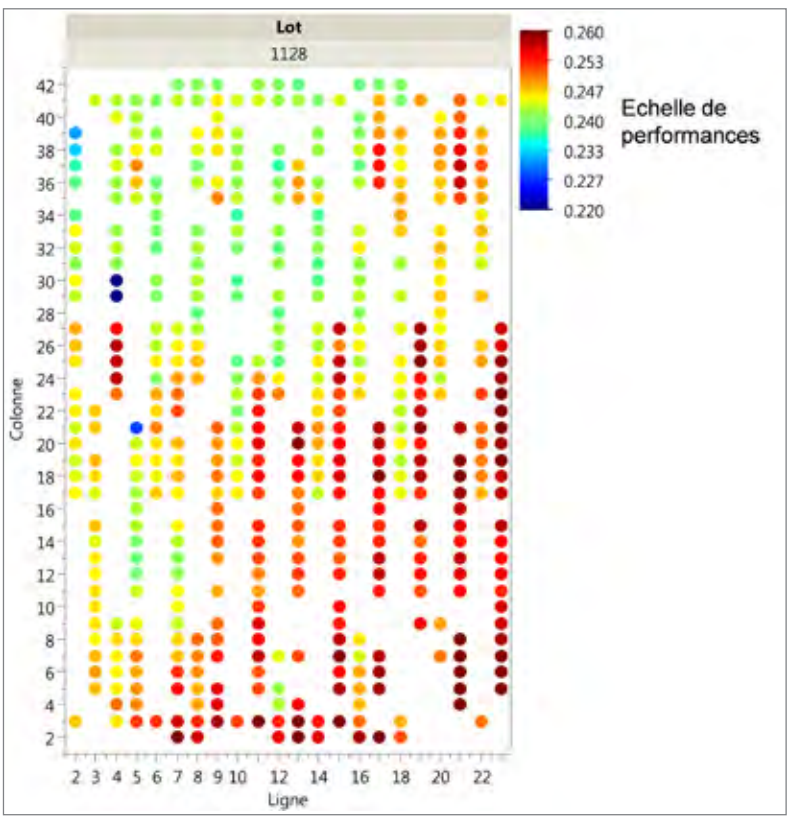
Statistical Discovery.™ From SAS.

At France's CEA, JMP® is at the heart of the innovation process

Researchers save valuable time on data analysis, communication and technology transfer

Who said France is short on innovation? The Laboratory for Innovation in New Energy Technologies, or LITEN, is one of Europe's largest centers for research into new energy technologies. This fast-growing research institute is one of four innovation centers in Grenoble on the campus of the CEA, the French Alternative Energies and Atomic Energy Commission.

The PICTIC platform in Grenoble develops new printing technologies for electronic components on flexible surfaces (plastic, paper, textiles, etc.) using inks containing organic materials, including polymers and/or nanomaterials such as silver nanowires instead of the traditional silicon. Potential applications are incredibly varied, ranging from flexible screens to medical biosensors, intelligent packaging and an X-ray plate that can bend to mirror the shape of a fractured arm.



Mapping performance on a plate. Each point corresponds to a component.

"Organic materials enable us to produce electronic components on large, conformable surfaces," explains Amélie Revaux, head of the Printed Organic Component Characterization and Aging laboratory.

Overall, the platform has around 50 researchers who are paving the way for innovations to connect the world and intelligent objects of the future. Some of the research is still experimental, focusing on devising and optimizing new processes. Other research, carried out in close conjunction with industrial partners, is nearing the technology transfer phase. It is at this stage that JMP® statistical discovery software from SAS enables Revaux's team to save precious time. But let's not get ahead of ourselves.

JMP® and ease of use

When the PICTIC platform was established in 2012, the research was still very experimental and did not involve extensive statistical analysis. Researchers carried out their experimental designs manually and worked on Excel macros. But as the technologies matured, the volume of data increased. As technology transfer to industrial partners approached, it became necessary to work on runs of thousands of components to test their performance under all possible conditions. A more powerful statistical

JMP® fosters statistical discovery by sometimes revealing important information that no one was looking for.

tool than conventional spreadsheets became essential.

Revaux looked at all the software available on the market. Other teams at LITEN were already using JMP to monitor platforms and processes, particularly in the Transport department, where hydrogen batteries are being developed. The ease of use of JMP persuaded her to follow suit. "It's essential for people like us, who are not statisticians," she says. "The graphic tool is very powerful, and JMP is both simple and flexible."

One of the software's major advantages is that it enables users to program analyses without needing to write any code. "JMP records how we process the data the first time and generates a script that can be reproduced for subsequent experiments. This is particularly useful when you are repeating the same type of protocol several times, for example, in reliability studies."

Large volumes of data in a flash

Reliability testing represents a crucial stage in innovation. In the case of PICTIC, this means testing the performance of runs of thousands of components and following their performance over a monthlong period, taking readings every hour – which means a thousand readings for every test. A conventional spreadsheet would struggle to handle such high volumes of data, particularly since several reliability runs are carried out in parallel for the same application, varying the conditions of use.

"Excel can draw a graph with 1,000 points," explains Revaux. "But it can't easily compare different reliability runs with each other." That is a significant deficit, since it is often by comparing runs that it becomes possible to move the research forward.

Moving quickly from visualization to analysis

The interactivity of JMP plays an important role in discovery, Revaux says. "JMP makes it easy to visualize anomalies on a particular parameter very quickly. Simply click on a point on the graph to access the data table so you can see what has caused the anomaly."

CHALLENGE

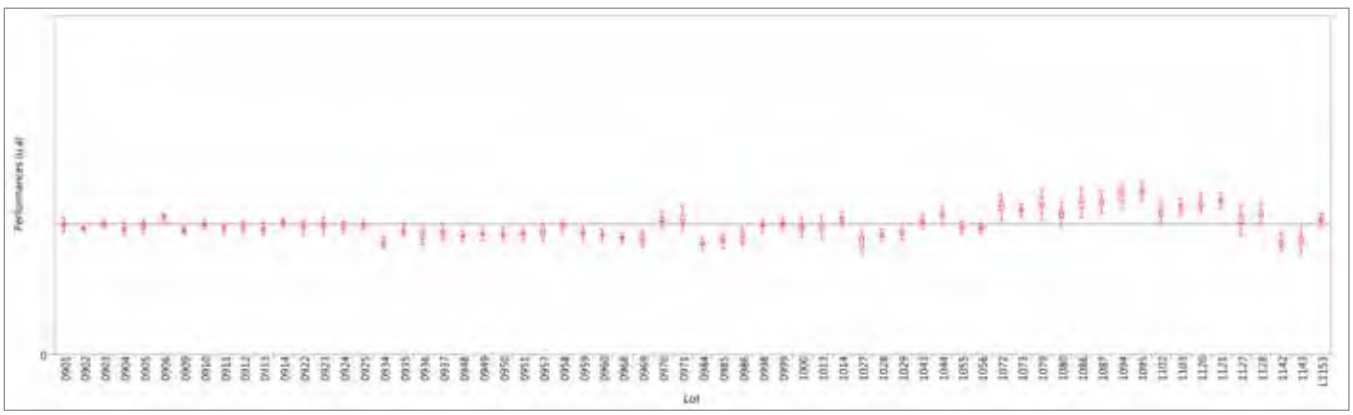
Analyze large volumes of data from strength and performance tests on electronic components printed using organic materials.

SOLUTION

Use JMP to monitor tests in real time to quickly identify and analyze anomalies.

RESULTS

- Display analysis results visually with interactive graphs.
- Work in real time, with a swift transition from visualization to analysis.
- Improve dialogue with industrial partners.



Monitoring the performance of the reference plates from the PICTIC platform: statistics of 1,000 components per plate.

Monitoring results in real time also makes it possible to split reliability testing into different phases, and therefore learn more from the tests.

The icing on the cake is that by providing access to numerous parameters via interactive graphs, JMP makes it easier to identify correlations between various parameters that researchers would not otherwise have thought to compare. Thus, JMP fosters statistical discovery by sometimes revealing important information that no one was looking for.

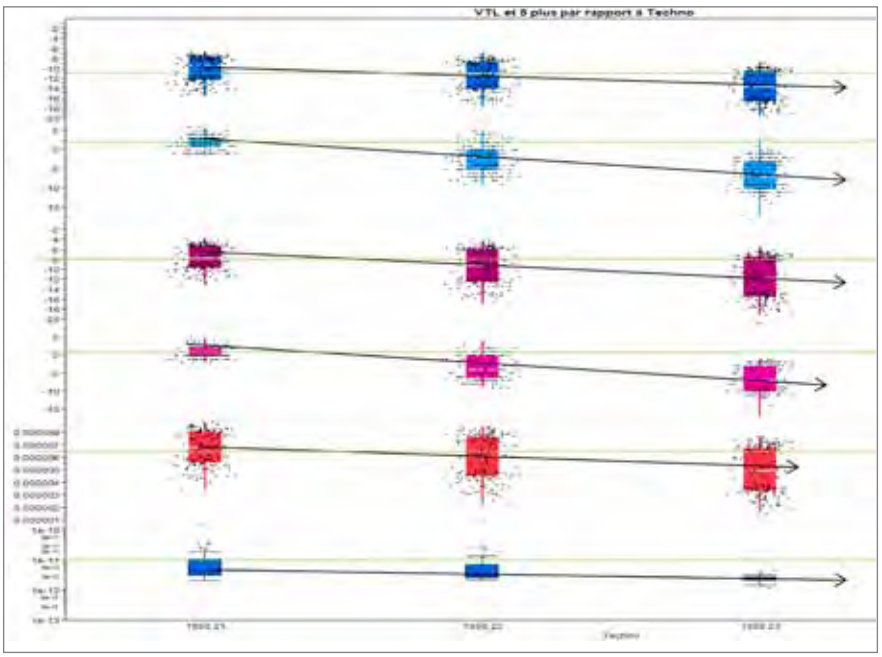
Saving time for the whole team

JMP software's graphic interface also saves laboratory researchers valuable time in the day-to-day task of formatting data. Where Revaux and her team earlier might have spent a day "drawing graphs" to produce a visual representation of their reliability runs to compare the results, they now need just an hour, allowing much more time for analysis and research.

Researchers can swap tips about using JMP or consult with others within the CEA, which hosted the annual JMP users day in Grenoble in 2014. JMP's advisers are "very responsive," according to Revaux, and are also available to demonstrate additional capabilities.

A common language with industrial partners

After the research stage is complete, there are weekly meetings with industrial partners. And here, JMP offers one final advantage. "The clarity of the graphs makes it easier for us to talk to our partners," explains Revaux. "Every week, I prepare a PowerPoint, which incorporates JMP screenshots. This makes it easy for them to follow the progress of the research and means we are all speaking the same language."



Extraction of printed parameters for thin-film transistors and changes over time.

Making full use of the software's potential

As their research reaches the critical technology transfer phase, members of Revaux's team will be exploring the laws of acceleration to test reliability over 15 years. Upstream, the PICTIC teams could also adapt JMP functionalities for the experimental design of future applications, paving the way for more and more innovations.

ONLINE

Free trial

Try JMP free for 30 days and start your journey of dynamic statistical discovery.
jmp.com/trial

Customer stories

See how other organizations get real work done with JMP.
jmp.com/success

Webcasts

Watch webcasts to see JMP in action and learn from world-renowned thought leaders.
jmp.com/webcasts

Reliability applications

Prevent failure and improve warranty performance using JMP.
jmp.com/reliability

Get social with JMP

Join the conversations.
jmp.com/social

SAS Institute Inc. World Headquarters +1 919 677 8000

JMP is a software solution from SAS. To learn more about SAS, visit **sas.com**
For JMP sales in the US and Canada, call 877 594 6567 or go to **jmp.com**