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Introduction

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 21508

Project, programme and portfolio management — Earned value management

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ISO/TC 258

Secretariat: **ANSI**

Voting begins on:
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Voting terminates on:
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106 Foreword

107 ISO (the International Organization for Standardization) is a worldwide federation of national
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114 The procedures used to develop this document and those intended for its further
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116 approval criteria needed for the different types of ISO documents should be noted. This
117 document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2
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129 For an explanation of the voluntary nature of standards, the meaning of ISO specific terms
130 and expressions related to conformity assessment, as well as information about ISO's
131 adherence to the World Trade Organization (WTO) principles in the Technical Barriers to
132 Trade (TBT), see www.iso.org/iso/foreword.html.

133 This document was prepared by Technical Committee ISO/TC 258, *Project, programme and*
134 *portfolio management*.

135 This second edition cancels and replaces the first edition (ISO 21508: 2018), which has been
136 technically revised.

137 The main changes are as follows:

- 138 — Integration of risk management into the earned value management process steps
- 139 — Addition of the earned value management integration clauses.

140 Any feedback or questions on this document should be directed to the user's national
141 standards body. A complete listing of these bodies can be found at
142 www.iso.org/members.html.

Introduction

The purpose of this document is to provide guidance to those individuals involved in earned value management. It describes practices to provide benefits for project, programme or portfolio planning and control.

Earned value management is used within projects, programmes and portfolios. **Error! Reference source not found.** illustrates one context and environment view within which projects, programmes and portfolios exist. The outputs from the portfolio components are expected to deliver outcomes, which should realize benefits for the sponsoring organizations, as well as for internal and external stakeholders. Projects, programmes and portfolios should have a governance framework.

This document provides guidance on concepts, responsibilities, integration and processes for the implementation of earned value management.

It provides information on performance metrics gathered or contained in an earned value management system.

It complements ISO 21500, ISO 21502, ISO 21503, ISO 21504, ISO 21505, ISO 21511 and ISO 21512.

The target audience of this document includes the following:

- a) executive managers and those individuals involved in sponsoring projects or programmes;
- b) decision-makers responsible for selecting, authorizing and governing projects, programmes and portfolios;
- c) individuals managing projects, programmes or earned value management systems;
- d) individuals involved in the management of performance of project, programme or portfolio management offices or project or programme control staff;
- e) developers of national or organizational standards.

The application of this document can be tailored to meet the needs of any organization or individual project, programme or portfolio, so they may better apply the concepts and practice of earned value management.

Project, programme and portfolio management — Earned value management

1 Scope

This document provides guidance for practices of earned value management in project, programme and portfolio management. It is applicable to any type of organization including public or private and any size or sector, as well as any type of project, or programme or portfolio in terms of complexity, size or duration.

This document provides the following:

- a) descriptions of the purpose and benefits of earned value management;
- b) the integration and relationship with project, programme and portfolio management;
- c) an overview of the processes and process descriptions;
- d) basic needs for an earned value management system;
- e) use of an earned value management system.

This document does not provide guidance on the use of specific processes, methods or tools in the practice of earned value management.

Annex A describes an integrated baseline review. It is contained in an Annex, since it is used by government organizations and their contractors, but is not used by most organizations, most of the time.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21506, Project, programme and portfolio management – Vocabulary apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- a) ISO Online browsing platform: available at <https://www.iso.org/obp>
- f) IEC Electropedia: available at <https://www.electropedia.org>.

3.2 Abbreviated terms

The following abbreviated terms are used in this document.

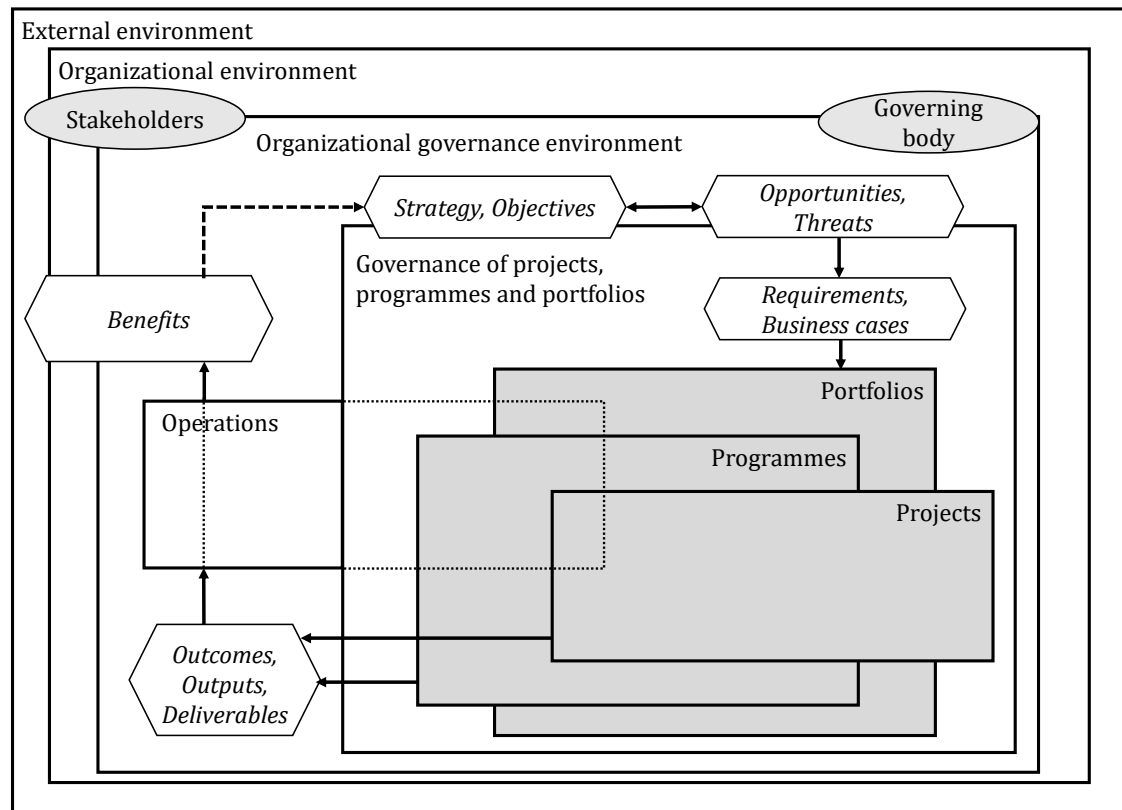
Actual cost	AC
-------------	----

203	Actual time	AT
204	Budget at completion	BAC
205	Budgeted cost for work remaining	BCWR
206	Cost performance index	CPI
207	Cost variance	CV
208	Estimate at completion	EAC
209	Estimated duration	ED
210	Estimate to complete	ETC
211	Earned schedule	ES
212	Earned value	EV
213	Earned value management	EVM
214	Independent estimate at completion	IEAC
215	Independent estimate at completion [time]	IEAC(t)
216	Planned duration	PD
217	Planned value	PV
218	Schedule performance index	SPI
219	Schedule performance index [time]	SPI(t)
220	Schedule variance	SV
221	Schedule variance [time]	SV(t)
222	To complete cost performance index	TCPI
223	To complete schedule performance index	TSPI
224	Undistributed budget	UB
225	Variance at completion	VAC

226 **4 Overview of earned value management**

227 **4.1 Context of earned value management**

228 Earned value management is used within projects, programmes and portfolios. Projects,
 229 programmes and portfolios should be aligned to the governance framework. An example of
 230 project, programme and portfolio alignment within an organizational context is shown in
 231 Figure 1, see ISO 21505 which illustrates a context and environment within which projects,
 232 programmes and portfolios can exist. The organizational strategy should be used to identify,
 233 document and evaluate opportunities, threats, weaknesses and strengths, which can help
 234 inform future action. Selected opportunities and threats can be further examined and justified
 235 resulting in projects, programmes and portfolios being initiated. The outputs from the
 236 projects, programmes and portfolios are expected to deliver outcomes, which should realize
 237 benefits for the sponsoring organizations, as well as for internal or external stakeholders.



NOTE: Additional information on project, programme and portfolio alignment within an organizational context can be found in ISO 21505.

Figure 1 — An example of project, programme and portfolio alignment within an organizational context

4.2 Earned value management

Earned value management should be achieved through a structured method that provides a performance measurement approach for reviewing past performance and using the past performance to forecast the future performance of the work package, project or programme.

Earned value management is a method of performance management that provides for the planning, implementing and controlling of the performance of a project or programme. See ISO 21512, AS 4817-2006, Reference [9].

4.3 Purpose and benefits of earned value management

The purpose of earned value management is control and analysis of the project or programme. Earned value management should facilitate analysis and decision-making for, but not limited to budget, schedule, human resources and materials, and allocation of other resources within the project, programme or portfolio.

256 The earned value management system can include communication of the status from metrics
257 established for the project or programme, improvements, preventive and corrective action
258 development, and a common framework and vocabulary.

259 The earned value management system provides a common framework and vocabulary for the
260 management of the project or programme, and communication of the status. This
261 communication of status can inform improvements and corrective action development.

262 An earned value management system should consist of a set of procedures, tools and methods
263 for establishing and maintaining project or programme control.

264 The application of earned value management should result in three overarching benefits:

- 265 a) developing objective measurement techniques;
- 266 b) making available data for project, or programme or portfolio management decisions;
- 267 c) providing a system to monitor the project, programme or portfolio, see ISO 21512,
268 AS4817-2006, Reference [9].

269 **4.3.1 Earned value management specific benefits**

270 Specific benefits can include the following:

- 271 a) forecasting of future performance and estimates at completion based on past
272 performance;
- 273 b) objective metrics for comparison of project or programme performance across a
274 programme or portfolio, across an organization and between or among organizations;
- 275 c) development of budgets and baselines;
- 276 d) compilation of estimates;
- 277 e) objective measurement of completion of work packages that is done in a consistent
278 manner;
- 279 f) comparison of work performed against actual performance and budget;
- 280 g) highlight of inconsistencies in the measures in earned value reports;
- 281 h) consistency of the reporting and performance measurement framework by regular
282 earned value reporting;
- 283 i) management by exception;
- 284 j) objective measurement of risk management reserve;
- 285 k) documented analysis that enables timely and reliable estimates at completion;
- 286 l) basis for continuous improvement activities.

287 Note: Management reserve can also be called risk contingency.

288 **4.4 Guidance for an earned value management system**

289 An earned value management system should provide for consistent performance metrics. To

achieve a consistent view of performance metrics, the system should integrate the baselines established for the project or programme, including the scope of work that should be defined through the work breakdown structure and performance measurement baseline. The system should enable formal, controlled incorporation of changes to the baselines authorized users and procedures.

To implement an earned value management system, the project or programme control metrics and processes should be documented and understood by project, the programme or portfolio teams and by those managing the organization or organizations performing the work. The system should be established to enable systematic review of the data, common assessment methodologies, targeted levels of performance, and an assessment feedback process which provides a means of following the project or programme's progress and feeds into a continuous improvement process. The system should be able to be tailored to accommodate different project or programme subject area integrations. Tailoring should also accommodate necessary reporting needs across programmes and portfolios or for more than one organization. Other tailoring needs can arise, as deemed necessary for different levels of control.

The core data contained in an earned value management system should be the earned value, actual cost, the planned value, estimate to complete, and budget at completion. The earned value management system should be able to show the planned status, as well as the actual status of the project or programme, see ISO 21512, AS 4817-2006.

To implement an earned value management system, there should be a common agreement on the assignment of value and performance that can be tailored based on project, programme or portfolio and organizational considerations.

The review of metrics of performance should be accomplished on a regular, scheduled basis to enable comparison and analysis of performance.

An earned value management system enable users to:

- a) determine what work is to be accomplished, by whom and when;
- b) establish resource requirements;
- c) measure work achievement and record associated costs;
- d) report deviations from the plan for which metrics have been established;
- e) forecast the completion date and cost;
- f) plan and implement corrective and preventive action plans;
- g) facilitate authorized scope changes; any approved changes to the prior approved baselines contained in the earned value management system should be controlled, traceable and documented.

4.5 Earned value management planning

Earned value management planning should enable:

- a) establishing project or programme objectives, as well as the consolidated view of the planning of programmes and portfolios;
- b) monitoring of project or programme progress to measure deviations from the plan;

- c) planning by the users of the performance management system, objective assessment of progress and use of resources within the programme or portfolio.

4.6 Using earned value measurements and performance metrics

Earned value measurements should be used to determine performance metrics to assess the cost and schedule status of a project or programme at a selected point in time. These metrics should enable informed decisions about the management of the project or programme. The metrics derived can be used to compare actual project or programme cost and schedule performance with the performance measurement baseline. Variance thresholds for cost and schedule performance, should be established with reference to the performance measurement baseline so that when exceeded significant variances for further analysis and management attention are identified, see ISO 21512, AS 4817-2006, Reference [9].

The information acquired by using the earned value performance measurements should be used to determine:

- a) progress of a project or programme;
- b) metrics for work accomplished;
- c) completion of the deliverables;
- d) progress towards delivery of a project or programme or portfolio.

These measurements, combined with the agreed upon variance threshold, should be used to determine the cost and schedule variances and cost and schedule performance indices as described in Clauses 7 and 8. Where variances exceed agreed thresholds, corrective actions should be developed.

4.6.1 Forecasting future performance of the project or programme

The information should also be used to forecast future performance of the project or programme. The data to establish a performance forecast should be based on historical performance and should include:

- a) estimate to complete;
- b) estimate at completion;
- c) variance at completion;
- d) schedule performance index
- e) schedule performance index (time)
- f) cost performance index
- g) to complete performance index
- h) management reserve to complete.

The information gathered in calculating these values (PV, EV, AC, BAC, EAC and management reserve) should be documented in an earned value management report, see ISO 21512, AS 4817-2006, References [8, 9].

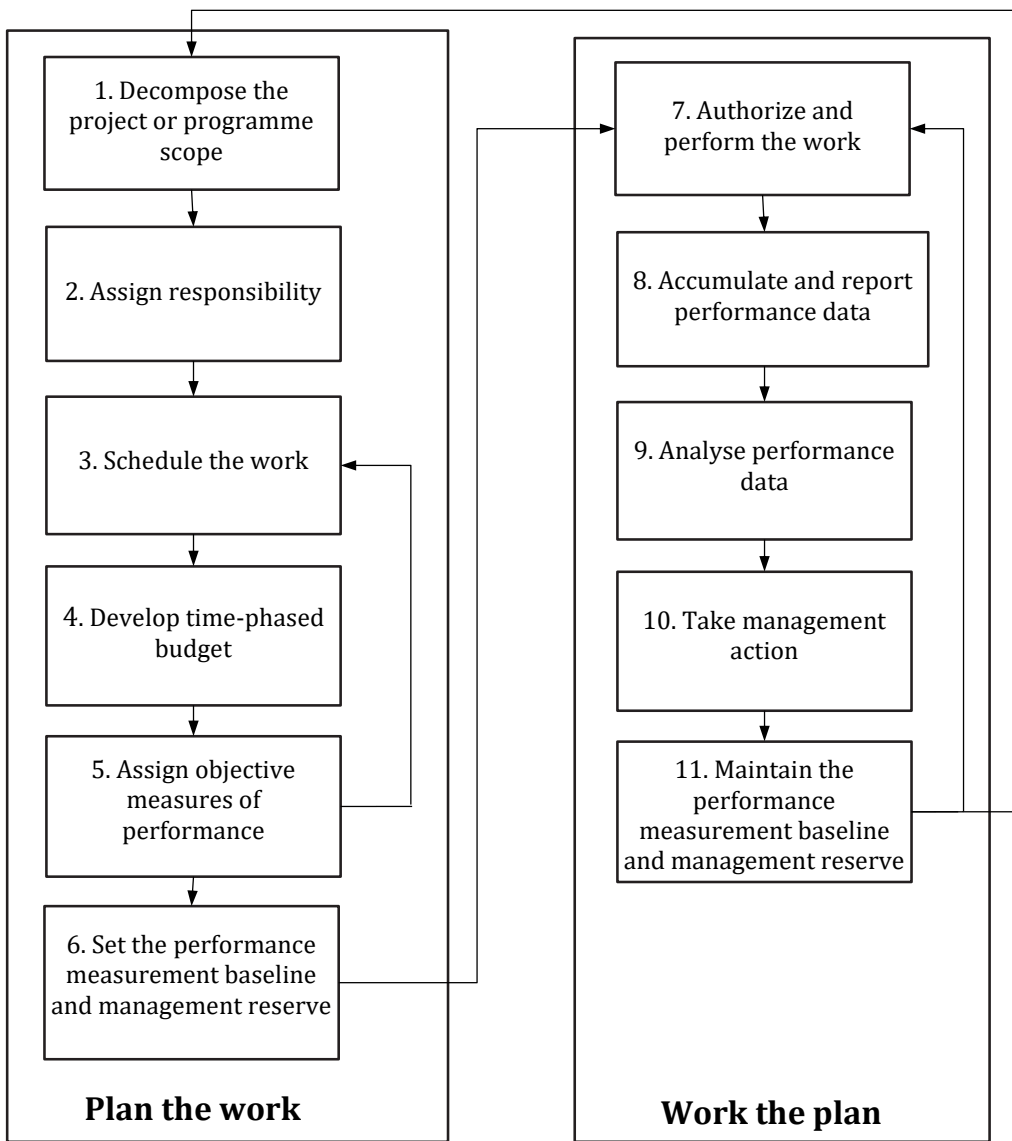
The prediction of cost at completion and the end date can be affected by many factors both internal and external to the work and also be influenced by emerging risks, opportunities and

threats.

5 Earned value management process steps

5.1 General

The earned value management process steps are shown in Figure 2.



NOTE 1 Steps 3, 4 and 5 are performed iteratively.

NOTE 2 The process steps can be performed once or several times during a project or programme.

375 NOTE 3 Source: AS 4817-2006, Project performance measurement using Earned Value, January
376 2006, Standards Australia, Figure 3.1.

377 **Figure 2 — Earned value management process steps**

378 Plan the work refers to the process steps which establish the foundations for project
379 execution and control.

380 Plan the work enables the effective use of earned value management by enabling project
381 teams to accurately measure performance and make informed decisions during the
382 implementation phase.

383 Work the plan refers to the process steps which are used to manage, monitor and control
384 the project or programme during the implementation phase.

385 Using earned value management during work the plan enables disciplined project or
386 programme implementation including the early detection, correction or prevention of
387 performance issues. This improves transparency, control and the likelihood of the project
388 or programme achieving successful outcomes.

389 The earned value management process steps should consist of the steps described in 5.2 to
390 5.12.

391 **5.2 Step 1: Decompose the project or programme scope**

392 Generally, the entire project or programme scope of work should be decomposed into
393 manageable elements using the following guidance:

- 394 a) project or programme scope should be decomposed into a work breakdown
395 structure;
- 396 b) work breakdown structure should include the entire scope of work for the project or
397 programme;
- 398 c) risks against work elements should be identified and recorded;
- 399 d) scope of work elements in the work breakdown structure should be mutually
400 exclusive, see ISO 21511.

401 **5.2.1 Work breakdown structure characteristics necessary to apply earned**
402 **value management**

403 The characteristics of a work breakdown structure necessary to apply earned value
404 management should be as follows:

- 405 a) complete, ordered, and logical decomposition of the work breakdown structure, as
406 well as the integration of other elements of project or programme management, such
407 as technical control, and schedule management;
- 408 b) work breakdown structure should be developed to the level needed to manage the
409 project or programme, including high-risk elements of work, as well as for work
410 authorization, tracking and reporting;
- 411 c) identification of the appropriate managers or persons, who will be responsible for the
412 performance data and the report in which the data should be contained.

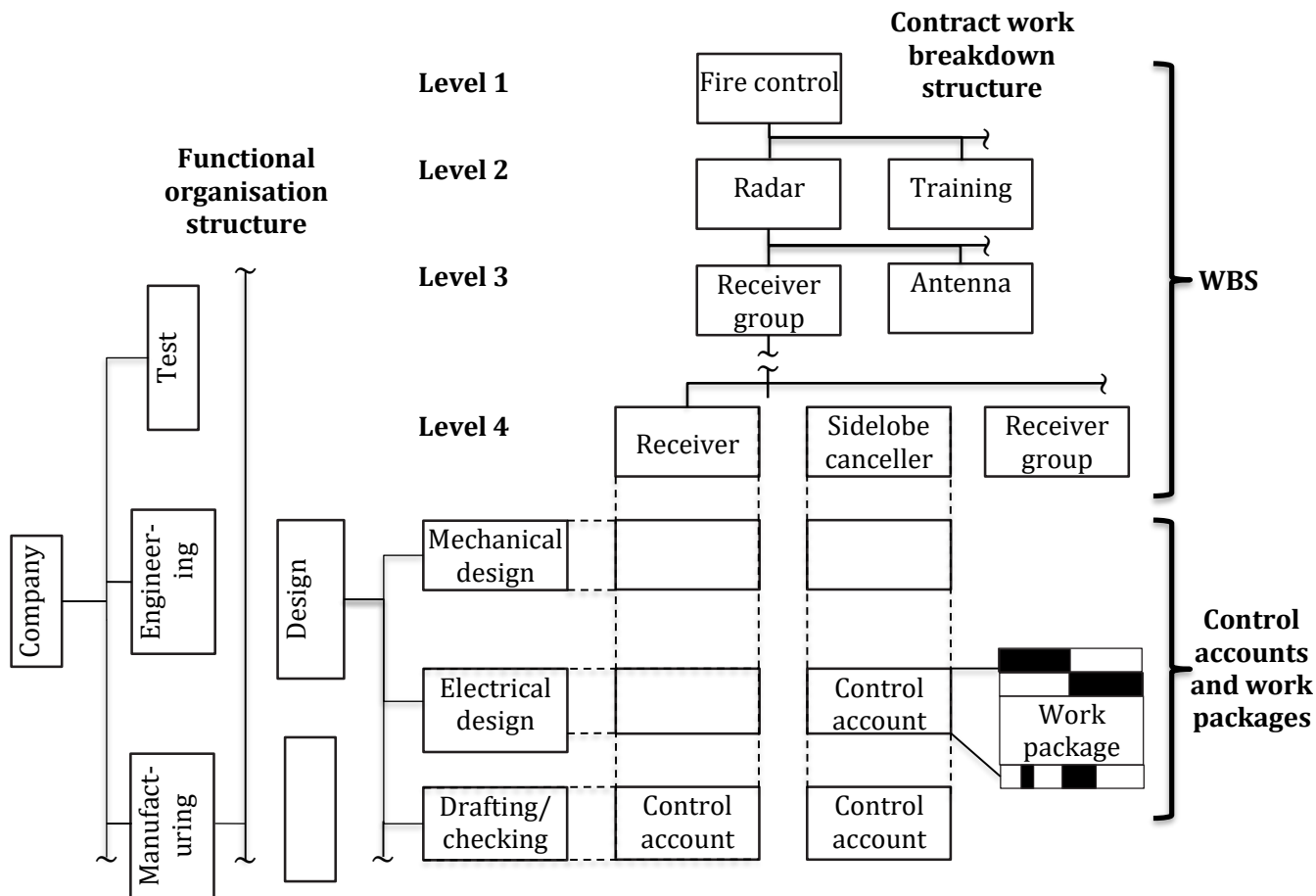
NOTE: Recommendations on developing the work breakdown structure can be found in ISO 21511.

5.3 Step 2: Assign responsibility

Responsibility should be assigned using the following guidance:

- a) performance responsibility should be assigned for each element of work and the project or programme in total;
- b) management responsibility should be clearly defined, including ownership of risk;
- c) managers within the project or programme management team or performing organization should be assigned the responsibility for work to be performed externally.

Responsibility should be assigned for the performance of each work element decomposed in the work breakdown structure. Figure 3 provides an example of assigning responsibility for work on a project or programme within a functional organization.



NOTE This figure depicts a functional organization but it can easily be any other type of organizational structure.

Figure 3 — Example of a responsibility assignment matrix: integration of a work breakdown structure and an organizational structure

5.4 Step 3: Schedule the work

A schedule for the work, which identifies activities, durations, milestones and interdependencies should be the basis for earned value determination and should be created using the following guidance:

- a) activities should be identified at or below the level of the work breakdown structure elements;
- b) decision points determined to be significant, constraints, and interfaces should be identified as major milestones;
- c) work should be scheduled to define the sequence of work;
- d) activity and milestone interdependencies should be identified that are necessary to meet the requirements of the project, or programme or portfolio;
- e) deliverables, milestones, technical performance goals, risk reduction targets or other objective measures of performance should be clearly identified and used as indicators of performance.

The schedule should be at a level of detail to support development of the performance measurement baseline.

Elements of the work should be scheduled in a logical sequence that identifies durations, activities, milestones and interdependencies, with planning for potential risk and risk treatment actions. In projects, programmes or portfolios involving several layers of schedules, the schedule should be vertically and horizontally traceable, see Figure 4. In other words, work should be traceable throughout the project, programme or portfolio to each level of the schedule consistent with the level of planning and sequencing should reflect interdependencies.