



# ESA Sea Level Climate Change Initiative Extension (SL\_CCI+) Kick Off meeting

Management activities  
JF. Legeais

29/03/2019



**CLS**  
COLLECTE LOCALISATION SATELLITES



**TUM**



**National  
Oceanography Centre**  
NATURAL ENVIRONMENT RESEARCH COUNCIL



- 1. SL\_cci+ Organisation & Management**
- 2. Technical Solution**
- 3. Planning**



# The Sea Level CCI+ Organisation



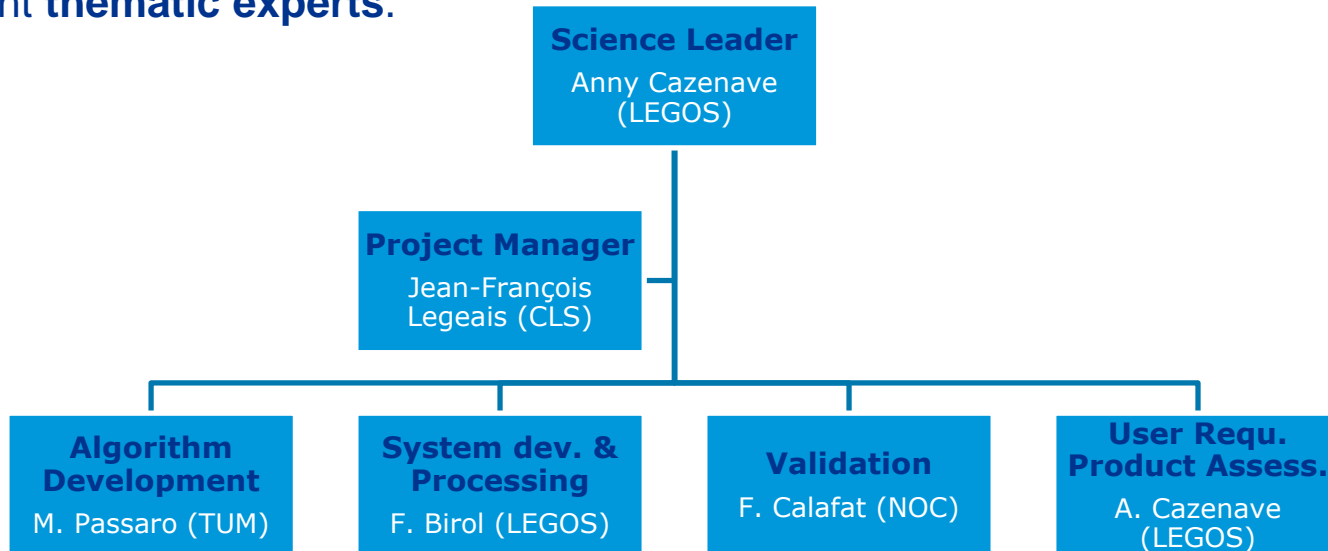
- **Organisation of the consortium:**
  - Four companies/institutes from three ESA participating states:

Consortium Member	Country	Role
Collecte Localisation Satellite (CLS)	France	Prime contractor
LEGOS	France	Subcontractor
National Oceanography Center (NOC)	United Kingdom	Subcontractor
Technical University of Munich	Germany	Subcontractor



- **Detailed roles:**

- A high level of **expertise** is gathered in this consortium
- **Scientifically-driven** activity
- Capacity to develop **inter disciplinary coordination** with the **project manager** and the different **thematic experts**.





- **Reporting and Meetings:**
  - **Project Management Outputs:**
    - D6.1: Quarterly progress reports
    - D6.2: Final Report
    - D6.3: Project Management Plan
    - D6.4: Project scientific highlights, reported quarterly by the science leader
    - Website update
  - **Meetings:**
    - Quarterly Progress Review teleconferences
    - Annual review meetings
    - Annual ESA colocation meetings with other CCI+ projects
    - Annual integration meetings with the Climate Modelling User Group (CMUG)
    - Final meeting @ ISSI Bern with external users



- Project meetings:

	Year 1												Year 2												Year 3												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Kick off	▲																																				
Progress Meetings			▼			▼			▼						▼			▼			▼						▼			▼			▼				
Annual Review												▲												▲													▲
Collocation Meetings			▲												▲												▲										
CMUG Integration Meetings									▼												▼												▼				



Meetings	Date	Location	Participants
ESA Colocation meeting	25-28/03/2019	Oxford, UK	B Meyssignac, JF Legeais
Q2 2019 QPR meeting	07/2019	Telecon	ESA, CLS
Q3 2019 QPR meeting	10/2019	Telecon	ESA, CLS
ESA CMUG meeting	10/2019	TBD	CLS
Q4 2019 QPR meeting	01/2020	Telecon	ESA, CLS
Annual review meeting	04/2020	ESRIN	All
ESA Colocation meeting	04/2020	TBD	CLS, LEGOS
Q2 2020 QPR meeting	07/2020	Telecon	ESA, CLS
Q3 2020 QPR meeting	10/2020	Telecon	ESA, CLS
ESA CMUG meeting	10/2020	TBD	CLS
Q4 2020 QPR meeting	01/2021	Telecon	ESA, CLS
Annual review meeting	04/2021	Toulouse	All
ESA Colocation meeting	04/2021	TBD	CLS, LEGOS
Q2 2021 QPR meeting	07/2021	Telecon	ESA, CLS
Q3 2021 QPR meeting	10/2021	Telecon	ESA, CLS
ESA CMUG meeting	10/2021	TBD	CLS
Q4 2021 QPR meeting	01/2022	Telecon	ESA, CLS
Annual Final review meeting	04/2022	ESRIN	All
ESA Colocation meeting	04/2022	TBD	CLS, LEGOS





- **Communication & Outreach:**
  - **SL\_cci website**
    - Update the SL\_cci ESA **website** with:
      - Presentation of the project,
      - Publication of technical documentation and outputs of the project
  - **International conferences**
    - EGU
    - OSTST meeting and coastal altimetry workshops
    - ESA Living Planet Symposium
    - IUGG conference
    - AGU
    - COSPAR meetings
    - ISSI Bern user workshop
- Contribute to **promote the activity** with the science leader,



- **Payment plan**

PRIME CONTRACTOR PAYMENT PLAN		
Milestone Description	Scheduled dates	Payment in Euros to CLS [FR]
<b>Milestone 1</b> : Upon acceptance of Phase 1 deliverable D.1.1 URD v1	KO+6 01/10/2019	133,327
<b>Milestone 2</b> : Upon successful completion of Phase 1 and acceptance of relevant deliverables.	KO+12 01/04/2020	33,332
<i>TOTAL Phase 1</i>		166,659
<b>Milestone 3</b> : Upon acceptance of Phase 2 deliverable D.1.1 URD v2	KO+18 01/10/2020	133,327
<b>Milestone 4</b> : Upon successful completion of Phase 2 and acceptance of relevant deliverables	KO+24 01/04/2021	33,332
<i>Total Phase 2</i>		166,659
<b>Milestone 5</b> : Upon acceptance of Phase 3 deliverable D.1.1 URD v3	KO+30 01/10/2021	133,327
<b>FINAL</b> : Upon successful completion of Phase 3 and acceptance of all deliverables	KO+36 01/04/2022	33,332
<i>Total Phase 3</i>		166,659
<b>TOTAL</b>		<b>499,977</b>

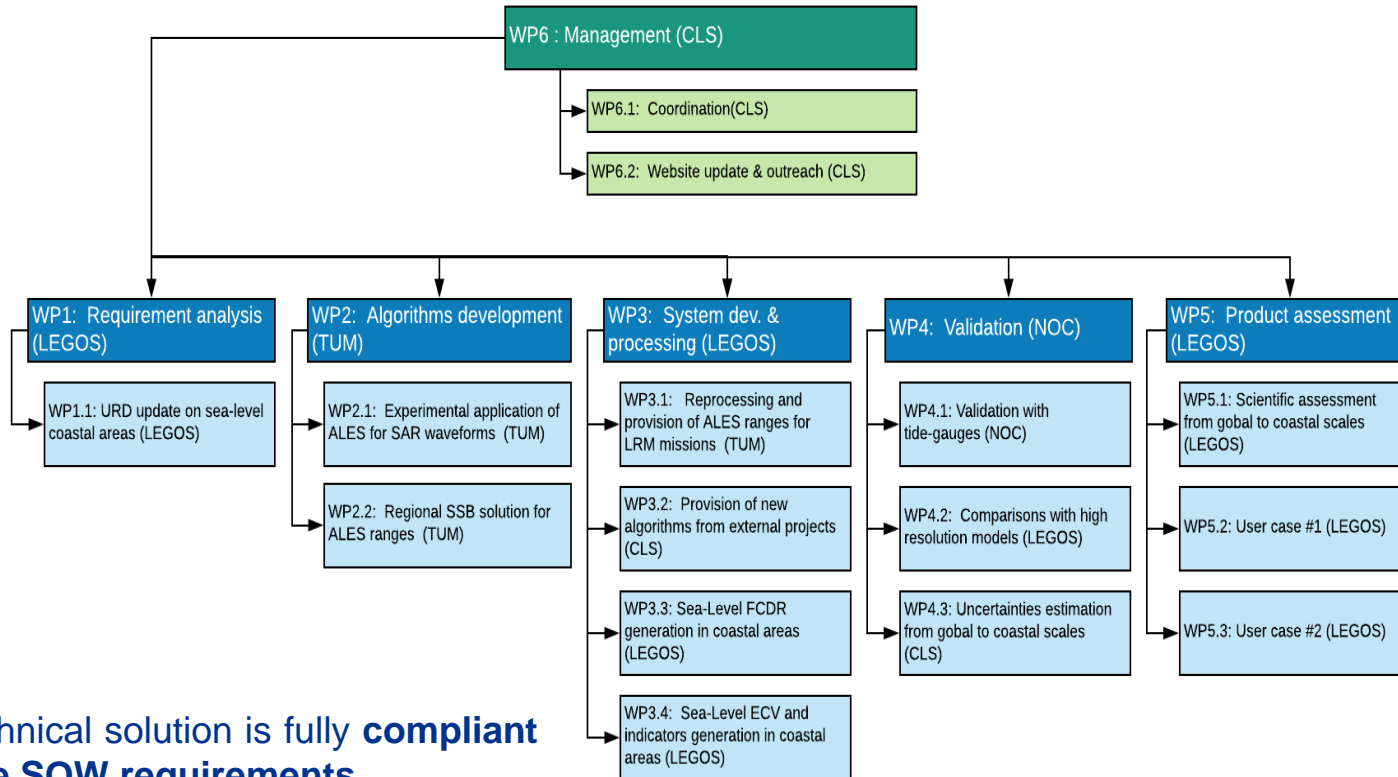
Payment to sub-contractors are expected after:

1. Notification of milestone completion from CLS to ESA
2. ESA approval of all deliverables (including review process)
3. Invoice delivery to ESA by CLS
4. Invoice delivery from sub contractors to CLS



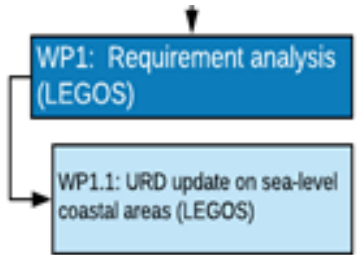
# The Sea Level CCI+ Technical Solution

# SL\_cci+ Technical solution



- The technical solution is fully **compliant** with the **SOW** requirements.

# SL\_cci+ Technical solution



- **WP1: Requirement analysis (LEGOS)**
  - KO+1 (04/2019) to KO+27 (06/2021)
- **Objectives:**
  - Update of the **User Requirements Document** dedicated to measuring **sea level coastal areas**
  - Building on the outcome of the **ISSI Workshop** on ‘Understanding the relationship between coastal sea level and large-scale ocean circulation’ (Bern, March 2018)
  - Based on the OceanObs19 community white papers
- **Outputs:**

Task	Deliverable			Year 1				Year 2				Year 3			
	code	Reference	Title	KO+3	KO+6	KO+9	KO+12	KO+15	KO+18	KO+21	KO+24	KO+27	KO+30	KO+33	KO+36
1	D1.1	URD	User Requirement Document	V1				V2				V3			
	D1.2	ADP	Algorithm development Plan (annex to PMP)	V1				V2				V3			
	D1.3	PVP	Product Validation Plan	V1				V2				V3			



- **WP1: Deliverables (LEGOS)**

- **D1.1: User Requirements Document (LEGOS)**

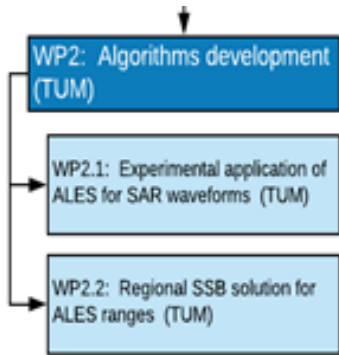
1. Introduction
2. Requirements from existing reference documents
  - 2.1. Requirements from international framework
    - 2.1.1. Requirements from Global Climate Observing System (GCOS)
    - 2.1.2. Requirements from WMO and WRCP
  - 2.2. Requirements from CMUG
3. Requirements collected by the coastal sea-level community
  - 3.1. Introduction
  - 3.2. User consultations analysis
  - 3.3. Requirement coming from coastal sea-level community
4. List of requirements synthesized by the New R&D ECV Sea Level
  - 4.1. General requirements
    - 4.1.1. Requirements for satellite observing system
    - 4.1.2. Requirements for validation and calibration
    - 4.1.3. Requirements for data format and access
  - 4.2 Requirements for parameters

- **D1.2: Algorithm Development Plan**  
⇒ Contributions from TUM and LEGOS

1. Overview
- 2 Schedule
- 3 Inputs
- 4 Implementation constraints

- **D1.3: Product Validation Plan (LEGOS)**  
⇒ Contributions from NOC (and LEGOS?)

1. Overview
2. Definition of validation diagnoses for water level content
3. Type of validation diagnoses
4. Input data for validation diagnoses
5. Description of Validation diagnoses



- **WP2: Algorithms Developments (Tech. Univ. Munich):**
  - KO+1 (04/2019) to KO+30 (09/2021)
- **Objectives:**
  - The adoption of a **consistent retracking strategy** that guarantees a smooth transition from typical open ocean conditions to perturbed signal in the coastal zone and,
  - The development of a **Sea State Bias (SSB) model** and correction that is at the same time specific to the retracker of choice and effective in reducing the sea-state dependent errors in the estimation of the sea level in shelf seas and coastal zones.
- **Outputs:**

Task	Deliverable			Year 1				Year 2				Year 3			
	code	Reference	Title	K0+3	K0+6	K0+9	K0+12	K0+15	K0+18	K0+21	K0+24	K0+27	K0+30	K0+33	K0+36
2	D2.1	ATBD	Algorithm Theoretical Basis Document		V1				V2				V3		
	D2.3	ADP	Update of the algorithm development plan (annex to PMP)		V1				V2				V3		



- **WP2: Deliverables (Tech Univ. Munich):**

- D2.1: Algorithm Theoretical Basis Document, ATBD (TUM)  
⇒ Contributions from TUM and LEGOS

1. Overview

- 1.1. References

2. List of ATBDs for Sea Level

- 2.1 ATBD- 1: <algo to be defined>

- 2.1.1 Selected altimeter standards

- 2.2.2 Function

- 2.2.3. Algorithm Definition

- 2.2.4. Input data

- 2.2.5. Output data

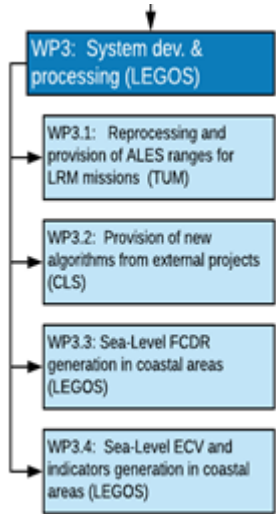
- 2.2.6. Mathematical statement

- 2.2.7. Accuracy

- 2.2.8 References

- D2.3: Updated Algorithm Development Plan (TUM and LEGOS)  
(See ADP D1.2)





- **WP3: System Development and processing (LEGOS)**

- KO+3 (07/2019) - KO+36 (03/2022)

- **Objectives:**

- **WP3.1 (TUM): Adapt the ALES/X-TRACK algorithms** developed in the SL\_cci 'Bridging Phase' to SAR altimetry data (i.e. Sentinel-3A, 3B) and to almost all nadir altimetry missions,
  - **WP3.2 (CLS): Analyse the altimetry geophysical corrections** available to define the best solutions for coastal sea level applications,
  - **WP3.3-3.4 (LEGOS): Combine the new algorithms** and corrections in a single and **homogeneous multi-mission coastal product** that can be easily used by the Climate Community.

- **Outputs:**

Task	Deliverable			Year 1				Year 2				Year 3			
	code	Reference	Title	KO+3	KO+6	KO+9	KO+12	KO+15	KO+18	KO+21	KO+24	KO+27	KO+30	KO+33	KO+36
3	D3.1	SSD	System Specification Document			V1				V2				V3	
	D3.2	CRDP	Climate Research Data Package (FCDR and ECV sea level products in coastal areas)			V1				V2				V3	



- **WP3: Deliverables**

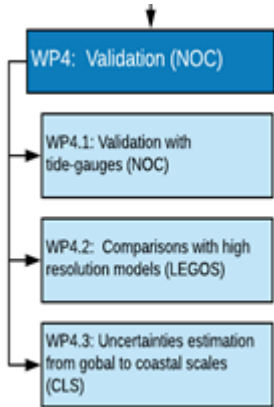
- **D3.1: System Specification Document (LEGOS)**

⇒ Contributions from TUM, LEGOS and CLS

1. Overview
2. System General description
3. System Architecture
4. Pan-ECV Collaboration View
5. Reuse View
6. Information view
7. Operational View
8. Deployment View
9. Development View
10. Perspectives

- **Data Provision** to the production team (CLS): provision of new algorithms from external projects

- **D3.2: Climate Research Data Package (LEGOS):** FCDR and ECV sea level products in coastal areas



- **WP4: Validation (NOC)**
  - KO+10 (01/2020) - KO+36 (03/2022)
- **Objectives:**
  - Comparison of the **altimetry and tide-gauge observations** in terms of the **sea-level annual cycle, inter-annual variability and trend**.
  - Investigate differences between **coastal** and **open-ocean** sea-level trends.
  - Use **ocean models** to quantify the **coastal / open ocean differences** and test the potential of altimetry to observe such signals at the coast
  - Estimate sea level **uncertainties** from global to coastal scales.
- **Outputs:**

Task	Deliverable			Year 1				Year 2				Year 3			
	code	Reference	Title	KO+3	KO+6	KO+9	KO+12	KO+15	KO+18	KO+21	KO+24	KO+27	KO+30	KO+33	KO+36
4	D4.1	PVIR	Product Validation and Intercomparison Report				V1					V2			V3
	D4.2	PUG	Product User Guide				V1				V2				V3
	D4.3	PRP	Peer reviewed Publication (ECV uncertainties)												V1



- **WP4: Validation (NOC)**

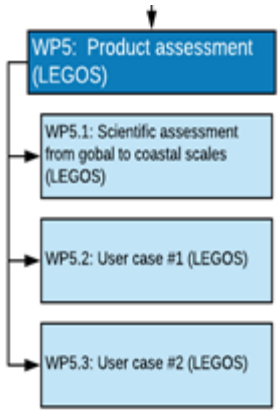
- D4.1: Product Validation and Intercomparison Report (PVIR):  
⇒ NOC + LEGOS + CLS contributions

1. Introduction
2. Overview
3. Validation with tide gauges (NOC)
4. Comparison with High resolution models (LEGOS)
5. Uncertainties estimation from global to coastal scales (CLS+LEGOS)

- D4.2: Product User Guide (LEGOS)

1. Introduction
2. Definition
3. Nomenclature
4. Format
5. Data Handling Variables
  - 5.1. Empty Fields
  - 5.2. Surface type flag
6. NetCDF Header
  - 6.1. Global attributes
  - 6.2. Variable attributes
7. Computation of the Corrected Sea Level
8. Example

- D4.3: Peer reviewed publications:
  - Validation (NOC)
  - ECV uncertainties (CLS/LEGOS)



- **WP5: Product Assessment (LEGOS)**
  - KO+1 (04/2019) - KO+36 (03/2022)
- **Objectives:**
  - **Comparing** the altimeter sea level record with independent estimate the various **contributions** causing **sea level changes** at global, regional and local scales.
  - To study the sea level changes in specific use case regions
- **Output:**

Task	Deliverable			Year 1				Year 2				Year 3			
	code	Reference	Title	KO+3	KO+6	KO+9	KO+12	KO+15	KO+18	KO+21	KO+24	KO+27	KO+30	KO+33	KO+36
5	D5.1	CAR	Climate Assessment Report					V1			V2				V3
	D5.2	PRP	Peer reviewed publications (User case)												V1



- **WP5: Product Assessment (LEGOS)**
  - **D5.1: Climate Assessment Report (LEGOS):**
    1. Introduction
    2. Assessment by CRG for Sea Level ECV
      - 2.1 Used Datasets
      - 2.2 Methods
      - 2.3 Results
    3. Cross ECVs time-series analysis
    4. User Case#1
    5. User Case#2
  - **D5.2: Peer reviewed publication (LEGOS):**
    - Scientific assessment
    - Use cases studies in Western Africa and Mediterranean Sea

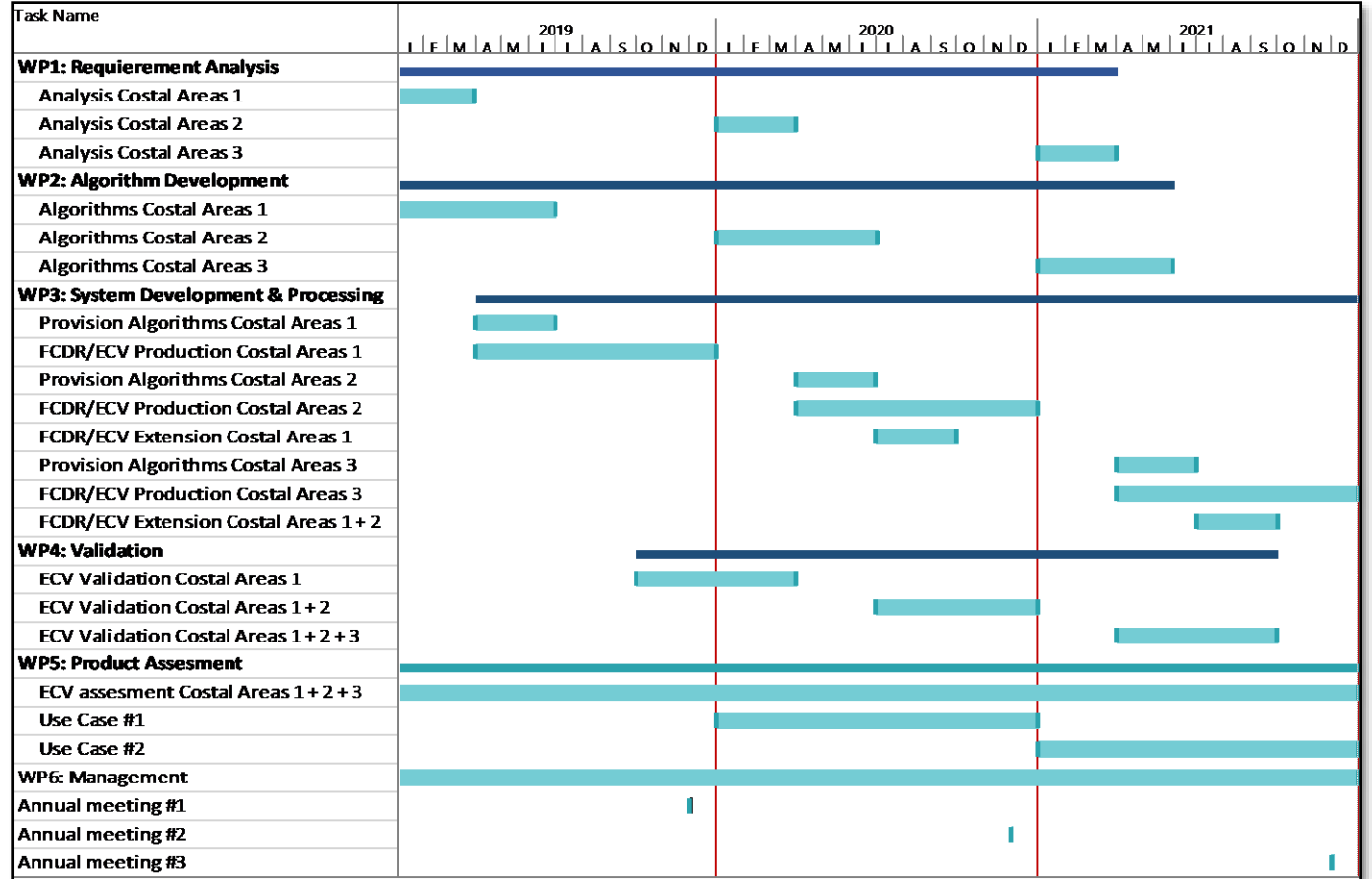


Task	Deliverable			Year 1				Year 2				Year 3			
	code	Reference	Title	K0+3	K0+6	K0+9	K0+12	K0+15	K0+18	K0+21	K0+24	K0+27	K0+30	K0+33	K0+36
1	D1.1	URD	User Requirement Document	V1				V2				V3			
	D1.2	ADP	Algorithm development Plan (annex to PMP)	V1				V2				V3			
	D1.3	PVP	Product Validation Plan	V1				V2				V3			
2	D2.1	ATBD	Algorithm Theoretical Basis Document		V1				V2				V3		
	D2.3	ADP	Update of the algorithm development plan (annex to PMP)		V1				V2				V3		
3	D3.1	SSD	System Specification Document			V1				V2				V3	
	D3.2	CRDP	Climate Research Data Package			V1				V2				V3	
4	D4.1	PVIR	Product Validation and Intercomparison Report				V1					V2			V3
	D4.2	PUG	Product User Guide				V1				V2				V3
	D4.3	PRP	Peer reviewed Publication (ECV uncertainties)												V1
5	D5.1	CAR	Climate Assessment Report					V1			V2				V3
	D5.2	PRP	Peer reviewed publications (User case)												V1
6	D6.1	QPR	Quarterly Progress Report	Quarterly  At the end of the project  Full and revised versions at each progress meeting  Quarterly											
	D6.2	FR	Final report												
	D6.3	PMP	Project Management Plan												
	D6.4	PSH	Project Scientific Highlights												

# SL\_cci+ solution



- 3-year project

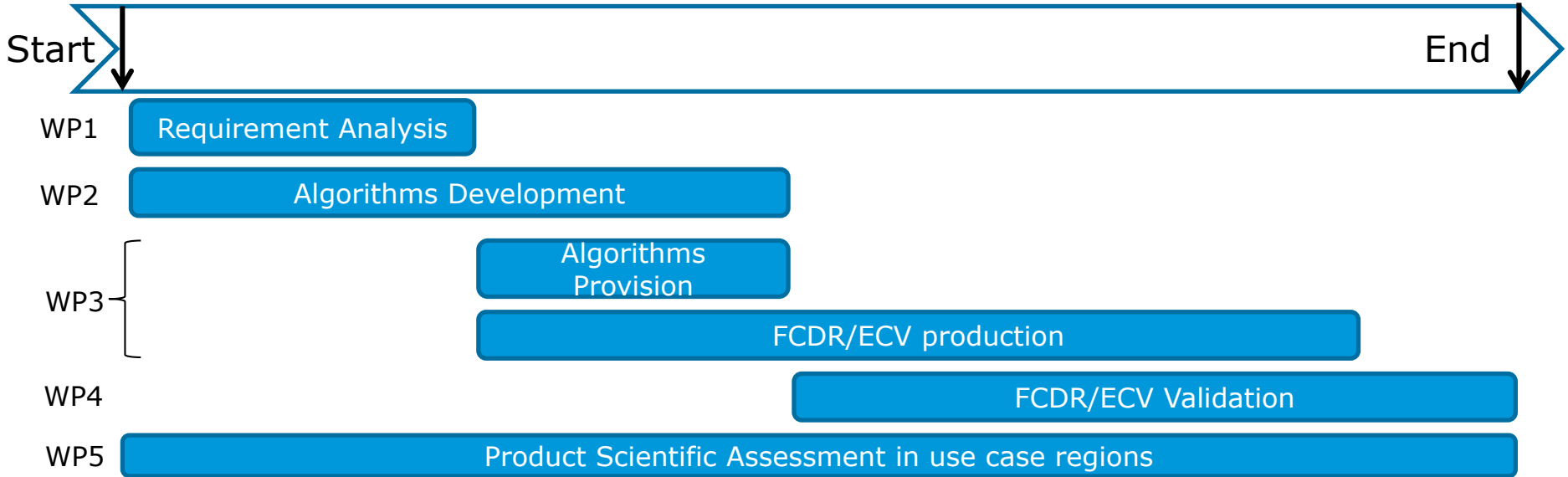




# SL\_cci+ solution



- 3-year project, based on the developments of the 2018 SL\_cci ‘bridging phase’:
  - Apply the processing to new altimeter missions
  - Extend the times series
- **Life cycle** of the project for each of the 3 coastal areas (repeated three times):



# Conclusion



- The Sea Level Bridging phase (2018) has allowed a smooth transition between SL\_cci phase II (2014-2017) and the Sea Level CCI extension activities (SL\_cci+)
- A 3-year long-project focused on development and production of coastal altimeter sea level products in three specific regions of interest.
- CLS will ensure the proper execution of all contract tasks and will work in close cooperation with subcontractors and ESA to coordinate the technical activities and create a common approach to the project.
- CLS will be in charge of the planning, documentation, reporting and communication in agreement with the science leader.
- Reporting, meetings and deliverables have been listed and the payment plan has been described.



Thank you for your attention!

