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ROS-Industrial Consortium Americas
2024 Annual Meeting

March 27-28, 2024 • San Antonio, TX

ROS-Industrial Consortium Americas Annual Meeting 2024

Advancing ROS for Industry

ROS-Industrial is an open-source project that applies the advanced capabilities of ROS to relevant industrial hardware and robotics applications. Now in its eleventh year, ROS-Industrial is helping to enable industrial innovation that was previously infeasible or cost-prohibitive for manufacturing and industrial robotics.

Not long ago, it was thought that the primary focus of a ROS-Industrial project was just to drive engagement in the idea that open-source software could be used for industrial robotic applications. This goal has not only been realized, but it could be considered that open-source capability has laid the foundation for the acceleration of some of the most compelling advanced robotics capability emerging from the sector.

Virtual representation of ROS-based production system

Continuing to advance open source for industrial use

The ROS-Industrial Consortia collaborate in a federated way, optimizing regional opportunities but working in concert to forward a vision. In the European Union, progress continues via AI-Matters, an European Union Grant program, which aims to provide reference hardware implementations that work efficiently with ROS 2 in meaningful industrial settings. Within the Asia-Pacific region, there has been significant development around a technology demonstration for Robotics Middleware Framework and focusing on application level easy to use technology components, such as easy perception and easy manipulation frameworks. These ROS-Industrial aligned initiatives, along with the individual contributions of members in the core ROS and ROS 2 technical support communities, have combined to enable ROS to gain traction in a way that ROS is nearly considered a standard for robotics application development.

Within the Americas specifically, the ROS-Industrial initiative has continued to grow to include new compelling capabilities:

- Optimization-based Path Planning
- Dynamic Part Reconstruction
- Quantitative Reach Analysis
- Sample Applications for Teaching

ROS 2 training has progressed along with introduction of new focused topics such as tuning motion planning pipelines and recently added calibration of perception pipelines. There has been a renewed effort to support, at a more regular cadence, ROS-I developer meetings and quarterly community meetings, all while maintaining and continuously improving numerous community-based events such as meetups co-located with the larger industrial conferences. More recently the release of SWORD and workshops and an available demonstration version seek to further bring ROS into the manufacturing and industrial domain by enabling application set up in a CAD environment.

These enhancements, along with means to match those with proven solutions with members having a need, align with recent feedback to focus on areas of ease of use and facilitating adoptability through training tools and means to enable more efficient collaboration and knowledge sharing.
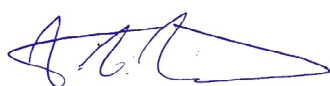
The ROS-Industrial Consortium Americas and the sister Consortia in Europe and Asia seek to bring these entities together in a way to set the strategy to realize the promise of ROS-Industrial. These goals include:

1. Provide a one-stop location for manufacturing-related ROS software.
2. Strive toward software robustness and reliability that meets the needs of industrial applications.
3. Combine the relative strengths of ROS and existing technology, combining ROS high-level functionality with the low-level reliability and safety of an industrial robot controller, as opposed to replacing any one technology entirely.
4. Stimulate the development of hardware-agnostic software by standardizing interfaces.
5. Provide an "easy" path to apply cutting-edge research to industrial applications by using a common ROS architecture.
6. Provide simple, easy-to-use, well-documented application programming interfaces.

The Consortia and the broader membership contribute to executing this strategy. Though possibly not as fast as preferred, there are numerous examples that this model is leading to tangible benefits that move from university into industry adopters, because of the work of the membership and the broader community, continuously building on the work provided before, leverage of prior knowledge and contributions, in a way that turns into meaningful capability on the shop floor.

We hope that you find the ROS-Industrial mission and the objectives of the combined Consortia compelling and of value to your organization. Thank you for participating in the idea of open-source robotics for industry. As we continue to push ROS 2 to the hands of those seeking advanced solutions for industry we welcome you to provide your needs, passion and energy into this shared vision.

Regards,

Matt Robinson

ROS-Industrial Consortium Americas

Objectives of the ROS-Industrial Consortium Annual Meeting

The intent of the ROS-Industrial Consortium Americas Annual Meeting is to convene the Consortium membership to review the latest in developments, stakeholder and partner initiatives, and sister Consortia activities, as well as review and provide input into the vision and strategic direction of ROS-Industrial.

This event contains both public and non-public days to foster the means to drive awareness and grow the ROS-Industrial network through demonstrations and compelling presentations that highlight the value proposition for both what is going on within ROS-Industrial and how the Consortium enables that vision.

Additional Objectives beyond a strategic direction and technical activities include:

1. Understand where ROS-Industrial is technically and sustainably, what has happened in the last year, and what is proposed moving forward.

2. Learn about the latest strategic non-technical initiatives that seek to move the ball forward in growing use, adoption, and support of ROS-Industrial.

3. Communicate and share what has been beneficial and what has been a challenge during workshops and networking sessions.

4. Revisit and provide the inputs to the "problem-centric" roadmap to enable update of the global technical vision. The idea is to cast the capabilities on the technical vision against prioritized problems to address a matrix, to ensure resources are focused on the right things and leverage global resources as efficiently as possible.

5. Generate, based on the problems to solve, compelling project topics that can be championed and launched to address the biggest challenges to the membership.

6. Take what has been learned and share it with your organizations. Provide feedback, and continue to participate in these events, as well as the other meetings that take place throughout the year and in the various regions. Without the engagement of the membership and community, ROS-Industrial will not realize its potential.

Chairs

Matt Robinson – ROS-Industrial Consortium Americas Program Manager

Paul Evans – Director, Technology, Operations, Programs, and Strategy (TOPS) – Southwest Research Institute

Michael Ripperger – ROS-Industrial Consortium Americas Technical Lead

About Southwest Research Institute – President's Message

Innovation in science and technology has been a hallmark of Southwest Research Institute since its earliest days. It's no exaggeration to say we are committed to advancing science and applying technology to benefit government, industry, and all of humankind. That is our mission. Our multidisciplinary, collaborative approach allows us to successfully solve clients' most challenging problems.

Our staff is just as committed today as our founder Thomas Baker Slick, Jr., was in 1947 when he proposed that the betterment of mankind depends on the use of advanced science and technology. His dream of building an internationally respected institution working in research and development has, I believe, been more than realized.

Today, we are a leader among independent, nonprofit research and development organizations. Our staff of 3,000 scientists, engineers, analysts, and support staff members continues to accomplish outstanding fundamental and applied engineering and research for clients from diverse segments of government and industry. And we will continue to strive to be the first choice for clients seeking solutions for their most complex problems.

Adam L. Hamilton, P.E., President & CEO, Southwest Research Institute

Agenda

Time	Description
March 27 – Day 1	
07:45	Shuttle from Hilton Hill Country to Bldg 263, Southwest Research Institute
08:30	Welcome & Light Breakfast
9:00	Welcome – Intro to SwRI/ROS-I, Paul Evans & Matt Robinson, SwRI
9:30	Open Source Solutions for Industry, Michael Ripperger, ROS-I/SwRI
10:00	MoveIt Pro: Accelerating Unstructured Robotics, Joe Schornak, PickNik
10:45	From Simulink Models to ROS 2 Control: Streamlining Robotic Controller Development, Josh Chen, MathWorks
11:15	Strategies for Making Advanced Robotic Manufacturing Technology Accessible to System Integrators and End Users, Larry Sweet, ARM Institute
11:45	On-Demand AI Solutions for Forging and Surface Finishing, Adam Buynak, OSU CDME
12:45	**Lunch Keynote:** Texas Robotics: Research, Academic, and Collaboration Updates from the Forty Acres, Mitch Pryor, University of Texas Austin
13:15	Lab Tours & Demonstrations, Building 290 and 68, SwRI
17:00	Adjourn and Shuttles Depart for Dinner: Iron Cactus
March 28 – Day 2	
07:45	Shuttle from Hilton Hill Country to Bldg 263, Southwest Research Institute
08:30	Welcome & Light Breakfast
09:00	ROS-I Consortium Americas – State of the Consortium, Matt Robinson, SwRI
09:30	ROS-I Consortium EU Updates, Vishnu Prachandabhanu, Fraunhofer IPA
10:00	ROS-I Consortium AP Updates, Maria Vergo, ARTC
11:00	ROS 2 News & Updates, Kat Scott, Open Source Robotics Foundation
11:30	OSRF Moving Forward, Tully Foote, Open Source Robotics Foundation
12:00	Lunch
12:30	**Lunch Keynote:** Air Force Research Lab Vision on Robotics, Harry Pierson, Air Force Research Lab
13:30	Building Openness into Industrial Robotics, Andreas Bihlmaier, Intrinsic
14:00	Obstacles and Opportunities for ROS in Small Industrial Teams, Kevin Sevcik, ARC Specialties
14:30	Workshops: Performance Needs, Resources for the Community, and Global Roadmapping for ROS-Industrial
16:30	Closing Remarks – Matt Robinson, SwRI

Welcome – Intro to Southwest Research Institute & RIC Americas

Southwest Research Institute is a premier independent, nonprofit research and development organization using multidisciplinary services to provide solutions to some of the world's most challenging scientific and engineering problems.

Headquartered in San Antonio, Texas, SwRI is a client-focused, client-funded organization that occupies more than 1,500 acres, providing more than 2.3 million square feet of laboratories, test facilities, workshops, and offices for 3,000 employees and an annual research volume of nearly $674 million.

ROS-Industrial has grown to be the default open-source advanced robotics development framework for manufacturing applications. The support of the research community, regional governments around the world, and industrial solution providers and end-users, has enabled significant growth. The Consortium has been instrumental in fostering this growth and setting forth the direction to enable continued success. This introduction serves to provide the motivation both for ROS-Industrial and the Consortium and set the stage for the remainder of the proceedings.

Paul Evans – **Director, Technology, Operations, Programs, and Strategy (TOPS) – Southwest Research Institute**

Over the course of his career, Mr. Evans has led and participated in a wide range of robotics and automation programs for both commercial and government customers. Programs relevant to flexible automation and intelligent machines encompass the development and implementation of a variety of robotics systems including custom, large-scale, mobile, underwater, enhanced off-the-shelf, and all the associated controls and perception technologies. Mr. Evans' department also initiated ROS-Industrial, an open-source extension of the Robot Operating System (ROS) that focuses on supporting the needs of manufacturers and industrial robot users, facilitated by a global consortia collaborative.

Matt Robinson – **ROS-Industrial Consortium Americas Program Manager**

Matt Robinson is the Program Manager for the ROS-Industrial Consortium Americas. In this role, Mr. Robinson is setting the strategy and vision to align the open source development community with industry needs to deliver innovative and sustainable advanced robotics solutions ready for factory deployment. Prior to this, Mr. Robinson was team leader for Caterpillar's Manufacturing Technology Automation Research. There, he led development and deployment of automation tools to improve the performance and productivity of Caterpillar manufacturing facilities around the globe. Mr. Robinson has led developments for automated materials joining processes for titanium and other challenging dissimilar material combinations for high temperature applications. He has a master's degree in Welding Engineering from Ohio State University.

Open Source Solutions for Industry

This talk will focus on the technical activities supported within the Americas around the ROS-Industrial open source project. This includes updates to key repositories and educational resources provided to the community. Examples will be provided around use of these resources and how the Consortium seeks to continue to advance the foundational capability moving forward.

Michael Ripperger – ROS-I Americas Tech Lead

Michael Ripperger is a Senior Research Engineer at Southwest Research Institute. He leads the development, design, and deployment of advanced "scan and plan" robotics systems, which use sensor data to autonomously perform various manufacturing tasks with minimal user guidance. In these efforts he has developed software for the perception, tool path and motion planning, hardware interface, and user interface components of these applications. He currently serves as the software lead for several automation projects in a variety of fields, including the Advanced Automation for Agile Aerospace Applications (A5) program.

MoveIt Pro: Accelerating Unstructured Robotics

MoveIt Pro enables rapid development of commercial-grade applications for unstructured robotics. It provides a user interface for creating, editing, and running robot tasks as behavior trees, a pre-built set of advanced perception and manipulation skills, and a developer API for creating custom behaviors for specific applications. This talk will provide an overview of new features added to the open-source MoveIt project, an introduction to MoveIt Pro, and a discussion of several reference applications which were implemented using MoveIt Pro.

Joe Schornak – Senior Robotics Engineer, PickNik

Joe is a Senior Robotics Engineer at PickNik. He has a M.S. in Robotics Engineering from Worcester Polytechnic Institute and B.S. in Mechanical Engineering from Rose-Hulman Institute of Technology. His work has focused on developing perception-driven robotics applications in ROS 2, with a specific focus on robots that move in unstructured environments and interact with previously unseen objects.

From Simulink Models to ROS 2 Control: Streamlining Robotic Controller Development

Simulink is the de-facto controller development tool in many industrial applications while ros_control and ros2_control are real-time controller development frameworks for ROS and ROS 2. The motivation of this project is to integrate the strength of these two – bridging between model-based design and real-time robotic control.

In this session, we'd like to give an update of this project to showcase how to fit a Simulink control model into the ros2_control framework. Learn how automated C++ code generation from Simulink can be a ros2_control plugin to the ros2_control framework, streamlining controller development. This session will also cover the seamless combination of MATLAB/Simulink-generated ROS and ROS 2 packages with existing ROS networks, marking a significant leap in controller design and deployment.

Josh Chen – Senior Software Engineer, MathWorks

Josh Chen holds the position of Senior Software Engineer at The MathWorks, Inc., where he possesses extensive expertise in Simulink and ROS Toolbox with focus on generating production-grade C++ code. He is at the forefront of creating Simulink applications to integrate with both ROS and ROS 2. His professional passions are centered around industrial robotics, network communication, and embedded systems. Josh earned his Master's degree in Mechanical Engineering from Purdue University.

YJ Lim – Principal Manager, Robotics and Autonomous Systems, MathWorks

YJ Lim is the principal manager of robotics and autonomous systems products at MathWorks, including Robotics System Toolbox and ROS Toolbox. With over 25 years of experience in robotics and autonomous systems, he previously held roles as a senior project manager at Vecna Robotics, Chief Innovation & Operating Officer at Hstar Technologies, and contributed to key software technologies at Energid, SimQuest, and GM R&D Center. Dr. Lim earned his Ph.D. in Mechanical Engineering from Rensselaer Polytechnic Institute and his Master's from the Korea Advanced Institute of Science & Technology.

Gijs vd. Hoorn – Researcher, TU Delft Mechanical, Maritime and Materials Engineering Department

Gijs van der Hoorn is a researcher in the Robot Dynamics group at Delft's Mechanical, Maritime, and Materials Engineering faculty. He serves as the Technical Lead Europe for RIC-EU, contributes to ROSIN H2020 EU project, and is part of SAM|XL's board for composite manufacturing automation. A Delft University of Technology graduate, he actively promotes open-source software adoption in automation within ROS and ROS-Industrial communities. Apart from maintaining software components, he assists users by addressing queries and solving problems.

Strategies for Making Advanced Robotic Manufacturing Technology Accessible to System Integrators and End Users

This presentation will highlight ARM Institute-sponsored projects that were recently completed at the end of 2023 and how these projects demonstrated advanced robotic manufacturing capabilities in fabrication, finishing, inspection, assembly, and material handling. Approximately 30% of these projects also incorporated AI and Machine Learning. Additionally, many of these projects used ROS-Industrial as an effective mechanism facilitating integration of prototypes comprised of hardware components and software. The ARM Institute and its members appreciate the support from ROS-Industrial on these projects. Building on this success, in 2024 the ARM Institute will place increased emphasis on transitioning technology from Laboratory stage to Production-Relevant and Production-Representative Environments. Advancing toward Technology and Manufacturing Readiness will require projects to demonstrate the ability to perform successfully in production conditions when operated by factory-floor personnel. Components and software will migrate to be commercially available and compliant with end user factory requirements. Technical risk, time, cost, and resource requirements currently facing system integrators will be reduced to levels acceptable to them. This presentation will conclude with open dialogue for collaboration between the ARM Institute and ROS Industrial.

Larry Sweet – Director of Engineering, ARM Institute

Dr. Larry Sweet is a widely recognized robotics and automation expert, working in both commercial organizations and academia. He brings experience in bringing emerging technologies into production by increasing their Technology Readiness Level, concurrent with improvements in factory floor processes and workforce skills. Previously he was the Director, Worldwide Robotics Deployment at Amazon Robotics, leading technology transition and system integration for all internally developed automation into Amazon's global network. Larry also held senior manufacturing and technology roles at Symbotic, the Frito-Lay, United Technologies, ABB, Fanuc, and GE. Industry recognition includes 33 patents, the Edison and IR-100 Awards, and the Manufacturing Leadership Council Outstanding Achiever Award for Supply Chain Excellence. Larry received his Ph.D. and M.S. degrees from MIT, and a B.S from the University of California, Berkeley. He was a tenured faculty member and Guggenheim Foundation Fellow at Princeton University.

On-Demand AI Solutions for Forging and Surface Finishing

In this talk, Adam Buynak will highlight recent developments by CDME toward on-demand robotic solutions for surface finishing and incremental robotic forging. Advancements to ease the integration of semi- and fully- autonomous systems has become a ripe opportunity for collaborative AI. This talk will cover CDME's approach to implement augmented reality (AR) as a human-machine translator in robotic finishing applications like painting. Additionally, this will cover CDME's work toward incremental robotic forging of large, high-strength components for on-site fabrication without the need to build custom dies.

Adam Buynak – Lead Engineer, Artificially Intelligent Manufacturing Systems (AIMS) Division at The Ohio State University's Center for Design and Manufacturing Excellence

Adam Buynak is the Lead Engineer of the Artificially Intelligent Manufacturing Systems (AIMS) Division at The Ohio State University's Center for Design and Manufacturing Excellence. He leads the design, development, and deployment of experimental industrial robot applications in collaboration with manufacturing partners. In these efforts, Adam has introduced over 200 undergrad and graduate students to the ROS Industrial ecosystem. Prior to joining Ohio State, Adam had roles in industrial design and manufacturing across the metal finishings, consumer appliance, and aerospace industries.

LUNCH Keynote:

Texas Robotics: Research, Academic, and Collaboration Updates from the Forty Acres

Texas Robotics 16 core faculty, 40 affiliated faculty and 250+ graduate students, research staff, visiting and post-docs come together from four top-ranked departments at The University of Texas at Austin, including the Department of Aerospace Engineering, the Department of Computer Science, the Department of Electrical and Computer Engineering, and the Department of Mechanical Engineering. Collectively we focus on research in long-term autonomy, human-robot interaction and manipulation. The 4 pillars of Texas Robotics include Research, Education (with a robotics minor and portfolio programs), Community (outreach and informal education), and Industry with a variety of affiliate partners, sponsored research projects, and spin-off companies. This presentation is intended to provide a broad overview of Texas Robotics and then dive a little deeper into the role of the Nuclear & Applied Robotics Group (one of 16 research labs) as it facilitates the transfer of technical innovations to one of our key partners: The Army Future Command.

Dr. Mitch Pryor – **Research Professor in the Cockrell School of Engineering at the University of Texas at Austin**

Dr. Pryor earned his BSME at Southern Methodist University in 1993. After graduating, he taught math and science courses at St. James School in St. James Maryland before returning to Texas. He completed his Masters (1999) and PhD (2002) at UT Austin with an emphasis on the modeling, simulation, and operation of redundant manipulators. Since earning his PhD, Dr. Pryor has taught graduate and undergraduate courses in the ME and ECE departments as well as led and conducted research in the area of applied robotics and automation with an emphasis on robotics in hazardous environments including nuclear, energy, and defense. He has worked for numerous research sponsors including Army Futures Command (AFC), NASA, DARPA, DOE-EM, Idaho National Lab (INL), Los Alamos National Lab (LANL), Oak Ridge National Lab (ORNL), Savannah River National Lab (SRNL), Y-12, and many industrial partners. Dr. Pryor is a co-founder of the Nuclear & Applied Robotics Group (NRG) and RAPID, an industry affiliate program supporting automation in the energy sector.

RIC-Americas State of the Consortium

An overview of the last year related to the ROS-Industrial Consortium Americas, including updates to training, strategic initiatives, changes upcoming, and technical highlights and developments. This will include a review of the "Health of the Consortium." Technical highlights will include new capabilities in the pipeline that should deliver unique capability to the membership and community.

Matt Robinson – **ROS-Industrial Consortium Americas Program Manager**

Matt Robinson is the Program Manager for the ROS-Industrial Consortium Americas. In this role, Mr. Robinson is setting the strategy and vision to align the open source development community with industry needs to deliver innovative and sustainable advanced robotics solutions ready for factory deployment.

RIC-Europe: Updates from ROS-I in Europe and highlights from ROSIN project and Fraunhofer IPA

We present the latest highlights from the past ROS-I Consortium year in the EU. Additionally, we will discuss the progress of the numerous initiatives in the EU, including the AI Matters project toward a ROS 2 reference cell, as well as other initiatives of interest to the community.

Vishnuprasad Prachandabhanu – ROS-Industrial Consortium
European Union Program Manager, Fraunhofer IPA

Vishnuprasad Prachandabhanu works as a Research Associate at Fraunhofer IPA, where he has been working on different research and technology transfer projects and introducing open source to industrial automation. In 2024, he took over the position of ROS Industrial Consortium Europe Program Manager. Before joining Fraunhofer IPA, he worked as a Robotic Software Developer at IWT Wirtschaft und Technik GmbH, contributing to various research projects aimed at digitalizing industries. He holds a Master's degree in Electrical Engineering from Ravensburg Weingarten University.

RIC-Asia-Pacific: ROS-Industrial Consortium AP Update: Implementation of open-source RMF for multi-story building

The development of Robotics Middleware Framework (RMF) started from the Healthcare sector and has recently gained interest from other adjacent verticals, specifically in facility management. The shift in demographic landscape inundated by availability of manpower has pushed the use of robotics for multiple applications, especially for public spaces. In this presentation, we will be sharing the implementation of open-source RMF for multi-story buildings where three types of robots would be used for cleaning, surveillance, and ushering. The implementation uncovers new challenges and development opportunities that can be leveraged on by the open-source community.

Maria Vergo – ROS-I AP Program Manager, ARTC
Maria Vergo is a talented professional with a diverse background in the digital solutions. She graduated with a first class honors in Chemical Engineering specializing in control and automation. She started her career in engineering before transitioning to a techno-commercial role. It was in this role that she discovered her passion for business development, particularly in the field of robotics. Currently, Maria serves as a Consortium Manager of ROS-Industrial Consortium Asia Pacific, where she manages complex projects while ensuring successful project execution. Her extensive experience in the digital solutions for multinational companies has given her a unique perspective on the challenges and opportunities that arise in this field.

ROS 2 News & Updates, Open Source Robotics Foundation

This short talk will cover recent and upcoming features of the upcoming latest release of ROS 2 and why they are important to the industrial community. We will also discuss software engineering practices and tools that are being used to improve the robustness and reliability of ROS 2. The talk will conclude with about future projects and where we require feedback from the industrial community.

Katherine Scott – ROS Developer Advocate, Open Source Robotics Foundation

Katherine "Kat" Scott is presently the ROS developer advocate at Intrinsic, an Alphabet company (formerly Open Robotics). She is a co-founder of Tempo Automation (electronics manufacturing) and Sight Machine (manufacturing analytics) and led image analytics teams at Planet (satellite imagery) and 3Scan (medical imagery). Kat holds a master's degree in computer science from Columbia University and undergraduate degrees in electrical engineering and computer engineering from the University of Michigan. She also serves on the board of the Open Source Hardware Association as its Open Hardware Certification Chair.

OSRF Moving Forward

To facilitate the growth and development of the Open Robotics community, the Open Source Robotics Foundation has created a new initiative called the Open Source Robotics Alliance. This talk will cover what OSRA is, why it was created, how it will work, and how to get involved.

Tully Foote – Open Source Lead, Open Source Robotics Foundation/ Intrinsic

Tully Foote is the Open Source Lead at Intrinsic, where he is coordinating internal open source development as well as working with external partnership. In school he participated in all three DARPA Grand Challenges. From there he transitioned to being one of the early ROS developers at Willow Garage. He has continued to work with ROS in various capacities at Open Robotics and continues to be involved in the project at Intrinsic.

LUNCH Keynote:
Air Force Research Lab Vision on Robotics, Harry Pierson, Air Force Research Lab

This talk will discuss the Air Force's vision for agile robots. Defining what agility means for the Air Force in the ultra high-mix, low volume to batch-size-one environment tying into the Air Force's goals for multiple, multi-purpose, mobile, teaming manipulators. Briefly touch on the Augmented Reality vision, how the Air Force sees that tech interfacing with robotics and serving as a sensor platform. Conclude with coming back to the challenge for ROS-Industrial to provide robust, validated solutions that developers can rely upon.

Harry Pierson – **Senior Technical Advisor for Automation, Robotics, and Mixed Reality in the Manufacturing and Industrial Technologies Division, Air Force Research Laboratory**

Harry Pierson is the Senior Technical Advisor for Automation, Robotics, and Mixed Reality in the Manufacturing and Industrial Technologies Division of the Air Force Research Laboratory. In this role he develops technology maturation strategy to enable the automation capabilities that the Department of the Air Force will need to support its near and far term manufacturing and sustainment needs. He also serves as the government Chief Technology Advisor for the Advanced Robotics for Manufacturing Institute, where he guides the development of dual use technology that is relevant to both US manufacturers and the Department of Defense. Prior to joining the government in 2020 he was a tenured Associate Professor of Industrial Engineering at the University of Arkansas, with research and teaching interests in robotics, automation, and manufacturing processes. His early career included time as a Process Automation Engineer and later Division Engineering Manger for a small manufacturing company. He holds a PhD from The Ohio State University and MS/BS degrees from Missouri University of Science and Technology.

Intrinsic's Flowstate: opening access to industrial robotics and AI

Industrial robotics is still largely dominated by a multitude of incompatible ecosystems. Solution builders need to decide very early in a project which hardware vendor they are going to use. Changing robot vendors at a later time effectively equates redoing the project from scratch. The talk presents Intrinsic's software-centric robotics and AI platform that facilitates hardware-agnosticity, reuse and interoperability, including with ROS.

Andreas Bihlmaier – **Lead Custom Solutions Engineering, Intrinsic**

Andreas has been with Intrinsic since 2022 and is currently heading Customer Solutions Engineering. Prior to joining Intrinsic, he was Chief Software Architect at ABB Robotics. Andreas obtained his PhD in the field of AI and robotics from the Karlsruhe Institute of Technology (KIT) Intelligent Process Automation and Robotics (IPR) lab. He studied computer science and philosophy. In 2016 Andreas co-founded robodev, a modular robotics and automation startup. In 2019 he received the "Innovator under 35" award by Technology Review. Andreas is author of the book "Robotics for Programmers".

Obstacles and Opportunities for ROS in Small Industrial Teams

This talk seeks to provide a synopsis of ROS/ROS-Industrial current strengths and weaknesses from the point of view of a control engineer at a solution provider that delivers integrated robotic solutions to end users. From here the talk will highlight a few application studies from ARC's current and future projects to illustrate those points.

Kevin Sevcik – **Control Systems Programmer, ARC Specialties**

Kevin Sevcik is an Automation Engineer, holding a B.S. degree from Texas A&M University. He furthered his academic pursuits with a year of graduate studies at Rice University's Mechatronics and Haptic Interfaces Lab. With a career spanning nearly two decades, Kevin has been an integral part of ARC Specialties since 2007, where he initially served as an Assistant Project Manager before progressing to his current role as Control Systems Programmer. In this capacity, he leverages his expertise in robot motion, path generation and process control to drive enhancements across various manufacturing processes. Kevin's contributions have significantly impacted critical projects, such as the submerged arc cladding of blowout preventer cavities, the implementation of streamlined programming for plasma-cutting vessel shells and heads and the automation of thermal forming of thick plates. Beyond his professional endeavors, Kevin is deeply committed to fostering the next generation of engineers and programmers. He dedicates his time outside of work to mentorship, serving as an enthusiastic guide to a high school FIRST robotics team.

Workshop – Providing guidance to the ROS-Industrial Roadmap

Day 2 will conclude with rotating interactive workshop sessions on three primary topics.

• Performance Requirements and Need to Support Functionality

• Resources for the Community

• Input into the Global Roadmapping effort across the ROS-Industrial regions

Demonstrations – March 27th

A guided tour that takes attendees through a range of ROS-based demonstrations will be conducted the afternoon of March 27th.

Demonstration Title	Organization
Markerless Motion Capture & Analysis	Human Performance - SwRI
Camera Based Localization	Autonomous Ground Vehicles - SwRI
Scan-N-Plan Interactive Demonstration	ROS-I Consortium Americas/SwRI
MoveIt Pro Demonstration	PickNik
Template Based Path Planning for Painting Protruding Features	Robotics Department - SwRI
Motion Planning for Space Applications	Space Robotics Initiative - SwRI
Coordinated Motion Mobile Processing Robotics - CoMoT	ROS-I Americas - SwRI
Multi-agent Supervised Autonomy for Remote Survey, Inspection, and Contact Task Applications	University of Texas Austin - Nuclear Robotics Group
Visualize and Analize Rosbag and Live ROS Data Using MATLAB	MathWorks
3D Vision Solutions for Robotics Platforms	Orbbec
ROS-based Application Development for Industrial and Space Robots	TracLabs

Accommodations and Welcome Dinner

Meeting attendees can extend their stay to include the weekend. San Antonio offers many family friendly amenities, and the Hilton San Antonio Hill Country is a close drive to nearby theme parks, downtown, and other San Antonio sites.

Hotel Address:

Hilton San Antonio Hill Country

9800 Westover Hills Blvd.

San Antonio, Texas 78251

A shuttle will be provided to and from the hotel on March 27th & 28th, departing at 8:20 AM both days, and includes return service to the hotel both days.

For participants that drive to the Southwest Research Institute campus a shuttle to and from dinner will be available, that makes a stop on campus after the dinner en route to the hotel.

The Welcome Dinner will be held at the Iron Cactus on the historic San Antonio River Walk. This dinner is open to all attendees. Approximate dinner start time for those that may need to arrive separately is approximately 6:30 PM on March 27th.

The location of the Iron Cactus is:

200 River Walk Suite 100, San Antonio, TX 78205.
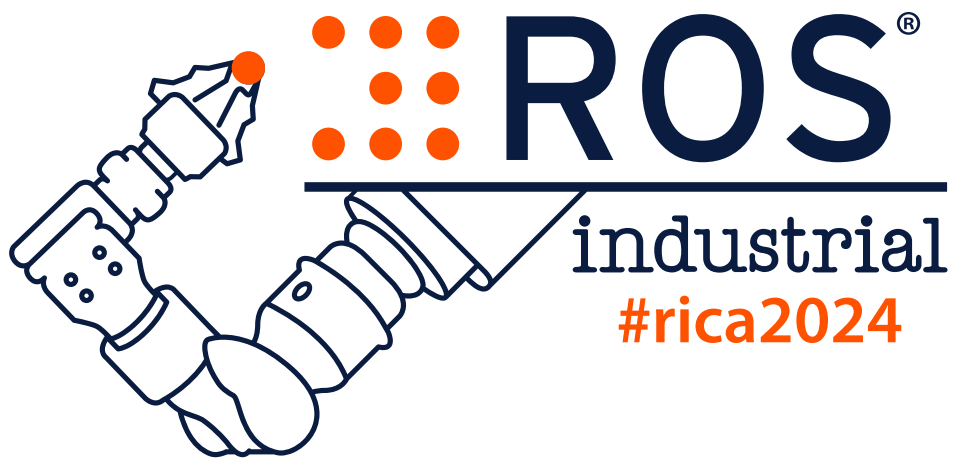
Tel: (210) 224-9835

Web: https://ironcactus.com/locations/san-antonio-mexican-restaurant/

Thank you to our Members

ROS-I is supported by an international Consortium of industry and research members. The ROS-Industrial Consortium-Americas Annual Meeting is supported by the Membership. Thank you to all of the members for their continued support of ROS-Industrial and the open source industrial robotics community!

NOTES

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