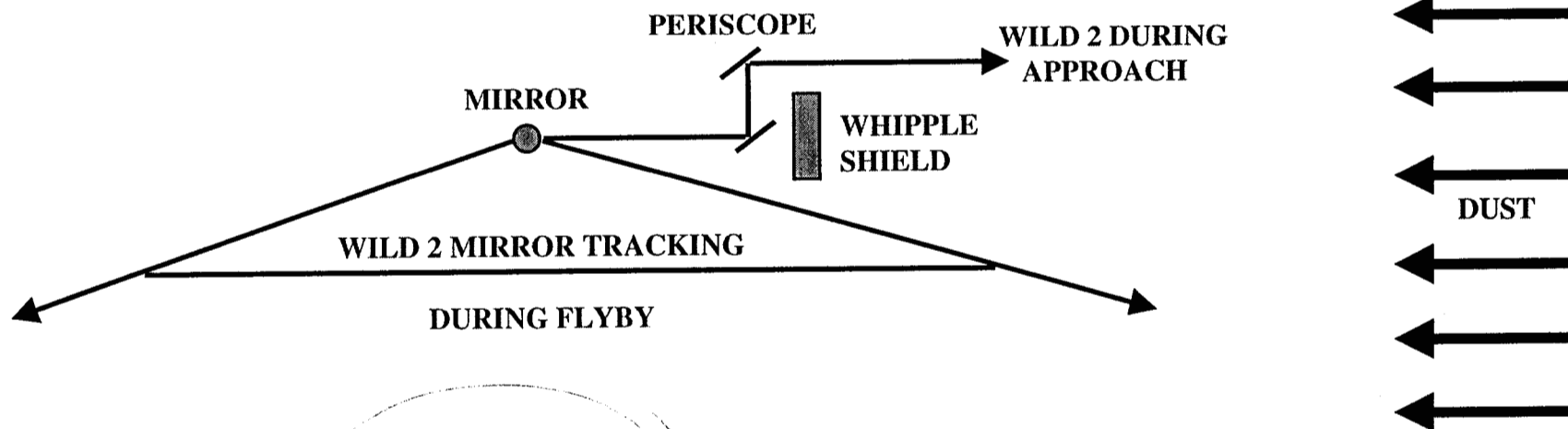
CAMERA



CHARACTERISTICS

- 200 mm VGR WA Optics
- 1024 x 1024 Cassini CCD
- 60 μ rad / pixel
- 1 Deg-of-freedom Mirror (200 deg)
- 8 Filters
 - 5140 \pm 60 C₂ (Blue)
 - 5800 \pm 20 Yellow Continuum
 - 5900 \pm 1000 Hi Res (Nucleus)
 - 6340 \pm 60 O^{[1]D}
 - 6650 \pm 75 NH₂
 - 7000 \pm 2000 Navigation
 - 7130 \pm 30 Red Continuum
 - 8700 \pm 150 Near IR

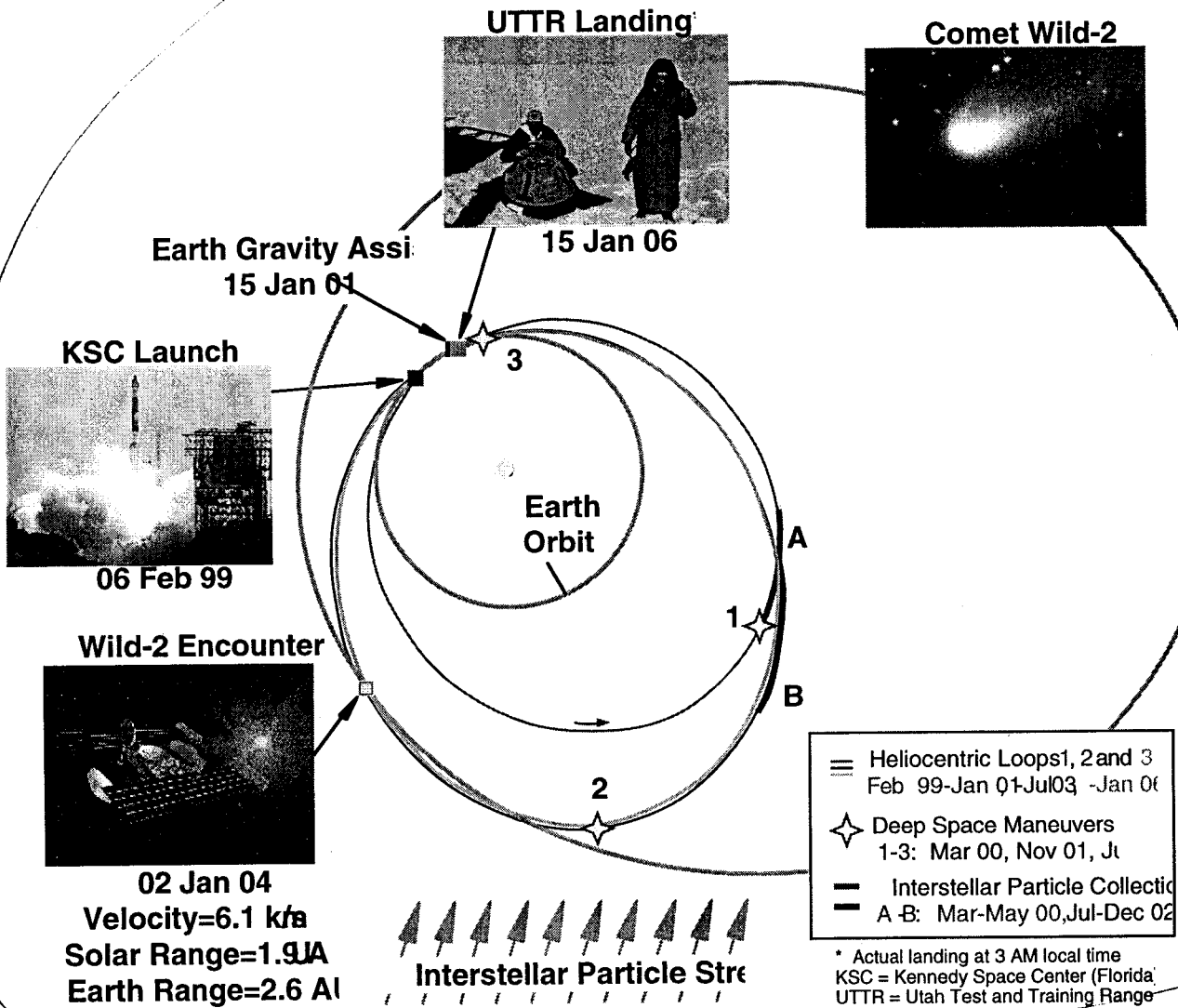
Periscope - protect optics during approach



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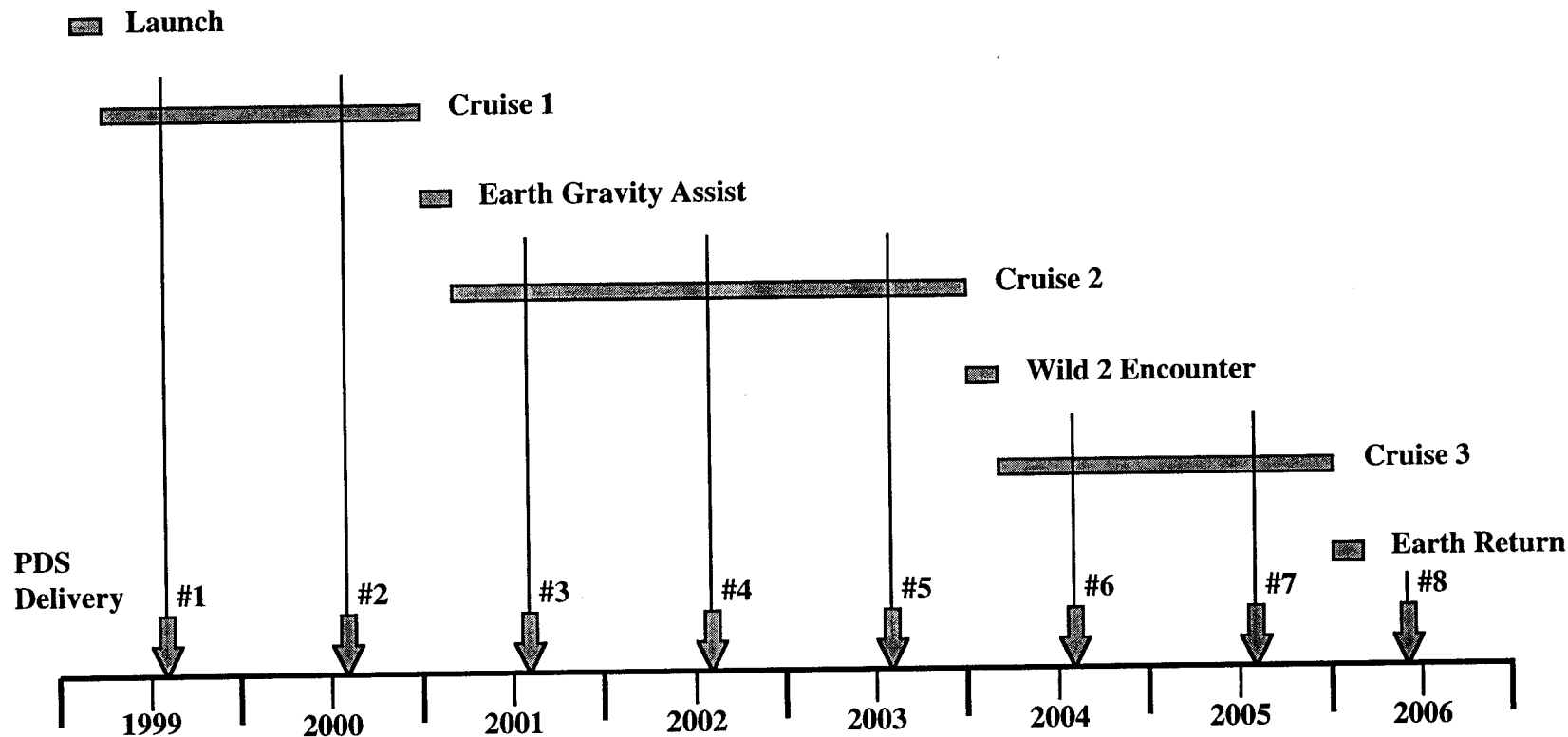
STARDUST MISSION

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 in national and international presentations.
 STARDUST Project Manager (ACT)

PROJECT DATA



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