

# LathropNEWS

If you have product development challenges...

# We have the solutions.

Lathrop has a seasoned staff of designers and engineers in the fields of:

- Mechanical Engineering
- Systems Engineering
- Electronics Design
- Optics Design
- Industrial Design & Human Factors
- Software & Firmware
  Development
- Project Management

# **Product Expertise**

Medical Devices Biotech Instruments Diagnostic Instruments Production Automation Consumables / Disposables Consumer Products



this issue Architecting Solutions for Your Requirements P.1-2 Random Access Instrument Development P.3 Events P.4

# Architecting Solutions for your Requirements

As Lathrop commences its 31<sup>st</sup> year of business, we are reminded of some of the traditions and processes that have evolved within our company over the years as we persistently strive for continual improvement. With the recent closing of the 2012 Summer Olympics in London, it reminds us of a tradition we started ten years ago during another Olympic year.

We were working with a client from Switzerland developing high level system concepts for an automated blood testing instrument for blood-banks. While the client was able to provide high level requirements, not many product level requirements were established at the time. As we developed system architecture concepts that met these preliminary requirements, we realized that each concept or groups of concepts impacted differently what would later need to be developed as final product requirements. Being in the Olympic spirit and in order to best classify each group of system architecture concepts we felt would be easily understandable by our international clients, we choose to use the Gold, Silver, and Bronze medal reference for each category. It proved to be a very memorable and easy to understand way of categorizing the different classes of system architecture. A decade later we continue to use the Gold. Silver, and Bronze names for communicating the different levels of conceptual system architecture options we present our clients.

In the early phase of product development, our customers bring their ideas, knowledge, and some form of requirements for their projects to us. They are looking to us for help with developing a conceptual system architecture that, along with a set of formal product requirements, will lead to a comprehensive product development plan for getting their product idea designed, engineered, and into production.

Through listening, understanding, research, analyzing needs, and creative brainstorming during early phases, we develop various architectural approaches which meet the high level systems requirements. Each conceptual design meets the system requirements with different combinations of factors that may impact certain variables like cost, size, throughput, development schedule, etc. Therefore, each concept may lead to a different set or subset of formal product requirements. The gap between when the high level system requirements are developed and when the final conceptual architecture is selected (when formal product requirements can be finalized) that necessitates an easy manner for classify-

"Each concept is categorized into one of three categories: Gold, Silver or Bronze."

#### Speaking of Product Requirements...

#### Olympic Medal Trivia:

The Olympic medals are designed especially for each individual Olympic Games by the host city's organizing committee. Each medal must be at least three millimeters thick and 60 millimeters in diameter. Also, the gold and silver Olympic medals must be made out of 92.5 percent silver, with the gold medal covered in six grams of gold.

The custom of the sequence of gold, silver, and bronze for the first three places dates from the 1904 Summer Olympics in St. Louis, Missouri in the United States.



Original Silver Industrial Design Concept

ing groups of concepts that are to be presented to our clients.

Instead of developing a single concept, Lathrop develops concepts that meet preliminary requirements and give our clients further options. Each concept is categorized into one of three categories: Gold, Silver or Bronze. As their names imply and by their Olympic medal reference, Bronze concepts are the lowest level, Silver are better, and Gold are the best. An important point to understand is that the categories do not refer to quality of design, engineering or product quality but rather how well each architecture meets and potentially exceeds the system requirements and its corresponding performance in the hands of the customer.

Concepts typically fall into different categories as their architecture is dictated by a combination of decisions and tradeoffs. For example, a Bronze concept may use the simplest architecture, simplest manufacturing techniques and lower cost components. In the same example a Silver concept may differ by using higher quality / cost components that allow greater performance and reliability with the tradeoff being a higher cost of goods. A Gold concept (for the same example) may use: a more complex architecture which reduces the instrument footprint; higher quality components which improve performance; and a better user interface which improves usability and customer satisfaction with the tradeoff being cost of goods and a longer development schedule. All three concepts meet the requirements; however, with each increasing level, additional benefits are available for a certain tradeoff.

By using these easy to understand categories, it allows the client to evaluate each concept and category of concept against each other so that they can weigh the trade-offs and understand how it will impact their final product requirements and the remainder of the product development process. This allows the customer to make informed decisions when selecting the direction for their product; and, it gives them greater control of their product development future and product success. This is important as it keeps the control under the au-

"... each concept meets and really exceeds the system requirements and its corresponding performance in the hands of the customer."

thority of the client and not solely in the hands of the outside development team that is not privy to all of the strategic business decisions being made within the client's organization.



Original Bronze Robot Architecture Concept



Original Gold Robot Architecture Concept

SOLUTION A	SOLUTI	SOLUTION B CLICK ME		SOLUTION C	
A Study of PCR automation integration of timing and multiple processes to achieve maximum efficiency through cost effective solutions. Architecting structure and value to our client(s).	CLIENT REQUIREMENTS	A 	B	C	

# Random Access Instrument Development

During a recent project for a major life science automation partner, we developed multiple system architecture concepts for a random access automated laboratory instrument. By completely understanding the complex processes our client faced for various test protocols, we generated multiple concepts for

"By completely understanding the complex processes for different test protocols, we developed multiple concepts for effectively multiplexing different sample tests."

effectively multiplexing diverse sample tests simultaneously. Bronze, Silver, and Gold concepts were created and met the system requirements; however, each final system architecture concept had varying rates of speed, size, throughput, and cost. The Bronze concepts were the simplest and most cost effective. The Silver level concepts provided good ease of random access to the samples and consumables therefore achieving better levels of performance while using a single deck. The Gold level concepts achieved the highest levels of performance using a double deck system layout.

All final concepts incorporated varying

architecture for a synchronized system with the ability to run different tests while controlling and eliminating contamination; separating and regulating drop off of used consumables; and sterilizing and reintegrating consumables into subsequent runs. The new systems architecture concepts provided the opportunity for our valued partner to take their PCR automation to a whole new level through a structured architecture system.



"*Innovation* is NOT an accident.

If it is a goal, a necessity, a priority... then make it a *requirement*." Bob Lathrop

**ISO 9001 CERTIFIED** 

## Lathrop Celebrates 30 years of Success

Lathrop has been providing "Best In Class" design and engineering services since its founding in 1982.

### **Upcoming Events**

- October 25-27 Association for Molecular Pathology AMP 2012 - Long Beach CA Booth 1021
- January 13—15 Society for Laboratory Automation and Screening SLAS 2013 - Orlando FL Booth 420

Lathrop exhibits and attends many tradeshows throughout the year across the country. Come visit us at our booth. If you cannot make it to the tradeshow, call us and we can schedule a visit while we are in your area.

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#### **Topics of Upcoming Newsletters**

- Risk and Hazards
- Part 2 and 3 of the Understanding Industrial Design Series
- Gap Analysis

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