



“The only way to discover the limits of the possible is to venture a little way past them into the impossible”

-- *Arthur C. Clarke*

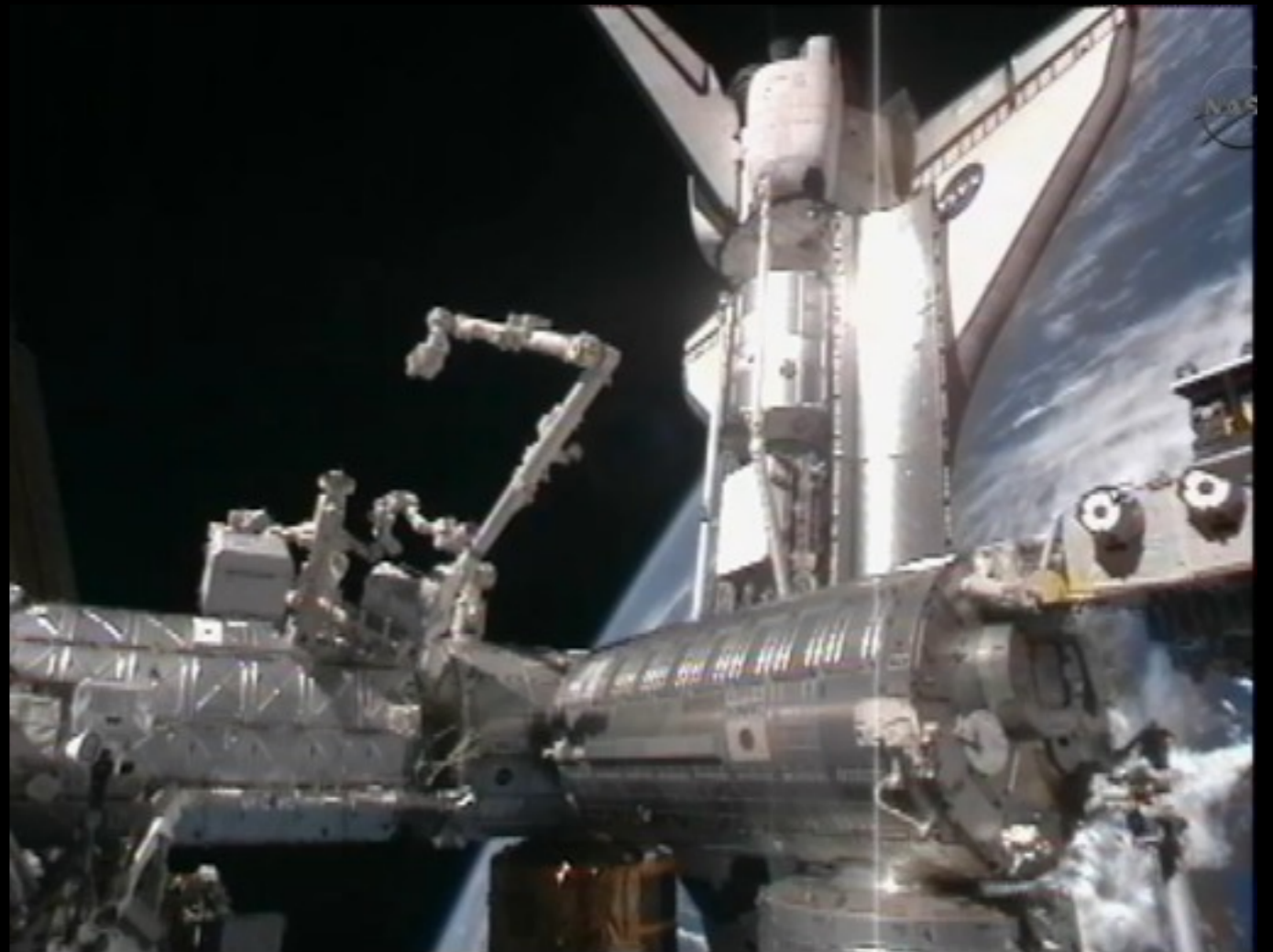
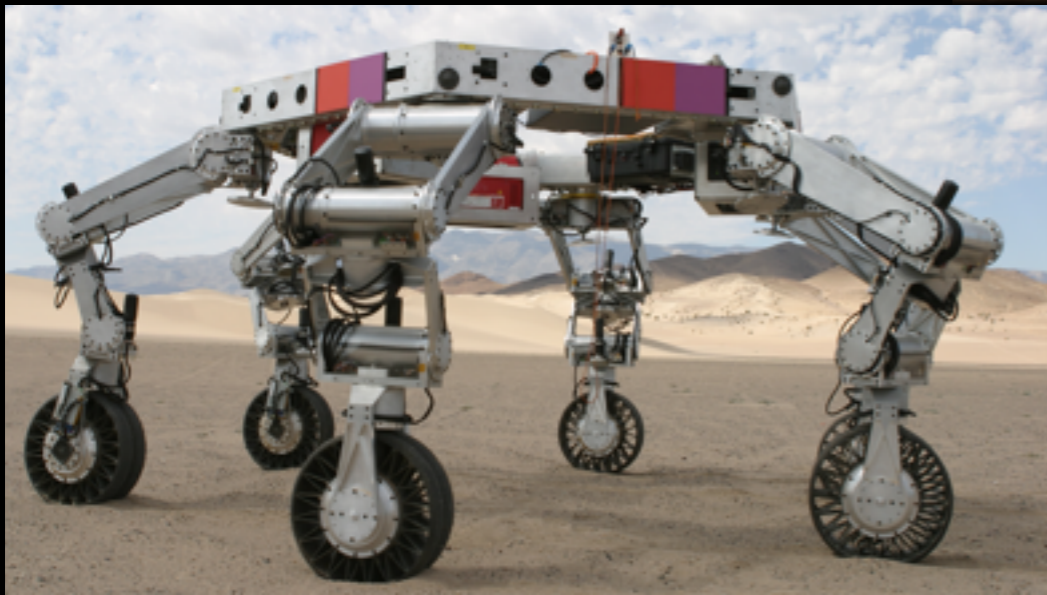
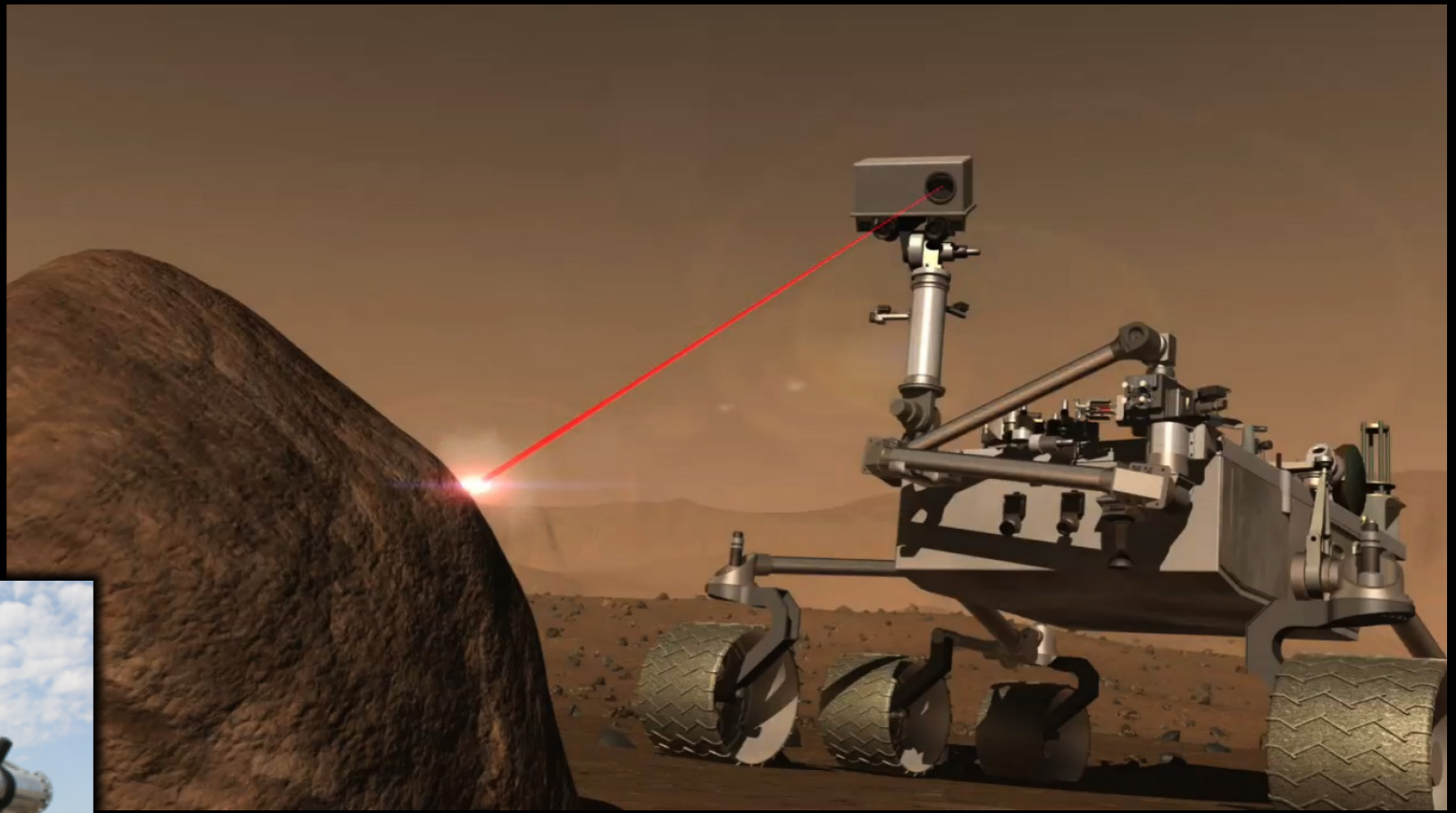
# Innovations and Integrations: Applying Trendy Technologies to NASA Mission Operations Planning

Mark Powell

Jet Propulsion Laboratory, California Institute of Technology

All JPL content copyright 2011 California Institute of Technology. Government sponsorship





BBC



# Science-Fiction and Software:

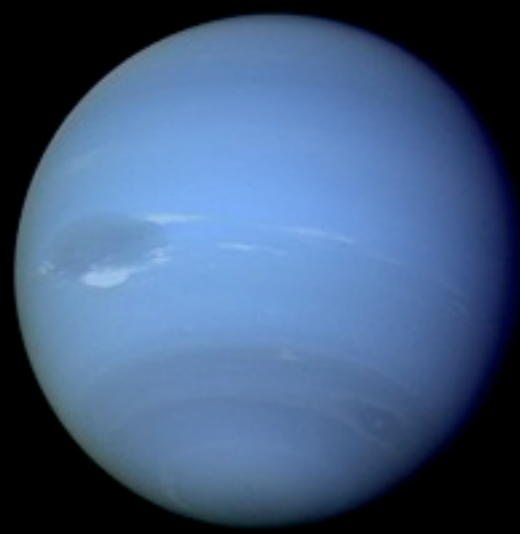
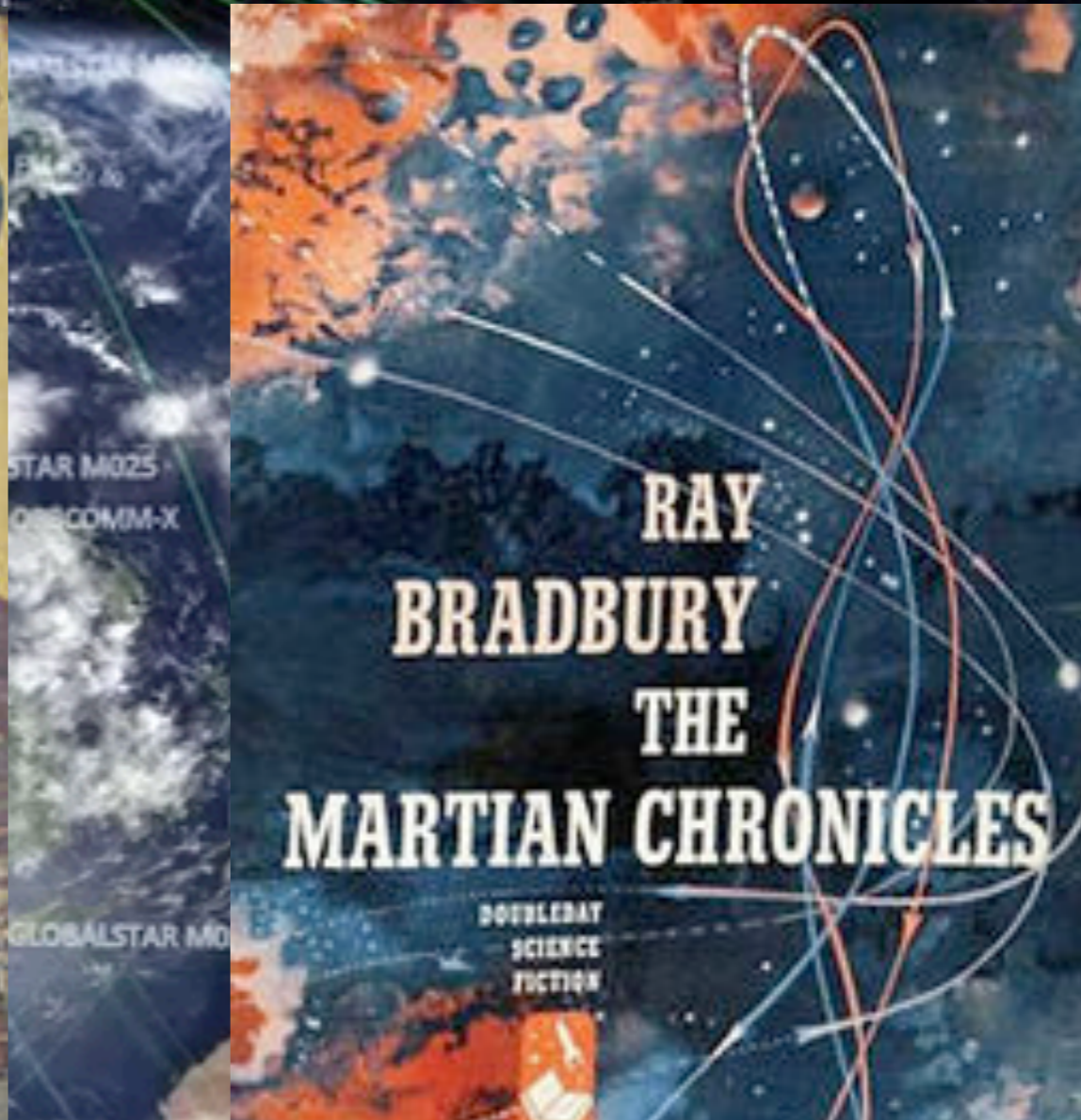
Some prophecies that came to pass,  
some that haven't,  
and some that still might...

Mark Powell

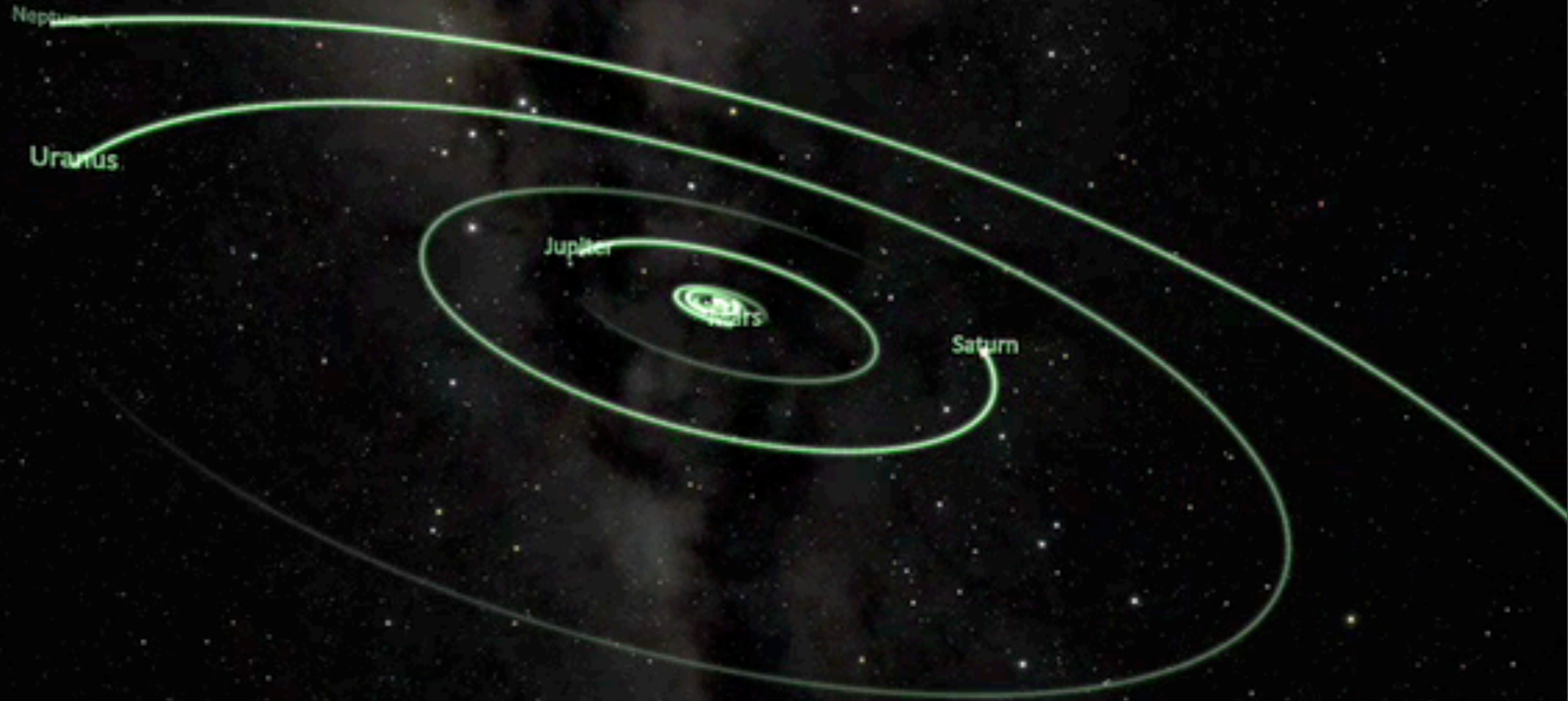
Jet Propulsion Laboratory, California Institute of Technology

All JPL content copyright 2011 California Institute of Technology. Government sponsorship

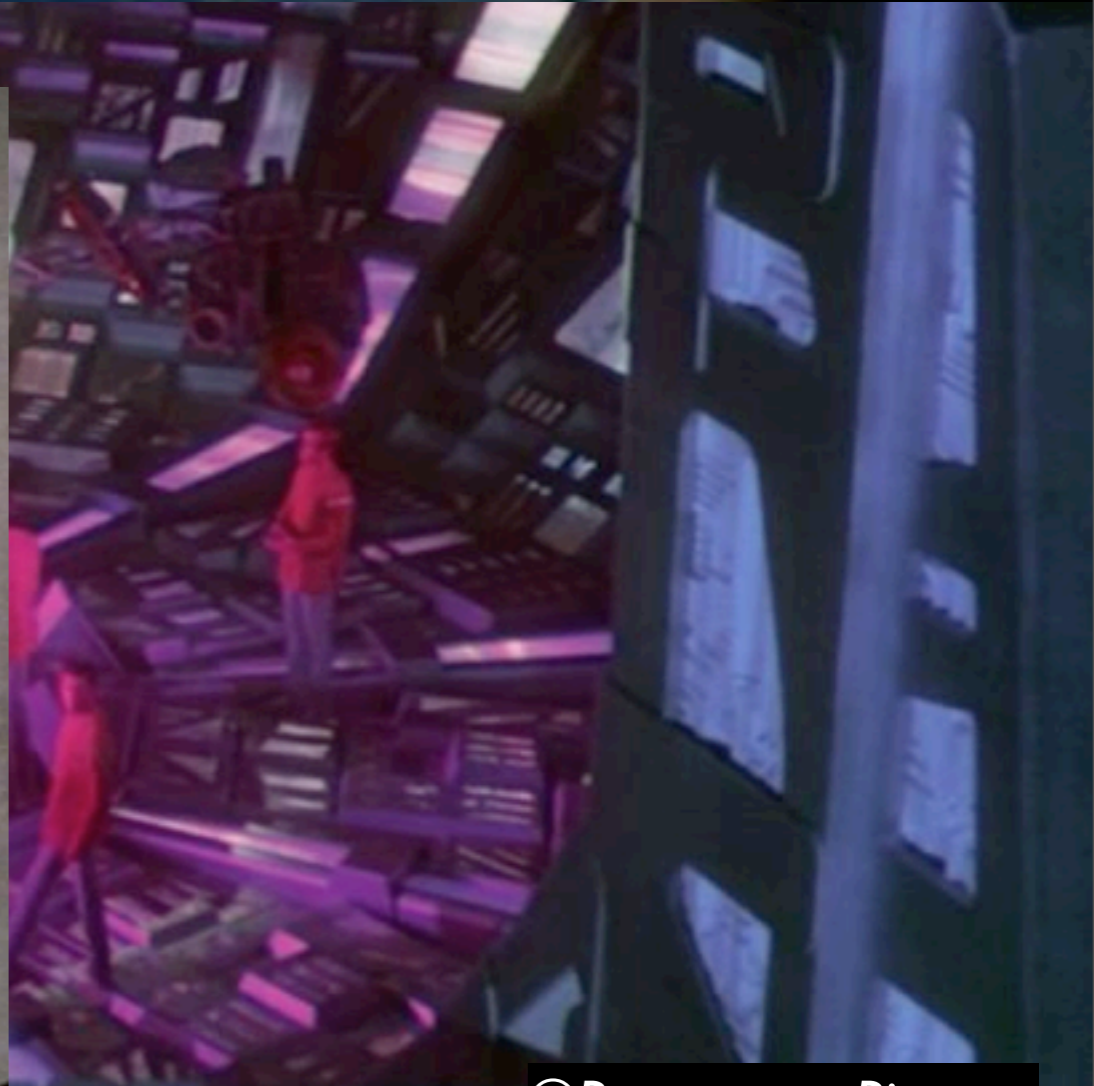
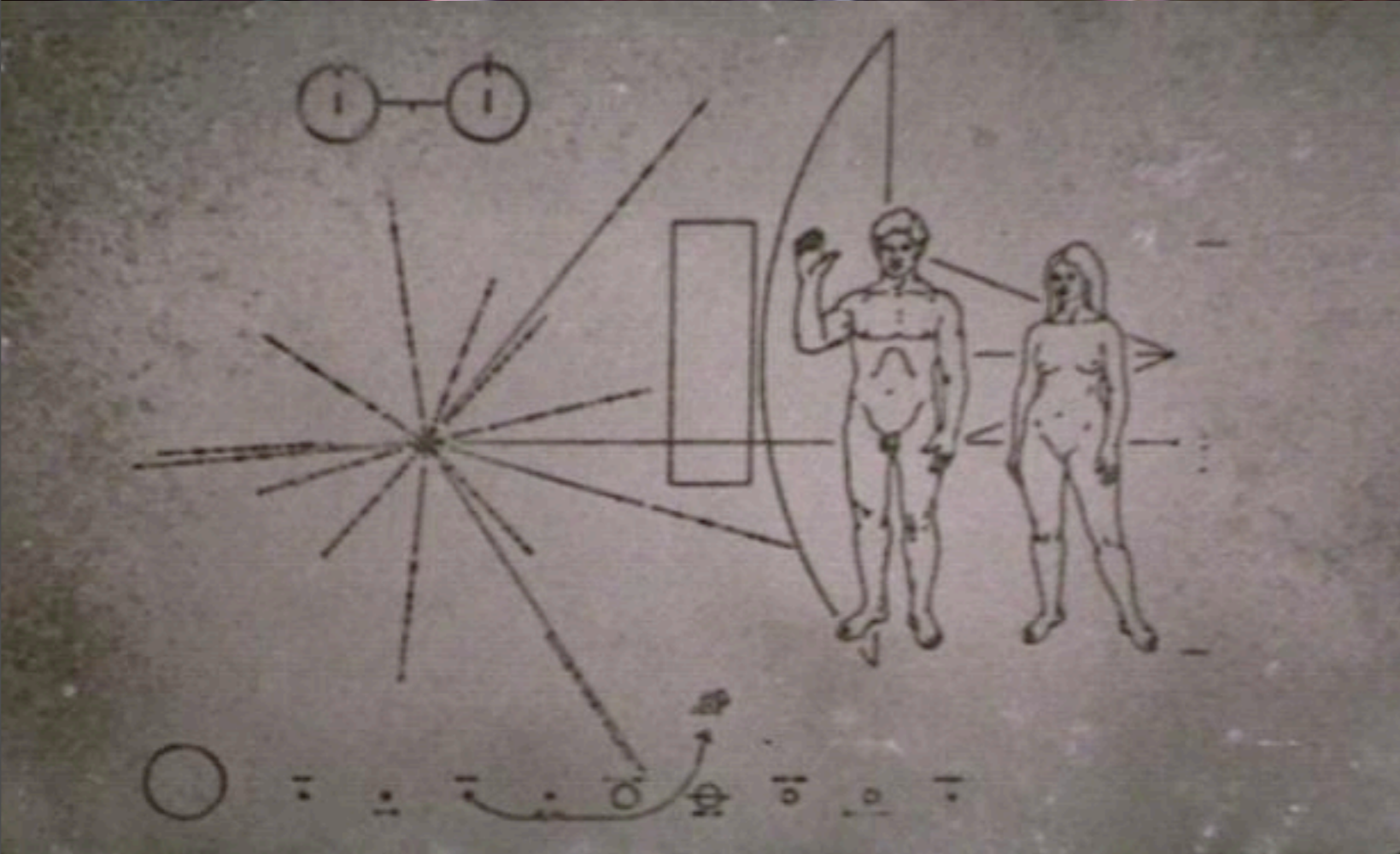
COSMOS Artificial satellites



# Our solar system







©Paramount Pictures

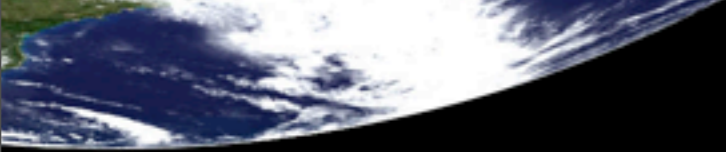
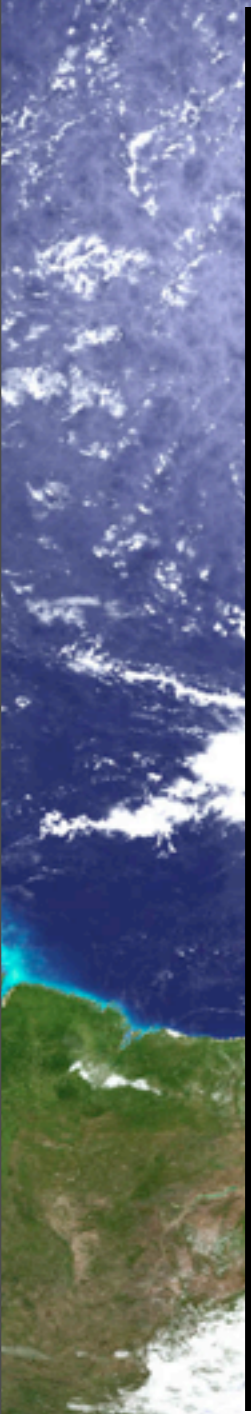
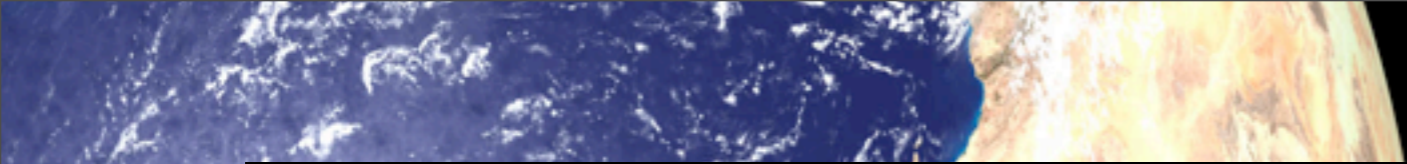
How did we get here?

Where are we going?

Are we alone?

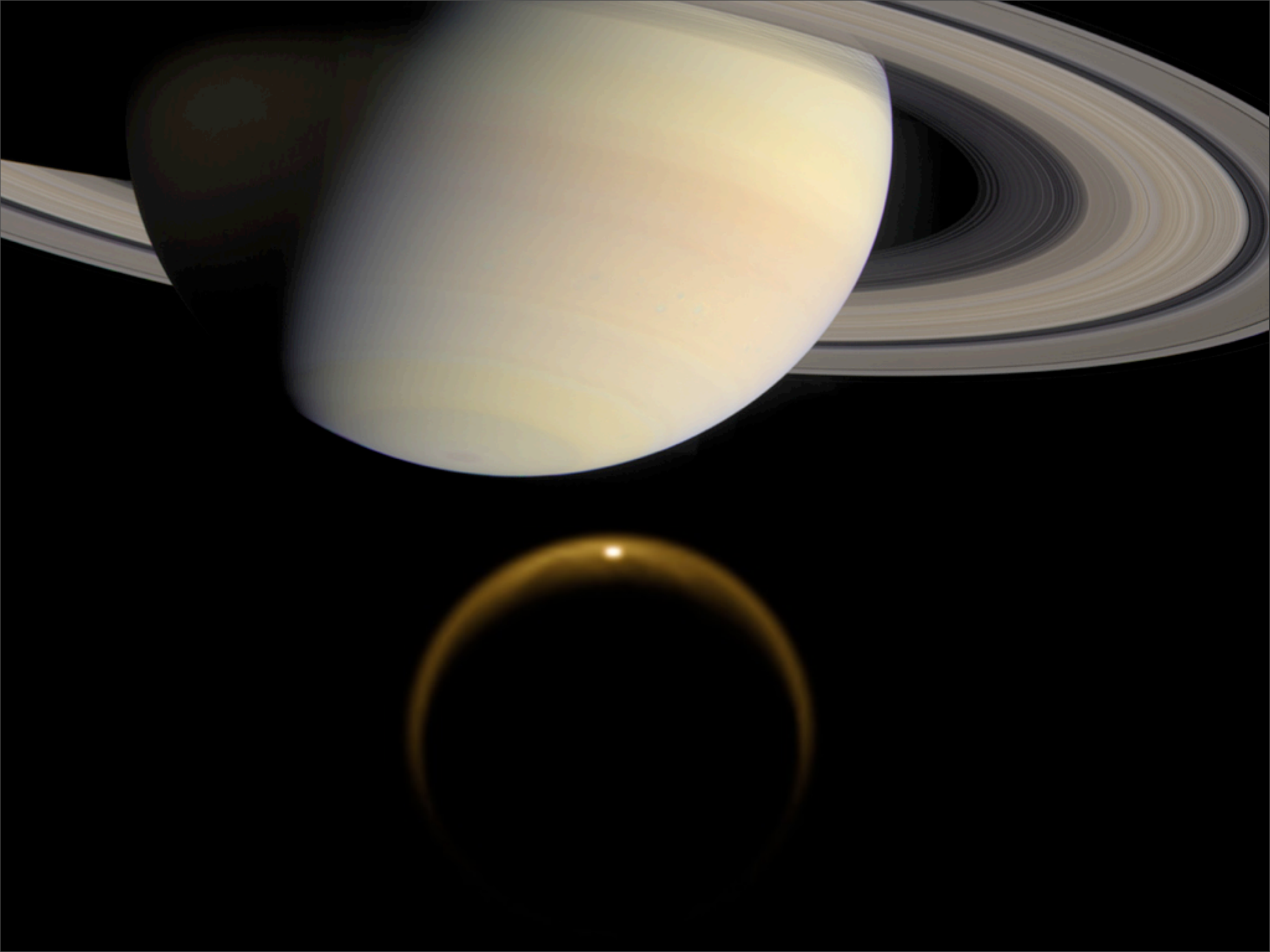
Science

Technology

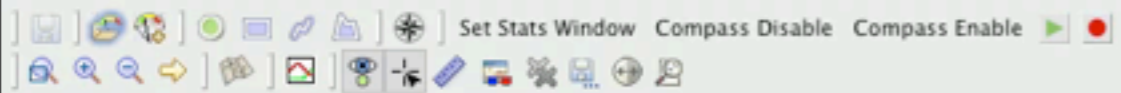




©BBC





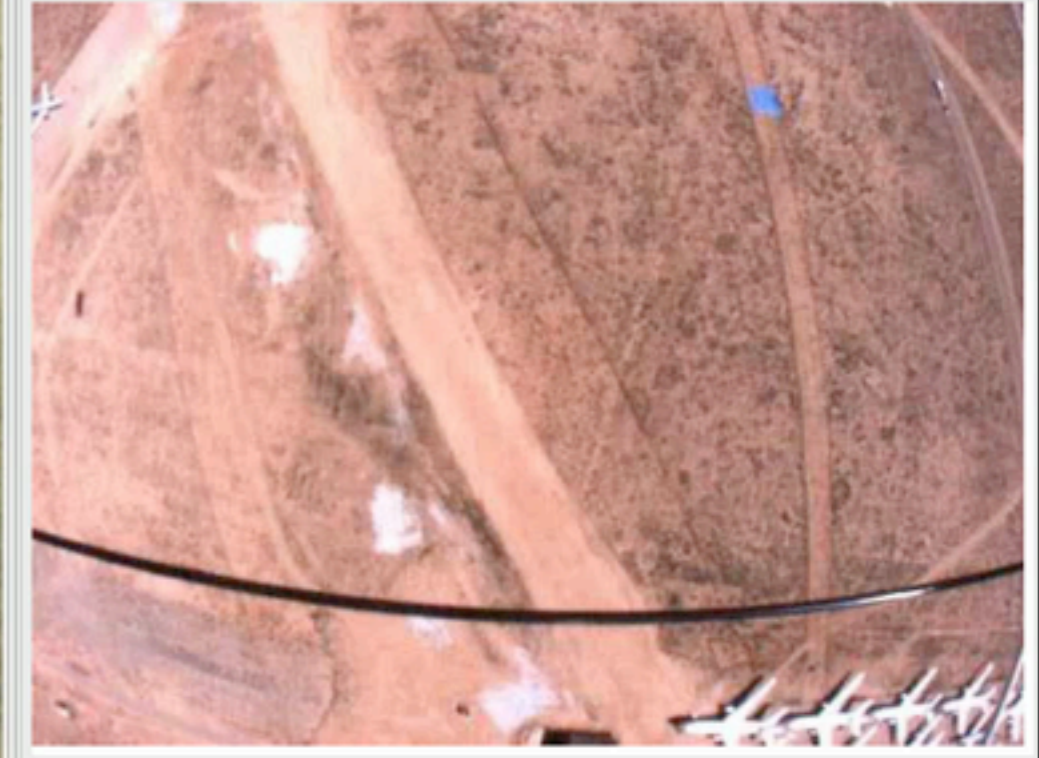


aerobot-canvas.tlc ControllerStats.tlc controllers.tlc Map View

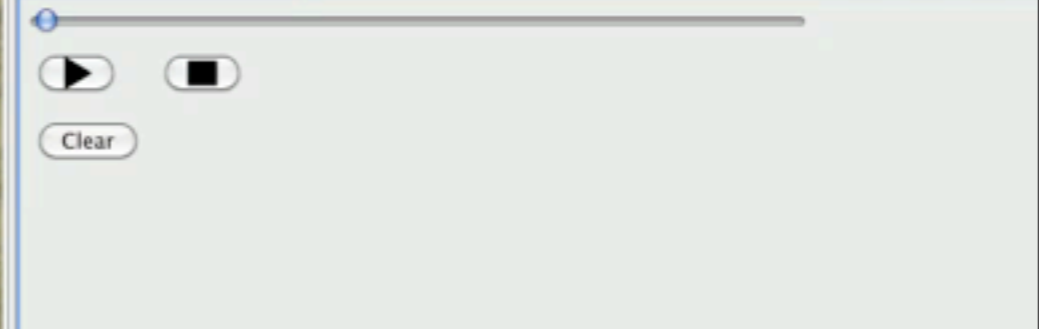


Streaming Image View Aerobot View

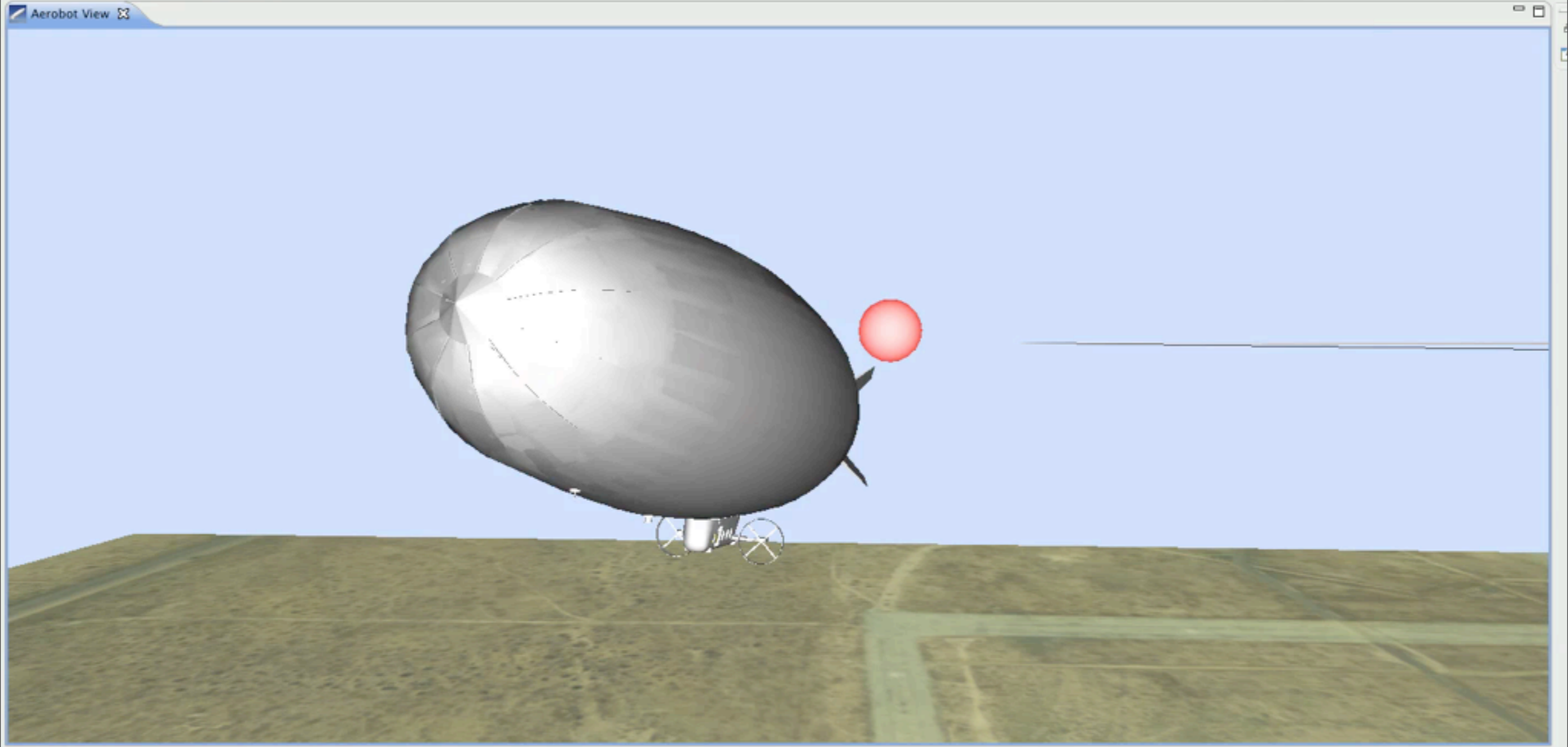
Status  
image received from camera 1 at: 1:34:13 PM 0 frames dropped, 464 images received



Playback View Detail











# SPRINT

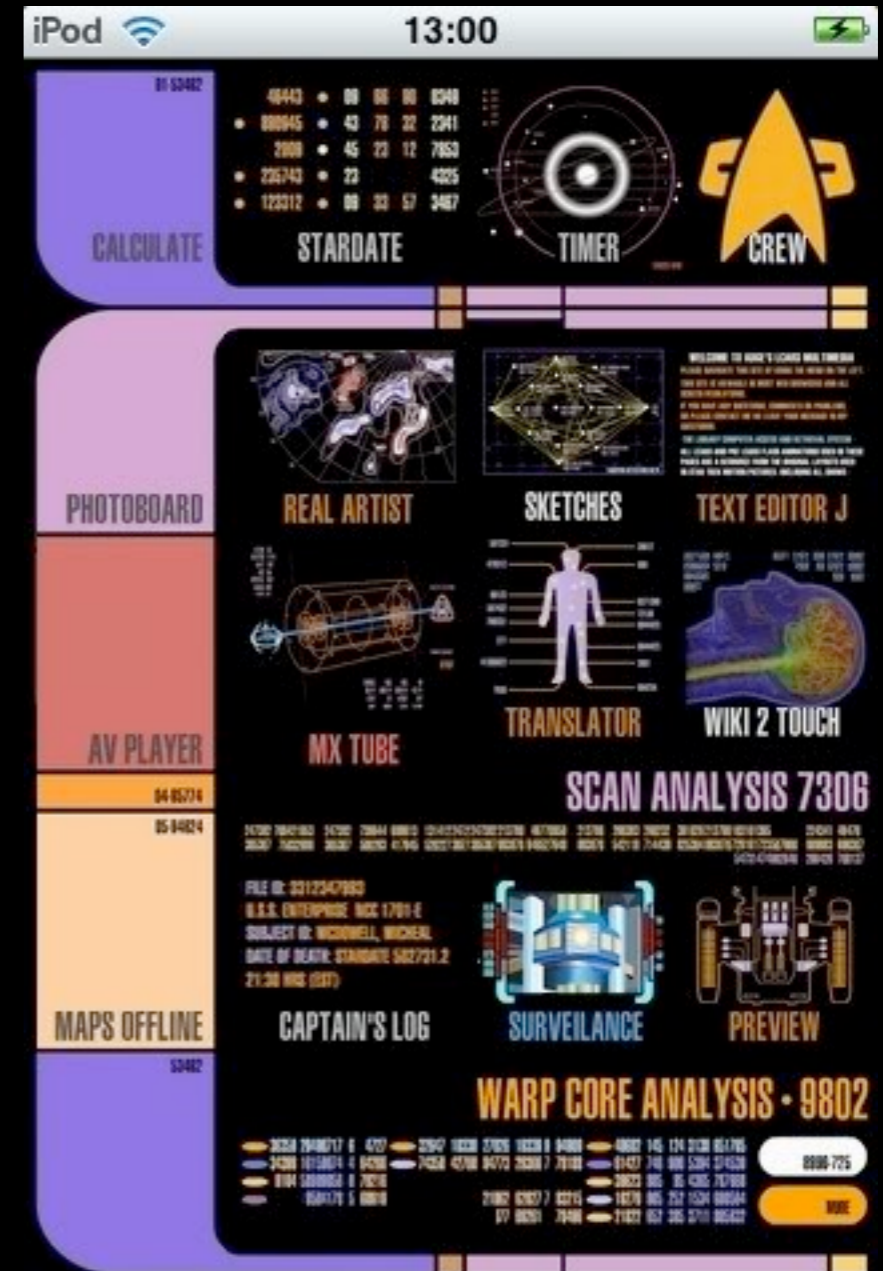
(Super-Portable Rapid INTerface)







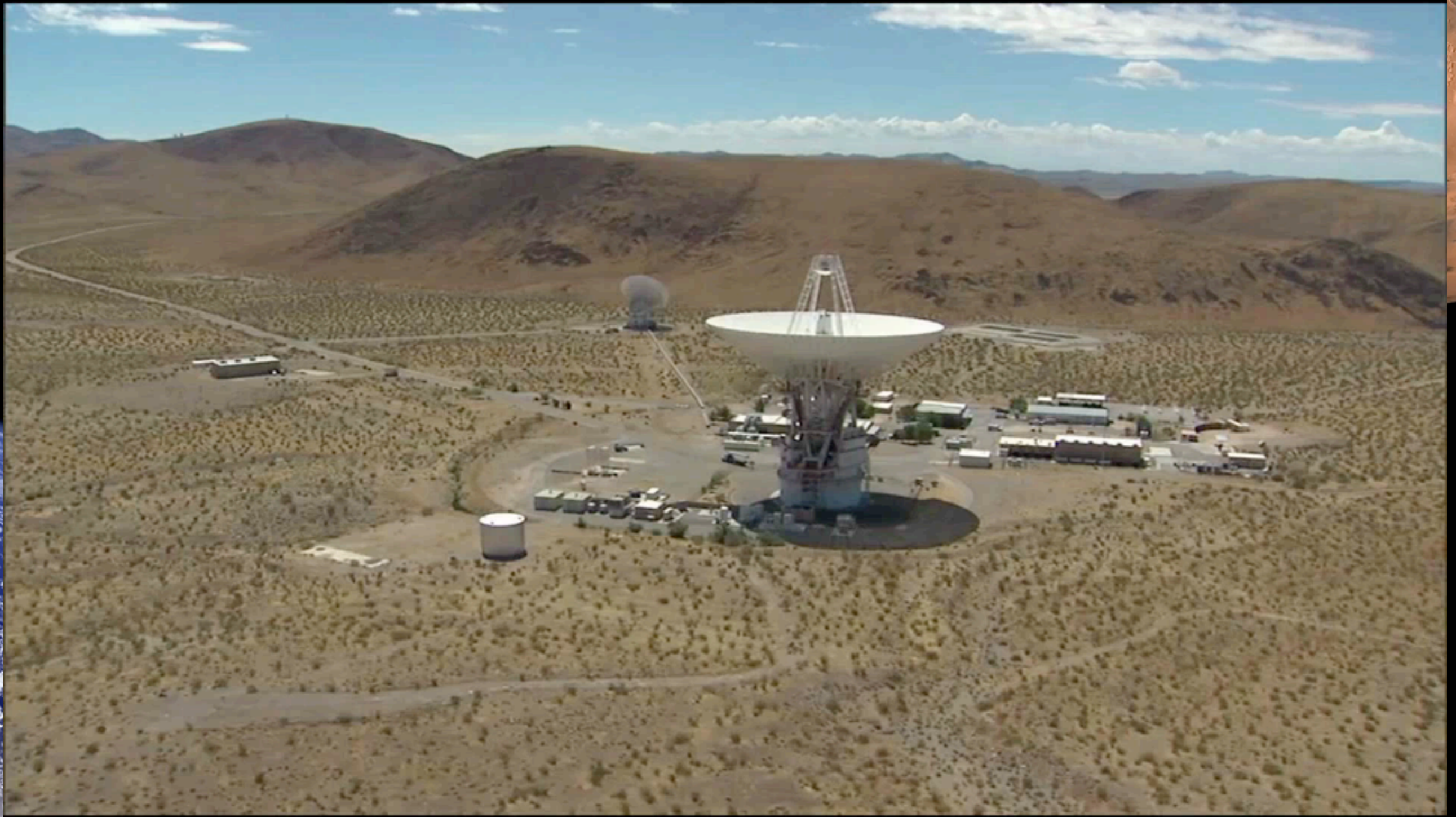
©Paramount Pictures



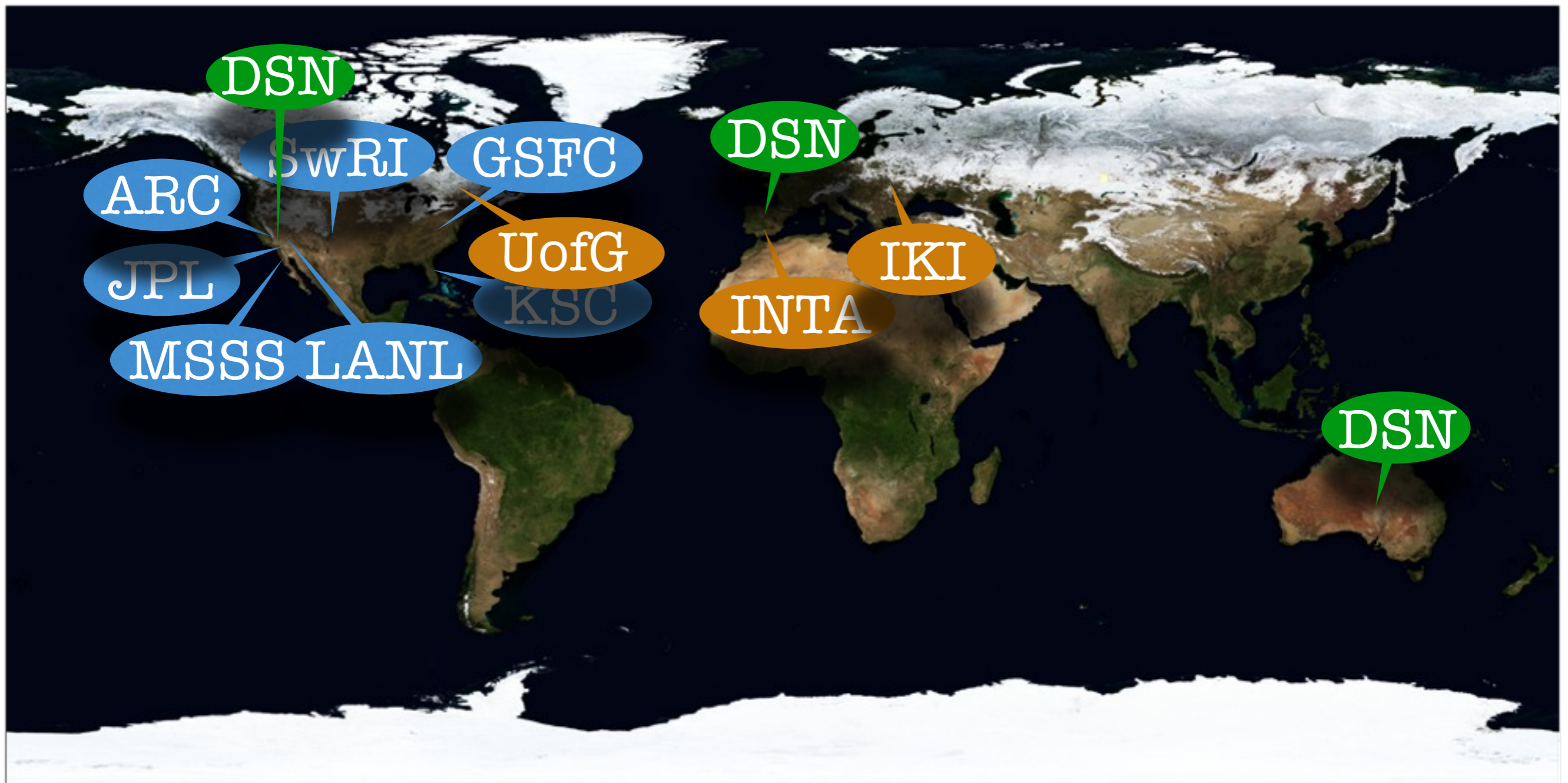


©Paramount Pictures









DSN

SWRI

GSFC

ARC

JPL

MSSS

LANL

UofG

KSC

DSN

INTA

IKI

DSN

# 13-filter mosaic of Flounder, Oyster, Moray Eel Spectral Analysis of Minnow Drive to Southern Shore, Post-drive imaging

● Mullet

● Flounder

● Oyster

● Moray Eel

● Minnow

120

67.5

45

22.5

0

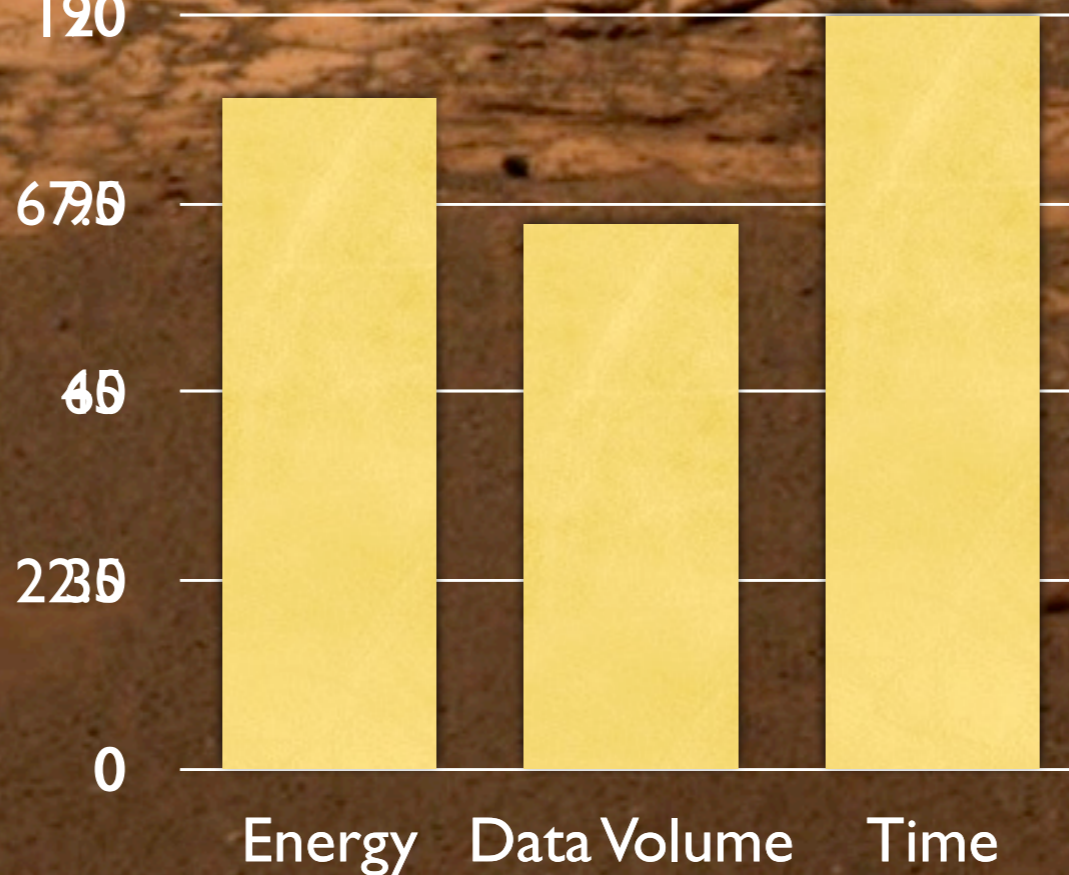
● Southern Shore

■ Spacecraft Resources

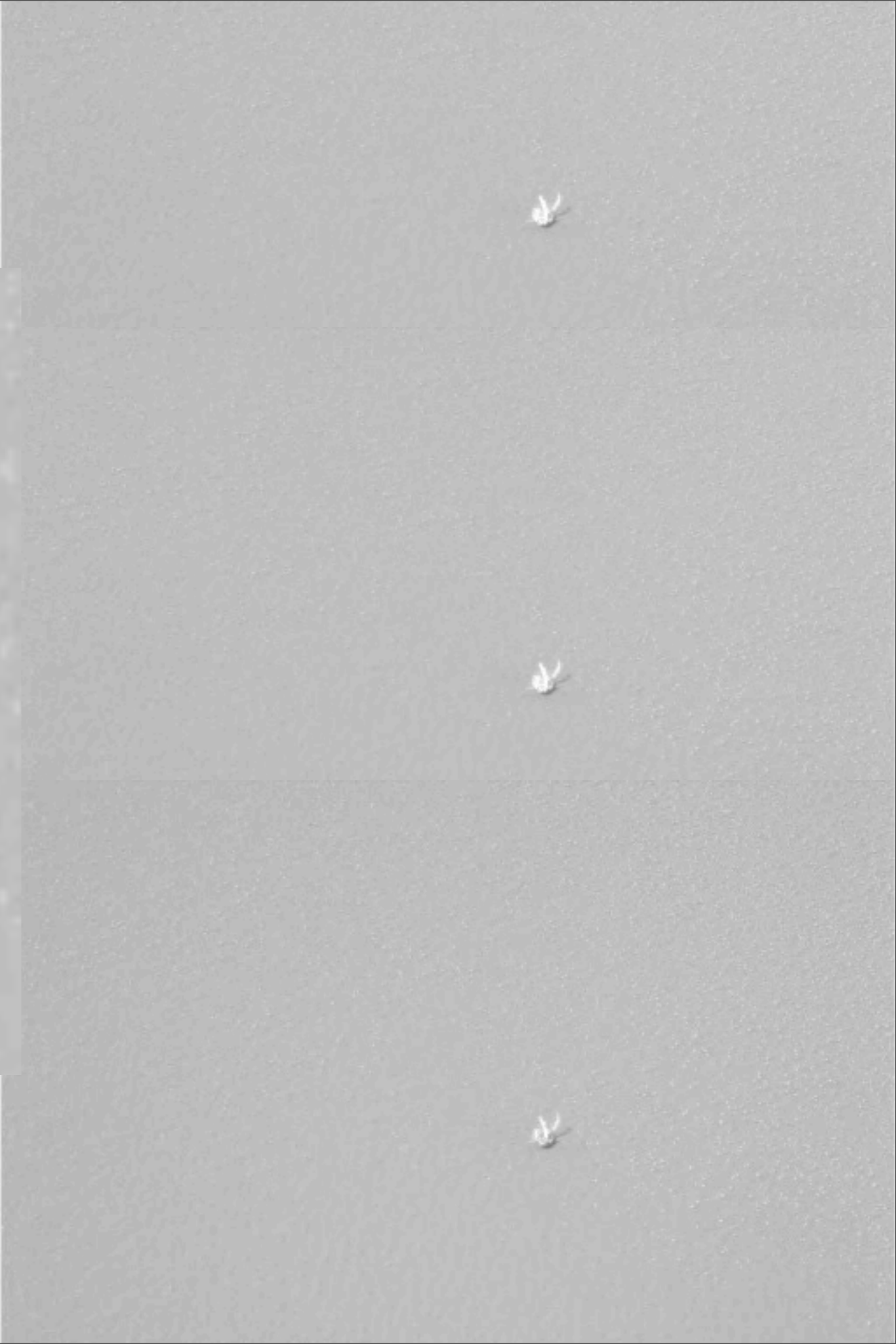
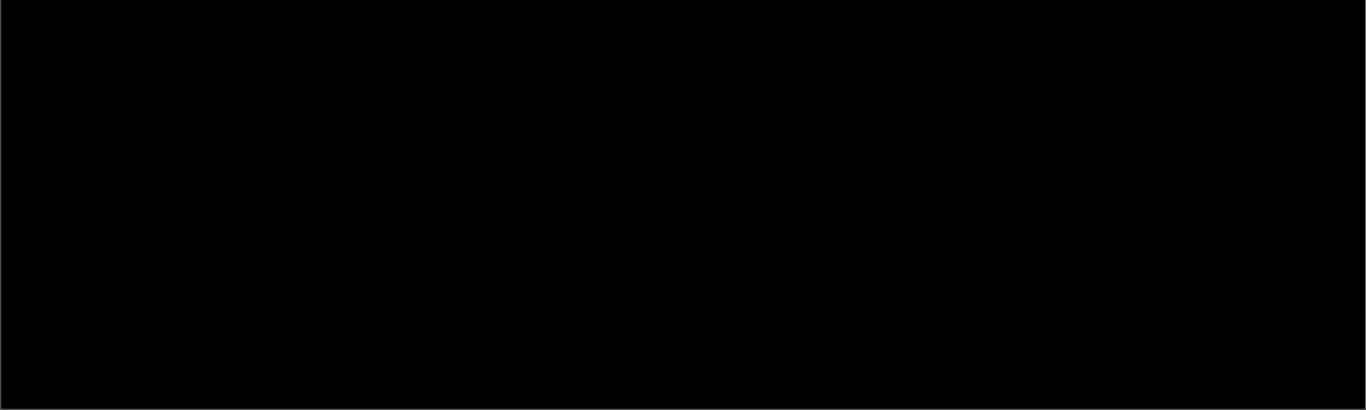
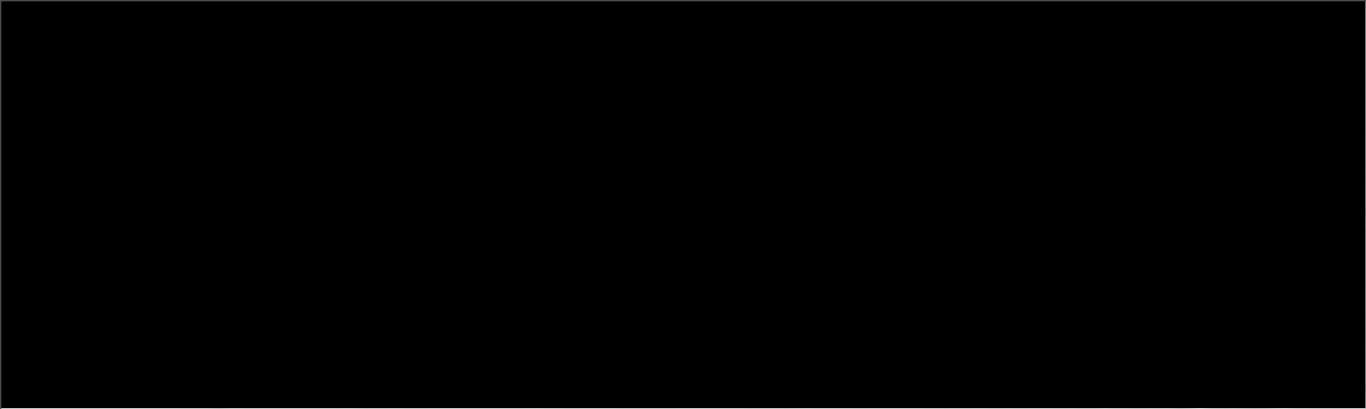
Energy

Data Volume

Time







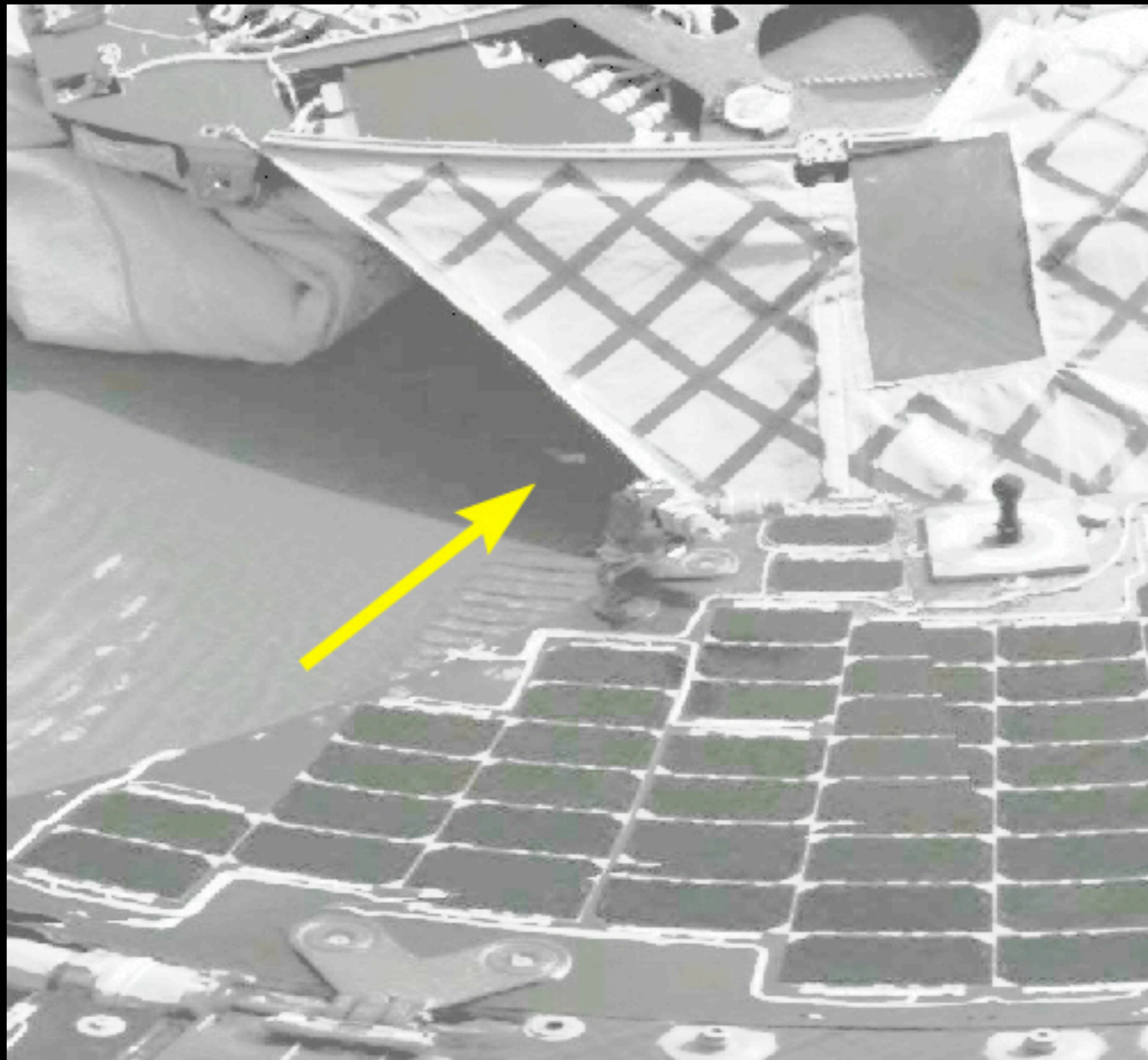


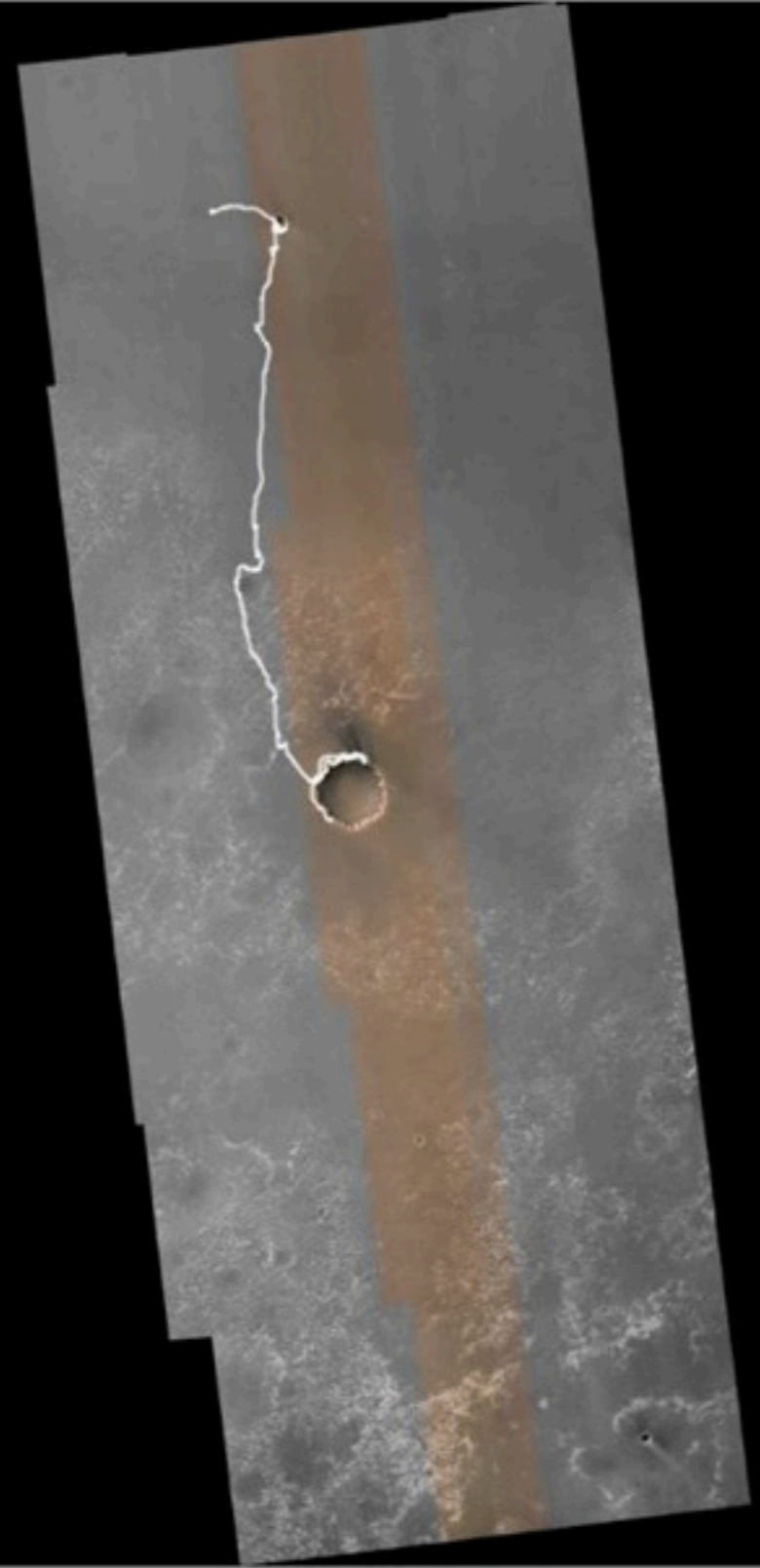












2000 m

JPL OCIO

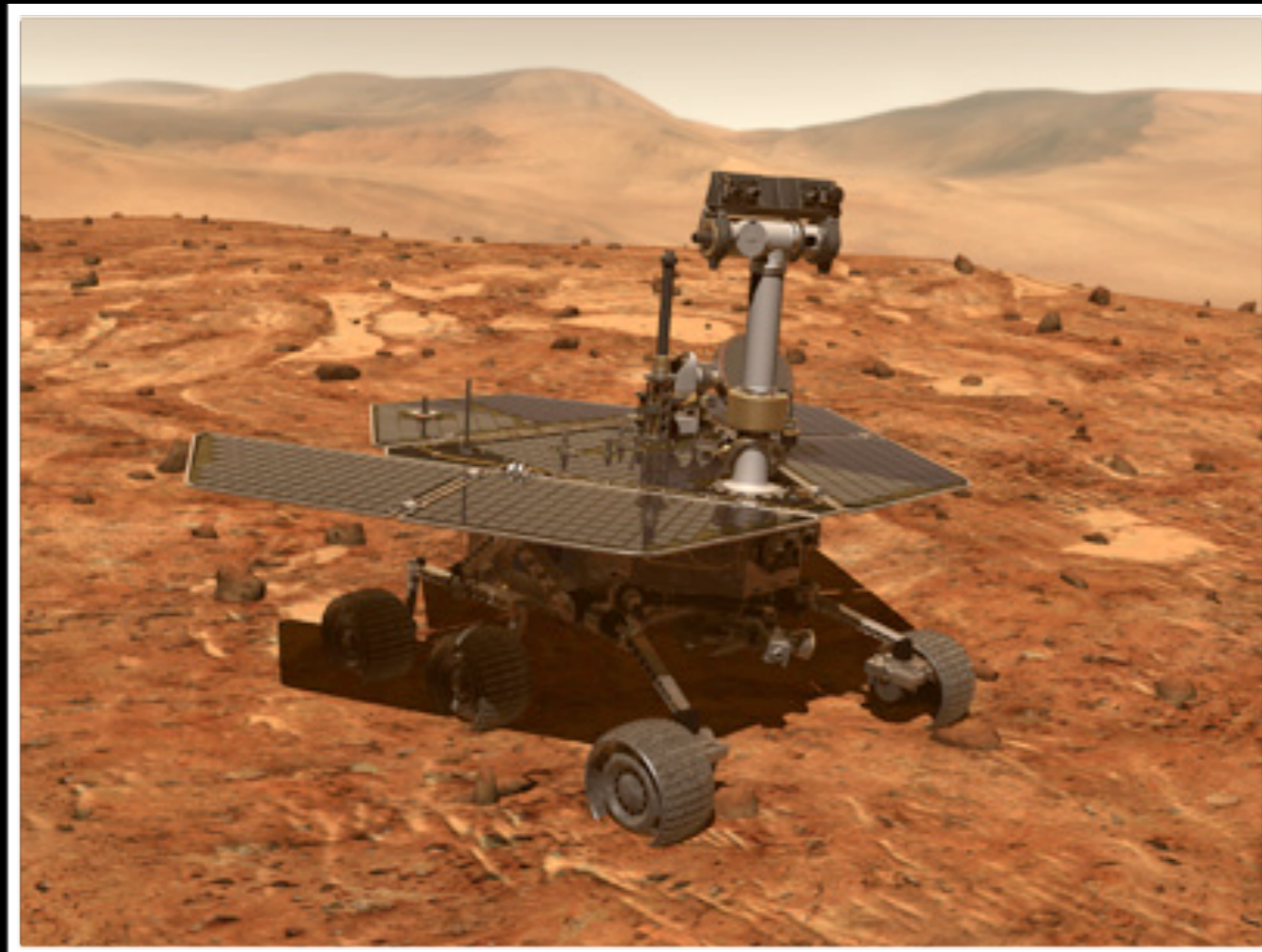






# SUSTAINABILITY

If your institution isn't looking into cloud computing, it's time to clean up those tribbles and get started.



Mars images

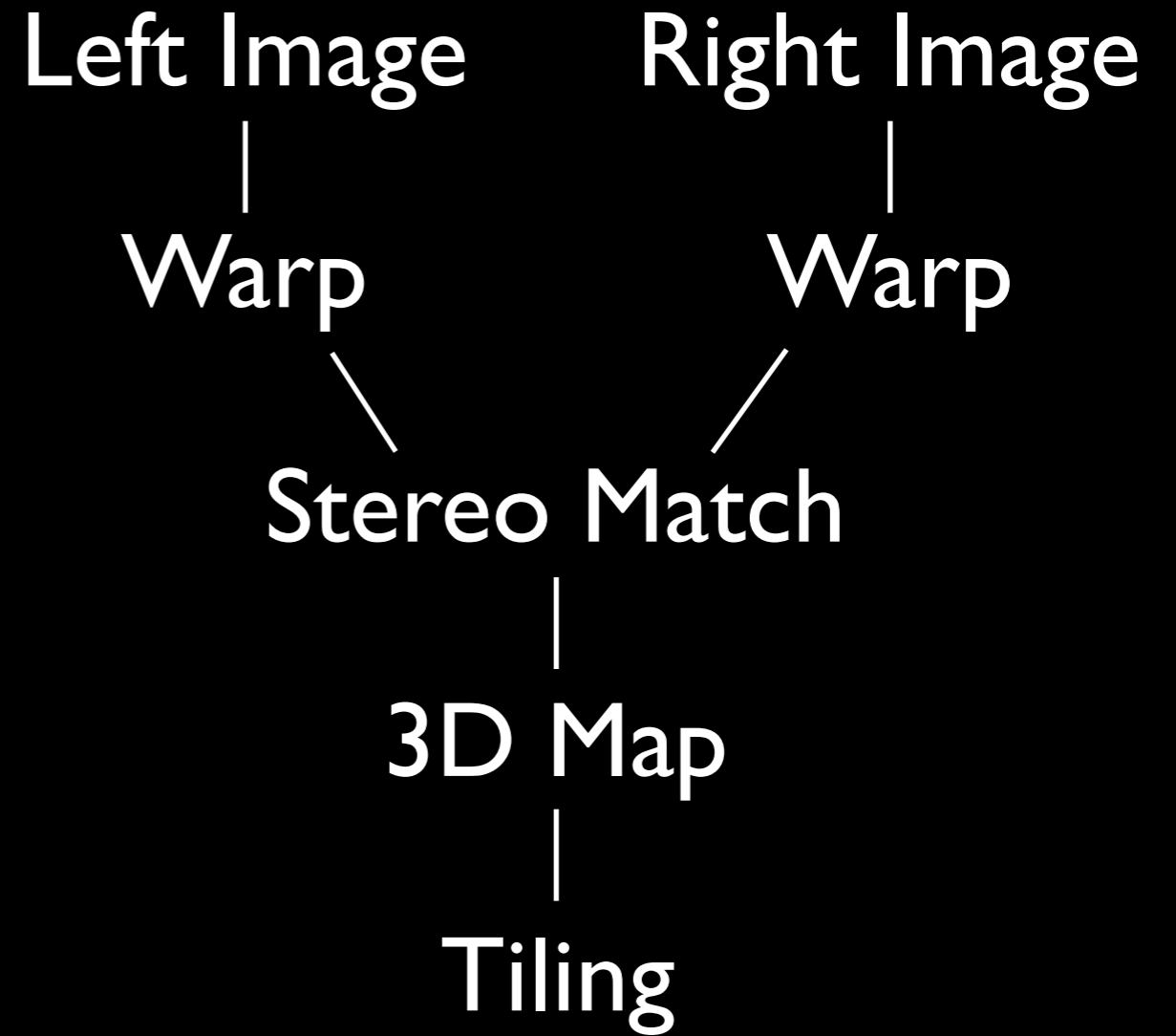
|  
Location

|  
Orientation

|  
Catalog

|  
Search

|  
Tiling





Images in every direction

Warp

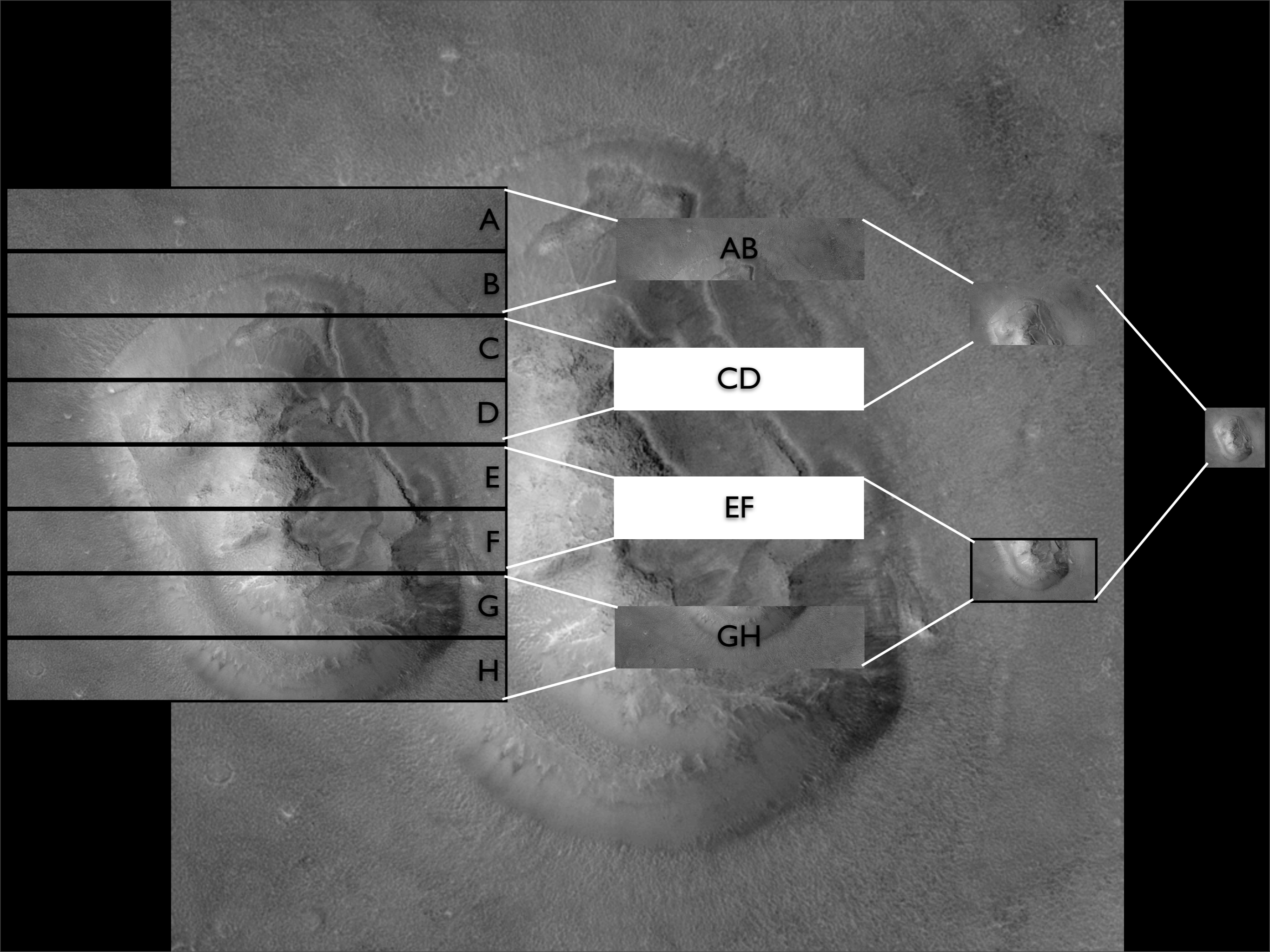
Stripe

Merge

Tiling







A

B

C

D

E

F

G

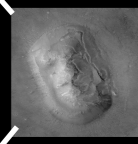
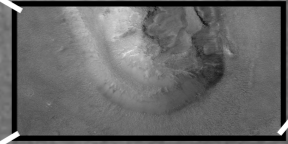
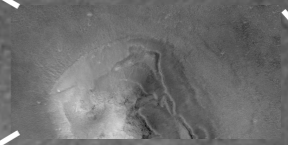
H

AB

CD

EF

GH





©Paramount

Search

Link

Browse

Category

- browse
- mosaic
- place
- plan
- product

Sol

- 1 TO 328 (13602)
- 329 TO 648 (15762)
- 649 TO 963 (8775)
- 964 TO 1276 (7959)
- 1277 TO 1610 (5546)

 to 




Tags




- HighPriority (100)
- Trench (60)
- aeolian (51)
- teamB (51)
- silica (50)




 




Bookmarks




- [images tagged highpriority on sols \(1554 to 1563\)](#) ✖
- [images fhaz sequenceid is f0006 on sol 603](#) ✖
- [images fhaz on sols \(1 to 328\)](#) ✖
- [images navcam tagged highpriority on sol 1553](#) ✖
- [images sequenceid is p2111 site is 134](#) ✖
- [crockett's places](#) ✖




TestPlan\_Aug17  
 Joswig  
 Sol: 77  
 State: My Plans  
 Modified Sep 21, 2009 14:43 PDT




sol\_77\_my\_plans  
 welch  
 Sol: 77  
 State: My Plans  
 Modified Aug 18, 2009 15:25 PDT




sol\_77\_my\_plans\_nstest2  
 nicoles  
 Sol: 77  
 State: My Plans  
 Modified Aug 18, 2009 13:30 PDT




sol\_77\_my\_plansns  
 nicoles  
 Sol: 77  
 State: My Plans  
 Modified Aug 17, 2009 17:56 PDT

markplan  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 13, 2009 11:12 PDT




kewl2plan  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 12, 2009 19:15 PDT


kewl\_plan  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 12, 2009 19:08 PDT

sol\_7447\_my\_plans  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 12, 2009 19:08 PDT


sexy\_plan  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 12, 2009 19:05 PDT







chet\_plan  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 12, 2009 18:54 PDT







tomsnewplan  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 12, 2009 18:52 PDT







my\_new\_plan  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 12, 2009 18:51 PDT







sol\_778my\_plans  
 ksshams  
 Sol: 77  
 State: My Plans  
 Modified Aug 12, 2009 18:51 PDT






sol\_77\_my\_plans  
 ksshams  
 Sol: 1  
 State: My Plans  
 Modified Aug 12, 2009 17:21 PDT






 Pancam  
 2P269292166ESFAY00P2600L8M1  
 Seq: p2600  
 Sol 1610  RMC:134/0  
 






 Pancam  
 2P269203261ESFAY00P2600L8M1  
 Seq: p2600  
 Sol 1609  RMC:134/0  
 

 Pancam  
 2P269203305ESFAY00P2111L2M1  
 Seq: p2111  
 Sol 1609  RMC:134/0  
 

 Navcam  
 2N269203984EDNAY00P1587L0...  
 Seq: p1587  
 Sol 1609  RMC:134/0  
 

 Navcam  
 2N269204096EDNAY00P1587L0...  
 Seq: p1587  
 Sol 1609  RMC:134/0  


 Navcam  
 2N269204118EDNAY00P1587L0...  
 Seq: p1587  
 Sol 1609  RMC:134/0  


 Pancam  
 2P269203658EFAY00P2275L2M1  
 Seq: p2275  
 Sol 1609  RMC:134/0  




Search

[rings](#) [issna](#)

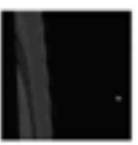
Browse

- Category
- Instrument
- Targets
  - [tethys, \(3\)](#)
- Observation ID
  - [nav\\_004sk\\_opnav652\\_prime \(3\)](#)
  - [nav\\_004sk\\_opnav741\\_prime \(3\)](#)
  - [nav\\_005sk\\_opnav951\\_prime \(3\)](#)
- Time
 

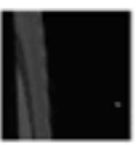
3/ 1/2008

TO 3/ 1/2009
- Tags
- Bookmarks

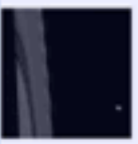
Target Description: Enceladu...  
 Obs. Id: NAV\_005SK\_OPNAV...  
 Instrument: ISSNA




Target Description: Enceladu...  
 Obs. Id: NAV\_005SK\_OPNAV...  
 Instrument: ISSNA




Target Description: Enceladu...  
 Obs. Id: NAV\_005SK\_OPNAV...  
 Instrument: ISSNA




Target Description: Tethys, R...  
 Obs. Id: NAV\_004SK\_OPNAV...  
 Instrument: ISSNA




Target Description: Tethys, R...  
 Obs. Id: NAV\_004SK\_OPNAV...  
 Instrument: ISSNA




Target Description: Tethys, R...  
 Obs. Id: NAV\_004SK\_OPNAV...  
 Instrument: ISSNA



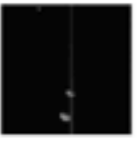
Target Description: Dione, R...  
 Obs. Id: NAV\_004SK\_OPNAV...  
 Instrument: ISSNA



Target Description: Dione, R...  
 Obs. Id: NAV\_004SK\_OPNAV...  
 Instrument: ISSNA



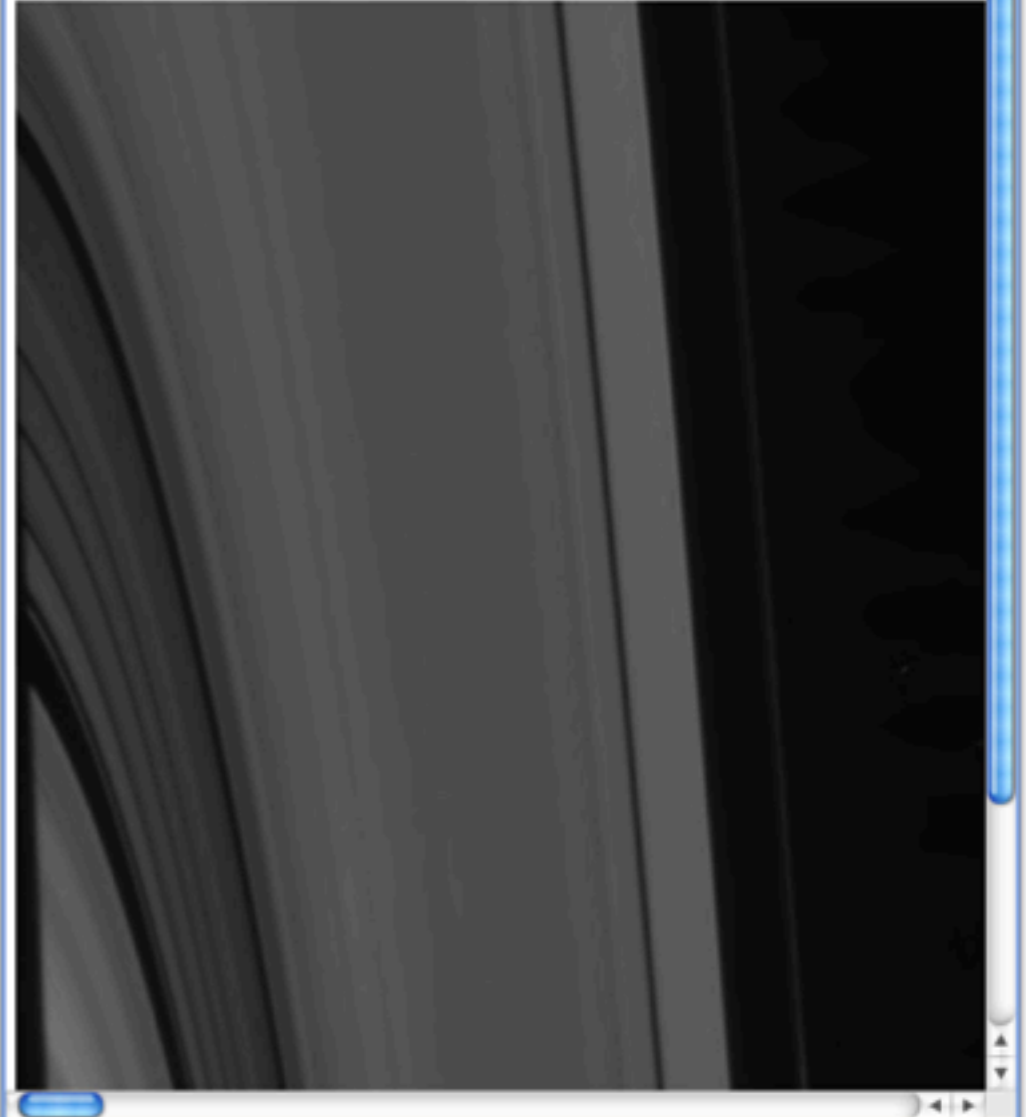
Target Description: Dione, R...  
 Obs. Id: NAV\_004SK\_OPNAV...  
 Instrument: ISSNA



Detail







▲IMAGE: (N1491361527\_3.IMG,5)  
 ANTIBLOOMING\_STATE\_FLAG: ON  
 ABSOLUTE\_PATH: /oss\_maestro/coiss\_2011/data/1491034420\_1491988345/N149136  
 SOFTWARE\_VERSION\_ID: ISS 9.00 01-11-2005  
 LINE\_PREFIX\_TABLE.ROW\_BYTES: 24  
 RECORD\_TYPE: FIXED\_LENGTH

Preview



Search Results

Any data products acquired from Sols 1783 to 1793  
(124 results found)

	Navcam Sequence Id: p1914	Sol 1783 Site 135 / Position 89
	MOSAIC 41 wedges Sequence Id: +	Sols 1783 to 1793 Site 135 / Position 89
	Navcam Sequence Id: p1914	Sol 1783 Site 135 / Position 89
	Navcam Sequence Id: p1914	Sol 1783 Site 135 / Position 89
	Navcam Sequence Id: p1914	Sol 1783 Site 135 / Position 89
	Navcam Sequence Id: p1914	Sol 1783 Site 135 / Position 89

Page 1 of 2

Detail

Point of Interest ( . . )

Target/Feature

- Create target
- Create feature

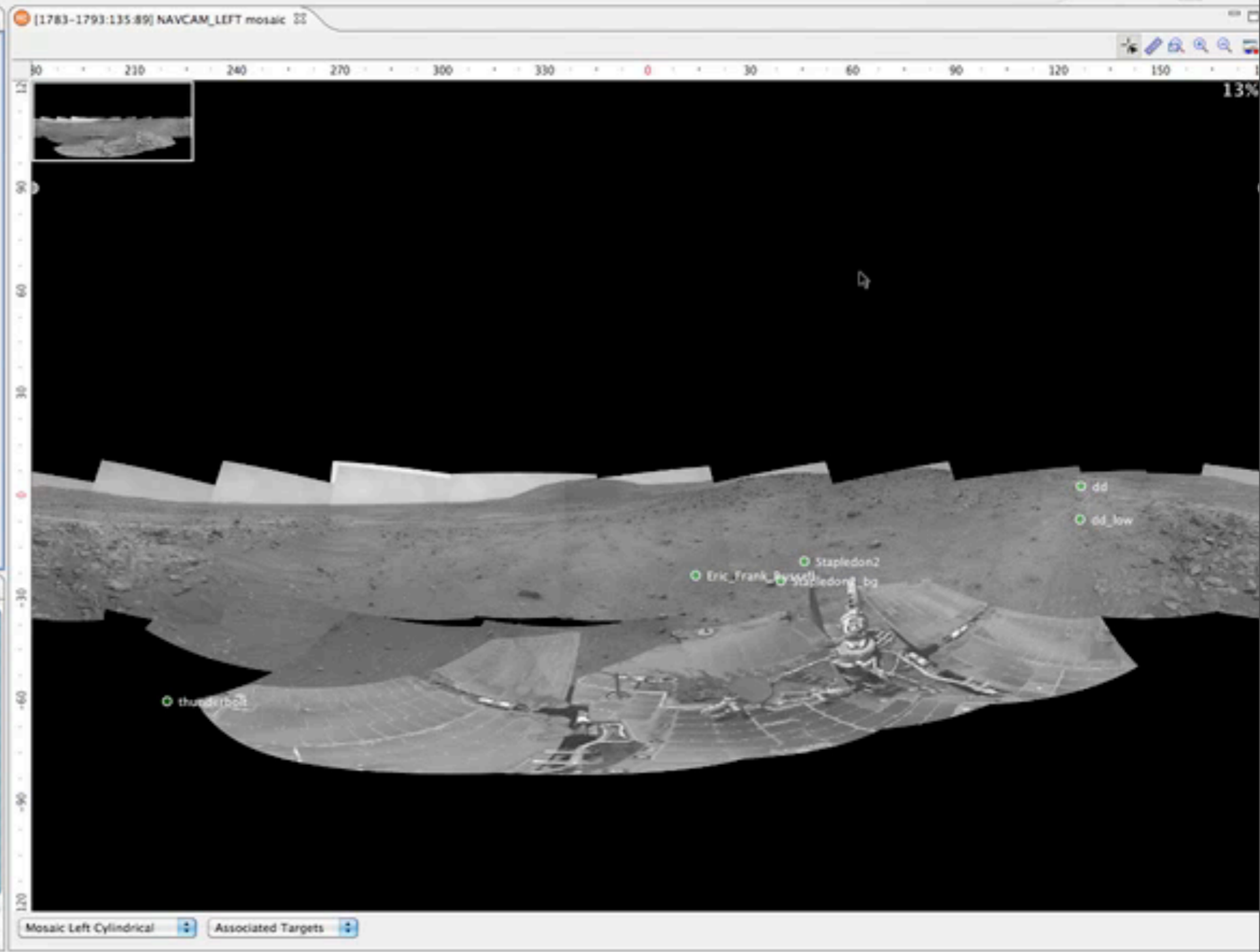
Related

- Find other images of this point

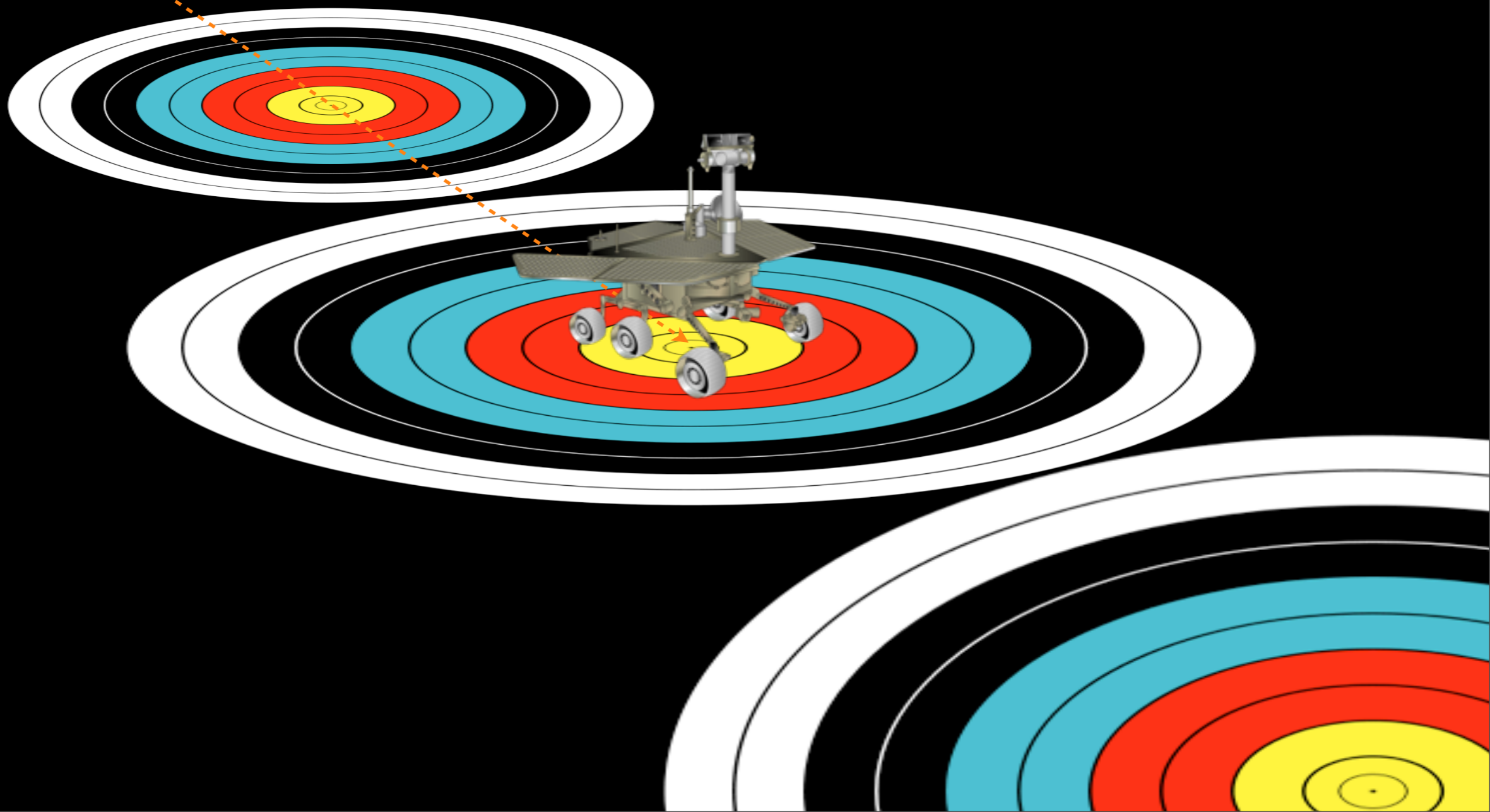
Point

Pixel (i, j): (0.000, 0.000)

Frame: SITE



100 meters +/- 10%



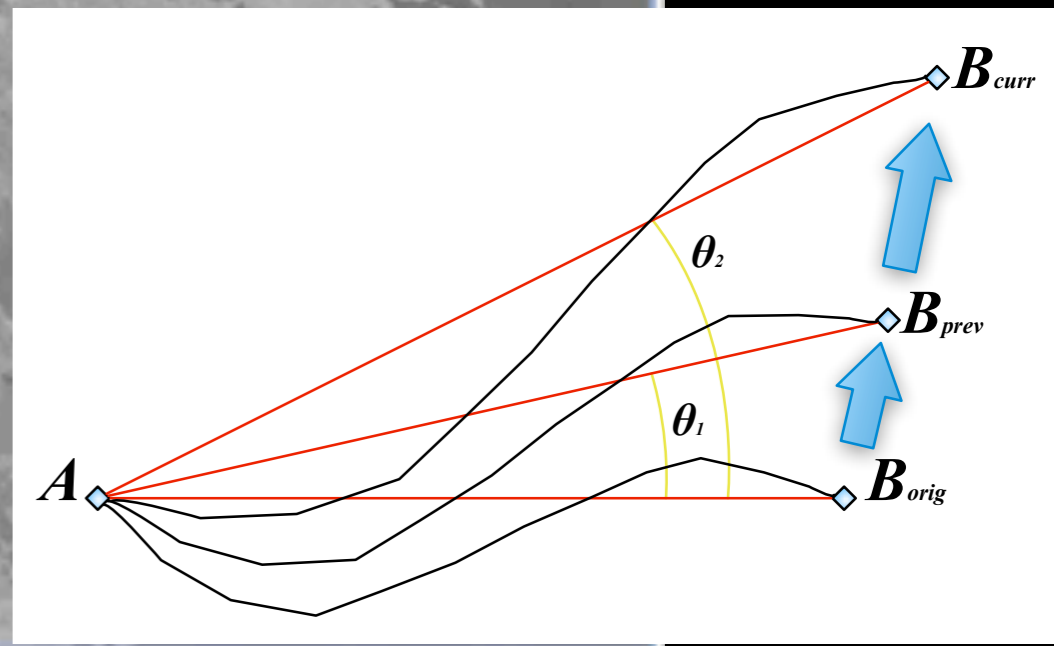
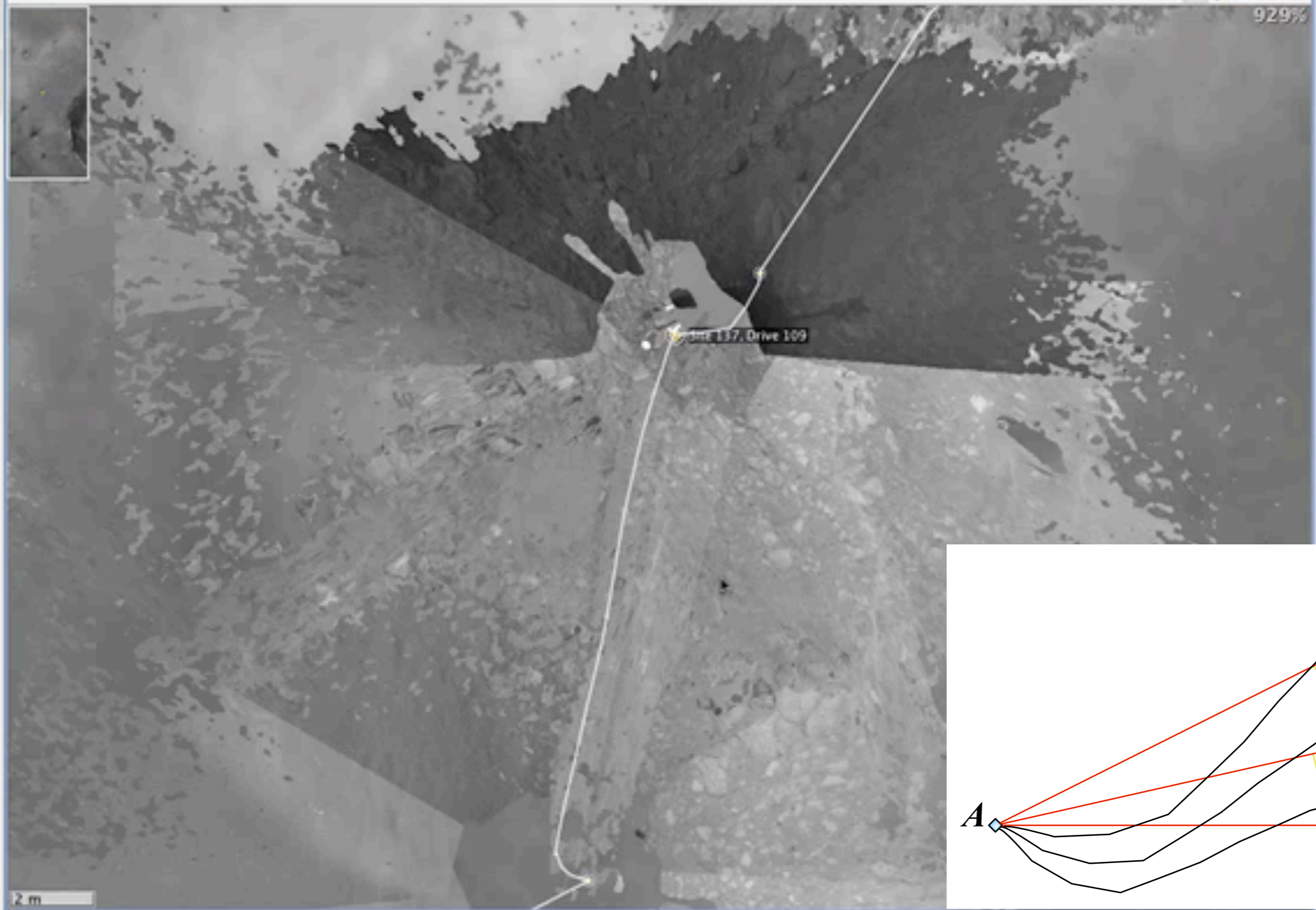




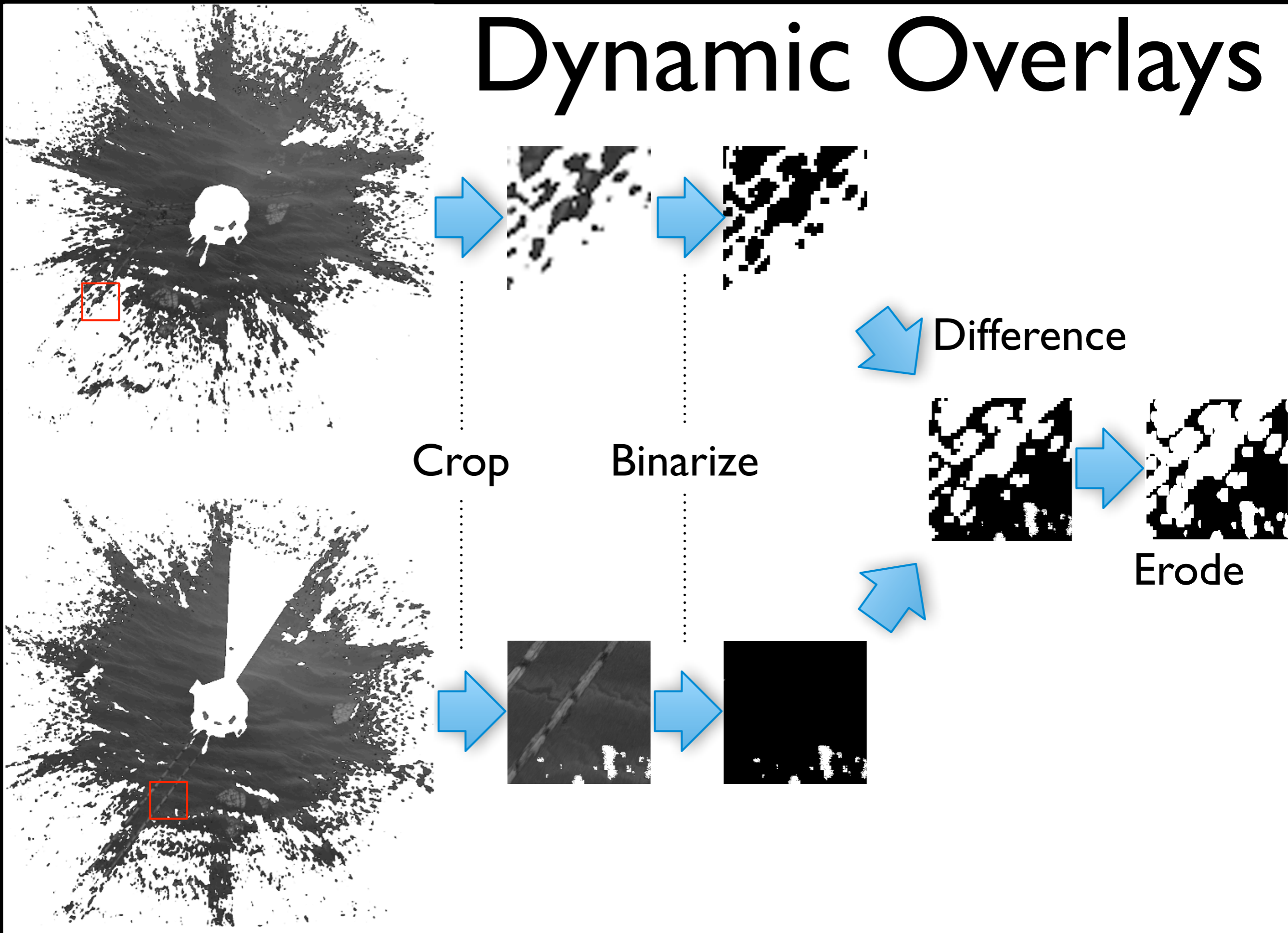


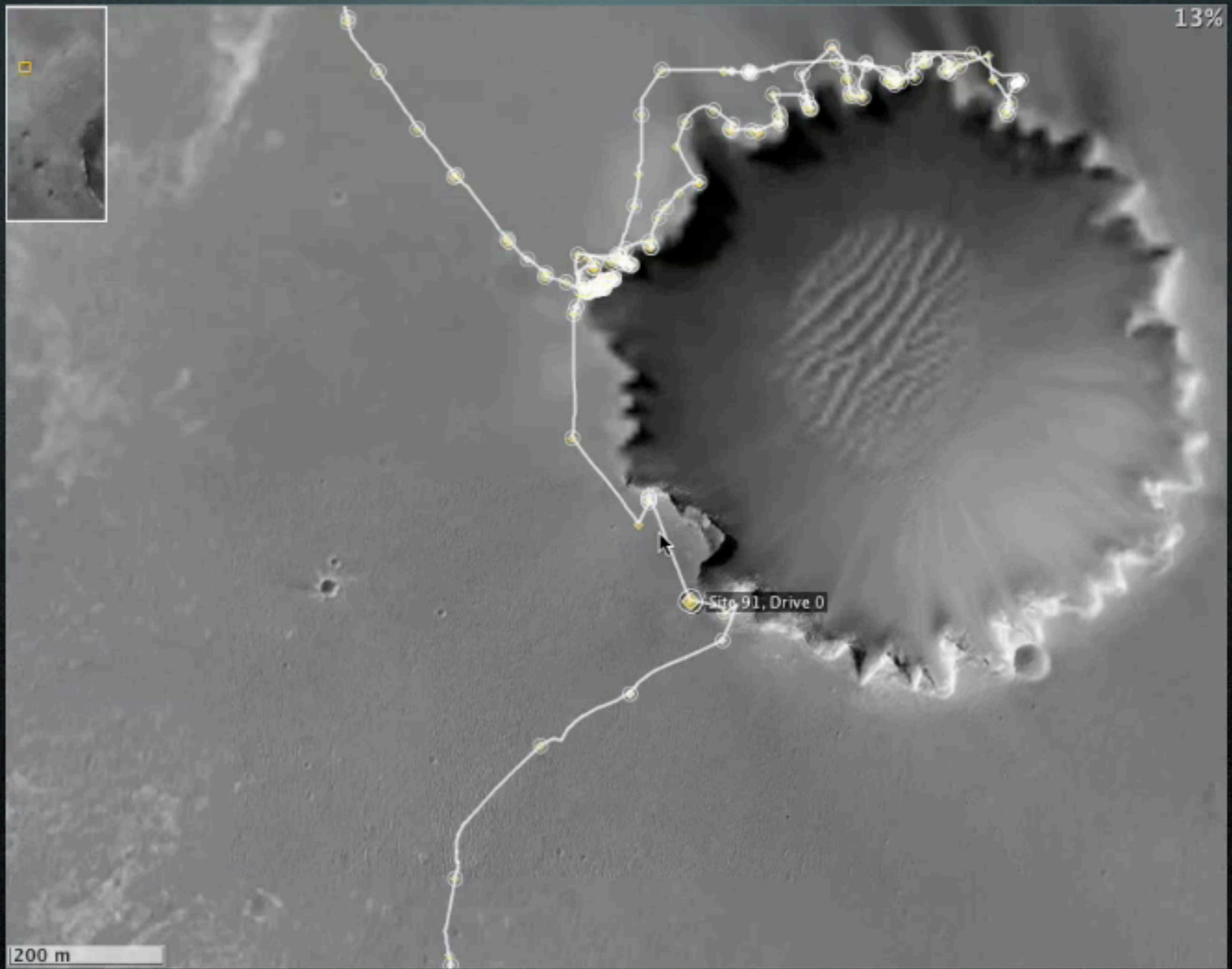
0%

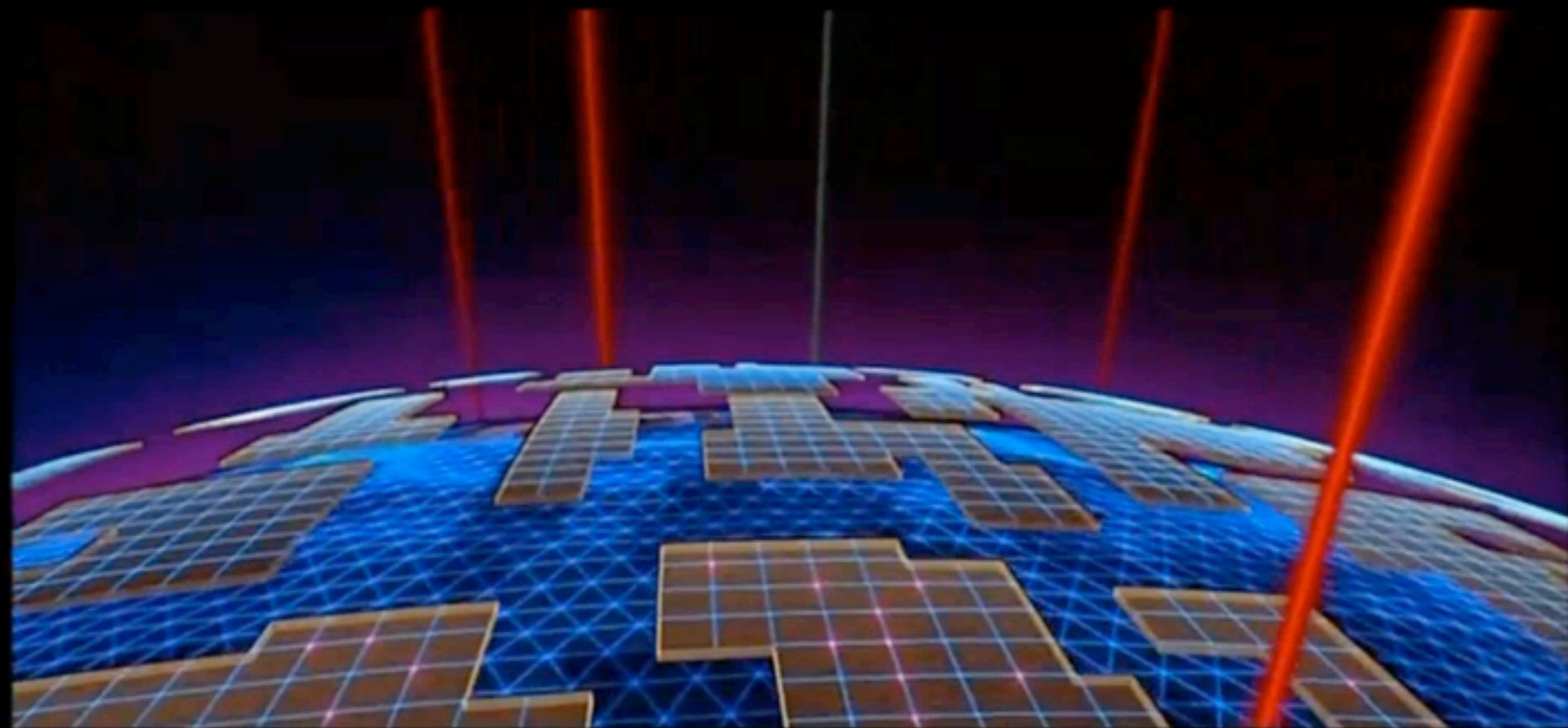
5000 m

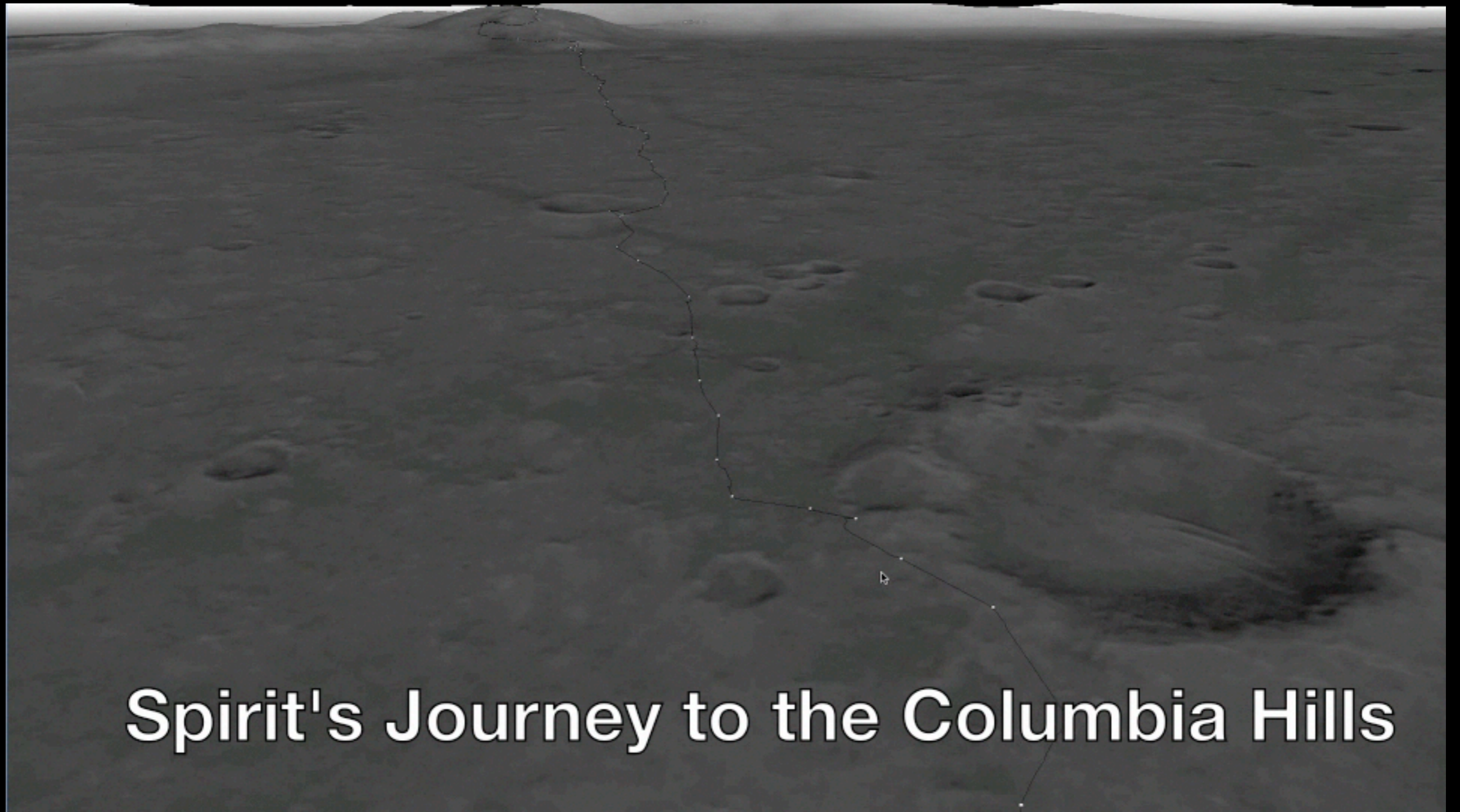


# Dynamic Overlays



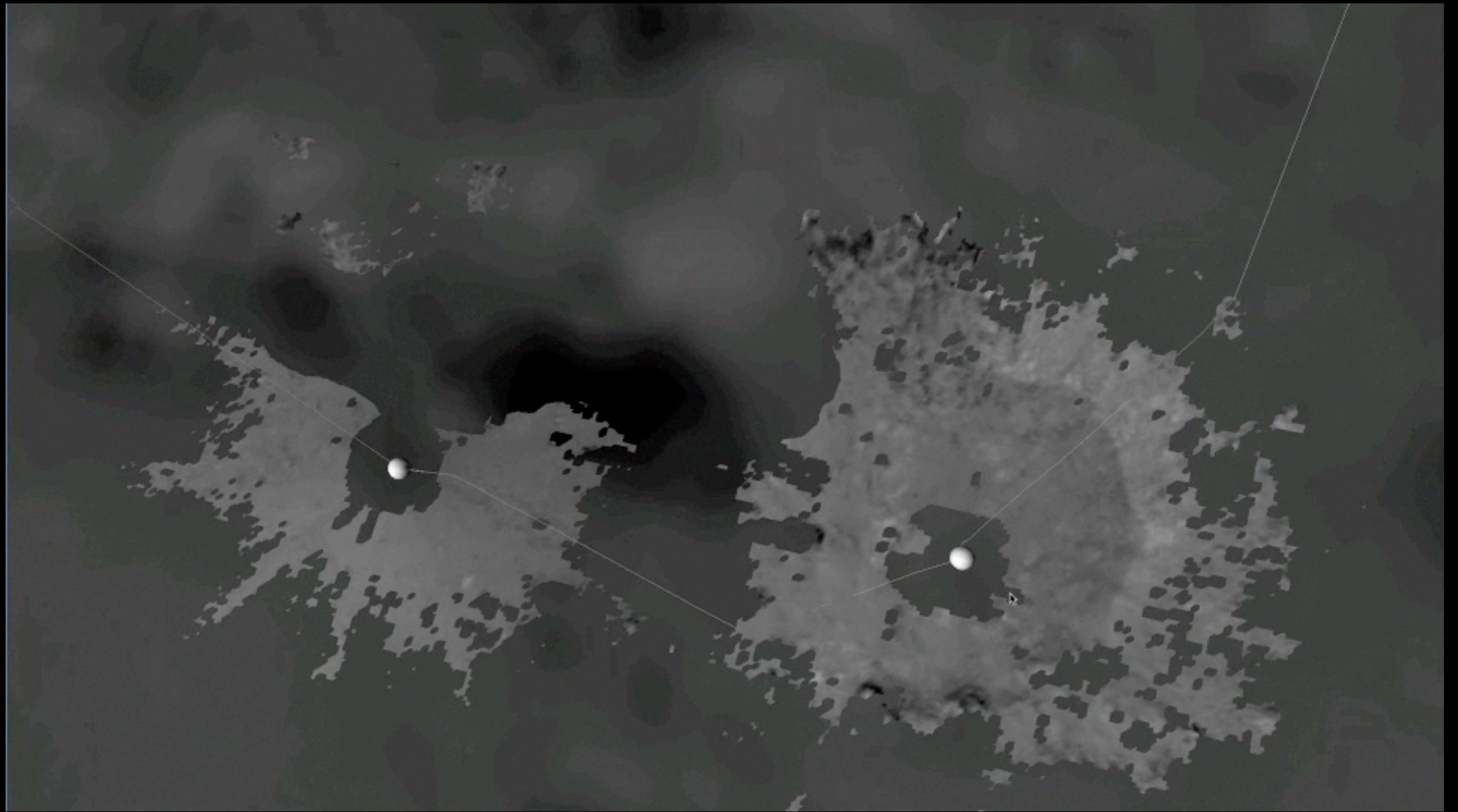






# Spirit's Journey to the Columbia Hills



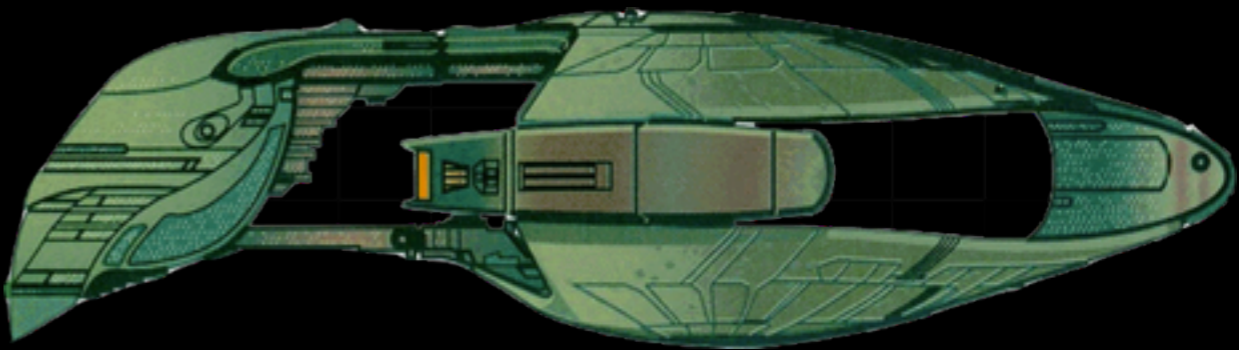




adapted from Miles K "Clever Things to Say" blog

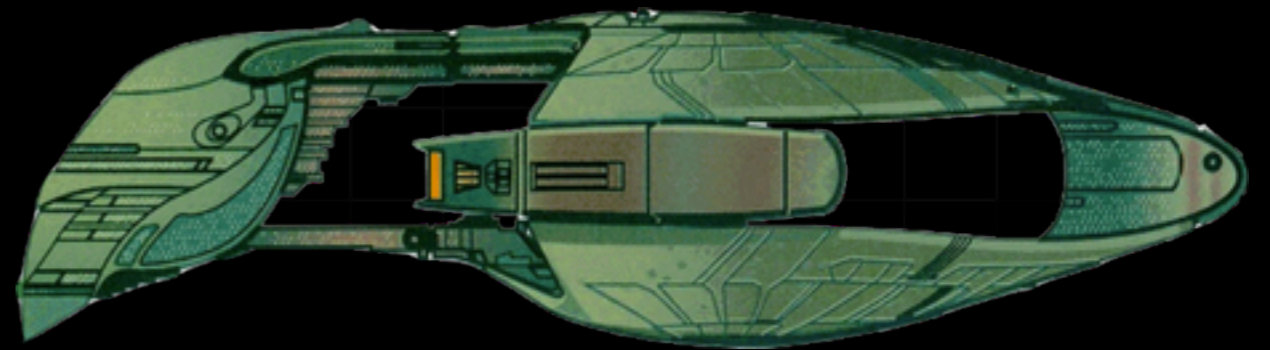


©Paramount





You're upside down  
LMAO!



NO WAI



N00bs.



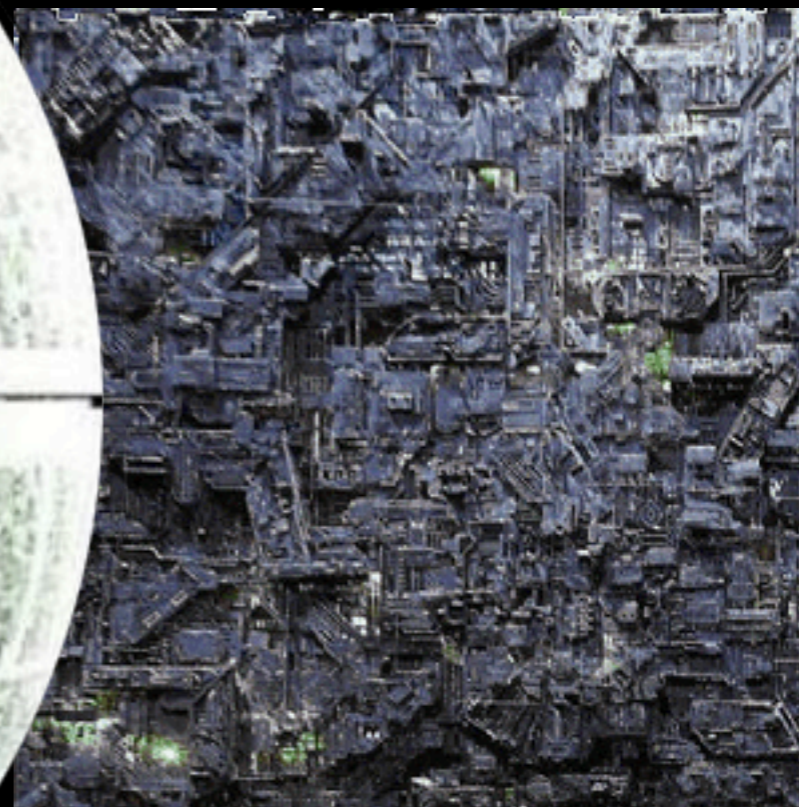
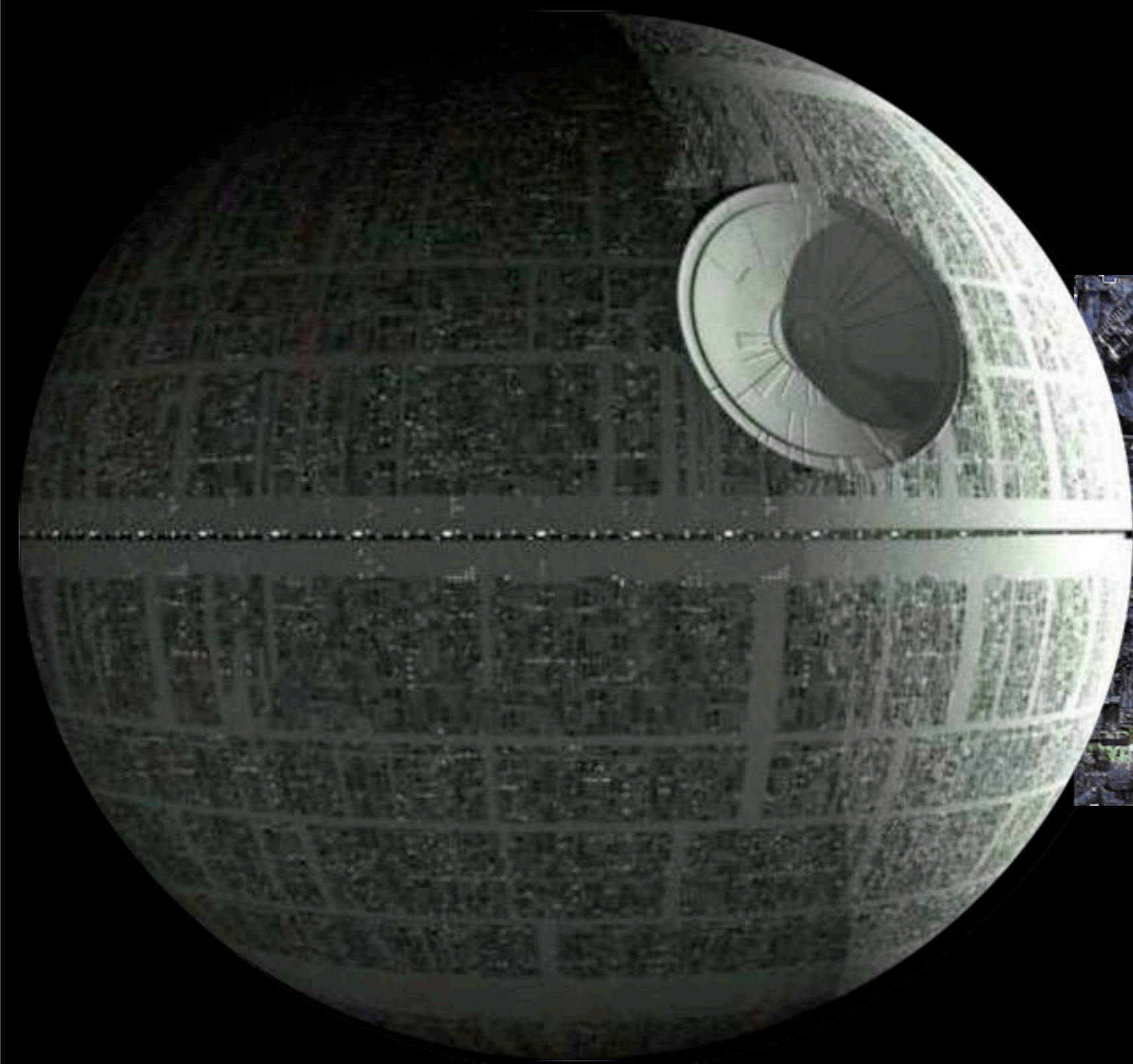
adapted from Miles K "Clever Things to Say" blog

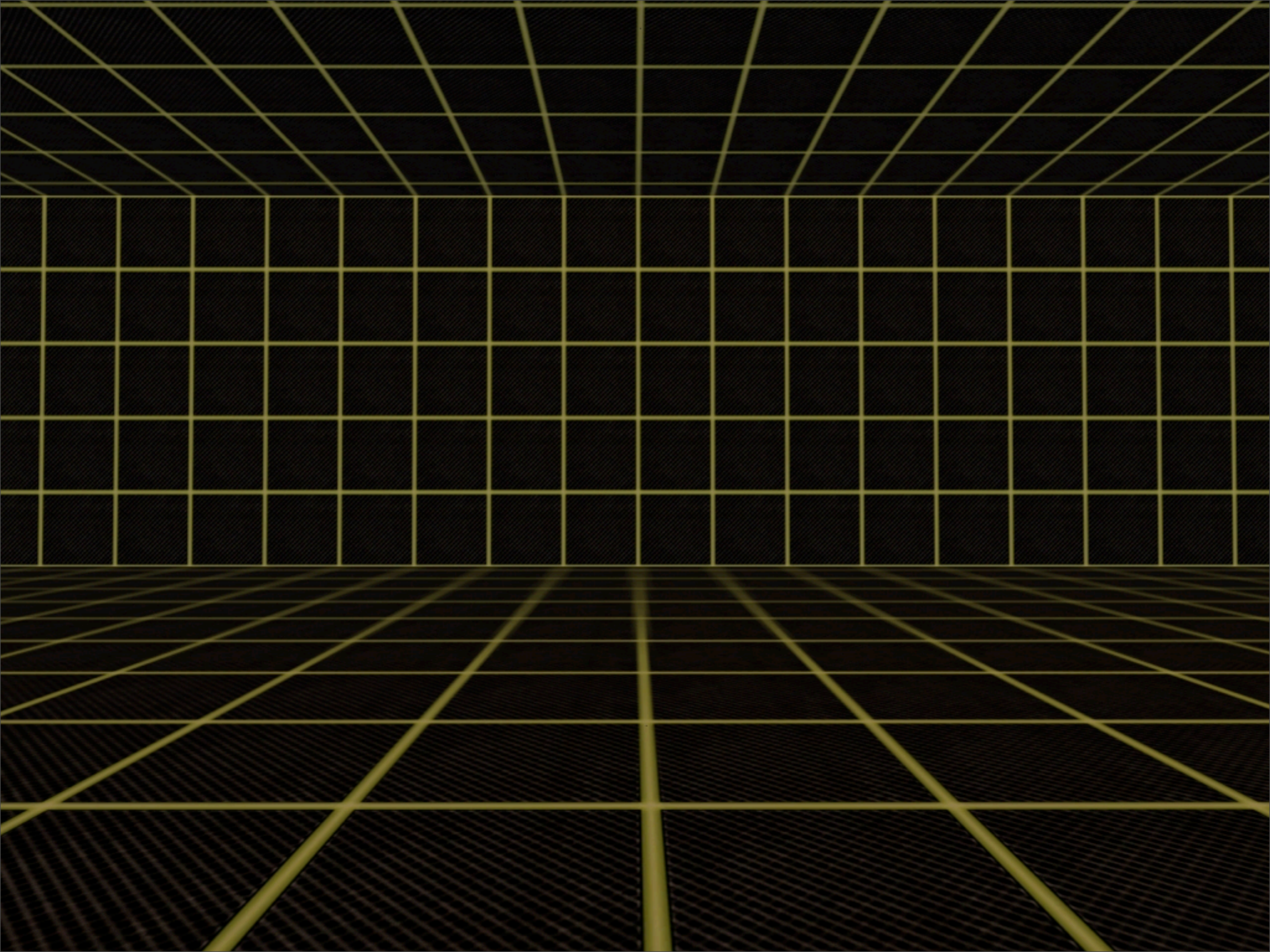
©Paramount



@#\$\$%^&\*!



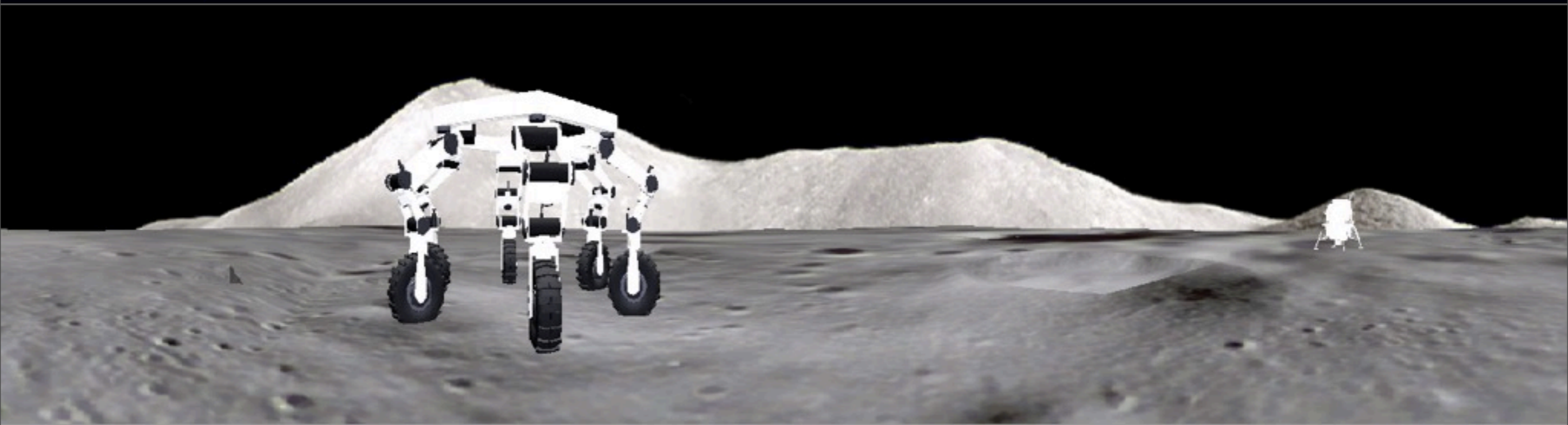






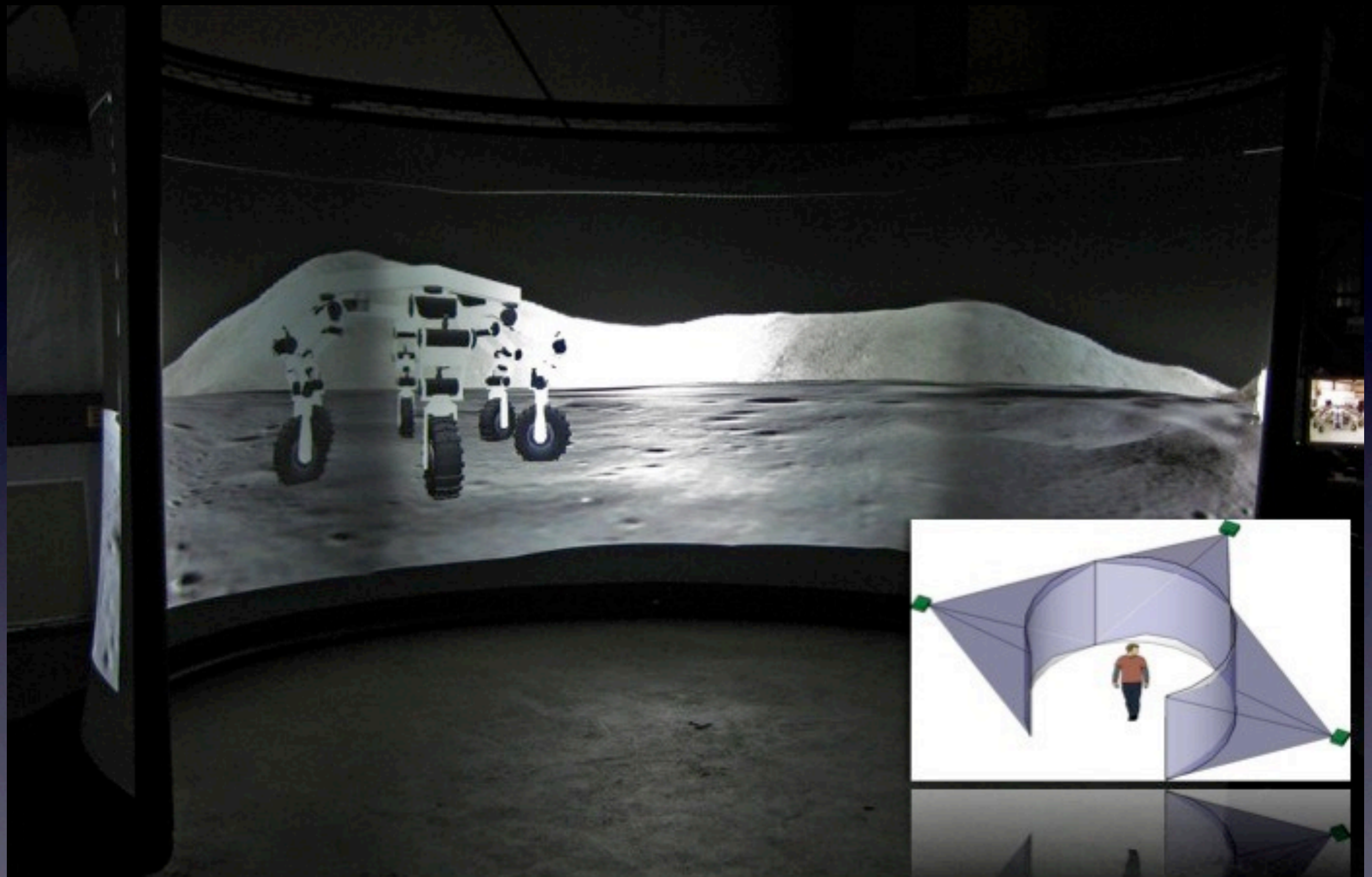
©Warner Bros. Television



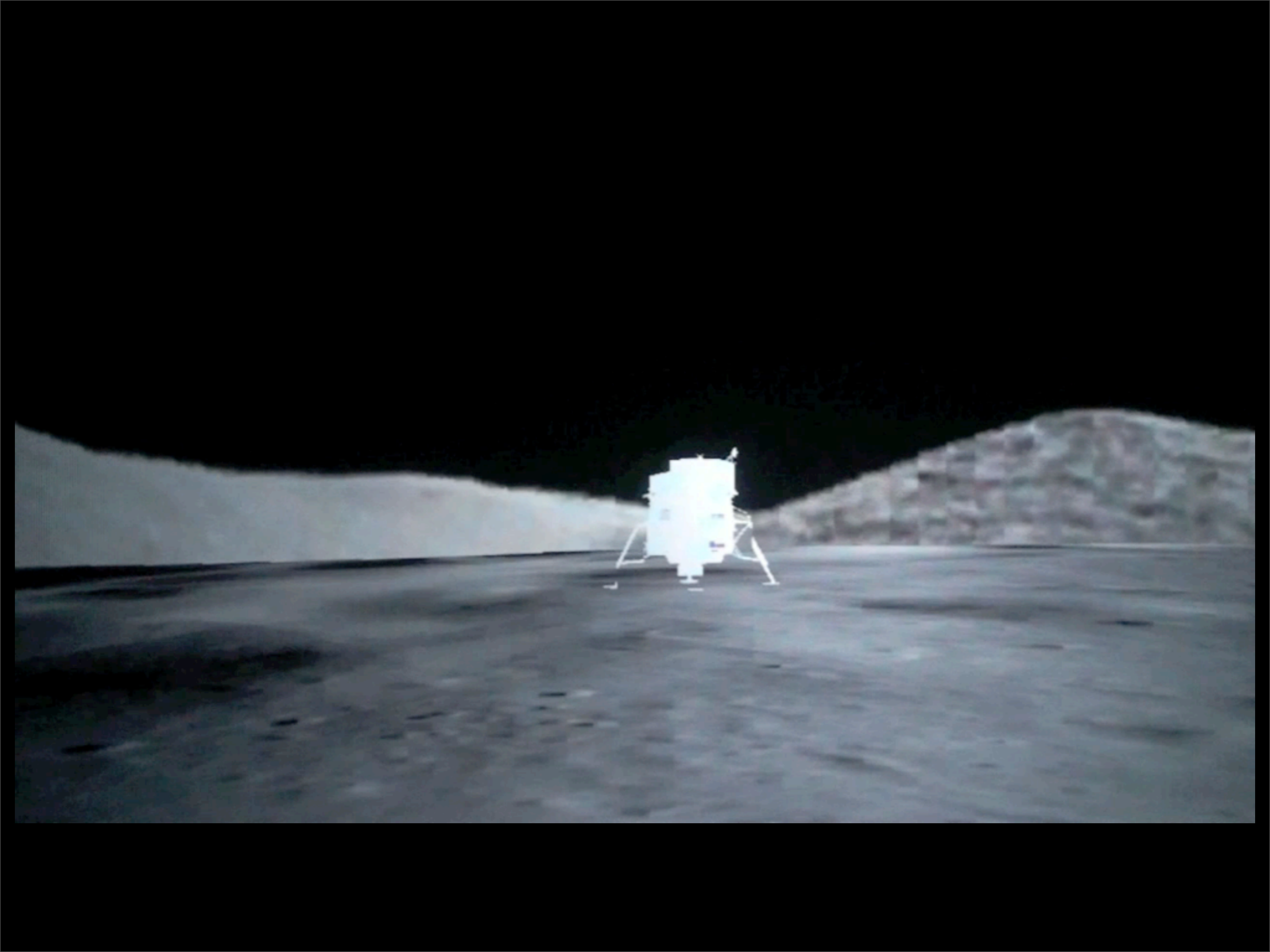




[www.visionair3d.com](http://www.visionair3d.com)





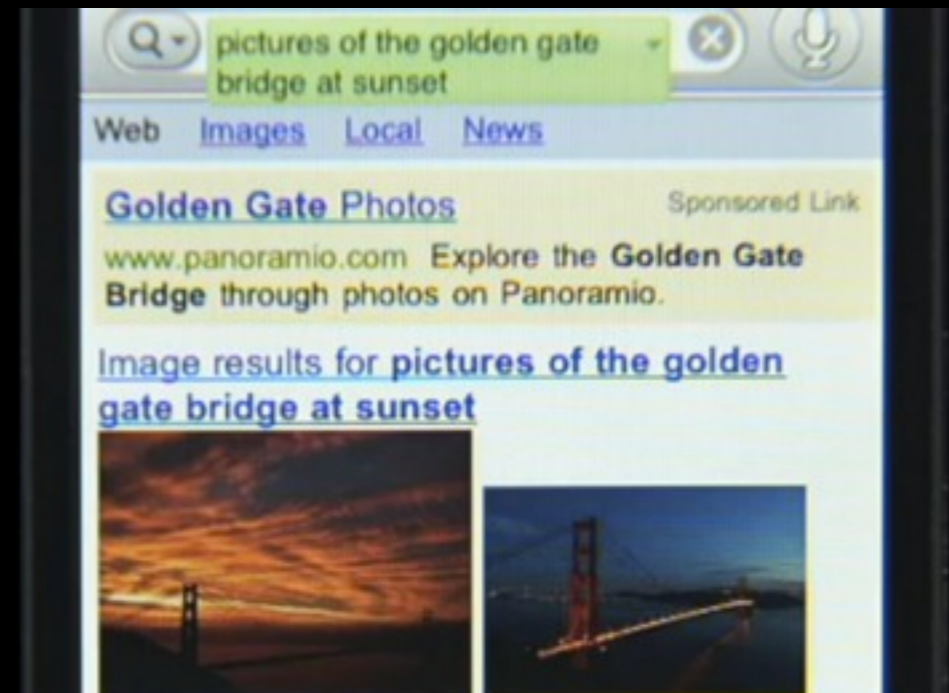




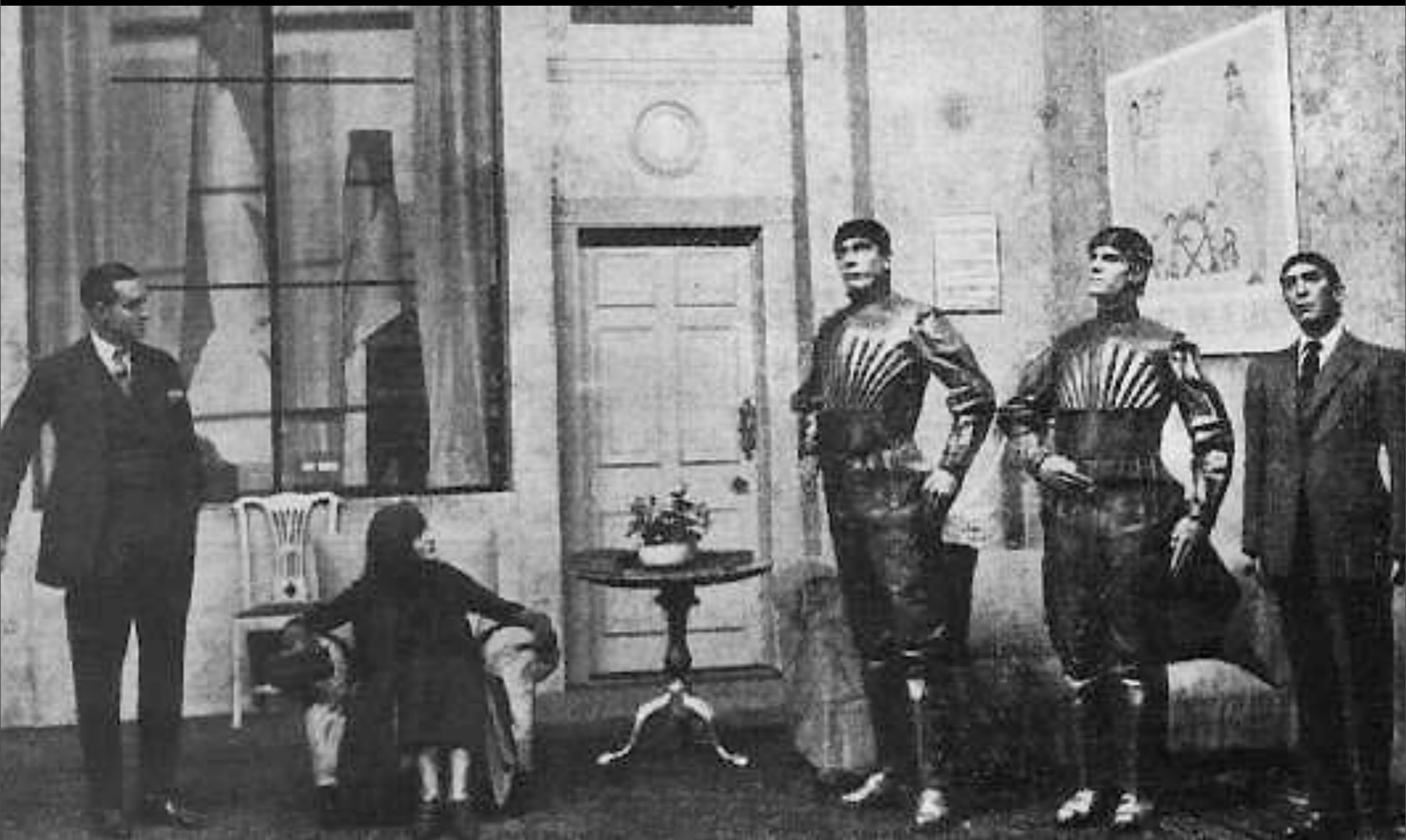
©Universal



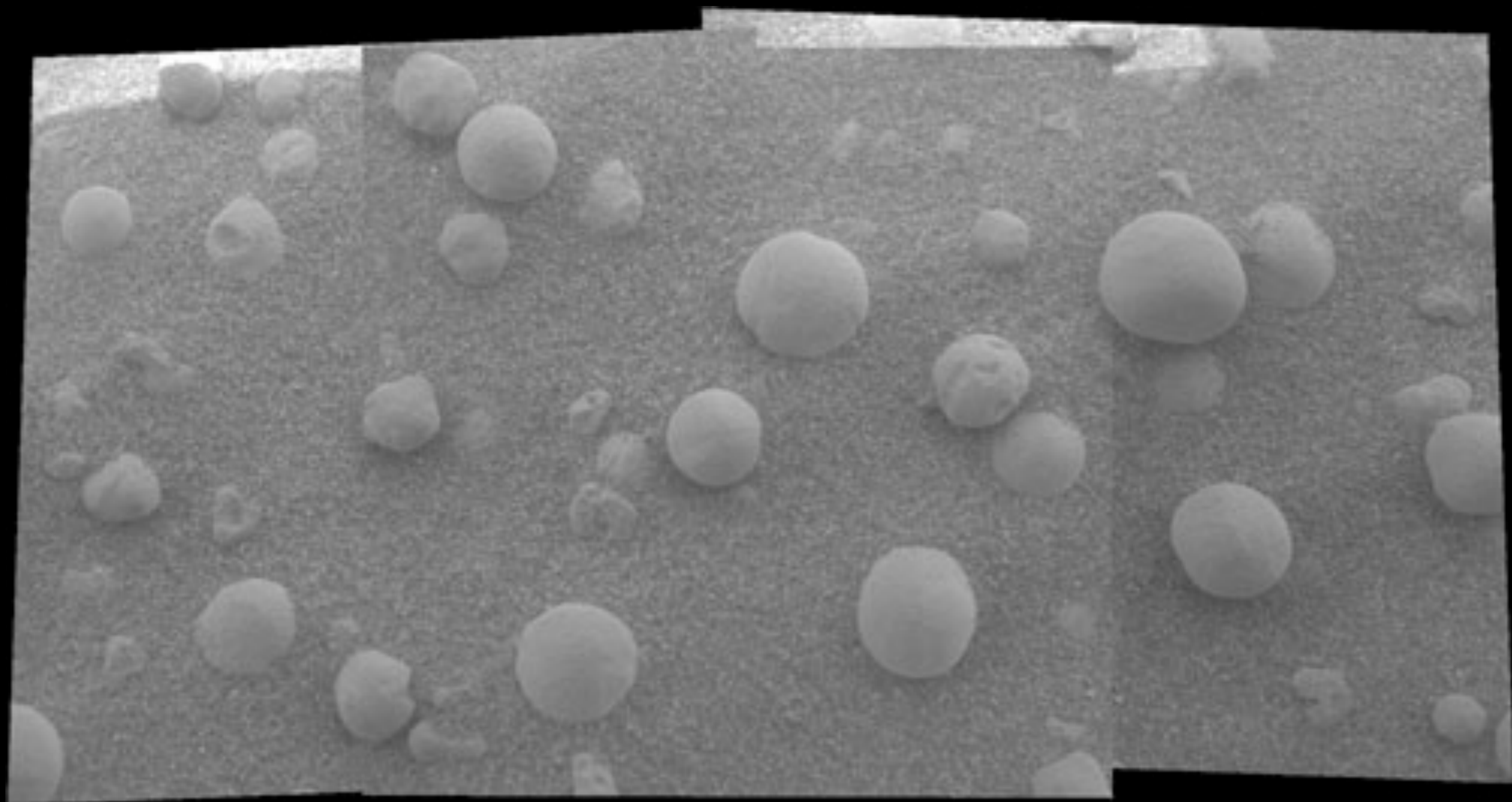
©Paramount Pictures

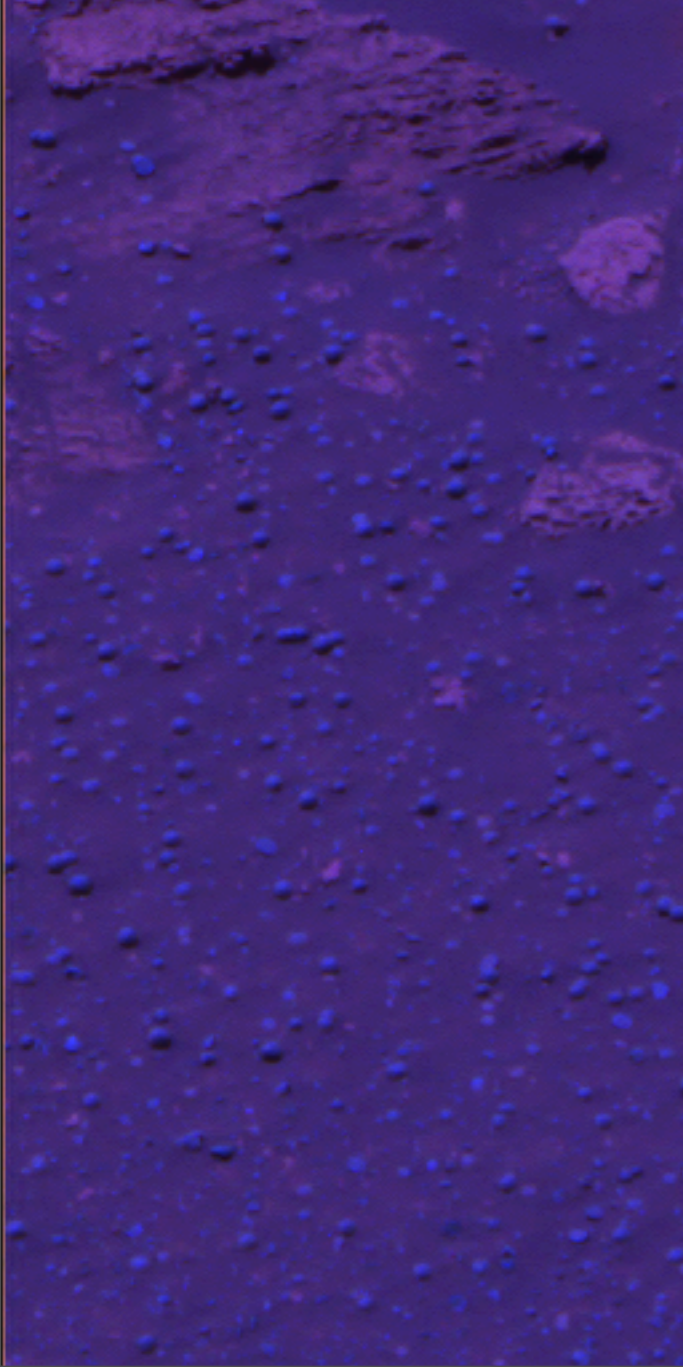
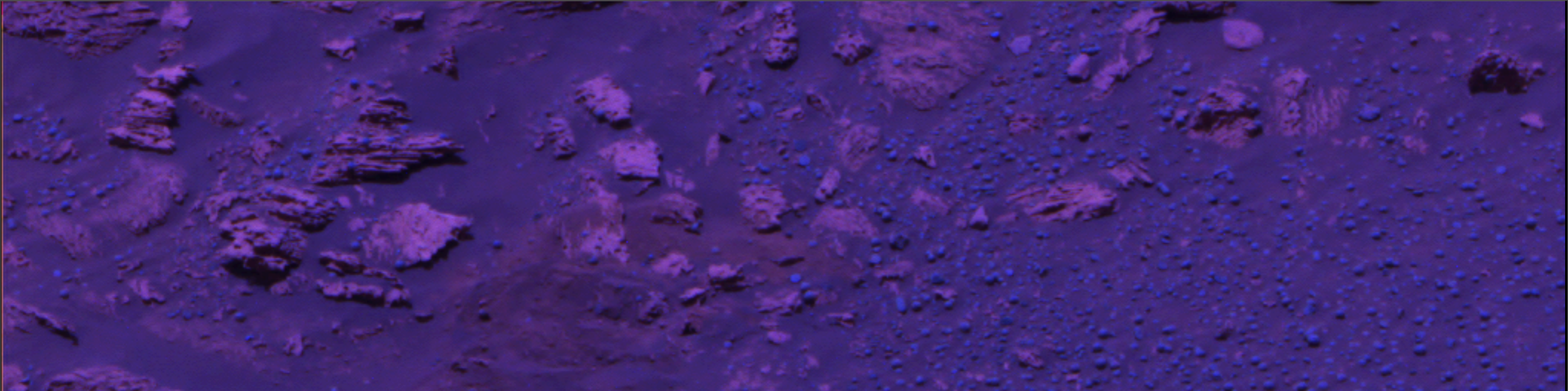












Distance:

Distance:  m

Distance:  m

Distance:  m



Distance:  m

Distance:  m

Distance:  m

Distance:  m





*Photo: Mark Kleis, leftlanenews.com*

# Sudden Unintended Acceleration

Year Reported	Make
1982-1987	Audi 5000
1988	Honda Accord
1997	Jeep Cherokee, Grand Cherokee
2000	Ford Explorer
2006	Ford Cobra
2008	Kia Sophia, Amanti
2009	Toyota Avalon
2010	Pontiac Vibe Toyota Camry, Corolla, Tacoma, Matrix, Avalon, Prius

Therac-25

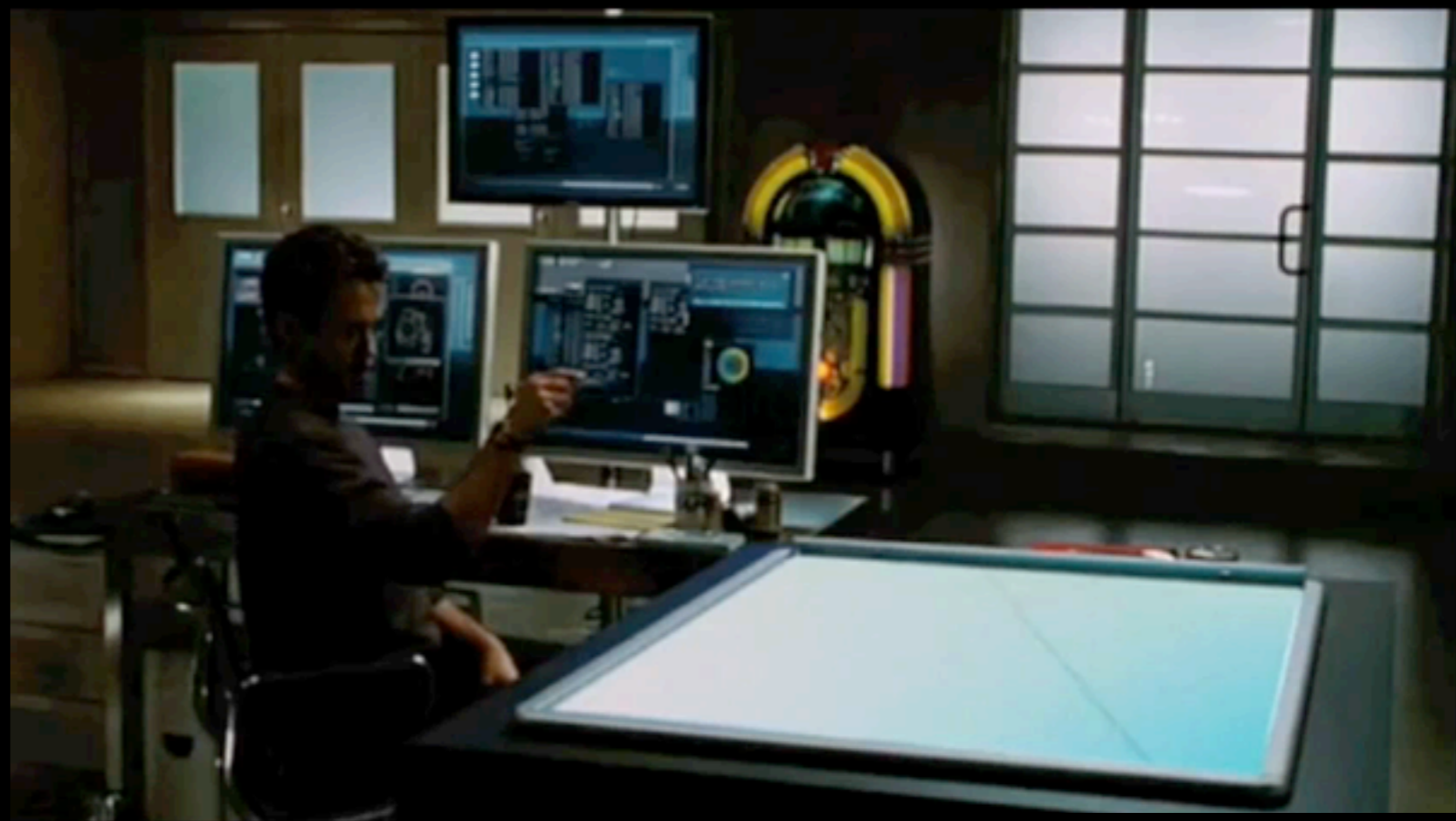




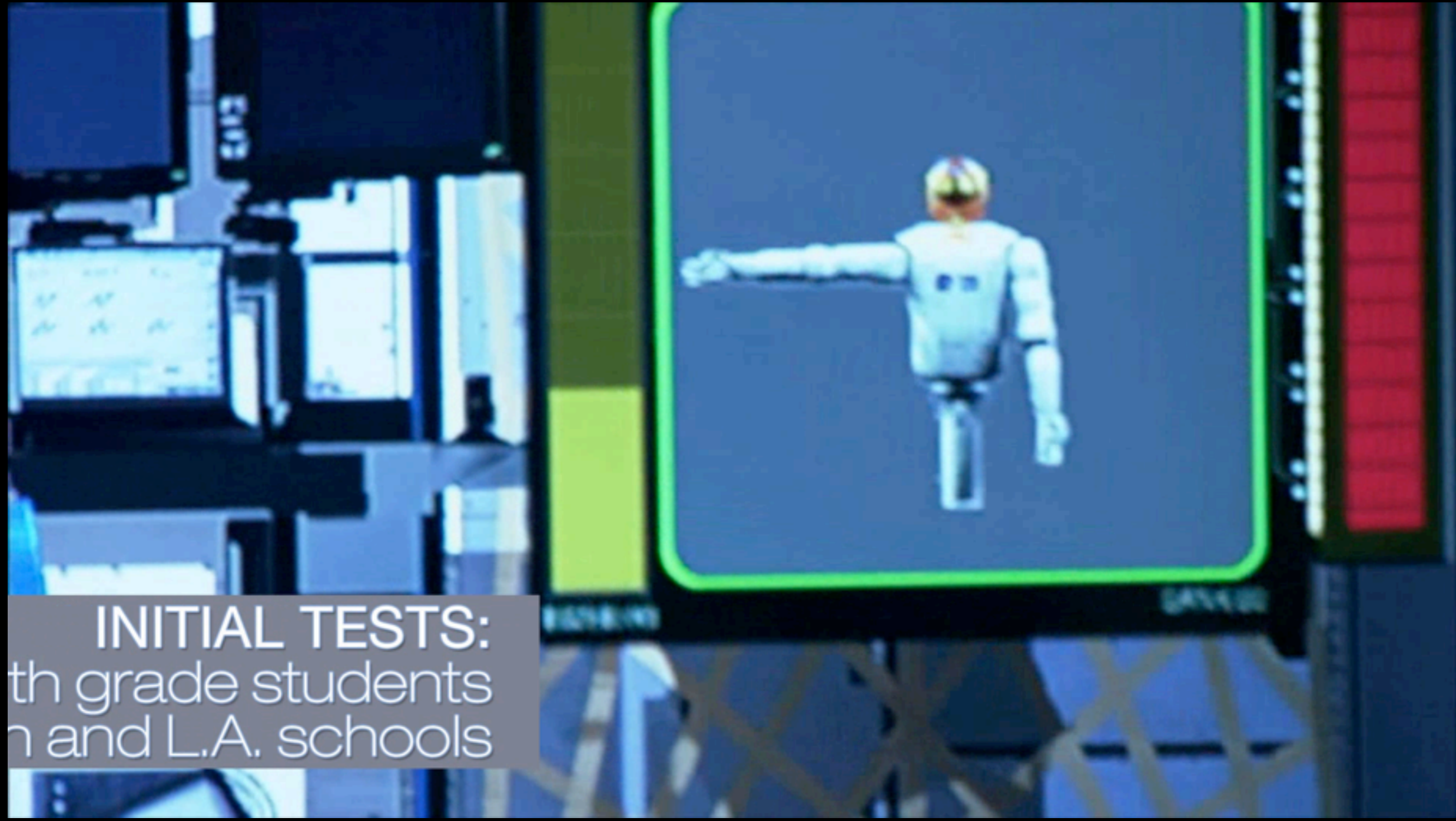




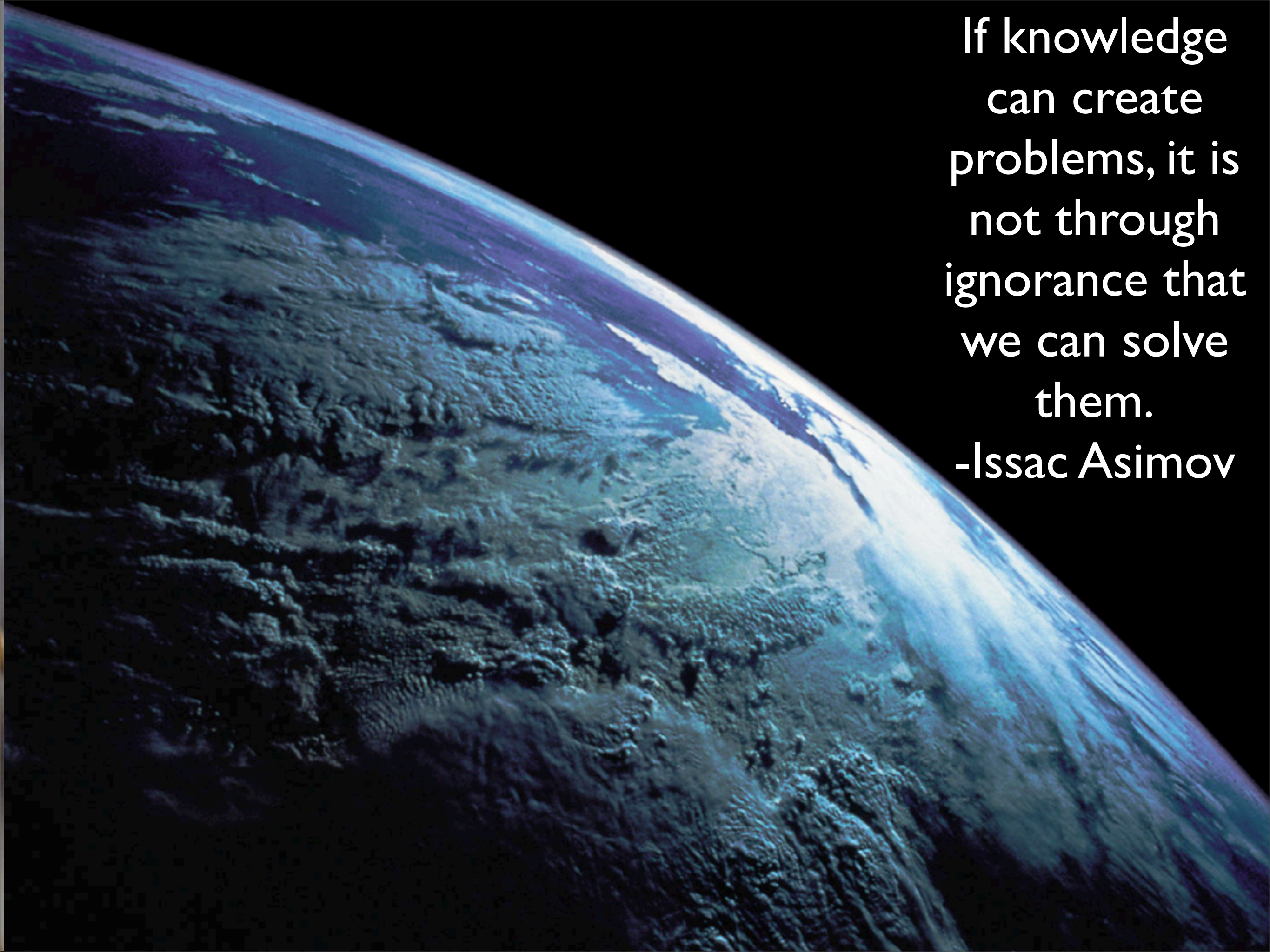
©20th Century Fox



©Paramount Pictures



**INITIAL TESTS:**  
5th grade students  
in L.A. schools



If knowledge  
can create  
problems, it is  
not through  
ignorance that  
we can solve  
them.  
-Issac Asimov