OSA MILESTONES AND USERS OF OSA TECHNOLOGY

J.W. Bandler

OSA-96-OS-10-V

May 22, 1996

MILESTONES

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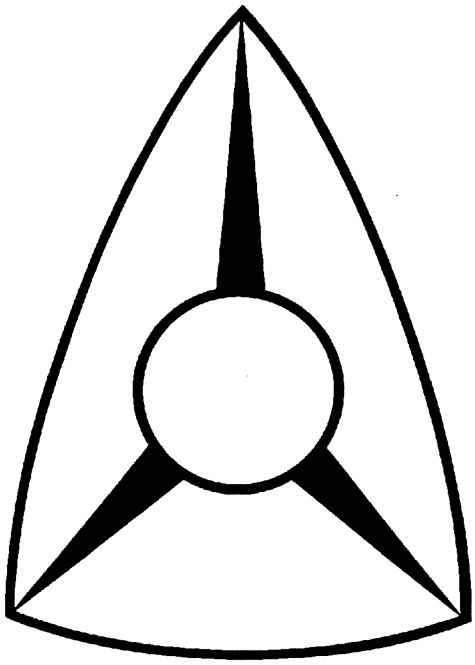

Milestones I

The following is a list of achievement milestones of the OSA team.

computerized Smith chart plots (1966)

performance-driven optimization (1968)

optimization of waveguide circuits (1969)

adjoint sensitivities (1970)

cost-driven worst-case design with optimized tolerances (1972)

centering, tolerance assignment integrated with tuning at the design stage (1974)

integrated approach to microwave design with tolerances and uncertainties (1975)

yield-driven optimization for general statistical distributions (1976)

new results for cascaded circuits (1978)

optimal tuning and alignment at the production stage (1980)

Milestones II

fault diagnosis and parameter extraction (1980)

world's fastest multiplexer optimizer (1984)

introduction of powerful minimax optimizers into commercial CAD/CAE products such as EEsof's Touchstone (1985)

large-scale microwave optimization (1986)

foundation of multi-circuit ℓ_1 modeling (1986)

world's first yield-driven design for Compact Software's Super-Compact® (1987)

computational enhancements of commercial CAD/CAE products including Compact Software's Microwave Harmonica™ (1988)

parameter extraction using novel large-scale concepts (1988)

nonlinear adjoint (harmonic balance) exact sensitivities (1988)

RoMPE™, world's first commercial product for FET parameter extraction featuring S-parameters and/or DC data (1988)

Milestones III

yield-driven design of nonlinear microwave circuits (1989)

FAST™, novel technique for high-speed nonlinear sensitivities (1989)

efficient large-signal FET parameter extraction using harmonics (1989)

HarPE™, world's first commercial product for harmonic balance driven FET parameter extraction (1989)

combined discrete/normal statistical modeling of active devices (1989)

efficient quadratic approximation for statistical design (1989)

nonlinear circuit optimization with dynamically integrated physical device models (1990)

analytically unified DC/small-signal/large-signal circuit design (1990)

OSA90™, world's first friendly optimization engine for performance- and yield-driven design (1990)

Milestones IV

Datapipe™ Technology, OSA90's interprocess communication system (1990)

OSA90/hope™, the microwave and RF harmonic optimization system (1991)

design optimization with external simulators, circuit-theoretic and field-theoretic (1991)

statistical modeling of GaAs MESFETs (1991)

gradient quadratic approximation for yield optimization (1991)

physics-based design and yield optimization of MMICs (1991)

Spicepipe™ connection of OSA90/hope™ with Zuberek's SPICE-PAC simulator (1992)

Empipe™ connection of OSA90/hope™ with Sonnet's Software's *em*™ field simulator (1992)

predictable yield-driven circuit optimization (1992)

integrated physics-oriented statistical modeling, simulation and optimization (1992)

Milestones V

"fulfils the requirement of microwave engineers to model and simulate nonlinear active and passive systems without having a thorough knowledge of analysis, and optimization methods" - MEE 1992

Datapipe™ connection of OSA90/hope™ with Hoefer's TLM electromagnetic field simulators (1993)

Datapipe™ connection of OSA90/hope™ with Nakhla/Zhang VLSI interconnect simulators (1993)

microstrip filter design using direct EM field simulation (1993)

yield-driven direct electromagnetic optimization (1993)

robustizing modeling and design using Huber functions (1993)

"CAD review: Non-linear CAD benchmark" by MEE (1993)

EM design of HTS microwave filters (1994)

CDF approach to statistical modeling (1994)

Milestones VI

Space Mapping™ - a fundamental new theory for design with CPU intensive simulators (1994)

"CAD review: the 7 GHz doubler circuit" by MEE (1994)

optimization of planar structures with arbitrary geometry (1994)

breakthrough Geometry Capture™ technique (1995)

aggressive Space Mapping™ for EM design (1995)

cost-driven physics-based large-signal simultaneous device and circuit design (1995)

integrated harmonic balance and EM optimization (1995)

novel heterogeneous parallel yield-driven EM CAD (1995)

mixed-domain multi-simulator statistical parameter extraction and yield-driven design (1995)

full-day MTT-S workshop on Automated Circuit Design Using Electromagnetic Simulators (Arndt, Bandler, Chen, Hoefer, Jain, Jansen, Pavio, Pucel, Sorrentino, Swanson, 1995)

Milestones VII

explosion of development and use of optimization-based technology for automated circuit design with EM simulators (1994, 1995)

Network Datapipe™ connection of OSA90/hope™ with Hoefer's TLM electromagnetic field simulators on massively parallel computers (1995)

Datapipe™ connections of OSA90/hope™ with Sorrentino's mode-matching electromagnetic field simulators with adjoint sensitivities (1995)

Datapipe™ connection of OSA90/hope™ with Arndt's waveguide component library (1995)

parameterization of arbitrary geometrical structures (1996)

fully-automated Space Mapping™ optimization of 3D structures (1996)

Empipe3D™ connection of OSA90/hope™ with Hewlett-Packard's HFSS and Ansoft's Maxwell® Eminence 3D full-wave simulators (1996)

EmpipeExpress™ connection of OSA90/hope™ with Sonnet's Software's *em*™ field simulator (1996)

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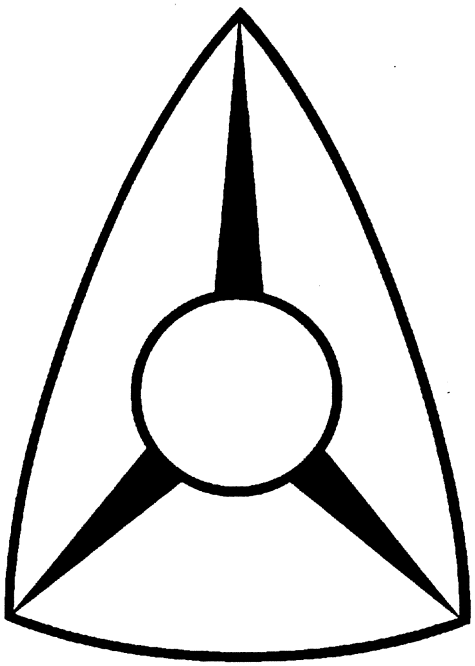

Selected Users of OSA Technology

Alcatel

AMTEL

Alenia

BNR

British Telecom

ComDev

Compact Software

COMSAT

CRC (Canada)

Daimler Benz

EEsof

France Telecom

GE

Hughes

IMST (Germany)

M/A-COM

MIT Lincoln Labs

Micronet

NAWC

Nortel

Raytheon

Rockwell

Schrack Aerospace

Siemens

Sumitomo

Telettra

Telecommunications Research Institute of Ontario (TRIO)

TRW

Watkins-Johnson

University Users of OSA Technology

Austria	Belgium
Canada	Denmark
Germany	Hong Kong
Italy	Korea
Mexico	Netherlands
Spain	Switzerland
UK	USA