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PLEIADES and IASI : Two innovative instrument concepts for more efficient applications in Earth system monitoring

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Within various international schemes including the ESA Convention, France developed and is currently developing several innovative instrument concepts to better serve wide categories of scientific, institutional and industrial users. Two of these instruments will be presented here: Pleiades and IASI.

Pleiades is the optical component of the so-called ORFEO dual system – the SAR component, Cosmo-Skymed being developed by Italy (Belgium, Sweden, Spain and Austria are also involved). Pleiades is the follow-on programme to the SPOT seamless series of satellites which started in 1986. It takes advantage of innovative technologies (both in terms of instrument and pre-processing) taking them to unprecedented limits. Pleiades will provide users with a 0.7 m resolution panchromatic bands based on TDI technology. The field of view is 20 km. The agility of Pleaides allows any point of the Earth surface to be observed once per day. It also allows stereoscopic coverage. This is essential for civil security, 3-D high resolution mapping applications and defence issues. A preparatory programme has been set up, focussing on such applications as security, environment, land use planning, hydrology and biosphere (forest, cultivated areas). The two Pleiades satellites are planned to be launched beginning of 2010 and March 2011.

IASI is a quite innovative instrument based upon an infrared Fourier Transform Michelson interferometer. IASI is the most innovative instrument on board METOP, the space component of the EUMETSAT Polar System (EPS). Three METOP satellites are planned. The first one was launched on October 19, 2006. So, the polar-

orbiting satellites dedicated to operational meteorology are now equally shared between NOAA and EUMETSAT. IASI is currently providing atmospheric infrared emission spectra of unprecedented accuracy. Its main mission is to provide meteorologists with vertical atmospheric profiles of humidity (accuracy: 1˚K) and humidity (accuracy: 10%) at a 1 km vertical resolution. It also allows retrieving such trace gases as O_3, CH_4, CO at a global scale.

These two examples clearly show how significant technological advances in instrumentation and measurement techniques within follow-on space programmes may (better) serve a wide(r) range of scientific and operational users.