Preparation and progress of Take 5 experiment

S. Sylvander, CNES Project Manager
O. Hagolle, Principal Investigator (CNES/CESBIO))

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Summary

- Context
- Constraints
- Roles of CNES and AIRBUS D&S
- Preparation of Take 5 experiment
- Progress of Take 5 experiment
- Conclusion

Context (1/2)

Call for ideas before SPOT4 disposal to lead technical experiments on the satellite

SPOT4/Take 5, selected as SPOT4 end of life experiment, consisted in:

- A SPOT4 orbit change to a high repetitivity orbit (5 days cycle) in order to have in-flight simulation of future Sentinel-2 mission during several months => a new mission for SPOT4
- A typical technical experiment by its nature and its duration

SPOT4/Take5 experiment:

- CNES was in charge of experiment management, system coordination and satellite operations
- CESBIO was responsible for science coordination, level 2A processor, products validation and users support
- Production and distribution of level 1C and 2A images were performed within THEIA land data center framework
- Experiment funded by CNES with ESA, JRC, NASA, CCRS participation for images expense

Context (2/2)

Main important dates:

- The end of SPOT4 commercial mission was planned in January 2013
- A key point confirmed the interest of the Take5 experiment in July 2012 => mission definition and feasibility study
- A decisional key point confirmed the experiment in December 2012 => finalization of preparation

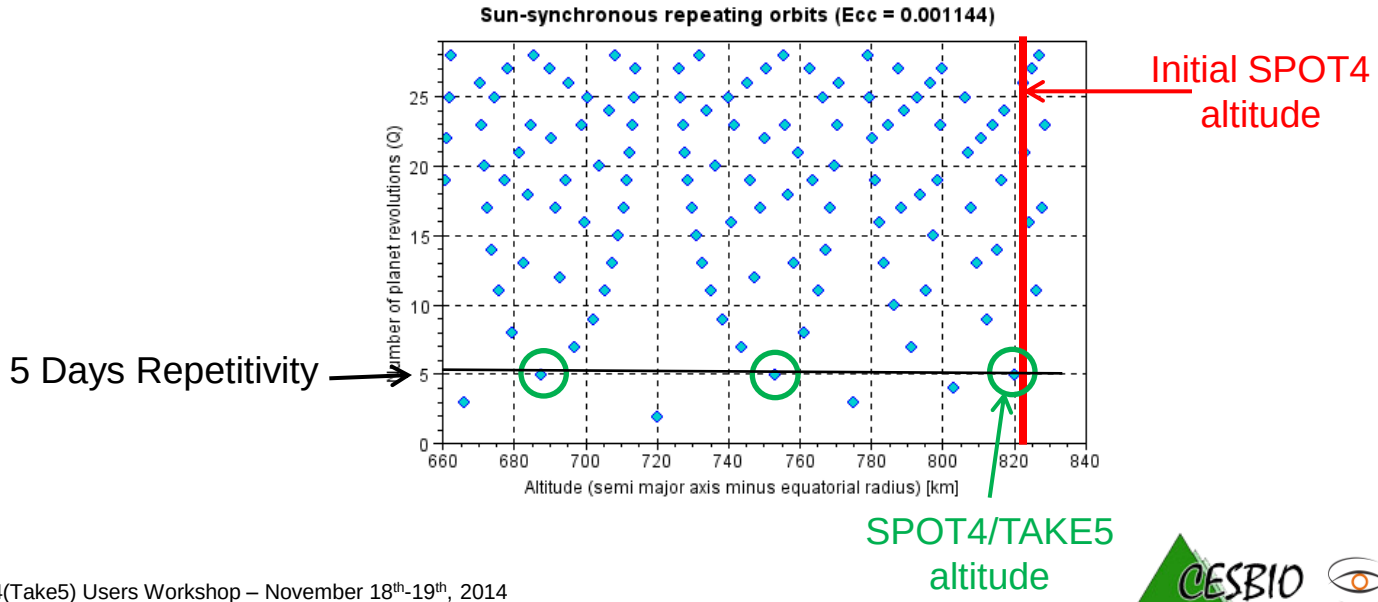
=> 6 months to study the feasibility and prepare the experiment

Constraints and choice of Take5 orbit

Main constraints:

- Respect of french satellite end-of-life law : propellant reserve just sufficient for end of life operations
- Delay (6 months) and ressources (human ressources and budget) not compliant with significant changes in the existing onboard and ground systems

=> Strongly impacts the choice of Take5 reference orbit



Roles of CNES and AIRBUS D&S during Take5 experiment

Role of CNES during Take5 experiment:

- Operation of the spatial component:
  - ✦the same as in commercial life
  - ✦+ Manual Tasking plan elaboration and detection of S and X-band passes scheduling conflicts and jammings with other satellites

  => modification of the CNES/AIRBUS D&S interfaces
- Production and distribution of level 1C and 2A images within THEIA framework

Role of AIRBUS D&S (commercial ground segment):

- Images acquisition
- Images inventory, production to level 1A and cataloging
- Level 1A images supply to CNES and partners (ESA, JRC, NASA, CCRS)

Preparation of the Take5 experiment

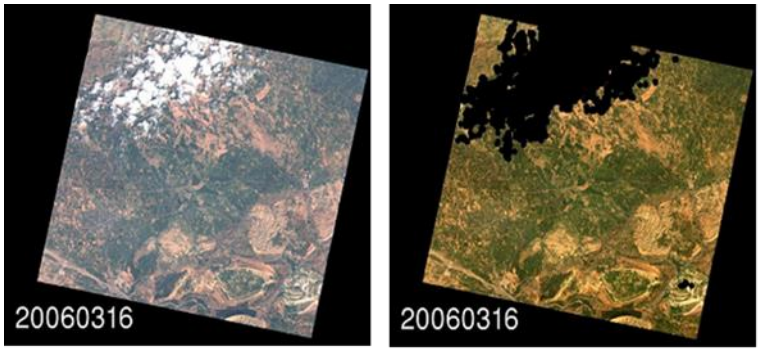
Main steps of the preparation:

- Mission definition: choice of sites
- Technical feasibility study:
  - Spatial component side:
    - » mission analysis and operational realisation
    - » system software updates
    - » capability to acquire all the sites of interest
  - Commercial component side: new interfaces with CNES control centre to be validated
  - System test => validation of software updates, mission feasibility and compatibility between spatial and commercial components
- Satellite Operations preparation
- Adaptation of THEIA production software
- Financial feasibility study, contractual and legal (licence) aspects

Progress of the Take5 experiment (1/3)

Main steps:

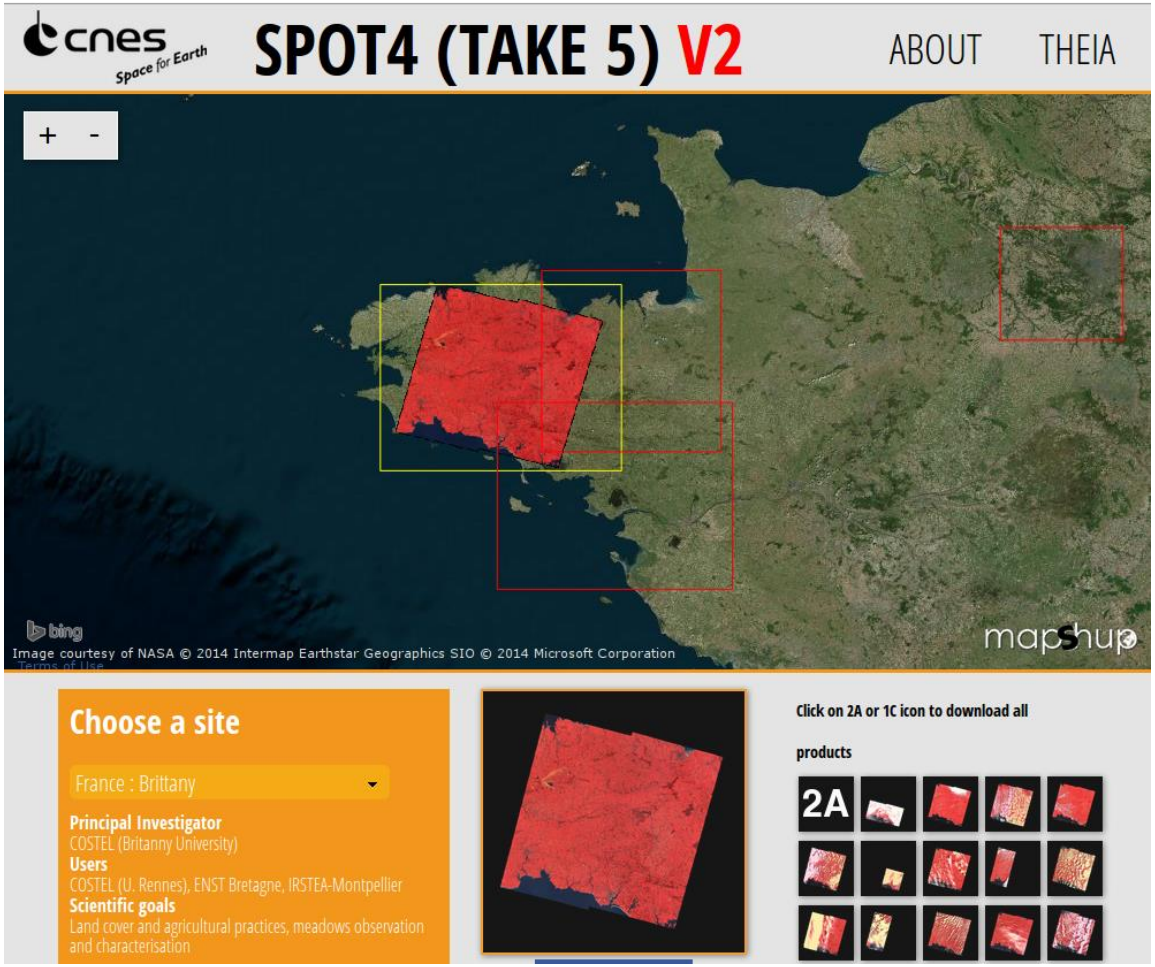
- 29 Jan. 2013: Change of orbit
- 1 Feb. – 19 June 2013: Take5 experiment
- 15 July 2013: First delivery of Level 1C and 2A images (THEIA Website)
- End of 2013: 2nd delivery of Level 1C and 2A images after improvement of THEIA processing software



Progress of the Take5 experiment (2/3)

SPOT4(Take5) data set freely available from THEIA Website :

http://www.theia-land.f/



Progress of the Take5 experiment (3/3)

Results:

- Complete success of programming
- Almost complete success of acquisition (15 images lost / 2500 images acquired)
- No problem of production and delivery at level 1A => about 1800 L1A images produced (production of images with less than 80% of clouds)
- Very good results of Level 1C and 2A production (except a few problems of registration) => see next presentation
- A large number of users

Conclusion

Take 5 experiment = a real challenge,

realised thanks to a very motivated team,

ready to start again with SPOT5 next year !

S. Sylvander , O. Hagolle, L. Houpert,J. Sarda, A. Moussy, JM. Walter, M. Moulin, L. Vintenat, JP. Chognard, C. Déchoz, JL. Raynaud, A. Meygret, D. Roumiguières, M. Leroy, B. Boissin, S. Cherchali, P. Henry, A. Lapeyre, A. Guerry, F. Schiavon, F. Lenoir, M. Farges, A. Linarès, V. Maso, P. Cornac, M. Behague, F. Normend, F. Rimbert, M. Wheeler, G. Beaumet (CNES)
F. Daniaud (CS-SI), D. Clesse (CapGemini), V. Poulain (Thalès), M. Huc (CESBIO), J. Recoules (AKKA), L. Bray (Thalès), S. Maitrel (APAVE), S. Calmen (TELESPAZIO), D. Krzyzanowski (TELESPAZIO), A. Alcaraz (TELESPAZIO), J. Mazenc (Thales), J. Bijac (ASTRIUM-Geo), B. Montfort (ASTRIUM-Geo)