solutions to meet the needs

MBJ Solutions GmbH

Fully automated test and measurement tasks in PV module production

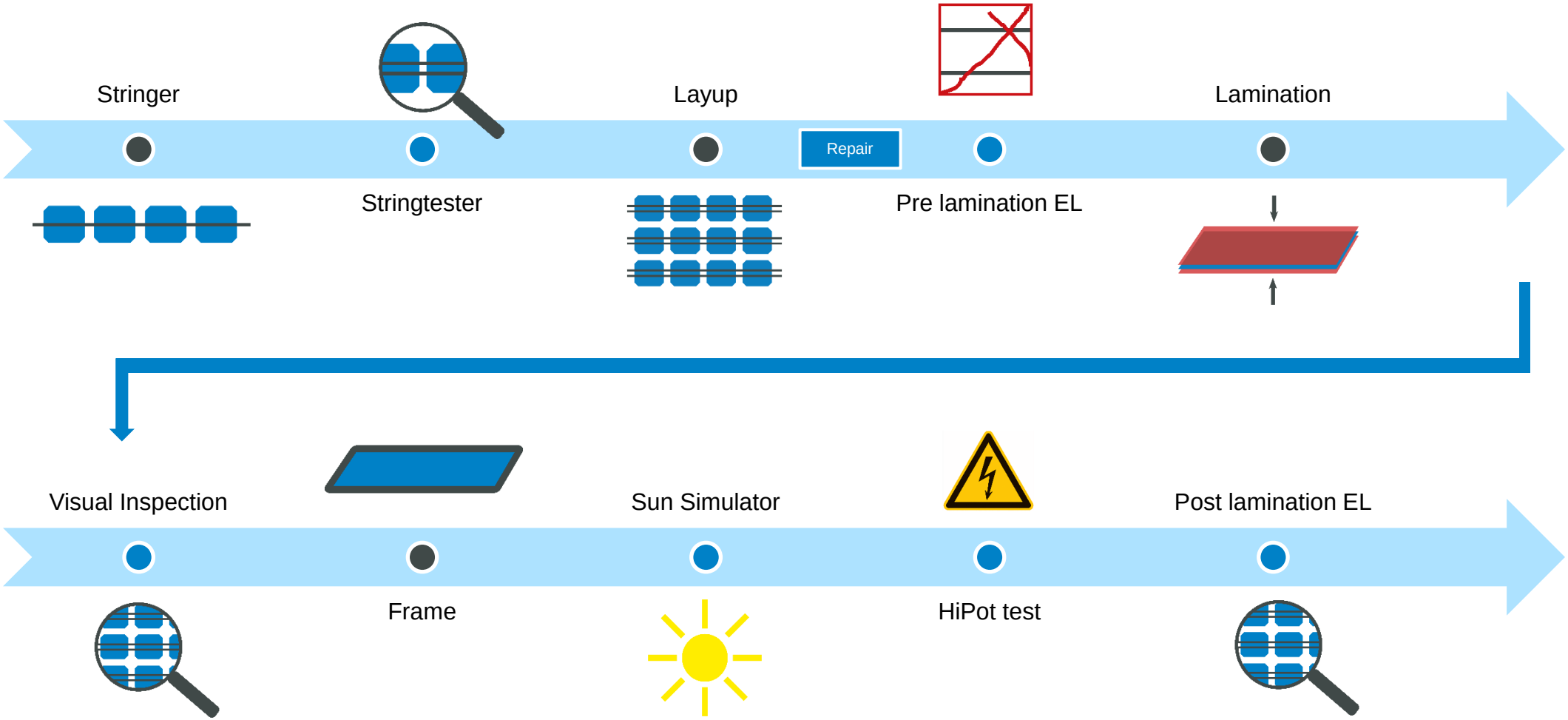
Dr. Michael Fuß // 14.06.23

Future of PV module production

Fully automated processes

Inspection in PV module production

Why?	Requirements	Effects of requirements on process
Direct feedback	Short cycle time	Fully automated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Stringtester
Layup
Repair
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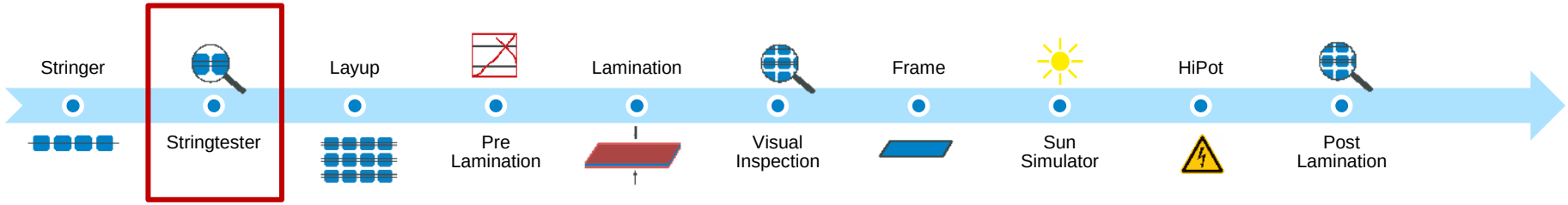
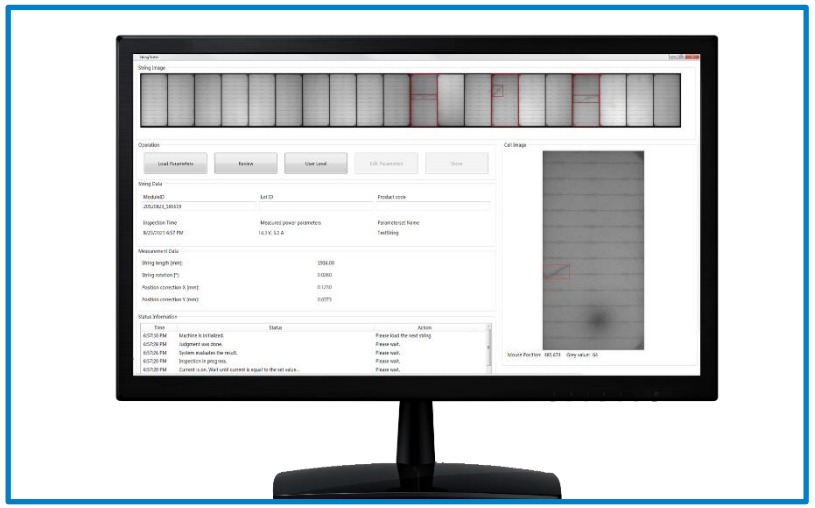
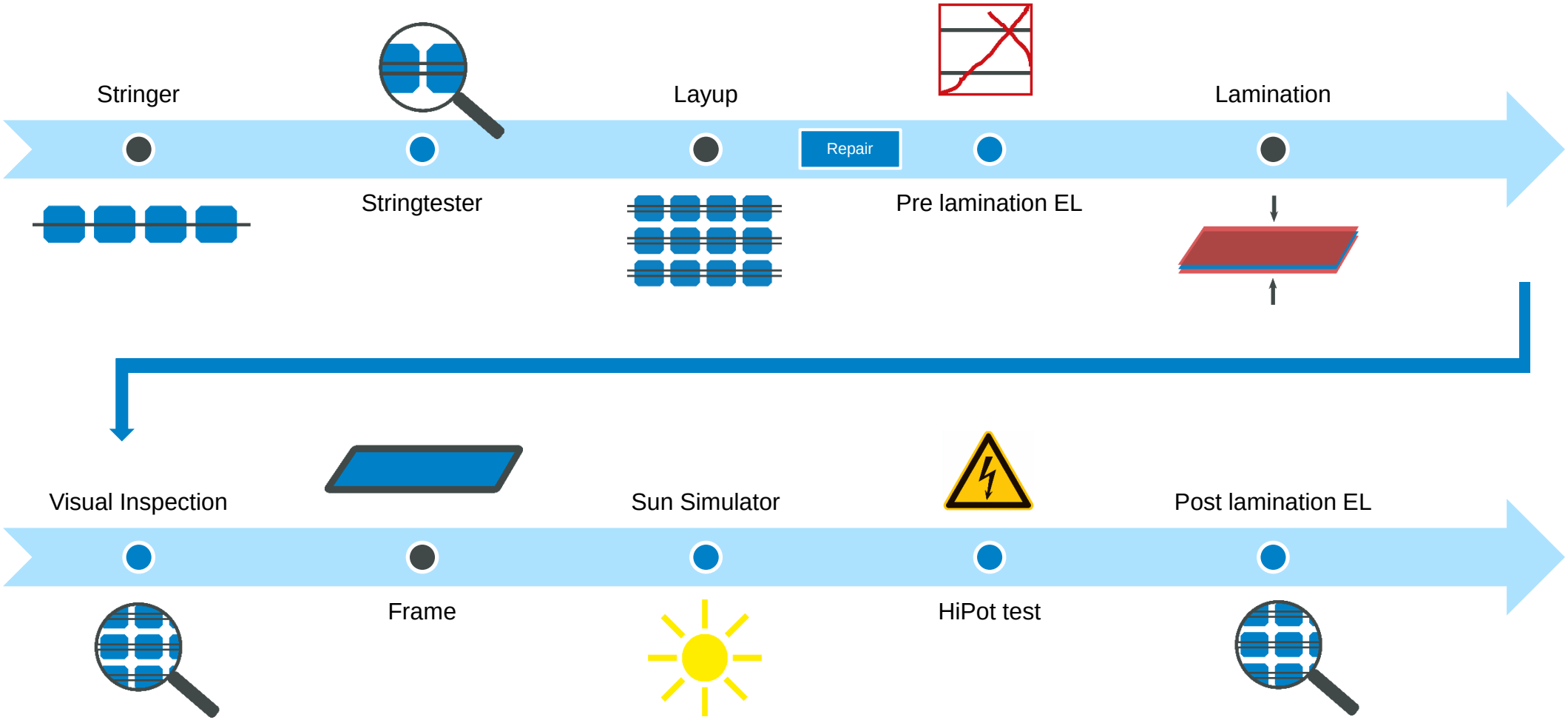


STRING TESTER

Fully automated Electroluminescence testing system with integrated backlight

- String and cell to cell measurement for layup control and feedback to the stringer
- Control of ribbon alignment
- Inspection of cell breakage and micro cracks
- Fast image acquisition (<1 sec) through multi camera concept
- Reliable defect detection based on deep learning

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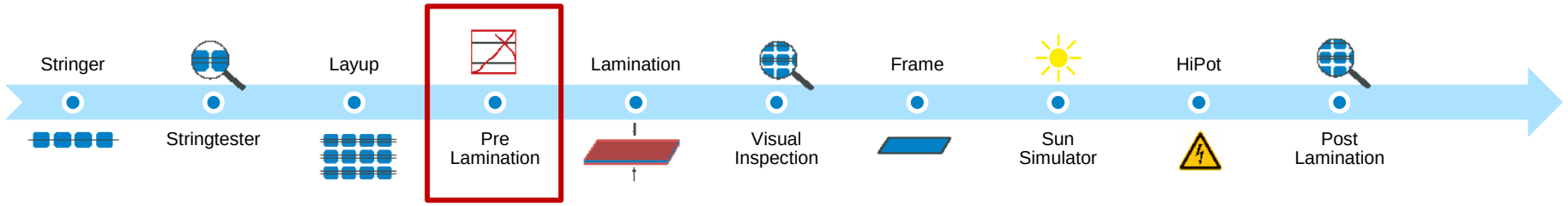
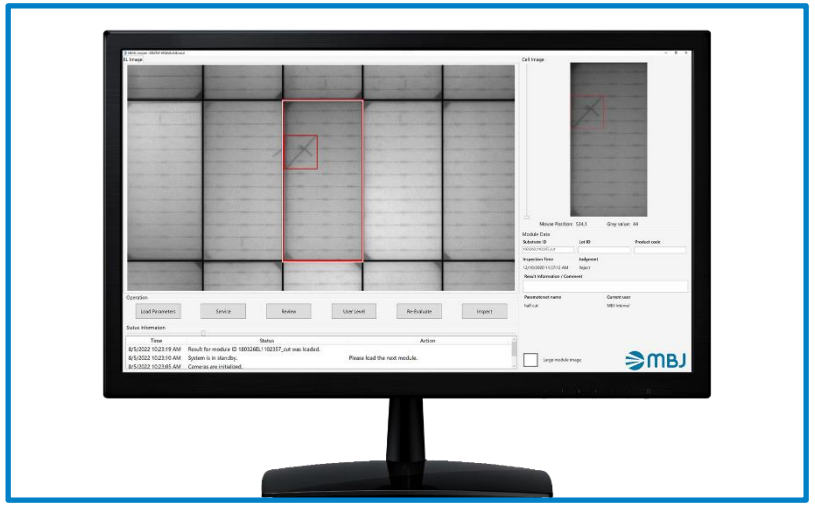


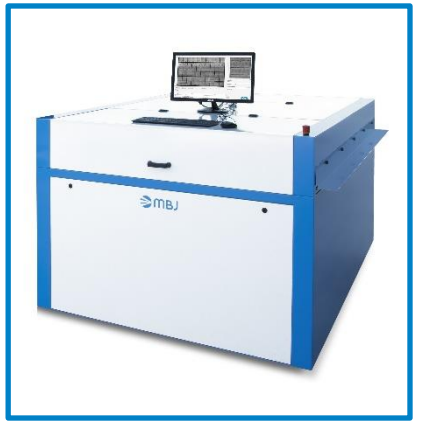
Pre Lamination

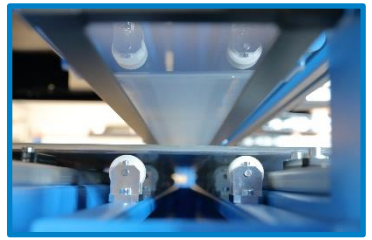
ELECTRO-LUMINESCENCE

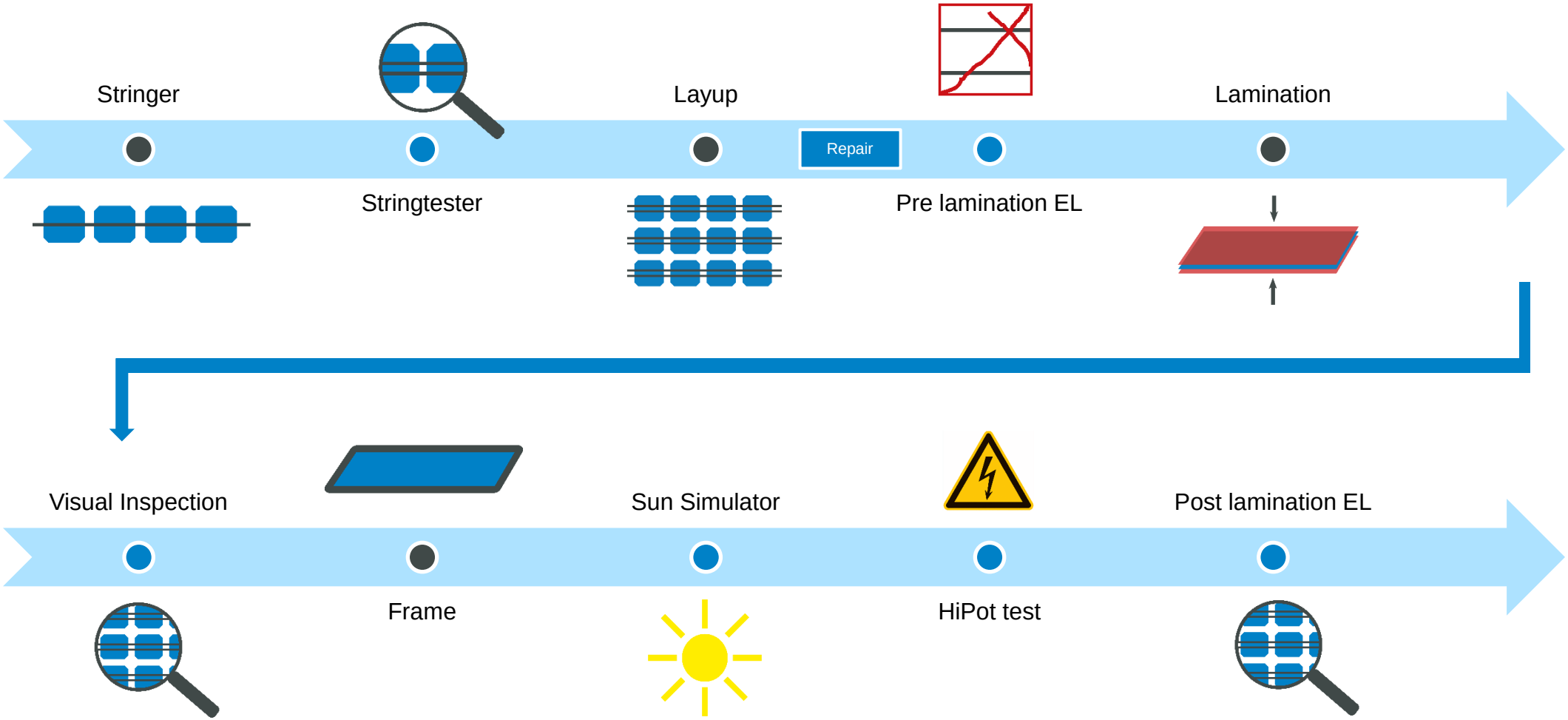
One of the most important step in the frontend is the fully automatic pre-lamination electroluminescence inspection

- Reliable automatic image evaluation with Deep Learning
- In case of failure detection, possibility to repair directly
- Cell measurement before the EL system as option
- Visual inspection as option





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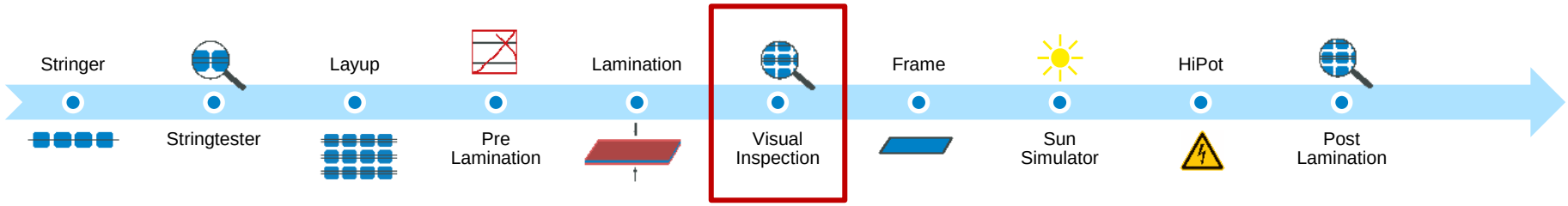
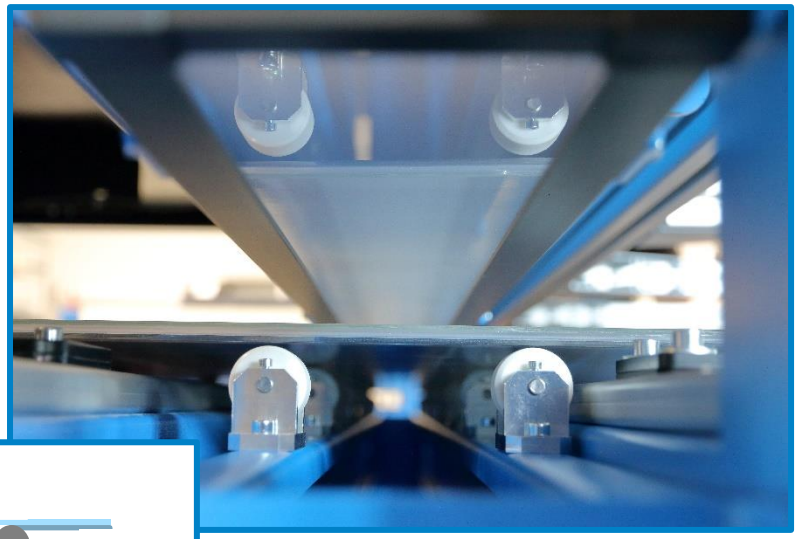
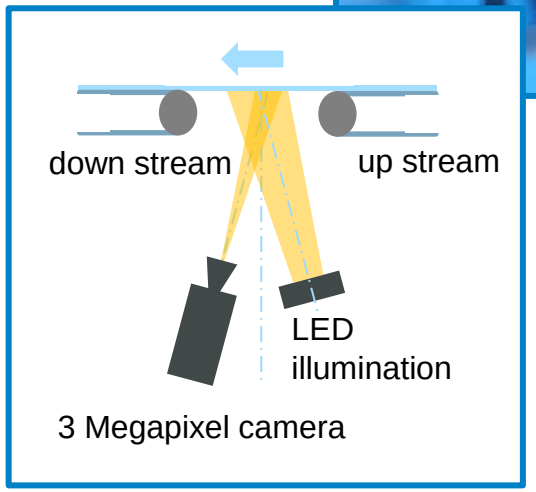


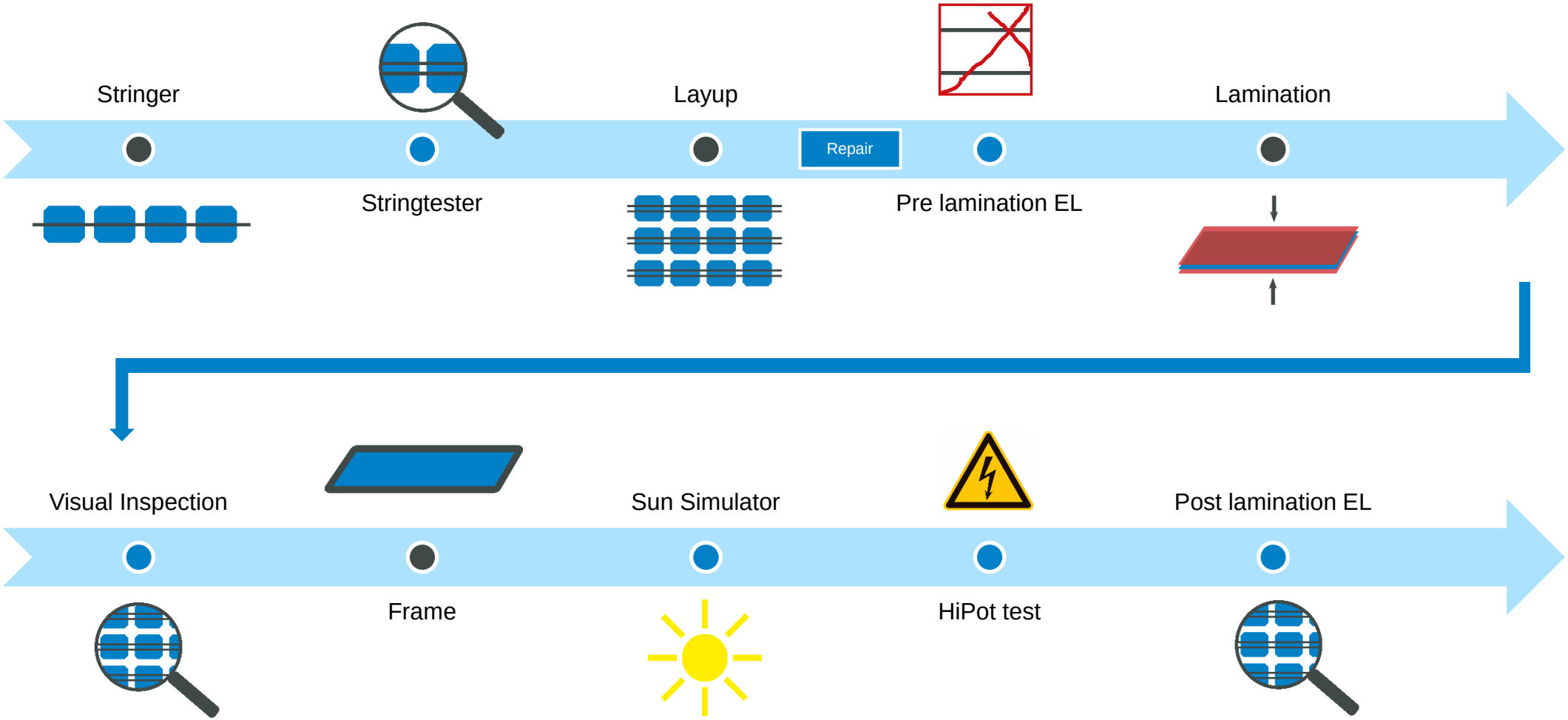
VISUAL INSPECTION

Fully automated Visual inspection with bright field illumination right after the lamination

- Automatic cell and string gap measurement
- Automatic visual inspection (bubbles in the laminate)
- Deep learning for the visual inspection part



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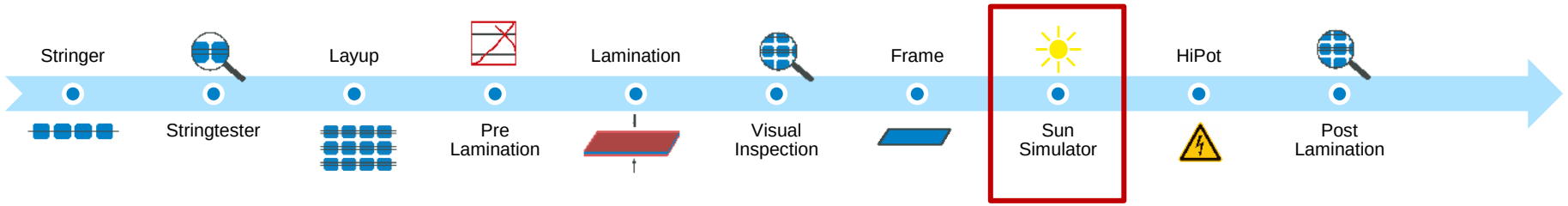
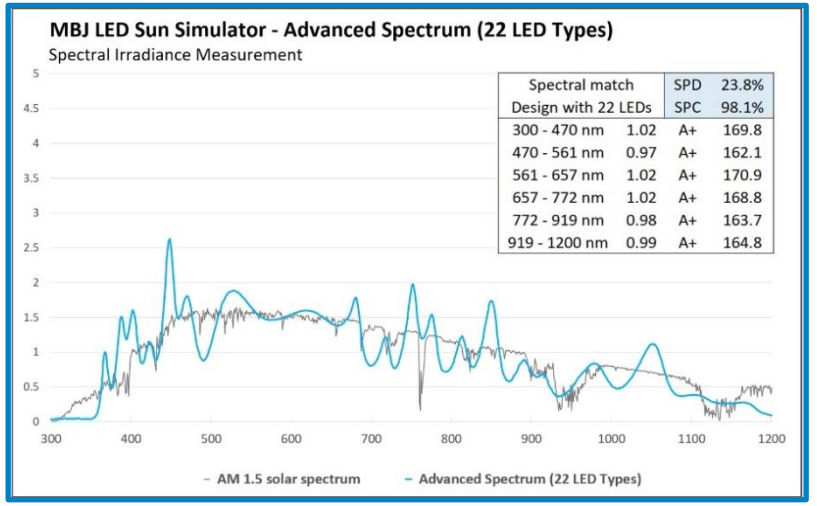
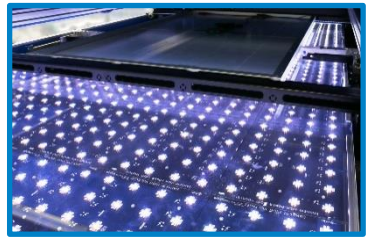


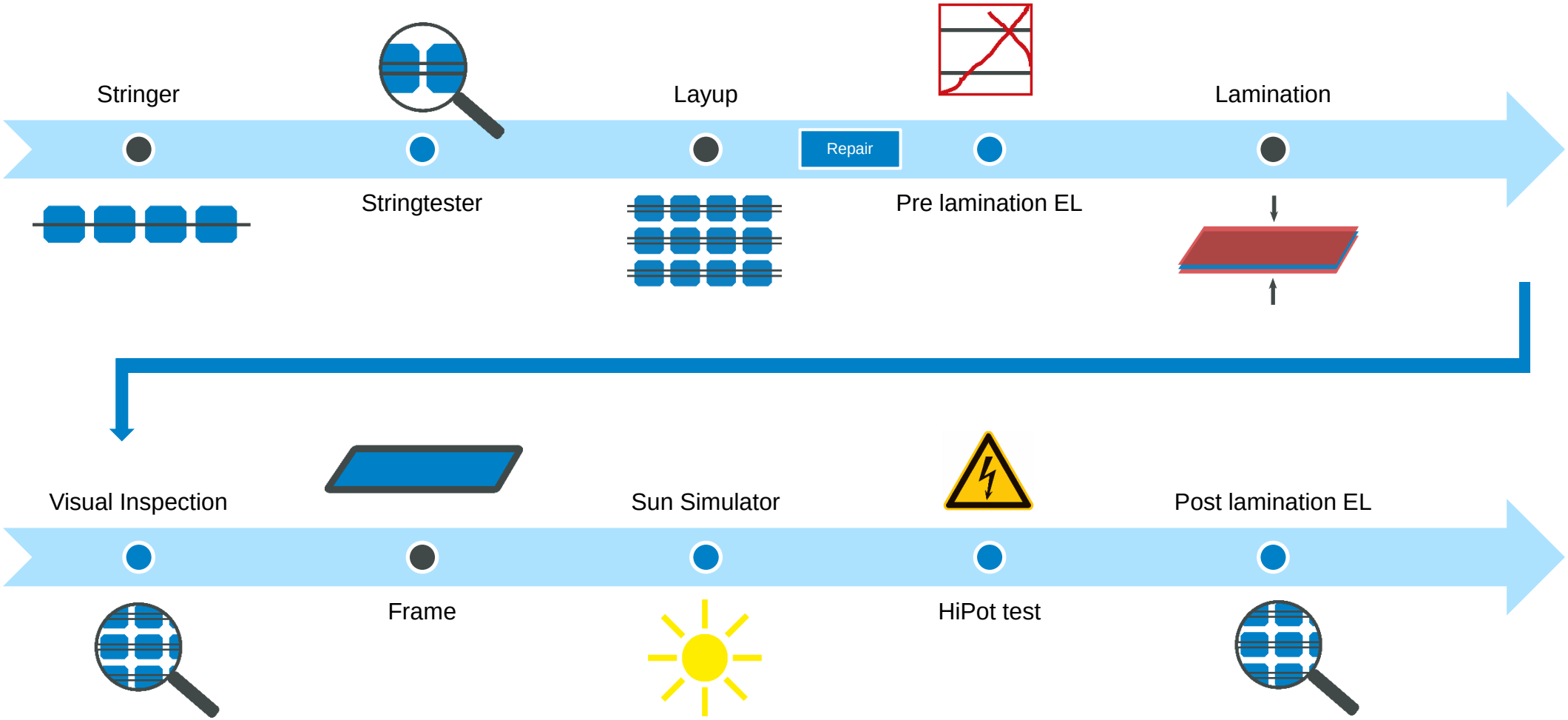
SUN SIMULATOR



MBJ LED Sun Simulator as the first step of inspection in the backend

- Newest LED technology with up to 22 LED Types
- Endless lifetime of LED = no lamp change results in a return of investment in less than 3 years
- Extremely good stability of the LED light source leads to less maintenance costs and to better measurement results

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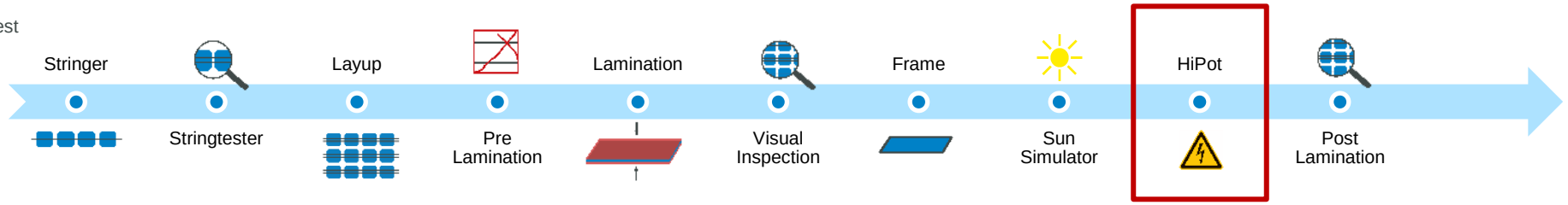
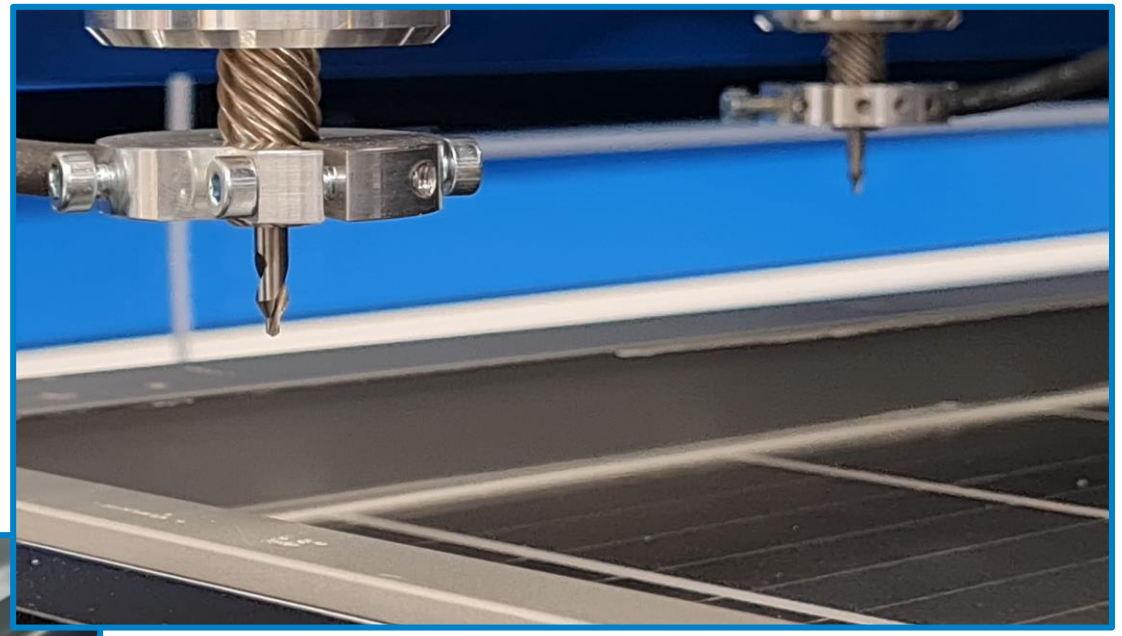
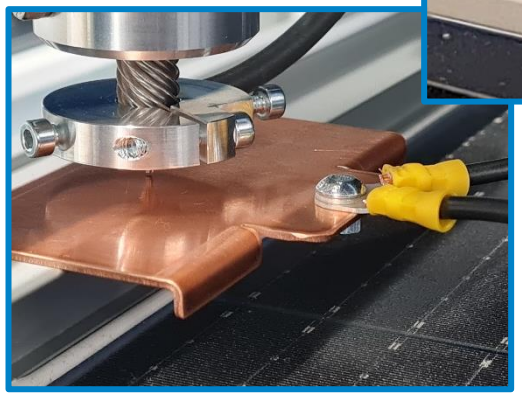


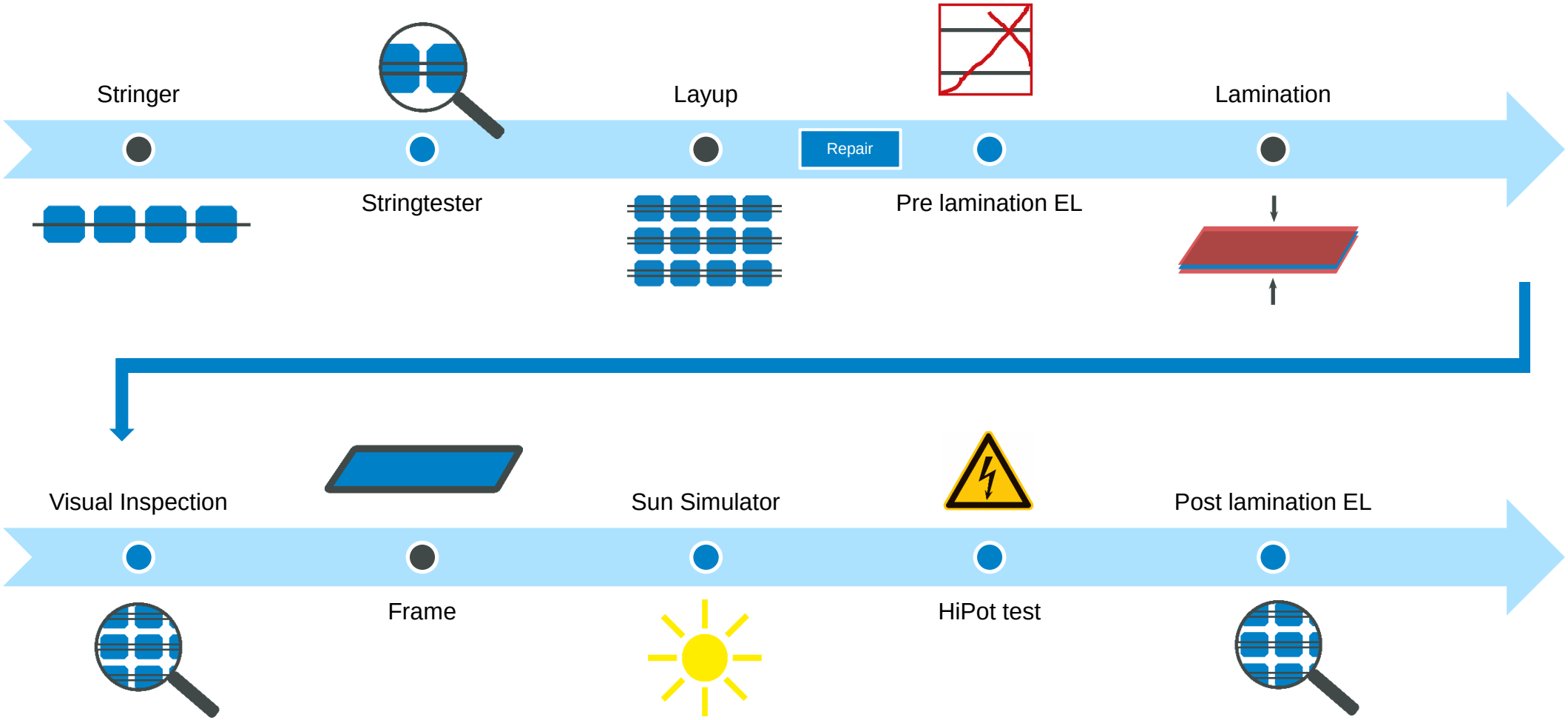
HIPOT TEST

Ground bond and isolation test is the second step of inspection in the backend

- Automatic pneumatic contact drills for a reliable contacting of the frame



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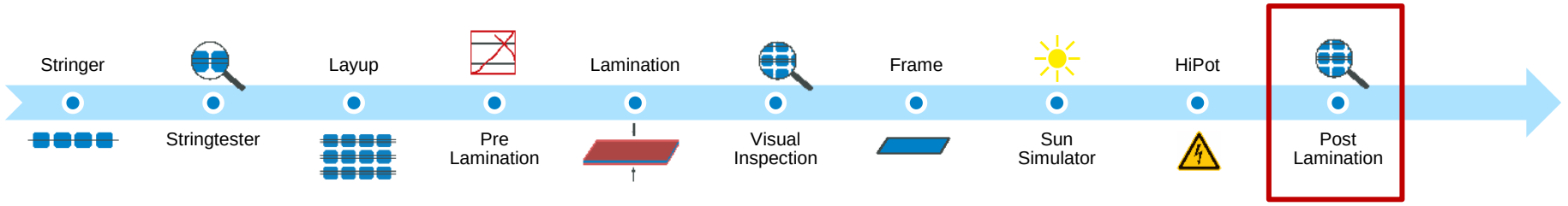
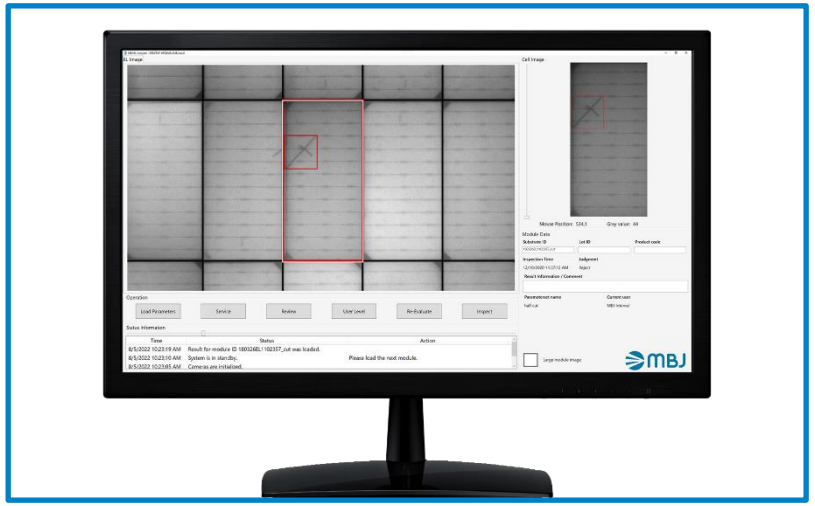


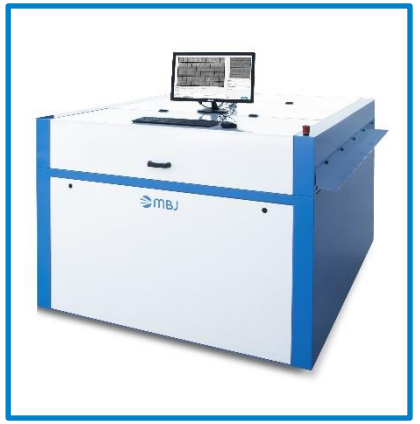
Post lamination

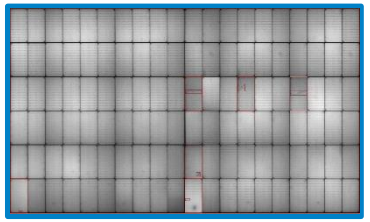
ELECTRO-LUMINESCENCE

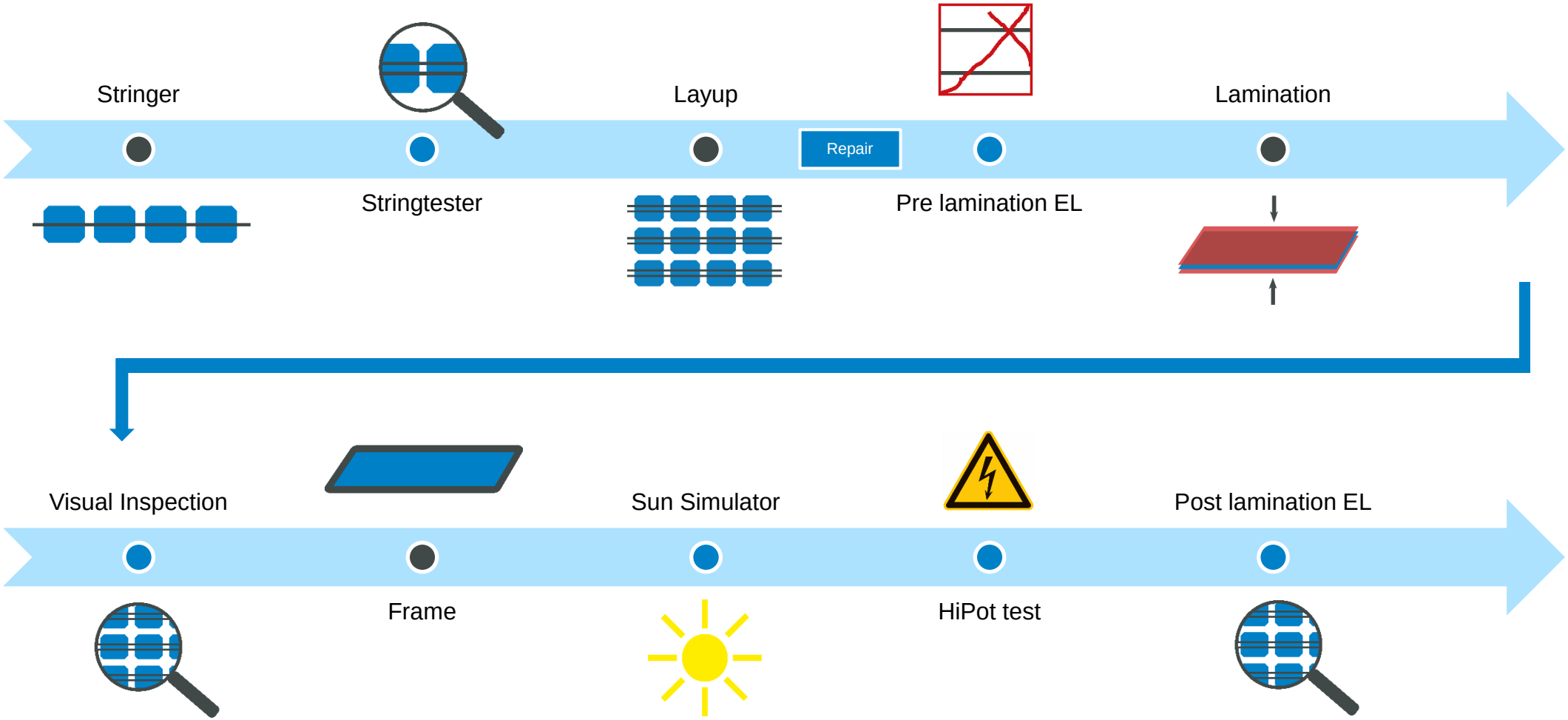
The third step in the backend is the fully automatic electroluminescence inspection

- Reliable automatic Image evaluation with Deep Learning
- EL image at the end of the production process
- Visual inspection as option





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Thank you for your attention!

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