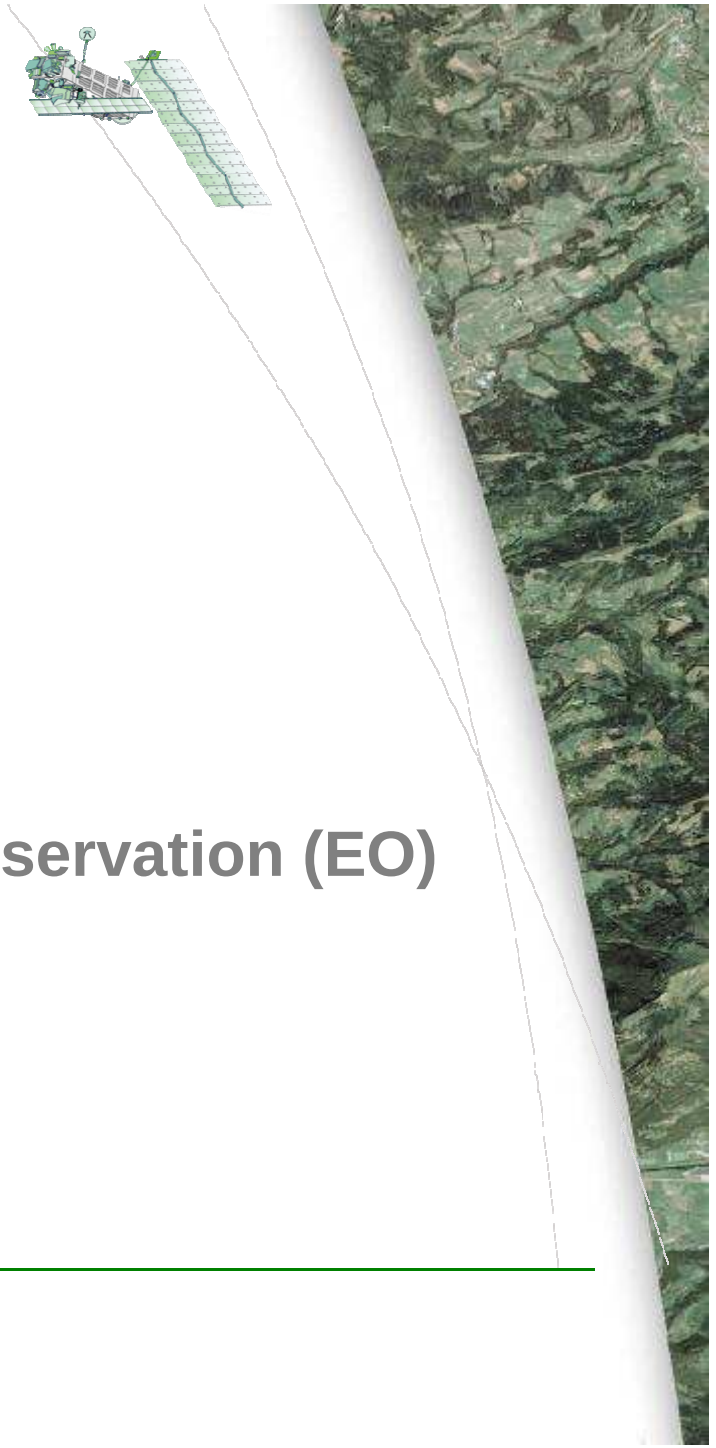
Side Event COP 16:

Integrating Adaptation Needs in REDD+

Sub-National Schemes

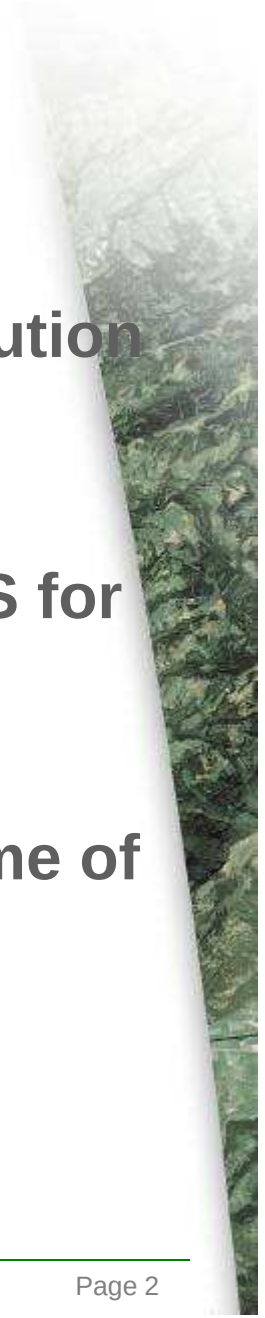


Application of Multi-Source Earth Observation (EO) Data for Forest Monitoring Projects

Thomas Häusler, Gernot Ramminger – GAF AG

The Role of EO for Forest Monitoring and REDD

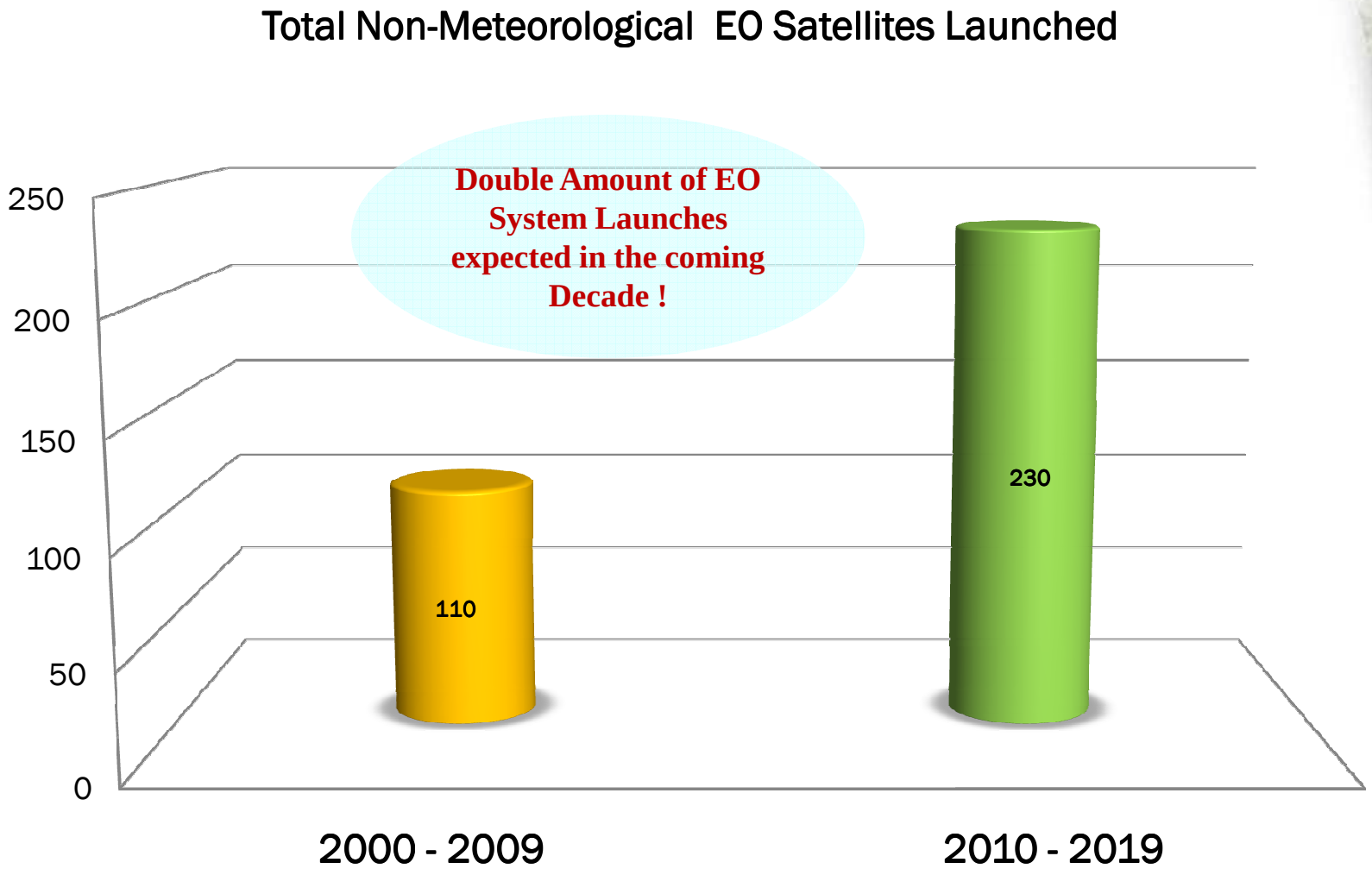
- In the REDD discussion Remote Sensing (RS) methodologies have been noted as a main contribution to Forest Monitoring - deforestation/degradation
- However, there are existing challenges of using RS for REDD
- The objectives of this presentation is to clarify some of these issues



Challenges for REDD: EO Application

- Historic and current EO data coverages, continuity in future?
- Accessibility / cost
- Trade offs between geometric resolution, thematic discrimination power, wide area foot print of satellite scenes
- Homogeneous acquisition dates
- Completeness/clouds

EO Systems Capacity: Status & Development

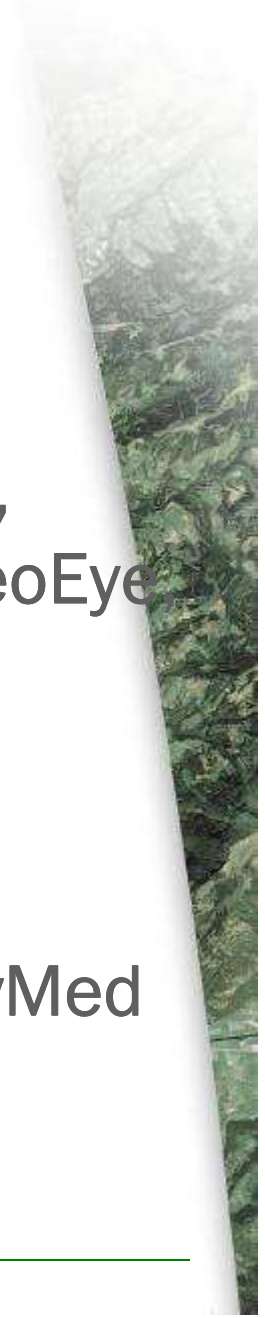


Application of EO Data for Forest Monitoring

Must be based on:

- **Selection of the most cost efficient combination of EO Data Sources**
- **Use of commercial and non-commercial Data Sources (optical and SAR)**
- **Quality controlled highly automated Pre-processing of EO Data**

Major current EO Data Systems for Forest Monitoring



Optical:

Landsat, Aster, DMC, ALOS, IRS, SPOT, RapidEye, Formosat, EROS, Kompsat, Ikonos, QuickBird, GeoEye, Worldview

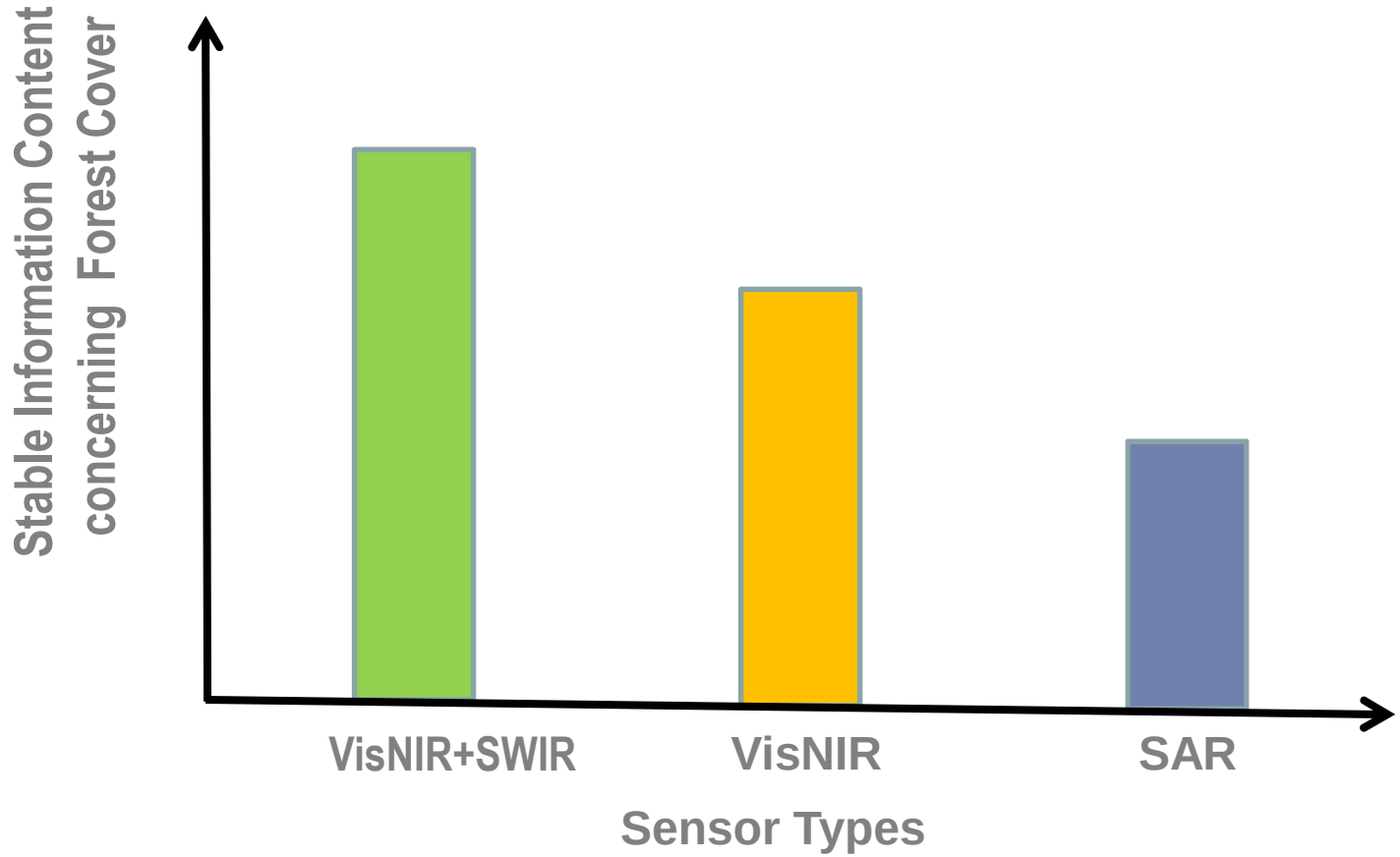
SAR:

Envisat, Radarsat, Palsar, TerraSar-X, Cosmo-SkyMed

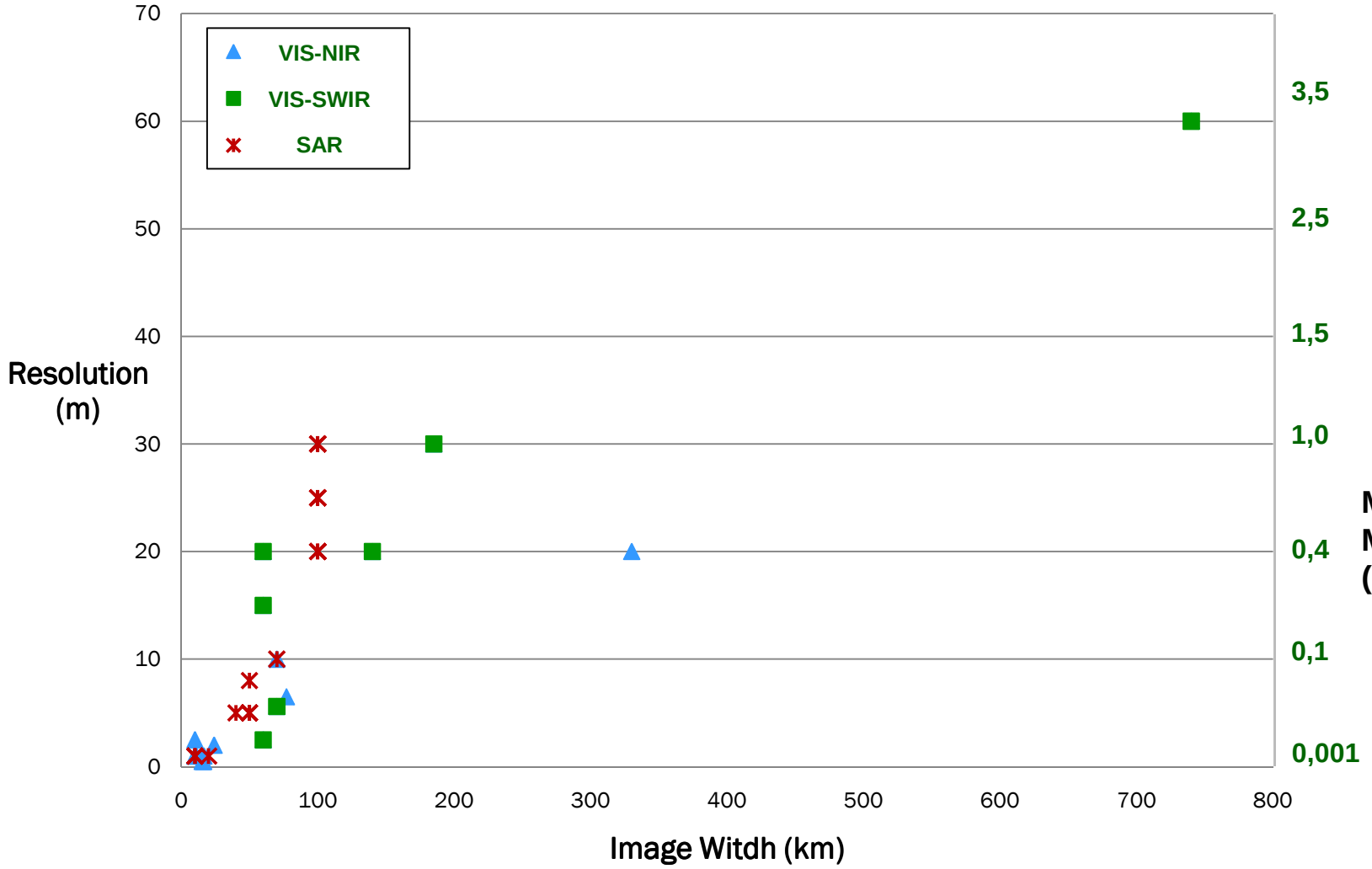
Main Selection Criteria

- Thematic Discrimination
- Minimum Mapping Unit
- Accessibility
- Costs

Suitability of Spectral Ranges for Forest Information



Minimum Mapping Unit



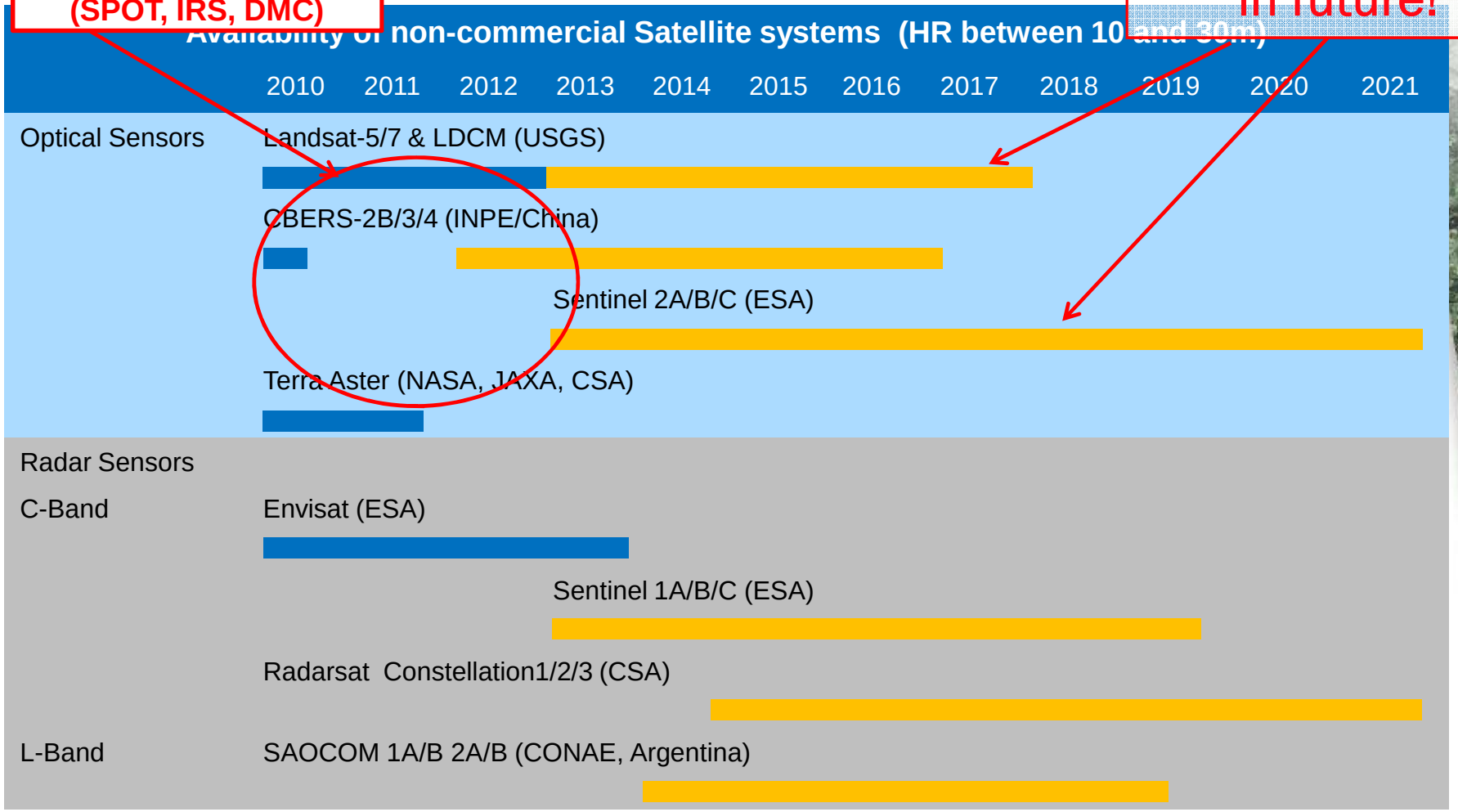
Accessibility

- **Repetition Rate** (Agility, Altitude, Orbit, Coverage, Conflicts)
- **Dependency on Atmospheric Conditions** (<-> Region)
- **Programmability** (Influence on Acquisition Schedule, Agility)
- **Operability** (Data Access Conditions, Reliability)
- **Archive Availability**

EO Data Availability and Continuity: Non-Commercial

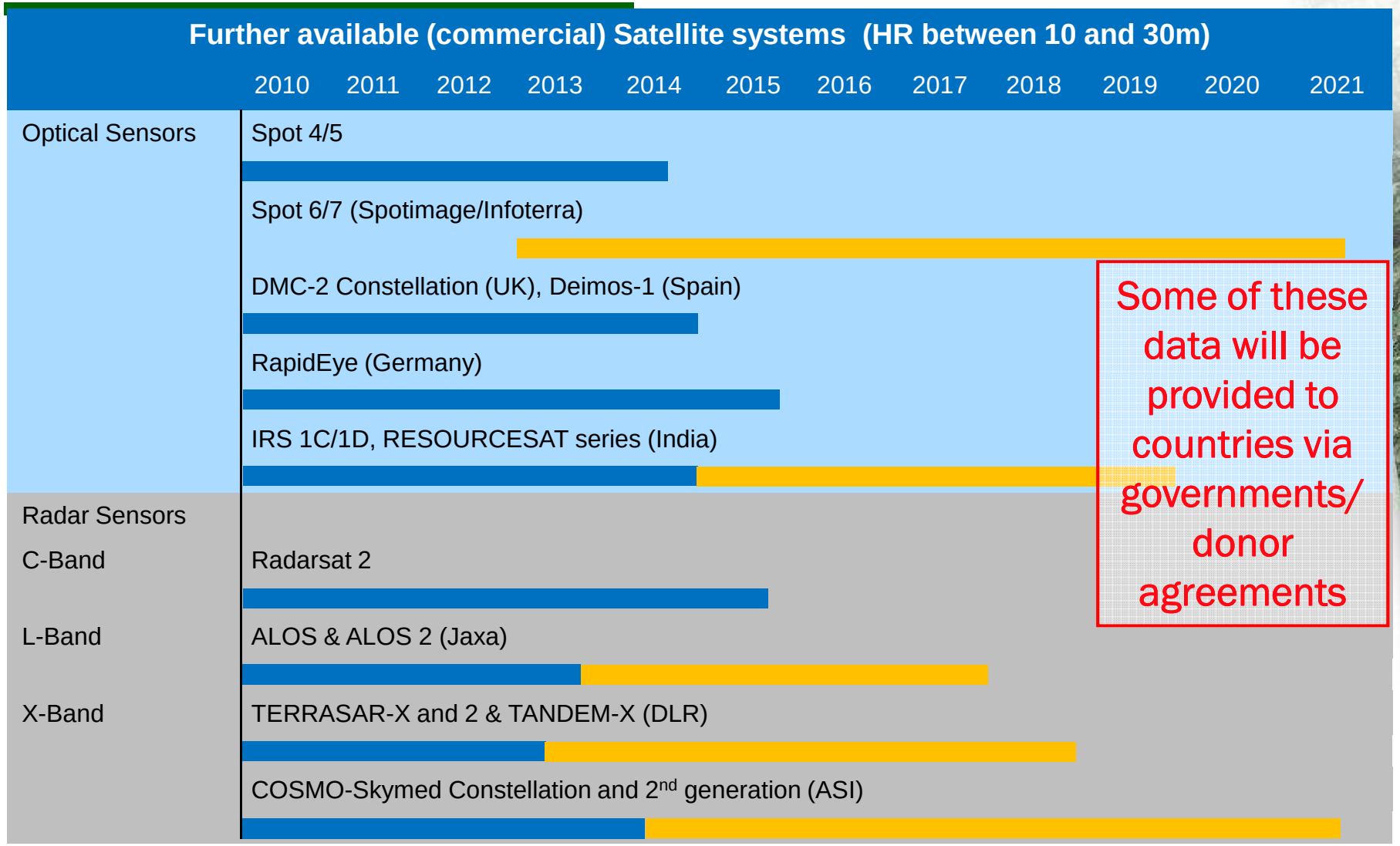
Acquisition capacity of new data are very limited between 2010 and 2013, commercial systems should be taken into account (SPOT, IRS, DMC)

These EO data will be most likely the work horses in future!



Source: CEOS, http://database.eohandbook.com/database/missiontable.aspx

EO Data Availability and Continuity: Commercial



Some of these data will be provided to countries via governments/ donor agreements

Source: CEOS, http://database.eohandbook.com/database/missiontable.aspx

GMES dedicated missions: Sentinels

Sentinel 1 – SAR imaging
All weather, day/night applications, interferometry

2012 (A), 2014+ (B)

Sentinel 2 – Multispectral imaging
Land applications: urban, forest, agriculture,..
Continuity of Landsat, SPOT

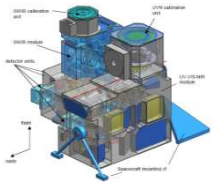
2013 (A), 2015+ (B)

Sentinel 3 – Ocean and global land monitoring
Wide-swath ocean colour, vegetation, sea/land surface temperature, altimetry

2013 (A), 2015+ (B)

Sentinel 4 – Geostationary atmospheric
Atmospheric composition monitoring, trans-boundary pollution

2018



Sentinel 5 and Precursor – Low-orbit atmospheric
Atmospheric composition monitoring

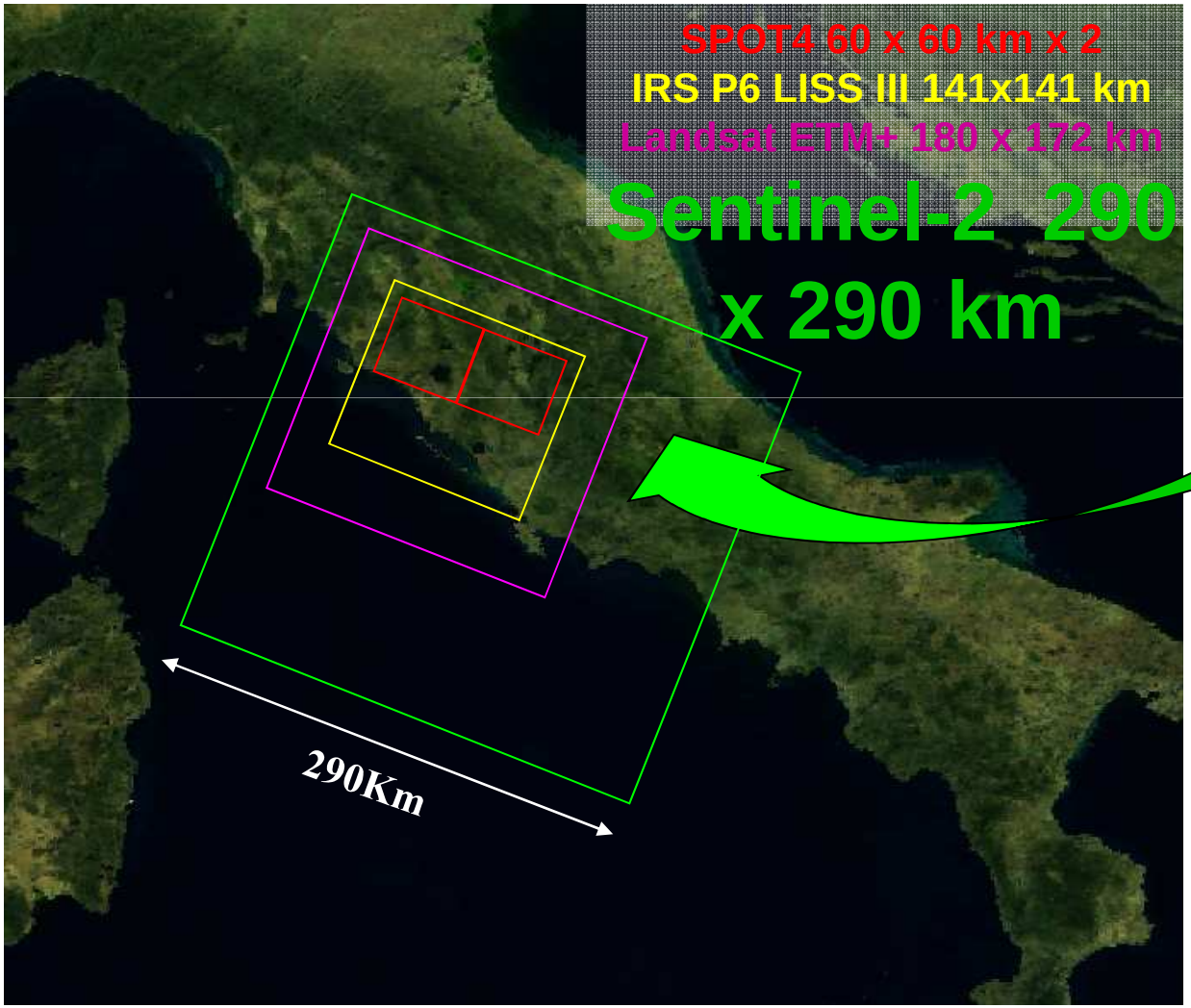
2014 (5P), 2019

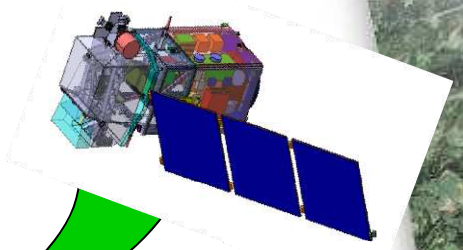
Sentinel–2: Superspectral imaging mission

- Applications:
  - generic land cover maps
  - rapid mapping for emergency response

- 13 spectral bands (VIS, NIR & SWIR)
- Spatial resolution: 10, 20 and 60 m
- 290 km swath width
- 5 days repeat cycle (cloud free) with 2 satellites
- Sun synchronous orbit at 786 km mean altitude
- 1200 kg spacecraft mass
- 7 years design life time, consumables for 12 years

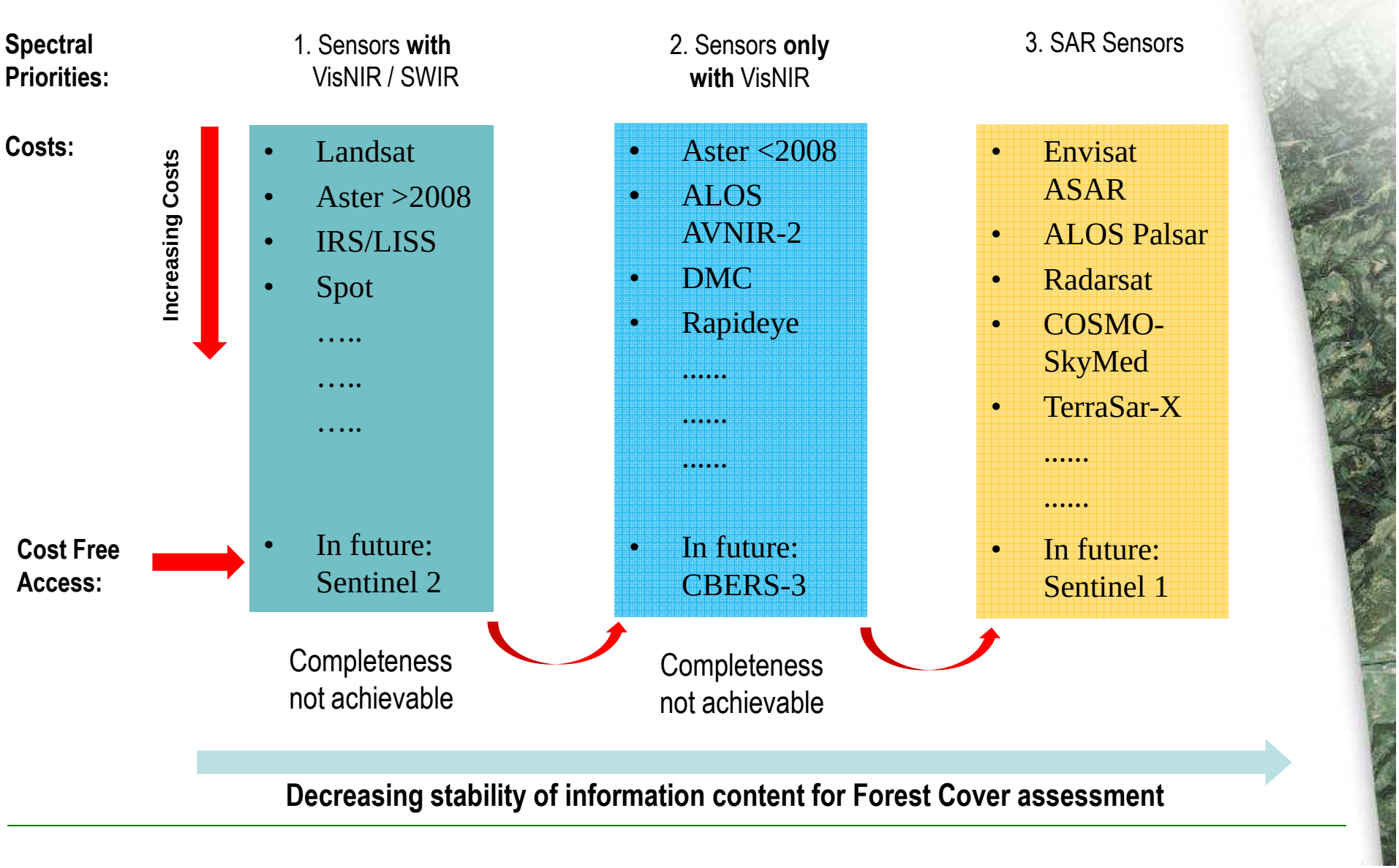
Sentinel-2 Swath





High revisit time assured by twin satellite observations performed over a very large swath

Decision Model for EO Data Selection



Conclusions and Recommendations

- **Planned “Open EO systems“ will most likely provide the majority of data coverages for REDD MRV in near future**

- **Commercial satellite systems will be needed to complement national data coverages and to guarantee quality for REDD MRV**

- **Governments-/Donor-Agreements on data procurement of certain EO data types in some Regions will close gaps till Open EO systems will be functional (2013/14)**

Conclusions and Recommendations

- User involvement in defining technical specifications for products is critical in order to achieve high utility
- REDD is a National Process and Parties have sovereignity on the processes and products
- In each country the relevant stakeholders have to be included in the production and knowhow transfer process