Version 2.1 Feb. 2026

MRV non-CO_2 data collection Guidance

This document provides guidance on the collection of data for the Monitoring, Reporting, and Verification (MRV) of non-CO_2 aviation effects

February 2026

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List of Acronyms

aCCFs	algorithmic Climate Change Functions
AOs	Aircraft Operators
AV	Accredited Verifier
AVR	Accreditation and Verification Regulation
CA	Competent Authority
CoCiP	Contrail Cirrus Prediction Model
CTFM	Current Tactical Flight Model
EGWP	Efficacy-weighted Global Warming Potential
FTFM	Filed Tactical Flight Model
MRV	Monitoring, Reporting and Verification
MRR	Monitoring and Reporting regulation
NEATS	Non-CO2 Aviation Effects Tracking System
NvPM	Non-volatile Particulate Matter
RTFM	Regulated Tactical Flight Model
UID	Unique Identifier

1 Introduction

This guidance document compliments and stems from the EU Monitoring and reporting regulation (Implementing Regulation (EU) 2018/2066), amended and published on 23 September 2024. The amending act is referred hereinafter as "the Regulation". It contains the key elements and definitions for the operationalization of the monitoring and reporting of non-CO_2 for Aircraft Operators (AOs).

This guidance takes into account discussions and input from aviation and non-CO_2 stakeholders and experts, as well as comments received through the open public consultation on the amending act of the Regulation.

AOs can apply the information from this document within non-CO_2 reporting tools such as the Commission **Non-CO_2 Aviation Effects Tracking System** (hereinafter, **"NEATS"**).

NEATS is an IT tool developed and provided by EUROCONTROL, and made available to all AOs (link to user platform: NEATS - THE NON-CO2 AVIATION EFFECTS TRACKING SYSTEM). More information and FAQ's on NEATS user access, AO focal point, managing users and uploading data can be found within the NEATS user Group.

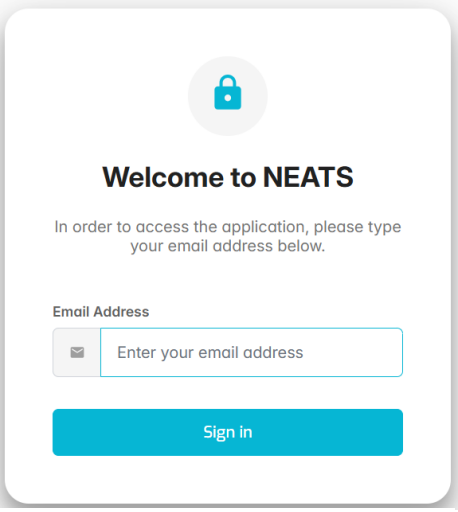

Figure 1: NEATS user platform login

This guidance is part of a series of documents provided by the Commission for supporting the implementation of the non-CO_2 MRV. These documents are listed in Table 1 below (in *italic*, documents that are not available at the time of updating this guidance).

For more up to date information, please see the Commission website[1].

Table 1	Documents and deliverables
1	"EU ETS Directive" - Directive (EU) 2023/958 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC (consolidated version here)
2	"Monitoring and Reporting Regulation (MRR)" - Commission Implementing Regulation (EU) 2024/2493 of 23 September 2024 amending Implementing Regulation (EU) 2018/2066 (consolidated version *here*)
3	"Accreditation and Verification Regulation (AVR)" - Commission Implementing Regulation (EU) 2025/1192 of 18 June 2025 amending Implementing Regulation (EU) 2018/2067 (consolidated version *here*)
4	Templates: • Annual emissions monitoring plan template (as part of the overall monitoring plan, Sections 18 to 23), February 2025; • *Annual non-CO2 aviation effects report for aircraft operators, to be published in conjunction with NEATS V3 release*;

[1] Reducing emissions from aviation - Climate Action - European Commission

	• Verification report template (as part of the overall verification report template, Sheet 2c), February 2026
5	Guidance: • MRV non-CO2 data collection Guidance, February 2025; and updated version, February 2026 **(this document)**; • AVR Explanatory Guidance (GD III), February 2026; • *Reporting guidance, to be published in conjunction with NEATS V3 release*; • Reporting of Aviation Fuel Suppliers, November 2025; • Initial MRV explainer, June 2024
6	Answers to Frequently Asked Questions (FAQs)
7	Technical documentation: • Reference set of technical specifications (RSTS), April 2025; • *NEATS V3 Methodology, to be published in conjunction with NEATS V3 release*; • Insights on System Architecture Description (pre-NEATS period), January 2025; • High-level guidelines for integrating new IT tools to the MRV – feeds into the elaboration of evaluation framework for own and third-party IT tools (framework to be made available in Q3 2026), May 2025
8	NEATS versions : • NEATS.v1 (Primary data provision), September 2025; • NEATS.v2 (CO2e calculation), January 2026; • NEATS.v3 (Reporting capabilities – version for 2025 reporting), March 2026

1.1 Aim of the Guidance document

The guidance aims to support AOs in understanding and complying with the non-CO_2 MRV requirements. It provides information on the process of the EU non-CO_2 MRV, specifically on what data is needed to run non-CO_2 monitoring within NEATS. It describes what data AOs can collect, how they can collect it and in what format it should be stored and uploaded to NEATS. It also describes what data is made available through NEATS.

The users of NEATS are the AOs, Accredited Verifiers and Competent Authorities.

Within NEATS, AOs can choose to source the data from their own databases (hereafter defined as ***"Primary data"***) or they may choose to rely on third party data sources that are provided through NEATS or other approved third-party monitoring tools (hereafter defined as ***"Secondary data"***). See definition of *Primary* and *Secondary data* in Section 2.3 of this guidance.

The guidance builds on the monitoring plan shared to AOs by their Competent Authority, which AOs fill in to inform the Competent Authority on how they plan to monitor their emissions under the EU implementing regulation 2024/2492.

1.2 Audience of the Guidance

The guidance is directed primarily at AOs who fall under the EU non-CO_2 MRV. Accredited Verifiers, Competent Authorities, and third-party non-CO_2 monitoring tool providers, and other relevant stakeholders may also find the guidance informative.

1.3 NEATS

NEATS connects all data and models required to calculate the non-CO_2 aviation effects on climate. It facilitates the upload of *Primary data*, but it cannot be incorporated in flight planning systems or to create protocols, or equivalent, to allow for the collection of monitored in-flight data in the first place. More information on NEATS can be found within the NEATS User Group, on online SharePoint hosted by Eurocontrol that is available to all AOs, Accredited Verifiers, and Competent Authorities (NEATS User Group - Home).

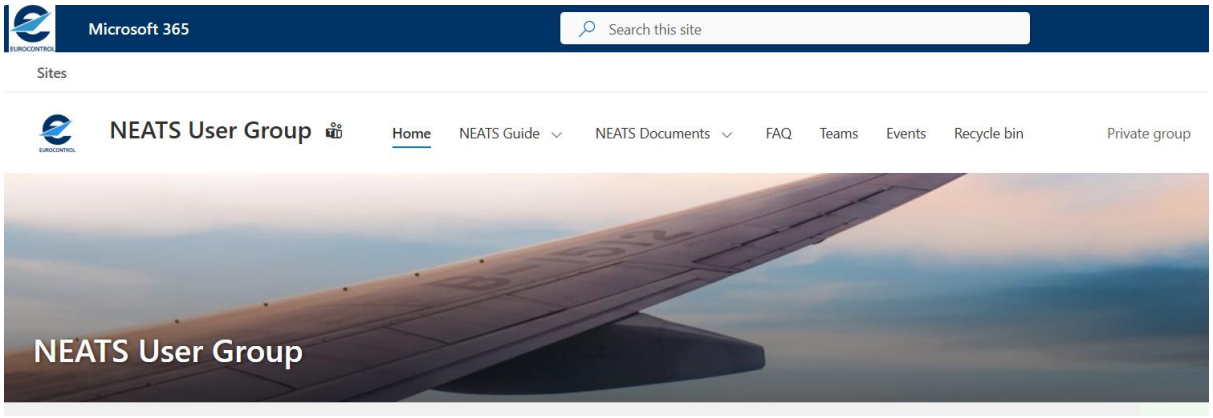

Figure 2: NEATS user platform home page

2 Context

In line with requirements in Article 56b(6) of the Regulation, the AOs must monitor the data mentioned in Annex IIIa of the regulation. **If AOs wish to provide their own data for any of the data points, they are required to provide, at the minimum, their flight information as *Primary data*.**

In the case of only using *Secondary data*, AOs must still use NEATS to monitor and compute their non-CO2 effects. Monitoring can be achieved by extracting *Secondary data* from NEATS (e.g. flight information, call sign) and checking this against their flown flights to ensure consistency between actual flights that took place and the flights included in the *Secondary data* extracted from NEATS.

2.1 Overview of MRV cycle

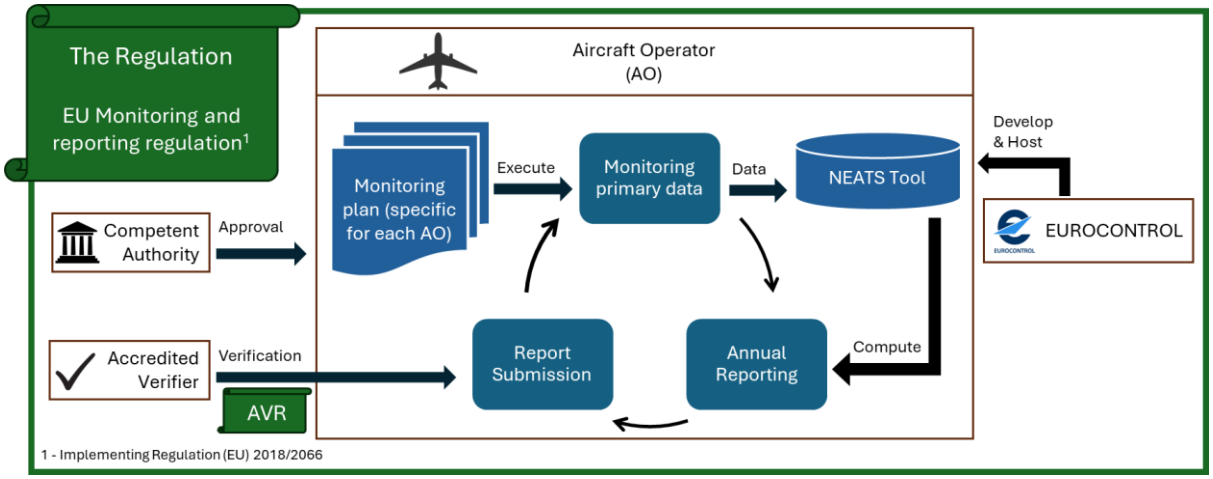

Figure 3: Principle of the MRV compliance cycle, adapted from the MRR Guidance document

The procedural steps and deadlines of the non-CO_2 MRV align with the existing EU ETS obligations for CO_2 monitoring. Starting January 1st, 2025, AOs are obliged to monitor and report the non-CO_2 effects of their flights. AOs must submit a monitoring plan to the Competent Authorities at least four months before they start their activities[2]. Monitoring plans for non-CO_2 effects are integrated with the CO_2 into the same monitoring plan through an additional sheet in the template, thus simplifying the administrative processes. AOs must report the non-CO_2 effects of their flights by March 31st of the subsequent year (in the case of MRV covering flights in 2025, this would be by March 31st 2026).

The monitoring plan serves as a support document for AOs to plan the data they intend to monitor and how to monitor it throughout the year. Within the monitoring plan, AOs have to decide whether they gather *Primary data* and if so, how they do it.

NEATS streamlines the submission requirement for AOs referred to in Article 68(5) of the Regulation (*"The AO shall submit to the competent authority [...] a separate report as attachment to the annual emissions report, that covers the annual non-CO2 aviation effects"*). NEATS can automatically generate the XML table and report referred to in the Regulation (Annex X, Section 2a(9)) at the end of each reporting year, simplifying the administrative process for NEATS users. Note that if AOs use both NEATS and another Commission-approved IT tool (own and third-party IT tools), the NEATS report will be incomplete. The AOs should make sure to integrate the separate reports into a consolidated comprehensive report. Once complete, AOs can request verification of the annual CO_2(e) from this report in line with the corresponding AVR regulation, just as is currently done for aviation CO_2 emissions. After submission of the verification report, the Competent Authority will conduct a compliance check.

[2] In line with Article 52(1) of the Regulation, in case the AOs are performing aviation activities (as defined in Annex I to Directive 2003/87/EC) for the first time and are unable to foresee them four months in advance, the AOs shall submit monitoring plans to the Competent Authority as soon as possible and no later than six weeks after the start of the activities, providing adequate justification for such delay.

2.2 Scope of the MRV

AOs must report the non-CO_2 aviation effects in CO_2 equivalent (CO_2(e)) per flight from the activities falling under the EU ETS Directive insofar these are performed by aircraft equipped with jet engines. Turboprops are excluded from the MRV. The MRV reporting covers all routes departing or entering the EEA executed by the AOs, except CH to EEA and UK to EEA. However, to facilitate the start of the MRV for non-CO_2 effects, the reporting for 2025 and 2026 is only required for routes involving two aerodromes located in the European Economic Area (EEA) (this also covers flights to, from and between outermost regions), and routes departing from an aerodrome located in the EEA and arriving to an aerodrome located in Switzerland or in the United Kingdom. AOs may select within their monitoring plan what scope they choose. This is either full scope (all flights departing or entering the EEA, except flights from CH to EEA or from UK to EEA), reduced scope (only intra EEA, outermost regions included, and EEA to UK or Switzerland), or any scope in between.

From 2027 onwards, the MRV reporting will cover all flights outbound from and inbound to the European Economic Area (EEA) (with flights to and from outermost regions remaining covered).

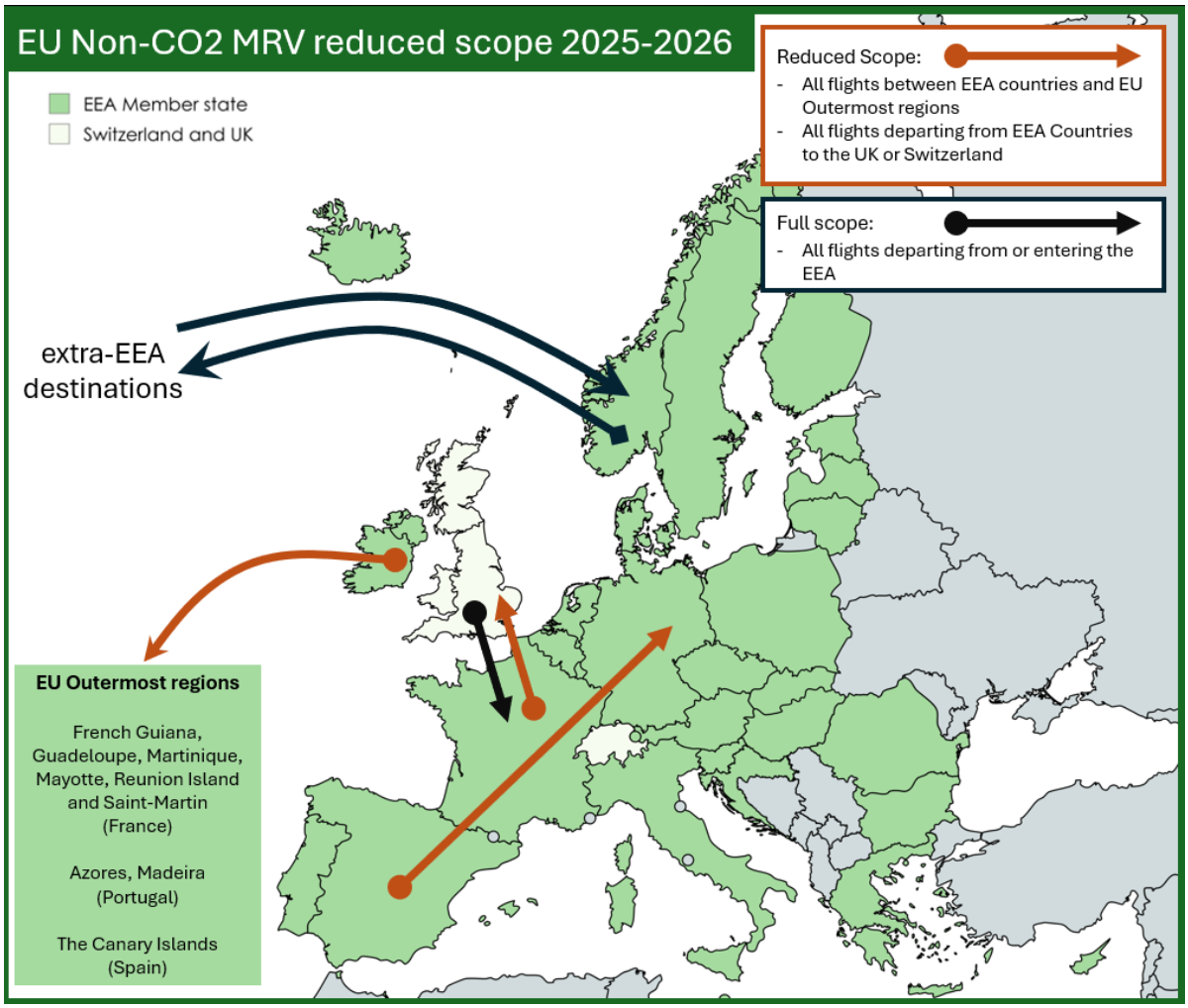

Figure 4: EU non-CO2 MRV scope

As of January 1st, 2025, aircraft operators under the Swiss ETS also have obligations with respect to the monitoring, reporting and verification of non-CO_2 climate effects of their flights (i.e. domestic flights and flights from Switzerland to EEA and to UK). The NEATS system is also available to facilitate the Swiss MRV process.

2.3 *Primary* and *Secondary data*

- ***Primary data*** is data that is measured and/or monitored and/or defined and recorded data directly by the AOs (e.g. actual flight trajectory, engine identifiers, aircraft mass along the trajectory, fuel flow, fuel properties). *Primary data* is reputed to be more accurate from what can be provided through NEATS (*Secondary data*).

- ***Secondary data*** is the data used by NEATS and not provided by the AOs. It includes both supporting values such as trajectories, aircraft properties 4D flight trajectory data and weather data from external sources, as well as conservative default values on specific data sets such as fuel, engine, and aircraft properties. Default values provide a conservative estimate and will lead to increased non-CO_2 calculations overall. All supporting and default values, except weather data, can be replaced with *Primary data* by the AOs derived from their own tracking systems monitored throughout the year, or from other sources.

NEATS is developed to allow AOs to comply with the MRV by fully monitoring their non-CO_2 effects in NEATS effects based on *Secondary data*. This means that **AOs can comply with the MRV without providing any *Primary data***, as long as they do check the completeness and correctness of their flight information provided by NEATS against their own flight information.

Except for the flight information that AOs can extract to check the completeness and correctness of their flights in NEATS, any other *Secondary data* available in NEATS cannot be extracted by AOs. Some of the *Secondary data* (flight information, aircraft type, engine identifier) will be available in the XML annual table, in line with the Annex X, Section 2a of the Regulation.

The Regulation allows for the use of own and third-party IT tools instead of NEATS, though any such tool must first be approved by the Commission. In the course of 2026, the Commission will provide the evaluation framework through which such tools can be approved so that they can be used by AOs to compute non-CO_2 effects from 2027 onwards. In June of 2025 the Accreditation and Verification Regulation (AVR) was published. A supporting guidance document for the AVR to ensure non-CO_2 emissions reporting can be verified is made available (GD III).

3 MRV guidance

3.1 Monitoring plan decision for AOs

1. First, the monitoring plan requires a decision on the geographic scope of the operations conducted by the AOs. See figure 4 for more information on the geographic scope of the MRV:

- Reduced scope: limited to intra-EEA flights (including flights to and from outermost regions) and flights from the EEA to Switzerland and United Kingdom.
- In-between geographical scope: includes the reduced scope and a subset of flights between an EEA Aerodrome and non-EEA Aerodrome. The AOs should select the

routes (country pairs) they wish to monitor on top of the intra-EEA scope and describe this in the monitoring plan.

- Full geographical scope: covers the reduced scope as well as flights outbound from and inbound to the EEA, with the exception of flights from Switzerland to EEA and from United Kingdom to EEA.

2. Second, the monitoring plan requires AOs to specify the IT tool they wish to use to determine the non-CO_2 effects. For reporting non-CO_2 emissions of the year 2025, and until own and third-party IT tools are approved by the Commission, only NEATS will be made available. For reporting emissions of subsequent years, the AOs will have the choice between:

- NEATS,
- Commission-approved IT tools (own and third-party IT tools), if such are available,
- Combination of NEATS and Commission-approved other IT tools, if such are available.

3. As third step in the monitoring plan, the AOs must select the method they will use to calculate their non-CO_2 effects. Only AOs which meet the conditions of being a small emitter as defined in Article 55(1) of the Regulation (i.e. AOs with less than 243 flights per period for three consecutive four-month periods and AOs with less than 25,000 tonne CO_2/year) may choose Method D (see next section).

4. Fourth, AOs must select in the monitoring plan what data they wish to provide as *Primary data* if any. The AOs can indicate provision of *Primary data* per category of data (for example: all flight trajectories), with respective description of the source and procedure applied to determine the data. NEATS can provide all the required data for the non-CO_2 effects calculations automatically, using *Secondary data* sources, including default values, though this may lead to an overestimation of the overall non-CO_2 effects of the monitored flights. AOs are therefore encouraged to actively monitor and make use of as much relevant *Primary data* as possible. If AOs wish to provide their own data for any of the data points, they are required to provide, at the minimum, their flight information as *Primary data*. The data provided to NEATS by the AOs must correspond to the data and methods indicated in their monitoring plans.

3.2 Data Input

This section provides guidance for AOs on the *Primary data* required for Methods C and D of the NEATS tool. The data input visualizations outline the data that AOs may collect throughout the year and provide within NEATS. All *Primary data* can be uploaded to NEATS during the annual reporting period, in JSON or in CSV format.

New data for a flight can be reuploaded within the NEATS tool, but it cannot be merged with previously uploaded data for the flight. The last uploaded data for a flight will be used by NEATS

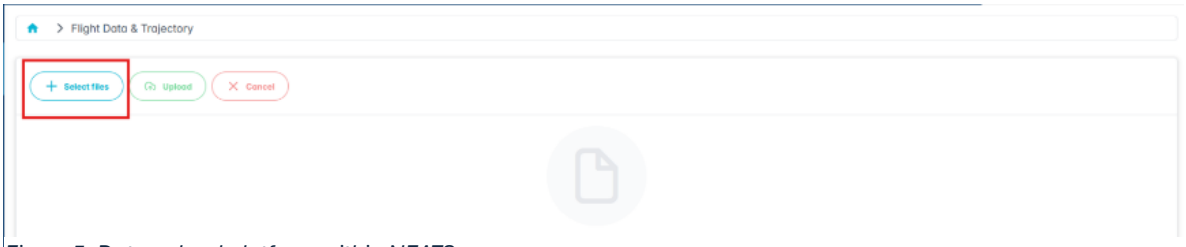

Figure 5: Data upload platform within NEATS

within the non-CO_2 effects computation. More information on uploading data and data confidentiality can be found through the NEATS user Group.

AOs use Methods C and D to determine the non-CO_2 effects. While Method C applies by default to AOs, small emitters may request to use Method D. Methods A and B, which are not described here, apply to the monitoring of CO_2 emissions.

- **Method C: Weather-based approach** (MRV Default)
  Mandatory for non-small emitters, as defined in Article 55(1) of the Regulation, this method utilizes flight information, trajectory data, aircraft properties, fuel properties and enhanced weather data. The key feature of Method C is that the climate impact at a specific time and location is calculated based on weather data for that time and that location. The data used in method C is as follows:
    - flight information;
    - flight trajectory;
    - (optional) aircraft performance information;
    - enhanced weather data;
    - aircraft properties;
    - flight fuel properties.
- **Method D: Location-based simplified approach**
  Developed for small emitters, as defined in Article 55(1) of the Regulation, this method uses climate response model(s) to estimate the impact of all non-CO2 effects per flight on a climatological basis. The CO_2(e) calculated with the location-based simplified approach shall average out any large deviations for individual flights over a longer period of time. The model(s) should ensure reduced efforts in data need, computation, and handling, as compared to the model(s) for the weather-based approach. Small emitters may opt to use Method D. The data needed for method D is as follows:
    - flight information;
    - flight trajectory;
    - (optional) aircraft performance information;
    - basic weather data;
    - aircraft properties;
    - (optional) flight fuel properties

Both methods require different datasets and engage distinct climate modules within NEATS. More information on the models applied within each method is provided within the Reference set of technical specifications (RSTS) and NEATS Methodology document.

Figures 6, 7 and 8 illustrate the data provision options within NEATS for AOs. It includes an option when providing **only** *Primary data,* **only** *Secondary data*, or a combination of *Primary* and *Secondary data*. It shows the interrelations between data inputs, and it describes the difference between types of data. These figures do not aim to indicate the only ways to implement the MRV.

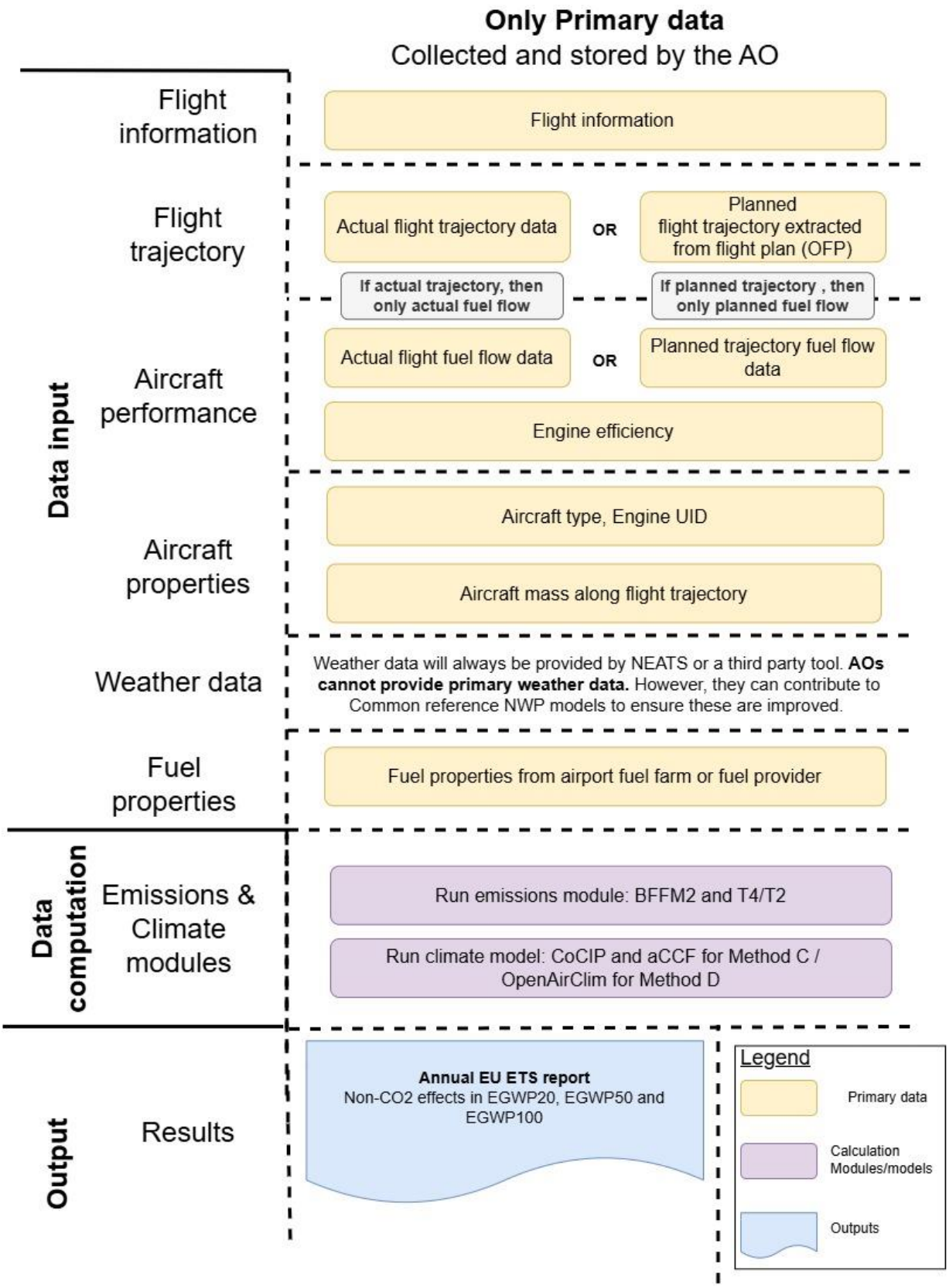

Figure 6: Data inputs for Primary data

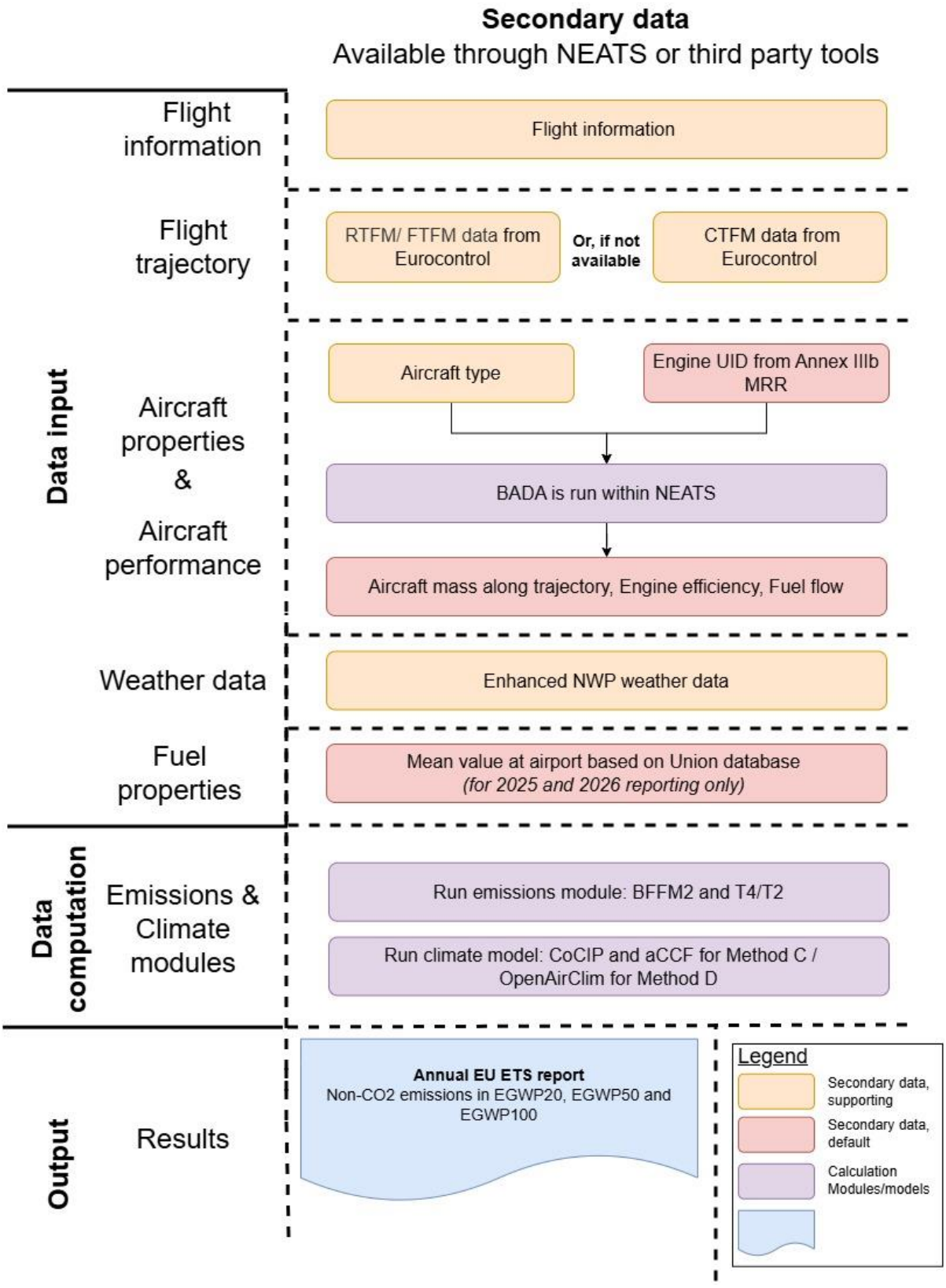

Figure 7: Data inputs for Secondary data

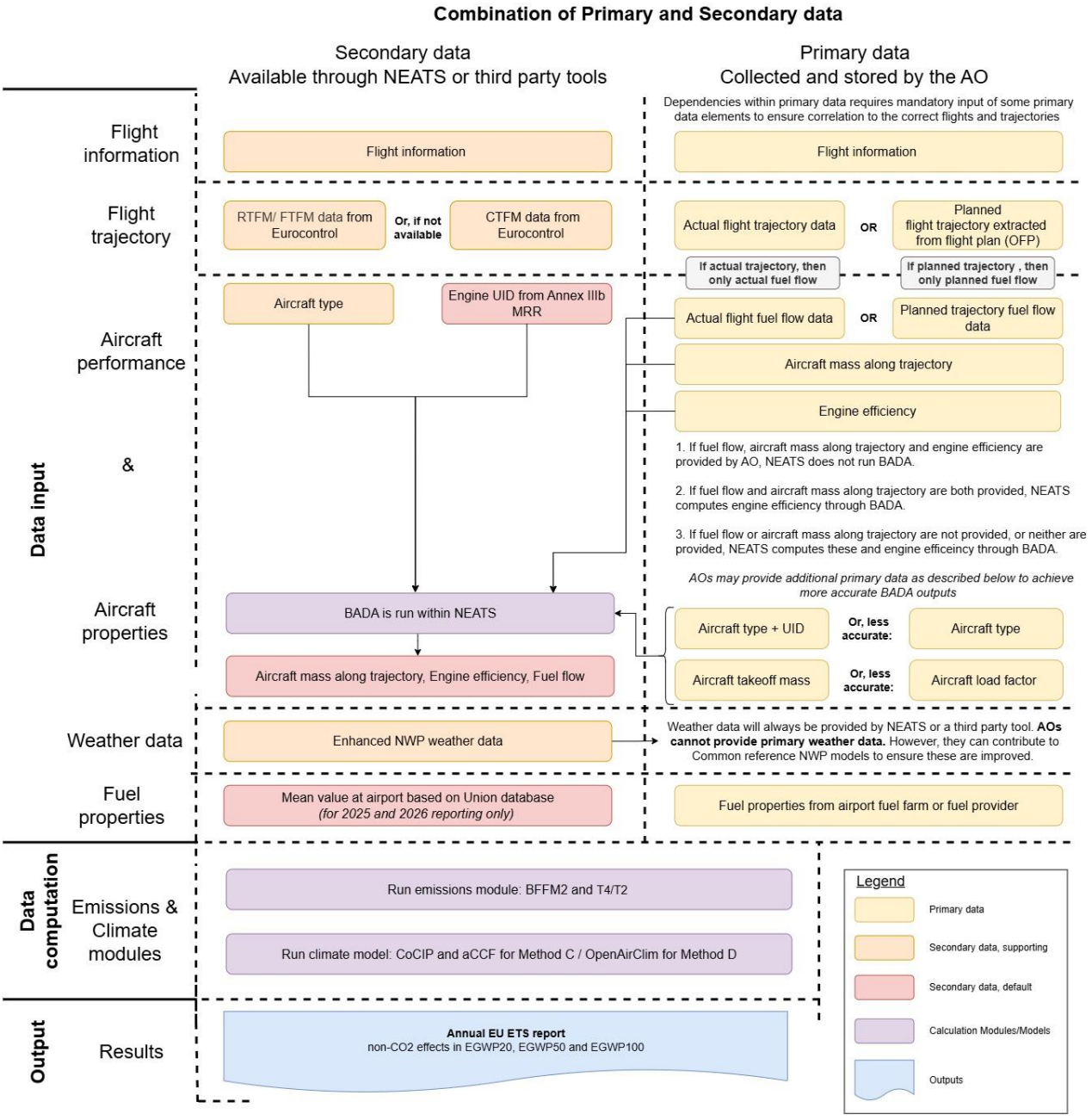

Figure 8: Data inputs for combination of Primary and Secondary data

3.3 Detailed *Primary* and *Secondary data* input in NEATS

AOs are recommended to record and monitor *Primary data*. If AOs don't monitor *Primary data*, *Secondary data* is used by NEATS. More details on data reporting, including examples for data, and data reporting templates can be found through the NEATS user group SharePoint.

Table 2 Data sets	Data variables	*Primary data* possible source	*Secondary data*
Flight information	Flight number	Flight plan (OFP)	ICAO (available through NEATS)
	Day and time (Departure and Arrival)		
	Departure airport		
	Arrival airport		
Flight Trajectory	4D flight trajectories	Flight plan (OFP)	EUROCONTROL: RTFM/ FTFM. If not available, the CTFM shall be used.
Aircraft performance	Fuel Flow	Actual fuel flow or Planned fuel flow	BADA model output based on default data or primary data
	Engine Efficiency	Percentage of useful thrust generated by aircraft engine relative to energy input from fuel	BADA model output based on default data or primary data
Weather data	Numerical Weather Prediction (NWP) model weather data	N/A	DWD[3] (available through NEATS)
Aircraft properties	Aircraft type	Flight plan (OFP)	ICAO (available through NEATS)
	Engine UIDs (allowing the case of an aircraft equipped with different engines).	Aircraft registration	See Annex IIIb of the Regulation
	Aircraft mass (along trajectory)	Performance data	BADA model output based on default data or primary data
	Aircraft take-off mass (as alternative to aircraft mass along trajectory)	Flight plan (OFP)	BADA model output based on default data or primary data
	Load factor (as alternative to take-off mass)	Flight plan (OFP)	1
	Hydrogen per carbon ratio		

[3] German Meteorological Service (The Deutscher Wetterdienst (DWD))

Fuel properties	Aromatic content	Airport, AOs, or fuel provider	See Annex III a (5)(4) and fuel properties section below (flexibility approach for 2025 and 2026).
	Net calorific value		
	Sulphur and Naphthalenes		

Flight information

As *Primary data*, AOs may provide flight information data, including the ICAO call sign, date and time of departure and arrival, as well as the ICAO/IATA codes of the departure and arrival airports. As any *Primary data* provided by AOs must be correlated to the correct flights, **any airline providing *Primary data* must always provide flight information.**

If AOs don't provide *Primary data*, they can make use of *Secondary data* provided in NEATS. To avoid discrepancies in the completeness of flights as provided by NEATS, all AOs applying the MRV with only *Secondary data* must check the correctness of the flight information provided in NEATS.

The flight information data is the same for both Method C and D.

Flight trajectory data (potentially enriched with fuel flow and engine efficiency data)

As *Primary data*, AOs may provide 4D flight trajectory data, defined by the aircraft latitude, longitude, and pressure altitude (flight level) at time stamps between the start and end of the flight. The interval between two-time stamps must not exceed 60 seconds. If this is not possible, NEATS will perform a linear interpolation to define the flight trajectory in homogenous flight phases, typically for the cruise phase. The AOs may decide whether to share the actual flown flight trajectory data, the planned flight trajectory data or trajectory data from an equivalent model in terms of accuracy (i.e. ADS-B). However, the AOs must maintain consistency between the 4D trajectory data and the aircraft performance data (e.g. planned fuel flow should be used when planned flight trajectory is used, while monitored in-flight fuel flow should be used when actual flight trajectory data is used).

If AOs don't provide *Primary data*, NEATS will make use of *Secondary data*, namely the planned flight trajectory data (Regulated Tactical Flight Model (RTFM) or the FTFM (Filed Tactical Flight Model). The ex-ante calculation ensures regulatory route adjustments during flight as well as inaccuracies in the weather forecast have no consequences on calculated CO_2e values. Alternatively, if RTFM and FTMF are not available, the CTFM (Current Tactical Flight Model) can be used.

The flight trajectory data is the same for both Method C and D.

Aircraft performance

As *Primary data*, AOs can input aircraft performance data along the trajectory (monitored values). This includes the fuel flow along the trajectory and the engine efficiency. The aircraft efficiency, or aircraft overall propulsion efficiency means the percentage of useful thrust generated by an aircraft engine relative to the energy input from fuel. AOs wishing to provide the aircraft efficiency as *Primary data* should calculate the aircraft engine efficiency based on the thrust over the duration of the flight and the energy input from the fuel.

If AOs don't provide *Primary data,* NEATS provides *Secondary data* using BADA to compute the fuel flow along the trajectory and engine efficiency based on either conservative default values or with *Primary data* input provided by the AOs such as aircraft mass along the trajectory, aircraft take off mass or load factor. If no *Primary data* is provided, a load factor of 1 is assumed.

When considering the possibility of interpolating 4D-trajectory data in cases where on-board fuel data is recorded at intervals exceeding 60 seconds, it is important to remember that, based on the assumptions for typical aircraft speeds and the extent of areas of ice supersaturation, a recommended effective time resolution is at least 60s. However, flight trajectories can be reported at a lower frequency (e.g. for straight cruise flight on same flight level) and subsequently be interpolated if the flight trajectory and aircraft performance are sufficiently homogeneous. Thus, an up-sampling to 60s resolution is only critical if flight level changes are not resolved by the original trajectory data.

Weather data

Weather data is always provided by NEATS as *Secondary* data through the common reference Numerical Weather Prediction (NWP) model. While the integration of relevant weather data from AOs or third party-sources is allowed in the common reference NWP model, currently in NEATS this only correspond to the NWP weather data provided by DWD[4].Method D requires basic weather data compared to the more detailed data for Method C. All weather data is provided as *Secondary data* through NEATS.

Aircraft properties

As *Primary data*, the AOs may provide aircraft properties – aircraft type, engine UID and aircraft mass – along the trajectory.

The aircraft type can be collected from the flight plan, while the aircraft version or engine UID can be provided based on the aircraft's registration/type certificate. In case of aircraft equipped with different engines, the AOs should provide the engine UID of each individual engine. NEATS will then run separately for each engine type, and the average output from the calculations will be used to determine the non-CO_2 aviation effects. The aircraft mass along the trajectory can be extracted from the flight data or based on flight planning data.

If AOs don't provide *Primary data*, they can make use of *Secondary data* provided through NEATS: the aircraft type is provided by EUROCONTROL and the default engine based on the aircraft type is selected based on Annex IIIb of the Regulation. For missing engines (not listed in the ICAO EDB), a suitable proxy (precursor/successor) is selected from the ICAO EDB, e.g., based on similarities in engine design characteristics. To that end, AOs are advised to consult with an engine expert or the engine manufacturer. The reasoning for the choice of such engines should be described in the monitoring plan. The aircraft mass along the trajectory can be provided through BADA computation. Similarly to aircraft performance data, AOs may provide *Primary data* to increase the accuracy of BADA outputs by providing aircraft take-off mass or the aircraft load factor as *Primary data*.

Fuel properties

As *Primary data*, AOs can provide fuel properties on a per flight basis (aromatics content, sulphur, naphthalene content, hydrogen-to-carbon ratio, and the net calorific value).

[4] The current common reference NWP model is provided by the German Meteorological Service (The Deutscher Wetterdienst (DWD))

Because it is challenging for AOs to provide *Primary data* for fuel properties at the current time, NEATS will use maximum values (for aromatics, sulphur, and naphthalene content) and minimum values (for net calorific values and hydrogen-to-carbon ratio) as available for the Union airports, i.e. the airports falling under the scope of the ReFuelEU Regulation, as *Secondary data* for the years 2025 and 2026. These values are based on the values reported by aviation fuel suppliers in the Union Database to fulfill the mandatory and voluntary data requirement under Article 10d of ReFuelEU Aviation[5]. Such flexibility approach is not valid for EEA airports that are not Union airports, as these are not under the scope of ReFuelEU.

As aviation fuel suppliers fulfill their ReFuelEU reporting obligations[6] by mid-February of the next year for each reporting year, the European Commission extracts the reported fuel properties data from the Union Database and includes these as *Secondary data* in NEATS as per the following approach:

1. If the threshold reporting rate[7] for a given fuel property (i.e. aromatics content, sulphur, naphthalene content, hydrogen-to-carbon ratio, net calorific value) at a given Union airport in a given year is equal to or higher than 10%, then the following flexibility provisions apply:

    a. If a threshold reporting rate at a given Union airport for a given fuel property exceeds or is equal to 30% in 2025 or 80% in 2026, then all the reported values that are outside two standard deviations (2σ) of the mean (i.e. meaning the most divergent ~5% values in the dataset containing all fuel properties reported at that airport in that year) will be excluded and the maximum and minimum values will be calculated from a smaller dataset. Such provision has been developed to exclude the most conservative outlier values within a given dataset.

    b. If a threshold reporting rate at a given Union airport for a given fuel property does not exceed 30% in 2025 or 80% in 2026, then the above outlier exclusion will not be performed.

Examples of how the above calculation will work in practice:

Example 1 for aromatics [reporting of fuel properties at airport X in the year 2026 is 67% of all aviation fuel delivered to the airport that year]: In the year 2026, airport X received Y number of batches where the highest observed aromatics level is 24%, and the mean is 16%, all flights taking off from airport X in 2026 are considered to contain 24% of aromatics.

Example 2 for aromatics [reporting of fuel properties at airport X in the year 2026 is 83% of all aviation fuel delivered to the airport that year]: In the year 2026, airport X received Y number of batches where the highest observed aromatics level is 24%, and the mean is 16%. The standard

[5] https://transport.ec.europa.eu/document/download/24d405c0-0db0-47ac-9f64-18cfa210df8a_en?filename=Guidance_document_Reporting_of_aviation_fuel_suppliers_under_Article_10_RFEUA.pdf

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02023R2405-20231031

[7] Reporting threshold is defined in terms of % reporting of a given fuel property at a given Union airport taken from the dataset containing property data of all the fuel batches supplied at that airport in a given year. This is calculated as, e.g.: % of fuel data including aromatics/(fuel data including aromatics + fuel data excluding aromatics).

deviation of the observed aromatics data of the Y number of batches is 2%. All flights taking off from airport X in 2026 are considered to contain 20% of aromatics.

The same approach is applied for reporting sulphur and naphthalene contents, as well as net calorific values and hydrogen-to-carbon ratio (although in this case, the minimum, rather than maximum values will be considered).

2. If the threshold reporting rate for a given fuel property at a given Union airport in a given year is lower than 10%, then default fuel property values as listed below will apply for flights departing from that airport.

If no fuel property data is provided as *Primary* data, NEATS will use the default fuel property values corresponding to the limits of Jet-A1, as listed in the MRR and the respective default values for hydrogen and net calorific value. These are as follows:

Table 3 Fuel property	 Default value
Net Calorific value (NCV)	42.8 MJ/kg
Hydrogen Content	13.79 % mass
Aromatic Content*	25% volume
Sulphur*	0.3 % mass
Naphthalene*	3 % volume

* The aromatic content, sulphur and naphthalene fuel properties, that AOs can provide, are not used in the calculations performed under the current version of NEATS, but these are required to be monitored and will be integrated gradually.

3.4 Emission & climate models in NEATS

Currently NEATS applies the following emission & climate models:

- Boeing Fuel Flow Method 2 (BFFM2) and T4/T2 models: calculates engine emissions (NO_x, HC, CO, NvPM),
- Contrail Cirrus Prediction Model (CoCiP): models contrail formation (only used in Method C),
- algorithmic Climate Change Functions (aCCFs): quantifies climate impacts of all other emissions (only used in Method C),
- OpenAirClim model (only for Method D)

Within NEATS, The BFFM2 and T4/T2 emissions module uses the collected and/or provided data to calculate engine emissions during different flight phases. In Method C, the outputs and other collected and/or provided data are fed into the CoCiP and aCCFs open-source models. In Method D, the outputs and other collected and/or provided data are fed into the OpenAirClim model. A detailed explanation of the models can be found in the *Reference set of technical specification document by DLR/DWD* and the application of these models within PyNEATS can be found in the *General Presentation of PyNEATS*.

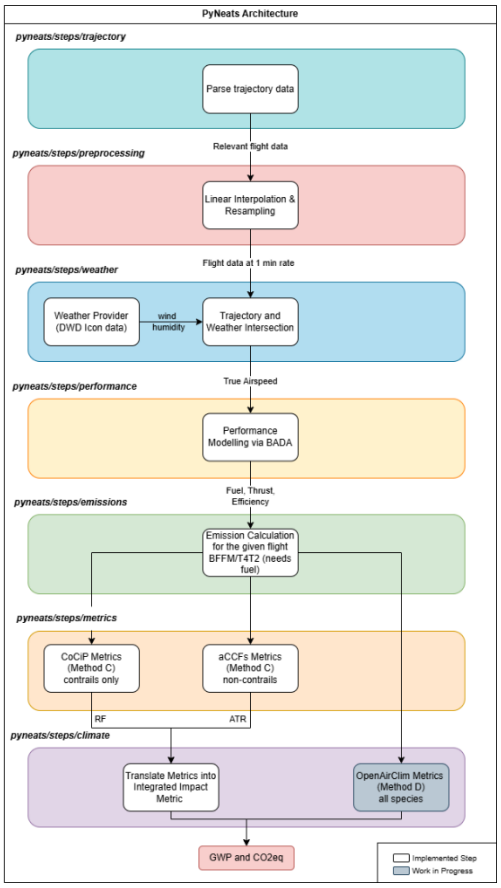

Figure 9: PyNEATS architecture

3.5 Outputs from NEATS

Once the data are provided (*Primary*) or selected within NEATS (*Secondary*), PyNEATS is run and NEATS generates the results in terms of CO_2(e). This is the same for both Method C and Method D. NEATS generates an XML table that includes details such as flight information, aircraft type, engine identifier, and CO_2(e) values for all three efficacy-weighted global warming potential (EGWP) time horizons (20, 50, and 100 years). The EGWP results take into account efficacy which is mandatory for the CO_2(e) calculation in the MRV. More detail on efficacy weightings can be found in the reference set of technical specification (RSTS

Discussions are still ongoing on how NEATS outputs can be applied within research and science, this will be shared at a later stage.

At the end of each reporting year, AOs can use NEATS to produce a report for all flights that fall under the scope of the MRV, or under the scope they selected within their monitoring plan. This can be then used within their annual reporting obligations.