Few assumptions have been made in here based on the devices list and the work you guys do. I assume this system will be used to form a meatal sheet (haha genius). the Laser Scanner and the Load Cell needs to give feedback about the accuracy over the metal sheet.

The Hydraulic pump system is used to handle the fixture

Spindle VFD (designed for 480VAC/4-20mA I assume) will be used to move the robots horizontally

After reviewing manuals and researching some of the hardware I decided to choose the fallowing for my design:

Star Topology would be my choice for this Fieldbus system because it will offer the following:

1. Centralized Control
2. Isolated Faults
3. Easy Expansion
4. Clear Structure and Management
5. Compatibility and Scalability
6. Efficient Data Transmission
7. Reduced Data Collision
8. Suitability for Small to Medium-Sized Networks

Standardizing on Ethernet-based comms (TCP/EIP/ECAT) feels like the right choice to me, it is compatible with all components, the simplicity of wiring standpoint but also just because "that's the direction everything is moving/has moved to", even if that means including things like the comms module to account for older hardware not supporting it natively. it also makes it easier in case of a future "upgrade" or part replacements--already having the system designed around a more modern fieldbus means that you aren't scrambling to adapt new hardware backwards or source obsolete devices (I have been there before), you can just replace an older component with a modern equivalent and maybe even simplify the design in the process

I would add some ECAT safety hardware (Controller+SDI+SDO) , fences , hard and soft e-stop this will add more cost but it is cheaper than a lawsuit

It will be more cost and time effective for a single project to buy pre-made cables, but with this much Ethernet, it would make more sense to buy a spool/connectors/the crimping tool

Other documents that I would like to include would be:

Creating a field bus system typically involves various documents, such as:

1. System Requirements Specification
2. Network Topology Diagram
3. Communication Protocol Documentation
4. Configuration and Installation Guides

For creating the BOM I believe it would more accurate to invest in an ERP system to generate it. Using excel still consider a manual process which I highly suggest to avoid using if possible.

\*It would have been great if all devices are compatible with ECAT protocol. That will give us a better real-time feedback and much better communication using Beckhoff. Plus removing the switch from the system