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DIRECTORATE-GENERAL FOR RESEARCH & INNOVATION

Directorate J - Common Support Centre
J.2 - Common audit service

Horizon 2020 Ex-post Audit Strategy

(2016 – 2025)

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1. BACKGROUND

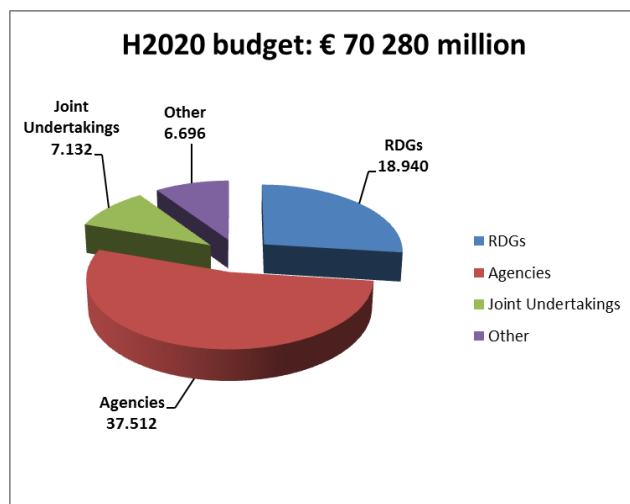
1.1. Context

1.1.1. Budget

The **H2020 Regulation of 11 December 2013** sets the Horizon 2020 budget (2014-2020) for EU-funded research activities at € 77 028 million (in current prices)¹. This represents a substantial increase compared to € 50 521 million of the FP7 budget (2006-2013)².

Since 2013, the H2020 budget has been reduced to € 74 820 million of which € 70 280 million for operational expenditure and the remainder for administrative expenditure (status: 13 July 2015).

This H2020 budget is implemented by 8 research-related Directorate Generals, 4 Executive Agencies, 7 Joint Undertakings, a Regulatory Agency and an Institute³. Furthermore, H2020 contributes financially to financial instruments implemented by the European Investment Bank (EIB) as well as to a series of 'Article 185' initiatives managed by the Member States via the delegation of executive tasks to dedicated implementation structures⁴.



Each of these entities manages its own budget and is responsible for its correct implementation.

The chart on the left shows the distribution of the total operational H2020 budget of € 70 280 million over the managing entities.

The 'Other' expenditure displayed in the chart for an amount of € 6 696 million relates to the EIT, the financial instruments implemented by the EIB, the 'Article 185'⁵ initiatives and the operational expenditure of the Joint

Research Centre (JRC) for direct, non-nuclear, research activities. This part of the budget falls outside of the expenditure covered by the H2020 Ex-post Audit Strategy. Suitable

¹ Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013.

² Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006. The final FP7 budget (as of 26 March 2015 and excluding the ITER budget) amounts to € 55 547 million of which € 43 349 million for operational expenditure.

³ 8 Research Directorates-General (RDGs) (RTD, CNECT, GROW, HOME, ENER, AGRI, MOVE, EAC), 4 Executive Agencies (EAs) (REA, ERCEA, EASME, INEA), 1 Regulatory Agency (GSA), 7 Joint Undertakings (JUs) (Clean Sky2, IMI2, ECSEL, BBI, FCH2, SESAR2, Shift2Rail) and the EIT (European Institute of Innovation and Technology), i.e. 20 entities in total.

⁴ EDCTP, EMPIR, AAL, Eurostars, BONUS.

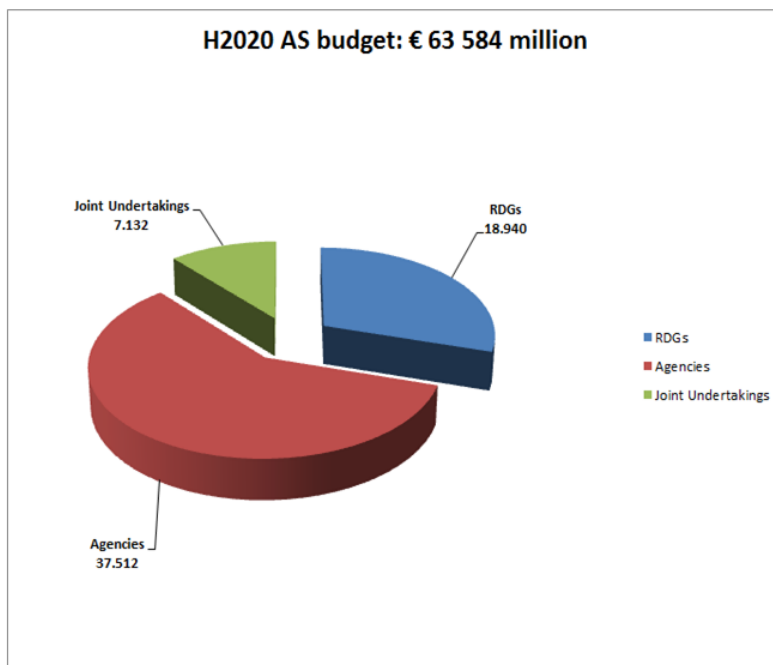
⁵ As regards audits relating to Art 185 initiatives: the ex-post audits on expenditure of the indirect actions are in principle carried out by the designated national programme management agencies. However, in line with the relevant European Parliament and Council decisions, in exceptional cases, the parent DG may request the CAS to carry out ex-post audits directly with the beneficiaries.

arrangements to supervise the budget implementation by the delegated bodies are set out separately⁶. The mentioned JRC expenditure is for direct actions whereas the H2020 Audit Strategy relates to the operational expenditure of the indirect actions⁷.

This document presents the H2020 Audit Strategy for the residual € 63 584 million operational H2020 budget (€ 70 280 million - € 6 696 million) of the remaining 20 entities, collectively referred to henceforth as the 'Implementing entities'. The budget allocation to these services is as follows:

Group	€ million	%
RDGs	18.940	30%
RTD	9.414	14,8%
CNECT	8.328	13,1%
GROW	651	1,0%
HOME	160	0,3%
ENER	261	0,4%
AGRI	85	0,1%
MOVE	39	0,1%
EAC	1	0,0%
Agencies	37.512	59%
REA	12.825	20,2%
ERCEA	12.629	19,9%
EASME	6.374	10,0%
INEA	5.603	8,8%
GSA*	80	0,1%
Joint Undertakings	7.132	11%
Clean Sky2	1.704	2,68%
IMI2	1.638	2,6%
ECSEL	1.167	1,8%
BBI	975	1,5%
FCH2	665	1,0%
SESAR2	585	0,9%
SHIFT2RAIL	398	0,6%
Grand Total	63.584	100%

* Budget is part of DG GROW budget



The Directorates General (DGs) amongst the implementing entities not only manage financial resources directly but also indirectly by delegating budget to other entities (e.g. a DG delegating to an Executive Agency) or a combination of both.

The forecasted **distribution of the budget payments**, expressed as "requests for contributions" by the beneficiaries, is in the graph below⁸. The H2020 programme runs from 2013 to 2020, but the H2020 Audit Strategy extends to five years beyond H2020,

⁶ **General:**
Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council on the financial rules applicable to the general budget of the Union of 25 October 2012 (FR 2012), Article 60 'Indirect Management' §5: the entities shall declare to the Commission that "the control systems put in place give the necessary guarantees concerning the legality and regularity of the underlying transactions".

Specific:
Article 185 entities: Model delegation agreement for Article 185 Initiatives.

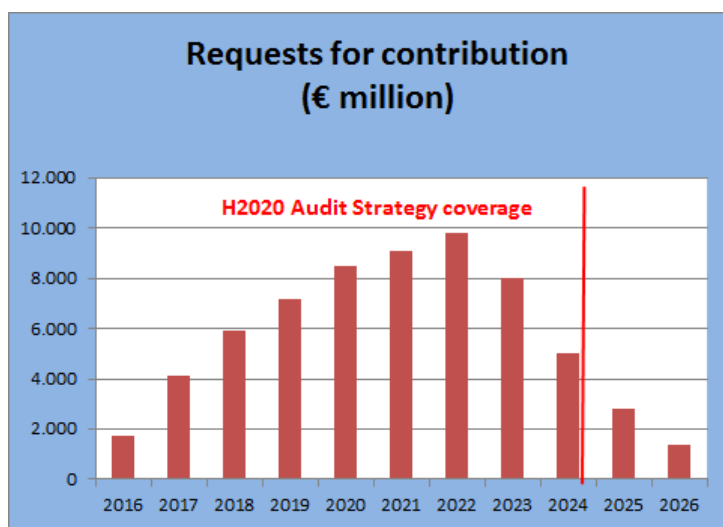
EIT: Regulation (EC) No 294/2008 of the European Parliament and of the Council of 11 March 2008 establishing the European Institute of Innovation and Technology, Article 21.

EIB: Delegation agreement.

⁷ See paragraph 1.2.

⁸ The 'requests for EU contribution' are obtained from the financial statements submitted by the beneficiaries. The requests in a given year follow, with a delay, the 'appropriations for commitments' in the budget of that year and preceding ones. The H2020 forecast is done according to the FP7 relationship between these two variables 'appropriations for commitments' on the one hand, 'requests for EU contribution' on the other.

thus spanning the period 2016 to 2025. The first audits start in 2016 (with closure in 2017), the last audits are initiated in 2024 (with closure in 2025). The expectation is that this audit timeframe will cover approximately 93% of the requests for EU contribution. Should significant changes in the budget or in the audit environment occur, the H2020 Audit Strategy will be adapted accordingly.



1.1.2. H2020 Audit Strategy as part of internal control

The internal control framework put in place for H2020 is based on the Commission's Internal Control Standards and defines a series of different controls that cover the entire project cycle of grant management⁹. The main building blocks of the internal control system for H2020 expenditure are:

- **procedures for selecting** the best projects and translating them into legal instruments;
- **project and contract management** throughout the lifetime of every project;
- **ex-ante checks** on the claims, including a review of the use of resources and plausibility checks (for example: the proportion of the budget spent with regard to the technical progress reported) as well as certificates on the financial statements and ex-ante certification of cost methodologies. Ex-ante certificates and assessments contribute to the reduction of the ex-post error rate. The ex-ante control requirements are deliberately limited in view of the attractiveness of the research programme and in line with the overall objective of simplification (see also point 1.2), laying more emphasis on the need to have an effective ex-post audit strategy.
- **ex-post audits** on a sample of claims and
- **scientific evaluation** of project results.

The H2020 Audit Strategy defines how the ex-post audits are to be carried out; it is therefore one part of the overall control framework and should provide inputs to those carrying out the ex-ante checks or those monitoring the causes of the error rate.

⁹ Article 10 of the H2020 Regulation of 11 December 2013 mentions the actions and funding instruments and stipulates that "H2020 shall support *indirect* actions through (...) grants, prizes, procurement and financial instruments" and "*direct* actions undertaken by JRC".

The internal control system as a whole is supported by the **Financial Regulation of 25 October 2012**¹⁰ which identifies the responsibility of the Authorising Officers for the control of budget implementation at programme level, including the calculation of the error level and the consequent corrective measures and with due account of the multi-annual character of the programmes¹¹. It also states that the ex-post financial audit rules shall be clear, consistent and transparent¹² and that the Commission shall ensure equal treatment of beneficiaries of a programme, in particular where it is implemented by several Authorising Officers¹³.

1.2. Legal basis

Article 29 of the **H2020 Regulation of 11 December 2013** defines the principles of **control and audit** of the H2020 expenditure:

“§1. The control system (...) shall be so designed as to provide reasonable assurance of achieving sufficient reduction and adequate management of the risks relating to the effectiveness and efficiency of the operations as well as the legality and regularity of the underlying transactions, taking into account the multi-annual character of programmes (...).

§2. The control system shall ensure an appropriate balance between trust and control, (...).

Moreover,

§3. As part of the control system, the audit strategy for expenditure on indirect actions under Horizon 2020 shall be based on the financial audit of a representative sample of expenditure across Horizon 2020 as a whole. That representative sample shall be complemented by a selection based on an assessment of the risks related to expenditure.

Audits of expenditure on indirect actions under Horizon 2020 shall be carried out in a coherent manner in accordance with the principles of economy, efficiency and effectiveness in order to minimise the audit burden on the participants”.

In relation to the balance between trust and control mentioned in §2 above, the European Parliament already called in 2010 for a pragmatic shift towards administrative and financial **simplification**, with an emphasis on a more **trust-based** approach towards

¹⁰ Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council on the financial rules applicable to the general budget of the Union of 25 October 2012.

¹¹ Article 32 "Internal control of budget implementation", §1" The budget shall be implemented in compliance with effective and efficient internal control as appropriate in each method of implementation, and in accordance with the relevant sector-specific rules.

§2. For the purposes of the implementation of the budget, internal control is defined as a process applicable at all levels of management and designed to provide reasonable assurance of achieving the following objectives (...):

(e) adequate management of the risks relating to the legality and regularity of the underlying transactions, taking into account the multiannual character of programmes as well as the nature of the payments concerned (...)

§5. If, during implementation, the level of error is persistently high, the Commission shall identify the weaknesses in the control systems, analyse the costs and benefits of possible corrective measures and take or propose appropriate action, such as simplification of the applicable provisions, improvement of the control systems and re-design of the programme or delivery systems".

¹² Article 66 "Powers and duties of the authorising officer", §6"Where the authorising officer by delegation implements financial audits of beneficiaries as ex-post controls, the related audit rules shall be clear, consistent and transparent, and shall respect the rights of both the Commission and the auditees".

¹³ Article 135 "Payment of grants and controls", §8" The Commission shall ensure equal treatment of beneficiaries of a programme, in particular where it is implemented by several authorising officers responsible".

beneficiaries. Then in 2011, the European Council asked for a new balance between trust and control, and between risk-taking and risk-avoidance¹⁴.

In its discharge resolution for 2013, the European Parliament:

*"[...]observes that **first-time applicants, particularly SMEs, are with a largely unknown risk/error profile; calls on the Commission not to undermine the efforts made to encourage these participants to participate in the programmes, by systematically increasing the level of control or administrative burden on them**"¹⁵.*

The right to carry out audits is foreseen in the Horizon 2020 Grant Agreement, Article 22.1.3:

"The [Agency, the JU or the] Commission may — during the implementation of the action or afterwards — carry out audits on the proper implementation of the action and compliance with the obligations under the Agreement".

1.3. Common Audit Service (CAS)

The implementation of the H2020 Audit Strategy will be the responsibility of the Common Audit Service.

The role of the Common Audit Service (CAS) is defined in the Commission Communication of 18 September 2013 establishing the Common Support Centre (CSC)¹⁶. The CAS has been designated as the single entity for implementing the H2020 audit campaign on behalf of the CSC stakeholders.

The Commission Decision of 14 April 2014 on the operating rules for the CSC further details the mission and tasks of the CAS¹⁷. In particular its Article 9 indicates that its mission is to:

*"contribute to assessing the **legality and regularity** of Horizon 2020 project payments by means of ex-post financial controls carried out, either by its own auditors or by independent audit firms in accordance with the decisions of the Steering Board. It shall provide the relevant Authorising Officers by Delegation (AODs) with necessary **elements of assurance** on the research budget for which they are responsible".*

¹⁴ The simplification and clarification introduced in H2020 is expected to enhance legal certainty for beneficiaries. Some examples are:

- a wider acceptance of average personnel costs by explicitly accepting - under certain conditions - standard productive hours and estimated cost elements;
- the acceptance of supplementary payments for non-profit organisations, up to € 8 000/year/person;
- the indirect costs to be declared as a flat rate instead of as actual indirect costs (with an exception for the costs of Large Research Infrastructure subject to an ex-ante assessment report);
- improved conditions for the participation of SMEs: a special SME instrument with an initial lump sum (€ 50000); a unit cost system for SME owners and physical persons without a salary with a number of annual productive hours fixed at 1 720;
- no time records for researchers working exclusively on the project.

¹⁵ Paragraph 249 of the Discharge resolution for 2013

¹⁶ Communication on the delegation of the management of the 2014-2020 programmes to Executive Agencies SEC(2013)493 of 18 September 2013, section 5.1.2.

¹⁷ Commission Decision C(2014)2656 of 14 April 2014 on the operating rules for the Common Support Centre for H2020 (2014-2020).

The CAS serves the implementing entities and strives to deliver a corporate approach for the audit cycle: audit selection, planning, application of rules, relations with beneficiaries and management information on the audit process. The CAS uses AUDEX as the IT tool for the audit process management.

2. OBJECTIVES AND ACTIONS OF THE H2020 AUDIT STRATEGY

The main objective of the H2020 Audit Strategy is to provide the individual AO(D)s of the implementing entities with the **necessary elements of assurance** in a timely manner on the H2020 budget for which they are responsible by contributing to:

- assessing the **legality and regularity** of H2020 project payments;
- attaining **residual error rates** at an acceptable level at the closure of H2020, once the financial impact of all audits, correction and recovery measures has been taken into account¹⁸.

The actions identified to realise these objectives are :

- the gradual achievement, in a cost effective-way, of quantitative multi-annual targets in terms of **audited participations** (see Annex I);
- the closure and communication of **audit findings and extension of audit findings** to those responsible for their implementation. When required by the operational services during implementation, the CAS provides further clarifications on the audit issues. The effectiveness of ex-post audits and the control of residual error rates largely depend on implementation; to that end concerted efforts of the ex-post audit function and the other internal control actors are important;
- the contribution to the **appropriate interpretation of the rules** (improved legality and regularity) by the beneficiaries, supported by the joint efforts of lawyers and auditors either through extensive input into financial guidelines (e.g. the Annotated Grant Agreement) or numerous internal and external communication actions/campaigns on the audit and financial aspects of H2020.
- the provision of **enhanced legal certainty** through the delivery of ex-ante certificates such as:
 - the *ex-ante certificates on the methodology to calculate unit costs*. Costs declared in line with the certified methodology are deemed to be compliant with the rules. However, this does not apply when the beneficiaries have not followed the methodology or would have omitted information when submitting a request for such a certificate;
 - the *ex-ante assessments for Large Research Infrastructure (LRI)*. Costs of Large Research Infrastructure (LRI) may only be claimed by beneficiaries who received a positive 'ex-ante assessment report' from the Commission;
- the **supervision of the quality** of *certificates on the financial statements*. H2020 requires a certificate if at the end of the action the requested contribution is € 325 000 or more. If an ex-post audit would reveal errors of larger than 2%, the auditors having delivered the certificate will be alerted.

¹⁸ Legislative Financial Statement as part of the 2011 Commission proposal for the Regulation on H2020 (COM/2011/809) of 30 November 2011, pages 98-102.

3. SCOPE, POPULATION AND CONSTRAINTS OF THE H2020 AUDIT STRATEGY

3.1. Scope and population

The H2020 budget of € 63 584 million implemented by the 20 entities ring-fences the **scope** of the H2020 Audit Strategy.

The H2020 Audit Strategy **population** is determined by the costs declared and paid by the beneficiaries through financial statements which are the basis for the calculation of the EU contribution.

As payments by the Commission are made to coordinators, choosing those payments as the object to audit would not provide direct access to the underlying costs incurred and declared. For this reason the financial statements earmarked as paid have been chosen as the audit object instead. This approach has also the advantage that it closely follows the progress of the research activities. In addition to the audit of the financial statements, the auditor gathers all the necessary information on the commitments, advance, interim and final payments to obtain a complete overview of the project life cycle.

The harmonised H2020 System for Grant Management (**SyGMA**) is the main data source for the audit population and audit selection. However, some relatively minor grants (and calls) are not in SyGMA¹⁹.

Non-SyGMA data sources are to be added to the available SyGMA data in order to ensure completeness of the population. This will have to be monitored in the course of the Audit Strategy, as audit samples are to be drawn from a full set of data.

3.2. Homogeneity of expenditure

A project, governed by a grant agreement, generates a number of financial statements. This number depends on the number of participating beneficiaries, the number of reporting periods (on average 3, one financial statement per period) and the number of adjustments. Assessing the homogeneity of the population (the generated financial statements) means assessing the homogeneity of the rules, and especially the grant agreements, as they govern the content of the financial statements.

All grants are based on the basic rules of H2020 and the Common Rules for Participation.

Grants for research and innovation actions, innovation actions and coordination and support actions commonly use the General Model Grant Agreement (MGA) or, if foreseen in the Work Programme, the specific Lump sum MGA. For other types of actions (ERC, Marie Skłodowska-Curie actions, SME Instrument, etc.) specific MGAs apply (see Annex IV).

The specific MGAs are derived models of the General MGA. They have the same structure, the same definitions of eligible costs, documentation to be provided and

¹⁹ Clean Sky: grants to Members (70% of the Clean Sky budget);
IMI: the first four calls (the fifth call should be channelled through SyGMA);
Furthermore, the H2020 budget for indirect actions spent by means of prizes and procurement is also not in SyGMA, but these are thought to be limited in volume.

stipulations on checks, reviews, audits and investigations. They are either simplifications of the General MGA (e.g. SME instrument) or they contain additional information on certain aspects (for instance to cater for costs to be claimed in case of Marie Skłodowska-Curie grants). The H2020 Audit Strategy will adapt the details of the audit checks in function of the specifics of the contracts selected for audit.

In addition, all grants follow the same basic process.

Thus, the homogeneity of the expenditure in H2020 is assured in general terms. This supports the requirement of the legislative authority to undertake a sample of H2020 expenditure as a whole which allows the managing services to assess the effectiveness of the control system as a whole. The addition of the different layers of audits will then allow for additional evidence to be gathered as necessary.

3.3. Constraints of the H2020 Audit Strategy

The H2020 Audit Strategy faces the following challenges and constraints.

- A usual constraint concerns the available CAS resources and their limited flexibility in time.

The realisation of the *audit targets* (see Annex I) will absorb the main part of the **available resources**. In this context, it is worth recalling that the CAS strives to have a quarter of its audits done by its in-house auditors (see paragraph 4.3.1).

Yet, the CAS capacity has **limited flexibility**, in view of the expected financial statements. The number of expected financial statements shows an uneven distribution with the expected peak of requests for contributions only in 2022, two years after the end of H2020. This expected peak, together with a fixed number of resources will demand a more even apportioning of the audits over the years.

- A constraint on the start of the audits.

Article 30§2 of the **H2020 Regulation of 11 December 2013** states that "*audits may be carried out up to two years after the payment of the balance*". Article 22.1.3 of the Model Grant Agreement translates this into: "*Audits may be started up to two years after the payment of the balance*". As audits should be initiated **within two years** after the payment of the balance, the audit selection focusses on recently received and paid financial statements taking into account as well the date of the payment of the balance.

- The same constraint applies to the scope of the extension of audit findings.

Article 22.5.2 of the Model Grant Agreement: the entities "*may extend findings ... if .. those findings are formally notified to the beneficiary concerned ... no later than two years after the payment of the balance*". Thus systematic findings highlighted in a particular audit cannot result in adjustments on non-audited grant agreements for which the payment of the balance occurred two years or more before the date of the letter of conclusion. The "cleaning" effect through the extension of audit findings will therefore be less.

- However, the two years limitation is a lesser constraint for the Common Representative Sample (CRS) since the CRS is taken from the entire population every second year on an incremental basis. Thus the CRS covers the financial statements

which have been submitted over the foregoing 24 months, falling within the 2 year limitation.

- The Commission proposal of 30 November 2011 for the Regulation on H2020 indicates a maximum of **7%** of the number of beneficiaries to be audited with the intention to reduce the audit burden on beneficiaries^{20, 21}. This is an indicator and should not be read as a regulatory requirement. Nevertheless, the evolution of this percentage will be monitored in the course of the H2020 Audit Strategy²².

²⁰ Legislative Financial Statement as part of the 2011 Commission proposal for the Regulation on H2020 (COM/2011/809) of 30 November 2011, page 101.

²¹ A 7% capping is also present in the Communication from the Commission on H2020 COM(2011)808, final of 18 September 2013 on the delegation of the management of the 2014-2020 programmes to the executive agencies, paragraph 5.1.2.

²² This constraint is likely to be met. By 31 December 2014 the CAS coverage for FP7 was 9.8%. Maintaining a comparable number of audits under H2020 as under FP7 and taking into account that the number of beneficiaries is expected to increase from 20 000 under FP7 to 30 000 under H2020, the 9.8% of FP7 is equivalent to $9.8\% \times \frac{2}{3} \sim 7\%$ under H2020.

4. THE PRINCIPLES OF THE H2020 AUDIT STRATEGY

4.1. A trust-based approach

H2020 Regulation of 11 December 2013 undertakes to reduce the control burden while implementing simplification measures. It considers that:

"a revised control strategy, shifting focus from minimisation of error rates towards risk-based control and fraud detection, should reduce the control burden for the participants"²³.

The H2020 Audit Strategy as part of this wider control strategy is conceived in the same spirit.

4.2. A corporate approach for H2020

The corporate approach for the H2020 Audit Strategy is derived from the conception of H2020 as a single programme. Although implemented by up to 20 different entities, H2020 harmonisation is ensured by the fact that a common legal framework and common IT systems have been set up. Indeed, the CSC provides common services for Legal Support, Audit (the CAS), Business Processes, IT and H2020 Information and Data.

The H2020 Audit Strategy is the framework to perform the ex-post audits allowing the Authorising Officers and the implementing entities to monitor the error level in H2020 expenditure and to take corrective action if necessary. A right balance has to be sought between their assurance needs and the overall requirements of a consistent and multi-annual control of H2020 in line with the **Financial Regulation of 25 October 2012** and the **H2020 Regulation of 11 December 2013**.

The H2020 Audit Strategy provides audit coverage via **three layers of sampling**:

- the '**corporate sample**' implemented via the Common Representative Sample (CRS) complemented by a risk-based selection;
- the '**additional sample**': additional audits for entities with specific grant agreements or a separate discharge procedure;
- the '**Article 10 sample**': additional audits performed on explicit requests of the JUs as specified in the respective delegation agreements²⁴.

Annual Audit Plans, submitted to the Executive Committee and the Steering Board of the CSC, monitor the annual and multi-annual targets for the number of **participations to be audited** belonging to the first two layers (corporate and additional samples) (see Annex I).

²³ Cf. Whereas n° 43 and 44.

²⁴ On basis of Article 11 of the GSA delegation agreement, the CAS can also carry out audits for GSA.

4.2.1. Three layers of sampling

4.2.1.1. Corporate sample (first layer)

The corporate approach, implying that the entire H2020 expenditure is covered, is applied for the CRS as well as for the risk based selections.

CRS

Article 29§3 "Control and audit" of the **H2020 Regulation of 11 December 2013** is explicit on how to use CRS for the audit of H2020 expenditure:

“As part of the control system, the audit strategy for expenditure on indirect actions under Horizon 2020 shall be based on the financial audit of a representative sample of expenditure across Horizon 2020 as a whole. That representative sample shall be complemented by a selection based on an assessment of the risks related to expenditure”.

This practice of a CRS is the consolidation of the already initiated and implemented audit approach under FP7. It is an important simplification, also in view of reducing the administrative burden onto the contractors. It is also a cost-efficient method to determine at Programme level the statistically Representative Error rate (RepEr) in the financial statements submitted by the research beneficiaries. This is not only a building block for the overall assurance but also for the separate assurance needs of the implementing entities.

The CRS population consists of the financial statements received and paid by the implementing entities from the date when the previous CRS was taken²⁵. To be statistically representative, Monetary Unit Sampling (MUS) with a set of pre-defined parameters is used to sample the population²⁶ (see Annex II for the details of the MUS sampling methodology).

In line with the multi-annual character of the Audit Strategy, launching a CRS sample every second year will facilitate the overall calculation of a statistically representative error rate for the entire H2020 programme. It also addresses the earlier described two year limitation for launching audits after the payment of the balance. The CAS decides together with its stakeholders on the timing of the first CRS.

Risk-based selection

The complementary sampling based on identified risks relevant for the overall population provides additional elements of assurance.

The aim of the risk-based selection is to target the portions of the budget in the implementing entities where corrections to the errors detected can be most effective (highest contribution beneficiaries, highest contribution participations, high-risk beneficiaries...), but the risk-based selection should also maximise the cleaning effect by cleaning the systematic errors from top beneficiaries.

Targeting areas with specific risks implies targeting areas for which error rates may go beyond the RepER.

²⁵ The first CRS is taken from the start of H2020.

²⁶ These result in a selection of 161 transactions.

Top beneficiaries

The top beneficiaries are the beneficiaries who account together for 50% of the expenditure. As an indication, for FP7, 300 beneficiaries can be considered as top beneficiaries. By specifically focusing on this group of beneficiaries, the coverage would encompass 50% of the expenditure and ensure that a large part of the expenditure is free from material, systematic errors. Top beneficiaries already selected as part of the CRS are not to be covered again by the risk-based selection. The audited financial statements (and their related EU contribution) compose the direct coverage. In the case of large beneficiaries the non-audited financial statements outnumber the audited ones.

Beneficiaries with cross cutting specific risks

When targeting specific risk areas, the risk-based audits distinguish between schemes set up to obtain a maximum contribution from EU funds²⁷ and any other higher than average risks. Identification of the risks is in collaboration with the H2020 stakeholders. The risks are listed according to the likelihood of their occurrence, their potential impact if they would materialise and their cross cutting relevance for the implementing entities.

By way of example, risk audits may be initiated on the basis of:

- preceding audit findings on the basis of previous reports.
- feedback from the services or audit requests lodged by services according to the standard "audit-on-request" procedure. These "audits-on-request" are carried out following properly justified requests from the AOSDs, which take the specific risks for the Beneficiary into account.
- risks identified in the course of the programme and confirmed in the past (such as new beneficiaries, SMEs, entities with a high dependency on EU-funds, etc.).

4.2.1.2. Additional sample (second layer)

The planning of the additional sampling – as the second layer of the Audit Strategy - depends on the requirements of specific implementing entities to obtain a certain level of direct audit coverage. Two reasons may be at the basis of these additional audits:

- on substance certain eligibility criteria the grant agreement are specific and different from the standard model grant agreement and may lead to a lower error rate. This is the case for:
 - Marie Skłodowska-Curie action grants;
 - ERC-grants;
- a different political context. This is the case for the entities for which there is a separate discharge procedure: the JUs and GSA. Respective AO(D)s may then require additional audit evidence for the entity concerned.

The selection of the items in the additional audit sample is done by the CAS considering the specific requirements of the stakeholders.

The initiation for these type of audits is defined in the “H2020 Working Arrangements”. These Working Arrangements define how the CAS collaborates with the H2020 stakeholders.

²⁷ See also the "Common Anti-Fraud Strategy in the Research Family", Ares(2015)1797066 - 28/04/2015. To note that the H2020 Regulation refers itself to an enhanced focus on fraud detection.

4.2.1.3. Article 10 sample (third layer)

If the audits foreseen in the H2020 Audit Strategy under the two first layers are not sufficient for the JUs, Article 10 of their respective delegation agreements foresees the possibility that the CAS performs additional ex-post audits at the request and expense of the JUs²⁸:

“(…) In case that the number of audits, as foreseen by the CAS in its Annual Audit Plan regarding the transactions of the [XXX JU], is considered by [XXX JU] to be inadequate in the context of the direct discharge procedure, the [XXX JU] may ask the CAS to complement, at the expense of the [XXX JU], the audit activities of the CAS by performing additional ex-post audits on its beneficiaries, in compliance with the principles of the Common Audit Strategy and in a cost-effective way”.

In the same way as for the second sample layer, the practical initiation of these type of audits is defined in a specific section of the "H2020 Working Arrangements".

4.2.2. Definition of Error Rates

The CRS as part of the first layer delivers the **RepER**. The RepER applies to the population as a whole and is **not** split up (stratified) by implementing entity, type of action, type or size of Beneficiary or any other criterion.

Starting from the initially observed RepER in the CRS (first layer), the audit results of the three layers together contribute to the reduction of the RepER down to the **Residual Error Rate (ResER)**. The ResER represents the error rate that remains in the population (see Annex III for details of the calculation of the representative and residual error rate).

The combination of the audit results stemming from the different layers permits an individual implementing entity to calculate an individual detected error rate based exclusively on the entity's share in the different samples, using only the audit results for its financial statements in the sampling (CRS, possibly the risk based selection, additional sampling and Article 10 sampling).

²⁸ The audits carried out for GSA by the CAS on basis of Article 11 of the GSA delegation agreement follow the same procedure.

4.2.3. Extension of audit findings

Article 135 §5-7 of the **Financial Regulation of 25 October 2012**²⁹ describes the modalities of the **extension of audit findings**. Under the H2020 Audit Strategy extension of audit findings is applied across all implementing entities of the Research family.

. The Extension Steering Committee (ESC) of RDGs, EAs and JUs decides on the systematic character of the audit findings. The H2020 procedure for the extension of audit findings applies the same principles, meaning that:

- extension applies to the open and closed H2020 actions in which a Beneficiary participates;
- the launch of the extension of audit findings is initiated after agreement of the ESC, taking due account of materiality. The appropriate materiality threshold under which an extension of audit findings would not be initiated will be determined by the AO(D)s of the implementing entities. Such a threshold may for instance take the form of a percentage (%) of systematic errors calculated over the total costs claimed covered by an audit, taking into account all errors (both positive and negative) as long as the overall adjustment is negative (i.e. in favour of the budget);
- follow-up audits may check if extension of audit findings has been correctly applied by beneficiaries. If the Beneficiary refuses to co-operate the applicable sanctions mentioned in the grant agreement will ultimately be recommended to the AO(D)s of the entities concerned.

A significant change in the procedure is the two year limitation introduced with H2020 (see paragraph 3.3). Thus the cleaning effect will decrease the further the H2020 Audit Strategy advances resulting in a diminishing effect on the residual error rate.

As a general remark, it is worth noting that, as part of the segregation of duties, the AO(D)s of the implementing entities are responsible for the implementation of the audit results as well as the results of extension of audit findings.

4.2.4. Audit coverage

Extension of audit findings has an important role in the **audit coverage**. The audit coverage consists of:

²⁹ §5”Where controls or audits demonstrate systemic or recurrent errors, irregularities, fraud or breach of obligations attributable to the beneficiary and having a material impact on a number of grants awarded to that beneficiary under similar conditions, the authorising officer responsible may suspend implementation of all the grants concerned or, where appropriate, terminate the concerned grant agreements or decisions with that beneficiary, in proportion to the seriousness of the errors, irregularities, fraud or of the breach of obligations, provided that the beneficiary has been given the opportunity to make observations.

The authorising officer responsible may, in addition, following an adversarial procedure, reduce the grants or recover amounts unduly paid in respect of all the grants affected by the systemic or recurrent errors, irregularities, fraud or breach of obligations referred to in the first subparagraph that may be audited in accordance with the grant agreements or decisions”.

§6” The authorising officer responsible shall determine the amounts to be reduced or recovered, wherever possible and practicable, on the basis of costs unduly declared as eligible for each grant concerned, following acceptance of the revised financial statements submitted by the beneficiary”.

§7” Where it is not possible or practicable to quantify precisely the amount of ineligible costs for each grant concerned, the amounts to be reduced or recovered may be determined by extrapolating the reduction or recovery rate applied to the grants for which the systemic or recurrent errors or irregularities have been demonstrated, or, where ineligible costs cannot serve as a basis for determining the amounts to be reduced or recovered, by applying a flat rate, having regard to the principle of proportionality. The beneficiary shall be given the opportunity to make observations on the extrapolation method or flat rate to be applied and to propose a duly substantiated alternative method or rate before the reduction or recovery is made”.

- the **direct** coverage: part of the budget covered by the audits deemed to be free from errors. The direct coverage, on the contrary, has a modest impact on the residual error rate given the relatively small weight of the audited financial statements in the overall budget;
- the **indirect** coverage: non-covered part of the sampled beneficiaries deemed to be free of material systematic errors. The non-audited financial statements of an audited Beneficiary will be considered to be free from material systematic errors, either because:
 - the audit did not show any systematic errors or
 - the systematic errors which were uncovered in the audited financial statements have been subsequently removed from the non-audited statements through the extension of audit findings procedure.

Experience of previous framework programmes shows that this approach to systematic errors contributes substantially in obtaining an acceptable residual error rate.

It is noted that non-systematic errors in the non-audited financial statements cannot be corrected. Given their nature systematically removing them is not possible. The residual error rate calculation keeps track of the incidence of these non-systematic errors. If the incidence of non-systematic errors is found to be important, the 'cleaning' of systematic errors from a larger part of the population will have to be intensified in order to have a better chance of lowering the residual error rate.

A sufficient audit coverage implies that the audited participations:

- are large enough (with the usual cost-benefit consideration and resource constraints) to obtain the objective of the targeted ResER per entity;
- have an adequate and well-balanced distribution of audits across the implementing entities;
- take into account the direct and indirect coverage.

4.2.5. Assurance assignments

The audits carried out are assurance assignments. For the execution of these assurance assignments guidance will be provided in the form of an indicative audit programme agreed between the CAS and its H2020 stakeholders. This guidance will also include the minimum conditions to be fulfilled for an eligibility criterion to be respected and the consequences to be drawn in terms of proposed adjustments. This being said the guidance is indicative and the auditor for justified reasons may consider carrying out less or more controls, using his/her professional judgement, in particular where specific guidance is not available.

4.3. Economy, efficiency and effectiveness

According to the **Financial Regulation of 25 October 2012** the principles of economy, efficiency and effectiveness are part of sound financial management³⁰. Article 29 §3 of the **H2020 Regulation** stipulates that the Audit Strategy must adhere to the same principles.

The **Financial Regulation of 25 October 2012** defines these principles as follows:

- economy: requires that the resources used by the institution in the pursuit of its activities shall be made available in due time, in appropriate quantity and quality and at the best price;
- efficiency: concerns the best relationship between resources employed and results achieved;
- effectiveness: concerns the attainment of the specific objectives set and the achievement of the intended results.

This section details how the H2020 Audit Strategy intends to perform against these three principles.

4.3.1. Economy

The right balance has to be found between part of the ex-post audits performed by the external audit firms on behalf of the CAS and the part done by the own CAS staff. Three quarters of the audits will be outsourced and awarded to the external audit firms via a public tendering procedure taking cost-benefit considerations into account. This means that the remaining 25% of the audits (the "in-house audits") is carried out by the staff of the CAS. As such, business continuity in-house is foreseen. This proportion has proven to be sufficient to carry out more demanding audits with own resources and to obtain first-hand information on the financial implementation of the actions by the beneficiaries, enabling appropriate feedback to the other stakeholders of this strategy. In addition, outsourcing the majority of the audits provides some flexibility in the audit capacity so that audit batches can for instance follow the (irregular) pattern of the submitted financial statements paid.

The following KPI will be used to assess economy:

- Cost per ex-post audit (in-house versus external). Cost per external audit will depend on the results of the public tender.

4.3.2. Efficiency

Compared to the preceding audit strategies, the H2020 corporate approach and the H2020 Audit Strategy represent an efficiency gain thanks to increased coordination of the ex-post audit efforts. A further optimisation realised by the H2020 Audit Strategy is that the ex-post audits efforts not only provide a contribution to the overall H2020 assurance but elements of assurance to the participating implementing entities as well. In this respect the timely execution of the planned audits by the CAS and a smooth coordination mechanism for the implementation of audit results by all stakeholders is a key condition.

³⁰ Article 30 "Principles of economy, efficiency and effectiveness"

The H2020 Audit Strategy covers the H2020 operational budget with less audit resources than under the previous research framework programmes

The harmonisation of the business processes, the use of the single grant management system tool SyGMA and of the single audit management tool AUDEX adds to efficiency. Moreover since many beneficiaries are common across the participating implementing entities, the corporate audit approach delivers significant advantages for the (direct and indirect) audit coverage to be achieved.

The following KPIs will be used to assess efficiency:

- number of audits closed – matched against the multi-annual audit plan
- audit coverage (direct and indirect) – matched against the multi-annual audit plan

4.3.3. *Effectiveness*

The H2020 Audit Strategy will deliver on the need to have a representative error rate for H2020 as a whole, as well as a coverage of a number of risk factors. Individual implementing entities will have the opportunity to calculate a detected error rate (cf. the paragraph on the definition of the error rates).

The H2020 Audit Strategy also delivers on the minimalisation of the audit burden on beneficiaries:

- it will be monitored that preferably not more than 7% of the beneficiaries will be audited;
- limitation of audit and extension of audit findings to two years after the payment of the balance;

The H2020 Audit Strategy can further be evaluated according to its contribution, as one of the pillars of the internal control system, to attaining "acceptable" residual error rates at the closure of H2020.

A non-negligible, but non-measurable effect is that the ex-post audits, through their existence stimulate beneficiaries to respect the agreed financial conditions when carrying out research and innovation actions. In addition, the 'learning effect' for audited beneficiaries should reduce causes of non-compliance and contribute favourably to the error rate as well.

The following KPIs will be used to assess effectiveness:

Representative Error rate – The RepER will reported each year as part of the AAR process. It will report on the representative audits closed up to that point in time. The RepER is expected to be in the 2-5% range. If it falls outside this range then the AO(D)s will need to consider if and how the control and audit strategy may need to be adjusted.

Residual error rates – calculate by the different services, these should also be in the range of 2-5%, though not necessarily below it. These will be reported in the AAR process and the AO(D)s will need to consider whether the rates identified require the control and audit strategy to be adjusted.

Number of beneficiaries audited – the target of 7% is a non-binding commitment of the Commission. If there is evidence that the target will not be respected, the AO(D)s will need to consider if and how the control and audit strategy may need to be adjusted.

Another KPI, not within the control of the CAS, is the total costs of the audits matched against the total recoveries of the audits. Over time the recoveries would be expected to exceed the costs.

However, this will vary depending on the level of error, speed of recovery, etc. This indicator can be used in the overall assessment of the effectiveness of the entire process (from audit to implementation).

5. SPECIFIC CAS AUDITS

In addition to the standard audit work performed other assignments are also taken up by the CAS.

5.1. Joint audits

5.1.1. Technical

In a number of cases, audits verifying both the financial and the scientific aspects or only the scientific aspects may be needed. These audits are often done at the request and in collaboration with operational services. They may require the involvement of external experts.

Depending on the circumstances it may prove useful to jointly conduct a technical and financial review/audit at the same time to align and harmonise the audit findings and conclusions. These joint audits will be managed in close cooperation between the CAS and the operational services concerned.

Technical audits only covering the scientific aspects are to be monitored by the operational service in question. Yet for statistical purposes, the CAS ought to be kept informed of these technical audits.

The H2020 Working Arrangements (see paragraph 6) describe the collaboration of the CAS with the operational services that intend to launch a technical audit and wish to have a financial auditor involved.

5.1.2. With the European Court of Auditors (ECA)

In line with its objective to provide elements of assurance to the AO(D)s and to optimise the ECA-audit process the CAS collaborates with the ECA. This covers in particular:

- exchange of planning information;
- joint audits (when appropriate);
- follow-up of ECA results and sector letters for these joint audits.

5.2. Fraud risk-based audits

This line of work stems from the Action Plan of the Anti-Fraud strategy³¹.

The fraud risk-based audits target specific fraud risks and schemes set up to obtain a maximum contribution from EU funding. They require specific audit assignments for which specific audit procedures are to be foreseen. A framework contract will also cater for this type of assignments.

These efforts will require intense collaboration with the services of OLAF, who is the privileged partner in investigations/inquiries of this sort.

³¹ Ares(2015)1797066 – Common Anti-Fraud Strategy in the Research Family.

6. RESPONSIBILITIES

The H2020 Working Arrangements are in a separate document and sum up the responsibilities of the CAS and H2020 stakeholders, detailing the roles of each of the parties involved for a list of procedures:

- gathering of audit input files and related quality checks;
- contradictory procedure of the draft/ final report;
- communication of the audit results to be implemented by the operational services;
- handling of any contestation after the finalisation of the audit;
- notification to OLAF of cases of potential frauds/ irregularities;
- processing of the audits on requests;
- processing of audits performed jointly with the European Court of Auditors;
- data to be provided for the reporting requirements;
- processing of technical audits;
- in addition for the JUs³² a working arrangement describes the cooperation and coordination of processes between the CAS and the external stakeholders of this strategy and how Article 10 of the JU Delegation agreements is to be activated.

Enclosures

Annex I : Audited participations in closed audits

Annex II : MUS sampling methodology

Annex III : Calculation of the representative and residual error rate

Annex IV : Derived models of the H2020 General Model Grant Agreement

³² And for GSA

ANNEX I: AUDITED PARTICIPATIONS IN CLOSED AUDITS

The table below is indicative only; the corporate character of the H2020 Audit Strategy prevails.

The targets listed are estimates for the duration of the entire H2020 programme. The annual planning will be agreed through the Annual Audit Plan, which will allow for possible deviations from the table below, if the actual development of the population of participations of the individual implementing entities so requires.

It is also worth noting that these are multi-annual targets meaning that, independently of yearly fluctuations, it is the end-closing target at the end of strategy that is to be achieved. Any implementing entity may request for a revision of its Audit Strategy target to the CAS. This request must be duly motivated.

				Closing targets (expressed in participations)										Targets				
		H2020 budget		2016	2017	Of which 02/2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total 09/2015	as % of share in budget	Art. 10 part
		€ million	%	482			643	1.125	1.125	1.125	1.125	1.125	1.125	1.111				
Layer 1	CRS			162			162	162	162	162	162	162	162	162	14	810		
	Risk based			145			247	377	495	353	538	420	595	460		3.630		
	RDGs	Share	18.921	30%														
	REA + ERCEA	REA (Marie-Curie included)	12.825	20,2%														69%
	Marie-Curie	5.937	9,3%	60	0		150	150	150	150	150	150	150	150		1.260		
	ERCEA	12.629	19,9%	20	0		90	190	190	190	190	190	190	190		1.440	81%	
Layer 2	Additional			80			240	340	340	340	340	340	340	340		2.700	75%	
	Share	25.454	40%	193			257	451	451	451	451	451	451	445		3.598		
	Agencies (REA, ERCEA, EASME, INEA, ex GSA)	37.432	59%															
JUs + GSA	Clean Sky2	1.704	2,7%	29	8		31	77	75	71	69	67	65	67	14	565	234%	324
	IMI2	1.638	2,6%	8	4		20	54	51	48	45	39	36	33		334	144%	102
	ECSEL	1.167	1,8%	17	3		20	25	30	30	22	15	5	2		166	100%	1
	BBI	975	1,5%	5	0		13	15	28	20	25	10	10	10		136	99%	
	FCH2	665	1,0%	3	0		8	23	38	44	46	47	49	37		295	313%	201
	SESAR	585	0,9%	15	0		24	24	24	18	15	15	15			150	181%	67
	SHIFT2RAIL	398	0,6%	2	0		13	15	25	25	20	10	10			120	213%	64
	GSA	99	0,2%	16	7		27	13	19	14	5					94	668%	80
Layer 2+3	Additional+Art 10			95	22		156	246	290	270	247	203	190	149	14	1.860	182%	838
	Share	7.212	11%	55			73	128	128	128	128	128	128	126		1.020		
	Total	63.564	100%															

Discharge 2016:

- June 2016 selection, LoC ready by February 2017

Discharge 2017 and further:

- determination in the Annual Audit Plans of the LoCs required by February of the year as is done for 2017

REA: The 150 annually audited participations for Marie-Curie cover both 50 randomly selected participations feeding into a representative error rate for this action and risk based audits selected following a bottom-up approach (i.e. participations identified by project officers as particularly at risk with respect to compliance issues). The annual 50 randomly selected participations to be audited allow REA to build a representative sample over time.

ERCEA: The 190 annually audited participations for ERCEA cover both 80 randomly selected participations feeding into a representative error rate for ERCEA and risk based audits following a bottom-up approach (i.e. participations identified by ERCEA as particularly at risk with respect to compliances issues/parameters). The annual 80 randomly selected participations to be audited allow ERCEA to build a representative sample over time.

JUs+GSA: The annually audited participations for the individual JUs and GSA cover both randomly selected participations feeding into a representative error rate for the individual JUs and GSA and risk based audits following a bottom-up approach (i.e. participations identified by the individual JUs and GSA as particularly at risk with respect to compliance issues). The annual randomly selected participations to be audited allow the individual JUs and GSA to build a representative sample over time.

ANNEX II: MUS SAMPLING METHODOLOGY

The Common Representative Sample and, consequently, of error rates that indicate the amount of error present in the population as a whole (and not just in the audited portion) requires a statistically representative sampling methodology.

Although the use of audit sampling techniques is a component of the overall audit process, it is only one of a number of factors which are taken into account for assurance. For this reason, the sampling approach adopted in this Strategy might differ in some aspects from the approach used by an external auditor.

Sampling method

Like in previous Audit Strategies, also for H2020 Monetary Unit Sampling (MUS) is used. This method is widely employed by the auditing profession and is particularly suitable for financial audits. It is based on the concept of probability-proportional-to-size (PPS): high value transactions have a higher probability of being selected than low value transactions. It also allows for more precision in estimating the error rate in the population, compared to more traditional random sampling.

Population and sampling units

The population from which to draw samples is defined as the sum of all requested EC contribution (€) contained in all financial statements received and paid by all the H2020 stakeholders since the date when the previous sample was taken and up to the date when the new sample is prepared. The chosen sampling unit is, therefore, hit individual €s contained in individual financial statements related to individual reporting periods of individual participations of a Beneficiary in H2020 research actions.

Sampling parameters

When using MUS, three parameters need to be set in order to determine the appropriate sample size and sampling interval: confidence level, materiality and expected total amount of errors.

The chosen values for the parameters for the H2020 audit campaign are:

Confidence level = 95%

A confidence level of 95% is standard practice (also used in previous Audit Strategies). It is also considered appropriate for the level of assurance expected from audit results.

This value specifies the statistical precision for the conclusions drawn from the audit results for the sampled transactions. For example, using a 95% confidence level means that, where the error rate detected in the sample remains below the materiality threshold (see below), declaring the error rate in the population is indeed below that materiality threshold will be wrong only one time out of 20 MUS-samples.

Expected total errors = 2%

This is the amount of error which is expected to be found based on any a priori knowledge of the characteristics of the population.

The European Court of Auditors (ECA) accepts up to 2% as the maximum level of non-compliance that is acceptable³³. It is therefore reasonable to use this fact as the premise for the hypothesis about the population to be proven or disproven through the use of statistical sampling: whether the error rate is indeed 2% or below.

In addition, it is important to remember that auditing common samples gives common representative error rates which will then be used as the starting point in the calculation of the different residual error rates for each Commission entity. It is the residual error rate against which the above 2% is measured, so even if the result of the sample is above 2%, this might still be a reasonable amount of error depending on the effect of corrective mechanisms.

Materiality = 5%

Materiality as a MUS-parameter is also defined as "the maximum percentage of the recorded population value that the auditor will tolerate for errors"³⁴.

The basis for proposing a value of 5% is that has shown in previous audit campaigns an appropriate level in relation to the residual error rates obtained.

It is very important not to set the materiality threshold too low. This is because one of the constraints of using the MUS-methodology is that, if the resulting error rate is higher than the materiality threshold, the only conclusion left to be drawn is that the initial hypothesis has been disproven, but it is no longer possible to know what the real Upper Error Limit (see Annex III) is in the population.

Sample size: assurance vs. resources

The above-mentioned values for the sampling parameters result in a theoretical maximum sample size of **161**.

It must be noted that sample size is directly related to the level of assurance afforded by the results of auditing the sample(s).

On the other hand, it must also be noted that the sample size calculated above is an indication of the maximum amount of audits that might be necessary for a given sample. In most cases, however, the real number of audits will be lower because of:

- multiple cost statements relating to the same beneficiaries, which can be grouped into a single audit, even if they correspond to different entities;
- cost statements with a bigger € figure than that of the resulting sample interval will always be selected and could appear more than once in the sample.

Sampling frequency

The H2020 Audit Strategy covers the period of 2016-2025. During this period, the auditable population will gradually grow as more and more cost statements are submitted over time.

The available resources and auditing capacities of the CAS are sufficient to carry out such a sample every second year. A common sample once every two years achieves the

³³ ECA Audit Manual 2012 http://www.eca.europa.eu/Lists/ECADocuments/FCAM_2012/FCAM_2012_EN.PDF, various pages

³⁴ *Brink's Modern Internal Auditing: A Common Body of Knowledge*, R. Moeller, p. 227

best balance between the different factors that play a part in deciding on sampling frequency: the requirements for error rate input into annual activity reports; the average amount of time that it takes to complete an audit; reducing the administrative burden of beneficiaries, the 2 year limitation introduced in H2020.

Centralised sampling

The steps for the CRS are:

- Prepare a common auditable population on the basis of information on financial statements paid, available in SyGMA and outside of SyGMA;
- Perform the sampling work in accordance with the methodology described in this Annex;
- Collect results as they become known, and calculate common representative error rates.

The representative audits have priority so that error rates can be calculated and reported in time.

Sample integrity vs. cost effectiveness

All the transactions in the selected sample must be processed in order to draw statistically valid conclusions.

Auditing certain transactions may not appear as cost effective when considering them in isolation. However, it is important to remember that, by auditing them, a conclusion can be derived not just for the audited amount, but for the whole portion of the budget they represent (i.e. the sampling interval amount, typically measured in millions of €), by virtue of their statistical relevance. Moreover, they convey a message to all H2020 beneficiaries that all participations may be subject to audit, irrespective of their value or risk profile.

Some of the participations in the representative sample may relate to beneficiaries benefitting from a certificate of methodology. However, these certificates are part of the preventive measures set-up by the entities. As such, errors detected on cost claims submitted by beneficiaries in accordance to their certified methodology will concentrate on other cost categories outside the scope of their certificate. The total error rate for the sampled transaction is nevertheless quantified in relation to the total value of the cost claim (not just the part excluded from the scope of the certificate).

ANNEX III: CALCULATION OF THE REPRESENTATIVE AND RESIDUAL ERROR RATE FOR THE CORPORATE SAMPLE

1. REPRESENTATIVE ERROR RATE

The representative error rate is the Most Likely Error rate (MLE%) from one or more samples selected in accordance with the sampling methodology described in Annex II. The calculation of the residual error rate subsequently uses the representative error rate as the starting point.

The MLE% for a population from which a MUS-sample has been drawn is calculated according to the following formula:

$$\text{MLE\%} = \frac{\sum_{i=1}^n \text{err}_i * \text{SI}_i}{P}$$

n = total sample size

err_i = error rate (in %) in requested EC contribution detected on individual transaction _i from the MUS-sample (in range [0, 100%]; i.e. only errors relating to overpayments are counted³⁵)

SI_i = sampling interval used for selecting transaction _i from the MUS-sample

P = total requested EC contribution (€) in the auditable population (i.e. all paid financial statements)

Notes:

- This formula also allows for the calculation of an aggregated representative error rate on a population which has been subject to multiple samples on various sub-populations, even if different sampling intervals were used.
- For assurance purposes, the CAS bases its audit conclusions on the MLE% which represents the best estimate, based on the audit conclusions for the sampled transactions at a given point in time, of the error rate in the total population.
- The more representative samples taken, the higher the level of precision with which the MLE can be established.

2. RESIDUAL ERROR RATE

The formula below provides an indication of the potential effect that the correction of all errors in audited amounts, and of systematic errors on the non-audited amounts of audited beneficiaries, could have on the error rate detected in the representative sample(s). In other words, it shows how much error is left in the auditable population after the outcome of ex-post audits.

³⁵ Adjustments in favour of the Beneficiary are considered as 0% error rate for the purpose of calculating the MLE.

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

P = total requested EC contribution (€) in the auditable population (i.e. all paid financial statements).

A = total requested EC contribution (€) as approved by financial officers of all audited financial statements. This will be collected from audit results.

E = total non-audited requested EC contribution (€) of all audited beneficiaries.

ResER% = residual error rate, expressed as a percentage.

RepER% = representative error rate, or error rate detected in the common representative sample, expressed as a percentage and calculated as described above (MLE%).

The RepER% is composed of complementary portions reflecting the proportion of negative systematic and non-systematic errors detected. This rate is the same for all implementing entities, without prejudice to possibly individual detected error rates.

RepERSys% = portion of the RepER% representing negative systematic errors, (expressed as a percentage).

The RepERSys% is the same for all entities and it is calculated from the same set of results as the RepER% as follows:

$$\text{RepERSys}\% = \frac{\sum_{i=1}^n \text{Neg_syst_err}_i * \text{SI}_i}{\left(\sum_{i=1}^n \text{Neg_syst_err}_i * \text{SI}_i \right) + \left(\sum_{i=1}^n \text{Neg_nonsyst_err}_i * \text{SI}_i \right)} * \text{RepER}\%$$

n = total sample size

Neg_syst_err_i = error rate (in %) of negative systematic error detected on individual transaction _i from the MUS-sample (in range [0, 100%]; i.e. only errors relating to overpayments are counted)

Neg_nonsyst_err_i = error rate (in %) of negative non-systematic error detected on individual transaction _i from the MUS-sample (in range [0, 100%]; i.e. only errors relating to overpayments are counted)

SI_i = sampling interval used for selecting transaction _i from the MUS-sample

This calculation will be performed on a point-in-time basis, i.e. all the figures will be provided as of a certain date. Values for P, A and E will be cumulative as of that date.

Note:

- As for the MLE%, also these formulas allow for the calculation of an aggregated residual error rate and systematic error rate on a population which has been subject to multiple samples on various sub-populations, even if different sampling intervals were used.

ANNEX IV: DERIVED MODELS OF THE H2020 GENERAL MODEL GRANT AGREEMENT

General Model Grant Agreement

H2020 General MGA - Multi_V2.0	H2020 Multi- beneficiary General Model Grant Agreement
H2020 General MGA - Mono_V2.0	H2020 Mono- beneficiary General Model Grant Agreement

Marie- Skłodowska- Curie (MSC)

H2020 MGA MSC IF - Mono_V2.0	H2020 Mono- beneficiary Model Grant Agreement for Marie- Skłodowska- Curie Individual Fellowships (MSC- IF)
H2020 MGA MSC ITN - Multi_V2.0	H2020 Multi- beneficiary Model Grant Agreement for Marie- Skłodowska- Curie Innovation Training Networks (MSC- ITN)
H2020 MGA MSC RISE - Multi_V2.0	H2020 Multi- beneficiary Model Grant Agreement for Marie- Skłodowska- Curie Research and Innovation Staff Exchange (MSC- RISE)
H2020 MGA MSC COFUND - Mono_V2.0	H2020 Mono- beneficiary Model Grant Agreement for Marie Skłodowska- Curie COFUND (MSC- COFUND)

European Research Council (ERC)

H2020 ERC MGA - Multi_V2.0	H2020 ERC Multi- beneficiary Model Grant Agreement
H2020 ERC MGA - Mono_V2.0	H2020 ERC Mono- beneficiary Model Grant Agreement
H2020 ERC MGA PoC - Multi_V2.0	H2020 ERC Specific Multi- beneficiary Model Grant Agreement for Proof of Concept Grants
H2020 ERC MGA PoC - Mono_V2.0	H2020 ERC Specific Mono- beneficiary Model Grant Agreement for Proof of Concept Grants
H2020 ERC MGA Low- value - Mono	H2020 ERC Low- value Mono- beneficiary Model Grant Agreement

SME Instrument

H2020 MGA SME Ph1 - Mono_V2.0	H2020 Mono- beneficiary Model Grant Agreement for the SME instrument Phase 1 (SME- Ph1)
H2020 MGA SME Ph1 - Multi_V2.0	H2020 Multi- beneficiary Model Grant Agreement for the SME instrument Phase 1 (SME- Ph1)
H2020 MGA SME Ph2 - Mono_V2.0	H2020 Mono- beneficiary Model Grant Agreement for the SME instrument Phase 2 (SME- Ph2)
H2020 MGA SME Ph2 - Multi_V2.0	H2020 Multi- beneficiary Model Grant Agreement for the SME instrument Phase 2 (SME- Ph2)

ERANET Cofund

H2020 MGA ERANET Cofund - Multi_V2.0	H2020 Multi- beneficiary Model Grant Agreement for ERANET Cofund
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Pre- Commercial Procurement (PCP)/Public Procurement of Innovative Solutions (PPI) Cofund

H2020 MGA PCP/PPI Cofund - Multi_V2.0	H2020 Multi- beneficiary Model Grant Agreement for PCP/PPI Cofund
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European Joint Programme Cofund

H2020 MGA EJP Cofund - Multi_v2.0	H2020 Multi- beneficiary Model Grant Agreement for the European Joint Programme Cofund (EJP Cofund)
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Framework Partnerships

H2020 MGA Framework Partnership - Multi_V2.0	H2020 Multi- partner Framework Partnership Agreement
H2020 MGA Framework Partnership - Mono	H2020 Mono- partner Framework Partnership Agreement
H2020 MGA Specific - Multi_v2.0	H2020 Multi- partner Specific Agreement
H2020 MGA Specific- Mono	H2020 Mono- partner Specific Agreement

Lump sum

H2020 MGA Lump sum - Multi	H2020 Multi- beneficiary Model Grant Agreement for Lump sum grants
H2020 MGA Lump sum - Mono	H2020 Mono- beneficiary Model Grant Agreement for Lump sum grants

Joint Undertakings

H2020 CleanSky2 MGA	H2020 CleanSky2 Multi- beneficiary Model Grant Agreement for Members
H2020 CleanSky2 GAP- Multi	H2020 CleanSky2 Multi- Beneficiary Model Grant Agreement for Partners
H2020 CleanSky2 GAP- Mono	H2020 CleanSky2 Mono- Beneficiary Model Grant Agreement for Partners
H2020 IM2 MGA	H2020 IM2 Multi- beneficiary Model Grant Agreement for Members
H2020 ECSEL MGA	H2020 ECSEL Multi- beneficiary Model Grant Agreement for Members
H2020 BBIMGA	H2020 BBI Multi- beneficiary Model Grant Agreement for Members
H2020 FCH2 MGA	H2020 FCH2 Multi- beneficiary Model Grant Agreement for Members
H2020 SESAR MGA	H2020 SESAR Multi- beneficiary Model Grant Agreement

Total: 32 (derived) Model Grant Agreements