HRSC Anaglyphs

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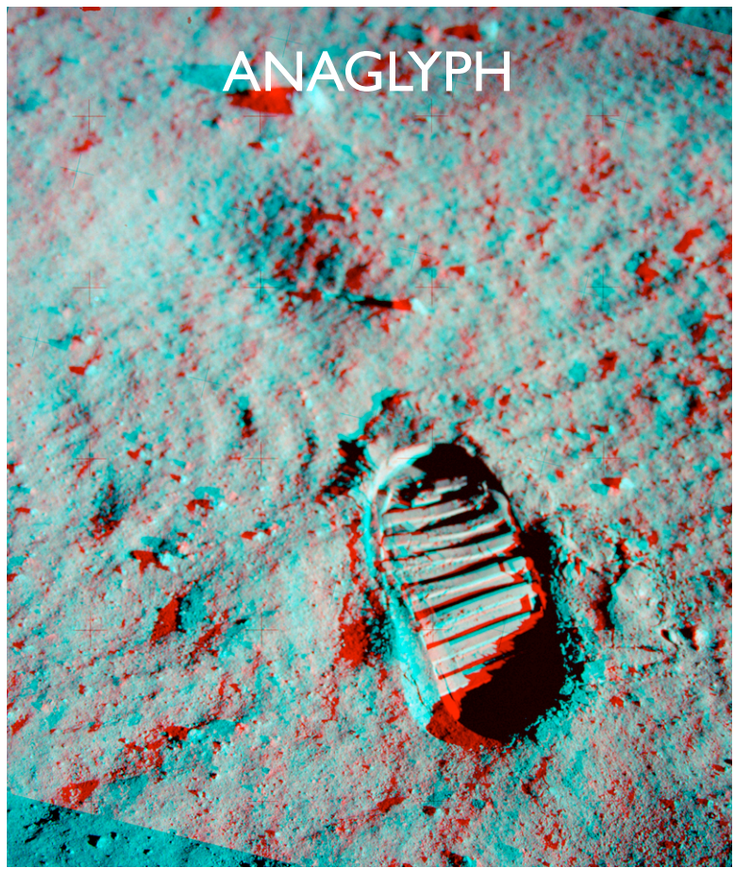
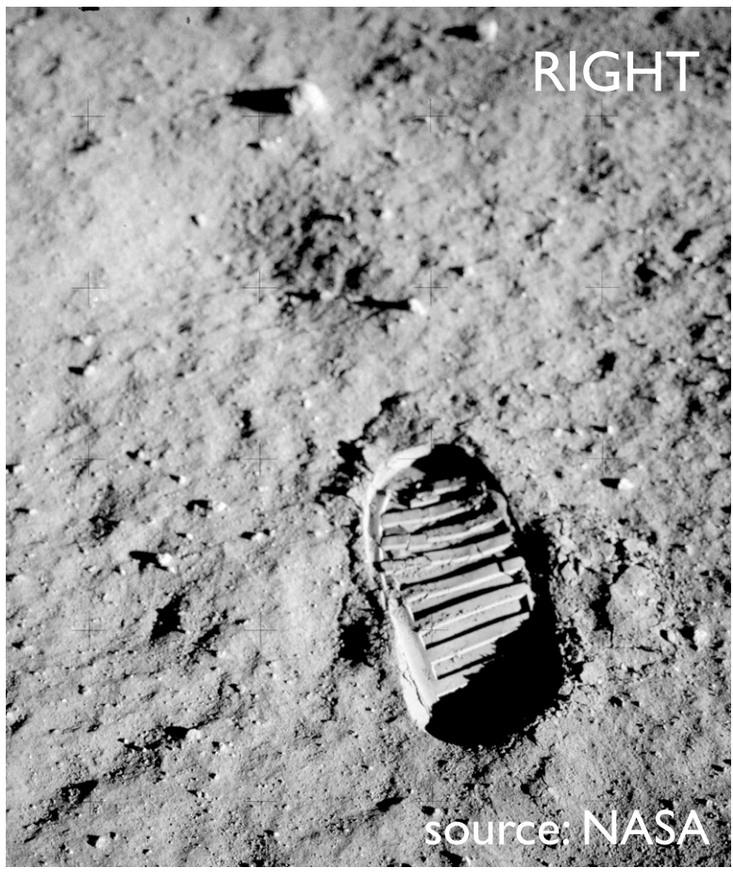
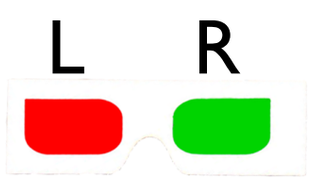
Anaglyphs: what are they?

A stereoscopic picture where the two images superimposed and printed or viewed in different colors (e.g. red, green) producing a stereo effect when viewed through corresponding color filters







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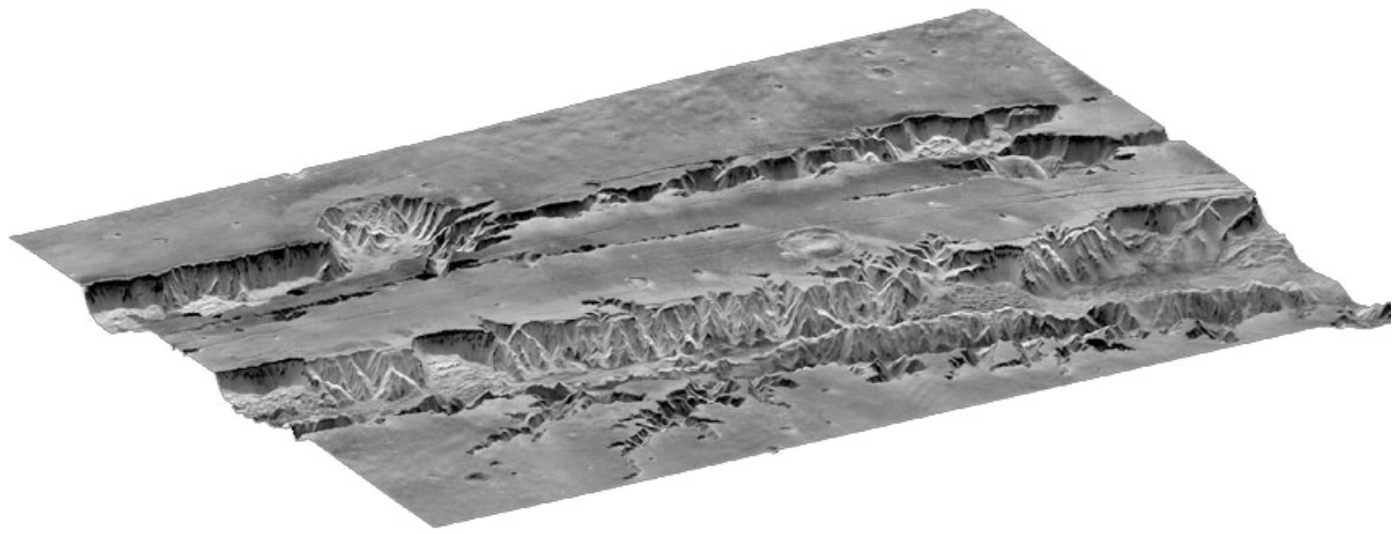
HRSC stereo

HRSC stereo
imaging principle



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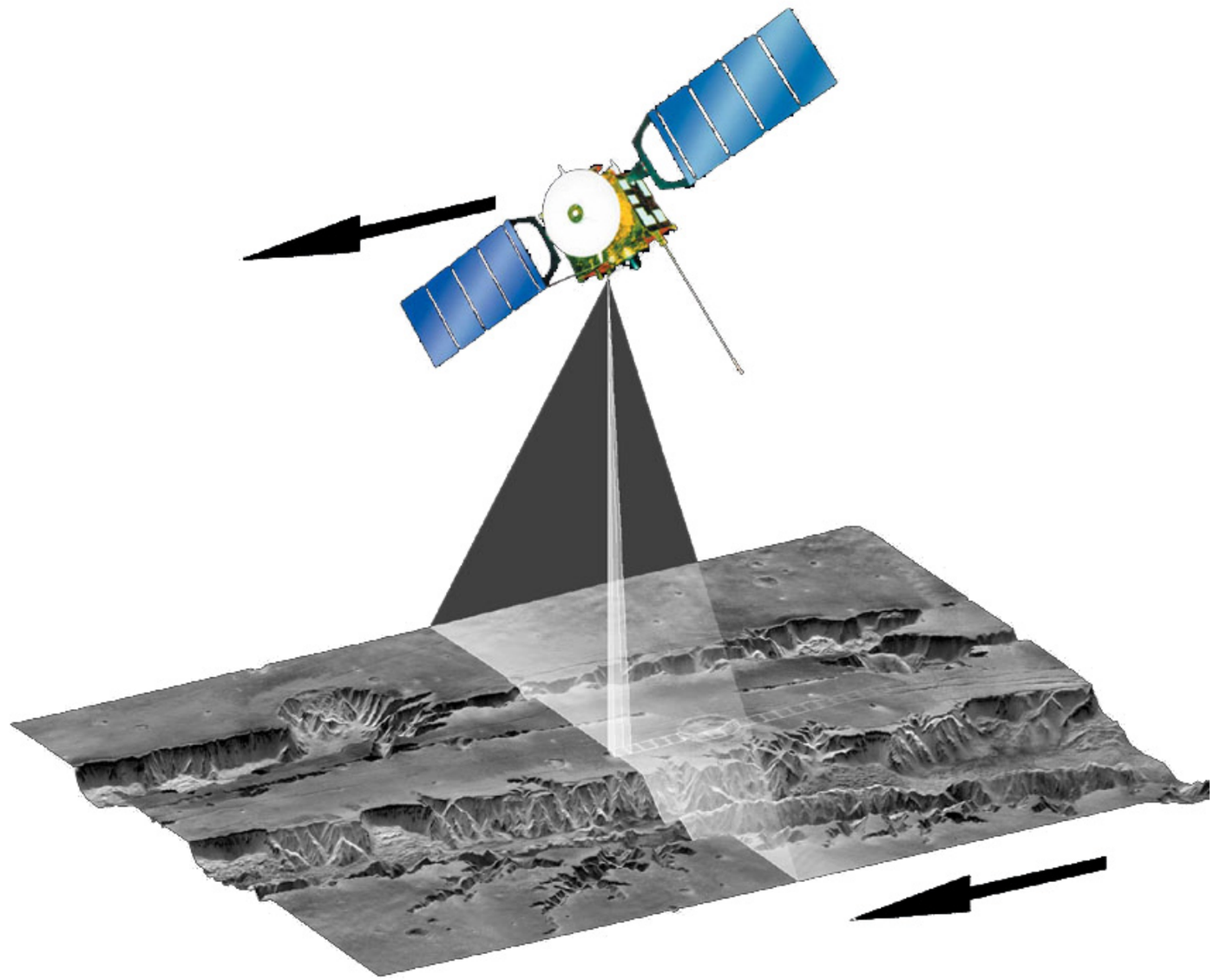
HRSC stereo

HRSC stereo
imaging principle



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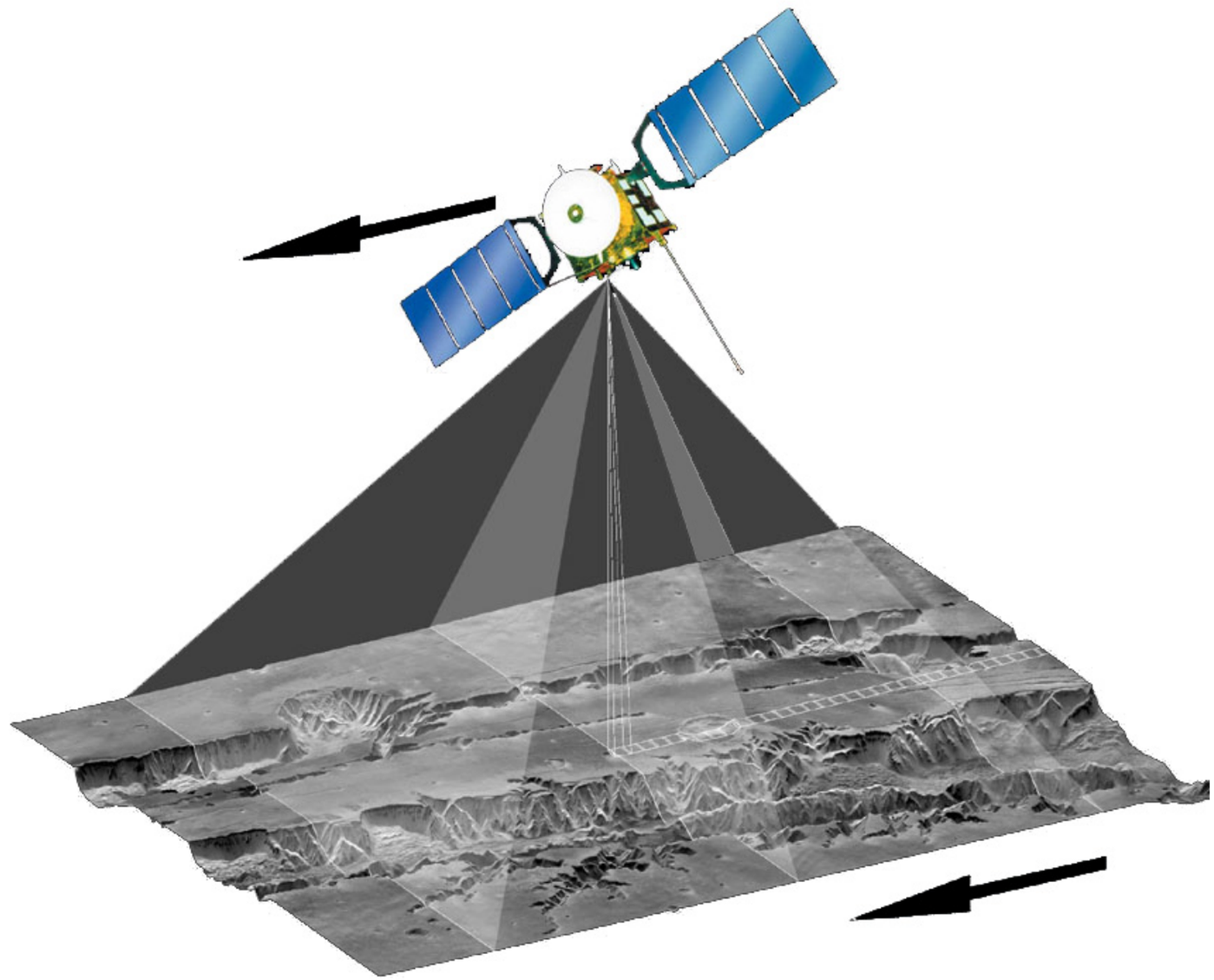
HRSC stereo

HRSC stereo
imaging principle



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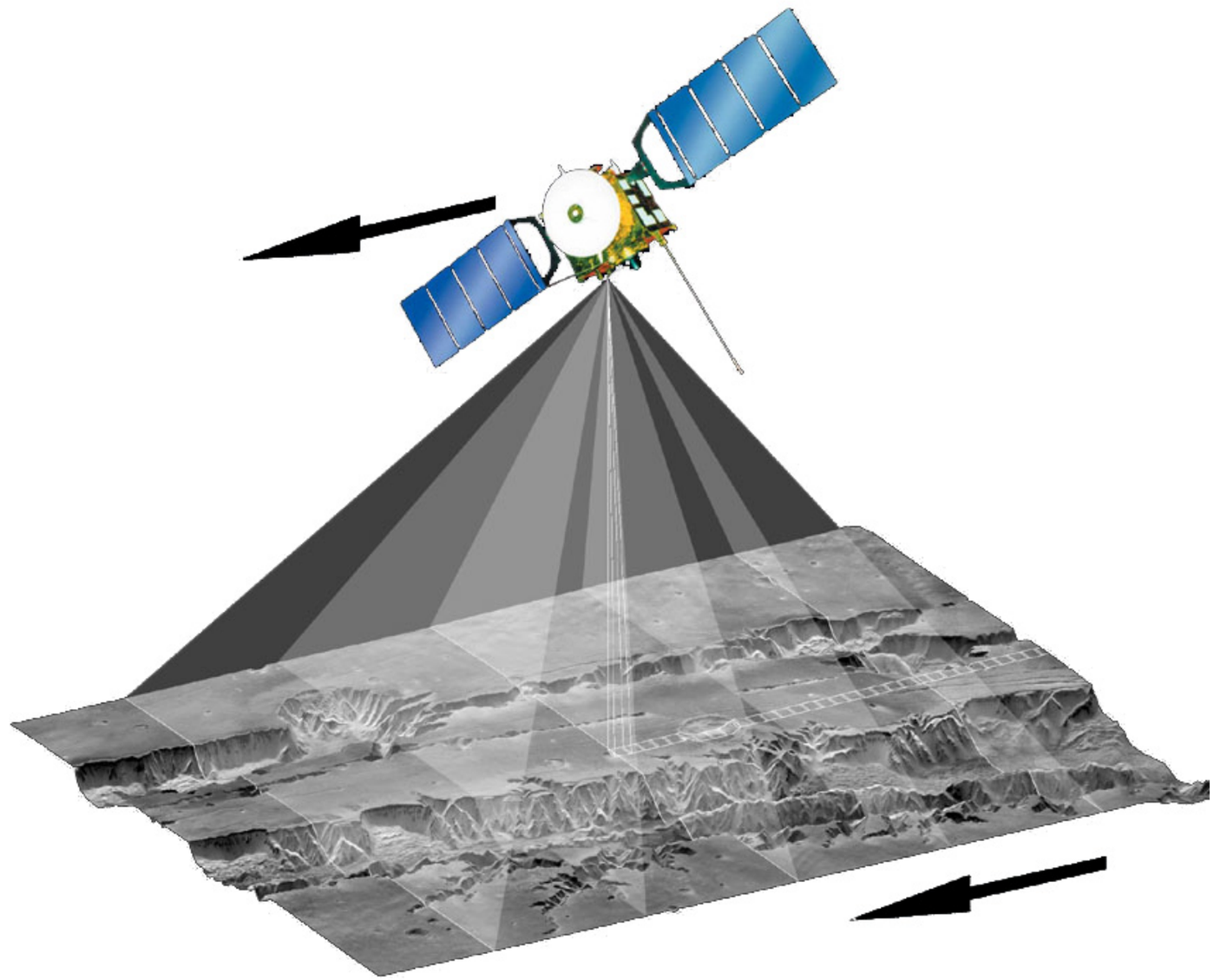
HRSC stereo

HRSC stereo
imaging principle



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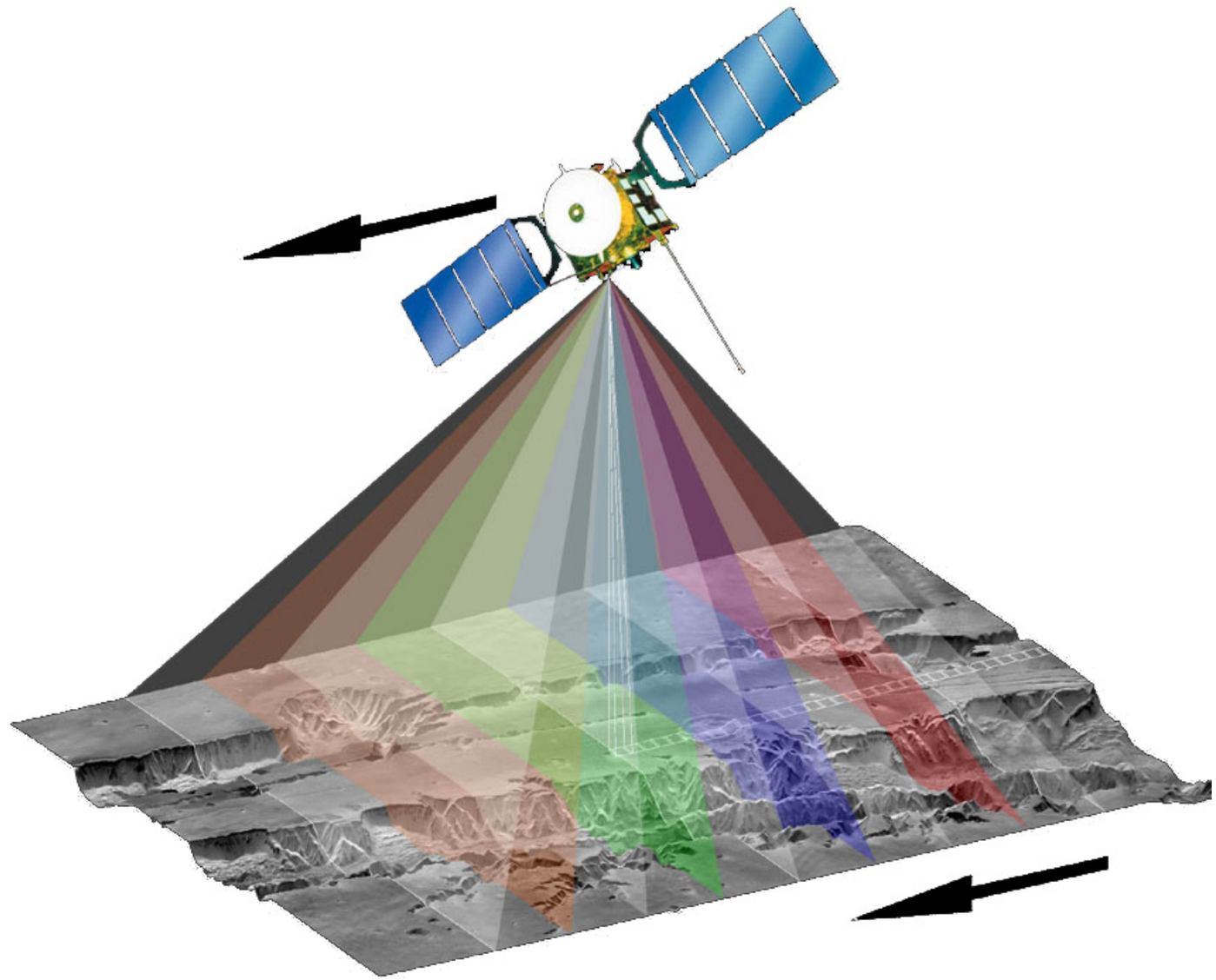
HRSC stereo

HRSC stereo
imaging principle



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HRSC - band names

H0000_0000_ND2.IMG ND = nadir

H0000_0000_S12.IMG S1 = stereo1

H0000_0000_S22.IMG S2 = stereo2

processing level
(Level2)

hrortho

Syntax:

```
$HWLIB/hrortho inp=... ori=spice dtm=... out=... [optionals]
```

```
dtm=...      dtm-file or height above datum in meter
inp=...      Input image used if
out=...      Output image generated
ori=spice    (spice KERNELS used)
fitto=...    File to which OUT should fit.
sL_inp=...   starting lines of input Level2 image
nl_inp=...   no. lines starting from nl_inp to be processed
```

“hrortho” produced map projected HRSC images

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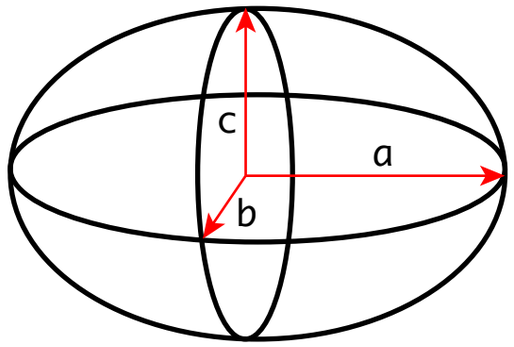
hrortho




```
mp_type=...   type of output projection
outmax=...    size limit for output image [in MegaByte]
a_axis=...    value of the a-axis of a solar system body
b_axis=...    value of the b-axis of a solar system body
c_axis=...    value of the c-axis of a solar system body
        ( DEFAULT a_axis=b_axis=3396.19 c_axis=3376.2 )
mp_scale=... measured in kilometers per pixel
cen_lat=...   reference latitude for certain map projections
cen_lon=...   reference longitude for certain map projections
```

For other parameters, have a look at:

`$V2TOP/hw/lib/x86-linux/hrortho.pdf`

(it's ASCII file, NOT an Adobe .pdf)

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hrortho - mp_type

mp_type=... type of output projection

```
parm MP_TYPE    type=(string,40) count=1   default=SINUSOIDAL +
           valid=(    ALBERS_ONE_PAR,                  +
                ALBERS_TWO_PAR,                 +
                CYLINDRICAL_E_A,                +
                EQUIDISTANT,                         +
                LAMBERT_AZIMUTH,                +
                LAMBERT_ONE_PAR,                +
                LAMBERT_TWO_PAR,                +
                MERCATOR,                       +
                MOLLWEIDE,                      +
                ORTHOGRAPHIC,                        +
                SINUSOIDAL,                          +
                STEREOGRAPHIC,                       +
                PERSPECTIVE,                         +
                RD,                     +
                UTM,                    +
                BMN28,                          +
                BMN31,                          +
                BMN34,                          +
                ING,                    +
                SLK,                    +
                GAUSS_KRUEGER,                       +
                SOLDNER,                        +
                CORRECTION )
```

copy-pasted from:

$V2TOP/hw/lib/x86-linux/hrortho.pdf

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hrortho for anaglyphs

```
hrortho inp=H0572_0000_ND2.IMG out=nadir dtm=0 ori=spice

hrortho inp=H0572_0000_S12.IMG out=stereo1 dtm=0 fitto=nadir
```

OR:

```
hrortho inp=H0572_0000_ND2.IMG out=nadir dtm=0 ori=spice

hrortho inp=H0572_0000_S22.IMG out=stereo1 dtm=0 fitto=nadir
```

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hrortho for anaglyphs

Using a 3396.19 km radius sphere:

```
hrortho inp=H0572_0000_ND2.IMG out=nadir dtm=0 ori=spice

a_axis=3396.19 b_axis=3396.19 c_axis=3396.19
```

nadir stereo1 stereo1

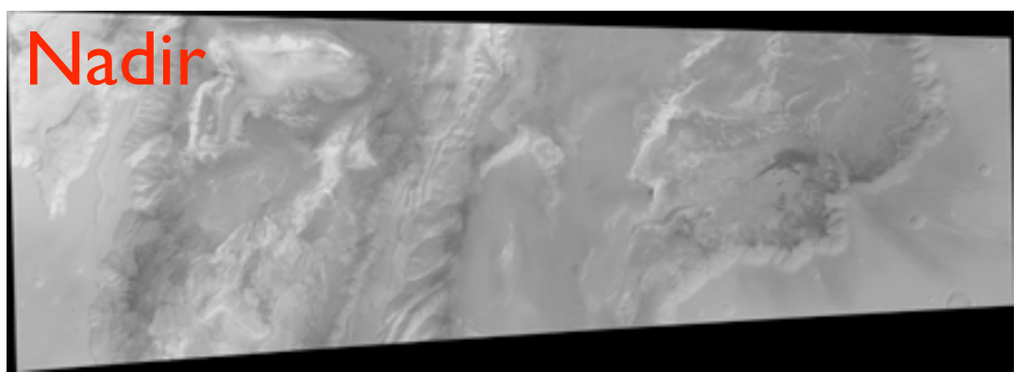
HRSC anaglyph

- Nadir on one channel (e.g. Red)
- Stereo1 (OR Stereo2) on the other 2 channels (Green, Blue)

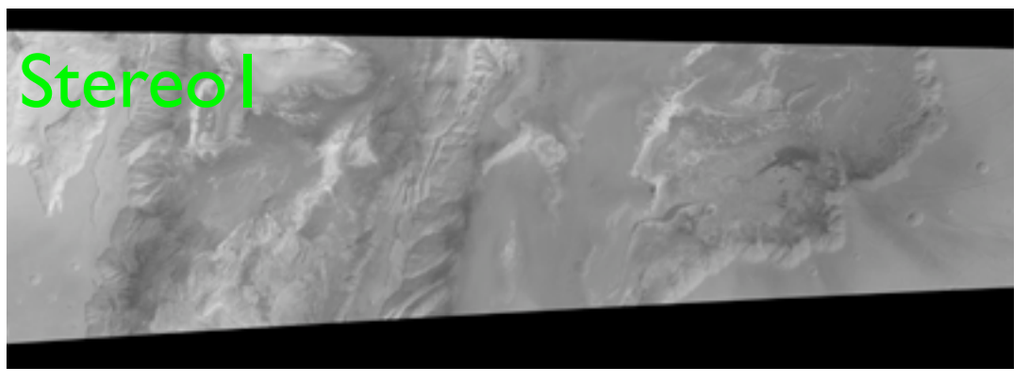
HRSC Anaglyph -How?

```
$HWLIB/hrortho inp=H0360_0000_ND2.IMG out=nadir0 sl_inp=5000 nl_inp=30000
ori=spice dtm=0
a_axis=3396.19 b_axis=3396.19 c_axis=3396.19

$HWLIB/hrortho inp=H0360_0000_S12.IMG out=red fitto=nadir0 ori=spice
a_axis=3396.19 b_axis=3396.19 c_axis=3396.19

$HWLIB/hrortho inp=H0360_0000_S22.IMG out=green fitto=nadir0 ori=spice
a_axis=3396.19 b_axis=3396.19 c_axis=3396.19
```

HRSC anaglyph



+



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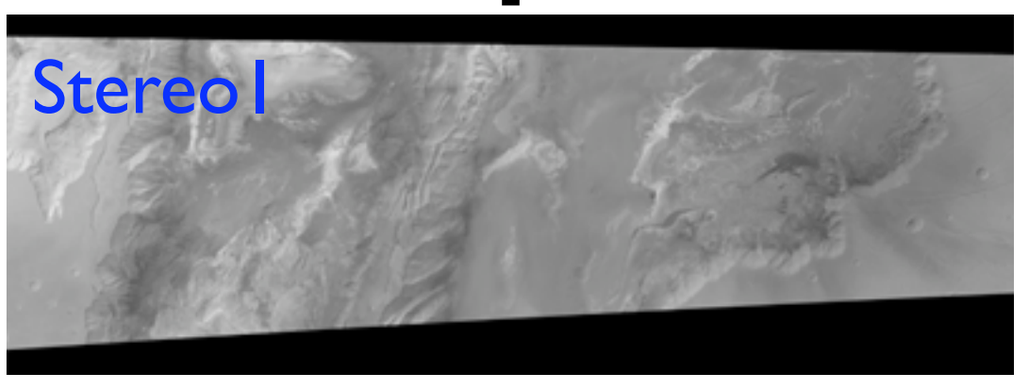
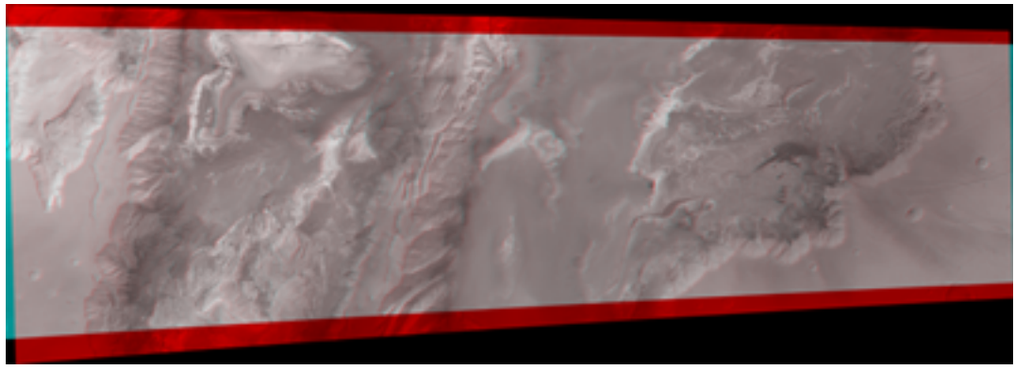


=



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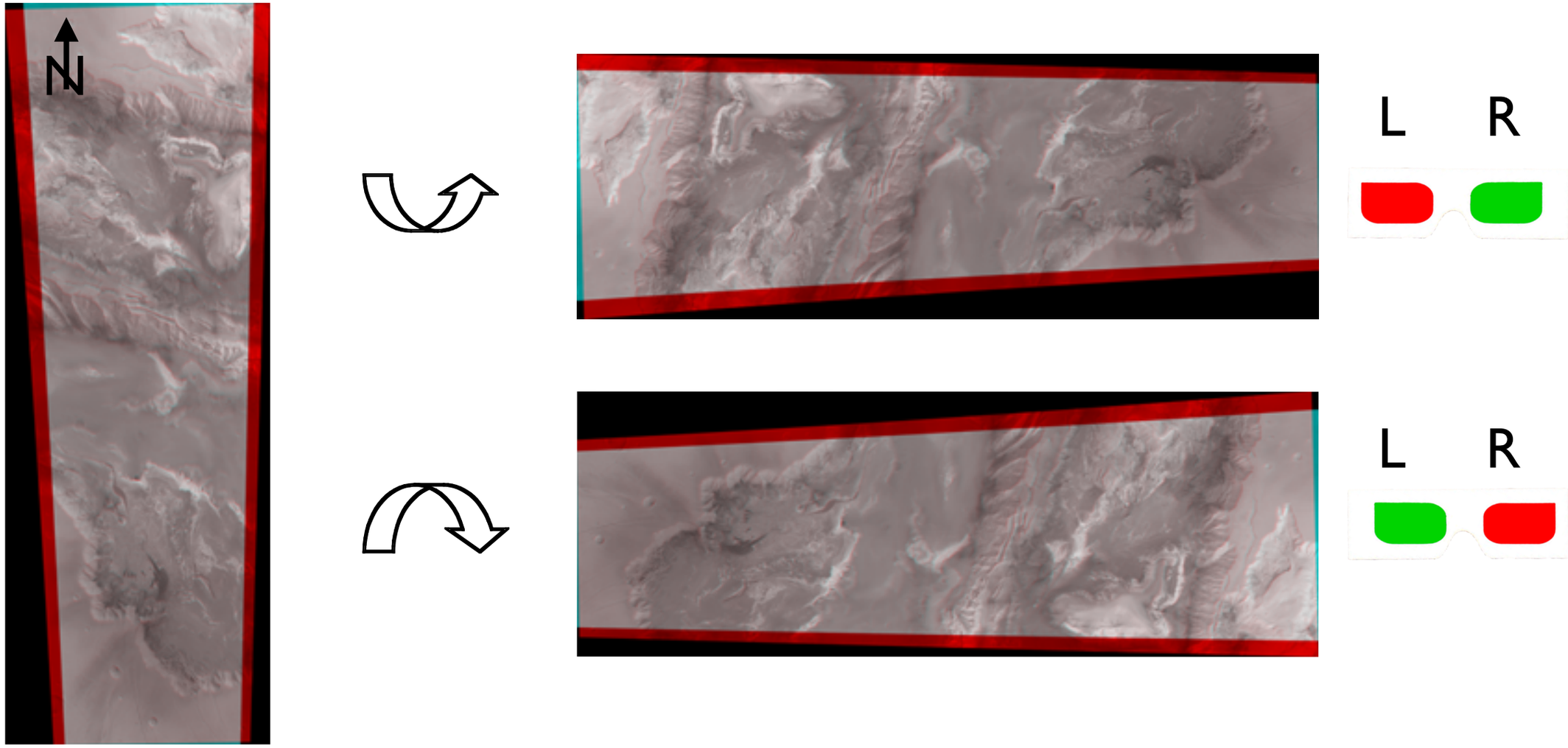
HRSC anaglyph



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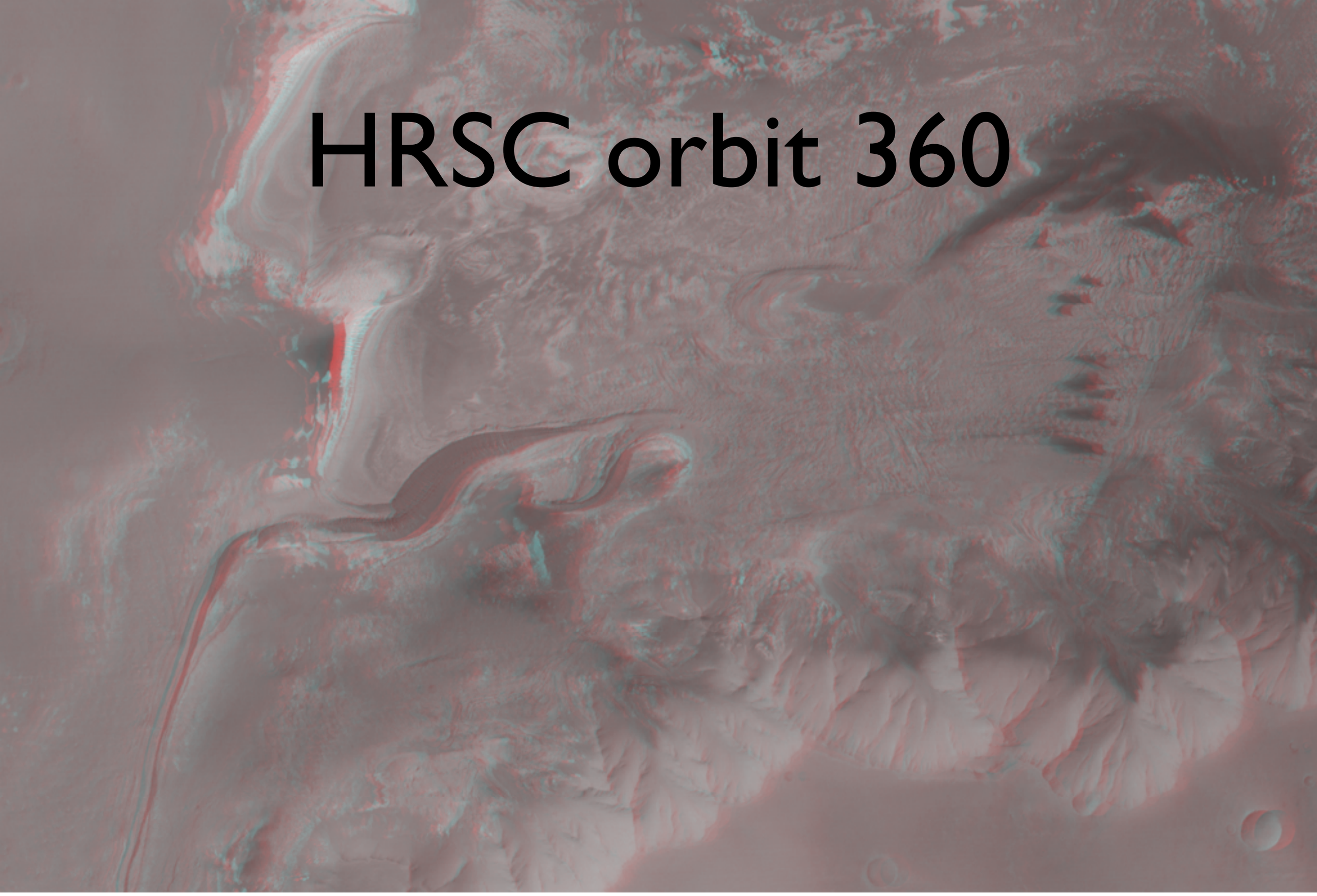
HRSC orbit 360



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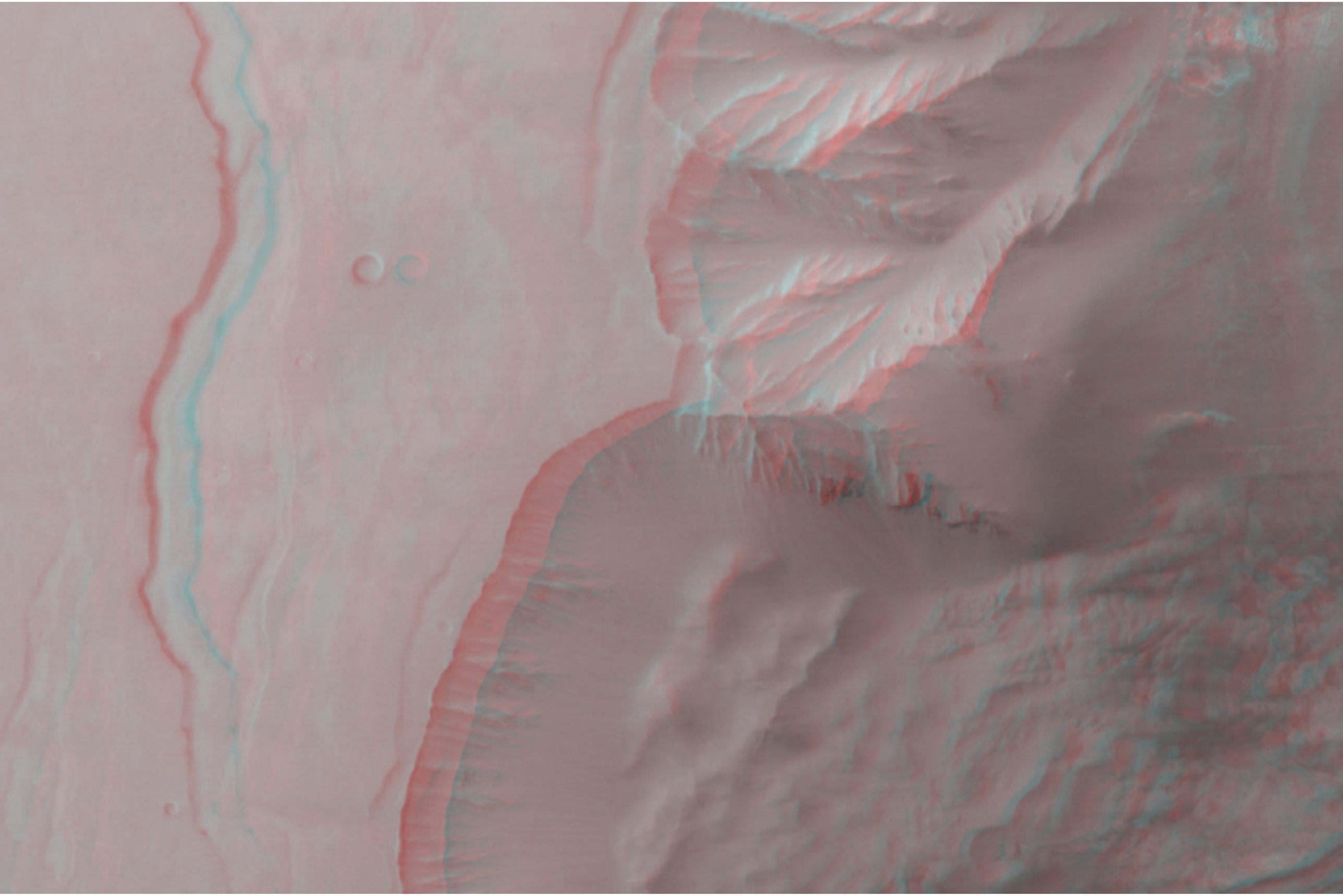

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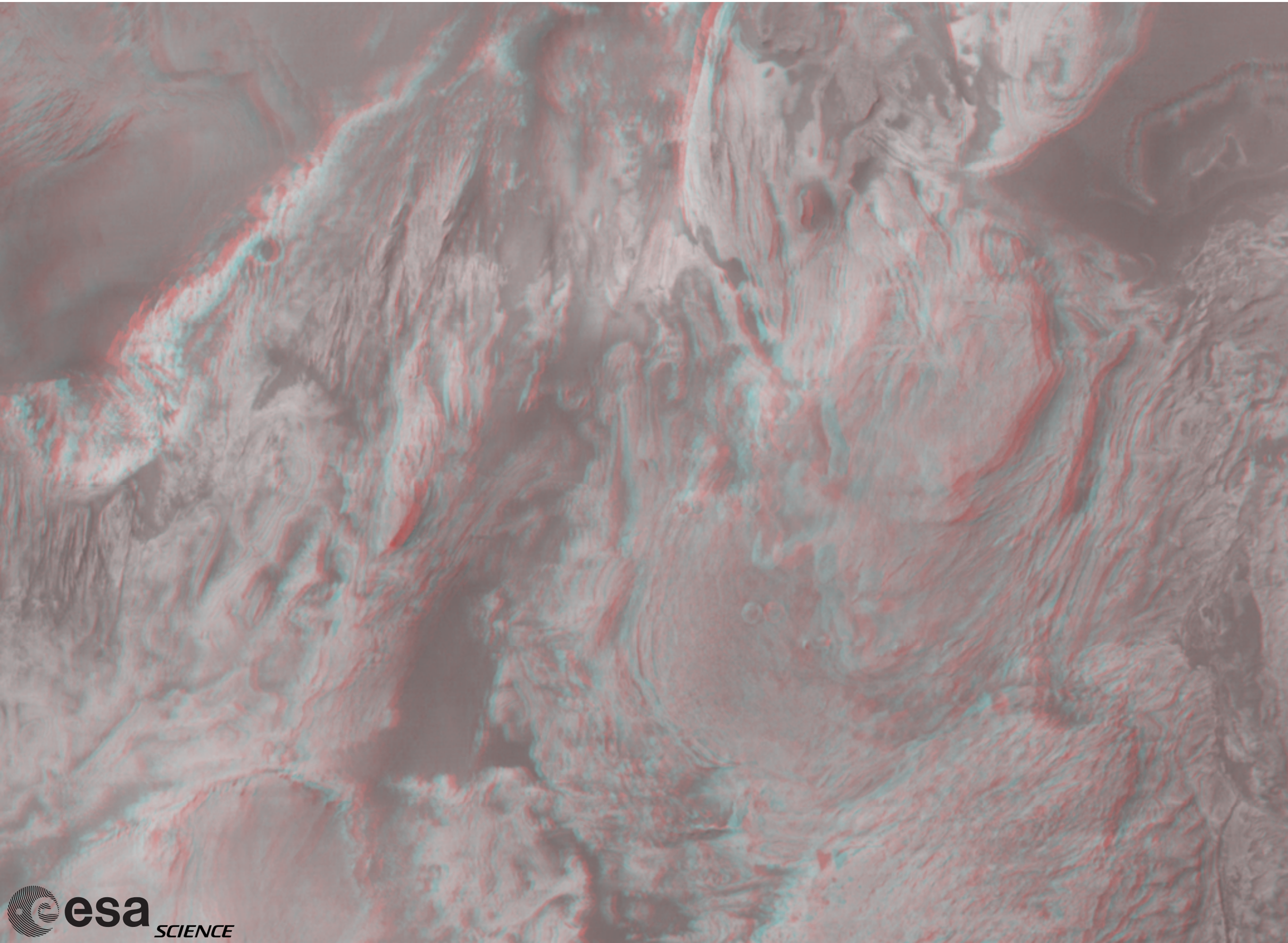

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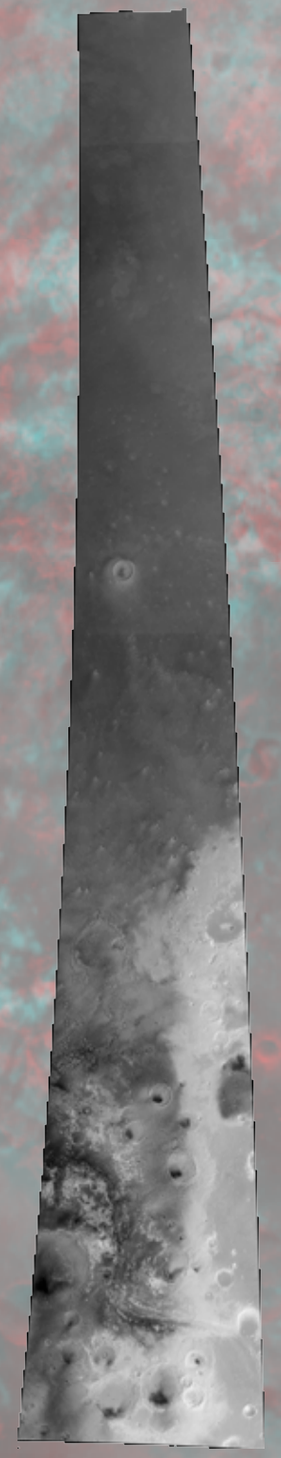
HRSC orbit 1542



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HRSC orbit 1542

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HRSC orbit 1542

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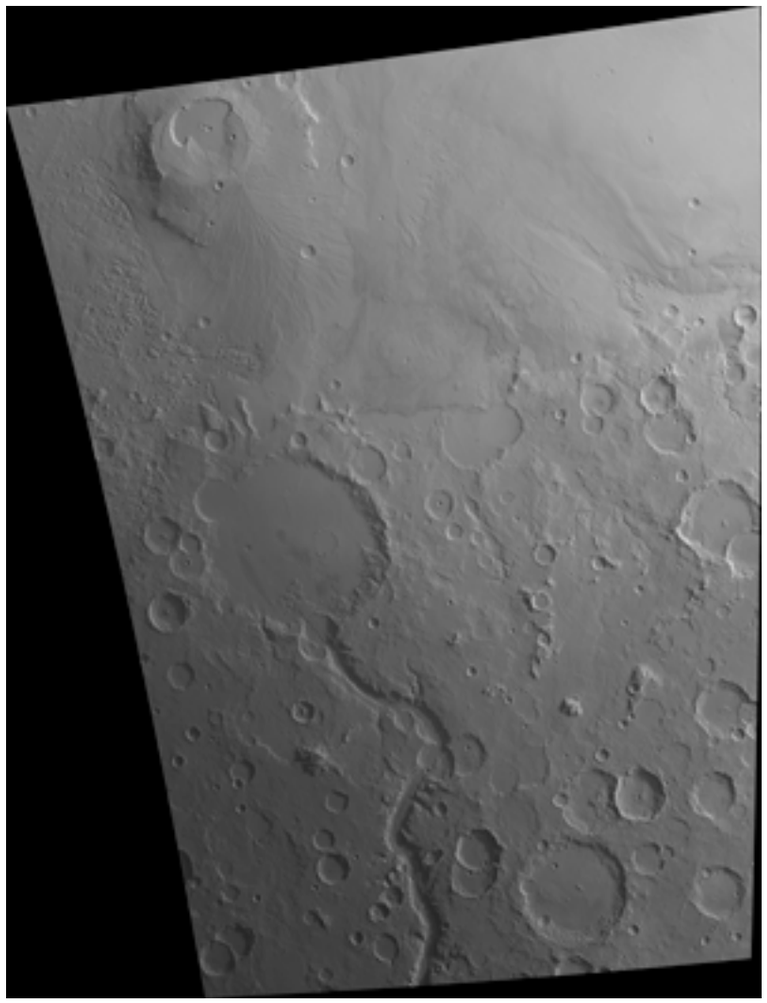
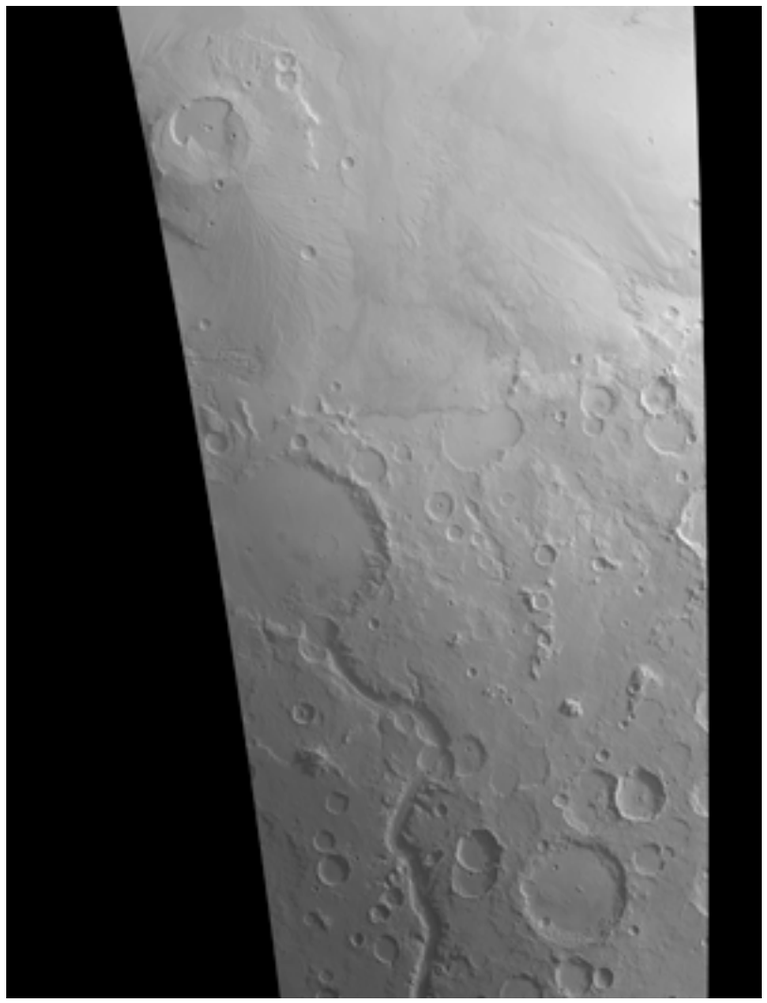
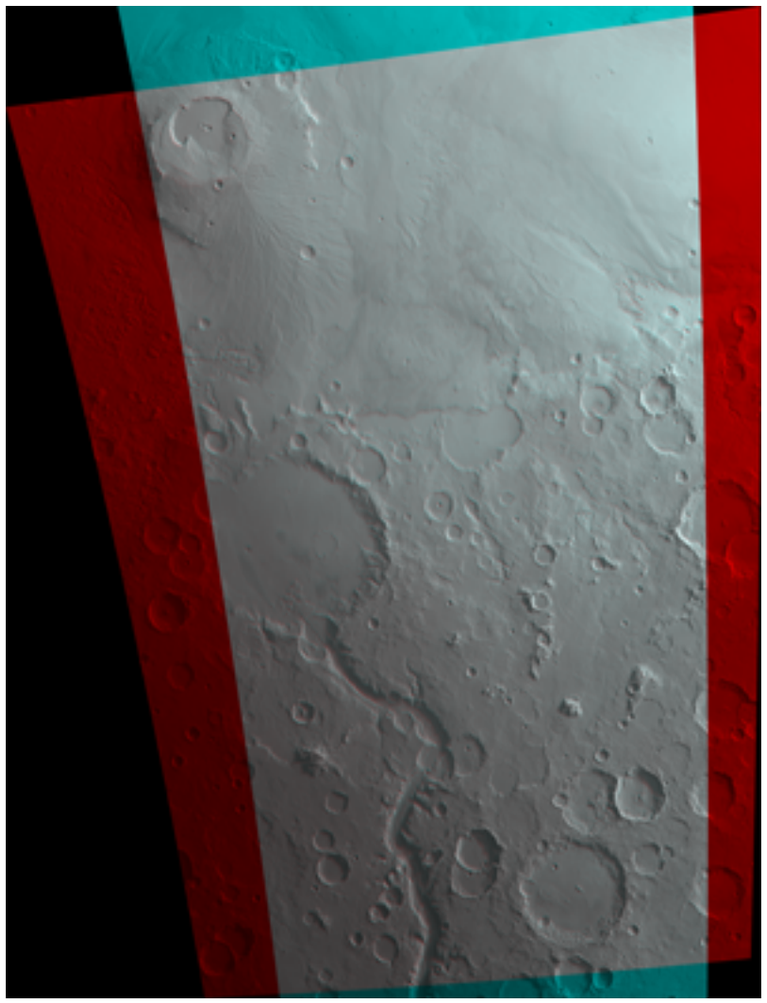
Gusev: anaglyph

Nadir



Stereo I





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Full procedure (i)

Example

```
#!/bin/tcsh

# MINIVICAR VARIABLES
setenv V2TOP /<PATH>/minivicar/vicar
source $V2TOP/vicset1.csh
source $V2TOP/vicset2.csh
setenv M94GEOCAL $V2TOP/../GEOCAL
set PATH = ( $PATH $V2TOP )

# VARIABLES FOR KERNELS AND DATA
setenv LEAPSECONDS $V2TOP/../kernels/NAIF0008.TLS
setenv CONSTANTS $V2TOP/../kernels/PCK00008.TPC
setenv SUNKER $V2TOP/../kernels/DE405S.BSP
setenv HWSPICE_TF $V2TOP/../kernels/MEX_V08.TF
setenv HWSPICE_TI $V2TOP/../kernels/MEX_HRSC_V03.TI
setenv HWSPICE_TSC $V2TOP/../kernels/MEX_070321_STEP.TSC
setenv HWSPICE_BC ./ATNM_P030602191822_00135.BC
setenv HWSPICE_BSP ./ORMM__050301000000_00117.BSP


# HRORTHO
$HWLIB/hrortho inp=H1542_0009_ND2.IMG out=nadir0 dtm=0 sl_inp=35000 nl_inp=30000 ori=spice a_axis=3396.19
b_axis=3396.19 c_axis=3396.19

$HWLIB/hrortho inp=H1542_0009_S12.IMG out=stereo1 dtm=0 fitto=nadir0 ori=spice a_axis=3396.19 b_axis=3396.19
c_axis=3396.19
```

Full procedure (ii)

Example

```
# 8 BIT CONVERSION

$HWLIB/dlrto8 inp=nadir0 out=nadir0_8bit.vic dnmin=0
$HWLIB/dlrto8 inp=stereo1 out=stereo1_8bit.vic dnmin=0


# EXPORT TO PNG

$HWLIB/dlrvic2png inp=nadir0_8bit.vic out=NADIR0.PNG
$HWLIB/dlrvic2png inp=stereo1_8bit.vic out=STEREO1.PNG
```