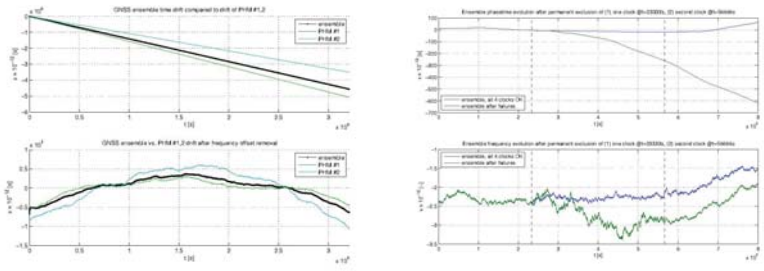
Activity Title:	***Optimal clock ensembling with robust implementation***		
Contract type	Czech Industry incentive Scheme	**Budget** *(k€)*	**88**
Company (-ies) *(including country)*	Serenum (Czech Republic)		
Team *(name of the participants in the project)*	M. Peca, SERENUM V. Michalek, SERENUM M. Vacek, SERENUM		
(*) **Speaker (s)**	M. Peca	**Email**	peca@serenum.cz
Short Speaker Information *(experience and involvement in this project – maximum 60 words)*	HW and SW designer, author of the algorithm to be presented		
Summary of the activity *(maximum 400 words and 2 pictures)*	A the Kalman filter (KF) estimators for both LTI as well as LTV clock ensembles of N arbitrary clocks has been derived. The developed KF presents a clean way to delimit observable and non-observable parts of estimated time quantities, and also to provide an LTI variant, compared to former GPS Composite clock algorithms which seem to be otherwise equivalent. A clock ensemble model was created to fit the supplied Galileo GNSS clock data. The same clock ensemble model has been applied to purely simulated data in order to check theoretical phase noise spectra against numerical estimations, demonstrating a good alignment between the twos. Both linear time-invariant as well as time-varying estimators were designed and implemented. A possibility to use the time-varying estimator to detect and mitigate measurement and/or clock errors (glitches and steps) has been demonstrated on different types of simulated fear events. Target implementation of LTI KF as well as LTV KF estimators for a generic clock ensemble have been created in ANSI C. The reduced complexity of the developed algorithm allows its implementation on FPGA and micro-controller based architectures 		

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