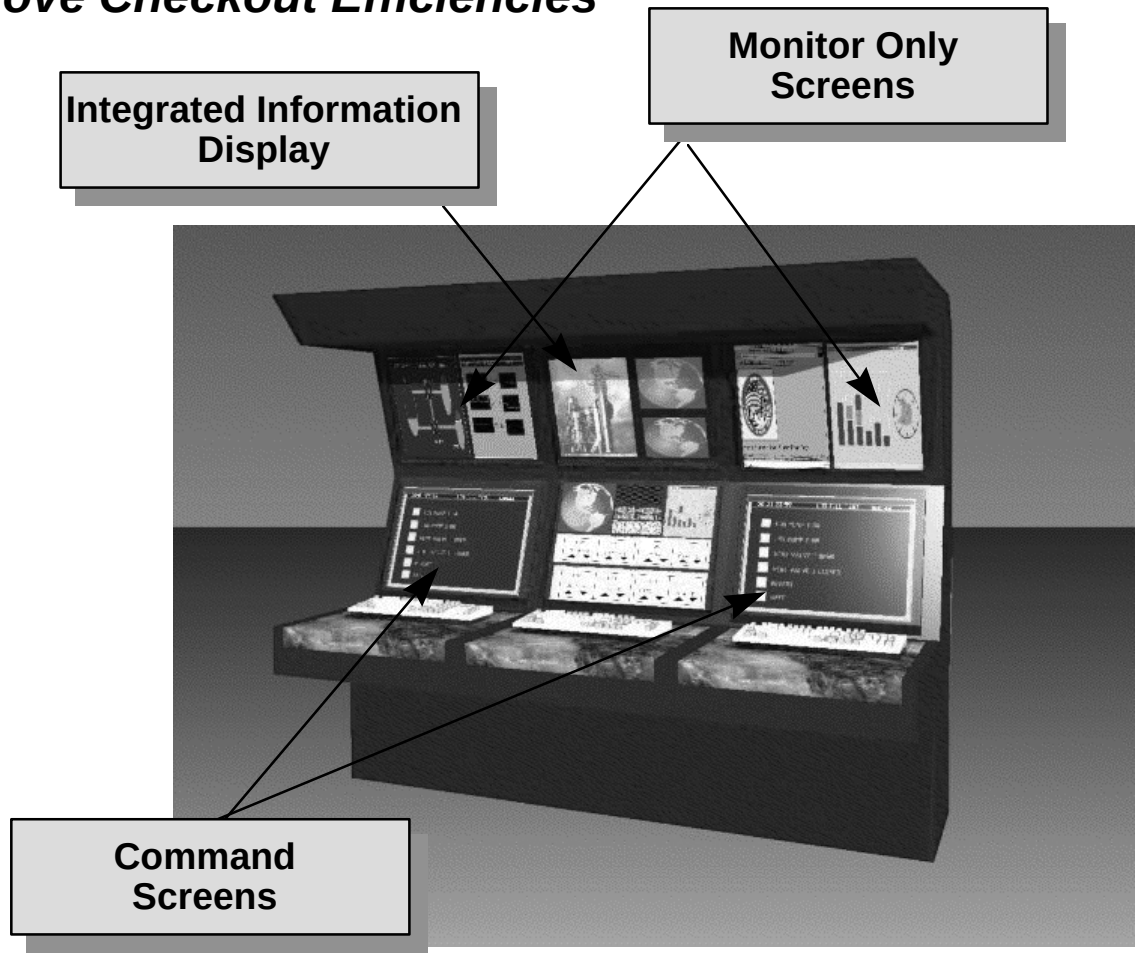
CLCS OPERATIONS CONCEPT

April 23, 1997

Features and Benefits

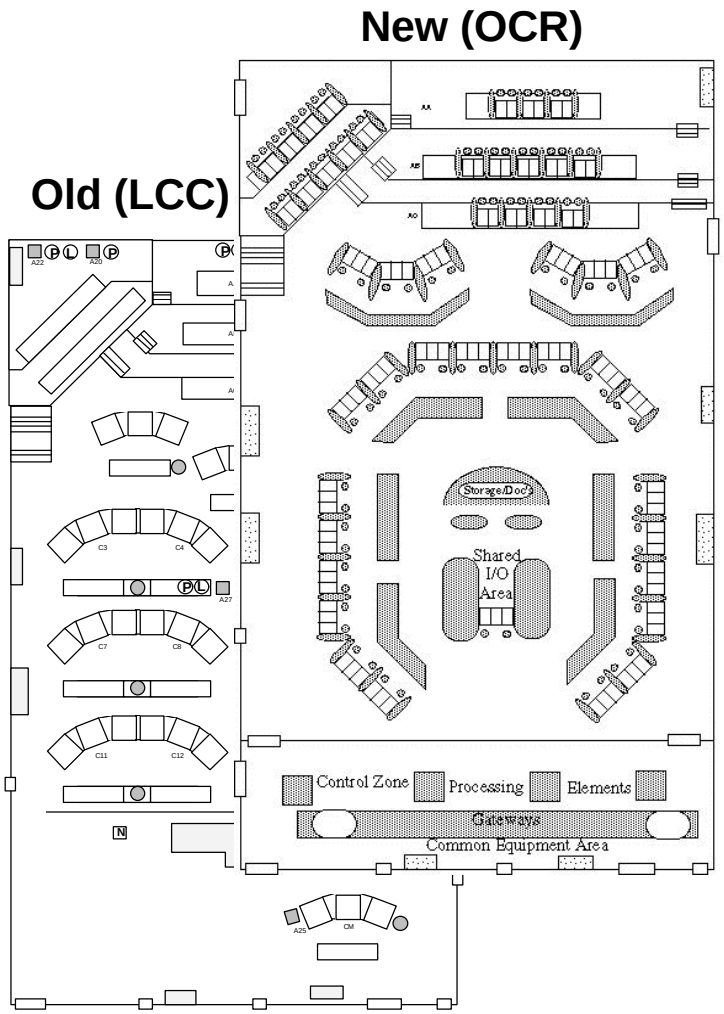
The CLCS Has Redefined the Shuttle Processing Environment in Several Key Areas Which Will Improve Checkout Efficiencies

- **Single Console Babysitting**
  - **Test Engineers Can Monitor & Control Multiple Systems From a Single Seat**
- **Integrated Information Displays**
  - **for OTV, SDC Retrievals, PRACA, SCAN, IWCS, Eng. Data, PSA, DLES, etc.**
- **Separate Command and Monitor Data Functions**
  - **Monitor Data Can be Distributed Freely Without Possibility of Inadvertent Command Issuance or Network Bottlenecks**
  - **Launch Team Members Can View Test, Playback, or Simulated Data in Their Office Environment**



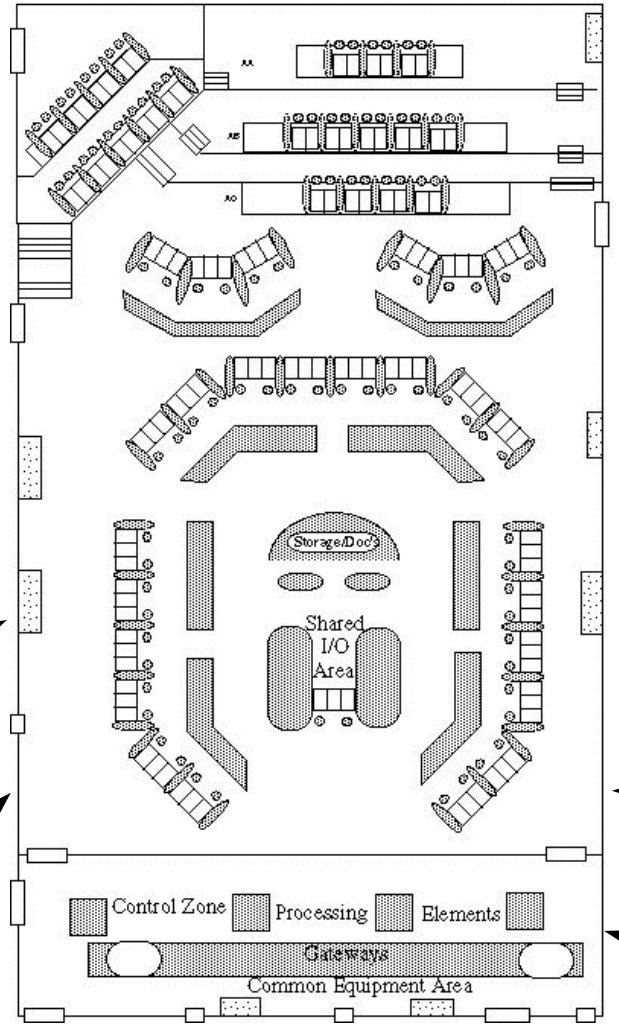
Features and Benefits

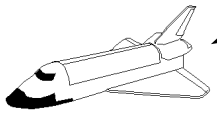
- **Program Compatible Data**
  - **CLCS Uses Data Formats & Protocols Compatible With Other NASA Centers**
  - **Eliminates Duplicate Services Between Centers**
  - **Data Fusion (Transformed Data into Information)**
- **Consolidated Data & Systems**
  - **Data Currently Residing Across Multi Control Room Platforms Will be Integrated via the Shuttle Data Center**
  - **Consolidation of Standalone ADPE Systems Such as PCGOAL, HUMS, PMS, AI Systems**
- **Integrated Complex/Facility Control**
  - **Control of Facility Systems Will be Combined into the Control Rooms**
  - **The CCC Will be Decommissioned**



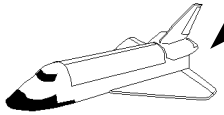
Features and Benefits

- **Multi-Orbiter Control From a Single Control Room**
  - **A Single Control Room Can be Divided into Multiple 'Flow Zones' ; Each Linked to a Different Orbiter**



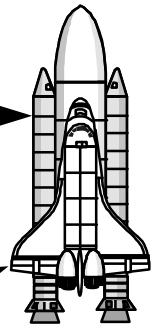


Multiple-Flow (OPF)



- **Local Commanding Operations**
  - **The System Will Allow Commanding From Specific Controlled Areas as Enabled by Test Conductors**
  - **Subsystem Retest Can be Performed Locally at the Test Item With Minimal Control Room Support**

Integrated Vehicle



Local OPS

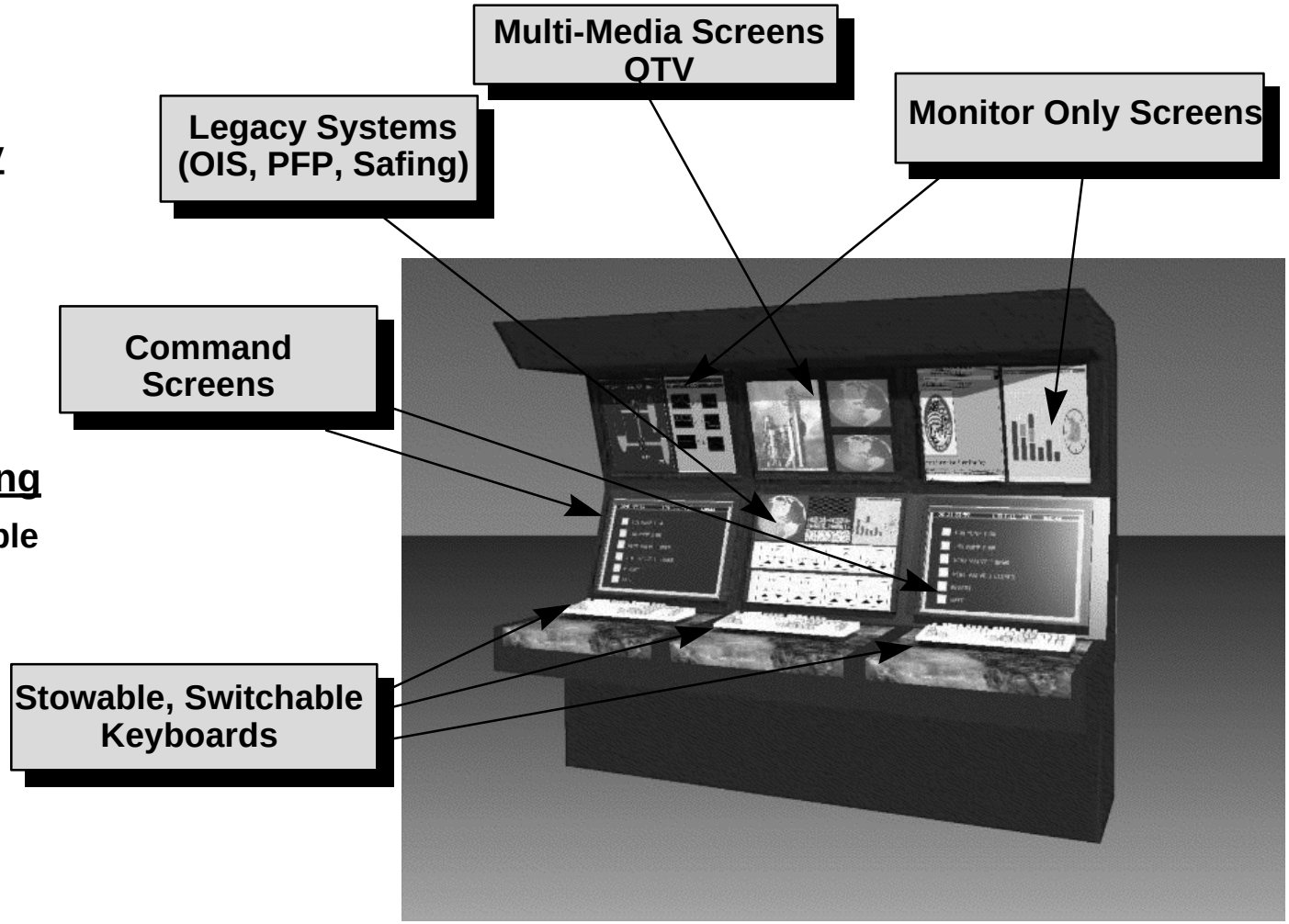
OCR Concepts - Standardized Console

Fail-Safe Redundancy

- -Adjacent Positions on Redundant Data Feeds & Power

Versatile System Safing

- -Generic Reprogrammable Safing And Software Interrupt Panel
- -Redundant Hardwire Safing



OPERATIONS AND MAINTENANCE

- **Reduced In-House Maintenance Support**
  - **Use Standard Hardware**
  - **Incorporate Just-in-Time Delivery of Replacement Components**
  - **Employ OEM Maintenance of COTS Hardware and Software**
  - **Reduced Custom Hardware and Software**

- **Reduced Operations Support**
  - **Reduced Set Load Time - 12 Hours to < 30 Minutes**
  - **Provide Automated Self Test and Diagnostics**
  - **Provide Increased Reliability - Eliminate Critical Failures**
  - **Allow for User Selectable Configuration**

Cost Effective, Flexible, Expandable and Reliable

CLCS OPERATIONS CONCEPT

Development Process

- ***Operations Concept Started With The 60 Day Study***
- ***Development of OPS Concept Has Been A Continuing Effort***
  - ***Team Formed, Led By Steve Altemus & Roberta Wyrick With User and Design Participation***
  - ***Is Being Coordinated With User/Design Community***
  - ***Will Assist In Better Requirement Definition***
  - ***Will Aid in Development Of A Detailed Transition Plan***
  - ***Addresses User's Issues & Concerns***

CLCS OPERATIONS CONCEPT

- **Operations Concept**
  - **Describes the physical characteristics**
    - » **Operational Control Room**
    - » **Flow Zones**
    - » **Consoles**
    - » **Specialized Processing Sites**
    - » **Local Operations**
    - » **Software Sustaining Environment**

CLCS OPERATIONS CONCEPT

- CLCS Operations
  - Support Operations
    - » Activity which prepare for execution of test operations
    - » Provide auxiliary services as required
  - Maintenance
    - » Commercial off the shelf hardware and custom hardware will be repaired as required by vendor or on-site personnel
    - » Provides Description of COTS H/W & S/W Sustaining Process
      - Tasks pertaining to hardware problem identification, resolution and closure
      - Task's pertaining to upkeep, upgrade and configuration control of System Software products
      - Task's pertaining to requirement definition, development and validation of Application Software
    - » Provides Description of System Level Major Assembly Maintenance

CLCS OPERATIONS CONCEPT

- **Test Operations**
  - » **Describes Test Control, System Access, Application Initialization and Control of Command/Monitor Applications**
  - » **Describes How System Functions Can Be Consolidated**
  - » **Will Define Redundancy and Control Room Configuration**
  - » **Describes the Master Function**

- **Data Access - Data Recording**
  - » **Will Describe Recording & Retrieval Services Being Consolidated In the Shuttle Data Center (SDC)**

CLCS OPERATIONS CONCEPT

- **User Environment**
  - **Defines Safing for CLCS**
  - **Describes Viewer Tools to support the user**
  - **Defines display characteristics/capabilities**
  - **Defines Business Systems and Advisory Systems Interfaces**

CLCS OPERATIONS CONCEPT

- **Operations Scenarios**
  - **Describes Launch/Landing Activity**
  - **Defines Multi-Flow CLCS Support**
  - **Describes Simulation, Standalone and Off-Line Facility Activity**
  - **Describes Local Operations**