

**→ MAPPING URBAN AREAS
FROM SPACE CONFERENCE**

GAFAG
an e-GEOS (ASI / Telespazio) Company

EO-Based Products and Services to Support Urban Development Activities

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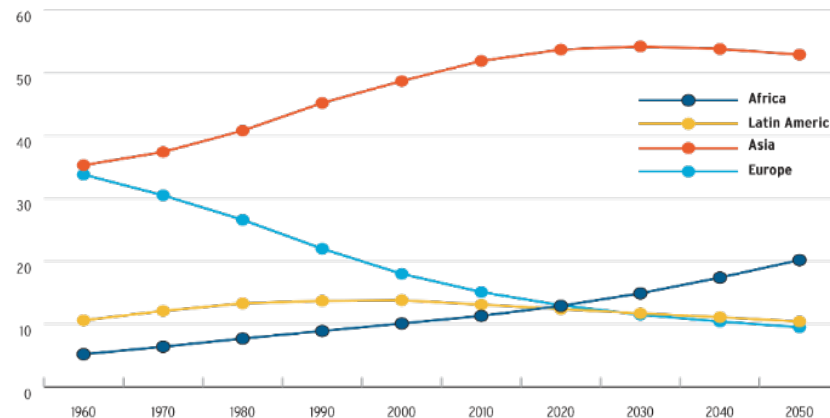
Outline of Presentation

- Addressing the need for operational urban mapping services for developing countries
- Provide examples of EO-based urban products/service to support the information needs
- Technical Challenges related to operational services
- Concluding Comments



Urban Growth in Developing Countries

- 2.5 billion people or 66% of the global population will be in urban areas by 2050.



Regional Trends in Urban Population Growth - Hoornweg and Freire, 2013

- **Nearly 90% of the world's urban population growth will occur in cities in Africa and Asia (Floater and Rode, 2014).**

Challenges for Governments



- The challenges faced by governments in developing countries to manage this staggering growth are multi-faceted
- They have to provide certain basic requirements to the population:
 - infrastructure,
 - access to clean water,
 - electricity,
 - sanitation
 - services to the inhabitants in order to avoid urban poverty which will have consequences on the overall development of the country
- The recent ESA IFI tender aims to address these challenges via EO applications for Urban planning

- EO-Monitoring of unplanned urban sprawl

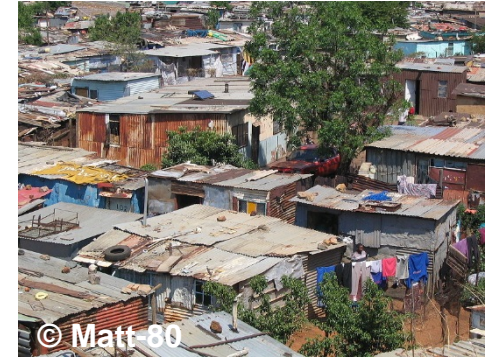


- Infrastructure Planning:
 - Road network detection
 - Illegal waste site detection and analysis (2D / 3D)
 - Telecommunication network planning



- Risk / Disaster Assessment – for example urban areas located in coastal zones threatened by sea-level rise and storm surges

- Assessment and monitoring of slums/informal settlements
- Urban pollution:
 - Atmospheric pollutants, noise
 - Propagation Analysis with accurate elevation data
- Urban green area planning
- Derivation of socio-economic estimations



End Users:

Local Authorities, Ministries, Engineering Firms, International Donors-World Bank, KfW, Asia Development Bank, UN agencies-UN Habitat, UNDP, NGOs

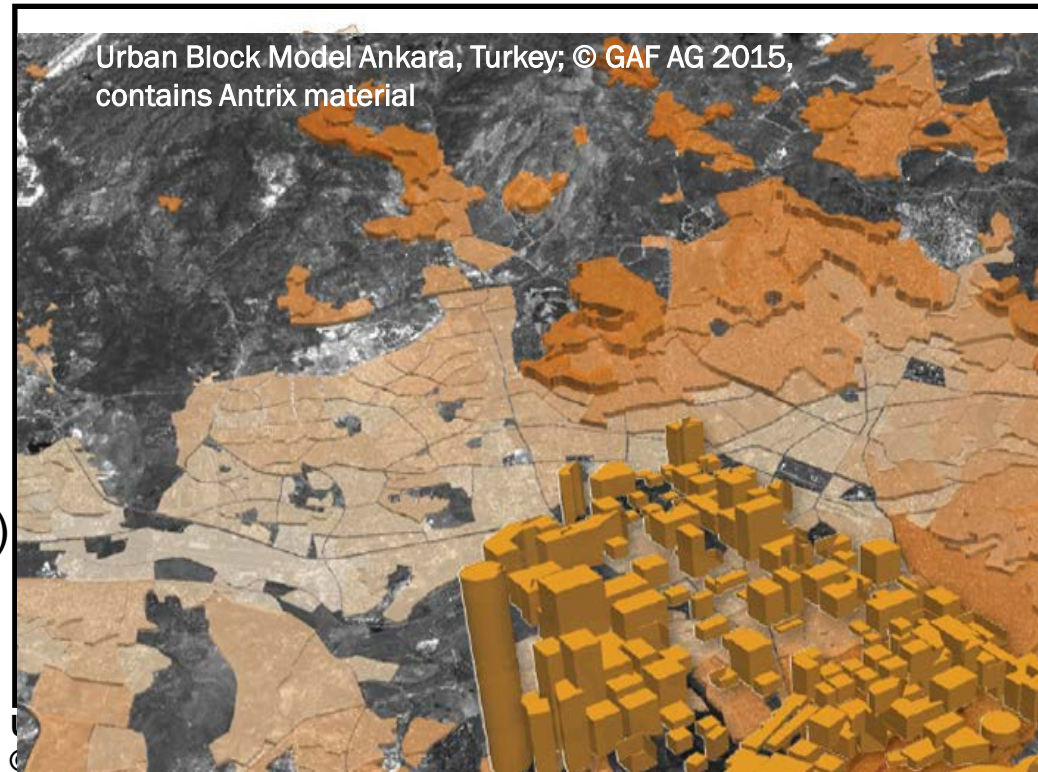
Urban Block Models and Buildings

Mapping of urban structures
according to different criteria:

- Function (living, industry,...)
- Building density (loose, dense,...)
- Building type (single, high-rise,...)
- Building heights (min, max, mean)

Blocks defined by street network

+ 3D Models of important buildings



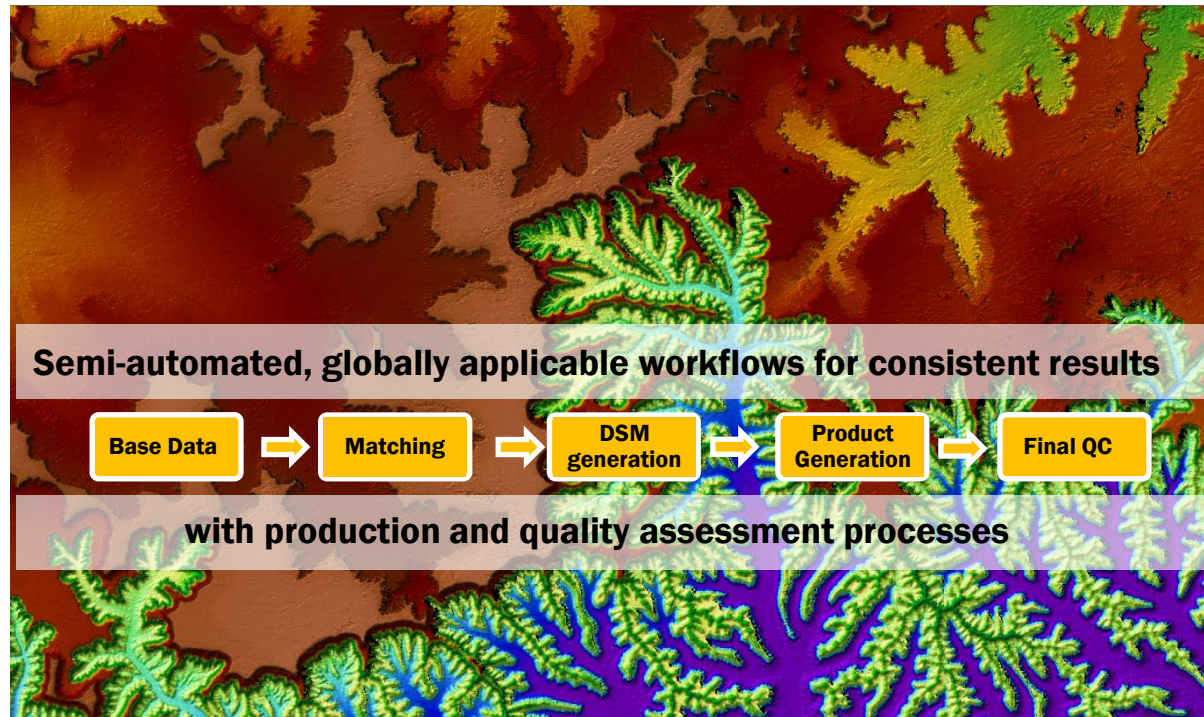
Building Footprints and Changes

WORK IN PROGRESS



Tashkent, Uzbekistan

Workflow DSM Generation



Software:



Production:



Distribution:



Tri-Stereo DSM

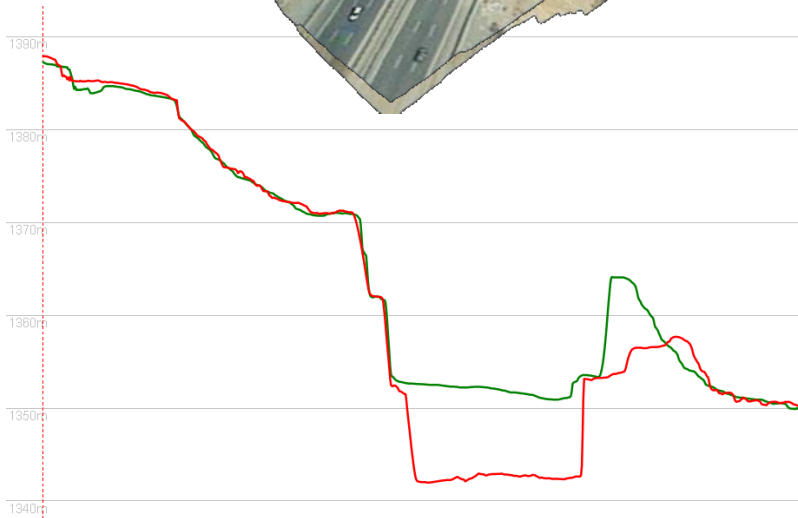


Infrastructure Planning

Analysing Data in

Tools for:

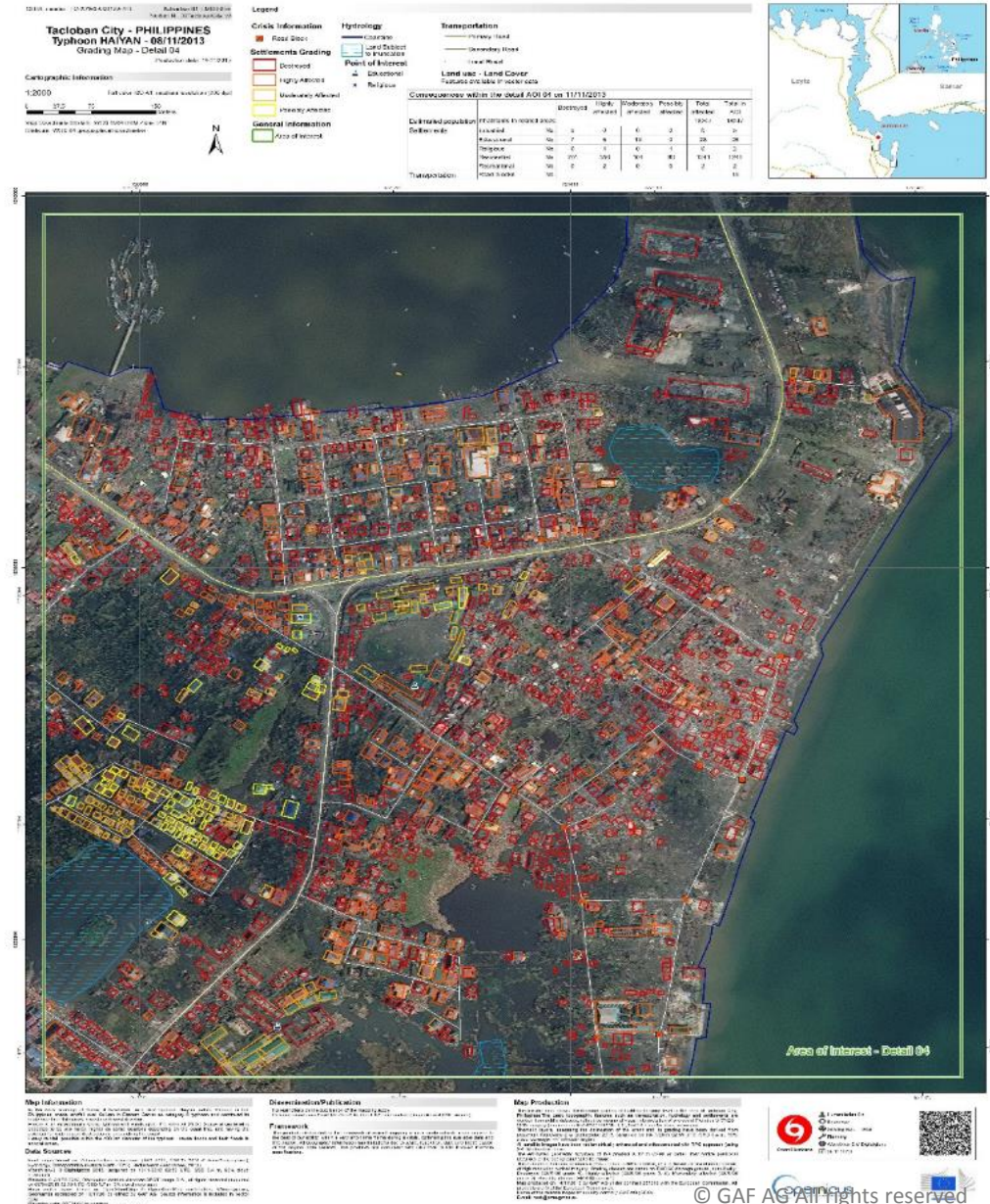
- Monitoring
- Volume Calculation
- Simulation



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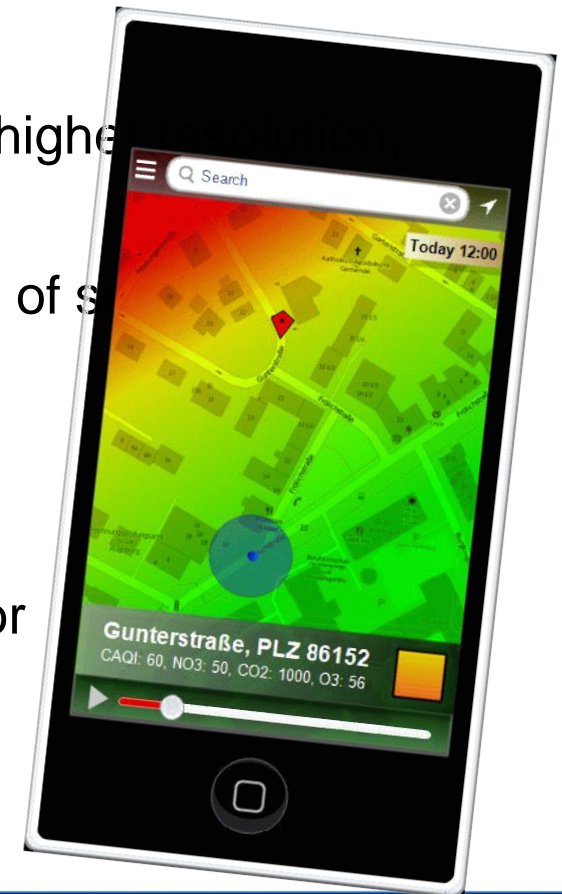
Disaster Management



- Data availability: clouds, inadequate repetition rates, acquisition conflicts
- Sensor constraints: spatial resolution, accuracy
- Methodological issues: need for further automatisisation of processing chains, e.g. Automatic generation of derived products from surface models / stereo data
- User awareness and access to products/services is limited

Concluding Comments - Technical

- Launch of Sentinel-suite of EO data will address some of the technical challenges and provide monitoring capabilities that were previously not possible
- New VHR Sensors planned: faster revisit rates, higher resolution, better accuracy
- Improved user access to services via integration of services with existing Web Platforms, e.g.:
 - Urban TEP (ESA, DLR)
 - PUMA (WB; GISAT)
 - Dissemination via mobile devices
- Further methodological developments needed for increasing degree of automation



Concluding Comments



- The use of EO-based urban products are not yet mainstreamed in urban planning in many developing countries
- ESA 's close co-operation with the Banks via arrangements such as Memorandum of Understandings (MoUs) and the recent tender can address this issue
- Envisaged future market for EO Urban data/information