

# HRSC & other datasets

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# HRSC & other datasets

- Integrating HRSC with other datasets (e.g. MOC, THEMIS, etc.)
- primary source of information and support:

<http://isis.astrogeology.usgs.gov/>

<http://isis.astrogeology.usgs.gov/IsisSupport/>

# ISIS 2

## Tutorials:

<http://isis.astrogeology.usgs.gov/documents/Isis2Tutorials/index.html>

- **MOC processing**

[http://isis.astrogeology.usgs.gov/Isis2/isis-bin/mgs\\_moc\\_processing.cgi](http://isis.astrogeology.usgs.gov/Isis2/isis-bin/mgs_moc_processing.cgi)

- **THEMIS processing**

[http://isis.astrogeology.usgs.gov/Isis2/isis-bin/themis\\_processing.cgi](http://isis.astrogeology.usgs.gov/Isis2/isis-bin/themis_processing.cgi)

# ISIS 3 ...

e.g. MOC

<http://isis.astrogeology.usgs.gov/IsisWorkshop/Lessons/WorkingWithMOC/>

e.g. HiRISE

<http://isis.astrogeology.usgs.gov/IsisWorkshop/Lessons/WorkingWithHiRISE/>

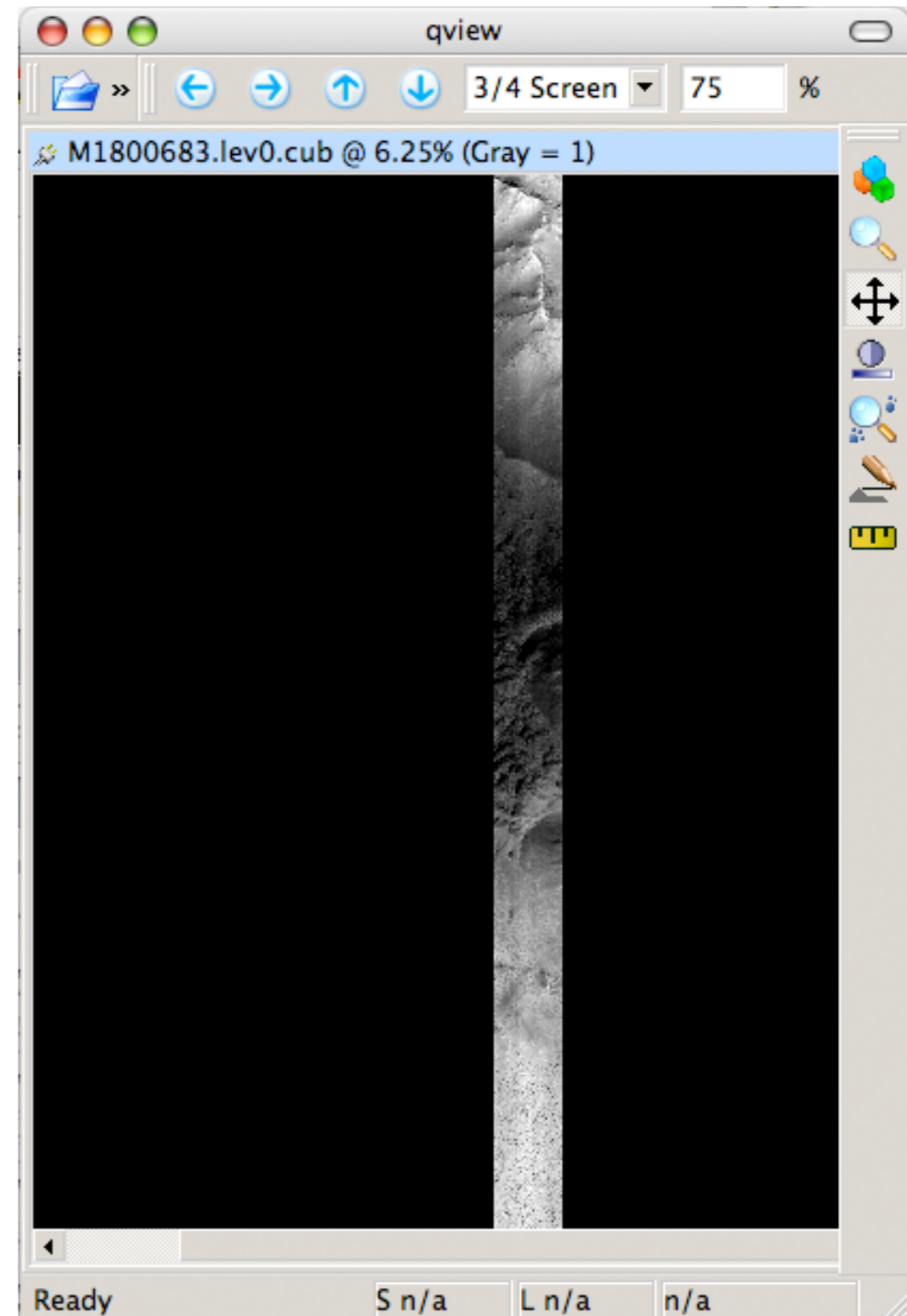
# MOC on ISIS 3

`moc2isis from=M1800683.img to=M1800683.lev0.cub`

`spiceinit from=M1800683.lev0.cub`

`moccal from=M1800683.lev0.cub to=M1800683.cal.cub`

`cam2map`



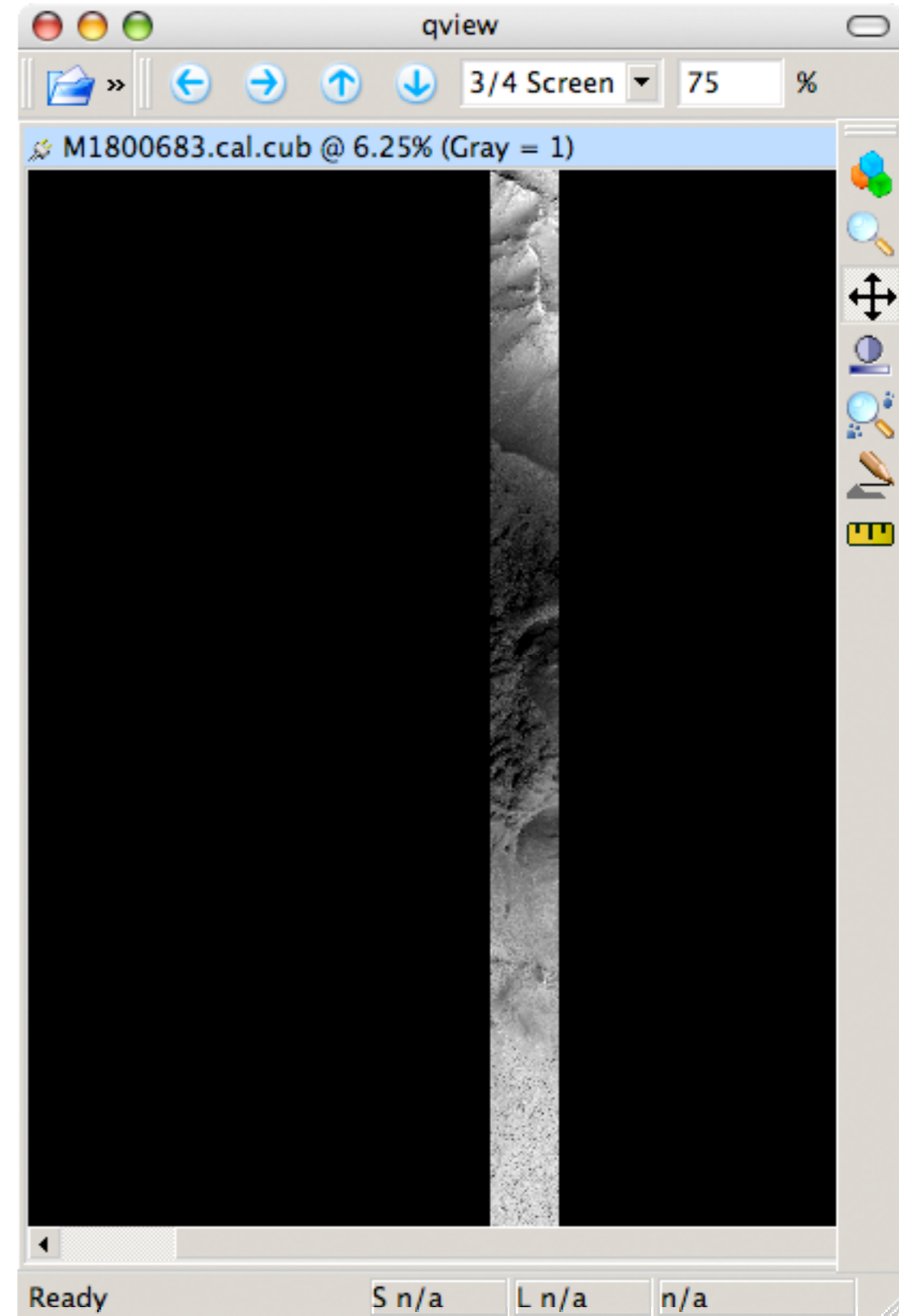
# MOC on ISIS 3

```
moc2isis from=M1800683.img to=M1800683.lev0.cub
```

```
spiceinit from=M1800683.lev0.cub
```

```
moccal from=M1800683.lev0.cub to=M1800683.cal.cub
```

```
cam2map
```



# MOC on ISIS 3

Group = Mapping  
ProjectionName = Sinusoidal  
CenterLongitude = XX.X  
End\_Group



The screenshot shows the ISIS 3 software interface. The 'Files' section contains three fields: 'FROM' with the path '/Volumes/Bull/TEST\_HRSC\_ISIS/MOC/M1800683.cal.cub', 'MAP' with the path '/usr/local/usgs/isis3/data/base/templates/maps/sinusoidal.map', and 'TO' with the path '/Volumes/Bull/TEST\_HRSC\_ISIS/MOC/M1800683.lev2.cub'. Below this are two sections: 'Output Map Resolution' and 'Output Map Ground Range'. The 'Output Map Resolution' section has a 'PIXRES' label and four radio button options: 'Compute resolution from input cube (CAMERA)', 'Read resolution from input map file (MAP)', 'Get resolution from user in meters per pixel (MPP)', and 'Get resolution from user in pixels per degree (PPD)'. The 'Output Map Ground Range' section has a 'DEFAULTRANGE' label and two radio button options: 'Compute default range from input cube (CAMERA)' and 'Read default range from map file (MAP)'. Below these are five text input fields for 'SLAT', 'ELAT', 'SLON', and 'ELON', all containing the text 'Use default range'. At the bottom, there is a 'TRIM' checkbox labeled 'Trim pixels outside ground range'.

moc2isis from=M1800683.img to=M1800683.lev0.cub

spiceinit from=M1800683.lev0.cub

moccal from=M1800683.lev0.cub to=M1800683.cal.cub

cam2map

# MOC on ISIS 3

```
Group = Mapping
ProjectionName      = Sinusoidal
CenterLongitude     = 285.0
TargetName          = Mars
EquatorialRadius    = 3396190.0 <meters>
PolarRadius         = 3376200.0 <meters>
LatitudeType        = Planetocentric
LongitudeDirection  = PositiveEast
LongitudeDomain     = 360
MinimumLatitude     = -5.3663937499135
MaximumLatitude     = -4.5709158171327
MinimumLongitude    = 287.99662671879
MaximumLongitude    = 288.15057299966
UpperLeftCornerX    = 176845.47445803 <meters>
UpperLeftCornerY    = -270938.46964656 <meters>
PixelResolution     = 5.7391274893889 <meters/pixel>
Scale               = 10328.172293245 <pixels/degree>
TrueScaleLatitude   = 0.0
End_Group
```

Terminology difference with PDS/VICAR keywords!!!!

moc2isis from=M1800683.img to=M1800683.lev0.cub

spiceinit from=M1800683.lev0.cub

moccal from=M1800683.lev0.cub to=M1800683.cal.cub

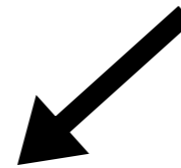
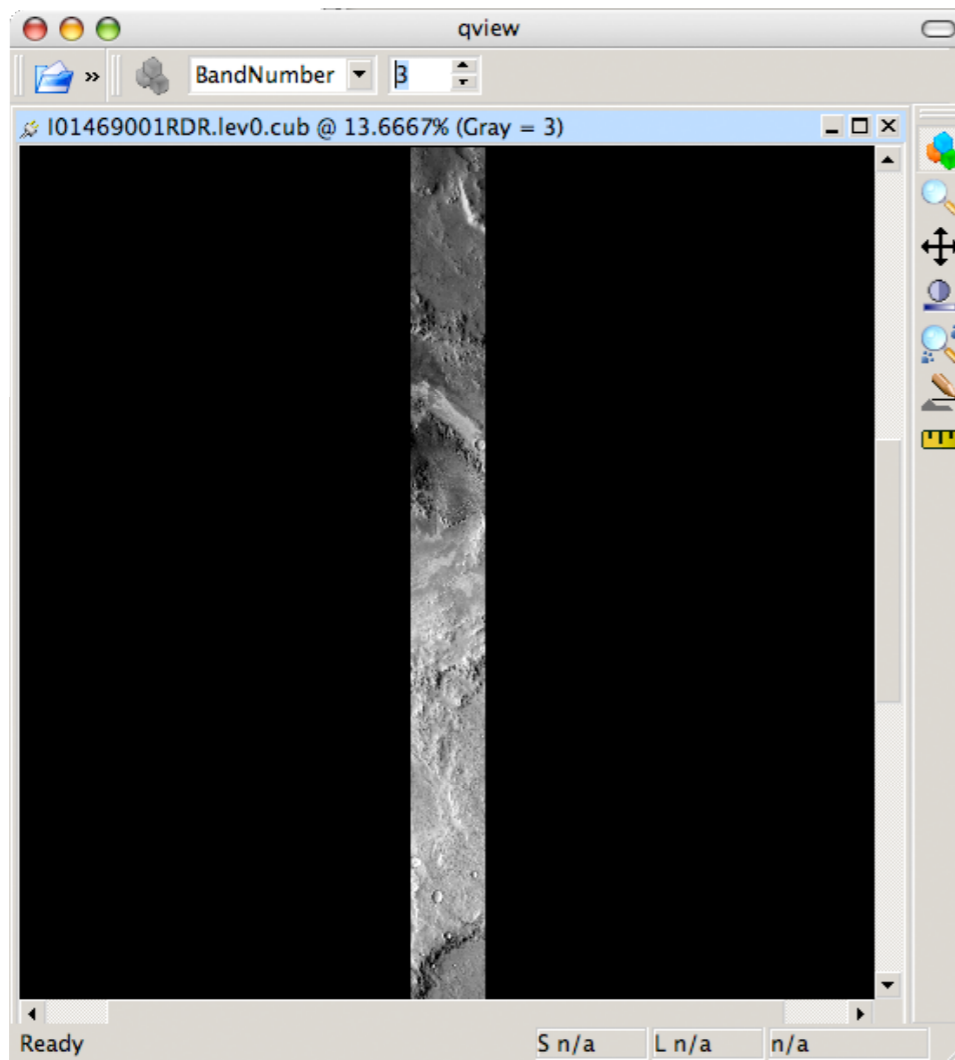
cam2map



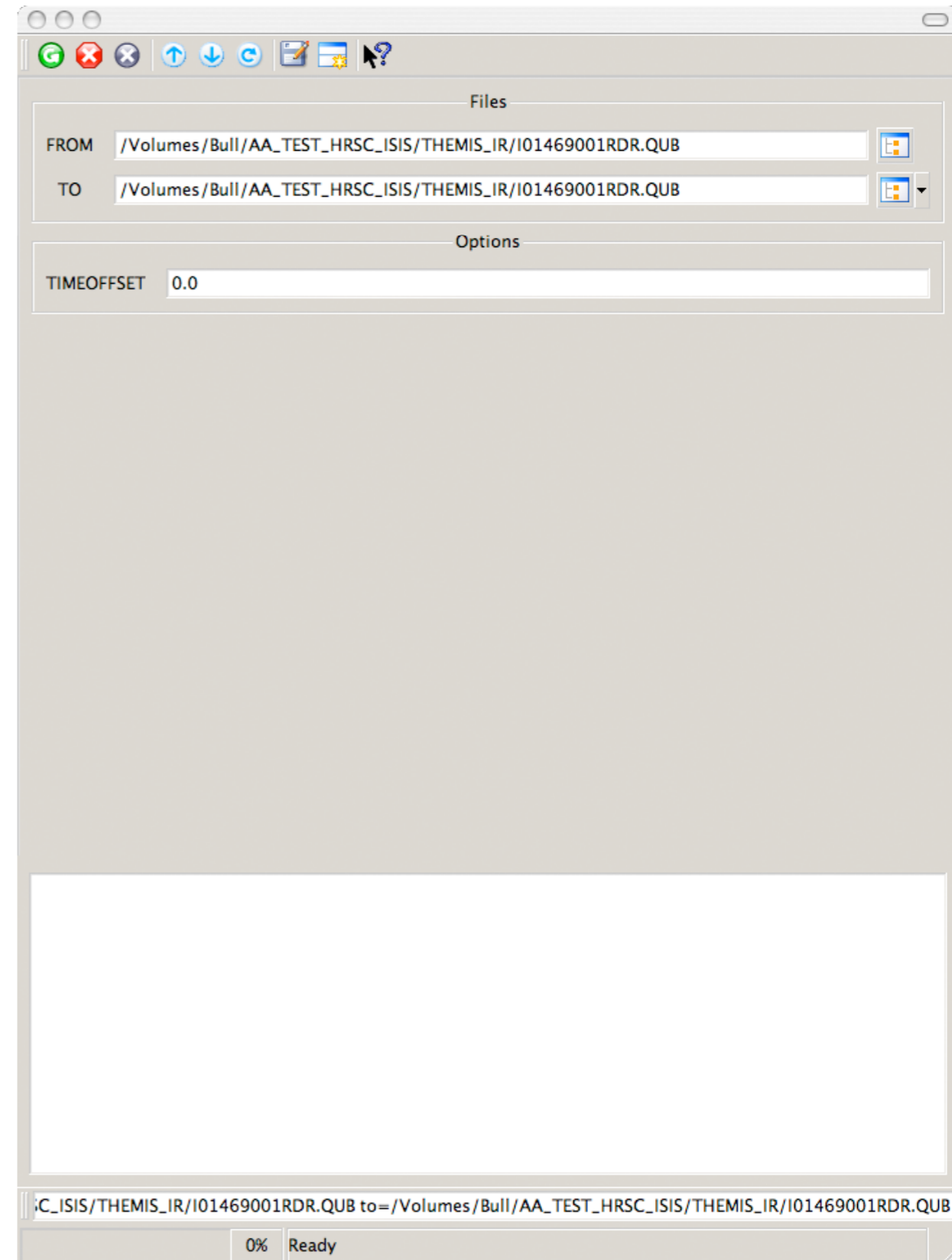


# THEMIS IR on ISIS 3

“thm2isis”

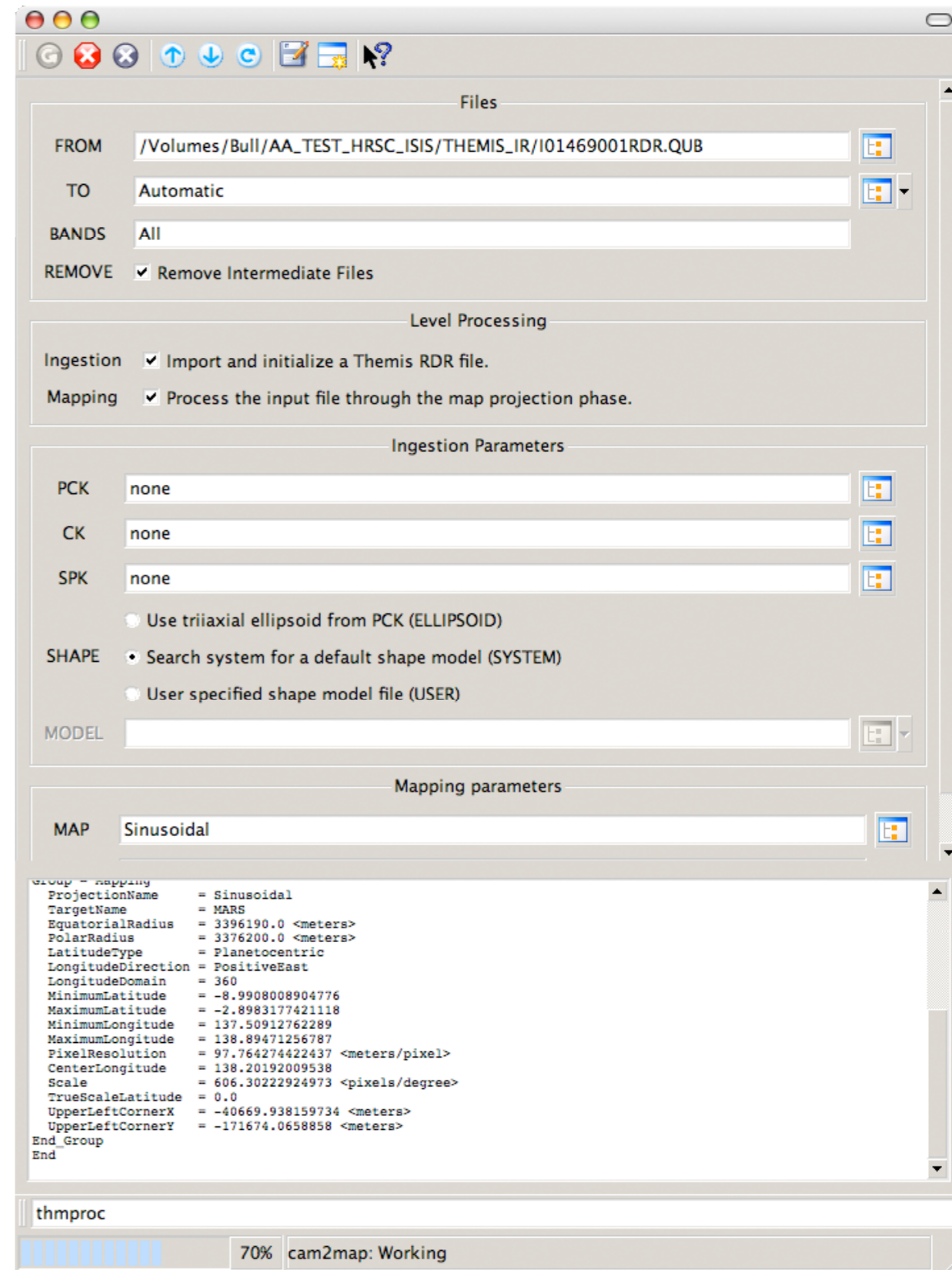
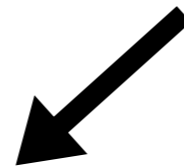
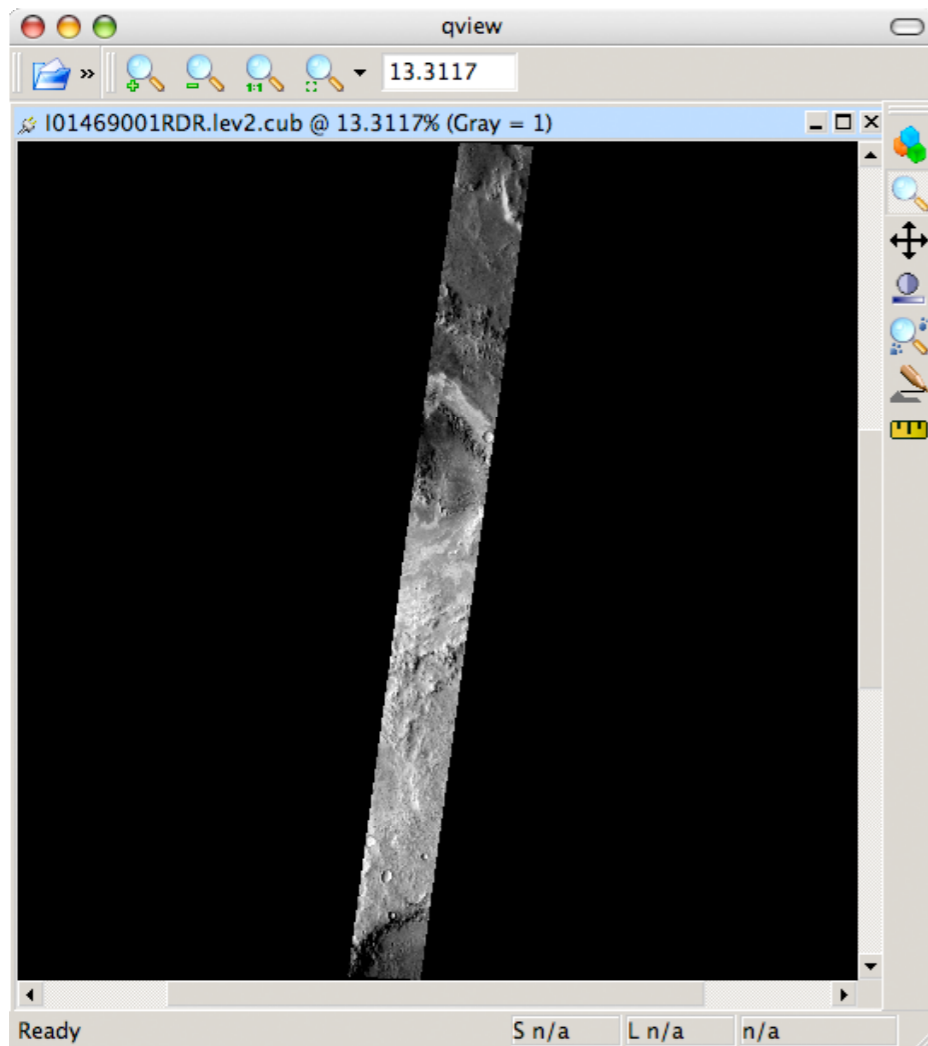


+ further steps...



# THEMIS IR on ISIS 3

OR: “thmproc”  
which includes all basic  
processing steps



# HRSC in ISIS3

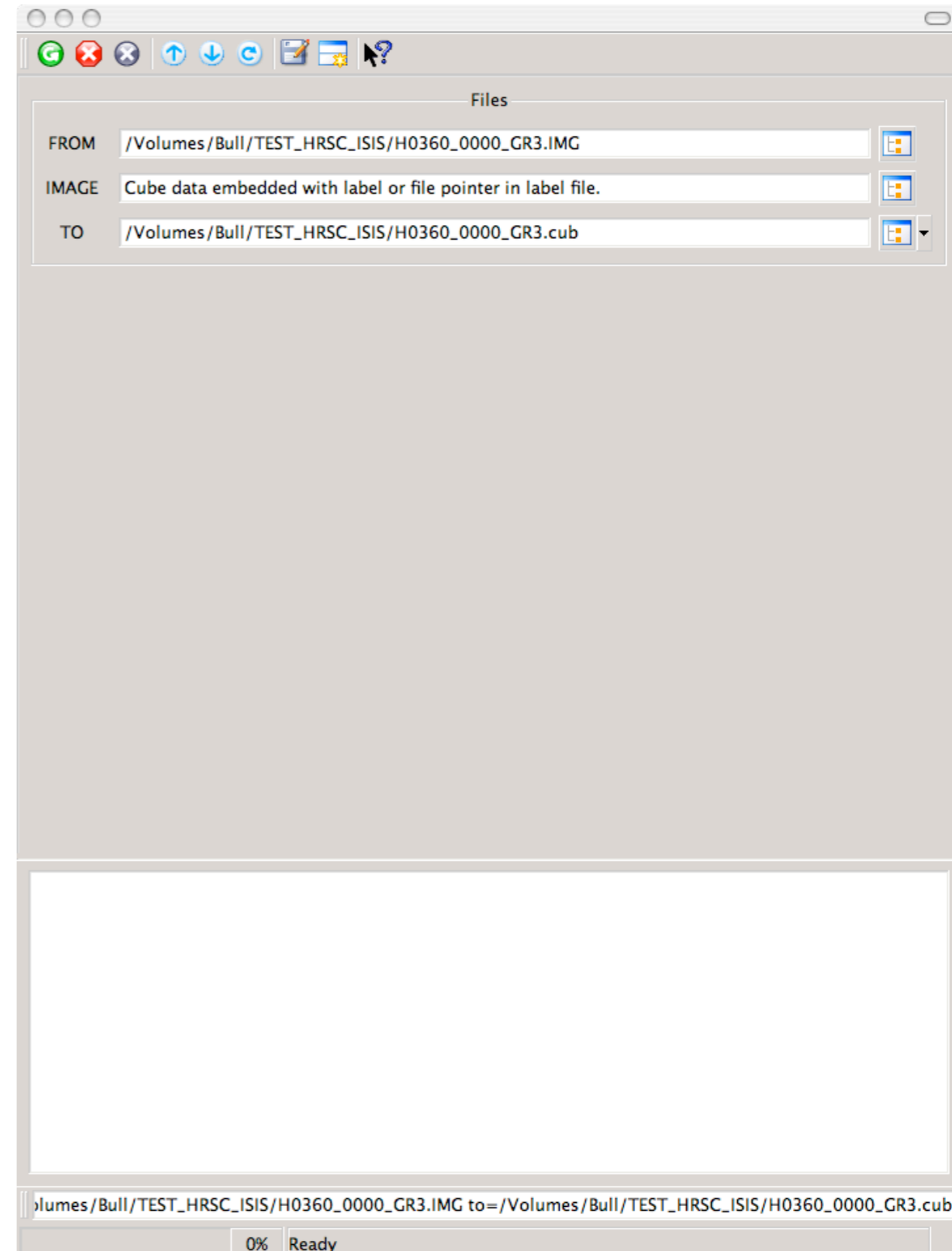
## PSA PDS Level3

“pds2isis”

```
[prompt:~] pds2isis
```

### Disclaimer:

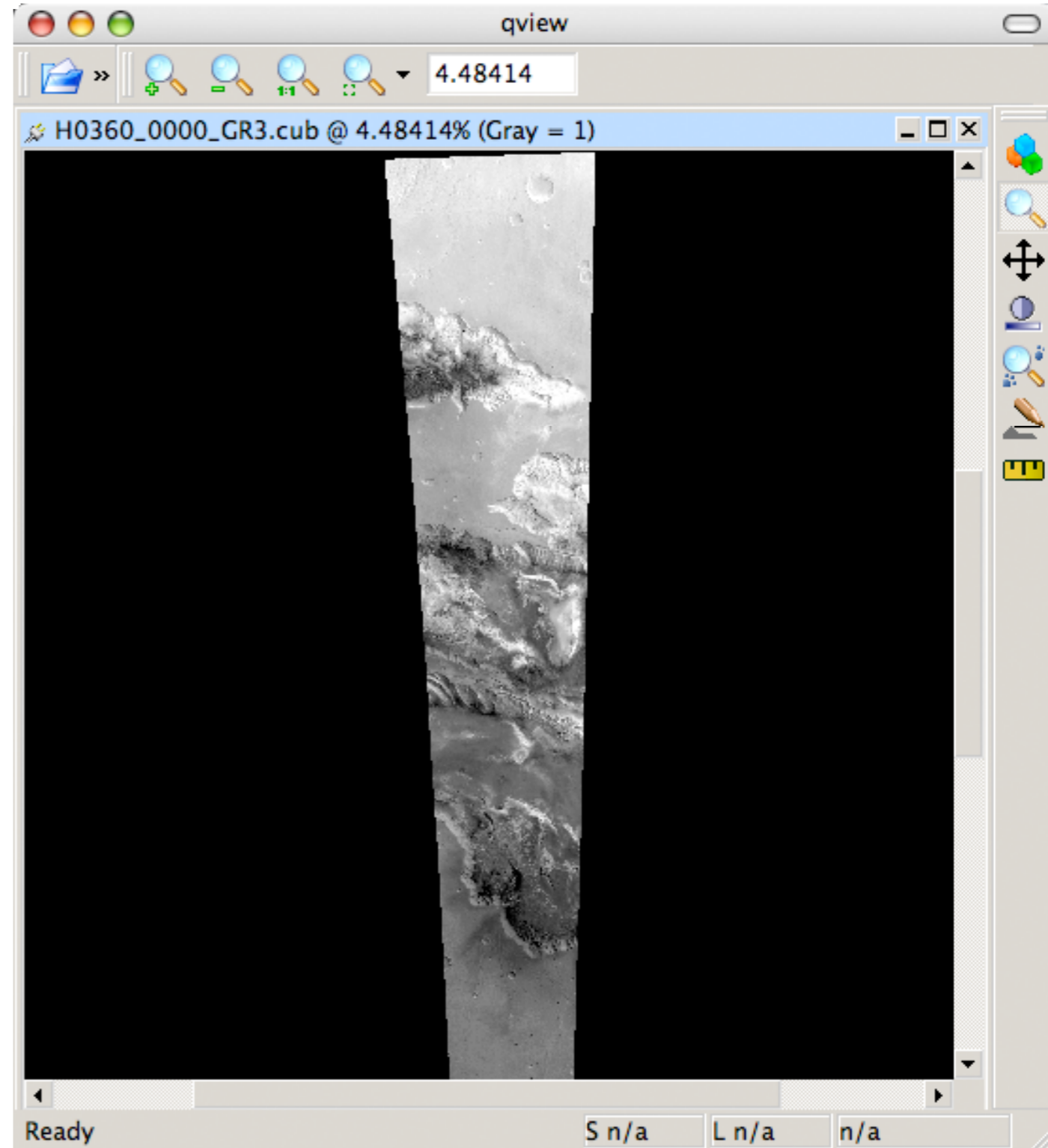
At this point HRSC data are not officially supported by ISIS3. All following information is provided “as is”.



# HRSC in ISIS3

## PSA PDS Level3

“qview”



# HRSC in ISIS3

## PSA PDS Level3

Currently (early June 2007) it looks like “pds2isis” imports some of the mapping keywords not correctly

imported header with pds2isis

```
Group = Mapping
  ProjectionName      = Sinusoidal
  CenterLongitude    = 285.0
  TargetName         = Mars
  EquatorialRadius   = 3396190.0 <meters>
  PolarRadius        = 3396190.0 <meters>
  LatitudeType       = Planetographic
  LongitudeDirection = PositiveWest
  LongitudeDomain    = 180
  MinimumLatitude    = -15.3784
  MaximumLatitude    = 3.11736
  MinimumLongitude   = 282.963
  MaximumLongitude   = 287.18
  UpperLeftCornerX   = -124862.5 <meters>
  UpperLeftCornerY   = 185312.5 <meters>
  PixelResolution    = 100.0 <meters/pixel>
  Scale              = 592.74696512189 <pixels/degree>
  TrueScaleLatitude  = 0.0
  LineProjectionOffset = 1853.625
  SampleProjectionOffset = 1249.125
End_Group
End_Object
```

“right” header

```
Group = Mapping
  ProjectionName      = Sinusoidal
  CenterLongitude    = 285.0
  TargetName         = Mars
  EquatorialRadius   = 3396190.0 <meters>
  PolarRadius        = 3396190.0 <meters>
  LatitudeType       = Planetographic
  LongitudeDirection = PositiveEast
  LongitudeDomain    = 360
  MinimumLatitude    = -15.3784
  MaximumLatitude    = 3.11736
  MinimumLongitude   = 282.963
  MaximumLongitude   = 287.18
  UpperLeftCornerX   = -124862.5 <meters>
  UpperLeftCornerY   = 185312.5 <meters>
  PixelResolution    = 100.0 <meters/pixel>
  Scale              = 592.74696512189 <pixels/degree>
  TrueScaleLatitude  = 0.0
  LineProjectionOffset = 1853.625
  SampleProjectionOffset = 1249.125
End_Group
End_Object
```

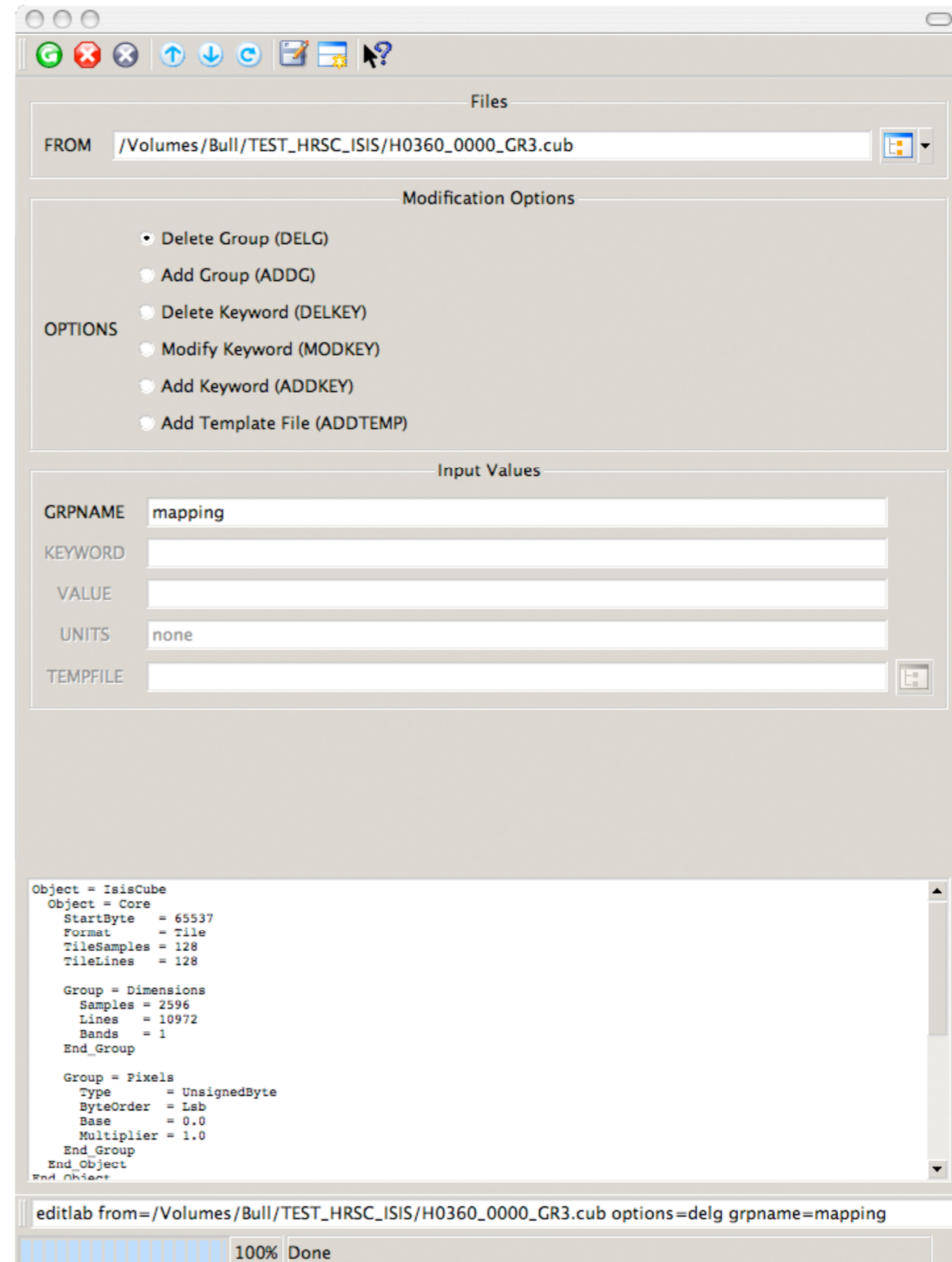
# HRSC in ISIS3

PSA PDS Level3

“editlab”

a) remove “mapping”  
group from label

```
Group = Mapping
  ProjectionName      = Sinusoidal
  CenterLongitude    = 285.0
  TargetName         = Mars
  EquatorialRadius   = 3396190.0 <meters>
  PolarRadius        = 3396190.0 <meters>
  LatitudeType       = Planetographic
  LongitudeDirection = PositiveWest
  LongitudeDomain    = 180
  MinimumLatitude    = -15.3784
  MaximumLatitude    = 3.11736
  MinimumLongitude   = 282.963
  MaximumLongitude   = 287.18
  UpperLeftCornerX    = -124862.5 <meters>
  UpperLeftCornerY    = 185312.5 <meters>
  PixelResolution     = 100.0 <meters/pixel>
  Scale               = 592.74696512189 <pixels/degree>
  TrueScaleLatitude   = 0.0
  LineProjectionOffset = 1853.625
  SampleProjectionOffset = 1249.125
End_Group
End_Object
```



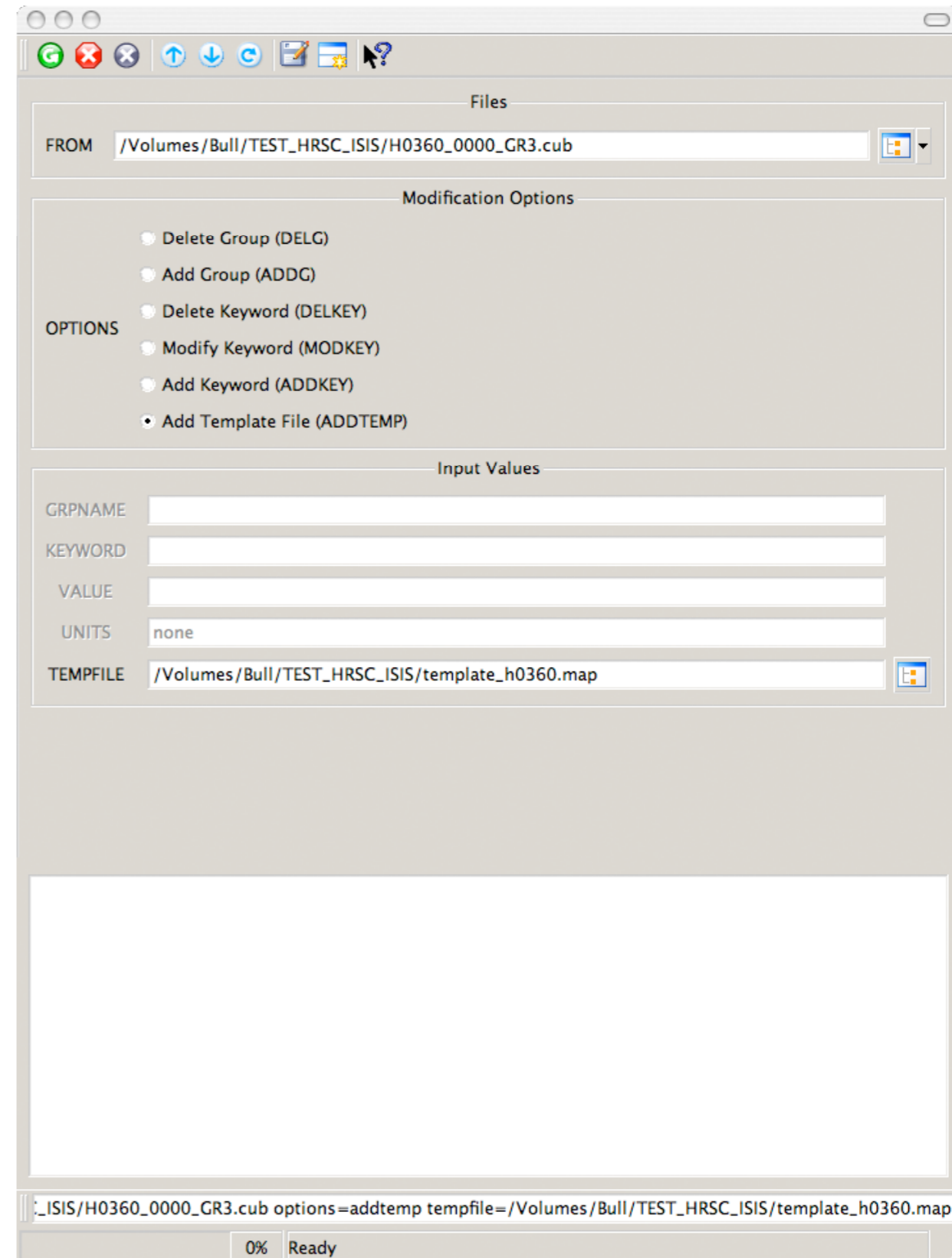
# HRSC in ISIS3

VICAR Level3/3+

“editlab”

b) adding “mapping” group to label from corrected template

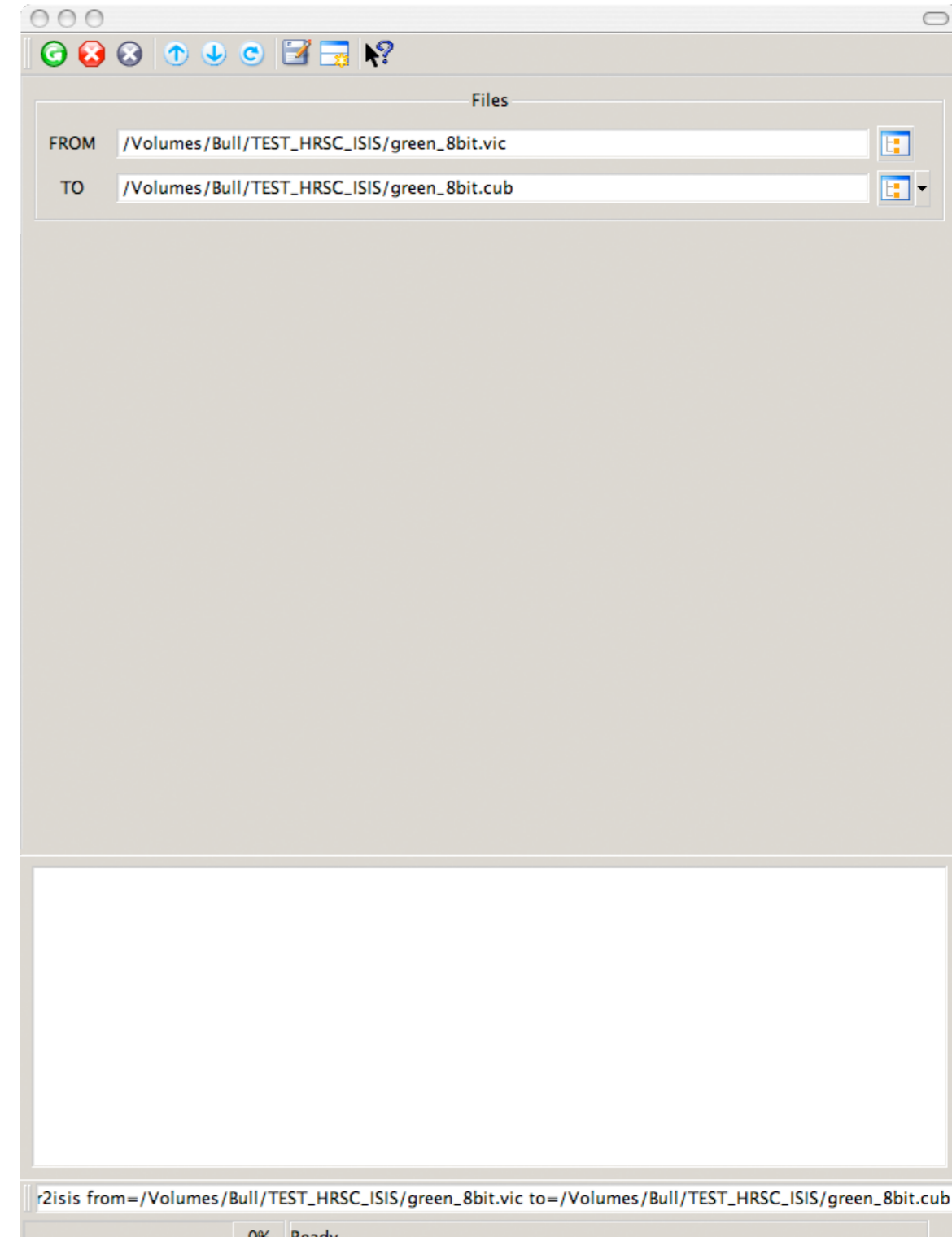
```
Group = Mapping
  ProjectionName      = Sinusoidal
  CenterLongitude    = 285.0
  TargetName         = Mars
  EquatorialRadius   = 3396190.0 <meters>
  PolarRadius        = 3396190.0 <meters>
  LatitudeType       = Planetographic
  LongitudeDirection = PositiveEast
  LongitudeDomain    = 360
  MinimumLatitude    = -15.3784
  MaximumLatitude    = 3.11736
  MinimumLongitude   = 282.963
  MaximumLongitude   = 287.18
  UpperLeftCornerX   = -124862.5 <meters>
  UpperLeftCornerY   = 185312.5 <meters>
  PixelResolution    = 100.0 <meters/pixel>
  Scale              = 592.74696512189 <pixels/degree>
  TrueScaleLatitude  = 0.0
  LineProjectionOffset = 1853.625
  SampleProjectionOffset = 1249.125
End_Group
End_Object
```



# HRSC in ISIS3

## VICAR Level3/3+

“vicar2isis”

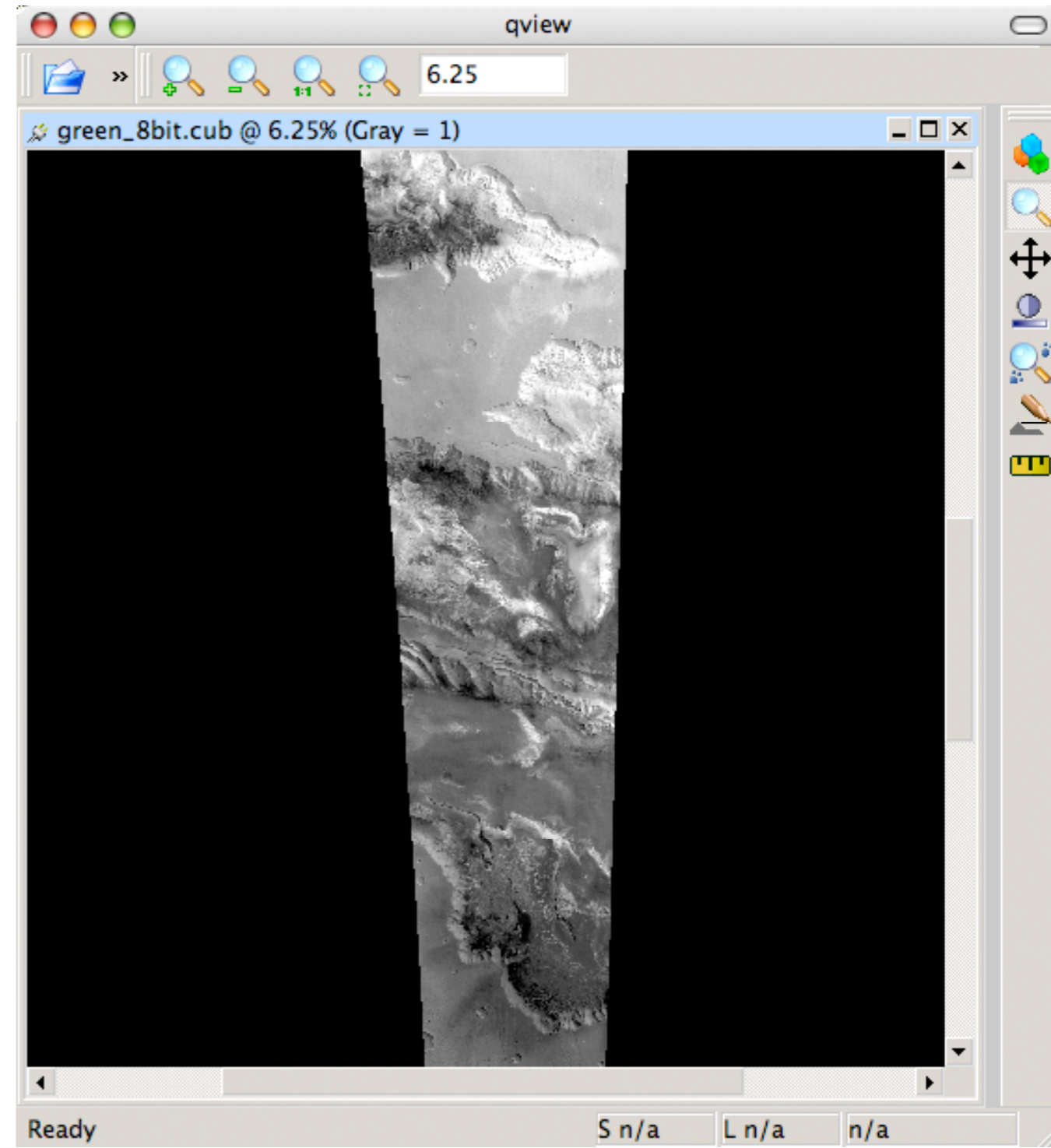




# HRSC in ISIS3

## VICAR Level3/3+

“qview”



# HRSC in ISIS3

VICAR Level3/3+

HRSC home-brewed  
Level3/+ in ISIS

NOTE: map-related keywords are not  
automatically imported

```
Object = IsisCube
  Object = Core
    StartByte = 65537
    Format = Tile
    TileSamples = 128
    TileLines = 128

    Group = Dimensions
      Samples = 2497
      Lines = 10965
      Bands = 1
    End_Group

    Group = Pixels
      Type = UnsignedByte
      ByteOrder = Lsb
      Base = 0.0
      Multiplier = 1.0
    End_Group
  End_Object
End_Object

Object = Label
  Bytes = 65536
End_Object

Object = History
  Name = IsisCube
  StartByte = 28246017
  Bytes = 428
End_Object
End
```

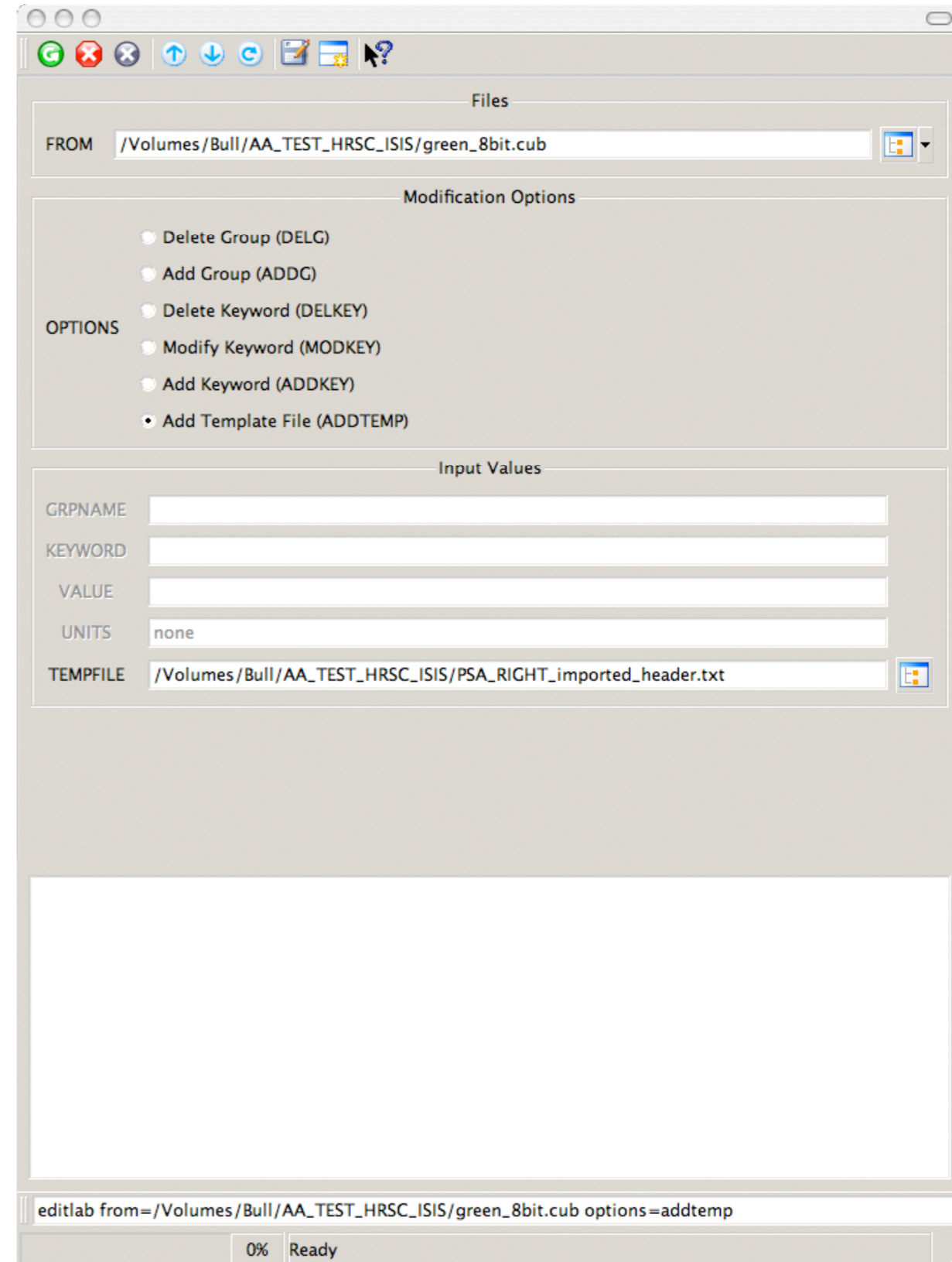
# HRSC in ISIS3

VICAR Level3/3+

“editlab”

b) adding “mapping” group to label from corrected template

```
Group = Mapping
  ProjectionName      = Sinusoidal
  CenterLongitude    = 285.0
  TargetName         = Mars
  EquatorialRadius   = 3396190.0 <meters>
  PolarRadius        = 3396190.0 <meters>
  LatitudeType       = Planetographic
  LongitudeDirection = PositiveEast
  LongitudeDomain    = 360
  MinimumLatitude    = -15.3784
  MaximumLatitude    = 3.11736
  MinimumLongitude   = 282.963
  MaximumLongitude   = 287.18
  UpperLeftCornerX   = -124862.5 <meters>
  UpperLeftCornerY   = 185312.5 <meters>
  PixelResolution    = 100.0 <meters/pixel>
  Scale              = 592.74696512189 <pixels/degree>
  TrueScaleLatitude  = 0.0
  LineProjectionOffset = 1853.625
  SampleProjectionOffset = 1249.125
End_Group
End_Object
```



# HRSC in ISIS3

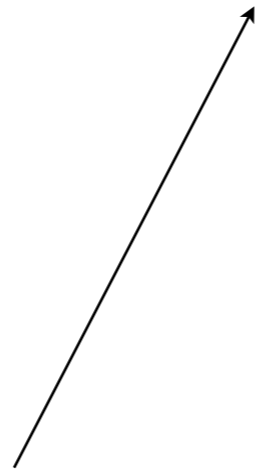
## VICAR Level3/3+

```
Object = IsisCube
Object = Core
  StartByte   = 65537
  Format       = Tile
  TileSamples = 128
  TileLines   = 128
```

```
Group = Dimensions
  Samples = 2497
  Lines   = 10965
  Bands   = 1
End_Group
```

```
Group = Pixels
  Type       = UnsignedByte
  ByteOrder  = Lsb
  Base       = 0.0
  Multiplier = 1.0
End_Group
End_Object
```

“Mapping” group added



```
Group = Mapping
  ProjectionName      = Sinusoidal
  CenterLongitude    = 285.0
  TargetName         = Mars
  EquatorialRadius   = 3396190.0 <meters>
  PolarRadius        = 3396190.0 <meters>
  LatitudeType       = Planetographic
  LongitudeDirection = PositiveEast
  LongitudeDomain    = 360
  MinimumLatitude    = -15.3784
  MaximumLatitude    = 3.11736
  MinimumLongitude   = 282.963
  MaximumLongitude   = 287.18
  UpperLeftCornerX    = -124862.5 <meters>
  UpperLeftCornerY    = 185312.5 <meters>
  PixelResolution     = 100.0 <meters/pixel>
  Scale               = 592.74696512189 <pixels/degree>
  TrueScaleLatitude  = 0.0
  LineProjectionOffset = 1853.625
  SampleProjectionOffset = 1249.125
End_Group
End_Object
```

```
Object = Label
  Bytes = 65536
End_Object
```

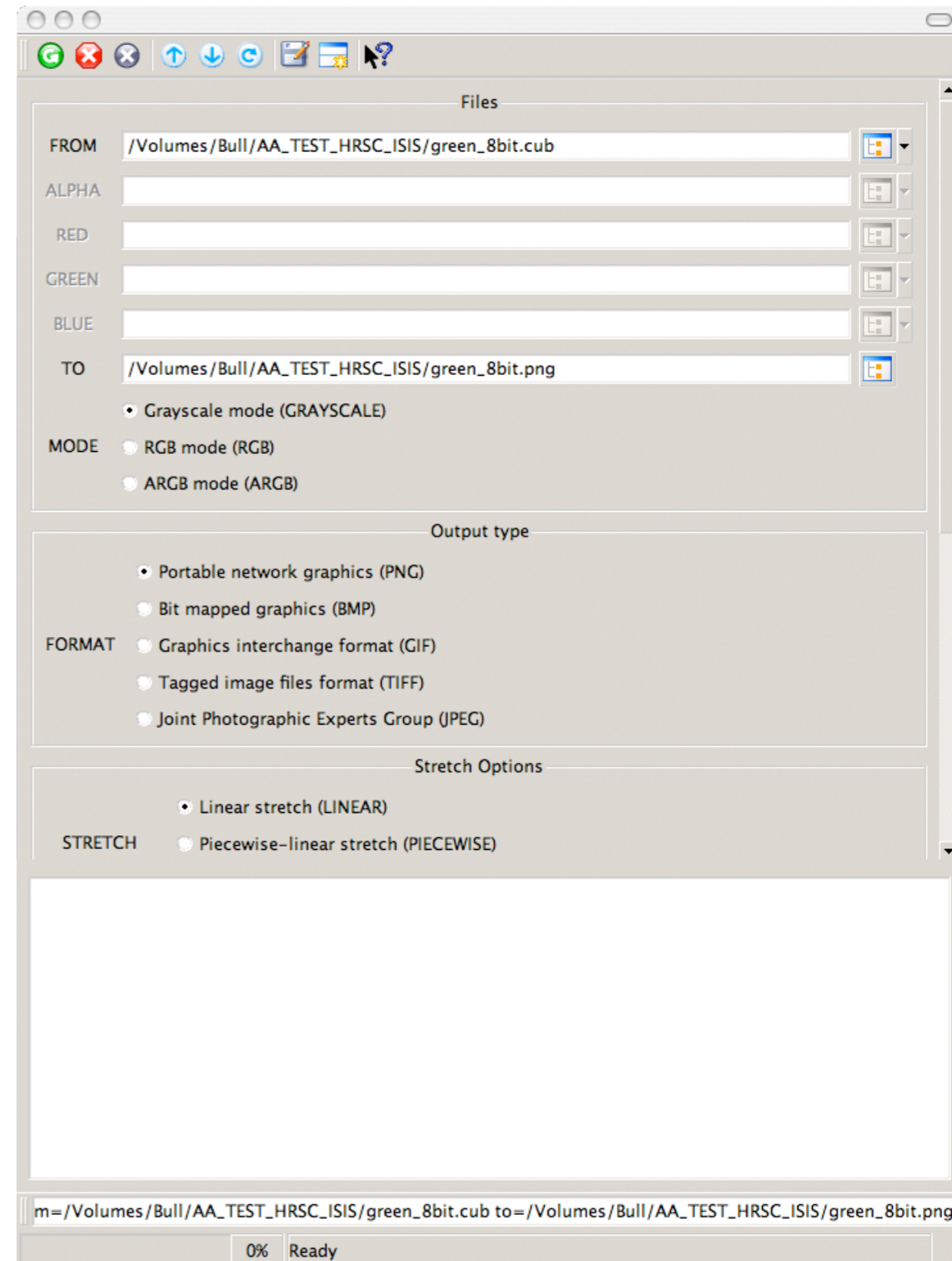
```
Object = History
  Name       = IsisCube
  StartByte = 28246017
  Bytes      = 428
End_Object
End
```

# HRSC in ISIS3

VICAR Level3/3+

“isis2std”

Exports to GIS-friendly  
formats



# HRSC, ISIS, etc.

- With a bit of time, you should be able to integrate HRSC single bands, anaglyphs, RGB & pan-sharpened RGB with other datasets (e.g. MOC, THEMIS VIS, THEMIS IR) within your GIS software/environment.
- Once you have your coregistered (same number of lines and columns) HRSC bands and you're adventurous enough, you can try mosaicking or other fancy things with ISIS

Good luck!