NANOSATS FOR A LOW FREQUENCY SPACE-BASED RADIO INTERFEROMETER

*Baptiste Cecconi[1], Andre Laurens[2], Carine Briand[1], Julien N Girard[3], Martin Bucher[4], Denis Puy[5], Boris Segret[6], Mark Bentum[7]

1. LESIA, Observatoire de Paris, CNRS, PSL Research University, Meudon, France, 2. PASO, CNES, Toulouse, France, 3. SAp-AIM, Univ. Denis Diderot Paris 7, Saclay, France, 4. APC, Univ. Denis Diderot Paris 7, Paris, France, 5. LUPM, Univ. Montpellier, Montpellier, France, 6. ESEP, LESIA, Observatoire de Paris, PSL, Meudon, France, 7. Technical Univ. Twente, Twente, the Netherlands

During the last decades, space physics and radioastronomy have dramatically changed our knowledge of the Universe and his evolution. However our view is still incomplete at the lowest frequencies range (below 30 MHz), which remains the last unexplored spectral band. Below 30 MHz, ionospheric fluctuations strongly perturb ground based radioastronomy observations. They are impossible below 10 MHz due to the ionospheric cutoff. Furthermore, man made radio interferences make these observations even more difficult. Deploying a space borne radio observatory is the only way to open the last window on the Universe. This spectral window starts at a few kHz, which is the local solar wind radio cutoff frequency and ends between 10 and 30 MHz. The science objectives of this observatory are diverse and numerous: the dark ages of the Universe, the mapping of the Galaxy, pulsars and astrophysical transients, space weather, the atmosphere and magnetospheres of solar system planets and exoplanets.

NOIRE (Nanosats pour un Observatoire Interfromtrique Radio dans l’ Espace; Nanosats for a space borne in- terferometric radio observatory) is an ongoing feasibility study with PASO (Plateau d’ Architecture des Syst`emes Orbitaux; Space Systems Architecture Service) at CNES that assesses the feasibility of a low frequency space radio interferometer using nanosatellites.. It is conducted in collaboration with Dutch colleagues involved in several space borne low frequency radio interferometers projects (OLFAR, DEx, SURO, DSL...) Bentum et al. (2011). The goal spectral range of NOIRE is 0.1 to 100 MHz. The technologies and methods (particularly interferometric imaging) developed for LOFAR, NenuFAR or SKA are useful ingredients for such a project.

Keywords: Radioastronomy, Interferometry, Space Physics, Nanosatellites

