Report of the
The GGOS Satellite Mission Working Group

Submitted to the GGOS EC

March 29, 2009

C. Shum & Other GGOS SMWG Members

The GGOS Satellite Mission Working Group efforts are just underway as the Working Group was formalized to be established during the GGOS EC meeting in San Francisco, CA, December 2008. Since then, we have solicited selected colleagues to become members of the Working Group and currently have the following list of confirmed members:

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The Working Group has supported Isabelle Panet/IGN and Richard Biancale/GRGS et al. for a CNES simulation study for the feasibility of the Gravity Recovery and Climate Experiment (GRACE) Follow-on Satellite Mission. The support letter (attached) was submitted also formerly by IAG (M. Sideries), to Steven Hosford, CNES/DSP on February 6, 2009.

The Working Group jointly submitted an invited abstract to the IAG Symposia, Geodesy for Planet Earth, IAG, Buenos Aires, August 31– September 4, 2009,

http://www.iag2009.com.ar/, Sub-Session 7.1: *Past Progress and Future Plans*, Session 7, *The Global Geodetic Observing System: Science and Applications* (Convenors: Richard Gross, Hans-Peter Plag, Luiz Paulo Fortes,). The title of the invited paper is: *Status and Prospects of the GGOS Satellite Mission Working Group,* by Shum et al.

INTERNATIONAL ASSOCIATION OF GEODESY

GLOBAL GEODETIC OBSERVING SYSTEM

February 6, 2009

Mr. Steven Hosford
CNES / DSP
18 avenue Edouard Belin
31401 Toulouse Cedex 9
France

Subject: Support letter for *The Gravity Recovery and Climate Experiment (GRACE) Follow-on Satellite Mission*

Dear Mr. Hosford:

We are writing to strongly support the effort towards successful launching of space mission constituting the Follow-on mission to the currently operating NASA/DLR Gravity Recovery and Climate Experiment (GRACE) twin-satellite mission. The Global Geodetic Observing System (GGOS, http://www.ggos.org) under the auspices of the International Association of Geodesy (IAG) supports scientific satellite missions such as GRACE and its follow-on missions to ensure a long-term and accurate measurement of Earth's temporal gravity field to address important scientific problems such as global climate-change and quantification of mass transport in Earth's water cycle.

Specifically, we are writing on behalf of the GGOS' *Space Missions Working Group* (http://www.iag-ggos.org/wgs/satellite_missions) to strongly support the effort to realize the GRACE Follow-on mission. The current GRACE mission has extended well beyond its 5-year mission lifetime and is projected to operate through 2010. It is critically important to ensure the continuation of the GRACE observations with scenarios of follow-on missions.

The GRACE satellites are undoubtedly one of the most outstanding Earth satellite missions with unprecedented technological and scientific achievements. Since the launch of the GRACE satellite in March 2002, GRACE has achieved so far a factor of 100 improvement in Earth's mean gravity field, making the spaceborne gravity sensor the most accurate ever to measure climate change signals. The GRACE data so far have enabled improved confirmation of the Lens-Thirring effect using satellite laser ranging (SLR) to the Lageos-1/-2 satellites; allowed the first discovery of an asteroid induced Permian-Triassic crater under the Antarctica ice sheets; estimation of recent rapid Greenland ice melt, estimates of Antarctic mass balance and Alaskan glacier melt; enabled studies of large river basin hydrologic fluxes; observed ocean tides

underneath Antarctic ice shelves and improved ocean tide modeling; quantified ocean bottom pressure waves in the tropical Pacific, Antarctic Circumpolar Current transport variability, and global ocean mass variability; study of global mass variations along with GPS; the discovery of multidomal ancient ice structures in Laurentia and provided new constraints on Glacial Isostatic Adjustment and mantle convection; and, for the first time, observed coseismic deformation associated with the Sumatra-Andaman undersea earthquake. It is anticipated that the observations from GRACE and its Follow-on missions will produce an unprecedented, long-term geophysical time series to improve our understanding in global mass fluxes related to global climate-change.

We give our strongest possible support to international efforts toward the realization of a GRACE follow-on mission and to continue the critical Earth observations without interruptions.

On behalf of the Space Missions Working Group (SSWG), IAG-GGOS,

C.K. Shum

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