

Advancing Digital Earth - Beyond the Next Generation

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Digital replicas (or ‘mirror worlds’) of complex entities and systems are now routine in many fields such as aerospace engineering; archaeology; medicine; or even fashion design. The Digital Earth (DE) concept as a digital replica of the entire planet occurs in Al Gore’s 1992 book *Earth in the Balance* (Gore 1992) and was popularized in his speech at the California Science Center in January 1998. It played a pivotal role in stimulating the development of a first generation of virtual globes, typified by Google Earth, that achieved many elements of this vision. Other direct ‘spin-offs’ included the founding of the International Society for Digital Earth (ISDE) in 2006 and the launch of the International Journal of Digital Earth (IJDE) in 2008.

Almost 15 years after Al Gore’s speech, the concept of DE needs to be re-evaluated in the light of the many scientific and technical developments in the fields of information technology, data infrastructures, citizen’s participation, and earth observation that have taken place since. This presentation is partly the outcome of a brainstorming workshop organized by the ISDE in Beijing in March 2011 which resulted in two position papers for the ‘next generation DE’ (Craglia et al., 2012; Goodchild et al., 2012) with a third one in preparation (Ehlers et al., 2012).

This paper intends to look beyond the next generation predominantly based on the developments of fields outside the spatial sciences, where concepts, software, and hardware with strong relationships to DE are being developed without referring to this term. Examples include the European Future and Emerging Technologies (FET) projects such as ‘FuturICT’ or ‘Guardian Angels’. It is also argued that the role of citizens and society has to be re-defined within an advanced DE (ADE) concept. Guiding criteria for ADE should include the following principles:

- ADE must offer unrestricted access to all humankind
- ADE development is for the needs of humankind as a whole
- ADE will be always ‘on’, immediate, precise, interactive, and available anywhere at anytime
- ADE will be breathtakingly virtual and predictive
- ADE will be ubiquitous, spatially accurate, and sentient

Similar to the evolution of bioethics and geoethics, the necessity exists to propose a set of underlying principles for the development, implementation, and use of DE, the *DEethics* so that DE will indeed deliver the anticipated benefit for all humankind. *DEethics* should follow generally established ethical principles such as Kant’s *Categorical Imperative* ethics and should be developed by a ‘steward’ or a ‘group of stewards’, ratified by a reputable body such as the United Nations.

References

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