Software development for 3D visualization of G-Code when working with CNC machines

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Any CNC machine essentially consists of the following components:
- part processing program;
- a device for data input;
- a drive mechanism;
- a machine tool for controlling the movement of the machine along the X and Y axes in the plane and along the Z axis vertically;
- a feedback system (measuring system);
- machine control device.
The G-CODE teams themselves are divided into groups:

* G - Preparatory (core) teams;
* M - Auxiliary (technological) teams.

These commands have parameters:

* X - The coordinate of the trajectory point along the X axis [G0 X100 Y0 Z0];
* Y - The coordinate of the trajectory point along the Y axis [G0 X0 Y100 Z0];
* Z - The coordinate of the trajectory point along the Z axis [G0 X0 Y0 Z100];
* E - The coordinate of the extrusion point of the plastic [G1 E100 F100];
* P - Parameter of the command [M300 S5000 P280];
* S - Command parameter [G04 S15];
* F - Command parameter, feed (speed) [G1 Y10 X10 F1000].
Emulation of the G-Code sweep
Beckhoff TwinCat HMI Shell