**Development of a Two-Phase Mechanically Pumped Loop for Active Phased Array Antennas**

The development of Active Phased Array Antennas (APAAs) is a key enabler to effectively accommodate the growing demand of data transfer in commercial telecommunication satellites. A highly efficient and integrated thermal management system is required so as to reject the waste heat produced by the antenna’s Solid State Power Amplifiers (SSPAs).

The development of such a thermal control system presents a number of technical challenges, chief among them being the large number of heat sources involved (typically ranging from 100 to 1000, with varying duty cycles), the need for spatial and temporal isothermal conditions across the set of SSPAs, as well as a low thermal gradient between the SSPAs and the working fluid, high total heat dissipation (10+ kW), high heat flux (20+ W/cm^2 at the evaporator’s interface) and large distances between the radiator and the payload, among others.

Spacecraft thermal control systems based on Heat Pipes (HP) and Loop Heat Pipes (LHP) are currently approaching their practical limits in high-power telecommunication satellites, being no longer capable of meeting the thermal control requirements of large platforms (e.g. high-throughput satellites); as a result, the interest in Mechanically Pumped Loops (MPLs) and two-phase pumped loops in particular has increased significantly in recent years as the latter are remarkably well suited for applications involving large heat loads, transfer of thermal energy over large distances (e.g. distributed payloads), high heat fluxes and payloads with tight temperature stability requirements.

An international consortium led by AVS is currently developing an ammonia two-phase MPL for APAAs within the frame of the IMPACTA project (an EU H2020 funded activity). The present paper provides an overview of the project and its current state.