Printing The Future: An Iterative Process for Medical Device Management

Jack Bouchier, Andy Spencer and Jacob Eltherington, Kings College Hospital Rehabilitation Engineering Division

3D printing has become an increasingly popular and accessible technology in manufacturing, particularly for prototyping and producing components for medical devices. The ease of access to 3D printers, combined with a growing knowledge base and an expanding range of aftermarket parts, has led to innovations in the production of items such as cushions. However, incorporating 3D printing into the manufacturing process of medical devices poses some specific challenges, particularly in terms of process control and documentation. Historically, our industry has outsourced manufacture to print farms, which was both costly and limited in terms of control. This prompted the acquisition of an in-house printer for the service. While this transition has provided greater flexibility, particularly for prototyping, it has come with a learning curve. A solid understanding of CAD systems and 3D printing principles has been essential in overcoming these challenges, enabling better print quality and material properties/selection. Failures are part of the iterative prototyping process, as well as our growth as 3D printing manufacturers. These have included; issues with build plate adhesion, material feed, nozzle clogging, print surface quality, and catastrophic failure of the printers. Through ongoing experimentation and upgrades to the printers, we have been able to implement a framework for quality improvement towards a reputable and reliable manufacturing process that has helped us to reduce the frequency of these failures, improve performance and overall print reliability.

Email: jack.bouchier@nhs.net