KEYNOTE:
CURRENT DEVELOPMENTS & FUTURE TRENDS IN IMAGING & MAPPING FROM SPACE

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ABSTRACT:

This keynote address presents an overview of the current situation and future trends regarding the acquisition of imagery from space for mapping purposes on a world-wide basis. As will be seen, quite different situations and totally different priorities exist in different parts of the world.

In North America, especially in the U.S.A., outside the area of very high-resolution imagery that remains in the hands of the military, intensive efforts have been made to start up a commercial industry based on the acquisition of high-resolution space imagery. So far, this has not been a success, with limited demand for the very expensive image products and large financial losses on the part of the investors and operators. Details of the financial losses will be given. Furthermore, due to the several failures at launch, currently the companies are all in a rather precarious position with reliance on a single satellite - that could, of course, also fail. At the same time, they are finding it difficult to raise the finance needed for the construction and launch of new replacement satellites. With NIMA issuing new long-term contracts for mapping imagery, the situation may improve in the future. In the medium resolution domain, the unexpected malfunction of Landsat-7 has also caused much difficulty for scientific and academic users and for government planning and monitoring agencies. The planned replacement for Landast-7 via the LDCM mission based on a public/private partnership will take quite some time to come to fruition. Its success will depend greatly, it seems, on the parallel plans by the commercial partners to introduce constellations of satellites producing imagery with an intermediate ground resolution designed specifically to serve the farming industry. In many ways, by far the most successful area for space imagery and mapping is that involving wide area coverage at coarse ground resolutions as provided by NOAA and NASA for weather, environmental science and global monitoring purposes. In Canada, most investment and effort is concentrated on the follow-on satellites to the successful Radarsat-1.

In Europe, there is only a very small involvement of the private sector. Government funded projects are the norm. The large pan-European (ESA) projects such as ERS and Envisat are again concentrated on global mapping and monitoring using medium- and low-resolution imagery. However, in strong contrast to the past, the emphasis now appears to be shifting towards smaller satellites, both with ESA and with national programmes. Even in France, for long the leading space power in Western Europe, while the military Helios and the semi-commercial SPOT series continue for the moment, again the emphasis for the future is towards the construction and operation of smaller satellites, e.g. the Franco-Italian cooperation based on the Pleiades (optical) and COSMO (radar) satellites. Besides these Italian radar satellites - and notwithstanding the previous pioneering MOMS optical missions - the emphasis in Germany also appears to have shifted towards the acquisition of radar imagery from space, as evidenced by the SAR-Lupe and TerraSAR-X programmes. In this particular context, the SAR emphasis follows on from the Shuttle Radar Topography Mission (SRTM) where both Germany and Italy had a very substantial involvement. In the U.K., at the moment, the much smaller space remote sensing programmes have their main emphasis on the development of micro-satellites and on

the supply of optical imagery of varying ground resolutions. Russian space imaging efforts, formerly conducted on a huge scale, have been greatly scaled down due to the country's financial problems.

In Asia, the whole scene is very different to those in North America and Europe, being dominated by the various national requirements for military reconnaissance, mapping and intelligence gathering - largely as a result of the currently unstable and threatening political and security situations that plague the continent. Thus, in the case of the two of the main Asian nations - India and Japan - that have the capabilities of building and launching satellites using their own national resources, the main focus is on satisfying national security requirements. This has led to the rapid development of high-resolution satellites and imagers, including the construction and launch of the TES (optical) satellite by India and the IGS optical and radar satellites by Japan. In turn, this has led to considerable delays in the construction and launch of the Indian Cartosat and Japanese ALOS satellites - which will however also feature high-resolution imaging capabilities! Israel's EROS and Ofeq satellites are also oriented largely towards military applications, both for the Israeli government and for other external governments, especially in Asia. However Israeli efforts are also geared towards the actual supply of similar satellites to Turkey and Singapore and to the export of its optical imaging technology to India and Korea. Other Asian players in the high-resolution space imaging field include Korea (with Kompsat-2) and Taiwan (with Rocsat-2). The Korean satellite construction efforts are largely indigenous, though the launch will be undertaken by a foreign launcher and contractor. In the case of Taiwan, the satellite is being built in France, while the launcher is American. With regard to the future, all of these Asian countries have plans for a series of highly capable follow-on satellites. As for the other major Asian power with satellite and launcher capabilities - China - while much is known about its weather and natural resources satellite programmes, little is known about its current and future plans in the field of high-resolution imagery.