

# Task 6.2: Gaps Assessment and Impacts Document (GAID)

- Purpose, Strategy and Timeline Task 6.2
- Results second user workshop for GAIDv4
- Revised gap template
- Gaps provided and missing information
- Suggested cross sections for GAIDv4
- Newly-emerged gaps and required cross-talk on the current set of gaps
- Comprehensible review of each of the gaps by WP6 team
- Next steps
  - Towards GAIDv4: first draft – review – second draft – review - final version - outreach
  - On line catalogue



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# Purpose of the GAID

- One of the two key expected outcomes of GAIA-CLIM alongside the associated recommendations document (other is the VO)
- Living document to gather, analyse and disseminate all **gaps** as emerging out of each of the GAIA-CLIM WPs, user survey and user workshops
- Through SMART gap formulations:
  - **Specific**                      Specific proposed action to remedy
  - **Measurable**                Outcome for success of the remedy
  - **Achievable**                Indicative cost estimate
  - **Relevance**                User impact if not remedied
  - **Time bounded**            Action on short-, mid- or long-term
- User and impact oriented risk assessment



\* A gap is an unfulfilled user need



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# Task 6.2 Strategy

- Bottom-up process
- Internal to all GAIA-CLIM project members through workpackage leads
- External input through dedicated user workshops and scientific advisory committee
- Feedback using deliverables providing formal input to the living document (GAID) with five official versions foreseen
  - 3 official deliverables arising from each WP inform v1, v3 and v5
- Document evolves as we learn from prior versions and feedback thereon



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# Evolution of the GAID thus far

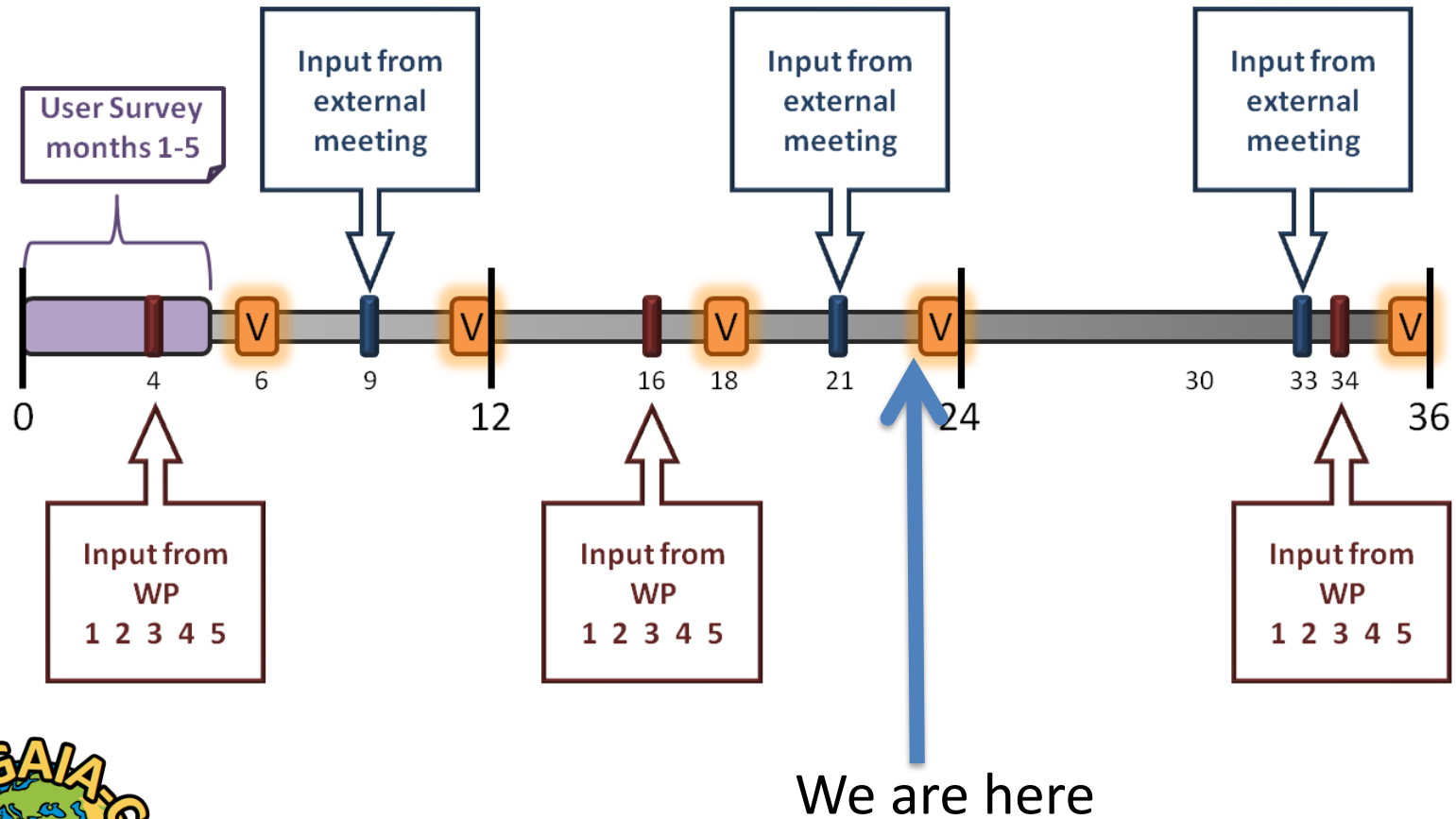
- V1
  - Based upon initial input from WPs and user survey
  - Inhomogeneous format
- V2
  - First effort to make smart remedies and start to think about viability
  - Benefitting from user workshop input
- V3
  - Use of a template to harmonize input formats
  - Categorization into generic gap types
  - Direct interaction with gap owners
  - On-line catalogue supported by the latest version of the GAID
  - Provision of one or more remedies (specific actions) for each gap



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# Timeline GAID



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# Second user workshop

- First day and a half on GAID
- Key feedback:
  - Improve searchability by use of additional criteria
  - Make gaps more relevant to stakeholders
    - Validation aspects addressed
    - Satellite missions impacted
    - Application(s) impacted
    - Remedy: scale of activity and potential actor(s)
    - Better impacts to non-resolution and add benefits of resolution
  - Remedies and gap descriptions fit to constitute future descriptions of work
  - Consolidate gaps, reduce redundancy/overlaps and clarify dependencies between gaps
- Full detail on user workshop in next presentation by Martine



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# New template

- Takes into account the feedback received from user workshop
- Early communicated with Project Officer
- Additional fields requested
- Even if a gap has not changed several entries to (re-)consider for each gap



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# New template (1)

## **Gn.mm Gap Title**

The gap title should be sufficiently short though specific, it should not allow misinterpretations or multiple interpretations, and it should be user- and impact oriented (see below for the user categories).

*Change the title of the gap if necessary*

## **Gap Abstract (in 100-150 words)**

The gap abstract should clarify the gap in a few very clearly written sentences that are understandable for users / relevant stakeholders.

*Add a gap abstract in a few sentences (max. of 150 words)*

## **Part I Gap Description**

### **(1) Primary Gap Type**

Spatiotemporal coverage

Vertical domain and/or vertical resolution

Knowledge of uncertainty budget and calibration

Uncertainty in relation to comparator measures

Technical (missing tools, formats etc.)

Parameter (missing auxiliary data etc.)

Governance (missing documentation, cooperation etc.)

*Select one gap type from (i) to (vii) for this gap*

### **(2) Secondary Gap Type(s)**

*Select any additionally relevant gap type from the seven gap types or leave blank for this gap*



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# New template (2)

## **(3) ECVs Impacted**

The GAIA-CLIM primary ECVs include:

Temperature, Water vapour, Ozone, Aerosols, Carbon Dioxide, Methane, All of the above six ECVs

*Select at least one and up to six ECVs from the list for this gap*

## **(4) User Categories / Application Areas Impacted**

The GAIA-CLIM targeted user categories / application areas include:

- Operational services and service development (*meteorological services, environmental services, Copernicus services C3S & CAMS, operational data assimilation development, etc.*)
- International (collaboration) frameworks (*SDGs, space agency, EU institutions, WMO programmes/frameworks etc.*)
- Climate research (*research groups working on development, validation and improvement of ECV Climate Data Records*)

*Select at least one and up to three user categories/application areas from the list for this gap*

## **(5) Non-satellite Instrument Techniques Involved**

The GAIA-CLIM targeted instrument techniques include:

Radiosonde, Ozonesonde, Lidar, FPH/CFH, Microwave Radiometer, FTIR, Brewer/Dobson, UV/VIS zenith DOAS, UV/VIS MAXDOAS, Pandora, GNSS-PW, other non-GAIA-CLIM targeted instrument techniques, please specify:  
independent of instrument technique

*Select one or more of the instrument techniques involved for this gap*



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# New template (3)

## (6) Related Gaps

Another gap identified within GAIA-CLIM might be critical (technical, timewise) dependent on the resolution of this gap, or v.v.

- Identify Critical Dependent Gap(s): Gn.mm (if any, up to 5)
- The critical dependent gap should be addressed before / with / after this gap. For technical but not time dependent gaps select 'with'
- Describe how the gaps are critically dependent upon one another (up to 100 words)

**!!!!!!Please see the action on related gaps on top of this template document before filling in your full gap template to prevent unnecessary work!!!!**

- To be addressed before/with/after the current gap
- Argument: ""

## (7) Gap Detailed Description

The gap detailed description should be able to be used e.g. in a funding call.

*Copy and paste existing text from the GAIDv3 gap. Edit to make specific and not allow multiple interpretations, and user and impact oriented.*

## (8) Operational Space Missions or Space Instruments impacted

The gap should be related to the (improvement of the) validation of space observations of the targeted ECV(s). Also a certain class of space instrumentation / missions can be selected.

*Select the (current/future) space missions / instrumentation or techniques relevant for this gap (at least one)*



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# New template (4)

## (9) Validation Aspects Addressed

At least the lowest product level should be provided. Higher level products are dependent on (derived from) lower level products, i.e. Level-2 from Level-1, Level-3 and Level-4 from Level-2.

Radiance (Level 1 product)

Geophysical product (Level 2 product)

Gridded product (Level 3)

Assimilated product (Level 4)

Time series and trends

Representativity (spatial, temporal)

Calibration (relative, absolute)

Spectroscopy

Specific pixel types (ocean, land, desert, tropical, polar, etc.), please specify:

Auxiliary parameters (clouds, lightpath, surface albedo, emissivity)

Other, please specify:

*Select the (primary) validation aspects addressed with this gap (at least one)*

## (10) Expected Gap Status after GAIA-CLIM

There are three possible status for the gap after the end of the GAIA-CLIM project:

GAIA-CLIM will close this gap

GAIA-CLIM will partly close this gap, please specify (up to 200 words):

After GAIA-CLIM this gap is likely to remain

*Select gap status. For option ii, copy gap text from GAID v3 'Activities within GAIA-CLIM to this gap' and edit as necessary.*



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# New template (5)

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# New template (6)

## (1) Table summarising the benefits to gap resolution

*Please insert multiple rows in the Benefits table.*

*Note: it is important that more than one benefit (for users) is identified*

Identified Benefit	User category / application area benefitted	Probability of benefit being realised	Impacts
Describe benefit (up to 100 words)	Identify user category / application area benefitted	High, medium, low [Select one or two*]	Describe user impact, impact on provision of Copernicus services, etc.

## (2) Table summarising the risks to non-resolution of the gap

*Please insert multiple rows in the Risk table.*

*Note: it is important that more than one risk (for users) by non-resolution is identified*

Identified Risk	User category / application area at risk	Probability of occurrence if gap not remedied	Impacts
Describe risk (up to 100 words)	Identify user category / application area benefitted	High, medium, low [Select one or two*]	Describe user impact, impact on provision of Copernicus services, etc.



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# New template (7)

## **Part III Gap Remedies**

*Please consider if more than one remedy could be identified and repeat the next steps for each of the identified remedies.*

*It is recommended that more than one remedy is identified and that the remedies are distinct in their expected viability for the outcome of success preferably at least one remedy should be achievable) and/or e.g. the scale of work / time bound / cost estimate.*

### **(1) Primary Gap Remedy Type**

The remedy could involve different types of action. The primary remedy types include:

Technical, Laboratory, Deployment, Research, Education/Training, Governance

*Select the primary remedy type*

### **(2) Secondary Gap Remedy Type(s)**

*Select any additionally relevant remedy type from the above six options or leave blank for this remedy*

### **(3) Specific Remedy Proposed**

The description of the specific remedy proposed may plausibly constitute a description of work in a funding call.

*Copy in the current text from the GAID v3 and edit as necessary to meet this revised guidance.*

### **(4) Relevance**

The relevance to remedy the gap with the specific remedy proposed should be substantiated in free text.

*Copy in the current text from the GAID v3 and edit as necessary.*



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# New template (8)

## (5) Measurable Outcome of Success

The measurable outcome of success for the specific remedy proposed.

*Copy in the current text from the GAID v3 and edit as necessary.*

## (6) Expected Viability for the Outcome of Success

A preliminary indication might be given on the expected viability of the outcome of success for the specific remedy proposed ('Is the remedy achievable?'). The expected viability might be low, medium or high.

*Select one or two levels of expected viability from [Low / Medium / High]\**

Note: If the Technical remedy type is chosen then in addition a Technology Readiness Level (TRL) of 1-9 could be assigned (optionally). The TRL that best describes the level of technology readiness should be based upon the criteria from

<http://www.hq.nasa.gov/office/codeq/trl/trl.pdf>, *Select TRL from 1-9*

\* Probability categories: high / medium-high / medium / medium-low / low

## (7) Scale of Work

The scale of work involved for the specific remedy proposed could be either performed individually, by a single institution, by a consortium or through a programmatic multi-year multi-institution activity.

*Select one or two scales of work from*

Individually

Single institution

Consortium

Programmatic multi-year, multi-institution activity

Other, please specify:



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# New template (9)

## **(8) Time Bound to Remedy**

The time needed to complete the resolution of this gap from funding inception might be estimated.

*Select one or two time bounds:*

Less than 1 year, Less than 3 years, Less than 5 years, Less than 10 years, More than 10 years

## **(9) Indicative Cost Estimate (investment)**

Given the time bound and scale of work a preliminary investment cost estimate might be given for specific proposed remedy. These costs are assumed one-time investments costs and exclude reoccurring operational costs (see below). Currency: Meuro

*Select one or two cost estimates:*

Low cost (<1 million), Medium cost (<5 million), High cost (>5 million), Very high cost (>10 million)], Unknown costs, please explain in less than 100 words

## **(10) Indicative Cost Estimate (exploitation)**

Are there annually reoccurring costs involved in this gap remedy?

Yes/No. If Yes, can you give an indicative exploitation cost estimate on annual basis (keuro/ year):

## **(11) Potential Actors**

Different actors might be envisaged to take up the specific remedy proposed. Please indicate potential actors.

*Select one or more potential actors:*

EU H2020 funding

Copernicus funding

National funding agencies

National Meteorological Services

WMO

ESA, Eumetsat or other Space agency

Academia, individual research institutes

SMEs/industry

National Measurement Institutes

Other, please specify:



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# GAPS provided per Friday February 3<sup>rd</sup> 2017

- A total of 88 gaps per GAIDv3 (September 2016)
- A total of 45 revised gap descriptions have been provided
  - WP1 (11): 1.03 / 1.04 / 1.05 / 1.06 / 1.07 / 1.09 / 1.10 / 1.11 / 1.13 / 1.14 / 1.15
  - WP2 (16): 2.13 / 2.14 / 2.15 / 2.16 / 2.17 / 2.20 / 2.22 / 2.23 / 2.24 / 2.26 / 2.27 / 2.28 / 2.29 / 2.31 / 2.32 / 2.33 / 2.34
  - WP3 (5): 3.01 / 3.02 / 3.04 / 3.05 / 3.06
  - WP4 (7): 4.01 / 4.02 / 4.07 / 4.08 / 4.09 / 4.10 / 4.11
  - WP5 (3): 5.06 / 5.07 / 5.10
  - WP6 (3): 6.01 / 6.02 / 6.03
- Couple of gaps have been amalgamated already
- A total of 30 revised gap descriptions might still come in summing up to 83 gaps: 75 gaps + 8 externally provided (no project ownership)



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# Newly-merged gaps and required cross-talk on the current set of gaps

- **Retired / merged gaps**
  - WP1: 1.01 / 1.02 / 1.08
  - WP2: --
  - WP3: 3.03
  - WP4: 4.03 / 4.04 / 4.05 / 4.06
  - WP5: 5.04 / 5.05 / 5.08
  - WP6: 6.06
- **Revised gap information still missing for ~ 30 gaps (Friday 3<sup>rd</sup> of Feb)**
  - WP1: 1.12
  - WP2: 2.01 / 2.02-2.05 / 2.06 - 2.09 / 2.10-2.12 / 2.21 / 2.30 / 2.35 (15 gaps)
  - WP3: spectroscopy gap?
  - WP4: spectroscopy gap?
  - WP5: 5.01 / 5.02 / 5.03 / 5.09 / 5.11
  - WP6: 6.04 / 6.05 / 6.07 / 6.08 / 6.09 / 6.10 / 6.11 + education gap?



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# Suggested cross sections for GAIDv4

## Gap Description

- Gap Type
- ECV
- User category
- Validation aspects addressed
- Instrument technique
- Gaps status after GAIA-CLIM

## Gap Remedies

- Remedy Type
- Measurable Outcome of Success
- Scale of Work
- Time bound to Remedy
- Indicative cost estimate
- Potential actors



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# GAIDv4: Review and Dissemination

- Grant Agreement

Task 6.2 Production of a Gaps Assessment and Impacts Document (GAID) (lead: KNMI; involved: BKS, BIRA, CNR, NERSC, MO, EUMETSAT, FMI, NPL)

Start: M4 End: M36

GAIA-CLIM Project objectives addressed: S6, O2, O3, O7

This task will result in a living gaps assessment and impact document (GAID), hosted on the project website and disseminated through other appropriate means.

Inputs to this document are the gap analyses results from WP1 to WP5 and user feedback collected in Task 6.1 survey and meetings. The Cal/Val gap analysis will include gaps based upon:

- Geographical coverage
- Measurement capabilities / characterisation
- User needs
- Technological impediments and opportunities
- National and international measurement strategies and governance

Regular updates of the GAID will be provided throughout the project duration (Figure 8, Section 2.2). Also intermediate versions of the GAID will be made publicly available and communicated to the stakeholders to ensure timely feedback on the impact assessment. Several means of collecting reviews from third parties will be pursued to ensure broad review.

KNMI: will lead the production of the document, have close interaction with the project partners on their inputs and will help to translate identified gaps to impact assessments as relevant for the Copernicus services, for satellite agencies and for other users.

BKS, BIRA, CNR, MO and EUMETSAT: will ensure that identified gaps in the underlying work packages are communicated to KNMI and appropriately documented within the GAID through a series of WP deliverables arising from WP 1 through WP 5.

FMI: Will provide input based upon the user survey detailed in Task 6.1.1

BIRA, ECMWF, BKS, CNR, MO, EUMETSAT, FMI, NPL and NERSC: will ensure adequate review of the document and appropriate dissemination of its results.



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# Your project coordinator says

- Because GAIDv4 shall be used as the basis for the outreach roadshow its imperative that it is a near final version
- KNMI alone cannot do this. Absolutely needs the participation of all parties on prior slide (and others encouraged)
- Need to ensure against redundancies (aggressively thin) and proper noting of dependencies
- Need to ensure **every** gap documented to a standard whereby we are happy for it to be used in external stakeholder outreach engagement.
- To this end have requested extension to 31/3 but this is **NOT** an invitation to forget about it for next 4 weeks. Reflection of degree of work req'd still.



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# Next steps (I): At the GA

- required interactions on individual gaps, also offline: scan each other's gaps as per GAIDv3 and provide your suggestions (from GA into next week)
- Completed input information on missing gaps solicited (deadline 14/2). Immature gaps might get retired at some point
- Identify owners for new gaps on spectroscopy and education (first drafts by 14/2)
- All partners in Task 6.2 to identify **at least one individual** who has time between now and GAIDv4 delivery to participate in review and resolution of issues.



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# Next steps (II): In depth expert review of individual gaps and potential overlaps and dependencies

- KNMI, BIRA and WP7 to further identify potential overlaps / redundancies, dependencies, and gaps requiring further work (Deadline: 17/2)
- Each issue arisen by KNMI/BIRA/WP7 to be delegated to at least two individuals with delegated responsibility to resolve (Deadline: 21/2)
- Parties to resolve issues with identified gap owners and provide revised gaps and rationale (Deadline: 7/3)
- GAID first full draft (Deadline 14/3)



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# Next steps (III): Final review and update to online tools

- Adequate in-depth review by Task 6.2 partners (deadline 21/3)
- Consolidated GAID second draft (deadline 24/3)
- Final review by BIRA and WP7 (deadline 29/3)
- Submission of deliverable GAIDv4 (31/3)
- Update of the on-line catalogue and inclusion of search/select tools (deadline 14/4)
- Outreach (see later session)



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