CLAIMS

1. A method comprising:

receiving a plurality of sets of part data associated with substrate processing equipment, wherein each of the plurality of sets of part data comprises corresponding part values and a corresponding part identifier, and wherein each of the plurality of sets of part data is associated with hardware parameters of a corresponding equipment part of substrate processing equipment;

receiving a plurality of sets of sensor data, wherein each of the plurality of sets of sensor data comprises corresponding sensor values associated with producing one or more corresponding substrates by the substrate processing equipment and a corresponding sensor data identifier;

receiving a plurality of sets of metrology data, wherein each of the plurality of sets of metrology data comprises corresponding metrology values associated with the one or more corresponding substrates and a corresponding metrology data identifier;

generating a plurality of sets of aggregated part-sensor-metrology data, each of the plurality of sets of aggregated part-sensor-metrology data comprising a corresponding set of equipment part data, a corresponding set of sensor data, and a corresponding set of metrology data; and

causing, based on the plurality of sets of aggregated part-sensor-metrology data, performance of a corrective action associated with the substrate processing equipment, wherein the causing of the performance of the corrective action comprises training a machine learning model using the plurality of sets of aggregated part-sensor-metrology data.

2. The method of claim 1, wherein the plurality of sets of part data comprise one or more of part manufacturing data, part measurement data, or part material property data.

3. The method of claim 1, wherein at least a portion of the plurality of sets of part data are measured via one or more of automated optical inspection (AOI) equipment, an atomic force microscope (AFM), or a coordinate measurement (CMM) machine.

4. The method of claim 1, wherein the plurality of sets of sensor data comprise one or more of pressure data, temperature data, time data, or gas flow data.

5. The method of claim 1, wherein the plurality of sets of metrology data comprise one or more of on-wafer metrology data, imaging data, or thickness data.

6. The method of claim 1, wherein:

each of the plurality of sets of sensor data is associated with one or more corresponding substrate processing operations performed to produce the one or more corresponding substrates; and

each of the plurality of sets of metrology data is associated with the one or more corresponding substrates produced by the one or more corresponding substrate processing operations performed by the substrate processing equipment that comprises the corresponding equipment part.

7. The method of claim 6, wherein the generating of the plurality of sets of aggregated part-sensor-metrology data comprises:

determining common portions between each corresponding part identifier, each corresponding sensor data identifier, and each corresponding metrology data identifier to identify part-sensor-metrology matches; and

for each of the part-sensor-metrology matches, generating a corresponding set of aggregated part-sensor-metrology data that comprises a respective set of part data that corresponds to the corresponding part identifier, a respective set of sensor data that corresponds to the corresponding sensor data identifier, and a respective set of metrology data that corresponds to the corresponding metrology data identifier to generate the plurality of sets of aggregated part-sensor-metrology data.

8. The method of claim 1, wherein the causing of the performance of the corrective action comprises providing the plurality of sets of aggregated part-sensor-metrology data to a trained machine learning model and receiving, from the trained machine learning model, one or more outputs to perform the corrective action.

9. The method of claim 1, wherein the causing of the performance of the corrective action comprises storing the plurality of sets of aggregated part-sensor-metrology data to train a machine learning model to provide a trained machine learning model, and wherein the trained machine learning model is capable of generating one or more outputs to perform the corrective action.

10. The method of claim 6, wherein the performance of the corrective action comprises one or more of:

updating design of the corresponding equipment part;

updating quality of the corresponding equipment part;

updating dimensions of the corresponding equipment part;

updating feature layout of the corresponding equipment part;

updating part manufacturing operations to produce the corresponding equipment part; or

performing root cause analysis to determine updates to the corresponding equipment part or to the one or more corresponding substrate processing operations.

11. A system comprising:

a memory; and

a processor, coupled to the memory, to:

receive a plurality of sets of part data associated with substrate processing equipment, wherein each of the plurality of sets of part data comprises corresponding part values and a corresponding part identifier, and wherein each of the plurality of sets of part data is associated with hardware parameters of a corresponding equipment part of substrate processing equipment;

receive a plurality of sets of sensor data, wherein each of the plurality of sets of sensor data comprises corresponding sensor values associated with producing one or more corresponding substrates by the substrate processing equipment and a corresponding sensor data identifier;

receive a plurality of sets of metrology data, wherein each of the plurality of sets of metrology data comprises corresponding metrology values associated with the one or more corresponding substrates and a corresponding metrology data identifier;

generate a plurality of sets of aggregated part-sensor-metrology data, each of the plurality of sets of aggregated part-sensor-metrology data comprising a corresponding set of equipment part data, a corresponding set of sensor data, and a corresponding set of metrology data; and

cause, based on the plurality of sets of aggregated part-sensor-metrology data, performance of a corrective action associated with the substrate processing equipment, wherein the causing of the performance of the corrective action comprises

training a machine learning model using the plurality of sets of aggregated part-sensor-metrology data.

12. The system of claim 11, wherein:

the plurality of sets of part data comprise one or more of part manufacturing data, part measurement data, or part material property data; and

at least a portion of the plurality of sets of part data are measured via one or more of automated optical inspection (AOI) equipment, an atomic force microscope (AFM), or a coordinate measurement (CMM) machine.

13. The system of claim 11, wherein to cause the performance of the corrective action, the processor is to provide the plurality of sets of aggregated part-sensor-metrology data to a trained machine learning model and receiving, from the trained machine learning model, one or more outputs to perform the corrective action.

14. The system of claim 11, wherein to cause the performance of the corrective action, the processor is to store the plurality of sets of aggregated part-sensor-metrology data to train a machine learning model to provide a trained machine learning model, and wherein the trained machine learning model is capable of generating one or more outputs to perform the corrective action.

15. A non-transitory computer readable medium having instructions stored thereon, which, when executed by a processing device, cause the processing device to:

receive a plurality of sets of part data associated with substrate processing equipment, wherein each of the plurality of sets of part data comprises corresponding part values and a corresponding part identifier, and wherein each of the plurality of sets of part data is associated with hardware parameters of a corresponding equipment part of substrate processing equipment;

receive a plurality of sets of sensor data, wherein each of the plurality of sets of sensor data comprises corresponding sensor values associated with producing one or more corresponding substrates by the substrate processing equipment and a corresponding sensor data identifier;

receive a plurality of sets of metrology data, wherein each of the plurality of sets of metrology data comprises corresponding metrology values associated with the one or more corresponding substrates and a corresponding metrology data identifier;

generate a plurality of sets of aggregated part-sensor-metrology data, each of the plurality of sets of aggregated part-sensor-metrology data comprising a corresponding set of part data, a corresponding set of sensor data, and a corresponding set of metrology data; and

cause, based on the plurality of sets of aggregated part-sensor-metrology data, performance of a corrective action associated with the substrate processing equipment, wherein the causing of the performance of the corrective action comprises training a machine learning model using the plurality of sets of aggregated part-sensor-metrology data.

16. The non-transitory computer readable medium of claim 15, wherein:

the plurality of sets of part data comprise one or more of part manufacturing data, part measurement data, or part material property data; and

at least a portion of the plurality of sets of part data are measured via one or more of automated optical inspection (AOI) equipment, an atomic force microscope (AFM), or a coordinate measurement (CMM) machine.

17. The non-transitory computer readable medium of claim 15, wherein to cause the performance of the corrective action, the processing device is to provide the plurality of sets of aggregated part-sensor-metrology data to a trained machine learning model and receiving, from the trained machine learning model, one or more outputs to perform the corrective action.