



intercax

# DIGITAL THREAD CONFERENCE 2024

*September 24-25, 2024*

Virtual

Registrations Open!

## Detailed Agenda

Conference details and registration link at: [www.intercax.com/dtc24](https://www.intercax.com/dtc24)



Day 1 – Sep 24, 2024 (Tue)

Detailed Agenda with Abstracts



## Welcome to Digital Thread Conference 2024

- **Speaker: Manas Bajaj**, Chief Systems Officer, Intercax
- **Abstract:**

Welcome to our inaugural Digital Thread Conference 2024! This welcome address will share details on the conference format, logistics, and agenda. We hope to make this event successful for everyone.



## Opening Remarks - Business Value of Digital Threads and Digital Engineering

- **Speaker:** Craig Austin, CEO, Intercax
- **Abstract:**

The opening remarks will discuss the importance of using digital engineering in today's time-compressed, financially constrained product development cycle. Gone are the days when companies had the luxury of “fly-fix-fly”. Today they must develop products on time, on budget, and with first-time quality. Digital engineering supports that concept, and digital threads takes digital engineering to the next level. Historically, the DoD has led the charge when it came to innovative development concepts, but now they are playing catch-up to private industry. Syndeia, the digital thread platform from Intercax, is a dual-use technology that benefits both government and commercial industries. The remarks will cover some recent innovations and future trends.



## SysML v2 – The Next-generation Systems Modeling Language enabling Digital Threads

- **Speakers:** Sanford Friedenthal, SAF Consulting | Manas Bajaj, Chief Systems Officer, Intercax
- **Abstract:**

SysML v2 is the next generation Systems Modeling Language for modeling complex systems that significantly enhances precision, expressiveness, usability, interoperability, and extensibility over SysML v1. SysML v2 is in its finalization phase at the Object Management Group (OMG). It includes three standard specifications: KerML 1.0, SysML 2.0, and Systems Modeling API and Services 1.0 (aka SysML v2 API). The SysML v2 language (KerML 1.0 and SysML 2.0) provides a new graph-based meta-model that is not constrained by UML. SysML v2 also includes a graphical and textual notation which represent the same underlying model. The SysML v2 API enables standard CRUD operations to be performed on SysML v2 models that are managed in a repository. This provides the capability to integrate SysML v2 models with other engineering models and enterprise data in a digital thread.

This presentation will be in two parts. The first part provides an overview of SysML v2. The second part will focus on data integration and digital threads. The presentation will then showcase how the Syndeia platform is used to generate, query, and visualize live digital threads connecting SysML v2 models with hardware (PLM), software (ALM), verification (Test Management), and other engineering models of complex cyber-physical systems.





## Exploring the Power of Digital Threads: Integration, Innovation, and Automation

- **Speaker:** Greg Porter, Principal Solutions Architect, Sev1Tech LLC
- **Abstract:**

This presentation will explain what a Digital Thread is and how it helps connect and manage data throughout the life of a product.

First, we will break down what Digital Threads are and why they are important. Then, we'll explore how these threads can work with smart technologies like Multi-agent Generative AI. This means using multiple AI programs that work together to make the Digital Thread even smarter and more efficient.

Next, we'll talk about how Digital Threads work with Digital Twins. Digital Twins are virtual models of real-world objects. We'll show how Digital Threads keep these twins updated in real-time, helping to improve operations and predict future issues before they happen.

Finally, we'll discuss how automated systems can help create and maintain Digital Threads. Using advanced tools, we can automate the process to ensure everything runs smoothly and efficiently.



**Day 1 – Sep 24, 2024 (Tue)**

**Lunch Break : 12:20 – 12:50 US EDT**



## Digital Engineering and Digital Threads in the Open Dragon Architecture for JPL Flight Projects

- **Speaker: Christopher Delp**, Group Supervisor, Systems Solutions Engineering Group, NASA Jet Propulsion Laboratory (NASA JPL)
- **Abstract:**

Concurrent engineering of modern spacecrafts is challenged by data silos with error-prone ad-hoc coordination using spreadsheets and the lack of a systematic qualification process. Increasing complexity of spacecraft functions, hardware, and software; and lack of digital workflows to coordinate development of flight software, ground data systems, and remote engineering units (REUs) is challenging the development of future missions on-time, on-budget, and first-time quality.

In this presentation, the Open Dragon Architecture (ODA) for digital engineering of flight projects at NASA JPL will be presented. Dragon enables a connected flow of data between systems and software engineering applications and services, traceability between produced artifacts, and change management. Example usages of the Dragon architecture for model-based development of JPL flight projects will be presented. This includes, but is not limited to, Europa Clipper REU, Requirements Development and Qualification Suite (RQDS), Flight Software Testing, and Document Generation. The presentation will highlight the digital threading and digital twin capabilities of the Dragon Architecture aimed at connecting spacecraft requirements, hardware models, software modules, verification and test data, and analyses.





## Integrated Model-Based Systems Engineering Framework for Vera C. Rubin Observatory

- **Speakers:** **Mostafa Lutfi**, Systems Verification Engineer | **Holger Drass**, Systems Engineering Manager, Vera C. Rubin Observatory
- **Abstract:**

Vera C. Rubin Observatory is a new astronomical site on top of Cerro Pachón, a mountain in Northern Chile. Rubin Observatory will conduct a 10-year survey of the Southern Hemisphere sky (referred to as the Legacy Survey of Space and Time, or LSST) with the goal of exploring some of astronomers' key inquiries about the Universe. The Rubin Observatory is one of the first observatories to apply Model-Based Systems Engineering (MBSE) in all major aspects of the project. Rubin Systems Engineering (SE) team maintains observatory SysML models in MagicDraw as single source of truth. As majority of the stakeholders are not familiar with SysML based modeling tools, verification elements (requirement tickets, hazard mitigation tickets, traceability) are generated from the SysML models residing in the repository into JIRA verification system through Syndeia. Stakeholders and/or responsible subsystem personnel work on execution of the test plans, test cycles and test cases which are traced to those verification elements. The updated verification elements information is pushed to the SysML model repository utilizing Syndeia from JIRA verification system so that core model stays up to date. In near future, Rubin SE team will integrate additional tools (SolidWorks, Computerized Maintenance Management System etc.) with the SysML models with the aid of Syndeia.



## Syndeia - An Overview of the Digital Thread Platform for Digital Engineering

- **Speaker:** Dirk Zwemer, COO, Intercax
- **Abstract:**

This overview presentation is intended for attendees with limited familiarity about how Syndeia functions in an Integrated Development Environment (IDE). We will review

- The Problem that Digital Thread Engineering addresses
- The Purpose of a Digital Thread Platform
- The Architecture of Syndeia
- The Implementation of Syndeia within an IDE, and
- Key Features of Syndeia

The goal is to help attendees put the Syndeia user presentations at the conference within the larger context of Digital Engineering.



## From Data Silos to Digital Thread Dashboards in 40 mins - Live Demonstration

- **Speakers:** Team Intercax

- **Abstract:**

Syndeia is designed for scale and speed. Watch Team Intercax start a new project and generate digital threads rapidly, connecting models and data distributed across repositories – system architecture, requirements, hardware and manufacturing, software, verification, simulation, and others. In under 40 mins, you will see digital threading, live dashboards, seamless graph navigation and queries across your data repositories, baselining and configuration management of digital threads, and reports for decision makers. The goal of this presentation is to demonstrate how quickly users can start building digital threads from their existing model/data repositories, and take advantage of digital thread analytics and reports for tracking program/project cost, risk, and schedule.



## Closing Day 1 - Summary of Day 1 and Agenda for Day 2

- **Speakers:** Manas Bajaj, Chief Systems Officer | Lonnie VanZandt, Principal Solutions Architect, Intercax
- **Abstract:**

The closing presentation for Day 1 will provide a summary of all the presentations on Day 1 and a quick look at the agenda for Day 2.



Day 2 – Sep 25, 2024 (Wed)

Detailed Agenda with Abstracts



## Welcome to Day 2 of Digital Thread Conference 2024

- **Speaker: Manas Bajaj**, Chief Systems Officer, Intercax
- **Abstract:**

Welcome to Day 2 of our inaugural Digital Thread Conference 2024! This welcome address will share details on the Day 2 agenda and address any questions from the audience. We hope to make this event successful for everyone.





## Architecting A Digital Thread For A System

- **Speaker:** Steve Kang, Senior Principal Systems Engineer, Modern Technology Solutions, Inc. (MTSI)
- **Abstract:**

A Digital Thread lays out the roadmap for tracing the design artifacts for a system. These artifacts are chained together, to represent a system's architecture, implementation, and removal across the design lifecycle. Architecting an effective digital thread requires a deep analysis of the system design process.

A digital thread architecture includes an origination point, the direction of data flow, chaining strategy and a final end point. The digital thread may require a feedback loop. In this presentation, we'll dive deep into the design elements that make up the anatomy of a digital thread, resulting in elimination of data stovepipes.



## Adapting and Adopting the Digital Thread for Enterprise Transformation

- **Speakers:** **Andy Kuhn**, MBE Program Chief Engineer | **Chris Schreiber**, Chief Engineer, Information Technology & Digital Enablement, Lockheed Martin Space
- **Abstract:**

TSM is a product developed by Lockheed Martin Space as an effort to provide commonality of data management both behind the scenes and to end users executing LM Space programs. It provides tools for users to manage their program's technical baseline through the creation of an Engineering Knowledge Graph for visualization, analysis, impact assessment, and data integration across multiple engineering repositories.

The Space Model Based Enterprise Team is working to deliver a collaborative engineering ecosystem & infrastructure to provide seamless data flow throughout the lifecycle and to cultivate a culture of transformation – focused on user experience and business value.



## Data Interoperability at NASA GSFC with Syndeia: Transparency for Stakeholders

- **Speakers:** Jesse Williams, Roohollah Heidary GTC Analytics | Olivia J. Pinon Fischer, Scott Duncan, ASDL, Georgia Tech | Matthew W. Dosberg, NASA GSFC

- **Abstract:**

NASA's Goddard Space Flight Center (GSFC) is advancing its digital engineering efforts by developing a unified architecture for data interoperability. Our project aims to address challenges such as siloed data sources and the need for real-time data analysis to enhance mission success despite facility limitations.

Syndeia is utilized to create a digital representation of NASA GSFC's enterprise, integrating the Lab Quality Management System (LQMS) and Teamwork Cloud for seamless data connectivity. The integration has resulted in improved data-driven decision-making and operational efficiency by mitigating the impact of unavailable facilities. Plans include expanding the use of Syndeia to further enhance digital thread protocols and improve data interconnectivity across more systems. Key lessons include the importance of efficient API development and the need to address latency issues in cloud-based models. Future Syndeia releases could focus on enhancing API efficiency and improving real-time data integration capabilities to support more complex digital engineering workflows.

**Key Words:** Unified Architecture Framework, Model-Based Systems Engineering, Digital Transformation, Digital Thread



Day 2 – Sep 25, 2024 (Wed)

Lunch Break : 12:40 – 13:10 US EDT



## Innovating Digital Threads - A Roadmap for Syndeia

- **Speaker:** Manas Bajaj, Chief Systems Officer, Intercax
- **Abstract:**

Syndeia has made significant progress since its initial release in 2014. That's right, it's been 10 years of continuous innovation. In this presentation, we will discuss our vision for Syndeia, with a focus on the Syndeia roadmap and important capabilities planned for future releases. Additionally, we will share recent trends in digital engineering and insights gained from user adoption.



## Ask InterCAX Anything - Open Forum for Syndeia and Digital Threads QnA

- **Speakers:** **Lonnie VanZandt**, Principal Solutions Architect | **Greg Salow**, VP, Business Development, InterCAX
- **Abstract:**

All registered attendees will receive an invitation to submit their questions to our technical and business teams. Participants are encouraged to ask "how to" or deployment questions. During this session, we'll share our thoughts on the best, most interesting, and challenging questions we receive. Note that this will not be an opportunity to share the status of any specific requests you may have submitted on our helpdesk. Our support team will work closely with you to address your questions directly on the helpdesk. This session will focus on the most challenging, conceptual, and thought-provoking questions on all things digital threads and digital engineering.





## Closing the Digital Thread Conference

- **Speakers:** Lonnie VanZandt, Principal Solutions Architect | Manas Bajaj, Chief Systems Officer, Intercax
- **Abstract:**

Goodbyes are never easy. The closing presentation for the Digital Thread Conference will provide a summary of Day 2 presentations and address any open questions from the audience. We will also share plans on strengthening the engagement with the Syndeia user community.



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Save the Date!

## Thank you and hope to see you at the event!

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