# INTERNATIONAL STANDARD

Second edition 2017-04

## Space systems — Experience gained in space projects (lessons learned) — Principles and guidelines

*Systèmes spatiaux — Évaluation de la connaissance pratique — Principes et lignes directrices* 

# iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO 16192:2017</u> https://standards.iteh.ai/catalog/standards/sist/d0d7afed-e513-4e51-be00-23f461d7f992/iso-16192-2017



Reference number ISO 16192:2017(E)

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## Contents

Introduction    v      1    Scope    1      2    Normative references    1      3    Terms and definitions    1      4    The role of a lessons learned activity    2      4.1    Role    2      4.2    Information availability    2      5    Lessons learned management    2      5.1    The main applications of the lessons learned    3      6    The lessons learned process    3      6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the selected lessons learned    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    Iclessinication of the selected lessons learned process    6      6.3.5    Recording of the selected lessons learned to a new project    6      6.3.6    Recording of the selected lessons learned to a new project    6      6.3.7    Measurement or assessment of the results of the lessons learned process	Fore	word		iv
2    Normative references    1      3    Terms and definitions    1      4    The role of a lessons learned activity    2      4.1    Role    2      4.2    Information availability    2      5    Lessons learned management    2      5.1    The main applications of the lessons learned    2      5.2    Information sources for the lessons learned    3      6    The lessons learned process    3      6.1    General    3      6.2    Process steps    44      6.3    Description of lessons learned process steps    46      6.3    Description of lessons learned process steps    66      6.3.1    Data and information collection    66      6.3.2    Selection of the lessons learned cases    66      6.3.3    Validation and acceptance of the selected lessons learned    66      6.3.4    IClassification of the selected cases    66      6.3.5    Recording of the selected cases    66      6.3.6    Recording of the selected cases    66      6.3.7    Measurement or assessment of the results of the lesson	Intro	oductio	n	v
3    Terms and definitions    1      4    The role of a lessons learned activity    2      4.1    Role    2      4.2    Information availability.    2      5    Lessons learned management    2      5.1    The main applications of the lessons learned    2      5.2    Information sources for the lessons learned    3      6    The lessons learned process    3      6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    Classification of the selected lessons learned to a new project    6      6.3.5    Recommontal than of applicable lessons learned to a new project    6      6.3.6    Recommontal acceptance of the selected lessons learned process    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      6.3.7    Measurement or assessment of the	1	Scop	e	
3    Terms and definitions    1      4    The role of a lessons learned activity    2      4.1    Role    2      4.2    Information availability.    2      5    Lessons learned management    2      5.1    The main applications of the lessons learned    2      5.2    Information sources for the lessons learned    3      6    The lessons learned process    3      6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    Classification of the selected lessons learned to a new project    6      6.3.5    Recommontal than of applicable lessons learned to a new project    6      6.3.6    Recommontal acceptance of the selected lessons learned process    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      6.3.7    Measurement or assessment of the	2	Norr	native references	
4    The role of a lessons learned activity    2      4.1    Role    2      4.2    Information availability.    2      5    Lessons learned management    2      5.1    The main applications of the lessons learned    2      5.1    Information sources for the lessons learned    3      6    The lessons learned process    3      6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.3    Validation of the selected cases    6      6.3.4    Classification of the selected lessons learned to a new project    6      6.3.5    Recording of the selected lessons learned to a new project    6      6.3.6    Recomment or assessment of the results of the lessons learned process    6      7    Content of the lessons learned record 102-2017    7    7      7.1    General    7	3			
4.1    Role    2      4.2    Information availability    2      5    Lessons learned management    2      5.1    The main applications of the lessons learned    2      5.2    Information sources for the lessons learned    3      6    The lessons learned process    3      6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    iclassification of the selected lessons learned recess    6      6.3.5    Recording of the selected lessons learned to a new project    6      6.3.6    Recording of the selected cases    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      7    Content of the lessons learned record 192/2017    7    7      7.1    General    7    7.2.1    General    7      7.2.2    Backg				
4.2    Information availability	Т			
5.1    The main applications of the lessons learned    2      5.2    Information sources for the lessons learned    3      6    The lessons learned process    3      6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    Classification of the selected cases    6      6.3.5    Recording of the selected cases    6      6.3.6    Recommendation of applicable lessons learned to a new project    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      7.1    Generial    7    7.1      7.1    Generial    7    7      7.2.2    Background of the root event    7    7.2.3      7.2.3    The lessons learned    7    7.2.4    Resulting recommendatio		4.2		
5.1    The main applications of the lessons learned    2      5.2    Information sources for the lessons learned    3      6    The lessons learned process    3      6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    Classification of the selected cases    6      6.3.5    Recording of the selected cases    6      6.3.6    Recommendation of applicable lessons learned to a new project    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      7.1    Generial    7    7.1      7.1    Generial    7    7      7.2.2    Background of the root event    7    7.2.3      7.2.3    The lessons learned    7    7.2.4    Resulting recommendatio	5	Lessons learned management		
6    The lessons learned process    3      6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    Classification of the selected cases    6      6.3.5    Recording of the selected cases    6      6.3.6    Recording of the selected cases    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      7    Content of the lessons learned record 1922017    7      7.1    General    7      7.2    Detailed content    23H61d7992/so-16192-2017    7      7.2.1    General    7      7.2.2    Background of the root event    7      7.2.3    The lessons learned    7      7.2.4    Resulting recommendations and actions    7      8.1    General    7      8.2    Application    8			The main applications of the lessons learned	2
6.1    General    3      6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.3    Validation of the selected lessons learned    6      6.3.4    Classification of the selected lessons learned to a new project    6      6.3.5    Recording of the selected cases    6      6.3.6    Recommendation of applicable lessons learned to a new project    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      7    Content of the lessons learned record 192.2017    7      7.1    General    7      7.2    Detailed content    23461d7092/so-16192-2017    7      7.2.1    General    7      7.2.2    Background of the root event    7      7.2.3    The lessons learned    7      7.2.4    Re		5.2	Information sources for the lessons learned	3
6.2    Process steps    4      6.3    Description of lessons learned process steps    6      6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    iClassification of the selected lessons learned process    6      6.3.5    Recording of the selected cases    6      6.3.6    Recommendation of applicable lessons learned to a new project    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      7    Content of the lessons learned record 192:2017    7      7.1    Generals //standards.itchai/catalog/standards/sist/d0d7alcd-c513-4c51-be00-    7      7.2.1    General    7      7.2.2    Background of the root event    7      7.2.3    The lessons learned    7      7.2.4    Resulting recommendations and actions    7      8    Lessons learned implementation    7      8.3    Responsibility    8      9    Effectiveness of the lessons learned process    8      9    Eff	6	The lessons learned process		
6.3    Description of lessons learned process steps		6.1	General	
6.3.1    Data and information collection    6      6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    Classification of the selected lessons learned    6      6.3.5    Recording of the selected lessons learned to a new project    6      6.3.6    Recommendation of applicable lessons learned to a new project    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      7    Content of the lessons learned record 192/2017    7      7.1    Generals://standards.iteha/catalog/standards/sist/d0d7afed-e513-4e51-be00-    7      7.2    Detailed content    23/461d70992/so-16192-2017    7      7.2.1    General    7    7.2.1      7.2.2    Background of the root event    7    7.2.3      7.2.3    The lessons learned    7    7      7.2.4    Resulting recommendations and actions    7      8.1    General    7      8.2    Application    8      8.3    Responsibility    8      9    Effectiveness of the lessons learned process				
6.3.2    Selection of the lessons learned cases    6      6.3.3    Validation and acceptance of the selected lessons learned    6      6.3.4    Classification of the selected lessons learned E    6      6.3.5    Recording of the selected cases    6      6.3.6    Recommendation of applicable lessons learned E    6      6.3.7    Measurement or assessment of the results of the lessons learned process    6      7    Content of the lessons learned record 192:2017    7      7.1    General Standards/sist/d0d7ated-e513-4e51-be00-    7      7.2    Detailed content    23/461d7/992/so-16192-2017    7      7.2.1    General    7    7.2.1    General    7      7.2.2    Background of the root event    7    7.2.1    General    7      7.2.3    The lessons learned    7    7.2.4    Resulting recommendations and actions    7      8    Lessons learned implementation    7    8.1    General    7      8.2    Application    8    8.3    Responsibility    8      9    Effectiveness of the lessons learned process    8    8    9    Anne		6.3		
6.3.3Validation and acceptance of the selected lessons learned66.3.4Classification of the selected lessons learned66.3.5Recording of the selected cases66.3.6Recommendation of applicable lessons learned to a new project66.3.7Measurement or assessment of the results of the lessons learned process67Content of the lessons learned record 192:201777.1General Standards itch ai catalog standards/sist/d0d7ated-e513-4e51-be00-77.2Detailed content23861d7/992/iso-16192-201777.2.1General77.2.2Background of the root event77.2.3The lessons learned77.2.4Resulting recommendations and actions78Lessons learned implementation78.1General78.2Application88.3Responsibility89Effectiveness of the lessons learned process8Annex A (informative) Generic lessons learned forms9Annex B (informative) Short lessons learned form12				
6.3.4Classification of the selected lessons learned 1				
6.3.5Recording of the selected cases66.3.6Recommendation of applicable lessons learned to a new project66.3.7Measurement or assessment of the results of the lessons learned process67Content of the lessons learned record 192:201777.1General St.//standards.ich.a/catalog/standards/sist/d0d7afed-e513-4e51-be00-77.2Detailed content23f461d7f992/iso-16192-201777.2.1General77.2.2Background of the root event77.2.3The lessons learned77.2.4Resulting recommendations and actions78Lessons learned implementation78.1General78.3Responsibility89Effectiveness of the lessons learned process8Annex A (informative) Generic lessons learned forms9Annex B (informative) Short lessons learned form12			6.3.3 Validation and acceptance of the selected lessons learned	6
6.3.6    Recommendation of applicable lessons learned to a new project				
6.3.7    Measurement or assessment of the results of the lessons learned process.    6      7    Content of the lessons learned record 192:2017    7      7.1    Generals://standards.iteh.a/catalog/standards/sist/d0d7afed-e513-4e51-bc00-    7      7.2    Detailed content    23461d7/992/so-16192-2017    7      7.2.1    General    7    7.2.2      7.2.2    Background of the root event    7      7.2.3    The lessons learned    7      7.2.4    Resulting recommendations and actions    7      8    Lessons learned implementation    7      8.1    General    7      8.2    Application    8      8.3    Responsibility    8      9    Effectiveness of the lessons learned process    8      Annex A (informative) Generic lessons learned forms    9    9			6.3.5 Recording of the selected cases	
7    Content of the lessons learned record 192:2017    7      7.1    General Standards.itch.ai/catalog/standards/sist/d0d7afed-e513-4e51-be00-    7      7.2    Detailed content    23#61d71992/iso-16192-2017    7      7.2.1    General    7    7      7.2.2    Background of the root event    7    7      7.2.3    The lessons learned    7    7      7.2.4    Resulting recommendations and actions    7      8    Lessons learned implementation    7      8.1    General    7      8.2    Application    8      8.3    Responsibility    8      9    Effectiveness of the lessons learned process    8      Annex A (informative) Generic lessons learned forms    9    12				
7.2.1General77.2.2Background of the root event77.2.3The lessons learned77.2.4Resulting recommendations and actions78Lessons learned implementation78.1General78.2Application88.3Responsibility89Effectiveness of the lessons learned process8Annex A (informative) Generic lessons learned forms9Annex B (informative) Short lessons learned form12	_	<b>.</b> .	*	
7.2.1General77.2.2Background of the root event77.2.3The lessons learned77.2.4Resulting recommendations and actions78Lessons learned implementation78.1General78.2Application88.3Responsibility89Effectiveness of the lessons learned process8Annex A (informative) Generic lessons learned forms9Annex B (informative) Short lessons learned form12	7	Cont	ent of the lessons learned record 122.2017	
7.2.1General77.2.2Background of the root event77.2.3The lessons learned77.2.4Resulting recommendations and actions78Lessons learned implementation78.1General78.2Application88.3Responsibility89Effectiveness of the lessons learned process8Annex A (informative) Generic lessons learned forms9Annex B (informative) Short lessons learned form12		7.1	Detailed content 23f461d7f992/iso-16192-2017	
7.2.2Background of the root event77.2.3The lessons learned77.2.4Resulting recommendations and actions78Lessons learned implementation78.1General78.2Application88.3Responsibility89Effectiveness of the lessons learned process8Annex A (informative) Generic lessons learned forms9Annex B (informative) Short lessons learned form12		1.2		
7.2.3The lessons learned77.2.4Resulting recommendations and actions78Lessons learned implementation78.1General78.2Application88.3Responsibility89Effectiveness of the lessons learned process8Annex A (informative) Generic lessons learned forms9Annex B (informative) Short lessons learned form12			7.2.1 General 7.2.1 7.2.1 7.2.1 Rackground of the root event	
7.2.4Resulting recommendations and actions78Lessons learned implementation78.1General78.2Application88.3Responsibility89Effectiveness of the lessons learned process8Annex A (informative) Generic lessons learned forms9Annex B (informative) Short lessons learned form12				
8.1    General    7      8.2    Application    8      8.3    Responsibility    8      9    Effectiveness of the lessons learned process    8      Annex A (informative) Generic lessons learned forms    9      Annex B (informative) Short lessons learned form    12				
8.1    General    7      8.2    Application    8      8.3    Responsibility    8      9    Effectiveness of the lessons learned process    8      Annex A (informative) Generic lessons learned forms    9      Annex B (informative) Short lessons learned form    12	8	Lessons learned implementation		
8.3    Responsibility    8      9    Effectiveness of the lessons learned process    8      Annex A (informative) Generic lessons learned forms    9      Annex B (informative) Short lessons learned form    12				
9    Effectiveness of the lessons learned process    8      Annex A (informative) Generic lessons learned forms    9      Annex B (informative) Short lessons learned form    12			Application	
Annex A (informative) Generic lessons learned forms    9      Annex B (informative) Short lessons learned form    12			Responsibility	
Annex B (informative) Short lessons learned form	9	Effec	tiveness of the lessons learned process	8
	Anno	ex A (in	formative) Generic lessons learned forms	9
	Annex B (informative) Short lessons learned form			
	<b>Bibl</b> i	LY		

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see <a href="https://www.iso.org/directives">www.iso.org/directives</a>).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: <a href="http://www.iso.org/iso/foreword.html">www.iso.org/iso/foreword.html</a>. (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 20, Aircraft and space vehicles, Subcommittee SC 14, Space systems and operations. https://standards.iteh.ai/catalog/standards/sist/d0d7afed-e513-4e51-be00-

This second edition cancels and replaces the first edition (ISO 16192:2010), which has been technically revised.

The main changes compared to the previous edition are as follows:

- information previously in Clause 2 (role of lessons learned) and Clause 4 (the lessons learned process) has been reorganised and rewritten to eliminate duplication and inconsistent text; and
- information describing the lessons learned process which was previously in Annex A has been removed and combined with similar information in Clause 4 to further simplify the text in Clause 4.

### Introduction

In order to improve the quality of products and to work efficiently, it is important to consider past experiences and how the knowledge of those experiences is transmitted. The aim is to decrease errors (in terms of both quantity and gravity), improve working methods and decrease risks of nonconformity to specified objectives (management, technical, quality, costs and schedules).

In the process of lessons learned, future space projects or programmes are intended to draw benefit from past experience, by capturing and communicating knowledge from the past through recording, classifying and making the information available.

An efficient processing of lessons learned is considered essential for:

- ongoing efficiency and quality improvement inside any organization;
- successful project management.

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# Space systems — Experience gained in space projects (lessons learned) — Principles and guidelines

#### 1 Scope

This document outlines lessons learned principles and guidelines that are applicable in all space project activities (management, technical, quality, cost and schedule).

The application of this document is intended to be included in the supplier quality management system, but can be tailored in individual contracts as agreed by the customer and supplier, depending on:

- the content of each project (size, technological level and novelty, particular organization, participants, etc.);
- the interest and usefulness of the related information.

The lessons learned information can result from any situation which might be encountered in similar contexts for future projects, i.e.:

- undesirable experiences that need to be avoided;
- strategies, rules, principles of design, validation, tests and operations that proved to be successful or necessary.
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This document neither endorses nor recommends the transmission of company proprietary information to external entities as part of a lessons learned process.

Implementing a formal lessons learned process as outlined in this document makes it possible to capture and benefit from this information.

The lessons learned activity is an important contribution to the processing of the preventive and corrective actions specified in ISO 9001 and ISO 17666.

This document also provides lessons learned processes and suggested lessons learned forms.

#### 2 Normative references

There are no normative references in this document.

#### 3 Terms and definitions

No terms and definitions are listed in this document.

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at <u>http://www.iso.org/obp</u>

#### 4 The role of a lessons learned activity

#### 4.1 Role

The role of a lessons learned activity is to ensure that projects benefit from the experiences – good and bad – of previous projects. The main activities involved in the process are:

- a) to identify and collect relevant information;
- b) to analyse information, classify lessons learned and issue recommendations;
- c) to document the process;
- d) to make information available.

The outputs of the activity are:

- root event background;
- lessons learned;
- recommendations.

The steps involved in the lessons learned process are described in detail in <u>Clause 6</u>.

# 4.2 Information availability h STANDARD PREVIEW

Information should be made available, as necessary, by referring to a collection of data and by consulting a shared database. External provision of data should be in accordance with agreements between the customer and supplier. This database should include any information considered by the participants to be useful for ongoing or future project activities. ISO 16192:2017

https://standards.iteh.ai/catalog/standards/sist/d0d7afed-e513-4e51-be00-The database should be searchable by domain.ctype.of/project2.period and type of anomaly.

Information may also be made available by means of more "active" ways of knowledge transfer, such as a debriefing or presentation of lessons learned to interested personnel (e.g. within the company) or the presentation of lessons learned to relevant project teams (e.g. within the company).

#### 5 Lessons learned management

#### 5.1 The main applications of the lessons learned

Lessons learned should be systematically applied in the following situations:

a) before the start of a space project;

EXAMPLE Information about costs and duration, technical performance and quality of previous projects are made available to a new project.

b) transition from one phase to another phase;

EXAMPLE The lesson learned during phase B (definition phase) or phase C (development phase) is that a qualification of an advanced technology is followed by specific inspection during manufacturing.

c) when the results from one project could benefit another coexisting project;

EXAMPLE The lessons learned from analysis of a component in a given project is directly beneficial to another project.

d) when the knowledge of one field can benefit another.

EXAMPLE The lessons learned from analysis of defects or failures during integration and test results in improvement of the specifications of a contract.

#### 5.2 Information sources for the lessons learned

The search for useful information is an essential step to developing lessons learned.

Suggested sources of useful information include the following:

- opinions of specialists and experts;
- documented conclusions of specialists and experts;
- technical reports, actions and recommendations resulting from reviews;
- non-conformance reports;
- failure analysis reports;
- assessments of success in meeting project objectives (at the end of a project);
- documented results of operation of models of space engineering, or results of space mission, or both;
- feedback from customers;
- alerts;
- accidents, mishaps, incidents and close calls; and PREVIEW
- risk assessments.

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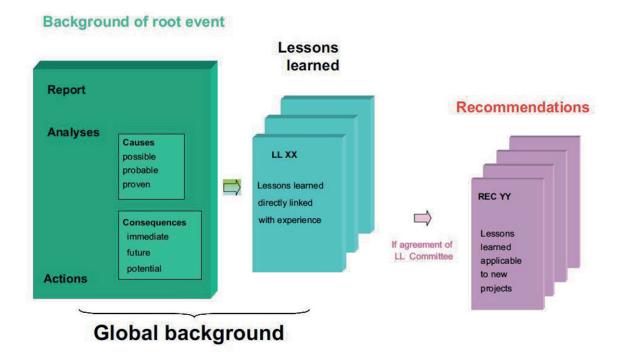
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6 The lessons learned process distribution of the standards of the standar 23f461d7f992/iso-16192-2017

#### 6.1 General

The lessons learned process is depicted in Figure 1. It comprises three phases with related outputs:

- the **background** of the experience, in which the following are described in detail: a)
  - the report of the fact;
  - the analyses which comprise the identification of the causes (possible, probable and proven) and the consequences (immediate, future and potential);
  - the resulting actions;
- b) **lessons learned**, which are lessons drawn from the experience;
- c) **recommendations** which are applicable to new projects (impact on documentation, impact on product).



## Figure 1 – Lessons learned process iTeh STANDARD PREVIEW (standards.iteh.ai)

#### 6.2 Process steps

The lessons learned process is optimized by implementing a common methodology of definition, classification, description and registration.

https://standards.iteh.ai/catalog/standards/sist/d0d7afed-e513-4e51-be00-

The three phases in the process each comprise one of more steps! These steps are depicted in Figure 2 and described in 6.3.1 to 6.3.7.

It should be noted that, whilst the process in <u>Figure 2</u> is shown as a simple sequence, only steps 3 to 5 describe a totally sequential flow. Steps 1 and 2 are performed continuously throughout the life of a project and will trigger the steps that follow. Step 6 is event triggered, and step 7 is scheduled or periodic.

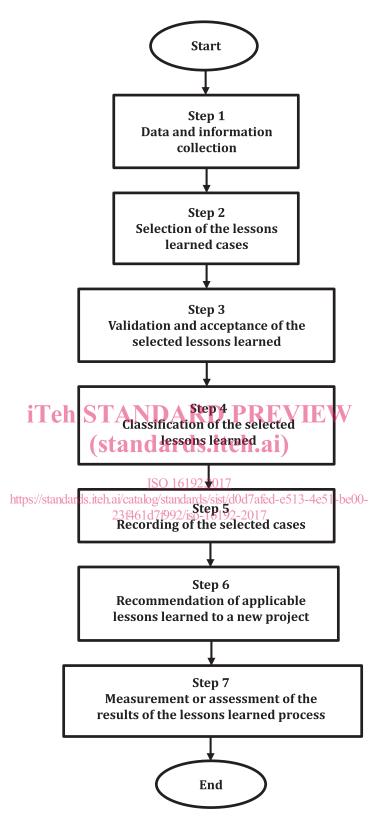


Figure 2 — Steps of lessons learned process