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研究论文

一种交替发射模式的机载MIMO-SAR下视三维成像方法

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摘要：

对阵列天线合成孔径雷达三维成像问题进行了研究. 针对传统单发模式下视三维合成孔径雷达成像所需天线阵元多、空间利用率低的问题，提出了一种基于交替发射模式的多输入多输出合成孔径雷达下视三维成像方法. 首先分析了交替发射模式下的下视三维合成孔径雷达回波信号模型，其次结合等效相位中心原理和波束形成技术给出了机载多输入多输出合成孔径雷达下视三维成像方法. 该方法可以大幅减少天线阵元的数目，提高雷达平台的空间利用率，有效降低工程实现难度.

关键词： 多输入多输出雷达 合成孔径雷达成像 下视三维成像 等效相位中心

Imaging method of airborne downward-looking 3D-MIMO-SAR with alternate-transmitting mode

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Abstract:

By study of the problem of three-dimensional (3D) imaging method of linear arrays synthetic aperture radar (LA-SAR), the conventional LA-SAR with a single transmitting antenna requires a number of receiving antennas to meet the requirement of the spatial sampling rate, which is difficult to implement. To solve the problem, a novel imaging method of down-looking 3D-MIMO-SAR based on the alternate-transmitting mode is proposed. Firstly, the 3-D echo signal model based on the alternate transmitting mode is analyzed. Then by combining equivalent phase center theory and beam-forming technology, the imaging method of downward-looking 3D-MIMO-SAR is put forward in detail, which can cut down the number of antennas significantly, improve the spatial efficiency of the radar platform and reduce the difficulty of project implementation. Finally, the effectiveness of this algorithm is validated by the simulation results.

Keywords: multy input multy output radar synthetic aperture radar imaging downward-looking 3-D imaging equivalent phase center

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