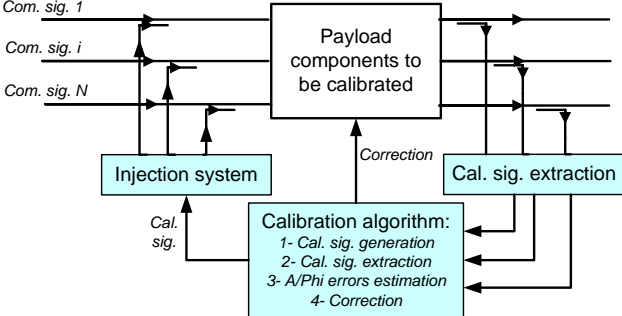


Title:	“Payload On-Board Self Calibration Techniques”		
Contract type	ARTES 5.1	Budget (K€)	280 k€
Company (-ies) (including country)	THALES ALENIA SPACE FRANCE (Toulouse)		
Team <i>(name of the participant in the project)</i>	<ul style="list-style-type: none"> - Aubin LECOINTRE - Cecile LARUE DE TOURNEMINE - Daniel ROUSSET - Eric MELET - Walid KAROUI - Aline BRIAND 		
(*) Speaker (s)	Aline BRIAND	Email	aline.briand@thalesaleniaspace.com
Short Speaker Information <i>(experience and involvement in this project)</i>	Responsible for the study		
Summary of the activity <i>(maximum 400 words)</i>	<p>The scope of the activity was the feasibility demonstration and performance assessment of an on-board calibration sub-systems for advanced Ku-band and Ka-band communication payload architectures using active/semi-active antennas and/or Multi Port Amplifiers. In particular, two types of calibration have been addressed:</p> <ul style="list-style-type: none"> • Equalisation of Payload RF paths frequency responses using a digital corrective filter inside the On-board Digital Transparent Processor; • Calibration of amplitude and phase tracking errors between distributed chains of a telecom Active Antenna at RF chain centre frequency by applying corrections through the on-board Beam Forming Network (Analogue or Digital) <p>The calibration shall be performed avoiding telecommunication service interruption and minimizing the degradation in the Quality of Service.</p> <p>Studied techniques rely on a calibration signal, which is on-board generated, extracted from traffic signals and processed, in order to define corrections to be applied, as described in following figure:</p>  <p>The feasibility of an on-board calibration sub-system performing both antenna calibration at beam centre frequency and RF chain frequency equalization within operational traffic conditions in RX and in TX has been fully demonstrated.</p> <p>A detailed performance assessment addressing a wide range of</p>		

	<p>calibration techniques (including different calibration algorithms and calibration signals) has been also carried out through extensive simulations and measurements performed over a digital beam-forming network breadboard in open loop (i.e., estimating amplitude and phase impairments between RF chains without computing and applying amplitude and phase corrections due to breadboard limitations).</p> <p>Calibration configurations allowing good impairments estimation have been evaluated experimentally, all including a calibration signal respecting communication channel transmission integrity (BER) or Payload operation point.</p> <p>On-Board calibration sub-system architecture for both Active Antenna calibration and in-band response equalization has been identified and detailed in terms of hardware components.</p>
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(*) The speaker needs to do the registration through the [website](#)