IEC 62714-3

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Engineering data exchange format for use in industrial automation systems engineering – Automation markup language – Part 3: Geometry and kinematics

Format d'échange de données techniques pour une utilisation dans l'ingénierie des systèmes d'automatisation industrielle – Automation markup language – Partie 3: Géométrie et cinématique

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FOREWORD

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International Standard IEC 62714-3 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this standard is based on the following documents:

CDV	Report on voting
65E/497/CDV	65E/508/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62714 series, published under the general title *Engineering data exchange format for use in industrial automation systems engineering – Automation markup language*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

The data exchange format defined in IEC 62714 (Automation Markup Language, AML) is an XML schema based data format and has been developed in order to support the data exchange between engineering tools in a heterogeneous engineering tool landscape. IEC 62714-1 gives an overview about the format.

The goal of AML is to interconnect engineering tools from the existing heterogeneous tool landscape in their different disciplines, e.g. mechanical plant engineering, electrical design, process engineering, process control engineering, HMI development, PLC programming, robot programming etc.

AML stores engineering information following the object oriented paradigm and allows modelling of physical and logical plant components as data objects encapsulating different aspects. An object may consist of other sub-objects and may itself be part of a larger composition or aggregation. Typical objects in plant automation comprise information on topology, geometry, kinematics and logic, whereas logic comprises sequencing, behaviour and control.

AML combines existing industry data formats that are designed for the storage and exchange of different aspects of engineering information. These data formats are used on "as-is" basis within their own specifications and are not branched for AML needs.

The core of AML is the top-level data format CAEX that connects the different data formats. Therefore, AML has an inherent distributed document architecture.

Figure 1 illustrates the basic AML architecture and the distribution of topology, geometry, kinematic and logic information.

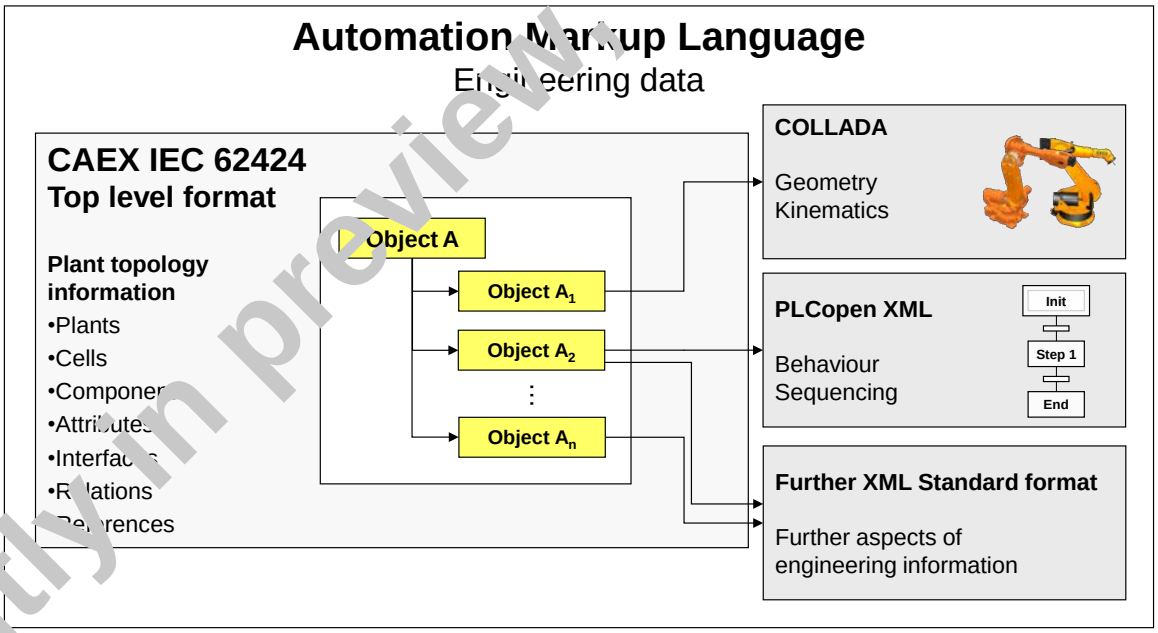

Figure 1 – Overview of the engineering data exchange format AML

Due to the different aspects of AML, IEC 62714 consists of different parts focussing on different aspects.

- IEC 62714-1: Architecture and general requirements

This part specifies the general AML architecture, the modelling of engineering data, classes, instances, relations, references, hierarchies, basic AML libraries and extended AML concepts.

- IEC 62714-2: Role class libraries

  This part specifies additional AML libraries.

- IEC 62714-3: Geometry and kinematics

  This part specifies the modelling of geometry and kinematics information.

Further parts may be added in the future in order to interconnect further data standards to AML.

Clause 5 describes the geometry related extensions of the role class libraries.

Clause 6 describes the frame attribute which can be used to represent the geometric position of an InternalElement, InstanceHierarchy, SystemUnitClass, or SystemUnitClassLibrary with respect to another CAEX Object.

Clause 7 gives a normative description regarding referencing COLLADA documents.

Clause 8 specifies the normative provisions for the attachment of two geometric AML objects.

Clause 9 defines how to store meta informations about the source tool directly into the COLLADA document.

Annex A describes the referencing methods for geometric and kinematic models.

Annex B provides an example for modelling of kinematic systems and their combination in AML.

Annex C gives an informative XML representation of the libraries defined in this part of IEC 62714.

ENGINEERING DATA EXCHANGE FORMAT FOR USE IN INDUSTRIAL AUTOMATION SYSTEMS ENGINEERING – AUTOMATION MARKUP LANGUAGE –

Part 3: Geometry and kinematics

1 Scope

This part of IEC 62714 specifies the integration of geometry and kinematics information for the exchange between engineering tools in the plant automation area by means of AML.

It does not define details of the data exchange procedure or implementation requirements for the import/export tools.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62714-1:2014, *Engineering data exchange format for use in industrial automation systems engineering – Automation markup language – Part 1: Architecture and general requirements*

IEC 62714-2:2015, *Engineering data exchange format for use in industrial automation systems engineering – Automation markup language – Part 2: Role class libraries*

ISO/PAS 17506, *Industrial automation systems and integration – COLLADA digital asset schema specification for 3D visualization of industrial data*

COLLADA 1.4.1: March 2008 COLLADA – Digital Asset Schema Release 1.4.1
(available at <http://www.khronos.org/files/collada_spec_1_4.pdf>)

Extensible Markup Language (XML) 1.0:2004, W3C Recommendation
(available at <http://www.w3.org/TR/2004/REC-xml-20040204/>)

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62714-1:2014 and of IEC 62714-2:2015 and the following apply.

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

- IEC Electropedia: available at http://www.electropedia.org/ [access on 26th September 2016]
- ISO Online browsing platform: available at http://www.iso.org/obp [access on 26th September 2016]