NRK TODAY

TRENDS AND ISSUES IMPACTING METROLOGY & *SPATIALANALYZER* VOLUME 3

Automation

***SpatialAnalyzer* enables advanced joining capabilities for complex assemblies.**

Automation brings to mind robots for most people. But rather than the stereotypical sci-fi robot, automation should bring to mind some more practical concepts: time and money saved.

Many applications are already increasing manufacturing automation, but in large scale projects that need the precision of portable metrology, the software called *SpatialAnalyzer* is boosting the efficiency and ease of automating processes.

Gone are the days of hand-built large machines for transportation. In the past, planes used to be hand-built, piece by piece. Assembly changes have driven the industry to innovate and replicate. Lower costs, raised quantities and repeatability are high priorities in the manufacturing sectors. The use of robots and automation allow for duplication more easily in the manufacturing process of trains, planes, and automobiles.

Some of the biggest advancements in automation are the many custom projects it applies to.

The term "automation" may imply creating many of the same, but some of the biggest advancements in automation are numerous custom projects it applies to. For every part, there is a process to automate and the need to measure the effectiveness of that automation.

Rick Cole, Sales Director for NRK, feels that custom designed automation processes are the future for portable metrology applications. "There are phases of automation, and really, there are no 'typical' applications. Everyone building anything needs to customize to fit their needs," he said.

Cole explained that modern automation's event-based model changes old ideas about automation that were based on time and often ran into production difficulties.

"Certainly, there are uses for off-the-shelf series of measurements that use data acquisition and measure them against templates," he said. "But there are also major applications that need solutions specifically and truly designed for them."

One example is the Delta 4 rocket being constructed in Florida, where seasonal hurricanes are an issue. The manufacturing facility is, by necessity, a building with only a few stories. Typically a fuselage for a rocket like the Delta 4 is stacked vertically. In this case, the Delta 4 is being built on its side, with some adjustments in the manufacturing process.

SpatialAnalyzer can be used to automate external activities and send movement instructions to a robot or piece of equipment. Cole describes it like this: "Here's where you are, and here's how you need to fit and move those pieces. There are two extra large pieces and you have to track their location and orientation in real time and be able to reposition in any direction. The laser trackers tell us where the pieces are and ensure that they will fit during the process."

There are serious consequences if components are not aligned properly, especially if they are not aerodynamic enough to fly. This is a dangerous situation, particularly if it has a fuel payload that potentially could explode. The question is: How can you measure something to a hair's breadth, if that something is the size of a locomotive? Well, with *SpatialAnalyzer*, you can.

Automation is surely making a difference in large scale projects and people are taking notice. After years in the metrology industry, NRK Sales Director James Gardner said that, "Automation is where so many things are pointed to for the future and I feel that software such as *SA* will be the key to bringing solutions to places such as Boeing and Lockheed, as well as several others."

Gardner said that he's excited about the new opportunities to work with more custom assignments such as automation within production. And in industries that are driven for higher productivity, more accountability and increased compatibility, it's not hard to predict the future: added automation. ■

Through the Eyes of an OEM

James Gardner sees the metrology industry from a different angle than most. As the former director of business development for Metris, he sees the big picture for original equipment manufacturers, or OEMs. After more than 20 years in the industry, he's seen major changes in how software is changing the way business is done.

Several years ago, Metris (now Nikon) moved to a more universal software solution, and Gardner was part of that decision. "Back in the 90s, I was missing sales opportunities because the proprietary software of each instrument was incompatible. Companies were reluctant to take a chance on having their people needing to be retrained every time they bought a new piece of instrumentation," Gardner said.

"I came to realize that *SpatialAnalyzer* helps sell instruments. It is that much of a difference maker."

The customers' fear of having to buy and train on new software was losing Gardner sales. He was hearing a lot of objections to the effect of, "love your tracker, but we can't switch software right now." So to solve this issue, Gardner began to seek a third party software solution. What he found was *SpatialAnalyzer*, which could be used on all types of trackers, scanners and arms. "I showed it to my clients and it helped me sell more instruments. They could get better hardware and have software that worked on both old and new pieces," he said.

Moving to *SA* has benefits for OEMs and customers. Aerospace clients LMCO, Boeing, shipbuilders in the US, Europe and the Far East are also using *SA*. "One of the advantages is that you can run multiple instruments and pull data at one time, all into the same job file. The other huge plus is being able to see the GD&T scripting and propagate the scripting right there," he said.

It also works in reverse – if a company is already running *SA*, it's easier for OEMs to get a foot in the door. "Every license already has all the instrument drivers and interfaces loaded on it now, so it's much easier to sell to a company who has a lot of different pieces of hardware," he said.

The company that makes *SpatialAnalyzer* is New River Kinematics, and Gardner met their Director of Sales, Rick Cole, when they both worked for other companies in the industry. "I knew the software is state-of-the-art and that NRK made quick changes compared to other software companies," Gardner said. In 2009, he decided that what NRK provided through *SpatialAnalyzer* was so unique that he wanted to get in on the action – he joined the NRK sales force.

It was a long history with *SA* that prompted Gardner to make this change. "I came to realize that *SpatialAnalyzer* helps sell instruments. It is that much of a difference maker," he said.

He's also seen some of the pitfalls in the industry, like various crews running different devices and different software. "It's a nightmare to manage. I know that on *SA* you don't have to reteach the root of the *SA* Operating system and it can run on anything – it's a dream," he said.

So, Gardner continues selling the dream to the same people he used to compete with – OEMs across the industry, who are helped by his years of experience with *SA*. ■

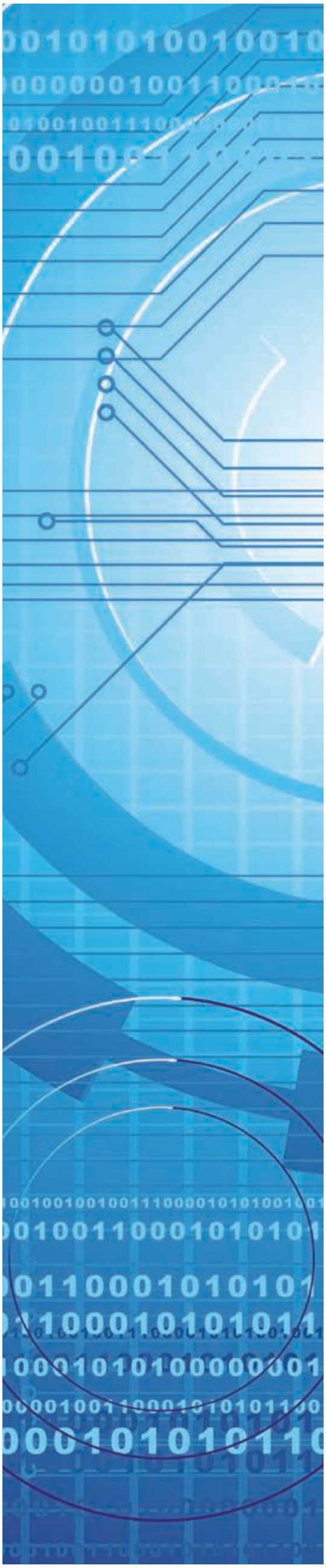
Sharing and Shaping the *SpatialAnalyzer* Experience

The last Users' Conference was so popular that New River Kinematics has decided to bring together their users again to discuss *SpatialAnalyzer*. Users from all over the world come together to discuss the ways they use the product. They bring questions and suggestions that they have, and the always evolving discussion of metrology challenges continued.

Because of the open and customized solutions that *SA* provides, the Users' Conference is a way to engage with others working with similar challenges in a non-competitive environment. Cross-functional education makes the event valuable for attendees, including breakout sessions covering GD&T, USMN, Measurement Planning, and Instrumentation. A hot topic is where *SpatialAnalyzer* will be in the future, and the many different ways that people are using *SA* and its applications today.

Co-founder Joe Calkins said, "We always get great feedback for product enhancements, and I was glad to see all the people who make the effort to come. Customer feedback has made *SA* what it is today!"

Calkins said that the first conference was a success because, "NRK customers took time to come and share their experiences, get educated about some new ideas they might be able to implement, and we got to know them better." And that feedback will continue to shape the future of NRK, as well as the businesses that utilize *SpatialAnalyzer* to innovate the way they get things done. Everyone is looking forward to the next conference as an opportunity to reduce costs, increase productivity, and decrease cycle time. Plus, it's a fun networking event for industry innovators. ■



CMSC: With Sizzle and Style

The hot event of the summer will be the Coordinate Metrology Systems Conference, well-known as the best-attended annual industry event. This year, it's in the desert: Reno, Nevada hosts the 2010 CMSC. In July, the annual CMSC crams five days full of industry topics, people and products into one place. In this case, it's the Grand Sierra Resort.

This unique event emphasizes technical education – and provides the means to get the techniques out there, for example, workshops, seminars and presentations. The Exhibit Hall is filled with the hands-on knowledge of hardware manufacturers and service companies. As usual, NRK will be exhibiting and showing how *SA* integrates with all of the instrument providers. The key to unlocking that knowledge is being there, and asking the questions about what you could be doing to increase your project's success. That's why it's important to take advantage of learning and networking with the industry leaders.

Every year, what draws attendees back to the CMSC is the shared resources and opportunities to collaborate. CMSC 2010 will feature whitepaper presentations by industry experts. For example, New River Kinematics is hosting a hospitality suite in which new and exciting things for *SA* will be discussed. It's always well-attended by those looking for project-based solutions.

Joe Calkins thinks highly of the conference and said, "We never miss a CMSC – not since we exhibited the first version of *SpatialAnalyzer* in 1996. It's the place to be in this industry and every year I look forward to learning something new."

The educational atmosphere encourages attendees to network and learn about the latest innovations in the field. Conference attendees hail from prominent science/research laboratories, and diverse industries such as aerospace, space hardware, antenna, automotive, shipbuilding, power generation, and general engineering.

Many of the exhibitors will feature metrology systems such as electronic theodolites, laser projection systems, laser trackers, laser radar, photogrammetry/videogrammetry systems, scanning devices, and articulating arms. The CMSC is a society of users, services and OEM manufacturers of close tolerance, industrial coordinate measurement systems, software and peripherals. The society's goal is advancement or development of any measurement system or software that produces and uses three-dimensional coordinate data.

Besides meeting for discussion about trends, industry issues and networking, this conference has social events as well. The area of Reno is known for casinos and restaurants as well as the striking natural beauty of the Northern Nevada desert. ■

Measurement Plans: Who Doesn't Like Saving Time?

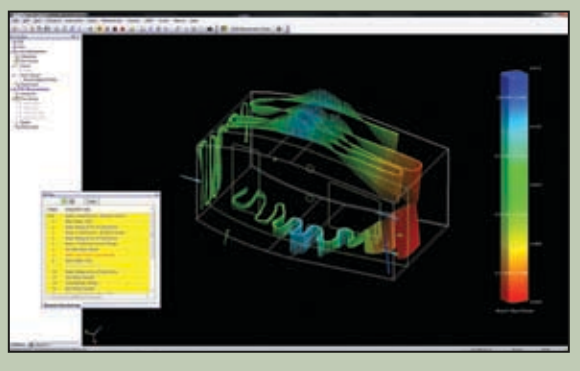
SpatialAnalyzer adoption has increased due to the need for added precision, common hardware interface and flexible applications – but there's even more it can do.

Todd Burch, an Application Engineer with NRK, talks about one of the growing uses for *SA:* Measurement Planning.

Measurement Planning is a module within *SA* used to script out commands in a series like a programming language. Measurement and analysis is automated with a series of 500 commands. "This enables complicated or repetitive analysis to run 'under the hood' without users doing it manually. This helps avoid errors, like keying in the wrong number accidentally," Burch said.

Standardizing a process with Measurement Planning has other benefits that save time, including faster analysis. The script doesn't just run, it also includes arguments and inputs to control execution – you can even communicate with the user through a window if needed.

So how do you do it? If you have a good working knowledge of the process you need to automate, then *SA* is the software to do it. Burch explains: "Let's say you had 100 groups with 100 points each, and you wanted to fit a circle to each group. You would write a measurement plan to execute a circle fit 100 times. Write it once in a measurement plan – and instead of doing it manually over and over for an hour, you can do it in a couple of seconds," he said.



Multiply by several times per year, and it saves time and money. Once you've decided that your process can be accelerated by a measurement plan, there are built-in ways to debug in *SA*. Burch said, "There are a number of tools to aid with testing. To avoid errors in automating, you can run through a test loop several times. There's the option to step through it one line at a time and a feature called "MP Watcher" which allows you to see what's happening under the hood as the script is running."

Measurement planning doesn't fit with every process, of course, but it's remarkable how many it does assist with. For example, compare a process that might take 2 people 5 to 7 days to complete, with the two weeks to write a measurement plan for the same process. It's about the same amount of manhours until you calculate this in: 2 minutes to execute every time after. It's easier, faster, and more reliable – desirable on all counts.

Burch is enthusiastic about measurement planning from his own personal experience. He worked at a shipyard and saw how doing the same task in several ways could open up room for error.

Measurement planning makes a compelling case for saving time and money and avoiding errors. So, why isn't everyone using it now? "I think it's a lack of education on what it is…without a programming background, I can see how it might be intimidating," Burch said. But, one of the advantages of MP in *SpatialAnalyzer* is that you don't necessarily need to know about programming – it has a graphical interface.

Burch said that it's not too hard for even an entry level user to benefit from using it. "Explore it – I think most people will find it's easier than they thought," he said. Ease plus efficiency: that's a valuable equation. ■

Training and Support — the Foundation of Successful *SA* Use

As the *SA* user base expands, NRK continues to offer training classes to fit the needs of their clients. Although *SA* is easy to use, there are a variety of customized applications and add-ons that can enhance projects and NRK helps their clients maximize *SA* with additional training. "It's a comprehensive package, with lots of tools for specific tasks. Once you master a few fundamental concepts, it's much less intimidating, and becomes quite easy to use," Gary Garrison, Director of Technology at NRK, said.

Customizing training is just as important as meeting all the needs on the factory floor. In addition to offering training for individuals, *SA's* range of capabilities makes it necessary to offer advanced classes. "Some of our larger accounts have asked for more advanced courses. Advanced *SA* includes things like advanced reporting, relationship fitting, uncertainty analysis, and an introduction to measurement plan," Garrison said. Measurement

Planning is another course that we now offer on an open enrollment basis.

NRK is making a concerted effort to provide training on many levels. Because people learn differently and technology is playing more of a role, NRK is premiering a video series that explores important topics related to the business. These short videos explore topics such as "Who is NRK?" "*SA*, A Short Overview" and "How to use *SA* with Faro Instruments." Videos, and other interactive web based tools are key to enabling our customers to choose the amount of time they want to devote. And NRK is there to support them with a strong foundation to get the job done, whatever that may be.

NRK's training is adapted to each customer's needs instead of assuming each customer wants to walk through a rote syllabus. Relying on the experience and knowledge of the NRK trainers, clients can ensure that their engineers become skilled at operating *SA* and honing their skills. In the NRK lab, there are many instruments and the staff guides each trainee through the scenarios of various projects. The training facilities mimic the real-life situations that engineers will face on the job.

In the end, having a solid foundation of knowledge and continually adding to it makes a difference to the bottom line. And NRK is there to provide assistance with *SA* every step of the way. ■

Precision Has a New Home : NRK opens new Metrology Center

New River Kinematics recently opened a new state-of-the-art facility in Williamsburg, Virginia. The eight-acre campus consists of two custom designed buildings that offer 20,000 sq. ft. of space. Included is 6,000 sq. ft. of lab space specifically dedicated to the continued research and development of the company's advanced metrology and production applications including *SpatialAnalyzer (SA)* software.

With a growth rate averaging over 20% in the last three years, NRK will need the room to grow. It continues to expand in the aerospace, shipbuilding and satellite industries.

The new facility enhances NRK's training capabilities. The central room of the building includes a type of laboratory for demonstrating *SA* on all types of hardware. The entire room is filled with workstations featuring instruments including arms, trackers, lasers and theodolites. Hands-on demonstrations for customers and partner customers are a key part of the purpose of the new NRK headquarters, aligning with their commitment to customized service.

The response has been positive and NRK co-founder Joe Calkins commented on the importance of the new facility, "This custom facility creates an ideal environment as we continuously improve *SpatialAnalyzer*. *SA* is now interfaced with over 100 hardware instruments and our new space will allow for many of the leading portable metrology instruments to be available at all times."

The growth of *SA* as the leading metrology software in the market parallels NRK's growth as a company. A product as cutting edge as *SA* indicates a bright future and there's room to grow. ■

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