

Applying OVM (UVM) to GOES-R C&DH Development



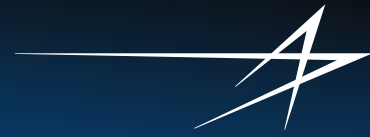
Dr. J. David Foggy
GOES-R Verification Lead
Lockheed Martin SSC

Doug Krening
Verification Consultant

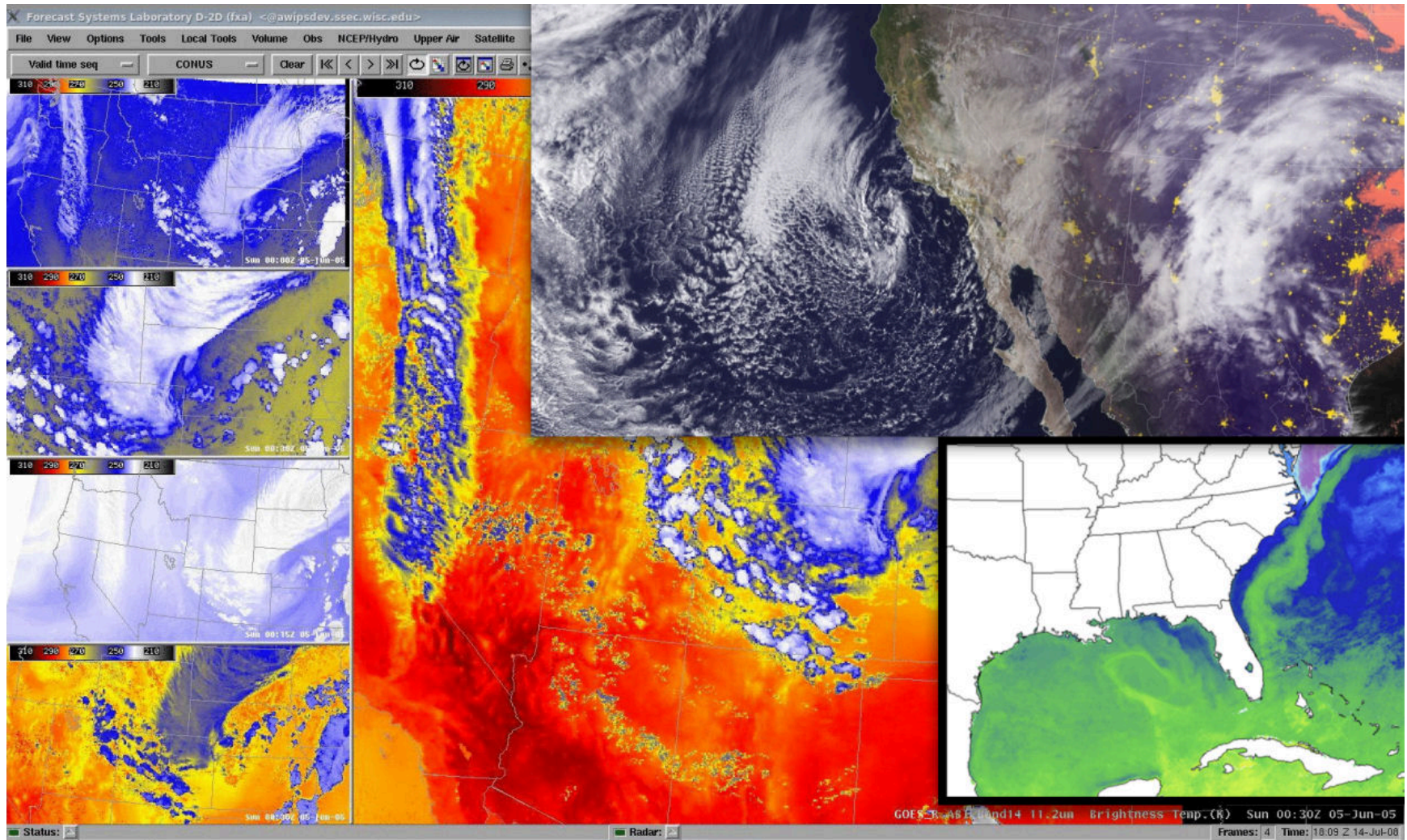
Michael Horn
Principal Verification Architect
Mentor Graphics

Tim Gallagher
LM Fellow
Lockheed Martin SSC

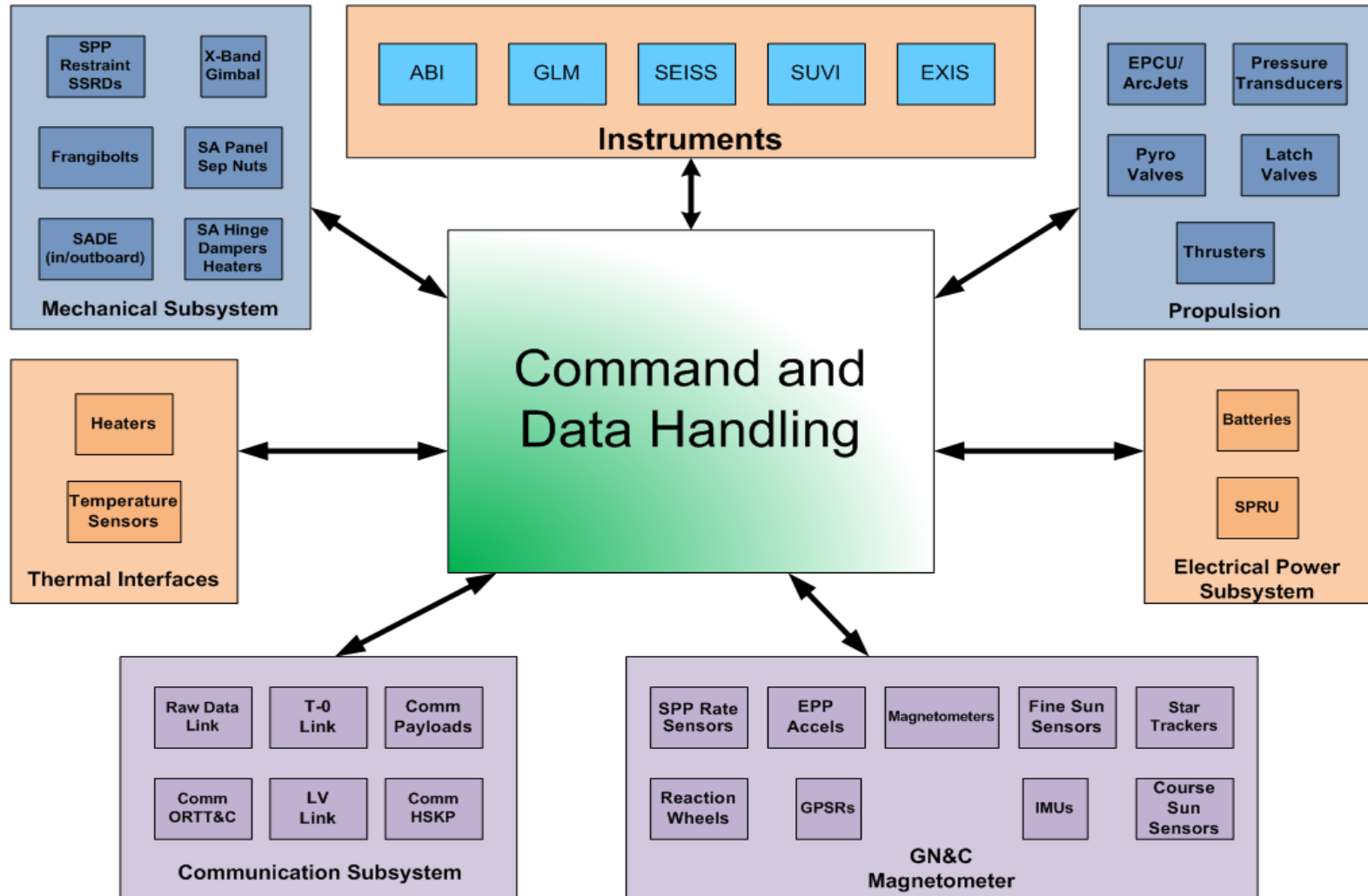
GOES-R

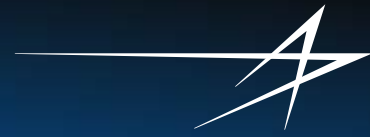


GOES-R Weather Images



Command & Data Handler (C&DH)





Why

Why Verification?

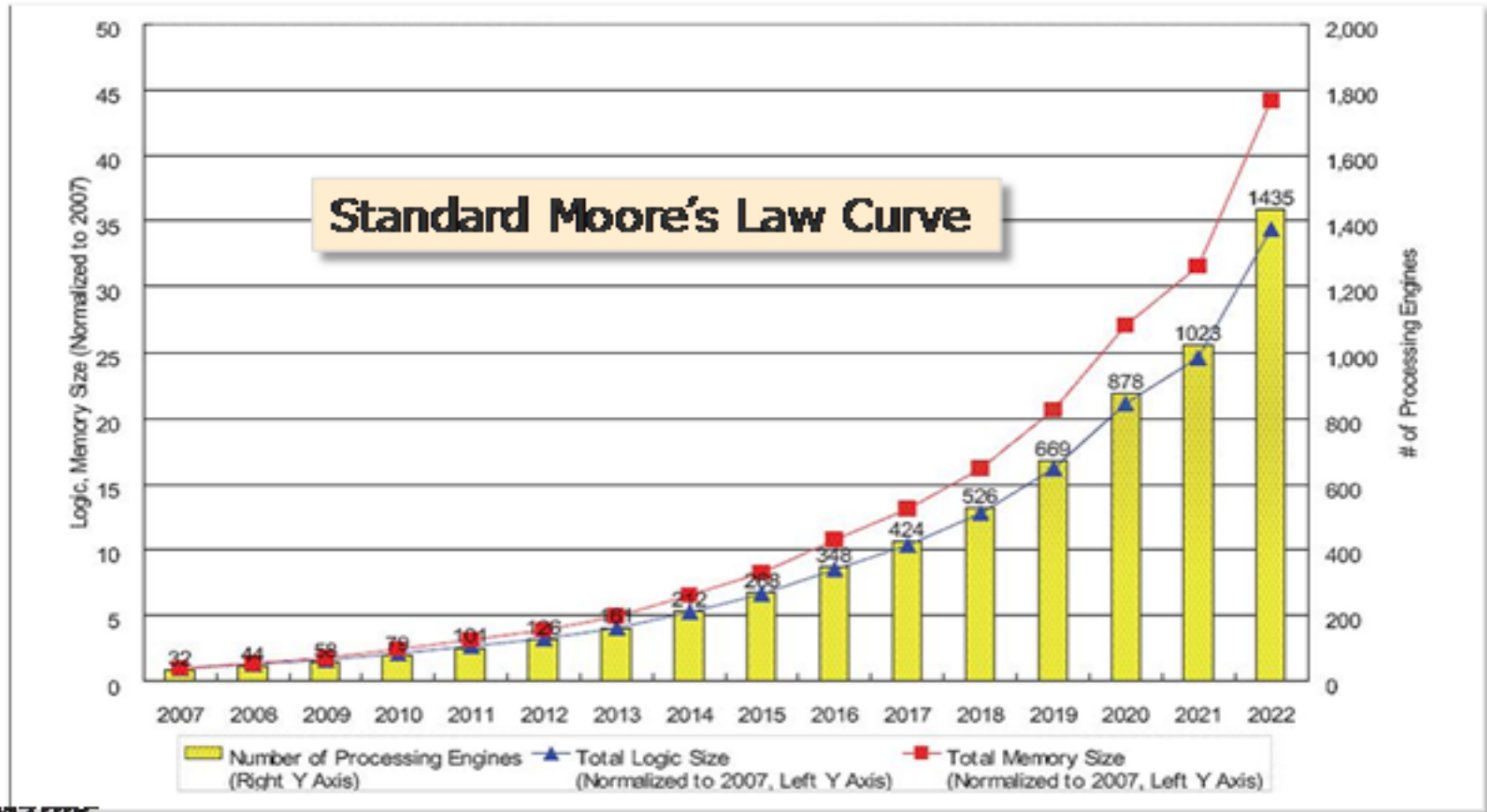
Design Phase	Requirements	Specifications	Logic Design	Verification	HW-SW Verification	Post-Si Test	Customer Return	Total Bug Detection Cost
Cost of Finding Bug (units)	1	10	100	1,000	10,000	100,000	1,000,000	(based on 1000 Bug Project)
Bug Injection Distribution	10%	30%	60%	0%	0%	0%	0%	
Bug Distribution Best In Class	5%	10%	20%	64%	1%	0.10%	0.01%	961,050
Bug Distribution Example 1	5%	10%	20%	54%	10%	1%	0.10%	3,561,050
Bug Distribution Example 2	5%	10%	20%	44%	15%	5%	1%	16,961,050
Bug Distribution Example 3	5%	10%	20%	38%	20%	10%	5%	32,401,050

*Source: Mentor Graphics

The Compounding Problem



Design Complexity Trends

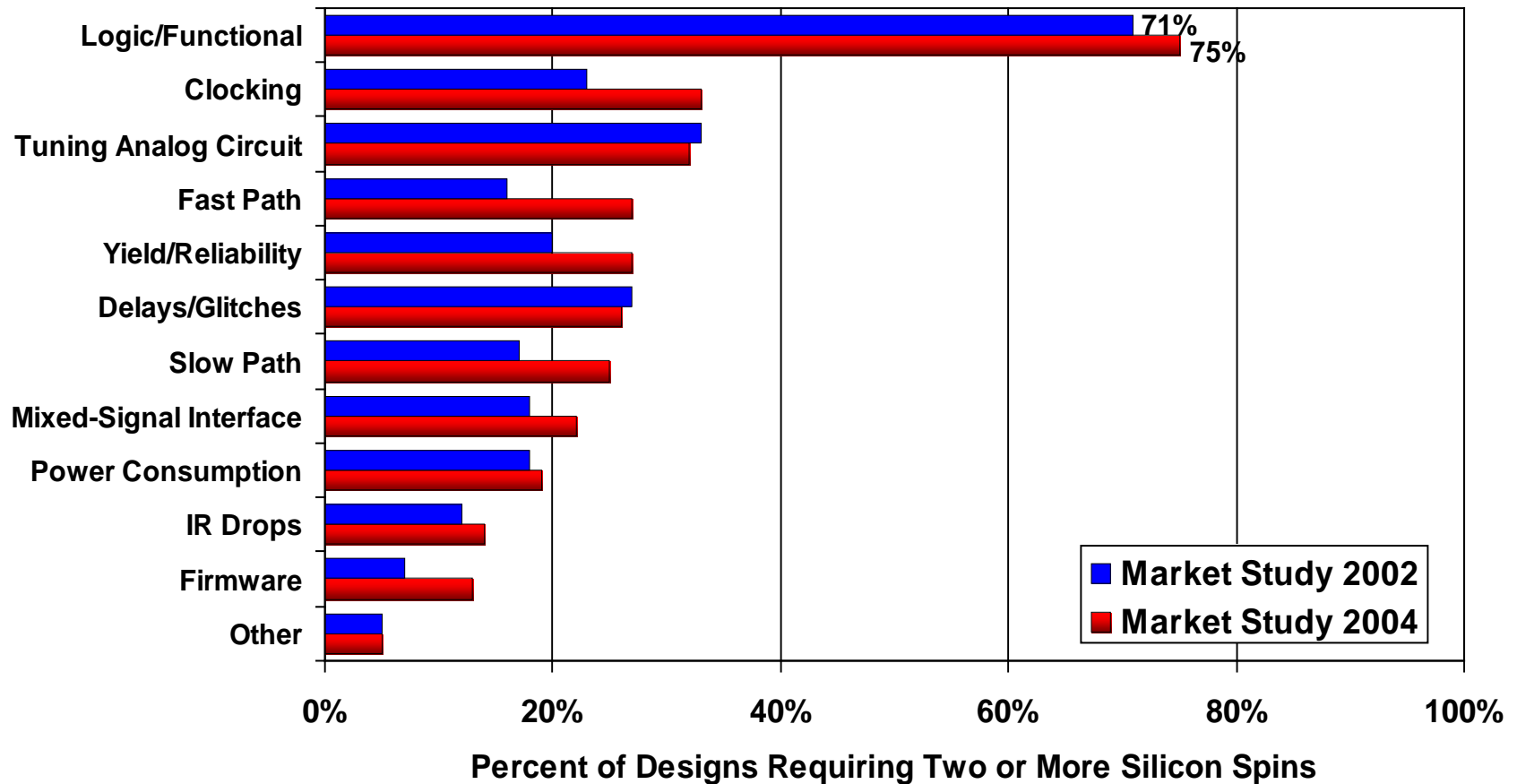


2007 ITRS

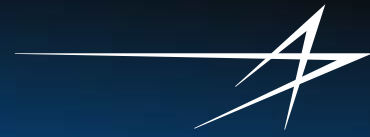
FPGA/ASIC Verification Trends



IC/ASIC Designs Requiring Re-Spins by Type of Flaw

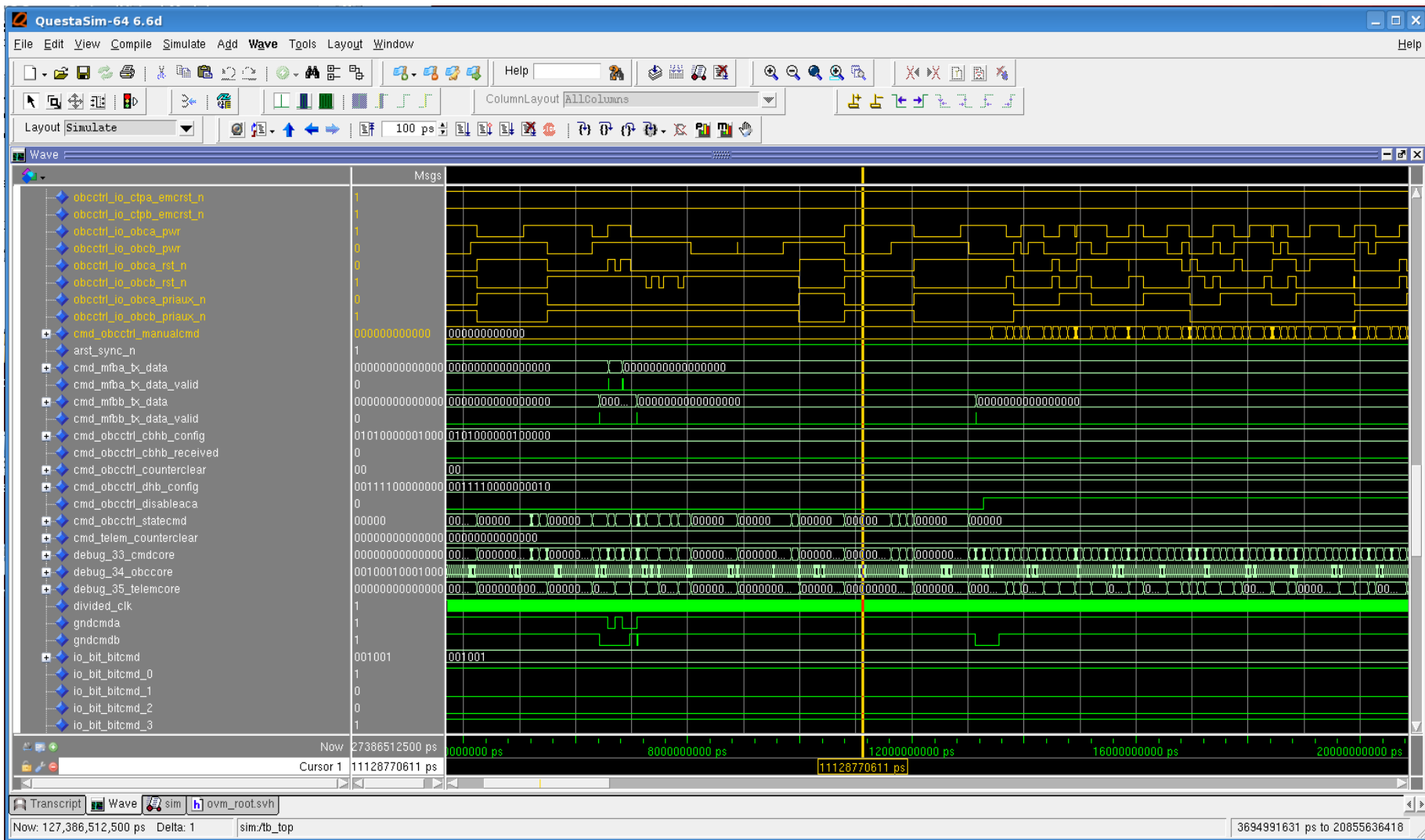


Source: 2004/2002 IC/ASIC Functional Verification Study, Collett International Research, Used with Permission

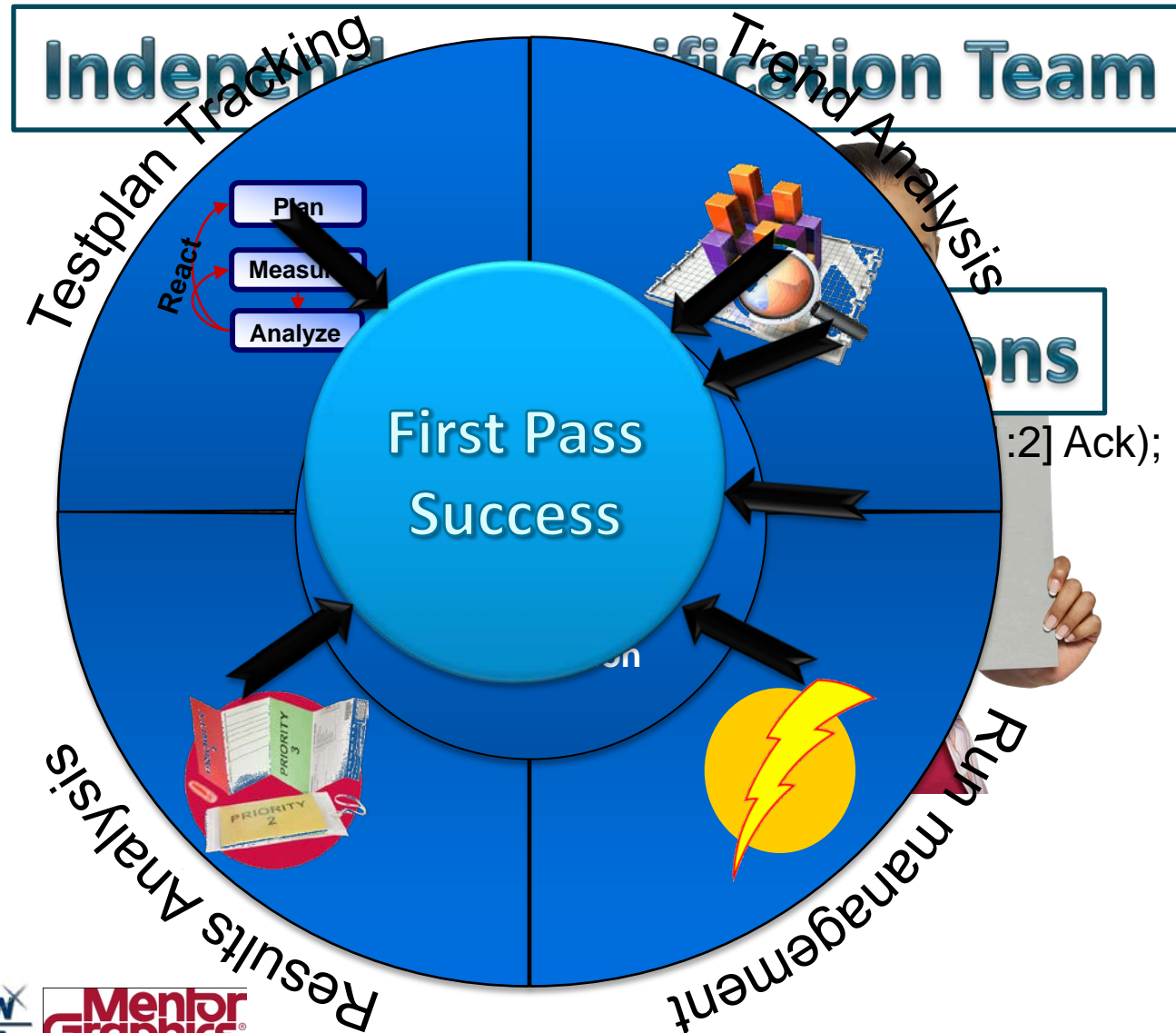


What

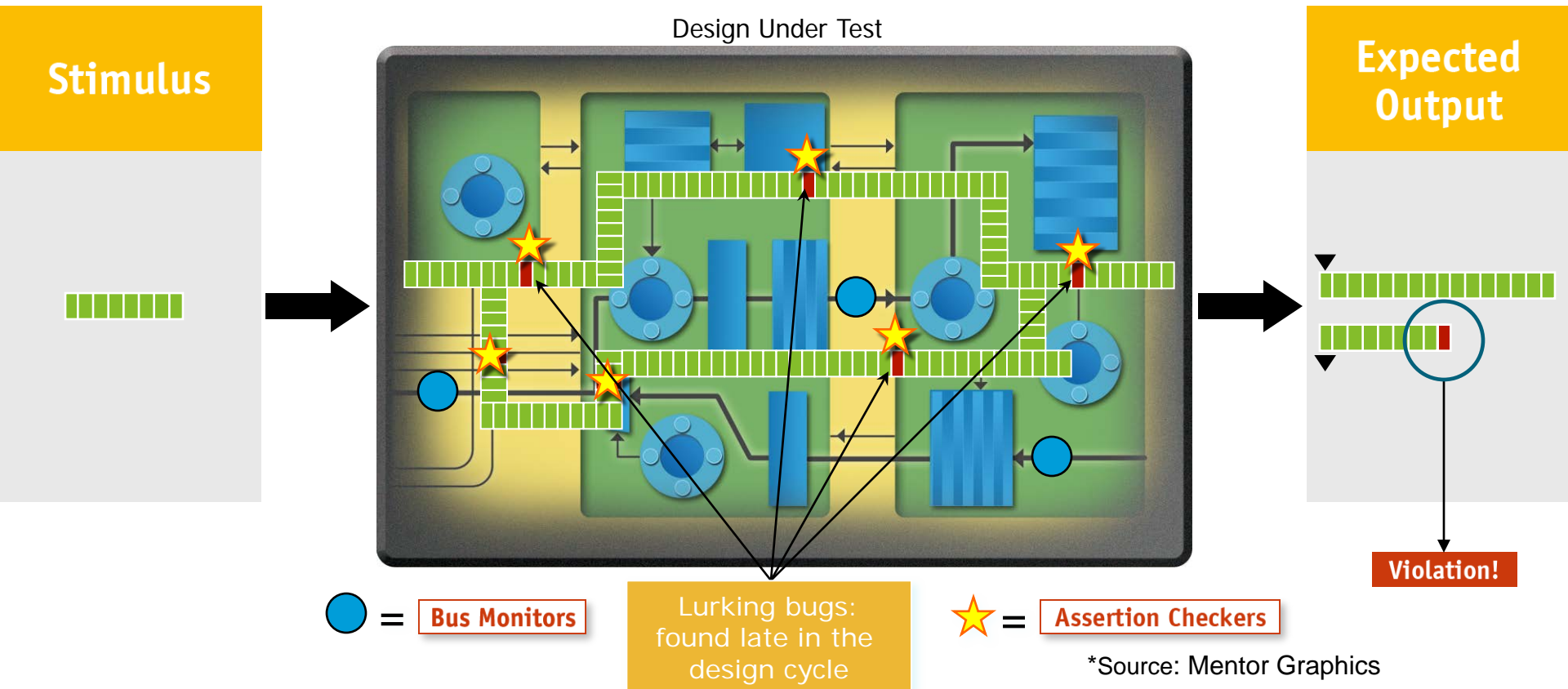
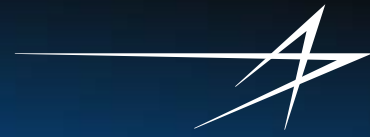
Yesterday



C&DH Techniques/Technologies



Advanced Functional Verification



Today



QuestaSim-64 6.6d <2>

File Edit View Compile Simulate Add Transcript Tools Layout Window Help

100 ps

Layout Simulate ColumnLayout AllColumns

Wave

Signal	Value	Time
rst	1	1994137957 ps
mfb_frame_n	0	60062451569 ps
mfb_xmit_en	HiZ	
mfb_data	HiZ	
mfb_busclk		

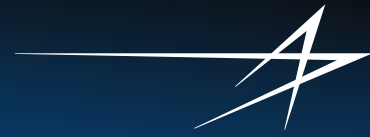
Now: 1994137957 ps
Cursor 1: 60062451569 ps

Wave Cover Groups Assertions

Transcript:

```
#
# ** Report counts by severity
# OVM_INFO : 52
# OVM_WARNING : 2
# OVM_ERROR : 0
# OVM_FATAL : 0
# ** Report counts by id
# [RNTST] 1
# [TEST_DONE] 1
# [analysis_cov:sample] 2
# [regtest_seq] 46
# [report] 4
# OVM_INFO @ 1994138000: reporter [report]
# -----\x1b[32;5;1mSIMULATION PASSED\x1b[0m-----
# ** Note: $finish : /home/jfogggy/projects/goes/common/verif/ovm_2.1.1/base/ovm_root.svh(507)
```

Now: 1,994,137,957 ps Delta: 18 sim:/ovm_pkg::ovm_root::run_test/#FORK#507_2b57a50e806



What and Why