Jama software®

EBOOK

The Complete Guide to ISO/IEC/IEEE 15288:2015 — Systems and Software Engineering and Lifecycle Processes

A comprehensive look at goals, standards, and tools to achieve compliance

Table of Contents

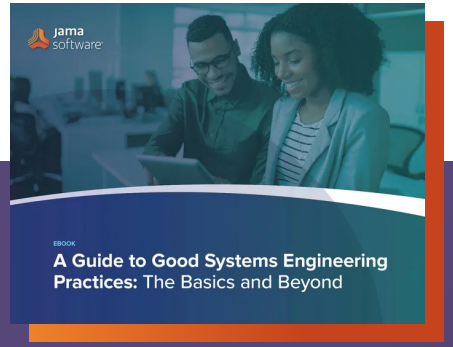
1 Introduction

Introduction

Product development is evolving quickly; over the past few years, it's become increasingly complex. A study of nearly 300 design and engineering professionals found that 92% of respondents say they're experiencing at least one form of increased complexity. Moreover, 76% say they're experiencing at least three.

A set of standards, such as those found in ISO/IEC/IEEE 15288:2015, can help manage increased complexities using established frameworks. But if you aren't familiar with the standards, you might have many questions such as: What is ISO/IEC/IEEE 15288:2015? What organizations use it? And how can it help with product development?

We've created a guide to help answer these questions so you can determine whether using this standard is right for your organization and explore other tools that can help.



GUIDE

A systems engineer will focus on making each of the individual systems work together into an integrated whole that performs as expected across the lifecycle of the product.

Learn more about systems engineering best practices in this guide.

Get the guide »

2 Why was ISO/IEC/IEEE 15288:2015 developed?

Why was ISO/IEC/IEEE 15288:2015 developed?

Building a new system is a large undertaking that involves a variety of moving parts and components. The success of any project, of course, relies on those parts working in synergy and solving for any potential disconnects. That's why having a common set of practices can help. **ISO/IEC/IEEE 15288:2015 was designed to create a standard reference of activities to be executed within a specific system engineering process.** The standards are designed for those in systems engineering leadership, such as:

1. Systems Architects
2. Systems Developers
3. Project Managers
4. Computer Scientists

The standards are commonly used to guide internal work on systems development but can also be used as an external reference. For example, if you work with a partner, you might use ISO/IEC/IEEE 15288:2015 to help create agreements about how work is completed.

Building a New System is Growing More Complex

A recent study of almost 300 design and engineer professional found that not only are engineering systems getting more complex, but many organizations aren't equipped with the right tools to manage the intricacies of complex system development.

92% of respondents reported experiencing at least one form of increased complexity.

76% report dealing with three or more increased measures of complexity.

25% report their products are becoming more complex in five or more ways.

3 How is this particular standard used?

How is this particular standard used?

During product and system development, you're working to solve a specific customer challenge. Using ISO/IEC/IEEE 15288:2015 helps you accomplish this goal by providing a framework for your processes. But how exactly are standards typically used? Here are a few examples.

- **Used by an organization.** An organization might use ISO/IEC/IEEE 15288:2015 to create an environment of desired processes. An infrastructure or method, procedures, technologies (and more) typically support these processes.
- **Used by the project.** You might decide to use what is found in ISO/IEC/IEEE 15288:2015 as internal standards to support the deployment of an existing environment or offer a new system or service. In addition, standards are used to judge the performance of a project in a specific environment.
- **Supports partner agreements.** Agreements are the foundation of any successful relationship, including those with suppliers or other external parties. You might partner with a supplier, for example, to select relevant processes and activities within the standards and create agreements based on those elements.
- **Used to evaluate processes.** ISO/IEC/IEEE 15288:2015 can serve as a process reference model to determine whether your existing processes support a specific goal around process improvements.

As you can see, you have flexibility when using standards. You can implement all frameworks or just a few of them. ISO/IEC/IEEE 15288:2015 can serve as a starting point, selecting what fits best for your project, processes or organization to guide your decisions.

4 ISO/IEC/IEEE 15288:2015 — The six parts, broken down

ISO/IEC/IEEE 15288:2015 — The six parts, broken down

As you view the standards, you'll notice six different sections. If you haven't viewed the full standard yet, you can get a detailed guide of what's included by viewing the table of contents. Here's a quick summary of each section so you know what to expect.

Chapter One — Overview

The first chapter provides details about the standard, what it is, who should use it and general implementation details. It covers the scope of the standard, and the limitations to consider. The goal is to provide you with a quick introduction to the standard so you're ready to dive deeper into later chapters.

Chapter Two — Conformance

The conformance section provides more details about how to use the standard, covering two main areas: full conformance and tailored conformance. Remember that flexibility mentioned earlier? This section details how you might apply that flexibility to your systems and projects.

The Six Main Parts of the Standard

The Overview. Details what the standard is, who should use it and implementation details.

Conformance. Information about how you can use the standard.

Normative References. A section that gives you references to further support elements included in the standard.

Terms, Definitions, and Abbreviated Terms. A reference that helps you understand terms and information included in the standard.

Key Concepts and Applications of This International Standard. A breakdown of key concepts included in the standard, with many subsections to explore.

System Lifecycle Processes. Details the lifecycle processes, which are broken into four main groups: technical, technical management, agreement, and organizational system-enabling.

Chapter Three — Normative References

The normative references section provides basic information to support you in understanding the standard. A strict criteria exist for reference inclusion:

1. References must have wide acceptance and authoritative status.
2. Easy access to the references must exist, such as public availability or the ability to purchase at a low cost.
3. The reference can't contain any commercial terms or conditions.
4. Normatively referenced "open source" has to be hosted on the IEEE open source platform.

Chapter three is similar to a library index because it points you to relevant resources. Consider a quick review of the section, and then revisit as needed when you need a greater understanding of specific concepts.

Chapter Four — Terms, Definitions, and Abbreviated Terms

The fourth chapter provides a list of common terms, definitions and abbreviations to guide you in understanding the standard. Similar to chapter three, consider skimming the section and referencing it as you encounter concepts or language that requires more clarity.

Chapter Five — Key Concepts and Application of This International Standard

Once you arrive at chapter five, you're ready to dive into the standard, what it covers and other specifics. The chapter includes many subsections, but here's a guide to a few of the larger ones:

- **System concepts (5.2).** This section includes system definitions, system structure, and system enablement details. It provides the details required to understand all relevant systems information, and concepts included in the standard.

- **Organization and project concepts (5.3).** The organization and project concepts section details organizational-level adoption and project-level adoption.
- **Lifecycle concepts (5.4).** Section 5.4 breaks down the systems lifecycle model and the system lifecycle stages. Six parts are included.
  - **Concept.** Creating the right product requires a solid understanding of the end user's needs. The concept stage helps meet those needs by establishing processes that conform to user requirements.
  - **Development.** The development stage helps explore concepts in greater depth to ensure you meet the requirements. Validation is an important component of this stage.
  - **Production.** The production stage, also known as the building stage, helps determine whether modifications are required. These modifications might be targeted at lowering production costs or improving previously imagined capabilities.
  - **Utilization.** The utilization phase provides a holistic view of defining, producing and operating your systems.

Advantages of Complying with ISO/IEC/IEEE 152.88:2015

If you're considering ISO/IEC/IEEE 152.88:2015 adoption, you might wonder about the advantages. Does your adoption make sense for your organization? Here are a couple of benefits:

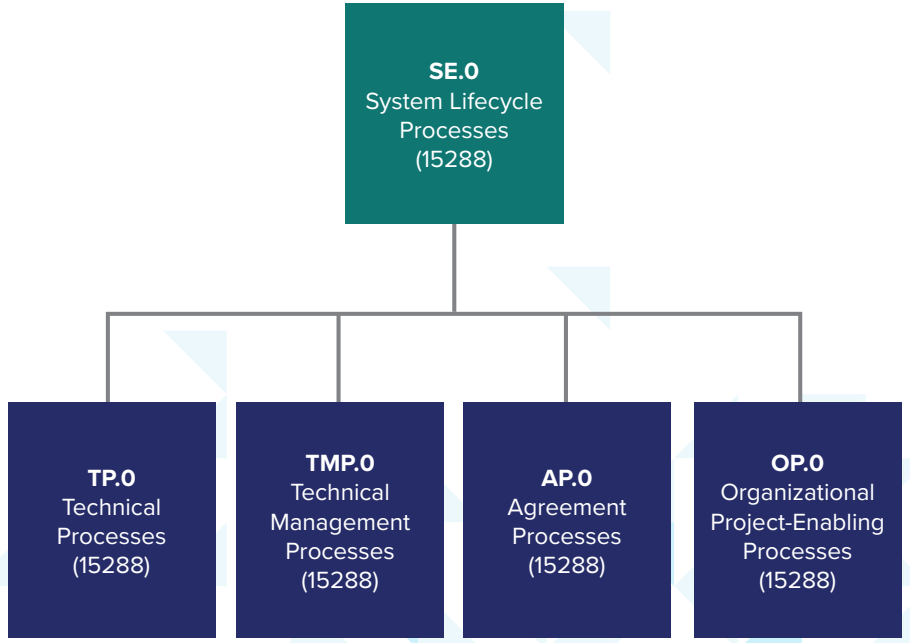
- **Has wide acceptance and recognition.** The standard is recognized worldwide by regulators, governments, professional organizations, and more.
- **Creates credibility with partners and customers.** Complying with the standard helps you show your customers and partners that you meet a certain level of requirements.
- **Instills confidence.** Adoption isn't required, but complying with ISO/IEC/IEEE 152.88:2015 communicates to your customers and partners that you conform to a widely accepted standard.

- **Support.** The support phase focuses on continuing operations in the future. For example, system modifications might be required to resolve a problem or extend the system's life.
- **Retirement.** The final stage is retirement, which focuses on the actions required to remove the system from operation.

Chapter Six — System Lifecycle Processes

As you move into the final chapter of the standard, system lifecycle processes are broken into four groups: technical processes, technical management processes, agreement processes, and organizational project-enabling processes. Here's a quick breakdown of each:

1. **Technical processes.** Explains what activities are connected to definitions, designs, and development for delivering and supporting a system.
2. **Technical management processes.** Outlines the activities connected to managing your project and other relevant details.
3. **Agreement processes.** Explains how your integrated product team will secure the required goods and services.
4. **Organizational project-enabling processes.** Covers methods performed by the IPT to support all projects executed by an organization.



5 How Jama Connect® can help

How Jama Connect® can help

Most organizations report that developing systems is getting more complicated. Yet only 15% rely on a dedicated requirements management platform to help manage that complexity. What's more, organizations with ineffective requirements management are more likely to experience product outcome failures (83%).

Leveraging a set of standards, such as those found in ISO/IEC/IEEE 15288:2015, is important for improving your processes and systems. But it also helps to have a unified hardware and software development process to increase speed to market and support risk mitigation.

Jama Connect® helps you manage needs and requirements from the idea stage to development, launch, and iteration. It brings people and data together in a single place, providing visibility and actionable insights into the product development lifecycle. And when you're working to leverage a standard such as ISO/IEC/IEEE 15288:2015, having this synergy is important for success.

Jama Connect supports your team with analyzing impacts, tracking decisions, and ensuring the quality of the products you build. Additionally, it helps:

- **Improve confidence.** Trace requirements throughout the entire development process to identify risk faster and proceed confidently that you're building what you set out to create.

- **Create greater visibility.** Improve product development visibility by monitoring relationships and dependencies between systems, teams, activities, and results.
- **Enhance speed.** Align teams, track decisions more efficiently, and minimize rework to create high-quality products — on time and on budget.
- **Improve adaptability.** Integrate Jama Connect into your project and organizational workflows to create an intuitive experience, helping your team get up to speed faster.
- **Level up performance.** Benchmark and monitor team performance over time to understand the benefits of retooling your product development process. Store and reuse existing intellectual property and best practices from multiple product lines.

Jama Connect is a platform that can be used to understand your complete product and system development lifecycle, helping product managers and engineers track requirements, decisions, and relationships on multiple levels to deliver compliant, market-driven products effectively. It helps teams deliver high-quality products on time and on budget by aligning stakeholders, identifying risks early on, and visualizing connections between regulations, requirements, and test cases throughout the development process.

Are you ready to better understand the complete product development cycle and track requirements decisions and relationships more efficiently?

In our ground-breaking ***Requirements Traceability Benchmark***, we examine how traceability is measured, and the business practices that separate top-quartile performers from the rest, including how to:

- Focus on Live Traceability™, not after-the-fact traceability
- Integrate traceable data across best-of-breed tools
- Make the Systems Engineering function data-centric
- Use model-based requirements to shorten and improve discovery
- Manage by exception

Download the whitepaper »

Jama Software® is focused on maximizing innovation success in multidisciplinary engineering organizations. Numerous firsts for humanity in fields such as fuel cells, electrification, space, software-defined vehicles, surgical robotics, and more all rely on Jama Connect® requirements management software to minimize the risk of defects, rework, cost overruns, and recalls. Using Jama Connect, engineering organizations can now intelligently manage the development process by leveraging Live Traceability™ across best-of-breed tools to measurably improve outcomes. Our rapidly growing customer base spans the automotive, medical device, life sciences, semiconductor, aerospace & defense, industrial manufacturing, consumer electronics, financial services, and insurance industries. To learn more, visit us at: jamasoftware.com.