

Applying Validation Techniques Across the System Life Cycle

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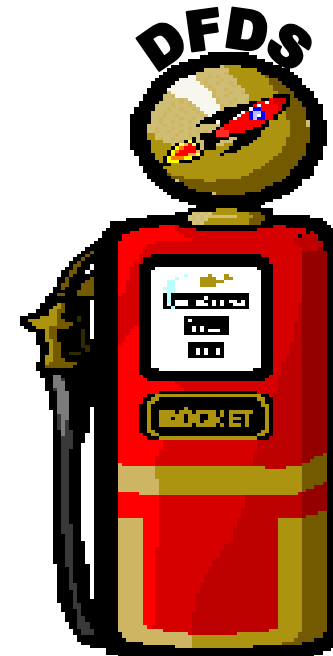
Harris Corporation
Government Communications Systems Division

Did we meet the customer's needs?



- How do you know if your system meets the customer's operational mission?
- The typical Systems Engineering process satisfies the tasks for each of the life-cycle phases, but...
 - Did we build the right product?
 - Do we know what the product does?
 - Do we know how the customer will use the product?
 - Do we know the operational mission of the product?

- Requirements for the Diesel Fuel Dispensing System
 - Design a diesel fuel dispensing system.
 - Include a nozzle length of at least 4 inches.
 - Dispense fuel into a tank that is between 6 inches and 6 feet from ground level.
 - An operator shall be able to dispense fuel
 - The system shall reside at the customer's facility.



Understanding Validation

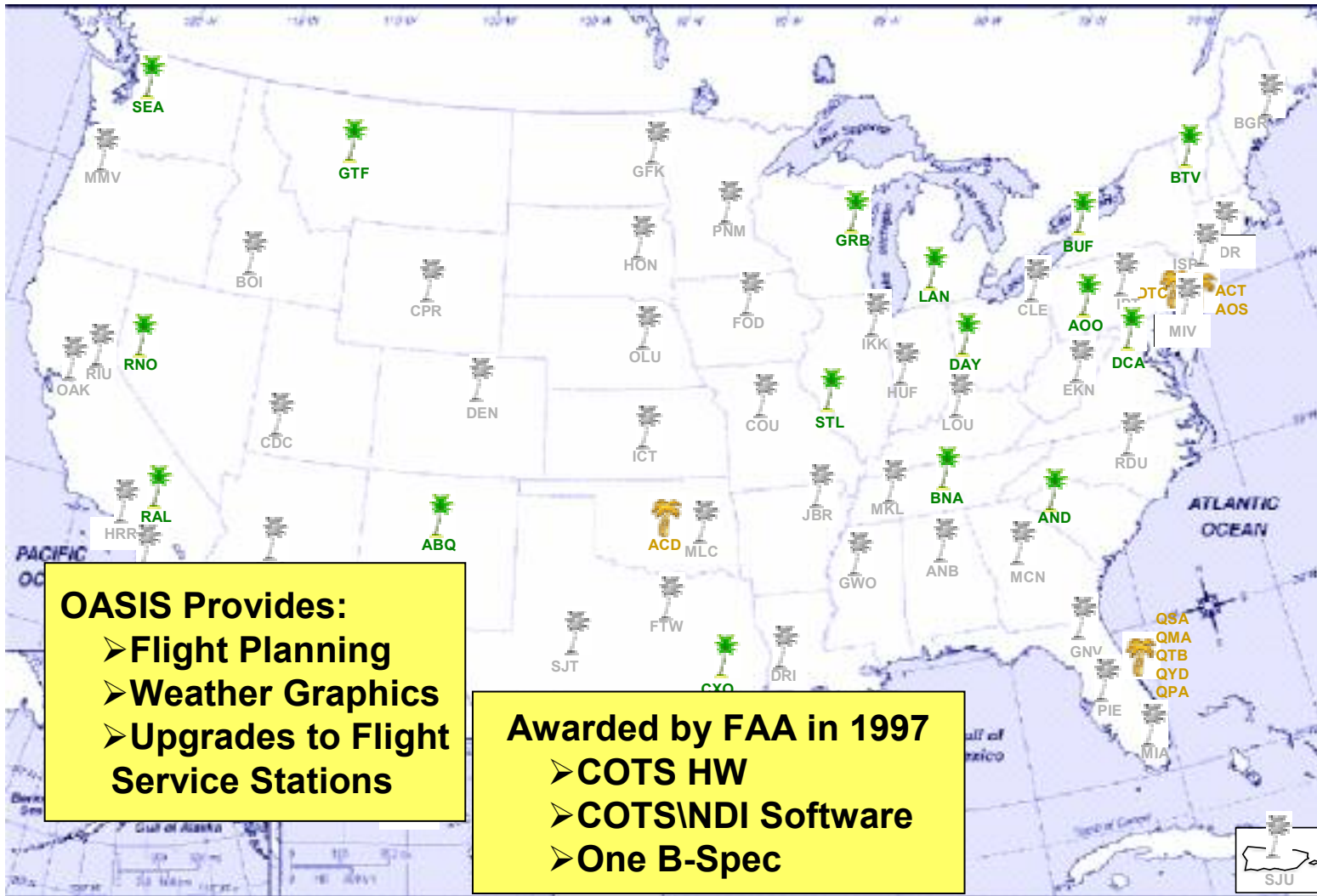



- But, here's what the customer wanted...



- What is the price of delivering a product without proper validation?
 - Reputation
 - Rework
 - Schedule Delays
 - Loss of Follow-on Orders

Operational and Support Implementation System (OASIS)



 Operational (16)
  Support (9)
  Non-OASIS AFSSs (45)

Who Defines the Mission?



- Multiple FAA Customer Interfaces
 - Program Office
 - Requirements Group
 - Security Organization
 - Test and Verification Team
 - National Airspace System Operations
 - Engineering & Installation
 - End Users
 - Flight Service Specialists
 - Flight Service Supervisors
 - Flight Service Maintenance

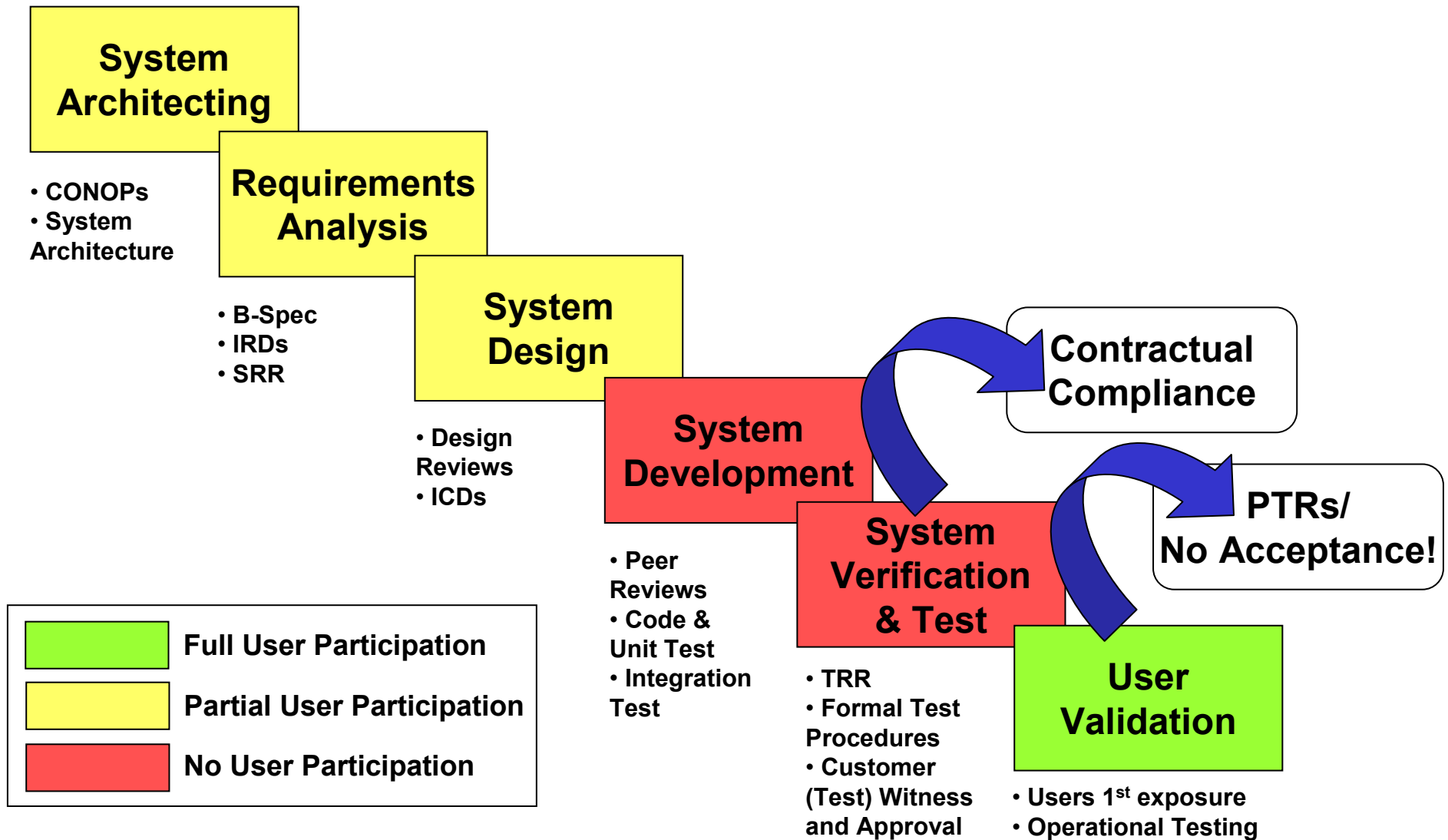


What Happened?



- Original procurement strategy was a COTS/NDI lease service with minimal development.
- Additional Human Factors Team and Functional requirements resulted in increased development and test necessitating a modified COTS/NDI based software solution.

OASIS Life Cycles



- The OASIS Program utilized concepts from the CMMI® Validation Process Area.

“The purpose of Validation is to demonstrate that a product or product component fulfills its intended use when placed in its intended environment.”

- Increased user involvement (and buy-in...) during:
 - **Chalk Talks**
 - Task Description Development and Approval
 - **Technical Exchange Meetings**
 - **User Assessment Tests**

Chalk Talks



- Informal Conduct – free exchange of ideas
- Empowered team of customers
- Defined Stakeholder Matrix
- Issues discussed and resolutions brainstormed
- Results form basis of a Task Description
- Active participation by every stakeholder

Task Descriptions (TDs)



- TD Development included:
 - Background Information
 - Concept of Operations
 - Subsystem Changes
 - Messages
 - User and External Interfaces
 - Implementation Notes
 - Affected Documentation
 - Security Considerations
- Peer Review by all stakeholders
- Stakeholder approval
 - Validates mission, requirements, and high-level design

Technical Exchange Meetings (TEMs)



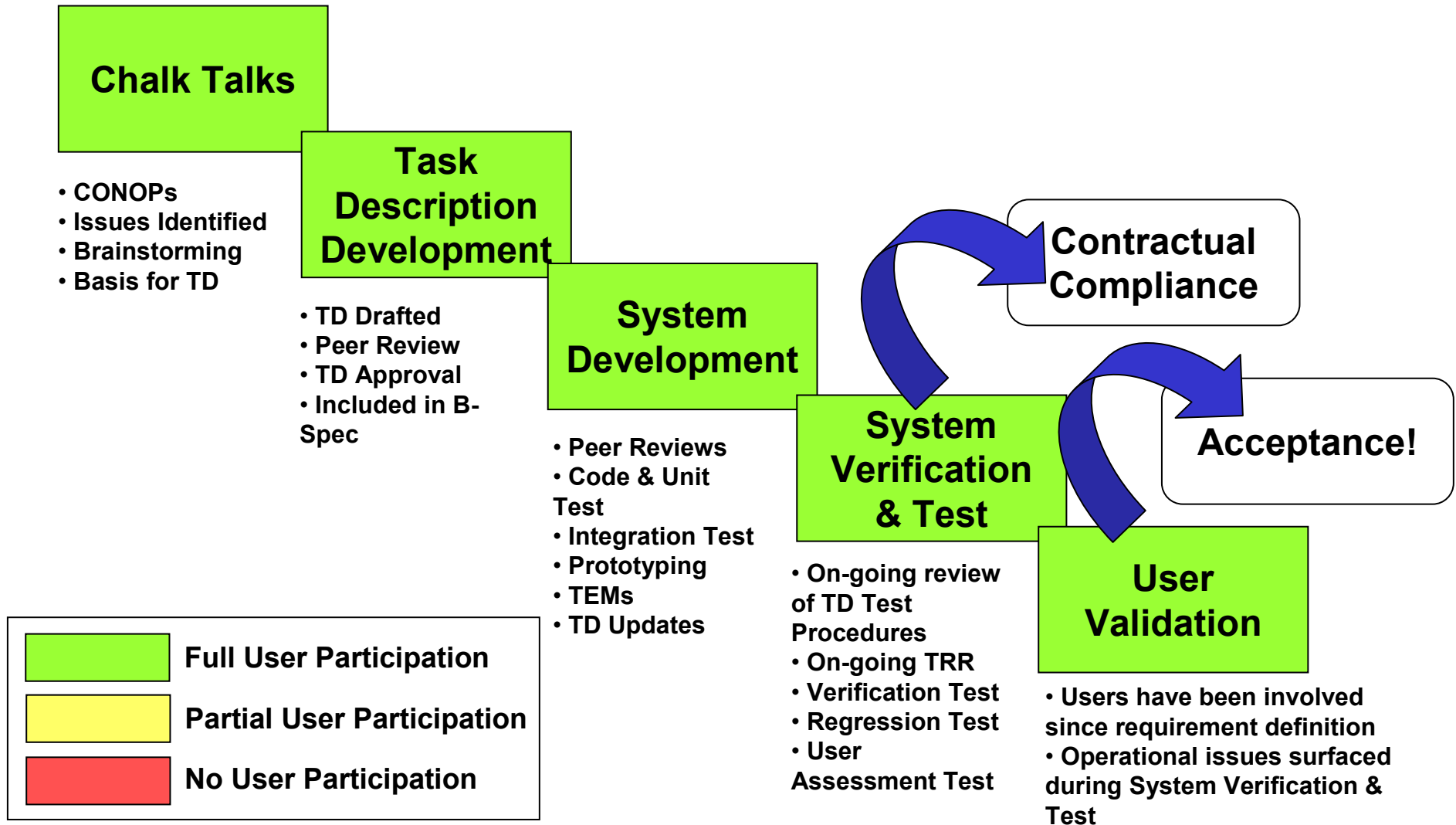
- TEMs held informally throughout development effort
 - Database
 - Hardware
 - Interfaces
 - Test
 - Training
 - Security
- Validating implementation approaches, revisiting:
 - Are we building the right product?
 - Do we know what the product is supposed to do?
 - Do we know how the customer will use the product?
 - Do we know the operational mission of the product?

User Assessment Tests



- Users at development facility – “Hands On”
- Preceded by Verification and Regression Testing held with FAA Test and Verification Team
- Users validate true operational scenarios prior to site installation
- Users granted full access to development staff
 - Reducing requirement interpretation issues

OASIS Program Background



Results



- Reduced cycle time of requirement development to deployment
- User buy-in of end product
 - They were a major part of development team
- Significant reduction in Problem Tracking Reports
- Increased Customer's trust in relationship
- User Acceptance
- Fully operational system, as user expected
 - Currently deployed in 16 Flight Service Stations

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