3rd VERSIM Workshop 2008
Tihany, Hungary
15th – 20th September 2008

POSTER

SoftPAL

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SoftPAL is a fully software version of AbsPAL (Absolute Phase and Amplitude Logger) which is used to study phase and amplitude variations in the transmission of VLF signals in the Earth-Ionosphere Wave Guide (EIWG). Such variations range from very fast (onsets < 1s for Trimpis), to very slow (periods 1 year). This is achieved by AbsPAL, and now SoftPAL, by locking to the GPS (Global Positioning System) Pulse-Per-Second (PPS), which is maintained to have zero phase drift in the long term. This requires the VLF transmitters to have similar phase stability (at least one of them is also locked to GPS).

Other VLF transmitters controlled by caesium beam standards are suitable for phase variations over several hours (e.g., those produced by solar flares) to several days. SoftPAL is the latest of a series of instruments (AbsPAL, OmniPAL, and OPAL) designed by Adams over the last 20+ years. It takes advantage of the processing power of modern PCs to provide MSK phase and amplitude measurements with much improved signal to noise ratios, higher time resolution (if desired), and reliable absolute phase measurements with 180° (rather than 90°) phase ambiguity. It provides a powerful and convenient graphical user interface that facilitates data visualization and analysis, in both the real-time sampling mode and the off-line analysis mode.

About 30 of the earlier instruments were made for research in particle precipitation from the radiation belts, sprites and possible earthquake prediction, resulting in some 50 publications.