Protean Surgical Instruments has outlined the following plan for each arm of development should Los Angeles be placed under four more months of "shelter in place":

Soft Robotic Catheter Design and Fabrication

Our team has established academic and professional partnerships to continue with research and development. Dr. Jin will provide computational modeling expertise to better understand and refine characteristics of the catheter. All computer software required for design and finite element modeling are available remotely. Digital renderings will be exchanged virtually for design feedback on changes in device features and function with respect to pressure and material properties.

Fabrication of the approved designs will be conducted in Dr. Jin's lab at UCLA utilizing her Asiga Pro 4K 3D-printer. This printer allows for a wide range of materials and is well suited for the team's initial prototyping stage. Should the team not have access, fabrication will be outsourced to a contract manufacturer in Irvine, CA through connections from the team's advisor Dave Ferrera. Device testing will be carried out at the new UCLA Biodesign Maker Space. Should the team not have access to this space, testing will be conducted at the residence of the primary engineer. Fortunately, there are no safety restrictions during the functionality testing of the device (e.g. no requirement for clean room, chemical handling/flammables, and biological use).

Vascular Model Assembly

In addition to catheter prototyping, the team is also prepared to create the physiologic vascular model for initial benchtop testing. The team will collaborate with the UCLA Department of Neurointerventional Radiology, which has key expertise in creating vascular models. However, if limitations in access arise, the team has received quotes from United Biologics, a company in Irvine, CA specialized in vascular modeling that is still operational despite the pandemic. The team has highlighted a particular model with both femoral and radial vasculature required for in-vitro testing. Current lead time on these models is 2-3 weeks, and the team is prepared to utilize these resources to expedite testing if needed.

Business Development

The team has registered for the National Science Foundation (NSF) Innovation Corps (I-Corps) Program, which mentors scientists in translating promising technologies from the laboratory to the marketplace. All workshops will be held virtually for the 2020 program. Completion of the program will make the team eligible for $50,000 in funding, and significantly increase the team's chances for future NSF-Small Business Innovation Research grants (<10% vs. >50% after completing I-Corps). The partnership with UCLA and the NSF LA-innovation hub has an excellent track record for preparing teams for the national level, with a 95% acceptance rate. The team is also currently semi-finalists in the UCLA Knapp Venture Competition, and has submitted a letter of intent for the UCLA Technology Development Group Innovation Fund.

In closing, Protean Surgical Instruments does not anticipate any significant obstacles presented by the pandemic. The company is fortunate to be in the healthcare sector and working in a specialty that treats urgent/emergent conditions making the market opportunity more resilient to worldwide events like COVID-19.