



# Overview of the GFOI Space Data Coordination and the CEOS Data Strategy for GFOI/FCT

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## Background and Purpose

### 25<sup>th</sup> CEOS Plenary (November 2011):

- Endorsed the implementation of a ***CEOS STRATEGY FOR SPACE DATA COVERAGE AND CONTINUITY IN SUPPORT OF THE GEO GLOBAL FOREST OBSERVATIONS INITIATIVE (GFOI) AND FOREST CARBON TRACKING (FCT) TASK (“CEOS DATA STRATEGY”)***
- Established the GFOI Space Data Coordination Group (**SDCG**)
- The SDCG serves to **implement *the CEOS Data Strategy***

## Scope of the Satellite Data Coordination Group

- Support **coordinated acquisition planning of all relevant Earth observing missions** supporting GFOI and FCT.
  - Emphasis on CEOS agency missions, but also to communicate needs to commercial operators.
- Initially limit **coordination to acquisition planning.**
  - Data processing and distribution through GFOI implementation with potential **future** roles for the SDCG.

## Membership and Representation

- **Participation is open** to all CEOS space agencies willing to support and contribute to the CEOS Data Strategy.
- Current Members (12):
  - **Co-chairs:** ESA, NSC/Norway, USGS/USA,
  - **Secretariat:** DCCEE/Australia
  - JAXA/Japan, INPE/Brazil, CNES/France, CONAE/Argentina, CRESDA/China, CSA/Canada, CSIRO/Australia, DLR/Germany
  - Pending invitations: ISRO/India, KARI/Korea, ASI/Italy



## SDCG Key Objective

Implementation of the  
*CEOS Data Strategy for GFOI/FCT*

# The CEOS Data Strategy for GFOI/FCT – Scope

- CEOS space agencies embrace a range of data policies
- Missions of all types are of interest for GFOI – and may be needed given the scale of the challenge
- CEOS Data Strategy - as a matter of principle – primarily focuses on the coordination of data made available for GFOI purposes on a free of charge basis (**GEO Data Sharing Principles**) whilst taking account of known plans for data which are not

## The CEOS Data Strategy for GFOI/FCT

- Level-1** [global scale]: A baseline, coordinated global data acquisition strategy (wall-to-wall) involving a number of ‘core data streams’ that can be used free-of-charge for GFOI purposes.
- Level-2** [national/sub-national scales] : Coordinated national data acquisition strategies in response to national needs assessments undertaken in the course of GFOI implementation.
- Level-3** [GEO-FCT National Demonstrator countries]: Data supply in support of the FCT R&D activities, including in support of the science studies assisting the development and evolution of the GEO-branded methods and protocol documents for GFOI.

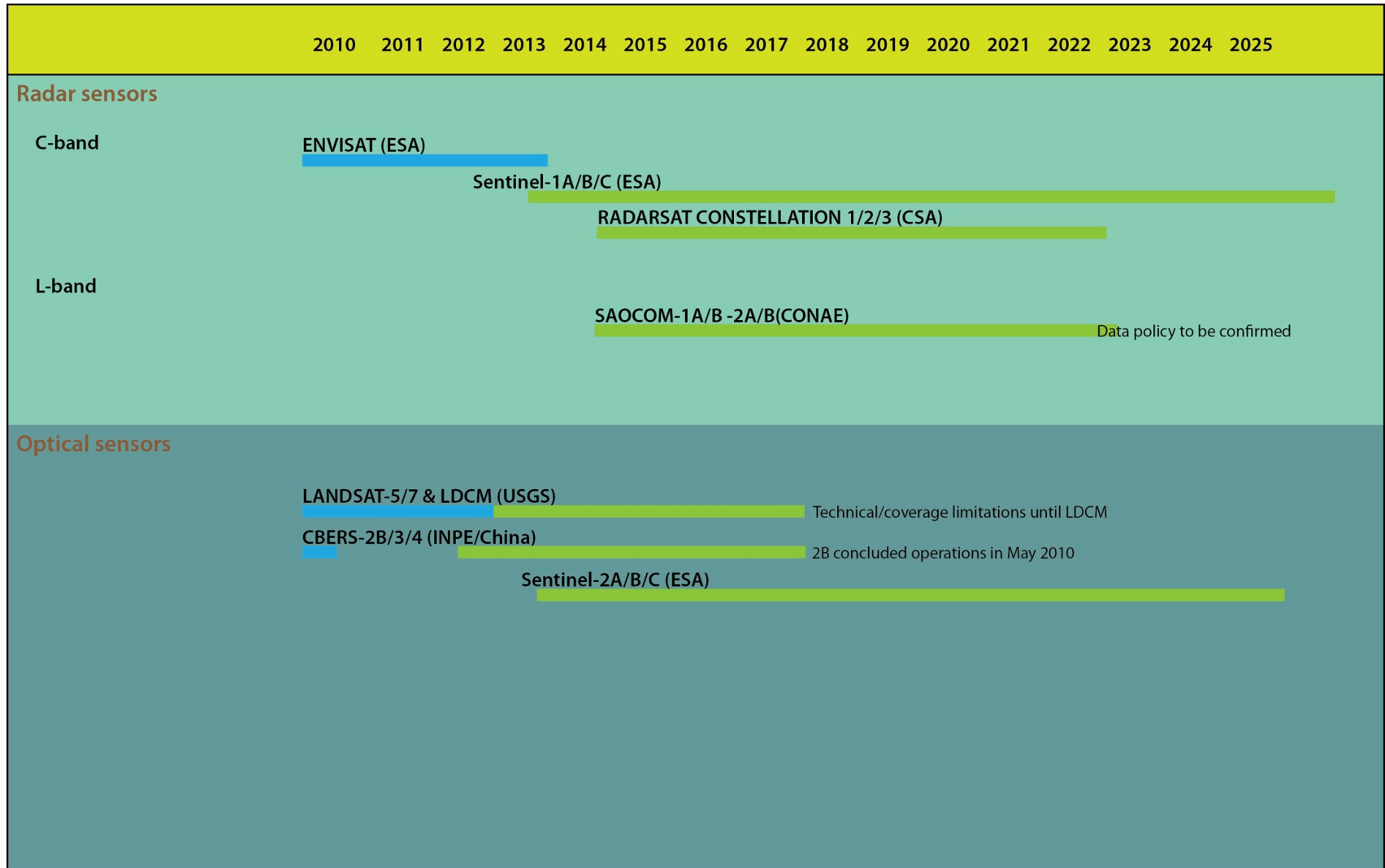
## Core satellite data streams for global baseline

- The baseline global data acquisition strategy for CEOS will involve coordination of a number of core data streams that satisfy key criteria consistent with the principles for implementation of the GFOI:
  - core data streams provide sub-30m data free-of-charge for GFOI purposes,;
  - core data stream systems should have a sustained and long-term capacity in coverage, processing and distribution which is consistent with the large (global) scale data requirements of the GFOI. CEOS space agencies embrace a range of data policies.
- Discussions among CEOS agencies active within the FCT task for the last several years have resulted in consensus on a working list of CEOS agency satellite missions assumed to represent the GFOI Core Satellite Data Streams



# Core satellite data streams for global baseline

Sep 2011



## Further satellite data streams

- Many more satellite missions which will be able to contribute to systematic national, regional, and global coverage
  - these include e.g. optical high-resolution missions, X-band and L-band SAR
- Coordination of the national data acquisition strategy for GFOI and of the data supply in support of the FCT activities will involve participation of a larger number of CEOS agencies, and possibly engagement of some commercial operators

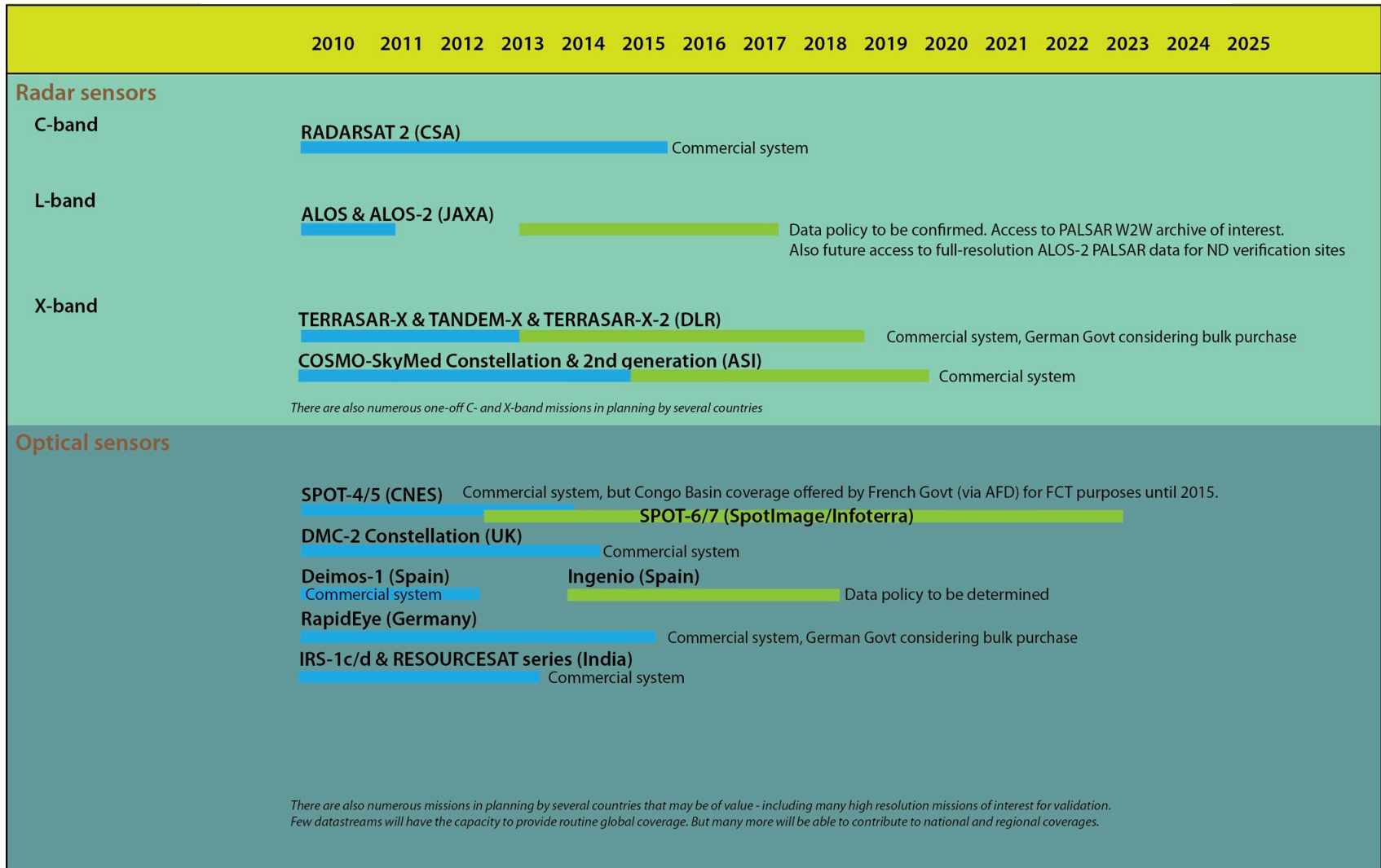
## Further satellite data streams

*Uninterrupted time-series archives of wall-to-wall data are fundamental to the success of GFOI.*

*The CEOS Data Strategy encourages **all missions** to contribute to the long-term building of **consistent wall-to-wall time series archives** on scales from national to global – even if an explicit commitment to free-of-charge data provision cannot be guaranteed.*

# Further satellite data streams

Sep 2011



## Timing

- GFOI IP suggests key components operational by 2014.
- CEOS data strategy should reflect and support GFOI IP schedule.
- Limited core data stream capacity until into 2013/14.
- Initial coverage priorities can be expected to reflect current levels of engagement of different countries (eg in UN-REDD or REDD+)

## Designing the Strategy – finding the optimal use of each sensor type

### **Optical sensors**

- *The optical core missions (Landsat, Sentinel-2, CBERS-3) are the anticipated work-horses for GFOI. **At least one cloud-free coverage desired per year***
- *Cloud coverage is the most serious limitation. What can be done to improve utilisation?*
  - *investigate interoperability between the core missions – as well as other relevant optical missions (SPOT, DMC, RapidEye etc.). Investigate to what extent can these sensors can be used to replace each other.*
  - *Enhanced pixel mining/cloud-free compositing – making use of all data acquired. (WELD pres.)*

## Designing the Strategy – finding the optimal use of each sensor type

### **C-band SAR**

– *Sentinel-1 and RCM the anticipated SAR work-horses. Several approaches to enhance information extraction from C-band SAR were demonstrated.*

*Possible acquisition scenario:*

- *National-scale w2w coverages 2 times/year (dual-season) (or every 2 years) for baseline mapping in combination with other sensors*
- *Dense time series mapping over deforestation hotspot regions (stratified w2w) under forest mask*
  - *Monthly – no less than bi-monthly – acquisitions required in order not to lose the signal*

## Designing the Strategy – finding the optimal use of each sensor type

### ***L-band SAR***

- *Demonstrated utility for forest applications with an established science and user community through the JERS-1 GRFM and ALOS K&C Initiative*
- *ALOS PALSAR is presently PPP and not one of the core missions, but nevertheless one of the most utilised sensors – on par with Landsat – within GEO-FCT.*
- *The global acquisition strategy for PALSAR – **global w2w coverage two times/year** – adequate for GFOI.*
- *L/C-band complementarity demonstrated*
- *SAOCOM-1 a core mission of interest*



## Designing the Strategy – finding the optimal use of each sensor type

### ***X-band SAR***

- *Several approaches to enhance information extraction from X-band SAR have been demonstrated. Very high resolution X-band is the key sensor to address the degradation requirement*
  - *VHR resolution acquisitions very demanding on system resources*
  - *No “default” acquisition strategy can be anticipated. Has to be tailored individually for each country that requests it (data provision through bilateral agreements foreseen for TS-X/TD-X)*



## **Draft Level-1 scenario** **2012-2013**

**Optical sensors** *At least one cloud-free w2w coverage annually*

*Coverage: at least GFOI extended ROI*

**Core:** Landsat 7

**Other missions:** SPOT, GeoEye ?

**SAR sensors 1** *Dual-season w2w coverage annually*

*Coverage: GFOI extended ROI*

**Core:** Envisat ASAR

**Other missions:** Radarsat-2, others?

**SAR sensors 2** *Monthly/bi-monthly – stratified hot spots*

– *Coverage: Stratified “deforestation hotspot” regions*

– **Core:** Envisat ASAR?

– *Other potential contributing missions: Radarsat-2, TS-X?*



## **Draft Level-1 scenario** **2014+**

**Optical sensors** *At least one cloud-free w2w coverage annually*

*Coverage: Global*

**Core:** LDCM, Landsat 7; Sentinel-2, CBERS-3

**Other missions:** SPOT, Pleiades, GeoEye ?

**SAR sensors 1** *Dual-season w2w coverage annually*

*Coverage: GFOI extended ROI*

**Core:** Sentinel-1, RCM, SAOCOM

**Other missions:** ALOS-2, Radarsat-2, ?

**SAR sensors 2** *Monthly/bi-monthly – stratified hot spots*

– *Coverage: Stratified “deforestation hotspot” regions*

– **Core:** Sentinel-1, RCM

– **Other missions:** ALOS-2, Radarsat-2, TerraSAR-X/TanDEM-X



Thank you