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THE DUAL USE OPTION OF THE MID FREQUENCY APERTURE ARRAY FOR SPACE DEBRIS
TRACKING

Abstract

The The Square Kilometre Array (SKA) project is an international effort to build the world's largest radio telescope, with eventually over a square kilometre (one million square metres) of collecting area. The Mid Frequency Aperture Array (MFAA) element of the SKA includes the activities necessary for the development of a set of antennas, integrated amplifiers and local processing required. MFAA includes the development of local station signal processing and hardware required to combine the antennas and the transport of antenna data to the station processing.

It will cover a wide-range of radio frequencies from 400 MHz to about 1.5GHz. One of the key science goals for these telescopes will be their planned mission to measure the effects of dark energy on the Universe, as well as doing high speed surveys for pulsars and other radio transient events. This requires very high sensitivities, with the ability to detect very small variations in the observed signal.

What this paper considers, are the other applications that exist in order to provide dual use capability for this telescope. Other applications can benefit with increased performance e.g. GNSS and in particular the survey capability allows for detection capability of space debris.

This paper focuses on the development of the associated infrastructure, technology and applications. We explore the principle of closely matched and unique capabilities of radio astronomy in a dual-use context including synergies and societal benefit. For example, how the Westerbork Array can contribute to GNSS and GNSS networks and more recently, we know much more how LOFAR can contribute to Space Situational Awareness, in particular Space Weather, thanks to its low frequency mapping capability of the ionosphere.

This paper will explore development and innovation in new areas such as low frequency space missions and space debris mapping.

The aim of this dual use programme is to develop sustainable colocated science and business programmes. The first phase will be to implement a science capable demonstrator in Africa with a primary focus of space debris mapping. As these demonstrators are established across African Partner countries, a large network will be established. This programme will drive capacity building from innovative concepts and science engagement towards skills development.