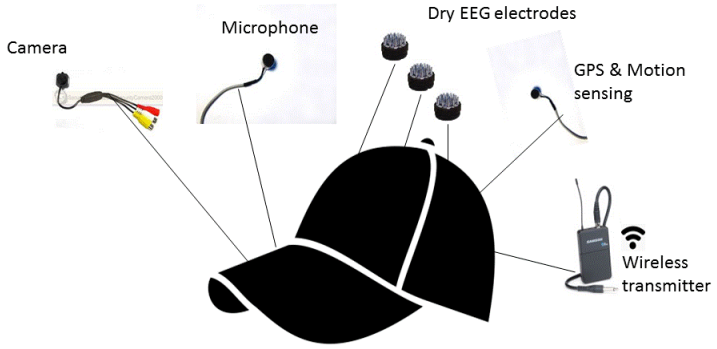
Neuro-Hat preliminary (N-Hat *P*)

"Neuro-Hat *Preliminary (*N-Hat *p)"* is a preliminary phase for the **Neuro-Hat** project which is the starting point of an ambitious project titled "**BrainFix**"

N-Hat *p* is a head-mounted sensory device equipped with sensors that can simultaneously and synchronously sample phenomenology of mental disorders (mental status examination) and electrophysiological brain imaging (EEG).



N-Hat *p* is unique in that it combines distinct existing technologies that jointly add unprecedented novel capabilities. **N-Hat *p*** combines the following:

1) Sensing smartphone devices such as those of "LifeGraph" and "Mont4t"
2) Dry electrodes EEG sampling such as that of "Cognionics" and "Muse"

Similarly to sensing devices the **N-Hat *p*** will provide for clinical follow-up with the advantages of frequent monitoring of patients phenomenology, objective measurements, low-cost clinical assessment in respect to doctors visit, assessment in the natural environment of the patients, and inclusive time related collection of phenomenology.
In addition to this already existing technology, brain imaging of EEG will be monitored simultaneously and synchronously to try and characterize brain-states related with psychiatric diseases.

N-Hat *p* Brain-Imaging will be "cleaned" of artifacts using the head-mounted motion-sensing oscillatiogram, a dynamic on-going correlation matrices between all electrodes will generate a time-dependent phenomenology-related connectivity-matrix of brain activity. This will enable to study the millisecond-range Connectom dynamics of the brain of each subject during prolonged timescales.

Calculations of baseline activity, deviations from baseline, clinical-related matrix-alterations, and event-related alteration will all be recorded and stored into large-data-sets personalized to each patient available for the discovery process of the causes of mental disorders – see **BrainFix**.

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