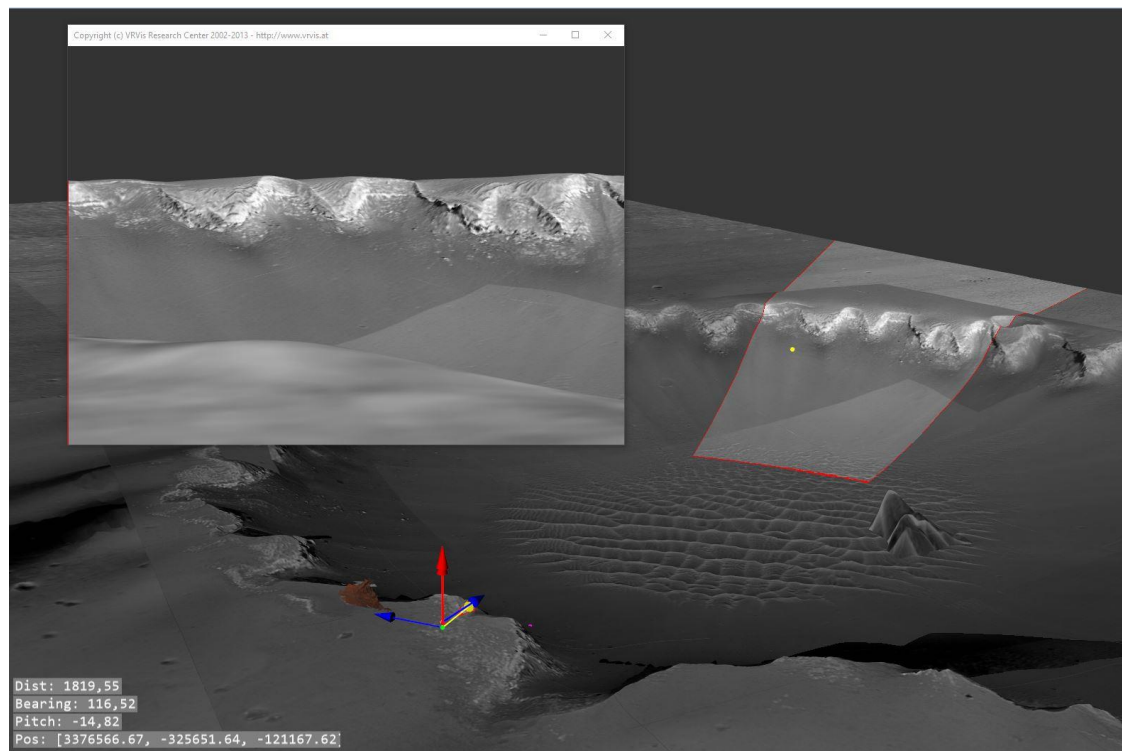




The PPro3D View Planner



Christoph Traxler, Thomas Ortner, Gerd Hesina, Robert Barnes,
Sanjeev Gupta and Gerhard Paar



Motivation

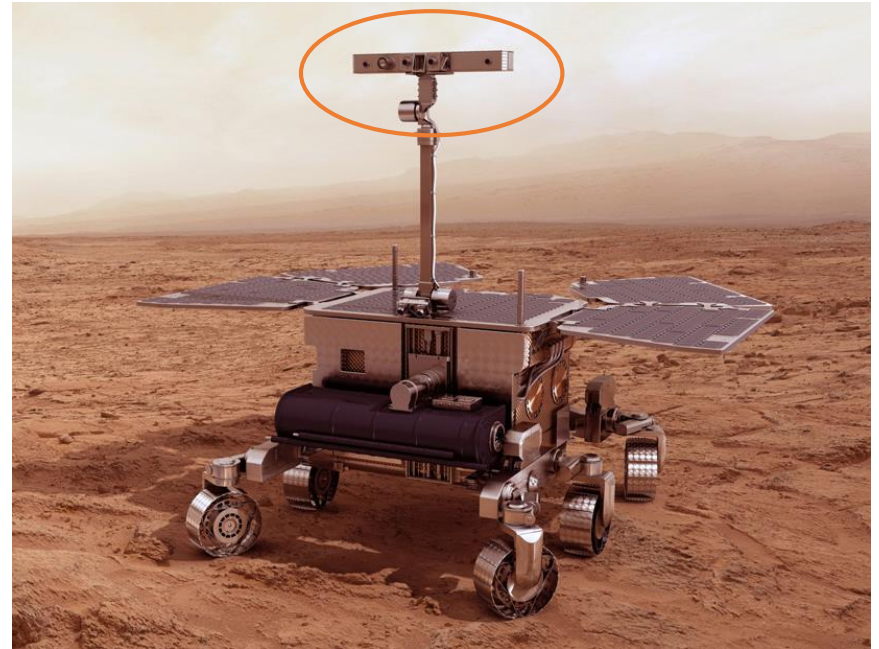
Find optimal viewing positions for rovers

Giving scientists a tool for mission planning

Take the scenic route!

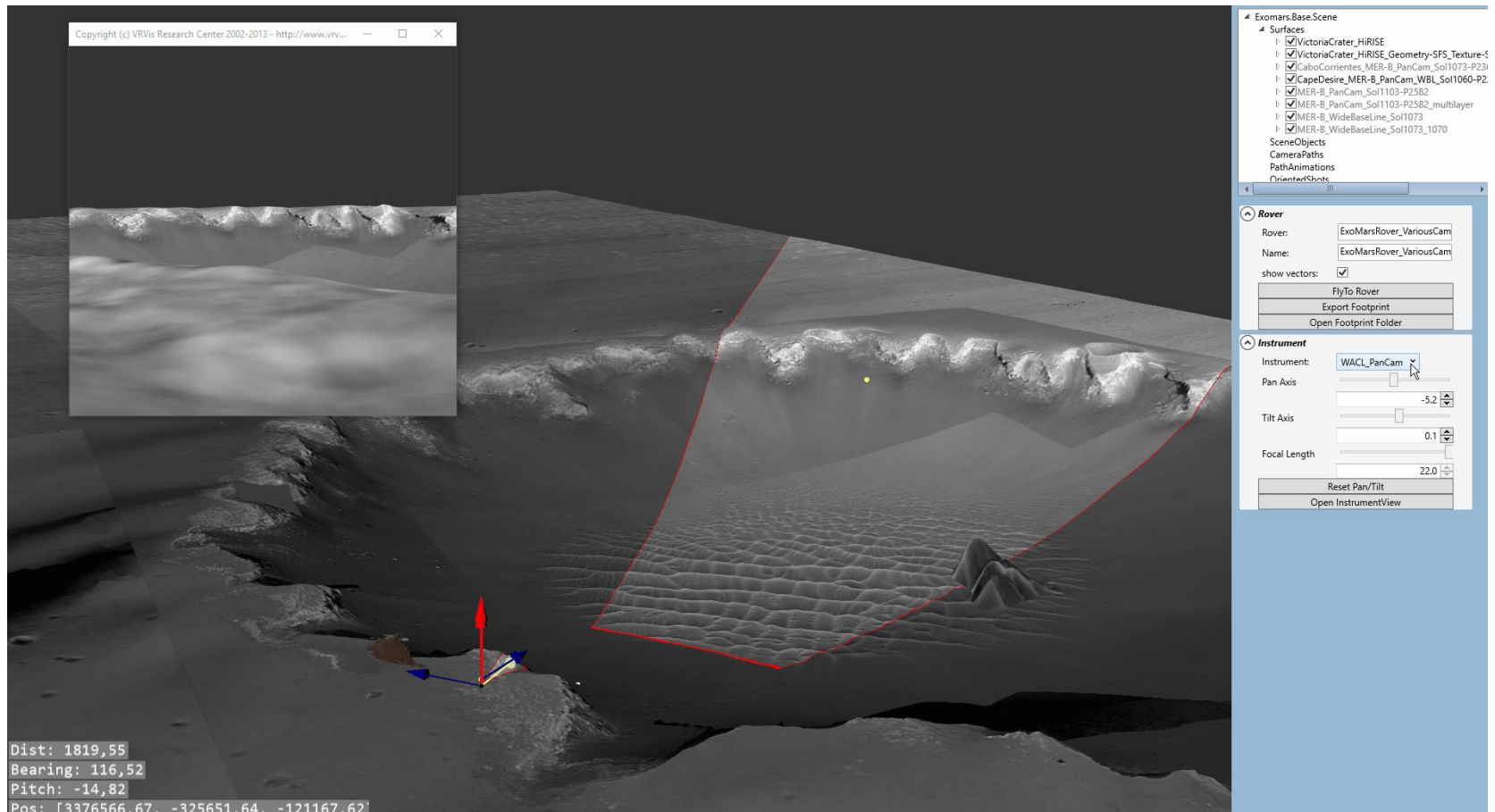
Identify opportunities for views on already planned trips

3D products: Make sure that this interesting structure there is accurately reconstructed



© ESA

View Planner



Source imagery © NASA/JPL-CALTECH/MSSS

Image Based Reconstruction

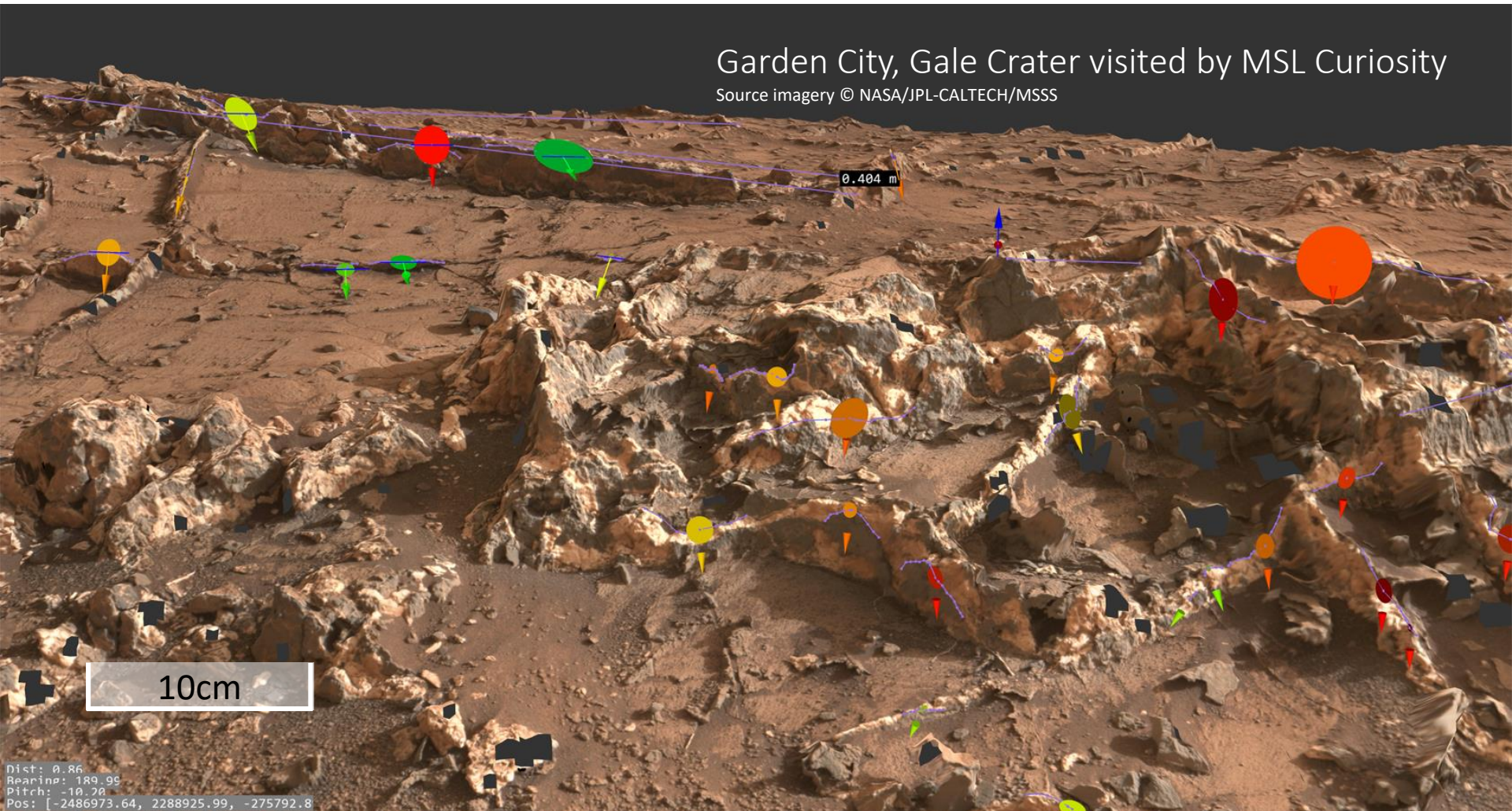
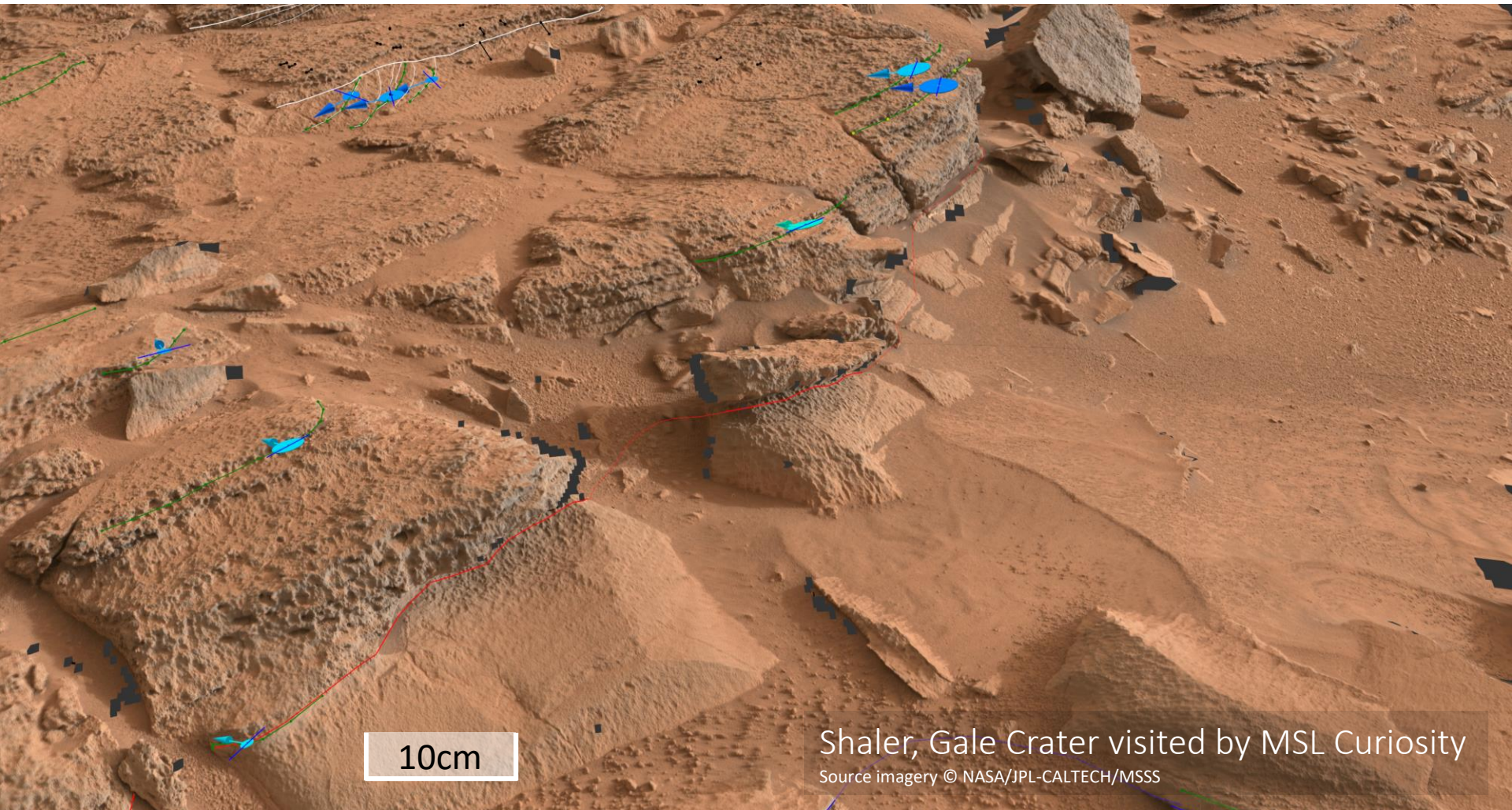


Image Based Reconstruction



Use Case Wide Baseline Stereo

Finding good stereo pairs ...

... in missions with no stereo cameras

... for wide baseline stereo

Good:

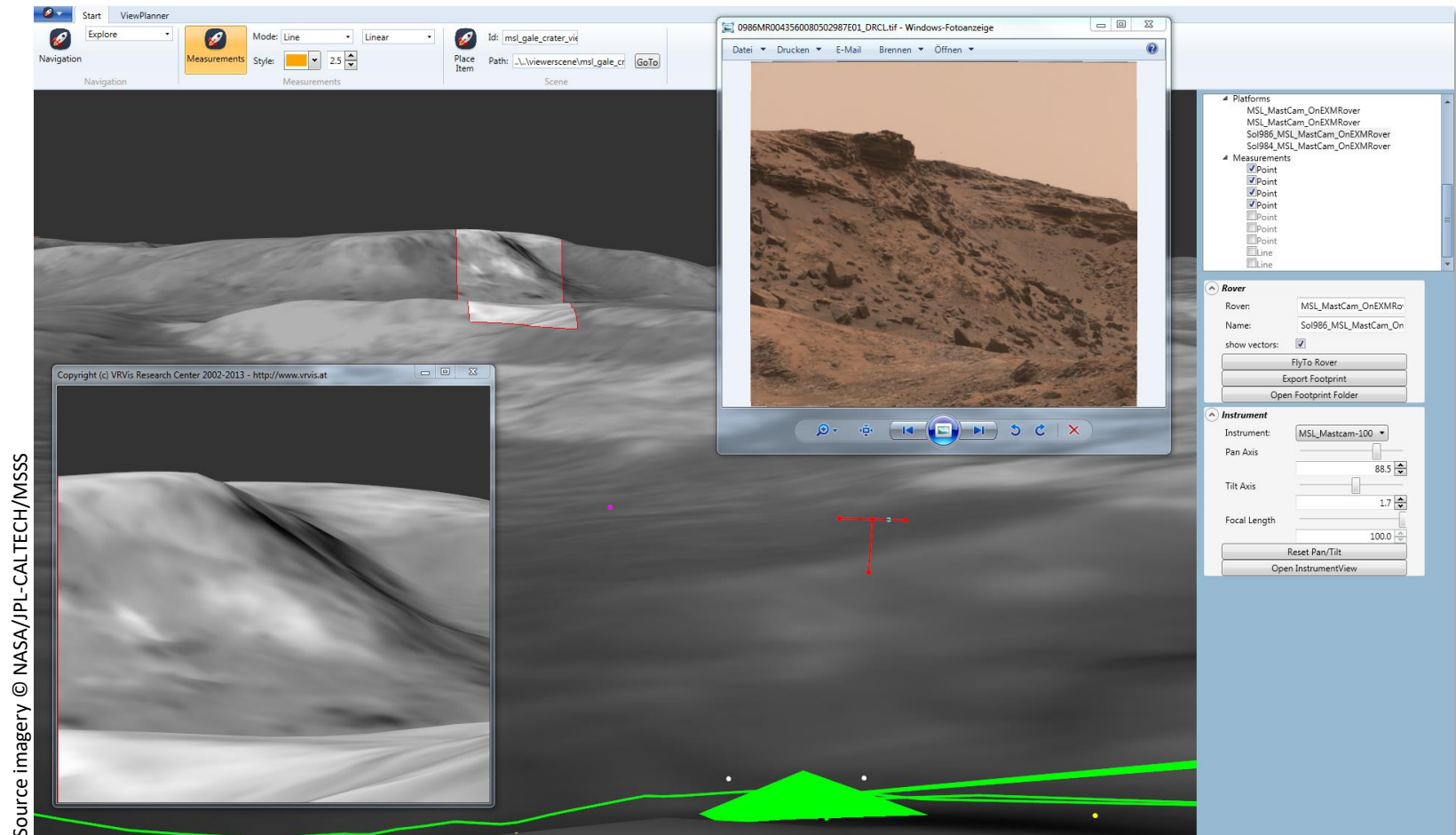
Little change in viewport

Optimal distance / baseline ratio

Plenty of common features

Use Case Wide Baseline Stereo

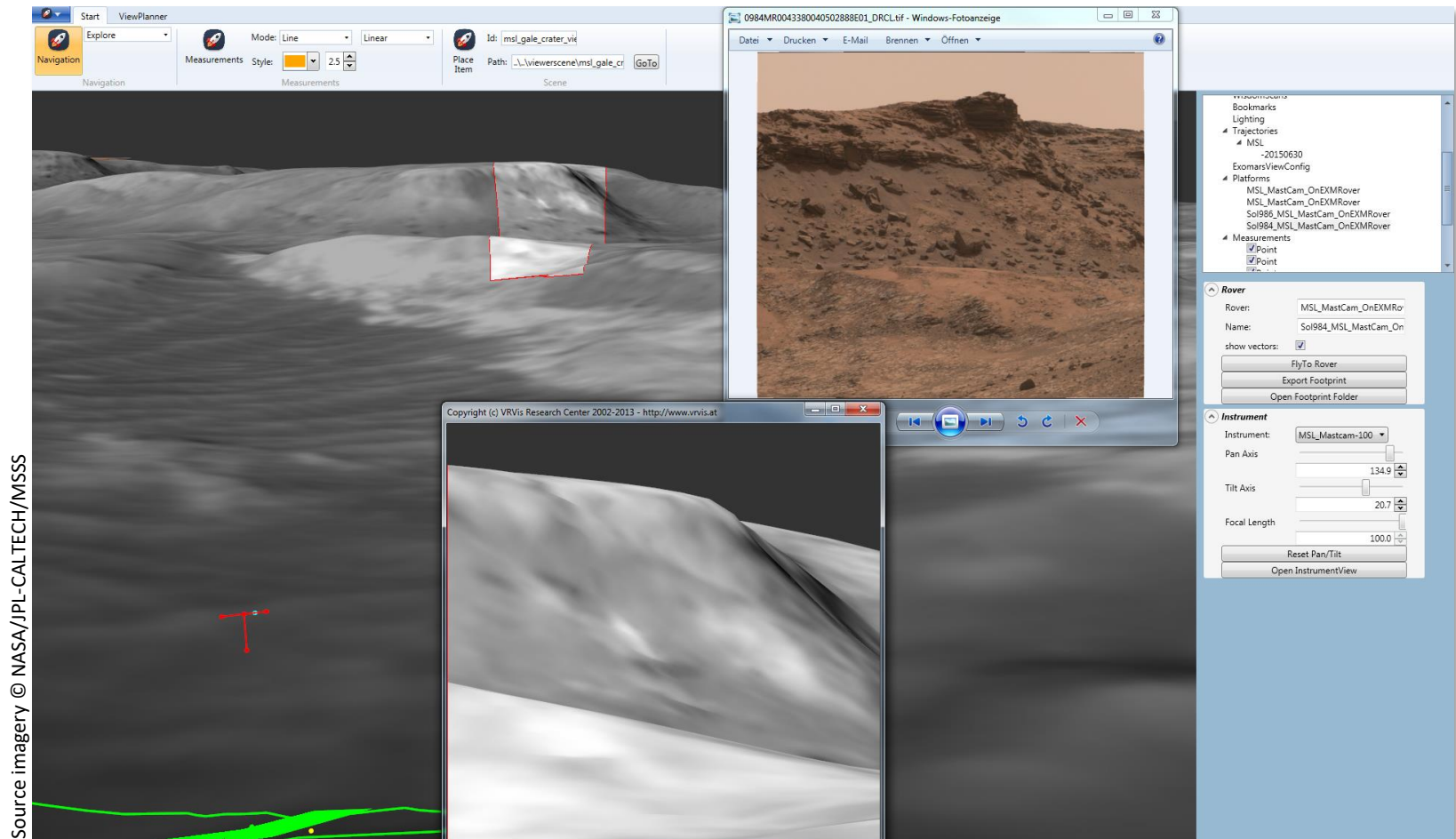
MSL Mastcam 100mm (right) Sol 986 (rover pose estimated)



Source imagery © NASA/JPL-CALTECH/MSSS

Use Case Wide Baseline Stereo

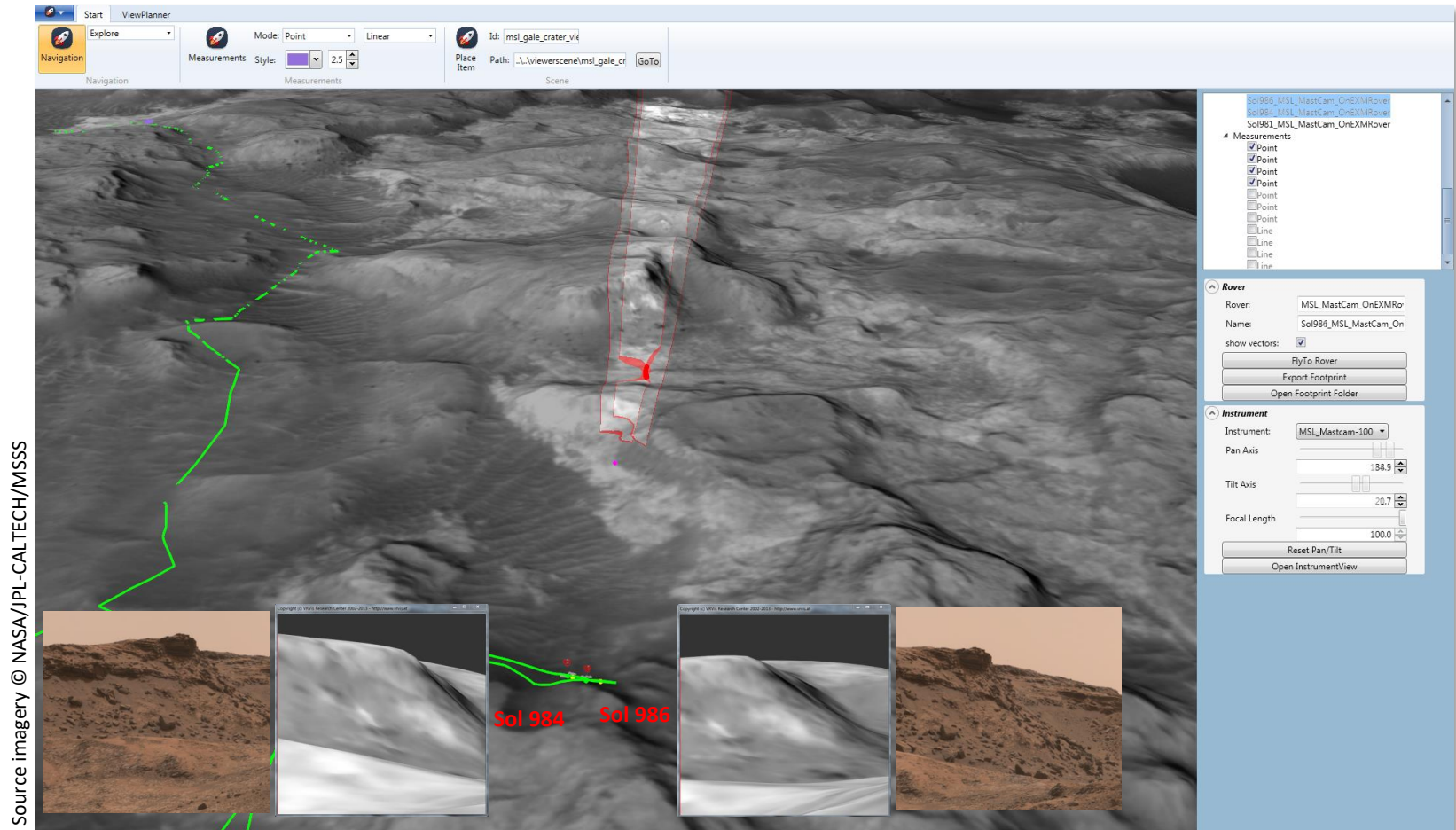
MSL Mastcam 100mm (right) Sol 984 (rover pose estimated)



Source imagery © NASA/JPL-CALTECH/MSS

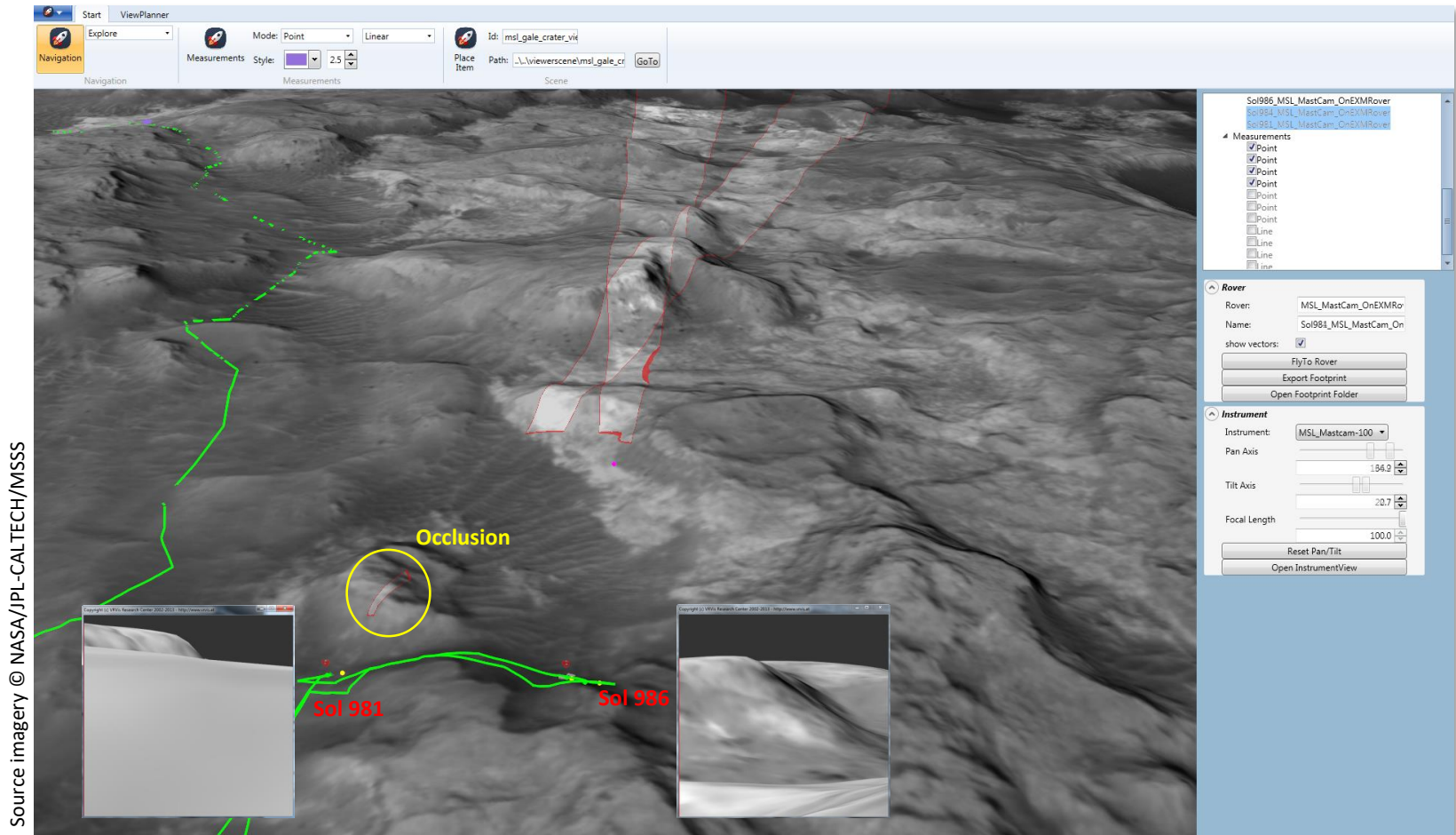
Use Case Wide Baseline Stereo

Sol 984 – Sol 986, stereo base $\sim 7\text{m}$, distance to ROI $\sim \text{MSL Mastcam } 100\text{mm}$ $\rightarrow$ cam view comparison (1) 170m, **Cons: too small stereo base in relation to distance**



Use Case Wide Baseline Stereo

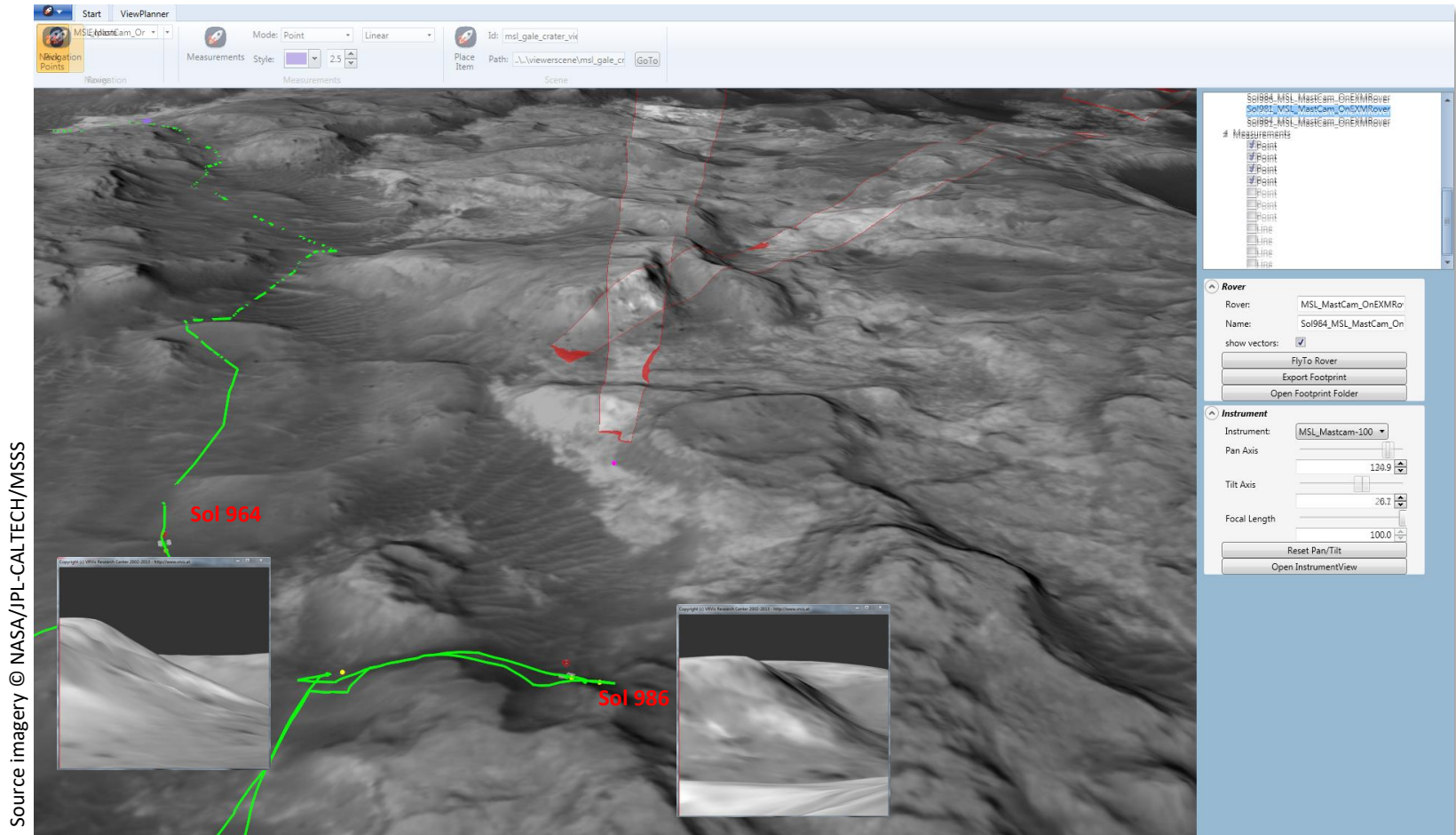
MSL Mastcam 100mm → cam view comparison (2), Sol 981 (fictive) – Sol 986, stereo base ~50m, distance to ROI ~170m, **Cons: occlusion in cam view Sol 981**



Source imagery © NASA/JPL-CALTECH/MSSS

Use Case Wide Baseline Stereo

MSL Mastcam 100mm → cam view comparison (2), Sol 964 (fictive) – Sol 986, stereo base ~100m, distance to ROI ~170m, **Data examples & processing tests needed**



Source imagery © NASA/JPL-CALTECH/MSSS

Current State

Place a rover on the ground

Select and orient instruments

Project footprint on the ground

Open Instrument View and export image

Planned Features

Overlap of instruments

Comparison of view plans

Simulated views

Skylight model, light, and shadow

Full camera model