Characterization of complex additive manufactured structures for the medical device industry using computed tomography

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Highly complex dendritic lattice structures can be produced with the aid of additive manufacturing (AM) allowing for more geometric freedom than traditional manufacturing techniques, and considerably less resources and cost. Currently AM methods lack true reproducibility, meaning that in some cases large numbers of components have to be scrapped or reworked. Therefore there is a clamour within industry to develop a robust and reliable methodology for characterising non-standard geometric dimensioning and tolerancing (GD&T) features using non-destructive evaluation. With potential ‘prints’ having a high probability of requiring further input using traditional manufacturing processes on mechanically interactive surfaces accurate specification of these complex structures is vital from a quality as well as regulatory perspective.

There is a growing clamour in the direction of investigating the efficacy and practicality of using computed tomography (CT) [[1-6]](#h.30j0zll) to both qualitatively and quantitatively analyse AM produced components, however, with both technologies and standards at a relatively early development and acceptance stage in industry a number of challenges exist in trying to achieve integrated valid subsurface AM feature measurements using CT.

This presentation will highlight the development of techniques used to characterise representative AM medical device-relevant structures and will further discuss best practices, tests and controls to assess integrity of build.