

# Orthoimagery – Executive Summary

Photographs and other images taken from airborne or satellite platforms are important means for documenting the surface of the Earth and the state of the environment. However these images have geometrical distortions caused by the optics and the camera/sensor tilt, as well as the differences of the elevations of the Earth's surface. Orthorectification is the process of removing these distortions resulting in a specific product: orthoimagery.

Recognising the specific role that orthoimagery may have in extracting thematic information, mapping, and monitoring the environment, the related data theme has been included in Annex II of INSPIRE. The *Orthoimagery* data theme includes imagery from the infrared to ultraviolet region of the electromagnetic spectrum, derived by scanning film positives and negatives, digital airborne and satellite imagery.

The INSPIRE data specification on orthoimagery has been prepared following the participative principle of a consensus building process. The stakeholders, based on their registration as a Spatial Data Interest Community (SDIC) or a Legally Mandated Organisation (LMO) have the opportunity to bring forward user requirements and reference materials, propose experts for the specification's development, and to participate in reviewing and testing the data specifications. The Thematic Working Group responsible for the specification development was composed of experts from Belgium, Finland, France, Germany, Norway, Spain, UK, and the European Space Agency. The specification process took place according to the methodology elaborated for INSPIRE respecting the requirements and the recommendation of the INSPIRE Generic Conceptual Model.

Since orthoimagery can be defined as a regular sampling of radiation values continuously varying in space, grid coverage, as defined in ISO 19123 has been selected for spatial representation form. The orthoimage coverage is the key concept of the data model that may refer to a single orthoimage or a mosaic of orthoimages. Moreover, an orthoimage coverage itself can be composed (aggregated) from other orthoimage coverages. The properties describing the geometric basis (i.e. the grid) are inherited from the Generic Conceptual Model and ISO 19123. This allows the inclusion of such technical properties as the range and the allowed values of the coverage, the interpolation method, and how the records are assigned to the grid points. Fulfilling the requirement of the Directive each orthoimage coverage carries a unique identifier enabling its unambiguous identification within INSPIRE. In addition, other information can be attached to each orthoimage coverage, comprising name, footprint, and temporal characteristics.

An orthoimage coverage may consist of orthoimages that are based on images captured at different times. By including the mosaic elements, the *Orthoimagery* data model provides the possibility to spatially represent the data acquisition time of the images that are part of the coverage.

Aggregated orthoimage coverages have to be aligned; i.e. fit to a common grid. In addition, alignment is also necessary when orthoimage coverages are integrated at European level. In order to do so, a pan-European grid is necessary. The Thematic Working Group recommends the usage of the Grid\_ETRS89-GRS80, which is based on geographical coordinates. Storing orthoimagery data in geographical coordinates also helps to bridge the difficulties caused by the diverse projection systems in use within Europe. Whenever projections are needed, they can be obtained by on the fly transformation for the area of interest.

Interoperability is further supported by harmonised metadata elements and agreed encoding.

The INSPIRE specification for *Orthoimagery* provides a compact, purely conceptual presentation of the data theme; therefore it does not deal with file-based tiling, which is considered as a practical implementation for data storage and delivery.

Being decoupled from particular production methods and platforms the INSPIRE orthoimagery data specification provides a presentation that constitute value not only in European, but also in local, regional and global contexts.