

Requirement Management Tool (ReMa)

One of the biggest challenges to any program specially aimed at developing a system to satisfy the objectives of DO-178B and DO-254 Level B criticality is meeting the objectives of DO-178B and DO-254 and most importantly show evidence to this compliance. There are several ways in which a development team can show this evidence. One of the simplest methods is to keep paper records of all the changes. But with team sizes exceeding 3-4 members this becomes unviable.

To maintain a minimum level of compliance to DO-178B any COTS requirement management tool is a must. Most of the requirement management tools provide all the basic functions such as

- Requirement Entry
- Requirement tracking
- Linking requirements
- User Access controls

To satisfy the objectives of DO-178B, the tool should support several additional features. Some of these are listed below.

- Ability to maintain change history of each requirement
- To have complete top down/Bottom up traceability
- Easy export feature
- Impact analysis report
- Ability to interact with a Configuration Management tool
- To verify the integrity of the database while interacting with the CM (Configuration Management) tool.
- Ability to enforce Change Proposals
- Ability to generate the complete traceability matrix, that can be exported

ReMa was designed with all these features and it was the tool of choice for the development of a GPS/WAAS receiver designed to meet DO-178B and DO-254 Level B criticality. ReMa provided the perfect framework to maintain and manage close to 15000 requirements by a large team of 20 members.

ReMa allowed us to integrate the DO-178B and DO-254 Review checklist directly into the Requirement management tool. This allowed us to develop and review the requirements simultaneously. This greatly helped us in managing the tight schedule of the program.

The most crucial feature was the ability of the tool to interface directly with the configuration management system. This allowed the team to work with the most current and accurate data.

ReMa allowed the FAA DER to audit our design and requirements remotely over the Internet. The team was able to show all the dependencies of requirements top-down and also bottom-up. The tool allowed the team to associate the test scripts configured into the configuration management system. This helped the verification team to comply with the CC1 (configuration control category) requirement of DO-178B.

To comply with the objectives of DO-254, the hardware requirements and the conceptual design were captured in ReMa. The requirement based test procedures were also imported into ReMa. The tool provided us easy access to the design and test procedures through the trace matrix. All the test scripts were reviewed within the environment of the tool. The test benches used to provide the stimuli to the tests were configured into the Configuration Management tool and direct link to the correct revisions of the test bench was provided from ReMa. This allowed testers to look the requirements and the test files that corresponded to one another and with the correct revision control, without having to move out from the ReMa tool.

One of the important feature of the tool that helped us immensely was the Impact analysis assessment. This provided us the crucial information regarding the impact of requirement change. In fact this was used extensively in identifying the impacted data items, which resulted due to the bug fixes after the certification baseline.

The impact analysis was used to assess the changes as Minor or Major and then follow the appropriate process for re-certification. This reduced the re-certification effort significantly, as only the impacted requirement based test were repeated.

In summary without ReMa our certification to DO-178B and DO-254 Level B criticality would have been extremely difficult to manage.

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