

Forest monitoring by satellite

SPOT IMAGE & Infoterra

Didier RIGAL

2010 – MAE Paris



Contribution of Satellite Based Technologies to REDD+

■ WALL to WALL Mapping at very high resolution

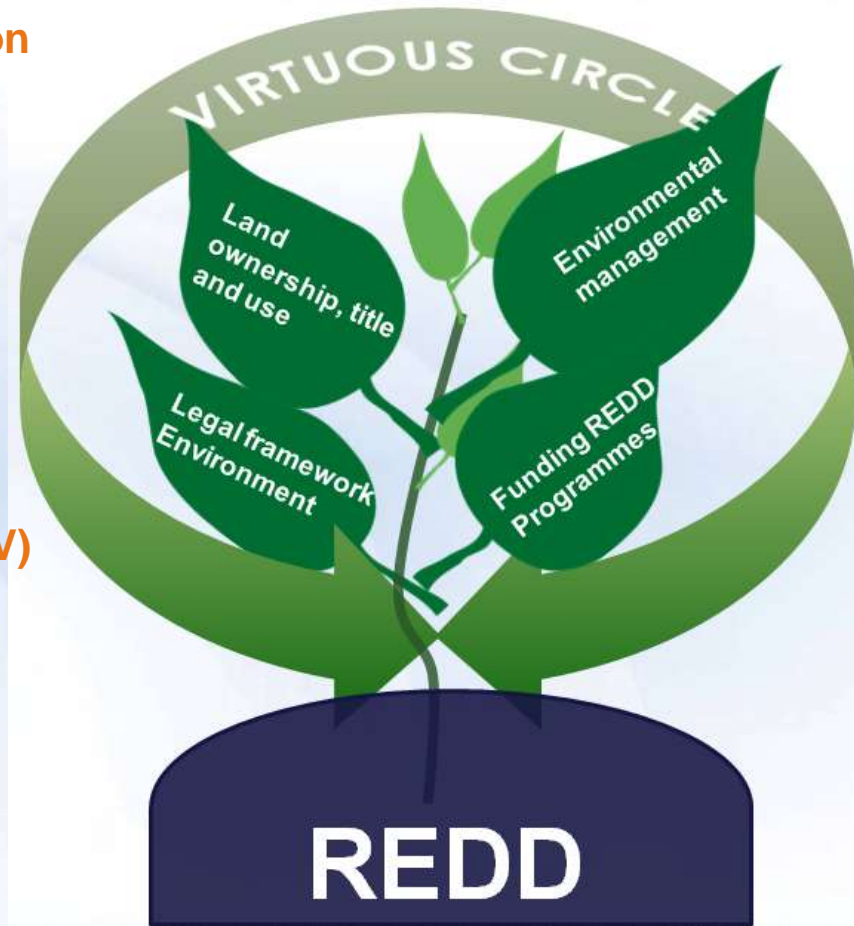
- Map up-to-date land use, prepare REDD+ projects
- Implement Land regime and ownership
- Draw legal framework

■ BASELINES Mapping

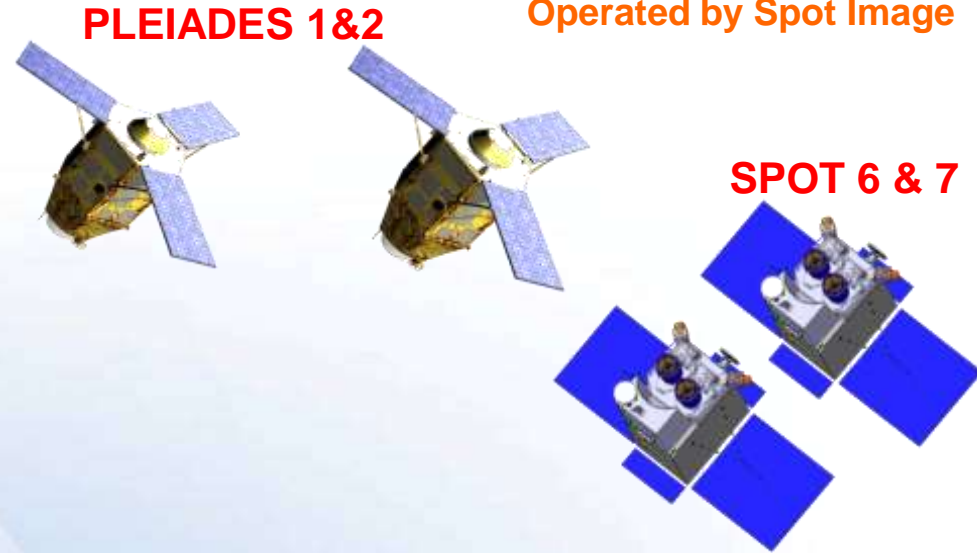
- Understand deforestation & degradation trends
- Project scenarios

■ Measurement, Reporting and Verification (MRV)

- Monitor regularly
- Measure the effectiveness of REDD+ programs
 - Independently, irrefutably, locally
 - Broadcast and advertise efforts
- Link Satellite observation with Carbon models



DATA availability and policy; from SPOT5 to PLEIADES & SPOT6 & 7



2 cameras
 Swath width: 60 km
 Oblique viewing capacity (27)
 Resolution:
 SPOT 1,2,3,4: 10m P; 20m XS
 SPOT 5: 2.5m P; 10m XS

Dedicated missions on smaller satellites
 High resolution, agility, wide field of view

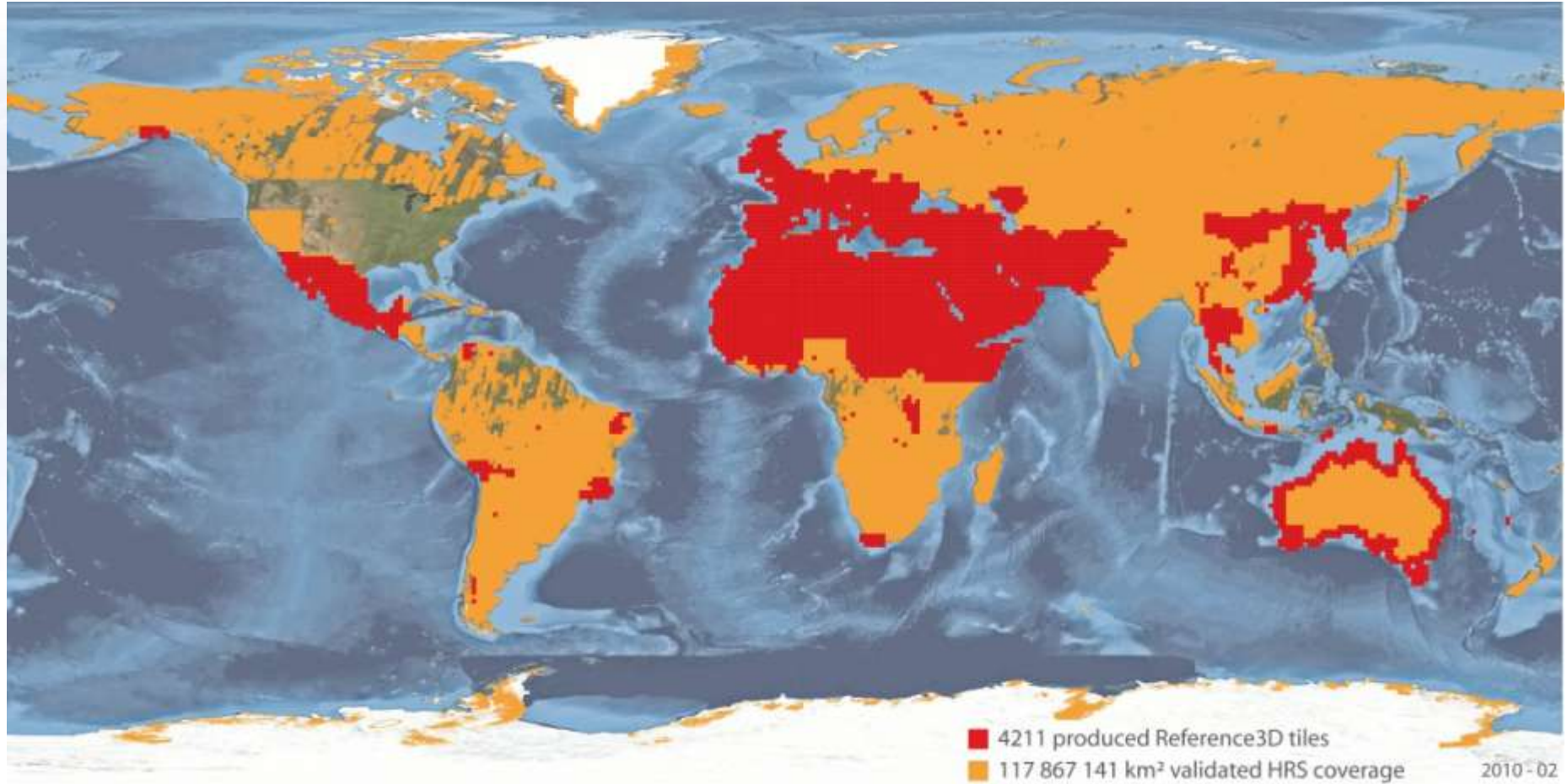
Pléiades 1 & 2: orthoimages at 0.50m / 20 km

SPOT6 & 7 : orthoimages at 2.0 m / 60 km

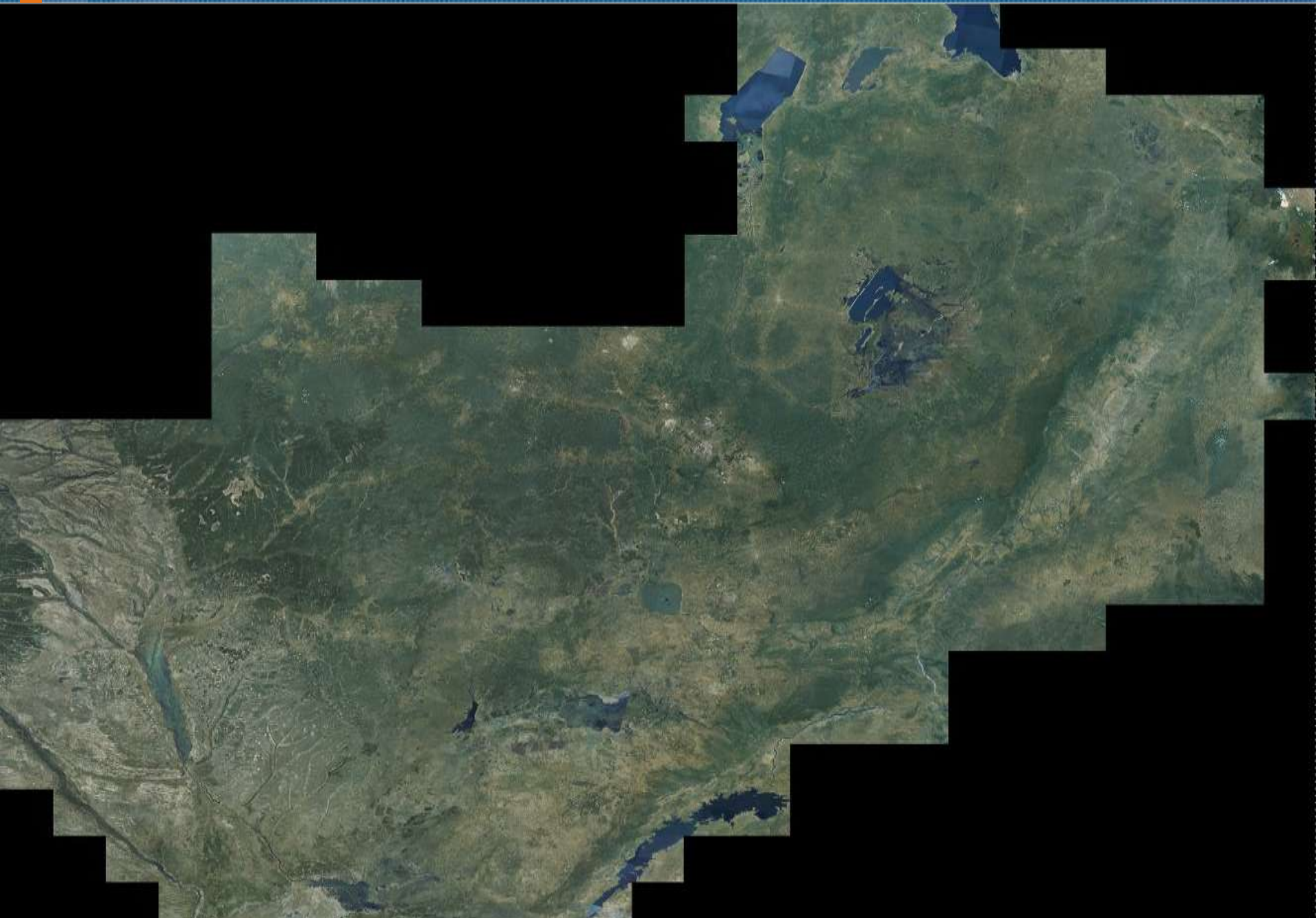


WALL to WALL Mapping : 3D Data Bases for Ortho-modeling

57 M Sqm validated as of today



WALL to WALL Mapping (ex: Zambia)



SPOT5 Data Base (2.5-m colour) covering forests of South America

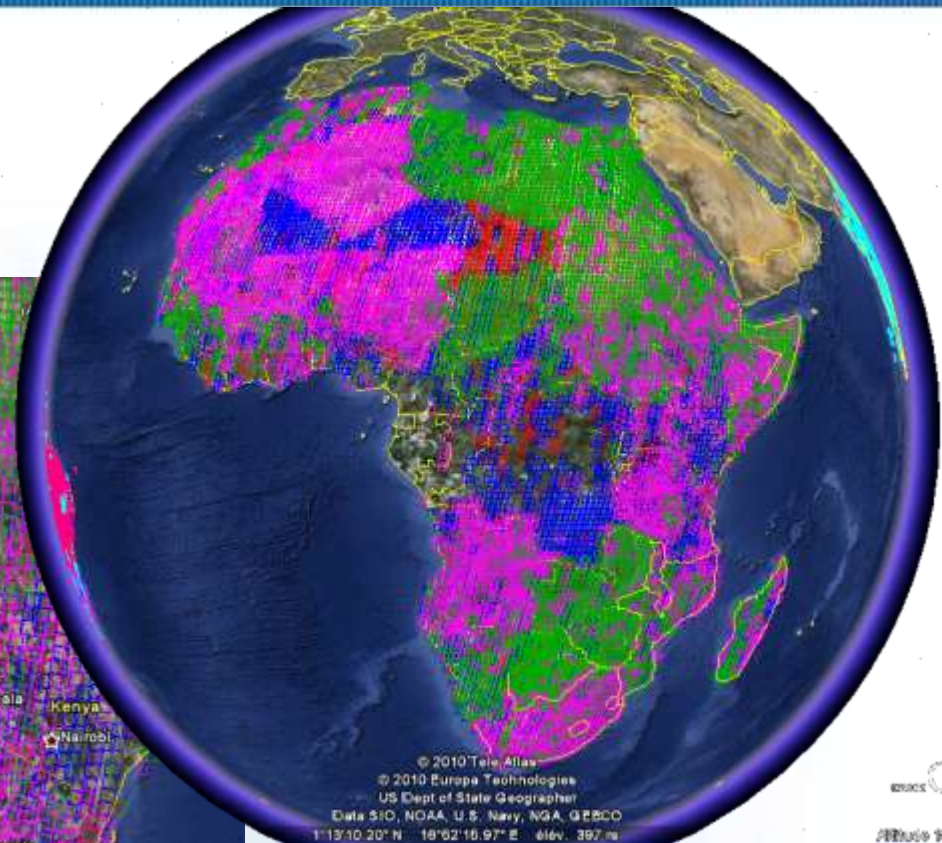
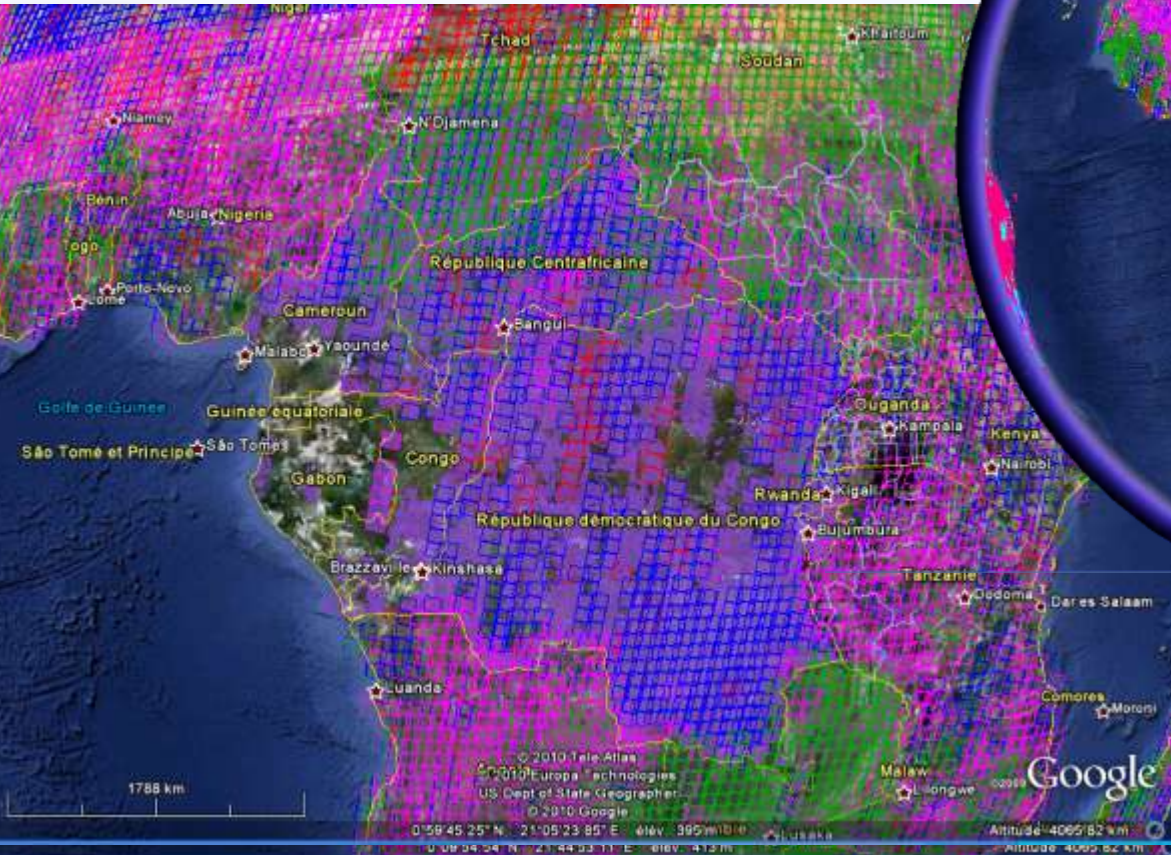
ACQUISITION PERIOD: 2006 to 2009
IMAGES < 10% CLOUDS



Right Side : Completed with SPOT4
data collected from French Guyana
Station in 2006 & 2007.
Denote interest of Receiving stations

SPOT5 Data Base (2.5-m colour) covering forests of Africa

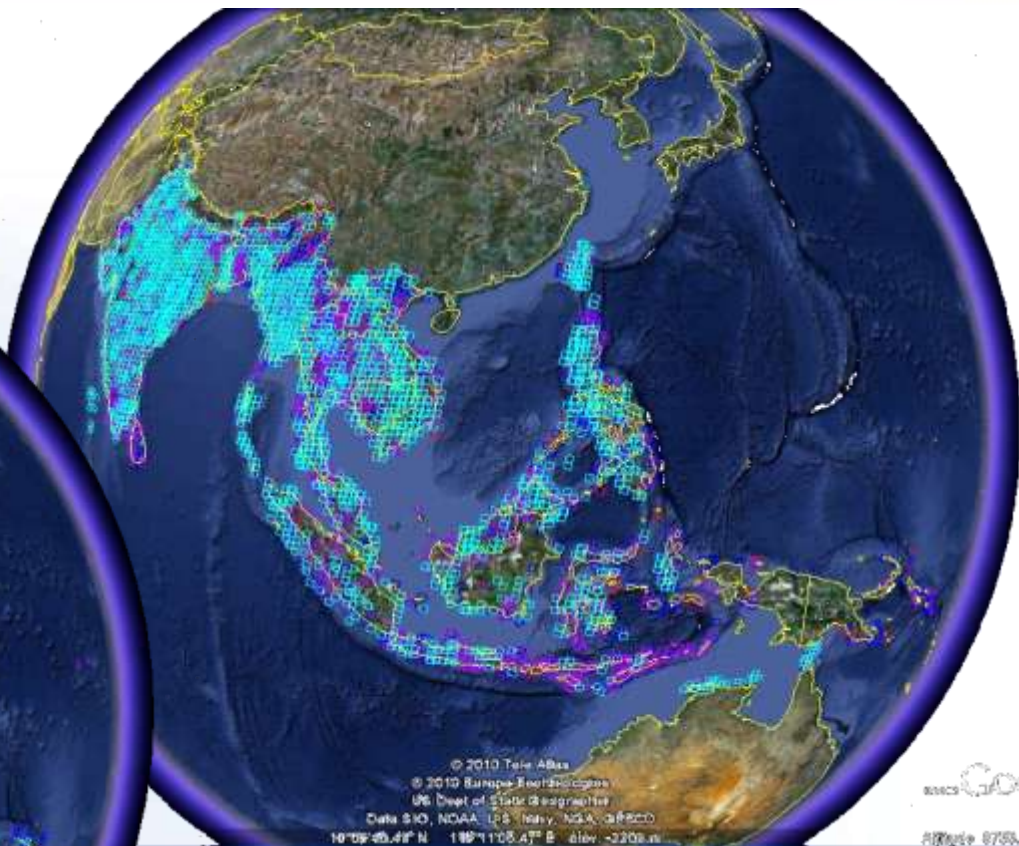
ACQUISITION PERIOD: 2006 to 2009
IMAGES < 10% CLOUDS



Left Side : Completed in purple with SPOT5 data partly cloudy combined after cloud masking.

SPOT5 Data Base (2.5-m colour) covering forests of South East Asia & India

ACQUISITION PERIOD: 2006 to 2009
IMAGES < 10% CLOUDS



Left Side : Completed in purple with 10m & 20m data acquired over the same period

BASELINE Mapping : dynamic analysis & incremental classification

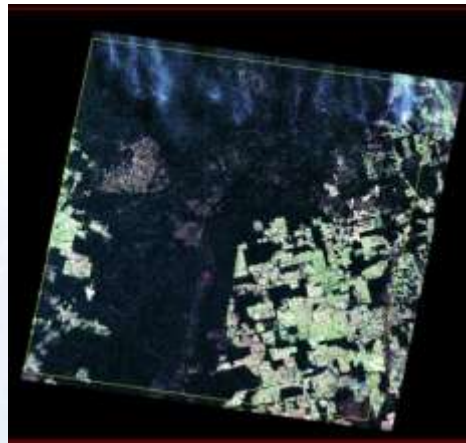
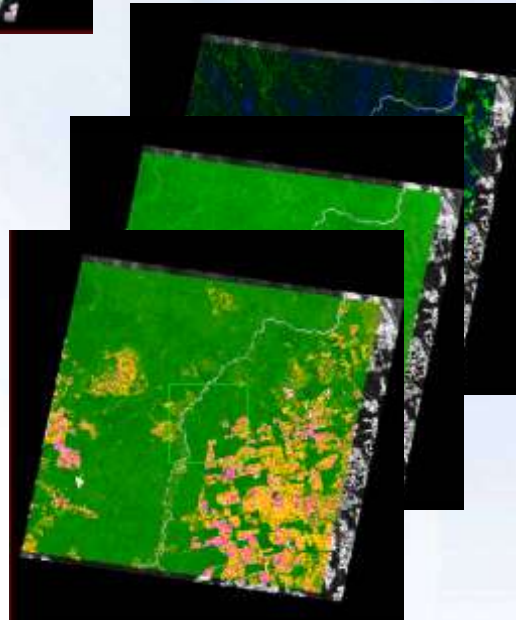


image of year N



processing with OVERLAND

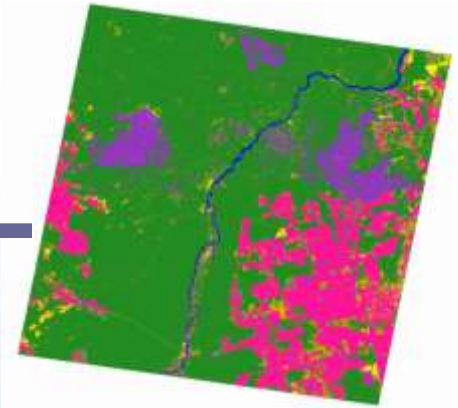


set of maps to characterize the physical state of the forest

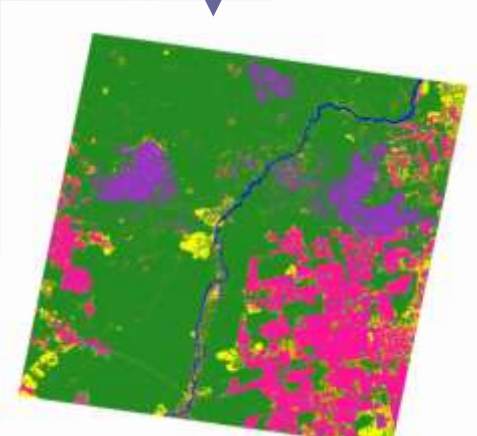


reasoning on transitions between Forest LC classes

Forest LC map from year N-1

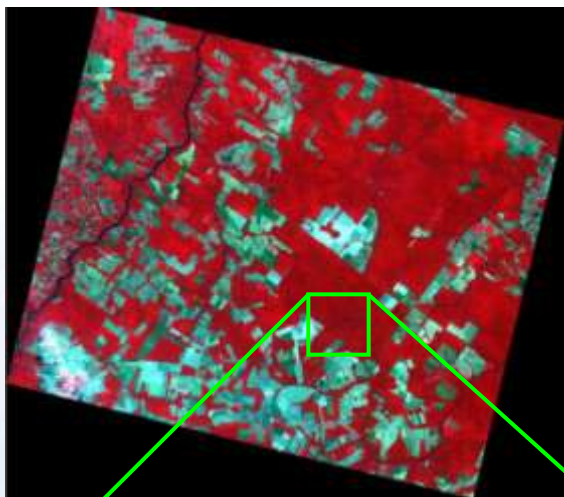


OVERLAND classification interactive tool: implementation as a decision tree

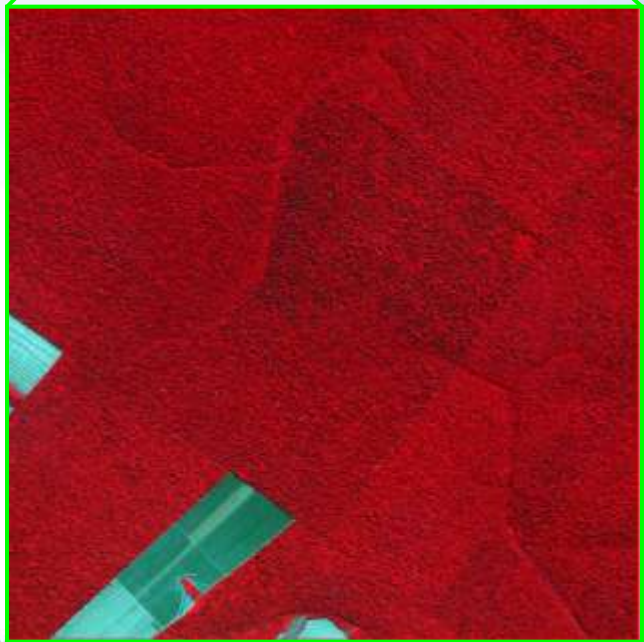


Updated Forest LC map (year N)

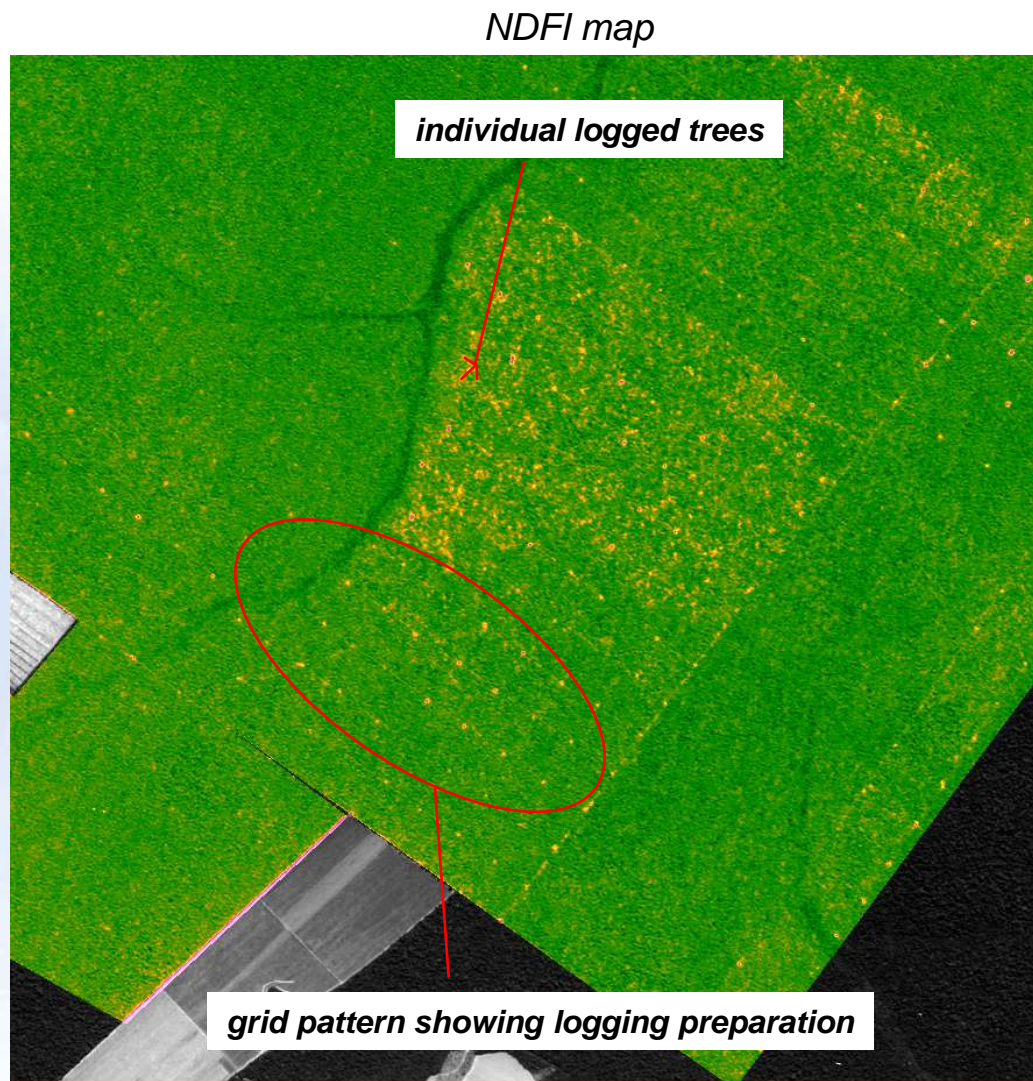
BASELINE MAPPING : Producing NDFI maps (normalised deforestation index)



high resolution image (SPOT5)



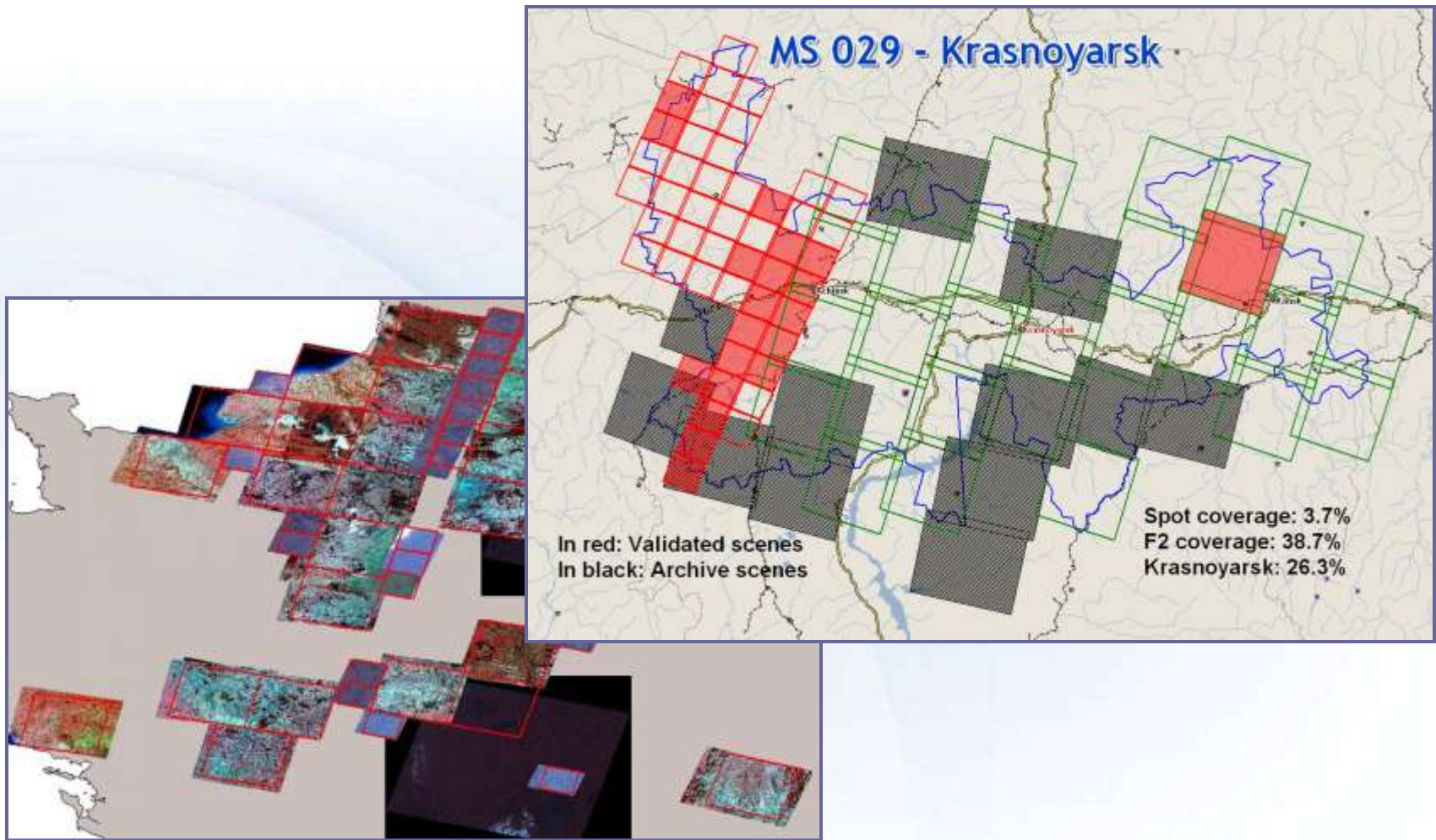
NIR composite image



NDFI map

individual logged trees

grid pattern showing logging preparation



REDD+ MONITORING CONCEPT – Interest of Web & Satellite networks

Acquisition campaigns



EO Data

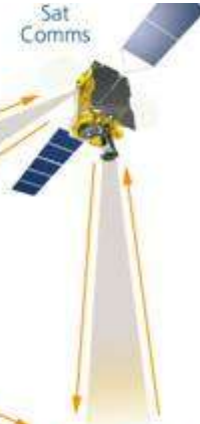
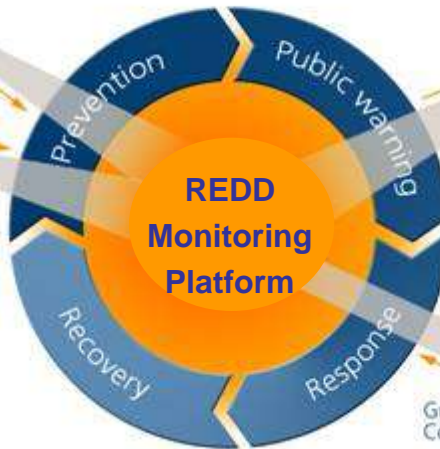
Data access & procurement
 SPOT5/6/7, TSX, CBERS,
 DMC2, DEIMOS, FII, K2 ,
 aerial, lidar, etc...



Processing facilities
 Overland,
 Pixel Factory,
 WEB-based services



Data base & data integration:
 Meteo, Forest,,
 Land Use, Field
 inventories...
 All consistent
 geographically



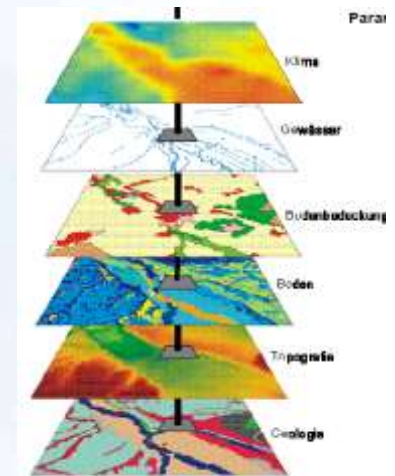
SATELLITE Networks

- Field teams
- Local authorities
- Regional centres

Ground Comms

WEB-Portal, access to the services and DATA
LINKING THE COMMUNITIES
 (Politics / Foresters /
 Entrepreneurs / Investors /
 Concessionaries)

Publishing and Registering gives confidence to investors



Service & Data providers

REDD Communities

Civil society

EADS ASTRIUM & SPOT IMAGE Corporate Responsibility program: PLANET ACTION the Earth Observation and GIS communities fighting the climate crisis



PLANET ACTION
Spot the impacts, engage in action

A Spot Image initiative

Projects

- ▶ Domains
- ▶ Eligibility Criteria
- ▶ Validation Process
- ▶ [Explore on the map](#)
- ▶ Search a project

Visualize Planet Action projects in Google Earth.

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Explore on the map

Select a theme :

Show points on map

PLANET ACTION
Spot the impacts, engage in action

A Spot Image initiative

Project Leader
Fred Stolle

Logo
WORLD RESOURCES INSTITUTE

MEASURE DEGRADATION BY LOGGING IN REP OF CONGO Congo

In Depth Coverage

Measuring degradation extent to differentiate between good and "bad" logging operations in the Republic of Congo

In the Congo basin only selectively logging is allowed and only as a few trees per hectare. If a company thus adheres to the law (what FSC companies are doing by definition) only small canopy gaps should be visible. It is thus clear that sensors such as AVHRR, MODIS, or Landsat are very unlikely to spot such clearings. There is thus a need for high resolution data to assess these small clearings.

The project used SPOT-5 (2.5m, T+X spectral mode) images to detect and assess small-clear cuts in a region where one FSC-certified and non-FSC certified timber concessions are present. In this report, we describe the method used. Then, we expose the results obtained. Finally, we explain the achievements, limitation, and lessons learned.

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News & Publications

Project Identification

Planet Action