Analysis of Radar Absorbing FSS on foldcores and honeycombs

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ABSTRACT

The objective of the paper is to investigate the radar absorption of honeycombs and foldcores with printed conductive patterns. These structures can be manufactured by first printing conductive Frequency Selective Surfaces (FSS) on planar substrates, which then can be used to shape foldcores and honeycombs by means of specific manufacturing technologies. Foldcores can be considered as intermediate shapes between planar sheets (where the printed patterns are perpendicular to the impinging radar waves) and honeycombs (where the printed patterns are parallel to the impinging radar wave).

Frequency Selective Surfaces are thin, repetitive patterns (such as the screen on a microwave oven) on planar sheets which are known as to reflect, transmit or absorb electromagnetic fields based on the frequency of the radar field. In the present paper we consider the electromagnetic design of conductive patterns on foldcores and honeycombs made from aramid paper. It will be shown that the radar absorbing properties of the design strongly depend on the electrical conductivity of the paint and the size of the printed patterns. These parameters appear to be essential to obtain maximum radar absorption. The size also determines the resonance frequency at which the maximum absorption is found.

In the present paper we also investigate the effect of the orientation of the printed patterns with respect to the impinging wave. It is shown that a planar FSS has a maximum absorption of 50%, while foldcores and honeycombs may obtain a higher absorption due to the fact that the patterns are orientated under a certain angle with respect to the propagation direction of the wave.

The conductive patterns presented in this paper promise light-weight absorbers that combine RF absorbing properties with the favourable structural properties of honeycombs and foldcores.