NIWeek
WORLDWIDE GRAPHICAL SYSTEM DESIGN
CONFERENCE

NATIONAL
INSTRUMENTS™

Using a Standard Vision Platform to Quickly Create Custom Solutions

NI Week 2013 – Vision Summit – Tuesday, August 6th

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Introduction

Qualimatest SA and National Instruments

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Introduction

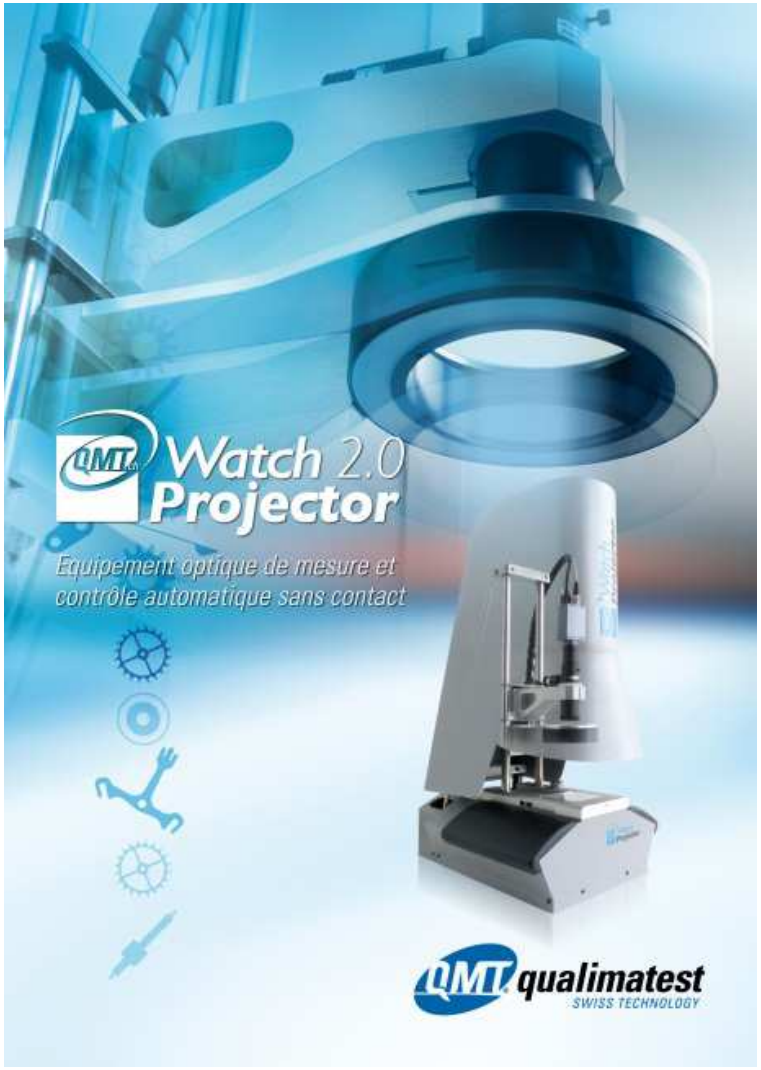
- Qualimatest SA is a Swiss company, specializing in vision applications
  - Founded in 1989 – 17 employees
  - Active in 4 main industries: automotive, watch, medical devices and railways (trains)
  - ISO9001 certified organization (CSIA in 2003)
- National Instruments is our strategic technical platform
  - All projects based on LabVIEW
    - Most of Vision Solutions based on Vision Builder for Automated Inspection (Vision Builder AI)
  - Select Alliance Platinum Partner (since 2000)
  - Member of the NI Vision Specialty
- For people who want to know more about Switzerland:

  http://youtu.be/YG9GOKyS33M

Examples of Qualimatest Applications

- Sorting machines

- WatchProjector



QMT Vision Inspector Platform

Vision Builder AI as a QVIEngine

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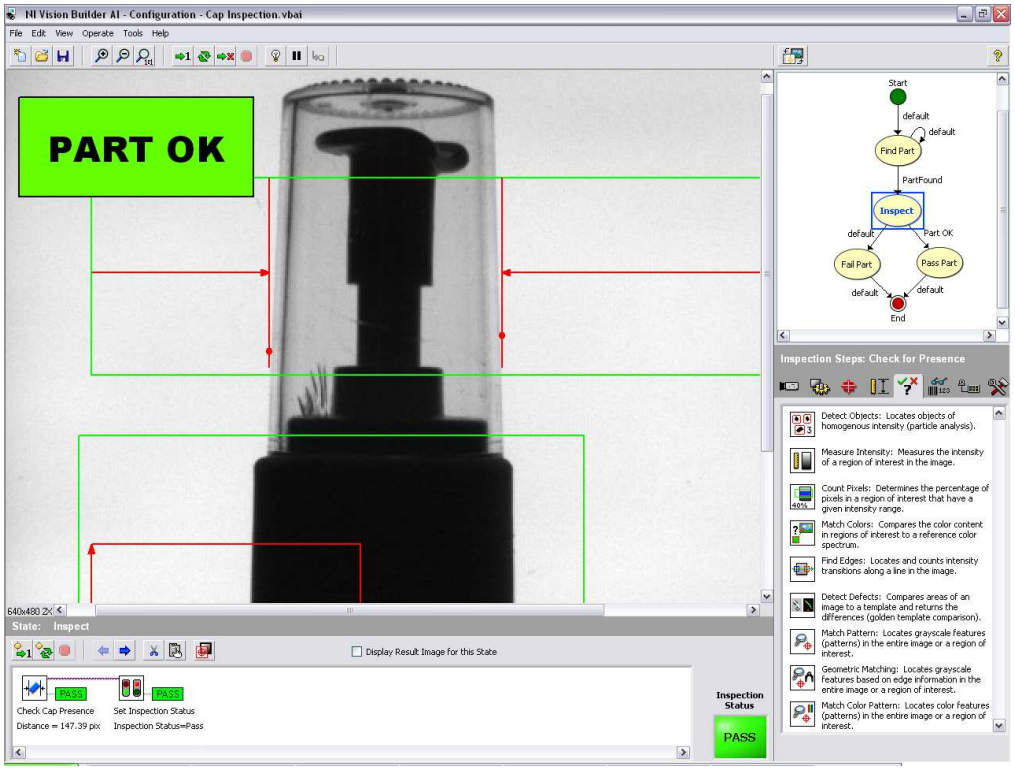
Vision Builder AI Benefits

- Easy-to-use interactive environment
- No programming (fast to set up)
- Acquire and process images
- More than 100 machine vision tools (pattern matching, data matrix, …)
- Pass/fail decisions
- Several communication possibilities (trigger, results display, …)



Most things are possible with Vision Builder AI…

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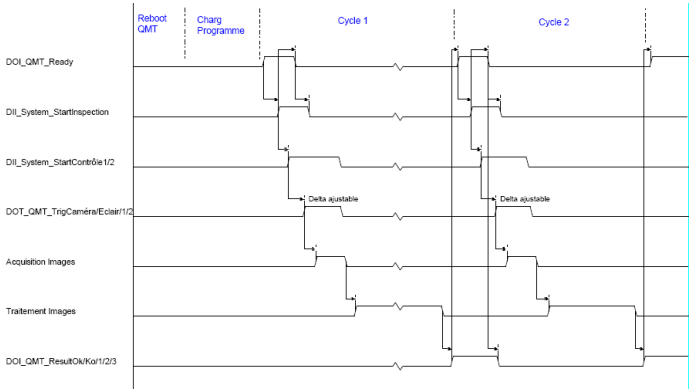
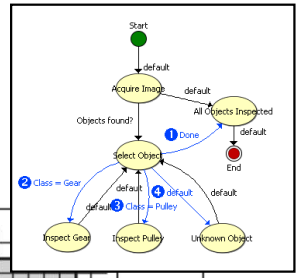
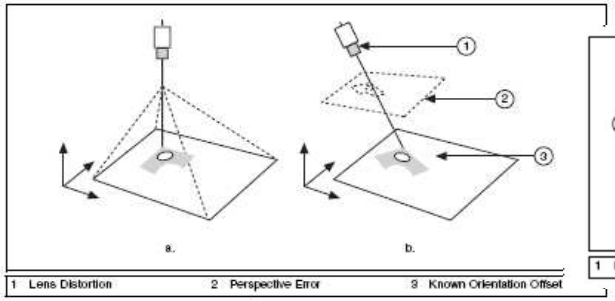
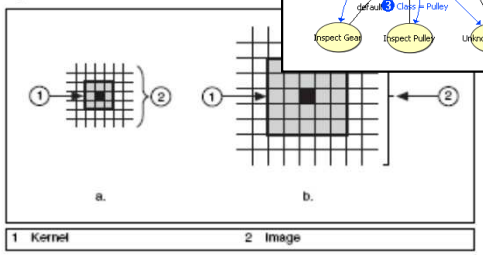
The Birth of QMT Vision Inspector

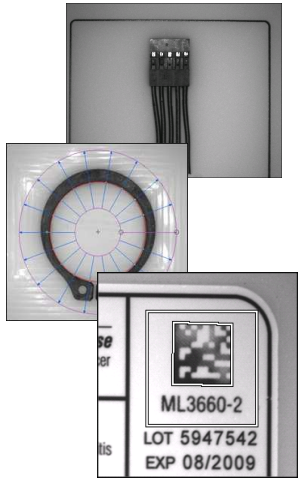
… how do you choose all of the components of a vision system?



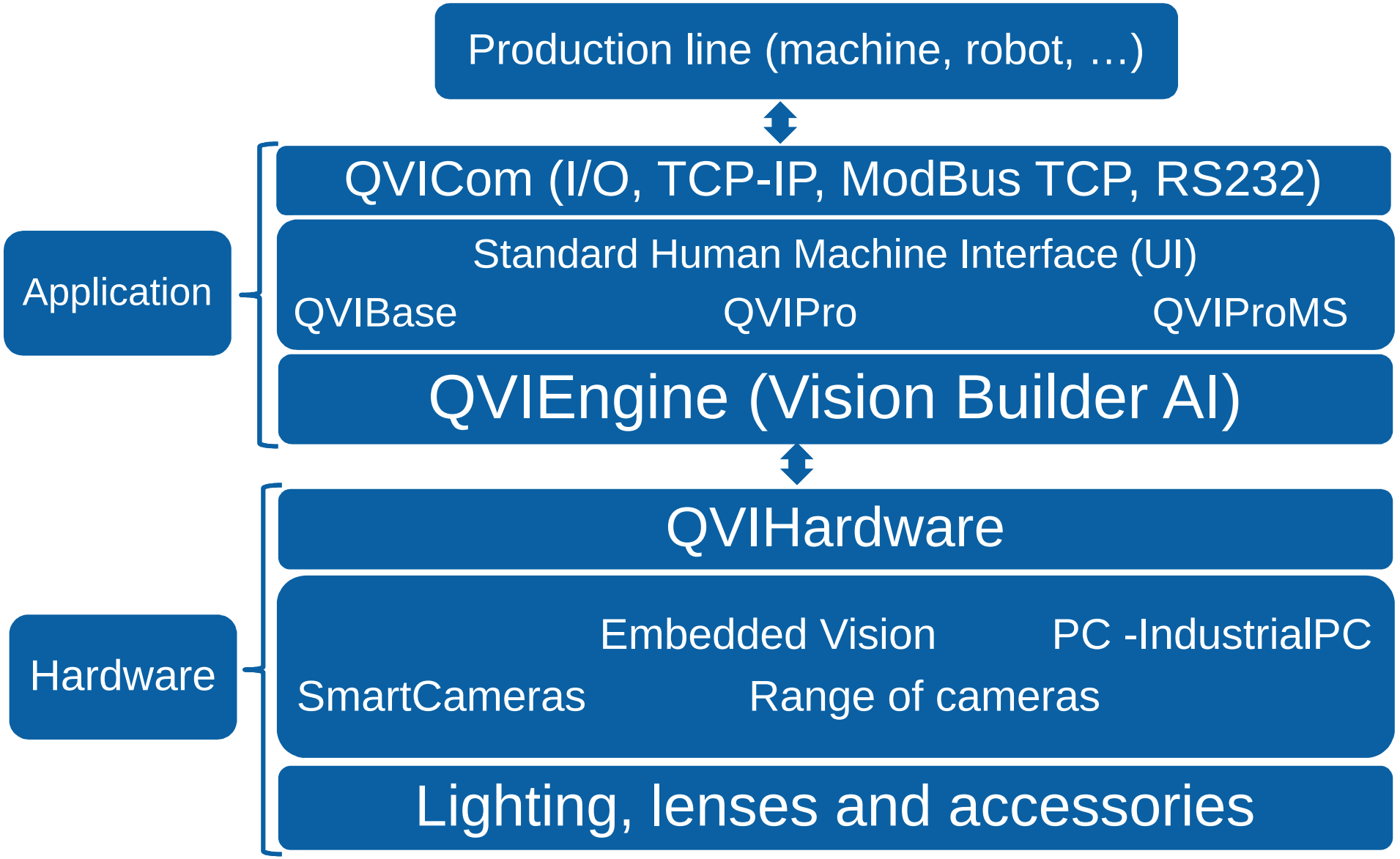








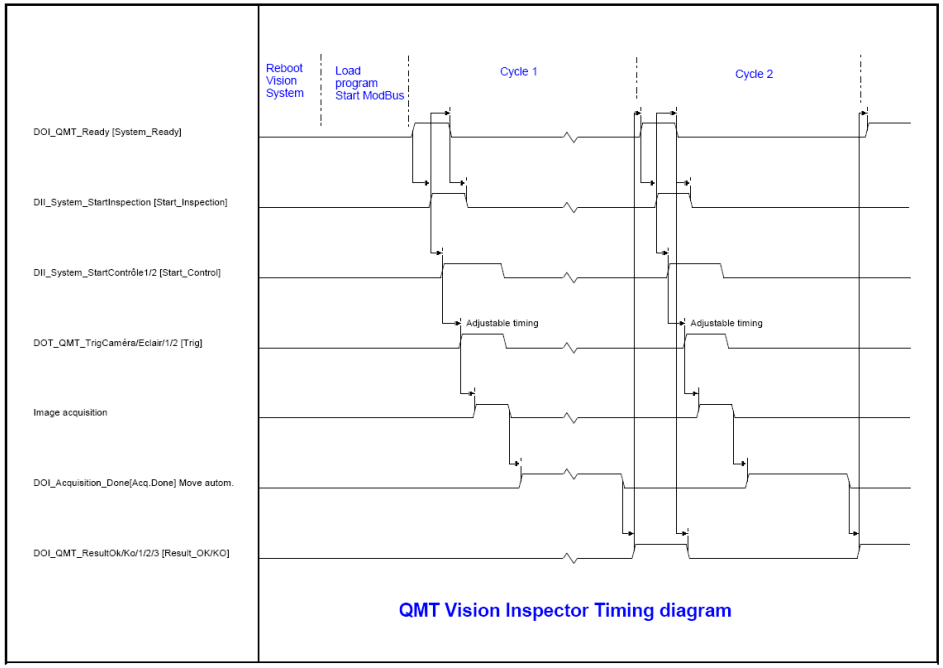
QMT Vision Inspector Architecture



QVICom for Standardized Communication

QVICom
Standard UI
QVIEngine
QVIHardware

- External I/O: triggering, state machine, results
- TCP/IP and RS232: state machine, results
- Internal I/O: synchronization between cameras, lighting, encoders
- ModBus TCP/IP: parameter management
- Integration of vision results and photos in a final machine interface
- Read/write access to all vision parameters through ModBus TCP



QMT Vision Inspector Timing diagram

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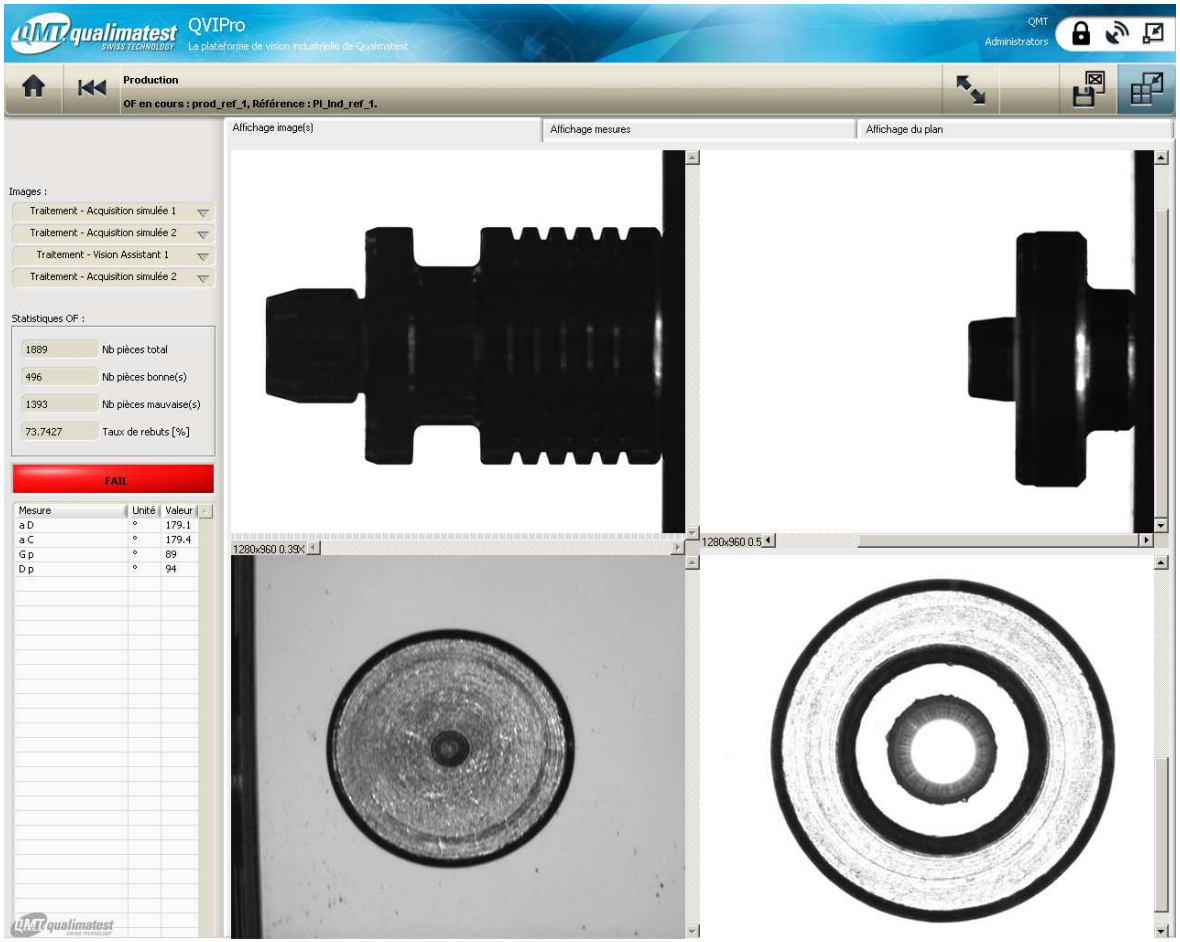
Standard UI
QVIBase, QVIPro, QVIProMS

- Target selection
- Easier image selection whatever the target
- Multi-lingual UI



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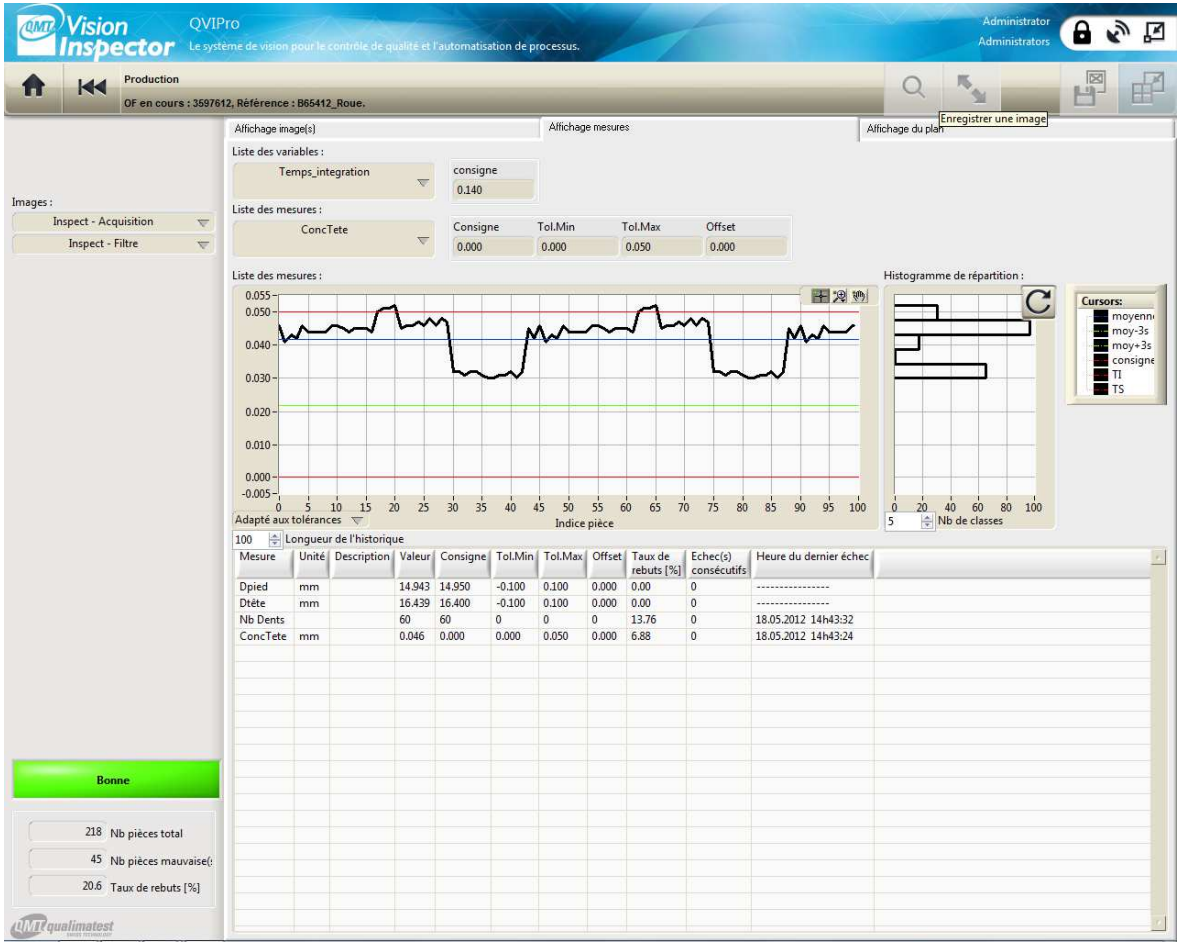
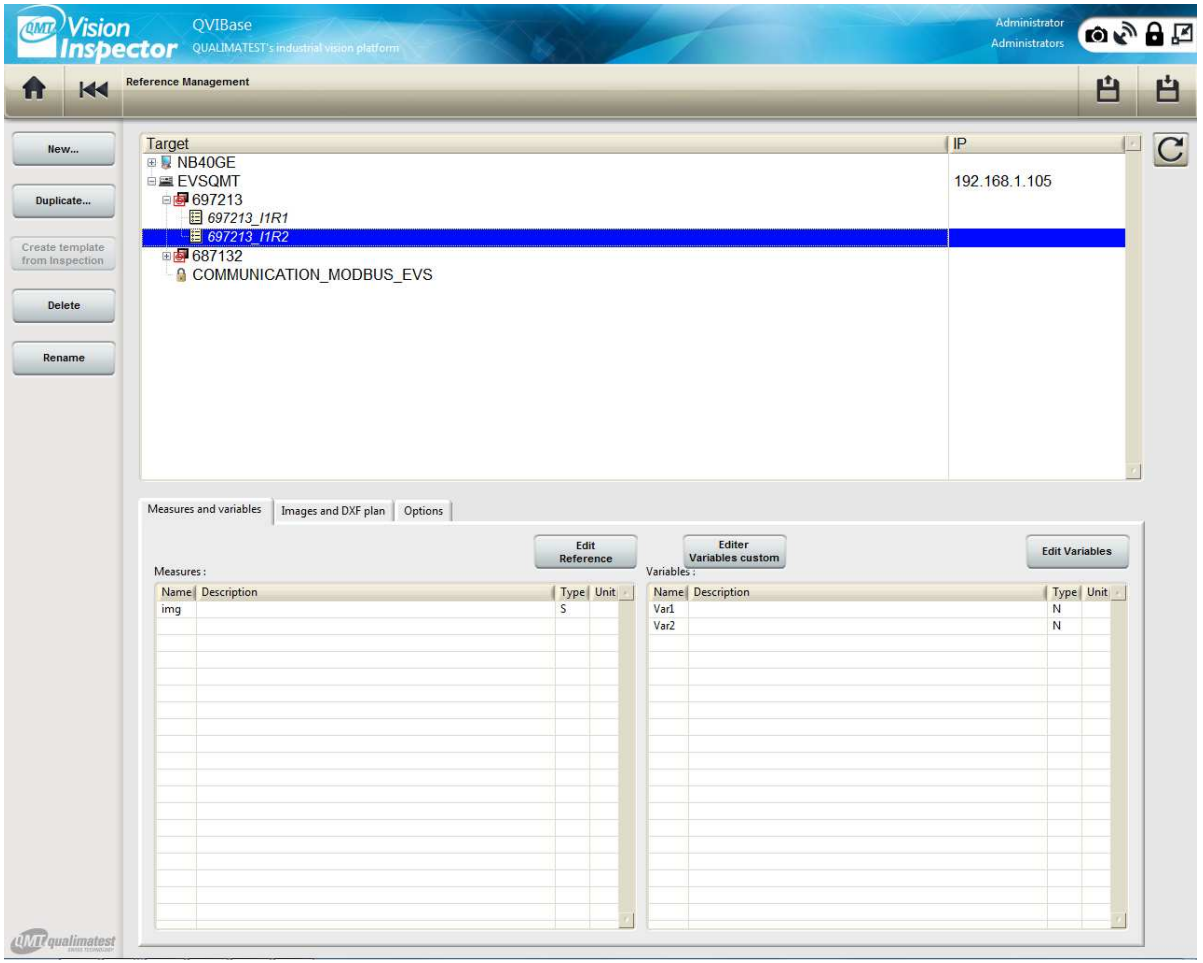
Standard UI
QVIBase, QVIPro, QVIProMS

- Variables, measurement selection
- Real time results logging
- Statistics calculations
- Reports, backup/restore



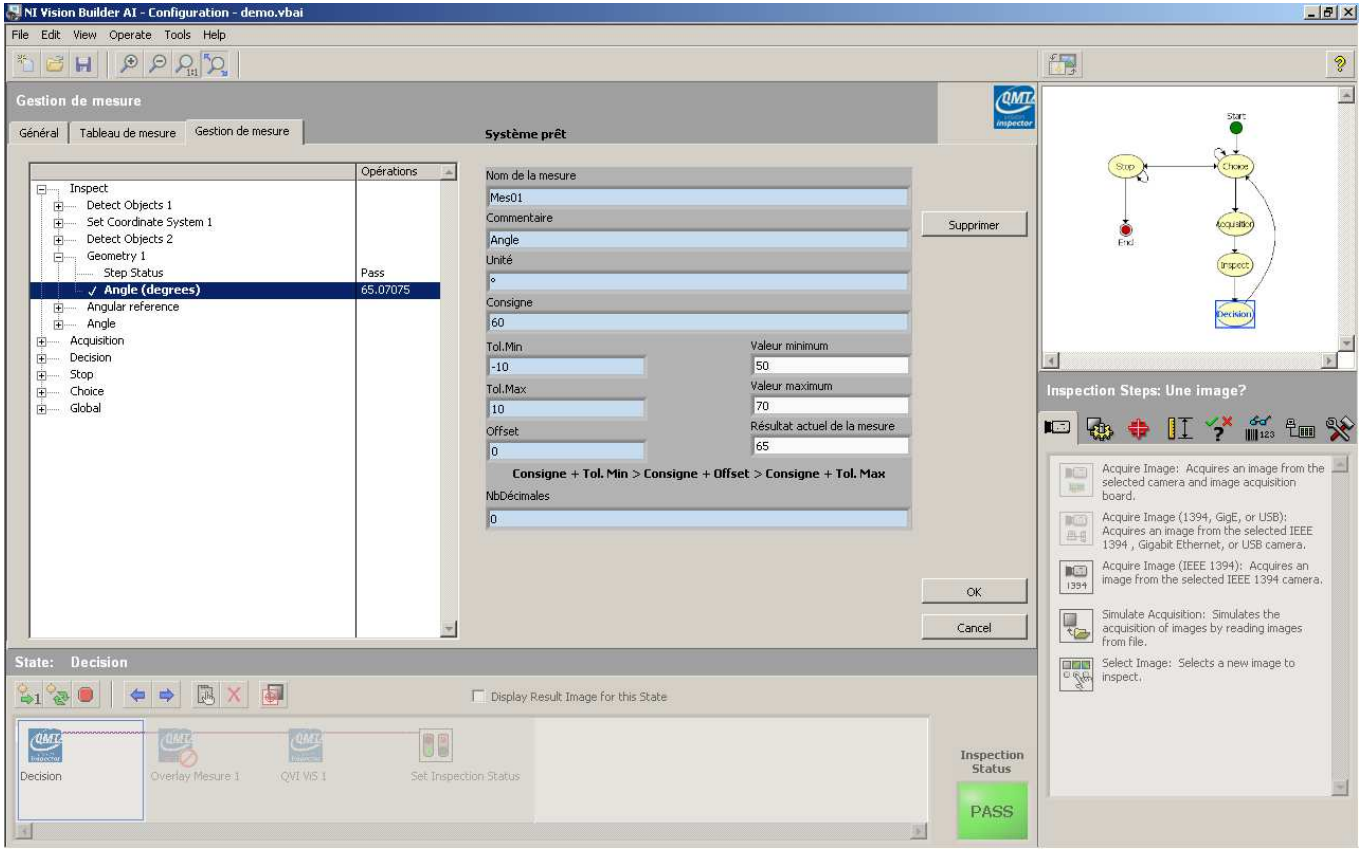
QVIEngine
Vision Builder AI Enhancements

- “Family” notion: different references linked to only one inspection
- Reference management included: creation, duplication, deletion, rename, templates
- Modification by using only variables, one set for each reference



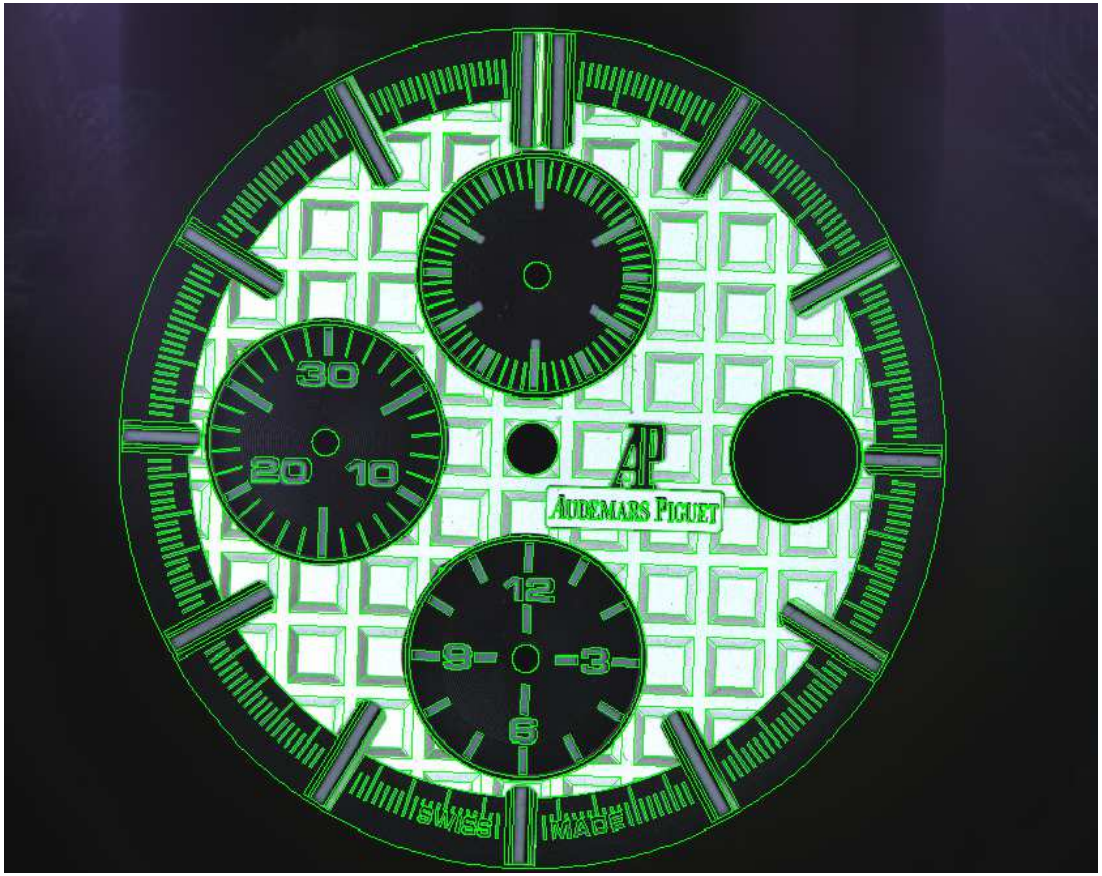
QVIEngine
Vision Builder AI Enhancements

- Plugins developed by Qualimatest
  - Decision making
    - Select only relevant results (easy to understand for operators)
    - Tolerance management through the HMI



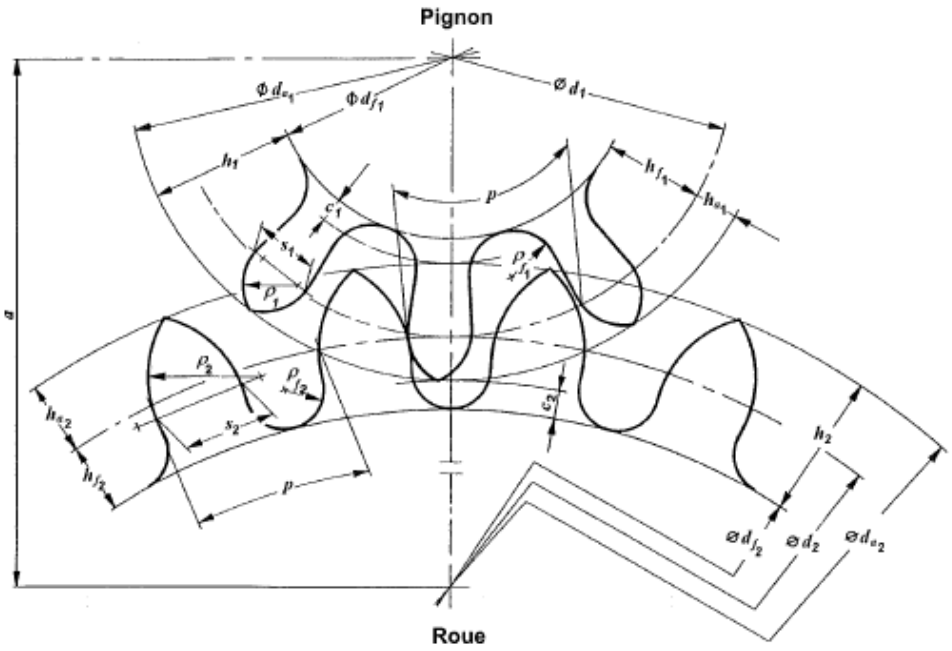
QVIEngine
Vision Builder AI Enhancements

- Plugins developed by Qualimatest
  - CAD overlay
    - Automatic placement of the CAD on the image
    - Suited for form controls (the operator makes the decision)

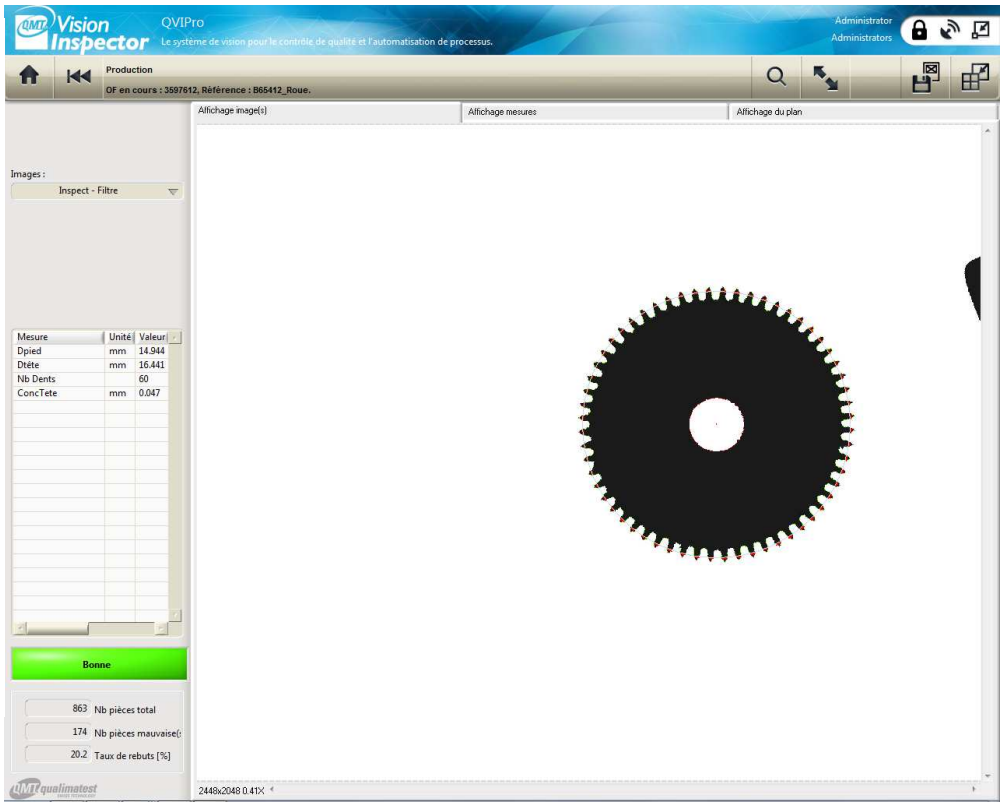


QVIEngine
Vision Builder AI Enhancements

- Plugins developed by Qualimatest
  - Standard Wheel (specifically for watch industry)
    - Gives all results according to relative norm in one Vision Builder AI step



Extract : Norm NIHS SN 282 001



QVIHardware

- Includes the whole range of standard vision components that Qualimatest use
  - Systems:

  - Cameras:

  - Lenses:

  - Lighting:

  - Cables: FireWire and Camera Link cables designed by Qualimatest

QVIHardware

- All QVIHardware components are:
  - Documented (marketing, technical datasheets, …)
  - Integrated into our internal database (prices, specific conditions, preferred distributors, ...)

- Using QVIHardware ensures our final customers of:
  - A mastered solution
  - A reliable solution
  - A long term solution

Typical Applications

Successes with QMT Vision Inspector

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WatchProjector

- Optical equipment for measurement and automatic control
  - Based on the same architecture as QMT Vision Inspector
  - Parts are manually positioned
  - Suited for components smaller than 60 mm diameter

Sorting Machines

- All based on QMT Vision Inspector, the only required adaptations are mechanics frames and Vision Builder AI inspections
  - QMTInspect-R
    - High cadency 100% automotive parts controls

    http://www.youtube.com/watch?v=ebrs9aoCM-Y&feature=player_embedded
  - QMTInspect-PL
    - Measures and sorts diamonds depending on their dimensions
    - http://www.youtube.com/watch?feature=player_embedded&v=kUzMl2Luxvg

Business Impact

QMT Vision Inspector as a key factor on integration revenue

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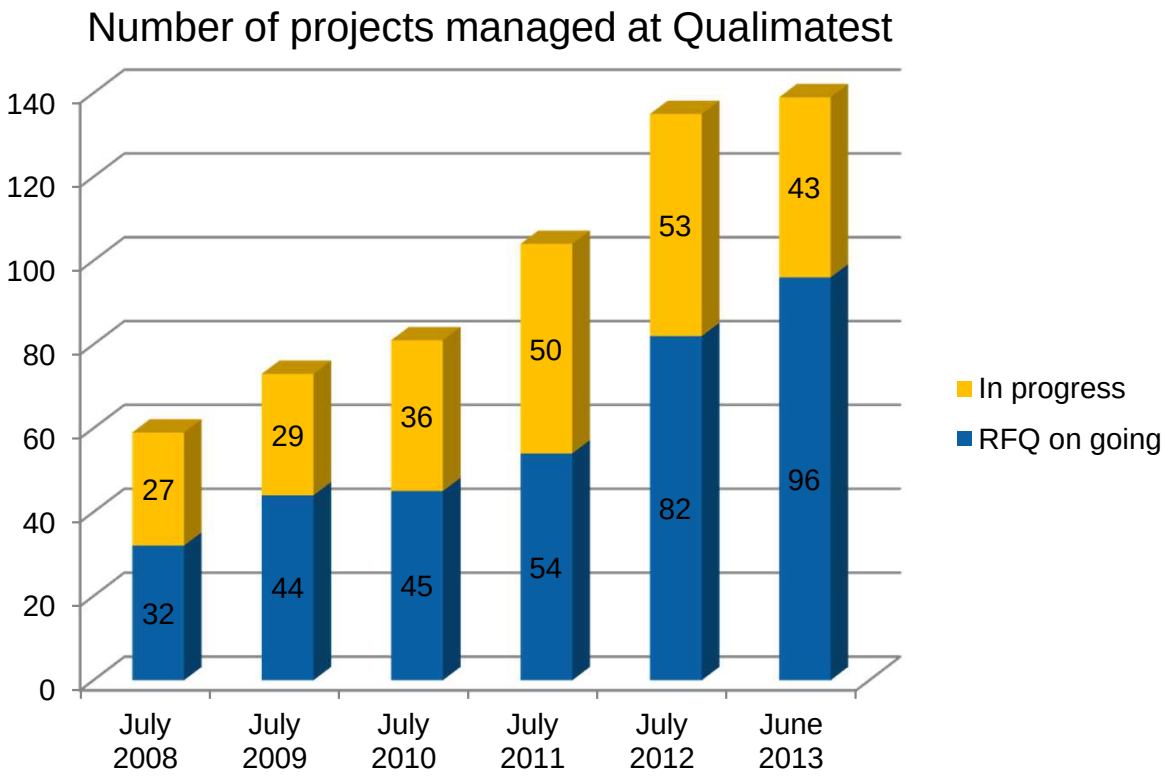
Business Impact

- Thanks to QMT Vision Inspector platform:
  - The re-use of material is automatic
    - 80% of our purchase orders based on 10% of our suppliers/ distributors
  - Time to delivery is reduced and under control
    - 5 weeks for a single vision system (typical delay)
  - The possibilities of using Vision Builder AI are dramatically increased
    - Industrialisation with an easy, multiple-reference management system
    - Results coming from multi-target on sorting machines
    - Custom-made plugins turn it into a unique solution

Business Impact

- More than 200 systems delivered with QMT Vision Inspector during the last 3 years
- 50 projects by project manager
  - As an average, request for quote and in progress included



Conclusion

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Conclusion

- Based on QMT Vision Inspector, our vision systems:
  - Are quickly designed
  - Suited to all of our strategic industrial application fields
  - Profit from existing functionalities of Vision Builder AI
  - Leave nothing to chance because of standards-based solutions
  - Guarantee a reliable system to our customers
  - Allow us to easily manage and develop either standard or specific custom solutions
- Feel free to visit our web site : www.qmt.ch

- Thank you for your attention!

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