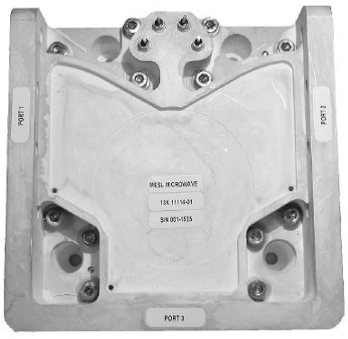
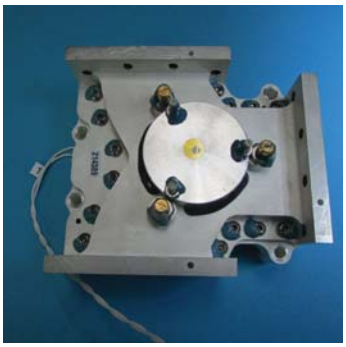
Activity Title:	***C-Band High Power Ferrite Switch (Pre-Development)***		
Contract type	**METOP-SG**	**Budget** *(k€)*	
Company (-ies) *(including country)*	COMDEV INTERNATIONAL (UK)		
Team *(name of the participants in the project)*	Mr. Neil Killoran Dr. Marta Padilla Mr. Jeff Stoker Dr. Imtiaz Khairuddin		
(*) **Speaker (s)**	Colin McLaren	**Email**	colin.mclaren@comdev.co.uk
Short Speaker Information *(experience and involvement in this project – maximum 60 words)*	Colin McLaren has been involved in the development of space technology over the past 25 years in technology areas such as filters, multiplexers, ferrite switches and active RF systems, both low and high power. He is currently responsible for the technology development within COM DEV International Systems. This is a wide portfolio covering Datalinks systems (TT&C, downlinks), ferrite switch systems and optical instruments for EO and Space situational awareness.		
Summary of the activity *(maximum 400 words and 2 pictures)*	The objective of the C-Band High Power Switch Breadboard Development for the Windscatterometer Instrument (SCA) of MetOp-SG was to demonstrate, by analysis and test, the feasibility of a partially magnetised high power low loss C-band ferrite switch for this application. The specified peak power (3.2KkW operating / 12.8kW multipaction margin), insertion loss (0.15dB) and operating temperature range (-40 to 70°C) specified for the predevelopment contract are a challenging combination of requirements but key to the overall instrument performance. From a design perspective this combination of high peak power, low loss and wide operating temperature range place competing requirements on ferrite material selection and geometry as explained below:- • Material selection – is determined by careful choice of saturation magnetisation, spinwave linewidth and Curie temperature. The choice of saturation magnetisation impacts peak power linearity and circuit performance. A design trade-off between Insertion loss and peak power linearity determines the optimum material spinwave linewidth. Finally the material Curie temperature places limitations on switch temperature stability and insertion loss performance. In practice a compromise must be made between conflicting requirements to meet key specified requirements. • Multipaction Breakdown – Multipaction threshold calculations for ferrite switches can be problematic. The combination of dielectric and ferrite materials and a magnetic bias field can result in the simplified conventional calculation techniques becoming inaccurate. To find the optimum solution a number of breadboard ferrite switches, utilising different material and geometry approaches, were designed, developed and tested to find the best compromise between insertion loss and peak power handling. These ferrite switches were successfully manufactured and tuned and exhibited the expected RF characteristics. Key was the trade-off between linear behaviour of the ferrite material in high power operation and low insertion loss which has now been successfully quantified by analysis and correlated by test. In addition, the switches were successfully subjected to multipaction testing.  		

(*) The speaker needs to do the registration through this website