RAPITA Systems Ltd
A DANLAW Company

# RapiTime tool qualification for DO-178B/C projects

## Introduction

Tool qualification is essential in the production of software designed for critical embedded systems. In the qualification process, the user of a tool must provide evidence that it satisfies qualification objectives.

When you use Rapi**Time** in a DO-178B/C project, we can provide documents, engineering effort and tests to support your tool qualification.

According to DO-178B/C guidelines, you need to qualify software tools used in your project if each of the following is true:

- The tool could potentially insert an error or fail to detect an existing error.

- The tool's output will not be verified or confirmed by another verification activity.

- Processes necessary for certification are eliminated, reduced or automated by the tool.

If you use a tool that requires qualification in a DO-178B/C project, you must demonstrate that the tool works correctly in your development environment.

## Tool qualification evidence

The RTCA/EUROCAE guidelines listed in DO-178B and DO-330 recommend that you supply the documents listed in Table 1 below when qualifying a tool for use in a DO-178B/C project.

*Table 1. Tool qualification documents for DO-178B/C projects*

| Document | DO-178B reference | DO-330 reference | Usage | Description |
|---|---|---|---|---|
| Plan for Software Aspects of Certification (PSAC) | 11.1, 12.2.3a, 12.2.4 | 1.3c, 10.1.1 | Submit to the certification authority (CA, *e.g.* FAA) early in development to discuss timescale, acceptable qualification methods and documentation approaches. | Describes the need for tool qualification. Identifies tools used in the project and their impact on the software life cycle. References many of the other documents in this list. |
| Tool Qualification Plan (TQP) | 12.2.3c(1), 12.2.3.1, 12.2.4 | 10.1.2 | Optional, but simplifies production of the PSAC. | Describes the process used to qualify the tool. |
| Tool Operational Requirements (TOR) | 12.2.3c(2), 12.2.3.2 | 5.1 | Must be available for review by the CA. | Describes what the tool does, how it is used and the environment it is used in. |
| Tool Verification Results (TVR) | 11.14 | 10.2.6, 10.3.4 | Must be available for review by the CA. | Summary of the data showing that all requirements in the TOR have been verified. |
| Tool Accomplishment Summary (TAS) | 11.20, 12.2.4, 12.2.3c(3) | 10.1.15 | Optional, but simplifies production of the PSAC. | Demonstrates compliance with the TQP. Lists discrepancies between planned and actual qualification. |

# RapiTime tool qualification

A tool qualification describes a software tool and its integration into the development environment it is used in, and demonstrates that the tool works correctly in this environment. When you purchase a license for Rapi**Time** (RPT), we can provide documents that you can use to qualify the tool for use in your project. These are part of a fully qualified installation of Rapi**Time**, which contains the following components:

- The Rapi**Time** tool (RPT).

- Target Integration Kit (TIK): integration of RPT into your development environment (see our *Target Integration Service* product brief for more details).

- Rapi**Time** Qualification Kit (QK-RPT): documents describing qualification for the version of Rapi**Time** you use in your project.

- Qualified Target Integration Kit (QTIK): documents describing qualification of the integration of Rapi**Time** into your development environment, including tests of the integration.

## Tool Qualification Kit

The tool qualification kit contains documents that describe the version of Rapi**Time** you are using. This forms part of the evidence you need to qualify the tool, and contains the following documents:

- Developer TQP (Tool Qualification Plan)

- Developer TQS (Tool Qualification Scope)

- Developer TOR (Tool Operational Requirements)

- Developer TCD (Test Case Design)

- Developer TVR (Tool Verification Record)

- Developer TAS (Tool Accomplishment Summary)

- Template IQR (Integration Qualification Report)

The documents in this kit must be supported with documents describing the integration of Rapi**Time** into your development environment, and tests of the integration.

## Qualified Target Integration Kit

To complete your Rapi**Time** qualification, you must provide evidence describing the integration of Rapi**Time** into your development environment and tests demonstrating its use on your system.

If we provided a TIK, we can provide this evidence through our qualified target integration kit (QTIK), which includes the following:

- Full IQR (Integration Qualification Report).

- On-site tests.

- A list of expected results.

When the documents and tests in the QK-RPT and QTIK are combined, they complete the evidence you need to submit for tool qualification.

## Qualification options and licensing

You have a number of qualification options when you purchase Rapi**Time**, as shown in Table 2.

Each *use* of a qualification kit requires a separate license of the qualification kit. A *use* is defined as a tool installation specific to one target and test environment and typically represents a single submission or application for certification. We offer multiple license discounts if you want to *use* our tools multiple times on the same system or project.

Table 2. Rapi**Time** qualification options

| | | Tool | | Qualification | |
|---|---|---|---|---|---|
| | | RapiTime tool (RPT) | Target Integration Kit (TIK) | RapiTime Qualification Kit (QK-RPT) | Qualified Target Integration Kit (QTIK) |
| Option 1 | Provided by: | Rapita | Customer | Customer | Customer |
| Option 2 | | Rapita | Rapita | Customer | Customer |
| Option 3 | | Rapita | Customer | Rapita | Customer |
| Option 4 | | Rapita | Rapita | Rapita | Customer |
| Option 5 | | Rapita | Raipta | Rapita | Rapita |