

## ARUP Laboratories



ARUP Clinical Laboratories in Salt Lake City, UT, was formed in 1984 as an independent, full service reference laboratory by the Department of Pathology at the University of Utah Health Sciences Center. ARUP performs testing on patient specimens for hospitals around the world, including military and government facilities, clinics, and major pharmaceutical firms. Reference labs such as ARUP perform the more specialized, or esoteric, tests that most hospitals do not perform, about 2,500 different tests in all.

**Total Laboratory Automation**, or (TLA), as well as modular laboratory automation, has seen widespread adoption in the past decade. Worldwide, there are now an estimated 800 laboratories with automation systems. However, ARUP's automation is unique when compared to the automation in these other laboratories. ARUP has had to adapt automation systems to its esoteric, testing environment. ARUP's accomplishments in automation are widely regarded in the industry and members of the ARUP team have been recognized in publications, and with speaking invitations and a major award.

### ARUP Laboratories

- Founded 1984
- Has over 1,900 employees
- Non-profit, owned by the University of Utah
- Esoteric reference lab serving only hospitals and other reference labs, little routine testing
- 18% annual growth rate from 1994-2003 with double digit growth still continuing
- 2,500 different tests or test combinations transported and sorted by the track system
- Daily specimens > 25,999, over 80% on "track"
- Expect to grow to 50,000 specimens / day by 2012



The rapid increase in demand for esoteric specimen testing has pushed ARUP's annual growth rate from 1994-2003 up 18%, with double digit growth still continuing. With growth expected to reach 50,000 specimens by the year 2012, automation has played a key role in ARUP's ability to keep up with industry growth, which is expected to continue for the next decade or two.

After careful consideration, it was determined that the ability to maintain this rate of growth could only be reached by the application of an Automated Storage and Retrieval System (AS/RS). The automated transport and sorting systems transports and sorts 22-26,000 new specimens a day. The AS/RS can robotically store more than 2.3 million tubes in 5,220 trays and can retrieval up to 210 trays per hour. ARUP currently uses 1,740 trays with 430 samples per tray, totaling 783,000 samples at any one time. The system was designed to be expanded from one aisle to three aisles 5,220 trays, 2,349,000 samples, allowing continued growth for decades to come.

ARUP has led the way in automation among U.S. reference labs. Many routine clinical labs have some level of automation – over 300 in the US and nearly 1,000 worldwide. Automation in routine labs has been relatively easy because specimens are more uniform and there are a limited number of

manual activities to be replaced. Automation in esoteric reference labs has been much more challenging due to the vast scope of the test menu, a wider variation of specimens, -20° F temperature requirements, and many more manual steps. Daifuku was able to tackle the unique challenges offered by ARUP's business model and develop a system that would give them a return on investment in only four years.

#### **Solution Highlights**

- The automated transport and sorting system transports and sorts 22-26,000 new specimens/day.
- An additional 80% of that volume is returned to the track each day to route for additional tests or for storage on the Motoman Storage AutoSorters, bringing the total daily volume on the track system to 40-45,000.
- The track has a capacity of 7,000 new tubes/hour or >100,000/day.
- The Storage AutoSorters can each store > 1,100 tubes per hr.
- AS/RS retrieval time for any single tube is < 2.5 minutes.
- Have achieved highly significant improvements in TAT, quality, and efficiency from the application of automation.