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The Cheshire Jet: Harnessing Metamaterials to Achieve an Optical Stealth Capability: Wright Flyer Paper No. 44

By Major, USAF, Timothy E. Beers

Createspace. Paperback. Book Condition: New. This item is printed on demand. Paperback. 54 pages. Dimensions: 9.0in. x 6.0in. x 0.1in. Laboratory research that melds physics with materials science has ventured into the design of matter with unique electromagnetic characteristics and response functions. This new class of ordered composites known as metamaterials exhibits exceptional, unnatural properties derived from their structure rather than from their composition. These materials promise to provide significant advances in stealth and survivability technology, both of which are highly applicable for future Air Force capabilities against a counter-low observable, directed energy equipped integrated air defense system. This paper addresses the question, Will metamaterials facilitate an operationally feasible and significant optical stealth capability for the US Air Force? To answer this question, the authors research is directed at the advances and development patterns of optical band metamaterials; specifically, it addresses the leading indicators of frequency, bandwidth, and energy loss. Following that, a backcasting futures technique helps uncover the obstacles of metamaterial durability, suitability, and manufacturability. This paper concludes with a 20-year timeline for optical band metamaterial capabilities and applications. This paper highlights the need for continued Department of Defense (DOD) funding and pursuit of metamaterial cloaking technology. The near-term objective of such a...

Reviews

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