Visualization

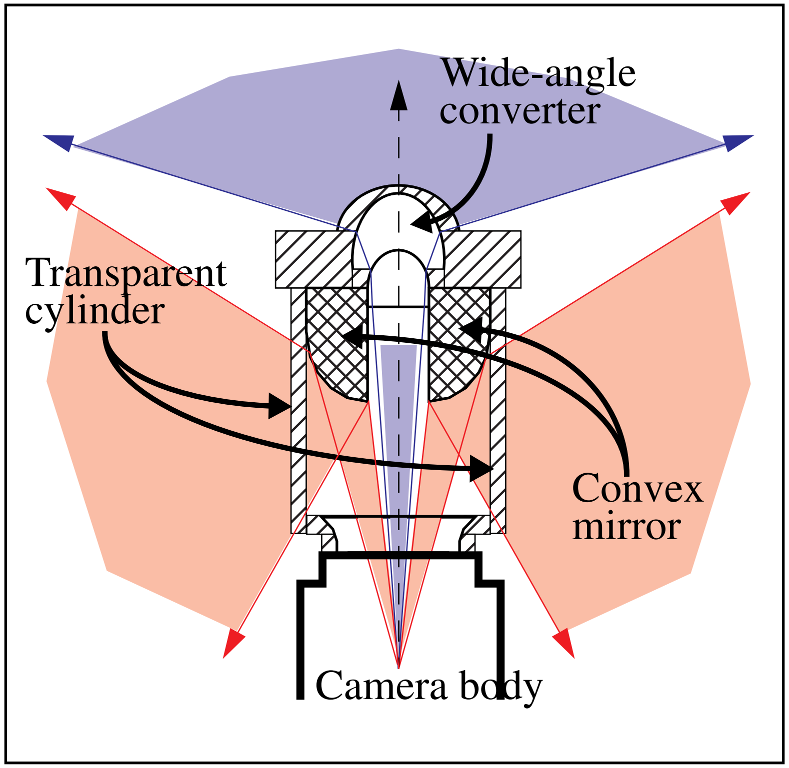
3 redundant pairs of cameras, located at front, back and bottom of rover

Front/back pano-sphere cameras for 360^{o} color panorama (+20 to -60 from horizontal) - 2k x 2k image at 10fps

Belly fish-eye camera (140^{o} FOV) for color safety views of wheel position on the terrain - 1k x 1k image at 0.3fps

Dynamic range packing (12->8 b/pixel) and image dewarping done in software

Video displayed on domed theatre



Subsystem Highlights:

- Optics coated with thin-film diamond for scratch resistance and thin-film gold to allow grounding (dust)
- Entire sphere about rover is capable of being imaged at any time
- Omnidirectional video allows multiple users to choose where they want to look and when
- Stereo ranging possible from side views of front/back pano-spheres

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Visualization (2)

The main risks are the development of a rad-hardened high-res color digital camera, turning 2k x 3k @ 10fps (the max datarate) into an exciting product, and porting processing algorithms to the rover computing environment.

Component (#)	Cost ($M)	Power (W)	Mass (kg)	Margin used	Model and Vendor
pano-sphere cameras (4)	1.5 + 0.5	24.0	7.3	5%	derived from DALSA's CA-D9 MegaSensor
under-body cameras (2)	1.0 + 0.25	5.4	3.2	5%	derived from DALSA's CA-D9 MegaSensor
image processing algorithms	0.4 + 0.1	N/A	N/A	N/A	iSight's dynamic range, PVSI's dewarping
17' domed display & driver interface (1)	0.2 + 1.3	N/A	N/A	N/A	based on Evans and Sutherland's VistaView

Primary issue to be addressed:

To achieve full night operations, the cameras must be able to return high-quality video during lunar night. The actual lighting conditions from Earthshine must be identified and modelled to test exposure and dynamic range algorithms.

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Pano-Sphere Placement and Schematic