Host (on behalf of ASD):

ADS is the Premier Trade Organisation for companies in the UK Aerospace, Defence, Security and Space Sectors.

Technical Publication Quality Assurance System Based on S1000D

Name of presenter: Zhang Ruyi

Rank/title of presenter: Senior Engineer

Company/organization: China Aero-Polytechnology Establishment (CAPE)

S1000D User Forum, London *October 14-16, 2019*

Agenda

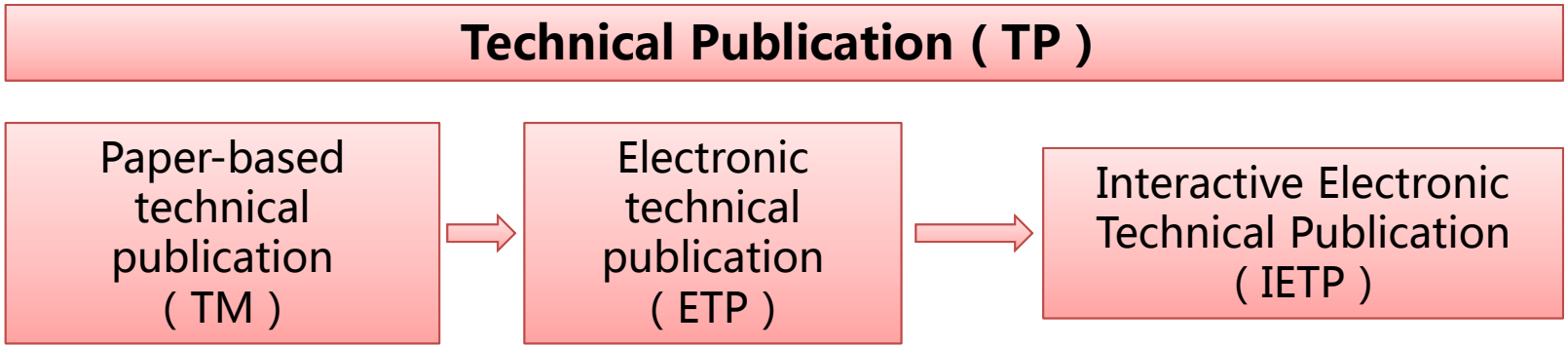
1. Requirements for technical publications
2. Literature Review: S1000D requirements for technical publication quality assurance
3. Design of Technical Publication Quality Assurance (TPQA) System Based on S1000D
4. Conclusions

1. Requirements for technical publications

(1)What is technical publication?

During the product lifecycle, the contractor delivers to the user to ensure the technical information required for product operation and maintenance. It is the data center and important element for product support.

The final output for technical publication can be: paper technical publication, electronic technical publication and interactive electronic technical publication(IETP).IETP is a kind of technical publication with modular content and strong interactivity.



1. Requirements for technical publications

(2) Why technical publication is important?

Technical publications are the basis for the use and maintenance of products. They provide standardized operational requirements, prevent the subjective randomness of maintenance personnel, ensure the safety of personnel and equipment, and improve the efficiency of use and maintenance.

A good technical publication can:

✓ assist the crew efficiently complete tasks and improve operational support efficiency.

✓provide optimal operating procedures in emergency.

✓be used as a data hub for product support to provide basic data.

And a bad technical publication can:

- Directly affect personnel and equipment safety.
- Directly affect operational support efficiency.

1. Requirements for technical publications

(3) What are the requirements for technical publication?

Technical publication is a special product, so it need to be viewed from the perspective of product development.

1. Requirements for technical publications

(3) What are the requirements for technical publication? **(Cont'd)**

Specifically, the requirements for source data, process, and final product are as follows:

a) Source Data

- ✓ Source data should be correct.
- ✓ Technical publication should conform with source data.

b) Process

- ✓ There should be technical publication creation and management processes.
- ✓ The actual work should conform to the process.
- ✓ Records show that the actual work conforms to the process.

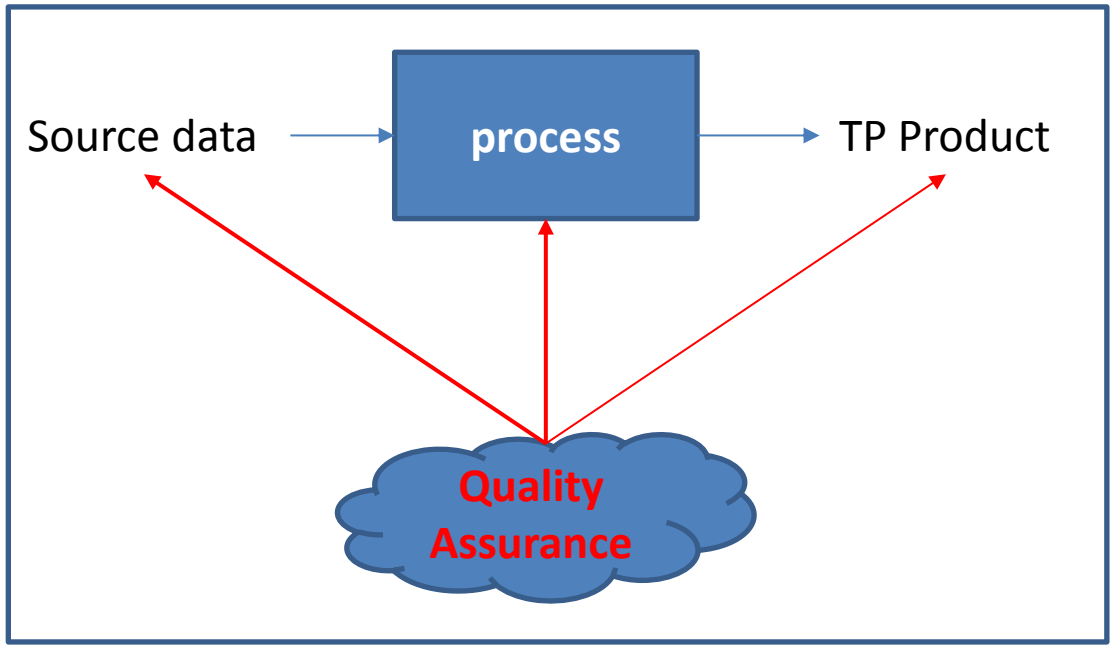
c) TP Product

- ✓ TP product should comply with the requirements of contracts, agreements and applicable standards & specifications.
- ✓ TP product should complete, accurate, operational.
- ✓ TP product should meet user's needs.

1. Requirements for technical publications

(4) How to realize these requirements?

To control the source data, process and final technical publication products with **Quality Assurance Activities**!



2. Literature Review: S1000D requirements for technical publication

(1)What is quality assurance?

- ✓According to ISO 9000, Quality Assurance(QA) can be defined as "part of quality management focused on providing confidence that quality requirements will be fulfilled.“
- ✓"all the planned and systematic activities implemented within the quality system that can be demonstrated to provide confidence that a product or service will fulfill requirements for quality.“
- ✓The purpose of QA is to ensure that the product or service can meet the required quality requirements.

2. Literature Review: S1000D requirements for technical publication

(2)What is QA of data modules/technical publications?

"The QA of data modules/technical publications is the collection of checking activities that are carried out to ensure that the contents are fit for purpose and technically accurate. These checking activities can vary, especially for aerospace systems between civil and military programs."

(originated from S1000D issue 4.2)

	In-process review(IPR)	First verification(Validation)	Second verification
initiated by	customer/user	contractor	customer/user
purpose	−to give guidance to the contractor −to ensure that the data modules/technical publications are in accordance with the contract and the applicable specifications.	− the correct data modules/technical publications − fit for purpose − adequately describe the Product − technically accurate − safe to use by the customer	To demonstrate that the technical information is adequate to permit the efficient and safe use of the Product
method		Table Top On Object	

2. Literature Review: S1000D requirements for technical publication

(2)What is QA of data modules/technical publications? **(Cont'd)**

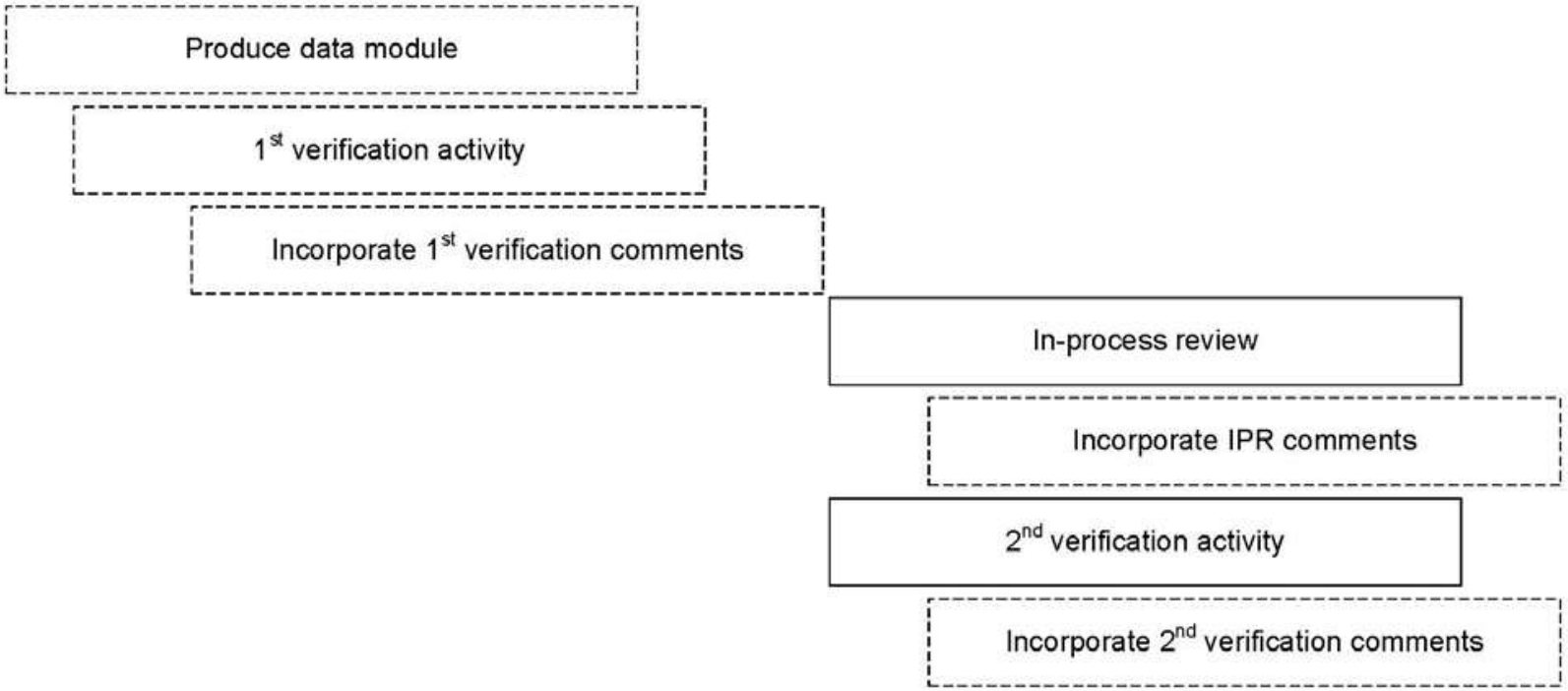
"The QA of data modules/technical publications is the collection of checking activities that are carried out to ensure that the contents are fit for purpose and technically accurate. These checking activities can vary, especially for aerospace systems between civil and military programs."

(originated from S1000D issue 4.2)

	First QA review - Civil	First verification - Civil and military
initiated by	contractor/contractor's QA organization	contractor
purpose	adequately and accurately complies with the requirements set by the rules of the project or organization and the applicable specifications.	– the correct data modules/technical publications – fit for purpose – adequately describe the Product – technically accurate – safe to use by the customer
method		Table Top On Object

2. Literature Review: S1000D requirements for technical publication

(3)Technical publication quality assurance process



originated from S1000D issue 4.2

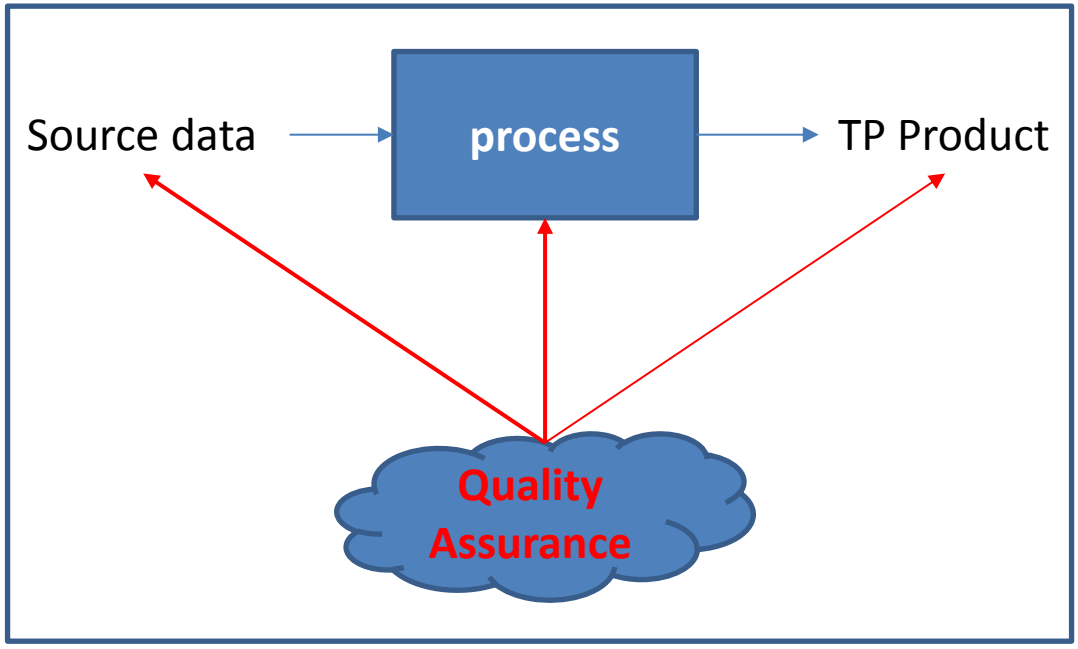
3. Design of TPQA System Based on S1000D

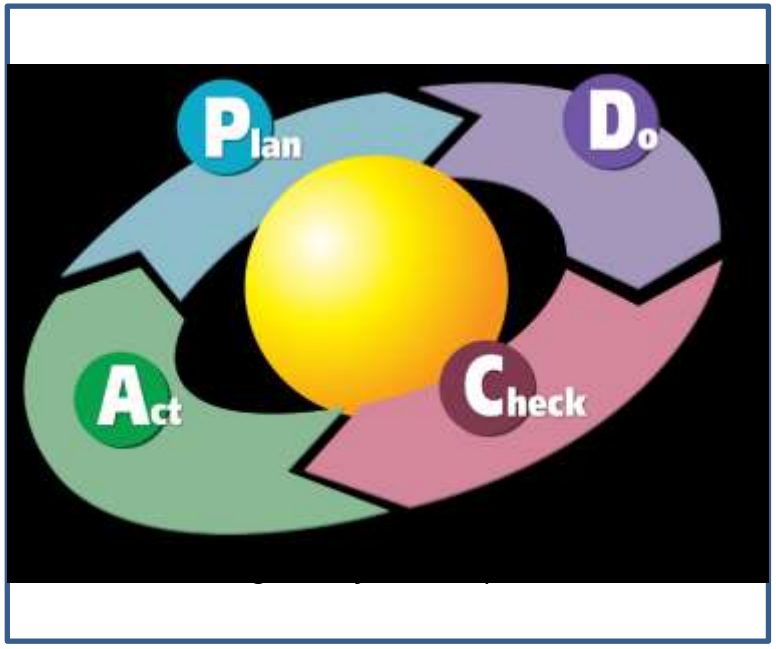
- With the development of technical publications, it is necessary to perform quality assurance activities, such as: review, validation, verification, etc.
- In the process of quality assurance, multiple quality assurance activities may be performed for the same technical content at different stages with various methods, which increases the complexity of management and traceability of quality assurance data.
- How to manage the data and track the status of the deficiencies found in quality assurance activities is a complicated issue.
- Therefore, it is necessary to establish a quality assurance system for technical publication to manage the planning, implementation and deficiency data in the whole process of technical publication quality assurance.

3. Design of TPQA System Based on S1000D

System concept

Based on the PDCA concept, we aim to improve the quality of technical publication continuously through quality control of technical publication source data, process and final product.

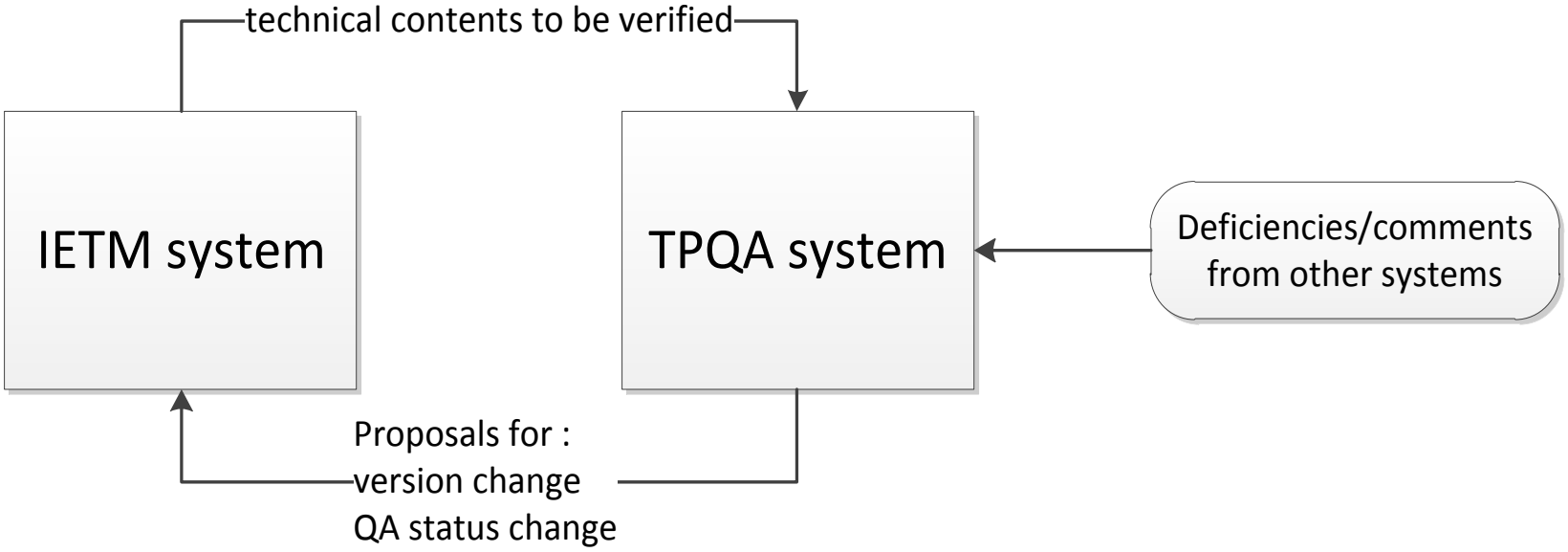




3. Design of TPQA System Based on S1000D

System concept

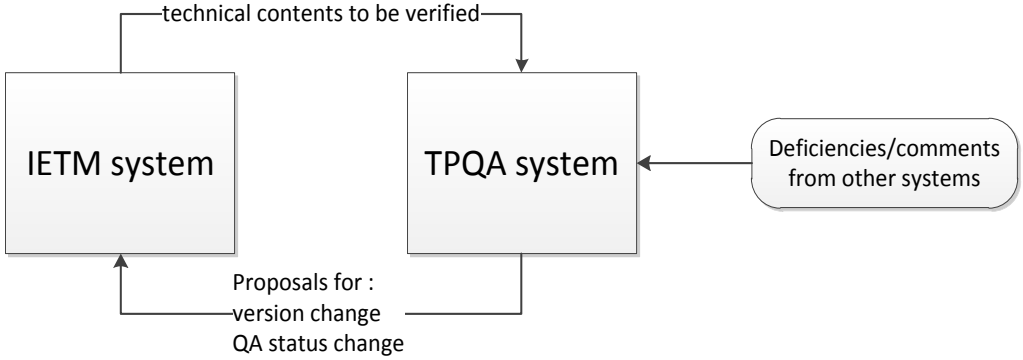
- ✓IETM system is for the creation, management, publishing and interactive browsing for technical publication data. Technical contents to be verified are generated from IETM system.
- ✓And finally IETM system can update the information in CSDB according to proposals for version and QA status change from TPQA system.



3. Design of TPQA System Based on S1000D

System concept(Cont'd)

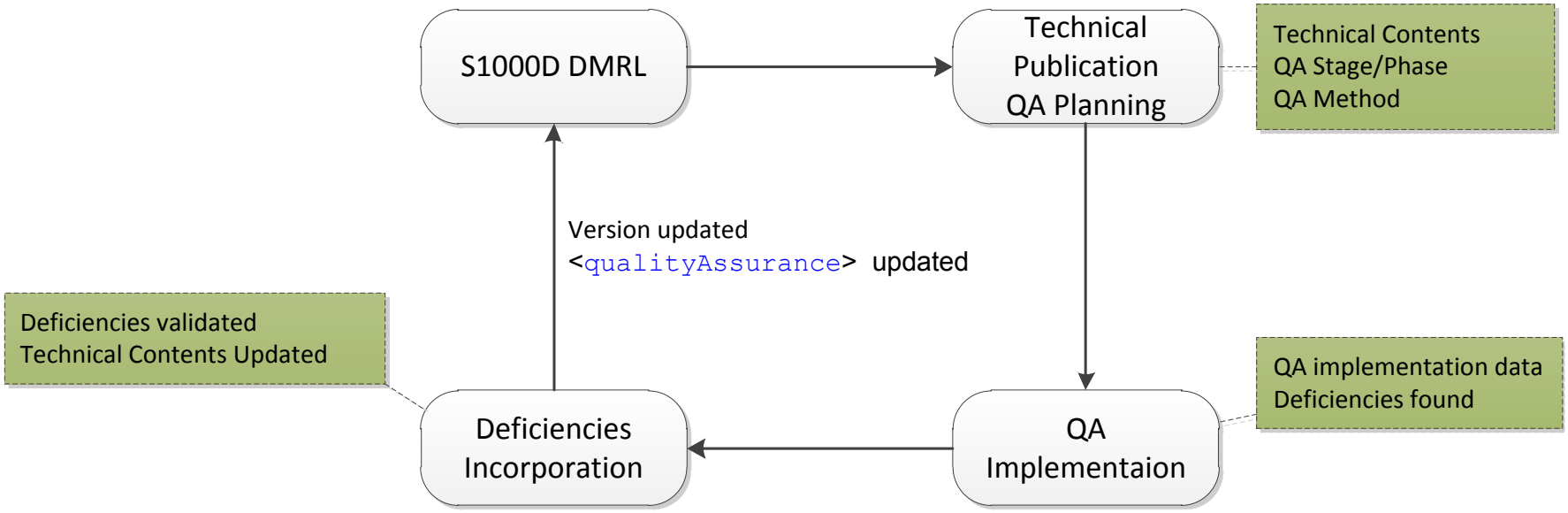
- ✓Technical publication quality assurance(TPQA) system can plan TPQA activities, generate use cases and record in-process data and deficiencies found during QA activities.
- ✓The system can also receive deficiencies and comments from other systems and act as a single source of data on the quality deficiencies of technical publications.
- ✓It can also provide suggestions for version changes and QA status changes for IETM system.



3. Design of TPQA System Based on S1000D

System Process

(1) S1000D DMRL is the basic data for technical publication QA activities. DMRL should be created and managed in IETM system. S1000D DMRL and related data(data modules and ICNs) are input for technical contents to be verified.

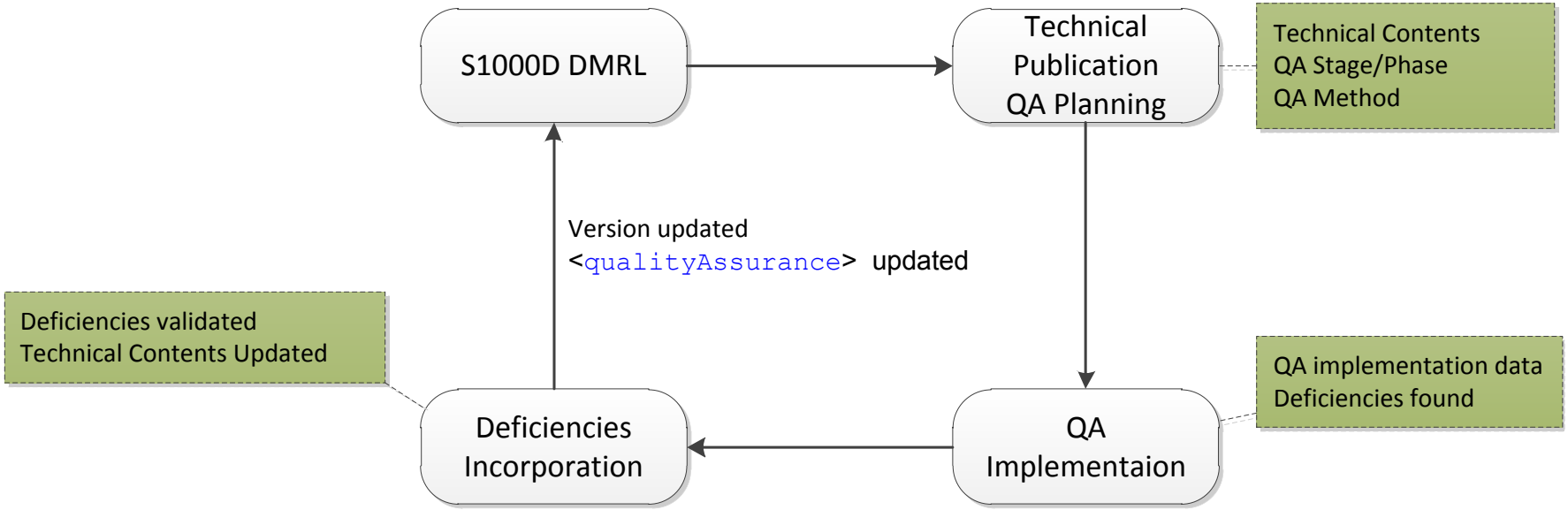


3. Design of TPQA System Based on S1000D

System Process(Cont'd)

(2) TPQA planning.

The main content for TPQA planning includes: determine the technical content to be verified(DMs, ICNs, PMs), plan QA status or timing for each technical content, specify verification method for each technical content.



3. Design of TPQA System Based on S1000D

System Process(Cont'd)

(2) TPQA planning.

Method name	Applicable scope
Table top	Contents(Table of contents, effective pages list, abbreviations, foreword, introduction) compliance with standards and specifications
	Contents(technical description, performance data, computing method, engineering drawings) compliance with source data and product configuration
	Contents that have previously verified with actual performance method

3. Design of TPQA System Based on S1000D

System Process(Cont'd)

(2) TPQA planning.

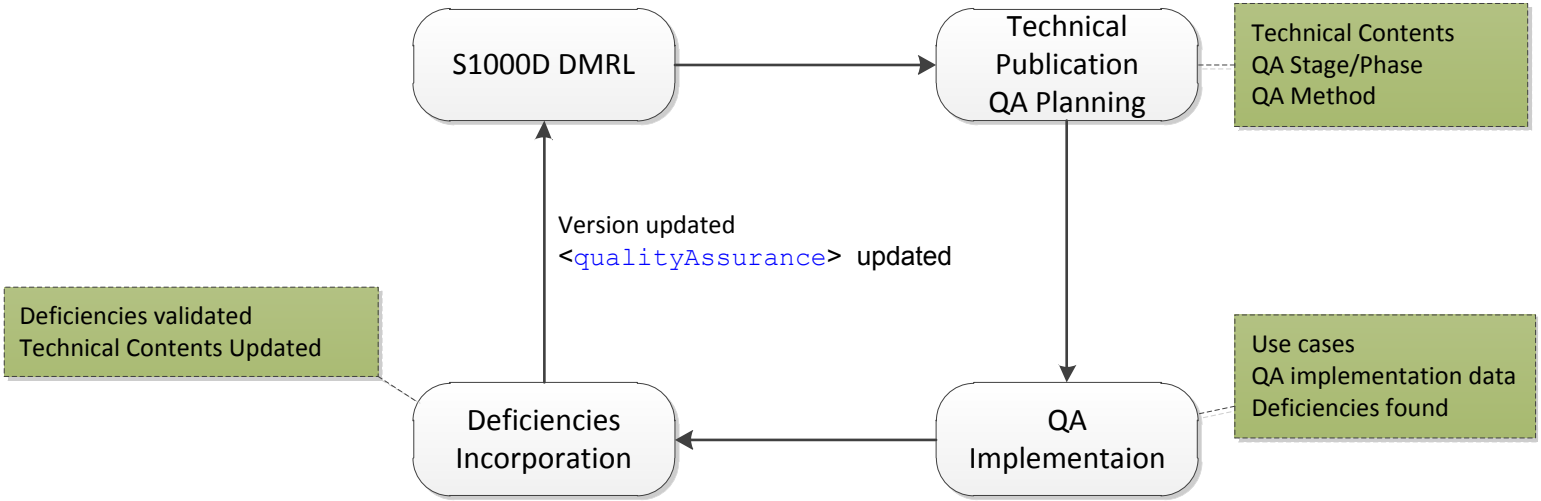
Method name	Applicable scope
On object	Contents related to flight operations procedures may be verified with flight test.
	Contents related to maintenance procedures may be verified with actual demonstration test.
	Contents related to operational procedures that may cause damage to safety or structural equipment may be verified with simulator.

3. Design of TPQA System Based on S1000D

System Process(Cont'd)

(3) TPQA implementation.

According to TPQA planning, TPQA use cases are created. A use case usually contains these information: identifier for technical content to be verified(e.g.: DMC), QA method, QA requirements, deficiencies/comments and signature.



3. Design of TPQA System Based on S1000D

System Process(Cont'd)

(3) TPQA implementation.

Use case is identified by use case code. Use case code is a unique code for QA during the lifecycle of technical publication.

DMC	QA stage code	QA method code	Serial code
DMC includes issue number and inwork number.	Eg.: IPR01,IPR02, Verification	Eg.: Table top On object	Starts from 000

3. Design of TPQA S

System Process(Cont'd)

(3) TPQA implementation.

- Basic information for technical content
- Basic information for QA activity
- QA requirements

1. Basic information for technical content

UC NO.	UC-XX-XX-XX-XXA		
DMC	XX-XX-XX-XXA	Version/DATE	
DM Title/Name	XXXX		

2. Basic information for QA activity

Location		Date	
Method	实操验证（OO）	Aircraft NO.	XX

3. QA requirements

content	requirements	result	remark
有效性	操作卡内容是否有效(与实际构型的一致性)？	□符合 □不符合 □不适用	
准备工作	区域信息是否准确、全面？	□符合 □不符合 □不适用	
	口盖信息是否准确、全面？	□符合 □不符合 □不适用	
	接近通道是否合理？	□符合 □不符合 □不适用	
	保障设备/工具、消耗品（油液、密封圈、清洗剂、除冰剂等）、备件条目和信息是否完整，是否必要，是否能够满足工作需要？	□符合 □不符合 □不适用	
	是否给出必要的前置工作？	□符合 □不符合 □不适用	
	涉及到人身、设备、飞机等存在危险隐患的工作前的警告、警示及注意信息是	□符合 □不符合	

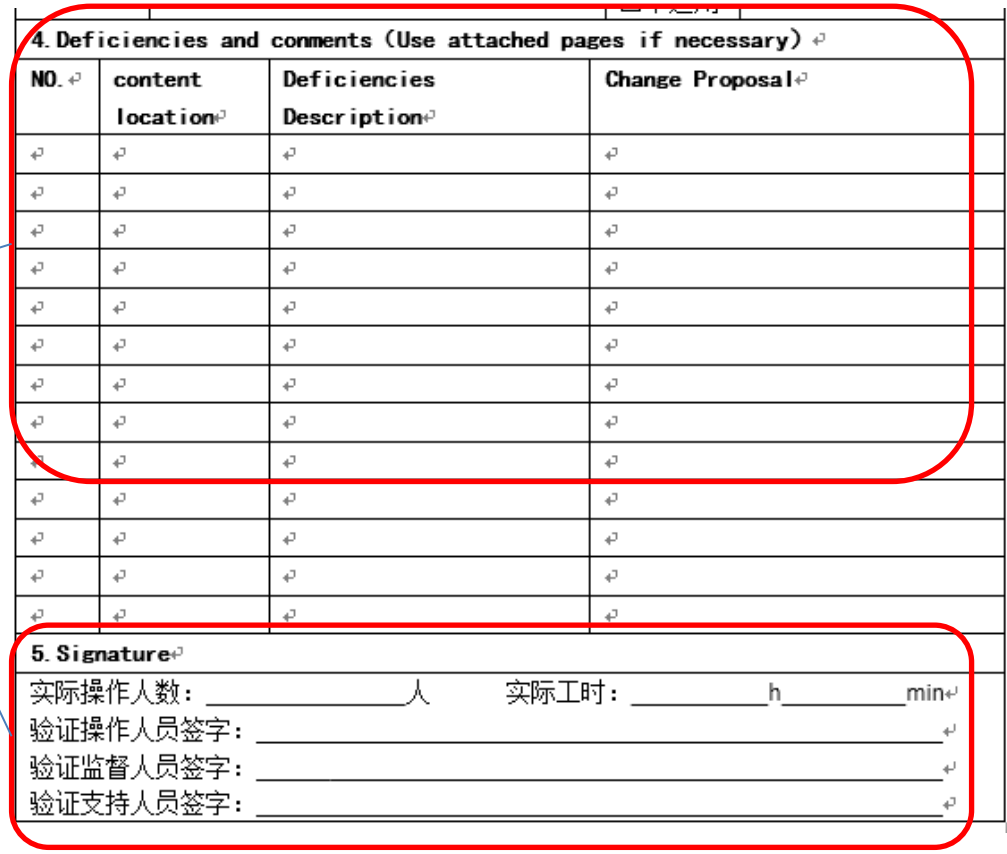
3. Design of TPQA System Based on S1000D

System Process(Cont'd)

(3) TPQA implementation.

Deficiencies and comments found by QA activity

Signature



4. Deficiencies and comments (Use attached pages if necessary)

NO.	content location	Deficiencies Description	Change Proposal

5. Signature

实际操作人数：_____人　　实际工时：_____h_____min

验证操作人员签字：_____

验证监督人员签字：_____

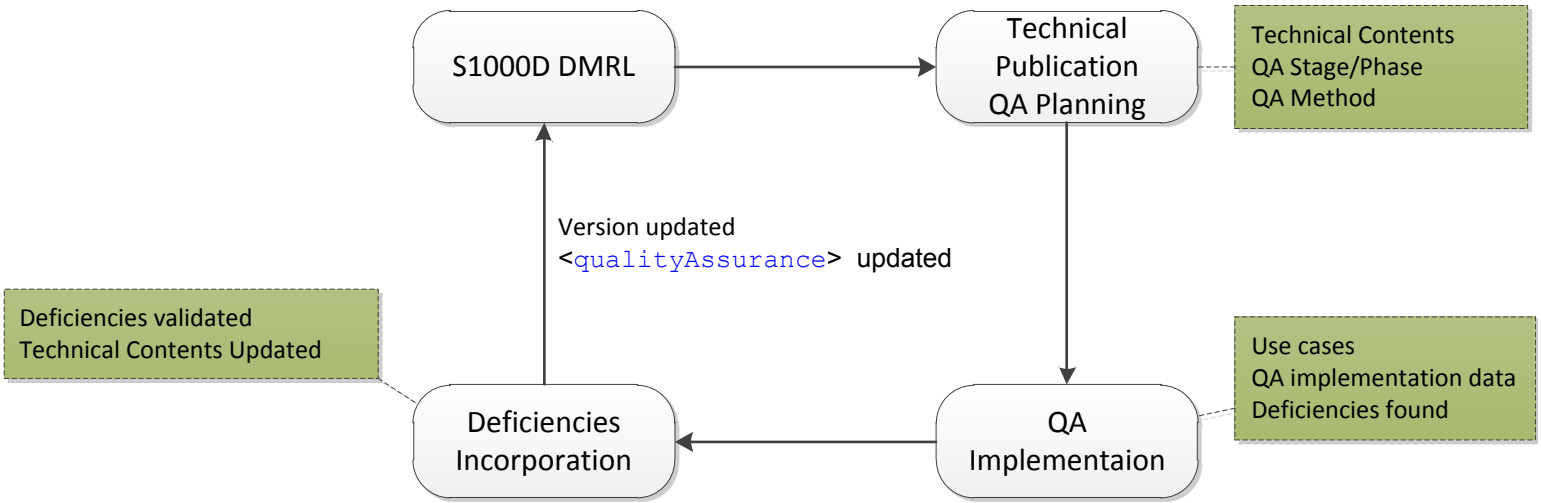
验证支持人员签字：_____

3. Design of TPQA System Based on S1000D

System Process(Cont'd)

(3) TPQA implementation.

The use cases are filled in while preforming QA activity. Determine if the contents of the technical publication meet the QA requirements in the use case and document the deficiencies and comments found during the QA process.

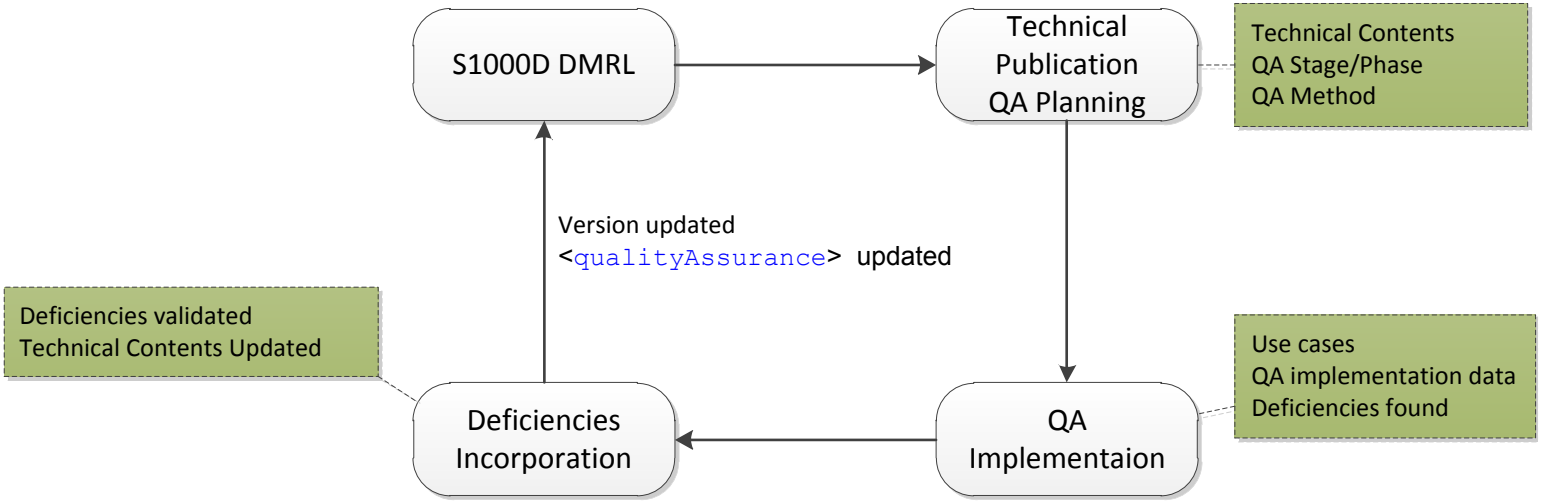


3. Design of TPQA System Based on S1000D

System Process(Cont'd)

(4) TPQA implementation.

Identify and refine non-conformities and deficiencies/comments based on information filled by use cases. These issues are evaluated to provide input and recommendations for updates to the technical publication data module. Finally, update data modules, update version and QA status of the DM in IETM system.

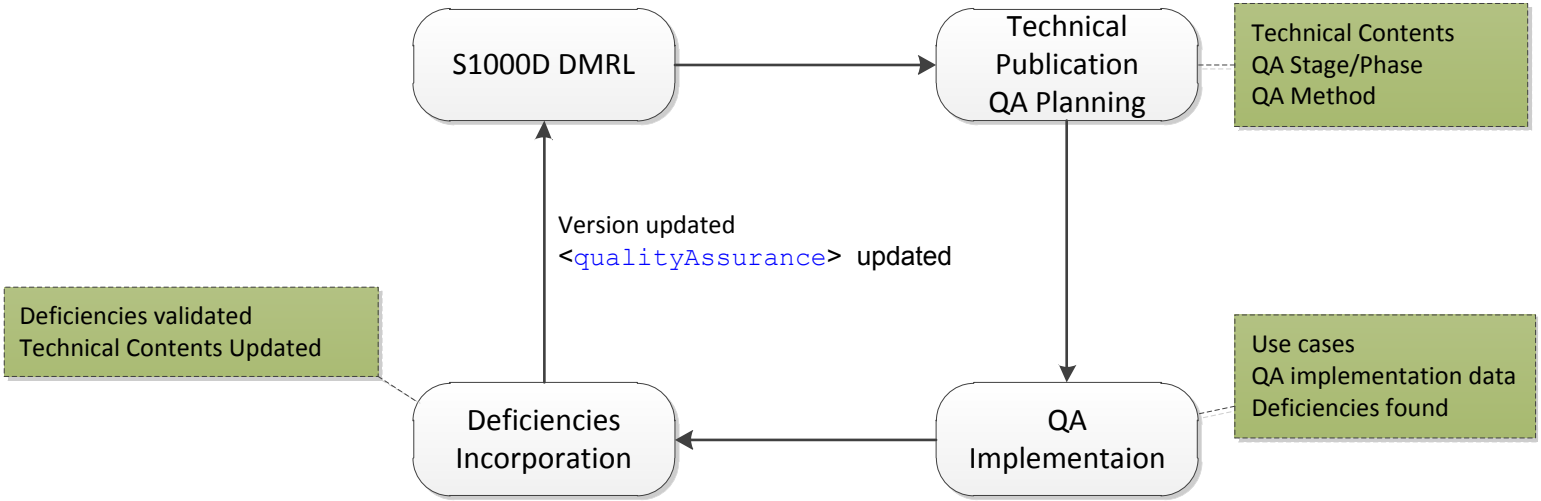


3. Design of TPQA System Based on S1000D

System Process(Cont'd)

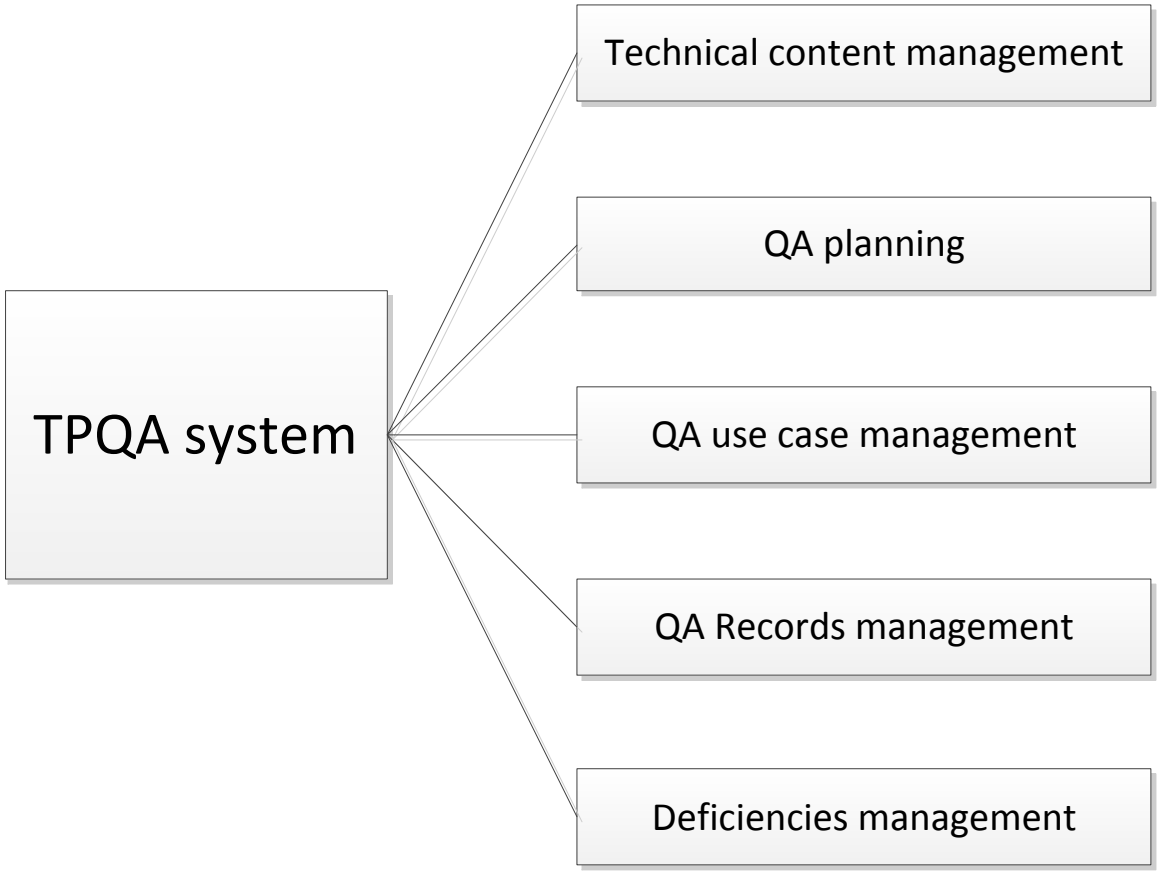
(4) TPQA implementation.

A new round of QA planning and implementation is initiated for changed DMs and new DMs to continuously improve quality of technical content .



3. Design of TPQA System Based on S1000D

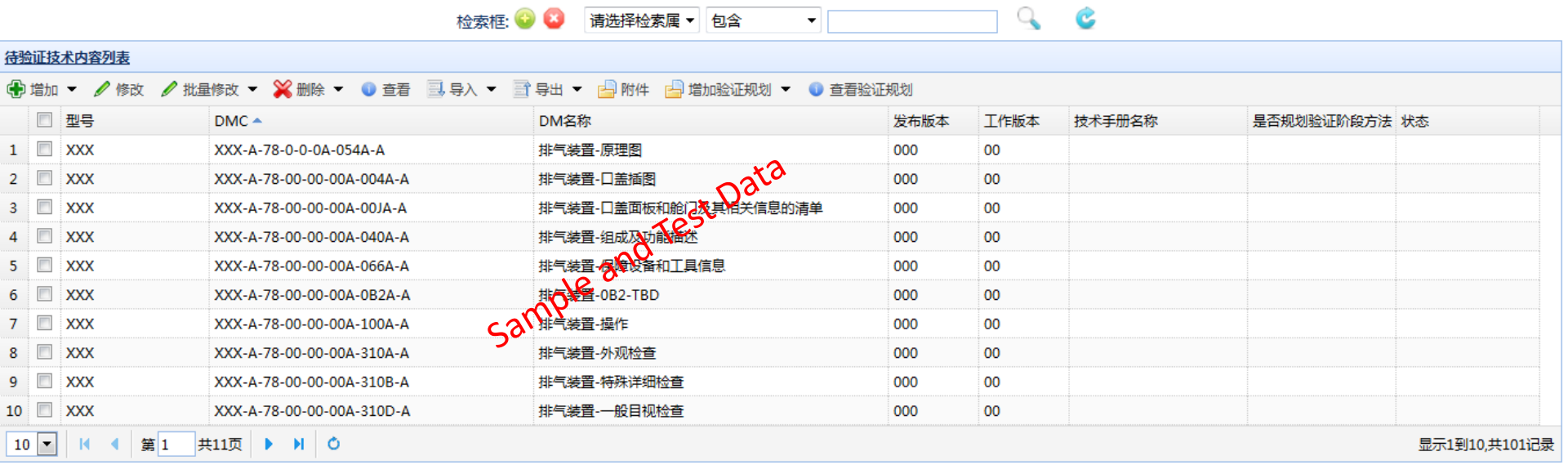
System functional Module



3. Design of TPQA System Based on S1000D

System UI pages

Main page for technical contents to be verified



		型号	DMC	DM名称	发布版本	工作版本	技术手册名称	是否规划验证阶段方法	状态
1		XXX	XXX-A-78-0-0-0A-054A-A	排气装置-原理图	000	00			
2		XXX	XXX-A-78-00-00-00A-004A-A	排气装置-口盖插图	000	00			
3		XXX	XXX-A-78-00-00-00A-00JA-A	排气装置-口盖面板和舱门及其相关信息的清单	000	00			
4		XXX	XXX-A-78-00-00-00A-040A-A	排气装置-组成及功能描述	000	00			
5		XXX	XXX-A-78-00-00-00A-066A-A	排气装置-保障设备和工具信息	000	00			
6		XXX	XXX-A-78-00-00-00A-0B2A-A	排气装置-0B2-TBD	000	00			
7		XXX	XXX-A-78-00-00-00A-100A-A	排气装置-操作	000	00			
8		XXX	XXX-A-78-00-00-00A-310A-A	排气装置-外观检查	000	00			
9		XXX	XXX-A-78-00-00-00A-310B-A	排气装置-特殊详细检查	000	00			
10		XXX	XXX-A-78-00-00-00A-310D-A	排气装置-一般目视检查	000	00			

3. Design of TPQA System Based on S1000D

System UI pages

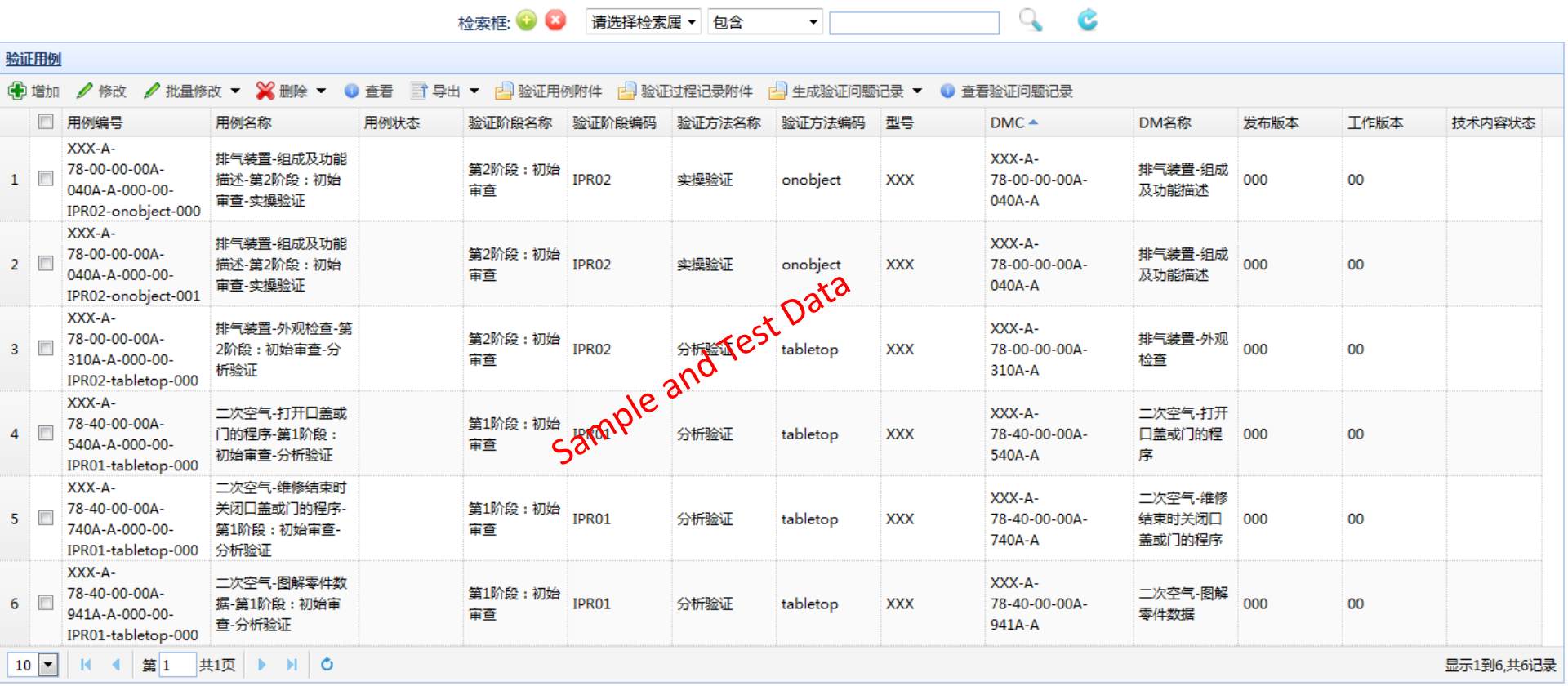
Main page for QA planning

		型号	DMC	DM名称	发布版本	工作版本	验证阶段名称	验证阶段编码	验证方法名称	验证方法编码	是否创建用	状态
1		XXX	XXX-A-78-00-00-00A-040A-A	排气装置-组成及功能描述	000	00	第2阶段：初始审查	IPR02	实操验证	onobject		
2		XXX	XXX-A-78-00-00-00A-066A-A	排气装置-保障设备和工具信息	000	00	第2阶段：初始审查	IPR02	实操验证	onobject		
3		XXX	XXX-A-78-00-00-00A-0B2A-A	排气装置-0B2-TBD	000	00	第2阶段：初始审查	IPR02	实操验证	onobject		
4		XXX	XXX-A-78-00-00-00A-100A-A	排气装置-操作	000	00	第2阶段：初始审查	IPR02	实操验证	onobject		
5		XXX	XXX-A-78-00-00-00A-310A-A	排气装置-外观检查	000	00	第2阶段：初始审查	IPR02	实操验证	onobject		
6		XXX	XXX-A-78-00-00-00A-310A-A	排气装置-外观检查	000	00	第2阶段：初始审查	IPR02	分析验证	tabletop		
7		XXX	XXX-A-78-00-00-00A-310B-A	排气装置-特殊详细检查	000	00	第2阶段：初始审查	IPR02	实操验证	onobject		
8		XXX	XXX-A-78-40-00-00A-540A-A	二次空气-打开口盖或门的程序	000	00	第1阶段：初始审查	IPR01	分析验证	tabletop		
9		XXX	XXX-A-78-40-00-00A-740A-A	二次空气-维修结束时关闭口盖或门的程序	000	00	第1阶段：初始审查	IPR01	分析验证	tabletop		
10		XXX	XXX-A-78-40-00-00A-941A-A	二次空气-图解零件数据	000	00	第1阶段：初始审查	IPR01	分析验证	tabletop		

3. Design of TPQA System Based on S1000D

System UI pages

Main page for QA use case management



	用例编号	用例名称	用例状态	验证阶段名称	验证阶段编码	验证方法名称	验证方法编码	型号	DMC	DM名称	发布版本	工作版本	技术内容状态
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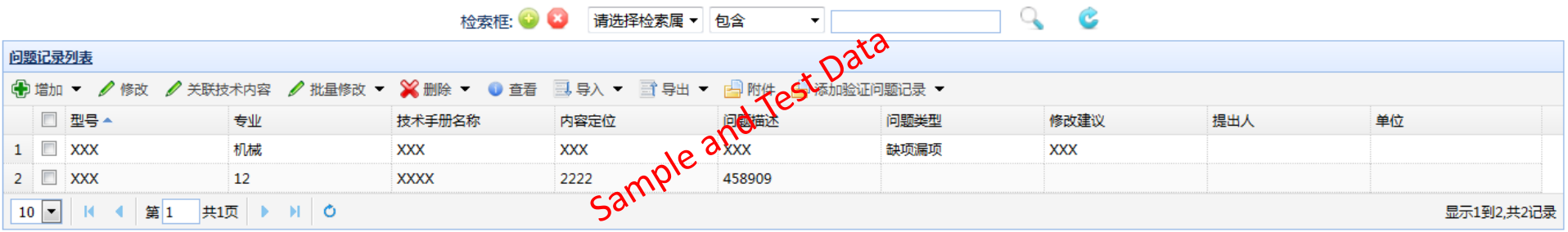
2	XXX-A-78-00-00-00A-040A-A-000-00-IPR02-onobject-001	排气装置-组成及功能描述-第2阶段：初始审查-实操验证		第2阶段：初始审查	IPR02	实操验证	onobject	XXX	XXX-A-78-00-00-00A-040A-A	排气装置-组成及功能描述	000	00	
3	XXX-A-78-00-00-00A-310A-A-000-00-IPR02-tabletop-000	排气装置-外观检查-第2阶段：初始审查-分析验证		第2阶段：初始审查	IPR02	分析验证	tabletop	XXX	XXX-A-78-00-00-00A-310A-A	排气装置-外观检查	000	00	
4	XXX-A-78-40-00-00A-540A-A-000-00-IPR01-tabletop-000	二次空气-打开口盖或门的程序-第1阶段：初始审查-分析验证		第1阶段：初始审查	IPR01	分析验证	tabletop	XXX	XXX-A-78-40-00-00A-540A-A	二次空气-打开口盖或门的程序	000	00	
5	XXX-A-78-40-00-00A-740A-A-000-00-IPR01-tabletop-000	二次空气-维修结束时关闭口盖或门的程序-第1阶段：初始审查-分析验证		第1阶段：初始审查	IPR01	分析验证	tabletop	XXX	XXX-A-78-40-00-00A-740A-A	二次空气-维修结束时关闭口盖或门的程序	000	00	
6	XXX-A-78-40-00-00A-941A-A-000-00-IPR01-tabletop-000	二次空气-图解零件数据-第1阶段：初始审查-分析验证		第1阶段：初始审查	IPR01	分析验证	tabletop	XXX	XXX-A-78-40-00-00A-941A-A	二次空气-图解零件数据	000	00	

3. Design of TPQA System Based on S1000D

System UI pages

Main page for QA deficiencies management



4. Conclusions

- ✓This presentation introduced a kind of Technical Publication Quality Assurance System based on S1000D. The system can manage the planning, implementation and deficiency data in the whole process of technical publication quality assurance.
- ✓The system can integrate with IETM system to establish a kind of deficiencies/change-driven mechanism for continuous improvement of technical publication.
- ✓The system can help provide confidence and proof of quality of technical publication for all parties, such as: customers, government agencies, regulators, certifiers, and third parties.

Thank you

for your attention!

Questions?

Zhang Ruyi

- Senior Engineer
- China Aero-Polytechnology Establishment (CAPE)
- E-mail: jixiezhangruyi@126.com