WELCOME TO ROS-INDUSTRIAL CONSORTIUM ASIA PACIFIC ANNUAL SUMMIT 2023

Organized By

Advanced Remanufacturing and Technology Centre
ARTC

In Collaboration with

NATIONAL ROBOTICS PROGRAMME

AUTOMATIONSG

Workforce Singapore

jtc
BUILDING INDUSTRIES

Presented by

Maria Vergo
Consortium Manager, ROS-Industrial Consortium Asia Pacific

ROS-Industrial Consortium Asia Pacific: 7 years in the making

ROS-I AP Workshop c.2016

SINCE THEN..

6 Annual Events

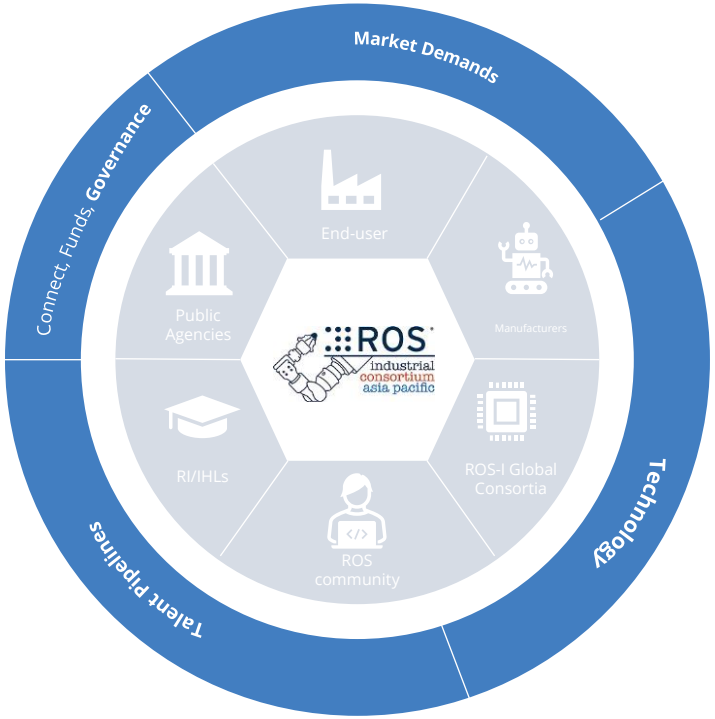
409 Talents trained

60 In Industry Projects

34 Companies adopting ROS
**count of our past and present members*

$27 MILLION in Fundings

ROS-Industrial Consortium Asia Pacific: 7 years in the making



VISION AND PURPOSE

Proliferating the adoption of robotics through development of advanced ROS capabilities

MISSION

- **Drive development of next-generation ROS** through consortium and collaboration model.
- **Lead standardization of ROS-based capabilities** for Industrial applications, including code quality standards, frameworks, reference applications / architecture
- Support **continuous talent developments** through collaboration with IHLs and industry members

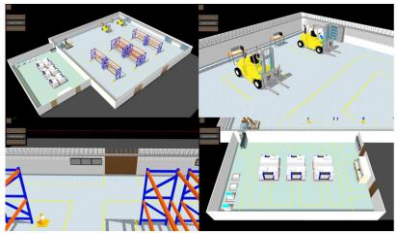
Fraunhofer IPA, Germany

Southwest Research Institute, Texas

A*STAR ARTC, Singapore

Our dynamic landscape drives our research domain

System

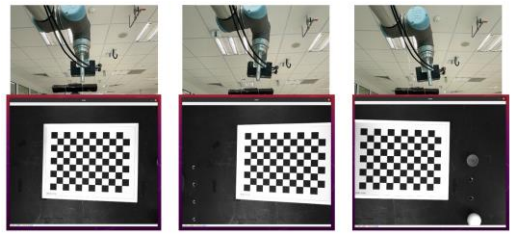


Simulation

Platform - Platform

System Integration

Sub-System

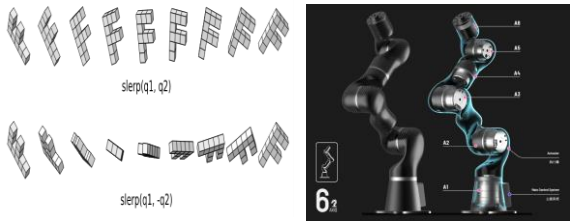


Automated workspace creation

Safe Whole body coordination

Grasping Strategy

Component

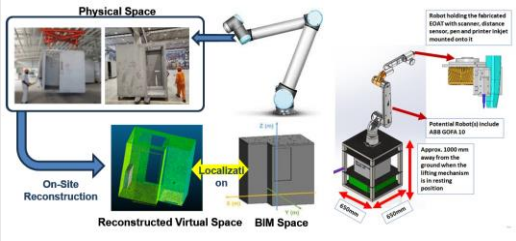


Unified Robot Controller

ROS 2 Drivers Framework for Industrial Arms

Some noteworthy projects developed in 2023 utilizes ROS 2

Development of native ROS 2-based applications

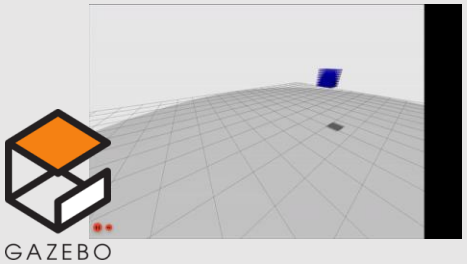


Automated creation of high-fidelity robot workspace with auto-correction

Key Features: Semantic Features detection for task motion planning with error correction algorithm

ROS 2 Native Robot Controller

Key Features: ROS-2 based framework for Unified control system that integrates the operation of robot arm and mobile base

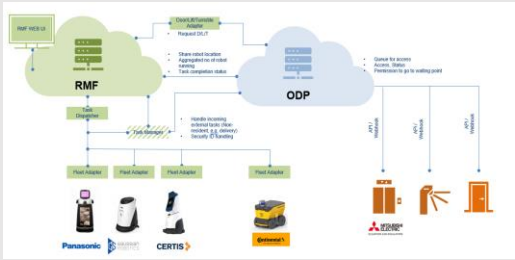


Development of network and environmental condition simulation plug-ins

Key Features: Gazebo plug-ins to simulate network and environmental conditions

Implementation of Robotics Middleware Framework (RMF)

Integration of RMF to an integrated building management system utilizing **3 type of robot fleets** operating through **multi-lift, turnstile and door operations** for **cleaning, surveillance, and concierge**



Special thanks to our project sponsors and collaborators

RMF Deployment Trial for **integrated cleaning operations** at large spaces. The deployment trial utilizes **2 types of robot fleets**. Operations are optimized using **a universal charger**

Sponsored by

CHANGI airport group

Project Collaborators

GAUSSIAN ROBOTICS · LIONSBOT · Xnergy Autonomous Power Technologies

We are releasing RMF packages that was developed as a Focus Technical Project by ROS-Industrial Consortium AP Members

Special Thanks To

The list of the packages that we will be releasing in the upcoming months

Repository	Brief Description
rmf_ftp_api_msgs	a collection of json message schemas specifically used for which bridges RMF's C++ and Python components to its web interface
rmf_ftp_msgs	Additional interfaces needed for the demonstration
rmf_ftp_maps	a collection of RMF FTP maps generated through the traffic editor
rmf_ftp_task_manager	offers APIs and classes for Task creation and management in RMF
rmf_inventory_sim_plugins	Simulation plugins for spawning inventory
rmf_workcell_manager	Workcell management library for RMF
test_rmf_ftp	Unit test cases for FTP simulation
ftp_sim_py	Proof-of-concept inventory spawning in simulation
rmf_web	a web application component which provides a configurable front-end dashboard and back-end infrastructures
husky	provides the control and navigation packages for both simulated and real husky robot
rmf_ros2	Contains additional changes needed for benchmarking and FTP
free_fleet_client_ros1	Contains additional fixes for free fleet
free_fleet_server_ros2	Local copy of open-rmf repository
webrtc_vendor	Contains webrtc dependency ROS2 wrapper and sensor interface
rosiap_sim_assets	Contains simulation assets created and used in the FTP project
rosiap_sim_plugins	Contains simulation plugins created and used in the FTP project.

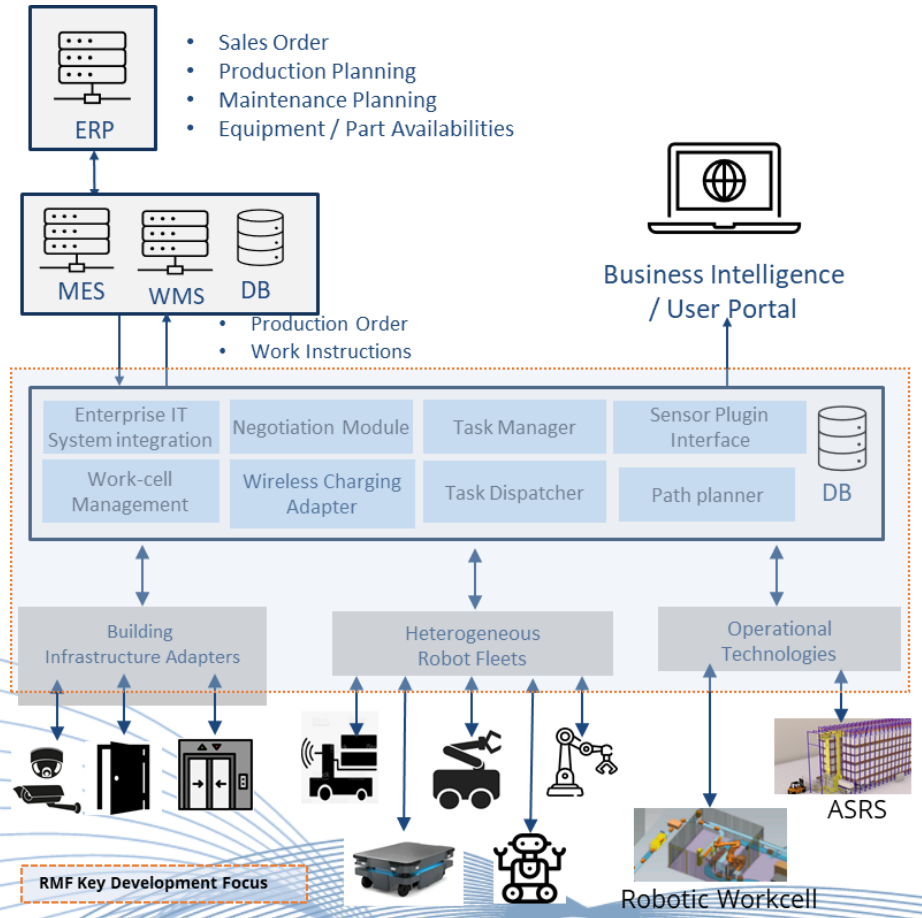
Special Thanks To

DELTA

Infineon

Johnson & Johnson

We are also making further advancement in Robotics Middleware Framework (RMF) through RMF 2.0



01 Robot Execution System for Autonomous Manufacturing Value Chain

Development of technologies that enable orchestrated execution of highly constrained tasks by fleets of interoperable heterogenous robots to accomplish time-critical missions in typical manufacturing and warehousing operation environment.

02 Integrative Dynamic Co-Simulation for Digital Twin-based Scenario Planning & Performance Optimization

Development of technologies to enable co-simulation of production and supporting robotics systems to support digital twin-based scenario planning and performance optimization.

03 Hyper Connectivity for Enterprise IT/OT Integration in Manufacturing and Logistics

Development of a scalable and integrative framework, software toolkits, and standardized protocols to enable close integration of robotics, IoT, equipment, and manufacturing and logistics enterprise IT systems.

Sponsored By

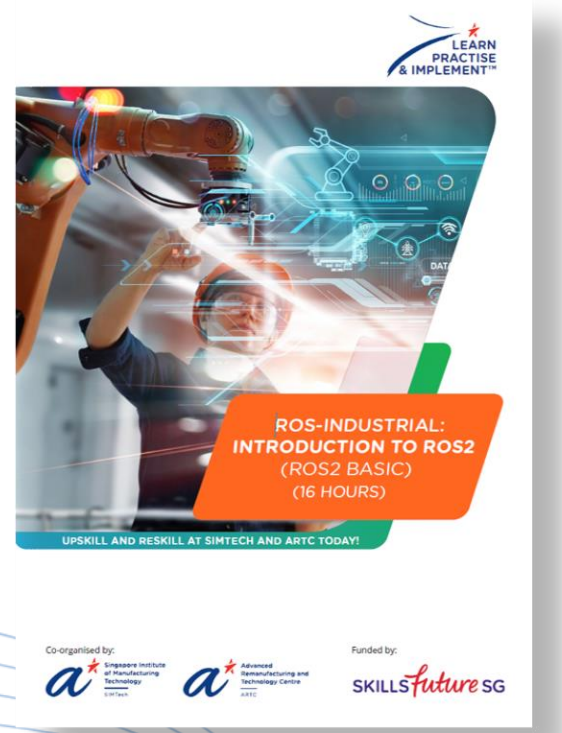
NATIONAL ROBOTICS PROGRAMME

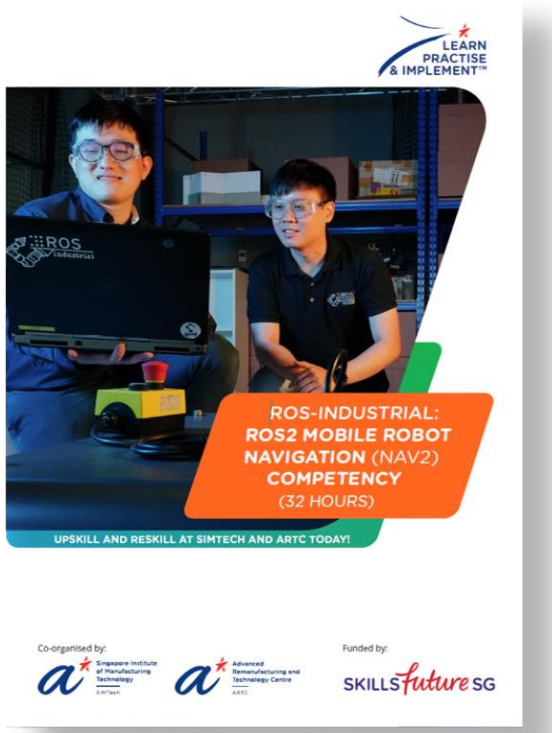
Collaborators

Centre for Healthcare Assistive & Robotics Technology

Technology requires talent pool to support its development

ROS-Industrial Trainings





ROS-Industrial Bootcamp 2023

In Partnership with

Singapore Polytechnic

ngee ann polytechnic

SUTD

We will continue to bolster innovation by advancing ROS based technologies while enhancing Industry-ready talent pipeline

1. RMF Deployment towards hybrid architecture
2. Physical and virtual sandbox development for RMF deployments
3. Implementation of ROS 2 applications for different use cases
4. Harmonization of ROS 2 basic curriculum in partnership with Institute of Higher Learnings

Shaping the future of Robotics requires a shared vision

So, if you want to...

Deploy robotics solutions

Enhance your robotics portfolio

Develop and deploy new robot applications

Create your own robot

Be part of a growing community

We Want You !

THANK YOU

For more information, email ros-i_asia@artc.a-star.edu.sg