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A two dimensional imaging software for the Brazilian decimetric array on a distributed computacional environment

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A Prototype five element interferometer is operating in the frequency range of 1.3 to 1.7 GHz at INPE, campus of São José dos Campos with base lines up to 32 meter. A computational system has been developed to obtain one and two dimensional images of radio sources observed with this prototype. The One dimensional images of the quite and active sun will be presented. Here we mainly present software tools developed for developing solar images after getting data from digital correlator of BDA. The amount of data produced by digital correlator is very high, due to the high temporal resolution (about 100 ms). This precludes real time visualization of solar images using standard sequential computers and, therefore, a parallel implementation of the BDA software is being proposed in order to achieve such capability. Particularly, the deconvolution techniques commonly used in radio astronomy such as the CLEAN or the Maximum Entropy algorithm require a high amount of processing. It is intended to use a low cost distributed memory parallel machine, a 18-node Beowulf cluster composed by non-homogeneous nodes. This machine, located at the PUC Minas campus, is composed by 6 nodes with 1.7 GHz AMD Athlon XP processors and 12 nodes with 400 MHz PowerPC G3 processors, connected by a Fast Ethernet switch. The prototype of a BDA data acquisition simulator was already implemented and is has been employed in the BDA software development and testing. The data acquisition, interferometric image synthesis, standard image deconvolution and image rendering routines will be parallelized by means of the MPI (Message Passing Interface) communication library. An evaluation of the parallel performance of the system will be carried out using this data simulator. In order to achieve the required performance, some routines of the software can be further optimized or even exchanged by routines that implement better algorithms.

Keywords: **image processing software**, **brazilian decimetric array**

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