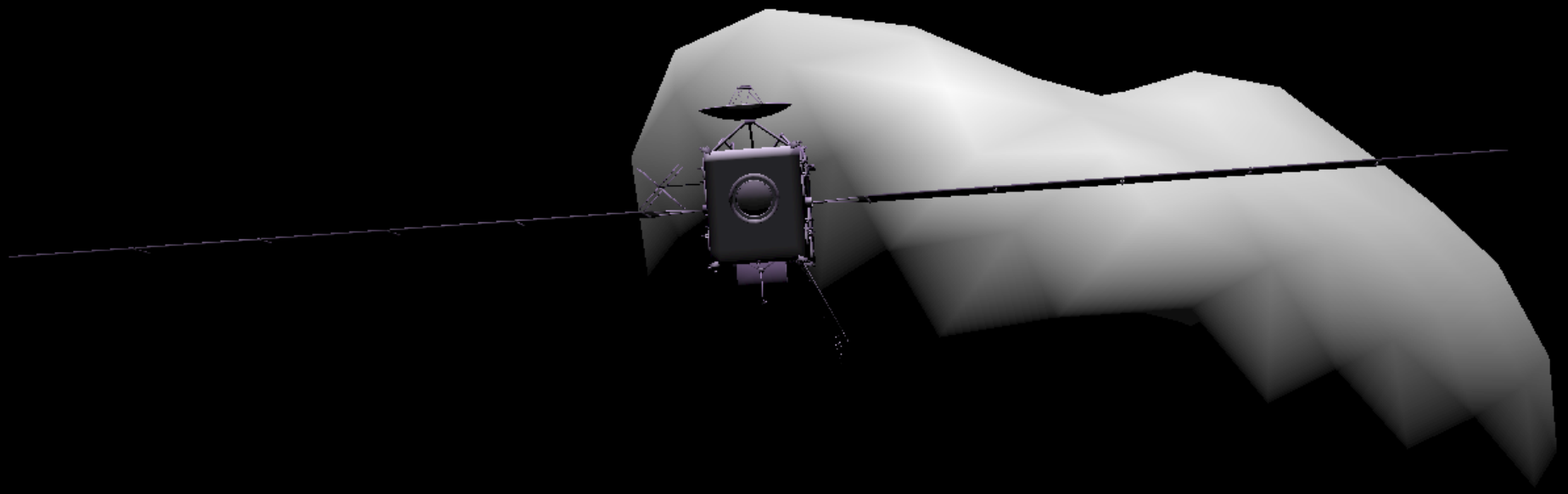
Review of
ro-c-osinac_osiwac-5-67p-shape-v1.0



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Aurora Technology, B. V.
ESAC, Madrid, Spain

1
Editorial comments

Lower case file names

```
aareadme.txt
catalog
data
document
index
voldesc.cat
```

All directory and file names are lower case, while the PDS standard requires them to be upper case.

There is, at this point, only one source of shape models - the 3-D Modeling group of the OSIRIS science team.

How about the MOC shape models?

SPC vs. MSPCD

aareadme.txt:

> The modeling group has produced
> two different models using
> stereophotoclinometry techniques,
> [...]

spc_model_info.asc:

> The shape models [...] were developed
> [...] from two different techniques:
> Stereophotoclinometry (SPC) and
> Multi-resolution photoclinometry by
> deformation (MSPCD).

Brief description of methods

Besides just citing the relevant publications, it would be helpful to have a brief description of both techniques directly available in the data set:

- How do stereophotoclinometry techniques work in general?
- How does the applied SPC technique work in particular?
- How does the applied MSPCD technique work in particular?

2
Consistency between plate shape models and provided rendered images

res_cg_mspcd_shap2_001m_cart.png

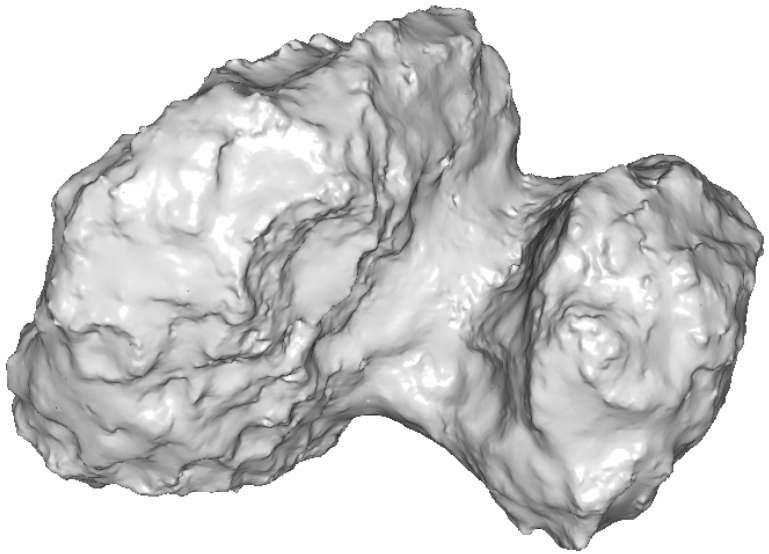
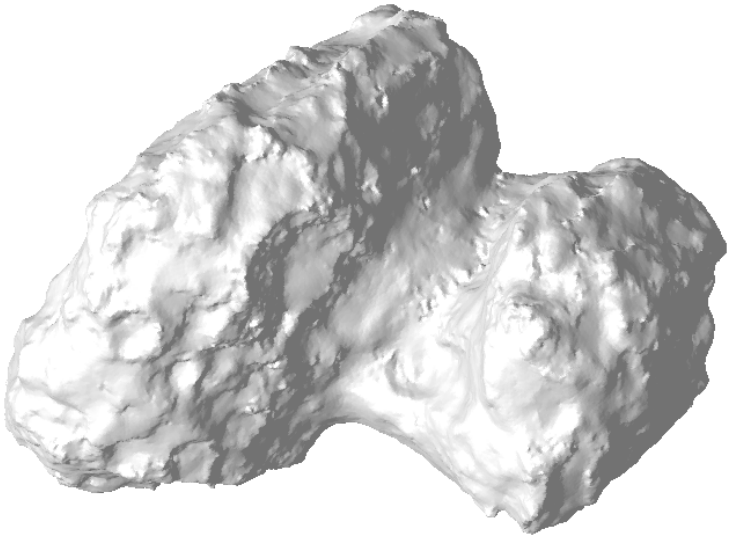


Image from data set



Rendered
Orthographic projection

res_cg_mspcd_shap2_001m_cart.png

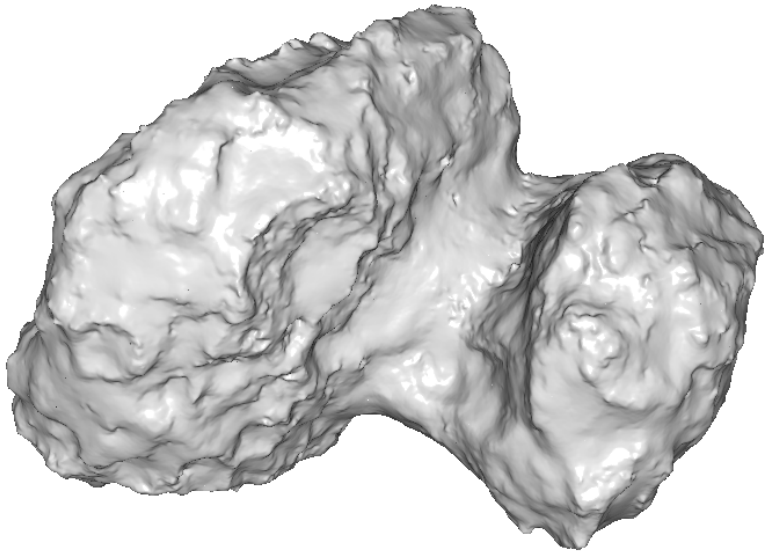
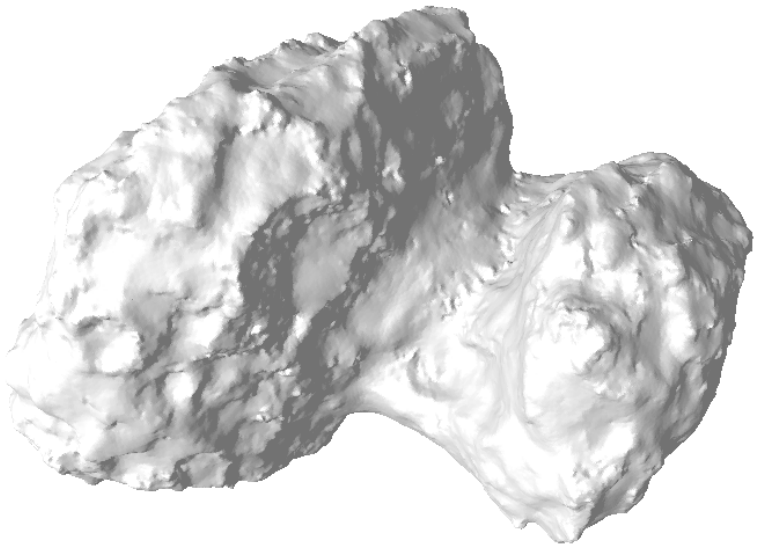


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

Image information

- Camera parameters shall be provided.
- Surface model and illumination should be provided.

res_cg_mspcd_shap2_760k_cart.png

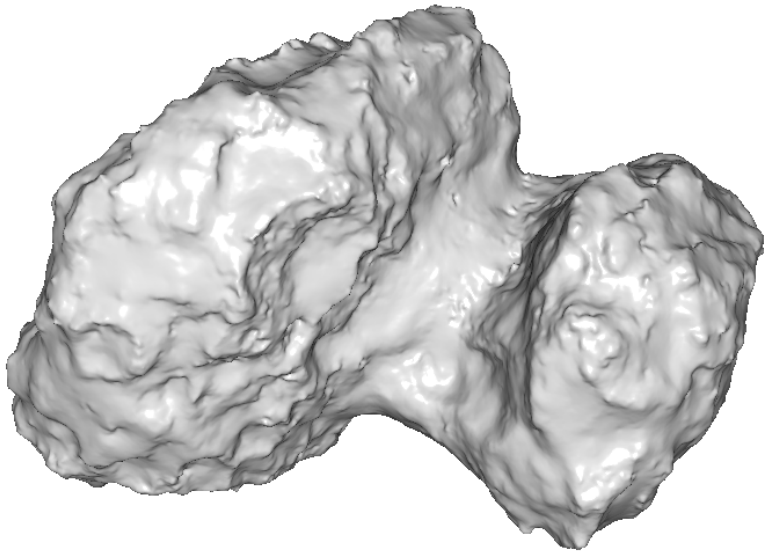
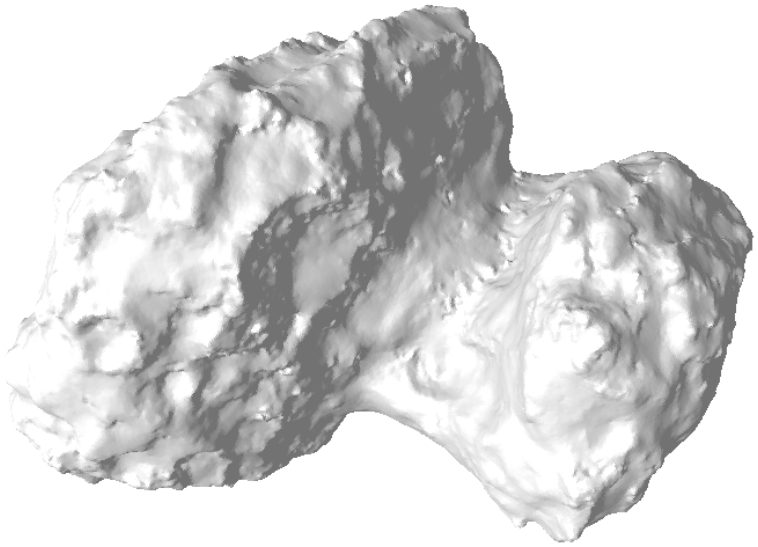


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_mspcd_shap2_391k_cart.png

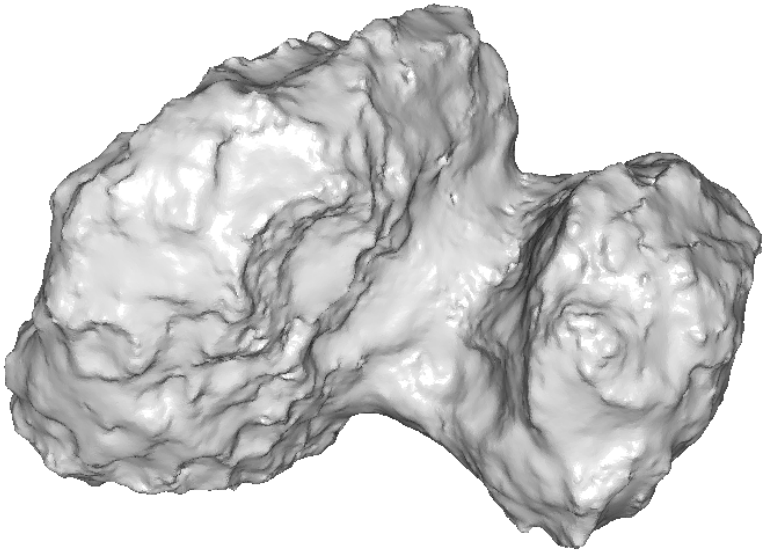
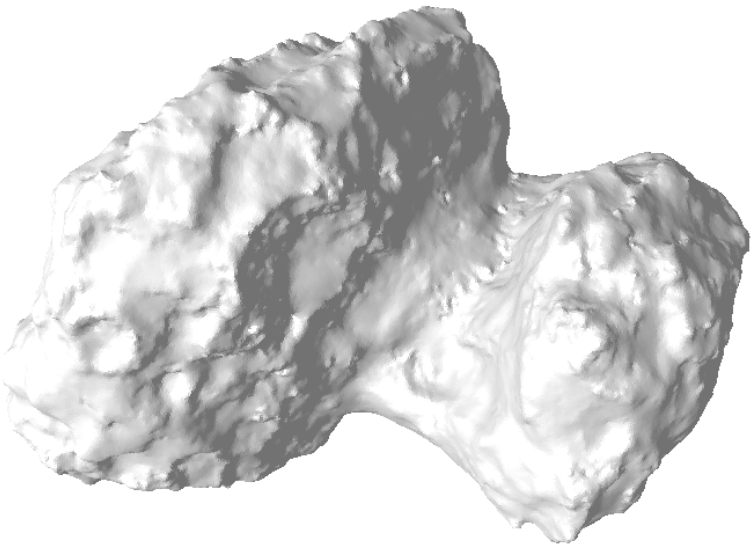


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_mspcd_shap2_191k_cart.png

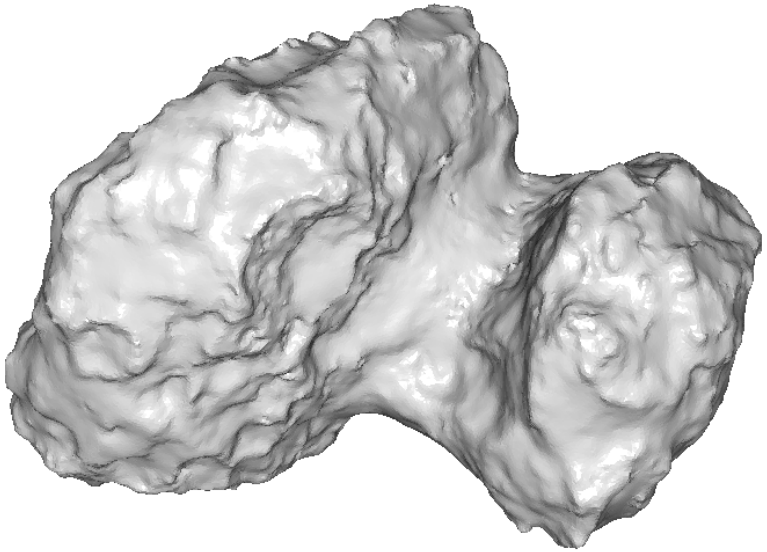
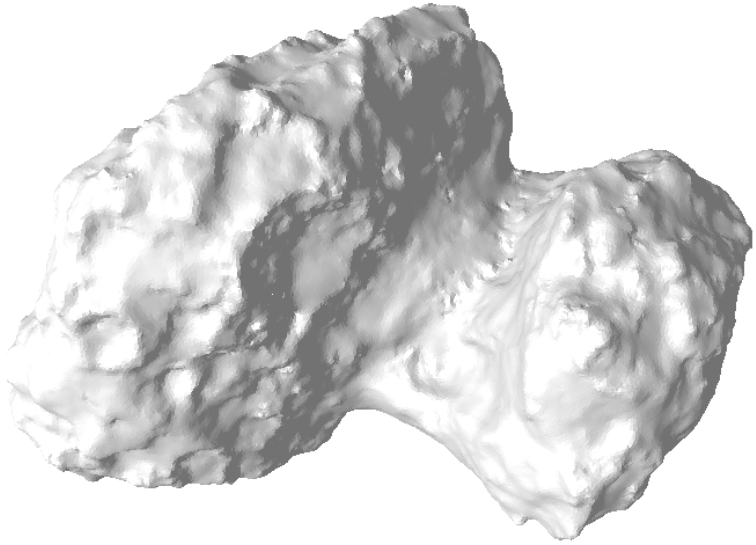


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_mspcd_shap2_098k_cart.png

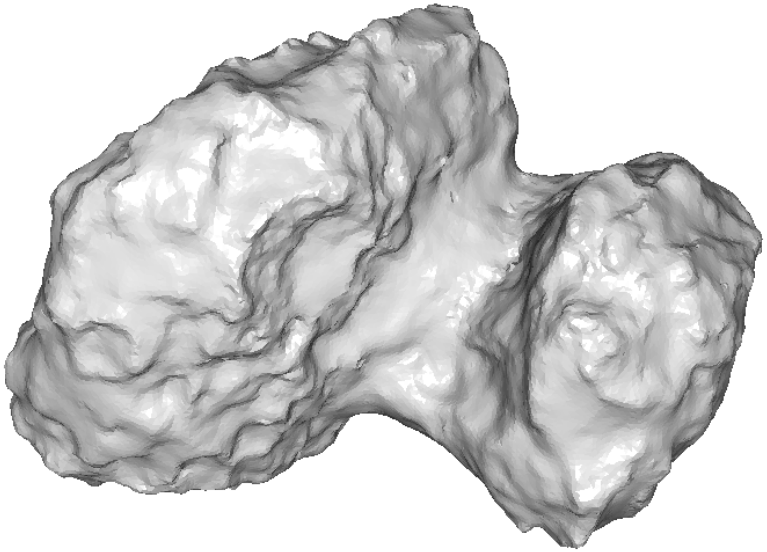
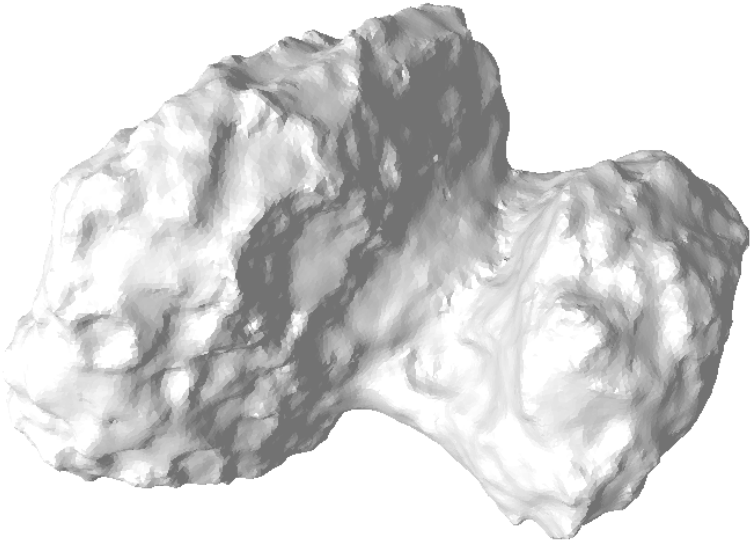


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_mspcd_shap2_048k_cart.png

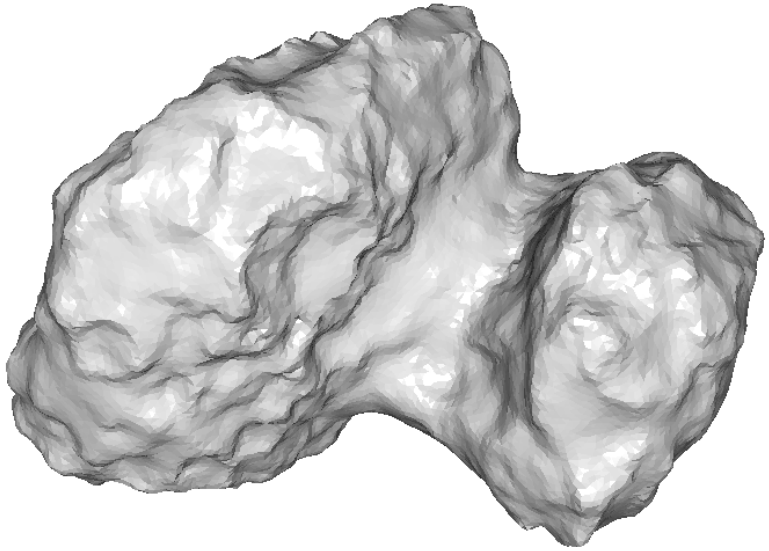
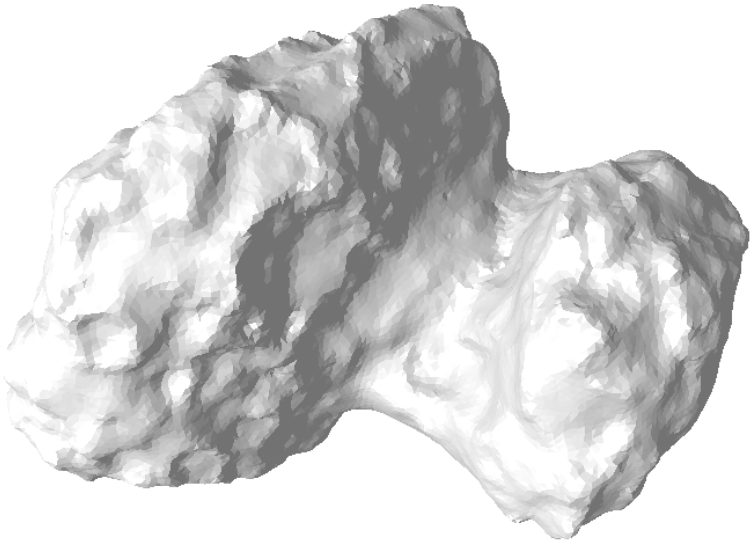


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_mspcd_shap2_024k_cart.png

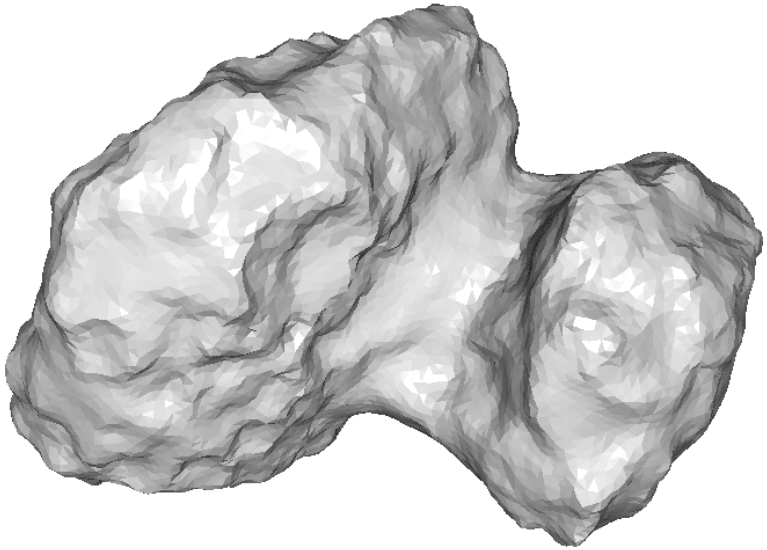
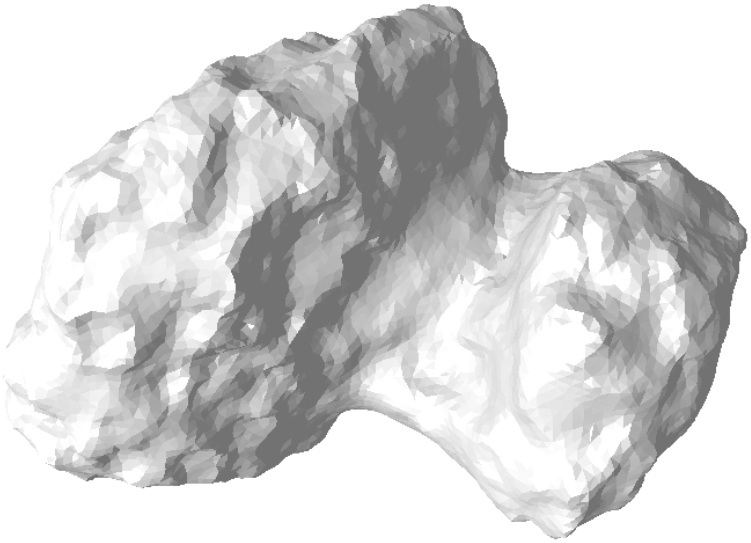


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_mspcd_shap2_012k_cart.png

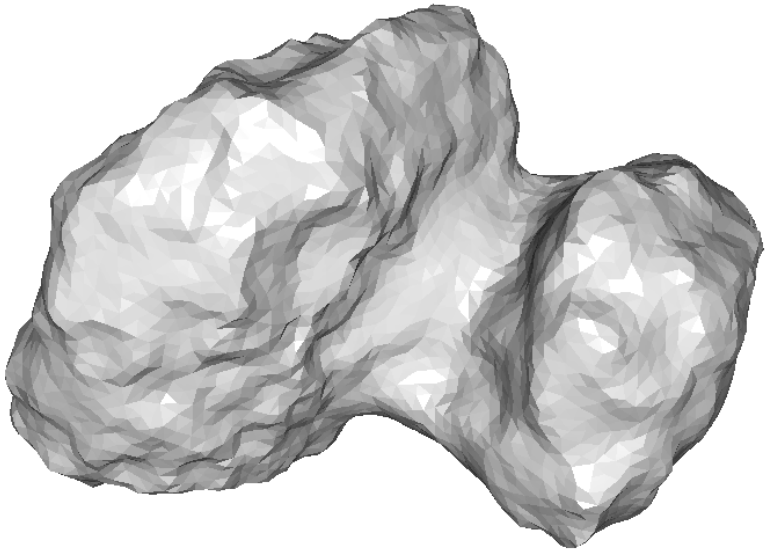
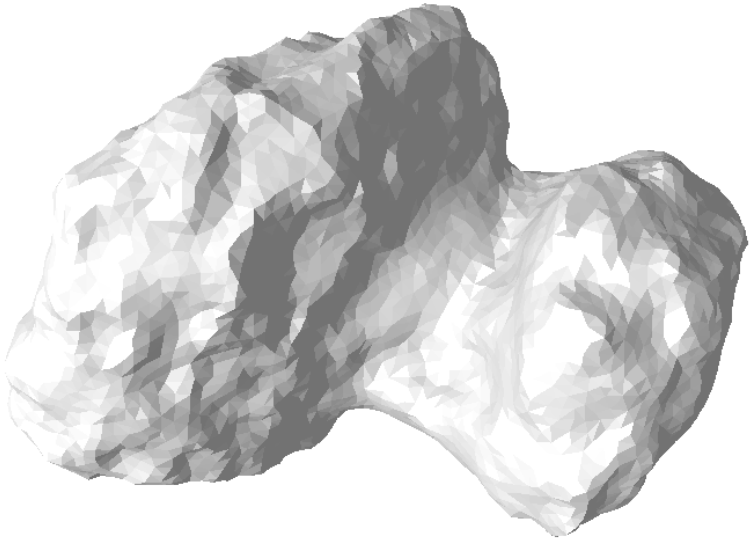


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_mspcd_shap2_006k_cart.png

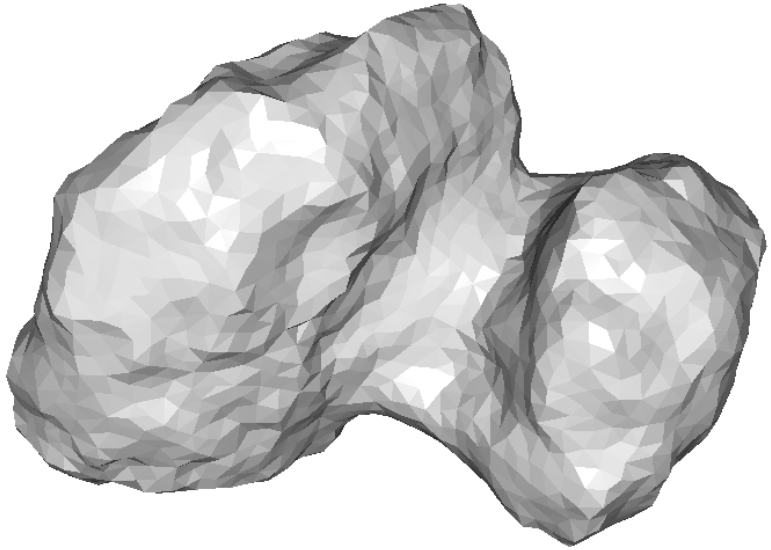
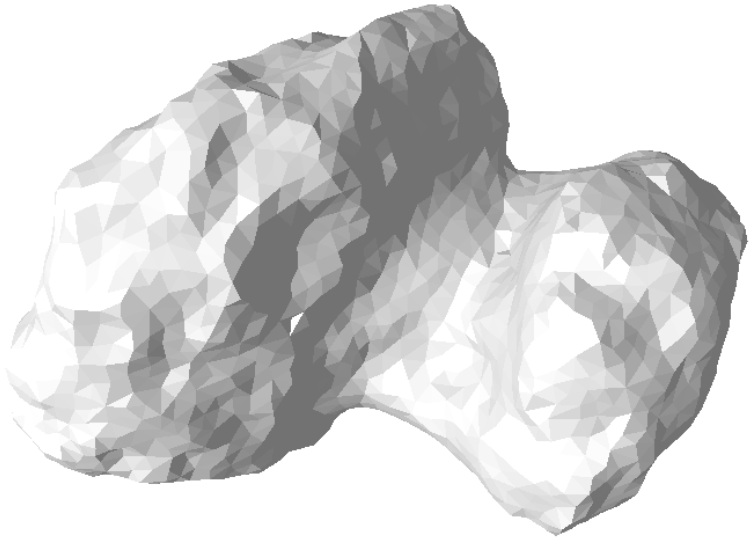


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

MSPCD images for different resolutions

$\rightarrow$ The images are consistent with the plate shape models.

res_cg_spc_shap2_786k_cart.png

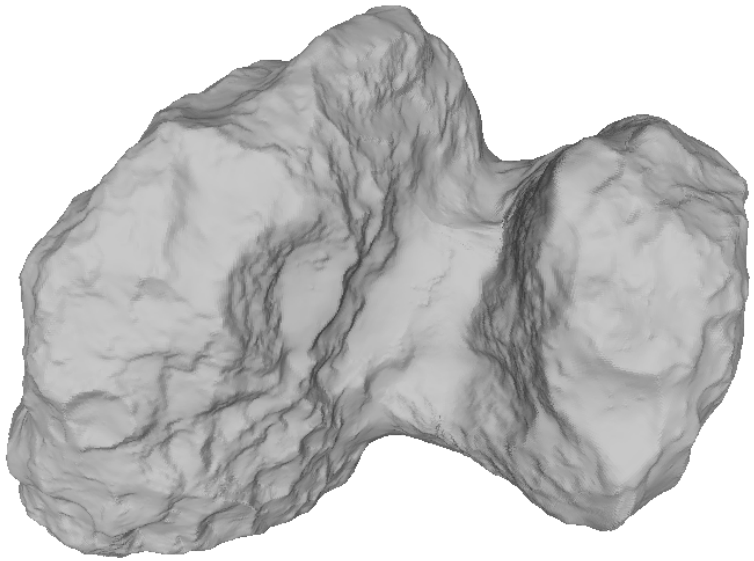
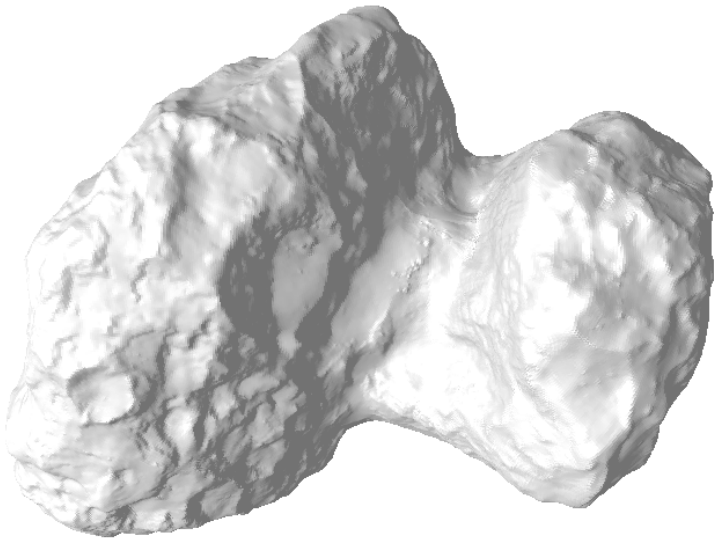


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_spc_shap2_399k_cart.png

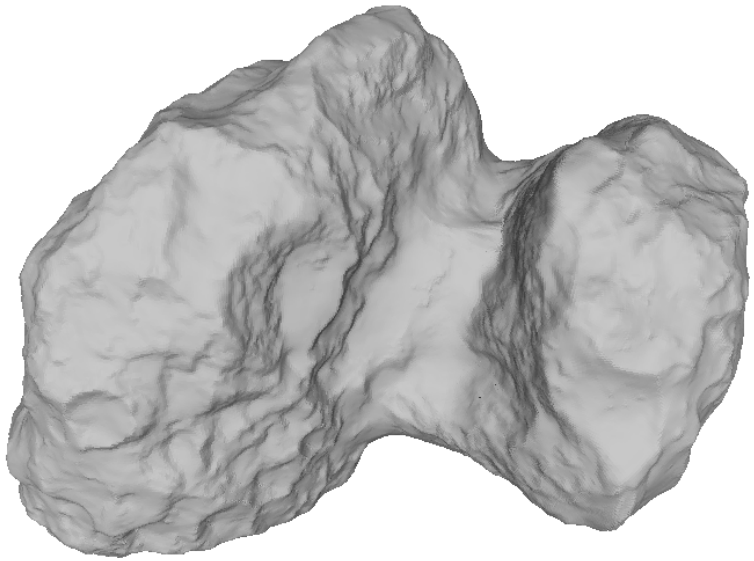
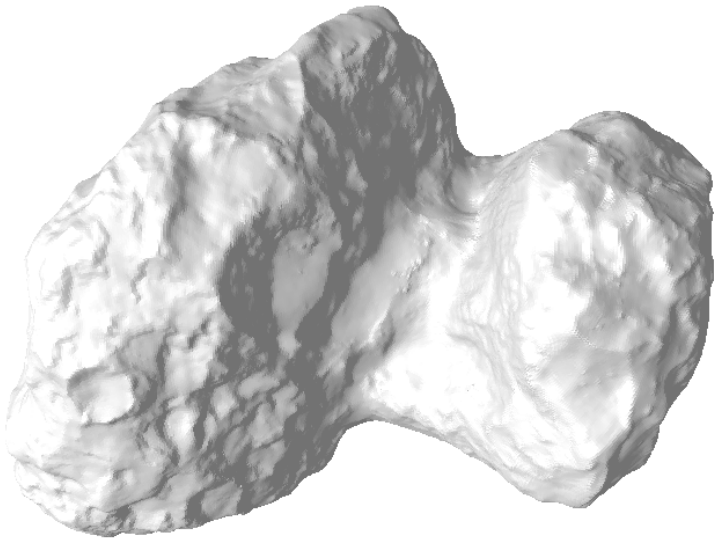


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_spc_shap2_195k_cart.png

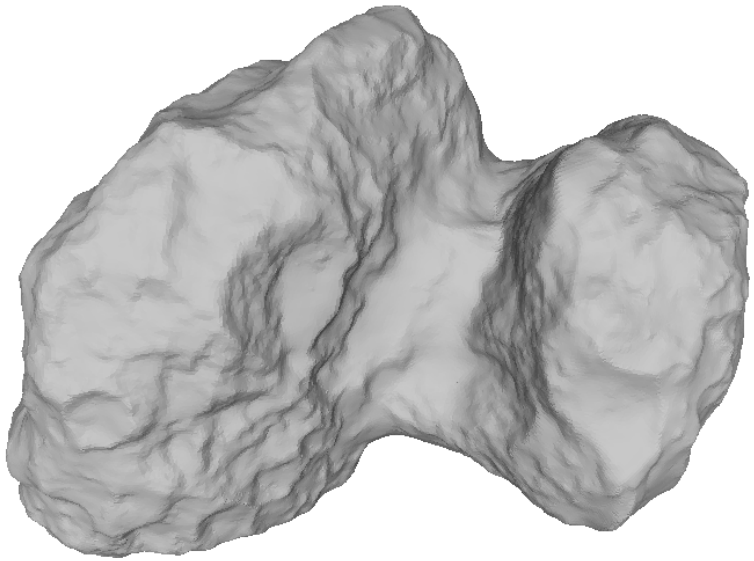
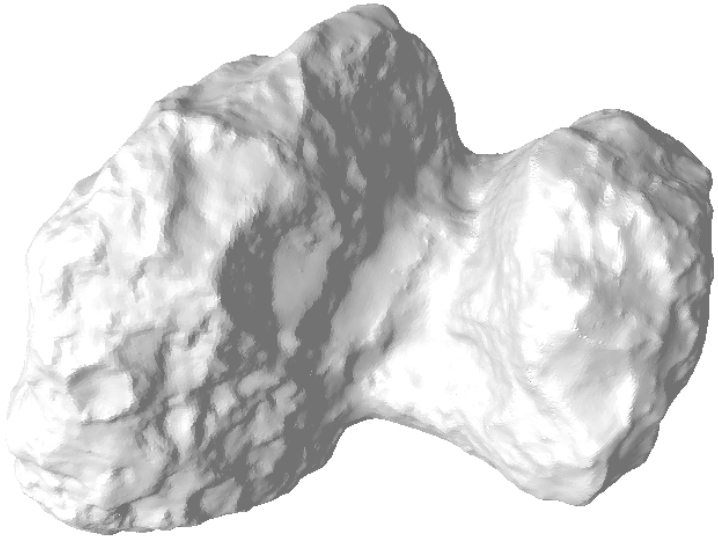


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_spc_shap2_096k_cart.png

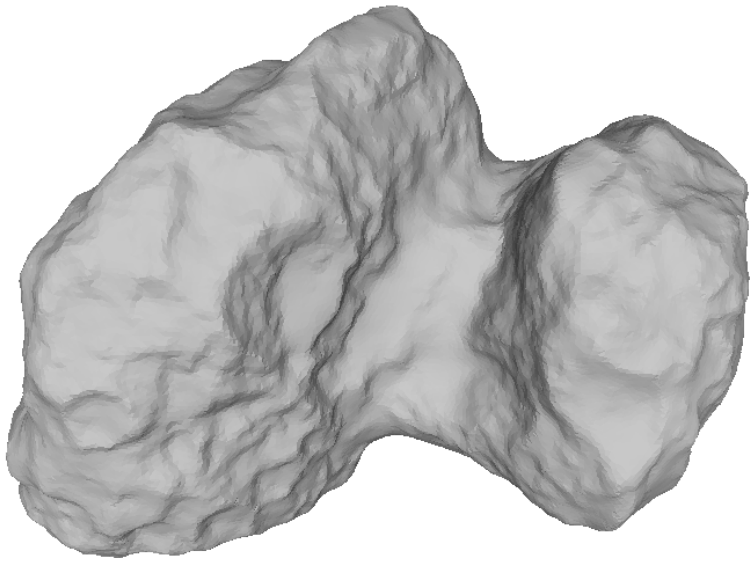
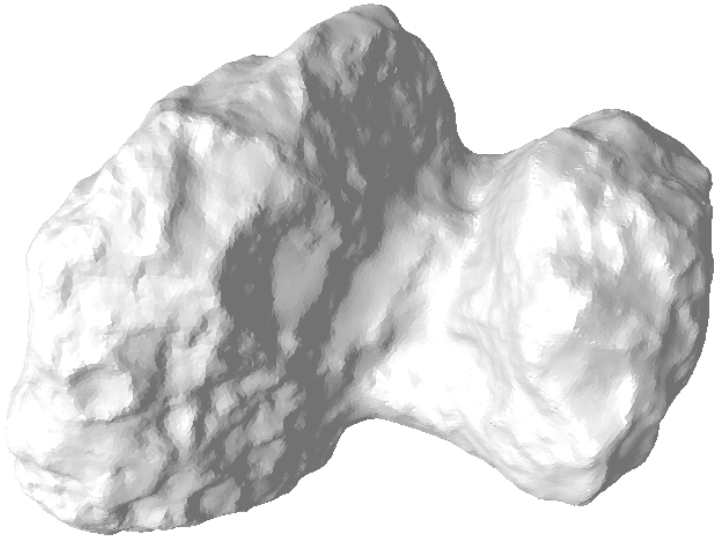


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_spc_shap2_047k_cart.png

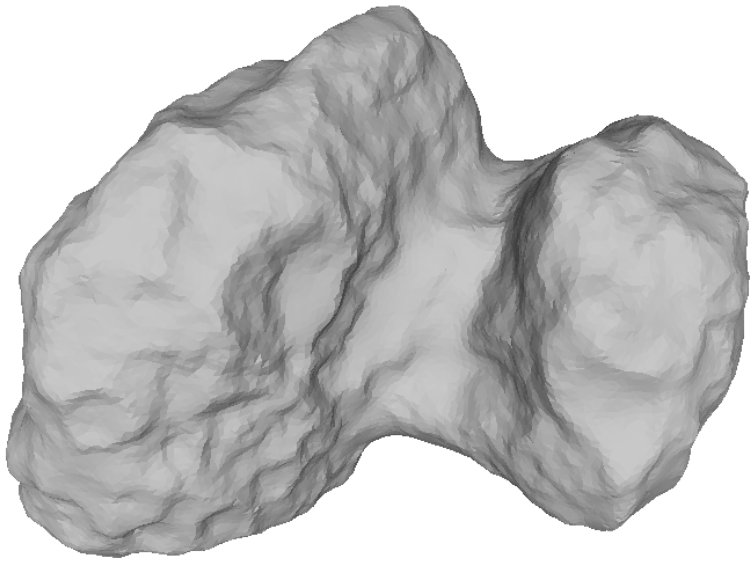
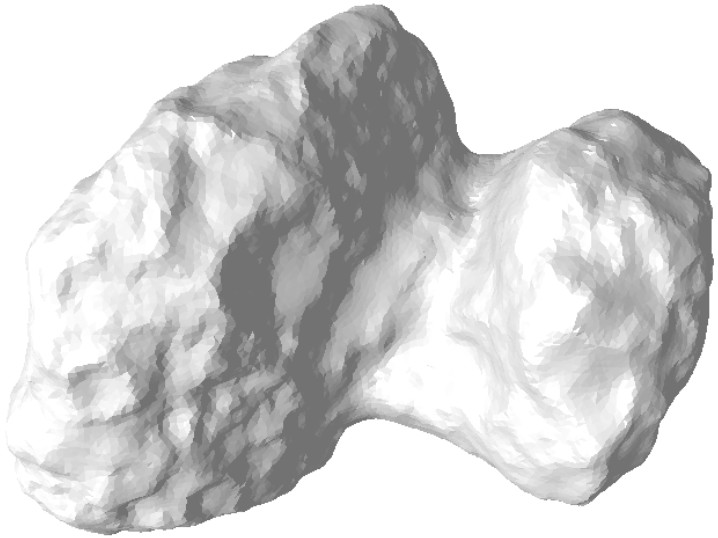


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_spc_shap2_024k_cart.png

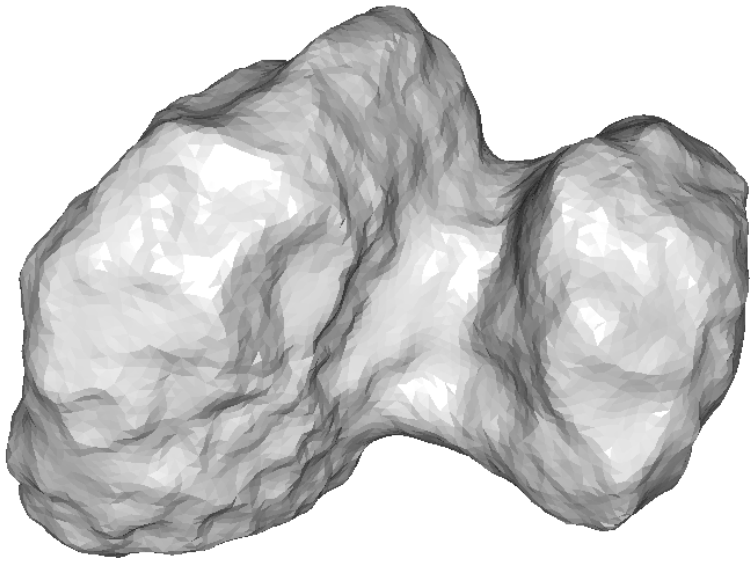
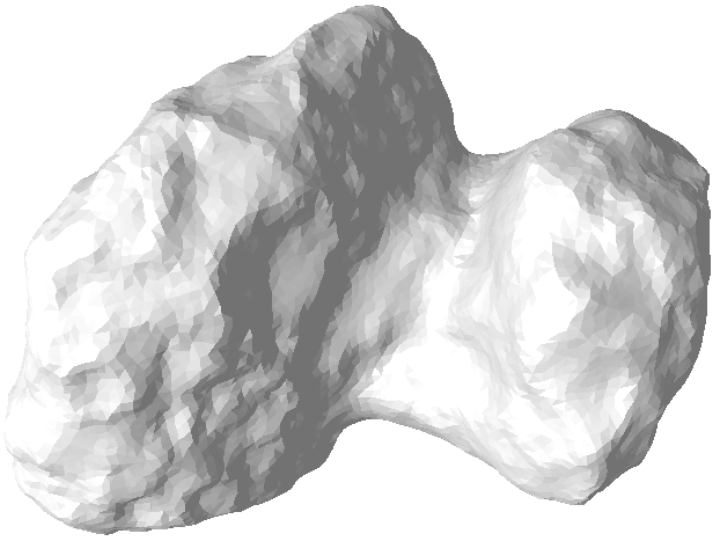


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_spc_shap2_012k_cart.png

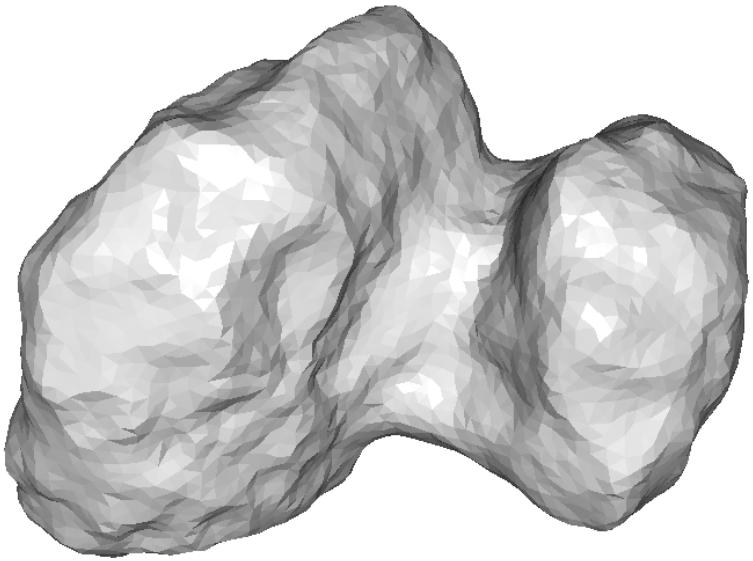
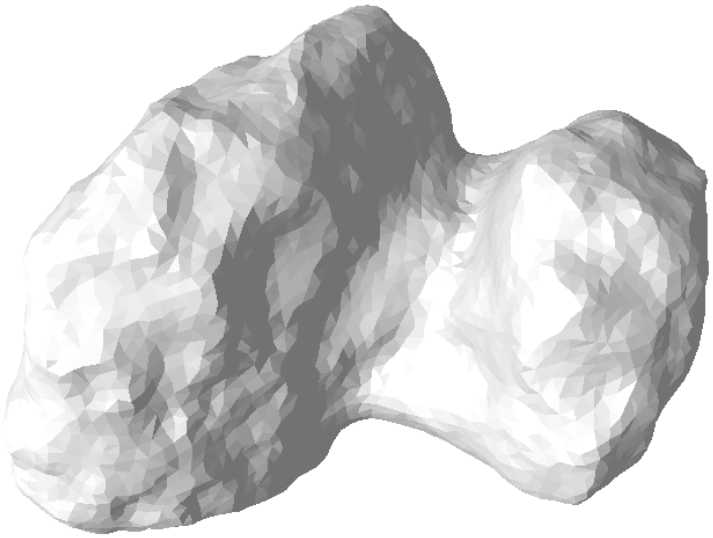


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

res_cg_spc_shap2_006k_cart.png

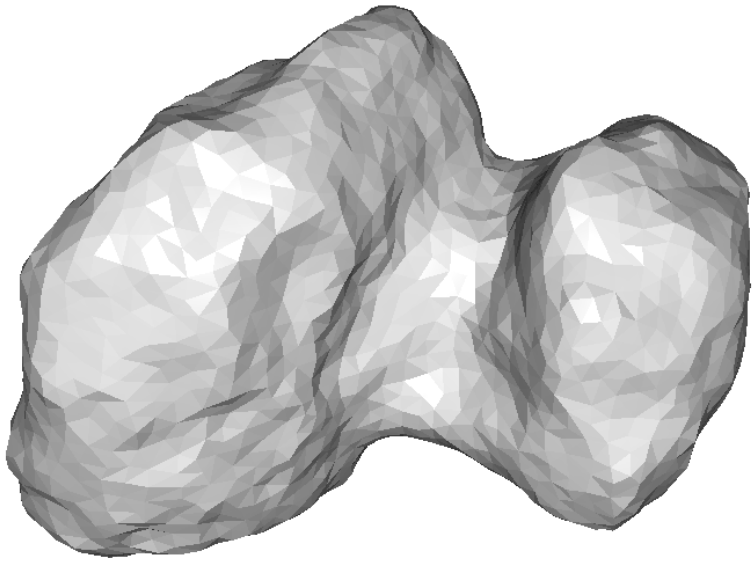
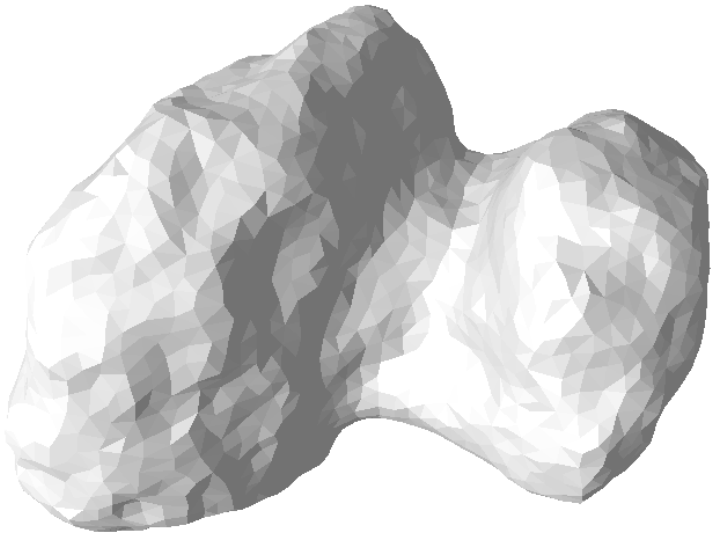


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

SPC images for different resolutions

$\rightarrow$ The images are consistent with the plate shape models.

view_cg_mspcd_shap2_391k_cart_xm.png

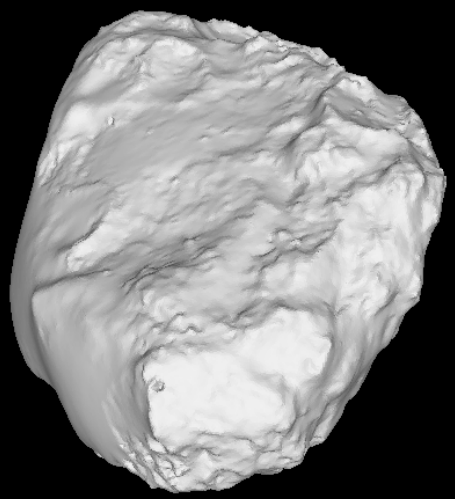
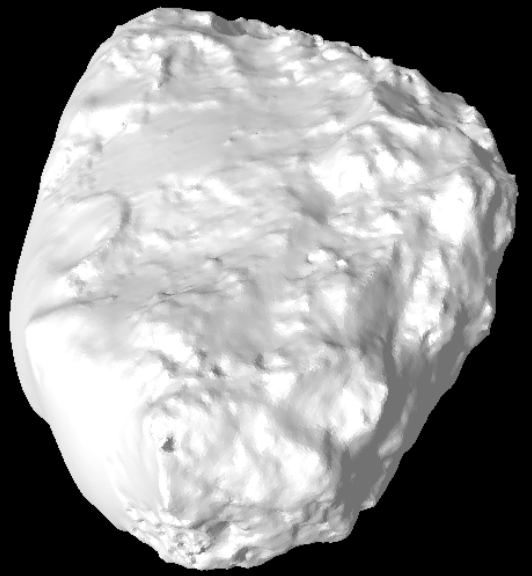


Image from data set



Rendered
Perspective projection
Distance 7.5 km
FOV 50°

view_cg_mspcd_shap2_391k_cart_xm.png

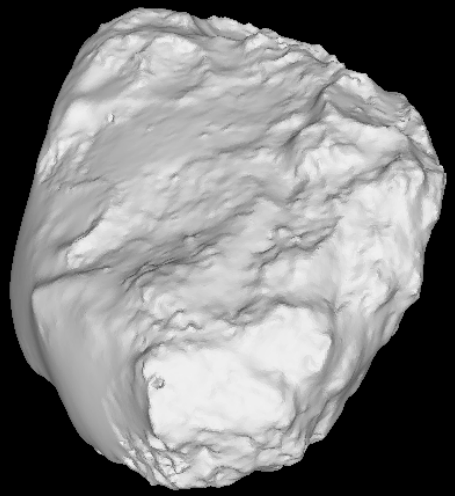
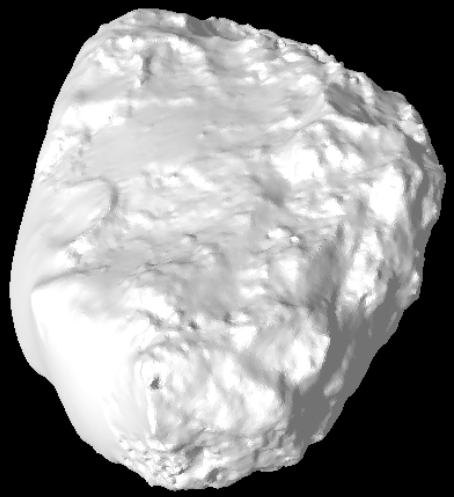


Image from data set



Rendered
Perspective projection
Distance 10 km
FOV 42.5°

view_cg_mspcd_shap2_391k_cart_xp.png

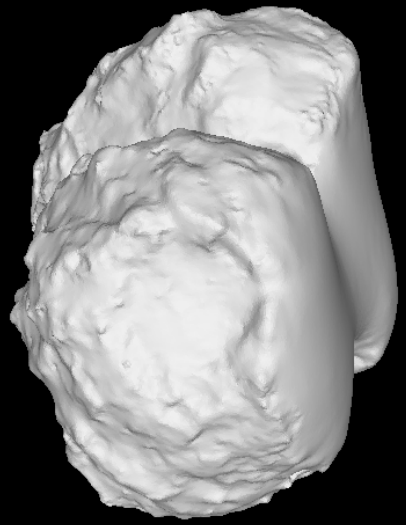


Image from data set

Rendered
Perspective projection
Distance 10 km
FOV 42.5°

view_cg_mspcd_shap2_391k_cart_ym.png

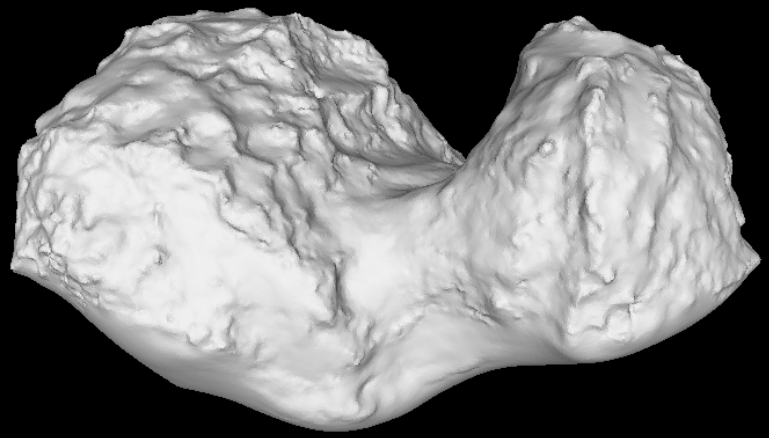
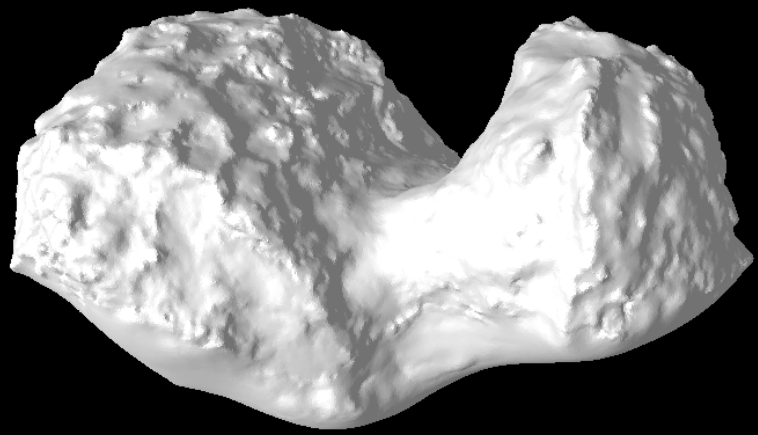


Image from data set



Rendered
Perspective projection
Distance 10 km
FOV 40°

view_cg_mspcd_shap2_391k_cart_yp.png

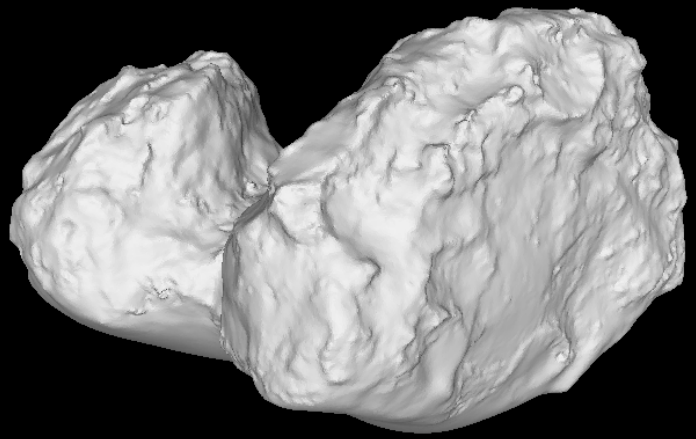
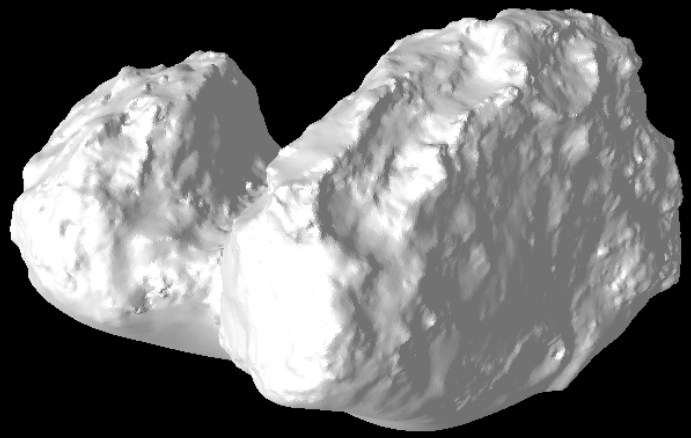


Image from data set



Rendered
Perspective projection
Distance 10 km
FOV 40°

view_cg_mspcd_shap2_391k_cart_zm.png

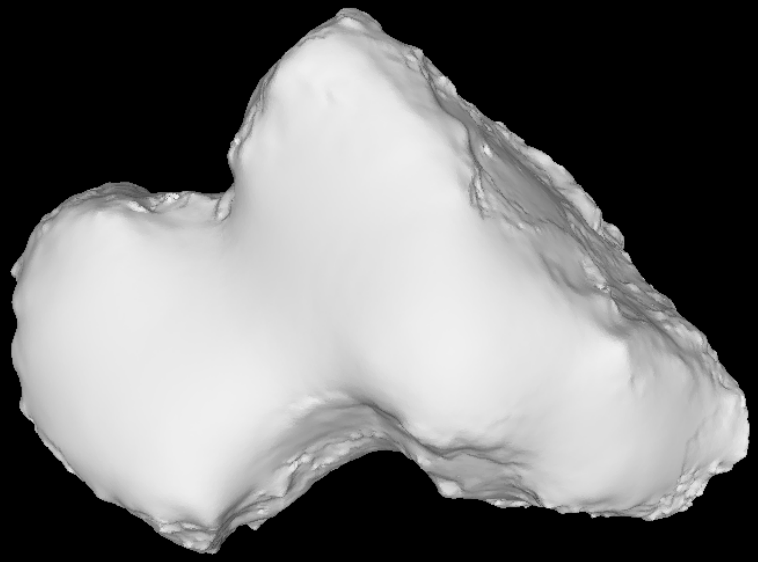


Image from data set

Rendered
Perspective projection
Distance 10 km
FOV 40°

view_cg_mspcd_shap2_391k_cart_zp.png

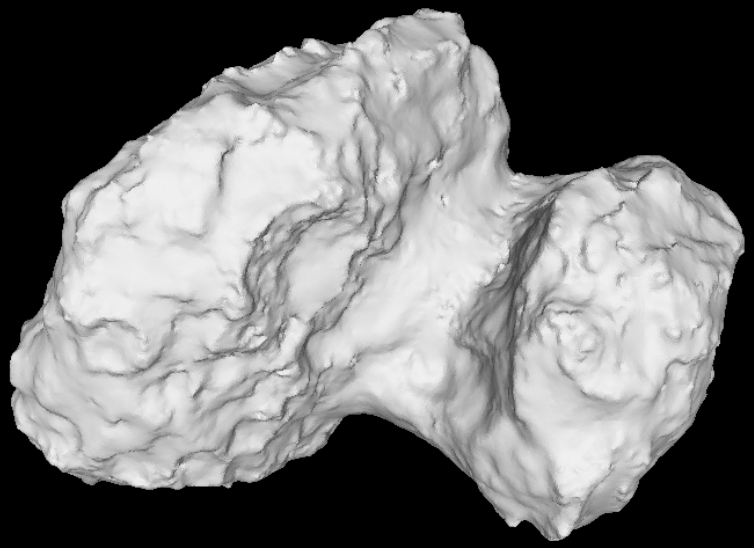
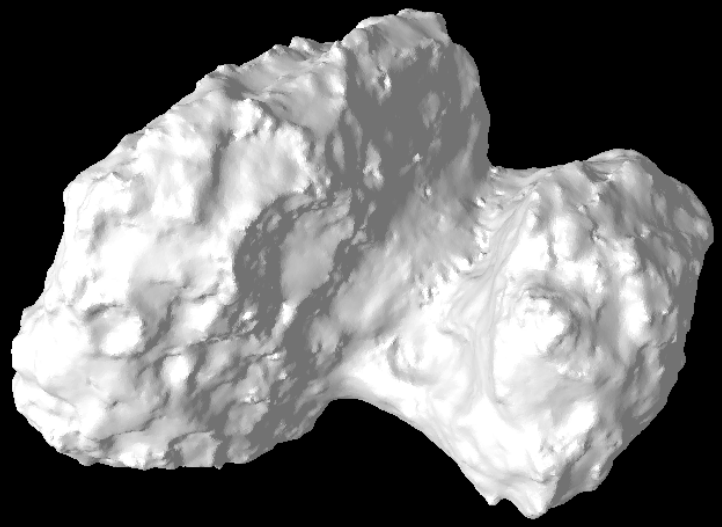


Image from data set



Rendered
Perspective projection
Distance 10 km
FOV 40°

MSPCD images for different viewing directions

$\rightarrow$ The images are consistent with the plate shape models.

view_cg_spc_shap2_399k_cart_xm.png

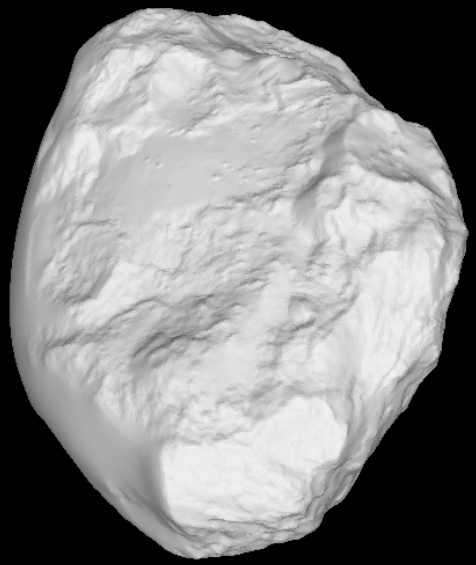
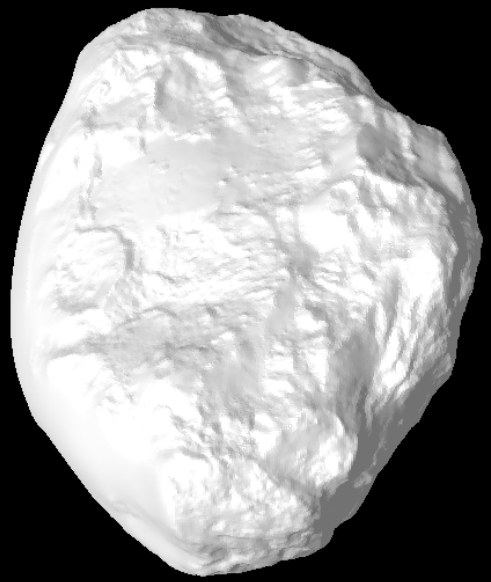


Image from data set



Rendered
Perspective projection
Distance 10 km
FOV 40°

view_cg_spc_shap2_399k_cart_xp.png

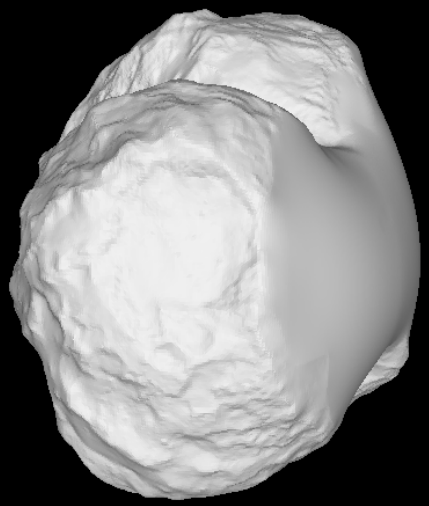
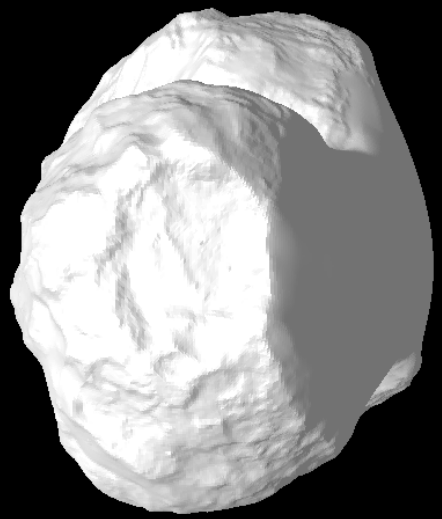


Image from data set



Rendered
Perspective projection
Distance 10 km
FOV 40°

view_cg_spc_shap2_399k_cart_ym.png

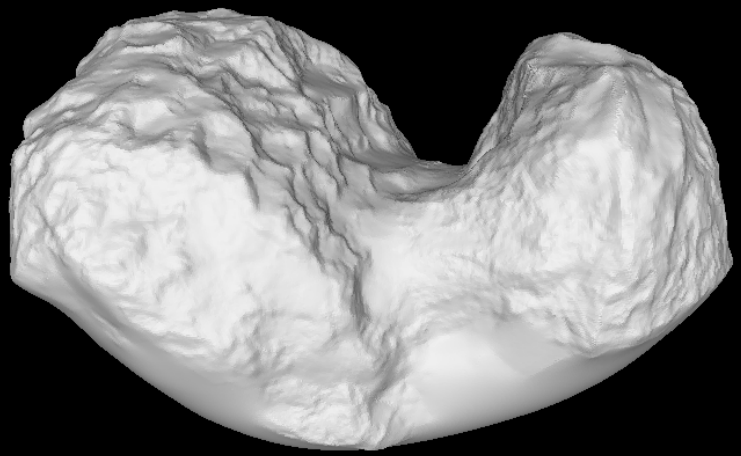
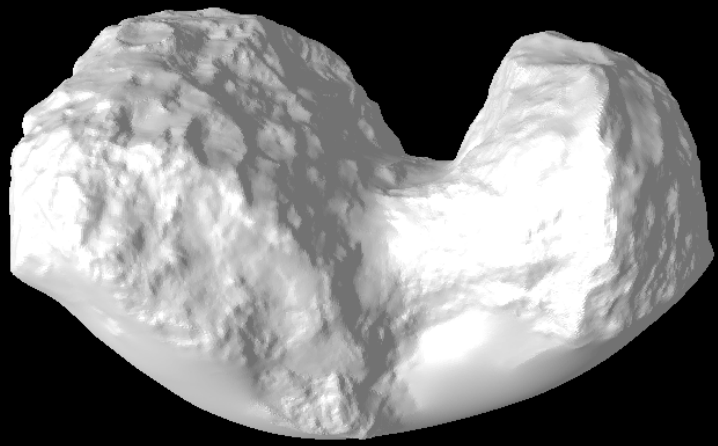


Image from data set



Rendered
Perspective projection
Distance 10 km
FOV 40°

view_cg_spc_shap2_399k_cart_yp.png

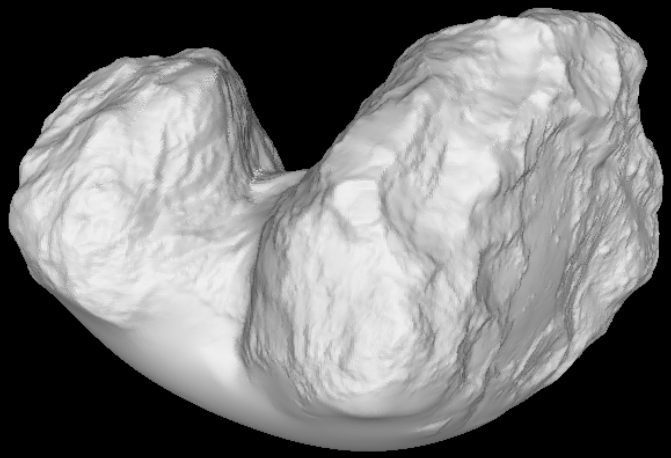
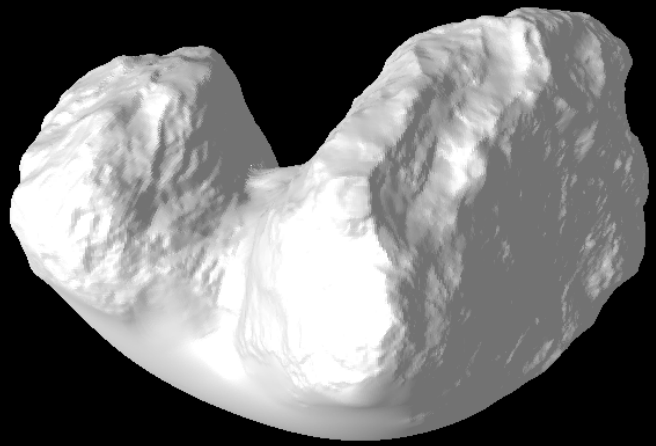


Image from data set



Rendered
Perspective projection
Distance 10 km
FOV 40°

view_cg_spc_shap2_399k_cart_zm.png

Image from data set

Rendered
Perspective projection
Distance 10 km
FOV 40°

view_cg_spc_shap2_399k_cart_zp.png

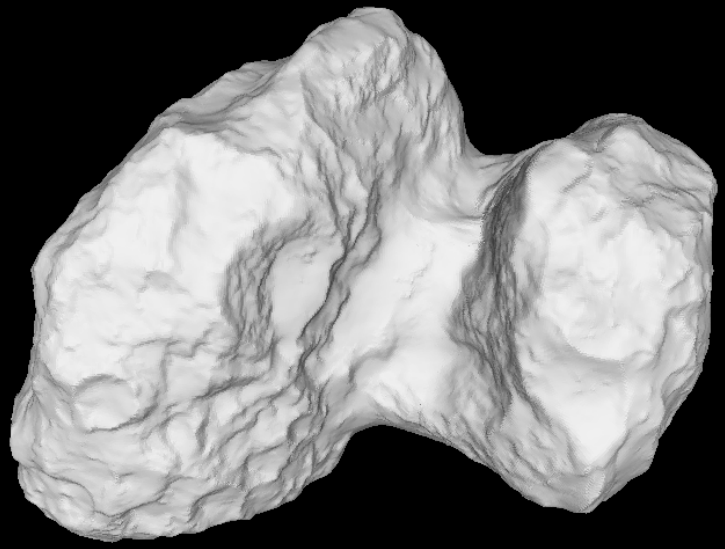
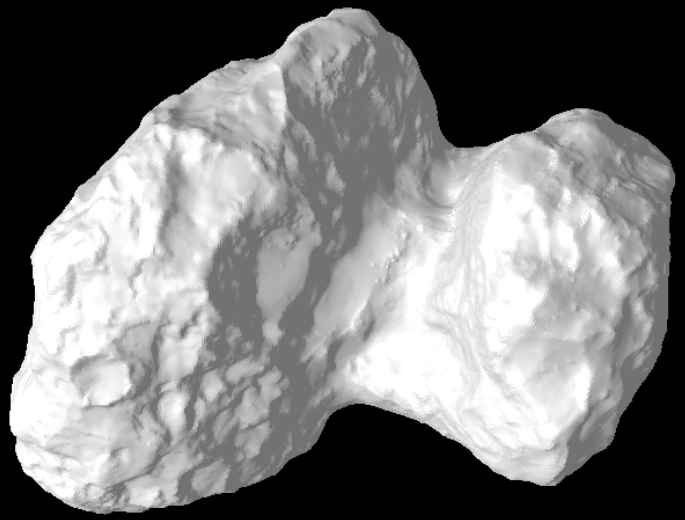


Image from data set



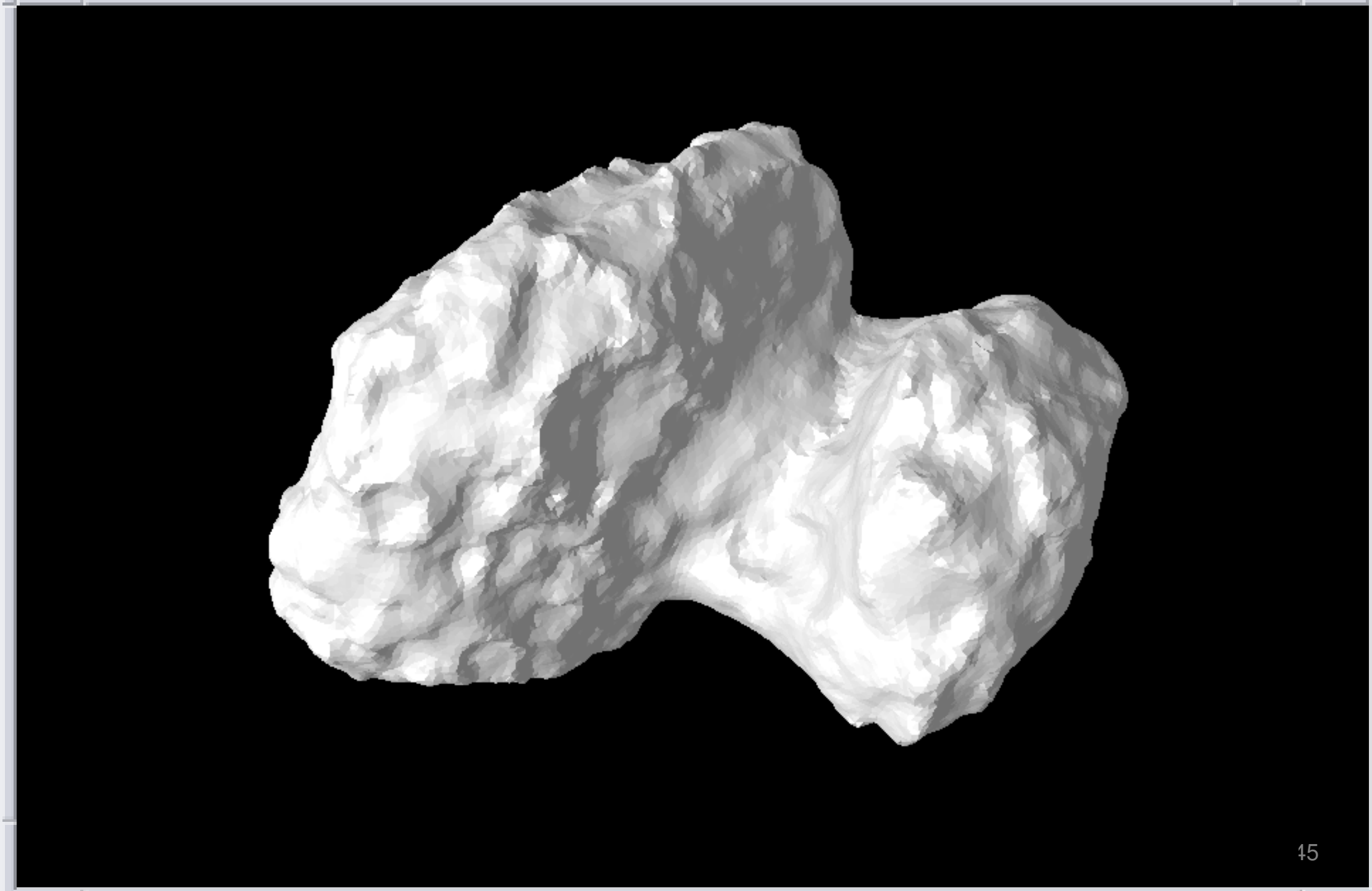
Rendered
Perspective projection
Distance 10 km
FOV 40°

SPC images for different viewing directions

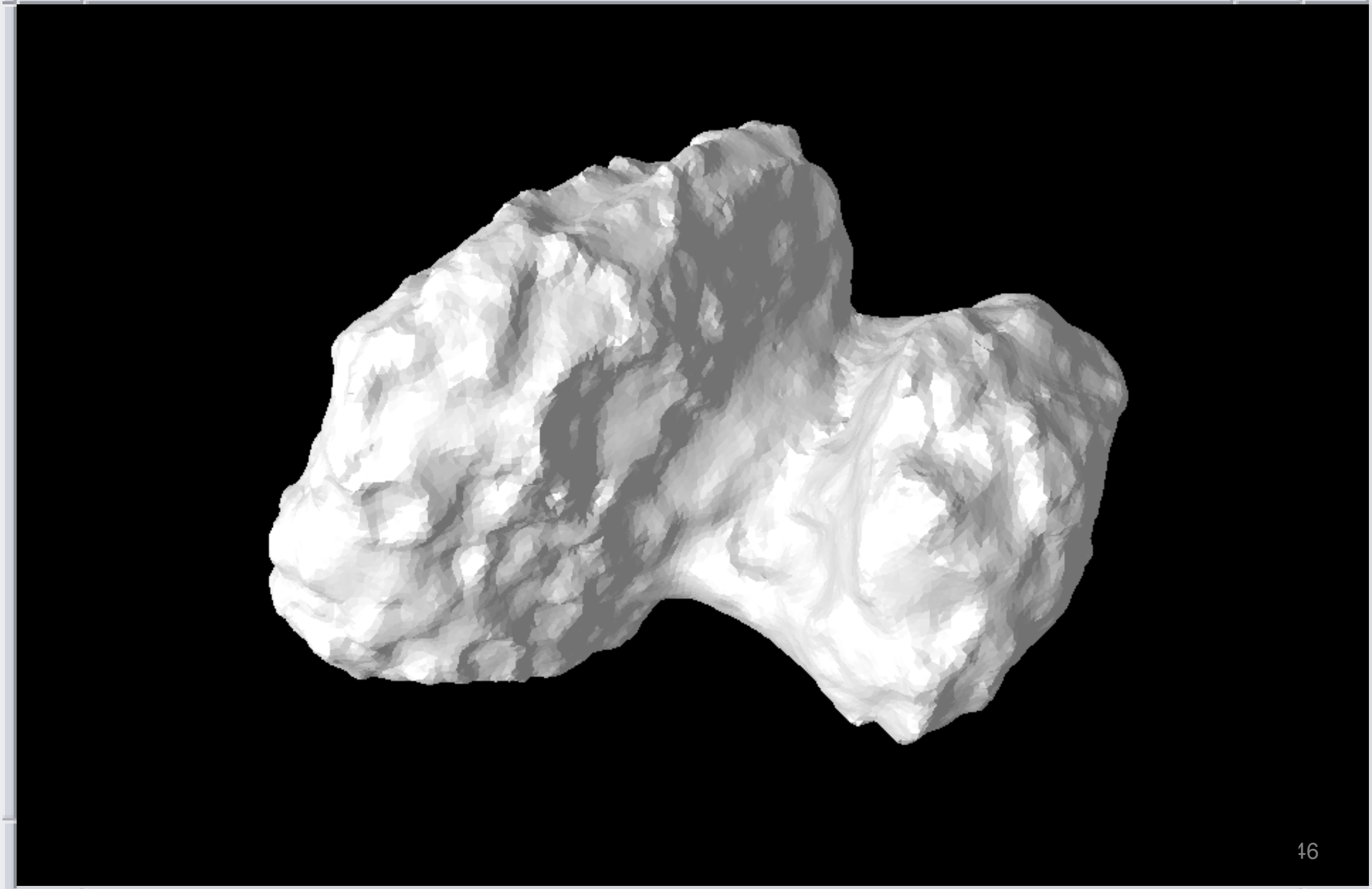
$\rightarrow$ The images are consistent with the plate shape models.

3
Consistency between plate shape models and DSKs

cg_mspcd_shap2_048k_cart.wrl



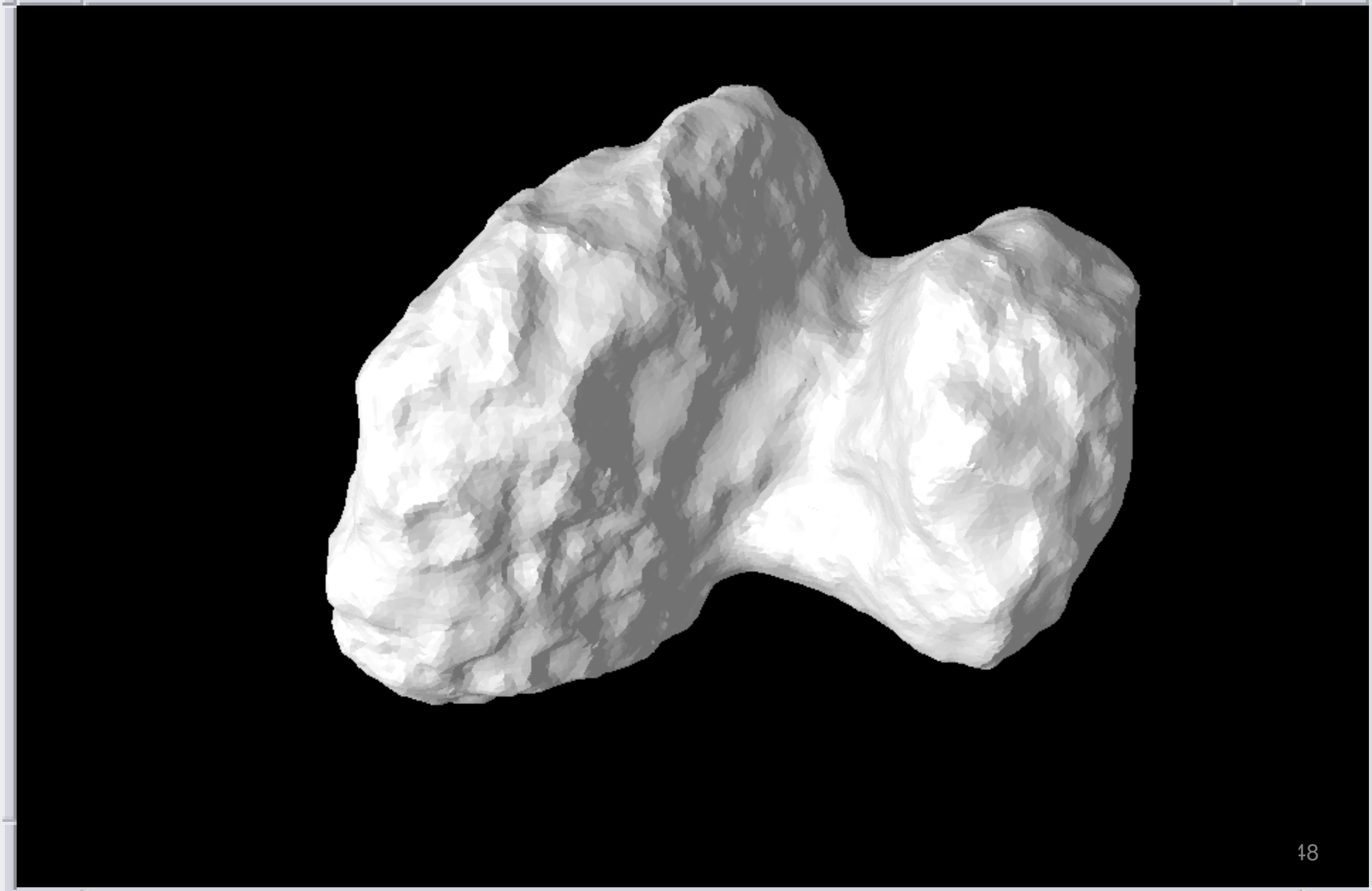
cg_mspcd_shap2_048k_cart_dsk.bds



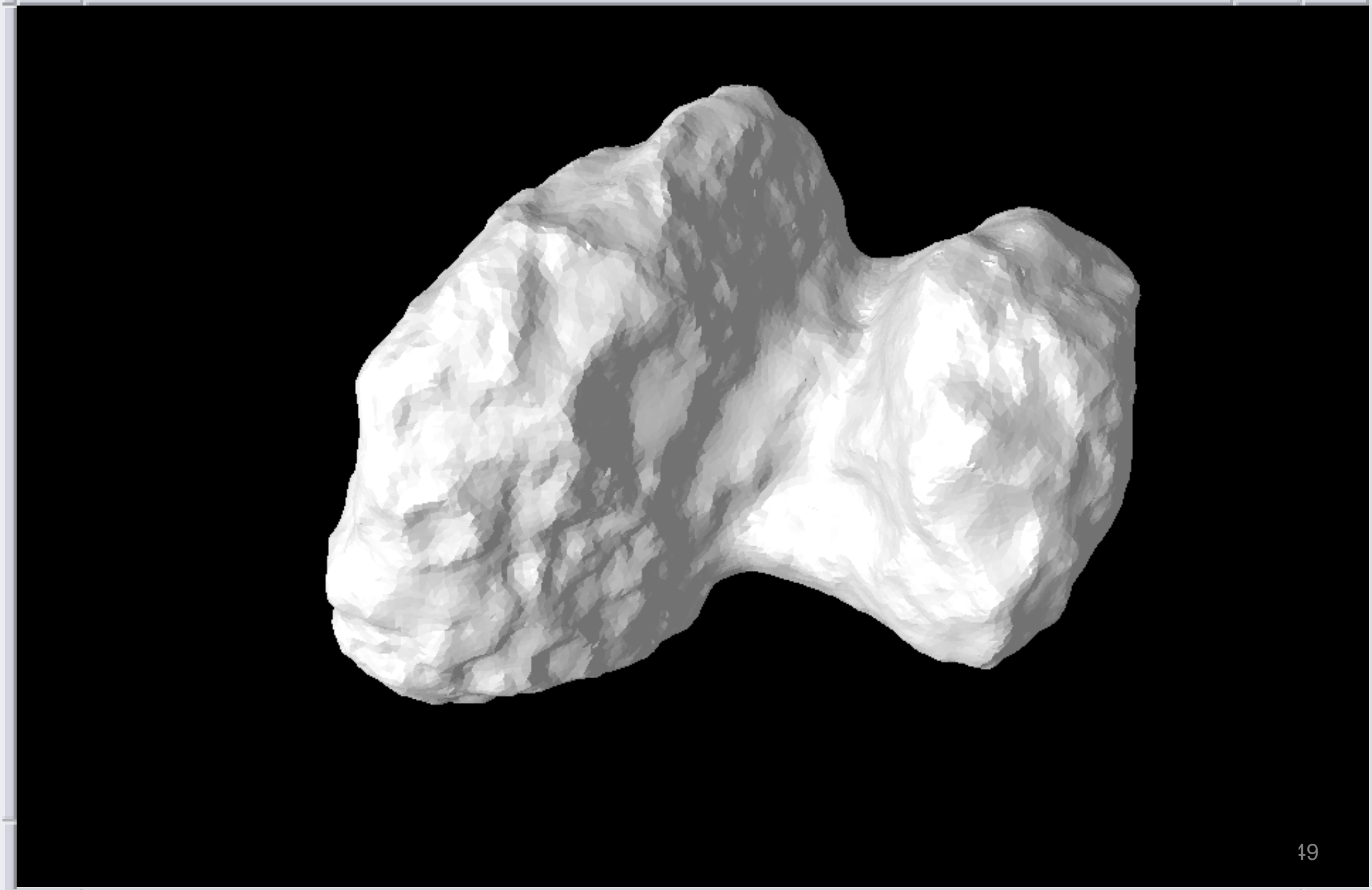
MSPCD plate models vs. DSKs

$\rightarrow$ The DSKs are consistent with the plate shape models (point check).

cg_spc_shap2_047k_cart.wrl



cg_spc_shap2_047k_cart_dsk.bds



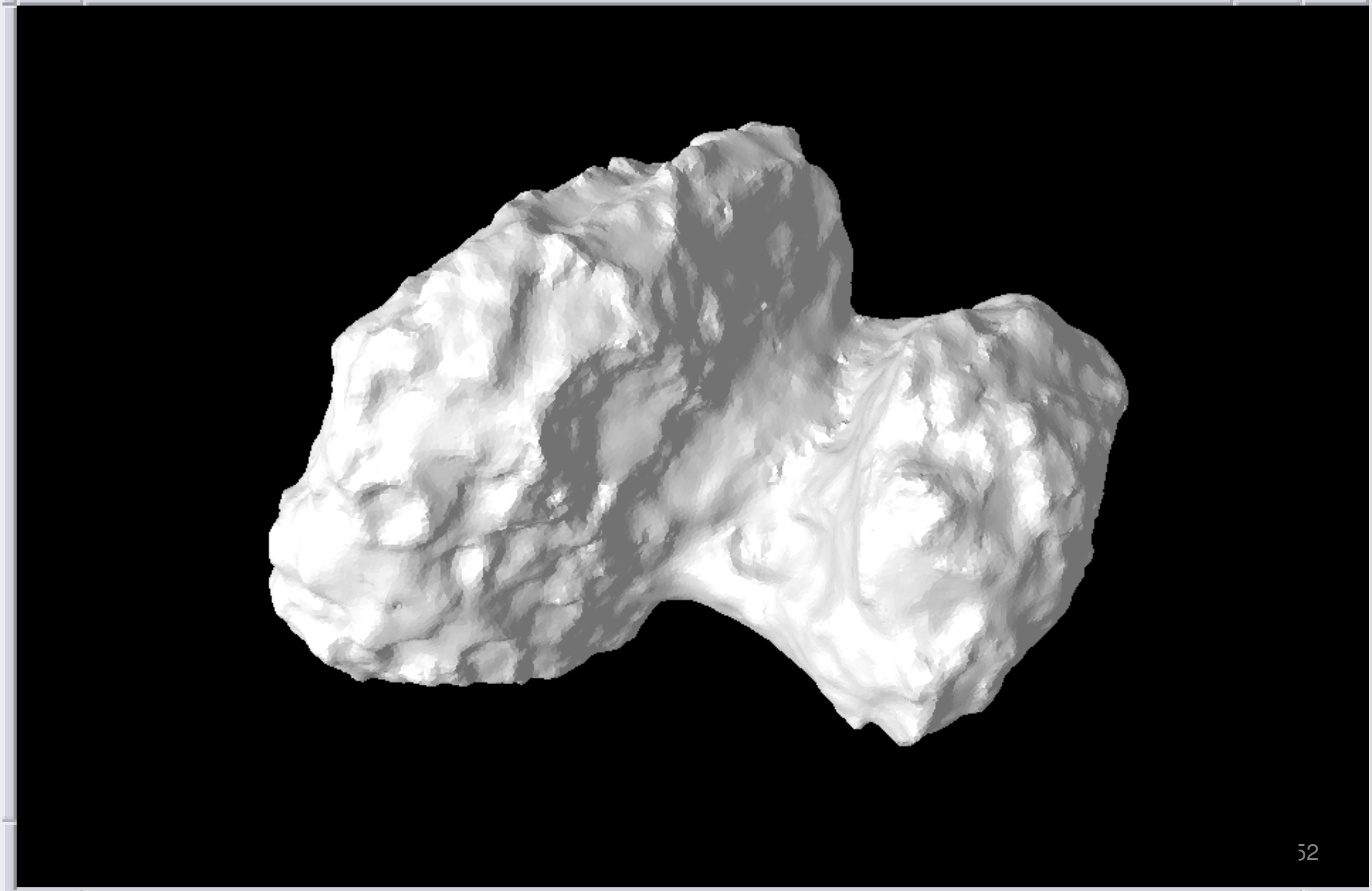
SPC plate models vs. DSKs

$\rightarrow$ The DSKs are consistent with the plate shape models (point check).

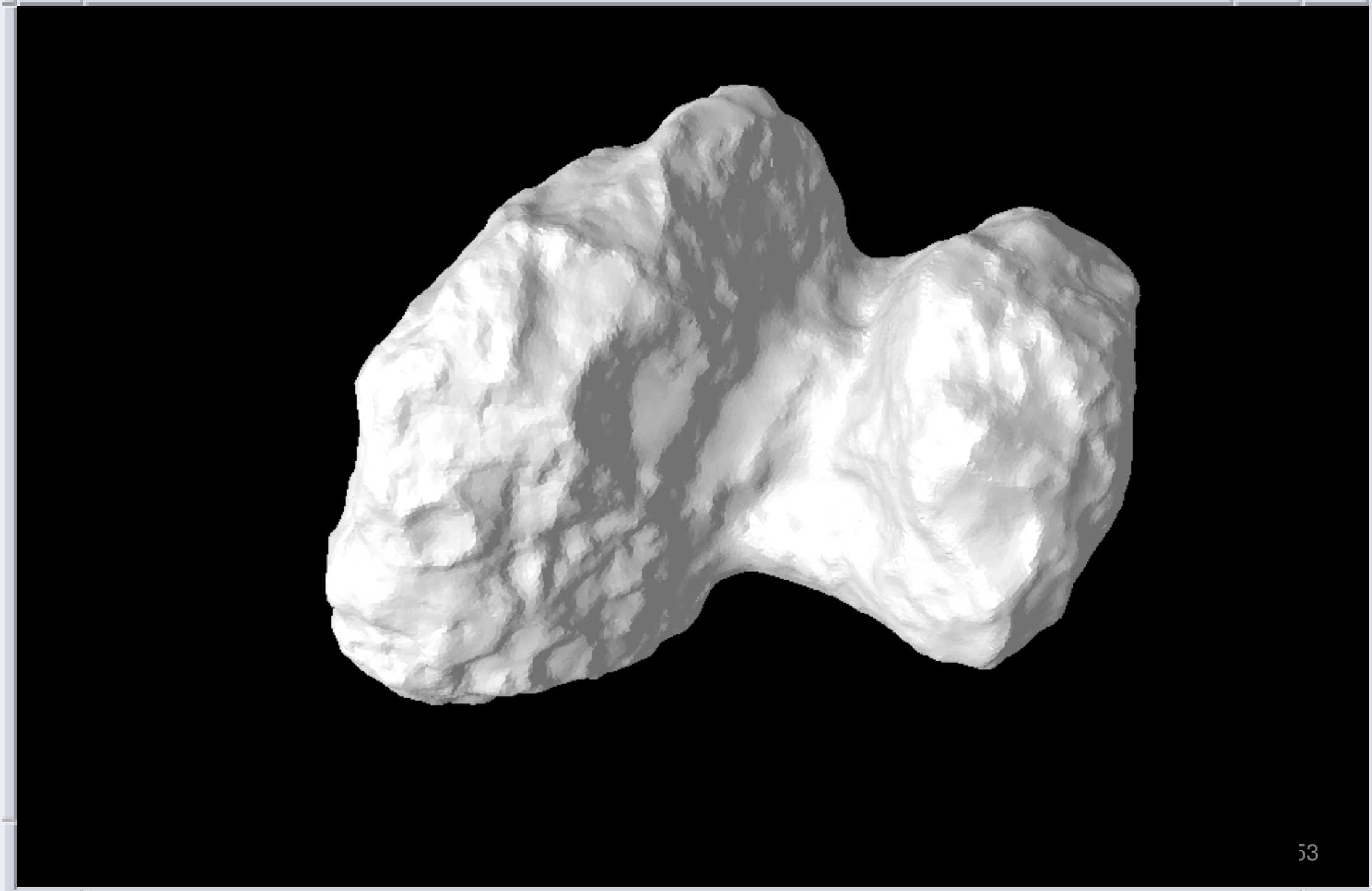
4

Consistency between the shape models from the two techniques and the MOC shape model

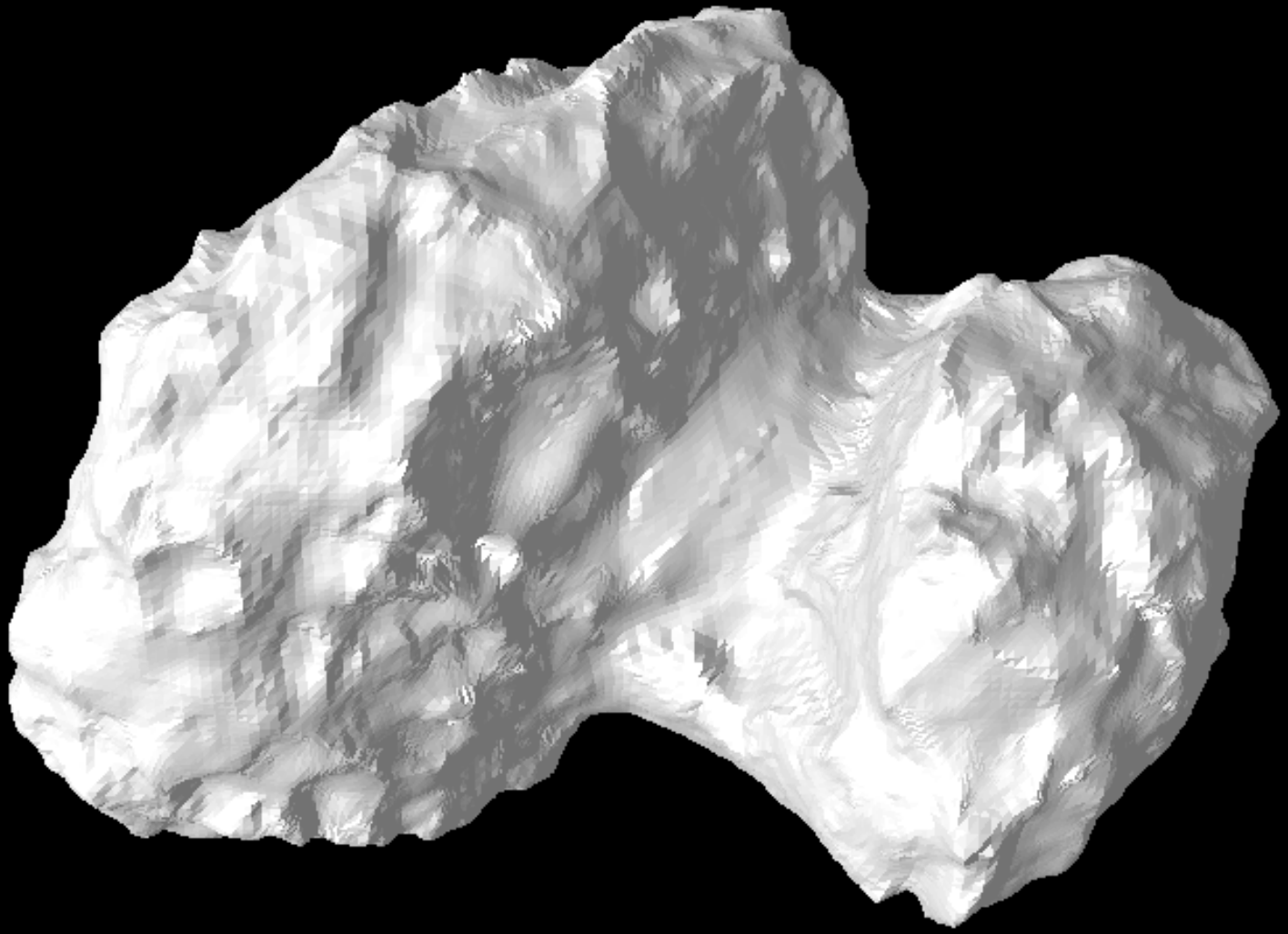
cg_mspcd_shap2_098k_cart.wrl



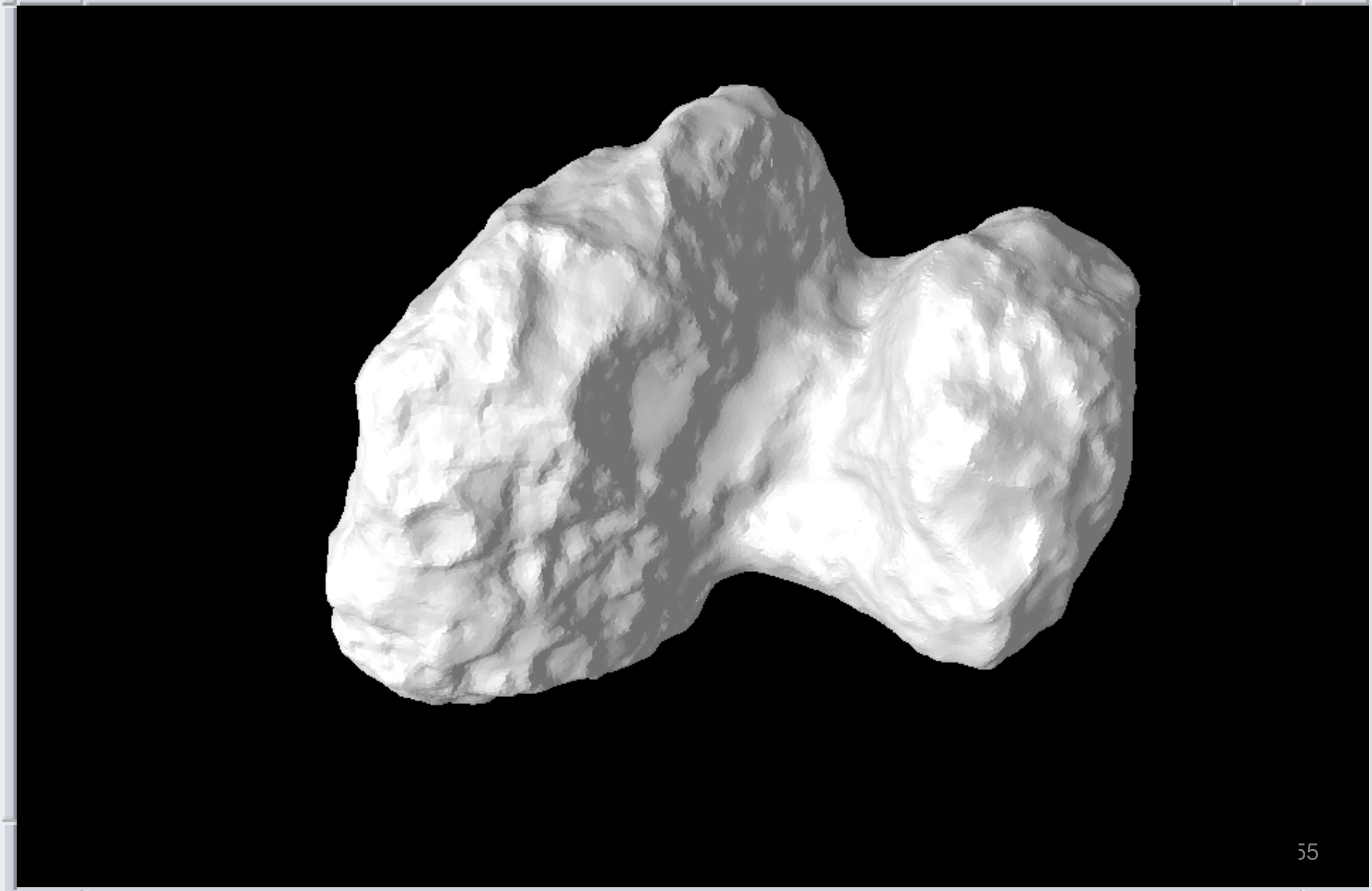
cg_spc_shap2_096k_cart.wrl



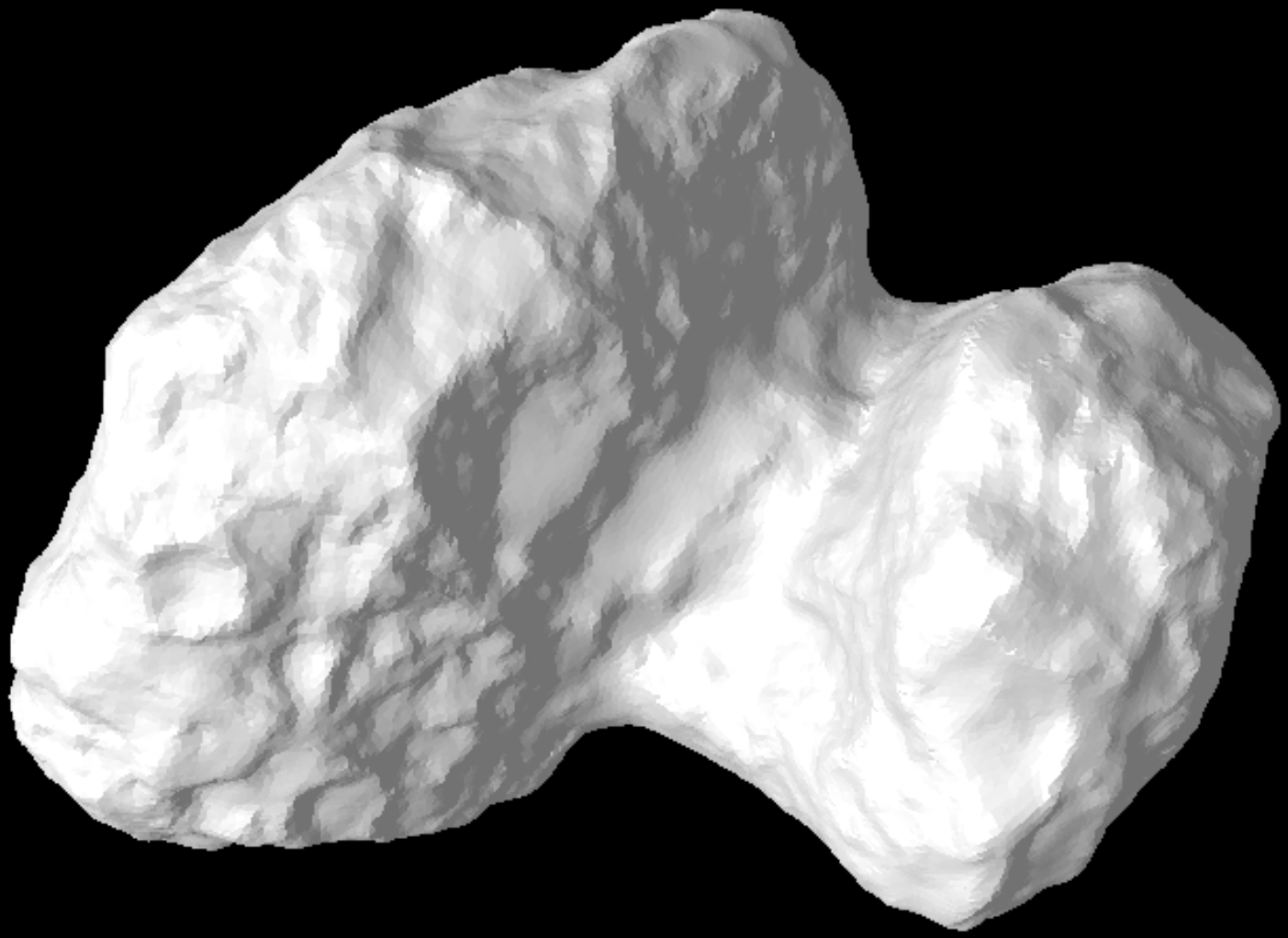
CSHP_DV_116_01_____00184.ROS



cg_spc_shap2_096k_cart.wrl

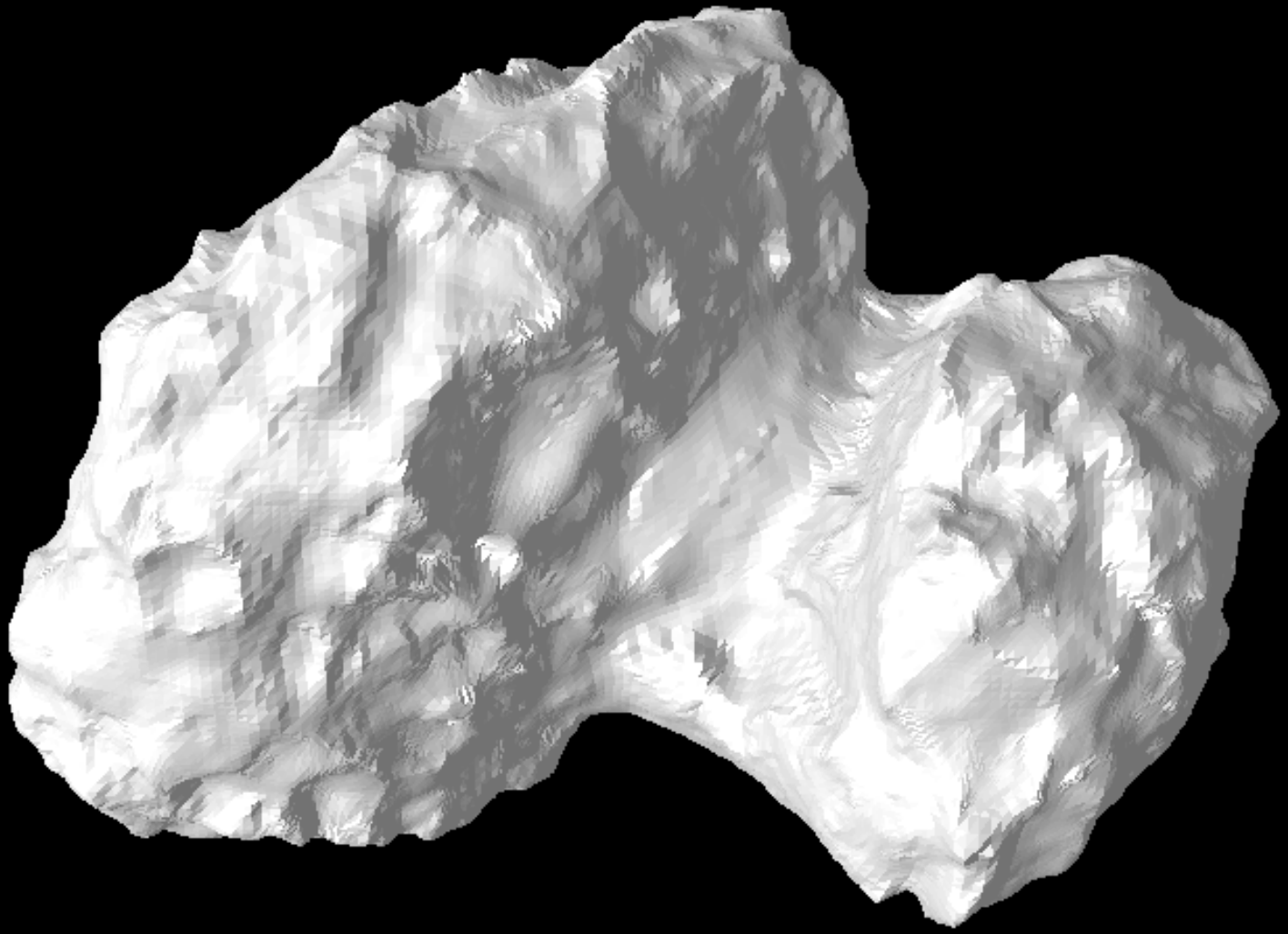


cg_spc_shap2_096k_cart.wrl

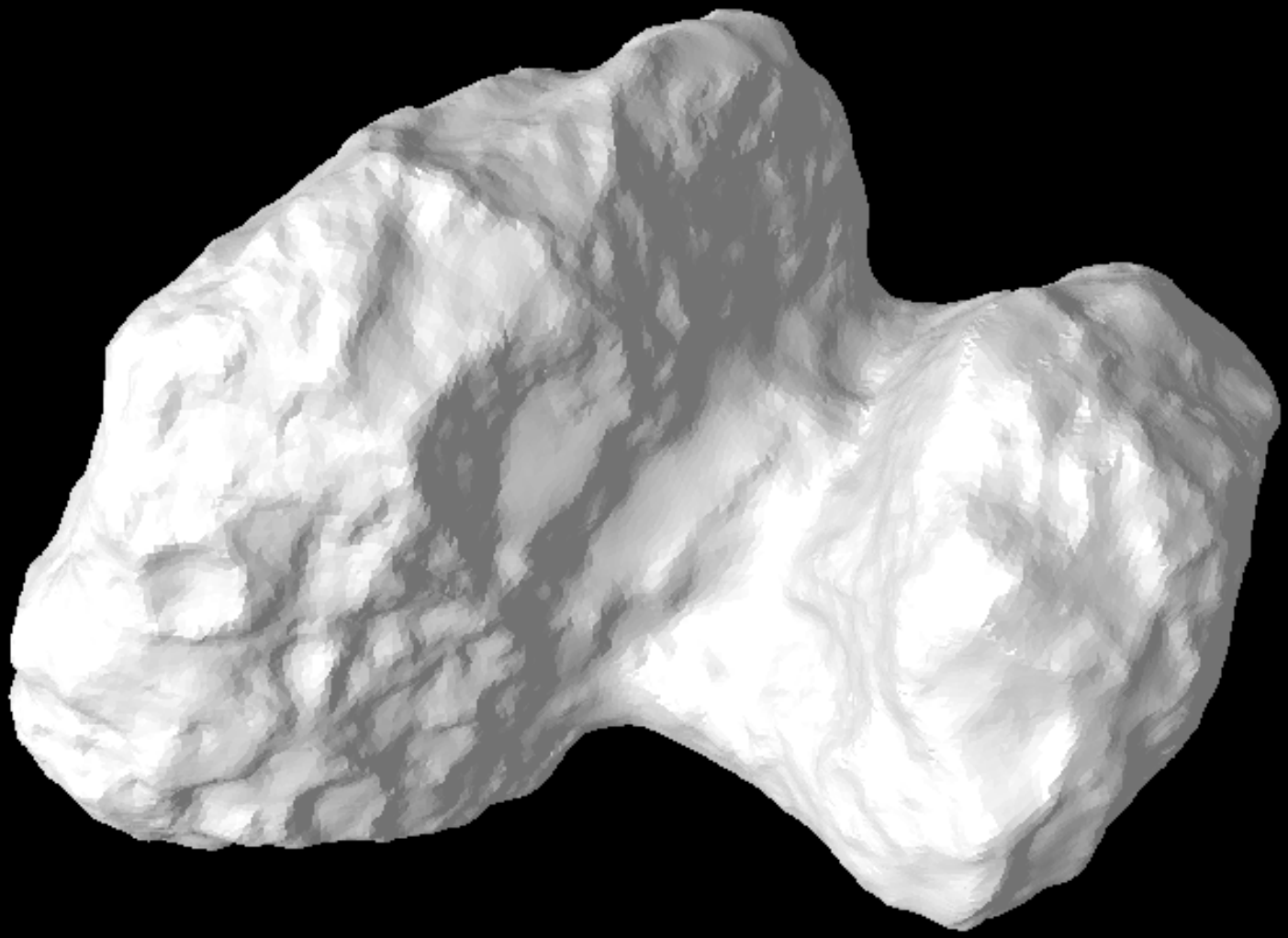


Rotated by 10°

CSHP_DV_116_01_____00184.ROS

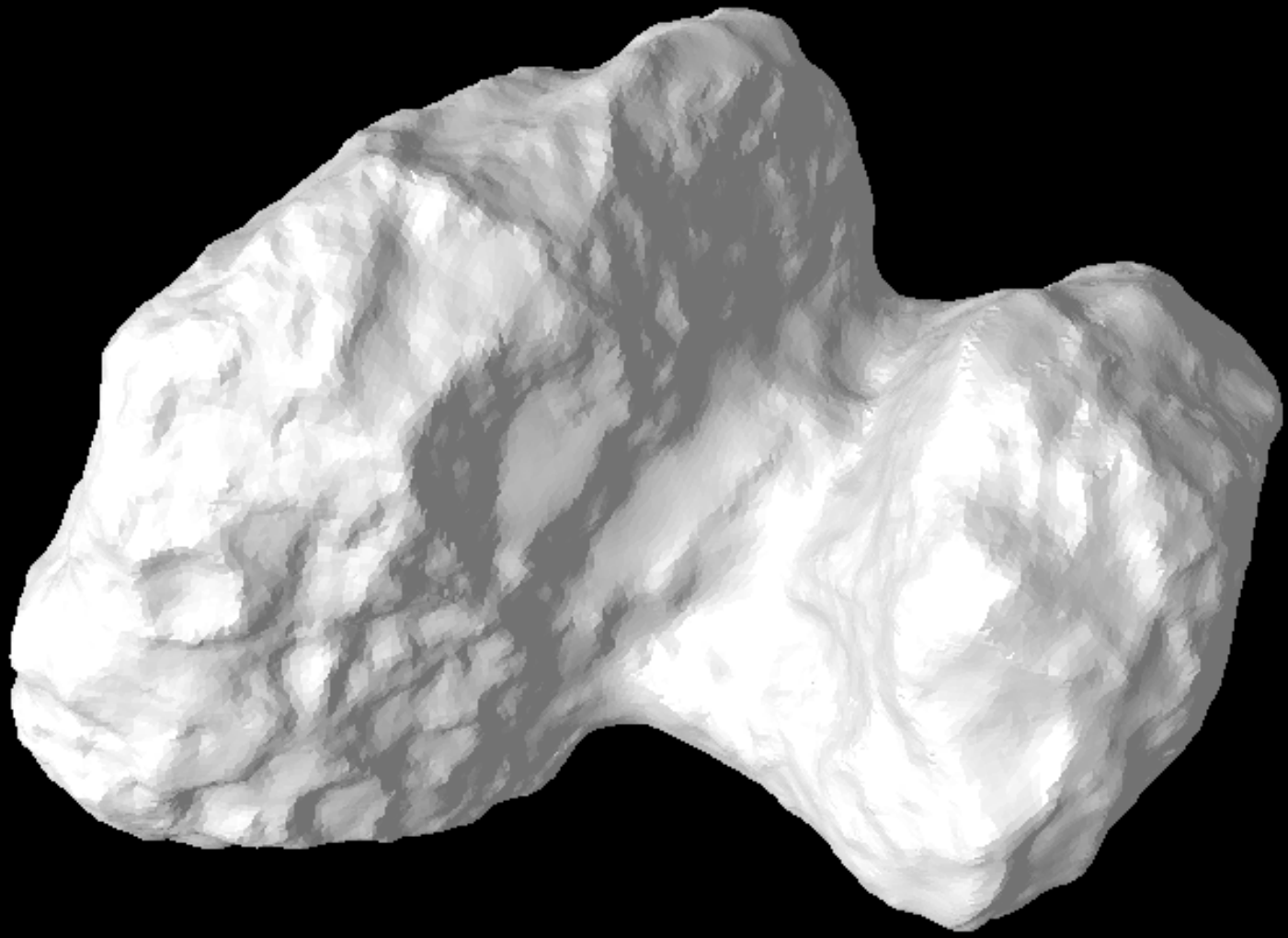


cg_spc_shap2_096k_cart.wrl



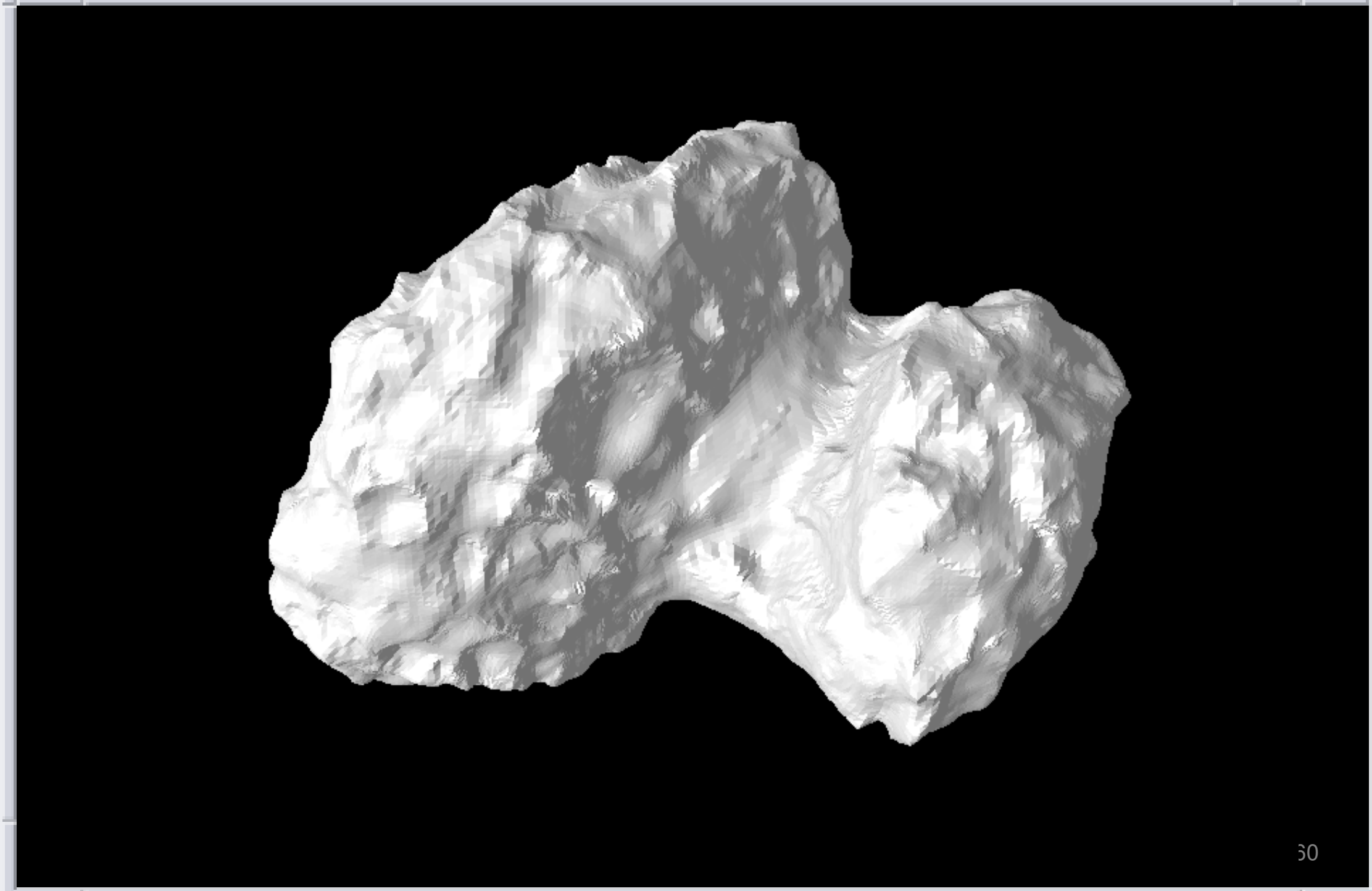
Rotated by 10°

cg_spc_shap2_096k_cart.wrl



Rotated by 10° and tranlated by –200 m in x and –150 m in y

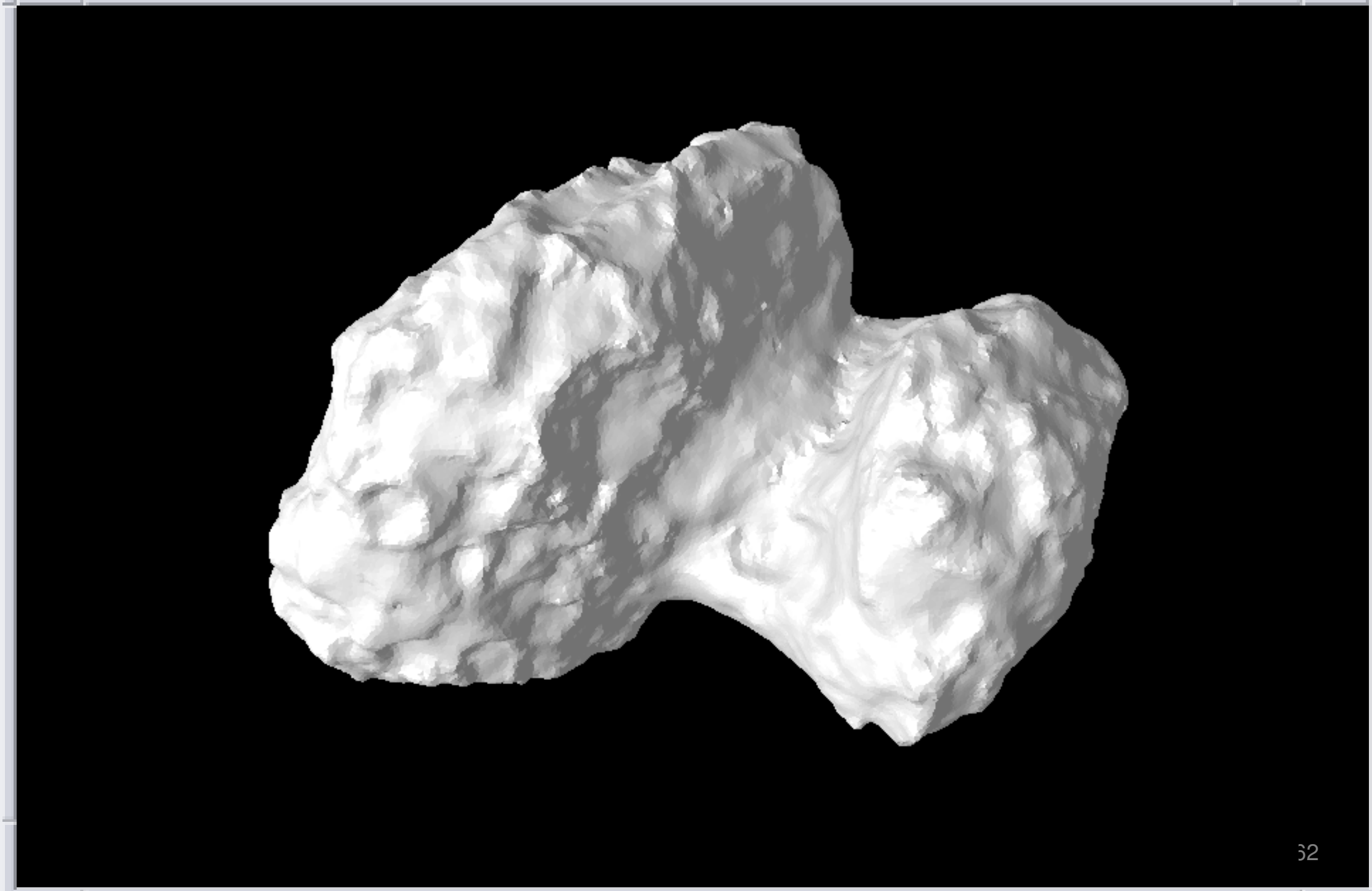
CSHP_DV_116_01_____00184.ROS



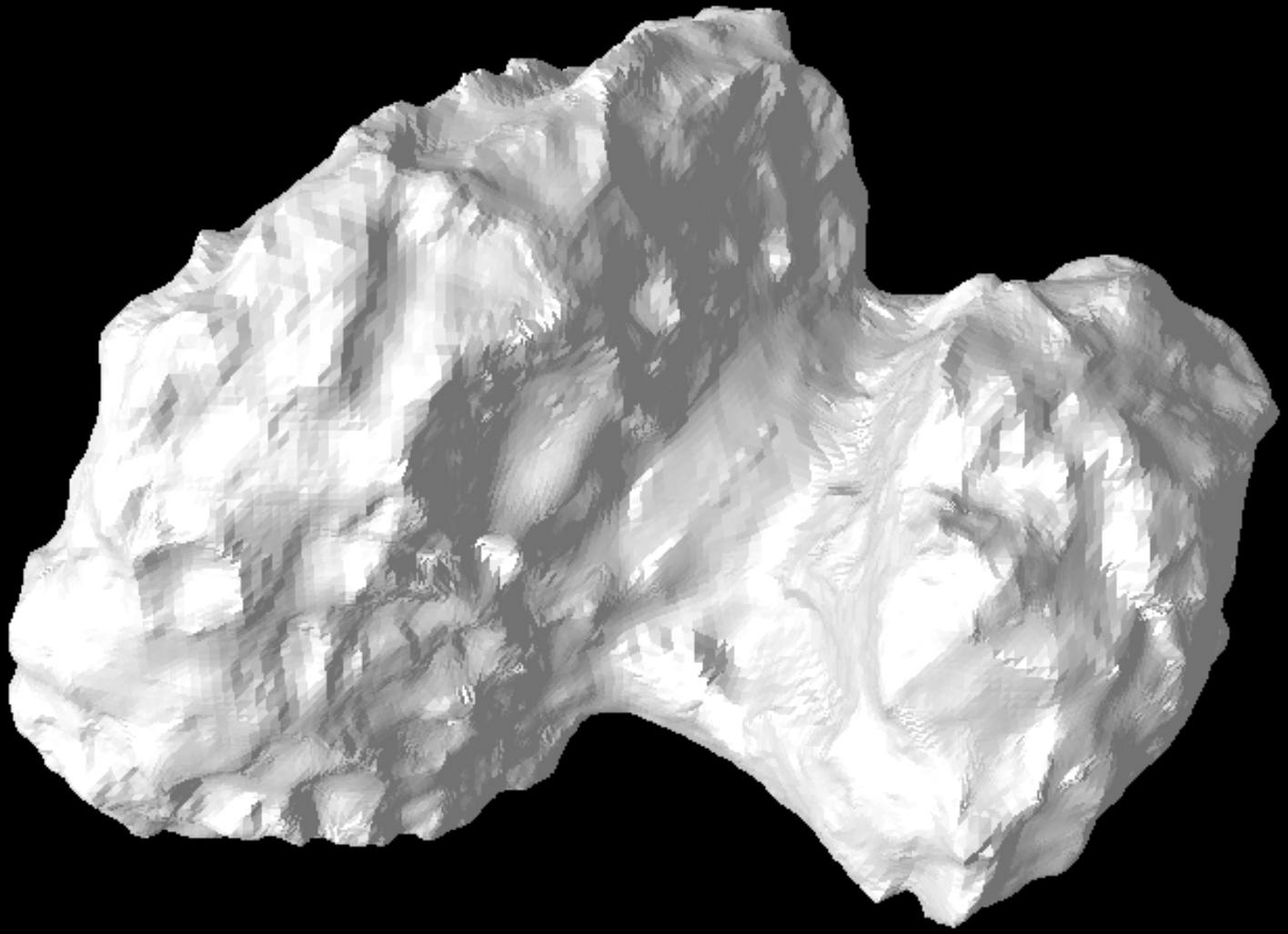
SPC vs. MOC shape model

→ The frame used for the shape model is off from the MOC frame (to which the Cheops frame is equivalent by definition) by 10° rotation and 250 m translation.

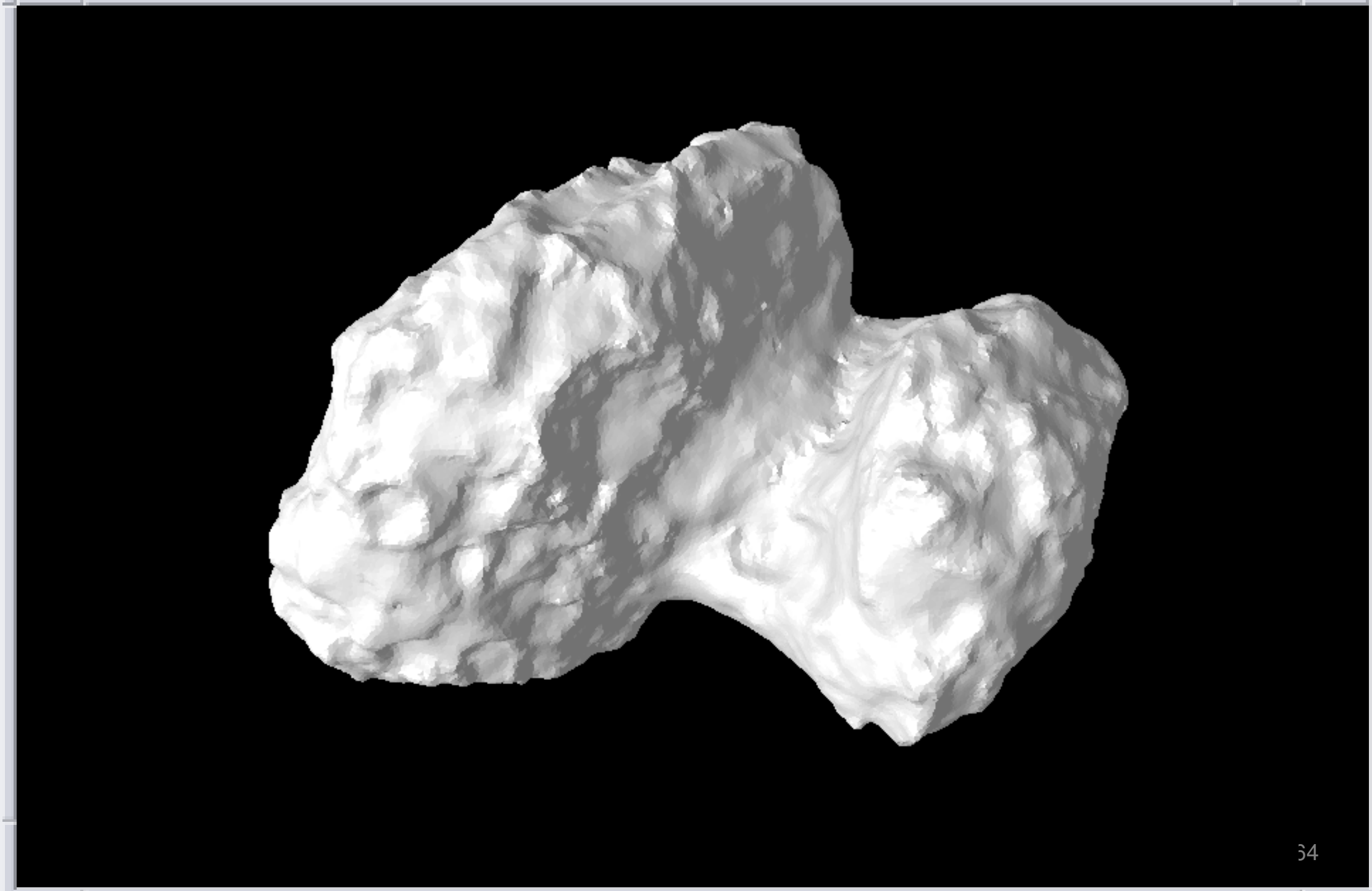
cg_mspcd_shap2_098k_cart.wrl



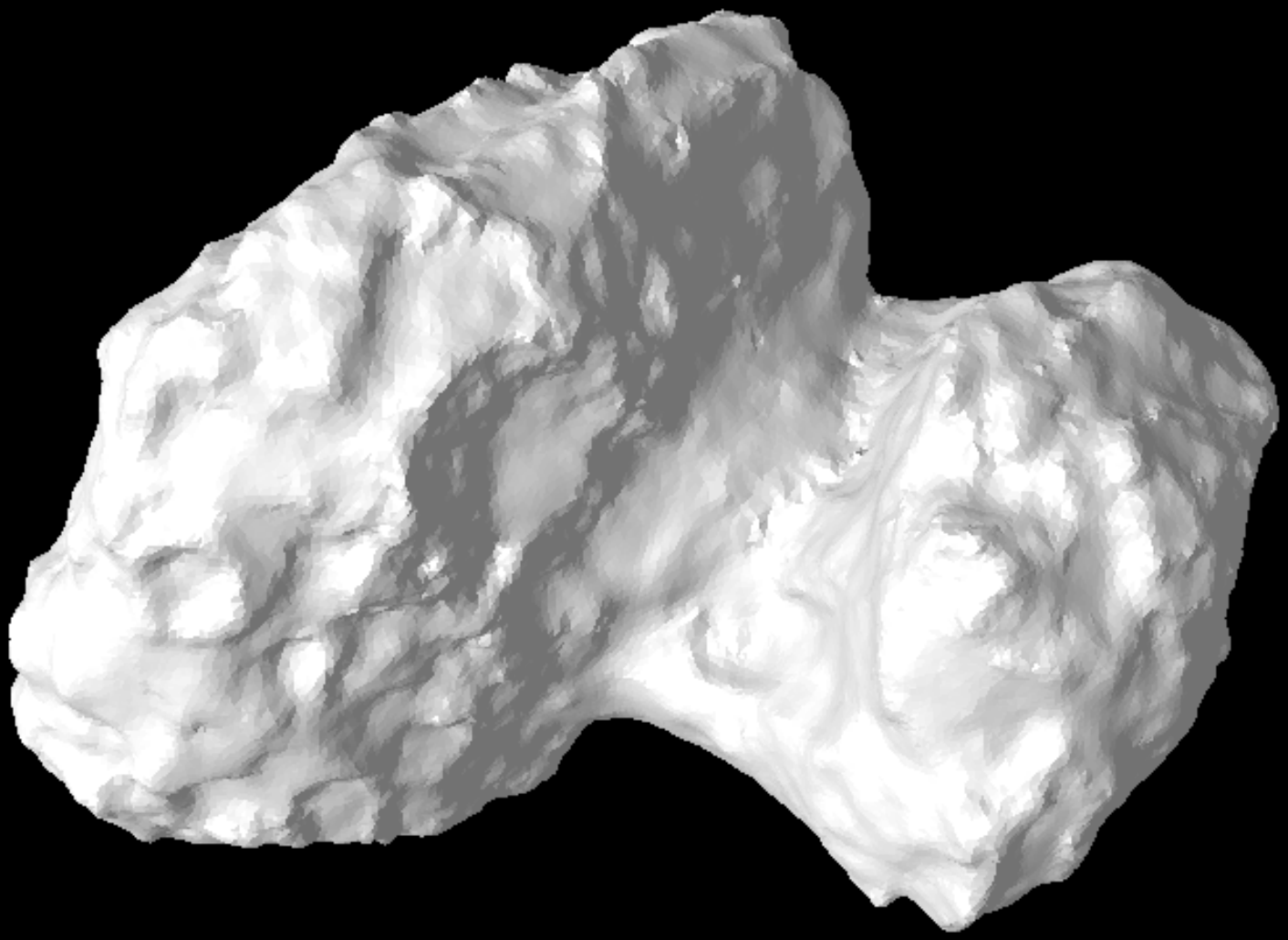
CSHP_DV_116_01_____00184.ROS



cg_mspcd_shap2_098k_cart.wrl

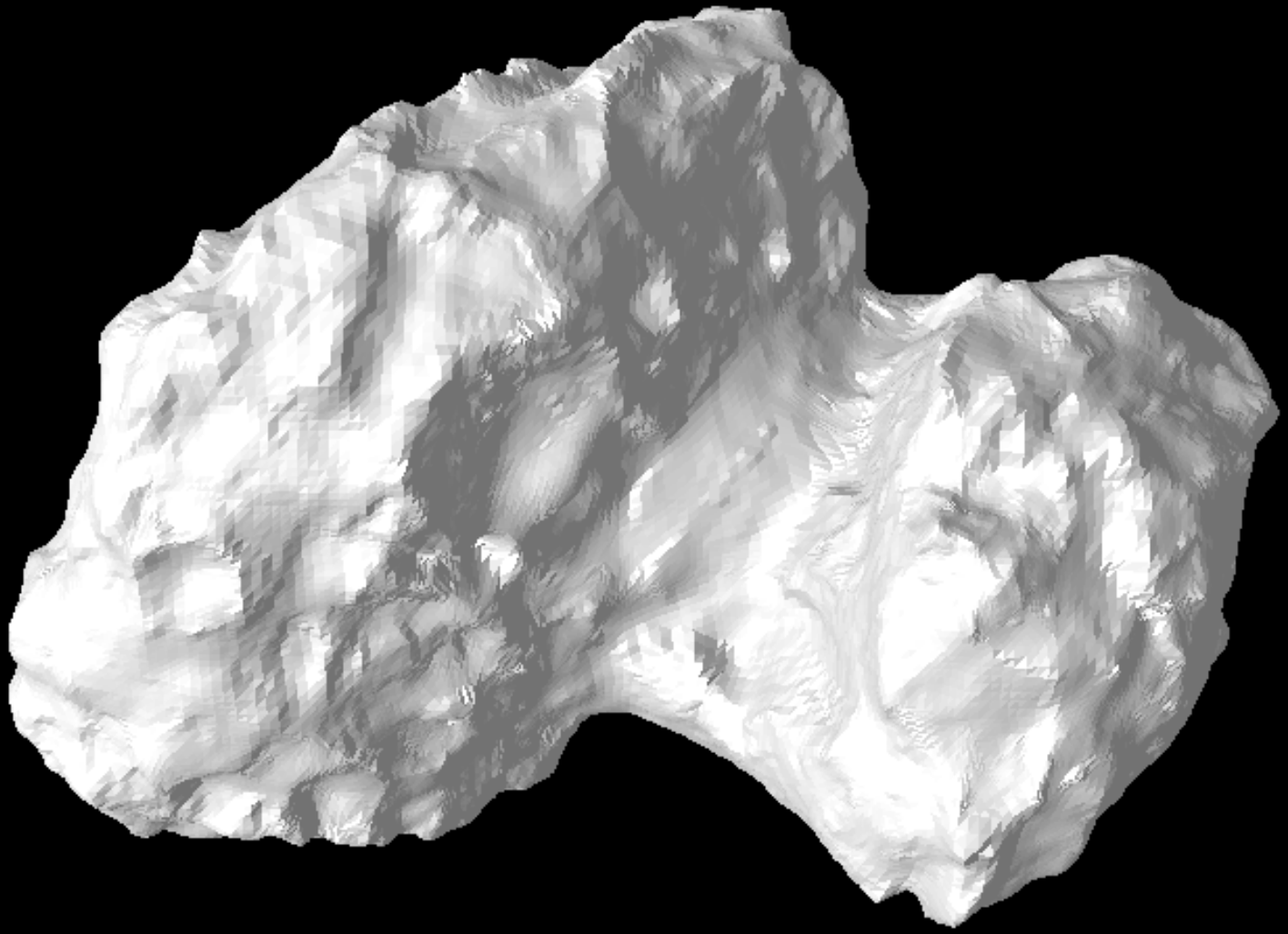


cg_mspcd_shap2_098k_cart.wrl



Rotated by 0.5° around x-, y-, and z-axis

CSHP_DV_116_01_____00184.ROS



MSPCD vs. MOC shape model

$\rightarrow$ The frame used for the shape model is off from the MOC frame (to which the Cheops frame is equivalent by definition) by $\sim 1^\circ$ rotation

Because the shape models from both techniques are not provided in the Cheops frame, a quantitative analysis of the shapes themselves is pending.

5
Efficiency of the DSKs

Computation times for one million intersections

	DSK created by			
# plates	MSPCD	SPC	ADCS	ROVIZ
∼50 k	45 s	44 s		37 s
∼100 k	49 s	46 s	61 s	
∼200 k	55 s			52 s

Quality of DSK auxiliary information

→ For the DSKs from both techniques, the efficiency is comparable to DSKs created by other tools.

Summary

1 Editorial comments

- Lower case filenames
- No mentioning of MOC shape models
- Very sparse description of techniques

2 Consistency between plate models and images

- For the rendered images, no camera parameters, surface model, or illumination information is provided.

√ For both techniques, all resolutions, and all viewing directions, the provided rendered imgages are consistent with the respective plate shape models.

3 Consistency between plate models and DSKs

- $\surd$ For both techniques, the DSKs are consistent with the plate shape models.

4 Consistency between the shape models

- × For both techniques, the shape models are not provided in the Cheops frame.
- Because of that, a quantitative analysis of the shapes themselves is pending.

5 Efficiency of the DSKs

- $\surd$ For the DSKs from both techniques, the efficiency is comparable to DSKs created by other tools.