



## Emergency Response Damage Assessment using Satellite Remote Sensing Data

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During disasters rescue and relief organisations need quick access to reliable and accurate information to be better equipped to do their job. It is increasingly felt that satellites offer a unique near real time (NRT) tool to aid disaster management.

A short introduction to the International Charter 'Space and Major Disasters', in operation since 2000 promoting worldwide cooperation among member space agencies, will be given as it is the foundation on which satellite-based, emergency response, damage assessment has been built. Other complementary mechanisms will also be discussed. The user access, triggering mechanism, an essential component for this user-driven service, will be highlighted with its 24/7 single access point. Then, a clear distinction will be made between data provision and geo-information delivery mechanisms to underline the user need for geo-information that is easily integrated into their working environments.

Briefly, the path to assured emergency response product quality will be presented beginning with user requirements, expressed early-on, for emergency response value-adding services. Initiatives were then established, supported by national and European institutions, to develop the sector, with SERTIT and DLR being key players, providing support to decision makers in headquarters and relief teams in the field. To consistently meet the high quality levels demanded by users, rapid mapping has been transformed via workflow and quality control standardisation to improve both speed and quality. As such, SERTIT located in Alsace, France, and DLR/ZKI from Bavaria, Germany, join their knowledge in this presentation to report about recent standards as both have ISO certified their rapid mapping services based on experienced, well-trained, 24/7 on-call teams and established systems providing the first crisis analysis product in 6 hours after satellite data reception.

The three main product types provided are then outlined: up-to-date pre-event reference maps, disaster extent maps and damage assessment or intensity/grading maps. With Google and open-sourced information the need for the reference maps has diminished, but not altogether, as damage extent and assessment products also require coherent reference geo-information which often has to be produced internally. Increasingly users need up-to-date, highly detailed, customised products; it is in damage assessment that an operator's working environment, geomatic skills and experience can often provide the highest levels of value-adding while adapting to user requests. Accordingly, DLR and SERTIT are involved in R&D work integrating data, e.g. TerraSAR-X and Pléiades sources plus Sentinel simulated data, which have interesting emergency mapping capacities. Their close interaction with the research sector is essential to be at the cutting-edge of the field, implementing effective and efficient analysis methods. Future R&D challenges to further improve the quality of the damage mapping service will be highlighted.

Finally, this presentation will show some practical examples and thus how at present, space-based rapid mapping, which has more than 10 years of experience, has come to being able to provide, if rapidly programmed and acquired, geo-information linked to disaster extent and damage assessment from overview scales down to the street level and this with an ever increasing array of satellite data sources.