

**INTLAND  
SOFTWARE**

**Intland's**

**Automotive**

**ISO 26262**

**Template**

codeBeamer ALM supports Automotive Development and Regulatory Compliance (ISO 26262, IEC 61508, Automotive SPICE, CMMI and more)



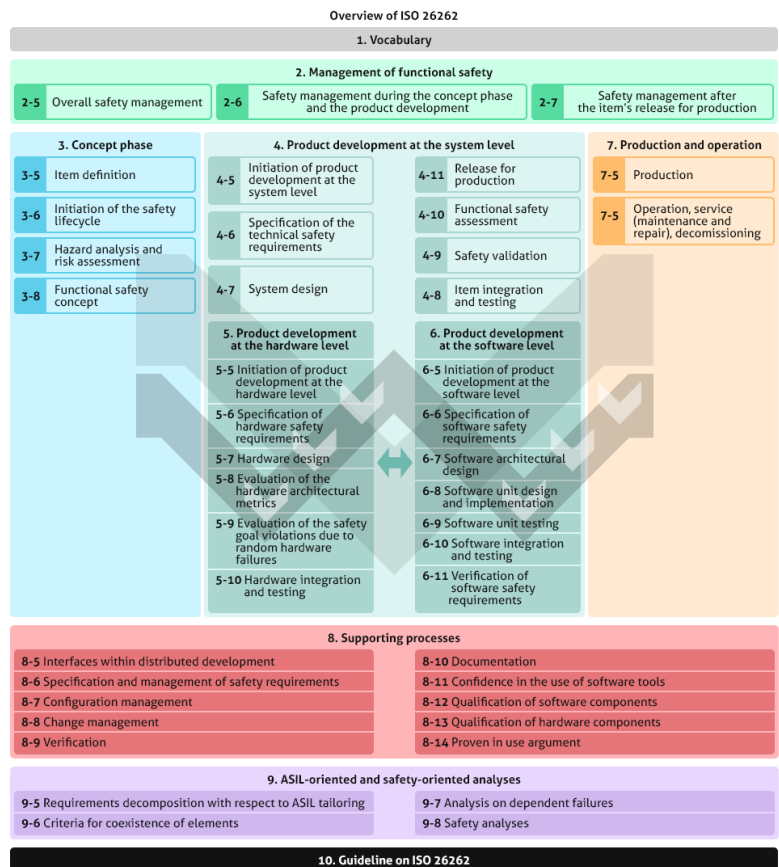
### codeBeamer ALM supports Automotive Development and Regulatory Compliance (ISO 26262, IEC 61508, Automotive SPICE, CMMI and more)

With growing complexity, and the increasing reliance on embedded electronics and software in modern vehicles, safety and reliability in automotive products is more important than ever. Complexity introduces risks, which have to be minimized or mitigated using specific risk management processes, and through the enforcement of adequate processes in the development of automotive systems.

To ensure that the end products of developers, suppliers and manufacturers in the automotive industry are all safe and reliable, several industry standards, regulations and programs have been devised. Adherence to these regulations is key to success in automotive development. Preparing for compliance audits is of vital importance for automotive developers.

The most important regulations and programs in the automotive field are ISO 26262, IEC 61508, Automotive SPICE, and CMMI. Intland's Automotive ISO 26262 Template leverages the advanced capabilities of codeBeamer ALM to assist you in adhering to the regulations of these standards.

The various features and functions of codeBeamer ALM support compliance with each of these, and overall enable you to develop safety-related embedded systems up to ASIL D or SIL 3.



## Configured for Automotive Lifecycles

Intland's Automotive ISO 26262 Template contains preconfigured, but highly customizable artifacts and workflows tailored for development processes in the automotive industry. codeBeamer's integrated capabilities include requirements management, hazard management, development, change management, configuration management, QA & testing and reporting in order to help you adhere to regulations and prepare for compliance audits.

## Automotive Requirements Management

The template's requirements work items (trackers) are flexibly configurable, and are able to store all relevant data such as ASIL, safety goal, type, complexity, etc. out of the box. codeBeamer ALM offers integration with ReqIF, round-trip export-import functions with MS Word and Excel, integrations with JIRA®, IBM® DOORS® and MATLAB® Simulink®, and UML diagram importing from Enterprise Architect. Requirements may be conveniently rated and commented on, saved in libraries for reuse to facilitate variants management, and managed throughout the development lifecycle via fully customizable workflows. Data consistency across teams and departments, and gapless end-to-end traceability (links between work items & a complete change history of all artifacts) is ensured, supporting requirements-based testing. Requirements' test coverage can be analyzed using a convenient Coverage Browser.

Automotive  
Requirements  
Management

Change control with  
work item history

| Submitted                | Action   | Version | Field changes | New Value   | Old Value   |
|--------------------------|----------|---------|---------------|---|---|
| hallerpetya Sep 01 16:20 | Edit     | 9       | Risk          | Power supply is missing, Power supply is exhausted  | Power supply  |
| hallerpetya Sep 01 16:23 | Edit     | 8       | Risk          | Power supply  | -   |
| hallerpetya Sep 01 16:20 | Accept   | 7       | Status        | Accepted  | Draft   |
| hallerpetya Sep 01 16:20 | Redefine | 6       | Status        | Draft   | Accepted  |
| hallerpetya Sep 01 16:20 | Accept   | 5       | Status        | Accepted  | Draft   |
| hallerpetya Sep 01 16:20 | Define   | 4       | Status        | Draft   | New   |
| hallerpetya Sep 01 16:19 | Edit     | 3       | Description   | [!car-battery.png!] An automotive battery is a type of rechargeable battery that supplies electric energy to an automobile. An automotive SLI battery (starting, lighting, ignition) powers the starter motor, the lights, and the ignition system of a vehicle's engine. Automotive SLI batteries are usually lead-acid type, and are made of six galvanic cells in series to provide a 12-volt system. Each cell provides 2.1 volts for | [!car-battery.png!] An automot automobile [ battery start vehicle's eng Automotive provide a 12 |
| hallerpetya Sep 01 16:19 | Edit     | 2       | Description   | [!car-battery.png!] An automotive battery is a type of rechargeable battery that supplies electric energy to an automobile. [!http://www.codebeamer.com/tracker/757699#ref:Project:418-1] An automotive SLI battery (starting, lighting, ignition) powers the starter motor, the lights, and the ignition system of a vehicle's engine.   |   |

### Automotive Software Development & Release Management

Links between requirements, risks, tasks, source code, test cases and releases may be established in a convenient manner, and are automatically maintained throughout the lifecycle. Development with several models (Waterfall or V-Model, Agile, scaled Agile with SAFe®, as well as custom Hybrid combinations of these two) is supported, and may be flexibly combined in separate development streams. codeBeamer's release management functionality allows you to plan and manage all activities using an efficient Gantt chart visualization. Statistics are provided to monitor the execution and performance of releases, providing complete visibility and control over your work processes.

### Hazard Management & Failure Mode and Effects Analysis (FMEA)

Through preconfigured trackers for hazards, risks, failure modes, and safety goals, codeBeamer efficiently supports compliance with the safety standard ISO 26262, and its parent standard IEC 61508. Relevant fields such as ASIL and RPN (Risk Priority Number) are provided, and their values can be automatically calculated. Intland's Automotive ISO 26262 Template also features a comprehensive Failure Mode and Effects Analysis (FMEA) feature set to support the identification, visualization, mitigation, control and monitoring of potential risks. An FMEA worksheet may be simply exported for easier auditability.

**Hardware development**

4 sprints 0% 0 closed 4 open  
 0 committed 0% 0 done 0 open  
 23 items 99% 19 done 10 open  
 0 overtime 0 overdue

**1 Define hardware requirements**  
 due in 5,385 days (Jun 01 2030)  
 Define hardware requirements  
 Target:  
 • Define all hardware requirements  
 • Get all hardware requirements approved

|                 |   |           |                       |  |
|-----------------|---|-----------|-----------------------|--|
| HARDREQ-314157  | Chassis                                       | NEW       | ...                   | Inland Software's Automotive Template → 3 Hardware Safety Requirements |
| HARDREQ-314160  | Spring rate                                   | NEW       | ...                   | Inland Software's Automotive Template → 3 Hardware Safety Requirements |
| HARDREQ-314161  | Wheel rate                                    | DRAFT     | ...                   | Inland Software's Automotive Template → 3 Hardware Safety Requirements |
| HARDREQ-314169  | Zero Emission                                 | NEW       | ...                   | Inland Software's Automotive Template → 3 Hardware Safety Requirements |
| HARDTASK-314261 | Define CPU requirements                       | COMPLETED | Requirements engineer | Inland Software's Automotive Template → 5 Hardware Tasks               |
| HARDTASK-314260 | Define digital signal processing requirements | COMPLETED | Requirements engineer | Inland Software's Automotive Template → 5 Hardware Tasks               |
| HARDTASK-314279 | Define USB requirements                       | COMPLETED | Requirements engineer | Inland Software's Automotive Template → 5 Hardware Tasks               |

**Releases**

Plan releases Show released

Hardware development  
 1 Define hardware requirements  
 2 Design hardware architecture  
 3 Build hardware  
 4 Test hardware

Software development  
 1.0 beta Design and implementation sprint QA sprint  
 2.0 "More audio formats" sprint

**Release Management**

**Risk Matrix Diagram**

**codeBeamer**

**Risk Matrix Diagram**

Export to Word Export to Excel

**Risks**  
 Requirements>User Stories with Risks

This Heat Map Matrix Diagram (color, size, rotation, contrast) shows the number of Risks and the number of related Requirements>User Stories in each category by severity and ASIL value. If you click on a cluster, you get the Risks and the related Requirements>User Stories.

The Risk Matrix Diagram only shows the requirements that have their Risk field populated with data. To check the Mitigation Requirements, please use the Traceability Browser.

**Initial risk matrix**

|                              |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|------------------------------|
| Requirements (11100)         | Requirements (11100 - 11100) | Requirements (11100 - 11100) | Requirements (11100 - 11100) |
| Requirements (11100 - 11100) | 2/1                          | 3/4                          |                              |
| Requirements (11100 - 11100) | 1/0                          |                              |                              |
| Requirements (11100 - 11100) |                              |                              |                              |

20 High risks 48 High risks 48 High risks 48 High risks 48 High risks

**Hazard Management**

**Status:** ANALYSED

Requirement: --  
 Failure cause: Brake liquid leaks from the system.  
 Failure effects: Brake system does not functioning. Driver unable to stop the vehicle  
 Controls: Review pipe specification, harden the cover  
 Severity: 3  
 Exposure: 4  
 Controllability: 3  
 ASIL: D  
 Planned actions: --  
 Derived requirements: --  
 Severity after actions taken: --  
 Exposure after actions taken: --  
 Controllability after actions taken: --  
 ASIL after actions taken: --  
 Submitted by: hallopetya Jul 31 12:14  
 Modified by: hallopetya Sep 01 15:42  
 Assigned to: --  
 Color: --

**Relations**

Situation Edit  
 Braking system failure

**Details**

Comments & Attachments (0) Associations (0) Children (0) References (2) SCM Commits (0) Escalations (0) History (7) Baselines (1) All (7)

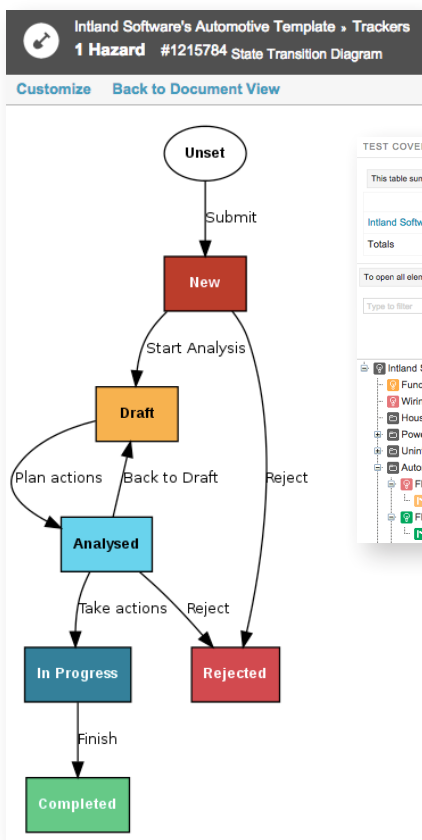
New Jul 31 12:14 by hallopetya Draft Start Analysis Sep 01 15:42 by hallopetya Analyzed Plan actions Sep 01 15:42 by hallopetya

## Security Features, Advanced Workflows

Intland's Automotive ISO 26262 Template takes advantage of codeBeamer's security and access control features based on roles or members, with authorization (e-signatures) optionally enforceable. A predefined hazard workflow allows you to identify and classify hazards (based on their ASIL), and achieve safety goals by planning, executing and monitoring risk control procedures. In codeBeamer, you can conveniently define custom workflows with status transitions and rules tailored to your internal processes. Our ALM platform's Business Process Management capabilities let you integrate processes and data throughout the lifecycle, enabling you to connect processes across tools, departments and projects.

## Automotive Quality Assurance & Testing

codeBeamer's QA & testing functionality lets you define test cases with parameters, organize them into test sets, and save them in test libraries for reuse to make variants management a more convenient process. You can create and link defects during test execution. Tests may be run manually or automatically on different software and hardware configurations, with automated testing supported by codeBeamer's Jenkins integration. Requirements-based testing is supported via our Coverage Browser, which helps you ensure that all your requirements are covered with test cases.



Workflows with  
custom status  
transitions

Test Coverage  
Browser

TEST COVERAGE STATISTICS

This table summarizes the coverage of the tracker items grouped by trackers.

|  | PASSED | PARTLY PASSED | FAILED | BLOCKED | INCOMPLETE | NOT COVERED | COVERED  | TOTAL |
|--|--------|---------------|--------|---------|------------|-------------|----------|-------|
| Intland Software's Medical Demo (Extended) - 2 System Requirements | 3 (9%) | 0             | 1 (3%) | 1 (3%)  | 7 (21%)    | 22 (65%)    | 12 (35%) | 34    |
| Totals   | 3 (9%) | 0             | 1 (3%) | 1 (3%)  | 7 (21%)    | 22 (65%)    | 12 (35%) | 34    |

To open all elements in the tree right click on a tracker node and click on "Expand Node".

Type to filter  Search in work items  Search in test cases  Show work item groups color  Calculate Coverage with Or

| Tracker Items                                    | Coverage    | Test Cases | Coverage Analysis | Last 10 Runs |   |   |  |  |
|--|-------------|------------|-------------------|--------------|---|---|--|--|
| Intland Software's Medical Demo (Extended) - 2 S | INCOMPLETE  | 15         | 4                 | 2            | 1 | 8 |  |  |
| Functional Electrostimulation                    | NOT COVERED | 0          |                   |              |   |   |  |  |
| Wiring   | NOT COVERED | 0          |                   |              |   |   |  |  |
| Housing  | FAILED      | 1          |                   | 1            |   |   |  |  |
| Power supply                                     | NOT COVERED | 0          |                   |              |   |   |  |  |
| Uninterrupted operation                          | NOT COVERED | 0          |                   |              |   |   |  |  |
| Automatic control of flow                        | BLOCKED     | 2          | 1                 |              |   | 1 |  |  |
| Flow control endpoint (peristaltic pump)         | BLOCKED     | 1          |                   |              | 1 |   |  |  |
| Peristaltic pump test                            | BLOCKED     | 1          |                   |              |   |   |  |  |
| Flow sensor                                      | PASSED      | 1          |                   |              | 1 |   |  |  |
| Flow sensor test                                 |             |            |                   |              |   |   |  |  |

Test runs on different  
configurations

Test Cases

Tracker: Test Cases  
Type: --  
Assigned to: halferpeya Dec 08 2015 15:54  
Priority: Lowest  
Created by: Sales Sep 15 2014 09:11  
Status: IN DESIGN  
Modified by: halferpeya Today 10:23

Verify: --  
Pre-Action: --  
Post-Action: --  
Test Parameters: --

Type of Test Case: Functional  
Pri: --  
Test Set: --

Relations

Results

Description

Details

Test Steps (4) | Test Parameters (0) | Comments & Attachments (3) | Associations (10) | Children (0) | References (16) | Test Runs (5) | History (24) | Baselines (0) | All (20)

Critical

1. Brake with ceramic brake pads.

Expected result

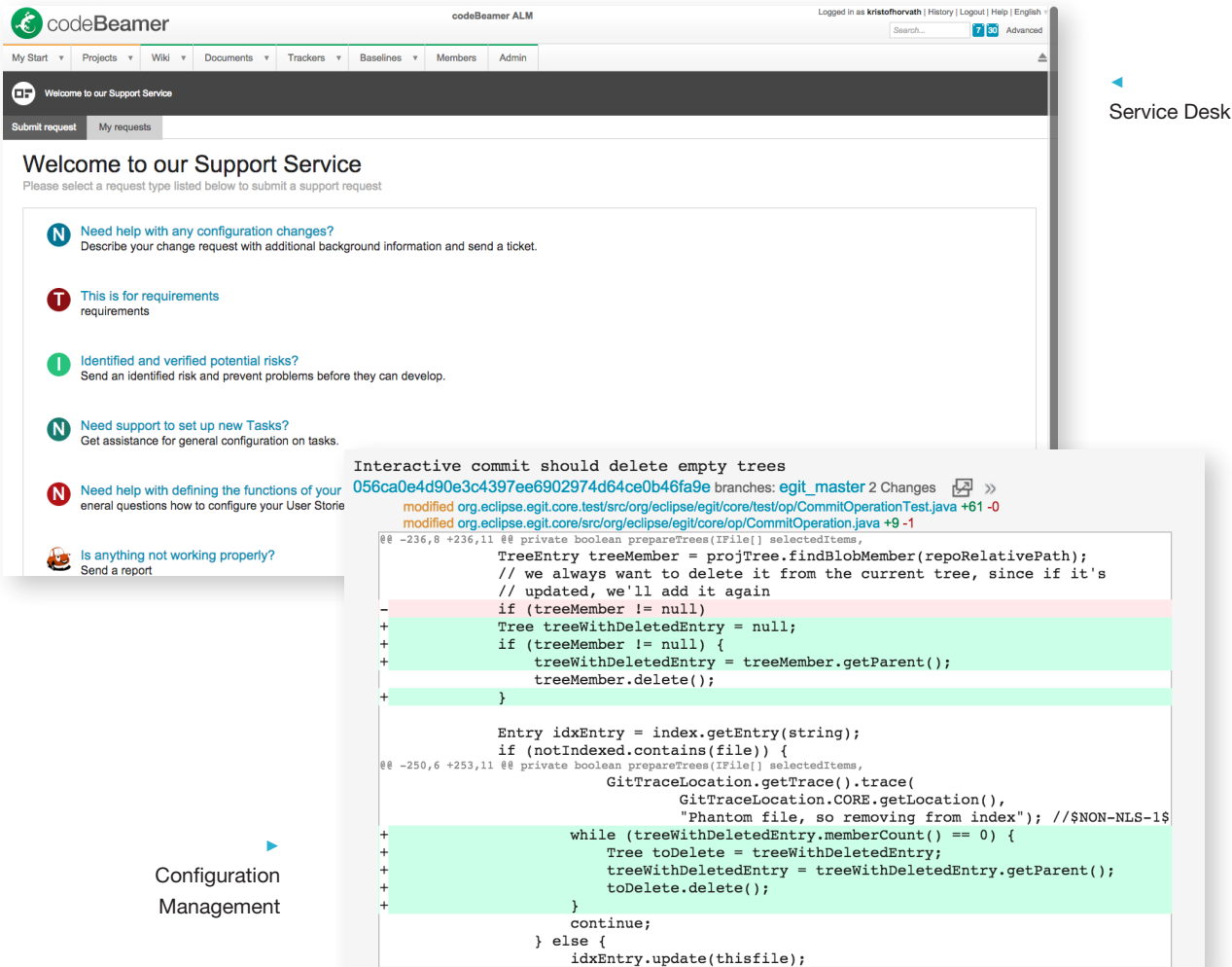
The brake pads work fine and the car stops.

## Change & Issue Management

Change requests can be simply collected, managed and tracked, and change management is further supported by codeBeamer's Service Desk feature. Through linking change requests to requirements and tests, traceability is ensured, and suspected links are also displayed. Effort estimation, time tracking and release readiness visualization help efficient change management. Issues may be tracked and managed using highly configurable Kanban boards, with escalation rules defined in custom workflows.

## Configuration Management

Several configuration management systems (Git, Subversion, Mercurial, CVS and Plastic SCM) are supported by codeBeamer, with repository management and access control plus traceability of code changes available. Defects, change requests and tasks may be related to source code changes, and issue relation may be enforced upon commit.



## Audit Preparation, Wiki & Reporting, Document Management

Intland's Automotive ISO 26262 Template comes with a document repository to provide a single source of truth for all your teams and departments. Everything stored in codeBeamer ALM is indexed to allow flexible searching, and versioning on all items is taking place automatically in the background.

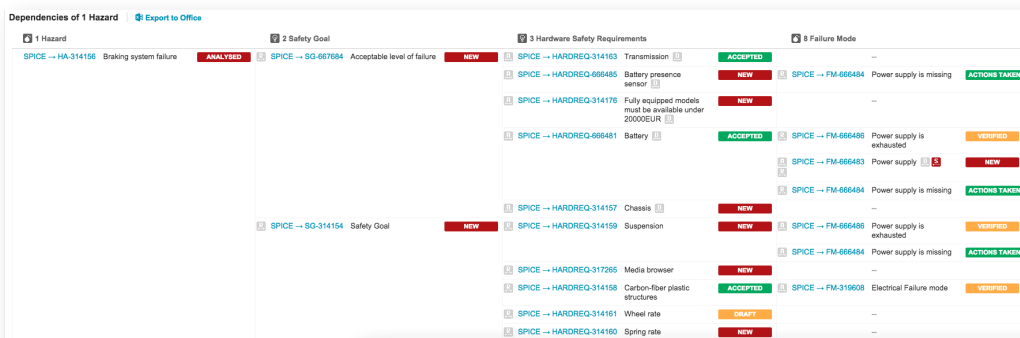
Various reporting options help you prepare for compliance audits. Preconfigured reports such as the 'Hazard by ASIL' report are available, while Wiki plugins can be used to set up your own custom reports. Easy to overview matrix visualization is available for associations between hazards, safety goals and requirements. Results of the Test Coverage Browser and the Traceability Browser may be simply exported.

## Baselines

codeBeamer's baselining functionality lets you take a snapshots of all your artifacts, and compare these baselines to be automatically notified of all changes. Individual tracker types or items may be specifically baselined, with their associations maintained (e.g. baselined requirements may be linked to test cases).

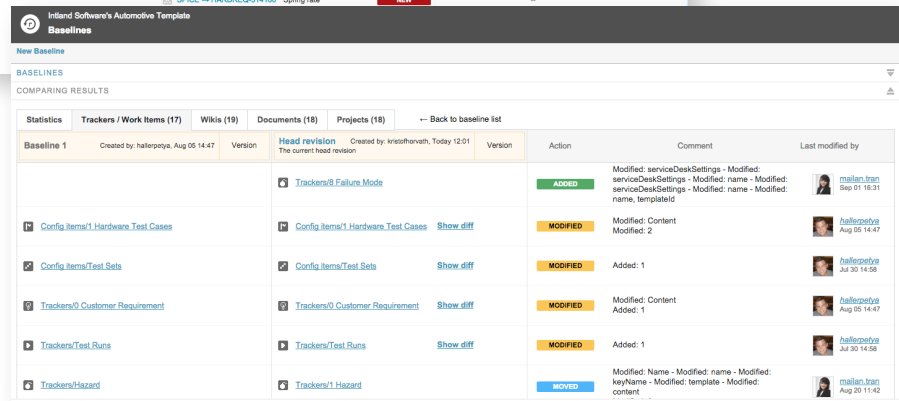
## Data Analytics and Reporting

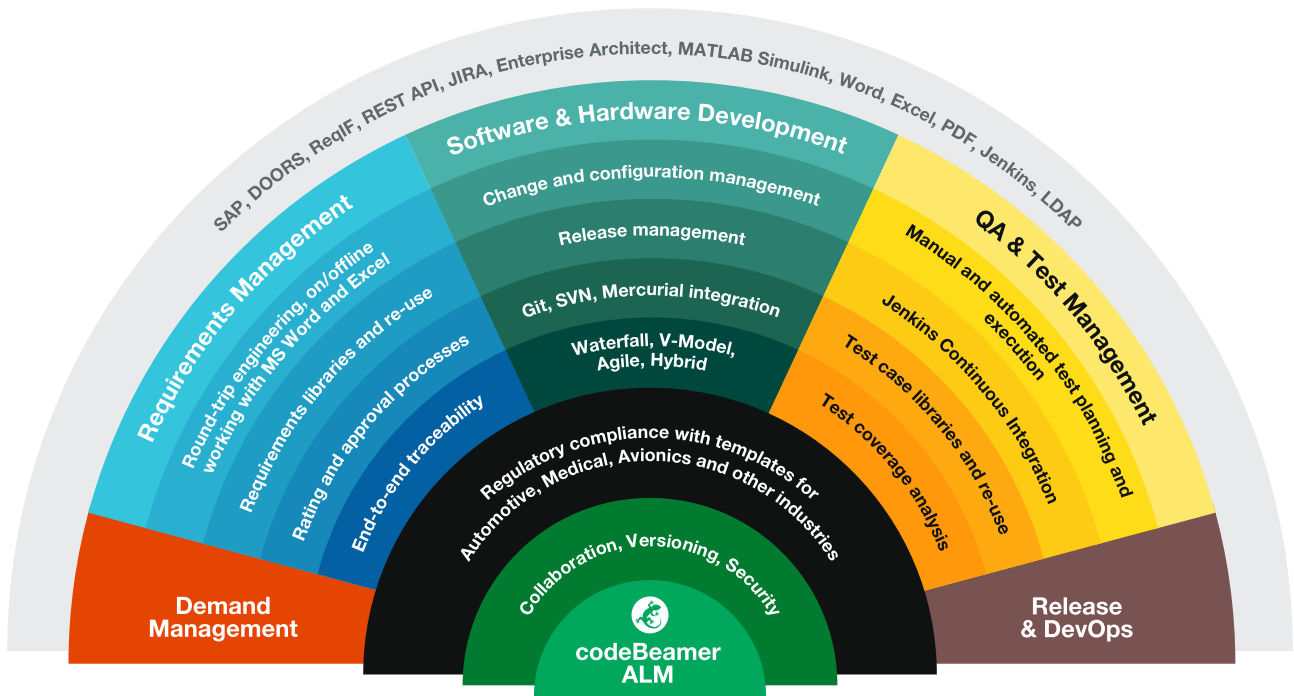
codeBeamer stores all your important production and historical data in its repository, from requirements through to testing and delivery. Its powerful data analytics and reporting features help make sense of all that data to unlock valuable insights. Search and filter data using queries, visualize it using preconfigured charts and diagrams, and analyze data to support decision-making – all with a few simple clicks. Using shareable, exportable automatic data visualization enables you to monitor business KPIs effortlessly, letting you oversee, improve and optimize processes. Dashboards and reports with benchmarks, visualized data, and production insights may be simply created and shared with others.



Traceability  
Browser

Baselines





To request Intland's Automotive ISO 26262 Template, please fill in this form:  
<https://intland.com/automotive-software-engineering/>

Or simply reach out to us for a live 1-on-1 product demonstration:  
[sales@intland.com](mailto:sales@intland.com)

If you'd rather get acquainted with the advanced features and capabilities of codeBeamer first, why not start your free 30-day trial today?  
<https://intland.com/download-codebeamer/>



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