

# *Tool Data eXplorer*

Monitoring and analysis of equipment data  
(Monitoring and Analysis of Tool Data)

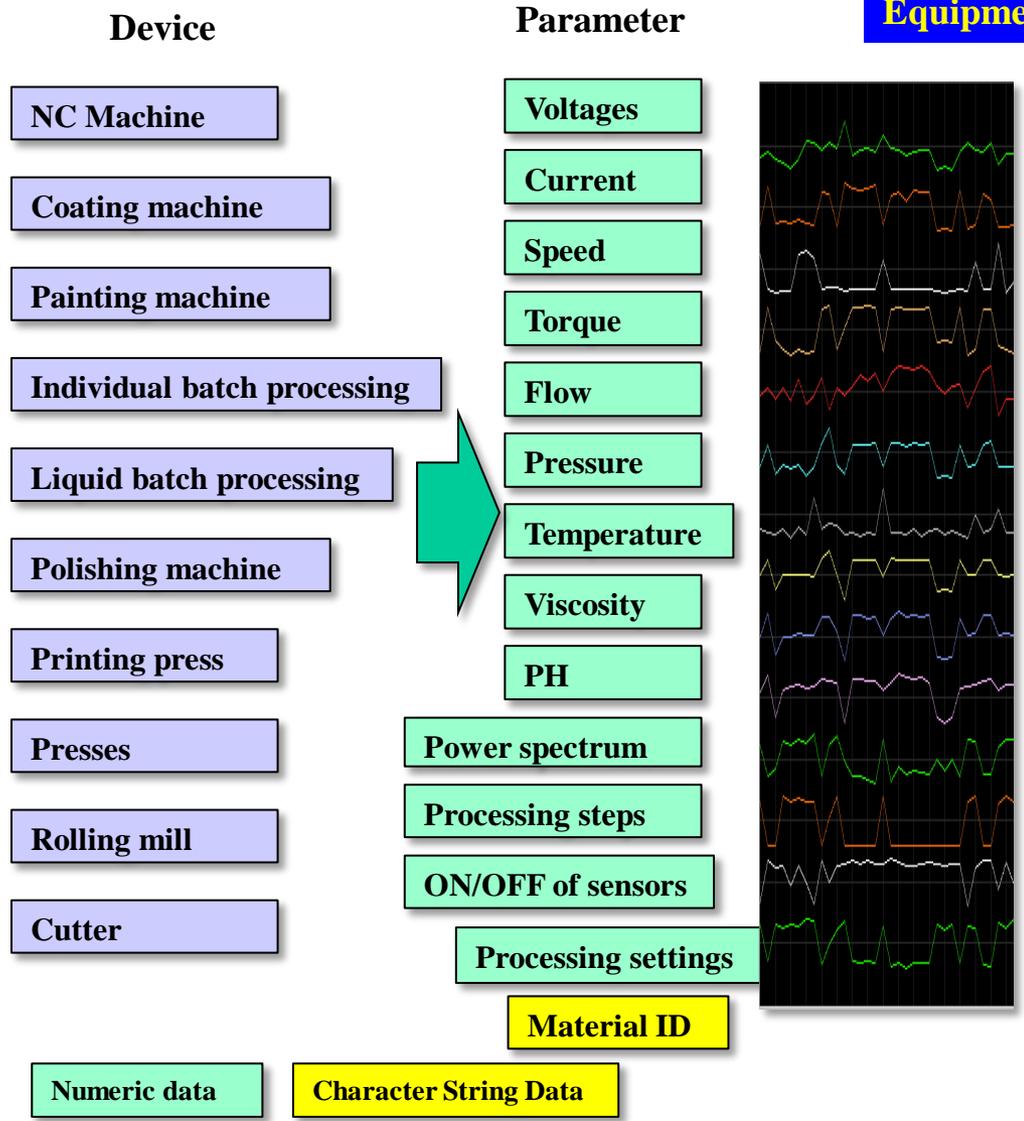
## OBJECTIVES AND FUNCTIONS

February 20, 2018

Dura Systems Co., Ltd.  
(DURA SYSTEMS CORPORATION)

# The purpose of TDX is to check the health of the equipment.

## Equipment Parameter Monitoring for Prediction Diagnosis

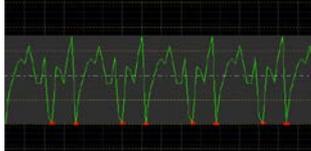
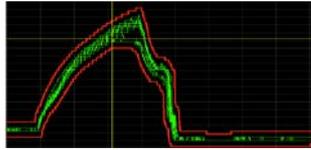


- Is there any parameter exceeding the specified value?
- Is the parameter abnormally fluctuating?
- Is the parameter progressively worse?
- Is the correlation between parameters normal?



- ### Monitoring of parameters
- Shape change of the waveform
  - Deviation of the upper and lower limits of the waveform
  - For representative values extracted from the waveform
    - Trends
    - Deviation from the upper and lower limits
    - Variation bias

# Equipment monitoring by TDX



- Waveform shape monitoring (guard band)
- Power spectrum waveforms are also included.

- Extract representative values from waveforms (maximum value, average value, minimum value,  $\sigma$ , etc.)
- SPC (Statistical Quality Control) Monitoring of Representative Values

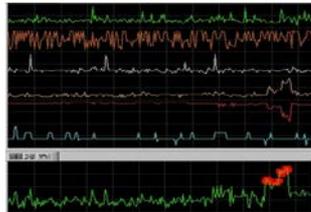
Is the waveform deviating from the standard?

Is the trend of the representative value normal with respect to the standard value?

Is the correlation between waveforms and representative values different from the standard?

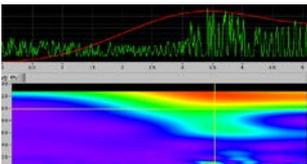
- The degree of deviation of the correlation between a plurality of waveforms and representative values (multivariate) is represented by a single variable.

No abnormalities were detected in the custom logic....



| ステップ | 処理内容/監視名 | モデル名   |
|------|----------|--------|
| 1    | 検出回数増減   | 検出回数増減 |
| 2    | 検出回数増減   | 検出回数増減 |
| 3    | 検出回数増減   | 検出回数増減 |
| 4    | 検出回数増減   | 検出回数増減 |
| 5    | 検出回数増減   | 検出回数増減 |
| 6    | 検出回数増減   | 検出回数増減 |
| 7    | 検出回数増減   | 検出回数増減 |
| 8    | 検出回数増減   | 検出回数増減 |
| 9    | 検出回数増減   | 検出回数増減 |

- Monitoring by sequence
- User-created custom monitoring logic

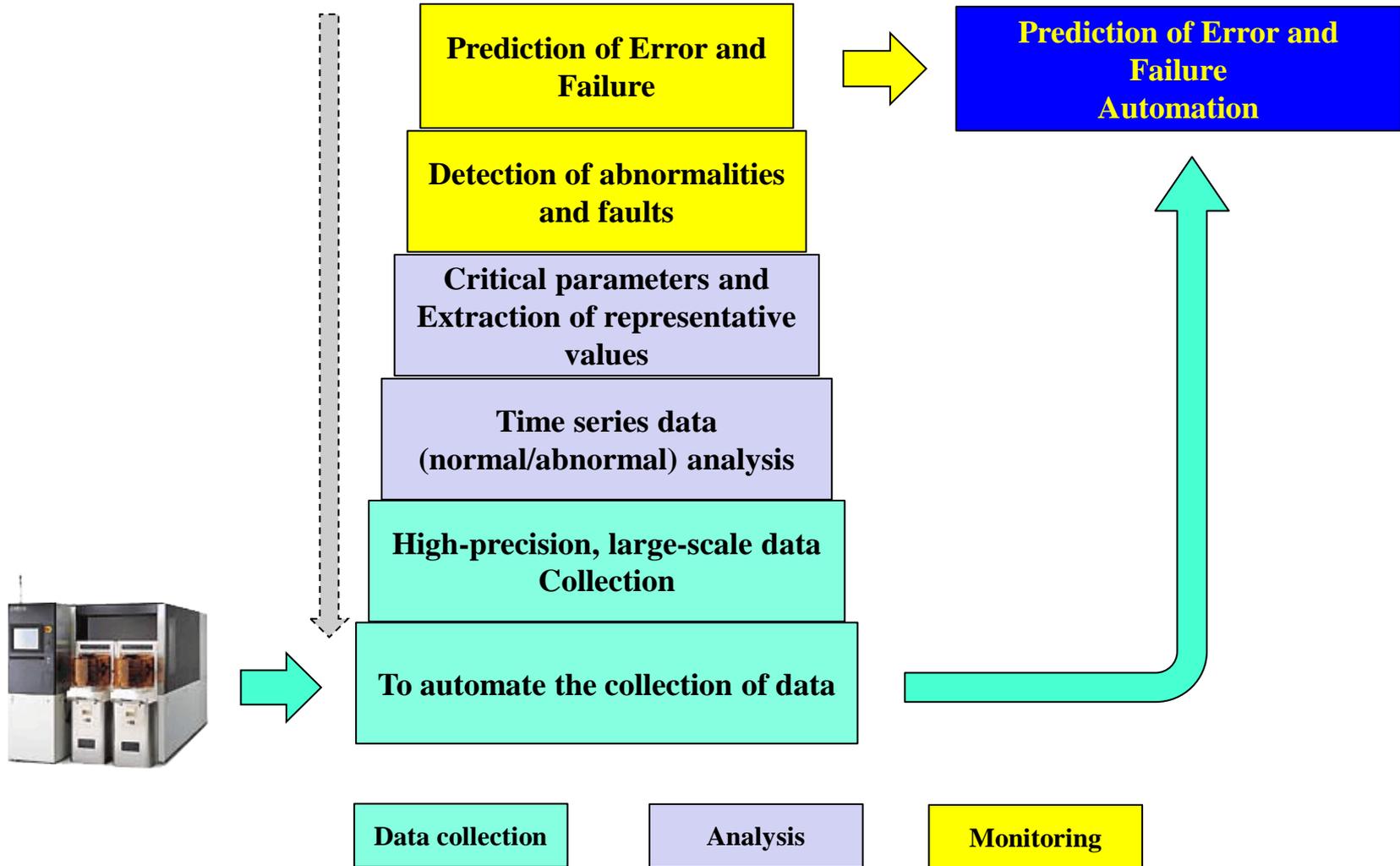


- Wavelet monitoring
- Time-series frequency monitoring



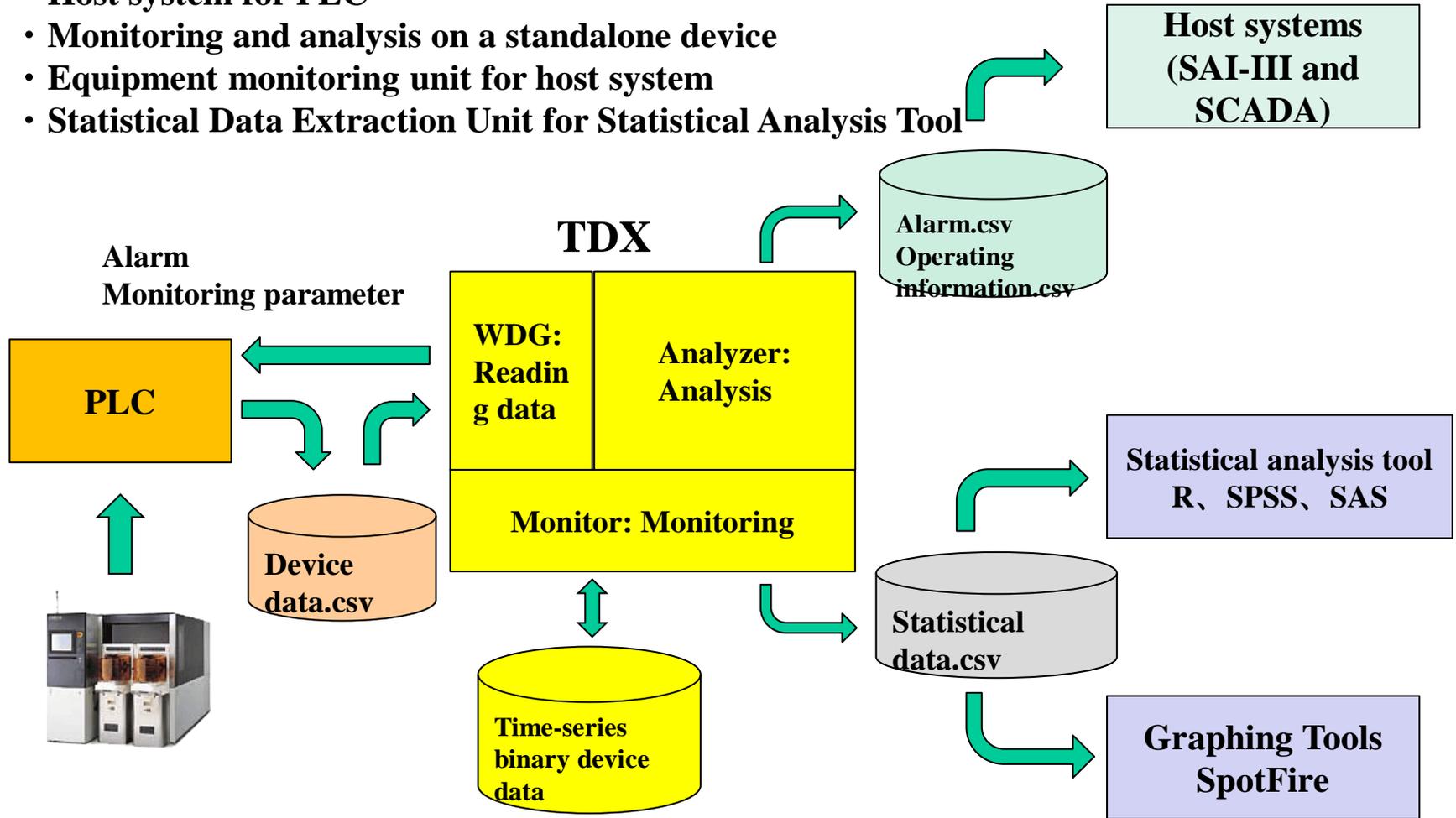
Error and signs of error detected and alarm output

# Seamless support from monitoring to analysis



# System coordination

- Host system for PLC
- Monitoring and analysis on a standalone device
- Equipment monitoring unit for host system
- Statistical Data Extraction Unit for Statistical Analysis Tool



# IOT promotion organization

