Matt Dzugan

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Data-Driven Designer, Modeler & Architect of Space-Communications Systems

Work Experience

The Boeing Company, Satellite Development Center — 2012 to Present
El Segundo, California — **2017 World-Class Engineer Award Recipient**

Senior New Business Campaign Team-Lead: End-to-End Communications Architecture

Led the End-to-End team on multiple design bids resulting in winning over $1B in new satellite contracts

- Communicated with external customers, and professionally challenged their assumptions allowing the internal Boeing team to pursue design options that were ultimately critical to our contract awards
- Iterated through multiple design iterations, tasking the internal team with actionable exploratory analyses, and creating several key performance measures to engage the potential customer and mature the design

Senior Communications Systems Architect

Identified key system-level design decisions & modeled their outcomes & impacts for 3 unique satellite systems

- Traded several vastly different architecture solutions by building detailed computational models of the systems, evaluating performance using many standard and custom metrics, and estimating impacts to both capital and operating expenditures
- Invented industry-leading (patents pending) solutions to:
  - weather dependent power pooling in direct-radiating-array antennas
  - streaming operations for space-based video-on-demand services
  - optimal geographic siting of gateways in constrained and dynamic-connectivity networks,
  - minimum angular area definition while maintaining full volumetric coverage
- Created now-standard tools and models for network throughput optimization/calculation, terrestrial multipath & reflection analysis, end-user demand quantification, system performance and geospatial data visualization
- Regularly communicated analysis results to internal and external audiences, executive and technical, most notably to the Wireless Telecommunications Bureau of the FCC (Federal Communications Commission)

Digital Signal Processing Algorithms Designer

Designed and tested error-detection/correction algorithms and circuits used on 4 spacecraft currently on orbit

- Designed several error-detection/correction algorithms using MATLAB & Simulink and identified pros and cons of each to enable final selection for flight hardware
- Implemented my design in VHDL and developed a suite of 100+ test waveforms, and executed them via Hardware-in-the-Loop tests to ensure the intended functionality

The MITRE Corporation, Software Defined Radio Group — Summer 2011
San Diego, California
Communications Systems Engineer

Motorola, Global Network Systems — Summer 2010
Schaumburg, Illinois
Network Equipment Engineer

Education

Master of Science in Electrical Engineering — 3.8 GPA — 2012
Northwestern University — Evanston, IL
Department of Electrical Engineering & Computer Science — Wireless Communications Systems

Bachelor of Science in Electrical Engineering — 3.8 GPA — 2012
Northwestern University — Evanston, IL
Department of Electrical Engineering & Computer Science — Magna Cum Laude

Technical Skills

Architecture Design · Antenna · Atmospheric Effects · Bit-Error Correction/Detection · Network Capacity Concept of Operations (ConOps) · Data Visualization · Digital Signal Processing · End-to-End Performance Frequency Reuse Optimization · Payload Hardware · Interference Calculation · Laser Comm Link Performance · Network Routing · Multipath Ray-Tracing · MIMO Antenna · RF Comm Resource Allocation Optimization · Satellite Orbits · Verification/Test

Bash · C · C++ · Javascript · MATLAB · Python · Simulink · VBA · VHDL/Verilog