Title:	*"Dual-Polarization Payloads for Higher Capacity Utilization"*		
Contract Type	*ARTES 5.1*	**Budget *[K€]***	*220*
Company (-ies) *(including country)*	*Space Engineering (I)* *Airbus Defence & Space (F)*		
Team *(name of the participant in the project)*	*Gabellini Piero (Space Engineering)* *D'Agristina Luciano (Space Engineering)* *Tosti Massimiliano (Space Engineering)* *Tirrò Emanuele (Space Engineering)* *Metzger-Fragnol Nathalie (Airbus D&S)*		
Speaker (s)	*Gabellini Piero*	**Email (s)**	Piero.Gabellini@space.it
Summary Speaker's experience and role in this project	*Piero Gabellini is with Space Engineering since 1989, initially as antenna designer and subsequently as project manager for system and/or antenna activities developed in the frame of several Satellite Programs. He is the Project Manager of this study.*		
Summary of the activity *(maximum 400 words)*	*The objective of the study was to investigate and design Ka-band multi-beam dual-polarization payloads for significantly higher capacity utilization with respect to conventional multi-beam payloads in the presence of unbalanced traffic demand (see Fig. 1), with specific focus on payload aspects related to efficient and flexible resource allocation in Multi-Beam Ka-Band satellites for Broad Band Services (BBS).* *In this respect technical aspects including dual-polarization payload architectures with flexible bandwidth/power allocation and dual polarization capability on hot-spots, flexible frequency and polarization assignment for reduced interference and higher capacity utilization have been investigated.* *In particular, the definition, trade-off and assessment of potential payload architectures and related technologies identifying key payload equipment for further development have been addressed.* *A key aspect for the trade-off was the capacity performance maximization of the flexible payload architectures in terms of optimization of flexible bandwidth/power resources allocation. This was accomplished by properly upgrading an existing optimization tool (HoTSPOT v2.x) in order to allow the management of the advanced payload architectures under investigation.* *The most suitable payload architecture derived from the trade-off activity consists of a conventional multi-beam payload, which is enhanced with an additional steerable antenna, based on a Confocal Dual-Reflector configuration (see Fig. 2), specifically dedicated to serve hot-spots in dual-polarization.* *Such an advanced payload architecture has been fully characterized in terms of detailed design, payload block diagrams, mass/power/dissipation budgets, high level specifications for the identified new payload equipment, hardware matrix and cost estimation.*		

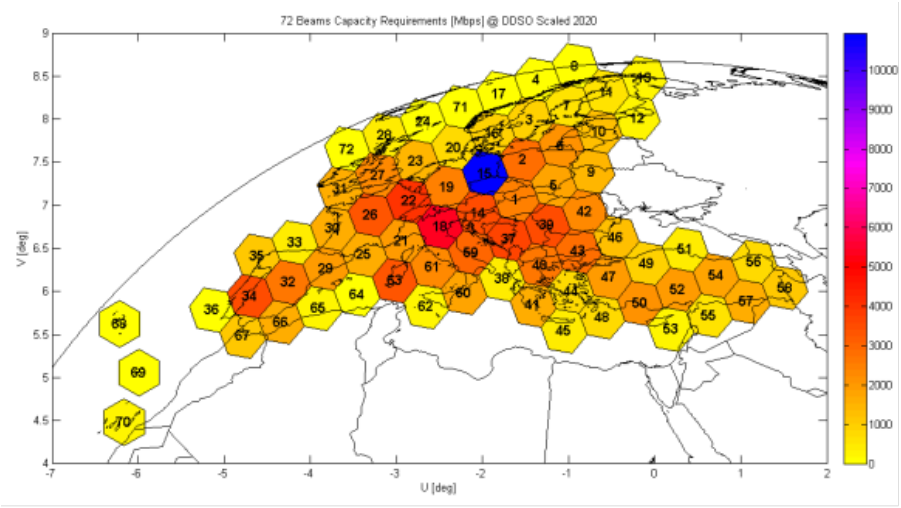

Fig. 1 - Beam Capacity Requirements for 72 Beams Scenario

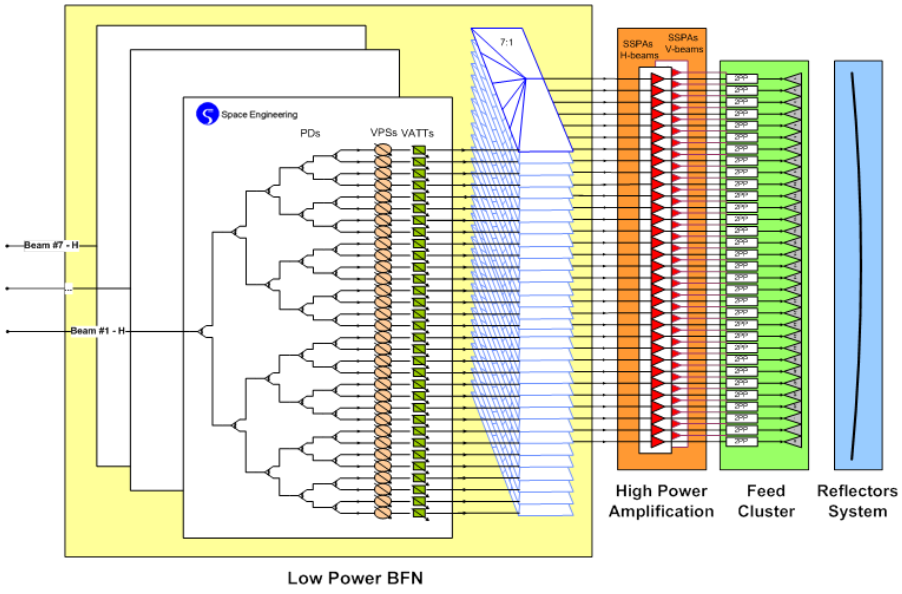

Fig. 2 – Confocal Antenna Configuration