

EADS TELECOM Validates the Feasibility of a Next-Generation Professional Mobile Radio Design with MATLAB®

Before a new telecommunications product is delivered to market, manufacturers need to verify the technical feasibility of the design. Extensive tests must be performed to confirm that the design will meet the technical specifications before committing product development time and resources. Key clients also must be convinced that the product can be delivered before selecting the manufacturer.

EADS TELECOM, a leading worldwide provider of digital public safety communications networks, recently used MATLAB® and companion MathWorks toolboxes to successfully demonstrate the feasibility of an air interface protocol for a professional mobile radio (PMR) communication network.

“With MATLAB, the Image Acquisition Toolbox, and the Data Acquisition Toolbox, we created a powerful proof-of-concept with little development resources and budget,” says Aurélie Gaussorgues, project manager at EADS TELECOM. “We showed our client the data services we proposed on a real-time platform.”

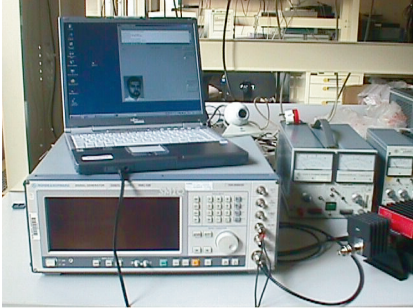


Image acquisition, processing, and base-band signal transmission.

Because hardware and software integration often occurs too late in the design process to test aspects of product design, such as the required data transmission rate, the design verification occurs later and at an additional cost. Therefore, the proof-of-concept would need to be developed before the actual hardware platform based on a custom DSP microchip was available.

To develop the proof-of-concept without the product hardware, image data would need to be acquired with a Web camera. The baseband signal of a radio transmission would then be generated based on the image's contents.

Performing traditional image acquisition involves using vendor-specific software provided with the image acquisition device. Similarly, generating data traditionally involves using vendor-specific software provided with the data acquisition equipment. Using one software package to acquire images, one package to analyze those images, and a third package to control data devices based on the image contents would be difficult and time-consuming.

THE CHALLENGE

To demonstrate the feasibility of an air interface protocol for a professional mobile radio communication network

THE SOLUTION

Used MathWorks tools to develop a proof-of-concept based on live test data

THE RESULTS

- Time saved
- Financial resources conserved
- Project feasibility quickly confirmed

THE CHALLENGE

EADS TELECOM was committed to selling a communications product based on a new design to an important client. To win the business, they would need to prove the technical feasibility of the design to the client. Specifically, they would have to prove that they could implement the future-generation PMR protocol at the specified data transmission rate. In addition, they would need to conduct the demonstration early in the development process to avoid jeopardizing the product sale.

To compete for their client's business, EADS TELECOM would need a single integrated image acquisition, hardware control, and data analysis software solution to make design testing possible within the required time.

THE SOLUTION

EADS TELECOM used MATLAB with the Image Acquisition Toolbox and the Data Acquisition Toolbox to control their test setup, which included a USB Web camera and a sound card.

To validate their design to their client, EADS TELECOM acquired one image every five seconds from a Web camera. Images acquired varied but typically involved surveillance of emergency situations in the end application. They performed the image acquisition with only a few lines of code in MATLAB using the Image Acquisition Toolbox. Since they used MATLAB to acquire the images, those images were directly available in MATLAB for analysis and visualization.

To generate the base-band signal, they used the Data Acquisition Toolbox to send the computed data to the audio output. They then used the filtering algorithms in the Signal Processing Toolbox to process the base-band signal. The entire generation routine consisted of a few lines of MATLAB code. Finally, they generated the spectrum of the radio signal using a vector signal generator to transpose it to 880 MHz.

EADS TELECOM created a GUI with MATLAB to demonstrate the image acquisition and data transfer capabilities to the internal and external clients, with positive results. Using MATLAB and related toolboxes, EADS TELECOM successfully confirmed the technical feasibility of their design. They are now enhancing their telecommunications product for their client.

APPLICATION AREAS

- Communications
- Data analysis
- Signal processing
- Test and measurement

PRODUCTS USED

- MATLAB
- Image Acquisition Toolbox
- Data Acquisition Toolbox
- Signal Processing Toolbox

“MATLAB, the Image Acquisition Toolbox, and the Data Acquisition Toolbox saved us more than a month's worth of time because we didn't have to deal with separate tools for measurement and analysis.”

Aurélie Gaussorgues, EADS TELECOM

THE RESULTS

■ **Time saved.** With data generation, hardware control, and data analysis capabilities accessible from the same environment, EADS TELECOM optimized and validated their design quickly. “MATLAB, the Image Acquisition Toolbox, and the Data Acquisition Toolbox saved us more than a month's worth of time because we didn't have to deal with separate tools for measurement and analysis,” Gaussorgues says.

■ **Financial resources conserved.** “MATLAB and its family of toolboxes enabled us to verify and demonstrate the technical feasibility of our design to our organization and to our client without allocating financial and engineering resources to developing the solution with DSP hardware,” explains Gaussorgues.

■ **Project feasibility quickly confirmed.** “With MATLAB and its associated toolboxes, we managed the risk related to the planning for our project,” says Gaussorgues. “We completed the feasibility phase very quickly, allowing us to complete the project on time.”

To learn more about EADS TELECOM, visit www.dcs.eads.net

www.mathworks.com