

BMAS 2003 Panel
October 7, 2003

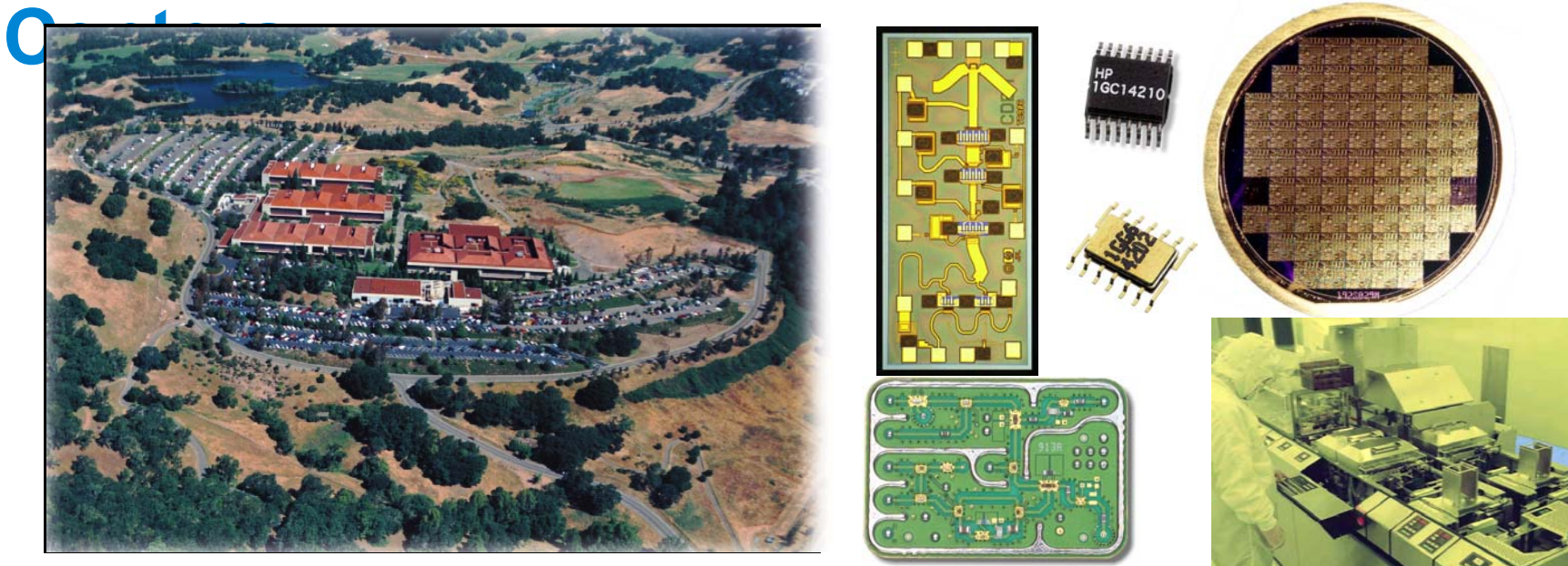
Standard Languages for Compact Modeling: Perspective of an Internal Model Developer

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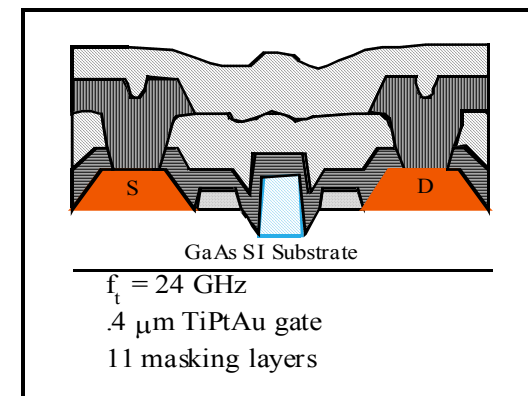
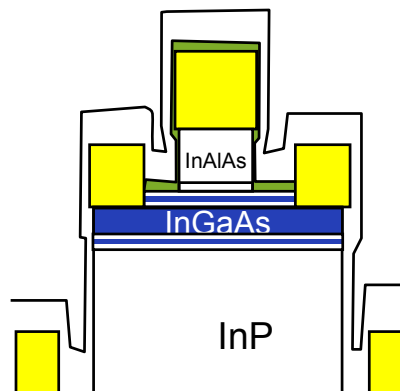
Agilent Technologies

Agilent Worldwide Process and Tech.



Our Job: Active Device Models for Agilent

- InP HBTs
- GaAs HBTs
- GaAs PHEMTs
- GaAs E-PHEMTs
- GaAs MESFETs
- Diode Processes



Internal Technology vs. Commercial EDA Perspective

Worldwide Process & Technology Ctr.

- Device Physicists
- Semiconductor Process Engineers
- IC and MCM Designers
- Nonlinear Modeling Experts
- Develop advanced models for leading-edge technologies
- Develop technology at cost to enable business for Divisions

Agilent EEsof Division

- Software Engineers
- Simulator Experts
- Application and Support Eng.
- Implement and support standard models for large external customer base
- Sell EDA tools for Profit

WPTC needs rapid development and deployment of new models for internal-Agilent designers for proprietary advantage

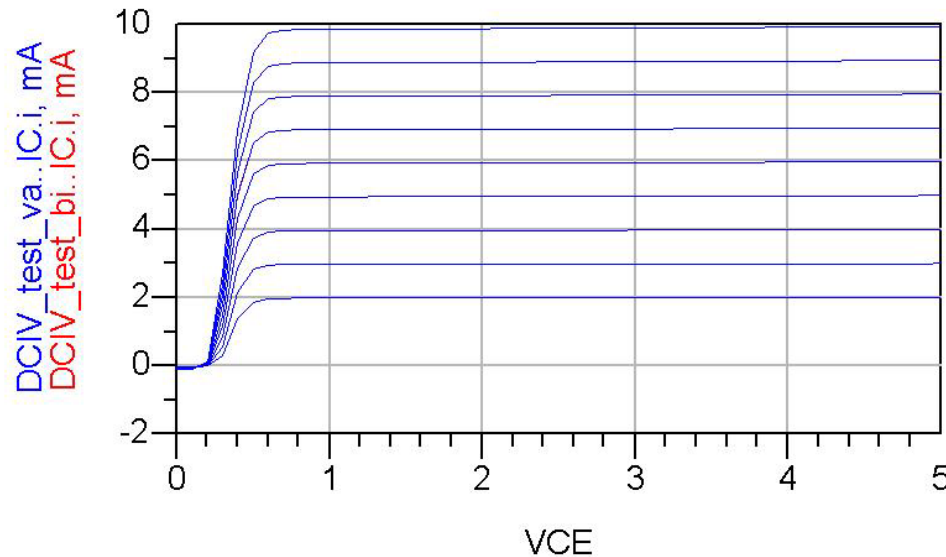


Importance of Standard Language to WPTC

- **Create new models for our new technologies**
 - As simple as (interpreted) SDD; Verilog-A a natural language for modelers
 - More general interface to simulators for high value-added capabilities (behavioral models; neural networks)
- **Compiled Verilog-A**
 - Performance near that of expert-compiled C-code. (Still a claim to be verified)
 - Much less time-consuming and error-prone than compiled C-code (no Partial Derivatives required from modeler)
 - Protect our modeling IP; Easier to work with strategic partners
 - Distribute model to users of other simulators
- **Enhance and maintain existing models**
 - Not dependent on EDA vendor

AgilentHBT Model – SDD to C vs Compiled Verilog-A

DC-IV C



5000 lines of C-code

2 months of work

500 lines of Verilog-A

2 days of work

25 pages of
Mathematica for
Partial Derivatives!



Extensions Needed

- **Better support for tables of data and interpolation**
 - **Table-based device models**
 - **Behavioral models**
- **Ability to link in new capabilities, such as Neural Networks**
 - **Enable us to add new capabilities to the standard simulators to support our modeling technologies**