



Hands-on

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What to do

- PSA/PDS data selection
- HRSC minivicar setup & processing
- Data display (xvd)
- Anaglyphs
- RGB/Pan-sharpening
- Data import/export
- HRSC mosaicking with ISIS3

What is needed

- needed tools
 - Minivicar
 - ISIS3 (*OPTIONAL*)
- needed data
 - HRSC scenes
 - Relevant SPICE kernels

(packed with minivicar for orbits 0360, 2149)

if you want to process other HRSC scenes, please download proper SPICE kernels and set relevant variables

Install miniVICAR

minivicar.tar.gz

```
~/> cd /<PATH> (or wherever minivicar.tar.gz is)
```

```
~/> tcsh
```

```
~/> gunzip minivicar.tar.gz
```

```
~/> tar -xvf minivicar.tar
```

```
~/> cd minivicar
```

EDIT “setenv V2TOP /<PATH>/minivicar/vicar” in minivicar_env.sh

```
~/> source minivicar_env.sh
```



PLEASE CHECK
ENVIRONMENTAL
VARIABLES

Sample minivicar_env

Set the correct
\$V2TOP path

```
!!! SET THE CORRECT PATH !!!
setenv V2TOP /home/arossi/minivicar/vicar
# MINIVICAR ENVIRONMENT
source $V2TOP/vicset1.csh
source $V2TOP/vicset2.csh
setenv M94GEOCAL $V2TOP/../../GEOCAL
set PATH = ($PATH $V2TOP)
# SPICE
# ~CONSTANTS
setenv LEAPSECONDS $V2TOP/../../kernels/lsk/NAIF0008.TLS
setenv CONSTANTS $V2TOP/../../kernels/pck/PCK00008.TPC
setenv SUNKER $V2TOP/../../kernels/spk/DE405S.BSP
setenv HWSPIICE_TF $V2TOP/../../kernels/fk/MEX_V08.TF
setenv HWSPIICE_TI $V2TOP/../../kernels/ik/MEX_HRSC_V03.TI
setenv HWSPIICE_TSC $V2TOP/../../kernels/sclk/MEX_080421_STEP.TSC
# !!! SAMPLE CK ENVIRONMENT FOR MEX DATA WORKSHOP
# ORBIT 360
# ACQUIRED ON: 2004-05-02T21:19:04.940Z
setenv HWSPIICE_BC $V2TOP/../../kernels/ck/ATNM_P030602191822_00135.BC
setenv HWSPIICE_BSP $V2TOP/../../kernels/spk/ORMM_040501000000_00076.BSP
# !!! SAMPLE CK ENVIRONMENT FOR MEX DATA WORKSHOP
# ORBIT 2149
# ACQUIRED ON: 2005-09-16T11:31:10.541Z
#setenv HWSPIICE_BC $V2TOP/../../kernels/ck/ATNM_P050401000000_00260.BC
#setenv HWSPIICE_BSP $V2TOP/../../kernels/spk/ORMM_050901000000_00165.BSP
```

comment, uncomment
or change accordingly
SPICE kernels variables

Get the data

- get all data (Level 2,3,4) from PSA/PDS for orbits 0360 (L 2,3,4) and 2149 (L 2,3)

`ftp://psa.esac.esa.int/pub/mirror/MARS-EXPRESS/HRSC/
MEX-M-HRSC-3-RDR-V2.0/DATA/0360`

Anaglyphs: Level2 processing

- go to the Level 2 data directory of orbit 0360
(or any other)

```
# MAP-PROJECT LEVEL2 DATA
```

```
$HWLIB/hrortho inp=H0360_0000_ND2.IMG out=nadir sl_inp=17000  
nl_inp=25000 ori=spice a_axis=3396.19 b_axis=3396.19 c_axis=3396.19  
outmax=2000
```

```
$HWLIB/hrortho inp=H0360_0000_S12.IMG out=stereo1 fitto=nadir  
ori=spice a_axis=3396.19 b_axis=3396.19 c_axis=3396.19  
outmax=2000
```

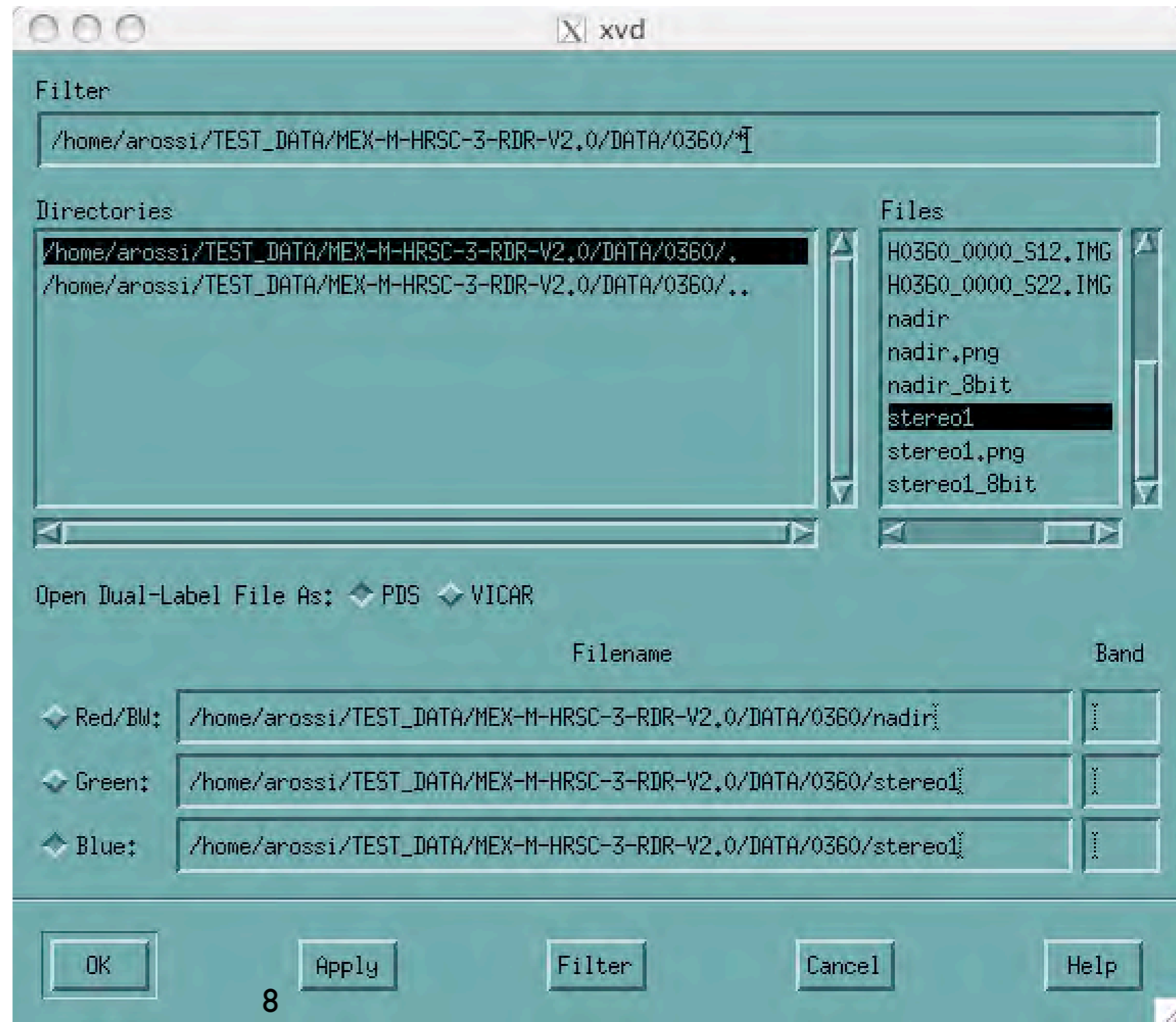
IF SOME KERNEL IS MISSING OR THE
RELATIVE VARIABLE IS MISCONFIGURED:
Error -603 in hrviewpa !
** ABEND called **

RGB Display on xvd

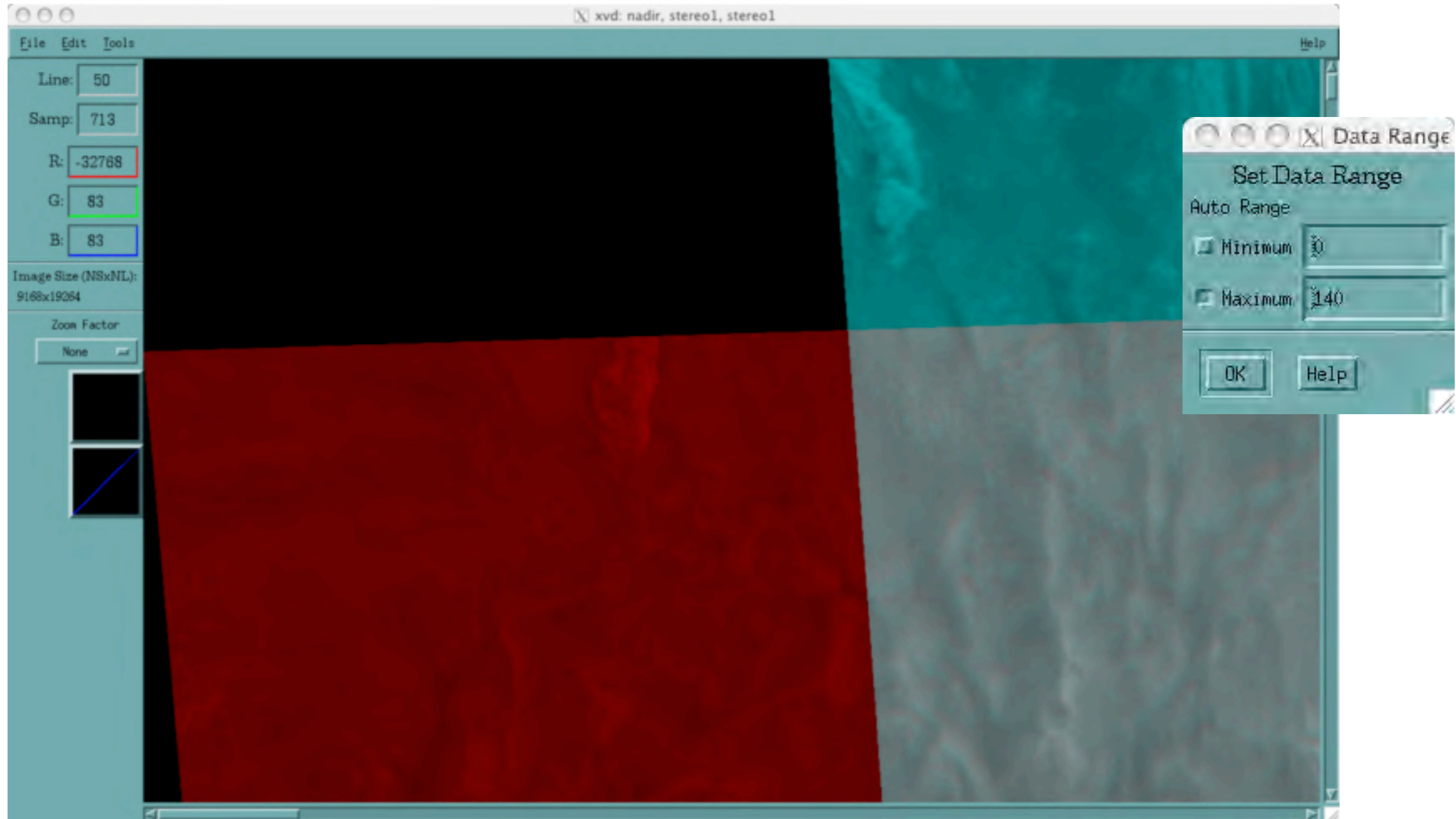
VISUALIZE ANAGLYPH

- launch "xvd"

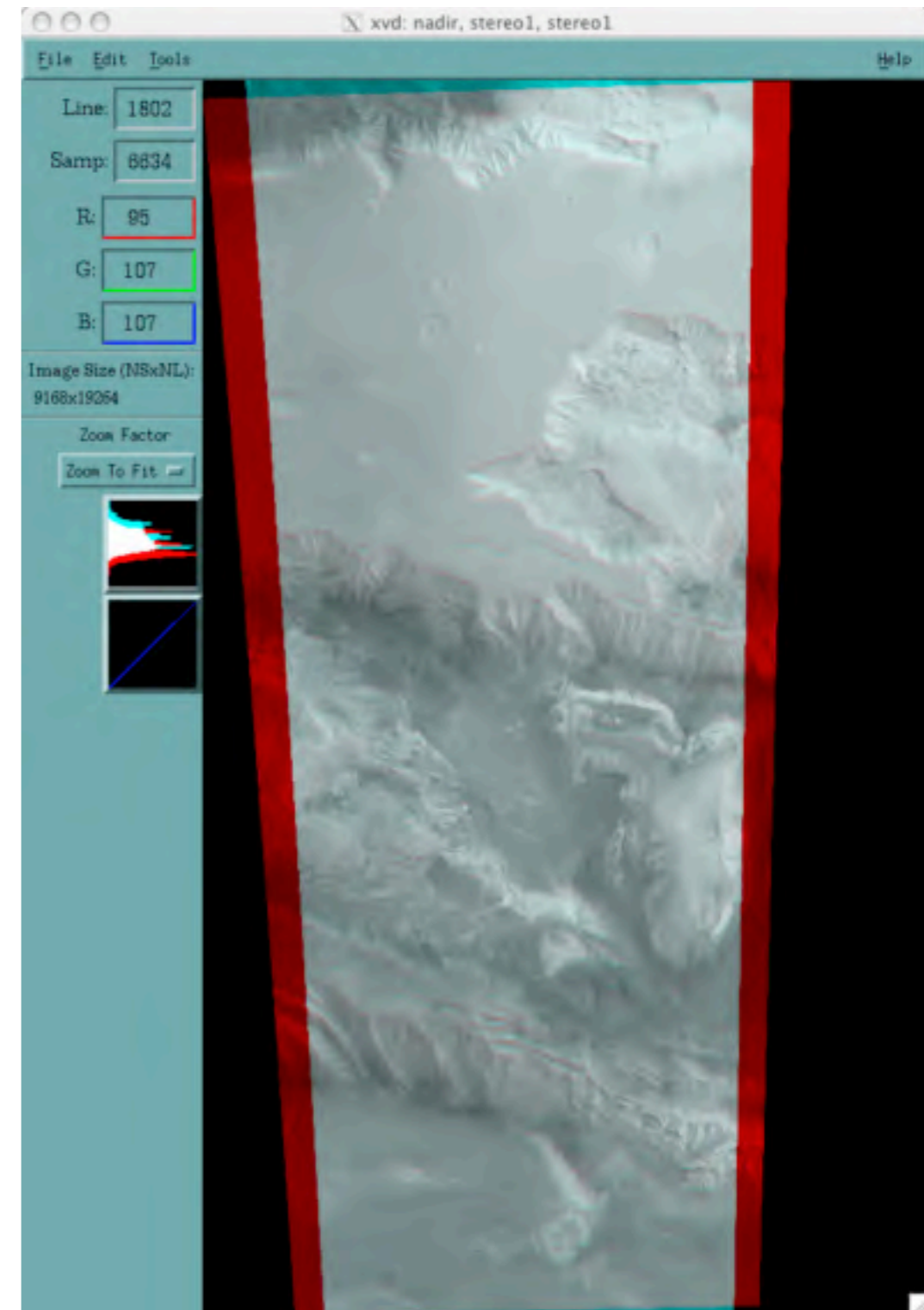
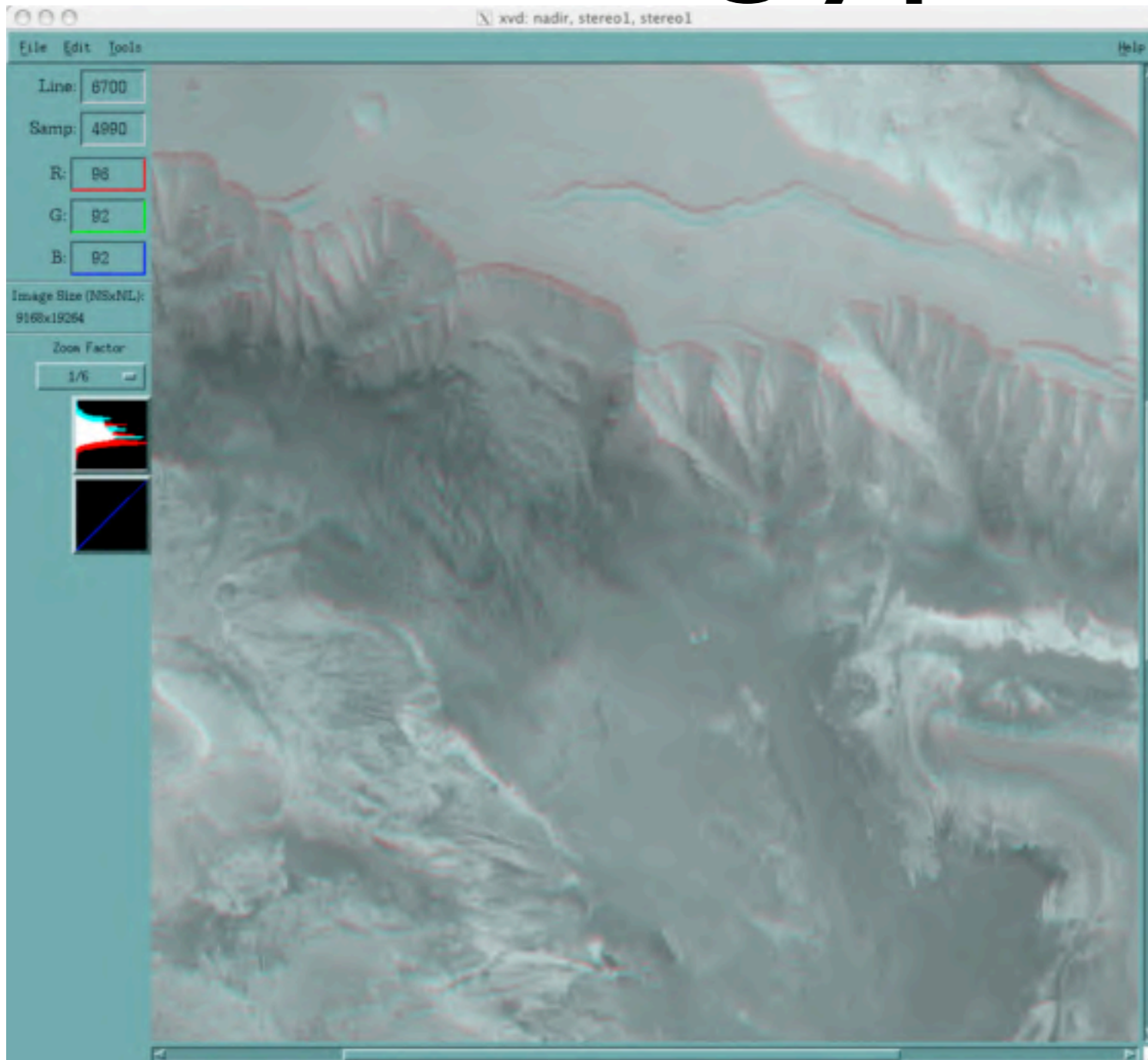
~/> xvd &



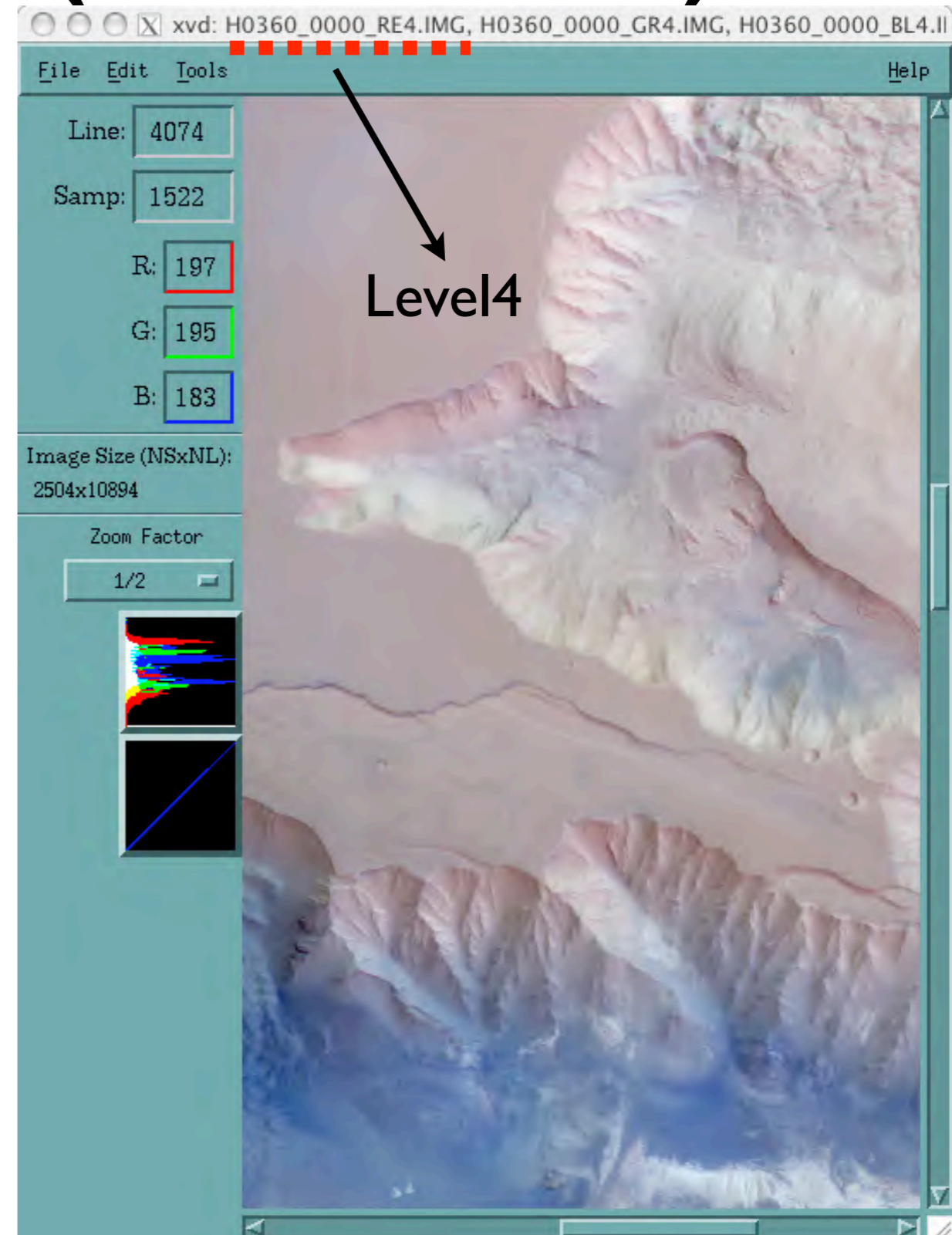
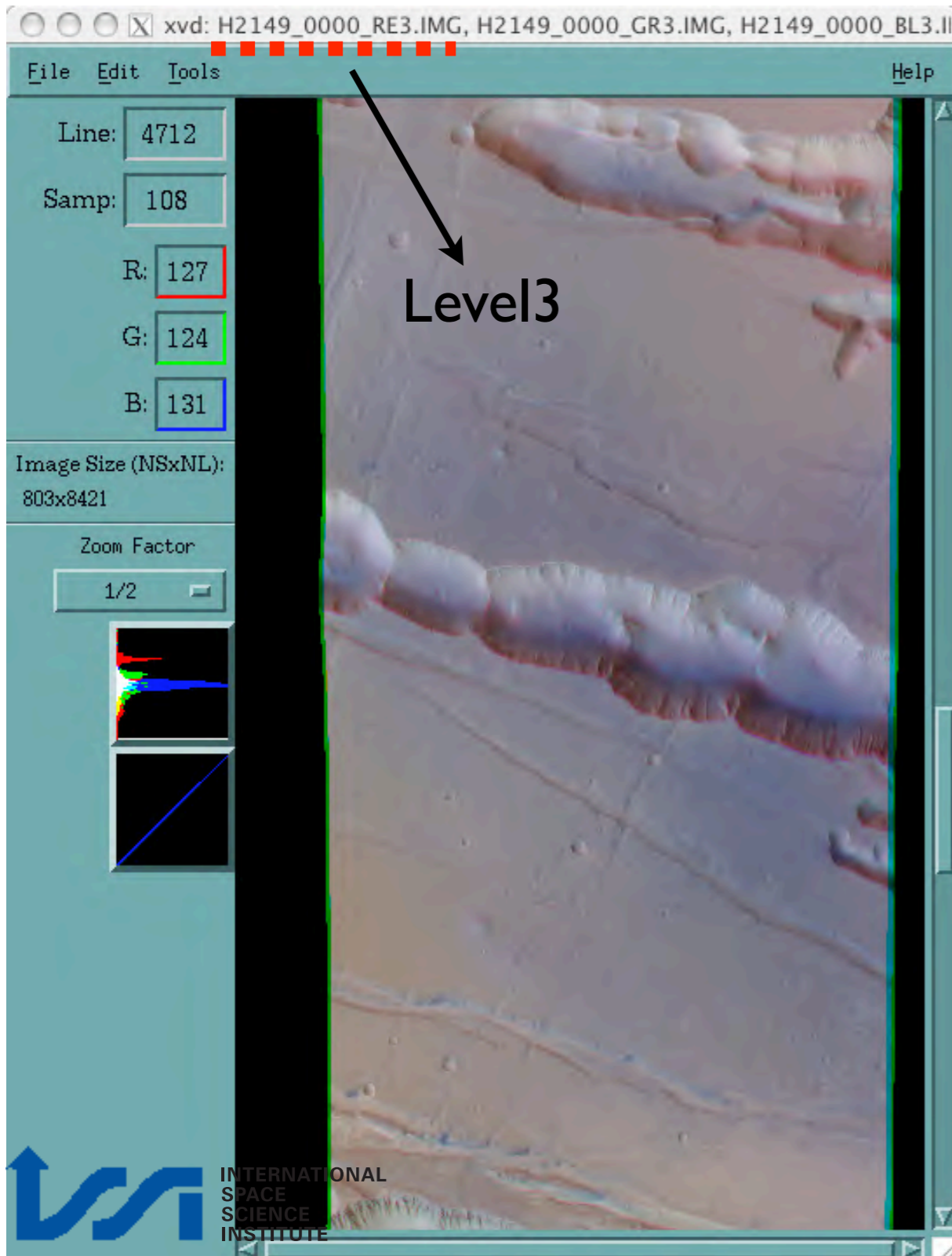
RGB Display on xvd



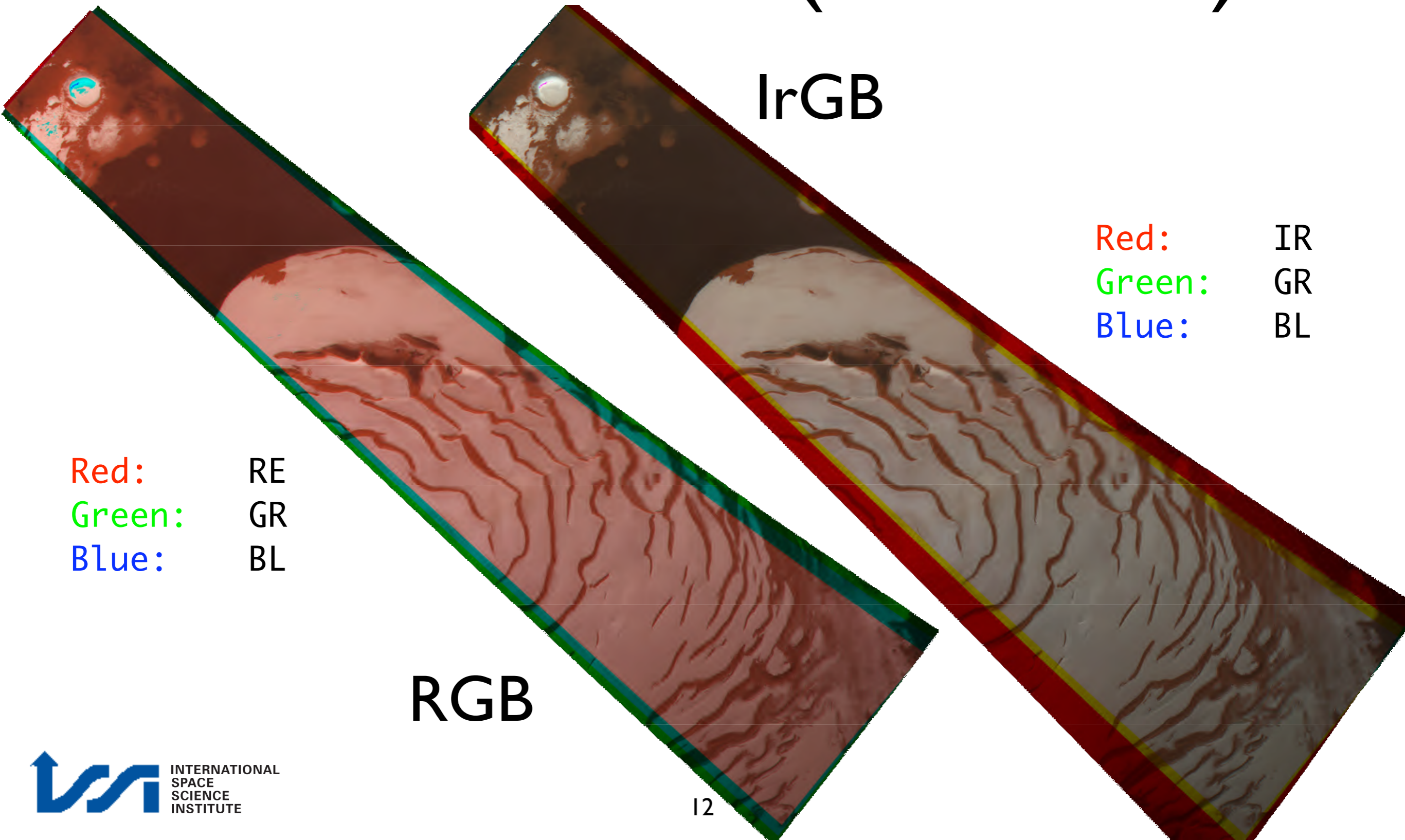
Anaglyph on xvd



RGB on xvd (Level3/4)



iRGB on xvd (Level3/4)



IrGB

Red: IR
Green: GR
Blue: BL

Red: RE
Green: GR
Blue: BL

RGB

16/8-bit conversion

```
# 16-bit TO 8-bit
```

```
$HWLIB/dlorto8 nadir nadir_8bit
```

```
$HWLIB/dlorto8 stereo1 stereo1_8bit
```

```
# EXPORT TO PNG
```

```
$HWLIB/dlrvic2png nadir_8bit nadir.png
```

```
$HWLIB/dlrvic2png stereo1_8bit stereo1.png
```

Pan-sharpening (Level4)

- Pan-sharpening can be easily performed on Level4 data, where the aspect ratio of all images (red, green, blue, nadir, DTM) is the same

Data export/import

- Import HRSC Level4 data into ISIS3

“pds2isis” → map keywords imported

- Import home-made Level3 (e.g. anaglyphs) into ISIS3

“vicar2isis” → map keywords **NOT** imported

+

“editlab”

+

“maplab”

[...]

HRSC into ISIS3

- Download HRSC Level3/4 data (e.g. nadir)
- Import them into ISIS3 (“pds2isis”)
- Use common projection (“map2map”)
- Mosaic (“automos”)
- Create color cube (“cubeit”)
- Visualize (“qview”)
- Export (“isis2std”)

Hands-on tasks

- From Level2 data
 - create and visualize anaglyphs
- From Level3 data
 - visualize and export RGB, ND
- From Level4 data
 - visualize and export RGB, ND
 - Perform pan-sharpening
 - Import data into ISIS3 (Color bands, Nadir, DTMs)
 - Create mosaics of one band with ISIS3
 - Create color cube / color mosaic with ISIS3
 - Create DTM mosaic with ISIS3