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Studienarbeit / Bachelorarbeit

A u f g a b e der Abschlussarbeit im Auslandsorientierten Studiengang International Studies in Engineering

für: Herrn Mohd Fais Bin Mansor

gestellt von: Prof. Dr.-Ing. K. Solbach
Fachbereich Ingenieurwissenschaften - Hochfrequenztechnik

Thema: **Dielectric Lens for an H-Plane Waveguide Horn**

Description of Problem

In the investigation of thermal microwave noise radiation from fires (our research project “Microwave-In-Fire”), a measurement set-up uses horn antennas to receive the radiation. While the horn antennas, in principle, are designed for maximum gain at the infinitely far distance, the source of radiation (the fire) is situated in close distance of 1m. For a maximum signal power gain, an antenna is needed with a focus at that distance.

Task

The thesis work is to develop a “correction” lens as a supplement to a given H-plane waveguide horn antenna (X-band) in order to produce a focus at 1m from the horn aperture. The design of the lens shall be based on ray-optics design rules in a first step and be verified and optimized in an electromagnetic simulation using the HFSS tool. The derived dimensions shall be used for the fabrication of the lens using Teflon or paraffin wax. The lens-corrected waveguide horn is to be tested in our antenna test chamber in order to verify the focussing radiation pattern characteristics. If time allows, the new antenna shall be employed in the above mentioned research project and comparisons between performance with vs. without lens made.

At the end of the thesis work, a public presentation of results is to be given.