BARR ASSOCIATES, INC.

RELATIONSHIPS THROUGH TECHNICAL COMPETENCE AND INTEGRITY

Using Assessments To Drive Change

Frank Pochopin | Quality Assurance Manager | October 2009

Who we are:

- **Barr Associates is a thin- film optical coating manufacturer with its headquarters located in Westford, MA.**
  - **Founded in 1971, privately owned with an unmatched heritage in the optical filter industry.**
  - **Approx. 300 employees**
  - **4 facilities with 110,000 ft² (11,800m²)**
  - **70+ coating deposition systems**
  - **Wavelength capabilities from 150 to 40,000nm**
  - **Provide optical filter solutions for virtually all key markets and applications**

What Do We Do?

Develop processes, devise systems and deploy facilities to provide customized optical coating solutions which aid our customers in bringing products with superior performance to their marketplace

Core Technology – Thin Film Coating

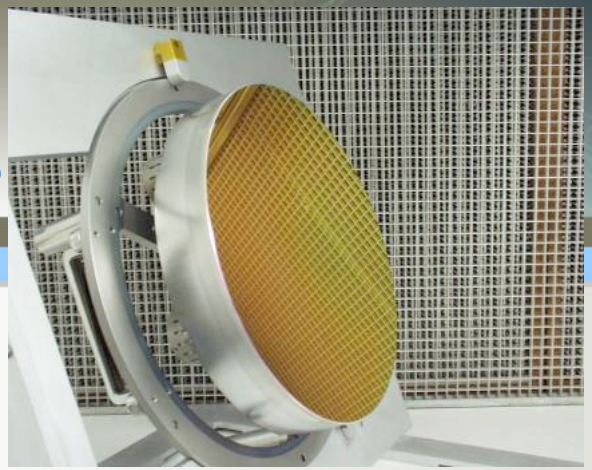
- Thermal Evaporation
- Ion Assisted Deposition (IAD)
- Magnetron Sputtering
- Ion Beam Sputtering (IBS)

Specialty

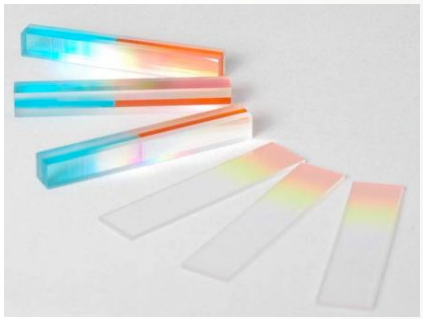
- Over a broad spectral range (150 to 40,000nm)
- To a diverse market
- Optimized for customer performance requirements

BARR ASSOCIATES, INC.

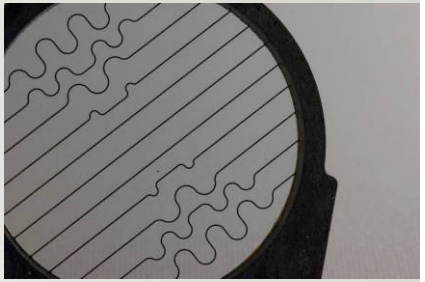
Filter & Coating Types



- Narrow Bands
- Edge Filters
- Notches
- Beam Splitters
- Reflectors
- Conductive-Transparent Coatings



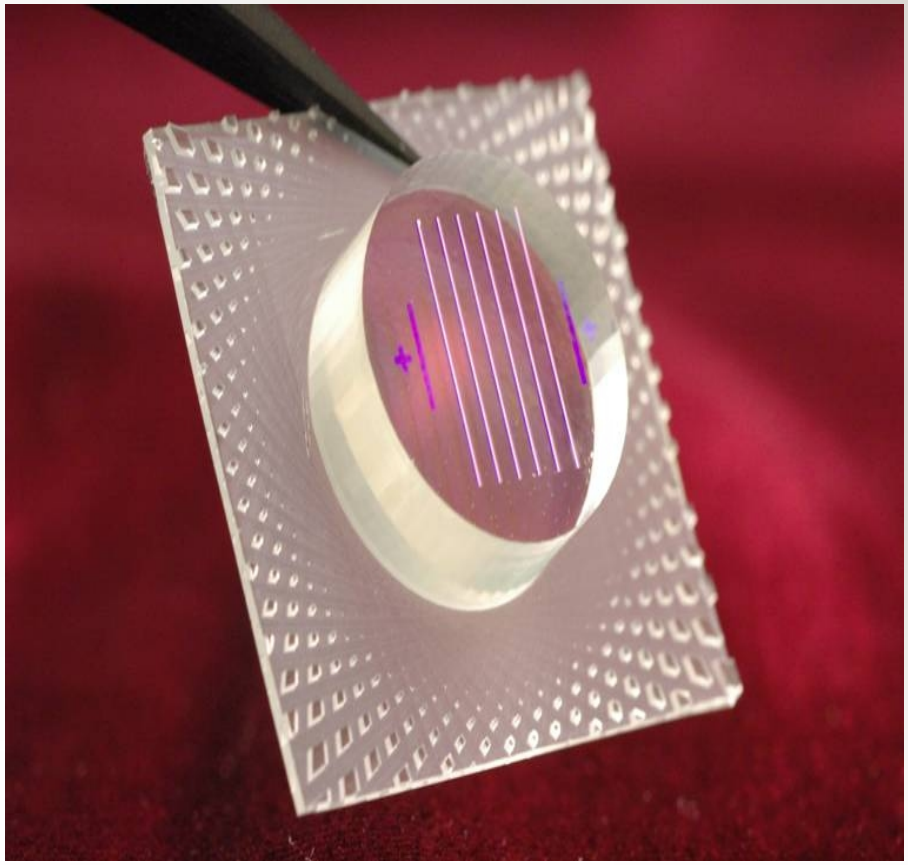
- AR Coatings
- Dark Mirrors
- Arrays
- Gain Flatteners
- Linear Variable Coatings



BARR ASSOCIATES, INC.

Other Unique Capabilities

- Rugate filter design and deposition
- Micro assemblies
- Photolithography
- Stress-controlled coating deposition
- Linear variable filters
- Transparent conductive coatings



BARR ASSOCIATES, INC.

BARR *Inside Hubble*

Advanced Camera SM3B (2001)

Features
- Image Quality
- UV-NIR

Types
- Linear Variable Arrays
- Single Element

Barr's Contribution
- Goddard SFC 34 of 42

STIS SM2 (1999)

VUV Patterned Reflectors
Ball Aerospace 8

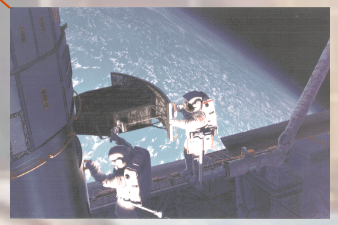
WFPC 2–SM1 (1992)

Features
- Image Quality
- Narrow Band
- UV-SWIR

Types
- Discreet
- Linear Variable Array

Barr's Contribution
- JPL **33 of 48**

WFPC 3-SM4 (Pending)



Features
- Image Quality
- UV-NIR

Types
- Discreet
- Arrays

Barr's Contribution
- Goddard SPC **38 of 47**
- JPL **14 of 14**

Heritage

4 Service Missions
(1992 – Present)

Breadth

4 Instruments
7 Subsystems
127 Filters & Coatings

Relationship

3 Customers
JPL
Ball Aerospace
Goddard SPC

It all started…

- I would like to tell you a story
  - It begins with we had an assessment
    - And the assessment progressed over several days and many wondrous things were seen
    - But when all was said and done the assessment did not end with
  - Happily ever after

BARR ASSOCIATES, INC.

Typical Reaction:

I HAVE TO ANSWER HOW MANY CARs!!!

BARR ASSOCIATES, INC.

A new way of reacting:

- A
  a

A CAR generated by an assessment

(just like nonconforming product that needs a RMA)

like

means we failed to satisfy the customer, we need to fix the problem, and we need to take steps to satisfy the customer and ensure we do a better job next time.

Assessments are a **tool for measuring** how well we are *meeting or exceeding our customers' expectations*

BARR ASSOCIATES, INC.

A mentor once told me

“ the true measure of a company

should not be gauged solely on what they do right…

but more importantly on how they react when something goes wrong ”

Our *'something'* was a tough assessment

- In Sept 2008 NASA performed an assessment of our systems
  - The positives:
    - Barr Associates management showed strong involvement in the audit and a clear commitment to understand concerns and make change.
    - Barr Associates from an intellectual and technical standpoint literally sets the bar in many areas in the thin-film coating industry.
  - The challenges:
    - 17 major corrective actions, with multiple points to each, and a large number of observations.
    - One of the representative's summarized the audit by characterizing Barr as a university environment with a large number of exceptional grad students micro managing their individual projects with no cohesive system tying it all together.

BARR ASSOCIATES, INC.

The findings included:

- The documentation system was an unmanaged patchwork of locally stored hardcopy documents.
- Hand written records in many cases were inconsistently maintained and locally stored with no clear mechanism for control.
- Engineering development, release, and configuration management varied from engineer to engineer.
- Contract Review did not exist at most levels.
- No consolidated business system existed to control flow of product realization, execution of daily tasks was accomplished using localized excel, and access spreadsheets.
- Quality was interpreted as inspection of product with little review of data/metrics for trending, preventive, or corrective action.
- If safety and cleanliness are next to godliness we were certainly not headed in the right direction.

BARR ASSOCIATES, INC.

How we reacted:

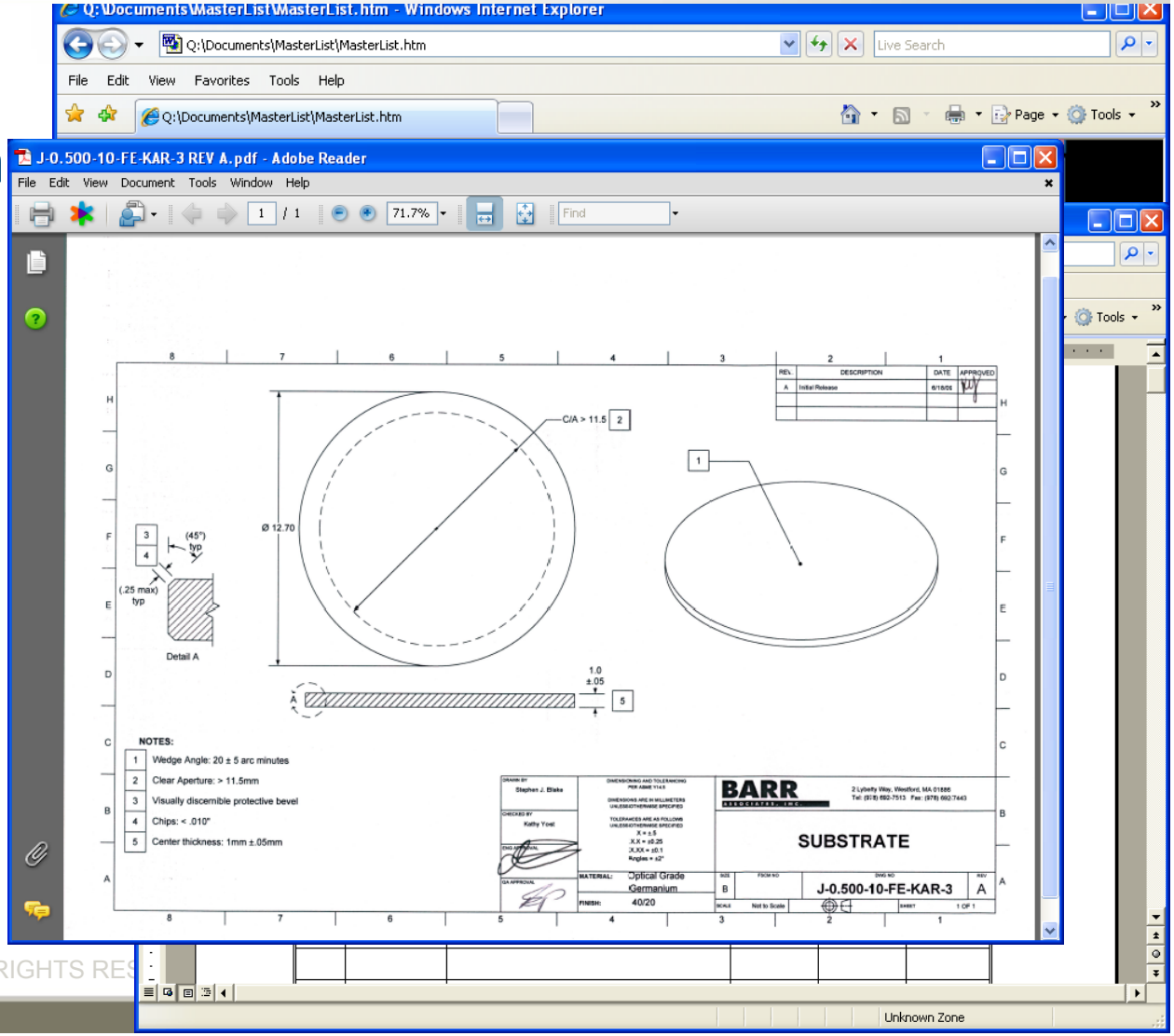
- Instead of being **frustrated** about having to answer the CARs…
  - 1st We committed ourselves, as a team, to using those CARs, (through the way we responded to them) as a tool to satisfy our customer and grow our business.
    - not by doing the bare minimum but by going above and beyond.
  - 2nd To ensure that this would be a sustained activity rather than a directed fix, Barr Associates decided to pursue

AS9100 Certification

BARR ASSOCIATES, INC.

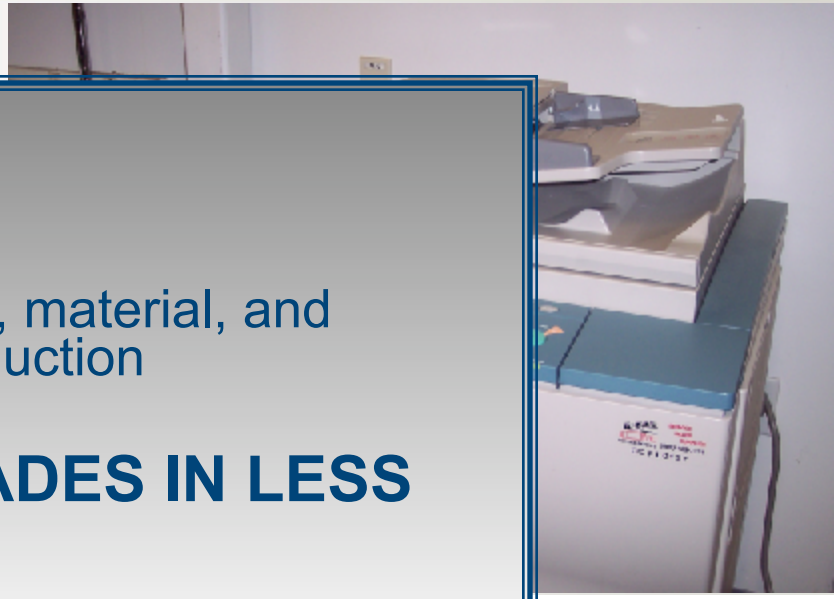
Our journey begins: Doc Control

- Selected documents open in new windows with associated documents and forms hyperlinked to each other



Record storage

- Examples of records we store.
  - Pro
  - Cor
  - Cal
  - Ray
  - FAI



- **THE SAVINGS**
  - In file handling, searching, material, and external storage costs reduction
- **PAID FOR THE UPGRADES IN LESS THAN 6 MONTHS**

- With the records stored electronically we now spend minutes vs. hours when we need to look up information.

BARR ASSOCIATES, INC.

Contract Review

- A full contract review and order acknowledgement process was developed and implemented.
  - We actively involve representatives from Account Management, Engineering, Legal, Security, Production, Quality and the customer

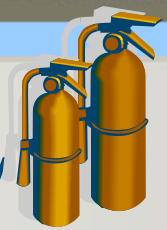
In reality though it made us better…

Now we catch issues proactively instead of reactively which saves more time than the actual contract review takes.

- We now identify and invoice things that we previously missed; costing us money.
- We have a better understanding of our capabilities.
- We have improved our on-time delivery.

BARR ASSOCIATES, INC.

Safety and Cleanliness



We
audits t

- We hav
  - Seve
  - Seve
    impro
  - Train
- We have implemented a FOD program

- **THE RESULTS**
- The Sept 2008 audit
  - Yielded over 80 safety violations
  - Housekeeping and FOD were wide spread issues
- Last month we had our NASA follow-up assessment

THERE WERE NO FINDINGS

FOR SAFETY

CLEANLINESS OR FOD

BARR ASSOCIATES, INC.

ERP System

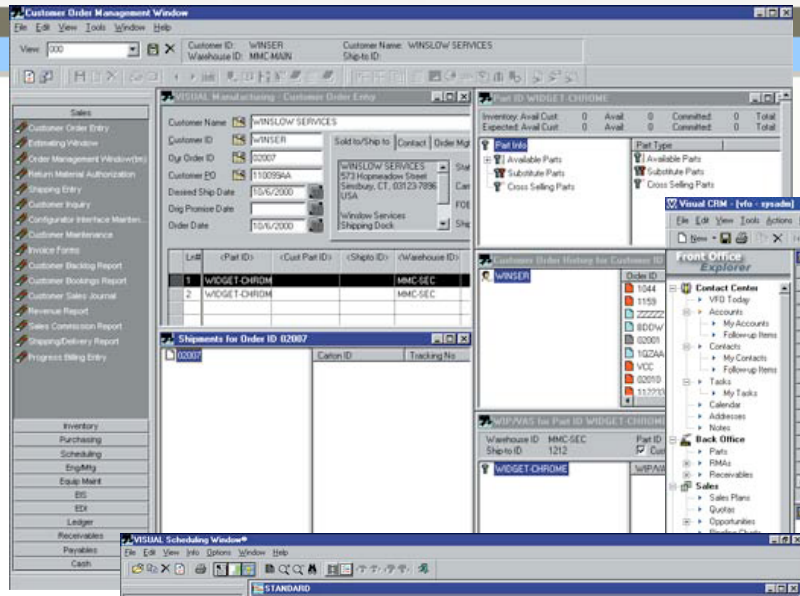
- We realized that we needed a tool to cohesively bring together and integrate the functions of the various organizations within the company and to ensure a consistent process based approach to product realization.

That tool would take the form of a full ERP System with advanced quality, CRM, and dashboard modules.

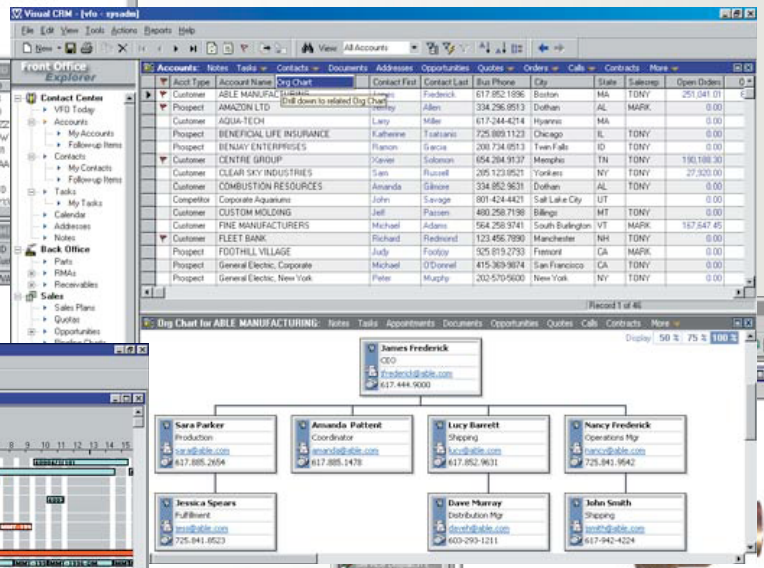
In January 2009 we purchased

VISUAL ENTERPRISE

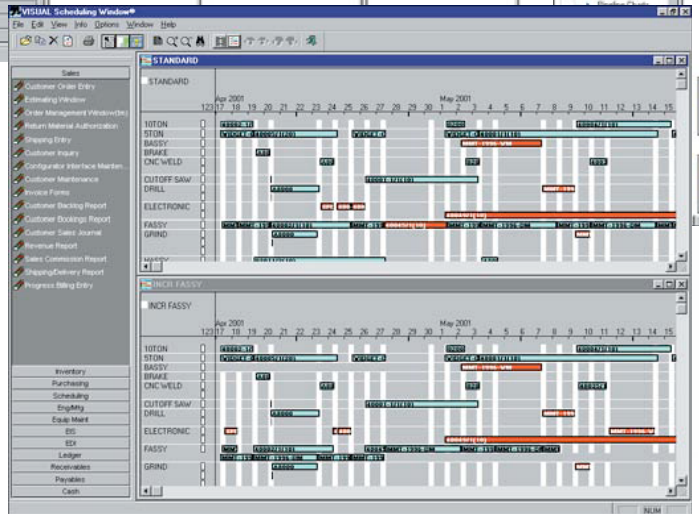
In just over 8 months we were able to research, identify, purchase, configure, implement, train, and go live.



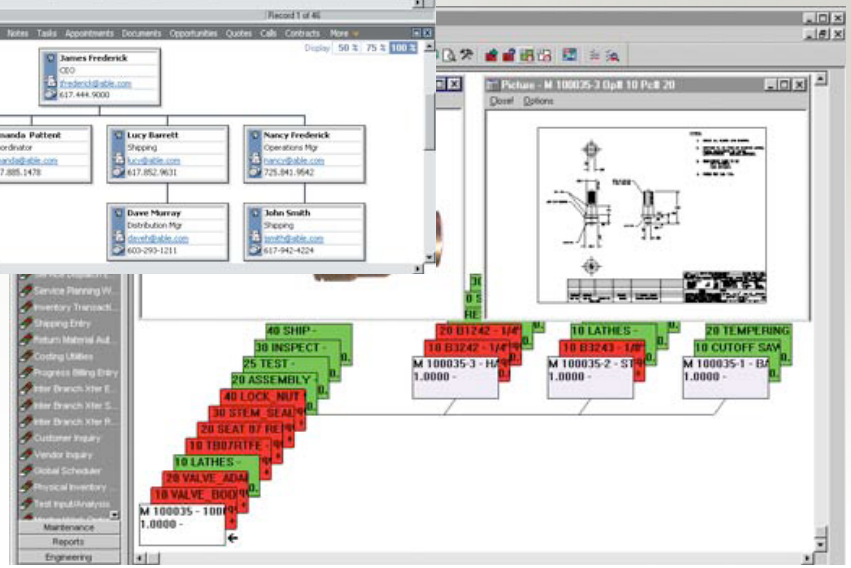
Order management



Contact center and customer relations module

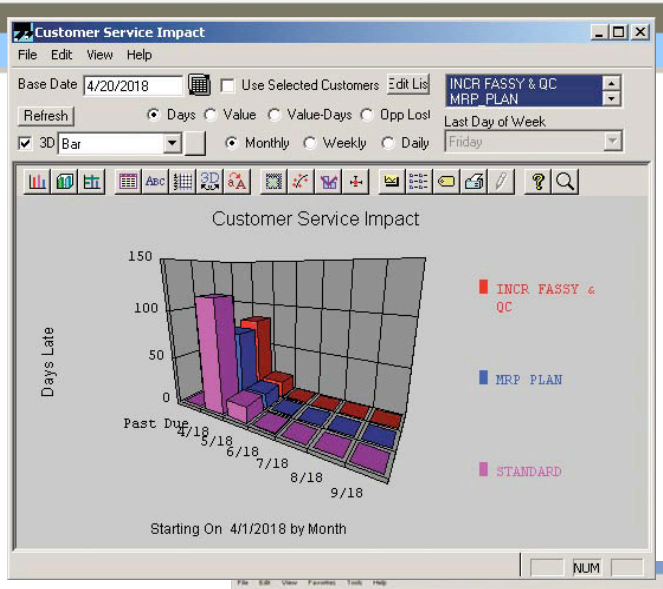


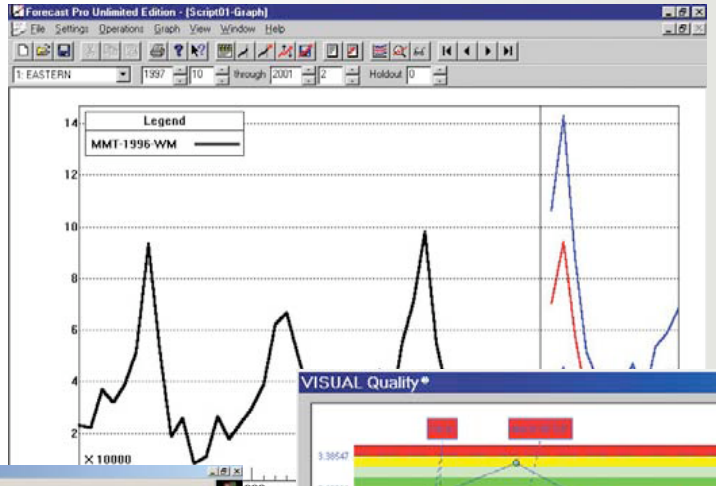
Concurrent Scheduling

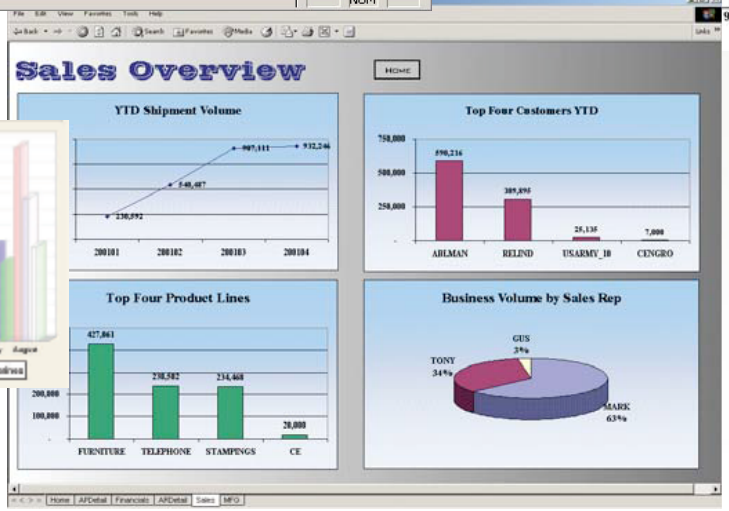


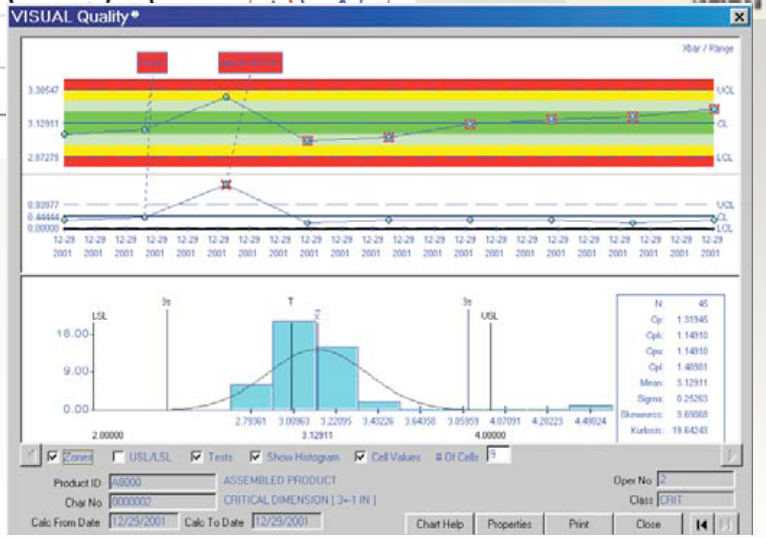
Manufacturing and cost accounting

Now data, graphs, and trends are at our fingertips.









BARR ASSOCIATES, INC.

ERP Benefits

- Standardized production work order travelers
- Bar code stations for paperless workflow tracking
- Electronic inspection and test data collection
- ECO controlled engineering repository for products and processes that integrates engineering masters, instructions, and work orders on the manufacturing floor
- Automatic gathering and trending of key metrics
- Complete schedule and capacity modeling to drive on-time delivery
- Accountability
- Foundation for understanding and growth.

BARR ASSOCIATES, INC.

So instead of asking…

I have to answer how many CARs?

GET EXCITED

about the opportunity to show your customer the true measure of what your company can do by taking your assessment and turning it into a tool to sell your companies capabilities.

BARR ASSOCIATES, INC.