

# Computer Integrated Manufacturing Activity and Reporting System (CIMARS)

## Project Background

Manufacturing Product Lines require an effective on-line monitoring system for

- Automated Machine & Conveyor Performance Tracking
- QA Purposes
- Production Control Purposes
- Maintenance Purposes
- Trouble Shooting Purposes
- Data Logging Purposes
- Tool Usage & Maintenance Tracking
- Up Time / Down Time Monitoring

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## Objective

To design an Interfacing system to Communicate all the data from Automated Manufacturing System

- From machine to Auto Link Controller (ALC)
- Front Operator Console (OC)
- From Progression Status Display

Interfacing Software

- Software driver to capture data from machine
- ALC and OC Interface Driver
- Software Driver to transmit data to centralize data server

Installation, Set-Up & Commissioning

- Machine Integration Controller
- Interfacing, Integration & Wiring

## What is CIMARS ?

CIMARS is a Computer Integrated manufacturing Activity and Reporting System encompassing

- Open platform standard
- Modular using Open standards
- Internet Accessible worldwide

User Friendly Interface

- Customizable
- Flexible

Object oriented approach

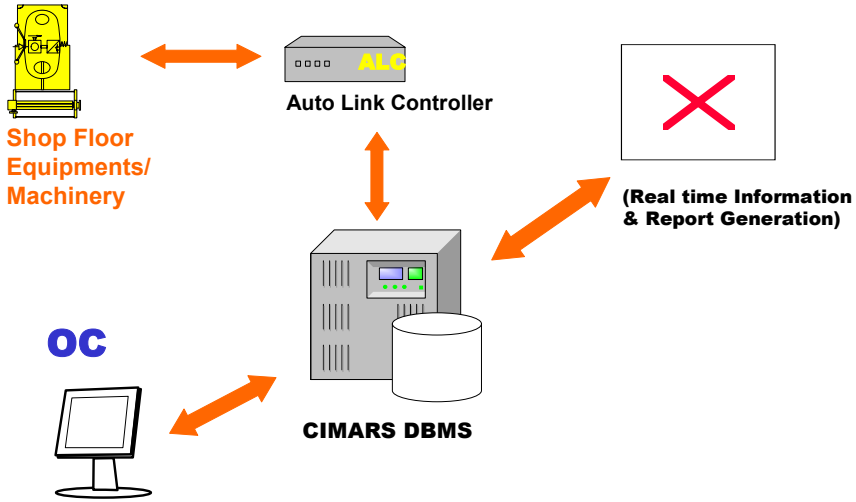
- Scalable Grow with the business
- Easily maintainable Modular Systems

Multi-level security

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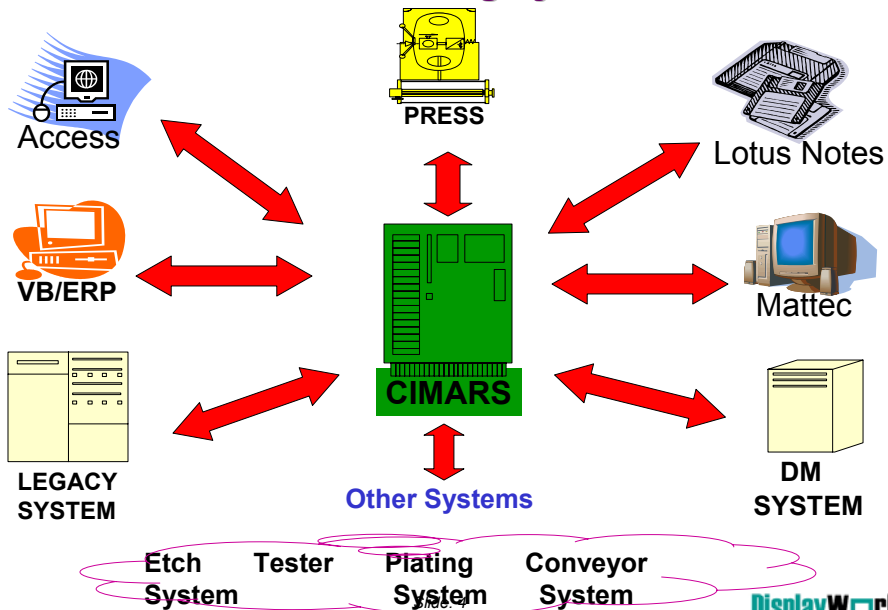
# CIMARS – Logical Modules



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# CIMARS Integration to the various Manufacturing System



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### **CIMARS Information Extraction Capability**

UPH

Raw UPH

Yielded UPH can be trended for comparison and decision making

MTBA

Low MTBA => lead to maintenance requirement

MTBF

MTTR

CPK

On going process capability tracking

Track by machine basis

Useful to compare machine capability

Triggering PM

### **CIMARS Information Output Presentation Capability**

TRENDING

Output / day trending

Scrap / day trending

Cpk

CONTROL CHARTING

USL

LSL

STATUS CHARTING WITH LOGGING

Pareto Charting, X-Y Plots, Tables

Local Data Storage for monthly, quarterly etc.

MACHINE PERFORMANCE PARAMETERS

Raw machine/tester/stroke speed

Tester, Press, Conveyor output quantity

Cumulative yield, throughput, process cycle time

Equipment utilization, downtime, QA

Equipment failure mode, frequency, response time, waiting time, etc

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### **CIMARS – Information Handling With Automated PUSH / PULL and Programmable Trigger Capability**

Data can be **PULLED** from the system ...Or... **PUSHED**  
by the system

#### **PULL SYSTEM - User Initiated**

User logs in to request for

- Real time system information
- Historical data plot, table, display, print
- Request system to generate periodic reports, and defines type of report

#### **PUSH SYSTEM - System Initiated**

Event triggered - System initiates transfer of information to user when

- Low yield, excessive down time, Machine speed/parameter incorrect, etc
- Urgent Information can be pushed to User via email, Pager, SMS, recorded voice information (option of stopping Press)

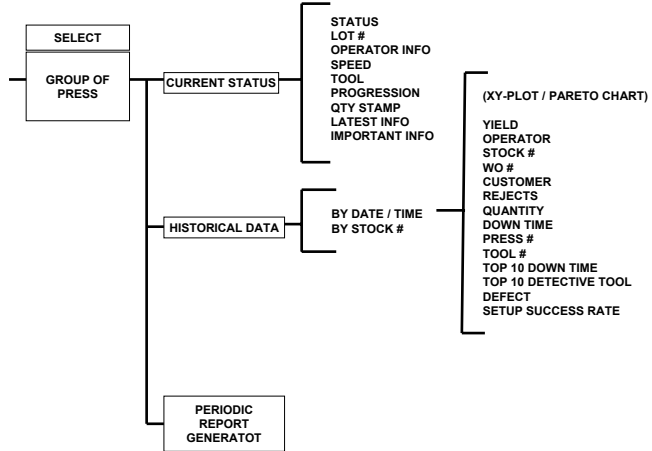
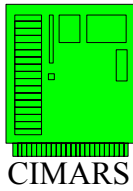
Real time continuous process monitoring via

- Shop floor display (Annunciation) system, score boards, etc

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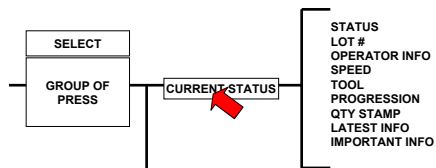
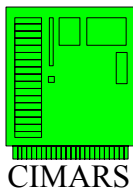
## CIMARS Information Report Generation Capabilities



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## CIMARS Information Report Generation Capabilities

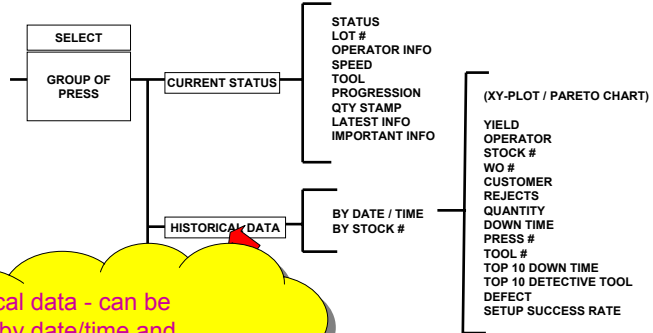
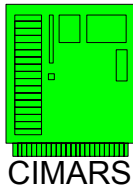


Current Status -Real time report generation can be viewed over the Eternet ..worldwide

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## CIMARS Information Report Generation Capabilities

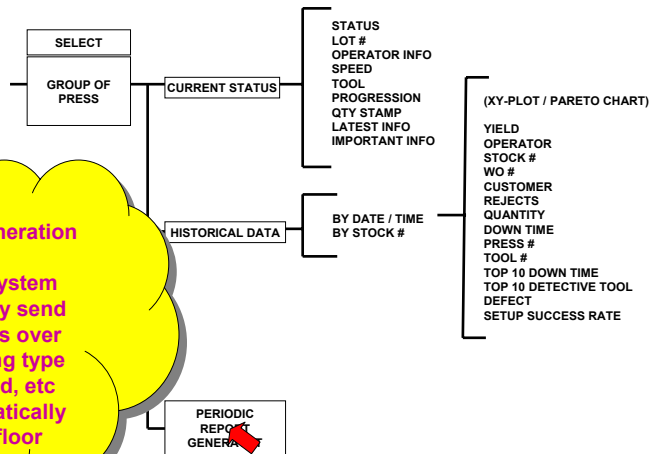
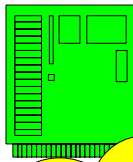


Historical data - can be sorted by date/time and displayed via X-Y Plot, Pareto, Tables, exported to worksheets, etc.

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## CIMARS Information Report Generation Capabilities



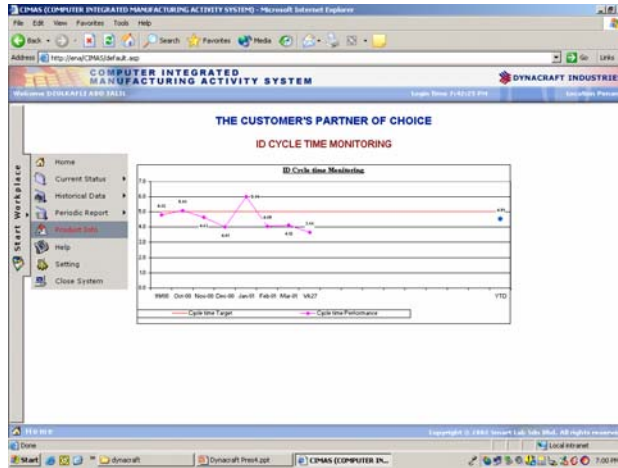
### Periodic Report Generation

- 1) User request system to automatically send periodic reports over email, by setting type of report, period, etc
- 2) System automatically updates Shop floor display Score-Board

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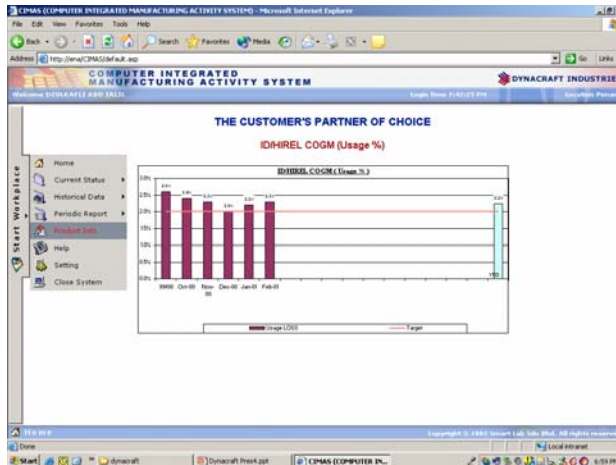
## CIMARS Information Report Generation Capabilities - Line Charts



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## CIMARS Information Report Generation Capabilities - Bar Chars



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## CIMARS Information Report Generation Capabilities

	Sept 00	Oct 00	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Ww 27
	1616S1	1616S1	1616S1	1616S1	1616S1	1616S1	1616S1	1616S1
ACC YLD	96.1	96.7	103.3	97.2	0.0	0.0	96.6	
ST ACC YLD	84.9	90.8	92.6	93.4	0.0	0.0	84.6	91.7
CC YLD	90.6	94.8	97.4	98.1	85.7	0.0	97.4	
LD	75.8	80.0	75.4	93.5	100.0	0.0	95.0	91.7
Problem Data	65.6	66.6	70.2	83.3	0.0	0.0	83.5	
Help	52.4	59.2	64.3	81.4	0.0	0.0	79.0	
Setting	720	1456	3413	3833	1020	0	2139	72
Close System	716	1456	3408	3824	1020	0	2132	72
DA-WB LED	4	0	5	8	0	0	7	0
QTY IN	1831	5561	3702	3193	0	0	3036	
QTY OUT	1863	5087	3613	3095	0	0	2962	
SCRAP	168	474	189	159	0	0	173	0
BONUS	79	290	313	70	13	0	127	
MATERIAL	0.5	0.2	0.2	0.1	0.0	0.0	0.6	
DA RELATED	1.5	1.3	0.6	0.3	0.0	0.0	0.4	
I B DRI ATEN	9.8	9.4	1.7	0.6	0.0	0.0	1.4	

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## CIMARS Information Report Generation Capabilities - Tables (Which can be exported)

ID	Oct 00	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Apr 01	May 01	Jun 01	Jul 01	Aug 01	Sep 01	Total	YTD
FG	0	0	0	0	0	0	0	0	0	0	0	0	2160	2160
CMYS													2048	2048
CMOS													2000	2000
IN													97.7%	97.7%
OUT													2504	2504
YIELD													2562	2562
4E													98.6%	98.6%
IN													94	2651
OUT													84	2482
YIELD													89.4%	93.6%
FT													877287	877287
IN													148132	163718
OUT													110803	134988
YIELD													160033	160033
CMOS													918899	918899
IN													161810	162320
OUT													160890	172862
YIELD													115157	137265
4E													165441	165441
IN													99.3%	99.3%
OUT													99.4%	99.4%
YIELD													99.2%	99.2%
FT													99.3%	99.3%
IN													113824	135442
OUT													116005	168863
YIELD													175284	134766
FT													138037	154069
IN													108883	138037
OUT													104663	134118
YIELD													160035	160035
FT													97.0%	97.0%
IN													96.6%	96.6%
OUT													103105	108883
YIELD													148786	178719
FT													96.1%	96.1%
IN													96.6%	96.6%
OUT													80012	80012
YIELD													96.1%	96.1%

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## CIMARS Information Report Generation Capabilities - Graphical User Interface

**INFORMATION SELECTION MENU**  
SELECT PRESS OR INFORMATION ( SELECT AT LEAST ONE )

**Start Workplace**

- Home
- Current Status
- Historical Data
- Periodic Report
- Product Info
- Help
- Setting
- Close System

**Information Selection Grid:**

3 N	3 S	19 N	4 S	28 N	3 L	19 N
4 L					4 X	24 S
3 U					1	1
3 N	9 L	11 S	15 L	17 S	21 S	

**Legend:**

- RUN: Green
- TROUBLESHOOT: Yellow
- ASSEMBLY: Red
- SET UP: Blue

**Status:** Date: 8 August 2002 Time: 6:11:43 PM  
User: Edward Furlong  
Urgent message: Please inspect lot A03456

**Buttons:** SELECT ALL, UNSELECT ALL, NEXT

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## CIMARS Information Report Data Sorting Capabilities

**HISTORICAL DATA**

Review the information from the selected machine.  
FILTER BY: DATE - TIME

You can choose what type of graph you want to view by clicking the button below:

1. Bar Graph    2. Pie Chart

**XY PLOT CRITERIA**  
X - DATE  
Y - QUANTITY

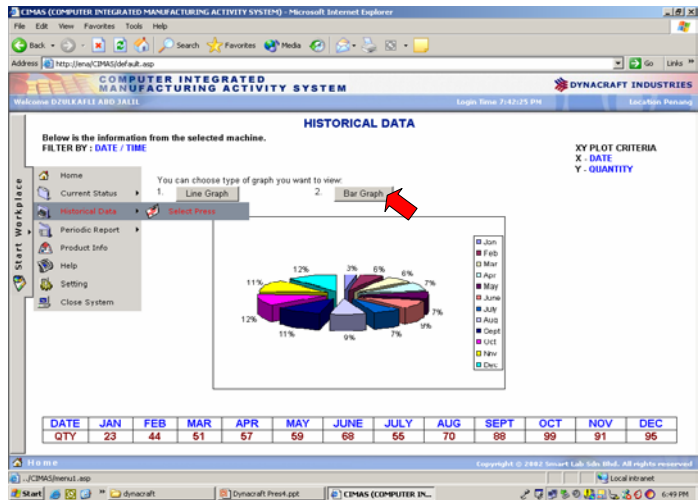
**Quantity vs. Date Graph:**

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
QTY	23	41	51	57	59	68	55	70	88	99	91	95

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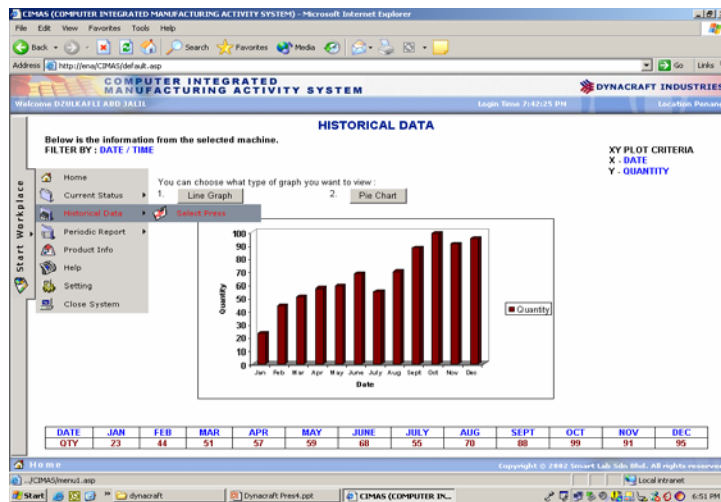
# CIMARS Information Report Data Sorting Capabilities - Pareto Presentation



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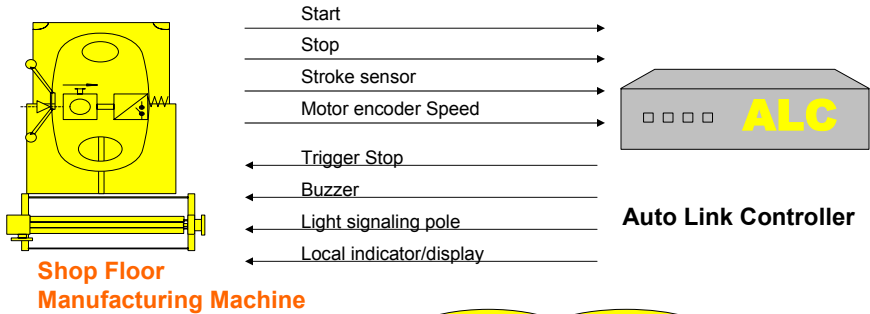
# CIMARS Information Report Data Sorting Capabilities - Bar Chart Presentation



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## CIMARS-Physical Interface (Signal Information between Stamping Press to ALC)

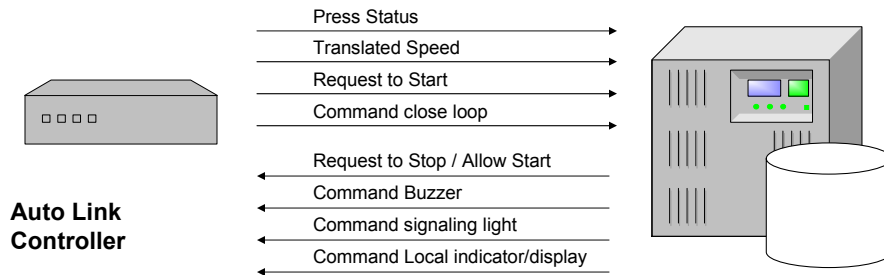


### ADVANTAGES :

- Remote monitoring of Manufacturing Machine
- Remote controlling of Machine (allow running / stopping)
- Close loop signal control (status of Machine)

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## CIMARS - Information Flow (Auto Link and DBMS) for Poka Yoke



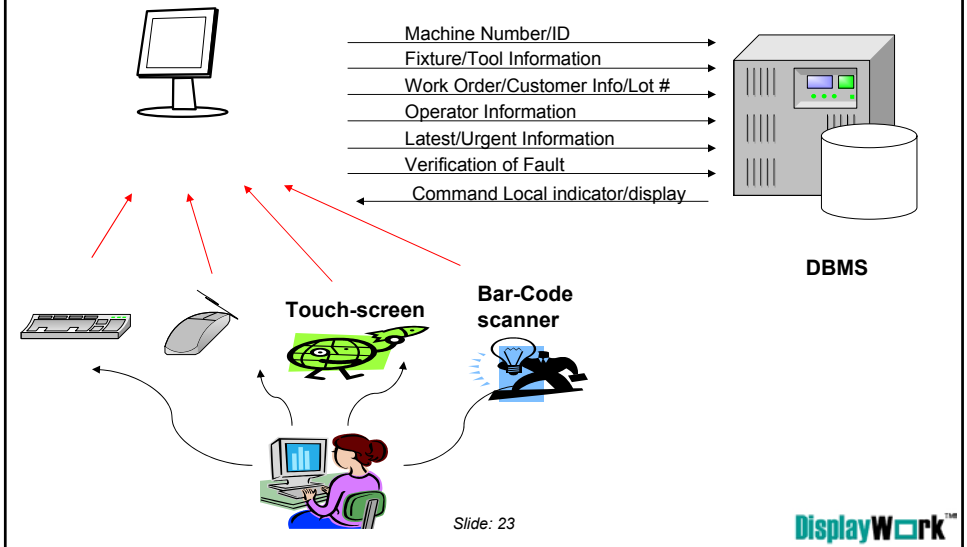
### ADVANTAGES :

- Poka-Yoke operation  
eg check & verify if Recipe/Tool used matches  
Machine, Customer, Stock #, Orders
- Automatically STOP/ALLOW press  
operation & alert operator / supervisor

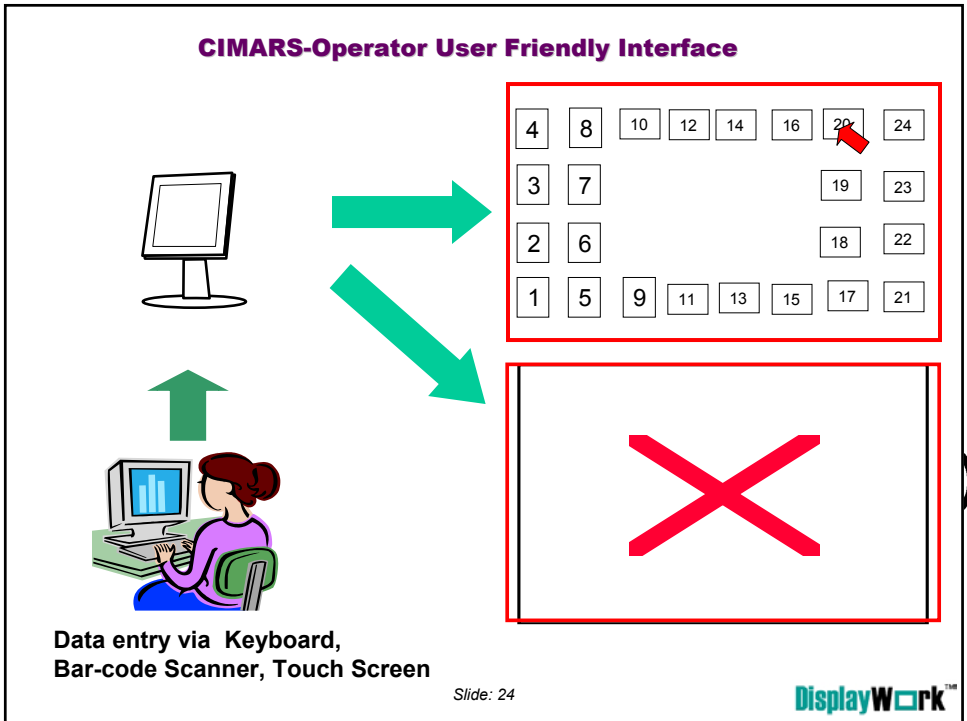
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### CIMARS - Information Flow Diagram (Operator Console and DBMS Modules)

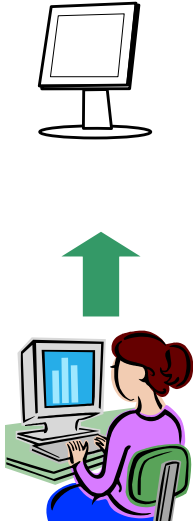


### CIMARS-Operator User Friendly Interface



Operator

## CIMARS-Operator User Friendly Interface



### ADVANTAGES :

#### - USER FRIENDLY

Graphical User Interface for operator information entry

- Options for Bar-code Scanner & Touch Screen

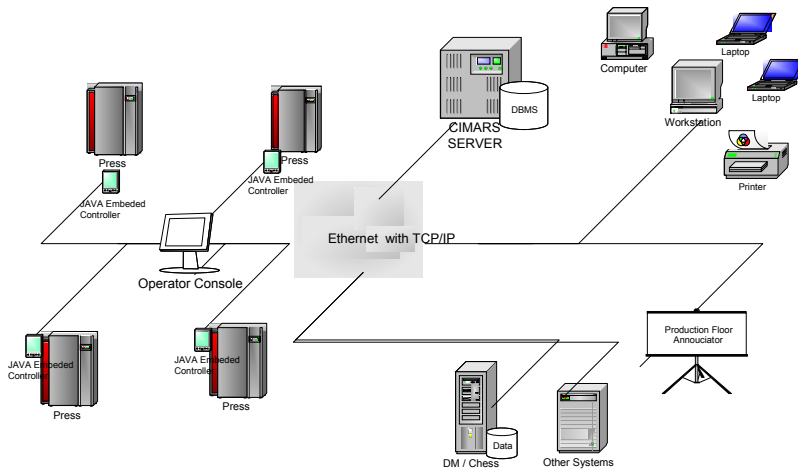
REDUCES error in operator entry

Data entry via Keyboard,  
Bar-code Scanner, Touch Screen

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## Proposed System Infrastructure



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operator

## **In Conclusion..**

**CIMARS** a system which is

User Friendly

Flexible

Scalable

Customizable

Maintainable

Internet Accessible

Multi-level security

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