Grant agreement no. 769051

EpiCARE – a network for rare and complex epilepsies

HP-ERN-2016 European Reference Networks / Framework Partnership Agreement

D8.2 Report on upgraded IT platform for MDT discussion

Work Package: WP8: Surgery (E-pilepsy)

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Lead beneficiary for this deliverable: *42 centers*
Contributors: *Carolina Ciumas, Philippe Ryvlin*

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1. Version log

Version	Date	Released by	Nature of Change
1.0	January 2018	C. Ciumas, CHUV	First draft
2.0	February 16 2018	C. Ciumas, CHUV	Final version

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2. Definition and acronyms

Acronyms	Definitions
EEG	Electroencefalography
VPN	Virtual private network
IT	Information technology
MEG	Magnetoencephalography
FSL	FMRIB Software Library
SPM	Statistical Parametric Mapping
MRI	Magnetic resonance imaging
ECoG	Electrocorticography
CT	Computer tomography

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3. Introduction

The IT platform offers a large selection of brain imaging and EEG processing tools. E-PILEPSY platform aims at making brain imaging more accessible and user-friendly by merging on the platform the latest data processing tools and offers support for users, thus optimizing brain MR imaging analysis. Softwares that are available for users on the platform are at the state of the art methodologies in the field (Curry – from CompuMedics, SPM, FSL, Freesurfer, Brainstorm, Matlab etc). Apart from imaging processing tools there is a number of viewing tools such as Dicom viewer and EEG viewers. Another advantage is the possibility to use tools that allow superposition of data on the brain, which is fairly difficult, especially when images are derived from different data acquisition modalities (possible with Curry8). Curry integrates multiple complementary imaging modalities such as EEG, ECoG, MEG, MRI, fMRI,CT. By combining the latest techniques for determining electrical activity in the brain with anatomical and functional imaging, Curry provides a powerful state-of-the-art method for accurately localizing the source of such activity. Curry uses the full physical anatomy from MR and CT to provide three-dimensional models of the head and brain, pinpointing the site of activity. Curry integrates fMRI functional imaging with EEG and MEG source analysis.

Users are connected to this virtual platform via a secured VPN connection and each user has a dedicated space. Uploaded data can remain entirely private or can be put into a shared folder (for example in case of seeking an expert opinion). Users can have the access to the platform from any location, through Pulse Secure (VPN recognition) and Microsoft remote desktop – both are freely available and the setup of the connection is described in the manual sent to users when they get the VPN access to the platform. The data that is uploaded on the platform is securely uploaded and stored. There are several security encryption protocols to access the platform, which protects any sensitive information added to the platform.
The specific objective of this deliverable is to insure that in a rapidly developing field, such as brain imaging, more tools become available, which are needed to be upgraded or made available, as well as the functionality of this platform in terms of space, speed and facility to use.

4. Activities carried out and results

There are several actions that we carried out on the platform:

1. A multimodal processing software **Curry7 was upgraded to Curry8**.
This allows:

- Integration of functional data (EEG, MEG, ECoG, sEEG, ECG, MCG) with image data (MRI, fMRI, CT, DTI FA, PET, SPECT).
- EEG data acquisition module with online processing capabilities.
- Complete data processing from filtering to source analysis.
- Event support, threshold and template-based event detection.
- Selective averaging (event type or SNR based).
- Artifact detection and reduction (subtraction and projection methods).

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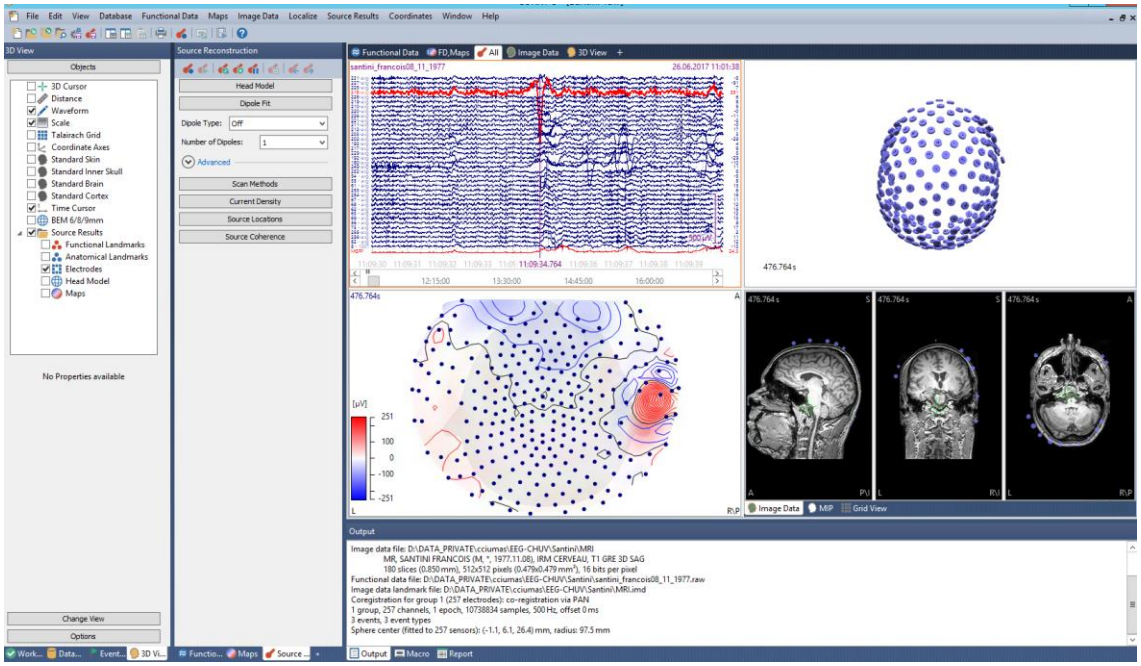
- Principal and Independent Component Analysis (PCA, ICA) and filtering.
- Time and frequency domain evaluations.
- Current Source Density (Laplacian).
- Individual realistic head models using Boundary and Finite Element Methods (BEM/FEM).
- Pre-computed realistic BEM head models.
- Sensor and source coherence, group statistics.
- Export of results in Excel, MATLAB, and SPM formats.
- Interface for data processing in MATLAB.
- Automation and batch processing.



2. Two additional licenses for **Curry8** were purchased, which allows **three users** usage of the software at the same time.

3. Installed **Branstorm3** software - an EEG data analysis tool that works under Matlab This allows:

- Analyse MEG/EEG recordings
- Powerful and versatile visualization:
- MRI visualization and coregistration:
- Head modeling:
- Source modeling:
- Functional connectivity:
- Group analysis

4. Installed **Nicolet EEG viewer** - alternative to SystemPLUS Evolution (MicroMed)

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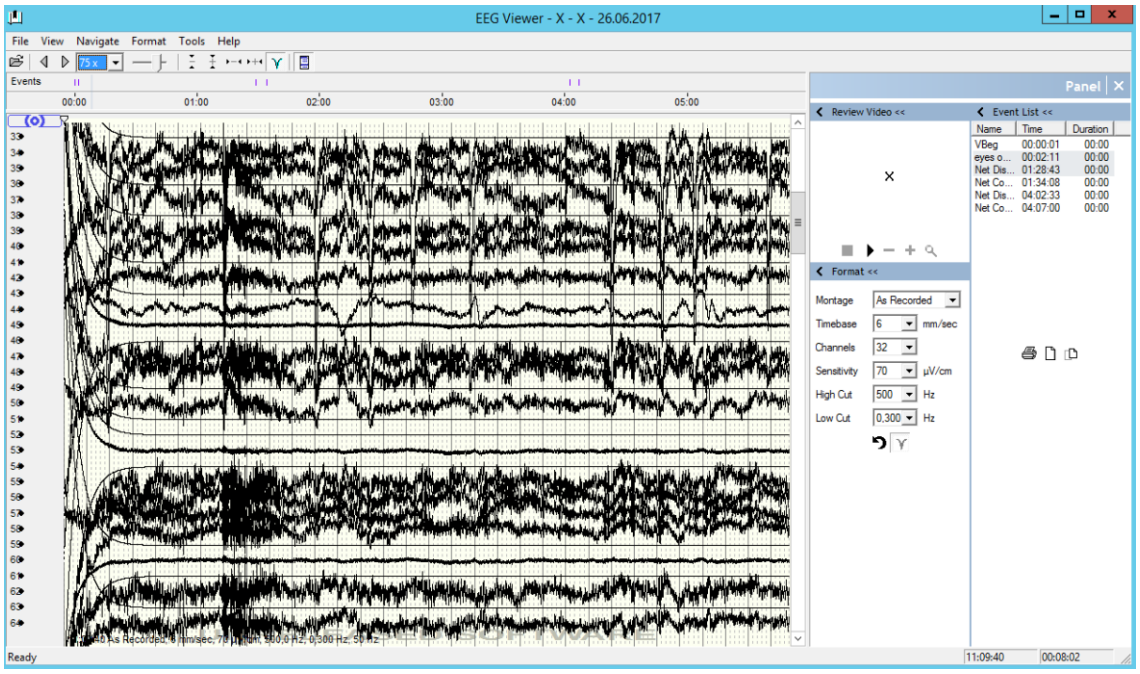

5. **Migrated data** from D drive to a virtual drive F - **4Tb** instead of **1Tb**, which solved the problem of space in case of processing of very large files.

6. Started monthly **newsletters** to keep users updated (January 2018). Part of the newsletter is below

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5 Conclusions

The upgrade of the platform was carried out as expected. The deliverable was achieved.

6 Bibliography / References

N/A

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