Systems Engineering, Design, and Integration

From concept to implementation in a broad range of technologies

Concurrent Technologies Corporation (CTC) has deep expertise to provide the full range of solution development in a variety of domains. Our core strength is developing first-of-a-kind prototypes and innovative designs that demonstrate "the art of the possible." We consider the trade space that impacts all stakeholders. We leverage digital models to validate component and system-level performance and perform verification testing.

Our proven, disciplined systems engineering processes result in robust total system solutions that can adapt to changing technical, production, and operating environments; respond to user needs; and balance requirements, design considerations, design constraints, schedules and budgets.

General Capabilities

- Engineering Design and Analysis
- Component and Process Design
- Systems Development & Implementation
- System Automation, Controls, and Data Acquisition
- Full-Scale Process Demonstration & Validation

Quality Standards

- ISO 9001:2015 Certified (Quality)
- ISO 14001:2015 Certified (Environmental)
- AS9100D:2016 Certified (Quality-Aerospace-Related Products)

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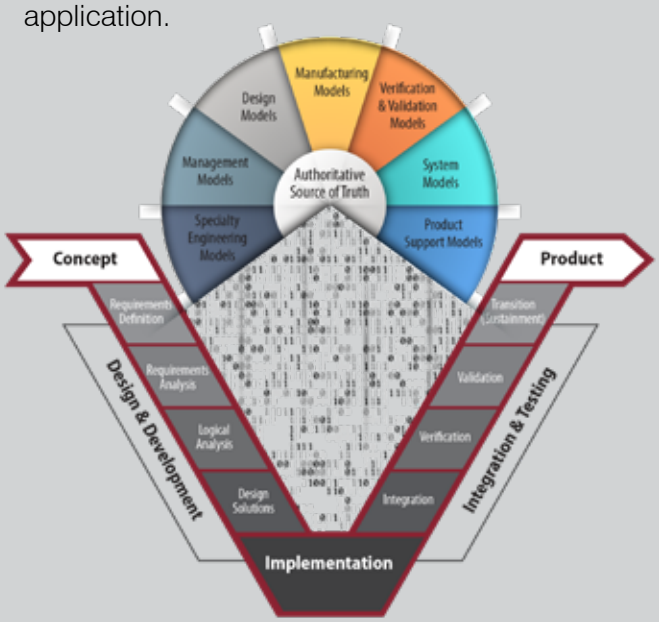
Our Process

CTC's systems engineering capabilities begin at concept development, where requirements and architecture are transitioned into well-thought-out system designs based on the trade space. Our capabilities span design, development, production, and sustainment. Our interdisciplinary team includes engineers, technical specialists, customers, and business and financial analysts who provide a framework to enable sound decision making relative to trade studies among system performance, risk, cost, and schedule.

Systems involve the interaction of components performing a function that cannot be achieved by a single component. Now more than ever, a system's mechanical and electrical components will likely include some sort of electronic interface. Our systems integration brings together hardware and software components and subsystems. We excel at experimentation and acceleration of technology transition using high-level prototyping to the fullest extent possible to reduce risk, but with a focus on field application.



Plug-in Electric Vehicle – Vehicle to Grid (PEV V2G)

Our systems process was applied to successfully research, develop, and engineer a PEV V2G system at Los Angeles Air Force Base, Fort Hood, and Joint Base Andrews. As a result, the Air Force unveiled the DoD's first non-tactical fleet composed entirely of PEVs. Energy providers pay for V2G services, allowing installations to offset energy costs. Bi-directional PEVs and charging systems with software controls to manage vehicle fleets enable bidding into the energy ancillary services market.

Hybrid Vehicles – Halvorsen 25K Loader

In an example of our systems integration requiring the design of hardware and software and integrating with the existing HMI and control system, CTC developed a diesel-battery hybrid powertrain for the U.S. Air Force's Halvorsen 25K Loader. The Halvorsen is used to load and unload cargo from Air Force transport aircraft. CTC's solution improves agility, energy efficiency, and airman safety, while reducing greenhouse gas emissions.

Process Optimization

We approach process optimization based on our proven systems engineering process to identify the problem, develop concepts, and determine feasibility. After that, we develop prototypes and perform testing while addressing maintenance and system decommissioning.

Control Systems Engineering

CTC develops industrial and vehicle control systems, including a master controller responsible for managing the following subsystems: engine, motor/ generator, transmission, battery, on-board charger, thermal control, safety features, and operator station controls. The master controller also interfaces with the OEM's control systems. CTC installed all the requisite equipment and wired and programmed all the communication to enable testing and validation for the entire hybrid Halvorsen 25K loader system operation (see above). CTC integrated the STW Technic ESX-3XL controller for the hybrid Halvorsen application. The STW Technic controller is a commercially available, rugged, off-highway vehicle controller that is weather rated for the intended operational environment. It is also an IP67 and IP69K rated sealed enclosure for worldwide environmental conditions. CTC used programmable logic controllers (PLC) for industrial control systems and PC based HMIs and control systems.

Water Recycling Technologies

CTC leveraged our systems engineering process to develop innovative water recycling technologies that use cost-effective stages of processing to purify and treat wastewater. Since one size doesn't fit all in this industry, solutions are tailored to the requirements and then optimized. We offer the ability to fully design, develop, prototype, test, build, and maintain industrial water treatment systems that will reduce costs and water usage.

Vehicle Event Data Recorder

Development of the VEDR system is another example of our systems engineering and integration. Designed for recording sensor data enabling post analysis of data to be used for rapid deployment of sound engineering solutions in the field to address battle, safety, or operational issues encountered by soldiers. The data enabled engineers to reconstruct vehicle crash, roll-over, and blast/Improvised Explosive Device (IED) events to better understand the causes of crew injury and facilitate the design of safer vehicles for the warfighter.

Concurrent Technologies Corporation

Concurrent Technologies Corporation (CTC) is an independent, nonprofit, applied scientific research and development professional services organization. CTC collaborates with its technology transition affiliate, Enterprise Ventures Corporation, to leverage research, development, test and evaluation work to provide transformative, full life-cycle solutions. To best serve our clients' needs, we offer the complete ability to fully design, develop, test, prototype, and build. We support our clients' core mission objectives with customized solutions and strive to exceed expectations.

CTC's quality management systems are certified to the ISO 9001:2015 (Quality) and 14001:2015 (Environmental) standards, and to AS9100D:2016 (Quality-Aerospace-Related Products).

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