

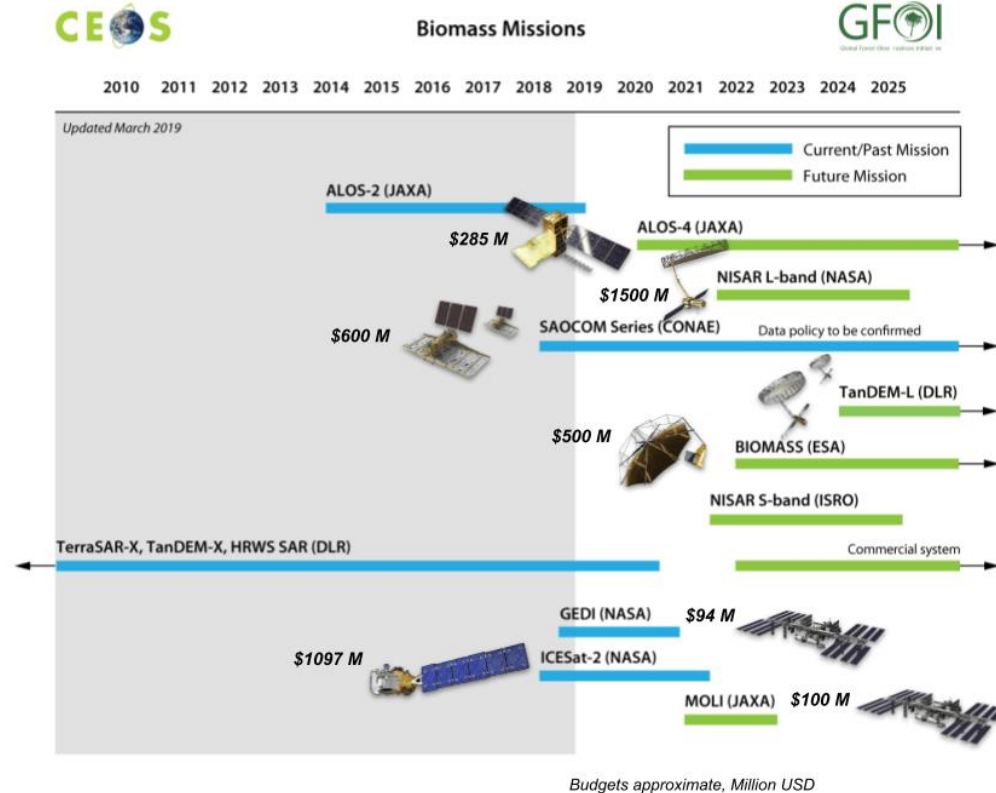


Biomass mission coordination and data uptake

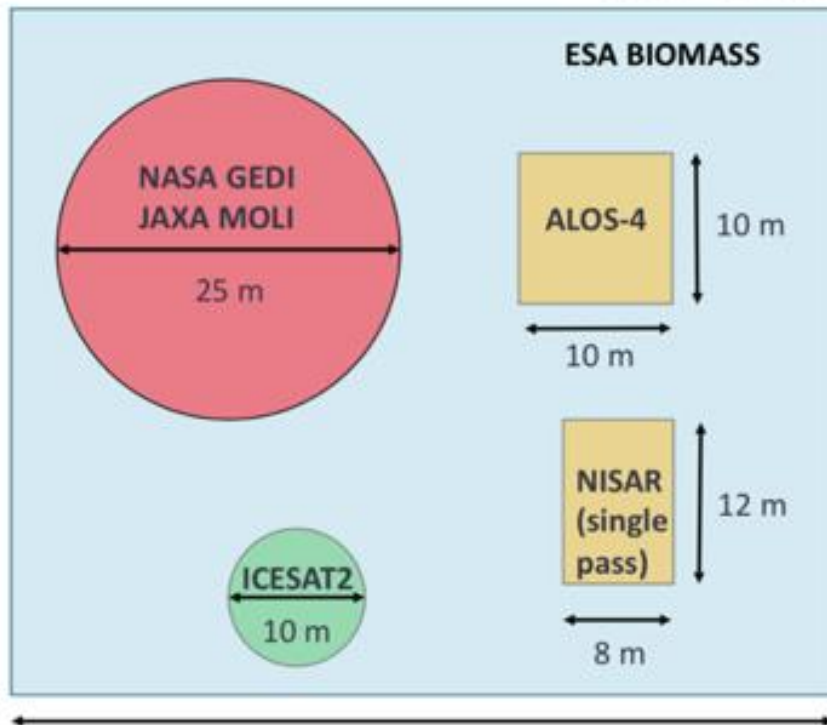
LSI-VC-8

S Ward, Sep 2019

- Substantial investment (\$4Bn+!) in biomass-related mission launches 2018-2024
- Strong interest in biomass from sectors related to carbon emissions and forests
- Need to optimise the policy relevance of the space data - through fora such as GFOI and World Bank



How will scientists make sense of many the data products?
How will policy makers?





Many current and upcoming missions will provide data that will be used to map biomass

Mission	Funding Agency	Expected Launch Date	Data Type	Geographic Domain	Biomass Product	
					Resolution	Accuracy Requirement
ALOS-2	JAXA	2014	L-band SAR	Global	NA	NA
ICESat-2	NASA	Sept 15, 2018	532 nm photon counting lidar	Global	NA	Global
SAOCOM 1A	CONAE	October 8, 2018	L-band SAR	Global	NA	NA
GEDI	NASA	Dec 5, 2018	1064 nm waveform lidar	ISS (+/- 51.6°)	1 km	<20% SE for 80% of forested 1 km cells
SAOCOM 1B	CONAE	October 2019	L-band SAR	Global	NA	NA
ALOS-4	JAXA	2021	L-band SAR	Global	NA	NA
NISAR	NASA/ISRO	2021/2022	L/S-band SAR	Global	1 ha (<100 Mg/ha)	<20% RMS accuracy for <100 Mg/ha
BIOMASS	ESA	2022	P-band SAR	Global (excl N. America & Europe)	4 ha	Accuracy of 20%; 10 Mg/ha for <50 Mg/ha
MOLI	JAXA	~2022	1064 nm waveform lidar	ISS (+/- 51.6°)	500 m	NA
TanDEM-L	DLR	2022-2023?	L-band SAR	Global	1 ha	20% accuracy or 20 Mg/ha

- **Many international policies requiring biomass information adopted in recent years.**
- **Multilateral agreements & performance-based incentive systems to curb trends in forest loss in tropics**
- **International negotiations related to climate change**
- **Voluntary international processes and their targets related to forests:**
 - UN Forum on Forests
 - Aichi targets under the UN convention on Biological Diversity
 - 2011 Bonn Challenge to restore 150 million hectares of degraded land by 2020
 - 2014 New York Declaration
 - Land degradation neutrality target UN Convention to Combat Desertification
 - UNFCCC NDCs, and the related Sustainable Development Goals (SDGs).
- **Biomass measurements are of particular significance for policies related to the UNFCCC, because countries must monitor emissions related to gains and loss of biomass, and must report on these regularly**

- **T12 is Above Ground Biomass (AGB)**
- **GCOS highlights the further need for actions to:**
 - Encourage inter-agency collaboration on developing methods to combine biomass estimates from current and upcoming missions (GCOS Action 52)
 - Encourage inter-agency collaboration to develop validation methodologies (GCOS action 53)
 - Develop a set of validation sites covering the major forest types, particularly in the tropics (GCOS action 54)
 - Promote access to well-calibrated and validated regional- and national-scale biomass maps including uncertainty assessment (GCOS action 55)
 - Improve access to high-quality forest inventories, especially in the tropics, which can be used for research purposes and Reducing emissions from deforestation and forest degradation plus (REDD+) (GCOS action 56)

- **Explore how CEOS groups and agencies might work together to accelerate the policy relevance of the new generation of above ground biomass datasets**
 - **gather, synthesize, and communicate user requirements** of forest biomass data and space-based AGB data products - that meet user needs, support forest monitoring and wider land use management applications and improve environmental policy to enable countries to help meet international climate and sustainable goals.
 - **stimulate uptake of biomass data** by key stakeholders. integration of biomass products in climate/vegetation models is already progressing (i.e. ESA Biomass CCI: <http://cci.esa.int/>), but there has been little progress in demonstrating how biomass mapping from space can be integrated in national forest monitoring and national GHG inventories efforts.
 - **promote collaborative and sustained data provision**
 - avoid a widening gap between what is evolving in research and from space-based missions, and the diverse demands of users, particularly in terms of the need for operational systems.

Future Biomass Framework



Data Component

(Country Needs Assessment, data accessibility, in-situ data, validation, country link and international policy link)

R&D

(Biomass Expert Meetings, funding opportunities for gap filling)

MGD

(Emission Factors, maturity assessment)

CB

(Capacity Building related to biomass estimation)



CARB-16
CARB-XX

LSI VC

WGCV

SDCG / Forest SG

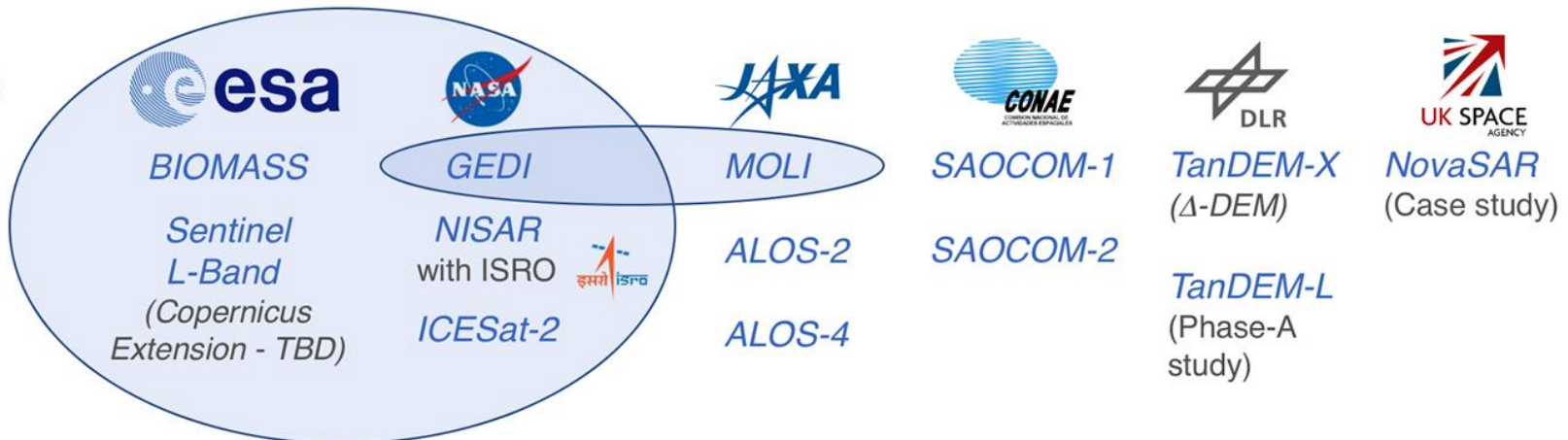
Multi-mission user interaction and data strategy, facilitate data uptake

LPV

Biomass Product Calibration, Cross-calibration, Validation Protocol

Space Agencies

Biomass related Missions



- **Biomass mission coordination implemented through an informal multi-mission group, with close ties to WGCV/LPV but not formally recognised in the CEOS structure**
 - product and cal-val focus (GCOS requirements)
- **Would agencies benefit from recognition of the challenges within a CEOS Virtual Constellation framework, and should that be LSI-VC or a standalone VC?**
 - JAXA, NASA, ESA, DLR, CONAE, ISRO fly the missions
 - definitely at the research end of a VC and not operational
 - land surface, not strictly imaging
 - CARD4Lidar?
 - could be embedded within new Forest & Biomass team
 - GEOGLAM/Ag will have interest in aspects also
- **How might we take advantage of the coming SIT term to kick-start any cooperation and establish CEOS Principal attention & support?**
- **Getting traction within LPV/Biomass group... NASA, ESA Principals?**