

The projected texture is a set of overlapping digital topographic maps which partially tile the surface of the body. The slopes are obtained by the stereo-photoclinometry and then integrated to produce the elevation maps relative to a local coordinate system.

6. CONCLUSION

This paper gives an overview of the detail design and operation of the developed 3-D visualization software (SRM) intended to facilitate retrieving optimal digital terrain shape models for the irregular-shaped celestial bodies. A hybrid algorithm is employed and evaluated using a class of captured images provided by recent space missions. Future work is focused on improving the quality of reconstruction. Also much consideration is given to enhancing and developing more utility tools to provide a fully integrated toolkit applicable for retrieving models of forthcoming space observations.

ACKNOWLEDGEMENTS

The author would like to thank the OSIRIS team for providing some captured images of asteroids.

REFERENCES

- Hapke, B., 1981: Bidirectional Reflectance Spectroscopy, I - Theory, *Journal of Geophysical Research*, Vol. 86, No. B4, pp. 3039-3054.
- Horn, B.K.P., 1970: Shape from Shading: Obtaining the Shape of a Smooth Opaque Object from One View. PhD thesis, MIT.
- Kirk, R.L., 1987: A Fast Finite-Element Algorithm for Two Dimensional Photoclinometry. Ph.D.Thesis, California Institute of Technology. pp. 165-258.
- Lohse, V., Heipke, C. 2003: Derivation of digital terrain models by means of multi-image shape-from-shading: results using Clementine images. In Heipke, C., Jacobsen, K., Schroeder, M. (Eds.): *High Resolution Mapping from Space 2003: Joint ISPRS/EARSeL Workshop*. (CD).
- McEwen, A.S., 1991: Photometric Functions for Photoclinometry and Other Applications. *Icarus* 92. pp. 298 - 311.
- Minnaert, M., 1941: The Reciprocity Principle in Lunar Photometry, *Astrophysical Journal*, Vol. 93, pp. 403-410.
- NAIF-JPL. The Planetary Science Division's Ancillary Information System. <http://naif.jpl.nasa.gov/>
- Oswald, M.R., Töppe, E., Kolev, K., Cremers, D., 2009: Non-parametric Single View Reconstruction of Curved Objects Using Convex Optimization. In: Denzler, J., Notni, G., Süße, H. (Eds.): *Pattern Recognition. Lecture Notes In Computer Science* Vol. 5748, pp. 171-180, *Proceedings of the 31st DAGM Symposium*, Jena.
- Russel, C.T., Raymond C.A., Fraschetti T.C., Rayman M.D., Polansky C.A., Schimmels K.A., and Joy, S.P., 2005: Dawn Mission and Operations. *Proceedings of the International Astronomical Union*, Cambridge University Press, 1: pp.97-119.
- Seidelmann, P.K. et al., 2002: Report of the IAU/IAG Working Group on Cartographic Coordinates and Rotational Elements of the Planets and Satellites: *Celestial Mechanics and Dynamical Astronomy*, Vol. 82, pp. 83-110.
- Simonelli, D.P., Kay J., Adinolfi D., Veverka J., Thomas P.C., Helfenstein P., 1999: Phoebe: Albedo Map and Photometric Properties, *Icarus*, Vol. 138, pp. 249-258
- Thibault, D., Gold, C.M., 2000: Terrain Reconstruction from Contours by Skeleton Construction, *Geoinformatica*. Vol. 4, Issue 4, pp. 49 - 373.