ASML

e-Diagnostics

- status and lessons learned -

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How did it start at ASML?

- 1998 First structural data collection (10 tools)
- 1999 Local Automatic Data Collection (ADC) (50 tools)
- 2000 Automatic data analysis and reporting focussed at reliability (300 tools)
- 2001 Global ADC introduced (700 tools) and first Remote Access Implemented
- 2002/2003 Added condition monitoring and configuration monitoring (1000 tools)

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Status 2004

- Remote Access to 7 sites and 3 under install
- 1300 tools monitored daily (25.5.e^6 hrs to date)
- Analyzed data used for process management
- Project ongoing to add availability analysis
  - planned projects for additional condition and configuration monitoring
- e-Diagnostics pilots planned with customers
- e-Diagnostics integral part of roadmaps

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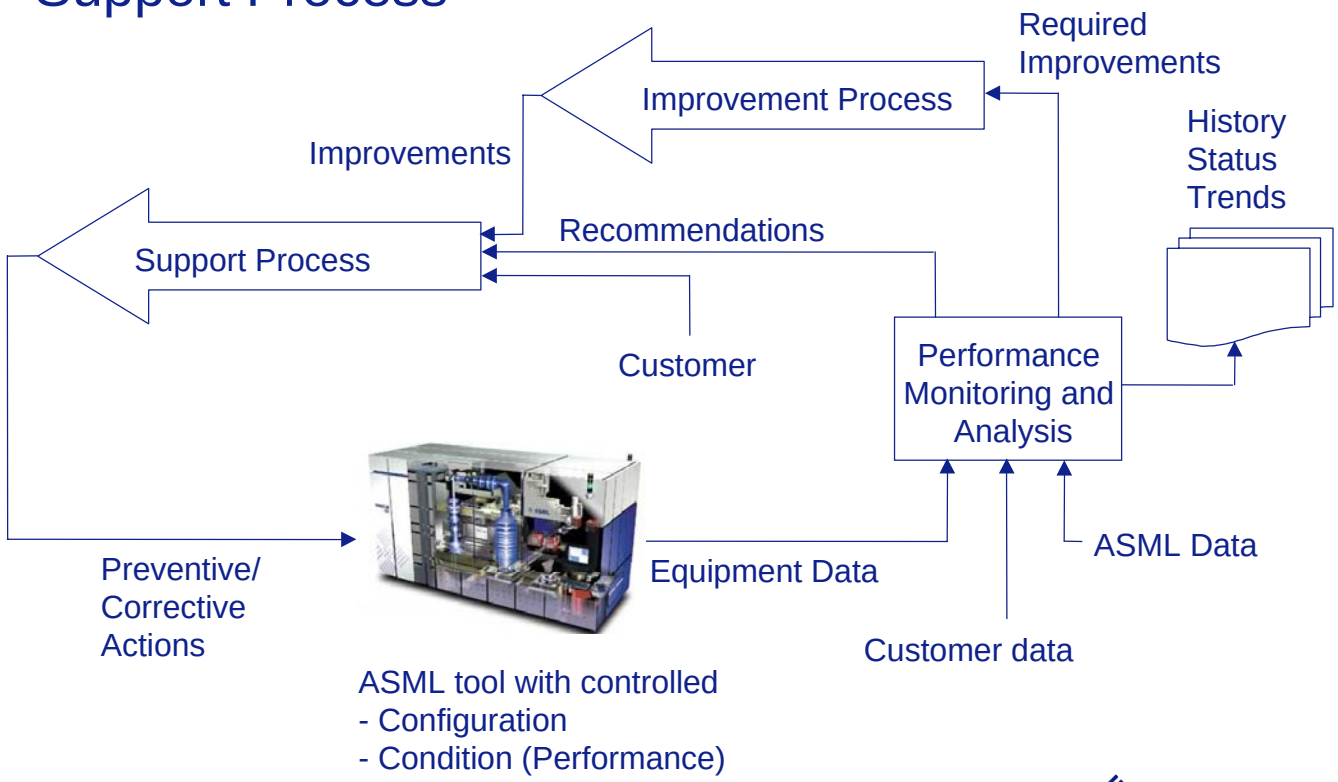
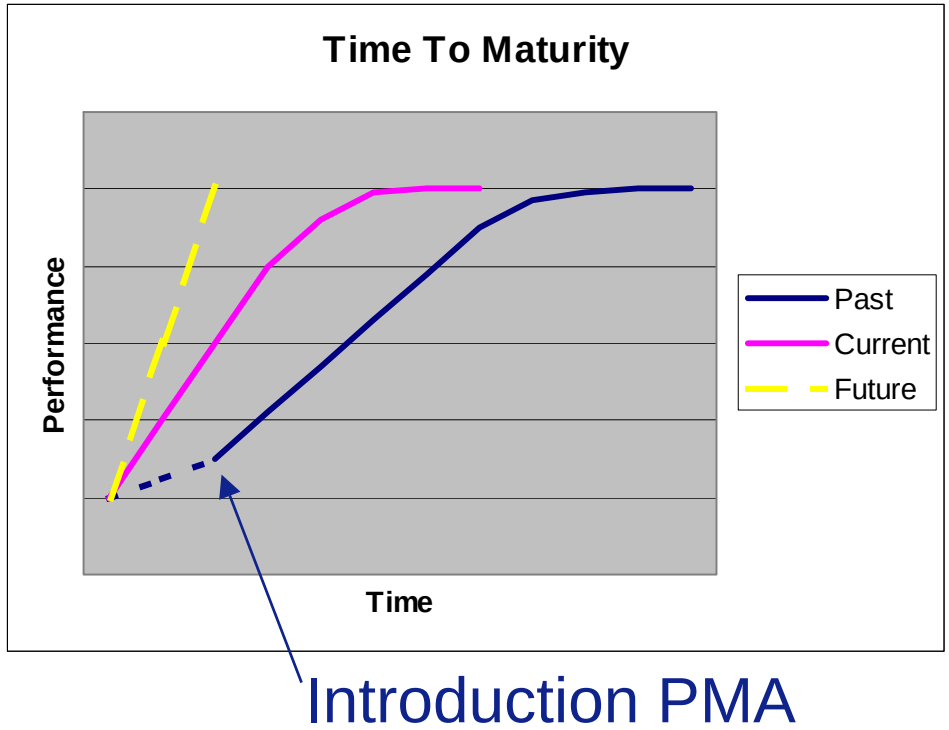
Processes Supported

- RAM based
  - Continuous Improvement Process
  - Support Process



Continuous Improvement Success

- Extensive use of Field Data has significantly reduced the time to maturity
  - 24 hrs coverage
    - every event is there
  - WW coverage
    - every machine counts
  - no ‘filtering’
    - all machines are equal
    - universal processing



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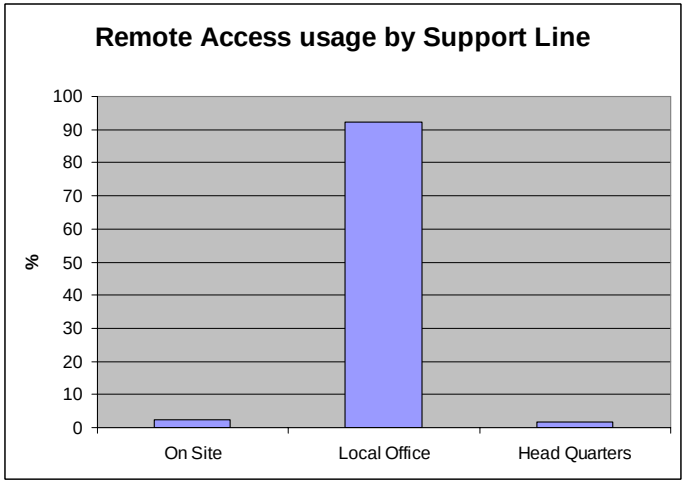
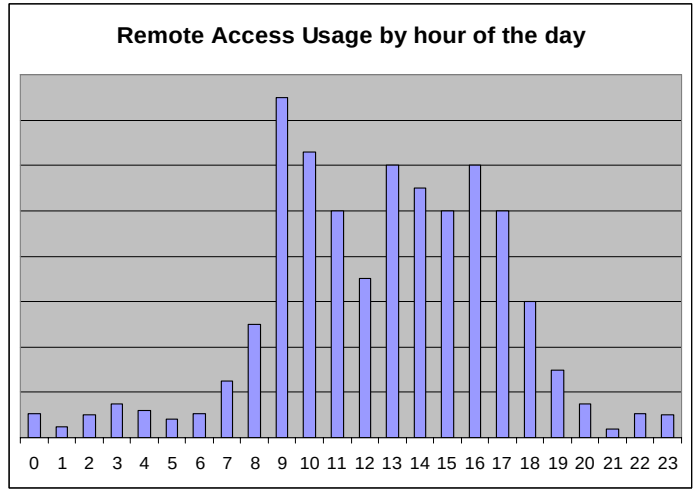
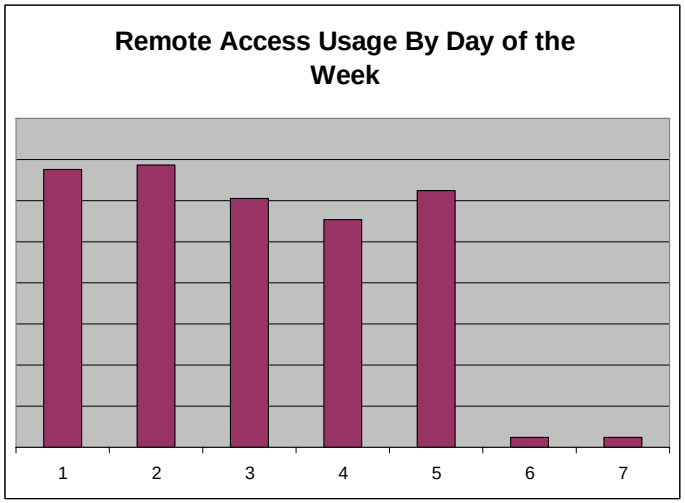
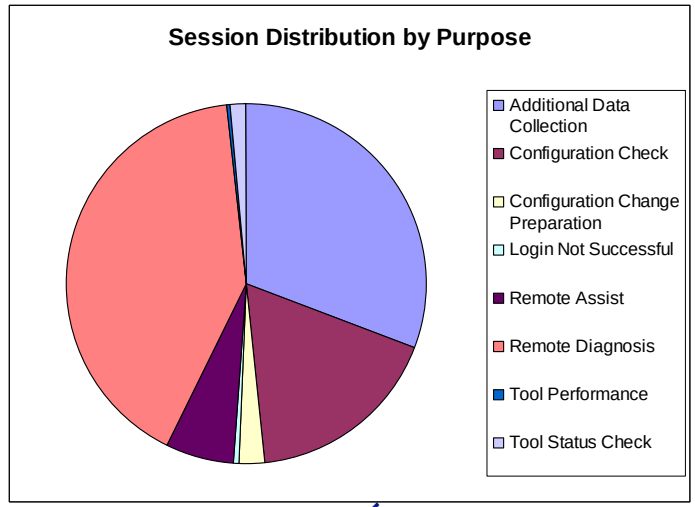
Remote Access Usage

(based on 9000 sessions/ 12.500 session hours)









Support Process Success

- Remote Access has:
  - Improved response times (ICM benefit)
  - Reduced engineer transit losses (OEM benefit)
- Automatic Data Collection has:
  - Reduced variance in Machine Performance (ICM benefit)
    - performance benchmarks are known
    - performance detractors are ‘visible’
    - machine events linked to knowledge base
  - Reduced the risk (ICM benefit) and workload (OEM benefit) of data collection

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Remote Access Issues

- Acceptance of e-Diagnostics within ICM (equipment owners) is growing fast
- Both parties benefit but investments a point of discussion
- Supporting different ICM solution flavours for Remote Access is a problem for ASML

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Current Support Issue

- Laptop computer as service tool and data carrier discouraged by fabs
  - Complexity of machines is increasing
  - Pressure on performance increasing
- To make ASML ww knowledge available for our service engineers we need:
  - Bi-directional data flow between Fabs and ASML
  - Secure communication between applications

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Directions Being Investigated

- Separate the Remote Access interface from the equipment level
- 3rd Party Connectivity Solutions
- Migration from various file formats to XML
- Migration from an informal distributed file based interface to a formal data interface
- Improve e-Diagnostics capabilities for the support and development processes

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Related Developments

- TWINSCAN will have Interface A with phasing:
  - 1) webserver + http: / XML file access
  - 1a) integration in e-Diagnostics 'loop’
  - 2) authentication / authorisation
  - 3) notification facilities
- Compliance level still under evaluation

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Summary

- ASML has been active with e-Diagnostics over the last 6 years
- e-Diagnostics functionality creates added value for our Customers and for ASML
- ASML sees opportunities for further service and performance improvements based on e-Diagnostics
- Developments are ongoing to realise a number of these opportunities

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