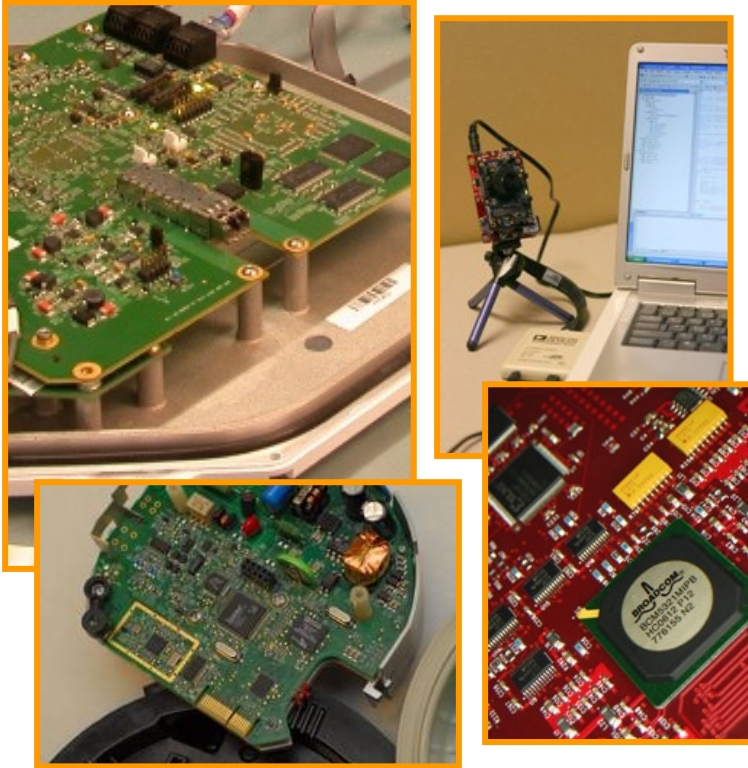




Mantaro Product Development Services

Services Overview & Industries Served



Services Overview

Mantaro offers a variety of Product Development Services (PDS) suitable for any company throughout their product development process. We are able to develop a subsystem or complete a product from concept until it is ready for manufacturing. In every scenario, working with Mantaro allows you to focus on your core business from developing a variety of specialty components to complete systems.

Mantaro's highly experienced team can step into projects at any stage. During product definition, we can research technology options, develop product requirements, define a system architecture, and construct a development plan that will reduce technology risks and accelerate time to market.

Our Product Development Services include:

- Turnkey Product Development
- Analog Hardware Design
- Digital Hardware Design
- RF Hardware Design
- FPGA Design
- Embedded Software Design
- DSP Design
- Green Design
- Power Supply Design
- Wireless Design
- RFI/EMI Design Consulting
- Marketing Services
- Project Management
- Sustaining Engineering
- System Development
- Engineering Technician Services

Industries Served

At Mantaro we have direct experience in applying technology solutions to a broad range of industries. We have found that for many industries the core technology is very similar. This has allowed us to leverage technologies from industry to industry in an efficient manner. We have also built up a substantial knowledge base of the subtleties, requirements and processes that are unique to various industries. Our expertise lie in the following industries:

- Consumer
- Government
- Industrial
- Medical
- Satellite Communications
- Telecommunications
- Test and Measurement
- Transportation

About Mantaro

Mantaro provides innovative technology and consulting services that enable our customers to deliver new products and services to market more quickly and cost effectively. We maintain an experienced team of full-time professionals with years of demonstrated expertise in product development.

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Mantaro Product Development Services

Case Studies

Upgrading Outdated Control System

A US Manufacturer had an aging, obsolete control system which had become increasingly expensive to maintain. A proof of concept project had been completed in middle of the decade which proved the viability of upgrading to a newer hardware standard and modern operating system. The proof of concept was too unstable and lacked maintainability. Key requirements for the system were to operate 24/7/365, zero crashes for a three month period minimum, and a cold start to operational state in "significantly" less time than the 15 minutes required by the legacy system. Mantaro reviewed the initial proof of concept architecture and a recommendation was given, and accepted, to pursue a different system, built around the [National Instruments Real Time PXI](#) product. Development challenges included limited or no documentation, ease of transfer of control between legacy and upgrade systems, ensure outputs of either system could not "cross control" the output signals simultaneously, and manage the industrial signals for safety and fidelity. The upgraded system ended up costing less than 50% of the proof of concept, was vastly improved in reliability (zero crashes or lockups achieved), and constructed to maximize maintainability and minimize technician troubleshooting time. A monitoring system was implemented to ensure the legacy and upgraded outputs were amplitude and timing matched, without cross interference. The tools utilized by Mantaro's software development team were adopted and adapted as a key monitoring and analysis tool. This allowed the clients engineering and automation team to more easily refine and tune the control system to maximize uptime, system response, and reliability. Additionally, the tools performance were sufficient to allow the removal of a secondary data network, saving an additional 10% hardware cost, and eliminating significant development work.



Engineering Cost Reduction

An elevator control systems provider was faced with the challenge to reduce the cost of their PLC based elevator control systems. By transitioning the hardware from a PLC based architecture to a [Microchip PIC32](#) based architecture, the client could offer new features while greatly reducing the cost of the product. The client engaged Mantaro due to Mantaro's extensive knowledge of real-time operating systems and embedded software. Mantaro engineers first developed a requirements document for a board support package (BSP) that would include drivers and other libraries on which they could build their application. This board support package supported such features as [FreeRTOS](#) integration, TCP/IP stack, USB support and drivers for the following: I2C bus, SPI bus, UART, Real-Time Clock and GPIO. Mantaro successfully completed the code and documentation for this BSP and have developed a foundation on which their legacy application code can be ported to.



Systems Engineering Expertise

A company with expertise in designing RF radios approached Mantaro to help develop a Point-to-Point wireless system based on their 70-80 GHz Radio design. The goal of the product was to provide a 99.999% error free, reliable Point-to-Point wireless link at a range of 1 mile, complete with remote monitoring capabilities. Mantaro architected a design from the ground up around the existing radio design to achieve the client's requirements. Mantaro fully developed the telecommunications interface and baseband hardware, embedded software, and higher level software apps necessary to configure, operate, and maintain the link. Management of the radio was accomplished via SNMP and a GUI tool for monitoring, and desktop PC applications for configuring. This radio system is currently offered as a networking solution for service providers that require 1 Gbps bandwidth in a Point-to-Point wireless configuration.

