

75th MORSS CD Cover Page



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712CD

75TH MORSS CD Cover Page

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Original title on 712 A/B:

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

If the title was revised please list the original title above and the revised title here:

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WORKING GROUP: 33

COMPOSITE GROUP:

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SPECIAL SESSION 2:

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Report Documentation Page

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

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Experimentation Data Process

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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

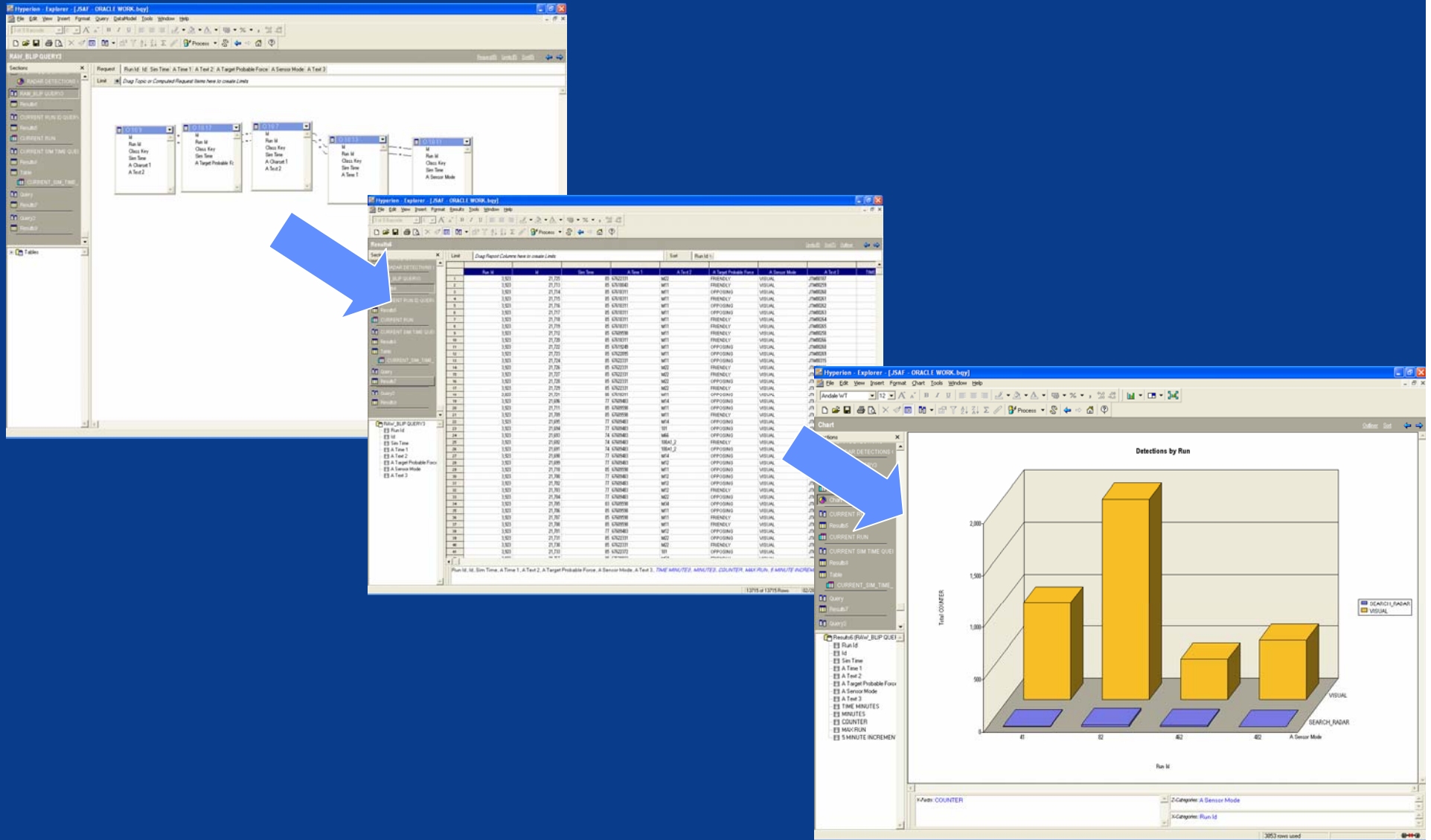
Experimentation in 2006

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- **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

Hyperion Intelligence

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The screenshot displays the Hyperion Explorer interface with several components:

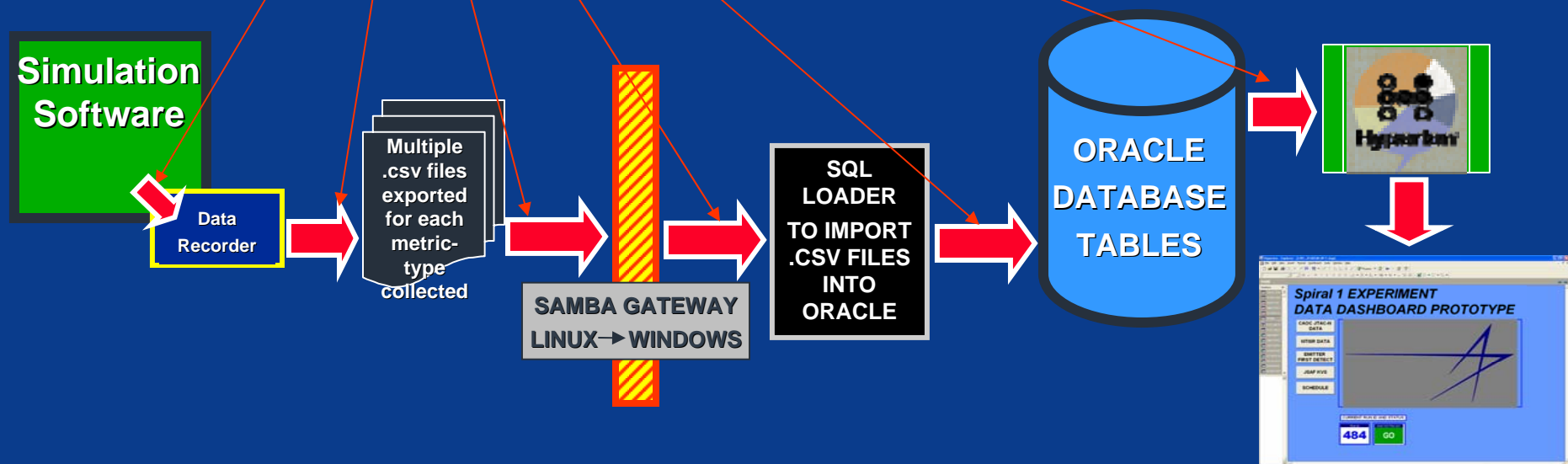
- Query Editor (Top Left):** Shows the SQL query: `RunID, Min Time, A Test 1, A Test 2, A Target Probable Force, A Sensor Mode, A Test 3`.
- Data Table (Middle):** A table with columns: Run ID, Min Time, A Test 1, A Test 2, A Target Probable Force, A Sensor Mode, A Test 3, and Result. The table contains 40 rows of data.
- 3D Bar Chart (Bottom Right):** Titled "Detections by Run", it compares "SEARCH_RADAR" and "VISUAL" detections across four runs (01, 02, 03, 04). Run 02 shows the highest number of detections for both categories.

Run ID	Min Time	A Test 1	A Test 2	A Target Probable Force	A Sensor Mode	A Test 3	Result
1	1.93	21.75	6	ENR0201	ME2	FRIENDLY	VISUAL
2	1.93	21.75	6	ENR0401	ME1	FRIENDLY	VISUAL
3	1.93	21.75	6	ENR0301	ME1	OPPOSING	VISUAL
4	1.93	21.75	6	ENR0101	ME1	OPPOSING	VISUAL
5	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
6	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
7	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
8	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
9	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
10	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
11	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
12	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
13	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
14	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
15	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
16	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
17	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
18	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
19	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
20	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
21	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
22	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
23	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
24	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
25	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
26	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
27	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
28	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
29	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
30	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
31	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
32	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
33	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
34	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
35	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
36	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
37	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
38	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
39	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL
40	1.93	21.75	6	ENR0101	ME1	FRIENDLY	VISUAL

Early Data Extraction

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



Manual Dashboards

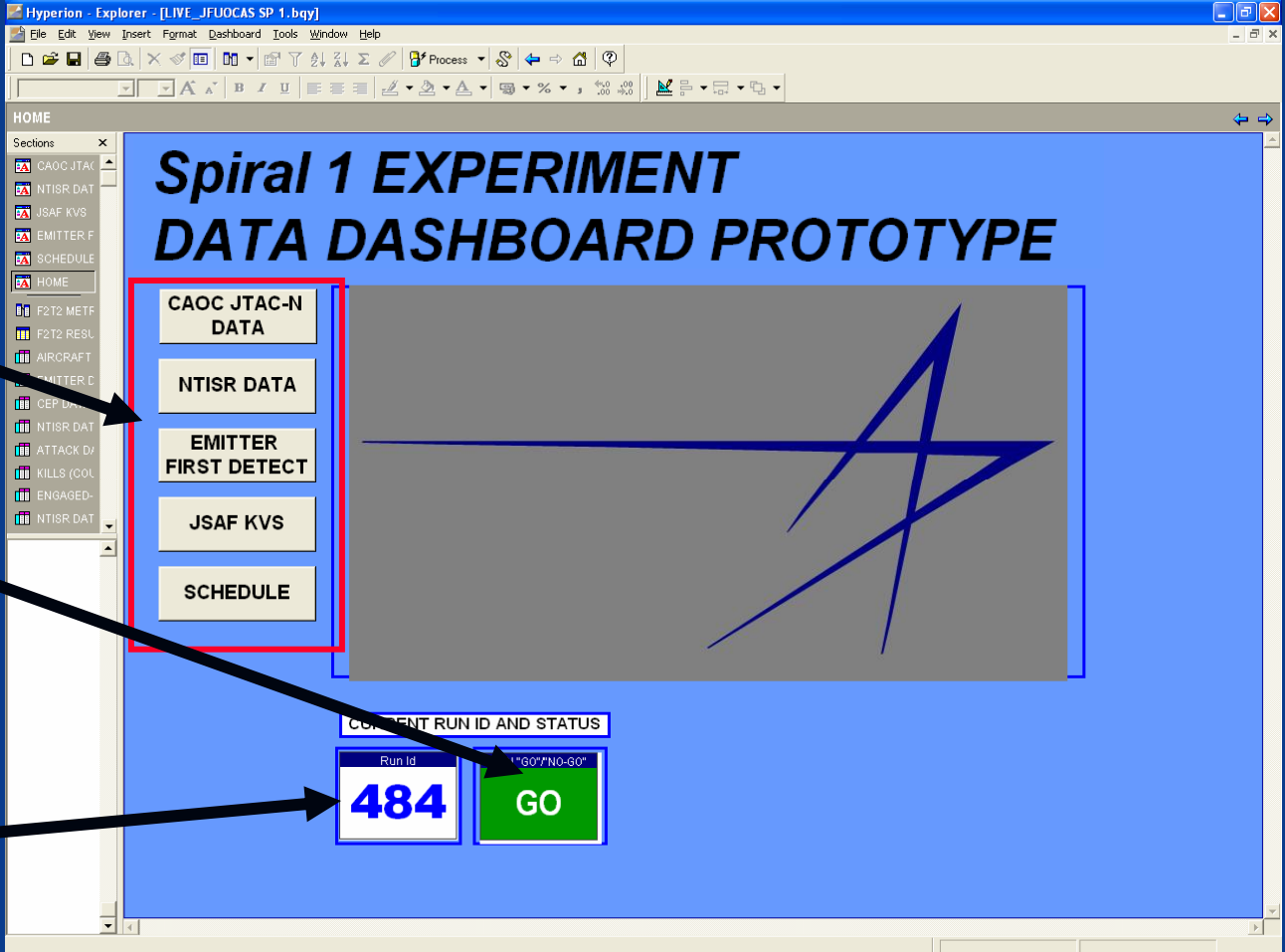
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- Dashboards constructed to allow access to data as experiment runs

Quick-look
Report buttons

GO/NO-GO
Indicator

Run Number



Hyperion - Explorer - [LIVE_JFUOCAS SP 1.bqy]

HOME

Sections

- CAOC JTAC
- NTISR DAT
- JSAF KVS
- EMITTER F
- SCHEDULE
- HOME
- F2T2 METF
- F2T2 REBL
- AIRCRAFT
- EMITTER D
- CEP DAT
- NTISR DAT
- ATTACK D
- KILLS (COL
- ENGAGED-
- NTISR DAT

Spiral 1 EXPERIMENT DATA DASHBOARD PROTOTYPE

CAOC JTAC-N
DATA

NTISR DATA

EMITTER
FIRST DETECT

JSAF KVS

SCHEDULE

CURRENT RUN ID AND STATUS

Run Id	GO/NO-GO
484	GO

Experimentation in 2007

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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

HLA Oracle Gateway

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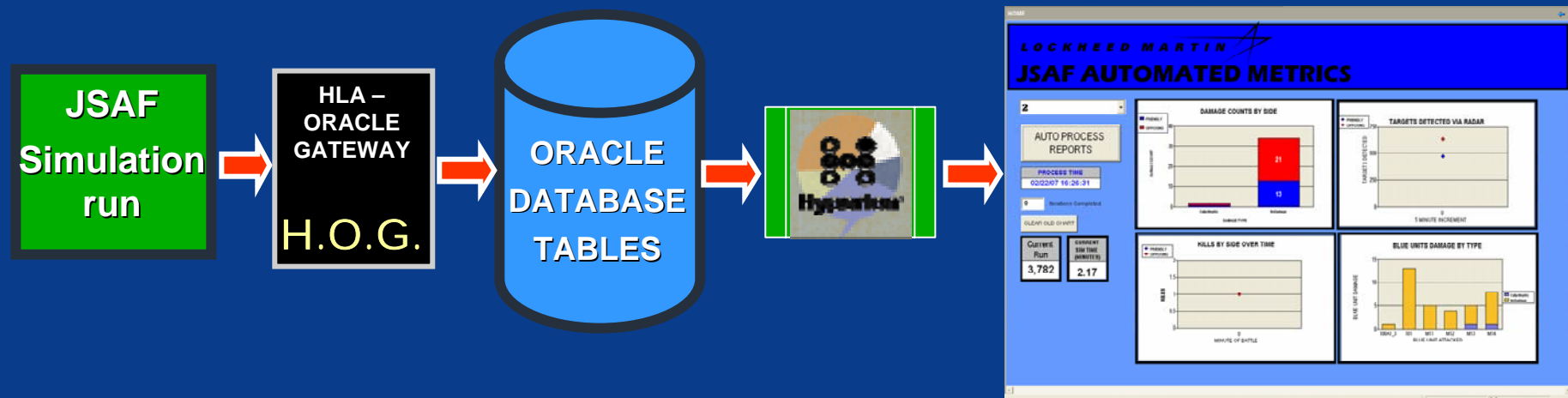
- H.O.G. stands for HLA Oracle Gateway
 - Subscribes to and records Objects & Interactions defined by the Simulation Object Model (SOM)
 - Records distributed simulation data translated into the SOM format via the Agile FOM Interface
 - Oracle schema defined by the SOM at run time
 - Multi-threaded queuing 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

Current Sim Data Accessibility

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• New JSAF Extraction Process

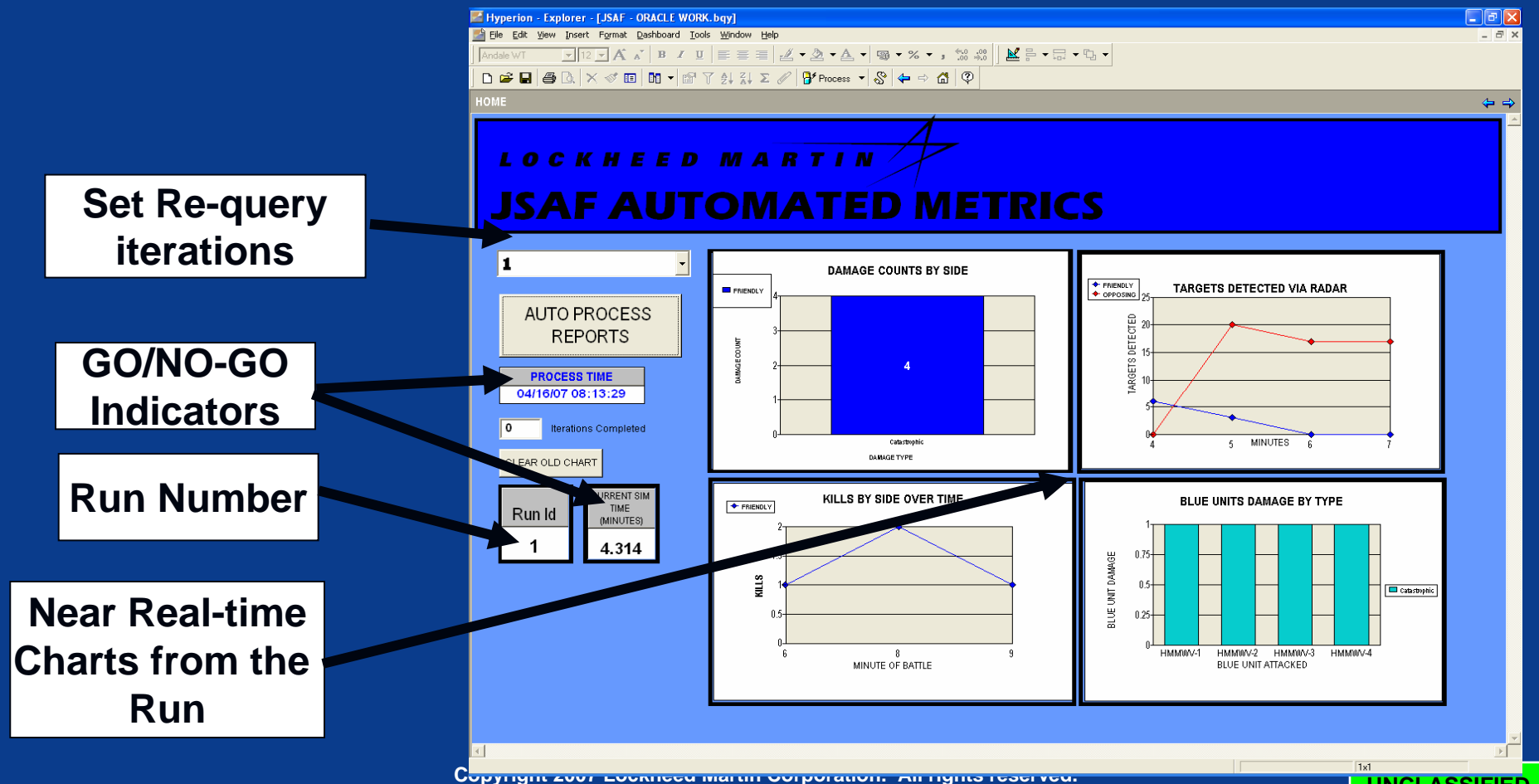
- Near Real-time extraction
- Nearly automated processing and display
- Hyperion continues to re-query the database to provide updated metrics visually



Automated Dashboards

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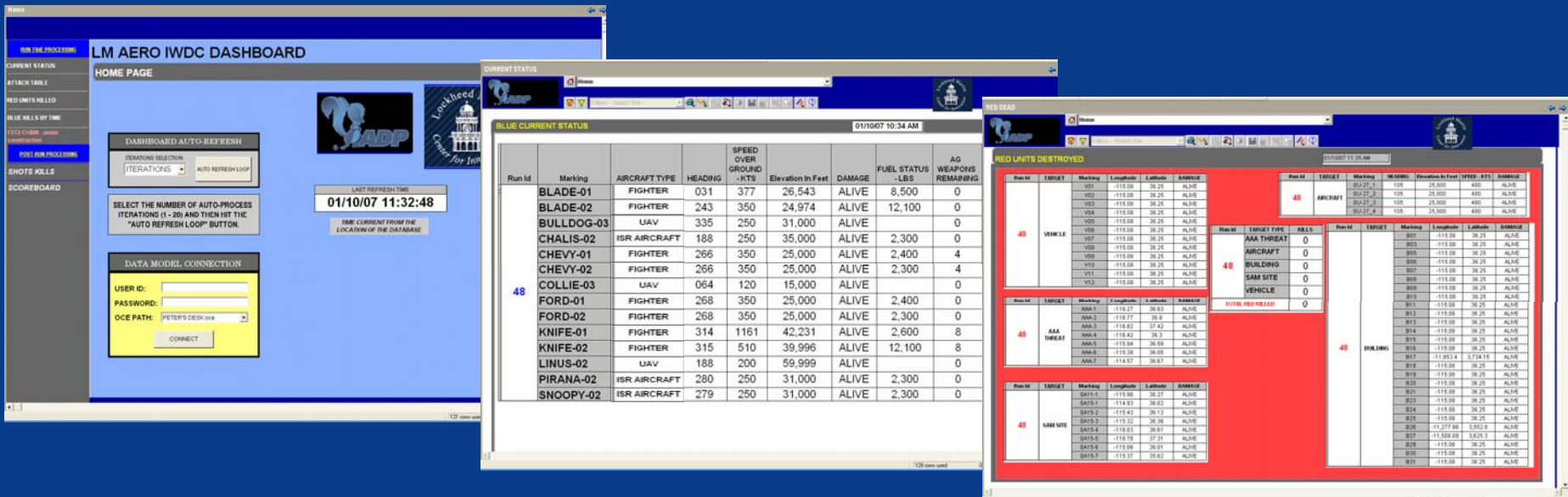
- Automated Dashboards allow near-real time continually updated access to data as experiment progresses



Flight Simulator Data Accessibility

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- 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



The screenshot displays the LM AERO IWDC DASHBOARD with several key components:

- HOME PAGE:** Includes a 'DASHBOARD AUTO-REFRESH' section with 'ITERATIONS' and 'AUTO REFRESH LOOP' buttons, and a 'DATA MODEL CONNECTION' section with fields for 'USER ID', 'PASSWORD', and 'OCE PATH'.
- BLUE CURRENT STATUS:** A table showing aircraft status as of 01/10/07 10:34 AM. The table includes columns for Run Id, Marking, AIRCRAFT TYPE, HEADING, SPEED OVER GROUND, Elevation In Feet, DAMAGE, FUEL STATUS, and AG WEAPONS REMAINING.
- RED DEAD:** A table showing 'RED UNITS DESTROYED' as of 01/10/07 11:35 AM. It includes columns for Run Id, TARGET, Marking, Longitude, Latitude, DAMAGE, and AG WEAPONS REMAINING.

Run Id	Marking	AIRCRAFT TYPE	HEADING	SPEED OVER GROUND -KTS	Elevation In Feet	DAMAGE	FUEL STATUS	AG WEAPONS REMAINING
48	BLADE-01	FIGHTER	031	377	26,543	ALIVE	8,500	0
	BLADE-02	FIGHTER	243	350	24,974	ALIVE	12,100	0
	BULLDOG-03	UAV	335	250	31,000	ALIVE	0	0
	CHALIS-01	ISR AIRCRAFT	188	250	35,000	ALIVE	2,300	0
	CHEVY-01	FIGHTER	266	350	25,000	ALIVE	2,400	4
	CHEVY-02	FIGHTER	266	350	25,000	ALIVE	2,300	4
	COLLIE-03	UAV	064	120	15,000	ALIVE	0	0
	FORD-01	FIGHTER	268	350	25,000	ALIVE	2,400	0
	FORD-02	FIGHTER	268	350	25,000	ALIVE	2,300	0
	KNIFE-01	FIGHTER	314	1161	42,231	ALIVE	2,600	8
	KNIFE-02	FIGHTER	315	510	39,996	ALIVE	12,100	8
	LINUS-02	UAV	188	200	59,999	ALIVE	0	0
	PIRANA-02	ISR AIRCRAFT	280	250	31,000	ALIVE	2,300	0
	SNOOPY-02	ISR AIRCRAFT	279	250	31,000	ALIVE	2,300	0

Run Id	TARGET	Marking	Longitude	Latitude	DAMAGE	AG WEAPONS REMAINING
48	VEHICLE	VEH1	-115.00	36.25	ALIVE	0
		VEH2	-115.00	36.25	ALIVE	0
		VEH3	-115.00	36.25	ALIVE	0
		VEH4	-115.00	36.25	ALIVE	0
		VEH5	-115.00	36.25	ALIVE	0
		VEH6	-115.00	36.25	ALIVE	0
		VEH7	-115.00	36.25	ALIVE	0
		VEH8	-115.00	36.25	ALIVE	0
		VEH9	-115.00	36.25	ALIVE	0
		VEH10	-115.00	36.25	ALIVE	0
		VEH11	-115.00	36.25	ALIVE	0
		VEH12	-115.00	36.25	ALIVE	0
48	AAA THREAT	AAA1	-116.27	36.83	ALIVE	0
		AAA2	-116.77	36.9	ALIVE	0
		AAA3	-116.82	37.62	ALIVE	0
		AAA4	-116.82	38.3	ALIVE	0
		AAA5	-116.84	36.88	ALIVE	0
		AAA6	-116.81	36.85	ALIVE	0
		AAA7	-116.87	36.87	ALIVE	0
48	SAM SITE	BATS-1	-115.98	36.27	ALIVE	0
		BATS-2	-116.83	36.82	ALIVE	0
		BATS-3	-115.21	36.26	ALIVE	0
		BATS-4	-116.83	36.81	ALIVE	0
		BATS-5	-116.76	37.01	ALIVE	0
		BATS-6	-116.81	36.81	ALIVE	0
		BATS-7	-115.37	36.82	ALIVE	0
		BATS-8	-115.00	36.25	ALIVE	0
		BATS-9	-115.00	36.25	ALIVE	0
		BATS-10	-115.00	36.25	ALIVE	0
		BATS-11	-115.00	36.25	ALIVE	0
		BATS-12	-115.00	36.25	ALIVE	0
		BATS-13	-115.00	36.25	ALIVE	0
		BATS-14	-115.00	36.25	ALIVE	0
		BATS-15	-115.00	36.25	ALIVE	0
		BATS-16	-115.00	36.25	ALIVE	0
		BATS-17	-115.00	36.25	ALIVE	0
		BATS-18	-115.00	36.25	ALIVE	0
		BATS-19	-115.00	36.25	ALIVE	0
		BATS-20	-115.00	36.25	ALIVE	0
		BATS-21	-115.00	36.25	ALIVE	0
		BATS-22	-115.00	36.25	ALIVE	0
		BATS-23	-115.00	36.25	ALIVE	0
		BATS-24	-115.00	36.25	ALIVE	0
		BATS-25	-115.00	36.25	ALIVE	0
		BATS-26	-115.00	36.25	ALIVE	0
		BATS-27	-115.00	36.25	ALIVE	0
		BATS-28	-115.00	36.25	ALIVE	0
		BATS-29	-115.00	36.25	ALIVE	0
		BATS-30	-115.00	36.25	ALIVE	0
		BATS-31	-115.00	36.25	ALIVE	0

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In Conclusion...

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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

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Questions?

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