Design Document

Without knowing the true size of the cell being implemented, it is hard to determine the cost analysis trade-off of creating a single panel with a network of longer cables + EP blocks stretching into the field versus multiple smaller remote panels to account for I/O. When in doubt, more I/O panels with shorter cables are typically opted for due to shortened down time when performing maintenance; replacing damaged cables, reduced demand for wire runway space, less cable entanglements, etc. More machine up time contributes to happier customers, engineers, and downstream clientele.

When deciding on what protocols to proceed forward with, high dexterity faster protocols were prioritized over simplistic ones.
(EtherCAT | Ethernet I/P > Ethernet TCP > RS-485 > RS-232 > CAN)
The 'in development' nature of software machines always benefit from extra tools and capabilities in the proverbial tool box. Though the expanded functionality of an Ethernet I/P equipped ATI tool changer may not be beneficial today, that does not mean it could not be utilized by the program 3+ years down the line. Likewise, a 20% spare reserve of free I/O prevents the need to rescan new EL blocks should new sensors be added to a system at 100% capacity. Future-proofing hardware has the potential to reduce down time needed to modernize equipment.

That said, equipping the latest and greatest technology is not a golden standard to strive for. A cost / benefit analysis should always be run to determine where money would be best spent and what opportunity cost would be incurred should the program need to change directions. Smart decisions today always pay dividends in the long run due to labor (engineering and technicians both) contributing a significant cost in any project.