

## M E M O R A N D U M

*A/To:* Antti Onella/PH (CAEC chair person), Stefan Haas/PH (ELEC chair person), Alan Burns/BE, Alan Silverman/IT, Paul Collier/BE, Frederic Hemmer/IT, Helge Meinhard/IT

*De/From:* Erk Jensen, BE-RF and CAEC, John Evans/IT, Pierre Baehler/IT

*Concerne/Subject:* Long term budget planning for RF and beam dynamics simulation tools

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Dear Antti and Stefan, dear department heads and budget responsables!

This memo concerns the budgets for the simulation tools:

- Ansoft HFSS Suite (Designer, Nexxim, HFSS, Optimetrics, Q3D, SIWave and TPA) by Ansys,
- CST Studio suite (Microwave Studio, Desgin Studio, Particle Studio, ...) and MAFIA 4 by CST
- GdfidL

These simulation tools are paid for by budgets from IT under ELEC and/or CAEC control, and BE department. BE department has a special role here since it has traditionally been the main users of the RF specific codes HFSS and Microwave Studio, along with the beam dynamics/wakefield simulation codes Particle Studio and GdfidL.

We would like to inform you with this memo about the overall budget need that is likely to arise for these simulation codes in the next years, such as to allow you to consider them in the budget planning and eventually to provide for the required resources.

We have had in the recent past seen some increases in the cost of some simulation tools, while at the same time we have seen the number of users increasing, which of course left us in a situation with many user complaints and inefficient work of those people who have to rely on the availability of these tools for their everyday work. This work is extremely important in the BE department to solve problems related to LHC beam stability and to design RF components for the next generation accelerators.

Summarizing, here an overview of how we have covered the cost for these tools in the recent years (numbers assume €= 1.5 CHF):

<b>2009</b>	annual cost [kCHF]	IT - CAEC [kCHF]	IT - ELEC [kCHF]	BE dep. [kCHF]
CST	90	45		45
Ansoft	72		48	24
GdfidL	30	30		0

The main users of these codes are inside BE department (primarily, but not exclusively RF and ABP groups), but also from other departments (primarily PH). Due to a recent, well justified, request to increase the number of seats for CST Particle Studio, this request had increased for 2010 to the following:

<b>2010 initial</b>	annual cost [kCHF]	IT - CAEC [kCHF]	IT - ELEC [kCHF]	BE dep. [kCHF]
CST	124	62		62
Ansoft	72		48	24
GdfidL	30	30		0

We had excellent support for the increase of 17 kCHF from both BE department and from IT - CAEC, and we would like to thank you for this fast and unbureaucratic help. As a reminder, the justification was the need for LHC and SPS impedance simulations (primarily for the LHC intensity upgrade). This

request, with the 50/50 split, was accepted in the BE management board on January 11<sup>th</sup>, CAEC accepted it on March 2<sup>nd</sup> 2010.

However, there is another increase of the resources required to be anticipated for 2010: the number of users of the Ansoft HFSS suite of codes is increasing drastically, and due to the number of seats actually limited to 9 for HFSS and 2 for Optimetrics, we have more and more refusals. Ansoft has now become ANSYS, and they are offering us to upgrade to 9 complete “bundles”, each bundle including not only a HFSS and Optimetrics seat but also the very useful multi-processor and distributed computing options for a total of 54 k€(approximately 81 kCHF, representing an increase of 9 kCHF in 2010). So the immediate requirements for 2010 are:

<b>2010 corrected</b>	annual cost [kCHF]	IT - CAEC [kCHF]	IT - ELEC [kCHF]	BE dep. [kCHF]
CST	124	62		62
Ansoft	81		54	27
GdfidL	30	30		0

For the medium and longer term however, the overall number of 9 seats is still insufficient. We have just started to look into a possible further upgrade. Please note that all the above costs are yearly recurring maintenance fees, while now we are looking into the investment for the acquisition of additional licenses. The cost given by ANSYS is:

number of additional seats	acquisition (once) [kCHF]	maintenance (yearly) [kCHF/year]
1	45	9
2	90	18
3	135	27
5	135	27
10	270	54

With ANSYS pricing, we would strongly suggest to provide for 5 additional seats of the HFSS Suite in early 2011. This would result in an additional cost of 135 kCHF in 2011 for the investment.

If we assume that the split of the funds between IT (CAEC, ELEC) and BE departments remains unchanged (but not anticipating a decision to this effect), the maintenance cost in 2011 and subsequent years would be the become:

<b>2011+ estimate</b>	annual cost [kCHF]	IT - CAEC [kCHF]	IT - ELEC [kCHF]	BE dep. [kCHF]
CST	124	62		62
Ansoft	108		72	36
GdfidL	30	30		0

Please note that the above-mentioned 135 kCHF must be added once in 2011. We understand that, due to this acquisition, the numbers for 2011 seem very high, but we consider this a reasonable investment, well justified by CERN’s needs in electromagnetic simulations.

This is an estimate of needs and does not anticipate where the money will actually come from – so any ideas how the scheme to finance these necessary tools can be improved are very welcome.

Summarizing, here the evolution of the yearly costs as discussed in the above memorandum:

<b>totals in kCHF\year</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>Maintenance</b>	192	235	262	262	262
<b>Investment</b>			135		

Many thanks in advance for your consideration of our concerns!

Pierre Baehler: IT  
 John Evans: IT  
 Erk Jensen: BE (chairman of Users Group for Field Calculation)