

ST-Ericsson Automates RFIC Validation Using NI LabVIEW and NI TestStand



"The new test automation platform built on NI TestStand and LabVIEW helped us reduce the time necessary to validate an RFIC from two months to three weeks."

- Sylvain Bertrand, [ST-Ericsson](#)

The Challenge:

Automating the characterization of complex RFICs in a global design environment that consists of multiple teams with varying levels of test automation.

The Solution:

Deploying an RFIC characterization software platform based on NI LabVIEW, NI TestStand, and software developed by National Instruments Alliance Partners.

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ST-Ericsson is one of the leading wireless IC providers. Our complex IC designs require significant validation and characterization to guarantee quality. To increase productivity in our laboratories, we developed software automation tools on RF test benches using software based on the NI LabVIEW Test Executive and several custom tools to facilitate measurements. To improve code reuse and reduce test development time, we needed to implement a new standard test automation framework built on common software tools in the industry. The new test automation platform built on [NI TestStand](#) and [LabVIEW](#) helped us reduce the time necessary to validate an RFIC from two months to three weeks.

Innovative Development Framework

We sought the help of two Alliance Partners, [MESULOG](#) and [SAPHIR](#), to implement our new development framework called the Robust and Fast Testing Solution (RFTS). We chose NI TestStand, LabVIEW, and [Mesulog TS+](#) characterization tools to implement the solution because the industry has widely adopted these tools and several groups within our company are familiar with these products. Using this new standard platform, the test application and validation teams can now more easily meet the requirements of the design and engineering teams and their customers through increased code reuse.

With the UNiversal Layer (UNL) developed using LabVIEW, the RFTS framework provides different levels of abstraction for instrument control development. This layer consists of the features necessary to control interfaces and instruments, an order interpreter to help test engineers program measurement modules, and the management of the electrical configurations. Using the RFTS, we can easily share the development software for various types of measurements and instrument driver libraries throughout projects and sites.

Drawing the Boundary between NI TestStand and LabVIEW

The overlapping features offered by LabVIEW and NI TestStand led to a debate among project development team members about how to use these tools together. With LabVIEW and NI TestStand, we could develop some functionality such as report generation, instrument device control, and loops on different parameters. Our seven years of experience using LabVIEW combined with the experience of the two Alliance Partners made it possible to take advantage of these two software tools and develop an environment for validation and characterization that is flexible, reliable, and scalable.

In the RFTS, we chose to use LabVIEW for instrument control, specifically to communicate with devices using NI-VISA and NI-DAQ driver software. We use NI TestStand for sequencing the LabVIEW code, managing test parameters, reporting, and database logging. It would have added unnecessary project development time and maintenance if we had tried to develop the functionality provided by NI TestStand using LabVIEW. We also used LabVIEW to write a custom operator interface for controlling the NI TestStand system.

With the RFTS platform, we reduced test development time and facilitated code sharing across groups. Instead of each group developing its own instrument control and test management software, the RFTS provides a complete set of software tools for automating tests.

Sharing and Deployment Are the Keys to a Successful Solution

Because the use of this new software environment is not mandatory in the company laboratories, the RFTS development team created an installation CD for the tools to facilitate its adoption. With the CD, the engineers can share the different components, such as instrument drivers or sample projects provided by the RFTS platform. Moreover, we can use this installation CD to install deployment stations.

The RFTS offers additional benefits to our engineers including a common set of tools that we can share across projects and groups. The code comes with example projects as well as detailed documentation to help users get started quickly. Additionally, Alliance Partners maintain the RFTS, guaranteeing that issues are resolved quickly and that help is available outside our organization.

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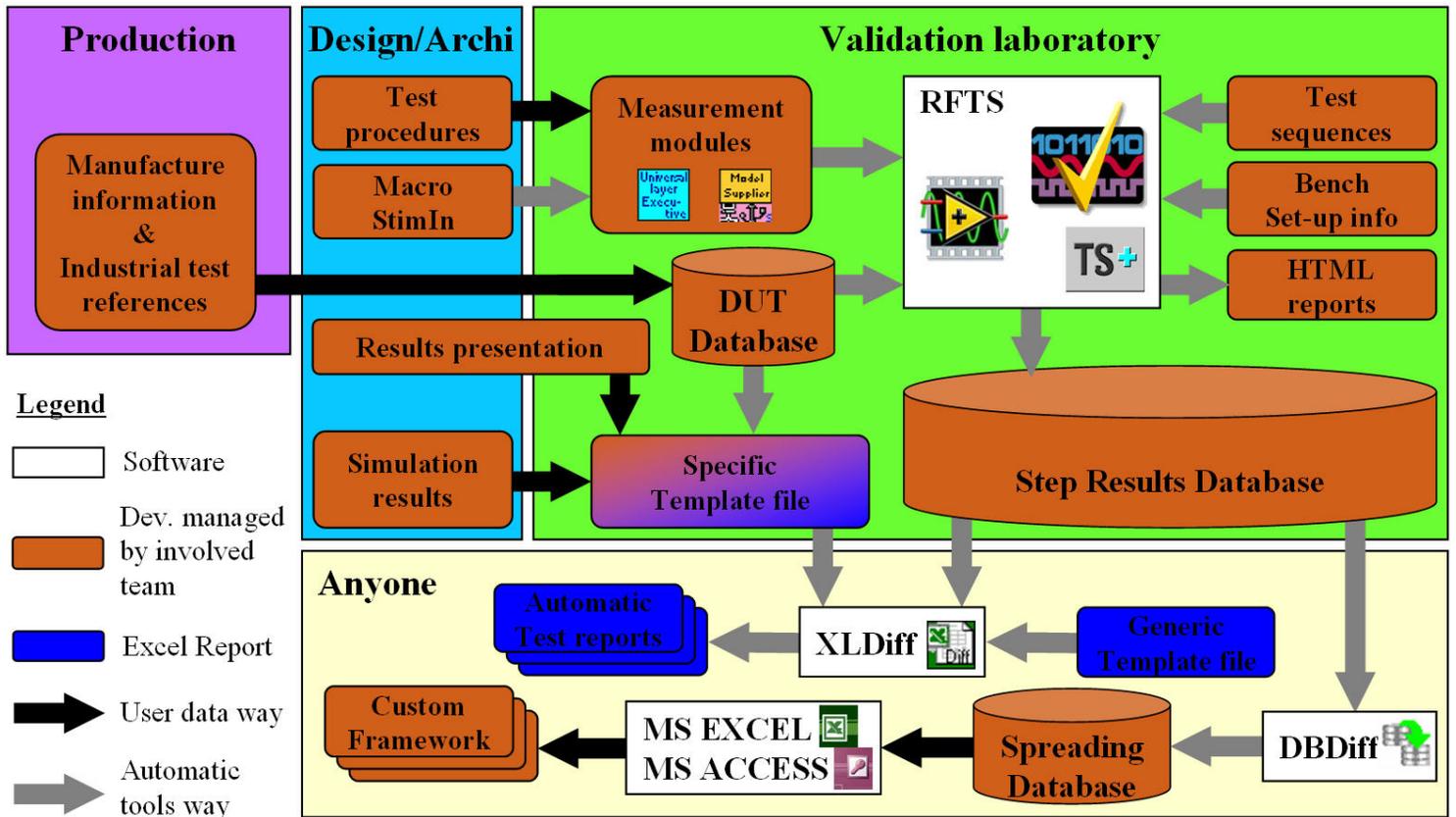
Sylvain Bertrand

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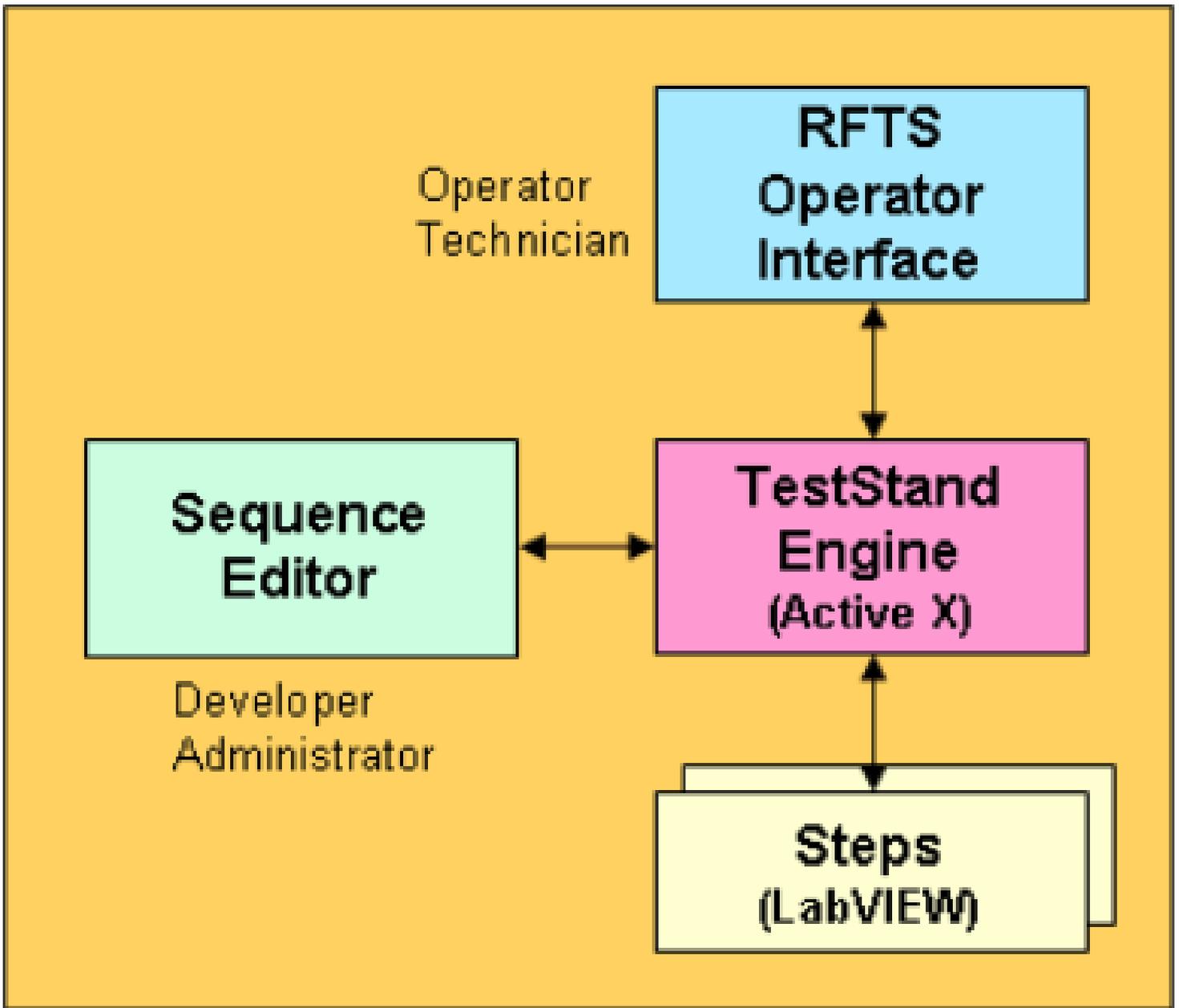
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Robust and Fast Testing Solution Setup Installer Screenshot



Information Setup for the RFTS



The Core of the RFTS

TestStand Operator Interface

File Execute Debug Configure Tools Help

RFTS TestStand Operator Interface

Sequence File: MESULOG 2009

Project: **Empty** Test Class: **NN_ClassSetup** Test UUTs

Setup: **Empty_NN_Main.seq** Single Pass Database Logging disabled

Sequence: **Empty_NN_Main_Characterization**

Step	Description	Settings
Options Selector	Action, RFTS_Empty_NN_UserOptionsSele...	
If	Locals.Calibration_Perform	
Calibration	Empty_NN_05_TX_Calib_SPTX.vi	
Write UNLE Memories	RFTS_ProjCom_Write_UNLE_Memories.vi	Pre Expression
Else		
Read UNLE Memories	RFTS_ProjCom_Read_UNLE_Memories.vi	Pre Expression
End		
Disable Loop Temp ?	RunState.NextStep.LoopMode = 1	Precondition
Loop Temp	Loop on "Temp" from 25.0°C to 25.0°C	
ENV --> Feed EnvReportText		
Set Temp	RFTS_PROJCom_T...	Pre Expression, Post Expression
Disable Loop Voltage ?	RunState.NextStep...	
LoopStr PS	Loop on "PS_Specif...	
Data PowerSupply	Play data from 2D ta...	
BrowseData	Browse data from 'D...	
ENV --> Feed EnvReportText		
Set Voltage	RFTS_PROJCom_Power_supplies_modifica...	Pre Expression, Post Expression
Init DIIT	Fmnlv_NN_01_Init.vi	

Sequence Description:
Sept 2009 - S. Bertrand & JL Schricke: RFTS 3.0 exemple

User: administrator Model: RFTS_SequentialMod... 1 Test Selected (9) Number of Tests: 23

The NI TestStand Interface Operator

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