

Development of Commercial Neutron Computed Tomography for Nondestructive Testing

Martin Wissink¹

¹Research and Development, Phoenix, LLC, USA

Neutron computed tomography (nCT) is a powerful and complimentary tool to the well known and established x-ray computed tomography. Whereas x-rays offer little contrast between elements and primarily probe density variations in objects, neutrons offer high sensitivity to several low atomic number elements while also having high penetration through many high atomic number elements. This enables unique contrast in multi-material systems such as energetic devices, composites, and cultural heritage objects, and the ability to penetrate through thicker sections of dense refractory metals such as tungsten. While nCT has been available for several years at research reactors and large government-operated neutron facilities, the focus of those facilities is academic research, and they generally do not have established aerospace or defense-oriented quality programs or the ability to handle large volumes of parts which may be proprietary, export-controlled, or energetic. General-purpose access to nCT is currently very limited worldwide, with most facilities severely oversubscribed with the current academic users. To bridge this gap, we present the development of a scalable, commercial nCT service using an accelerator-based neutron source with a primary focus on nondestructive testing for aerospace and defense and general-purpose R&D applications. Several case studies will be presented illustrating potential applications of this exciting technology.