

## **Evaluating the effect of atmospheric gravity and annual gravity field variation on Lageos orbits**

*Ramesh Govind, Geoscience Australia, Canberra, Australia.*

*Frank Lemoine, Goddard Space Flight Centre, Greenbelt, Maryland, USA.*

*Nikita Zelensky, SGT, Inc., Greenbelt Maryland, USA.*

As contribution to the ILRS AWG activities, Lageos solutions were submitted from the beginning of 1983 to August 2007 were processed using version Geodyn0401 and following the ILRS AWG recommended computation standards. The seven-day arc solutions were based on the GGM02S earth gravity field and the respective time varying gravity coefficients for degree 2, 3 and 4 zonals, C21 and S21. The GOT99 Ocean tide model was used for both the dynamic potential and ocean loading site deformation. The standard geodetic and orbit parameters were estimated. The Lageos data for the period beginning 2002 to mid 2007 was reprocessed using version Geodyn0511. The reprocessing was a full implementation of the IERS2003 standards for earth tides, ocean tides and earth orientation parameters and the inclusion of gravitational potential of the earth's atmosphere and the annual variation of the earth's gravity field. This provided the opportunity to evaluate the effects of these new components to the processing on the Lageos orbit and the estimates of the geodetic parameters. The results are presented as a comparison of the RMS of the orbit fits between the individual cases for each seven-day arc and an orbit spectral analysis over the period of the recomputation.