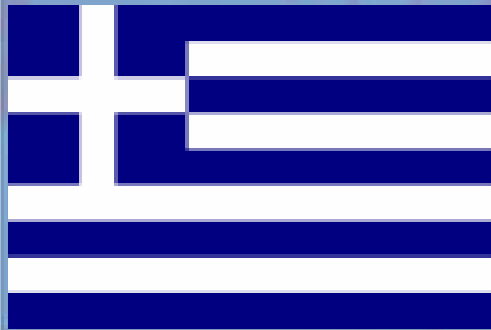


Theodorou Automation OEE Technology Day

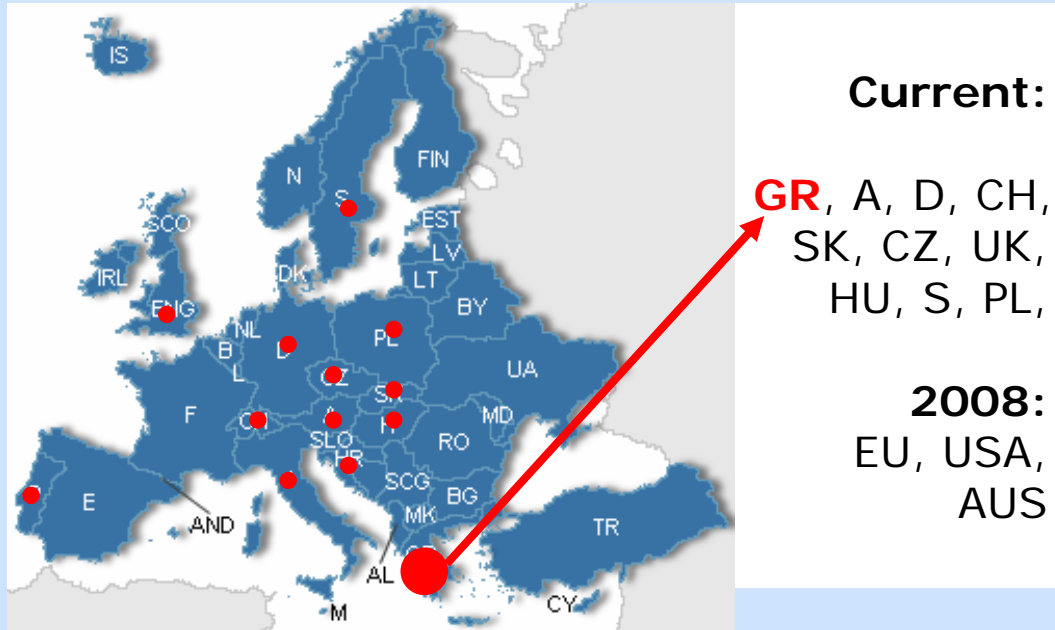
Athens, March 6th 2008



Machine Relationship Management

MRM is an innovative company focused on solution development in relation to holistic production controlling.
MRM Vienna: Competence Center for Software Development

Partner – Sales & Installation



MRM[©] Production Controlling

How is it possible to control all relevant data on one screen?

How can I react to production, process, capacity and quality problems on-time?

How can I measure and control my performance fast and incomplex?



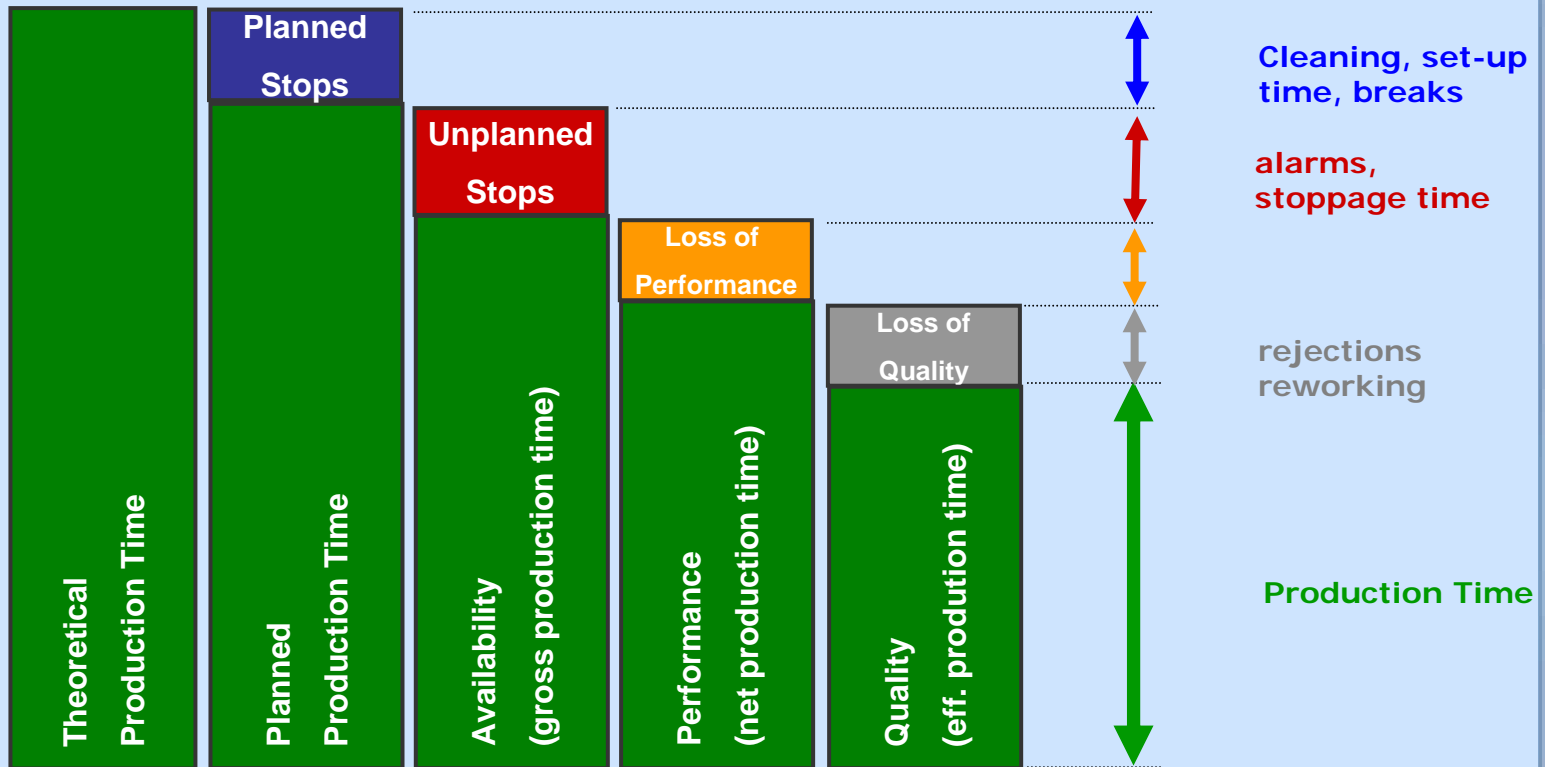
„The system displays online all production lines deviating from the production targets as well as the extend and reason for the deviation. It also displays any performance reserves you may have.“

Production Controlling – A Historical Overview

- Source: Automobile Industry (Toyota)
- Base for improvement and optimization programs like Six Sigma, Kaizen, TPM, Kanbana, etc.
- Targets: productivity increase, 0-mistakes, continuous improvement, cost savings, increase effectiveness, employee information and motivation

MRM[©] OEE

$$\text{OEE} = \text{Availability} * \text{Performance} * \text{Quality}$$



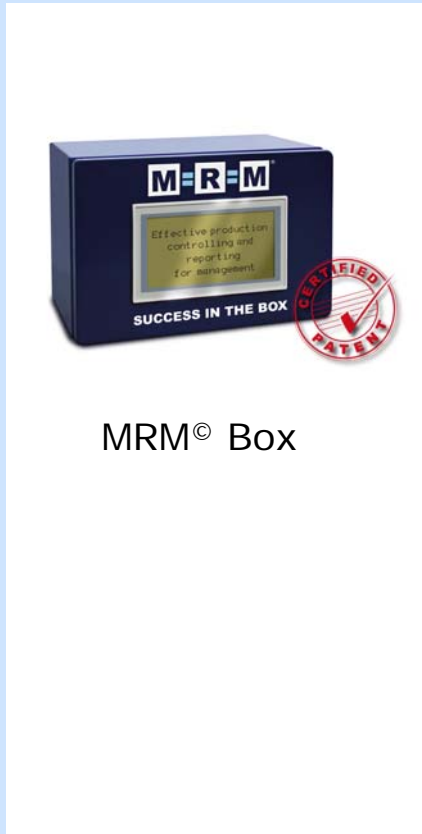
MRM[©] Targets

- Identification of performance losses and estimation in EURO.
- Increase of effectiveness of production plants.
- Identification and elimination of technical, organisational or personnel bottlenecks.
- Detection of weak spots in process and operational organization.
- Standardization of communication and information exchange

MRM[©] Benefits

- Immediate, detailed overview about production and alarm time
- Permanent comparison of target and actual data, comparison of amount and lots.
- Detection and reduction setup and cleaning processes.
- Detection and solving of speed losses.
- Paperless production data acquisition
- Consistent reporting
- Consistent communication and information flow between management and employees (display – screen)

MRM[©] Box



- Systematic and automatic collection of data on actual machine conditions
- MRM Boxes are connected to a network (line management)
- Touch display for input of e. g. order number, personnel number or customer number, etc.
- Put into operation with low installation costs
- Plug and Play System

MRM[©] Systems - Generally

- Webbased solution – no additional software installation necessary
- Independent from time and place
- Autonomous or networked overview of different production lines or production plants
- Standard reports / individual reports (report generator), analysis with real-time or historic production data
- Data exchange with ERP systems (i e. SAP or Microsoft Dynamics, etc.)

MRM[®] Systems – Reporting



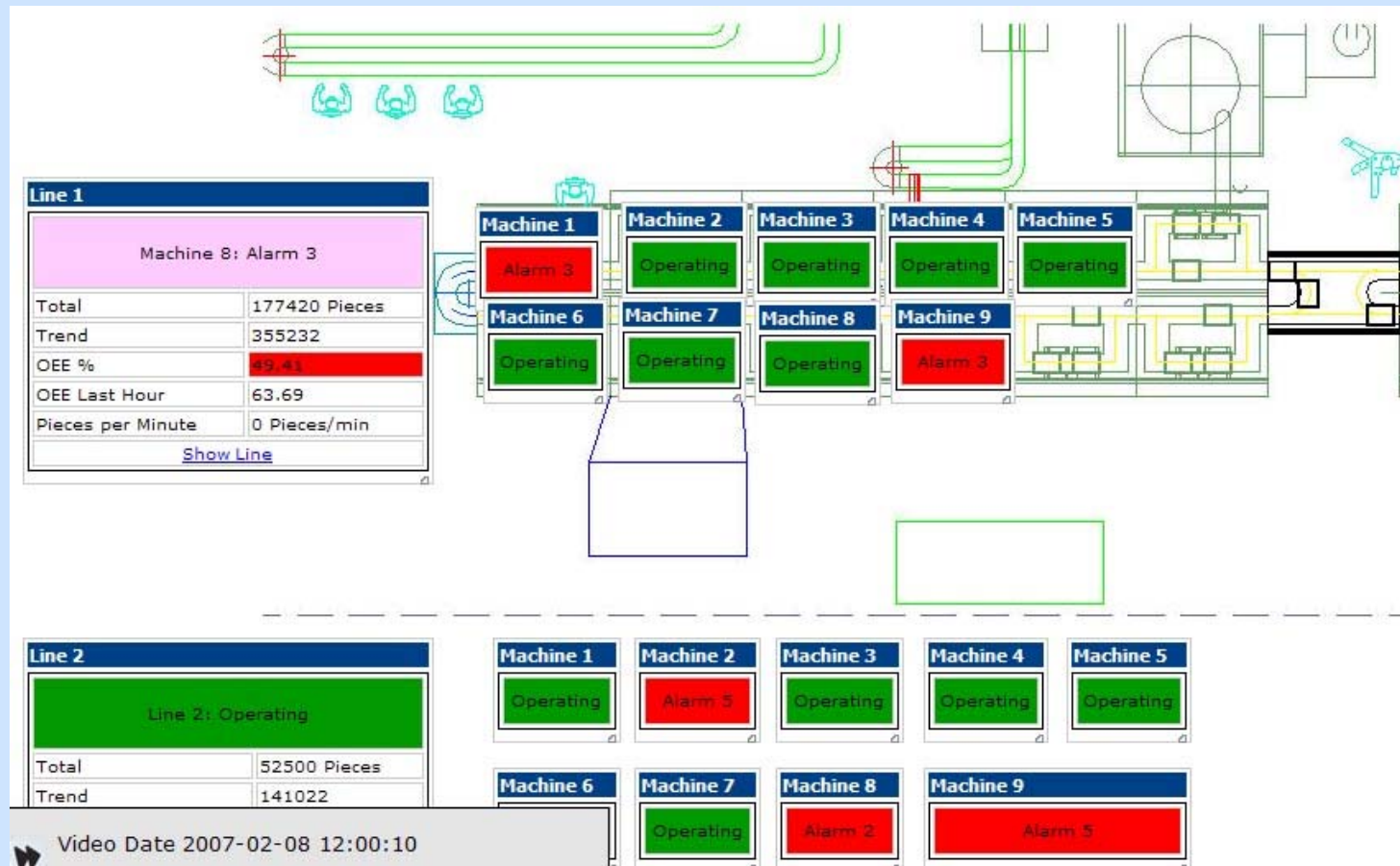
Please Login

Username

Password

Remind me

MRM[©] Live View – Production Layout

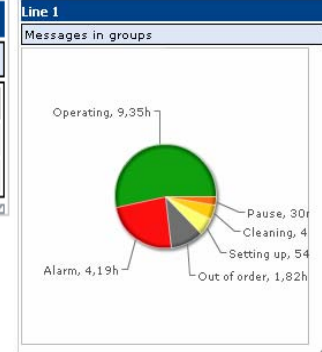


MRM[©] Live View – Line Overview

Line 1	
Day	
Line 1: Operating	
Pieces	80629
Pieces Bad	0
Piece Productivity (%)	28.75
Time Productivity (%)	69
OEE (%)	19.83

Line 1			
Times			
Group	Count	Duration	
Alarm	103	04:11:32	
Cleaning	6	00:47:18	
Operating	125	09:21:00	
Out of order	11	01:49:20	
Pause	2	00:30:00	
Setting up	8	00:54:35	

Line 1			
Top 5 Alarms			
Machine	Message	Count	Duration
Machine 1	Alarm 2	50	01:21:36
Machine 1	Alarm 1	53	02:49:56



Line 1	
Job	
Article	1234 - Article 1
Number	20070304221904
Target Quantity	258000 Pieces
Job Pieces	282001 Pieces
Pieces per Hour	0 Pieces/h
Piece Productivity (%)	10.92
Time Productivity (%)	60.6
OEE (%)	6.61
Current Employees	-
Job Start	2007-03-04 22:19:04
Calculated End	2007-03-10 08:25:25



MRM[©] Live View – Management Overview

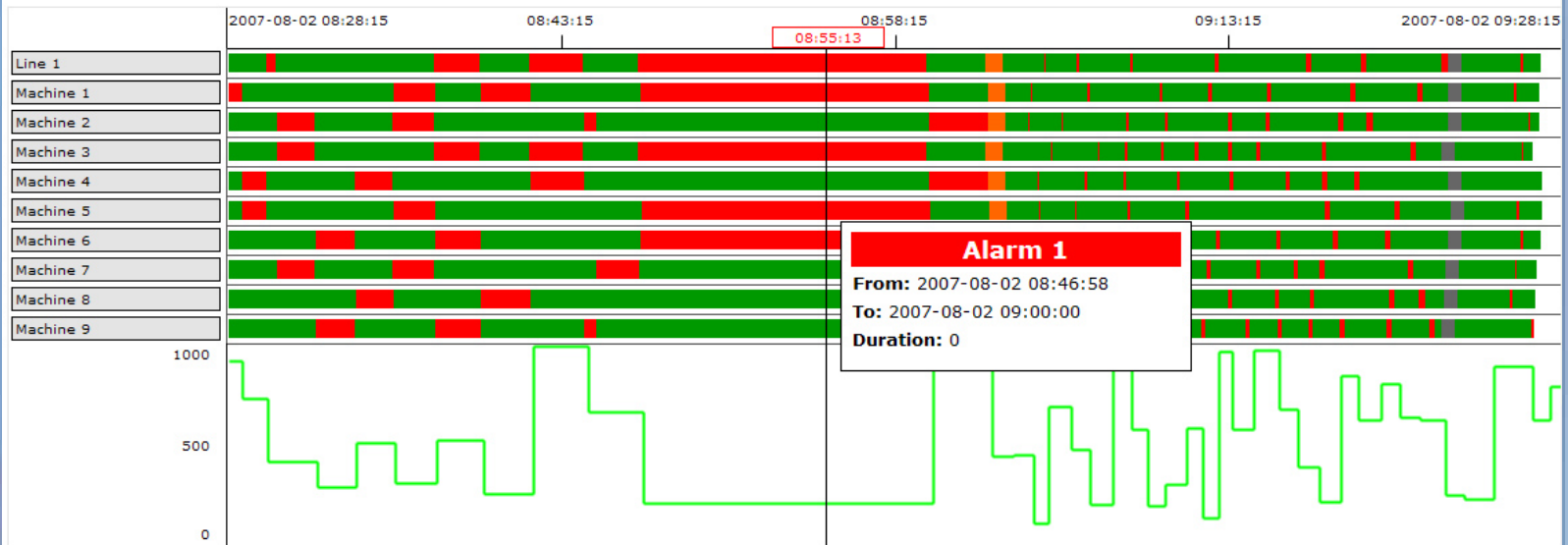
Line 1	
Day	
Machine 8: Alarm 3	
Pieces	177420
OEE Piece %	87.61
OEE Time %	56.4
Performance (%)	-31 %
Power Reserve	-18042 €
Trend	355232
OEE %	49.41
Pieces per Minute	0 Pieces/min
Show Line	

Line 2	
Day	
Line 2: Operating	
Pieces	52500
OEE Piece %	42.21
OEE Time %	58.3
Performance (%)	-50 %
Power Reserve	-11645 €
Trend	141022
OEE %	24.61
Pieces per Minute	0 Pieces/min
Show Line	

Line 1			
Top 5 Alarms			
Machine	Message	Count	Duration
Machine 8	Alarm 3	12	01:44:25
Machine 8	Alarm 1	22	01:33:33
Machine 9	Alarm 3	26	01:18:56
Machine 1	Alarm 3	23	00:33:05

Line 2			
Top 5 Alarms			
Machine	Message	Count	Duration
Machine 2	Alarm 5	40	02:58:14

MRM[©] Live View – Gantt Chart



MRM[©] Historical Reports

Day report

OEE, Employees, Articles ...

Shift report

OEE, Employees, Articles ...

Job Report

Detailed information of Job.

Performance period

Performance summarized in days, weeks, months or years

Performance jobs

Jobs chronological ordered

Performance employees

Performance of employees chronological or summarized, divided by shifts

Performance shift

Performance in a time period, divided by shifts

Performance articles

Performance of articles grouped

Procedures chronological

All procedures in their production order

Alarms chronological

All alarms in their chronological order

Alarms grouped

All alarms in groups, ordered by duration

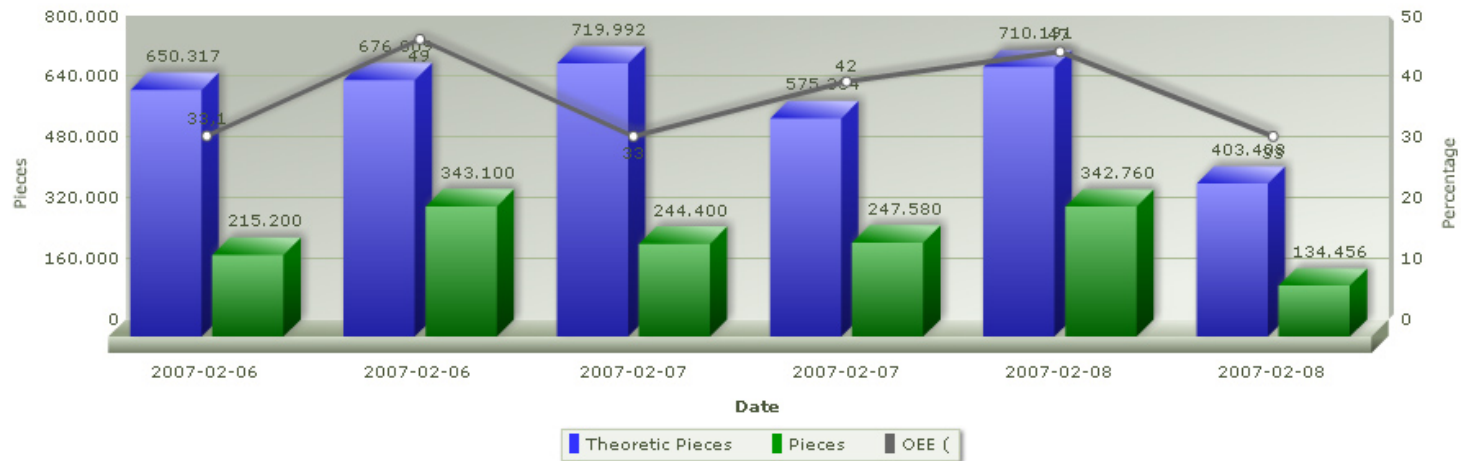
Top 5 messages

The longest 5 messages of a machine

MRM[©] Reporting – Shift Report

Shift 1 2007-02-06 06:00:00 2007-02-06 13:59:59		Shift 2 2007-02-06 14:00:00 2007-02-06 21:59:59		Shift 3 2007-02-06 22:00:00 2007-02-07 05:59:59				
Employee		Employee		Employee				
OEE (%)	36.72	OEE (%)	29.23	OEE (%)	44.54			
Jobs (Pieces)		Jobs (Pieces)		Jobs (Pieces)				
Article	Produced pieces	Article	Produced pieces	Article	Produced pieces			
1234 - Article 1	88100	1234 - Article 1	70200	1234 - Article 1	106800			
Total	88100	Total	70200	Total	106800			
Times			Times			Times		
Message	Count	Duration	Message	Count	Duration	Message	Count	Duration
Standing	3	00:00:03	Standing	2	00:00:05	Out of order	1	00:00:09
Top 5 Alarms			Top 5 Alarms			Top 5 Alarms		
Message	Count	Duration	Message	Count	Duration	Message	Count	Duration
Alarm 1 (Machine 8)	7	00:38:40	Alarm 1 (Machine 8)	15	02:09:10	Alarm 1 (Machine 8)	17	00:56:21
Alarm 3 (Machine 8)	11	00:26:25	Alarm 3 (Machine 9)	11	01:04:47	Alarm 3 (Machine 8)	8	00:56:12
Alarm 3 (Machine 9)	4	00:18:49	Alarm 3 (Machine 8)	2	00:57:03	Alarm 3 (Machine 9)	21	00:52:37
Alarm 3 (Machine 1)	5	00:15:56	Alarm 3 (Machine 1)	7	00:24:13	Alarm 3 (Machine 1)	17	00:19:52
Alarm 1 (Machine 7)	2	00:14:31	Alarm 1 (Machine 9)	1	00:09:00	Alarm 1 (Machine 6)	3	00:10:38

MRM[®] Reporting - Performance per day/week/month/year



Day	Pieces	Theoretic Pieces	Piece Productivity (%)	Time Productivity (%)	OEE (%)	Operatingtime	Alarmtime	PCSS Time	Line
2007-02-06	215.200	650.317	54,18	61,10	33,10	13:14:26	08:26:01	02:19:23	Line 1
2007-02-06	343.100	676.009	74	67	49	15:17:52	07:14:09	01:27:23	Line 2
2007-02-07	244.400	719.992	71	47	33	11:24:57	12:35:02	00:00:00	Line 1

MRM[©] Systems – Modules

- MRM Alarm Documentation (Documents providing solutions for downtimes)
- MRM Quality Management (Batch Control)
- MRM Streaming Function
- MRM SMS Module
- MRM Measurement Integration (Humidity, ph-value, temperature in relation to productivity)
- MRM Screens (staff information)
- MRM Personell Time Recording
- MRM Service & Maintenance
- MRM Serial Connection (i. e. Barcode-Reader, RFID)
- MRM WLAN or GSM
- MRM GANTT Diagramm
- MRM Webcam

MRM[©] Systems – ROI (less than 1 year)

- Increase of productivity by 10 % or even up to 20 %, depending on production line.
- Change from 3 shift to 2 shift operation.
- No investments necessary because of optimized processes
- Minimize eject rate thus saving raw material, etc.

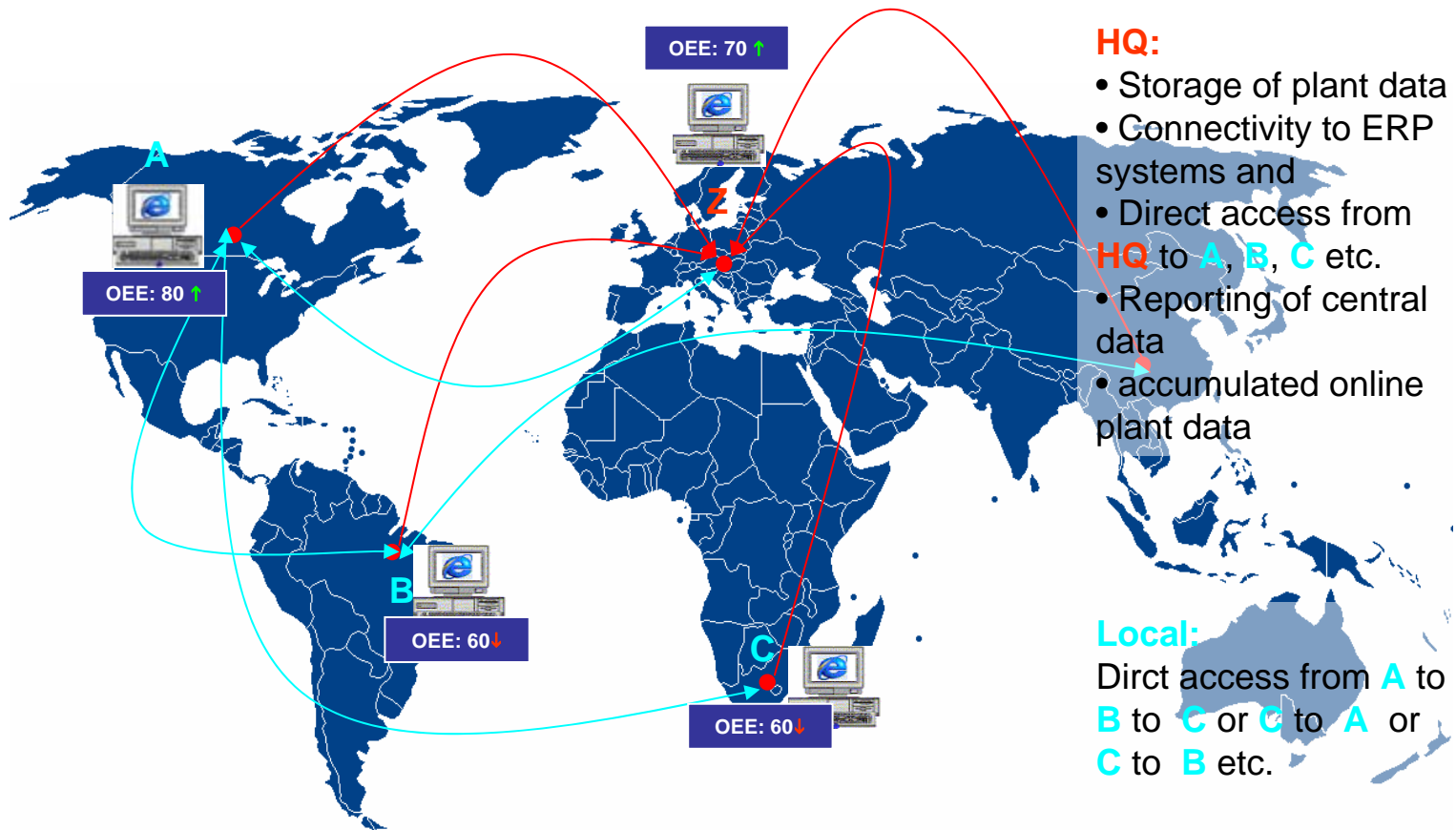
MRM[©] Systems – Summary

- Easy and fast installation
- Total flexibility
- ROI less than 1 year
- Easy to use
- Plug & Play
- Paperless production processes
- Independent from machine type and manufacturer
- Reasonable pricing

The logo features the text 'MRM' in a large, bold, sans-serif font, with each letter enclosed in a square frame. Below this, the words 'MACHINE', 'RELATIONSHIP', and 'MANAGEMENT' are stacked in a smaller, lighter font, with each word also enclosed in a square frame. The entire logo is set against a light blue background.

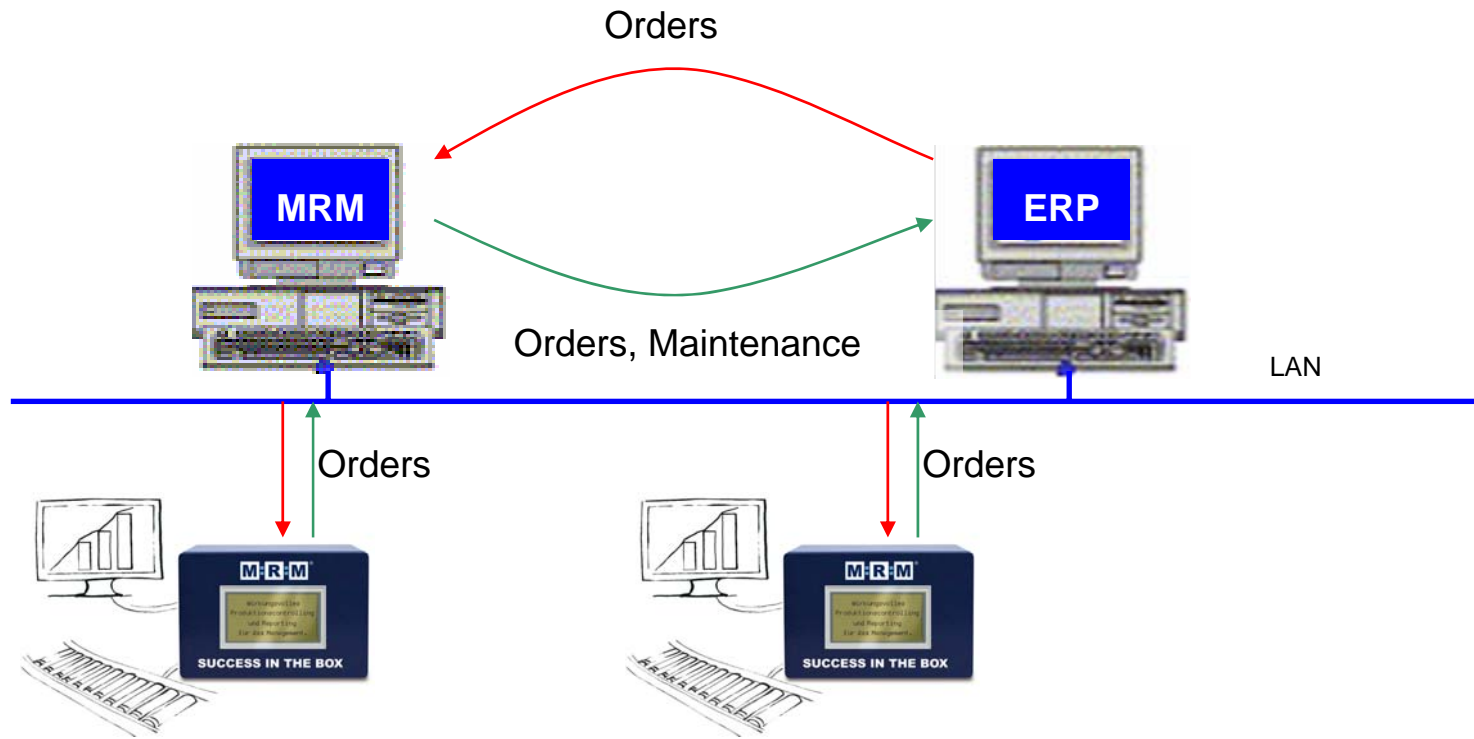
MRM[®] Business Intelligence

MRM Datawarehouse



MRM SAP Integration

Paperless Data Traffic (Orders, Maintenance)



MRM - SAP Businesscase / Apply Order

Fertigungsauftrag anlegen: Einstieg

Material	A320101215
Produktionswerk	1000
Planungswerk	1000
Auftragsart	PP01
Auftrag	

Fertigungsauftrag anlegen: Kopf

Material Kapazität

Auftrag %000000000001 Art PP01
 Material A320101215 FEMA. 8.00 MAXIFUSE Werk 1000
 Status EROF ABRV NMVP NTER

Allgemein | Zuordnung | Wareneingang | Steuerung | Termine/Mengen | Stammdaten | Langt

Mengen

Gesamtmenge 20.000 ST Davon Ausschuß 0,00 %
 Geliefert 0 Mind-/Mehrzugang 0

Termine

	Ecktermine	Terminiert	Gemeldet
Ende	28.12.2007 24:00	28.12.2007 23:00	
Start	28.12.2007 00:00	28.12.2007 23:00	00:00
Freigabe		28.12.2007	

Terminierung

Art 2 Rückwärts
 Reduzierung Es wurde nicht reduziert
 Hinweis Kein Terminierungshinweis

Priorität

Terminierungspuffer

Horizontschlüssel
 Vorgriffszeit Arbeitstage
 Sicherheitszeit Arbeitstage
 Freigabehorizont Arbeitstage

Order: 100045 placed

MRM SAP Businesscase/Show Order

Fertigungsauftrag anzeigen: Komponentenübersicht

Material: A320101215 FEMA. 8.00 MAXIFUSE Werk: 1000

NO_FIL Kein Filter | ST_STA Standardsort...

Pos	Komponente	Bezeichnung	Bedarfsmenge	ME	PT	Vrg	Flg	Werk	LOrt	Charge	AP	SG	RG	SB	D..
0010	A132013137	OL 77, RM 370-420, CuMg, F...	120,720	KG	L	0020	0	1000							
0020	A96305000005	Gewinnung Stol78 gal Of. = fsn...	54,120	KG	L	0020	0	1000							
0040	A83600005361	Kartoneinheit WQ33	20	ST	L	0020	0	1000							
0041		Wellpappspule, verklebt, WQ 3...	23	ST	N	0020	0	1000							1
0042		Karton 650 x 150 x 790													
0043		Winkelzuschnitt für Karton													
0095	A83700002221	MASCH-LEDERP. 30 MM, AD=...													
0100		Holzpalette 800 x 1300													

Fertigungsauftrag anzeigen: Vorgangsübersicht

Material: A320101215 FEMA. 8.00 MAXIFUSE Werk: 1000

Folge: 0 | 0 Stamm..

Vrg	UVrg	Start	Start	ArbPlatz	Werk	Steu	VISchl	Kurztext Vorgang	Txt	SysStatus	KO...	FHM	EPK	BEZE
0020		28.12.2007	23:00:00	545240	1000	PP01		STZF-Q1, WQ 33, mit Ma...	✓	EROF	✓	✓		

Approve Order



Status: FREI VOKL PLKF ABRV NMVP

MRM Planning

Detailed Planning

Transfer of orders from PPS systems (production planning and controlling). Free allocation of orders to shop floor areas or production lines.

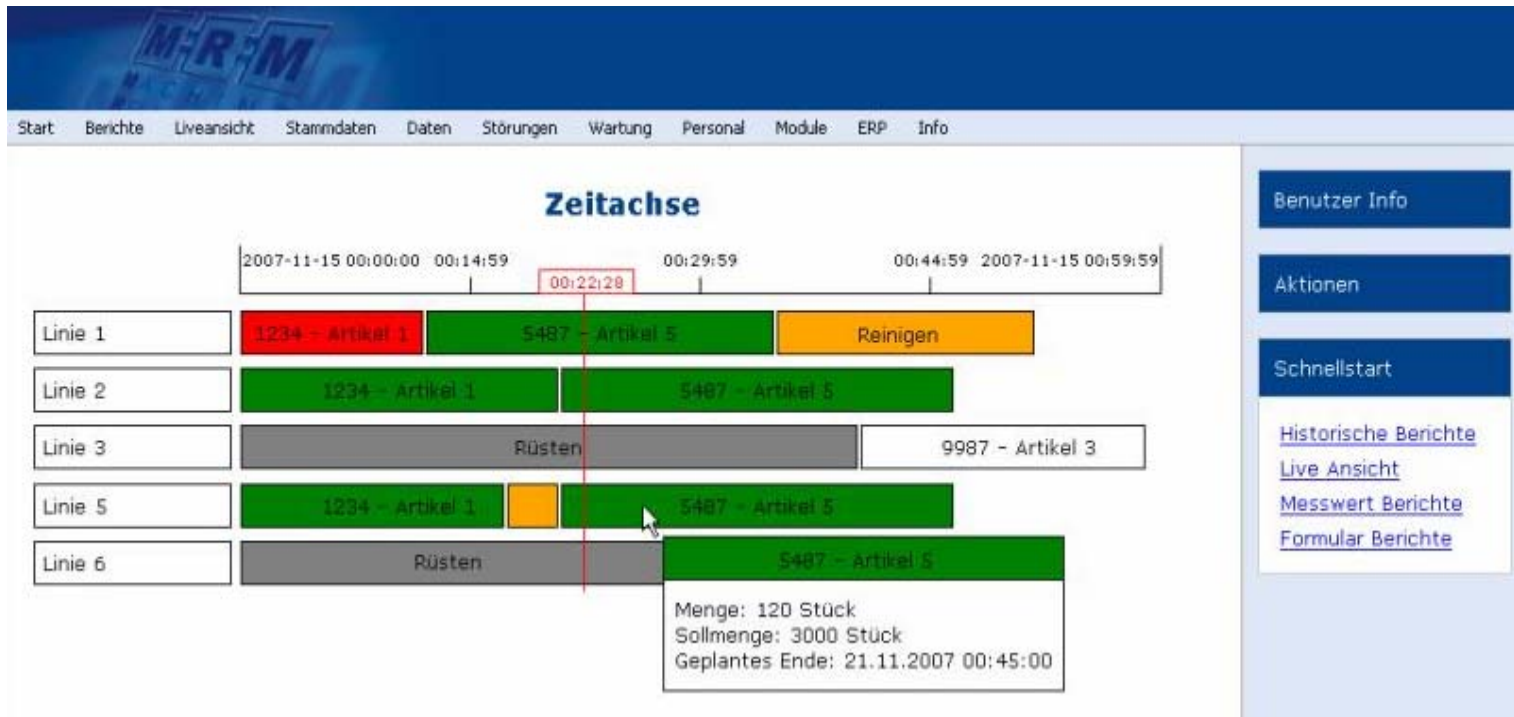
Control Center (Planning Table)

The planning table is a visual tool for all planned manufacturing processes. It shows bar diagrams. The length of the bar shows the duration of the process. The different colors show the current status of the process.

Intelligent Planning Assistent

Guarantees the highest level of efficiency of production capacities. The planning assistent recognizes process correlations, and which machines can be prepared (set up) for a specific product. It also tests every planning activity to prevent bottlenecks in capacity.

MRM Planning



MRM - Ordercontrolling

Automatic Order Monitoring

Order Start
Quantities
Down-Times
Order End
Activities

Integration to MRM Production Controlling


Related to order and/or products
Cross-locational and comprehensive to production lines

Feedback to SAP

Quantities
Times
Activities

Booking Quantities in SAP (automatically)

Wareneingang zum Auftrag: Neue Position 0001



Auftrag	1000045	Bewegungsart	101 WE zum Auftrag
Werk	1000 Wien		
Material	A320101215		FEMA. 8.00 MAXIFUSE
Bestandsmaterial			
Bestellt	20.000	ST	
Eingegangen	0		

Menge in

ErfassungsME	20.000	ST	Lagerort	0001	BestArt	
			Charge			


Weitere Informationen

<input checked="" type="checkbox"/> Endlieferung	Anzahl WE-Sch	1	
Abladestelle			
Text			
Buchungskreis	0010	Geschäftsjahr	2007

Beleg 5000000076 gebucht


Time & Action Feedback in SAP (automatically)

Rückmeldung Zeitergebnis erfassen : Istdaten

 Warenbewegungen

Rückmeldung

Auftrag Material FEMA. 8.00 MAXIFUSE

Vorgang Folge STZ.F-Q1, WQ 33, mit Maschinenleder... 

Arbeitsplatz /


Untervorgang Meilenstein Fortschrittsrückmeldung

Satzart Start Rüsten

Teilrückmeld. Endrückmeld.

Istdaten

Personalnummer Ztauswnr Huber Franz

Start Rüsten  :01:11

Arbeitsplatz Werk montage

Buchungsdatum

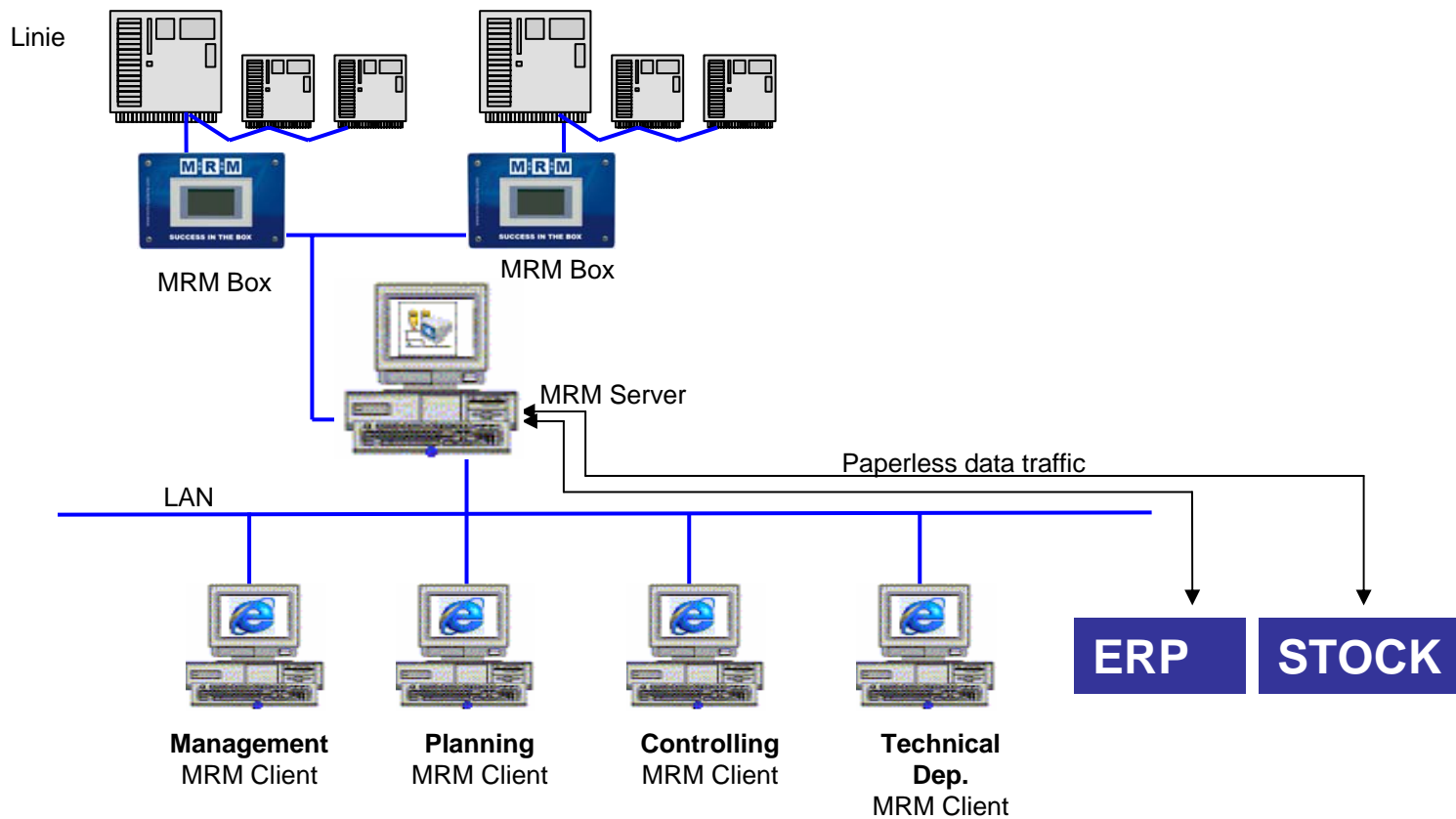
Abw.Ursache

Rückmeldetext Langtext vorh.

MRM[®] Current Customers



MRM[©] Konzept



MRM[®] Contact Greece



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