

Performance Review Body: En route and terminal cost allocation Methodology review

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1 ABOUT THE DOCUMENT

- 1 This document analyses the principles for the allocation of en route and terminal costs of air navigation services (ANS) and of meteorological services (MET). It details the methodologies and criteria submitted by Member States in 2019 draft performance plans, when Member States provided the information in different formats. Harmonisation will support Member States in submitting information on cost allocation and will facilitate the assessment of the revised performance plans due for submission in October 2021.
- 2 The legal framework of the Single European Sky (SES) defines statutory requirements for allocating the cost base to en route and terminal services. In addition there is guidance material developed by ICAO and Eurocontrol which the report takes into account. The PRB also considers the findings of the 2017 audit by the European Court of Auditors¹ and two studies published by the European Commission addressing cross-subsidisation between terminal and en route charging zones.²
- 3 The report is organised as follows: Section 2 explains the legal basis for reporting the cost basis for charges as well as the methodology and criteria for en route/terminal cost allocation. Section 3 describes the findings of previous studies. Section 4 summarises the accounting methodologies and cost allocation criteria applied by Member States and highlights the limitations of high level data analysis. Section 5 concludes the report with observations, conclusions and recommendations.

¹ “Single European Sky: a changed culture but not a single sky” https://eca.europa.eu/Lists/ECADocuments/SR17_18/SR_SES_EN.pdf, 37 (c), page 27: “Guidance in respect of the en-route/terminal cost allocation was found to be insufficient, which leads to a lack of harmonized accounting procedures across Member States and a risk of cross-subsidization between en-route and terminal services: the charging of terminal air navigation services to airspace users that are only overflying the concerned airspace and not using those terminal services”.

² “Policy options for the modulation of charges in the Single European Sky” <https://ec.europa.eu/transport/sites/default/files/modes/air/studies/doc/ses/2015-04-policy-options-modulation-charges-in-ses.pdf>

“Support study to the evaluation of cost allocation to marketable terminal air navigation services” <https://op.europa.eu/en/publication-detail/-/publication/b055b2fb-9bab-11e9-9d01-01aa75ed71a1>

2 ABOUT COST ALLOCATION

4 The SES performance and charging scheme requires the cost allocation of air navigation services (ANS). During RP2, most of the actual en route costs were related to ANS costs (92%); 3% were MET costs and 89% costs of air traffic management (ATM), communication, navigation, surveillance (CNS) and aeronautical information services (AIS).³

2.1 Legal basis - EU law

5 The SES legal framework Regulation⁴ defines the main legal requirements for the en route/terminal cost allocation by an ANSP.

6 Regulation 550/2004 requires ANSPs to comply with the following obligations:

- Art. 12 (1) to “draw up, submit to audit and publish their financial accounts”. In financial statements, ANSPs account for costs in the following standard categories: staff costs, other operating costs, depreciation, interest, extraordinary costs, and taxes. Such financial statements of ANSPs include not only costs of activities covered by the charging scheme, but also commercial activities (e.g. consultancy services) and do not identify the cost of capital that is recovered through (regulated) charges.⁵
- Art. 12 (3) to “identify and disclose the costs and income deriving from air navigation services, broken down in accordance with the charging scheme for air navigation services referred to in Article 14”.
- Art. 15 (2) (e) to observe that “cross-subsidy shall not be allowed between en-route services and terminal services. Costs that pertain to both terminal services and en-route services shall be allocated in a proportional way between en-route services and terminal services

on the basis of a transparent methodology.”(emphasis added)

Establishment of the cost base

7 Implementing Regulation 2019/317 specifies the following obligations with respect to cost allocation:

- Art. 20 defines the principles for the financing of air navigation charges:
 - (1) “The determined costs of en route air navigation services shall be financed by en route charges imposed on airspace users”,
 - (2) “The determined costs of terminal air navigation services shall be financed by terminal charges imposed on airspace users”.
- Establishment of the **cost base for charges**; art. 22 (5) defines how Member States should allocate costs in the cost base for terminal charging zones:
 - “Determined costs that are incurred in respect of several charging zones shall be allocated in a proportionate way on the basis of a transparent methodology”.
- Identification of certain **services** which need to be allocated to the cost base for the terminal zone (art. 22 (5)):
 - “the determined costs included in the cost bases for terminal charging zones shall cover the cost of the following services:
 - (a) aerodrome control services or aerodrome flight information services which include air traffic advisory services and alerting services;
 - (b) air traffic services related to the approach and departure of aircraft within a certain distance of an airport which shall be defined on the basis of operational requirements;

³ National Supervisory Authorities (NSA) costs are the remaining 8% of total actual costs in RP2 (Source: draft RP3 performance plans submitted in November 2019). NSA costs comprise supervision costs and other state costs. Of these NSA costs, 80% are Eurocontrol costs. Neither Regulation 2019/317 nor ICAO “Manual on Air Navigation Services Economics” provide guidance on the allocation of NSA costs.

⁴ Regulation (EC) No 550/2004 on the provision of air navigation services in the single European sky and Commission Implementing Regulation (EU) 2019/317 laying down a performance and charging scheme in the single European sky.

⁵ According to the ICAO Manual on Air Navigation Services Economics (Doc 9161), paragraph 5.81: “cost of capital imputed on the net capital value of the assets of an entity providing air navigation services would normally not be reflected in its accounts but should be included in the cost basis for charges. The same practice should apply in those few instances when equity capital is involved.” Given that the cost of capital is not accounted for in financial statements, Implementing Regulation (EU) 2019/317 art 22 (4) defines the formula that ANSPs shall use to calculate the cost of capital that may be recovered through air navigation charges.

https://www.icao.int/publications/Documents/9161_en.pdf

(c) *the proportional part of the air navigation services common to en route and terminal services*". (art. 22 (5), emphasis added)

- 8 In line with EU law (Regulation 550/2004), Regulation 2019/317 art. 22 (5), requires that the services in (b) and (c) are allocated transparently and proportionally based on specific methodologies and criteria. NSAs must verify the compliance with this article when drawing up national performance plans as per art. 10. In this context, a periodic review by NSAs of the existing cost allocation (or any changes) should be considered as part of the monitoring and assessment of performance plans. Annex II 3.3 (d) provides a template for the submission of performance plans which requests description, as well as justification of the criteria and methodology for allocating the costs of common services between en route and terminal charging zones.

Methodology for allocating costs

- 9 Regulation 2019/317 does not define methodologies or criteria that ANSPs must use for allocating certain services to the cost base. It only requires that the applied methodology must be transparent and result in a proportional cost allocation (art.22 (5)).⁶ In addition, the scope of common services varies significantly among ANSPs according to local operational specificities, business size and sophistication of their accounting system. As a result, ANSPs apply different accounting methodologies and cost allocation criteria that suit their particular circumstances.
- 10 To better understand the available methodologies, international bodies such as ICAO and Eurocontrol have developed guidance material.

2.2 ICAO Guidance material

- 11 ICAO published two documents relevant to interpreting cost allocation in the context of the SES legal framework:

- Manual on Air Navigation Services Economics (ICAO Document 9161); and
- Policies on Charges for Airports and Air Navigation Services (ICAO Document 9082).

- 12 These documents define cost allocation, explain the methodologies for allocating costs to the relevant activities or locations (en route, approach and tower), and recommend criteria that may be used to allocate specific categories of common costs to en route and terminal charges.
- 13 A summary of relevant ICAO guidelines can be found in Annex II of this report.

2.3 Eurocontrol principles

- 14 The Eurocontrol Central Route Charges Office publishes "*Principles for establishing the cost-base for en route charges and the calculation of the unit rates*" (hereafter "the Eurocontrol principles") which Eurocontrol Member States have agreed. The principles based on ICAO guidance material.⁷
- 15 The document points out that Member States that apply the rules of the SES performance and charging scheme "*are considered to comply with the rules adopted by Eurocontrol on these matters*"⁸. Nevertheless, to clarify the scope of the obligations under the SES legal framework, Eurocontrol guidance is useful.
- 16 Eurocontrol recommends to use the following criterion when allocating ANS costs other than MET costs:

"where the utilisation of ATS facilities between en route services on the one hand and terminal services on the other cannot be allocated on a statistical basis, the said facilities shall be classified as follows:

- facilities provided mainly for en route services (allocation of 75% of the corresponding costs to route services);
- facilities provided virtually to the same extent for en route and terminal services (allocation

⁶ For example, Regulation 2019/317 does not define the distance around an airport for allocating en route costs and terminal costs. It only requires that this distance is defined "on the basis of operational requirements" (art. 22(5)). However, some Member States allocate costs between en route and terminal using the distance defined in Annex VIII (1.2) of the Implementing Regulation for the calculation of service units. The distance used to calculate en route service units excludes 20 km around an airport.

⁷ The Eurocontrol principles are based on those described in the "ICAO's Policies on Charges for Airports and Air Navigation Services" (ICAO Document 9082) and in the "Manual on Air Navigation Services Economics" (ICAO Document 9161), <https://www.eurocontrol.int/sites/default/files/2019-12/doc-20.60.01-eurocontrol-principles-january-2020-en.pdf>

⁸ Page 2 of Eurocontrol "*Principles for establishing the cost-base for en route charges and the calculation of the unit rates*".

- of 50% of the corresponding costs to route services);
- facilities provided mainly for terminal services (allocation of 25% of the corresponding costs to route services)."⁹

2.4 Main Features of the SES legal framework

- 17 The SES legal framework requires ANSPs to allocate costs to en route and terminal charging zones in a proportional manner and based on transparent methodology and criteria. However, the framework does not provide guidelines for a harmonised implementation of specific methodologies and criteria among Member States.
- 18 In 2017, the European Court of Auditors examined cost allocation under the SES legal framework. In 2015 and 2019 the European Commission published two studies relevant to cost allocation. The next section summarises their findings and recommendations on harmonisation and further guidance of cost allocation methodologies and criteria.

⁹ Paragraph 2.5.4 of the Eurocontrol principles.

3 PREVIOUS STUDIES

19 This section summarises the findings of the 2017 Special Report of the European Court of Auditors titled *“Single European Sky: a changed culture but not a single sky”* and two studies published by the European Commission in relation to cost allocation between en route and terminal services. The first study published by the European Commission in 2015 is titled *“Policy options for the modulation of charges in the Single European Sky”* (hereafter “the 2015 study”), the second one from 2019 is titled *“Support study to the evaluation of cost allocation to marketable terminal air navigation services”* (hereafter “the 2019 study”).

3.1 2017 Special Report of the European Court of Auditors

20 The 2017 Special Report of the European Court of Auditors reviewed selected key components of the Single European Sky initiative and provided recommendations to improve the effectiveness of the SES, including the verification of the ANS cost allocation.

21 The report stated that *“guidance in respect of the en-route/terminal cost allocation was found to be insufficient, which leads to a lack of harmonized accounting procedures across Member States and a risk of cross-subsidization between en-route and terminal services: the charging of terminal air navigation services to airspace users that are only overflying the concerned airspace and not using those terminal services.”*

22 The report found that NSAs do not conduct inspections on the eligibility, economy and adequate allocation of costs. The Court of Auditors indicated that the verification by NSAs is crucial since the European Commission does not perform these checks, and recommended that¹⁰:

- (i) NSAs and the European Commission should assess regularly cost allocation methods.
- (ii) The European Commission should provide additional guidance on cost allocation to ensure a harmonized accounting treatment.

3.2 Studies published by the European Commission

23 The 2015 study investigated four mechanisms for modulating air navigation charges to encourage greater flight efficiency and a reduction in delay. One of the mechanisms consists in harmonising the allocation of costs between en route and terminal services.

24 The 2015 study showed that most service providers use multiple criteria to allocate their costs. It indicated that the rationale of Member States for using multiple criteria is that it is a more realistic approach than using a single criterion. The 2015 study also stated that, usually, service providers do not detail the cost allocation methodologies or criteria.

25 In relation to cost allocation methodologies, the 2015 study recommended to the European Commission that:

- (i) Cost allocations principles and criteria used by ANSPs should be more transparent.
- (ii) The definition of en route, terminal, and approach services should be clarified.
- (iii) ATCO hours should be reported in the reporting tables of the charging scheme.

26 The 2015 study also made recommendations to the European Commission regarding the use of criteria for allocation of en route and terminal costs in the performance scheme (summarised in Table 1, next page).

¹⁰ “Single European Sky: a changed culture but not a single sky” https://eca.europa.eu/Lists/ECADocuments/SR17_18/SR_SES_EN.pdf, page 44.

Allocation criteria for ANSP costs	2015 study recommendations to the European Commission
Criteria supported by ICAO guidelines	
ATCOs – staff numbers	Recommended if an ANSP has separate en route and terminal control centres and separate groups of en route and terminal staff.
ATCOs – sectors, positions or shifts provided	Allocating costs based on planned data may be somewhat inaccurate as actual services could be different from the planned provision of sectors or positions.
ATCOs – hours worked	Recommended criteria to be used by ANSPs with no separate cost centres or providers with some ATCOs delivering both en route and terminal services.
Location of equipment / radio frequencies	Recommended only for depreciation, maintenance and operation of physical assets such as communications systems and radar equipment, but not for other costs.
Other criteria used by ANSPs	
Composite flight hours	Composite flight hours computation is based on a weighted average of past cost allocation (i.e. previous cost allocations). Applying this criterion is not recommended as future allocation would depend on past allocation, leading to circularity.
Distance around airports	Annex VIII (1.2) of the Implementing Regulation (EU) 2019/317 provides that the calculation of en route service units shall exclude a distance of 20 km around airports. However, the 2015 study points out that the handover between en route and terminal can occur at a wide range of distances from airports due to operational conditions, for example up to 100 km in Finland. ¹¹ When using this criteria, the study recommends to the European Commission to require ANSPs to: <ul style="list-style-type: none"> • “declare, for each airport, assumed handover points to and from tower control for arriving and departing aircraft - in some cases these might be based on the Final Approach Point (FAP)”, and • “calculate the terminal Flight-Kilometres as the distance between these handover points and the 20 kilometre charging boundary”.
Eurocontrol criteria	Recommended for common costs to all facilities, including depreciation and other operating costs related to specific assets. However, not recommended for allocating staff costs.
Revenues	Not recommended because revenues reflect the demand for en route or terminal services. As ANSPs have a large part of costs that are fixed, costs do not necessarily grow with demand (i.e. revenues can grow faster than costs).
Service units	Not recommended because en route and terminal units are not equivalent in terms of the level of activity provided.

Table 1 - Summary of the recommendations by the 2015 study (source: PRB elaboration of “2015 study”).

¹¹ <https://ec.europa.eu/transport/sites/transport/files/modes/air/studies/doc/ses/2015-04-policy-options-modulation-charges-in-ses.pdf>

- 27 The 2019 study investigated the transition towards market-based provision of terminal air navigation services and provides arguments for a common cost allocation methodology between terminal and en route services. The study provides recommendations to the European Commission on en route/terminal cost allocation criteria and data reporting.
- 28 In relation to en route/terminal cost allocation criteria, the 2019 study indicated that¹²:
- (i) Maximum Take Off Weight (MTOW) or “tons controlled” bears very little relation to the controlling activity.
 - (ii) Revenue is a circular approach, as a larger share of en route revenues in the past results in a larger share of en route costs in the future.¹³ It supports the conclusion of the 2015 study.
 - (iii) Service units is a measure of customer activity (demand) rather than costs.
- 29 Therefore, the 2019 study concluded that the above cost allocation criteria are not recommended. It also concluded that a new reporting system should be considered. The study suggests to require additional information on cost allocation and recommends that:
- The conditions for using the Eurocontrol criterion should be further clarified because there is an overreliance of it and many service providers use it as a default approach. The study points out that when a portion of approach services is allocated to en route charges, it results in overflights paying for approach services which they do not use.
 - ANSPs should allocate their costs using an agreed set of standard criteria. NSAs should request from ANSPs a table with the cost allocation criteria used for each cost centre, the value of the cost centres and the proportion applied to approach, tower and en route services, as well as a justification when using non-standard criteria.
- NSAs should submit the Reporting Tables of the SES charging scheme in a “cubic format of data” which breaks down costs by unit, service, and nature, and provides cost allocation criteria.¹⁴

¹² “Support study to the evaluation of cost allocation to marketable terminal air navigation services”, page 38 and 53.

¹³ Revenues reflect the demand for en route or terminal services. As ANSPs have a large part of costs that are fixed, costs do not necessarily grow with demand (i.e. revenues can grow faster than costs).

¹⁴ The 2019 Study refers to criteria as allocation keys.

4 APPLIED METHODOLOGIES AND CRITERIA

30 This section analyses cost allocation information and aggregate data for main ANSPs. The analysis shows that detailed verification of cost allocation by NSAs is essential to avoid cross subsidisation between en route and terminal services. NSAs must verify cost allocation and cost of capital when drawing national performance plans.

31 First, the section details the information in performance plans submitted in October 2019 (hereafter 2019 draft performance plans):

- accounting methodologies (Table 2), and
- cost allocation criteria (Table 3, next page).¹⁵

32 Second, the section indicates the limitations of top down analysis of en route/terminal allocation using total costs and costs per flight hour.

33 Finally, the section discusses the impact on cost allocation of applying different levels of weighted average cost of capital (WACC) for en route and terminal services when those differences are not properly justified.

4.1 Accounting methodologies used by Member States

34 The accounting methodologies reported by Member States are categorized according to the cost allocation methodologies defined in the ICAO guidance material (see Annex II). The categorised

methodologies reported by Member States are shown in Table 2.¹⁶

35 According to the 2019 draft performance plans, the activity-based costing methodology is the most frequently used by Member States. While 20 Member States reported a single methodology, seven reported both methodologies, and one did not report any methodology.

4.2 Cost allocation criteria used by Member States

36 The cost allocation criteria used by Member States is analysed based on international guidelines or recommendations by previous studies. A list of criteria from relevant sources is presented in Annex I.

37 According to the 2019 draft performance plans, the most frequently used criteria by Member States are related to ATCO numbers/working positions and traffic/airspace structure. Concerning the number of criteria reported, 17 Member States reported multiple criteria, eight reported a single criterion, and three Member States did not provide enough information. A summary of the cost allocation criteria used by Member States is shown in Table 3 (next page).¹⁷

Accounting methodologies	Number of Member States	Description
Activity-based	23	Member States that apply the activity-based methodology which allocates costs to: (i) aerodrome services, (ii) approach service, that may provide both en route and terminal services, and (iii) en route service.
Location-based	11	Member States that apply the location-based methodology which allocates costs to: (i) tower control centre(s) that may provide both en route and terminal services, (ii) approach control office(s), that may provide both en route and terminal services, and (iii) area control centre(s), that provides services to en route.
No methodology reported	1	Member State not detailing a specific accounting methodology, while reporting the use of ICAO or Eurocontrol criteria.

Table 2 - Methodology for cost allocation (source: PRB elaboration of additional information of the 2019 draft performance plans).

¹⁵ As the categorization reported in Table 2 and Table 3 has been elaborated by the PRB, it is subject to interpretation.

¹⁶ Annex II provides the list of Member States per methodology reported.

¹⁷ Annex II provides the list of Member States per criteria reported.

Criteria for cost allocation	Number of Member States	Description
ATCO or other - Staff numbers	13	Allocation based on full time equivalents (FTE) of ATCO or non-ATCO staff working on either terminal or en route services, or ATCO working positions.
Number of flights and air-space structure	10	Allocation based on IFR flights, service units, airspace sectors, etc.
Distance around airports for approach services	10	Allocation terminal services if the service is provided to a flight within a certain distance (usually 20km) from the airport.
Equipment or assets used	9	Allocation based on the use or location of equipment or assets.
Distance flown and/or time spent in the area	7	Allocation based on the “distance flown and/or time spent in the area” by airspace users.
Floor areas devoted to separate control services	5	Allocation based on the physical location of control services.
Not specified	3	The cost allocation criteria were not specified by the respective Member States.
Eurocontrol/ICAO	1	Allocation based only on the use of ICAO or Eurocontrol criteria, while not reporting another specific criteria.
Actual demand	1	Allocation reported to be based on “actual demand”, without defining it.

Table 3 - Summary of criteria for cost allocation (source: PRB elaboration of additional information of the RP3 draft performance plans).

4.3 Allocation of 2019 actual ANSP costs

38 Different allocation shares among Member States may be due to one or more of the following:

- appropriate but locally specific cost allocation criteria
- local airspace conditions
- different levels of fixed costs
- economies of scale
- cross-subsidisation

39 ANSP data available at Union-wide level does not allow to disentangle the impact of each of the above factors. Bottom up verification by NSAs of cost allocation methodologies and criteria is essential to confirm that the criteria applied does not lead to cross subsidisation.

40 There are drawbacks of assessing or comparing the cost allocation among Member States based solely on available data in reporting tables,

performance plans and operational data from the Network Manager on total costs or on costs per flight hour.

41 The allocation of total costs is not comparable among Member States because, in addition to the factors mentioned in paragraph 38, it depends on the number of charging zones, their scope, and the level of en route and terminal traffic.

42 Figure 1 (next page) shows that the en route share of actual staff costs and total costs of main ANSPs in 2019 ranges between 95% for Bulgaria and 33% for Luxembourg.¹⁸ For comparison, the Union-wide average of en route cost share is 81%. Part of the differences can be explained by the size (scope) of the charging zones. For example, Bulgaria and Slovenia have a low share of IFR airport movements (11% and 6%, respectively), while Finland and the Netherlands have a high share (97% and 88%, respectively).

¹⁸ This report defines main ANSPs as the largest ANSP per charging zone. Figure 1 sorts ANSPs in Member States by en route cost share, from highest to lowest. Spain Canarias and Maastricht Upper Area Control Centre (MUAC) are 100% allocated to en route and are not included.

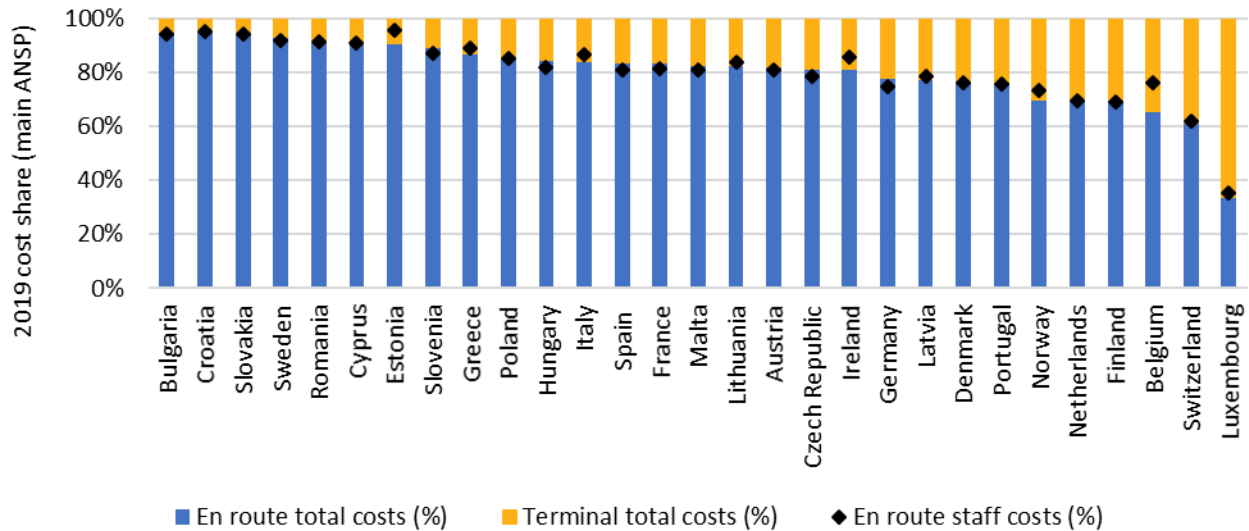


Figure 1 - 2019 en route/terminal total costs allocation versus en route staff costs per main ANSP (source: PRB elaboration).

- 43 Figure 1 also shows that the en route total cost share is roughly the same as the en route share of staff costs. As staff costs is the largest cost category of main ANSPs, its allocation has a large impact on the allocation of total costs.
- 44 In theory, the allocation of staff costs to en route and terminal services could be cross checked at an aggregate level using ATCO hours dedicated to en route and terminal services. However, such verification is currently not possible as ANSPs disclose ATCOs hours dedicated to (i) area control and to (ii) approach and tower centres. ATCO hours need further allocation into en route and terminal services. For the purpose of cross-checking the cost allocation of staff costs, ANSPs should report ATCO hours dedicated to en route and terminal services as part of monitoring templates. Moreover, the figures reported by ANSPs should be verified by NSAs.
- 45 One possibility to compare the cost allocation amongst Member States regardless of the number of charging zones and their traffic level, is to analyse the en route and terminal costs per flight hour for each main ANSP. En route costs per flight hour can be calculated as actual en route cost divided by total IFR flight hours. Terminal costs per flight hour can be calculated as the actual terminal costs divided by an hour estimate derived from IFR airport movements. The terminal hour estimate is calculated using the same transformation coefficient used by Eurocontrol to calculate composite flight hours.¹⁹
- 46 The resulting ranking of Member States by the percentage difference between en route and terminal costs per flight hour is different from the ranking by total en route and terminal cost share.
- 47 While costs per flight hour allow to compare ANSP costs regardless of size, it still does not disentangle the effect of the factors mentioned in paragraph 38, and it has two additional drawbacks:
- The calculation of en route cost per flight assumes that all the IFR flight hours controlled by the ANSP are allocated to en route services. However, the actual allocation may differ from this assumption. Actual allocation of IFR flight hours to en route is not reported.
 - As shown in previous studies, the proportion of IFR movements used to calculate the terminal cost per flight hour is a historical figure (based on average data from 2002-2018) and therefore reflects past average allocation.

¹⁹ Flight-hours controlled by the main ANSP and IFR airport movements are obtained from the 2019 Key Operational Data published by Eurocontrol. <https://www.eurocontrol.int/ACE/ACE-Home.html>. The terminal flight hours are calculated as IFR airport movement times a factor equal to 0.27. The 0.27 factor is based on the total monetary value of the en route and terminal outputs over the period 2002-2018. The average weighting factor (0.27) is used in the formula to calculate the composite gate-to-gate flight-hours. <https://www.eurocontrol.int/ACE/ACE-Reports/ACE2018.pdf>

4.4 WACC applied to en route and terminal services

- 48 When an ANSP uses a different weighted average cost of capital (WACC) for en route and terminal services, it affects the cost level and cost allocation between en route and terminal services. When different WACC levels are not duly justified, they may result in cross-subsidisation between en route and terminal services.
- 49 The WACC is the rate of return that bondholders and shareholders require as compensation for their contribution of capital. The WACC of ANSPs should reflect their business and financial risk profile. According to credit rating agencies, the business risk of ANSPs is generally low due to their monopolistic competition, public ownership and strategic importance to their Member States.²⁰
- 50 During RP2, roughly half of the Member States applied the same determined WACC for en route and terminal services, hence reflecting the same level of business and financial risk of the ANSP in the provision of both services. However, some Member States had different levels of WACC for en route and terminal services. This results in a different cost allocation between en route and terminal compared to the situation when the WACC is set at the same level for both services.
- 51 The WACC in RP2 may have been different for en route and terminal charging zones due to the possibility that Member States had to exclude airports with fewer than 225 thousand IFR movements per year from the traffic risk sharing mechanism (Article 13 (6) of Regulation 391/2013).²¹ Also, the WACC may be different if terminal services face more competition than en route services in a given Member State.
- 52 In order to prevent cross subsidisation, performance plans should justify any difference in the business or financial risk between en route and terminal services that results in a different WACC for each service.²²

²⁰ 20 January 2021, NATS (En Route) PLC -- Moody's announces completion of a periodic review of ratings of NATS (En Route) PLC (yahoo.com). July 2012, "DFS Deutsche Flugsicherung GmH and NATS (En Route) Limited – Peer Comparison", Moody's.

²¹ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:128:0031:0058:EN:PDF>

²² For recommendations on the cost of capital assessment of performance plans see the 2021 PRB Study on cost of capital

5 CONCLUSIONS AND RECOMMENDATIONS

- 53 **Conclusion 1:** Information on cost allocation is provided by Member States in different formats and level of detail.
- 54 **Recommendation 1:** The PRB recommends to the European Commission to harmonise information reported by the NSAs regarding the en route/terminal cost allocation methodology and criteria, as well as on any changes proposed. For this purpose, the PRB recommends to the Commission to use the template proposed in Annex IV. The PRB recommends the Commission to include the template in the submissions of revised performance plans in October 2021.
- 55 **Conclusion 2:** ATCO hours allocated to en route and terminal services could be used as an external cross check of the allocation of staff costs between en route and terminal services. Staff costs are the largest category of costs and largely impacts cost allocation. However, ATCO hours allocated to en route and terminal are currently not reported by ANSPs.
- 56 **Recommendation 2:** The PRB recommends to the European Commission to require ANSPs to report ATCO hours allocated to en route and terminal services as part of the annual monitoring. This information can be included in the reporting tables and should be verified by NSAs.
- 57 **Recommendation 3:** The PRB recommends to the European Commission to implement in future reference periods the recommendations by the 2019 Study to (i) clarify the conditions for using the Eurocontrol criterion, (ii) to consider whether NSAs should report the value of the cost centres and the proportion applied to approach, tower and en route services, and (iii) to consider whether NSAs should submit the reporting tables of the SES charging scheme in a “cubic format” which breaks down costs by unit, service, and nature, and provides cost allocation criteria.
- 58 **Conclusion 3:** The WACC component of the cost of capital costs charged may have been different between en route and terminal charging zones during RP2 due to the possibility of Member States to exclude airports with fewer than 225 thousand IFR movements per year from the traffic risk sharing mechanism (Article 13 (6) of Regulation 391/2013).²³ More generally, the WACC may be different if terminal services face more competition than en route services in a given Member State.
- 59 **Recommendation 4:** The PRB recommends to the European Commission to request NSAs to justify a different level of the WACC for en route and terminal services. This justification should relate to differences in business and financial risks between en route and terminal services. The European Commission should evaluate the justification provided by a Member State based on Annex X of Implementing Regulation laying down the criteria for the assessment of whether the provision of terminal ANS, CNS, MET, AIS and ATM data services is subject to market conditions.

²³ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:128:0031:0058:EN:PDF>

ANNEX I – CRITERIA GLOSSARY

Criteria for cost allocation	Definition
ATCOs – staff numbers	Number of full time equivalent air traffic controllers (ATCOs) that are working for either terminal or en route services. (source: 2015 study)
ATCOs – hours worked	Number of hours ATCOs have been working for either terminal or en route services. (source: 2015 study and ICAO guidelines)
ATCOs - sectors, positions or shifts provided	Sectors controlled, positions or shifts provided. Within a Member State, the air traffic is divided into Area Control Centres (ACC), each of these ACCs (and staff working for it) being responsible of a block of airspace. Furthermore, ACCs are sub-divided into control sectors. ²⁴ A way to allocate costs between en route and terminal services is to analyse if these control sectors (and therefore ATCOs working for them) are providing services to en route or terminal. (source: 2015 study and ICAO guidelines)
Composite flight hours	Composite flight hours are defined as “the sum of en route flight hours and IFR airport movements weighted by a factor of 0,27 that reflected the relative importance of terminal and en route costs in the cost base from 2002-2012” ²⁵ . (source: 2015 study and Eurocontrol)
Distance around airports	Distance around airports that is considered as being part of terminal or en route services. Article 22(5) of Implementing Regulation (EU) 2019/317 states that the cost basis for terminal services should take into account approach and departure of airlines services that are allocated to terminal. Depending on operational requirements of Member States, a specific distance from the airport shall be defined to allocate costs between en route and terminal services for approach and departure services. (source: 2015 study and the Implementing Regulation)
Eurocontrol criterion	Eurocontrol recommends the following criterion when operational criteria cannot be applied: (i) if costs are mainly for en route services, the allocation should therefore be 75% en route – 25% terminal, (ii) if costs are estimated approximately to be from both terminal and en route services, the allocation should be 50% en route - 50% terminal, (iii) if costs are mainly for terminal services, the allocation should then be 25% en route – 75% terminal. ²⁶ (source: Eurocontrol principles, 2015 study and 2019 study)

²⁴ <https://eur-lex.europa.eu/legal-content/NL/TXT/?uri=CELEX%3A52017SC0207#footnote17>

²⁵ https://ext.eurocontrol.int/lexicon/index.php/Composite_flight_hour

²⁶ <https://www.eurocontrol.int/sites/default/files/2019-12/doc-20.60.01-eurocontrol-principles-january-2020-en.pdf>

Criteria for cost allocation	Definition
Floor areas devoted to separate control services	Floor areas are used to allocate common costs (depreciation, cost of capital or administrative costs) of separate control services physically situated in one location. It may be measured as squared meters of floor space occupied by each control service. (source: ICAO guidelines)
Location of equipment	The physical location of an asset is used to allocate costs. (source: 2015 study and ICAO guidelines)
Radio frequencies/channels	The number of frequencies assigned for route and airport control to allocate costs. (source: 2015 study and ICAO guidelines)
Revenues	Revenues from terminal and en route charges to airspace users. They are the product of en route or terminal service units and the en route or terminal unit rate, respectively. (source: 2015 and 2019 study)
Service units	En route service units are calculated on a flight level, and are used to charge the costs of air navigation services to airspace users. These are calculated by multiplying the distance flown by the square root of the Maximum Take Off Weight (MTOW) of the aircraft of the specific flight. Terminal service units are calculated based on the number of flights, MTOW and an exponential factor (usually 0.7). ²⁷ (source: 2015 and 2019 study)
Tons controlled	Total tonnage or MTOW of an aircraft. The allocation of costs between en route and terminal would be therefore based on the tons controlled either for terminal or en route services. ²⁸ (source: 2019 study)

Table 4 - Criteria glossary (source PRB elaboration of "Commission staff working document – Practices favouring Air Traffic Management Service Continuity", Implementing Regulation (EU) 2019/317, Eurocontrol, ICAO, "the 2015 study" and "the 2019 study").

²⁷ <https://www.eurocontrol.int/ServiceUnits/Dashboard/About.html#:~:text=En%2Droute%20service%20units%20are,ser-vices%20this%20flight%20has%20received.&text=The%20evolution%20of%20en%2Droute%20service%20units%20is%20there-fore%20a,the%20evolution%20of%20aircraft%20weight.>

²⁸ <https://ec.europa.eu/transport/sites/transport/files/modes/air/studies/doc/ses/2015-04-policy-options-modulation-charges-in-ses.pdf>

ANNEX II – ICAO GUIDELINES

60 ICAO has published two documents which are relevant to interpret the SES legal framework on cost allocation methodologies:

- the “*Manual on Air Navigation Services Economics*”²⁹ (hereafter “the ICAO Manual”), which provides guidelines for ICAO Member States, ANSPs, and regulatory authorities on the economic management of air navigation services, and
- the “*Policies on Charges for Airports and Air Navigation Services*” (hereafter “the ICAO policies on charges report”), which contains recommendations of the ICAO Council with respect to key charging principles.

61 Cost allocation is defined in the ICAO Manual as “*the activity undertaken to assist the management of the air navigation services organization to understand and monitor costs and to establish the costing of services for the purpose of recovering those costs from users*”. For the purpose of accounting for the cost basis of charges and allocating those costs between en route and terminal, the ICAO Manual describes a three-step procedure:

- Step 1: The preparation of financial statements usually mandated for ANSPs in ICAO Member States as well as for Member States of the charging scheme as described under the legal basis.
- Step 2: The allocation of financial data to activities and locations, often referred to as “management accounting”, which is optional and not standardised. It classifies ANSP costs in self-contained operating units known as cost centres.
- Step 3: The allocation of ANSP costs from financial statements and management accounts (cost centres) to en route and terminal

services in order to establish the cost basis for charges.

62 Regulation 550/2004 is in accordance with the first step of the ICAO guidelines related to the financial accounting requirement for ANSPs. Implementing Regulation 2019/317 art. 22 (5), requiring transparent and proportional methodologies and criteria for cost allocation can be interpreted using the second and third steps of the ICAO guidance material.

63 In the second step, the management of ANSPs classifies the costs in cost centres³⁰ to understand their financial performance. ANSPs may allocate costs to as many or as few cost centres as required by their own management. Large ANSPs may have hundreds of cost centres.³¹ The type of cost centres used by ANSPs depend on their own organisational structure or services provided. However, for the purposes of allocating costs to en route and terminal charges, there are two management accounting methodologies described by ICAO: activity-based, and location-based costing.

- “Activity-based costing” is a methodology which allocates the cost to the activity (service) of the ANSP. The activities defined by the ICAO Manual are (i) aerodrome control services, (ii) approach control services, and (iii) area control services. The ICAO document on policies on charges recommends ANSPs of ICAO Member States to identify separately, where possible, their costs during aerodrome, approach, and area control phases.³² Currently, the performance and charging scheme does not require ANSPs to identify the costs of the approach phase separately. However, reporting costs disaggregated in this manner would increase the transparency of cost allocation. For example, the Spanish safety supervisory authority (AESA) has requested to the service provider (ENAIRES) to have an

²⁹ ICAO Document 9161

³⁰ A cost centre is a function within an organization that does not directly add to profit but still costs money to operate, such as the accounting, HR, or IT departments. The main use of a cost centre is to track actual expenses for comparison to budget. A cost centre indirectly contributes to a company’s profit via operational excellence, customer service, and enhanced product value.

³¹ For example, in Annex A, the “Additional Information to Reporting Tables” submitted in the performance plan of 2019, France mentions “55 cost-accounting units, divided into around 400 cost centres”.

³² Paragraph 3. iii) of ICAO Document 9082 titled Policies on Charges for Airports and Air Navigation Services.

https://www.icao.int/publications/Documents/9082_9ed_en.pdf

evidence-based approach with a separation of the three services mentioned above.³³

- “Location-based costing” is a methodology which allocates ANSPs’ costs by physical location. For example, traffic control towers located on or near an airport traffic control service; approach control centres established in the vicinity of one or more major aerodromes; and area control centres.

64 The classification conducted based on this second step is an intermediate step in establishing the cost basis for en route and terminal services. Indeed, despite some of the services identified by the “management accounting” being fully and easily allocated to one service (e.g. aerodrome control services to terminal services, and area control services to en route services), this may not

be valid for several common costs. Such common costs are allocated in the third step. Common costs such as approach services or services provided from certain locations are then allocated using one or more operational criteria. The third step completes the establishment of the accounting of the cost basis for setting en route and terminal charges. Table 5 summarises the three accounting steps.

65 The ICAO Manual recommends to ANSPs of ICAO Member States to define and maintain appropriate criteria for allocating common costs, and advises ANSPs to review periodically the allocation criteria in order to reflect changes in the way that ANS are provided. The ICAO Manual recommends using the criteria detailed in Table 6 (next page).³⁴

Step 1: Financial accounting	Step 2: Management accounting	Step 3: Accounting for setting en route and terminal charges
Costs allocation by category : <ul style="list-style-type: none"> - staff costs - other operating costs - depreciation - interest - extraordinary costs - taxes 	Cost allocation by: <ul style="list-style-type: none"> 1- Activity: <ul style="list-style-type: none"> - en route service - approach service - tower service 2- Location: <ul style="list-style-type: none"> - area control (en route) centre(s) - approach control office(s) - tower control centre(s) 	Cost allocation by: <ul style="list-style-type: none"> - en route service - terminal service <p>Criteria are used to allocate costs of common services, e.g. approach services or services provided from shared locations which may correspond to both en route and terminal services.</p>

Table 5 - Financial and management accounting and cost allocation to en route and terminal (source: PRB elaboration of ICAO Manual).

³³ Support study to the evaluation of cost allocation to marketable terminal air navigation services - Publications Office of the EU (europa.eu) <https://op.europa.eu/en/publication-detail/-/publication/b055b2fb-9bab-11e9-9d01-01aa75ed71a1>

³⁴ A glossary of the criteria discussed in this study is available in Annex I.

Allocation criteria for ANSP costs	Recommendations by the ICAO Manual
Air traffic controller (ATCO) – number of sectors and/or number of controller positions	<ul style="list-style-type: none"> - Criteria to allocate costs when aerodrome, approach or en route services are provided from a shared area of an approach or area control centre. - The criteria can be used to allocate depreciation and cost of capital of shared premises, as well as shared administrative and common costs. - ATCO costs can be allocated according to the sectors under their responsibility. - The cost of engineering support can be allocated according to the number of ATCO positions.
ATCO – actual work-hours	<ul style="list-style-type: none"> - Shared air traffic service (ATS) costs may be allocated according to the actual work-hours devoted to approach, aerodrome, and en route control. - This criterion can be used to allocate depreciation and cost of capital of shared premises, as well as shared administrative and common costs. - ATCO costs can be identified according to their watch rosters and the sectors under their responsibility.
Number of radio channels for communications and ATCO positions for surveillance	<ul style="list-style-type: none"> - The allocation of the cost of equipment used for communications, navigation and surveillance may be based on this criteria. - In the case of navigation aids, the published frequencies can be used as a guide to the type of service provided.
Floor areas devoted to two services	<ul style="list-style-type: none"> - This criterion can be used to allocate depreciation and cost of capital of shared premises, as well as shared administrative and common costs.

Table 6 - Recommended allocation criteria for ANSP costs by the ICAO Manual (source: PRB elaboration of ICAO Manual).

66 Costs of meteorological services (MET) for air navigation that are common to en route and terminal also need to be allocated. The ICAO Manual states that MET services for air navigation are meteorological observations, reports and forecasts, and any other meteorological data required from Member States for aeronautical use.³⁵ The ICAO Manual also identifies various facilities that provide MET services for air navigation: world area forecast centres, volcanic ash advisory centres, tropical cyclone advisory centres, meteorological watch offices, aerodrome meteorological offices, aeronautical meteorological stations (including the observational and telecommunications equipment).

67 The ICAO Manual recommends that national aviation authorities of ICAO Member States (i.e. the civil aviation administration) and the meteorological authority designated in the ICAO Member State draw up jointly an inventory of all meteorological facilities and services which serve to meet aeronautical requirements as per the Annexes to the Chicago Convention. Once MET facilities and services have been identified, the national aviation authorities and the meteorological authorities may use one or more criteria detailed in Table 7 (next page) when allocating the related costs.³⁶

³⁵ Other examples of MET services in the ICAO Manual are: briefing and flight documentation; world area forecasts for computerized flight planning; MET information for broadcasts and data link services; and aeronautical MET telecommunications (if not included elsewhere).

³⁶ The ICAO Manual also indicates that there are general supporting facilities and services related to meteorological services that provide aeronautical and non-aeronautical services (e.g. surface and upper-air observation networks, meteorological telecommunications systems, data-processing centres and supporting core research, training and administration). The costs of these general-purpose facilities and services must first be allocated between aeronautical and non-aeronautical services before allocating them between en route and terminal services, by using the same logic of criteria in Table 3.

Allocation criteria for MET costs	Recommendations by the ICAO Manual
Analytical accounting system	Recommended if the results from an analytical accounting system ensure an equitable allocation of the costs concerned.
Estimated time of use of computers	Recommended to allocate the costs of electronic data processing facilities.
Estimated volume of information transmitted	Recommended to allocate the costs of telecommunications facilities.
Staff working on meteorological data	Recommended to allocate the costs of climatological services.
Approximation from best data available	When the above criteria cannot be applied, the ICAO Manual recommends to establish the ratio between the costs of those facilities and services needed to serve exclusively en route requirements and the costs of those needed to serve terminal. This ratio would then be applied to the costs of those core facilities which serve both en route and terminal services in order to estimate the portion of costs.

Table 7 - Recommended allocation criteria of MET costs by the ICAO Manual (source: PRB elaboration of ICAO Manual).

ANNEX III – METHODS AND CRITERIA APPLIED BY MEMBER STATES

Methods	Member States
Activity-based	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain Continental, and Sweden
Location-based	Belgium, Croatia, Estonia, Finland, France, Germany, Hungary, Malta, Norway, Poland, and Romania
No specific accounting methodology reported	Switzerland

Table 8 - Methodologies by Member State for cost allocation (source: PRB elaboration of additional information of the RP3 draft performance plans).

Criteria	Member States
ATCO or other - Staff numbers	Belgium, Bulgaria, Croatia, Cyprus, Greece, Ireland, Latvia, Lithuania, the Netherlands, Poland, Romania, Slovenia, and Spain Continental
Number of flights and air-space structure	Bulgaria, Croatia, Greece, Latvia, Lithuania, Norway, Poland, Slovakia, Slovenia, and Spain Continental
Distance around airports for approach services	Belgium, Croatia, Estonia, Finland, France, Ireland, Italy, the Netherlands, Slovakia, and Spain Continental
Equipment or assets used	Bulgaria, Croatia, Cyprus, France, Greece, Malta, the Netherlands, Norway, and Poland
Distance flown and/or time spent in the area	Czech Republic, Denmark, Hungary, Romania, Slovakia, and Slovenia
Floor areas devoted to separate control services	Belgium, Bulgaria, Ireland, Malta and Spain Continental
Not specified	Portugal, Sweden, and Switzerland
Eurocontrol/ICAO (only)	Austria
Actual demand	Germany

Table 9 - Criteria by Member State for cost allocation (source: PRB elaboration of additional information of the RP3 draft performance plans).

ANNEX IV – NEW INFORMATION RECOMENDED

1. Determined costs and unit costs

Description of the methodology used for allocating costs of facilities or services between different air navigation services, based on the list of facilities and services listed in ICAO Regional Air Navigation Plan, European Region (Doc 7754) as last amended, and a description of the methodology used for allocating those costs between different charging zones.

Please fill in the following table describing the cost allocation methodology for each applicable item.

Entity (e.g. ANSP, MET or NSA)		
1. Detail by nature, if applicable	Method (e.g. activity- and/or location-based costing related to aerodrome, approach and en route)	Description
1.1 Staff costs		
of which, pension costs		
1.2 Other operating costs		
1.3 Depreciation		
1.4 Cost of capital		
1.5 Exceptional items		
2. Detail by service, if applicable		
2.1 Air Traffic Management		
2.2 Communication		
2.3 Navigation		
2.4 Surveillance		
2.5 Search and rescue		
2.6 Aeronautical Information		
2.7 Meteorological services		
2.8 Supervision costs		
2.9 Other State costs		

Are there changes in the cost allocation methodology with respect to the previous reference period? Y/N? If yes, please detail the changes and impact(s) on the determined costs and/or baseline.

Change(s) in the cost allocation methodology? Y/N	Detail of changes	Impact(s) on the determined costs and/or baseline

Criteria used to allocate costs between terminal and en route services, in accordance with Article 22(5).

Please fill in the following table the criteria used for allocating costs between en route and terminal services:

Entity (e.g. ANSP, MET or NSA)			
1. Detail by nature, if applicable	% allocation to en route	Criteria used to calculate the %	Description
1.1 Staff costs			
of which, pension costs			
1.2 Other operating costs			
1.3 Depreciation			
1.4 Cost of capital			
1.5 Exceptional items			
2. Detail by service, if applicable			
2.1 Air Traffic Management			
2.2 Communication			
2.3 Navigation			
2.4 Surveillance			
2.5 Search and rescue			
2.6 Aeronautical Information			
2.7 Meteorological services			
2.8 Supervision costs			
2.9 Other State costs			

Are there changes in the cost allocation criteria with respect to the previous reference period? Y/N? If yes, please detail the changes and impact(s) on the determined costs and/or baseline.

Change(s) in the cost allocation criteria? Y/N	Detail of changes	Impact(s) on the determined costs and/or baseline