
	<p>Clean Sky Joint Undertaking</p> <p>Ex-post Audit</p>	
<p>Ex-post audit Report 2020 – Final version</p>		
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I. Introduction

The purpose of this Ex-post Audit Report is to provide input to the assurance on the legality and regularity of the CS2 JU operational expenditure of the year 2020 for the Executive Director.

In this context, the report describes the results of the ex-post audits performed until today, which potentially provide support or put in doubt the confirmations given in the annual assurance declaration 2020 by the Director, i.e.:

- The information provided in the Annual Activity Report (AAR) 2020 gives a true and fair view
- Resources have been used in the year 2020 for the intended purpose
- Resources have been spent in accordance with the principle of sound financial management
- The underlying transactions are legal and regular
- No information, which could hamper the interest of the JU, is missing in the AAR 2020

The results of the EPA process represent a significant element of the Internal Control System of the JU and need to be described in the AAR. Therefore, this report summarises key information regarding the EPA process, which should be summarised in the AAR 2020 in the section related to Internal Controls.

The main objectives of the ex-post audits are:

- 1) Assess the legality and regularity of the validation of cost claims performed by the JU's management through the achievement of a number of quantitative targets,
- 2) Provide an adequate indication on the effectiveness of the related ex-ante controls
- 3) Provide the basis for corrective and recovery activities, if necessary

The scope of the audits performed during the year 2020 comprised only H2020 grant agreements and their expenditure.

The audit activities for H2020 grants are fully centralised in the Common Audit Service (CAS) of DG R&I. This contributes to a consistent harmonised audit approach for the totality of H2020 projects and aims at reducing the audit burden for beneficiaries who participate in projects with several granting authorities of the H2020 Research family¹. The implementation of the audit results remains under the responsibility of Clean Sky 2 JU.

On the basis of the H2020 Audit Strategy and in line with the related Clean Sky 2 JU Procedure for implementing the H2020 Ex-post Audit Strategy, the JU is establishing its

¹ Group of Commission services, Agencies and Joint Undertakings implementing the H2020 programme

specific audit results for the H2020 programme on the basis of its individual samples drawn from the CSJU population of grants. These samples may include representative and risk based selections. So far, for the EPA exercises carried out from the beginning of the H2020 programme until 2020, only representative samples have been established.

In addition, cost claims pertaining to Clean Sky 2 projects also form part of the Common Representative Sample (CRS) of the Common Audit Service of DG R&I (CAS), which is the basis for calculating the results of the ex-post audits for the entire H2020 Research family.

Furthermore, cost claims of Clean Sky 2 projects will be included in various samples of corrective (risk based) audits established by the CAS.

Taking into account the above mentioned audit layers the following samples are considered relevant for the assurance of the Executive Director of Clean Sky 2 JU for the year 2020:

- (A) *Specific sample of Clean Sky 2 JU for H2020 projects* (including only representative audits)
- (B) *Sample of corrective (risk based) audits of the Common Audit Service of DG R&I (CAS) covering Clean Sky 2 H2020 projects*
- (C) *Common Representative Sample (CRS) of the CAS covering H2020 projects for all H2020 stakeholders, including Clean Sky 2 JU*

The Common Representative Sample of the CAS (CRS) provides an estimate, via a representative sample of cost claims, of the **overall level of error** in the Research Framework programmes, across all services involved in its management.

Whilst the CRS is therefore a basic indicator of legality and regularity for the Framework Programme as a whole, Clean Sky 2 JU aims to assess its particular population to provide specific assurance on the legality and regularity regarding the JU's individual operational expenditure.

Due to the specific samples taken for the Clean Sky 2 JU population of grants, as described in the following sections, explicit evidence has been made available to draw conclusions on the error rate prevailing in the specific population of grants of the Clean Sky 2 JU.

II. Scope of the audit exercise 2020 and coverage

For the calculation of the audit coverage, the accumulated audited value of H2020 projects covered by the EPA exercises 2016 to 2020 is compared to the accumulated total amount of validated cost claims for H2020 projects at the end of year 2020.

(A) Specific CS2 JU sample

The audit sample for 2020 was established in line with the H2020 Audit Strategy and the Clean Sky 2 JU Procedure for implementing the H2020 Ex-post Audit Strategy. It comprises the following elements:

- Representative sample
 - Most significant cost claims selected at random (the population was stratified to achieve a certain coverage of the most significant cost claims).
 - Cost claims from previous representative samples²
- No risk based sample was selected

52 new audits for H2020 projects, covering 83 cost claims, were launched until October 2020, out of which, 40 final reports have been issued until the date of this report. The reports for two additional audits are still in a pre-final stage. However, all results of the 42 audits are considered as final.

Additionally, the results of five audits stemming from the 2019 representative sample (five final audit reports) are included in the 2020 reporting.

The total audited value of the JU specific sample reported in 2020 was € 97,758,797.09 (validated project costs).

Table 1:

Audits included in EPA exercise 2020 H2020 Program		
	Total value of audited project costs	Number of audits
Final H2020 Audits launched before 2020	5,724,054.40	5
Final H2020 Audits launched during 2020	92,034,743	42
Total final H2020 audits included in EPA exercise 2020	97,758,797.09	47

Based on the results of the final audit reports, extrapolation of systematic errors has been performed and recoveries of finally validated errors have been achieved to a high percentage. Final representative and residual error rates have been calculated and contribute to the Declaration of Assurance for 2020 of the Executive Director. The scope of

² The audit of some participations of earlier selections had to be postponed, as the concerned beneficiaries had been subject to audit shortly before, either by CS2 JU or other granting authorities of the H2020 programme.

the audits covers H2020 projects from the years 2015 to 2018 from both, Partners and Members:

Table 2a: scope of audit exercise 2020

Audit exercise 2020 H2020	Totals	GAMs 2015	GAPs 2016	GAMs & GAPs 2017	GAMs & GAPs 2018
(A.2/1)	5 Remaining audits from EPA exercise 2019 (Batch 4) on GAMs				
audited value	5,724,054			5,724,054	
number of cost claims	5			5	
number of audits	5			5	
(A.2/2)	42 out of 52 Audits launched in 2020 (Batch 5) on GAMs and GAPs				
audited value	92,034,743	308,624	26,032,082	46,630,978	19,063,058
number of cost claims	68	1	10	33	24
number of audits	42	1	2	18	21
total					
audited value	97,758,797	308,624	26,032,082	52,355,032	19,063,058
number of cost claims	73	1	10	38	24
number of audits	47	1	2	23	21

Out of the 47 audits included in the EPA exercise 2020, 8 audits launched in 2020 include projects from partners. The audited value of these 8 audit reports on GAPs amounts to € 8,713,897 (reported validated project costs).

The overall accumulated coverage achieved for the H2020 projects (GAMs and GAPs) at the end of the year 2020 is 16.93% as shown in the following table:

Table 2b: audit coverage based on audits fully finalised

Accumulated audit coverage based on audits fully finalised until end of 2020	
	Euro
Total audited value from EPA exercises 2016 to 2020 (a)	205,109,922
Total amount of validated cost claims (b)	1,211,523,332
Coverage (a) / (b)	16.93%

(B) Sample of corrective (risk based) audits of the Common Audit Service of DG R&I (CAS) covering Clean Sky 2 H2020 projects

In addition to the Clean Sky 2 JU representative samples, cost claims pertaining to Clean Sky 2 JU projects have also been audited as part of the corrective (risk based) samples selected by the CAS.

The JU does not consider them as representative for the specific Clean Sky 2 error rate calculation.

Table 2c: scope of CAS audit exercise 2020 – corrective (risk based) audits on CS2 projects

Audit exercise 2020 H2020	Totals	GAMs	GAMs & GAPs	GAMs & GAPs	GAMs & GAPs
		2015	2016	2017	2018
(B.2/1)	4 Remaining audits from EPA exercise 2019 (Batch 4) on GAMs				
audited value	4,310,234		4,310,234		
number of cost claims	5		5		
number of audits	4		4		
(B.2/2)	11 out of 15 Audits launched in 2020 (Batch 5) on GAMs and GAPs				
audited value	4,422,497	1,222,973	2,241,247	73,119	885,158
number of cost claims	14	5	6	1	2
number of audits	11	2	6	1	2
total					
audited value	8,732,730	1,222,973	6,551,481	73,119	885,158
number of cost claims	19	5	11	1	2
number of audits	15	2	10	1	2

The total annual value of audits stemming from the corrective CAS samples reported in 2020 was € 8,732,730 (validated project costs). The corresponding accumulated audited value until 2020 was € 49,509,234.61.

Through these samples, an additional coverage for the Clean Sky 2 H2020 operational payments of 4% could be achieved.

III. Audits launched, on-going, closed

Table 3:

Status of current H2020 audits launched in 2020 and before	number	share of total launched
audits launched for the representative sample 2019	5	
Total number launched	5	100%
Pre-final reports received	5	100%
Final reports received	5	100%
Audits included in the final audit results 2020	5	100%
audits launched for the representative sample 2020	52	
Total number launched ³	52	100%
Pre-final reports received	42	81%
Final reports received	40	77%
Audits included in the final audit results 2020	42	81%

³ Two audits stemming from the JU representative sample 2020 have been cancelled in line with the “Guidance Note on the management of cases of audited beneficiaries under liquidation” endorsed by the CIC Executive Committee in 2016

IV. Adjustments and error rates of the CS2

Table 4:

Audit exercises - individual and accumulated until 2020	Total Audited value (100% costs) of reports received	Adjustment	Adjustment in favour of CSJU	Adjustment in favour of the beneficiary	Detected error rate in favour of the beneficiary	Detected error rate in favour of CSJU	Systematic error in favour of JU	Systematic error rate in favor of JU	Total unaudited cost claims of audited beneficiaries (E)
2016 RESULTS									
Results audit exercise 2016 (all representative)	13,067,875.10	-129,320.98	-148,803.72	19,482.74	0.15%	-1.14%	-50,543.52	-0.39%	2,032,186.36
2017 RESULTS									
Results audit exercise 2017 (all representative)	27,132,195.87	-373,888.03	-527,965.16	154,155.92	0.57%	-1.95%	-143,185.38	-0.53%	59,275,139.67
2018 RESULTS									
Results audit exercise 2018 (all representative)	21,112,705.41	-103,512.27	-207,015.67	103,503.40	0.49%	-0.98%	-148,295.93	-0.70%	75,806,533.02
2019 RESULTS									
Results audit exercise 2019 (all representative)	46,038,348.19	262,520.66	-512,589.45	775,110.12	1.68%	-1.11%	-409,565.89	-0.89%	117,681,332.31
2020 RESULTS									
Results audit exercise 2020 (all representative)	97,758,797.09	-662,226.28	-1,891,853.48	1,229,862.42	1.26%	-1.94%	-1,476,128.94	-1.51%	213,994,389.33
SUMMARY -ACCUMULATED									
Accumulated results all audit exercises (all representative)	205,109,921.67	-1,006,426.89	-3,288,227.48	2,282,114.59	1.11%	-1.60%	-2,227,719.65	-1.09%	468,789,580.69

Error rates:

The representative error rate is an indicator of the quality of the ex-ante controls as it gives an estimate of errors that remain undetected after the ex-ante controls have been performed.

Based on the final results of the audits, detected errors are corrected and extension of systematic errors is calculated and implemented following the related rules of the Clean Sky 2 grant agreements. Under this assumption, the residual error rate is calculated and contributes to the assurance on the legality and regularity of the Clean Sky 2 JU's operations. The audit reports received provide final results for 42 representative audit engagements launched in 2019 and 2020.

The **final accumulated representative error rate** in favour of Clean Sky 2 JU for the H2020 programme expenditure, identified in the audited cost claims of the audit exercises of the years 2016 to 2020, amounts to **1.60%**.

The corresponding rate for the individual audit exercise of the year 2020 is at **1.94%**. The residual error rate indicates the 'net-errors' that remain in the total population after implementing corrective actions resulting from the ex-post controls including extension of systematic errors to non-audited cost claims. The following formula is applied:

$$\text{ResER}\% = \frac{(\text{RepER}\% * (P-A) - (\text{RepERsys}\% * E))}{P}$$

P =	Total population
A =	Audited population
E =	total non-audited cost claims of audited beneficiaries
RepER% =	Representative error rate
RepERsys% =	Systematic error rate
ResER% =	Residual error rate

Taking into account the systematic errors identified by the auditors, the following residual error rates are calculated:

Table 5a:

Calculation of H2020 accumulated residual error rate (ResER%) 2016-2020	
Total population (P) =	1,211,523,331.35
Audited population (A)=	205,109,921.67
total non-audited cost claims of audited beneficiaries (E) =	468,789,580.69
Representative error rate (RepER%) =	-1.60%
Systematic error rate (RepERsys%) =	-1.09%
ResER% =	-0.91%

Table 5b:

Calculation of annual residual error rate (ResER%) 2020	
Total population (P) =	385,795,150.35
Audited population (A)=	97,758,797.09
total non-audited cost claims of audited beneficiaries (E) =	213,994,389.33
Representative error rate (RepER%) =	-1.94%
Systematic error rate (RepERsys%) =	-1.51%
ResER% =	-0.61%

The error rates reported for the year 2020 – accumulated and annual – indicate a similar level of error as identified in the previous year for the H2020 projects of Clean Sky. On the level of the programme and of the actual year 2020, the error stays below the targeted threshold of 2%.

V. Extension of audit findings

The extension of audit findings stemming from H2020 audits is done according to common criteria for the entire H2020 Research Family. This means that systematic errors identified in individual cost claims of H2020 projects are corrected in all projects of the concerned beneficiaries including those funded by other granting authorities. For efficiency reasons, the minimum threshold for the audit extension is an average systematic error of 2% identified in the audited projects of an individual audit.

The initiation of the audit extension has to be agreed by all affected granting authorities in dedicated meetings on each case. Only after a positive decision, the audit extensions are launched by the CAS. The implementation is then performed by the individual granting authorities.

In the 164 audits concerning beneficiaries of Clean Sky 2 JU finalised until end of 2020, extension of systematic audit findings has been launched in 35 cases. 80% of these cases have been successfully closed until the end of 2020.

Table 6: H2020 extension of audit findings until EPA 2020

	Finalised Audits	Value of audited cost claims	Extension of audit findings launched (numbers of cases)	Value of corrected unaudited cost claims after extension	Extension of audit findings Implemented⁴ (% of numbers of cases)
EPA 2016	6	13,067,875	0	-	-
EPA 2017	16	27,132,196	4	3,720,391	100%
EPA 2018	28	21,112,705	6	5,455,076	100%
EPA 2019	72	46,038,348	18	18,354,067	83%
EPA 2020	42	97,758,797	7	5,965,956	43%
Total	164	205,109,921	35	33,495,490	80%

In addition to the above cases of audit extension, CS2 JU implemented the correction of systematic errors also in 4 further cases, following audits of Clean Sky 2 beneficiaries, which had been audited by the CAS for other than Clean Sky projects.

⁴ The implementation of the correction is done by CS2 JU, in the case of on-going projects, through withholding the overpaid amounts from the next payment to the coordinator and, in the case of closed projects, through recovery orders directly sent to the beneficiary.

VI. Materiality applied for specific audit exercises

The control objective is to ensure for the CS H2020 programme that the residual error rate, which represents the level of errors which remains undetected and uncorrected, does not exceed 2% of the total expense recognised until the end of the programme. 2% is therefore the materiality level set for the JU. A detailed description of the materiality criteria applied for the assessment of the audit results with a view to the assurance declaration of the Executive Director of the JU is provided in a dedicated Annex of the AAR 2020.

VII. Implementation of H2020 audit results

Overpayments identified in the EPA exercise 2019 for H2020 projects had been implemented until the closure of the JU's Final Accounts 2019 at a rate of 71%. The implementation rate has meanwhile improved further to 88%.

Table 7a:

ACCUMULATED Total corrective action for H2020 EPA exercise 2016- 2019 - implementation achieved				
Audited value (of audited and unaudited cost claims)	Adjustments (detected error and extension of findings) in favour of CSJU	related overpayment	recovered overpayment (€) (i.e. adjustments booked in the system for next payment or RO issued)	recovery rate (%)
347,046,255	-2,270,608	-1,715,559	-1,508,038	87.90%

For overpayments detected in H2020 audits of the ex-post audit exercise 2020, the implementation rate is at 79% in May 2021 and is expected to arrive at 100% until the end of 2021, when the extension of audit finding cases will have been assessed and closed by the dedicated unit in the Common Audit Service.

Table 7b:

Total corrective action for H2020 EPA exercise 2020 - implementation achieved				
Audited value (of audited and unaudited cost claims)	Adjustments (detected error and extension of findings) in favour of CSJU	related overpayment	recovered overpayment (€) (i.e. adjustments booked in the system for next payment or RO issued)	recovery rate (%)
310,035,970	-2,789,435	-1,961,615	-1,556,235	79.33%

At the time of this report, the accumulated corrections implemented for the H2020 programme until the date of this report represent 83% of the total impact of detected errors and extension of audit findings.

ACCUMULATED Total corrective action for H2020 EPA exercise 2016- 2020 - implementation achieved				
Audited value (of audited and unaudited cost claims)	Adjustments (detected error and extension of findings) in favour of CSJU	related overpayment	recovered overpayment (€) (i.e. adjustments booked in the system for next payment or RO issued)	recovery rate (%)
657,082,225	-5,060,043	-3,677,174	-3,064,273	83.33%

VIII. Results of non-representative ex-post audits pertaining to the sample of corrective (risk based) audits of the CAS covering Clean Sky 2 H2020 projects

In the year 2020, a detected error rate resulting from the sample of corrective (risk based) audits selected by the CAS covering Clean Sky 2 H2020 projects has been established and represents 3.46%⁵ of the 2020 audited expenditure. The accumulated detected error for the years 2016 to 2020 of this type of sample currently amounts to 2.28%.

The representativeness of this error rate is limited as the selection of the samples has not been based on a consistent methodology for random sampling and the coverage achieved is only at 4.09% (see section II above).

IX. Results of the Common Representative Sample (CRS) of the CAS covering H2020 projects for all H2020 stakeholders, including Clean Sky 2 JU

The Horizon 2020 audit campaign started in 2016. At this stage, 3 Common Representative Samples with a total of 467 expected results have been selected. By the end of 2020, cost claims amounting to EUR 24.3 billion have been submitted by the beneficiaries to the services. The error rates at 31 December 2020 are:

- Representative detected error rate⁶: **2,95%**
The rate is based on the 334 representative results out of the 467 expected in the 3 Common Representative Samples
- Cumulative residual error rate for the Research and Innovation Family DGs: **2,16 %**
- The rate for DG R&I alone amounts to **2,24 %**

As in 2019, the above-presented error rates need to be treated with caution. Since not all the results of the 3 CRS are yet available, the error rate is not fully representative of the expenditure under control. Moreover, the nature of expenditure in the first years of the programme may not be totally representative of the expenditure across the whole period. As H2020 is a multi-annual programme, the error rates, and especially the residual error rate, should be considered in a time perspective. Specifically, the cleaning effect of audits

⁵ The difference to the annual detected error rate of the specific representative sample of Clean Sky 2 JU is caused by the results of one audit in the non-representative sample with a very significant audited value, which provided for a high individual (non-systemic) detected error.

⁶ In the year 2020, the Commission re-defined its methodology for calculating the Horizon 2020 error rates in line with the European Court of Auditors' observations in its 2018 and 2019 Annual Reports. The methodology applied is described in the related annex of the AAR of DG R&I on 'Materiality criteria'. As of January 2020, the application of the revised methodology resulted in an error rate higher, on average, by 0,41 % in comparison to the error rate calculated by applying the methodology used in the past on the same samples. Consequently, the detected error rate for 2020 calculated according to the methodology used in the past has been corrected by adding 0.41%.

will tend to increase the difference between the representative detected error rate and the cumulative residual error rate, with the latter finishing at a lower value.

Due to its multi-annual nature, the effectiveness of the H2020 control strategy can only be fully measured and assessed in the final stages of the programme, once the ex-post control strategy has been fully implemented and systematic errors have been detected and corrected.

As a result of the COVID-19 pandemic crisis and related travel limitations during 2020, the Common Audit Service (CAS) – in line with the instructions of the Commission – had to postpone on-the-spot missions until further notice. To minimise the impact of COVID-19 on the implementation of the audit campaign, the CAS converted traditional in-house audit assignments into desk audits, in line with international best practice and auditing standards. Regarding outsourced audits, the CAS instructed the audit firms to perform remotely the maximum possible amount of audit tests while complementing those with on-the-spot audit missions once travel restrictions were eased.

As last year, there is evidence that the simplifications introduced in Horizon 2020, along with the ever-increasing experience acquired by the major beneficiaries, affect positively the number and level of errors for all H2020 stakeholders.

Given the results of the audit campaign up until 2020, and the observations made by the European Court of Auditors in its 2018 and 2019 Annual Reports, the CIC, in close cooperation with DG BUDG, SecGen and the IAS, are defining actions aiming at reducing further the multiannual error rate of Horizon 2020. Actions include further simplification, increased use of simplified forms of funding, consultation with the stakeholders, focused communication campaigns, and enhanced training to internal project officers and External Audit Firms performing audits on behalf of the Commission. It should be noted that although the start of the implementation of these actions will be immediate, their positive effect in the form of reduction in the multiannual error rate may take time to materialise.

X. Assessment of the ex-post audit results and conclusion for the Assurance declaration of the Executive Director in the AAR 2020

As described in the materiality criteria in the dedicated Annex of the AAR 2020, the control objective of the JU is to ensure, that the residual error rate, which represents the remaining level of errors in payments made after corrective measures, does not exceed 2% of the total expense incurred until the end of the H2020 programme.

The audit approach for H2020 grants is based on the H2020 Audit Strategy and the related implementing procedure of CS2 JU⁷.

⁷ Clean Sky 2 JU Procedure for implementing the H2020 Ex-post Audit Strategy, dated 01.12.2016

The results of the CS2 JU EPA process 2020 provide information on the legality and regularity of the validation process for GAM and GAP execution 2014 to 2018 for the H2020 programme. The EPA results of the year 2020 do not directly relate to the entire H2020 expenditure incurred by the JU until the end of 2020. However, the JU's EPA strategies are implemented through an on-going process, which produces accumulated results applicable to the entire expense incurred for the CS programme up to a certain point of time.

The accumulated direct audit **coverage** of the validated financial statements pertaining to GAMs and GAPs of the years 2014 to 2018 is **17%**.

The additional coverage achieved through corrective audits launched by the CAS on Clean Sky 2 grants is 4%.

The accumulated results established in the H2020 samples of the years 2016 to 2020 reflect a **representative error** in favour of Clean Sky 2 JU in the validated operational expense of **1.60%**, compared to 1.30% for the accumulated audit exercises until 2019.

The H2020 **accumulated residual error rate** stemming from 5 annual audit exercises amounts to **0.91%**, maintaining the same level as in the previous year.

In view of the moderate errors detected, the level of assurance provided through these audit results is considered adequate for the reporting of the year 2020.

The results from audits pertaining to the specific samples carried out on the Clean Sky 2 expenditure as well as the samples of the CAS (CRS and other corrective audits), indicate, that over the multiannual period, and especially considering the envisaged level of the overall audit coverage of Horizon 2020 expenditure of Clean Sky2, the residual error rate will stay below 2% for the Clean Sky 2 H2020 programme.

Conclusion

The error rates for the audited population of H2020 stay below the materiality level of 2%, a reservation in the Assurance Declaration of the Executive Director for the Final AAR 2020 is not considered necessary.