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Automation, Software and Information Technology

ISaGRAF 5.1 assessment according to IEC 61499
ICS Triplex ISaGRAF Inc.
Canada

Report-No.: 968/EL 434.01/07
Date: 2007-03-14

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Test object:	ISaGRAF 5.1
Customer/Manufacturer:	ICS Triplex ISaGRAF Inc. 9975 Avenue de Catania Local U Brossard, Quebec, J4Z 3V6 Canada
Order-No./Date:	P.O. No. 15036 dated 2005-12-06
Test Institute:	TÜV Rheinland Industrie Service GmbH Automation, Software and Information Technology (ASI) Am Grauen Stein 51105 Köln Germany
TÜV-Offer-No./Date:	JLAN-6CRKD9-0 dated 2005-05-26
TÜV-Order-No./Date:	3050399 dated 2006-01-31
Inspectors:	Dipl.-Ing. Matthias Haynl
Test location:	see Test Institute and TUV Rheinland of North America (TRNA)
Test duration:	January - March 2007

The test results are exclusively related to the test samples.

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1. Scope

Scope of the inspection was the compliance test for the programming software "ISaGRAF 5.1" of ICS Triplex ISaGRAF Inc. according to the standard IEC 61499.

2. Applicable standards

/N 1/ **IEC 61499-1:2005**
Functional Block – Part 1: Architecture

/N 2/ **IEC 61499-2:2005**
Functional Block – Part 2: Software tool requirements

/N 3/ **IEC 61499-4:2005**
Functional Block – Part 4: Rules for compliance profiles

3. Object description

The programming software "ISaGRAF 5.1" is a Microsoft Windows based development platform providing IEC 61499 function blocks features to program distributed Industrial-Process Measurement and Control Systems (IPMCSs).

3.1. Safety related aspect

Specific safety related requirements were not applied to the "ISaGRAF 5.1" programming software.

3.2. Inspected documents

Testing was mainly based on the following documents:

/U 1/ **IEC 61499 Compliance Profile for ISaGRAF 5.1, revision 1.2, dated 2007-03**
ICS Triplex ISaGRAF Inc.

/U 2/ **Validation Tests ISaGRAF 5.1 for IEC 61499, revision 2.0 dated 2007-03-13**
ICS Triplex ISaGRAF Inc.

/U 3/ **ISaGRAF 5.1 - workbench, dated 2006-10**
ICS Triplex ISaGRAF Inc.

/U 4/ **ISaGRAF 5 IEC 61499 IXL Service Interface, dated 2006-10**
ICS Triplex ISaGRAF Inc.

/U 5/ **Application Notes (System,- Resource,- Application- and FB-models), dated 01/2006**
ICS Triplex ISaGRAF Inc.

4. Performance of testing and test results

Inspection of the ISaGRAF 5.1 were subdivided into an assessment of the architecture of the function blocks, the software tool requirements and the review of the compliance profile in accordance to the requirements outlined in IEC 61499.

The steps below were performed as part of the assessment:

- Inspection of the user documentation /U 3/, /U 4/ and /U 5/
- Tests with the programming tool
- Review of the test results presented by the manufacturer /U 2/

4.1. Inspection to the requirements of IEC 61499

4.2. Architecture

The inspection of the architecture requirements regarding the “Reference Models” listed in /N 1/ was done by reviewing the documents listed under /U 5/ and compiling a distributed test application.

The specification of basic function blocks was inspected in accordance to the requirements of /N 1/ (chapter 5.2 and annex A). The assessment of the composite function blocks was performed in reference to /N 1/ (chapter 5.3). The implementation of the basic function blocks, composite function blocks, sub-application and adapter interface were inspected by compiling test an application.

The assessment of Service Interface in reference to /N 1/ (chapter 6) was subdivided in the assessment of the management and communication blocks characteristics.

The “Configuration of Functional Units and Systems” analysis was performed with the test application running at the target WIN32-TGTA-L. The requirements from /N 1/ (chapter 7) were applied as far as possible.

Result:

The inspection of the System,- Resource,- Application- and Function-block-models as well as the Distribution model has shown no obviously deviations in reference to the requirements stipulated by /N 1/.

The inspected basic function blocks fulfils the requirements driven by /N 1/ (chapter 5.2 and annex A). No obvious deviations from requirements of /N 1/ (chapter 5.3) were identified during the assessment of the composite function block (type specification and behaviour of instances). Sub-application /N 1/ (chapter 5.4) at function block level are implemented as application saved as a library. Adapter interface /N 1/ (chapter 5.5) are not supported by ISaGRAF 5.1. The contradictions are documented in the compliance document /U 1/.

The management block is not implemented as a programmable function block, but the ISaGRAF eXchange Layer (IXL) is capable to interact with the requests. The contradiction is documented in the compliance document /U 1/. The communication block can be programmed with ISaGRAF 5.1 and as an example the IXL Service Interface (Ixl_reader, ixl_writer blocks) is provided by the manufacture.

4.3. Software tool requirements

The assessment of the software tool requirements for ISaGRAF 5.1 was performed in accordance with the requirements stipulated by /N 2/. The following tasks were inspected:

- Information to be provided by ICS Triplex ISaGRAF Inc.
- Exchange of library elements
- Display, modification, verification and implementation of declaration
- System operation, testing and maintenance

Result:

The information provided by ICS Triplex ISaGRAF Inc. (see /U 3/) regarding the types of library elements, the implementation of library elements and the tasks supported by the software tool ISaGRAF 5.1 are conform to the requirements of /N 2/.

The exchange of library elements is not confirm to the /N 2/ (annex A). ISaGRAF 5.1 is capable to exchange elements defined to the semantic of the IEC 61131-3 XML format. The contradiction is documented in the compliance document /U 1/.

ISaGRAF 5.1 is conform to display (graphical format), modify, verify and implement the declaration of associated library elements in reference to the requirements of /N 2/.

The system operation, testing and maintenance facilities implemented in ISaGRAF 5.1 satisfy the /N 2/.

4.4. Rules for compliance profiles

The compliance profile /U 1/ was reviewed in reference to the requirements of /N 3/ and under consideration of the results in the chapters 4.2 and 4.3.

Result:

No obviously contradictions were identified by the review of the compliance profile /U 1/ in correlation to the requirements of /N 3/.

5. Overall inspection results

The assessment of the software tool ISaGRAF 5.1 has shown the following contradictions to the normative requirements of /N 1/ and /N 2/:

- Adapter interface /N 1/ (chapter 5.5) are not supported by ISaGRAF 5.1.
- The management block is not implemented as a programmable function block, but the IXL layer is capable to produce the proper requests
- Applications saved as a library are implemented as a substitute for sub-application function blocks
- The exchange of library elements is not confirm to the /N 2/ (annex A).

The contradictions are described in /U 1/ and therefore the general conformance for the software tool ISaGRAF 5.1 to the requirements of IEC 61499 series of standards is confirmed by the Test Institute.

The ISaGRAF 5.1 tool was not inspected regarding any safety related aspects.

Cologne,2007-03-14
TIS/ASI/Kst. 968 hy-la

The inspector

Dipl.-Ing. Matthias Haynl