



NIRA's road to mastering requirements

Kenny Stjernström, kenny.stjernstrom@niradynamics.se
Quality Manager at NIRA Dynamics AB,
2018-04-26

About me

M.Sc. in Applied physics and electrical engineering, Linköping university



Summer
2008

Aug 2010 Jan 2012



Jan 2016



About NIRA dynamics

- Established in 2001
- ~70 employees
- ~45 consultants and partners around the world

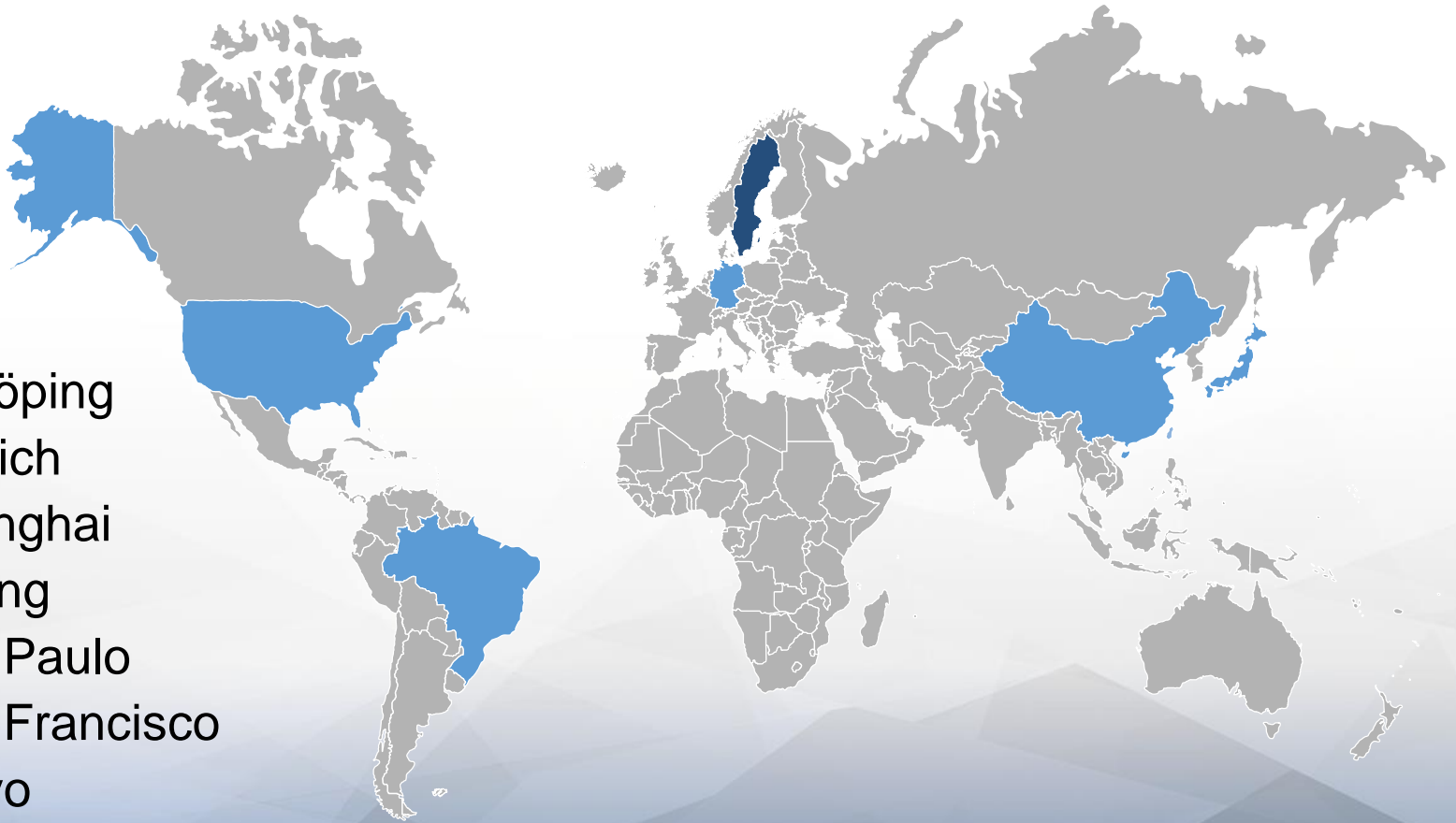
Field of excellence

Utilizing information from existing sensors to create new signals enabling value-adding functionality with high performance and precision. At low cost.



NIRA offices worldwide

Linköping
Munich
Shanghai
Beijing
Sao Paulo
San Francisco
Tokyo

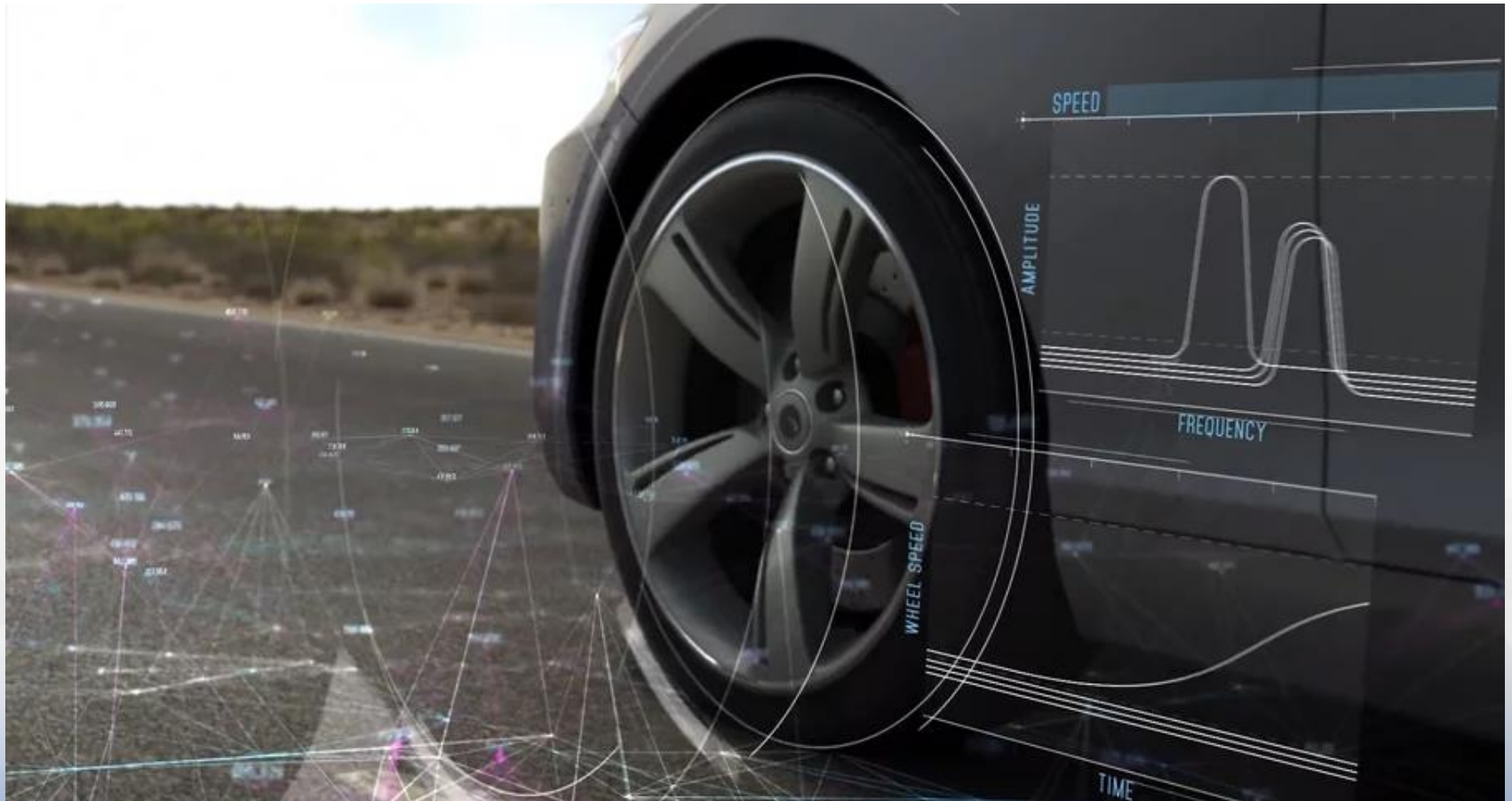


TOGETHER FOR SMARTER SAFETY.



Tire Pressure Indicator

<https://vimeo.com/161890961>



Installed in 40M vehicles



Road Surface Information

<https://vimeo.com/161890953>



The road to Polarion

- 2006 TPI installed in Audi TT.
 - No proper requirement handling.
- Handled the requirements in Excel
 - Hard to know when the specification was fulfilled.
 - At some point the customer started to send RIF-files.
 - Increasing number of customers with different requirements.



Picture by Mike Coats - <https://www.flickr.com/photos/capnoats/266902480/>,
CC BY-SA 2.0, <https://commons.wikimedia.org/w/index.php?curid=1314097>

Introducing Polarion

2011

- Evaluation DOORS-Polarion
- Purchased Polarion license
- Configured Polarion






2012

- Test result reporting
- Traceability Tables
- New projects -> new configuration

2013-2015

- Updated traceability table
- Minor updates

The traceability

ND-2538 - Vehicle instrument standing	
ND-2539 - Vehicle diagnostics Clear DTC request	
ND-2540 - UDS Routine service: Full system reset	
ND-2541 - UDS Routine service: System soft reset	
ND-2542 - UDS read/write data: Adaptation channel	
ND-2543 - Vehicle variant coding	
ND-2544 - Use Runtime Mode request	
ND-2547 - The call state shall change from "Calls Nothing" to "Calls Confirmed" if a resu...	<div>  ND-4045 - CalibrationLogix_DbgCallsRequest </div> <div>Test Result: Not Verified</div>
ND-2548 - The call state shall change from "Calls Nothing" to "Calls Confirmed" if a resu...	<div>  ND-4046 - CalibrationLogix_DbgReset </div> <div>Test Result: Not Verified</div>
ND-2549 - The call state shall change from "Calls Nothing" to "Button Down Start" if the s...	<div>  ND-4042 - CalibrationLogix_ButtonPressedStart </div> <div>Test Result: Not Verified</div>
	<div>  ND-4044 - CalibrationLogix_ButtonPressedStartOk </div> <div>Test Result: Not Verified</div>
ND-2550 - The call state shall change from "Button Down Start" to "Button Down OK" if the s...	<div>  ND-4042 - CalibrationLogix_ButtonPressedStart </div> <div>Test Result: Not Verified</div>

The road up till today

2016

- New traceability
- Using Jenkins to create test reports in Polarion
- Reconfigured Polarion

2017

2018

The new traceability

<div> <div> JCC-3292 - If the calibration button is pressed too short before release, see the settings... </div> <div>Status: Open</div> </div>	<div> <div> JCC-2410 - CalibrationButton_PressAndSeeThenOpen </div> <div>Status: Awaiting Test</div> </div>			
	<div> <div> JCC-3293 - If the calibration button is pressed longer than 200ms, see the settings... </div> <div>Status: Open</div> </div>	<div> <div> JCC-2411 - CalibrationButton_PressAndSeeThenOpen </div> <div>Status: Awaiting Test</div> </div>		
		<div> <div> JCC-2412 - CalibrationButton_PressAndSeeThenOpen </div> <div>Status: Awaiting Test</div> </div>		
	<div> <div> JCC-3294 - If the button is released after 200ms before 20s, see the calibration settings... </div> <div>Status: Open</div> </div>	<div> <div> JCC-2411 - CalibrationButton_PressAndSeeThenOpen </div> <div>Status: Awaiting Test</div> </div>	<div> <div> JCC-3295 - If the button is pressed longer than 200ms or not for 20s, see the settings... </div> <div>Status: Open</div> </div>	<div> <div> JCC-2411 - CalibrationButton_PressAndSeeThenOpen </div> <div>Status: Awaiting Test</div> </div>
			<div> <div> JCC-2412 - CalibrationButton_PressAndSeeThenOpen </div> <div>Status: Awaiting Test</div> </div>	
<div> <div> JCC-3296 - The corresponding mechanical settings are specific to each mechanical unit... </div> <div>Status: Open</div> </div>	<div> <div> JCC-2411 - CalibrationButton_PressAndSeeThenOpen </div> <div>Status: Awaiting Test</div> </div>			

Jenkins

Project ReleaseQueue

This build requires parameters:

EmailRecipient	<input type="text" value="kenny.stjernstrom@niradynamic.se"/>
	<small>Specify email recipient. If more than one, use comma to separate.</small>
Reference	<input type="text" value="master"/>
	<small>Specify which branch or tag to use.</small>
Command	<input -m="" \"update="" functional="" polaron="" tests\"="" tests\""="" type="text" unit="" update="" value="-m \"/>

Build

The road up till today

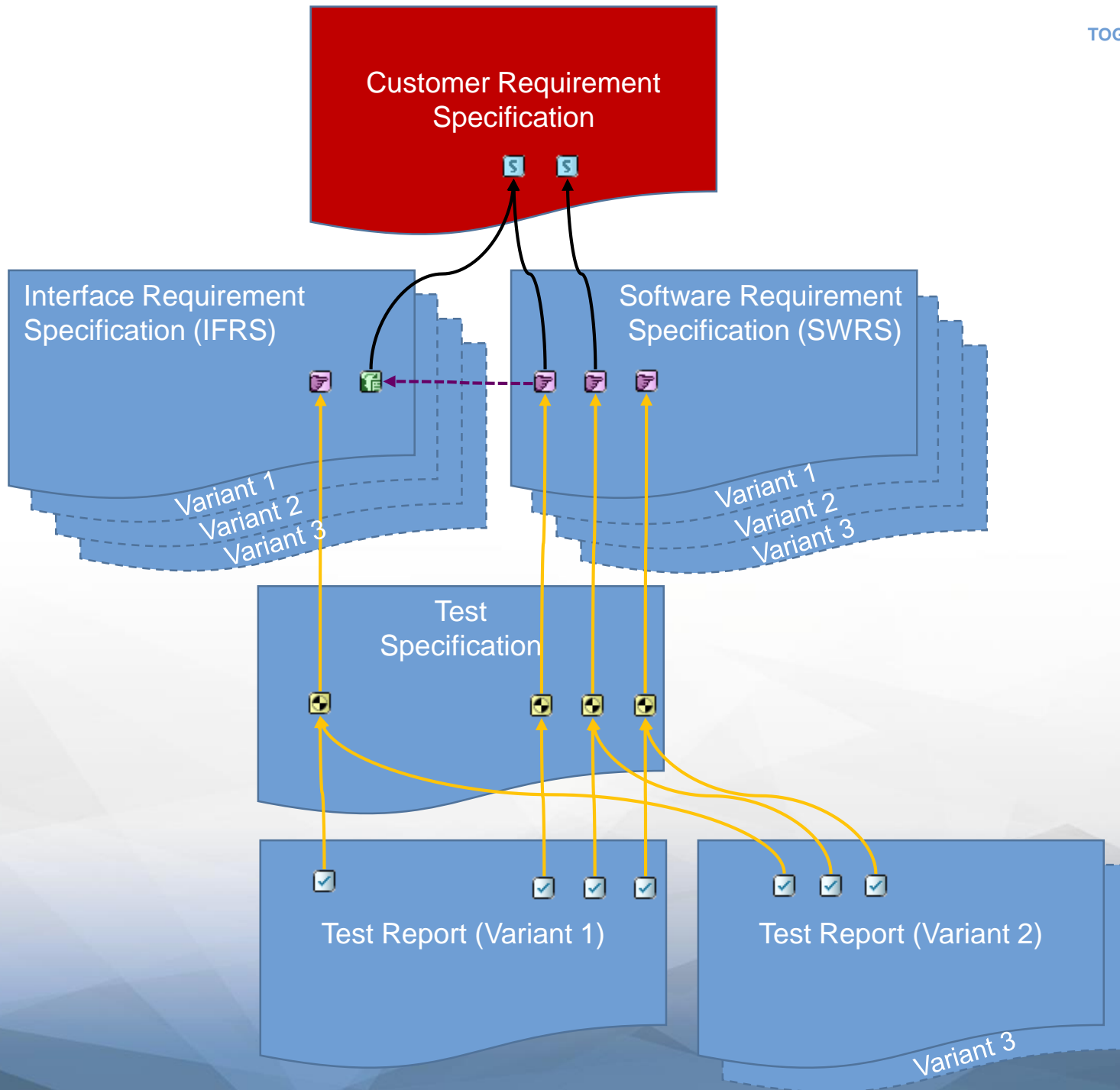
2016

- New traceability
- Using Jenkins to create test reports
- Reconfigured Polarion

2017

- Variants
- Status pages
- Separated test result from test cases

2018



Status pages

NDSuite

Search

Kenny Stjernström
My Polarion

Home

Documents & Pages

Default Space

Customer

Features

Functional Testing

Generated Specifications

Index

AUTOSAR_4x_TPI - Interface Requirement Specification

AUTOSAR_4x_TPI - Software Requirement Specification

Verification report internal

Legislation

Manual Verification

Master Specifications

Performance Testing

Expand Tools

Selected documents:

Title	Status	Updated	Updated By
AUTOSAR_4x_TPI - Interface Requirement Specification AUTOSAR_4x	Open	2017-12-20 14:14	Henrik Stafin
AUTOSAR_4x_TPI - Software Requirement Specification	Open	2018-03-19 11:13	Kenny Stjernström

2 items found

Requirement status

Status of the Requirement items

The pie chart shows how the status is distributed for all Requirement items. I.e. performance, non performance software and general requirements are included.

Verification of the requirements

The requirements can be verified via Functional Tests, Performance tests, Unit tests, manual verifications or by subrequirements.

Test coverage of requirements

The pie chart shows how many of the requirements is linked to Test cases or verified by subrequirement. All Requirement items are considered. I.e. performance, non performance software and general requirements are included

Non approved requirements

ID	Title	Status
NDS-2474	...	Open
NDS-2514	...	Open
NDS-2516	...	Open
NDS-2584	...	Open
NDS-2594	...	Open
NDS-2604	...	Open

Requirements with undefined Verified by

ID	Title	Status
0 items found		

Not linked requirements

ID	Title	Status
NDS-15754	...	Open
NDS-16679	...	Open
NDS-16680	...	Open
NDS-16681	...	Open
NDS-16683	...	Open
NDS-16684	...	Open

Status pages

NDSuite

Q Search

Kenny Stjernström

My Polarion

Home

Documents & Pages

Default Space

Customer

Features

Functional Testing

Index

FunctionalTestReport_autosar_1x

FunctionalTestReport_autosar_1x_1

FunctionalTestReport_autosar_1x_2

FunctionalTestReport_autosar_1x_3

FunctionalTestReport_autosar_1x_4

FunctionalTestReport_autosar_1x_5

FunctionalTestReport_autosar_1x_6

FunctionalTestReport_autosar_1x_7

FunctionalTestReport_autosar_1x_8

FunctionalTestReport_autosar_1x_9

FunctionalTestReport_autosar_1x_10

FunctionalTests

Generated Specifications

Legislation

Manual Verification

Master Specifications

Performance Testing

Unit Testing

Variants

Work Items

Expand

Title

Status

Expand Tools

Updated

Updated By

FunctionalTestReport_autosar_1x

In Review

2017-12-04 15:05

Autotest

1 items found

Status of functional testing

Functional tests

Approved

In Review

Rejected

Open

Functional test results

Failed

Not tested

Awaiting Review

Passed

Rejected

Passed with remark

Not to be tested

Not approved functional tests:

ID	Title	Status
NDS-15763	FunctionalTestReport_autosar_1x	Open
NDS-15761	FunctionalTestReport_autosar_1x_1	Open
NDS-15759	FunctionalTestReport_autosar_1x_2	Open
NDS-15757	FunctionalTestReport_autosar_1x_3	Open
NDS-15755	FunctionalTestReport_autosar_1x_4	Open
NDS-7658	FunctionalTestReport_autosar_1x_5	Open
NDS-5960	FunctionalTestReport_autosar_1x_6	Open
NDS-5885	FunctionalTestReport_autosar_1x_7	Open
NDS-5884	FunctionalTestReport_autosar_1x_8	Open
NDS-5883	FunctionalTestReport_autosar_1x_9	Open
NDS-5882	FunctionalTestReport_autosar_1x_10	Open
NDS-5881	FunctionalTestReport_autosar_1x_11	Open
NDS-5880	FunctionalTestReport_autosar_1x_12	Open
NDS-571	FunctionalTestReport_autosar_1x_13	Open

2 items found

Test records not marked with Passed:

ID	Title	Status
NDS-7554	FunctionalTestReport_autosar_1x_14	Not tested
NDS-7549	FunctionalTestReport_autosar_1x_15	Not tested

2 items found

Status pages

ND Suite

Search

Kenny Stjernström
My Polarion

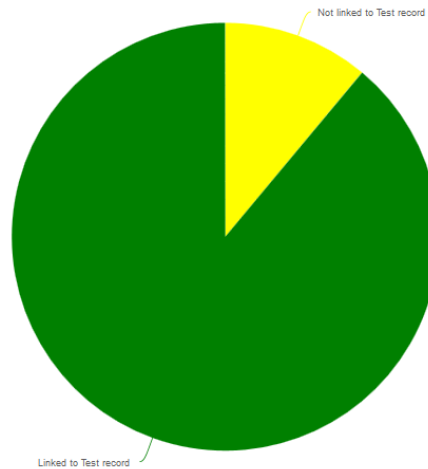
Home

Documents & Pages

- Default Space
- Customer
- Features
- Functional Testing
 - Index
 - FunctionTestReport_autosar_1x
 - FunctionTestReport_autosar_1x_1
 - FunctionTestReport_autosar_1x_2
 - FunctionTestReport_autosar_1x_3
 - FunctionTestReport_autosar_1x_4
 - FunctionTestReport_autosar_1x_5
 - FunctionTestReport_autosar_1x_6
 - FunctionTestReport_autosar_1x_7
 - FunctionTestReport_autosar_1x_8
 - FunctionTestReport_autosar_1x_9
 - FunctionTestReport_autosar_1x_10
 - FunctionTestReport_autosar_1x_11
 - FunctionTestReport_autosar_1x_12
 - FunctionTestReport_autosar_1x_13
 - FunctionTestReport_autosar_1x_14
 - FunctionTestReport_autosar_1x_15
 - FunctionTestReport_autosar_1x_16
 - FunctionTestReport_autosar_1x_17
 - FunctionTestReport_autosar_1x_18
 - FunctionTestReport_autosar_1x_19
 - FunctionTestReport_autosar_1x_20
 - FunctionTestReport_autosar_1x_21
 - FunctionTestReport_autosar_1x_22
 - FunctionTestReport_autosar_1x_23
 - FunctionTestReport_autosar_1x_24
 - FunctionTestReport_autosar_1x_25
 - FunctionTestReport_autosar_1x_26
 - FunctionTestReport_autosar_1x_27
 - FunctionTestReport_autosar_1x_28
 - FunctionTestReport_autosar_1x_29
 - FunctionTestReport_autosar_1x_30
 - FunctionTestReport_autosar_1x_31
 - FunctionTestReport_autosar_1x_32
 - FunctionTestReport_autosar_1x_33
 - FunctionTestReport_autosar_1x_34
 - FunctionTestReport_autosar_1x_35
 - FunctionTestReport_autosar_1x_36
 - FunctionTestReport_autosar_1x_37
 - FunctionTestReport_autosar_1x_38
 - FunctionTestReport_autosar_1x_39
 - FunctionTestReport_autosar_1x_40
 - FunctionTestReport_autosar_1x_41
 - FunctionTestReport_autosar_1x_42
 - FunctionTestReport_autosar_1x_43
 - FunctionTestReport_autosar_1x_44
 - FunctionTestReport_autosar_1x_45
 - FunctionTestReport_autosar_1x_46
 - FunctionTestReport_autosar_1x_47
 - FunctionTestReport_autosar_1x_48
 - FunctionTestReport_autosar_1x_49
 - FunctionTestReport_autosar_1x_50
 - FunctionTestReport_autosar_1x_51
 - FunctionTestReport_autosar_1x_52
 - FunctionTestReport_autosar_1x_53
 - FunctionTestReport_autosar_1x_54
 - FunctionTestReport_autosar_1x_55
 - FunctionTestReport_autosar_1x_56
 - FunctionTestReport_autosar_1x_57
 - FunctionTestReport_autosar_1x_58
 - FunctionTestReport_autosar_1x_59
 - FunctionTestReport_autosar_1x_60
 - FunctionTestReport_autosar_1x_61
 - FunctionTestReport_autosar_1x_62
 - FunctionTestReport_autosar_1x_63
 - FunctionTestReport_autosar_1x_64
 - FunctionTestReport_autosar_1x_65
 - FunctionTestReport_autosar_1x_66
 - FunctionTestReport_autosar_1x_67
 - FunctionTestReport_autosar_1x_68
 - FunctionTestReport_autosar_1x_69
 - FunctionTestReport_autosar_1x_70
 - FunctionTestReport_autosar_1x_71
 - FunctionTestReport_autosar_1x_72
 - FunctionTestReport_autosar_1x_73
 - FunctionTestReport_autosar_1x_74
 - FunctionTestReport_autosar_1x_75
 - FunctionTestReport_autosar_1x_76
 - FunctionTestReport_autosar_1x_77
 - FunctionTestReport_autosar_1x_78
 - FunctionTestReport_autosar_1x_79
 - FunctionTestReport_autosar_1x_80
 - FunctionTestReport_autosar_1x_81
 - FunctionTestReport_autosar_1x_82
 - FunctionTestReport_autosar_1x_83
 - FunctionTestReport_autosar_1x_84
 - FunctionTestReport_autosar_1x_85
 - FunctionTestReport_autosar_1x_86
 - FunctionTestReport_autosar_1x_87
 - FunctionTestReport_autosar_1x_88
 - FunctionTestReport_autosar_1x_89
 - FunctionTestReport_autosar_1x_90
 - FunctionTestReport_autosar_1x_91
 - FunctionTestReport_autosar_1x_92
 - FunctionTestReport_autosar_1x_93
 - FunctionTestReport_autosar_1x_94
 - FunctionTestReport_autosar_1x_95
 - FunctionTestReport_autosar_1x_96
 - FunctionTestReport_autosar_1x_97
 - FunctionTestReport_autosar_1x_98
 - FunctionTestReport_autosar_1x_99
 - FunctionTestReport_autosar_1x_100
- Generated Specifications
- Legislation
- Manual Verification
- Master Specifications
- Performance Testing
- Unit Testing
- Variants
- Work Items

Expand

Test case-> Test record



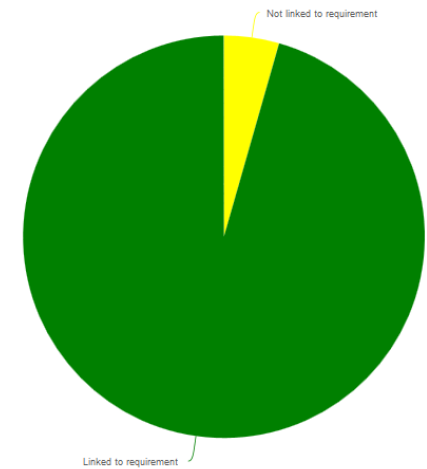
Test cases that are not linked to test record for selected variant:

ID	Title	Status
NDS-507	FunctionTestReport_autosar_1x_1	Open
NDS-511	FunctionTestReport_autosar_1x_2	Open
NDS-505	FunctionTestReport_autosar_1x_3	Open
NDS-506	FunctionTestReport_autosar_1x_4	Open
NDS-514	FunctionTestReport_autosar_1x_5	Open
NDS-6844	FunctionTestReport_autosar_1x_6	Open
NDS-534	FunctionTestReport_autosar_1x_7	Open
NDS-513	FunctionTestReport_autosar_1x_8	Open
NDS-543	FunctionTestReport_autosar_1x_9	Open
NDS-522	FunctionTestReport_autosar_1x_10	Open
NDS-517	FunctionTestReport_autosar_1x_11	Open
NDS-499	FunctionTestReport_autosar_1x_12	Open
NDS-510	FunctionTestReport_autosar_1x_13	Open
NDS-509	FunctionTestReport_autosar_1x_14	Open
NDS-541	FunctionTestReport_autosar_1x_15	Open
NDS-542	FunctionTestReport_autosar_1x_16	Open
NDS-512	FunctionTestReport_autosar_1x_17	Open
NDS-520	FunctionTestReport_autosar_1x_18	Open
NDS-129	FunctionTestReport_autosar_1x_19	Open
NDS-498	FunctionTestReport_autosar_1x_20	Open

Showing 20 items of 28 found

Expand Tools

Test case-> Requirement linking



Not linked test cases:

ID	Title	Status
NDS-15755	FunctionTestReport_autosar_1x_1	Open
NDS-15757	FunctionTestReport_autosar_1x_2	Open
NDS-15759	FunctionTestReport_autosar_1x_3	Open
NDS-15761	FunctionTestReport_autosar_1x_4	Open
NDS-15763	FunctionTestReport_autosar_1x_5	Open
NDS-390	FunctionTestReport_autosar_1x_6	Open
NDS-396	FunctionTestReport_autosar_1x_7	Open
NDS-475	FunctionTestReport_autosar_1x_8	Open
NDS-555	FunctionTestReport_autosar_1x_9	Open
NDS-7658	FunctionTestReport_autosar_1x_10	Open

10 items found

The road up till today

2016

- New traceability
- Using Jenkins to create test reports
- Reconfigured Polarion

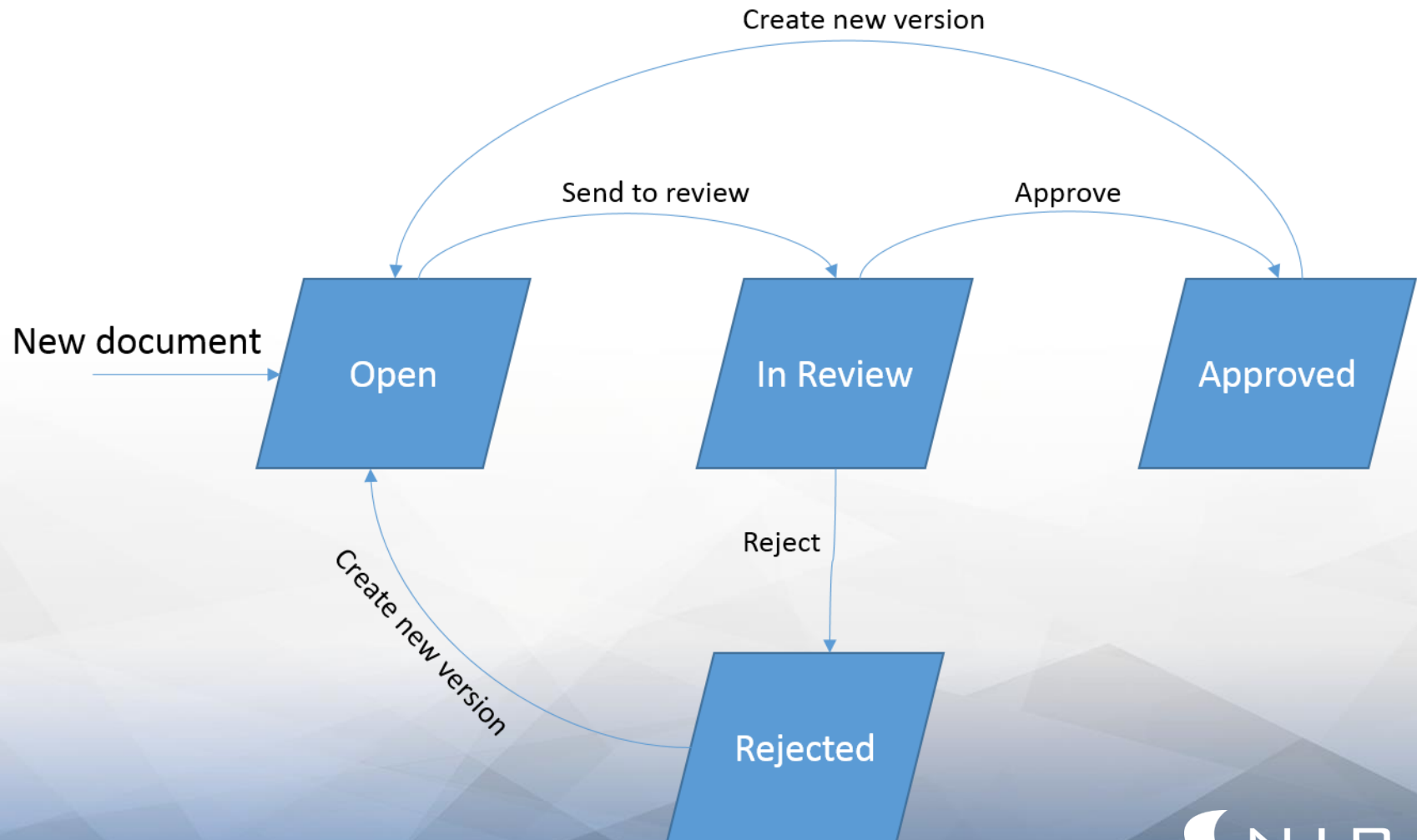
2017

- Variants
- Overview pages
- Separated test result from test cases

2018

- Document workflow

Document workflow



Challenges

- NCS
- The tool must support the user to do the right thing.
- Use the comment functionality to do the reviews.



Improvement suggestions

- Usability improvements.
 - Automatic set up of imports.
 - Number of savings needed must be decreased.
- Performance improvements
 - Saving performance.
 - Poor performance when viewing history, especially SQL queries.



