



UAB Grand Challenge
To Make Life Better for People

SYSTEMS PROCESS FOR PROJECT SUCCESS

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DEFINITION OF A SYSTEM

A regularly interacting

or

Interdependent

group of items

forming a unified whole

What is a System?

A functionally related group of elements such as:

- The human body regarded as a marvelous functional physiological unit
- A city, country, or the entire human community
- A network of structures and channels, as for communication, travel, or distribution
- A network of related computer software, hardware, and data transmission devices
- An automobile
- The United States Congress
- The Medicare apparatus in the United States
- A Grand Challenge Project

REASONS FOR SYSTEMS APPROACH

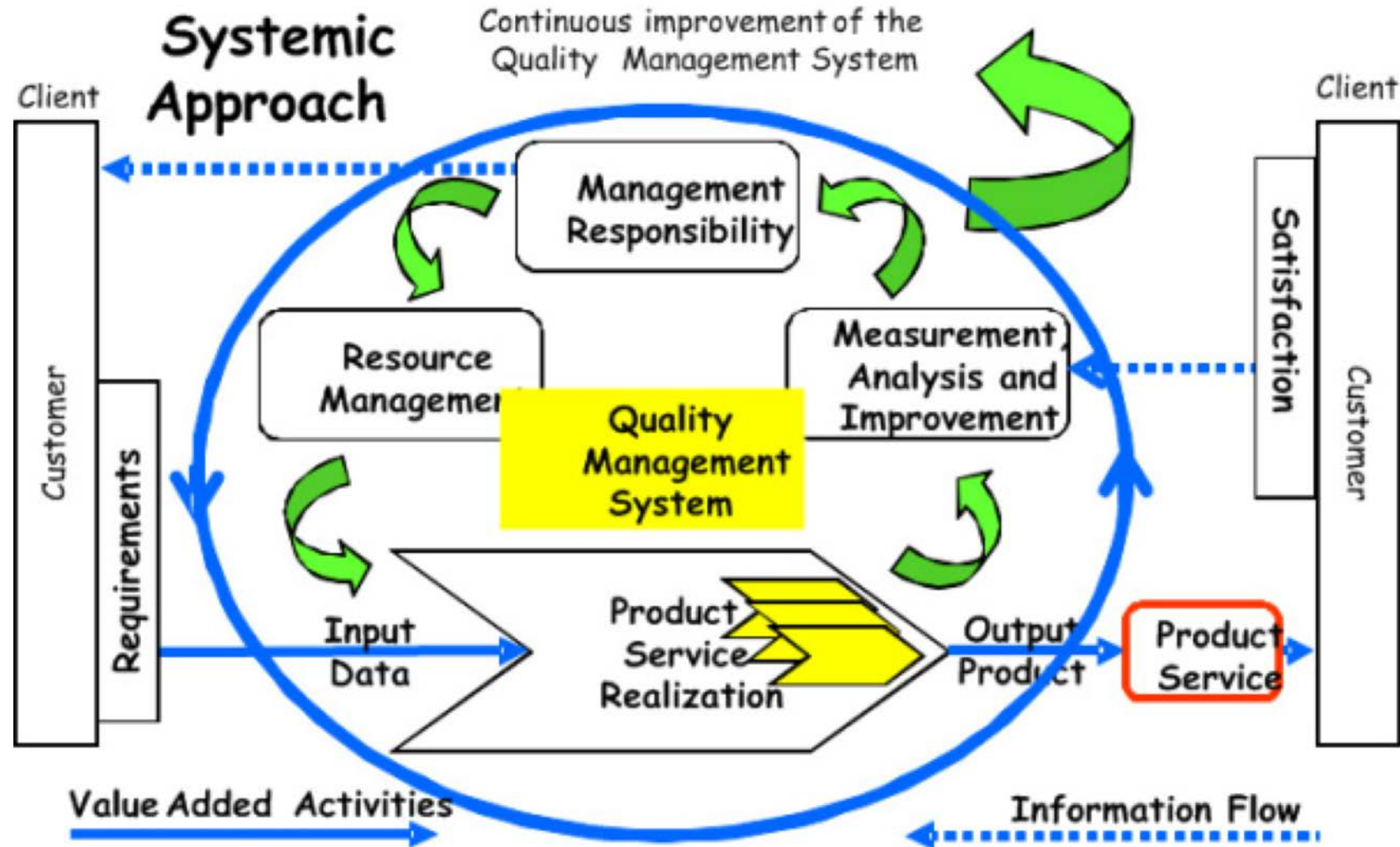


Vasa, Sweden, 1628

- Systems of pieces built by different subsystem groups did not perform system functions
 - Often broke at the interfaces
- Problems emerged and desired properties did not when subsystems designed independently were integrated
- Managers and scientists tended to pay attention to the areas in which they were skilled
- Developed systems were not usable
- Cost overruns, schedule delays, performance problems



Systems Approach



The Importance of Requirements

- Lack of proper requirements are the single biggest cause of project problems.
- 73% of projects are either cancelled or fail due to insufficient requirements.
- 76% of the 500 IT managers surveyed had been involved with failed projects at some point in their careers, and most failures were attributed to changing user requirements
- Requirements define what is to be done, how well and under what constraints - get the requirements wrong and the product will be wrong.
- Requirements drive Cost - Design - Schedules - Skills required - Verification - Operational procedures - *everything*
- *It is amazing how many teams begin to solve a problem before there is agreement on what the problem is.* Requirements and their associated constraints and assumptions quantify the problem to be solved - they establish how project success will be determined.

Good Requirements Are SMART-YPants

- **Specific** -
 - It must address only one aspect of the system design or performance
 - It must be expressed in terms of the need (what and how well), not the solution (how).
- **Measurable** -
 - Performance is expressed objectively and quantitatively
 - E.g., gas mileage of a car.
- **Achievable** -
 - It must be technically achievable at costs considered affordable
 - E.g., speed of a car.
- **Relevant** -
 - It must be appropriate for the level being specified
 - E.g., requirement on the tire pressure should not be specified at the engine level.
- **Time-bound** –
 - Each requirement must be limited over a specified period of time
- **YP** – WhY will the Public care?
 - Buy-in from the institution and public increases the success of meeting the requirements

WITHOUT REQUIREMENTS YOU MAY GET THIS



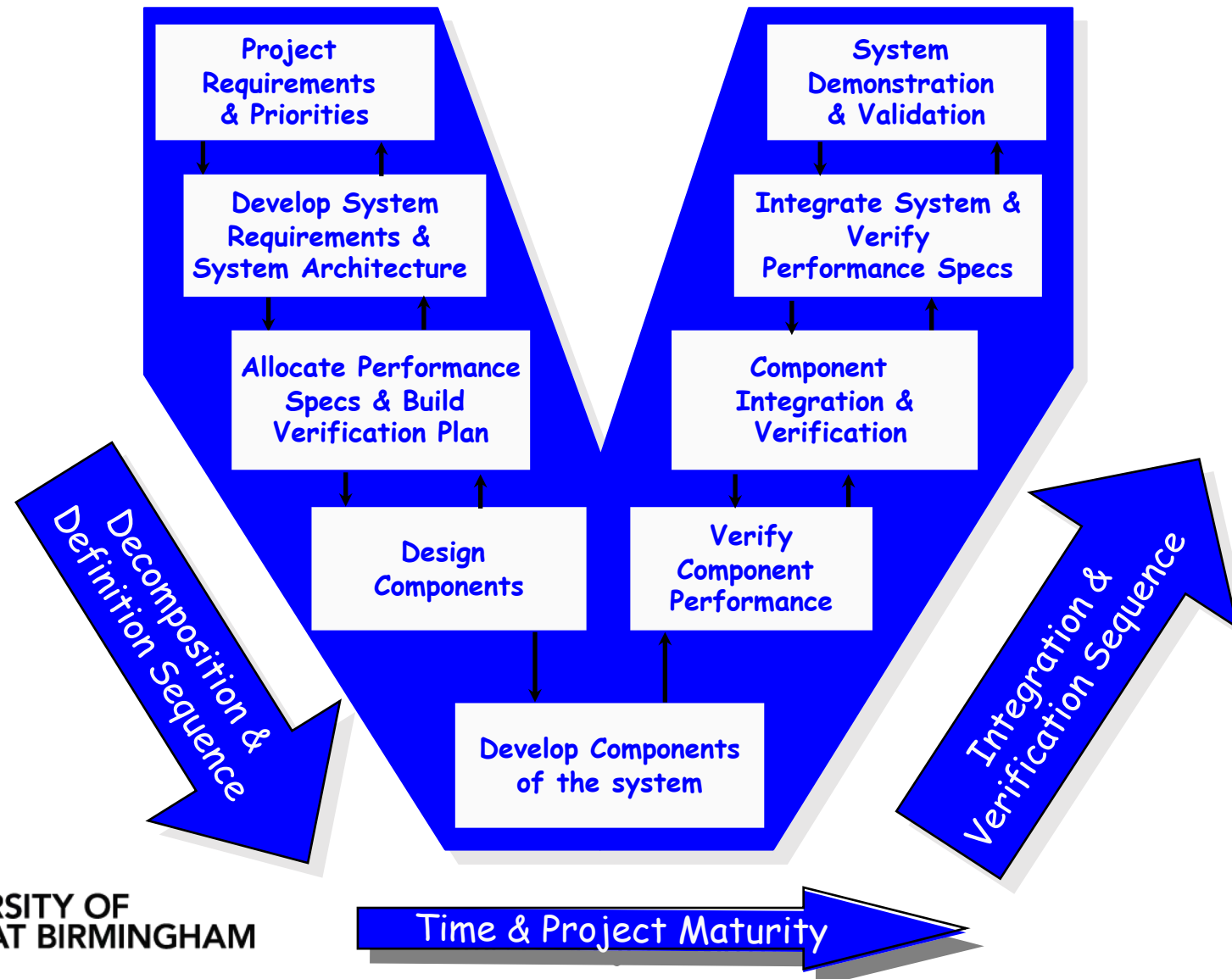
Requirements Validation

- Requirement Validation is the process of confirming the completeness, compatibility and correctness of the requirements.
- Requirement Validation answers the questions: “ Are the system development requirements correctly defined and mean what we intended? “Is the set of requirements, or the specification, self-consistent?”
- When does requirement validation take place?
 - Before design and during detailed design
 - Ideally, completed prior to System Requirements Review
- What is importance of getting requirements validation right early in the project life cycle?
 - So when it comes time to verify the system, you are verifying to the right requirements.

Product Realization Process (Lifecycle)

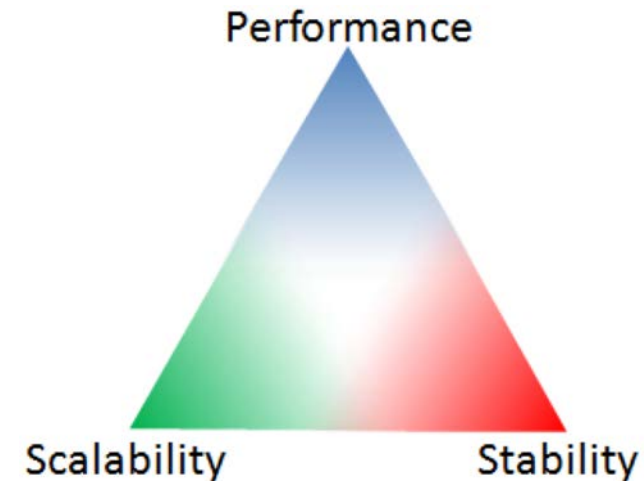
- Idea – (Identification of Need)
- Initial Screening
 - Develop and review Requirements and Existing system Readiness Level
- Scope and Feasibility Evaluation
 - Identify Goals, Objectives, Constraints, Budgets, Schedule
- Concept Formulation
 - Requirements Definition, Preliminary Development and Analysis
- First System Demonstration
 - Breadboard/System Development
 - System Demonstration and Test
- Final Development
- Implementation/Delivery
- End

The Systems Approach 'Vee' Model Extends the Traditional View with Explicit Decomposition and Integration



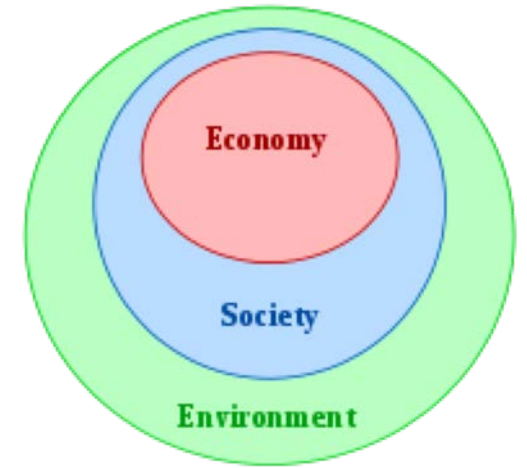
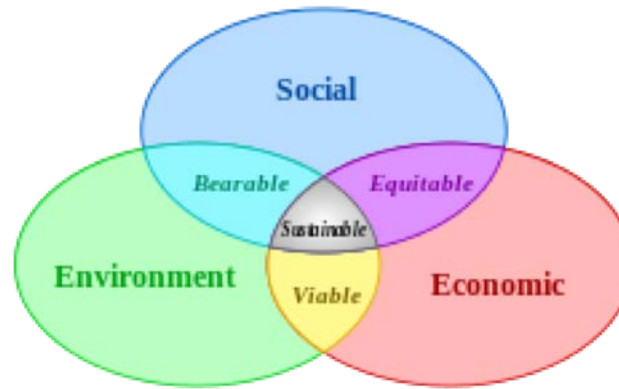
Performance, Scalability, and Stability

- **Performance** is about the time taken to execute tasks. The quicker a task completes, the better the application is performing.
- **Scalability** is about the number of tasks a system can execute at the same time. This usually maps almost directly to the number of concurrent users that an application can support.
- **Stability** is about how many failures an application exhibits; whether that is manifested as unexpected or unintended behavior, users receiving errors, or a catastrophic failure that brings a system down. The fewer failures that are observed the more stable an application is.
- **Poor Performance affects Scalability**
- **Poor Performance affects Stability**
- **Poor Scalability affects Performance**
- **Poor Scalability affects Stability**
- **Poor Stability affects Performance**
- **Poor Stability affects Scalability**



Project Sustainability

- **Sustainability:** The process of maintaining change in a balanced fashion
- Is your project economically sustainable over time?
- Can your project endure changes?
 - Funding
 - Requirements
 - Internal and external forces
 - State and Federal regulations
- Is your project **resilient**?
 - Can it absorb disturbances and still retain its basic structure and viability?
 - Adaptability



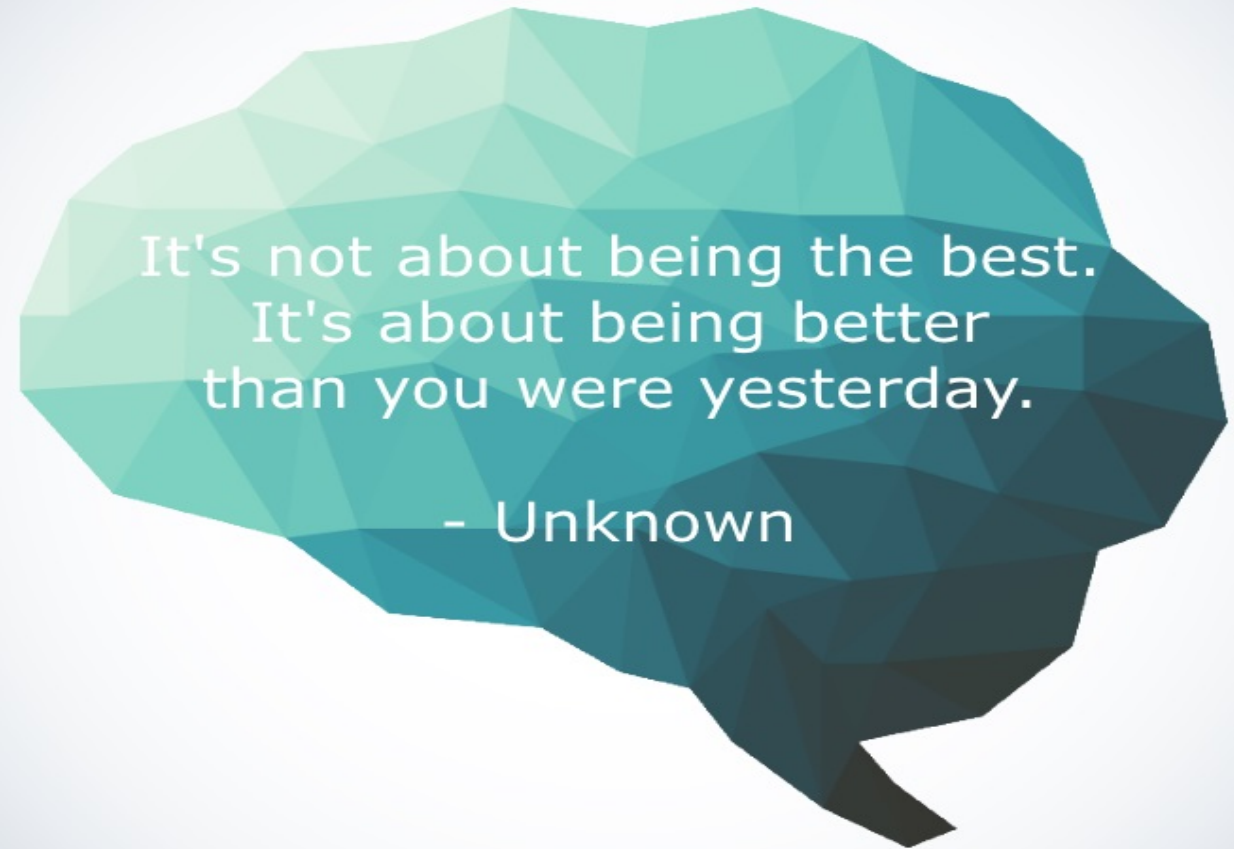
Team Principles

***A major difference between university studies and the work world:
transition from individual work performance to team work performance.***

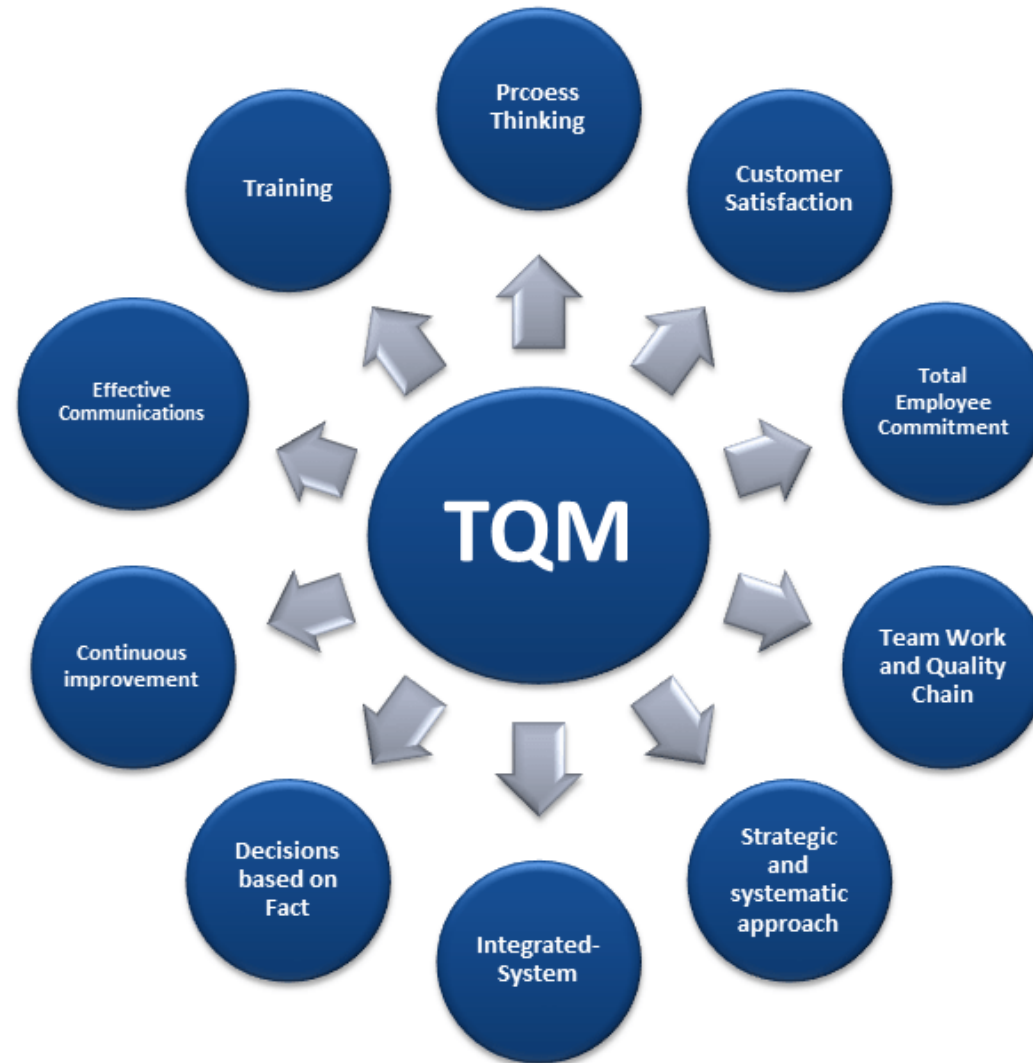
- 1. An atmosphere of professional expectations, trust and mutual respect*
- 2. Staff leadership positions with team players*
- 3. Focus on outcomes*
- 4. Cooperation*
- 5. Healthy teaming that maximizes leverage of the entire venture*
- 6. Vigilance in finding and eliminating 'wasted motion' in pursuit of desired outcomes – Stay lean*
- 7. Team leads must take a 'servant leader' approach.*

Kaizen: Continual Improvement

Japanese word and literally means “good change” (kai = change, zen = good).



TOTAL QUALITY MANAGEMENT



QUESTIONS?