Data cockpit: Ways to extend a master table on click with additional data

Georg Raming, Siltronic AG

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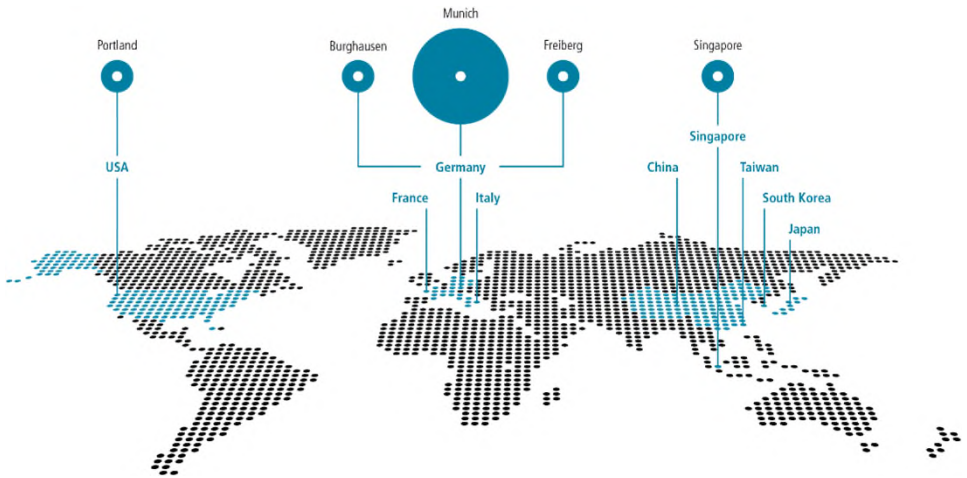
Siltronic at a glance



4 world-class production sites

~ 4,500 employees

global scale and reach

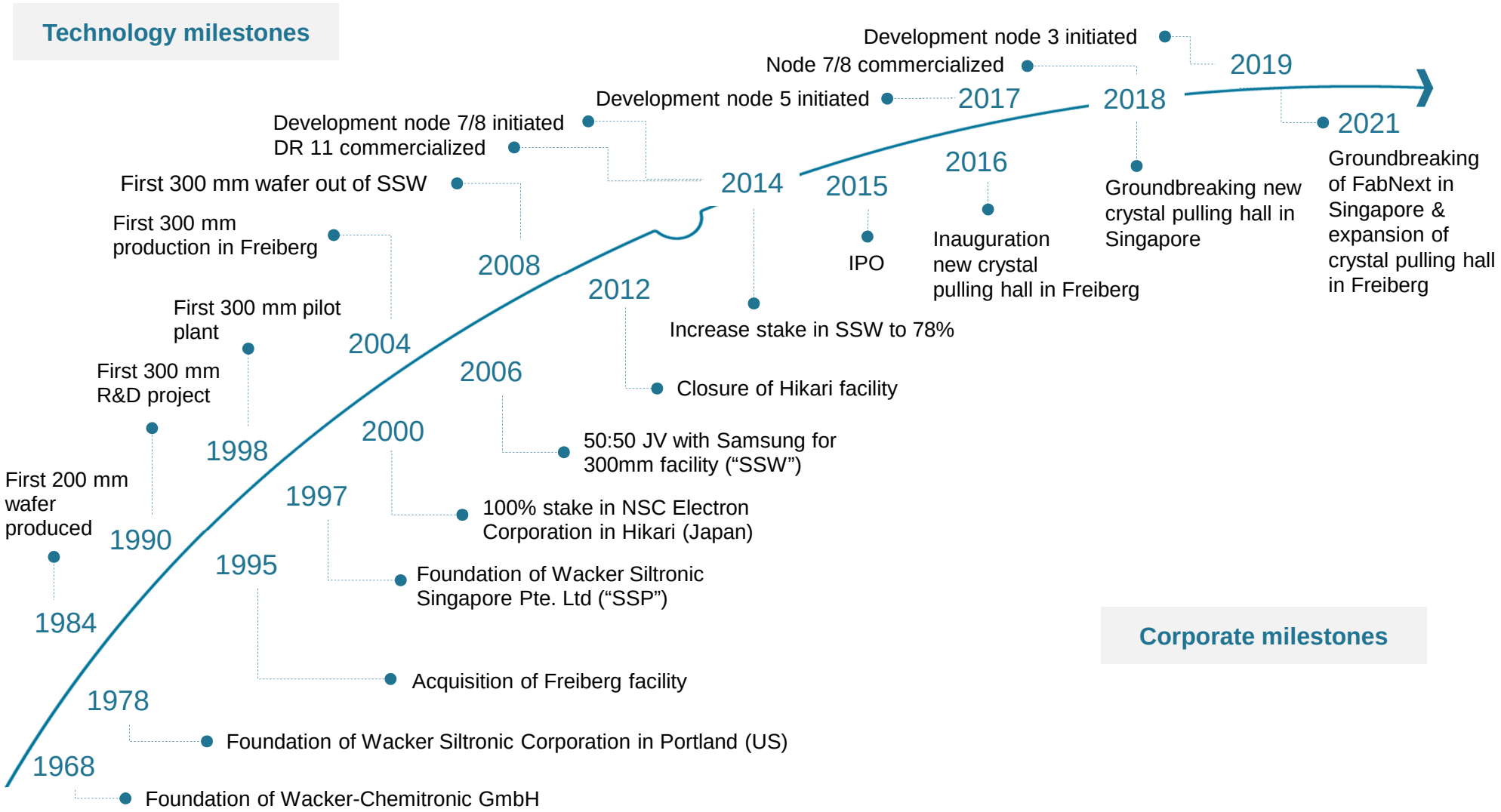
50+ years of history in silicon technologies

Key financial figures 2022

- Sales: EUR 1,805.3 million
- EBITDA: EUR 671.6 million
- EBITDA margin: 37.2%
- Net cashflow: EUR -395.4 million
- Net financial assets: EUR 373.6 million

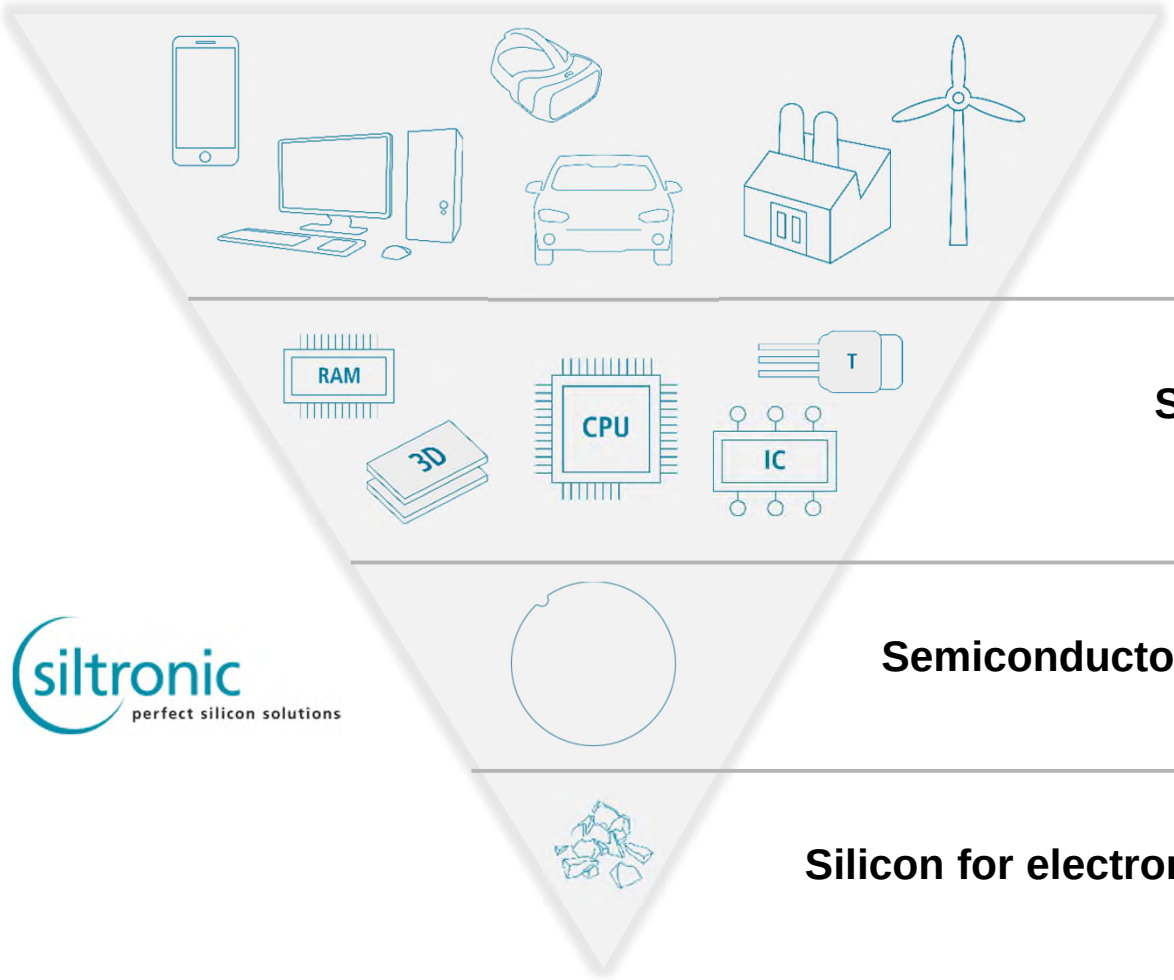
= Production sites, Headquarter in Munich

More than 50 years of experience in the semiconductor industry



Electronics value chain continued to grow in 2022

Increasing demand for electronic devices and new applications drive semiconductor growth, which in turn fuels silicon demand



Electronics
USD 1,855 bn

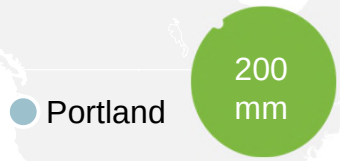
Semiconductors
USD 562 bn

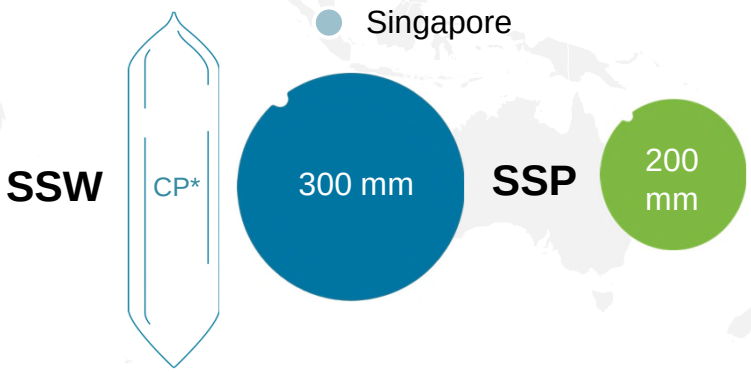
Semiconductor silicon wafers
USD 13.8 bn

Silicon for electronic applications
USD 1.3 bn

Sources: TechInsights, WSTS (Si based), SEMI SMG, Siltronic Marketing

International manufacturing network supports strong market position and business focus





- Central R&D hub in Burghausen
- High-volume 300 mm fabs in Germany and Singapore
- Singapore fabs among the world's newest & largest

*CP = Crystal Pulling | *SD = 150 mm and smaller

Top technology position complemented with a high level of quality

A leading position in wafer technology

- Commercialization of 3 nm node started in 2022
- Development of 2 nm node started in 2021 (commercialization expected to start in 2024)
- Concurrently optimizing on 50+ wafer parameters of each design rule
- Single wafer traceability for 300 mm
- Standardized processes across sites enabling “copy exactly” at product level

R&D expenditure, in EUR mn (% of sales)

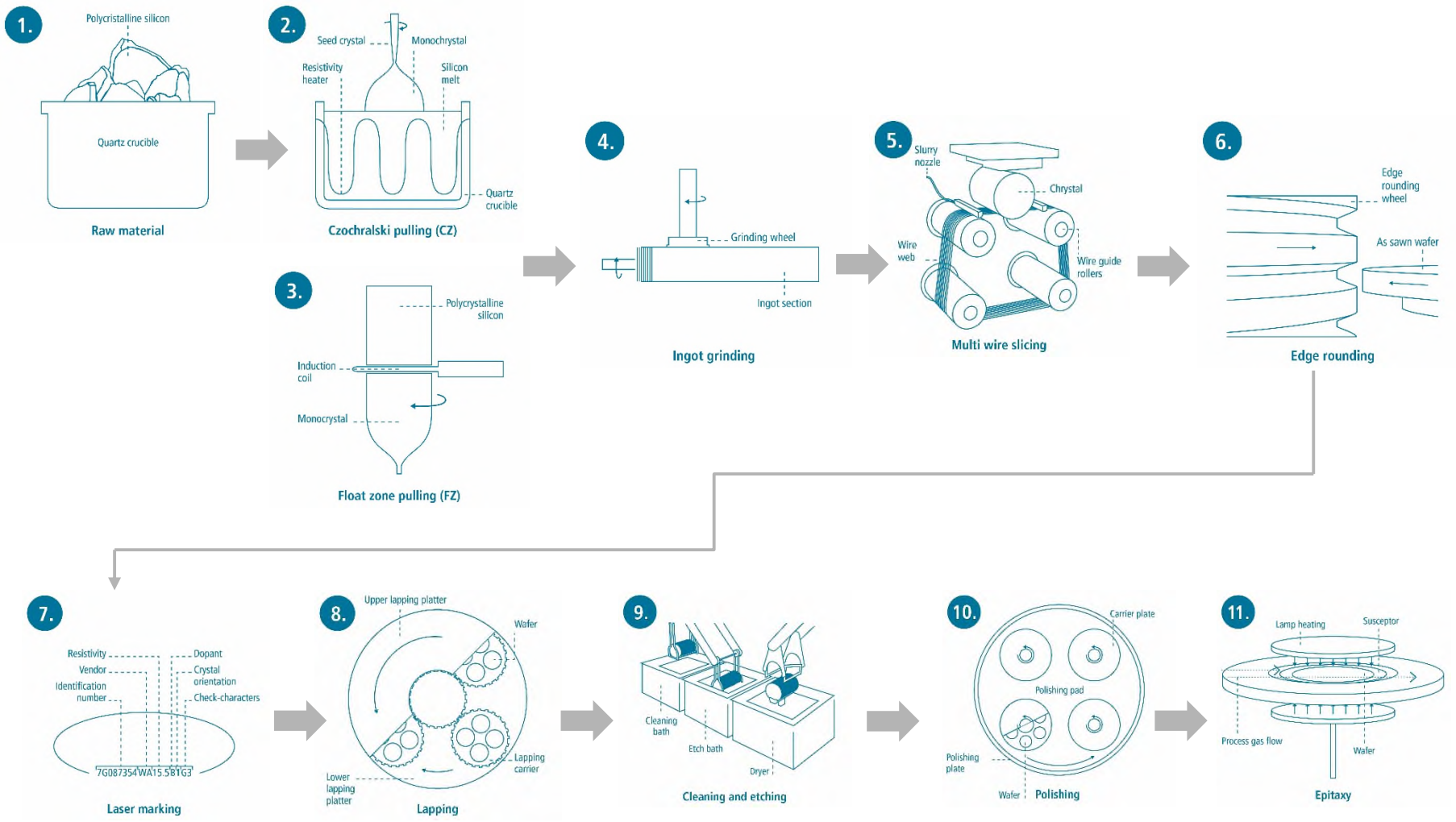
>400 R&D employees worldwide

Approximately 1,890 pending and active patents in almost 350 patent families*

Quality awards from several top semiconductor customers received over the years

*as of December 31, 2022

Crystal growing and wafer production process



About the author

Georg Raming

- Electrical Engineer, PHD in simulation of electrothermal processes
- Six Sigma Black Belt
- Development of Silicon crystal growth processes at Siltronic AG, Freiberg (Germany), a semiconductor wafer manufacturer
- Responsible for support of JMP Software within Siltronic AG for ~ 500 users

source: Siltronic AG

Data cockpit:
Ways to extend a master table on click with additional data

Problem / Task

- One table (Data Cockpit) contains an overview on products or batches etc.
- Overview graphs to assess performance and other parameter
- Additional tables are generated based on content and selection of main table
- Additional Columns / Values are added to main table
- Links provided to drill down for more detail data

JMP Data table is a great GUI

Solution steps

- Database Queries (new sql query)
- JMP Data table for overview
- Event handler to act on click
- Table scripts for
  - starting platforms
  - adding columns
  - generate detail tables
  - one click execute all

JSL for detail implementation

Database
Simulated by sample Table “Anodic Bond”

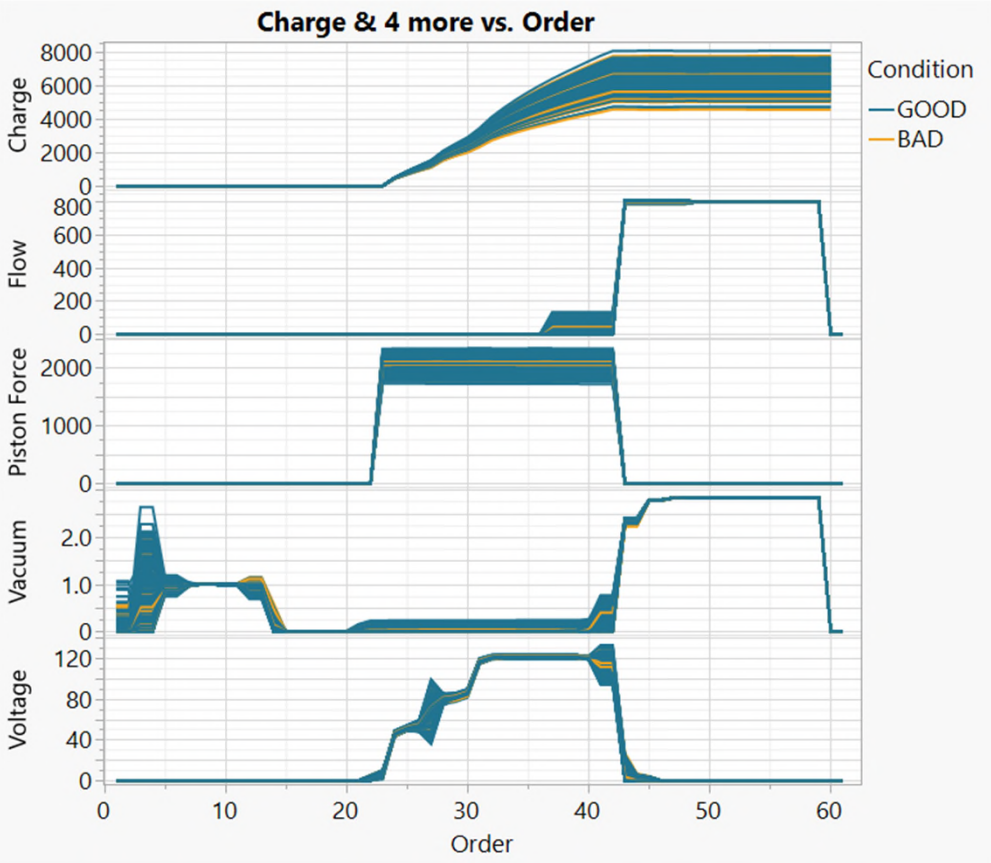
In real application data comes from company database(s)

- Cockpit / Summary is compiled by query on many different tables
- Additional data is added from same or other tables
- Other sources available for JMP could be used as well (files, www, images, video …)

In this presentation a sample data table is used to simulate database

- table: Anodic Bond

DB access similar to table access

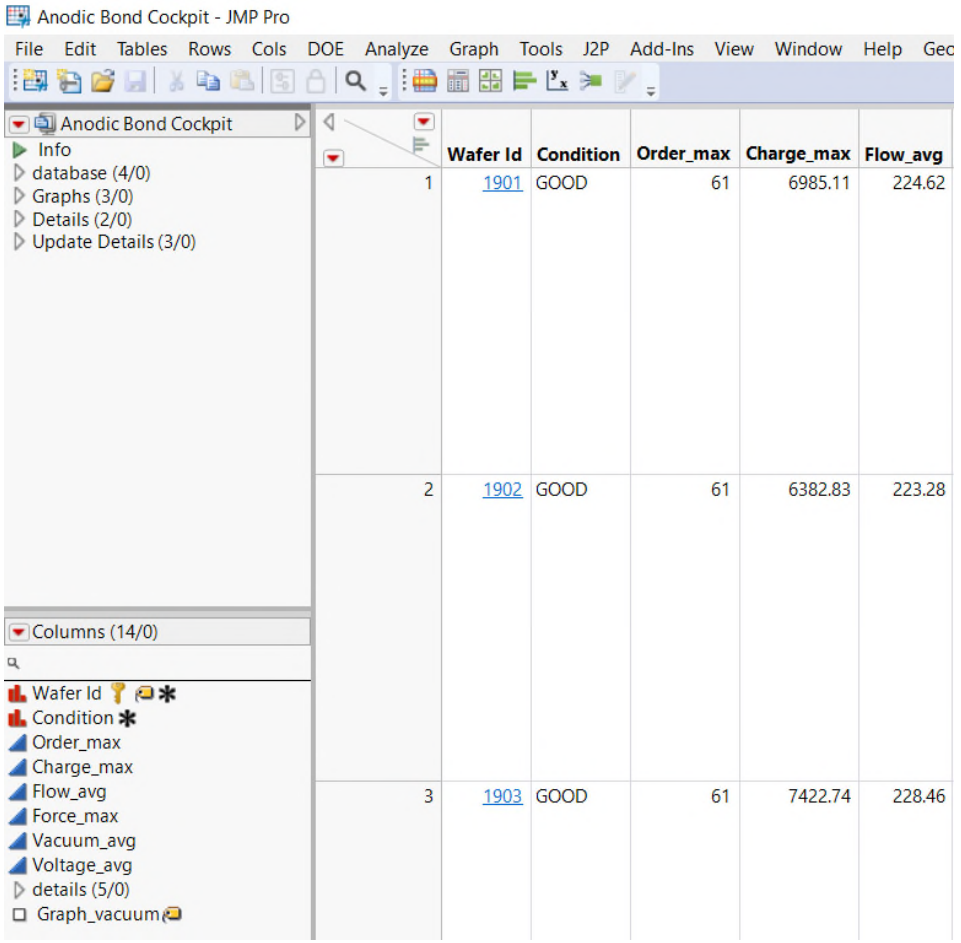


5 variables along order for each ID

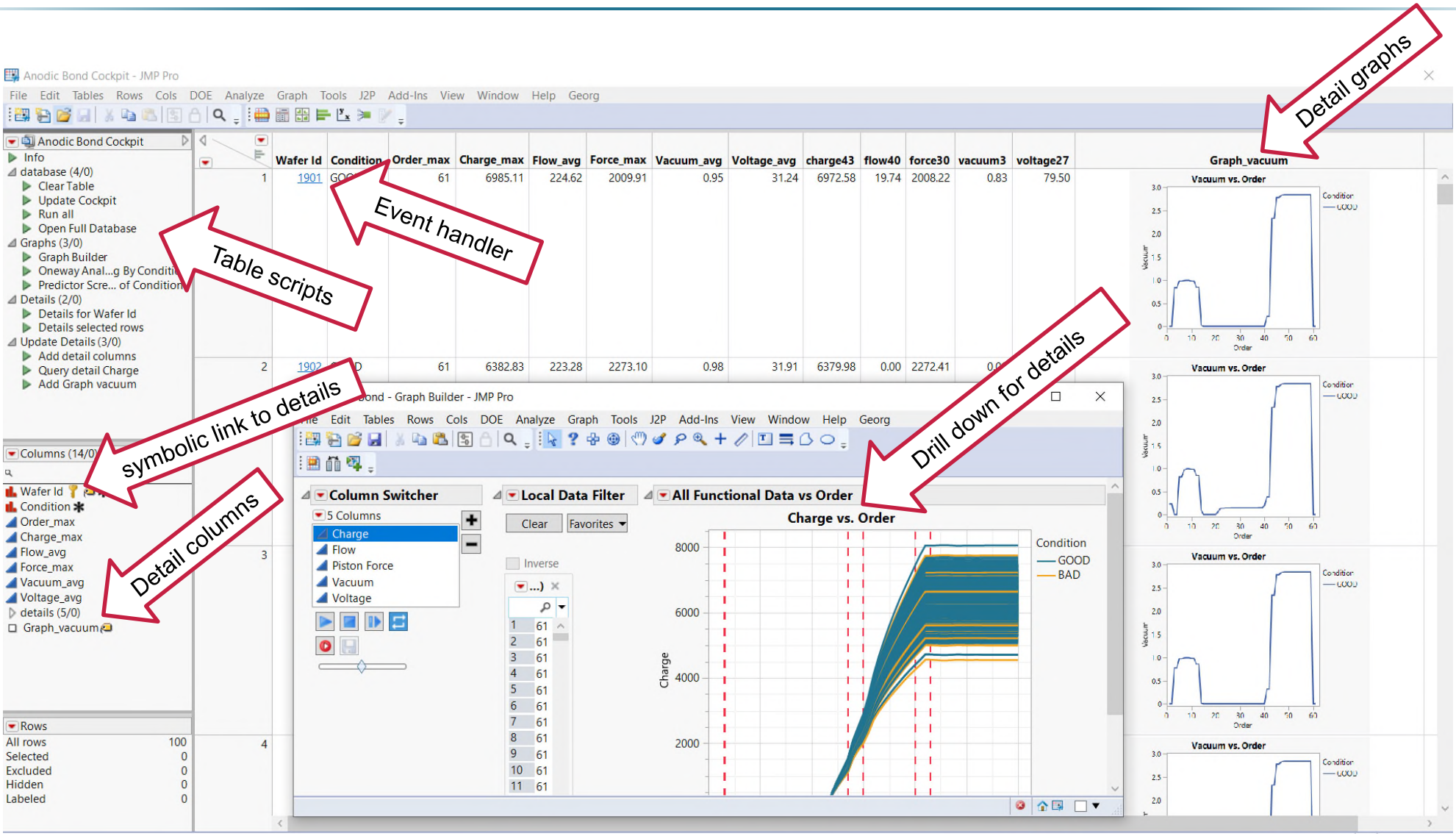
Data Cockpit
Summary table with update (from DB) function

Data Table as User GUI

- contains ID and summary data
- table scripts to
  - update data
  - show evaluations
  - add details
  - add tables
- link on Wafer Id for detail drill down
- detail columns are grouped
- column with graph elements



Data Cockpit
Detailed view of features



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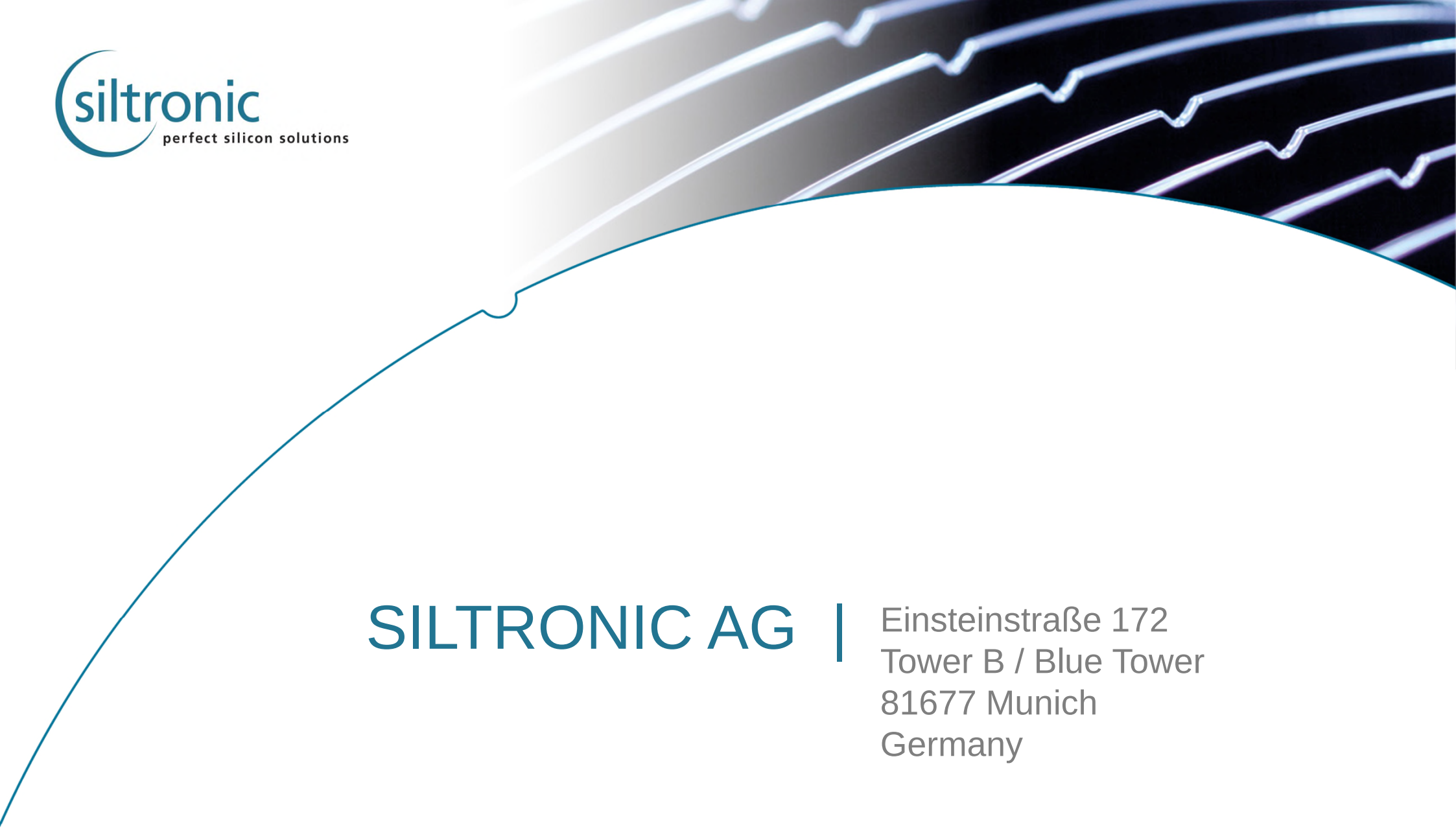

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