# INSIGHTS

*into* **MedTech Innovation**

**MEDACUITY**

# OPTIMIZING MEDTECH CONNECTIVITY AND SECURITY

> *Putting DDS at the core communication layer has accelerated project delivery. DDS is data centric and data agnostic, enabling the necessary interoperability between systems without the need for custom code. RTI Connext runs on dozens of platforms, which frees up valuable developer time and lowers project risk through a scalable, secure and flexible framework for data exchange. In addition, RTI's deep bench of DDS experts compliments our deep bench of medtech architects, enabling MedAcuity to provide rapid training and support to customers throughout the project design and development."*

*- Tom Amlicke, Software Architect and Technical Lead | MedAcuity*

## MedAcuity Expertise with DDS Communications Software

MedAcuity is an ISO 13485:2016 and 27001-certified software engineering firm focused on supporting clients in the MedTech & Robotics industries. Over the past fifteen years, MedAcuity has successfully completed 400+ projects for medical device clients.

In more recent years, MedAcuity's rapidly growing portfolio of medical robotics led to the establishment of our Robotics Practice.  The Robotics Practice focuses on designing software for complex systems that integrate hardware, sensors, and control algorithms.  Our robotics team has deep knowledge and experience, allowing them to provide more effective solutions unique to robotics.

To help optimize communication within and between sophisticated robotic systems, MedAcuity has added a new focus on DDS, the data-centric connectivity framework. Data Distribution Service (DDS) is the open OMG® communication standard that enables interoperability and data exchange among different systems and devices while removing vendor lock-in.

With experience in DDS technology and a close working relationship with Real-Time Innovations (RTI), MedAcuity is the ideal software development partner for projects using DDS as the underlying communication middleware.  RTI Connext® is the leading DDS implementation in the world, with over 2,000 customer designs. This enables customers to implement state-of-the-art solutions for DDS-based data exchange for new application development.

MedAcuity has an experienced team of 80 software engineers and a highly specialized team of solutions architects who use DDS to build, test, and run connectivity within complex medtech and robotic systems. In addition to new builds, its engineers have migrated systems using homegrown or open-source communications in the early prototype stages to commercial DDS in order to reduce risk and expand platform support. MedAcuity engineers provide outsourced engineering expertise for a number of name-brand medical device and surgical robotic companies, from large global organizations to startups, helping to bring safety-certifiable products to market. In addition to incorporating DDS as the middleware, MedAcuity uses DDS to help protect data from cybersecurity attacks.

While most projects are under NDA and cannot be shared, here are a few examples of MedAcuity projects using DDS.

## Medical Robotics

MedAcuity created a *demonstration* that showcases how data is securely transported via RTI Connext from a real-time QNX remote controller client to a KUKA LBR MED robot arm. Authorized data is rapidly transmitted via the DDS publish/subscribe protocol, while unauthorized data is rejected, keeping bad actors out and ensuring system security. This integrated platform accelerates performance while increasing safety, security, and reliability for medical robotics. *Read more about this project here: https://www.rti.com/company/events/kuka-demo*

## Remote Testing Across Multiple Locations

MedAcuity created a custom tool, the DDS Emulator, for automated remote testing of two medical robotic arms to be used in abdominal surgical procedures. The tested system ran across three locations spanning two continents and required real-time data exchange among the robots, the user interface (UI), the control systems and the video system. The DDS Emulator was built using RTI Connext and the Connext Python API. *Read more about this project here: https://www.rti.com/blog/medacuity-connext-python-api*

## DDS-based Application Development

MedAcuity has experience building and supporting DDS-based medtech application areas including:

### MEDICAL DEVICES

- **Surgical Robotics**

  - *Surgical Teleoperation*
    1. Surgeon console to robots
    2. Surgeon console to a surgical simulator

  - *Teleremote Surgical Systems*
    1. Low-latency video and control

  - *Image Guided Therapy*
    1. CT Scanner
    2. MRI
    3. Ultrasound

- *Control Systems*
  1. Integrating DDS with QNX C++
  2. Integrating DDS with Kuka Java API
  3. Integrating DDS with Simulink-generated code

- *Motion Control*
  1. Integrating DDS with EtherCAT
  2. Integrating DDS with CAN

### AUTONOMOUS MOBILE ROBOTS (AMRS)

- **Warehouse Robotics**
- **Unmanned Ground Vehicles**



## ABOUT MEDACUITY

MedAcuity, a software engineering firm, partners with companies to address the business and technical challenges inherent in developing complex software-intensive solutions. Offering a combination of strategic consulting services focused on aligning product technology strategy with business goals and full lifecycle software development expertise, we accelerate the pace of innovation for leading companies and innovators in the MedTech, Life Sciences and Robotics industries. With over a decade of experience in software design and development methodologies for highly regulated and compliance-driven environments, our technical capabilities span all levels of software from embedded systems to mobile devices, the cloud and enterprise technologies. Contact us at **medacuity.com**