MITSUBISHI ELECTRIC
Changes for the Better

Significant reduction the cost of design & tuning by AI
Parameter automatic tuning using AI (optimization technology)

Spend a lot of time on tunings?
Shortage of personnel for tunings?

Consuming time for design param tuning

➤ Shortening lead time for design

- Automatically presentation of optimal design parameters to achieve the designer's desired specifications by AI.
- Quickly tuning parameters for multiple indicators with trade-offs.

Consuming time for equipment param tuning

➤ Shortening startup time for equipment

- Finding parameters that achieve the same or better performance as a skilled worker in a short time by AI.
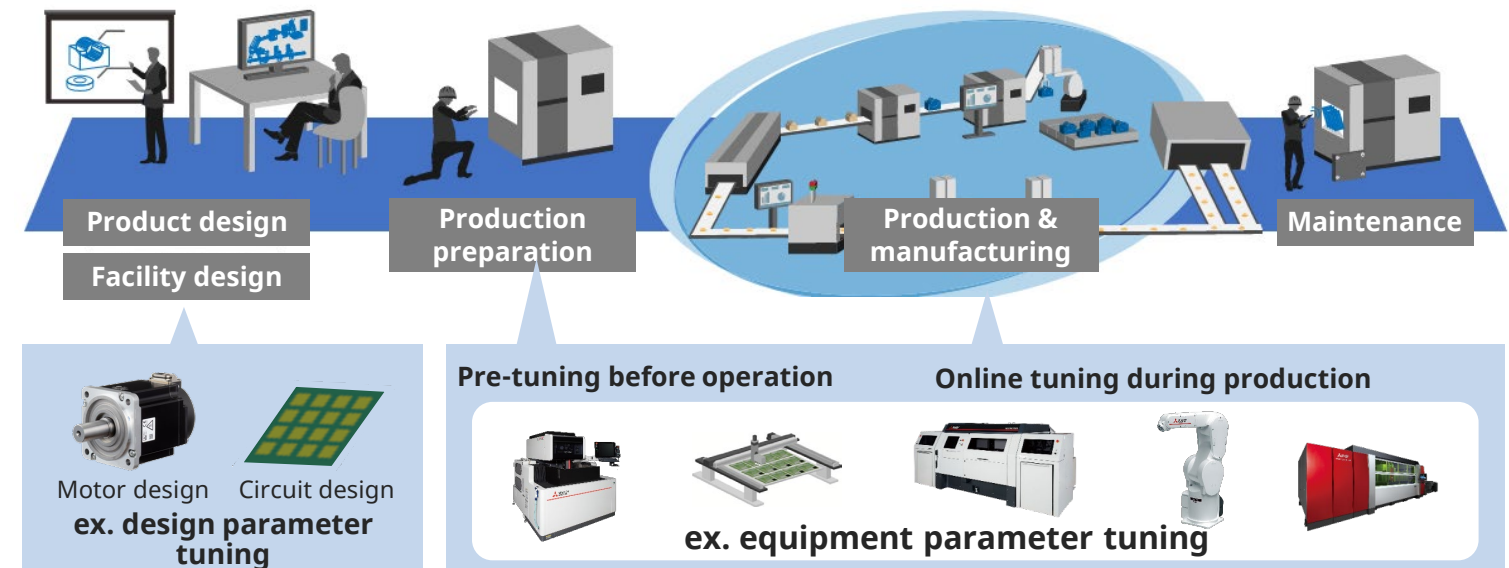
Shortage of skilled worker

➤ Labor saving for automatic tuning

- Easy tuning for everyone using AI such as Bayesian optimization, evolutionary computation and etc.
- Further performance improvement by datalization of the skilled worker's expertise.

Parameter tuning work in the production

Engineering chain

Product design / Facility design — Production preparation — Production & manufacturing — Maintenance

Motor design   Circuit design
ex. design parameter tuning

Pre-tuning before operation   Online tuning during production
ex. equipment parameter tuning

AI automatic parameter tuning

Before (Skilled workers)
Manual parameters setting → Machine operation → Confirmation of results
numerous trial and error attempts by manually

After (Normal workers)
Maisart ※1
AI suggested parameters setting → Machine operation → Confirmation of results
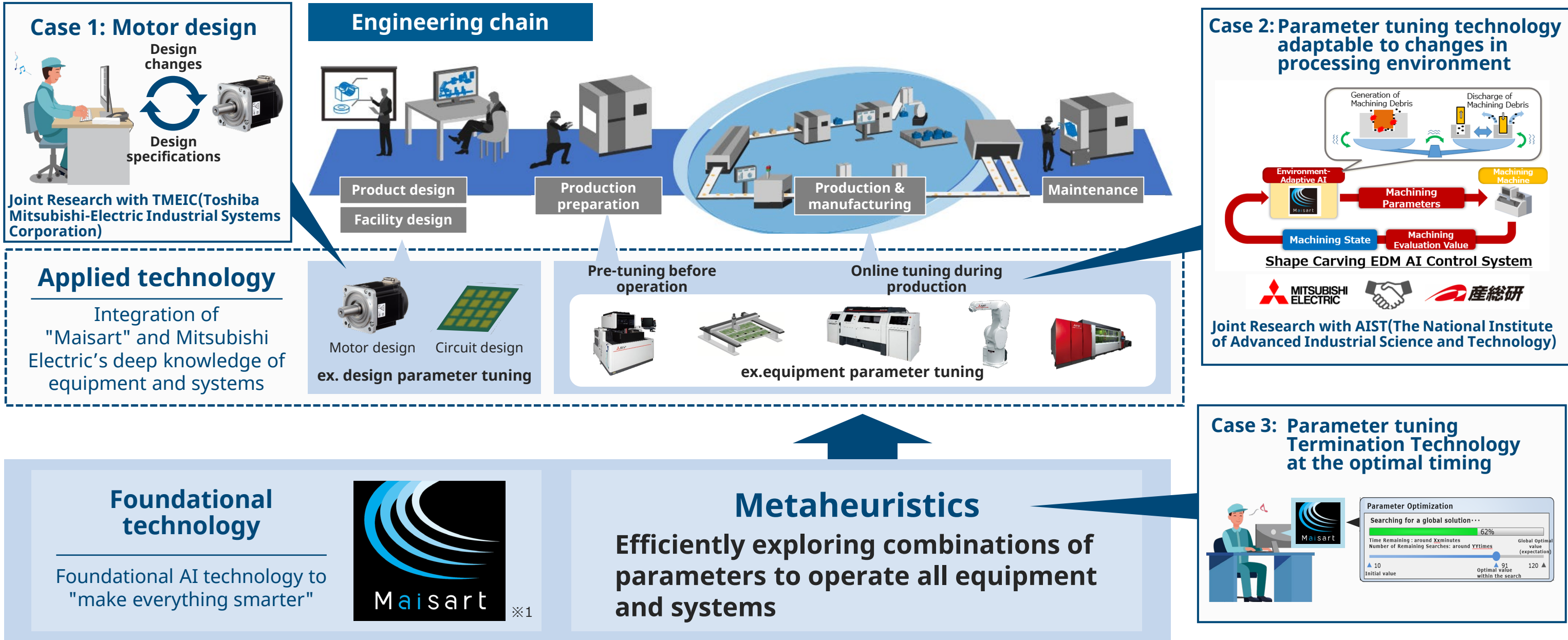efficient automatic tunings by AI

*1: Mitsubishi Electric's AI creates the State-of-the-ART in technology. Our AI technology brand aims to make all equipment smarter.

Automating the World

Significant reduction the cost of design & tuning by AI

Parameter automatic tuning using AI (optimization technology)

Case 1: Motor design

Design changes ⇄ Design specifications

Joint Research with TMEIC(Toshiba Mitsubishi-Electric Industrial Systems Corporation)

Engineering chain

Product design
Facility design

Production preparation

Production & manufacturing

Maintenance

Applied technology

Integration of "Maisart" and Mitsubishi Electric's deep knowledge of equipment and systems

Motor design   Circuit design

ex. design parameter tuning

Pre-tuning before operation

Online tuning during production

ex.equipment parameter tuning

Case 2: Parameter tuning technology adaptable to changes in processing environment

Generation of Machining Debris   Discharge of Machining Debris

Environment-Adaptive AI → Machining Parameters → Machining Machine

Machining State ← Machining Evaluation Value

Shape Carving EDM AI Control System

MITSUBISHI ELECTRIC   産総研

Joint Research with AIST(The National Institute of Advanced Industrial Science and Technology)

Foundational technology

Foundational AI technology to "make everything smarter"

Maisart ※1

Metaheuristics

Efficiently exploring combinations of parameters to operate all equipment and systems

Case 3: Parameter tuning Termination Technology at the optimal timing

Maisart

Parameter Optimization
Searching for a global solution···
62%
Time Remaining : around Xxminutes
Number of Remaining Searches: around YYtimes
Global Optimal value (expectation)
▲ 10   91   120 ▲
Initial value   Optimal value within the search

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Automating the World