POSTER #38

SWTest Conference

Simplifying the Process of Probe Card Design Through Software Automation

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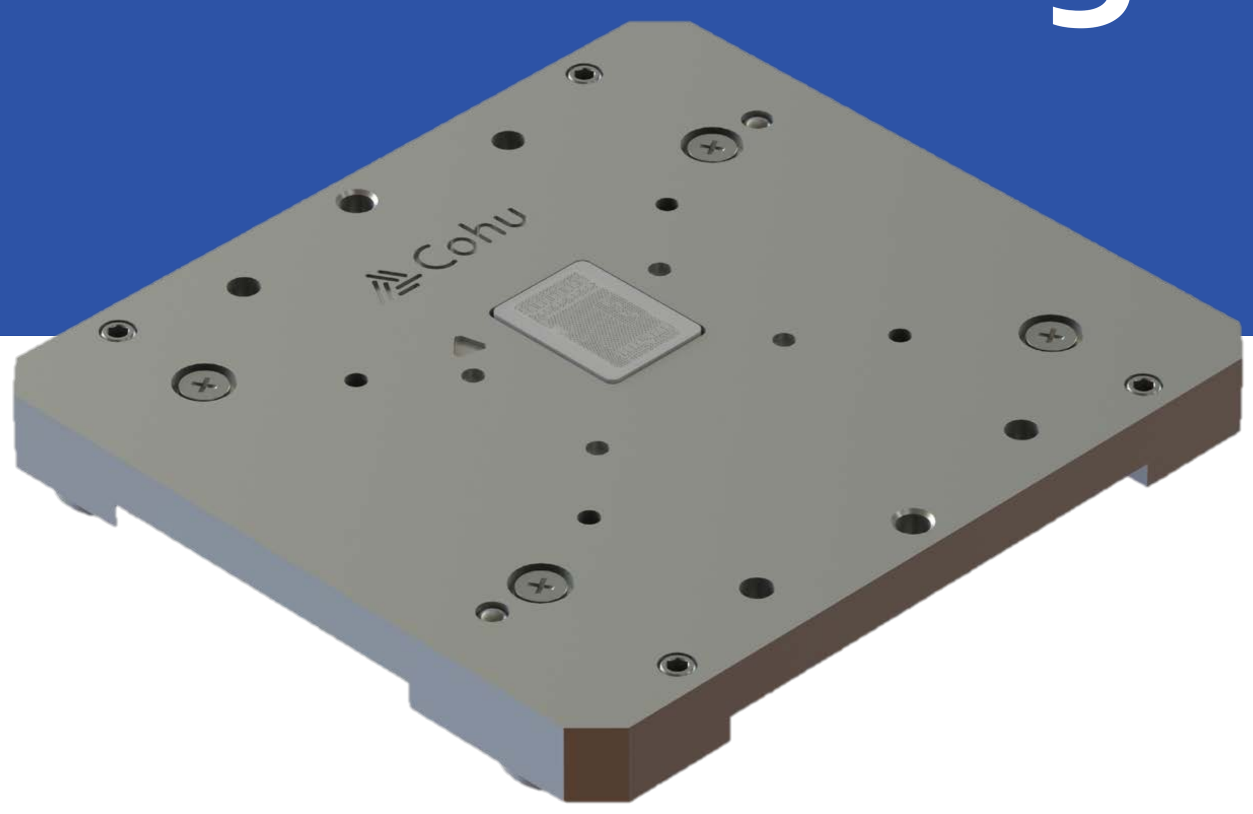


Introduction

In this presentation we'll review an approach to automating RF simulation for probe cards which significantly reduces effort, simulation errors, lead time, and cost. The proposed method involves automated model creation with an integrated electromagnetics solver. Simulated models incorporate probe head geometries, materials, cross sections, and die features. Automating and parameterizing the models significantly reduces the manual effort required to create, run, and optimize complex RF simulations. Additionally, the automation process minimizes the risk of human error, thereby improving the accuracy and reliability of simulation results.

Desired Outcome:	
Drastically reduce manual input	Reduce errors and increase accuracy
Reduce standard lead time	Simplify and standardize setup

Achieve Outcome By:		
Automating 3D model design	Standardizing inputs	Leveraging existing part vault
Fully parameterizing models	Automatic optimization	Automatic report generation

Method

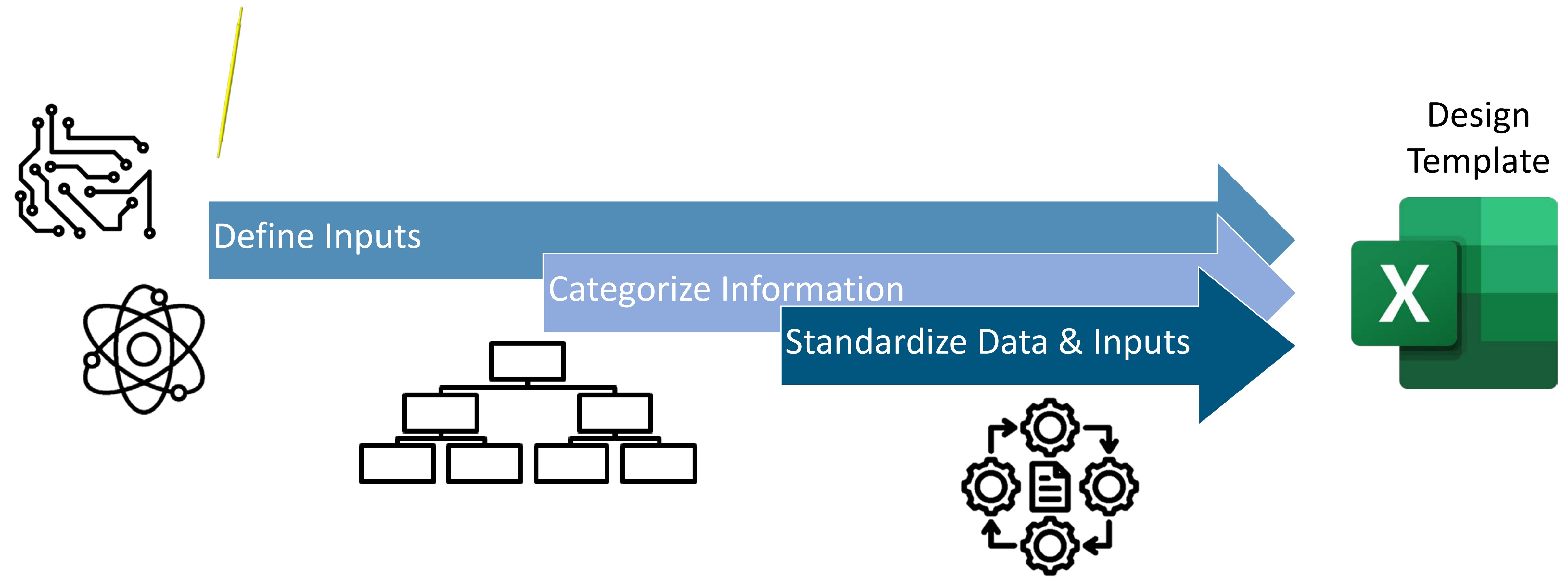
Determine Inputs and Outputs

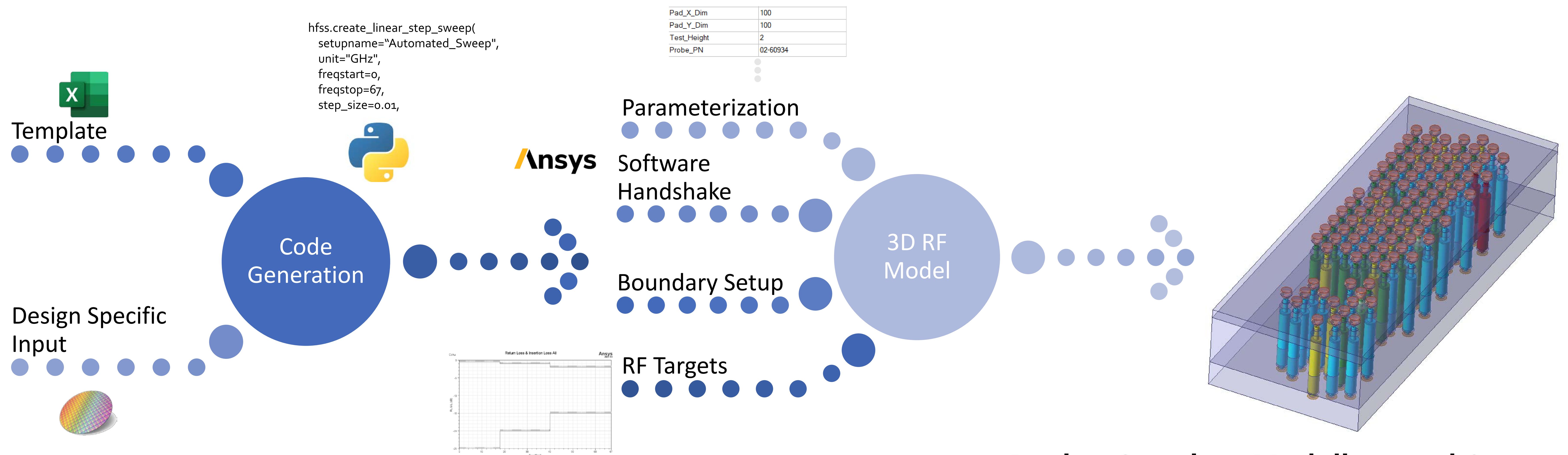
- Define all inputs of the 3D model and RF setup
- Break down types/source of information into categories
- Format data manipulation software to easily accept the different types of information
- Standardize processes and inputs based on information type
- Communicate physical and RF characteristics to the EM software
- Import standard components from part vault
- Setup RF targets and optimization automatically
- Export RF simulation results for review

Methods

Decompose & Standardize

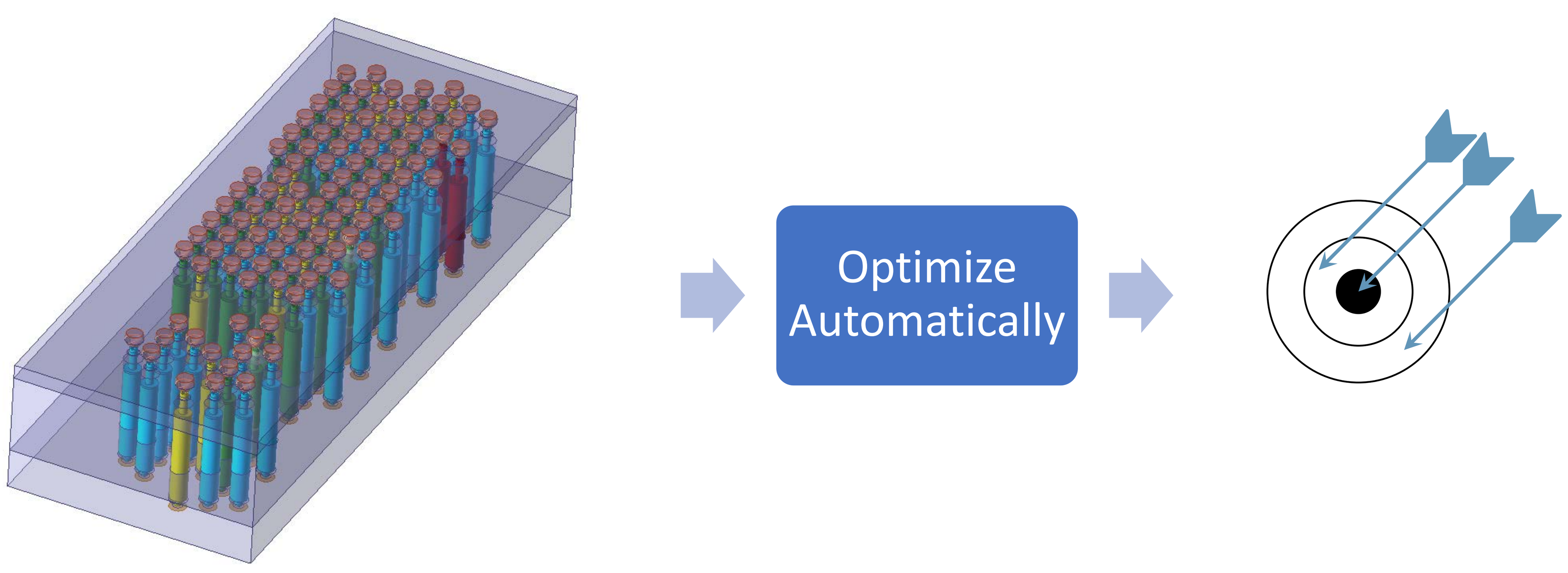
- Break down inputs
- Define critical parameters
- Utilize existing infrastructure
- Construct template according to outcome

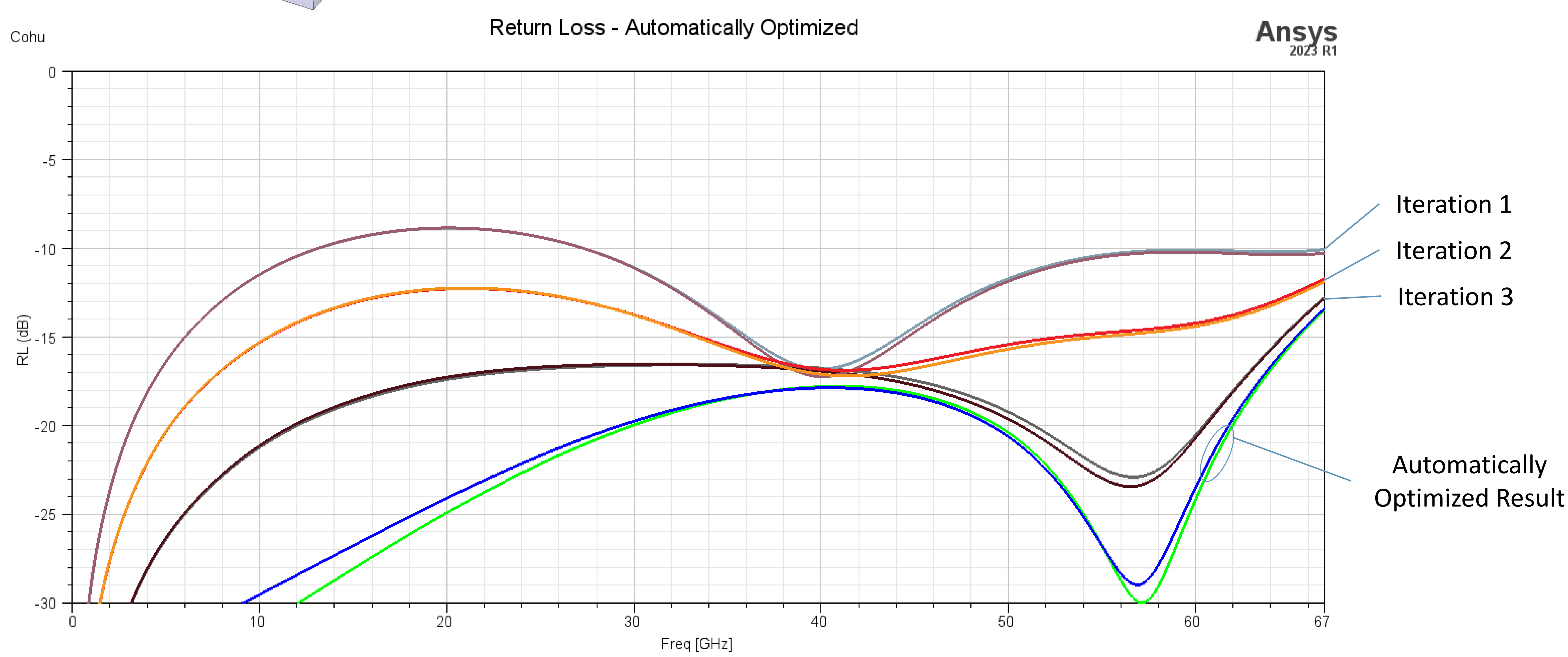




Design Creation, Modeling, and Output

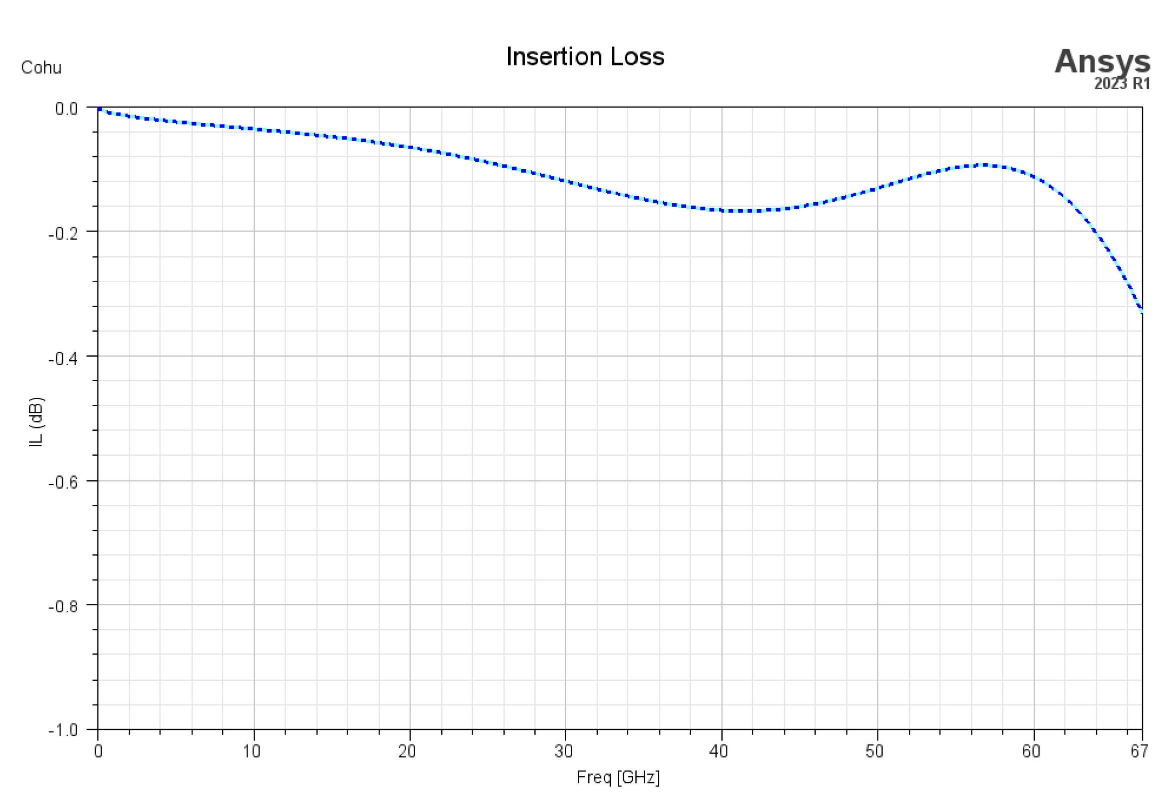
- Input design specific info into the template
- Code is generated to utilize template and design information
- Code interfaces with the EM software, parameterizes the model, and inputs RF targets

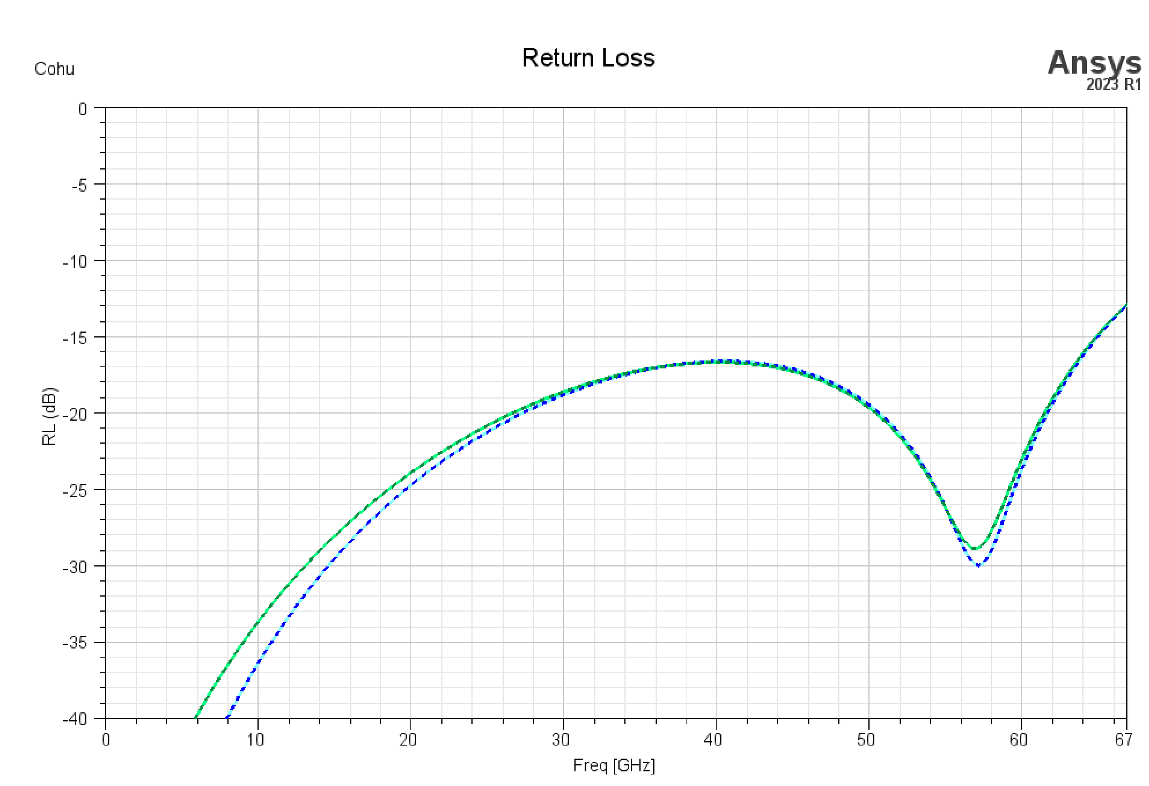




Process Verification

- Same model created using both methods
- Parameters match inputs from template
- Results correlate extremely well (overlap exactly) between both methods

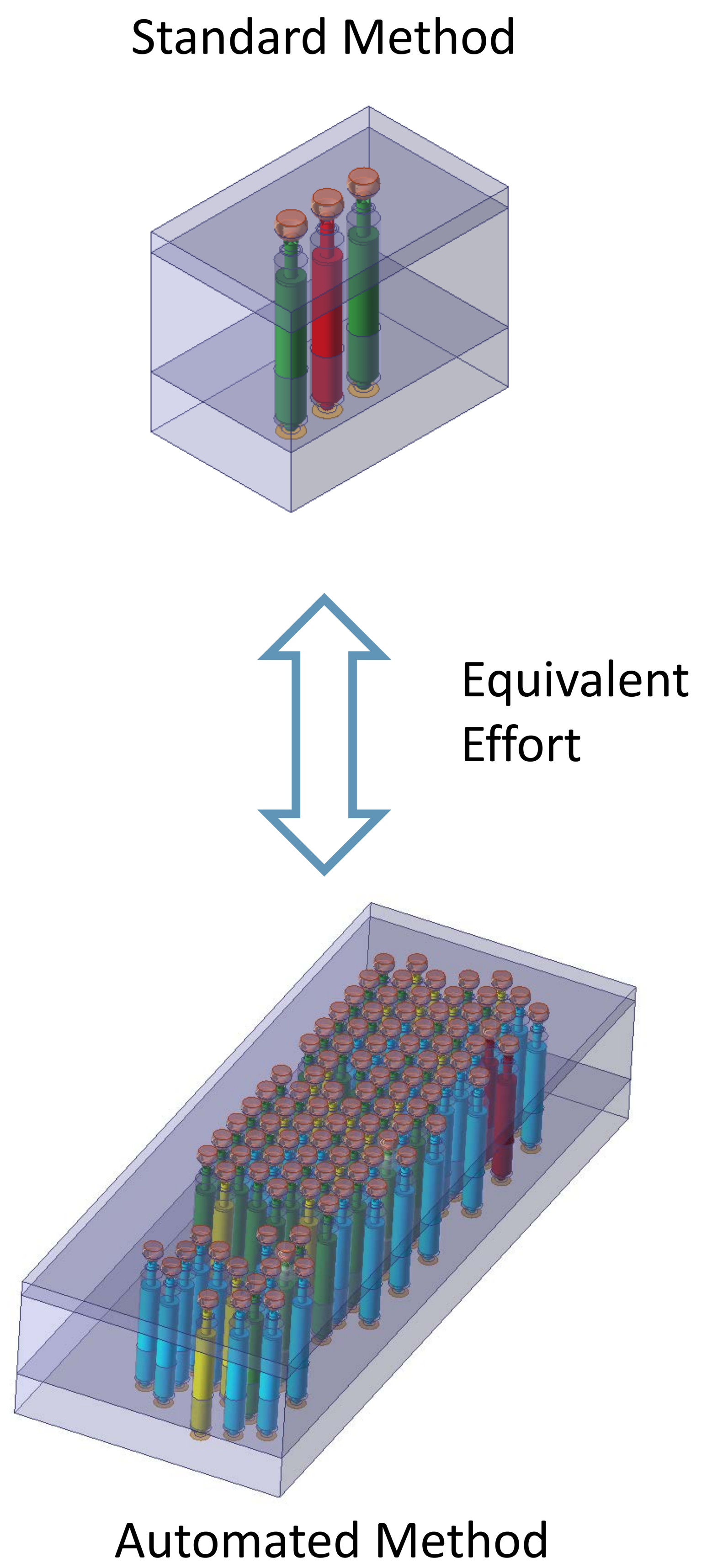


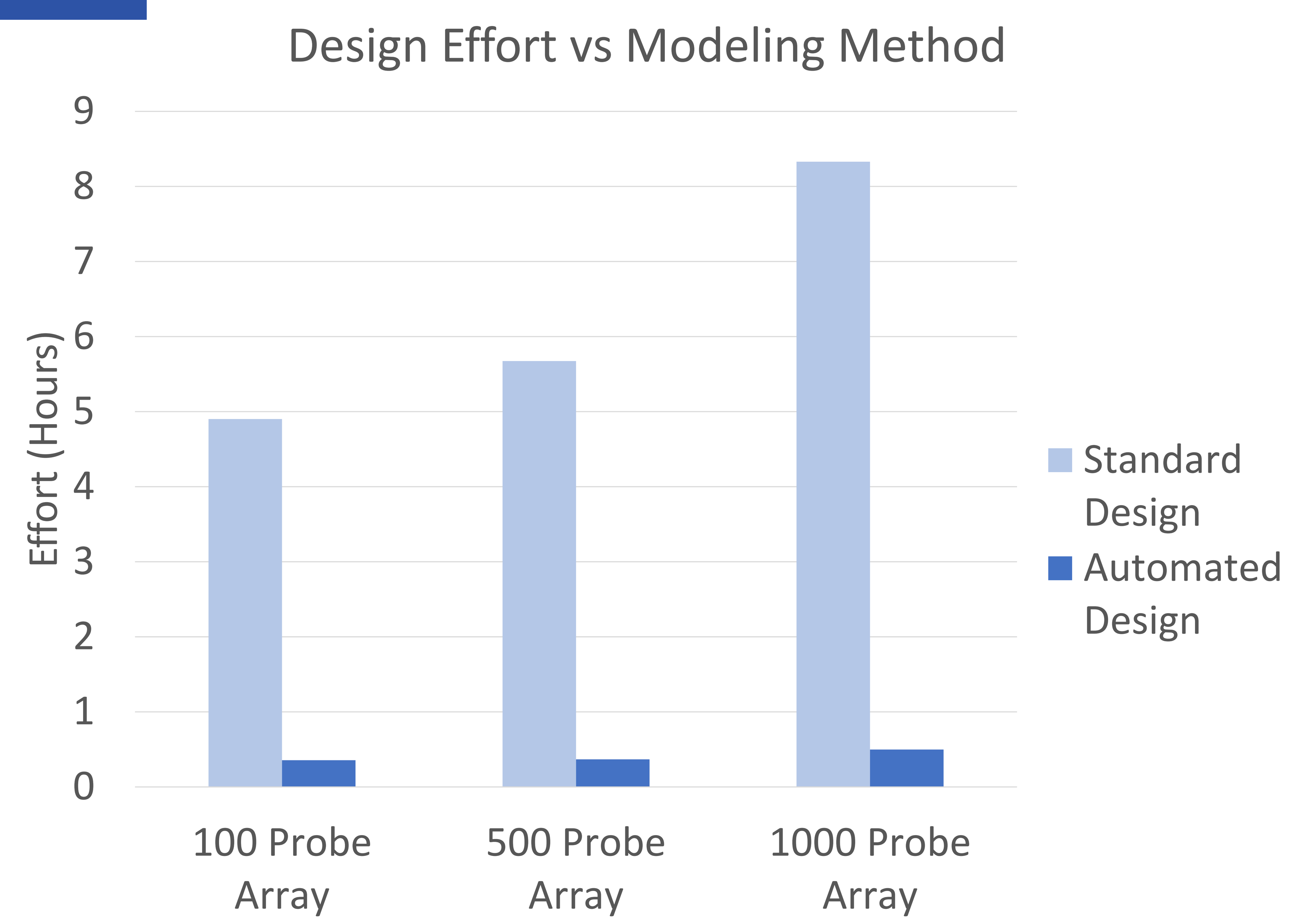


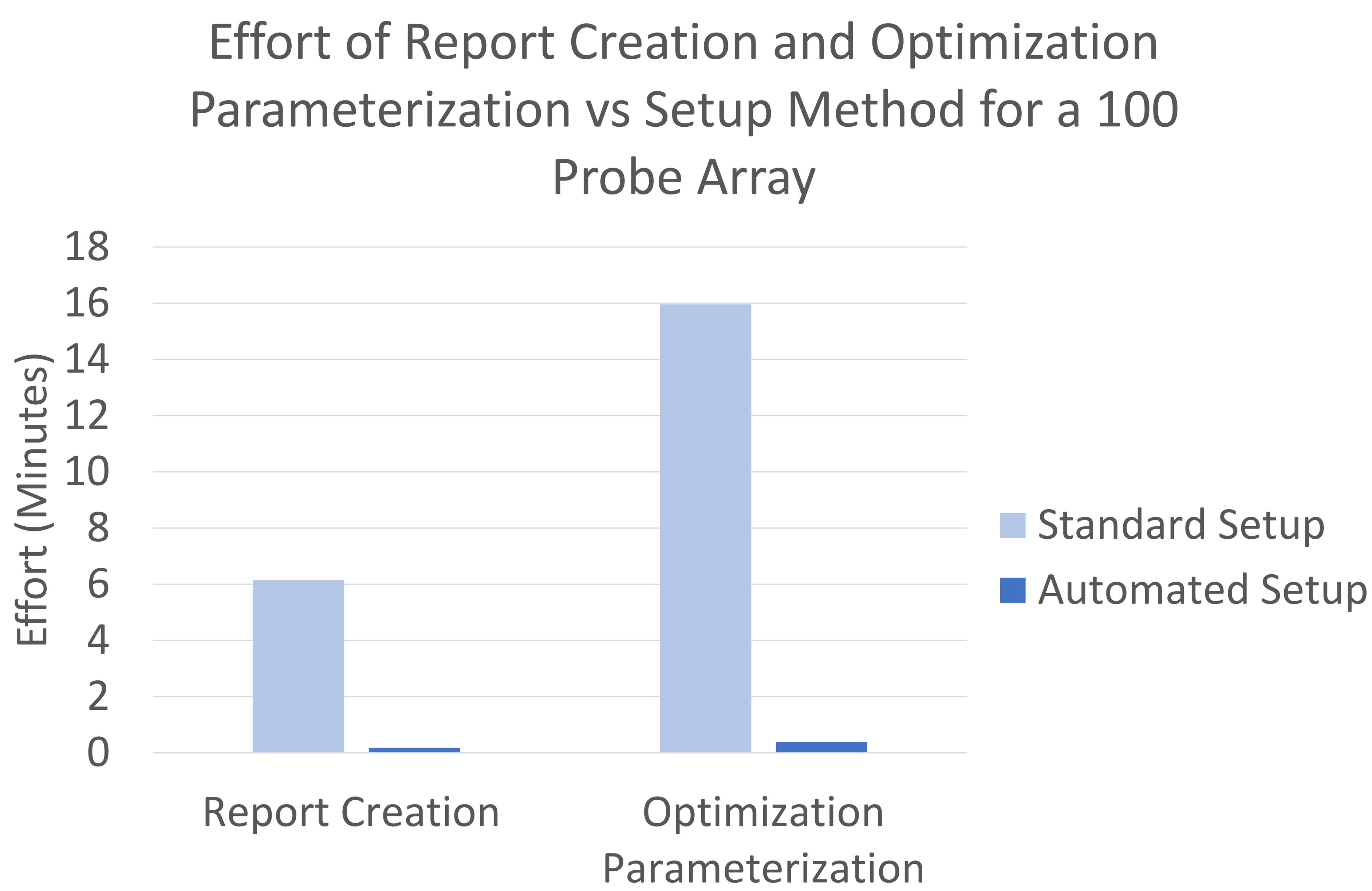
Results

Beyond Efficient

- Effort was recorded for five designs of each type
- The standard setup and automated setup were then compared for effort against varying probe counts for a single site
- Massive efficiency improvement
- No modeling errors for automated design method







Conclusion

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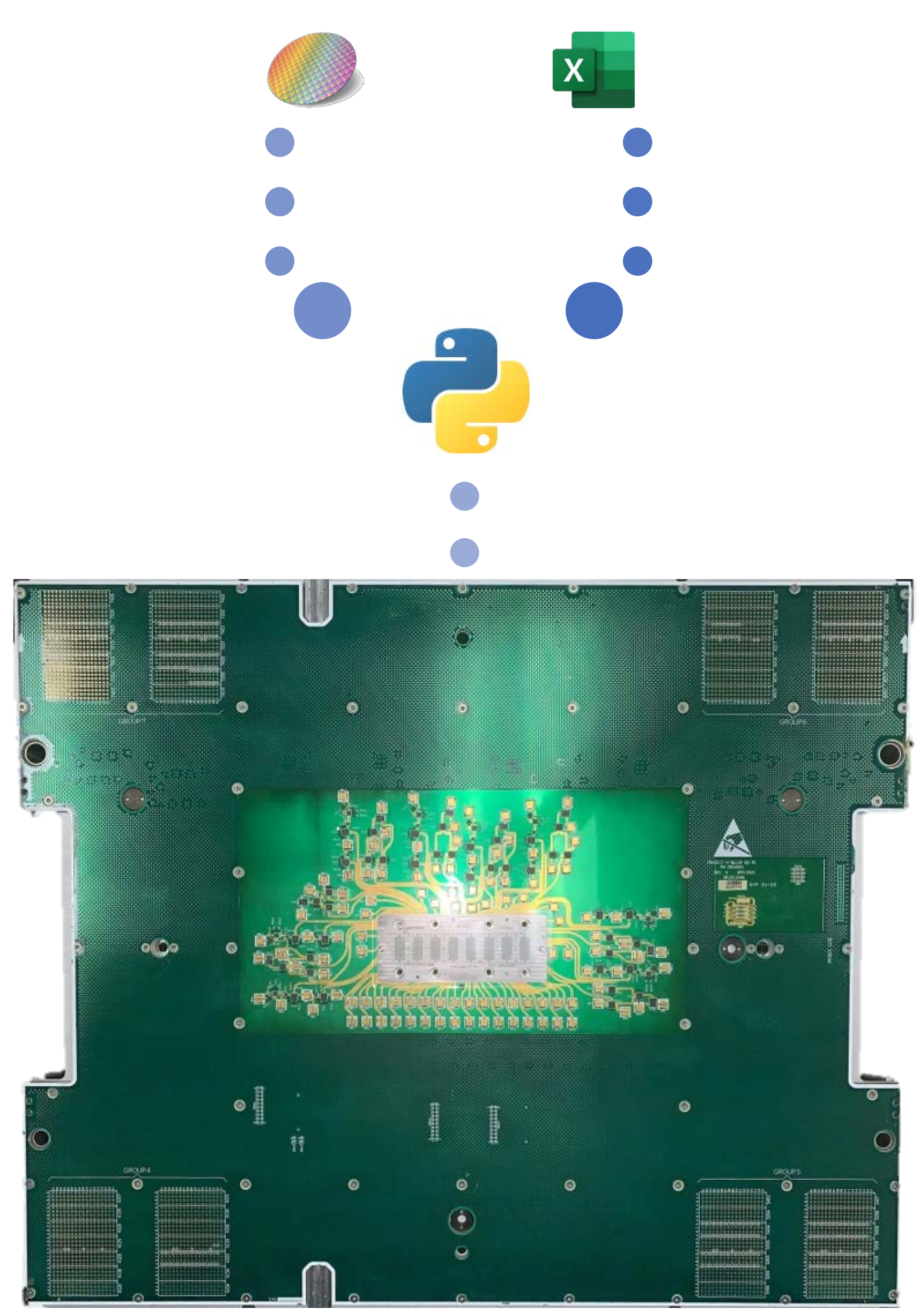
- The automated method has shown a clear improvement in RF modeling throughput while preserving model integrity
- More complex and precise models can be created in less time improving accuracy and decreasing lead time and cost
- Human error is vastly reduced with no errors seen in automated modeling of the sample set

Future work

- Continuing integration with the EM software
- Multiphysics simulation with RF and mechanical
- Fully automated probe head assembly modeling



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