AGRO-X – INVENTORY OF EUROPEAN AGRICULTURE BY TERRASAR-X DATA

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Objective of the study
TerraSAR-X will be the first X-Band satellite, supposed to be launched on the 29th of May 2006. It will have excellent capabilities to monitor agricultural landscapes within the scope of the intended research proposal agro-X, making operational use of the extensive scientific results of several airborne SAR campaigns. agro-X is focussing on the European Agriculture along a transsect from Sweden over Poland, Germany, France and Italy, addressing issues of the sustainable European GAP Policy.

Knowledge about European land use is still necessary in future within the scope of the reform of the common agricultural policy (CAP), although EU wide subsidies are decoupled from particular fruits onto areal extent of agricultural parcels. One primary reason for this is conservation of groundwater from nitrate fertilizers, a pollution which still needs to be reduced. Following keywords are essential: Cross compliance regarding food quality and safety as well as environmental protection, farm related audits and modulation of direct aid payments to rural development as a second pillar of the CAP.

From the technical point of view, the TerraSAR-X sensor has several outstanding sensor characteristics, which makes this sensor particularly useful for agricultural monitoring. They are as follows:
- high spatial resolution:
  The different acquisition modes (ScanSAR 16 x 16 m, Stripmap 3 x 3 m and Spotlight 1 x 1 m) will enable experimental monitoring at different scales, it will enable texture analysis and it will also enable the observation of small scale farming in several European areas with radar for the first time.
- high temporal resolution:
  The short repetition cycle of 11 days will enable a detailed temporal observation with sophisticated change detection methods, especially in crucial phenological stages of the vegetation period.
- Polarimetry:
  TerraSAR-X with its full polarimetric X-Band capabilities (X-VV, X-HH and X-HV) will enable the clear differentiation of the agricultural land cover classes from all others through a-angle and entropy on one hand and on the other hand it will detect field heterogeneities caused by different soil properties, irrigation or wind impact.

More possibilities will be presented like multisensoral opportunities as well as the determination of vegetation parameters. The paper therefore will give an outlook on perspectives of future applications of new microwave sensors in Europe wide agricultural monitoring.