Potential of Pleiades HR data for large gathering monitoring, within security and humanitarian context

H. Yésou
SERTIT
GT2 Risks and Humanitarian Aid

Few “large gathering” demonstrators have been carried within ORFEO program concerning two thematics:

- Humanitarian context: population flee

- Security: political events with possible large demonstration and/or people movement (in partnership with GT8 Defence)

⇒ Ndjamena population flee in February 2008

⇒ Political event in France, NATO summit in Strasbourg in 2009; Afrique - France summit in Nice 2010, G8 Deauville May 2011, G20 Nice November 2011

Particularities of these demonstrators
- Dedicated/specific land cover/land use mapping
- Refreshed information
- Request for evenmential images for monitoring

First advanced project 2007
Large gathering

Civil population fleeing NDjaména February 2008

H. Yésou, M. Montbabord, S. Battiston, C. Uribe, S. Clandillon
Gathering: a new thematic for RS community

- Dynamic event
- Population fleeing:

Chad case of February 2008:
To escape fights between rebels and regular army units 30 000 people fleeing N’Djamena: 20 000 went to Cameroon. Between 7000 - 10 000 would camp somewhere
Gathering: more recent cases

- **RDC October 2008**: «20 000 personnes déplacées fuient les combats en RDC» «Des milliers de Congolais se réfugient vers Goma. 45 000 personnes ont fuies dans la panique le camp de déplacés de Kibati» (Le monde des 27-29 10 2008)

- **“2010 Arabian Spring”, Foreign workers escaping Lybia in February**: «Plus de 38 000 personnes, essentiellement des Tunisiens et des Egyptiens, ont fui la Libye vers la Tunisie par le principal point de passage frontalier de Ras Jedir depuis le début de l'exode le week-end dernier. L'exil se poursuit aussi par la mer et par les airs. »

- **Contest marches in Yemen, in Egypt etc ...**
Large gathering Chad: data & processing

Pleiades HR like data:
- Quick Bird 8 January 2008
- World View, 4 and 8 February 2008

Processing, information extraction chain

Geometric correction, merging XS-PAN

- First step: Classical land use/cover product generation
  => Object oriented Segmentation / SVM classification
  => Networks extraction (road and hydrographical network)

- Second step: Dedicated geo products generation
  - People movement on the 4 (flow)
  - People movement on the 8 of February (return)
  - Potential sites for IDP camps
  - Potential sites for logistic
Land cover derived from Pleiades like image
Network extraction from Pleiades like image

N'Djamena : plan du réseau

Pont taïwanais

Pont Nguell

Pléiades Days
Toulouse, France - January 17, 2012
People temporarily blocked at bridge
People fleeing estimation: 4 of February
People fleeing estimation: 8 of February

Driving forces: markets
IDP camp location
Dedicated land cover map for IDP camp location

Potential sites for IDP camps: 1800 tents only !!!

Potential sites for logistical camps, ie NGO’s
Dedicated land cover map for IDP camp location

Potential sites for IDP camps: 1800 tents only !!!

Potential sites for logistical camps, ie NGO’s

Possibility to install the 2/3 of the population escaping Ndjamena
Dedicated logistic map
Large gathering: Security Aspect

Political events

Subject discussed within thematic group since 2005-6
First tentative for a project 2007

NATO summit in Strasbourg in 2009
Afrique - France summit in Nice 2010, G8 Deauville May 2011,
G20 Nice November 2011
Security geo-product derived from Pleiades like data

Requests from DDSC: information on sensitive sites or elements

Strategic areas
• Airport where are arriving and taking of delegations
• Harbors, road networks, parking place
• Conference sites and hotels areas, official buildings (prefecture, hospital..)

Others information
• Buildings with specific shape
• Landing areas for helicopters
• ...

Toulouse, France - January 17, 2012
Security geo-product derived from Pleiades like data

Interest of optical VHR data: very precise and detailed overview of the event areas offering a much real landscape representation than classical maps

VHR data allow the possibility of present a general overview of the event site as well as zooming
Global overview of the event site both maritime and terrestrial parts
Overview of the site and its neighborhood limited speed or exclusion zone maritime
Pléiades like Terrestrial part
Pleiades like derived Product
Centre Nice : Palais Sarde - Agropolis
Expectations and hopes of Pleiades HR data for large gathering monitoring

Pleiades like derived Product
Centre Nice : Agropolis
Interest of optical VHR data: very precise and detailed overview of the event areas a better landscape representation than classical maps
Airport and landing sites
Benefits of Pleiades HR: Refresh the information

Security services become more and more users, consumers of virtual globe or to open to semi open access database...

Therefore these are often obsolete whereas security applications request refreshed information.
Benefits of Pleiades HR: insure access to VHR images

Case of G8 Deauville

3 months of programming niche
None available acquisition despite a very long sunny period

No VHR Pleiades like data

No possibility to generate highly detailed maps of Deauville city center
Particularities of these large gathering ORFEO projects

• From demonstration stages to integration in operational command system
• Dedicated/specific land cover/land use mapping
• Refreshed information
• Request for event images for monitoring

• Need to investigation the 3D aspect for Security aspect (even if probably already done in some services..)
Perspectives

What will offer Pléiades HR in operational mode?

Hope and expects towards Pléiades HR in terms of:

- programming capacity, through French gateway and its associated ground station networks: less than 6 hours before acquisition for the last programming order?
- revisit capacity, thanks to its agility: 24 hours thanks to Pléiades 1-B?
- time of delivery: < 2 hours?
- important parameters for operational exploitation

Commissioning phase will allow the access to real Pléiades HR images in order to confirm the results of simulated data

- new events, with acquisition shortly before event, and during event
Expectations and hopes of Pleiades HR data for large gathering monitoring

Perspectives
Commissioning phase

First very possible feed back after the WEB publication of the first Pleiades HR acquired
Many thanks to the ORFEO Pléiades team

Congratulations to CNES team and many thanks for this rich experience

Thank you for your attention

Parc d’innovation
Boulevard Sébastien Brant
BP 10413
F-67412 Illkirch Graffenstaden
Tel. +33 (0)3 90 24 46 44
http://sertit.u-strasbg.fr