PROGETTO COFINANZIATO DALL'UNIONE EUROPEA

Project: ARDENT

Public advertisement "KETS – tecnologie abilitanti" approved with Determination n. G13675 del 21/11/2016 in the POR FESR LAZIO 2014 – 2020

Request of contribution Prot. n. A0114-2017-14821 del 13/02/2017

Code CUP: F81B18000370007

The ARDENT Project is realized from the following Companies grouped in ATS:

Company	Contribution distributed (euro)
Information Technologies Services Srl (capofila)	374.991,09
Università di Roma "La Sapienza" – DIET	153.458,90

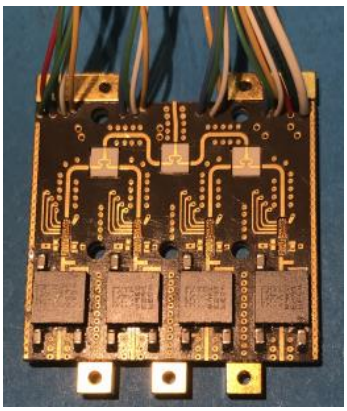
Description – Scope – Results

The project named ARDENT has the aim to develop a design capability in the field of Active Antennas on the Ku/Ka/Q/V frequency band for Space, Avionic and Terrestrial applications. For this purpose, the project defines the requirements and the architecture of a Terminal (named Antenna Assembly), composed of a number of elementary assemblies, named TILE. The TILE is the core element of the Antenna Assembly, that is the most relevant part from the technological point of view, being based on the Phased Array technology for electronically scan antennas. The project further aim is to manufacture a prototype of the TILE using state-of-the-art technology and to verify its electromagnetic performance.

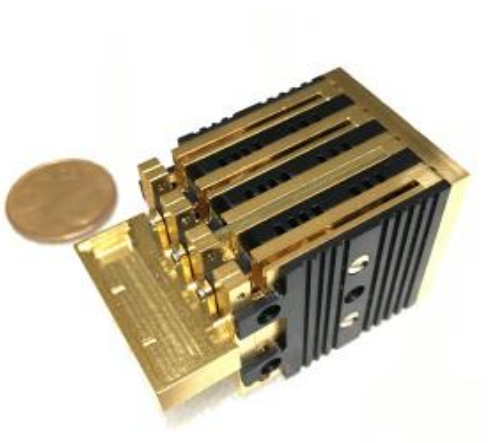
The architecture of the TILE is made such to allow an easy expandability, in order to meet the ERP (*Effective Radiated Power*) requirements for a wide range of application (i.e. satellite communication terminals, or antennas for 5G applications). The equipment is composed of 64 channels with 1W RF power with Phase Shifters and control electronics, which form an analog beamforming network with 4 inputs (thus 4 independent sub-arrays). In the framework of the present project, ¼ of the radiofrequency front-end has been manufactured, together with the complete antenna and control electronics.

Main technical characteristics of the TILE are:

- Frequency band 28-30 GHz
- Array lattice with dimension that makes it *Grating-lobes free* in a 30° cone of nominal scan from boresight. The aperture dimensions are 56x56 mm (64 elements)
- The ERP is class 40dBW. Thus, for example, a 4 Tiles architecture is compatible with a satellite terminal application.
- The antenna is composed of UWB (ultra-wide band) radiating elements, with the purpose of further experimenting and frequency expandability of the equipment.



Circuit of a *blade*, the RF Front-End assembly, that includes 4 1W channels.



Assembly of 4 blades, including 16 RF channels, with part of the beamforming network.