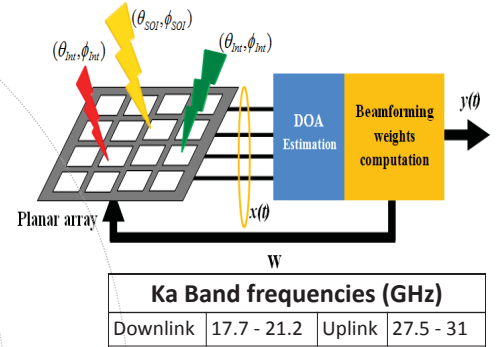


μWave Photonics for Satellite Comms

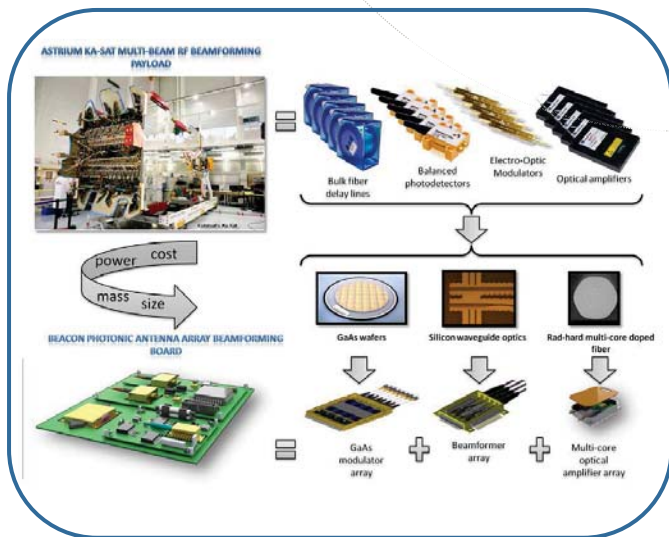
Background and challenges

- **Satellite antennas** require an adaptive feature in its radiation pattern, to continuously tracking.
- **Satellite tracking** is more suitable with electronic beamforming than with mechanical rotation that has serious physical limitations.
- The main obstacle to developing the electronic beamforming antenna array is the difficulty to construct an efficient network controller of amplitude and phase for each element of the array.



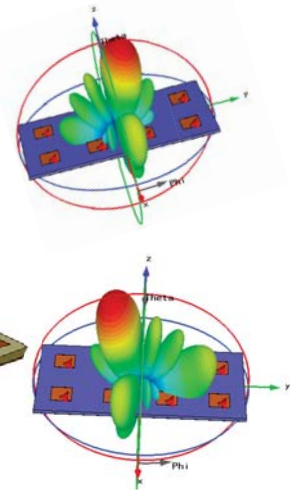
Description and main innovation

- The main purpose of this work is to follow a **new approach** in satellite communications, focusing in the **application of microwave photonic techniques** for **feeding the satellite's phased array antennas**.
- The feed network incorporates **electro-optic modulators** for RF-to-optical conversion, followed by a **small-size, low-weight, fast and power efficient photonic beamformer**.



❖ Design the antenna module

- Half Power Beamwidth $\approx 0.21^\circ$
- Modular geometric config.: 2×4
- Microstrip elements



Achievements

- **2 PhDs** being done in the scope of the **FP7 project BEACON** (Scalable & Low Power Microwave Photonics for Flexible, Terabit Telecom Payloads & High speed Coherent Inter Satellite Links)
- **Patent pending** on the photonic beamformer used in BEACON.
- Publications about Beamforming algorithms in Journals and Conference Proceedings
 - IEEE International Symposium on Antennas and Propagation and USNC-URSI 2014
 - The Applied Computational Electromagnetics Society Journal

