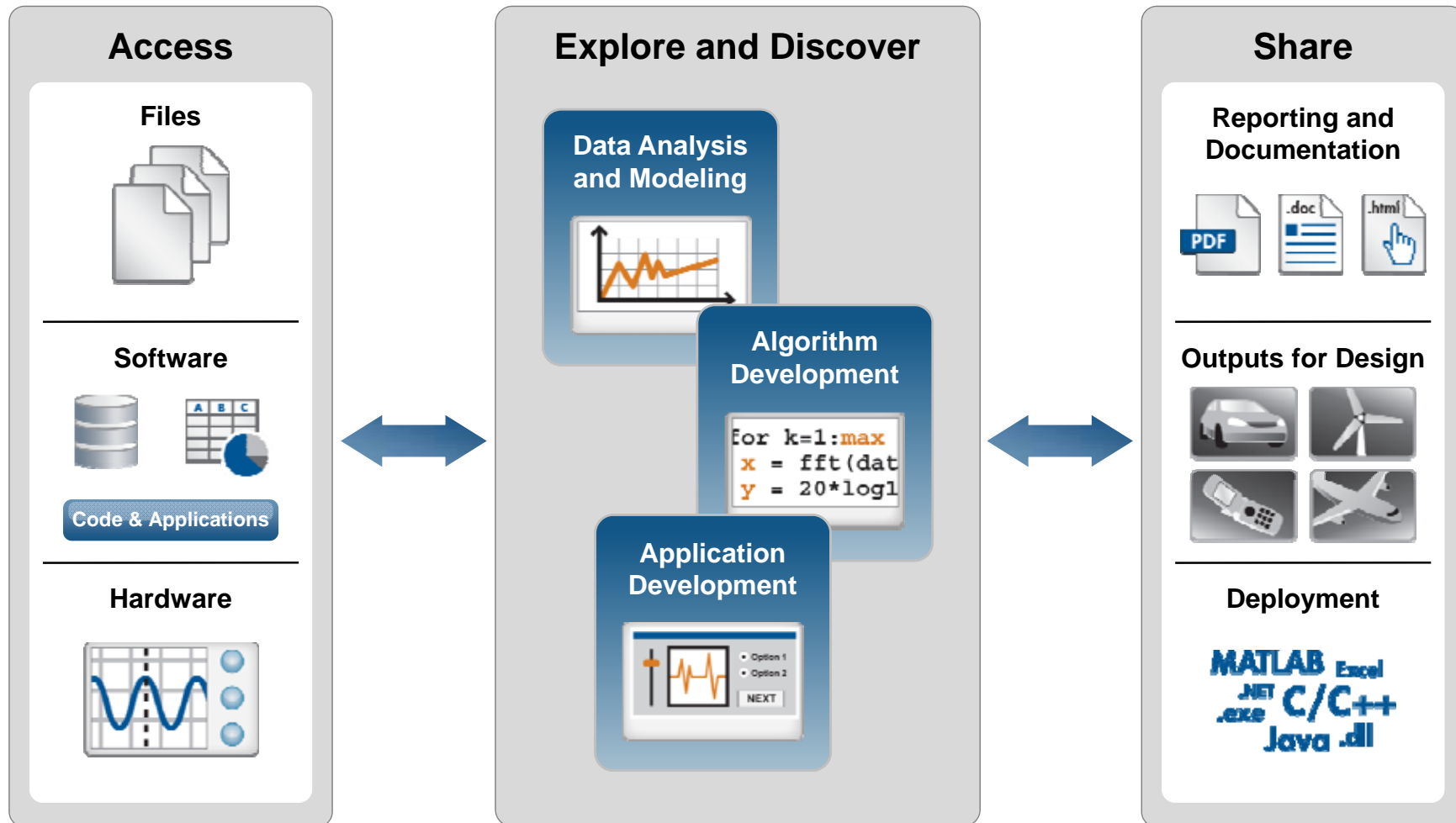


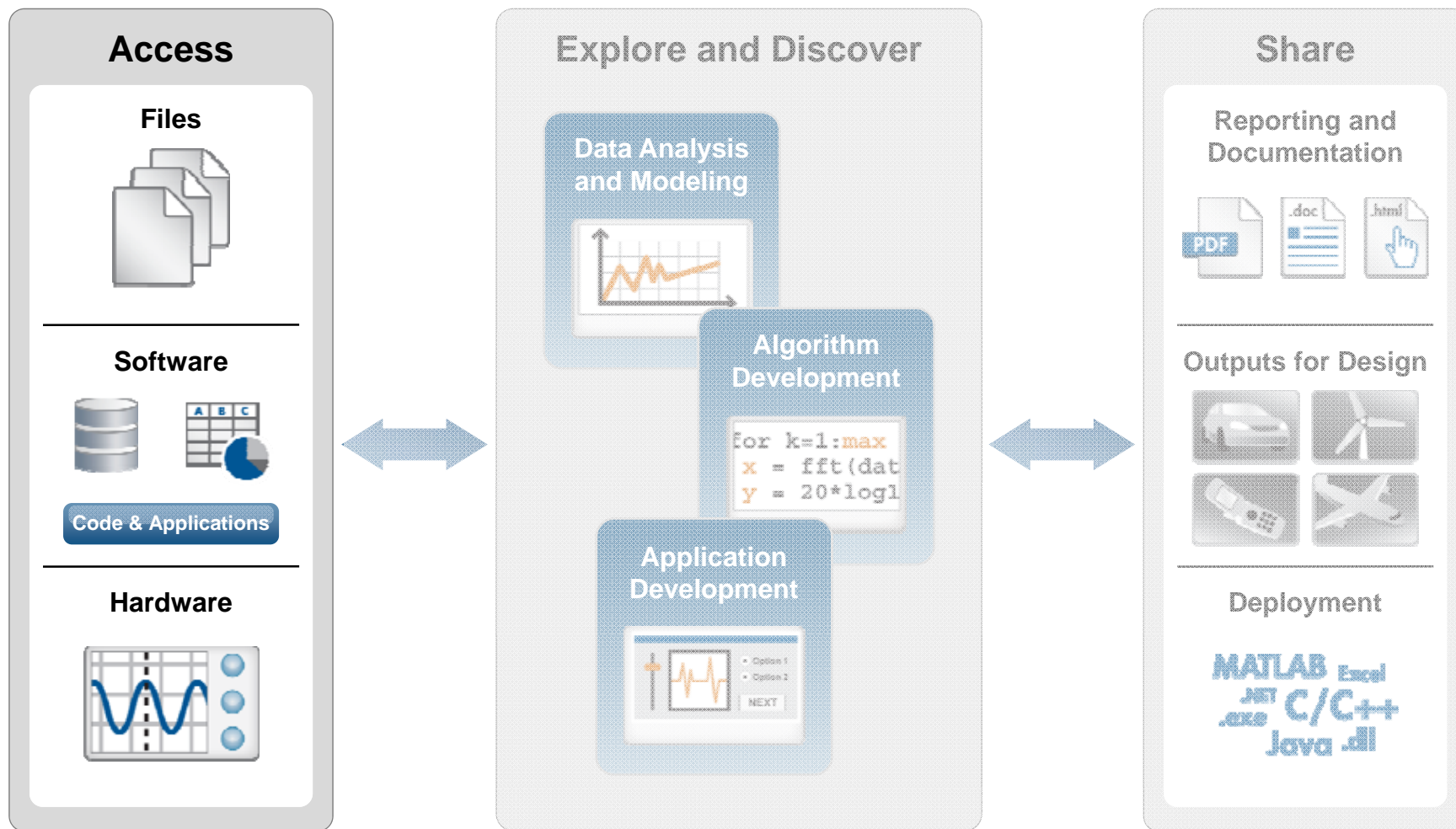
Massgeschneiderte Datenanalyse für die Messtechnik

Dr. Simon Ginsburg, MathWorks Schweiz

Key Takeaways



Accessing Data from MATLAB



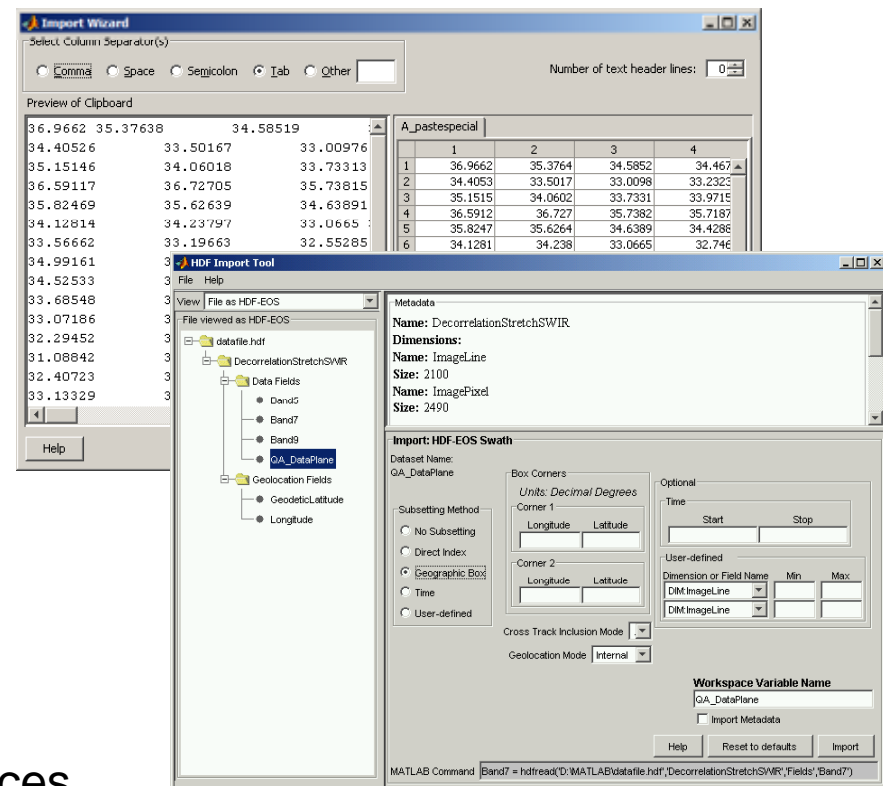
Accessing Data from MATLAB

Access

- Files
 - Excel, text, or binary
 - Multimedia, scientific
 - Web, XML
- Applications and languages
 - C/C++, Java, FORTRAN
 - COM, .NET, shared libraries
 - Databases
- Measurement hardware
 - Data acquisition hardware for signals or images
 - Stand-alone instruments and devices

Explore and Discover

Share



MATLAB Connects to Your Hardware Devices



Instrument Control Toolbox

Electronic and scientific instrumentation

Data Acquisition Toolbox

Plug-in data acquisition boards



Image Acquisition Toolbox

Video devices



MATLAB

Interfaces for communicating with everything

Automotive Systems Laboratory Tests Crash Sensors Using MATLAB and Data Acquisition Toolbox

Challenge

To sample crash test data fast enough to enable accurate testing of a magnetic sensor

Solution

Use MATLAB and Data Acquisition Toolbox to develop an onboard crash test system and analyze the resulting data

Results

- 30-40% reduction in test and analysis time
- Data acquisition program built and refined in just two hours
- Versatile, built-in mathematical functions for complete data analysis



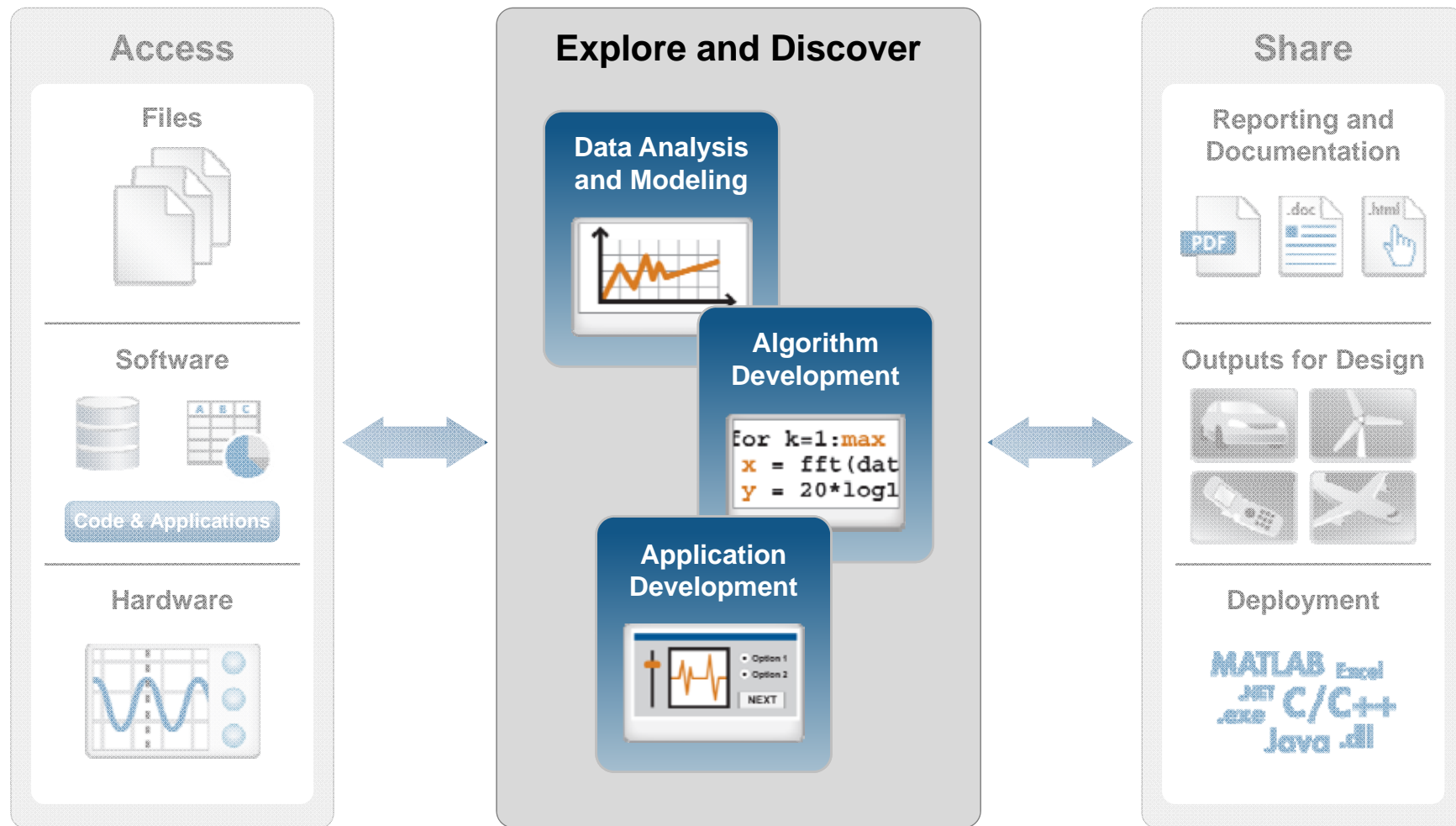
Automotive Systems Laboratory crash test unit.

“MATLAB and Data Acquisition Toolbox saved me at least 30-40% of time because I didn’t have to deal with separate tools for measurements and analysis.”

William Merrick
Automotive Systems Laboratory
Takata

[Link to user story](#)

Data Analysis and Visualization in MATLAB



Data Analysis and Visualization in MATLAB

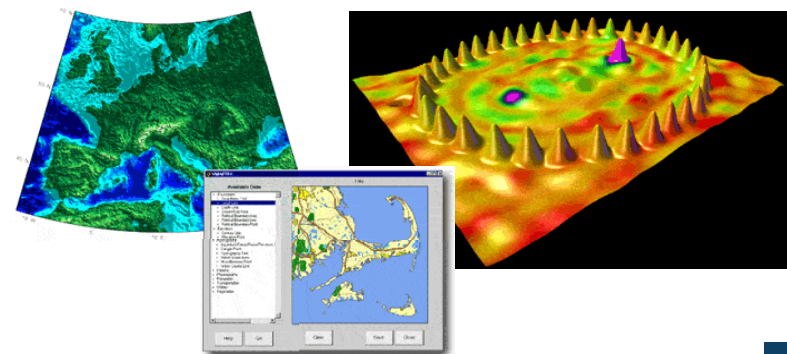
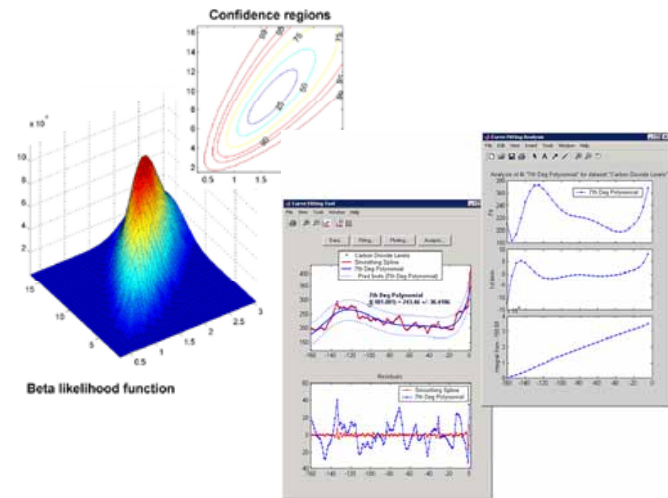
Access

Explore and Discover

Share

- Data analysis
 - Manipulate, preprocess, and manage data
 - Fast, accurate analysis with pre-built math and engineering functions

- Visualization
 - Built in graphics functions for engineering and science (2D, 3D, VolViz)
 - Interactive tools to annotate and customize graphics



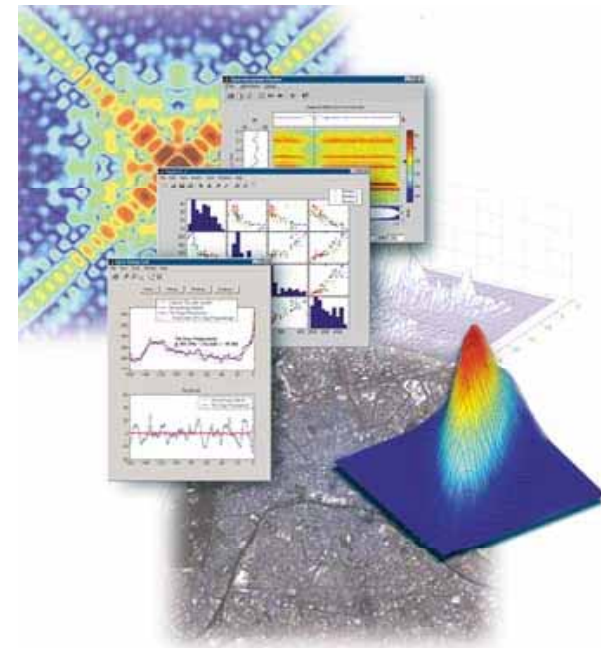
Expanding the Capabilities of MATLAB

Access

Explore and Discover

Share

- MathWorks add-on tools for
 - Statistics and curve fitting
 - Signal and image processing
 - System identification and control system analysis
 - Neural networks and fuzzy logic
 - Optimization
 - Model-based calibration and more ...
- Partner products for
 - Additional interfaces
 - Domain-specific analysis
 - Niche applications



Roche Evaluates Drug Safety and Efficacy Using MathWorks Tools

Challenge

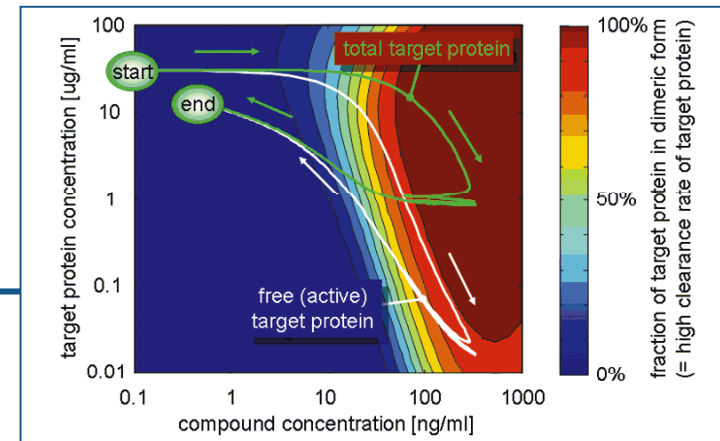
To increase the efficacy and safety of clinical drug trials and accelerate drug discovery

Solution

Use MathWorks tools to model drug interaction with human tissues and organs, optimize dosing regimes

Results

- Months of effort saved
- Therapeutic profile redefined
- Clinical trial approval process streamlined

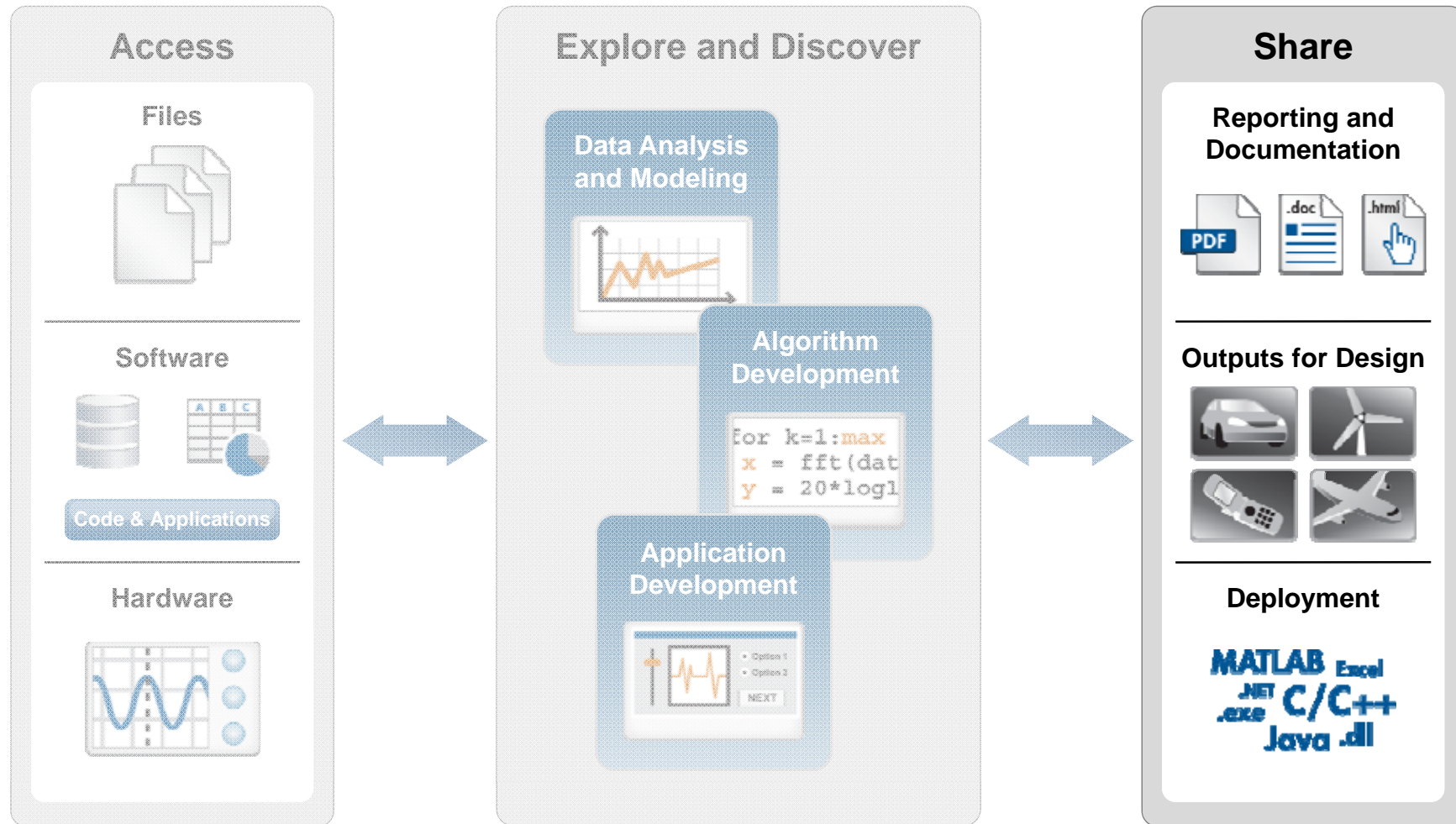


MATLAB visualization used to predict the clearance rate of the target protein.

“Using MathWorks tools to solve difficult ODE and ODE-PDE models, visualize results, and perform parameter optimization enables us to quickly isolate issues in the development of candidate drugs and to design the best experiments to tackle those issues.”

Cristiano Migliorini
Roche

Sharing Results from MATLAB



Sharing Results from MATLAB

Access

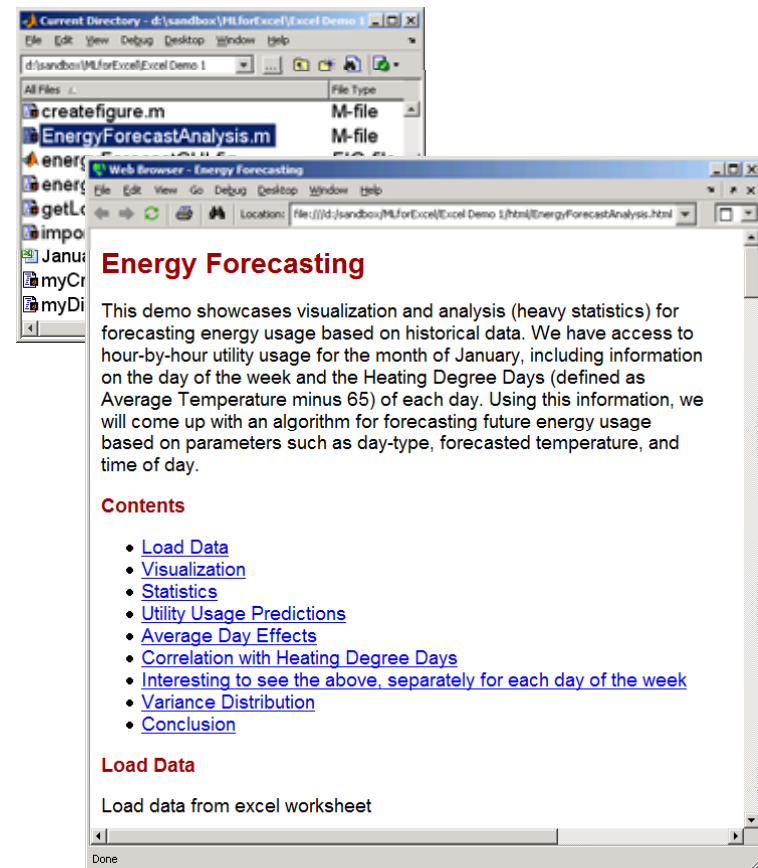
Explore and Discover

Share

- Automatically generate structured reports
 - Published MATLAB files
 - MATLAB Report Generator

- Feed your results into downstream design tools

- Deploy applications to other environments



Automating Digital Filter Implementation for an Audio Codec at MediaTek

Challenge

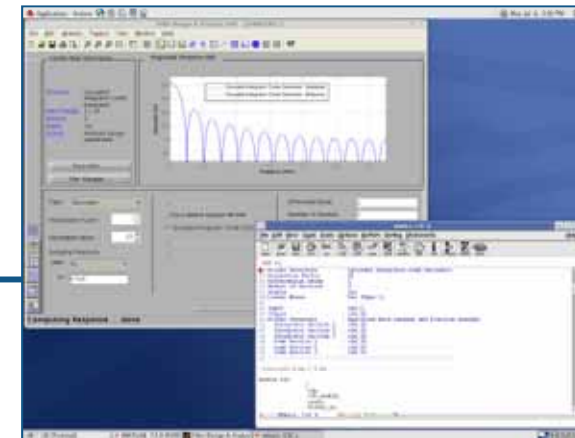
Design audio codec filters to rigorous signal-to-noise ratio and total harmonic distortion standards while minimizing power consumption and silicon area

Solution

Design individual filters in MATLAB and Filter Design Toolbox and use Filter Design HDL Coder to generate synthesizable RTL code

Results

- RTL development cycle reduced from three months to less than two weeks
- System modifications made in days, not weeks
- Evaluation of multiple filter architectures accelerated



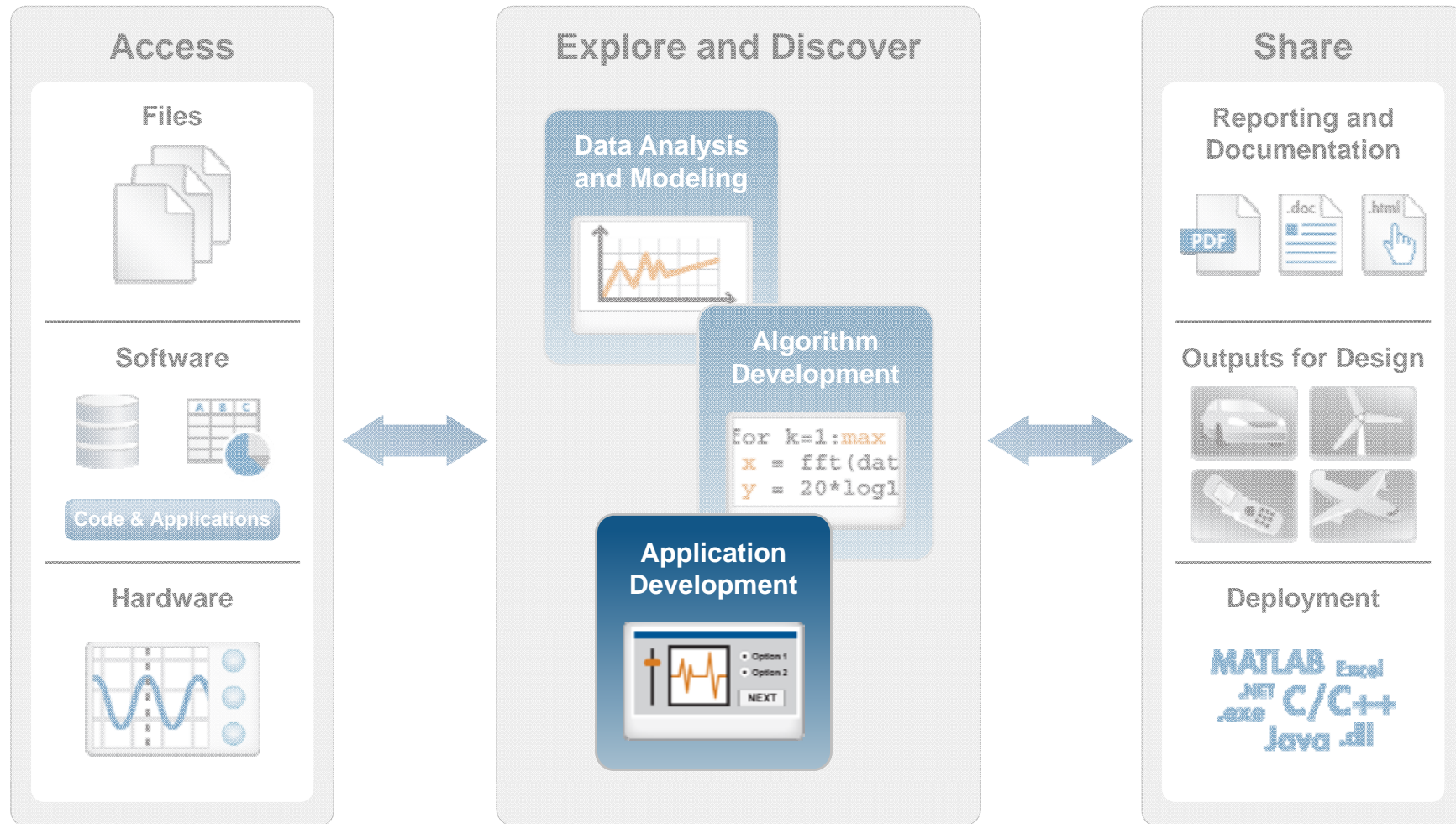
Filter architecture and segment of generated code.

“Tests of the initial chip run uncovered no problems whatsoever with the digital portion of the audio codec. This meant that our team was free to lend a hand with the analog parts of the design and with the rest of the testing effort.”

MediaTek Inc.

[Link to article](#)

Building an Analysis Application with MATLAB



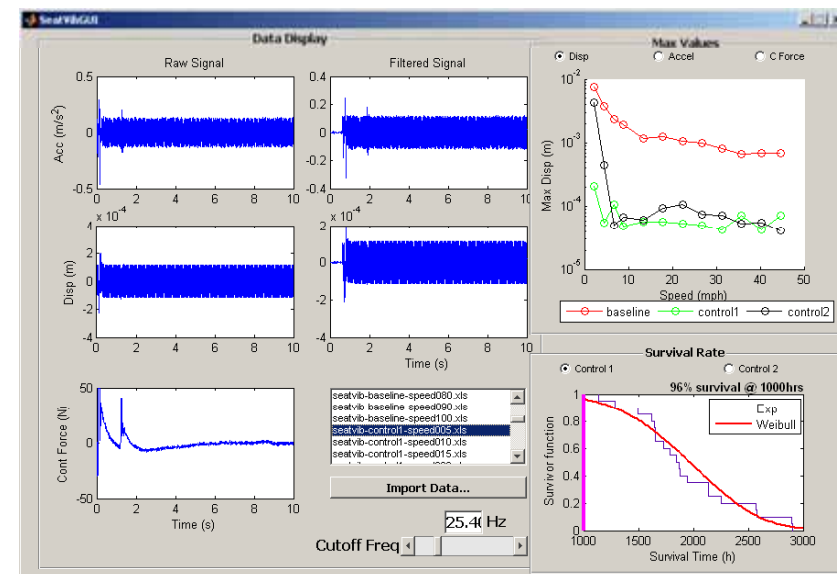
Building an Analysis Application with MATLAB

Access

Explore and Discover

Share

- Write reusable functions
- Leverage development tools to improve:
 - Code quality
 - Performance
 - Supportability
- Add a graphical user interface
 - Use pre-defined dialog boxes (select files, print graphics, ...)
 - Develop a complete custom graphical user interface



Beth Israel Deaconess Medical Center Improves MRI Accuracy Using MathWorks Tools

Challenge

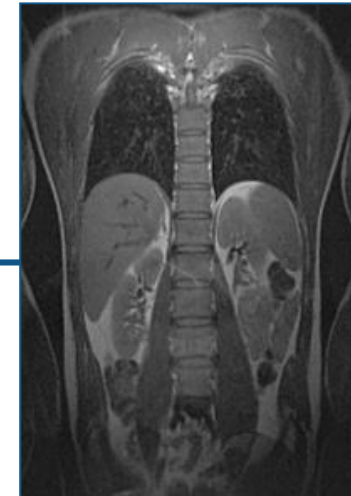
To develop a safe and effective way to improve the resolution and speed of MR scans

Solution

Use Image Processing Toolbox software and other MathWorks products to develop a technique for accessing multiple image components simultaneously

Results

- Faster, more informative MR scans
- Ability to experiment with new approaches
- Reduced programming time



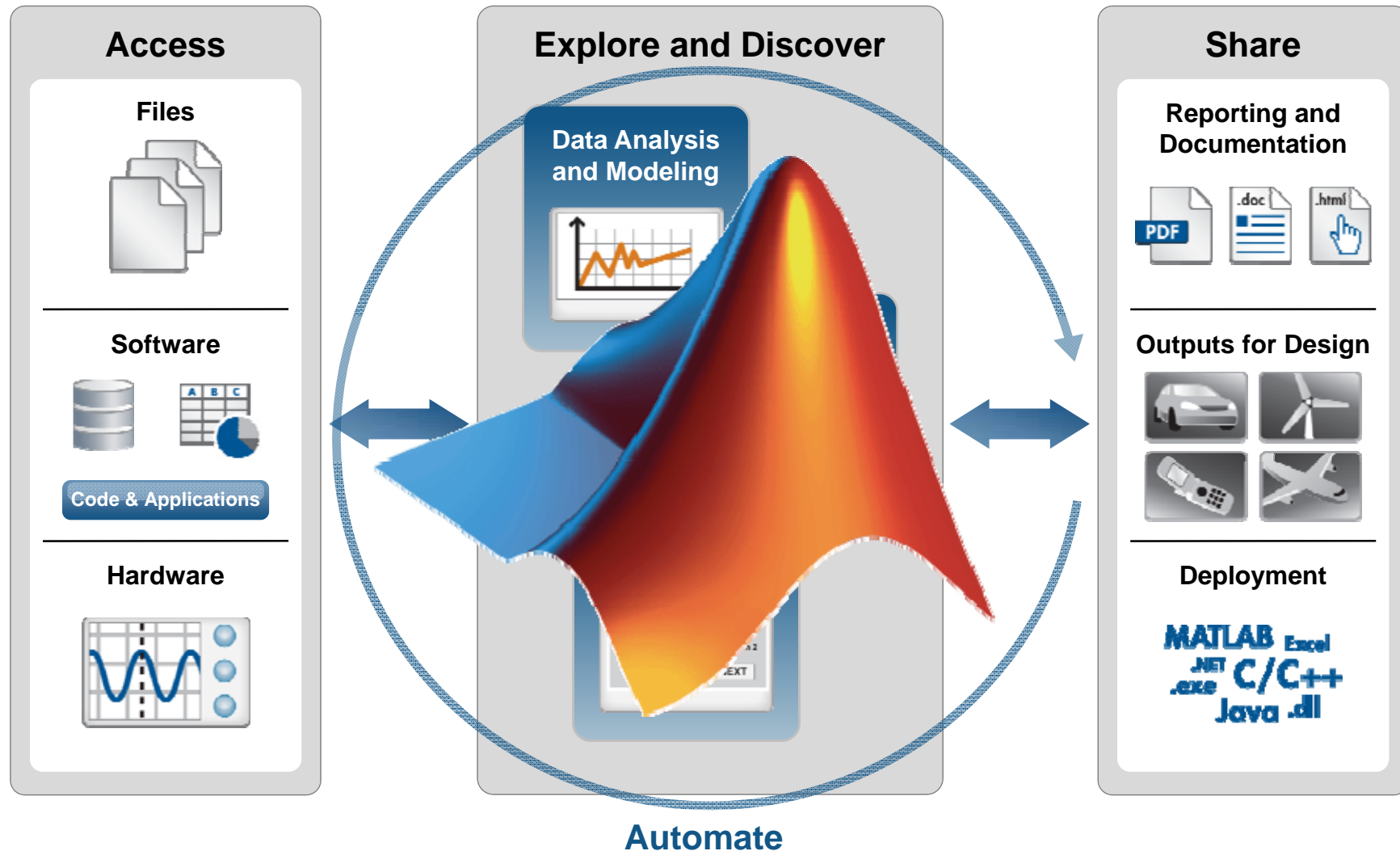
SMASH image of the chest and abdomen, reconstructed from MR signal data.

“MATLAB provides a combination of matrix manipulation and visualization capabilities that are key to our imaging work.”

**Dr. Daniel Sodickson
Beth Israel Deaconess Medical Center**

[Link to user story](#)

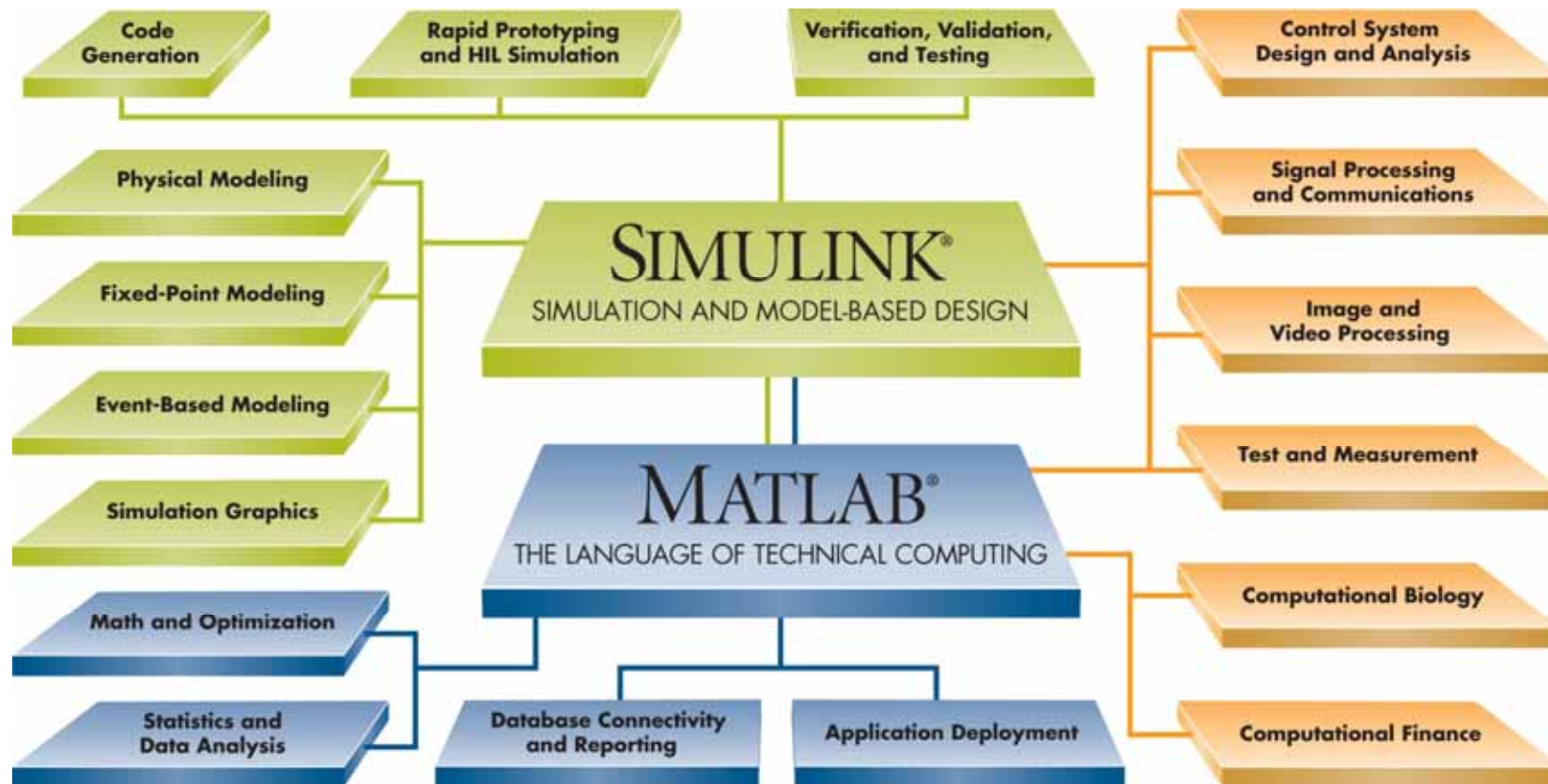
Summary: Unified Environment for T&M



Outlook: There's more for you!

Simulink Product Family

Application-Specific Products



MATLAB Product Family