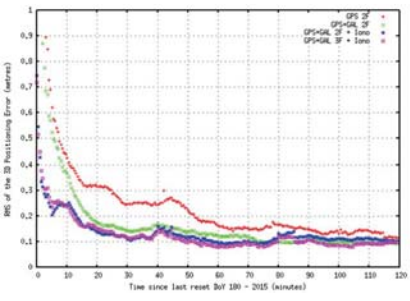
Activity Title:	***Assessing the capabilities of real Galileo-signals to support centimetre level absolute positioning accuracy***		
Contract type	**NPI**	**Budget** *(k€)*	**90**
Company (-ies) *(including country)*	Universitat Politecnica de Catalunya (ES), FUGRO (NL)		
Team *(name of the participants in the project)*	UPC: Dr. Adria Rovira Garcia, Prof. Dr. Jose Miguel Juan Zornoza, Prof. Dr. Jaume Sanz Subirana FUGRO: Dr. Xianglin Liu ESA: Dr. Francisco Gonzalez Martinez		
(*) **Speaker (s)**	Dr. Adria Rovira Garcia	**Email**	adria.rovira @ upc.edu
Short Speaker Information *(experience and involvement in this project – maximum 60 words)*	Adrià Rovira Garcia has obtained the Ph.D. on high-accuracy navigation using a precise ionospheric modelling, titled "Consolidation and assessment of a technique to provide Fast and Precise Point Positioning (Fast-PPP)", co-funded with this project.		
Summary of the activity *(maximum 400 words and 2 pictures)*	The research of this activity has been focused on the Fast Precise Point Positioning (Fast-PPP) technique. The novelty relies on using an accurate ionosphere model, in combination with the standard precise satellite clock and orbit products, to reduce the convergence time of state-of-the-art high-accuracy navigation techniques from one hour to few minutes. The first contribution to the Fast-PPP technique within this activity has been the design and implementation of a novel user navigation filter, based on the raw treatment of undifferenced multi-frequency code and carrier-phase Global Navigation Satellite System (GNSS) measurements. The innovative strategy of the filter avoids applying the usual ionospheric-free combination to the GNSS observables, exploiting the full capacity of new multi-frequency signals and increasing the robustness of Fast-PPP in challenging environments where the sky visibility is reduced. It has been optimised to take advantage of the corrections required to compensate the delays (i.e., errors) affecting the GNSS signals. The Fast-PPP corrections, and most important, their corrections uncertainties (i.e., the confidence bounds) are added as additional equations in the navigation filter to obtain Precise Point Positioning (PPP) in few minutes. The second contribution to Fast-PPP extension of the precise ionospheric modelling from a regional to a global (world-wide) scale. The correct use of the confidence bounds (sigmas) has been found of great importance when navigating in the low-latitude areas of the equator, where the ionosphere is difficult to be accurately modelled. Even in such scenario, a great consistency has been achieved between the actual positioning errors with respect to the formal errors, as demonstrated using similar figures of merit used in civil aviation, as the Stanford plot. A third contribution within this dissertation has been the characterisation of the accuracy of different ionospheric models currently used in GNSS. The new method uses actual, unambiguous and undifferenced carrier-phase measurements. This is possible thanks to the centimetre-level modelling capability within the Fast-PPP technique. Not only the errors of the ionosphere models have been quantified in absolute and relative terms, but also, their effect on navigation.  		

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