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INTERNATIONAL STANDARD

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Standard for automatic test markup language (ATML) test configuration

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STANDARD FOR AUTOMATIC TEST MARKUP LANGUAGE (ATML) INSTRUMENT DESCRIPTION

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IEEE Standard for Automatic Test Markup Language (ATML) Test Configuration

Sponsor

IEEE Standards Coordinating Committee 20 on Test and Diagnosis for Electronic Systems

Approved 27 March 2014

IEEE-SA Standards Board

Abstract: An exchange format is specified in this standard, using extensible markup language (XML), for identifying the test configuration used to test for and diagnose faults of a unit under test (UUT) on an automatic test system (ATS).

Keywords: ATML instance document, automatic test equipment (ATE), Automatic Test Markup Language (ATML), automatic test system (ATS), IEEE 1671.4™, Master Configuration Control Document (MCCD), Master Test Program Set Index (MTPSI), station configuration file, test configuration, XML schema

IEEE Introduction

This introduction is not part of IEEE Std 1671.4™-2014, IEEE Standard for Automatic Test Markup Language (ATML) Test Configuration.

This child, or "dot" standard, also known as an automatic test markup language (ATML) component standard, provides for the definition of the *TestConfiguration* XML schema and contains references to an example. The XML schema and example that accompany this standard provide for the identification of all of the hardware, software, and documentation that is required to test and diagnose a unit under test (UUT) on an automatic test system (ATS).

ATML's XML schemas define the basic information required within any test application and provide a vehicle for formally defining the test environment by defining a class hierarchy corresponding to these basic information entities and providing several methods within each to enable basic operations to be performed on these entities. ATML component standards within the ATML framework define the particular requirements within the test environment.

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Standard for Automatic Test Markup Language (ATML) Test Configuration

1. Overview

1.1 General

Automatic test markup language (ATML) is a collection of IEEE standards and associated eXtensible markup language (XML) schemas that allow automatic test system (ATS) and test information to be exchanged in a common format adhering to the XML standard[1].

The ATML framework and the ATML family of standards have been developed and are maintained under the guidance of the Test Information Integration (TII) Subcommittee of IEEE Standards Coordinating Committee 20 (SCC20) to serve as a comprehensive environment for integrating design data, test strategies, test requirements, test procedures, test results management, and test system implementations, while allowing test program (TP), test asset interoperability, and unit under test (UUT) data to be interchanged between heterogeneous systems.

This standard (as well as the XML schema and XML instance document example[2] that accompany this standard) is intended to be used in documenting the test configuration utilized during the testing of a

[1] This information is given for the convenience of users of this standard and does not constitute an endorsement by the IEEE of this consortium standard. Equivalent standards or products may be used if they can be shown to lead to the same results.
[2] The XML schemas and examples that accompany this standard are available at the locations defined in Clause 6.

particular UUT. This information includes information regarding the tested UUT, the test equipment, and the test program set (TPS).

1.2 Application of this document's annexes

This document includes three annexes.

Annex A, Annex B, and Annex C are informative, thus they are provided strictly as information, for users, implementers, and maintainers of this document.

1.3 Scope

This standard defines an exchange format, utilizing XML, for identifying all of the hardware, software, and documentation that is needed to test and diagnose a UUT on an ATS.

1.4 Application

This standard provides for the identification of all necessary assets required to test a particular UUT. Assets consist of, but are not limited to, test stations, instrumentation, interface cables, interface devices, ancillary equipment, test station software, test program software, and test program documentation. This collection of assets is the test configuration for that particular UUT.

Identifying a test configuration provides for the generation of a single "document" (also sometimes referred to as an "index card") in which every asset that is required to be in place prior to testing the UUT is recorded. This document is readable by both humans and machines; humans may use the document to identify and assemble the necessary assets, whereas the machine may use the document to verify that the necessary assets are in place.

The information contained in the XML documents conforming to this standard will be useful to the following:

a) TPS developers

b) TPS maintainers

c) Automatic test equipment (ATE) system developers

d) ATE system maintainers

e) Developers of ATML-based tools and systems

f) UUT developers and maintainers

1.5 Conventions used within this document

1.5.1 General

In accordance with *IEEE Standards Style Manual* [B9][3], any schema examples will be shown in `Courier` font. In cases where instance document examples are necessary to clearly depict the use of a schema type or element, such examples will also be shown in `Courier` font. When the characters "..." appear in an example, it indicates that the example component is incomplete.

All simple types, complex types, attribute groups, and elements will be listed. Explanatory information will be provided along with examples if additional clarification is needed. The explanatory information will include information on the intended use of the elements and/or attributes where the name of the entity does not clearly indicate its intended use. Only attributes that extend the source type will be listed for elements derived from another source type (e.g., an abstract type). Details regarding the base type will be listed along with the base type.

When referring an attribute of an XML element, the convention of [*element]@[attribute*] will be used. In cases where an attribute name is referred to with no associated element, the attribute name will be enclosed in single quotes. Element and type names will always be set in italics when appearing in text.

This standard uses the vocabulary and definitions of relevant IEEE standards. In case of conflict of definitions, except for those portions quoted from standards, the following precedence shall be observed: 1) Clause 3 and 2) The *IEEE Standards Dictionary Online* [B8].

1.5.2 Precedence

The *TestConfiguration* schema (TestConfiguration.xsd) element, child element, and annotation information shall take precedence over the descriptive information contained in Clause 4.

1.5.3 Word usage

In accordance with *the IEEE Standards Style Manual* [B9], the word *shall* is used to indicate mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals *is required to*). The use of the word *must* is used only to describe unavoidable situations. The use of the word *will* is only used in statements of fact.

The word *should* is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others (*should* equals *is recommended that*).

The word *may* is used to indicate a course of action permissible within the limits of the standard (*may* equals *is permitted to*).

The word *can* is used for statements of possibility and capability (*can* equals *is able to*).

[3] The numbers in brackets correspond to those of the bibliography in Annex C.

2. Normative references

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IEEE Std 1671™-2010, IEEE Standard for Automatic Test Equipment Markup Language (ATML) for Exchanging Automatic Test Equipment and Test Information via XML.[4,5]

3. Definitions, acronyms, and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* [B8][6] should be consulted for terms not defined in this clause. In the event a term is explicitly redefined, or defined in more detail, in an ATML component standard, the component standards definition shall be normative for that ATML component standard.

automatic test equipment (ATE): An integrated assembly of stimulus, measurement, and switching components under computer-control that is capable of processing software routines designed specifically to test a particular item or group of items. ATE software includes operating system software, test executive software, and instrument control software.[7]

automatic test system (ATS): A fully-integrated, computer-controlled suite of electronic test equipment hardware, software, documentation, and ancillary items designed to verify the functionality of unit under test (UUT) assemblies at any level of maintenance. An ATS combines the following three elements: ATE, TPS, and the test environment.[7]

child or "dot" standard: An IEEE standard that is identified by a number (e.g., 1671), a dot, then a number. (e.g. dot 1 refers to 1671.1; dot 2 refers to 1671.2, etc.)

digital rights management: Access control technologies that may be utilized to impose limitations on the usage of digital content material that were not foreseen by the content provider. Within the context of automatic test markup language (ATML), the digital content materials are the associated XML schemas and the content provider is IEEE.

eXtensible Markup Language (XML) style sheet: A description of how an XML document is to be presented on a computer screen or in print.

system identifier: A reference intended to identify an element of an automatic test system (ATS) (e.g., the system identifier DMM identifies a digital multi-meter in an ATS)

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test executive: A software application which controls the execution environment of unit under test (UUT) programs. Typical functions include (but are not limited to), the verification of hardware/software availability, interpretation and execution of operators commands, the initialization and control of tests, providing common subprograms for test software usage, providing debug and simulation capabilities, the logging of test data, and the allocation of virtual resources.

test program set (TPS): automatic test equipment (ATE), interface hardware, test program software, documentation, and other ancillary equipment that connects the unit under test (UUT) to the ATE. The TPS software performs fault isolation and diagnostics, and can certify a UUT as ready for issue. Ancillary hardware consists of probes, holding fixtures and peculiar instrumentation. [7]

3.2 Acronyms and abbreviations

AHAF	air hose attachment fixture
ARB	arbitrary waveform generator
ATE	automatic test equipment
ATML	Automatic Test Markup Language
ATS	automatic test system
CA	cable
CFA	cognizant field activity
CHG #	change number
CSET	cable set
DCPS	direct current power supply
DMM	digital multi-meter
ETE	end to end
FSCM	federal supply code for manufacturers
FST	fleet support team
GPO	Government Printing Office
HA	hose assembly
HF	holding fixture
ID	interface device
ITP	internal test program
ITP/SW	internal test program software
MCCD	master configuration control document

MIM	maintenance instruction manual
MTPSI	master test program set index
NAMP	Naval Aviation Maintenance Program
NOMEN	nomenclature
ODSK	optical disk
OFP	operational flight program
OFP/SW	operational flight program software
OS	operating system
OTPH	operational test program hardware
OTPI	operational test program instruction
OTPM	operational test program media
PG	page
PIN	product identification number
PLT	pallet
P/N	part number
PNL	panel
POC	point of contact
PROG	program
REFDES	reference designator
RFI	ready for issue
R/T	run-time
SCC20	Standards Coordinating Committee 20
SE	support equipment
SW NO	software number
T/E	test executive
TEC	type equipment code
TECPUB	technical publication
TF	test fixture

TII	Test Information Integration
TM	technical manual
TP	test program
TPI	test program instruction
TPM	test program medium
TPS	test program set
TWP	temporary workaround procedure
UIC	unit identification code
UNK	unknown
UUT	unit under test
W3C®[8]	World Wide Web Consortium
WUC	work unit code
XML	eXtensible Markup Language

4. TestConfiguration schema

4.1 Background

Should the reader not have a general understanding of XML schemas, there are several XML schema tutorials available for reference. The XML Schema Part 0: Primer [B13], the XML Schema Tutorial [B14], and the XML Schema Tutorial, Part 1 [B15] are three tutorials available on the World Wide Web. These tutorials will help with the understanding of the contents of the TestConfiguration.xsd schema defined in Clause 4.

In addition to the conventions specified in 1.5.1, the prefix “c:” represents that the element is defined by the Common.xsd XML schema defined in IEEE Std 1671-2010[9]. The IEEE Std 1671-2010 schema is inherited by the TestConfiguration.xsd XML schema.

4.2 Test configuration.xsd

attributeFormDefault: **unqualified**
elementFormDefault: **qualified**
targetNamespace: **urn:IEEE-1671.4:2014:TestConfiguration**

[8] W3C is a trademark or registered trademark of the W3C®, (registered in numerous countries) World Wide Web Consortium. Marks of W3C are registered and held by its host institutions: Massachusetts Institute of Technology (MIT), European Research Consortium for Information and Mathematics (ERCIM), and Keio University, Japan.
[9] Information on references can be found in Clause 2.

4.2.1 element TestConfiguration

type	extension of tc:TestConfiguration
properties	content complex
children	tc:AncillaryEquipment tc:Extension tc:FleetSupportTeamLocation tc:SupplementalData tc:TestEquipmentAssets tc:TestProgram tc:TPSHardware tc:UnitUnderTest

attributes

Name	Type	Use	Default	Fixed	Annotation
changeDate	xs:date	optional			documentation: The date that changes were made to the Test Configuration XML instance document
changeNumber	xs:integer	optional	0		documentation: The change number of the Test Configuration XML instance document. This should initially be 0, each time the XML instance document is changed this should be incremented by 1.
title	c:NonBlankString	optional			documentation: The title of the Test Configuration XML instance document
uuid	c:Uuid	required			documentation: A universal unique identifier for the element containing this attribute.
classified	xs:boolean	optional			documentation: An indication that the element is or is not classified.
securityClassification	c:NonBlankString	optional			documentation: A use-case determined string declaring the security classification level of the element containing this attribute and the subordinate branch of the XML document.

annotation	documentation TestConfiguration schema encompasses all information necessary to identify the hardware, software and documentation that may be necessary in order to test and diagnose a Unit Under Test (UUT) on a test station. A given UUT may have multiple TestConfiguration XML instance documents. The attributes "changeNumber" should initially be 0, and should be incremented by 1 each time the XML instance document is changed, "changeDate" should reflect the date the XML instance document was changed. The “title” is equivalent to the US Navy Master Test Program Set Index (MTPSI) deck number less the version number, or the title of the UK Master Configuration Control Document (MCCD), and represents the title of the TestConfiguration XML instance document.

4.2.2 complexType AncillaryHardwareAssets

children	tc:AncillaryHardwareItem
used by	element TestConfiguration/AncillaryEquipment
annotation	documentation Identifies each of the ancillary hardware items (e.g., assets) required to test the UUT. Each ancillary hardware item (excluding common tools) should include a description, the quantity, and the part number. This shall be repeated for each ancillary hardware item.

4.2.3 element AncillaryHardwareAssets/AncillaryHardwareItem

properties	minOcc 1 maxOcc unbounded content complex					
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	c:NonBlankString	required			documentation Description of the equipment Example: "Oscilloscope" and "Manual Lift"
	partNumber	c:NonBlankString	required			documentation The part number of the equipment. If more than one part number exists the verbiage "or equivalent" may be appended (Example: ACME1183A or equivalent)
	quantity	xs:integer	required			documentation How many of this item is required to test the UUT.
annotation	documentation Identifies a particular ancillary hardware item (e.g., asset) required to test the UUT. The “part number” represents the P/N of the asset, the “quantity” should indicate how many of the assets are required (the default is 1), and the “name” should be a descriptive name of the asset. This shall be repeated for each ancillary hardware item.					

4.2.4 complexType ATEAssets

children	tc:SystemIdentifier
used by	element TestConfiguration/TestEquipmentAssets
annotation	documentation Identifies the ATE system identifier (e.g., DMM, ARB, etc.) for each of the station assets that will be used by the TPS.

4.2.5 element ATEAssets/SystemIdentifier

properties	minOcc 1 maxOcc unbounded content complex					
attributes	Name	Type	Use	Default	Fixed	Annotation
	systemID	c:NonBlankString	required			documentation The system identifier for the particular asset (example: DMM)
annotation	documentation Identifies a particular ATE system identifier (DMM, etc.) representative of the ATE station asset. System identifier acronyms are typically unique to each ATE, thus each system identifier acronym should match that of the particular ATE that will be used to test the UUT.					

4.2.6 complexType ATEVersion

children	tc:ATEConfiguration tc:ATEFamily tc:MinimumConfiguration
used by	elements ConfigurationTestProgramElements/EndToEndRunTimes/EndToEndRunTime/ATEVersion ConfigurationTestProgramElements/ATEVersions
annotation	documentation Identifies the ATE versions known to run the TPS

4.2.7 element ATEVersion/ATEConfiguration

type	c:NonBlankString		
properties	minOcc 0 maxOcc unbounded content simple		
facets	Kind	Value	Annotation
	minLength	1	
	whiteSpace	replace	
annotation	documentation The configuration of the ATE family known to run the TPS. For example, "CASS Block III" or "RTCASS".		

4.2.8 element ATEVersion/ATEFamily

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The ATE family known to run the TPS. For example, "CASS" or "IFTE".

4.2.9 element ATEVersion/MinimumConfiguration

type	c:NonBlankString
properties	minOcc 0 maxOcc unbounded content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The minimum station configuration required to run the TPS. For example, "CASS HPDTS" would indicate that the TPS can only run on a CASS HPDTS configured station.

4.2.10 complexType ConfigurationSoftwareReference

used by	elements ConfigurationUUTElements/SoftwarePrograms/InternalTestProgram ConfigurationUUTElements/SoftwarePrograms/OperationalFlightProgram ConfigurationUUTElements/SoftwarePrograms/SoftwareNumber
attributes	Name Type Use Default Fixed Annotation partNumber c:NonBlankString optional documentation The part number of the software. version c:NonBlankString optional documentation The version number of the software
annotation	documentation Base type for all TestConfiguration software elements.

4.2.11 complexType ConfigurationTestProgramElements

children	tc:AdapterRequired tc:ATERunTimeSoftware tc:ATEVersions tc:EndToEndRunTimes tc:Extension tc:OperationalDataNote tc:OperationalTestProgram tc:RunTimeClassifications tc:TemporaryWorkaroundProcedures tc:TestDiagram tc:TestProgramSoftware tc:TestProgramType tc:FederalSupplyCode tc:UnitIdentificationCode
used by	element TestConfiguration/TestProgram/TestProgramElements
annotation	documentation Base type for Test Configuration elements related to the test program such as run-time, security classification, what operational software the test program will execute with, etc.

4.2.12 element ConfigurationTestProgramElements/AdapterRequired

type	xs:boolean
properties	minOcc 0 maxOcc 1 content simple
annotation	documentation Identifies if an interface device (ID) (also known as an adapter or test adapter) is required. The Boolean "false" indicates that no adapter is required. The Boolean "true" indicates that an ID is required. Should this element not be specified, it shall be assumed that no ID is required.

4.2.13 element ConfigurationTestProgramElements/ATERunTimeSoftware

properties	content complex
children	tc:OperatingSystems tc:RunTimeApplicationSoftware
annotation	documentation The ATE Software responsible for the execution of the TPS (operating system and test executive).

4.2.14 element ConfigurationTestProgramElements/ATERunTimeSoftware/OperatingSystems

properties	minOcc 1 maxOcc unbounded content complex
children	tc:OperatingSystem
attributes	Name: revision; Type: c:NonBlankString; Use: optional; Default: ; Fixed: ; Annotation: documentation: The revision or service pack number of the operating system. Example "SP2" (for service pack 2) Name: version; Type: c:NonBlankString; Use: optional; Default: ; Fixed: ; Annotation: documentation: The version number of the operating system. Example "7" (for Windows 7)
annotation	documentation The operating system (OS) used during the last update of the test program. If more than on version of OS applies (due to multiple configurations of stations e.g., ATE Version 1, ATE Version 2), than all applicable OS's may be listed. Examples are 'UNIX[10]', 'Windows 7 SP2[11]' and "Open VMS 6.2[12]"

[10] UNIX is a registered trademark of The Open Group.
[11] Windows is a registered trademark of Microsoft Corporation.
[12] OpenVMS is a registered trademark of Hewlett-Packard Development Company, L.P.

4.2.15 element ConfigurationTestProgramElements/ATERunTimeSoftware/OperatingSystems/OperatingSystem

type	c:NonBlankString
properties	content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation Identification of the operating system. Examples are "Windows" and "UNIX"

4.2.16 element ConfigurationTestProgramElements/ATERunTimeSoftware/RunTimeApplicationSoftware

properties	minOcc 1 maxOcc unbounded content complex
children	tc:ApplicationSoftware
attributes	Name Type Use Default Fixed Annotation relativeSpeed xs:integer 0 documentation: An indication of the relative speed of the run-time application (e.g., test executive) that the TPS has been verified with. The integer representations are as follows: No speed indication = 0, The TPS has been verified to run on the target ATE test execution environment = 1, The TPS has been verified to run only on earlier (typically slower) test execution environments = 3 version c:NonBlankString documentation: The version number of the application software
annotation	documentation The application software program and version used during the last update of the test program. If more than one version of application software applies (due to multiple configurations of stations e.g., ATE Version 1, ATE Version 2), then all applicable application software programs may be listed.

4.2.17 element ConfigurationTestProgramElements/ATERunTimeSoftware/RunTimeApplicationSoftware/ApplicationSoftware

type	c:NonBlankString
properties	content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation Identification of the application software program. Examples are "VECP-1-008" and "LabWindows"

4.2.18 element ConfigurationTestProgramElements/ATEVersions

type	tc:ATEVersion
properties	content complex
children	tc:ATEConfiguration tc:ATEFamily tc:MinimumConfiguration
annotation	documentation The versions of ATE known to run the TPS.

4.2.19 element ConfigurationTestProgramElements/EndToEndRunTimes

properties	minOcc 0 maxOcc 1 content complex
children	tc:EndToEndRunTime
annotation	documentation The time required for an experienced operator, beginning at the start menu to run a UUT to the end of testing (e.g., the RFI message appears). TPS directed test setup time is typically included, but tear down time typically is not included. If the ETE run time is unknown, 'UNK' should be identified.

4.2.20 element ConfigurationTestProgramElements/EndToEndRunTimes/EndToEndRunTime

properties	minOcc 1 maxOcc unbounded content complex
children	tc:RunTime
annotation	documentation The end-to-end (ETE) run time(s). If the TPS can be executed on more than one ATE version, an ETE run time should be included for each ATE version.

4.2.21 element ConfigurationTestProgramElements/ EndToEndRunTimes/EndToEndRunTime/RunTime

type	xs:time
properties	content simple
annotation	documentation The end-to-end (ETE) run time.

4.2.22 element ConfigurationTestProgramElements/EndToEndRunTimes/EndToEndRunTime/ATEVersion

type	tc:ATEVersion
properties	minOcc 0 maxOcc 1 content complex
children	tc:ATEConfiguration tc:ATEFamily tc:MinimumConfiguration
annotation	documentation The ATE Version associated with this specific end-to-end run time

4.2.23 element ConfigurationTestProgramElements/Extension

type	c:Extension
properties	minOcc 0 maxOcc 1 content complex
annotation	documentation The Extension type shall be used only as the base type of extension elements in XML schema. Such elements are provided to permit implementers to extend a XML schema as required to meet the unique needs of their use case. Use follows the W3C standard XML extension mechanism.

4.2.24 element ConfigurationTestProgramElements/OperationalDataNote

type	c:Document
properties	minOcc 0 maxOcc 1 content complex
children	c:URL c:Text c:Extension
attributes	Name / Type / Use / Default / Fixed / Annotation uuid / c:Uuid / required / documentation: The universal unique identifier for the document. name / c:NonBlankString / required / documentation: A descriptive or common name for the document controlNumber / c:NonBlankString / optional / documentation: A unique identifier for the document. version / c:NonBlankString / optional / documentation: The version identification of the document.
annotation	documentation Miscellaneous information about running the TPS.

4.2.25 element ConfigurationTestProgramElements/OperationalTestProgram

properties	minOcc 0 maxOcc 1 content complex
children	tc:OTPINumber tc:OTPMNumber
annotation	documentation Identification of the operational test program (OTP) instructions and media.

4.2.26 element ConfigurationTestProgramElements/OperationalTestProgram/OTPINumber

type	c:NonBlankString
properties	content simple
facets	Kind / Value / Annotation minLength 1 whiteSpace replace
annotation	documentation The operational test program instruction (OTPI) number.

4.2.27 element ConfigurationTestProgramElements/OperationalTestProgram/OTPMNumber

type	c:NonBlankString
properties	content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The operational test program media (OTPM) identification number.

4.2.28 element ConfigurationTestProgramElements/RunTimeClassifications

properties	minOcc 0 maxOcc 1 content complex
children	tc:RunTimeClassification
annotation	documentation The run-time classification of the TPS.

4.2.29 element ConfigurationTestProgramElements/RunTimeClassifications/RunTimeClassification

type	tc:ClassificationCode
properties	content simple
facets	Kind Value Annotation enumeration U enumeration C enumeration S enumeration TS
annotation	documentation Either (U) Unclassified, (C) Confidential, (S) Secret or (TS) Top Secret. Should this not be identified, it should be assumed that the TPS is (U) Unclassified.

4.2.30 element ConfigurationTestProgramElements/TemporaryWorkaroundProcedures

properties	minOcc 0 maxOcc 1 content complex
children	tc:TWPDescription tc:TWPIssueDate tc:TWPNumber
annotation	documentation The technical workaround procedure (TWP) number, description and issue date of any active TWP against the TPS. TWP's are notification of a workaround for a TPS execution problem. If there are no active TWP's for a particular TPS, this element should not be included.

4.2.31 element ConfigurationTestProgramElements/TemporaryWorkaroundProcedures/TWPDescription

type	c:NonBlankString
properties	content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation A textual description of the TWP.

4.2.32 element ConfigurationTestProgramElements/TemporaryWorkaroundProcedures/TWPIssueDate

type	xs:date
properties	content simple
annotation	documentation The date the TWP was issued.

4.2.33 element ConfigurationTestProgramElements/TemporaryWorkaroundProcedures/TWPNumber

type	xs:integer
properties	content simple
annotation	documentation The number of the TWP.

4.2.34 element ConfigurationTestProgramElements/TestDiagram

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The test diagram number when the test diagram is not included as part of the test program instructions (TPI), or TPI related material.

4.2.35 element ConfigurationTestProgramElements/TestProgramSoftware

properties	content complex
children	tc:DirectoryName tc:TestProgamInstruction tc:TestProgramMedium tc:TestProgramName
annotation	documentation Identification of the test program name, location, media, and instructions.

4.2.36 element ConfigurationTestProgramElements/TestProgramSoftware/DirectoryName

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The test program directory name or test program root subdirectory.

4.2.37 element ConfigurationTestProgramElements/TestProgramSoftware/TestProgramInstruction

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The test program instruction (TPI) identification number.

4.2.38 element ConfigurationTestProgramElements/TestProgramSoftware/TestProgramMedium

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The test program media (TPM) identification number.

4.2.39 element ConfigurationTestProgramElements/TestProgramSoftware/TestProgramName

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The name of the test program used to test the UUT.

4.2.40 element ConfigurationTestProgramElements/TestProgramType

type	tc:TestProgramTypes
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation enumeration UUT enumeration Self-Test enumeration Calibration
annotation	documentation The distinct type of TPS; either “UUT”, “Self-Test”, or “Calibration”. If the test program type is not identified, it should be assumed that this is a UUT TPS.

4.2.41 element ConfigurationTestProgramElements/FederalSupplyCode

type	c:NonBlankString
properties	content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The commercial industries TPS developers (or maintainers) federal supply code for manufacturers (FSCM).

4.2.42 element ConfigurationTestProgramElements/UnitIdentificationCode

type	c:NonBlankString
properties	content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The US governments TPS developers (or maintainers) unit identification code (UIC).

4.2.43 complexType ConfigurationUUTElements

children	tc:DiagnosticFlowChart tc:Extension tc:Model tc:Nomenclature tc:PartNumber tc:ReferenceDesignator tc:SoftwarePrograms tc:SystemNumber tc:TechnicalManuals tc:TypeEquipmentCode tc:WorkUnitCode
used by	element TestConfiguration/UnitUnderTest/UUTElements
annotation	documentation Base type for Test Configuration elements related to the UUT such as model, nomenclatures (NOMEN), part number, type equipment codes (TEC), work unit codes (WUC), UUT software -operational flight program (OFP), internal test program (ITP), and technical manuals (TM)s.

4.2.44 element ConfigurationUUTElements/DiagnosticFlowChart

type	c:Document
properties	minOcc 0 maxOcc unbounded content complex
children	c:URL c:Text c:Extension
attributes	Name / Type / Use / Default / Fixed / Annotation uuid / c:Uuid / required / documentation: The universal unique identifier for the document. name / c:NonBlankString / required / documentation: A descriptive or common name for the document controlNumber / c:NonBlankString / optional / documentation: A unique identifier for the document. version / c:NonBlankString / optional / documentation: The version identification of the document.
annotation	documentation The diagnostic flow chart for the UUT.

4.2.45 element ConfigurationUUTElements/Extension

type	c:Extension
properties	minOcc 0 maxOcc 1 content complex
annotation	documentation The Extension type shall be used only as the base type of extension elements in XML schema. Such elements are provided to permit implementers to extend a XML schema as required to meet the unique needs of their use case. Use follows the W3C standard XML extension mechanism.

4.2.46 element ConfigurationUUTElements/Model

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind / Value / Annotation minLength / 1 whiteSpace / replace
annotation	documentation The model number of the UUT.

4.2.47 element ConfigurationUUTElements/Nomenclature

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The name / nomenclature (NOMEN) of the UUT.

4.2.48 element ConfigurationUUTElements/PartNumber

type	c:NonBlankString
properties	content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The part number of the UUT.

4.2.49 element ConfigurationUUTElements/ReferenceDesignator

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The reference designator (REFDES) of the UUT. Example "A10".

4.2.50 element ConfigurationUUTElements/SoftwarePrograms

properties	minOcc 0 maxOcc 1 content complex
children	tc:OperationalFlightProgram tc:InternalTestProgram tc:SoftwareNumber
annotation	documentation The executable software programs loaded into the UUT.

4.2.51 element ConfigurationUUTElements/SoftwarePrograms/OperationalFlightProgram

type	tc:ConfigurationSoftwareReference
properties	minOcc 0 maxOcc 1 content complex
attributes	Name / Type / Use / Default / Fixed / Annotation partNumber / c:NonBlankString / optional / / / documentation: The part number of the software. version / c:NonBlankString / optional / / / documentation: The version number of the software
annotation	documentation The operational flight program (OFP) software (OFP/SW) identification and version number (This may also be known as a "'Oper Flight Prog"). This software, when present, typically is required by the UUT to operate within the weapon system.

4.2.52 element ConfigurationUUTElements/SoftwarePrograms/InternalTestProgram

type	tc:ConfigurationSoftwareReference
properties	minOcc 0 maxOcc 1 content complex
attributes	Name / Type / Use / Default / Fixed / Annotation partNumber / c:NonBlankString / optional / / / documentation: The part number of the software. version / c:NonBlankString / optional / / / documentation: The version number of the software
annotation	documentation The internal test program (ITP) software (ITP/SW) identification and version number. This software when present typically overwrites the OFP for the purposes of testing the UUT.

4.2.53 element ConfigurationUUTElements/SoftwarePrograms/SoftwareNumber

type	tc:ConfigurationSoftwareReference
properties	minOcc 0 maxOcc 1 content complex
attributes	Name / Type / Use / Default / Fixed / Annotation partNumber / c:NonBlankString / optional / / / documentation: The part number of the software. version / c:NonBlankString / optional / / / documentation: The version number of the software
annotation	documentation The identification and version number for software related to the UUT, similar to the OFP/SW and ITP/SW; but software that is not an OFP or ITP loaded into the UUT.

4.2.54 element ConfigurationUUTElements/SystemNumber

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The system number of the UUT.

4.2.55 element ConfigurationUUTElements/TechnicalManuals

namespace	urn:IEEE-1671.4:2014:TestConfiguration
type	c:Document
properties	minOcc 0 maxOcc unbounded content complex
children	c:URL c:Text c:Extension
attributes	Name Type Use Default Fixed Annotation uuid c:Uuid required documentation The universal unique identifier for the document. name c:NonBlankString required documentation A descriptive or common name for the document controlNumber c:NonBlankString optional documentation A unique identifier for the document. version c:NonBlankString optional documentation The version identification of the document.
annotation	documentation The name of either the technical manual (TM), technical publication (TECPUB) or maintenance instruction manual (MIM) for the UUT.

4.2.56 element ConfigurationUUTElements/TypeEquipmentCode

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation The type equipment code (TEC) is an US military alphanumeric code that identifies the end item of equipment on which work is performed. For example, there are sixteen (16) categories of equipment, identified by the first character of the TEC. The first character for an Aircraft is 'A', the first character for a Jet Engine is 'J'. Refer to COMNAVAIRFORINST 4790.2B [B12] for a description of TEC codes.

4.2.57 element ConfigurationUUTElements/UUTDescriptionInstanceFile

type	c:NonBlankString
properties	minOcc 0 maxOcc 1 content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	Documentation The name of the UUT Description XML instance file for the UUT.

4.2.58 element ConfigurationUUTElements/WorkUnitCode

type	c:NonBlankString
properties	minOcc 0 maxOcc unbounded content simple
facets	Kind Value Annotation minLength 1 whiteSpace replace
annotation	documentation A work unit code (WUC) is a US military code that identifies the system, subsystem, or component; which is the UUT being tested. A UUT may have more than one WUC. Refer to Mil-Std-780G [B11] for a description of WUC's.

4.2.59 complexType TestConfiguration

children	tc:AncillaryEquipment tc:Extension tc:FleetSupportTeamLocation tc:SupplementalData tc:TestEquipmentAssets tc:TestProgram tc:TPSHardware tc:UnitUnderTest
used by	element TestConfiguration
annotation	documentation The Base type for all Test Configuration elements.

4.2.60 element TestConfiguration/AncillaryEquipment

type	tc:AncillaryHardwareAssets
properties	minOcc 0 maxOcc 1 content complex
children	tc:AncillaryHardwareItem
annotation	documentation Collector element for the name/nomenclatures (NOMEN) of each piece of ancillary equipment required by the TPS, but not included with the TPS. Ancillary equipment refers to any support equipment (SE), other than common shop tools. Examples of ancillary equipment are Oscilloscopes, Meg-ohmmeters, Ground Straps, and Lift Devices.

4.2.61 element TestConfiguration/Extension

type	c:Extension
properties	minOcc 0 maxOcc 1 content complex
annotation	documentation The Extension type shall be used only as the base type of extension elements in XML schema. Such elements are provided to permit implementers to extend a XML schema as required to meet the unique needs of their use case. Use follows the W3C standard XML extension mechanism.

4.2.62 element TestConfiguration/FleetSupportTeamLocation

properties	minOcc 0 maxOcc 1 content complex
children	tc:TPSSupport tc:UUTSupport tc:UUTTPSSupport
annotation	documentation The fleet support team (FST) (also referred to as a cognizant field activity or CFA) responsible for the TPS and the UUT. The location(s) should be identified, the POC should not (TPS's may transition, which would create erroneous POC information about the TPS). Either the common UUT/TPS location or the separate UUT/TPS locations should be identified.

4.2.63 element TestConfiguration/FleetSupportTeamLocation/TPSSupport

type	c:ManufacturerData
properties	content complex
children	c:Contacts c:FaxNumber c:MailingAddress c:URL
attributes	Name: name; Type: c:NonBlankString; Use: required; Default: ; Fixed: ; Annotation: documentation: A descriptive or common name for the manufacturer. Name: cageCode; Type: c:NonBlankString; Use: optional; Default: ; Fixed: ; Annotation: documentation: The commercial and government entity (CAGE) code for the company indicated by the name attribute.
annotation	documentation Identifies the FST activity responsible for the TPS when the UUT is maintained by a separate activity.

4.2.64 element TestConfiguration/FleetSupportTeamLocation/UUTSupport

type	c:ManufacturerData
properties	minOcc 0 maxOcc 1 content complex
children	c:Contacts c:FaxNumber c:MailingAddress c:URL
attributes	Name: name; Type: c:NonBlankString; Use: required; Default: ; Fixed: ; Annotation: documentation: A descriptive or common name for the manufacturer. Name: cageCode; Type: c:NonBlankString; Use: optional; Default: ; Fixed: ; Annotation: documentation: The commercial and government entity (CAGE) code for the company indicated by the name attribute.
annotation	documentation Identifies the FST activity responsible for the UUT when the TPS is maintained by a separate activity.

4.2.65 element TestConfiguration/FleetSupportTeamLocation/UUTTPSSupport

type	c:ManufacturerData
properties	content complex
children	c:Contacts c:FaxNumber c:MailingAddress c:URL
attributes	Name / Type / Use / Default / Fixed / Annotation name / c:NonBlankString / required / / / documentation: A descriptive or common name for the manufacturer. cageCode / c:NonBlankString / optional / / / documentation: The commercial and government entity (CAGE) code for the company indicated by the name attribute.
annotation	documentation Identifies the FST responsible for maintaining both the UUT and TPS in those cases where the FST is the same for both the UUT and the TPS,

4.2.66 element TestConfiguration/SupplementalData

type	c:Document
properties	minOcc 0 maxOcc 1 content complex
children	c:URL c:Text c:Extension
attributes	Name / Type / Use / Default / Fixed / Annotation uuid / c:Uuid / required / / / documentation: The universal unique identifier for the document. name / c:NonBlankString / required / / / documentation: A descriptive or common name for the document controlNumber / c:NonBlankString / optional / / / documentation: A unique identifier for the document. version / c:NonBlankString / optional / / / documentation: The version identification of the document.
annotation	documentation Identification any additional / supplemental Test Configuration data in a textual format.

4.2.67 element TestConfiguration/TestEquipmentAssets

type	tc:ATEAssets
properties	content complex
children	tc:SystemIdentifier
annotation	documentation Collector element for the list of ATE assets, represented by their acronyms that will be used during the execution of the TPS to test the UUT. Examples are 'DMM', 'ARB', UPCONV and EO. Should an ATML Test Station XML instance document exist, the acronyms can be derived from that XML instance document.

4.2.68 element TestConfiguration/TestProgram

properties	content complex
children	tc:TestProgramElements
annotation	documentation Collector element for test program and test program developer / maintainer information. This includes such things as the test program classification, directory structures, run-times, instructions, and work around procedures.

4.2.69 element TestConfiguration/TestProgram/TestProgramElements

type	tc:ConfigurationTestProgramElements
properties	minOcc 1 maxOcc unbounded content complex
children	tc:AdapterRequired tc:ATERunTimeSoftware tc:ATEVersions tc:EndToEndRunTimes tc:Extension tc:OperationalDataNote tc:OperationalTestProgram tc:RunTimeClassifications tc:TemporaryWorkaroundProcedures tc:TestDiagram tc:TestProgramSoftware tc:TestProgramType tc:FederalSupplyCode tc:UnitIdentificationCode
annotation	documentation Identifies all elements which have been identified to be related to the test program.

4.2.70 element TestConfiguration/TPSHardware

type	tc:TPSHardwareAssets
properties	content complex
children	tc:TPSHardwareItem
annotation	documentation Collector element for the TPS hardware components (including adapters, interface devices, cables, etc.) required to test the UUT, which are supplied with the TPS. Should an ATML Test Adapter XML instance document exist, the type, P/N, REFDES and quantity should be derived from that XML instance document.

4.2.71 element TestConfiguration/UnitUnderTest

properties	content complex
children	tc:UUTElements
annotation	documentation Collector element for UUT and UUT developer / maintainer information. This includes such things as UUT nomenclatures, OFP's, ITP's, and technical manuals.

4.2.72 element TestConfiguration/UnitUnderTest/UUTElements

type	tc:ConfigurationUUTElements
properties	minOcc 1 maxOcc unbounded content complex
children	tc:DiagnosticFlowChart tc:Extension tc:Model tc:Nomenclature tc:PartNumber tc:ReferenceDesignator tc:SoftwarePrograms tc:SystemNumber tc:TechnicalManuals tc:TypeEquipmentCode tc:WorkUnitCode
annotation	documentation The UUT and UUT developer / maintainer information.

4.2.73 complexType TPSHardwareAssets

children	tc:TPSHardwareItem
used by	element TestConfiguration/TPSHardware
annotation	Documentation Identifies the Type, Part Number, Reference Designator, and Quantity for each piece of "government approved support equipment (SE)" required to test the UUT. This should include a description, reference designation, quantity, and part number of a piece of support equipment (interface devices, cables, adapters, etc). This shall be repeated for each piece of support equipment required to test the UUT. Should a TestAdapter XML instance document exist for the TPS, this information could be derived from that XML instance document.

4.2.74 element TPSHardwareAssets/TPSHardwareItem

properties	minOcc 1 maxOcc unbounded content complex					
attributes	Name	Type	Use	Default	Fixed	Annotation
	partNumber	c:NonBlankString	required			documentation The part numbers of each piece of government approved support equipment required to test the UUT. This is the hardware components supplied with the TPS (adapters, interface test adapters, cables, etc.).
	quantity	xs:integer	required			documentation The quantity indicates how many assets are required.
	referenceDesignator	c:NonBlankString	optional			documentation For cables and/or shorting adapters, the TPS hardware component's REFDES number (e.g., W201, A10).
	type	c:NonBlankString	required			documentation Type is typically the acronym (example: CA=Cable, CSET=Cable Set, ID=Interface Device, TF=Test Fixture, HF=Holding Fixture, AHAF=Air Hose Attach Fixture, HA=Hose Assembly, ODSK=Optical Disk, PNL= Panel, PLT=Pallet) This is not a complete list as Acronyms can be unique to each TPS

annotation	documentation Identifies each piece of TPS hardware required to test the UUT.

4.2.75 simpleType ClassificationCode

namespace	urn:IEEE-1671.4:2014:TestConfiguration
type	restriction of **xs:string**
properties	base xs:string
used by	element ConfigurationTestProgramElements/RunTimeClassifications/RunTimeClassification
facets	Kind Value Annotation enumeration U enumeration C enumeration S enumeration TS
annotation	documentation Base type: restriction of xs:string Enumerations: U | C | S | TS This shall be used as the base type for the run-time classifications (either, unclassified, confidential, secret or top secret).

4.2.76 simpleType TestProgramTypes

namespace	urn:IEEE-1671.4:2014:TestConfiguration
type	restriction of **xs:string**
properties	base xs:string
used by	element ConfigurationTestProgramElements/TestProgramType
facets	Kind Value Annotation enumeration UUT enumeration Self-Test enumeration Calibration
annotation	documentation Base type: restriction of xs:string Enumerations: UUT | Self-Test | Calibration This shall be used as the base type for the type of test (either, unit under test, self-test or calibration).

5. TestConfiguration instance schema

The ATML *TestConfiguration* sub-domain does not include a *TestConfiguration* instance schema.

6. ATML TestConfiguration XML schema names and locations

IEEE provides a download web-site for material published in association with published IEEE Standards, presented in machine friendly format. This material is digital rights management restricted use material. The ATML family of standards utilizes this download web-site to allow easy accessibility to all of the ATML family XML schemas (and in some cases, example XML instance documents). As depicted by

Figure 1, the IEEE download web-site (http://standards.ieee.org/downloads/) contains several folders, each folder labeled by an associated IEEE standards number (e.g., IEEE 1671 series standards are in the 1671 folder). Each folder under this "base" IEEE standard number contains the material (XML schemas, etc) for that ATML family component standard. ATML family component standards are identified by their IEEE 1671 series "dot" standard number and the year in which that standard was published by the IEEE.

NOTE 1—Standards that are revised will contain a folder for the year in which the standard is "reissued." Both folders (for each year the standard was published) will be present on the IEEE download web-site.[13]

NOTE 2—Folders for a particular standard are not available until the standard is published by the IEEE and providing the standard has associated material that is to be made available via the download web-site.

Figure 1 depicts a portion of the entire IEEE download web-site, as it pertains to the Test Configuration ATML family standard.

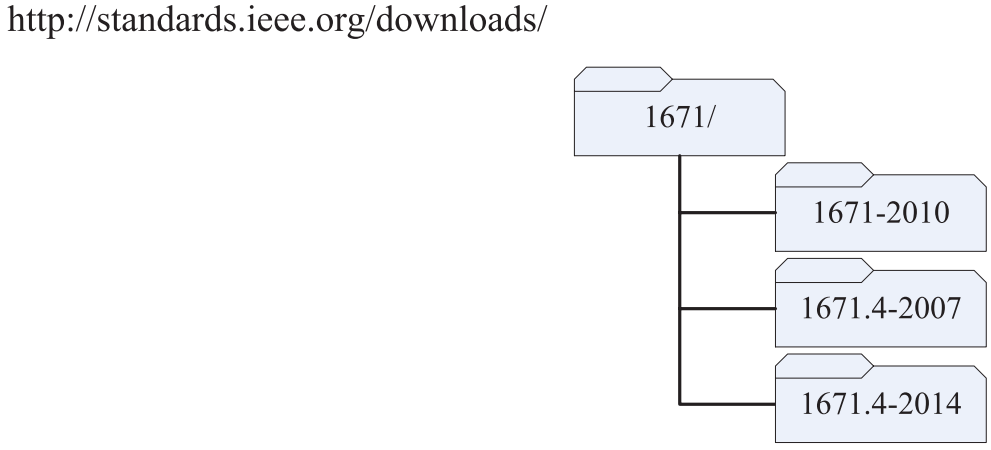

Figure 1—ATML Test Configuration related IEEE download web-site structure

The Test Configuration ATML family component standard, where the component is defined, their associated XML schemas names, and the IEEE download web-site folder name (where the XML schemas shall be located), is as defined in Table 1.

Table 1—TestConfiguration XML schema name and folder location

Component	Defined in Clause	XML schema name	IEEE download Web site folder (see Figure 1)
Test Configuration	4	TestConfiguration.xsd	1671.4-2014

The XML schema identified in Table 1 contains ATML common elements included by Test Configuration.xsd. The ATML common element (e.g., component), where the component is defined, the associated XML schemas name, and the IEEE download web-site folder name (where the XML schema shall be located), is as defined in Table 2.

[13] Notes in text, tables, and figures of a standard are given for information only and do not contain requirements needed to implement this standard.

Table 2—ATML Common element XML schema name and location

Component	Defined in IEEE Std 1671-2010	XML schema name	IEEE download Web site folder (see Figure 1)
Common	Annex B.1	Common.xsd	1671-2010

7. ATML XML schema extensibility

The provision of an extension mechanism is necessary to help ensure the viability of the specification and allow producers and consumers of Test Configuration instance documents to interoperate in those cases where there is a requirement to exchange relevant data that is not included in the *Test Configuration* associated XML schema. The use of the extensions shall be done in a way that can help ensure that a conformant consumer can utilize the extended file without error, discard or otherwise sidestep the extended data, and use the non-extended portions of the data as it is intended without error or loss of functionality.

Extensions shall be additional information added to the content model of the element being extended.

Extensions shall not repackage existing information entities that are already supported by the *Test Configuration* XML schema.

An extended instance document shall be accompanied by the extension XML schema and documentation sufficient to explain the need for the extension as well as the underlying semantics and relationship(s) to the base *Test Configuration* XML schema.

The ATML family of standards associated XML schemas allow for three forms of extension:

— Wildcard-based extensions allow for the extension of the XML schemas with additional elements.

— Type derivation allows for extending the set of data types by deriving a new type from an existing common element type.

— Lists derived from `c:NamedValues` allowing user defined properties with attached values.

8. Conformance

The minimal expectations for *TestConfiguration* conformant XML instance documents shall be that a completely populated instance document is considered valid if said document complies with:

— The constraints expressed in the *TestConfiguration* schema associated with this standard and

— Any constraints imposed by inherited elements from Annex B of IEEE Std 1671-2010.

Extensions are permitted to the *TestConfiguration* schema, but shall only occur through the facility of the extensibility mechanism described in Clause 7. In short, extensions may only appear in the specific `<extension>` tags provided in the associated XML schema. As defined in the W3C XML schema standard, an extended schema must conform to the W3C XML schema specification and shall not contain any entities defined in the base schema.

Annex A

(informative)

IEEE download web-site material associated with this document

This document includes supporting material required to maintain and/or develop the ATML framework as well as maintain the ATML family of standards. This material is published by IEEE in association with this document, presented in a machine friendly format. This is digital rights management restricted use material. The ATML family of standards utilizes this download Web site to allow easy accessibility to these documents XML schemas, and associated material referenced within this document (e.g., examples or committee drafts). For an explanation, and the location, of the IEEE download web-site and its structure (as it pertains to the ATML family of standards), see Clause 6. The material available on the IEEE download Web site in association with this document is described in Table A.1.

Table A.1—IEEE download web-site contents

File	Description
TestConfiguration.xsd	The ATML *TestConfiguration* schema defined in Clause 4.
Common.xsd	The ATML common element schema defined in Annex B of IEEE Std 1671-2010.
1671_4 Annex C Example XML instance document.xml	The XML instance document contained in Annex C (Examples).
Readme.txt	User information pertaining to the files posted, and their usage.

Annex B

(informative)

Test Configuration XML element mappings to MTPSI card fields

Table B.1 details all possible master test program set index card fields, and identifies which Test Configuration schema element(s) support the fields and the entries into those fields.

Table B.1—MTPSI mapping to Test Configuration

MTPSI field and description	Test Configuration XML schema
ADAPTER REQUIRED: An yes/no indication as to whether a adapter is required for use with the interface device (ID).	complexType: `ConfigurationTestProgramElements / AdapterRequired`
ANCILLARY EQUIPMENT DESCRIPTION: A list of the name/nomenclature of each piece of ancillary equipment required by the TPS to test the UUT. “Ancillary equipment” refers to any support equipment (SE), other than common shop tools that are not provided with the TPS. Examples of ancillary equipment are oscilloscopes, megohmmeters, ground straps, and lift devices.	complexType: `AncillaryHardwareAssets / AncillaryHardwareItem /` attribute `'name'`
ANCILLARY EQUIPMENT PART NUMBER: The part number of the identified ancillary equipment. If a part number is known to have one or more acceptable alternates, then “(or equivalent)” may be included. Example: ACME 1234 (or equivalent).	complexType: `AncillaryHardwareAssets / AncillaryHardwareItem /` attribute `'partNumber'`
ANCILLARY EQUIPMENT QUANTITY: Required quantity of each identified ancillary equipment item.	complexType: `AncillaryHardwareAssets / AncillaryHardwareItem /` attribute `'quantity'`
ATE ASSETS: List of ATE assets (e.g., DMM, ARB, DCPS) used by the TPS.	complexType: `ATEAssets / SystemIdentifier /` attribute `'systemID'`
ATE CONFIGURATION: The configuration of the ATE family known to run the TPS. For example, “CASS Block III” or “RTCASS”.	complexType: `ConfigurationTestProgramElements / ATEVersions / ATEConfiguration`
ATE FAMILY: The ATE family known to run the TPS. For example, “CASS” or “IFTE”.	complexType: `ConfigurationTestProgramElements / ATEVersions / ATEFamily`
CHG #: The change number of the master test program set index. The initial document change number should be blank or contain zeros (e.g., ‘000’). Subsequent changes to the document should increment the change number by one.	element: `TestConfiguration /` attribute `'changeNumber'`
DATE: The date the master test program set index was changed/edited/created	Element: `TestConfiguration /` attribute `'changeDate'`
DIAGNOSTIC FLOW CHARTS: The diagnostic flow charts for the UUT.	complexType: `ConfigurationUUTElements / DiagnosticFlowChart`

Table B.1—Master Test Program Set Index mapping to Test Configuration (*continued*)

MTPSI field and description	Test Configuration XML schema
ETE TIME: The end-to-end (ETE) time required for an experienced operator, beginning at the start menu to run a UUT to the end of testing (e.g., the RFI message appears). TPS directed test setup time should be included, but the tear down time should not be included. If the ETE run time is unknown, 'UNK' should be identified. If the TPS can be executed on more than one ATE version, the time should be included for each ATE version.	complexType: `ConfigurationTestProgramElements / EndToEndRunTimes / EndToEndRunTime`
FSCM: The TPS developers (or Maintainers) Federal Supply Code for Manufacturers (FSCM) (See [B3] for commercial sites.)	complexType: `ConfigurationTestProgramElements / FederalSupplyCode`
FST Location: The Fleet Support Team (FST) [may also be referred to as a Cognizant Field Activity (CFA)] location responsible for the TPS. The location should be identified, the POC should not [TPS's may transition, which would create erroneous point of contact (POC) information about the TPS].	complexType: `TestConfiguration / FleetSupportTeamLocation`
ITP SW: The internal test program (ITP) software (SW) (ITP/SW) product identification number (PIN) version number. This software when present, typically overwrites the OFP for the purposes of testing the UUT.	complexType: `ConfigurationUUTElements / SoftwarePrograms / InternalTestProgram`
MIN STATION REQUIRED: The minimum station configuration required to run the TPS. Example, "CASS CNI" would indicate that the TPS can only be run on CASS CNI stations.	complexType: `ConfigurationTestProgramElements / ATEVersions / MinimumConfiguration`
MTPSI TITLE: The MTPSI Deck Number less the version number of the deck or the MCCD title.	element: `TestConfiguration /` attribute `'title'`
OFP SW PIN: The operational flight program (OFP) software (SW) (OFP/SW) product identification number (PIN) version number (This is also sometimes called 'Oper Flight Prog').	complexType: `ConfigurationUUTElements / SoftwarePrograms / OperationalFlightProgram`
OPERATING SYSTEM: The operating system (OS) used during the last update of the test program (TP). If more than on version of OS applies (due to multiple configurations of stations e.g., ATE Version 1, ATE Version 2), than all applicable OS's may be listed.	complexType: `ConfigurationTestProgramElements / ATERunTimeSoftware / OperatingSystems / OperatingSystem`
OPER DATA NOTE: The operational data note contains miscellaneous information about running the TPS.	complexType: `ConfigurationTestProgramElements / OperationalDataNote`
OTPH PART NUMBER: Support Equipment (SE) Part Number (P/N). A list of the part numbers of each piece of "Government Approved SE" required to test the UUT. This "Government-approved SE" is the hardware components (including adapters, interface device, cables, etc.) supplied with the TPS.	complexType: `TPSHardwareAssets / TPSHardwareItem /` attribute `'partNumber'`

Table B.1—MTPSI mapping to Test Configuration (*continued*)

Legacy working description and type	XML schema
OTPH QTY: The quantity of each OTPH/SUPPORT EQUIPMENT component listed. Quantities greater than 1 are typically limited to cables and connectors.	complexType: `TPSHardwareAssets / TPSHardwareItem /` attribute `'quantity'`
OTPH REFERENCE DESIGNATOR: Support Equipment (SE) Reference Designator (REFDES) number (e.g., W201, A10 – See [B1]) for cables and/or shorting adapters. The REFDES information gives the TPS operator a quick reference when looking for the associated items, which is easier than comparing a 10- or 12-digit part number. Most technicians will use the REFDES information in everyday situations rather than part numbers.	complexType: `TPSHardwareAssets / TPSHardwareItem /` attribute `'referenceDesignator'`
OTPH TYPE: The type of each OTPH/SUPPORT EQUIPMENT component listed. Examples of OTPH TYPE are: AHAF—Air hose attach fixture, CA—Cable, CSET—Cable set, HA—Hose assembly, HF—Holding fixture, ID—interface device, ODSK—Optical disk, PNL—Panel, PLT—Pallet, TF - Test fixture	complexType: `TPSHardwareAssets / TPSHardwareItem /` attribute `'type'`
OTPI: The operational test program instruction number.	complexType: `ConfigurationTestProgramElements / OperationalTestProgram / OTPINumber`
OTPM: The operational test program medium number.	complexType: `ConfigurationTestProgramElements / OperationalTestProgram / OTPMNumber`
PG X OF N: Page number.	There is no restriction to “fit” data onto any physical page size; therefore this is not directly supported in the XML schema. Should an implementation require paper copy, a XML Style Sheet (See [B2]) should be developed to produce physical page numbers along with physical page format and physical page size.
PROG: The name of the TPS test program used to test the UUT.	complexType: `ConfigurationTestProgramElements / TestProgramSoftware / TestProgramName`
REF DES: The UUT reference designator (REFDES) (e.g., A10, W101 – See [B1]). If UUT REF DES does not apply to a particular UUT, then this field should remain blank.	complexType: `ConfigurationUUTElements / ReferenceDesignator`
R/T CLASS: The TPS Run-Time classification allows a TPS developer to designate a test program as either: ‘U’ for unclassified, ‘C’ for confidential, ‘S’ for secret, ‘TS’ for top secret.	complexType: `ConfigurationTestProgramElements / RunTimeClassifications / RunTimeClassification`
SUPPLEMENTAL DATA: Any supplemental (or additional) data about the UUT, TPS, etc., that will be useful to the test station operator.	complexType: `TestConfiguration / SupplementalData`
SW NO: The software version number for any software related to the UUT, similar to the OFP/SW PIN.	complexType: `ConfigurationUUTElements / SoftwarePrograms / SoftwareNumber`

Table B.1—MTPSI mapping to Test Configuration (*continued*)

Legacy working description and type	XML schema
T/E: The application software [may also be called Test Executive (T/E)] used during the last update of the test program. If more than on version of application software applies (due to multiple configurations of stations e.g., ATE Version 1, ATE Version 2), than all applicable application software (T/E's) may be listed.	complexType: `ConfigurationTestProgramElements / ATERunTimeSoftware / RunTimeApplicationSoftware / ApplicationSoftware`
T/E VERSION: The application software (may also be called T/E) version used during the last update of the test program.	complexType: `ConfigurationTestProgramElements / ATERunTimeSoftware / RunTimeApplicationSoftware /` attribute `'version'`
TEC: Type Equipment Code (TEC) is an alphanumeric code that identifies the end item of equipment on which work is performed. In the US Military for example, there are 16 categories of equipment, identified by the first character of the TEC. For example, the first character for an aircraft is 'A', the first character for a jet engine is 'J'. Refer to COMNAVAIRFORINST 4790.2B (See [B4]) for a description of US Military TEC codes.	complexType: `ConfigurationUUTElements / TypeEquipmentCode`
TEST DIAG: The test diagram number, used when the test diagram is not included as part of the test program instruction (TPI), or TPI related material.	complexType: `ConfigurationTestProgramElements / TestDiagram`
TEST EXECUTION RELITIVE SPEED: The Test Execution Relative Speed is used to indicate the relative speed of the Run-Time Application (Test Executive, e.g., CASS TURBO Mode). Valid entries are; 0—No speed indication is specified, 1—The TPS has been verified to run on the target ATE test execution environment, 2—The TPS has been verified to run only on earlier (typically slower) test execution environments.	complexType: `ConfigurationTestProgramElements / ATERunTimeSoftware / RunTimeApplicationSoftware /` attribute `'relativeSpeed'`
TEST TYPE: The distinct type of TPS; either 'UUT', 'Self-Test', or 'Calibration'. If the Test Type is not identified, it should be assumed that this is a UUT TPS. Typically a 0 is UUT, 2 is Calibration, 3 is Self-Test	complexType: `ConfigurationTestProgramElements / TestProgramType`
TM: The technical manual (TM) or technical publication (TECPUB) or maintenance instruction manual (MIM) for the UUT.	complexType: `ConfigurationUUTElements / TechnicalManuals`
TPI: The test program instruction number.	complexType: `ConfigurationTestProgramElements / TestProgramSoftware / TestProgramInstruction`
TPM: The test program medium number.	complexType: `ConfigurationTestProgramElements / TestProgramSoftware / TestProgramMeduim`
TPS DIRECTORY NAME: The TPS directory name or the TPS root subdirectory.	complexType: `ConfigurationTestProgramElements / TestProgramSoftware / DirectoryName`

Table B.1—MTPSI mapping to Test Configuration (*continued*)

Legacy working description and type	XML schema
TWP: The Temporary Workaround Procedure (TWP) number(s) of any active TWP against the TPS. A TWP is notification of a workaround for an OTPS execution problem that was identified after an OTPS was released or before a permanent solution to the problem has been incorporated into the TPS. The TWP notification is accomplished by release of the workaround instructions (typically in hard copy format) to affected work sites by the Fleet Support Team (FST) responsible for the affected OTPS. TWP numbers are assigned by the applicable FST. If there are no active TWP's for a particular TPS, this should be blank.	complexType: `ConfigurationTestProgramElements / TemporaryWorkaroundProcedures / TWPNumber`
TWP Description: The TWP description of any active TWP against the TPS. The description should reflect the issued TWP's nomenclature field.	complexType: `ConfigurationTestProgramElements / TemporaryWorkaroundProcedures / TWPDescription`
TWP Issue Date: The TWP date of issue of any active TWP against the TPS. The date should reflect the date the FST issued the workaround.	complexType: `ConfigurationTestProgramElements / TemporaryWorkaroundProcedures / TWPIssueDate`
UIC: Unit Identification Code (UIC) for US government sites (See [B6]).	complexType: `ConfigurationTestProgramElements / UnitIdentificationCode`
UUT Model: The UUT model number.	complexType: `ConfigurationUUTElements / Model`
UUT NOMEN: The name/nomenclature (NOMEN) of the UUT tested by the TPS.	complexType: `ConfigurationUUTElements / Nomenclature`
UUT P/N: The part number (P/N) of the UUT tested by the TPS.	complexType: `ConfigurationUUTElements / PartNumber`
UUT SYSTEM: The UUT system number.	complexType: `ConfigurationUUTElements / SystemNumber`
WUC: The Work Unit Code (WUC) is a code that identifies the system, subsystem, or component; which is the UUT being tested. Refer to Mil-Std-780G (See [B11]) for a description of US Military WUC's.	complexType: `ConfigurationUUTElements / WorkUnitCode`

Annex C

(informative)

Examples

The purpose of this example is to depict an example MTPSI card's content (See Figure C.1), representative of those elements that are required to be in place before testing UUT P/N 3907AS1000-01; and depict the Figure C.1 contents in a TestConfiguration XML instance document.

NOTE 1—Items contained in Figure C.1 that are either 'blank', 'N/A', or 'NONE' (SUPPLEMENTAL DATA NONE, TPM: , SW NO: N/A for example) are not contained in the attached XML instance document.

NOTE 2—A unique uuid has not been created for this example. An actual XML instance document would contain a unique identifier other than all zeros.

NOTE 3—Although Figure C.1 does not include Adapter Required, it is contained in the attached XML instance document to conform with the schema annotation.

NOTE 4—As described in Annex A, this XML instance document is also available at the IEEE download web-site located as defined in Clause 6.

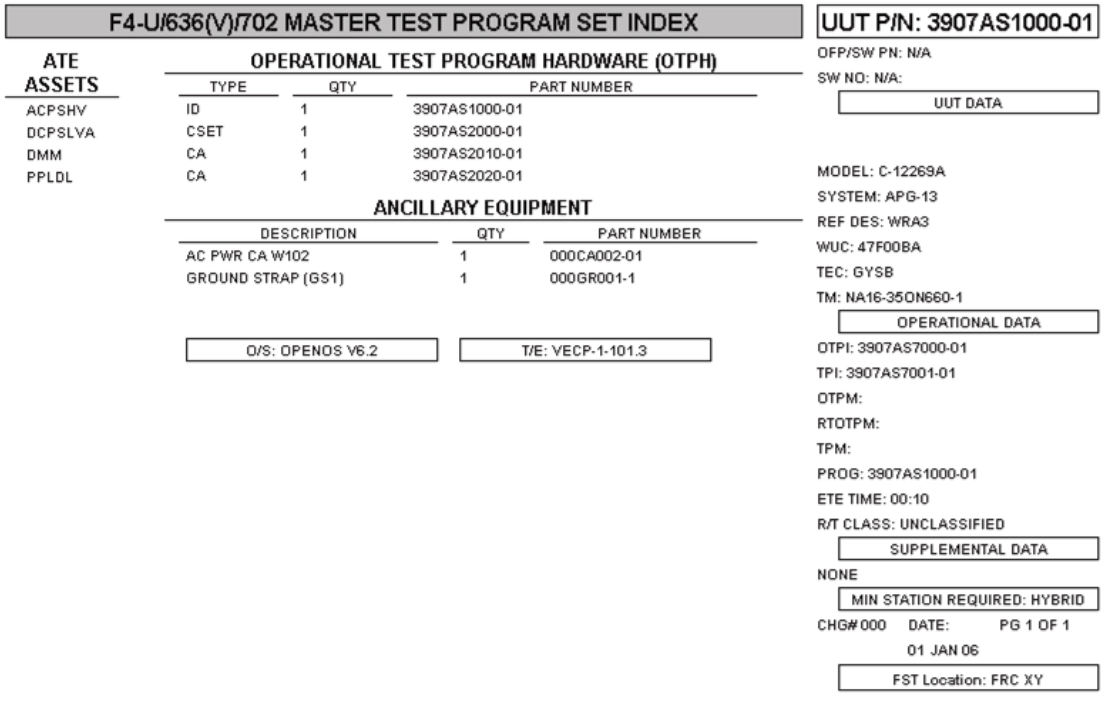

Figure C.1— Example MTPSI card

A valid XML instance document supporting Figure C.1 would appear as:

```
<?xml version="1.0" encoding="UTF-8"?>
<tc:TestConfiguration changeDate="2006-01-01" changeNumber="000" title="F4-
U/636(V)/702" uuid="00000000000000000000000000000000" classified="false"
securityClassification="U" xsi:schemaLocation="urn:IEEE-
1671.4:2014:TestConfiguration TestConfiguration.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:tc="urn:IEEE-
1671.4:2014:TestConfiguration">

  <tc:AncillaryEquipment>
    <tc:AncillaryHardwareItem name="AC PWR CA W102" partNumber="000CA002-01"
quantity="1"/>
    <tc:AncillaryHardwareItem name="GROUND STRAP (GS1)" partNumber="000GR001-1"
quantity="1"/>
  </tc:AncillaryEquipment>
  <tc:FleetSupportTeamLocation>
    <tc:TPSSupport name="FRC XY"/>
  </tc:FleetSupportTeamLocation>
  <tc:TestEquipmentAssets>
    <tc:SystemIdentifier systemID="ACPSHV"/>
    <tc:SystemIdentifier systemID="DCPSLVA"/>
    <tc:SystemIdentifier systemID="DMM"/>
    <tc:SystemIdentifier systemID="PPLDL"/>
  </tc:TestEquipmentAssets>
  <tc:TestProgram>
    <tc:TestProgramElements>
      <tc:ATERunTimeSoftware>
        <tc:OperatingSystems version="6.2">
          <tc:OperatingSystem>OPENOS</tc:OperatingSystem>
        </tc:OperatingSystems>
        <tc:RunTimeApplicationSoftware>
          <tc:ApplicationSoftware>VECP-1-101.3</tc:ApplicationSoftware>
        </tc:RunTimeApplicationSoftware>
      </tc:ATERunTimeSoftware>
      <tc:ATEVersions>
        <tc:MinimumConfiguration>Hybrid</tc:MinimumConfiguration>
      </tc:ATEVersions>
      <tc:EndToEndRunTimes>
        <tc:EndToEndRunTime>
          <tc:RunTime>00:10:00</tc:RunTime>
        </tc:EndToEndRunTime>
      </tc:EndToEndRunTimes>
      <tc:OperationalTestProgram>
        <tc:OTPINumber>3907AS7000-01</tc:OTPINumber>
      </tc:OperationalTestProgram>
      <tc:RunTimeClassifications>
        <tc:RunTimeClassification>U</tc:RunTimeClassification>
      </tc:RunTimeClassifications>
      <tc:TestProgramSoftware>
        <tc:TestProgamInstruction>3907AS7001-01</tc:TestProgamInstruction>
        <tc:TestProgramName>3907AS1000-01</tc:TestProgramName>
      </tc:TestProgramSoftware>
    </tc:TestProgramElements>
  </tc:TestProgram>
  <tc:TPSHardware>
    <tc:TPSHardwareItem partNumber="3907AS1000-01" quantity="1" type="ID"/>
    <tc:TPSHardwareItem partNumber="3907AS2000-01" quantity="1" type="CSET"/>
    <tc:TPSHardwareItem partNumber="3907AS2010-01" quantity="1" type="CA"/>
    <tc:TPSHardwareItem partNumber="3907AS2020-01" quantity="1" type="CA"/>
  </tc:TPSHardware>
  <tc:UnitUnderTest>
    <tc:UUTElements>
      <tc:Model>C-12269A</tc:Model>
      <tc:PartNumber>3907AS1000-01</tc:PartNumber>
```

```
      <tc:ReferenceDesignator>WRA3</tc:ReferenceDesignator>
      <tc:SystemNumber>APG-13</tc:SystemNumber>
      <tc:TechnicalManuals>NA16-35ON660-1</tc:TechnicalManuals>
      <tc:TypeEquipmentCode>GYSB</tc:TypeEquipmentCode>
      <tc:WorkUnitCode>47F00BA</tc:WorkUnitCode>
    </tc:UUTElements>
  </tc:UnitUnderTest>
</tc:TestConfiguration>
```

Annex D

(informative)

Bibliography

Bibliographical references are resources that provide additional or helpful material but do not need to be understood or used to implement this standard. Reference to these resources is made for informational use only.

[B1] ASME Y14.44-2008, Reference Designations for Electrical and Electronics Parts and Equipment.[14]

[B2] Associating Style Sheets with XML Documents 1.0, 2nd ed. W3C Recommendation 28 October 2010.[15]

[B3] Cataloging Handbook H4-1 and H4-2, Federal Supply Code for Manufacturers.[16]

[B4] COMNAVAIRFORINST Instruction 4790.2B Appendix E, Maintenance Documentation Codes, 15 May 2012.[17]

[B5] DoD ATS Selection Process Guide, 2009.[18]

[B6] DoD Instruction 7730.64, Automated Extracts of Manpower and Unit Organizational Elements Files, Enclosure 3, Unit Identification Codes, 11 December 2004.[19]

[B7] Extensible Markup Language (XML) 1.0, 5th ed. W3C Recommendation 26 November 2008.[20]

[B8] The *IEEE Standards Dictionary Online.*[21]

[B9] IEEE Standards Style Manual.[22]

[B10] Namespaces in XML 1.0, 3rd ed. W3C Recommendation 8 December 2009.[23]

[B11] MIL-STD-780G, Military Standard: Work Unit Codes for Aeronautical Equipment; Uniform Numbering System.[24].

[B12] Naval Aviation Maintenance Program (NAMP) COMOPNAVAIRFORINST Instruction 4790.2, 6 June 2012. [25]

[B13] XML Schema Part 0: Primer 2nd ed. W3C Recommendation 28 October 2004.[26]

[B14] XML Schema Tutorial.[27]

[B15] XML Schema Tutorial, Part 1: Defining Elements and Attributes.[28]

[14] ASME publications are available from the American Society of Mechanical Engineers, 3 Park Avenue, New York, NY 10016-5990, USA (http://www.asme.org/).
[15] Available at: http://www.w3.org/TR/xml-stylesheet/
[16] Available from: Superintendent of Documents, Government Printing Office (GPO), Washington, D.C. 20402.
[17] Available at: http://www.navair.navy.mil/logistics/4790/library/appendix%20E.pdf
[18] Available at: http://www.acq.osd.mil/ats/
[19] Available at: http://www.dtic.mil/whs/directives/corres/ins1.html
[20] Available at: http://www.w3.org//TR/REC-xml/
[21] IEEE Standards Dictionary Online subscription is available at: http://www.ieee.org/portal/innovate/products/standard/standards_dictionary.html
[22] Available at: https://development.standards.ieee.org/myproject/Public/mytools/draft/styleman.pdf
[23] Available at: http://www.w3.org/TR/REC-xml-names/
[24] Available at: http://www.everyspec.com/MIL-STD/MIL-STD-0700-0799/MIL_STD_780G_1049/
[25] Available at: http://www.navair.navy.mil/logistics/4790/
[26] Available at: http://www.w3.org/TR/xmlschema-0
[27] Available at: http://www.xfront.com
[28] Available at: www.liquid-technologies.com/Tutorials/XmlSchemas/XsdTutorial_01.aspx

Annex E
(informative)
IEEE List of Participants

At the time this draft standard was completed, the 1671.4 Working Group had the following membership:

Mike Seavey, *Chair*

Chris Gorringe
Anand Jain
Teresa Lopes
Ion Naeg
Ron Taylor

The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

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James Dumser
Sourav Dutta
William Frank
David Friscia
Chris Gorringe
Randall Groves
Werner Hoelzl
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Bartien Sayogo
Stephen Schwarm
Mike Seavey
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Ron Taylor
John Vergis
Oren Yuen
Daidi Zhong

When the IEEE-SA Standards Board approved this standard on 27 March 2014, it had the following membership:

John Kulick, *Chair*
Jon Walter Rosdahl, *Vice Chair*
Richard H. Hulett, *Past Chair*
Konstantinos Karachalios, *Secretary*

Peter Balma
Farooq Bari
Ted Burse
Clint Chaplin
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Gary Hoffman
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Adrian Stephens
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Yatin Trivedi
Phil Winston
Don Wright
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*Member Emeritus

Also included are the following nonvoting IEEE-SA Standards Board liaisons:

Richard DeBlasio, *DOE Representative*
Michael Janezic, *NIST Representative*

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