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Hyperion Intelligence Dashboards and Experimentation at Lockheed Martin's Center for Innovation (U)

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• Lockheed Martin experimentation at the Center for Innovation
  – Constructive Simulations
  – Human-in-the-Loop Simulation

• Two main issues
  – Data Extraction/Storage
  – Data Manipulation/Reduction

• Early Experimentation (2006 Processes)
  – Post Run extraction
  – Manual reduction/consolidation

• Current Experimentation (2007 Processes)
  – Real-Time and Post Run extraction
  – Hyperion Intelligence for Data reduction
Experimentation in 2006

- **Post experiment runs**
  - Data pulled “as-is” using Hyperion Intelligence and Excel
  - Data stored on PC hard drive

- **Upon completion of all experiment runs**
  - Analyst used manual methods to consolidate datasets
  - Analyst uses Excel and C.O.T.S. statistics packages to analyze data
  - Results consolidated into final experiment report

- **Hyperion Intelligence uses an ODBC connection to the Oracle database**
  - Uses graphical SQL
  - Create Tables, Charts, Graphs
  - Prepare datasets for further analysis
  - Dashboards
Early Data Extraction

- Old Data Extraction Process
  - Post-Run extraction
  - Extremely Manual and Time-consuming process

Simulation Software

- Data Recorder
- Multiple .csv files exported for each metric type collected
- SAMBA GATEWAY LINUX→WINDOWS
- SQL LOADER TO IMPORT .CSV FILES INTO ORACLE

Oracle Database Tables

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Manual Dashboards

- Dashboards constructed to allow access to data as experiment runs

Quick-look Report buttons

GO/NO-GO Indicator

Run Number

Spiral 1 EXPERIMENT DATA DASHBOARD PROTOTYPE

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• Experiment Data Conference held after Main Planning Conference
  – Database design developed
  – Sample output “analyzed”

• Output Data stored in Oracle Databases

• HLA Oracle Gateway (H.O.G.) developed to provide real-time data from JSAF

• C.O.T.S tool, Hyperion Intelligence, used to manipulate and reduce data
  – Near Real-time data pulls
  – Supplemental Post-experiment processing
• **H.O.G. stands for HLA Oracle Gateway**
  - Subscribes to and records Objects & Interactions defined by the Simulation Object Model (SOM)
  - Records distributed simulation data translated into the SOM format via the Agile FOM Interface
  - Oracle schema defined by the SOM at run time
  - Multi-threaded queuing prevents data loss due to heavy network traffic and bursts in HLA data
  - Optimized Oracle inserts balance large scenarios with real time analysis requirements
    • Binary Data Inserts, Batch Updates, etc.
  - Generic interface allows MySQL or other recording methods
• New JSAF Extraction Process
  - Near Real-time extraction
  - Nearly automated processing and display
  - Hyperion continues to re-query the database to provide updated metrics visually
Automated Dashboards

- Automated Dashboards allow near-real time continually updated access to data as experiment progresses.

- Set Re-query iterations
- GO/NO-GO Indicators
- Run Number
- Near Real-time Charts from the Run
Flight Simulator Data Accessibility

- In addition to JSAF, other simulations can use the same process...
  - Data extracted real-time into Oracle database
  - Used Hyperion Intelligence Dashboards to consolidate and aggregate aircraft information.
  - Hyperion Intelligence continuously re-queries the database.
  - Dashboards use JavaScript to revolve through a set of tables, charts or graphs and provide near real-time “hands off” updates to status
In Conclusion...

Hyperion Intelligence is critical to the success of Operations Analysis at Lockheed Martin’s Center for Innovation

- As our simulation and experimentation processes become more detailed, we need to be more agile
  - Number of data elements continues to increase
  - Complexity of data tables continues to increase
  - Analysis of output data becomes more detailed

- Dashboards via Hyperion Intelligence allow flexibility and vision into the experiment:
  - Enables capability to determine experiment accuracy as they are in progress
  - Enables instant extract of result data for quick-turn metrics
  - Enables Observers to “see” the experiment data and “watch” the story unfold
Questions?