Geo-strategy with examples

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  - increasing number of air- and space-borne instruments, many American, European Sentinel series will deliver longer and longer global time series

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- Global Navigation Satellite Systems (GNSS) such as GPS and soon Galileo etc.

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- increased need for physics/mathematics/statistics/learning based data science/big data methodologies, for example for mapping purposes, for the study of spatio-temporal dynamics including change detection, and for the derivation of information on important (for example climate) parameters from the data

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- DTU (Compute) should facilitate method development and provision of BScs, MScs and PhDs

The Arctic

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- North-East Passage, North-West Passage, ice charting (DMI, IMO)
- Danish presentation of a claim to the United Nations to an 895,000 km^2 area along the Lomonosov Ridge covering the North Pole (claimed by Russia also)

Global: sea level rise, El Niño

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  - also airborne laser height measurements generates enormous amounts of data, to establish updated terrain height models to fight flooding caused by heavy rain or rising sea level

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- Some of these challenges can be met by means of data science methodology and the aforementioned data.

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- Computer implementation of methods with a view to data science/big data aspects, i.e., the handling of the enormous amounts of data collected routinely (in the geodata domain and in many other domains). These methods include parallel programming in clusters of CPUs using for example MPI, MapReduce, Hadoop, Spark, Tez and/or GeoWave, or in (clusters of) GPUs using for example CUDA.

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- Analysis at segment or patch level (as opposed to pixel or single sample level).

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- Visualization of results from complex analysis methods and models by means of indigenously developed methods, and for example Google Earth, NASA World Wind and Microsoft Bing Maps.
- Integration of methodology from different data science sub-disciplines such as (exploratory) data analysis, (multivariate) statistics, signal processing, image processing, time series analysis, information theory, chemometrics, data mining, machine learning etc.

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- Teaching at all levels including continuing education.

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- view to the National Space Strategy (`http://ufm.dk/en/publications/2016/denmarks-national-space-strategy`)

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You may may want to open /User/alan/Documents/MyTalks/IRMADscaleSpace.ppt (manually)

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CIA

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Present – future

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Jacob Schack Vestergaard
Peter Limkilde Svendsen
David Malmgren-Hansen

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