International Association of Geodesy

of the International Union of Geodesy and Geophysics

IUGG

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Dear Professor Cheung

UN support for provision of geodetic infrastructure adequate for critical Global Change monitoring

Monitoring of the Earth's shape and deformation (including that of the water and ice surfaces), its orientation and rotation, and gravity field with associated temporal variations is vital for understanding many global processes that have a crucial impact on human society. These processes express themselves in a variety of ways, such as earthquakes, volcanism, floods, sea level change, climate change, water redistribution, polar ice mass rebalance, post-glacial rebound, and others. The International Association of Geodesy (IAG) believes that a UN mandate to *promote* investment in global geodetic infrastructure will be crucial in establishing a more accurate and stable basis for analysing complex global change phenomena such as glacial isostatic adjustment, the evolution of tectonic stress patterns, sea level rise and fall, the hydrological cycle, transport processes in the oceans, and the dynamics and physics of the atmosphere. These global changes are increasingly linked to anthropogenic causes, yet to understand these phenomena, to mitigate their impacts on the biosphere (including the „anthroposphere"), and to aid policy-making in general, requires observations of the faint signatures of Global Change phenomena.

Earth observation of the melting of great icecaps, the global rise in sea level, and changes to the Earth's movements and mass balance is conducted today from outer space. Satellite technology has accordingly provided new and valuable knowledge. However information about current trends may not be good enough to inform national and international decision-making unless detailed knowledge of spatial and temporal variations in critical Earth parameters is obtained.

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For example, changes in sea level as a result of melting ice could have dramatic consequences for certain countries – vast numbers of people would have to be relocated. For this to be done in an orderly and planned manner, knowledge is needed about when specific areas will be flooded, and this in turn requires the global observing systems, and services, made possible by modern space-based geodetic techniques.

Geodesy provides the observational basis to maintain a stable, accurate, and global reference frame, and in this function is crucial for many Earth observations, and other practical societal applications of geospatial data. However, global geodesy is based today on a voluntary international collaboration between scientific agencies and national mapping organisations. In such circumstances, progress is naturally strongest in the developed world and weakest in developing nations. The IAG believes that it is necessary to elevate global geodetic collaboration to the highest political arena in order to ensure an optimum investment in the critical geodetic infrastructure, and sustainable geodetic services, to the overall benefit of the international community.

A UN mandate could encourage countries to make a commitment to invest in geodetic infrastructure, which will ultimately lead to an order of magnitude improvement in the accuracy and stability of the reference frame, and other crucial Earth System observations. The IAG is wishes to assist the UN-GGIM in satisfying its goals of, amongst others, the maintenance of the global geodetic reference frame at a level commensurate to its contribution to the Global Change studies referred to earlier.

Yours sincerely

President, International Association of Geodesy