

# Essential SysML Applied™ Workshop

## — SysML/MagicDraw™ edition; updated for UPDM

**Accelerate your DoDAF project with this intense, interactive workshop that emphasizes pragmatic modeling principles and techniques. This workshop features SysML as the architecture description language for DoDAF or its UPDM standard profile, and shows how to apply the techniques using MagicDraw, an award-winning modeling tool.**

As enterprise systems continue to sprawl into systems-of-systems that are monotonically increasing in complexity, there is an urgent need for large-scale mechanisms to help manage their size and complications. A mechanism that has emerged to help address this problem is the *enterprise architecture framework* (*architecture framework* for short). An **architecture framework is a prefabricated structure that organizes an enterprise architecture into complementary views**, analogous to how a building blueprint is arranged into complementary *plans* (site plan, elevation, floor plan, etc.). In 2004 the Department of Defense (DoD) approved the DoD Architecture Framework v. 1.0 as the standard architecture framework for DoD applications. Since that time there has been a proliferation of DoDAF mutations (MODAF, NAF, DNDAF) and revisions (DoDAF 1.5, DoDAF 2.0), as well as a tool vendor effort to unify the variations with a common UML/SysML profile—the Unified Profile for DoDAF/MODAF (UPDM).

This introductory DoDAF workshop **provides students with a solid foundation for applying Model-Based Engineering principles and best practices to DoDAF/UPDM compliant architectures using SysML as the architecture description language**. The workshop teaches the student **how to solve practical problems using a pragmatic subset of DoDAF/UPDM views and SysML diagram types** that are appropriate for their systems. Learning modules are punctuated with frequent Q&A sessions and hands-on practice exercises. This workshop edition is customized to integrate basic modeling tool training with MagicDraw, an award-winning modeling tool.

### WHY TRAIN WITH US? – PIVOTPOINT TRAINING ADVANTAGES

- PivotPoint workshops are **authored and taught by Model-Based Engineering experts** with 10+ years practical application experience.
- PivotPoint workshops **are intense (high Instructor/Student ratio) and pragmatic—punctuated with frequent Q&A sessions and hands-on practice exercises**.
- PivotPoint workshops are **based on proven tool-independent principles and techniques**, so you can learn a leading modeling language or architecture framework with/without a modeling tool. (For a list of workshops customized for popular visual modeling tools see the *Training* page on the PivotPoint web.)
- PivotPoint workshops are **modular and can be customized to meet your team and project needs**. To begin with, you can pick-and-choose your modeling language, and then select from modeling tool and architecture framework training options.
- PivotPoint workshops **offer flexible choices of venues (onsite, offsite, webconference) and durations (#days)**.

For more details about the advantages of PivotPoint's Model-Based Engineering training check out the [“Why Train with Us?”](#) page on the PivotPoint web. But don't just take our word for it; you should also check out the [Client Testimonials](#) page on our web.

Workshop **learning objectives, prerequisites, syllabus, and logistical information are described below.**

## WHAT WILL YOU LEARN?

- What is DoDAF and why do we model enterprise architectures with frameworks?
- What is the UPDM and how does it help specify DoDAF-compliant architectures?
- DoDAF's essential and supporting products for specifying architectures
- How SysML can be used as Architecture Description Language for DoDAF
- How DoDAF + SysML can specify large, complex systems
- How DoDAF + SysML can specify artifacts for the full system lifecycle: requirements through testing
- How to reduce the complexity of mapping SysML diagrams to DoDAF views
- Practical guidelines for specifying correct, complete, clear, concise, and consistent DoDAF specifications
- How to select DoDAF/SysML tools and methods [optional]
- How to architect a DoDAF-compliant system using a selected DoDAF/UPDM/SysML tool: MagicDraw
- How to learn more about DoDAF/UPDM and SysML modeling

## WHO SHOULD PARTICIPATE?

Systems engineers, software engineers, system architects, project managers, and others who want to learn how to improve how they specify system models and architectures will benefit from this workshop.

**PREREQUISITES:** Systems or software engineering experience in building large, complex systems. Experience using one or more structured analysis/design, object or component methods is desirable.

## WORKSHOP AUTHOR & CHIEF INSTRUCTOR



**Cris Kobryn** is the CEO and Founder of PivotPoint Technology Corporation, a company that specializes in Model-Based Engineering Solutions™ for tough business and engineering problems. He is an internationally recognized expert in visual modeling and Model-Based Engineering, and has successfully applied these technologies to diverse industries ranging from aerospace-defense and communications to financial services and manufacturing. Cris chaired large international teams of vendors and users to specify the Unified Modeling Language (UML) 1.x and 2.0 standards for software engineering, and the Systems Modeling Language (SysML) 1.0 standard for systems engineering. In recognition of Cris's contributions to the UML the Object Management Group (OMG) presented him with its Distinguished Service Award, and in acknowledgement of his contributions to the SysML the International

Council on Systems Engineering (INCOSE) presented him with its Outstanding Service Award.

**WORKSHOP SYLLABUS:** The workshop syllabus, in a menu form that can be customized to meet your team/project needs, is described at the end of this document. NOTE: This workshop description and syllabus are subject to revision. Check the *Training* page on the PivotPoint web for the most recent update.

**FLEXIBLE VENUES:** All of our workshops are available onsite (at a Client training facility), offsite (at a PivotPoint training facility), and via webconference.

**FOLLOW-UP CONSULTING/MENTORING SERVICES:** All of our workshops can be followed up with consulting/mentoring services that will keep your Model-Based Engineering project on track. Please check out the Consulting services page on the PivotPoint web, or contact us to discuss details.

**SCHEDULING AND COST:** Workshops must be reserved in advance by Purchase Order or prepayment. We generally require at least 4 weeks lead time for scheduling workshops, but longer lead time is desirable to reserve your preferred training dates. Workshop cost depends upon workshop duration (number of days), venue choice (onsite, offsite, webconference), and number of students.

**FURTHER INFORMATION & PRICE QUOTES:** Please visit our web site at [www.PTCorp.com](http://www.PTCorp.com), email us at [workshops@PTCorp.com](mailto:workshops@PTCorp.com), or call us at +1-760-201-0200 to discuss workshop details and receive a price quote.

# WORKSHOP MENU

All PivotPoint workshops include both structured presentations and interactive hands-on work sessions to reinforce learning principles and best practices. In addition, all workshops can be customized to address special project or team requirements.

- **3 day workshop** includes: *DoDAF – Basic, SysML – Intermediate, and DoDAF – Intermediate.*
- **4 day workshop** includes: *DoDAF – Basic, SysML – Intermediate, DoDAF – Intermediate, and DoDAF/SysML – Basic Modeling Tool.*
- **5 day workshop** includes: *DoDAF – Basic, SysML – Intermediate, and DoDAF – Intermediate, DoDAF/SysML – Basic Modeling Tool, and DoDAF – Project Practicum.*

<p style="text-align: center;"><b>DoDAF – BASIC (SysML)</b> [Module# FD101-S]</p> <p><b>Introduction</b></p> <ul style="list-style-type: none"> <li>• Model-Based Engineering &amp; Architecture Frameworks</li> <li>• Basic concepts</li> <li>• Principles and best practices</li> </ul> <p><b>DoDAF/UPDM Quick Tour</b></p> <ul style="list-style-type: none"> <li>• Framework overview</li> <li>• View and product walkthrough</li> </ul> <p><b>SysML Quick Tour</b> <i>[If SysML crash course or refresher required]</i></p> <p><b>Diagram Techniques</b></p> <ul style="list-style-type: none"> <li>• Use Case</li> <li>• Requirement</li> <li>• Activity</li> <li>• Block Definition</li> </ul> <p><b>Selected Operational View Products</b></p> <ul style="list-style-type: none"> <li>• OV-1 High Level Operational Concept Graphic</li> <li>• OV-2 Operational Node Connectivity Description</li> <li>• OV-4 Organizational Relationships Chart</li> <li>• OV-5 Operational Activity Model</li> <li>• OV-6c Operational Event Trace Description</li> <li>• OV-7 Logical Data Model</li> </ul>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>• Learn about the advantages of a Model-Based Engineering approach that uses architecture frameworks</li> <li>• Understand the basic concepts and principles for modeling complex systems with DoDAF/UPDM and SysML</li> <li>• Learn how to apply basic SysML diagram techniques</li> <li>• Learn how to specify a correct, complete, clear, concise, and consistent DoDAF-compliant system model</li> </ul>
<p style="text-align: center;"><b>SysML – INTERMEDIATE</b> [Module# LS102]</p> <p><b>Topics</b></p> <ul style="list-style-type: none"> <li>• Model verification and validation</li> <li>• Model integrity guidelines</li> <li>• Model metrics</li> <li>• Cost/performance trade studies</li> <li>• Interface-based design</li> </ul> <p><b>Diagram Techniques</b></p> <ul style="list-style-type: none"> <li>• Internal Block</li> <li>• Sequence</li> <li>• State Machine</li> <li>• Parametric</li> <li>• Package</li> <li>• Allocation tables</li> </ul> <p><b>Lifecycle Phases</b></p> <ul style="list-style-type: none"> <li>• Design</li> <li>• Construction</li> <li>• Testing</li> </ul>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>• Learn how to apply SysML to the full System Development Life Cycle (SDLC)</li> <li>• Understand how to make your models more scalable</li> <li>• Learn how to improve the integrity and quality of your models</li> <li>• Learn how to verify and validate your models</li> </ul>

<p style="text-align: center;"><b>DoDAF – INTERMEDIATE (SYSML)</b> [Module# FD102-S]</p> <p><b>Topics</b></p> <ul style="list-style-type: none"> <li>Refining Operational View products into System View products</li> <li>Modeling Network-Centric Operations (Service Oriented Architectures)</li> <li>Unified Profile for DoDAF/MODAF (UPDM)</li> </ul> <p><b>Selected System View Products</b></p> <ul style="list-style-type: none"> <li>SV-1 Systems Interface Description</li> <li>SV-2 Communication Description</li> <li>SV-4 Systems Functionality Description</li> <li>SV-10b Systems State Transition Description</li> <li>SV-10c Systems Event Trace Description</li> <li>SV-11 Physical Schema</li> </ul>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>Learn how to Operational View products can be refined into System View products</li> <li>Understand how to specify Service Oriented Architectures (Network Centric Operations) using DoDAF View products</li> <li>Learn how to specify a DoDAF compliant architecture using the UPDM</li> </ul>
<p style="text-align: center;"><b>DoDAF/SysML – BASIC MODELING TOOL: MAGICDRAW</b> [Module# FD111-S/MD]</p> <p><i>[All Model-Based Engineering workshops are based on tool-independent principles and best practices. If you have already chosen a DoDAF/SysML modeling tool, we can integrate optional tool training into your workshop. If you have not, we can help you select one that best meets your project and team needs. For a list of workshops customized for popular visual modeling tools see the Training page of the PivotPoint web.]</i></p> <p><b>Topics</b></p> <ul style="list-style-type: none"> <li>Projects and diagrams</li> <li>Generating documentation</li> <li>Importing/exporting models</li> <li>Requirements verification</li> <li>Model validation and metrics</li> <li>Model simulation/execution</li> </ul> <p><b>Diagram Techniques</b></p> <ul style="list-style-type: none"> <li>Use Case</li> <li>Requirement</li> <li>Activity</li> <li>Block Definition</li> <li>Internal Block</li> <li>Sequence</li> <li>State Machine</li> <li>Parametric</li> <li>Package</li> <li>Allocation tables</li> </ul>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>Gain familiarity with the user interface and basic features of selected DoDAF/SysML modeling tool</li> <li>Learn how to model most common DoDAF View products using your selected DoDAF/SysML modeling tool</li> <li>Understand the strengths and weaknesses of selected modeling tool</li> <li>Assess DoDAF, SysML, and XML standards compliance for selected modeling tool</li> </ul>
<p style="text-align: center;"><b>DoDAF – PROJECT PRACTICUM (SYSML)</b> [Module# FD121-S]</p> <p>The project practicum provides an opportunity to apply DoDAF/SysML modeling principles and best practices to solve project modeling problems in a creative and supervised workshop environment. The practicum can be used to facilitate:</p> <ul style="list-style-type: none"> <li>DoDAF/SysML model peer reviews</li> <li>DoDAF/SysML model revisions and extreme makeovers</li> </ul> <p>Students can identify project modeling problems in advance, or Instructor will work with students to identify them.</p>	<p style="text-align: center;"><b>Goals</b></p> <ul style="list-style-type: none"> <li>Identify the DoDAF/SysML principles and best practices that are most important to your team and your project</li> <li>Apply advanced DoDAF/SysML modeling techniques to a practical problem that you choose</li> </ul>