IV. Assuring Requirements Accuracy/Completeness

Users never know
what they want.

✪*Checking Importance and Criticality*

- Important capabilities add value
  - reduced cost
  - increased revenue
  - more satisfied customers
- Critical capabilities are necessary for effective delivery of the value

✪*Clarifying Application Capability Quality Requirements*

- Failure to clarify is major source of
  - "not what I expected"
  - "requirements creep"
  - "Cadillac when a VW will do"
- Quality consists of
  - how much
  - how well

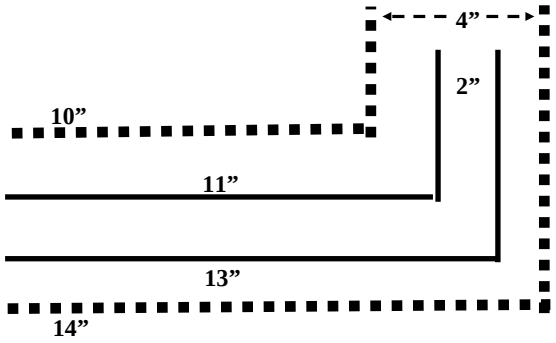
Engineered Deliverable Quality™

How Much	***How Well***		
Deliverable Capability	Minimum	Desirable	Ideal

✪ *Guidelines and Conventions*

- Guidelines
  - suggested, non-mandatory
  - presumably best practice
- Conventions
  - standardized methods and specifications
  - agreed upon ways for everyone to do job
  - reduce learning curve and confusion

An Engineering Truth



The tighter the tolerance, the higher the quality.

Engineers Define Quality in Terms of Tolerances

- For product characteristics
  - Dimensions
  - Physical properties
  - Appearance
  - Functions
  - Performance nature and level
- Measured as either a quantifiable *metric* (variable) or present-absent *attribute*

✪*Engineering Standards Define How to Do a Job* ***Well***

- Tolerances for achieving
  - minimum (good) acceptable quality
  - desirable (better) quality
  - ideal (best) quality
- Criticality if tolerance is not met (defect) or characteristic is omitted
- Defects and seriousness, extent to which causes standard not to be met

Example: Engineering Standard (1 of 3)

Quality Factor: Usability

Usability is the extent to which the human user of a system finds the system convenient and worthwhile to interact with. The procedures to follow must be easy to learn, easy to perform correctly, and difficult to perform incorrectly. The feedback and outputs from the system must be appropriate, understandable, and useful as presented without confusion or excessive additional effort.

STANDARDS:
1. Documentation and training
2. Operating procedures
3. Data entry
4. Outputs
5. Support and assistance

STANDARD: 3. Data Entry

DEFINITION: The individual entering data into the system must be able to do so efficiently and with a high degree of accuracy.

CRITICALITY: MAJOR Overly time-consuming or inaccurate data significantly reduces system effectiveness.

Example: Engineering Standard (2 of 3)

Quality Factor: Usability

STANDARD: 3. Data Entry

MINIMUM:
1. Entry is field-by-field.
2. Each field is discrete and clearly identifiable.
3. Entry is positioned automatically to the beginning of the field.
4. All data fields are submitted to relevant automated editing prior to being relied upon.
5. A means is provided to delete or correct erroneous entries.

TARGET:
1. Each data field is accepted only after passing relevant editing at the time it is entered.
2. Where practical, field values are filled automatically.
3. Data fields are formatted automatically, e.g., right-justify numerics.
4. All data filling, formatting, and interpretations are displayed and can be modified at the time of entry.

IDEAL:
1. Where practical, entry is automated, such as bar-code scanning.
2. Where appropriate, the end-user enters and verifies the data.

Example: Engineering Standard (3 of 3)

Quality Factor: Usability

STANDARD: 3. Data Entry

***DEFECTS MAJOR*:**	1. Field value cannot be entered as operator intends. 2. Incorrect format, range, or other editable value is accepted. 3. Operator cannot tell what value to enter. 4. Entry duration significantly interferes with reasonable workflow.
***MINOR*:**	1. Operator must manually accomplish format or spacing of entered field, e.g., entering fill characters to right-justify a field. 2. Operator must manually position to the beginning of a field. 3. Error messages do not clearly indicate what is wrong. 4. Workflow is clumsy or inefficient. 5. Non-obvious coded values are not displayed back.
***INCIDENTAL*:**	1. Obvious coded values are not displayed back, e.g., M-Male.
TESTS:	1. Observation. 3. Automated capture of input and displays. 2. Operator reports. 4. Usability laboratory hidden videotaping.

✪*Balancing Trade-Offs*

- Identifying requirements conflicts
- Expected benefits of quality level vs.
  - cost, time
  - technical feasibility
  - risk
    - » delivery
    - » operation
- Other requirements due to choices

Working Out Implications

- Paper and pencil or spreadsheet, show examples in action per the business rules
- Determine rules regarding corrections
- Identify historical data archiving and access
- Map to manual procedures
- Anticipate parameters of likely changes
- Review test cases (especially by user)

Prototyping and Simulation

- Prototypes are quick models, often used poorly but religiously (don't question me)
  - value: quick, concrete *feedback* on small pieces
  - not "the requirements," shifts focus to design
  - excuse to leap to code vs. competent analysis
  - "prototypitis," no architecture, hard to maintain
  - GUI vs. guts, false expectations
- Simulate workload/performance

✪ *Requirements Walkthroughs*

- Warning: Premature attempts signal inadequate requirements definition
- Must be based on conceptual design, the *how* which follows the *what*
- Tend to be educational presentations rather than looking for problems

✪ *Joint Application Development (JAD)*

- Facilitated group problem solving
- Involves all stakeholders together
- Builds mutual respect and ownership
- Mainly defining rather than reviewing
- Emphasizes design over requirements
- Illusion of alternative to sound analysis
- Good for high-level, not for detail

✪ *Defining Acceptance Criteria*

- What the customer must see to be satisfied the delivered system works
  - not the requirements
  - how they will tell requirements are met
- Specify
  - functions, volumes, frequencies, workloads
  - quality judgments, responsibilities/guides
  - how and by whom tests are carried out

Representative Acceptance Criteria (1 of 2)

FUNCTIONS

1. Easily enter and print purchase orders.
2. Accept orders for new and existing vendors and new and existing SKUs.
3. Allow easy, foolproof selection of existing data values, e.g., find a vendor's number or SKU.
4. Detail sizes/colors and correctly total by line item and P.O.
5. Adjust open-to-buy with each P.O. issued.
6. Able without going through P.O. entry to inquire and find vendors, SKUs, on-hand and on-order quantities, and open P.O.s.
7. Easily and reliably upload orders/new vendors and download updated/new data with the central computer.
8. Continue to allow central entry of P.O.s and show them in notebook as well as showing notebook P.O.s in central system.
9. Use on-the-road as well as at headquarters.
10. Able with authorization to override open-to-buy restriction.

Representative Acceptance Criteria 2 of 2)

HOW MUCH, HOW FAST, HOW OFTEN

11. Enter and print a P.O. in no more time than it currently takes to write the P.O. manually.
12. Hold all the buyer's data (can be 10,000 SKUs), 250 vendors, and 50 P.O.s per day.
13. Work adequately for all P.O.s of two buyers for a week.
14. Able to skip one or more days' upload and/or download.

HOW WELL

15. Upload and download take less than 15 minutes per day.
16. Is easy to use in opinion of the acceptance testers.
17. Printed P.O.s are acceptable to five representative vendors.
18. More accurate than manual P.O.s--as written and entered into the central computer system.

BY WHOM

19. Will be conducted by two buyers, each of whom has more than one department.

IN WHAT MANNER

20. The test will be run in parallel with manually written P.O.s for a pilot group of buyers.

✪*Matching Against Independent Requirements Definitions*

- Independent “mini definition”
  - 80-20 rule
  - can involve parallel separate analysis
- “Canned” definitions
  - trade literature
  - textbooks
  - product descriptions

*Features of a Typical Purchasing System Package**

- Cut and paste from a word processor or enter text directly
- No limit on amount of P.O. or item text
- Capture P.O. history
- Maintain a complete audit trail of all purchasing transactions
- 2 minutes, just a few keystrokes & clicks to generate a P.O.
- Typical P.O. includes:

P.O. number	Supplier number	Per item ordered	
Order date	Supplier name	Line number	
Buyer's name	Supplier address	Item number	
Dept. number	Supplier contact	Quantity	
Ship to name and address	Supplier phone no.	Description	Page number
Bill to name and address	F.O.B.	Unit of measure	Confirm needed
Authorization	Terms	Taxable	Adjustment
Signature	Ship via	Due date	Tax
Order type	Notes concerning order	Unit price	Page totals
Extended price	Special instructions	Extended price	P.O. totals

* Based on sales literature for *P.O. Writer Plus* from American Tech PO Box 320 Holmdel, NJ 07733-9943

✪*Independent/Expert Validation*

- Must be independent of requirements definition process; can be internal
- Requires subject matter expertise, can be obtained as part of review process
- Review can be strengthened by
  - advance mini-definition of requirements
  - structured approach, inspection topics

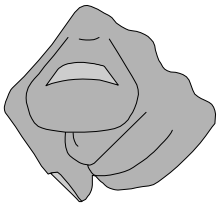
✪ Compare two independent reviews

Exercise: Re-review the requirements.

Measuring "Proof of the Pudding"

- Cost/Benefit analysis
- Design the system
- Requirements problems discovered later
  - development
  - testing
  - training
  - installation
  - production

***YOU** Are Responsible for Your Results!*



- Only ***YOU*** can learn/use the ideas
- ***YOUR*** active interest and openness are essential; "can it work?" not just does it fit your current mold?
- I try to be open too and answer as best I can.
  - If you're not getting what you want, or you're having trouble with *any* aspect of the class, ***YOU*** must act to make me aware while there's time to address your need.
  - That's how you get what you need and I improve.

Holding issues for the evaluations at the end is not appropriate

Objectives

Participants will be able to:

- Identify the importance of and reasons for difficulty testing business requirements
- Apply the CAT-Scan Approach™ to improve testing effectiveness
- Describe 21 methods to test that business requirements are accurate and complete
  - Testing of formats
  - Finding overlooked requirements
  - Evaluating substance/content