Scanning can be performed remotely or via visualization. The laser scanner measures the thickness of the residual refractory lining.

Views with the thickness of the residual refractory lining are displayed on the visualization PC through the laser software.

The images are available in the form of 2D and 3D images, and the results can be analyzed. Import your wall contour view into the software.

You can manually select projection areas and the number of layers or import predefined projection programs.

The consumption of refractory mix and the required time are calculated beforehand before projection.

Our robot is positioned in the center of the furnace via radio remote control. The preselected areas are projected automatically.

The projection consumption data and process data are stored and can be analyzed. We need someone who can program our new laser (C++, PYTHON, JAVA, etc.).

The task is to program this laser from scratch to perform the functions mentioned above and be creative for additional functions:

To program your new laser system to perform the functions you’ve described, you’ll need a combination of skills in C++, Python, or Java, along with experience in robotics and laser scanning technology. Here’s a high-level overview of how you might approach this task:

**1. Understanding Requirements**

* **Laser Scanning**: Implement functionality to measure the thickness of the residual refractory lining.
* **Visualization**: Develop software to display 2D and 3D images of the scanned data.
* **Data Analysis**: Create tools to analyze the scanned data and calculate the consumption of refractory mix and required time.
* **Robot Control**: Program the robot to position itself and project the refractory mix automatically.

**2. Setting Up the Environment**

* **Choose a Programming Language**: Decide whether to use C++, Python, or Java based on your team’s expertise and the specific requirements of the laser and robot hardware.
* **Development Tools**: Set up your development environment with necessary libraries and tools for robotics and laser scanning.

**3. Programming the Laser Scanner**

* **Interface with Hardware**: Write code to interface with the laser scanner hardware to capture thickness measurements.
* **Data Processing**: Implement algorithms to process the raw data into meaningful measurements.

**4. Visualization Software**

* **2D and 3D Rendering**: Use libraries like OpenGL (C++), Matplotlib (Python), or JavaFX (Java) to render the scanned data.
* **User Interface**: Develop a user-friendly interface to display the data and allow for manual selection of projection areas.

**5. Projection and Analysis**

* **Projection Calculation**: Write algorithms to calculate the consumption of refractory mix and the required time for projection.
* **Automation**: Program the robot to automatically project the refractory mix based on the preselected areas.

**6. Data Storage and Analysis**

* **Data Logging**: Implement functionality to store projection consumption data and process data.
* **Analysis Tools**: Create tools to analyze the stored data for future optimization.

**7. Testing and Debugging**

* **Simulations**: Run simulations to test the software before deploying it to the actual hardware.
* **Field Testing**: Conduct field tests to ensure everything works as expected in a real-world environment.

**8. Documentation and Training**

* **Documentation**: Write comprehensive documentation for the software.
* **Training**: Provide training for the team on how to use and maintain the system.

Would you like more detailed guidance on any specific part of this process?