

## Teleconference: 18/04/2016 (CEST)

### Purpose to discuss:

1. Dimensions of the laser
2. Modulation of the laser beam
3. The implementation of the modulation scheme
4. Any other particular relevant points that need to be clarified /explored further

### Attendees:

- Marwan Abdou-Ahmed (USTUTT)
- Jan-Philipp Negel (USTUTT)
- Andreas Michalowski (BOSCH)
- Clemens Hoenninger (AMP)
- Jose Ramos De Campos (LASEA)
- David Bruneel (LASEA)
- Julie Devall (KITE)

MAA	<ul style="list-style-type: none"> <li>• Marwan explained the purpose of the TC and stated that one of the key discussion points is around the size of the lasers /laser boxes and to discuss with LASEA the “installation” of the laser.</li> </ul>
JRdC	<ul style="list-style-type: none"> <li>• This is one of the purposes of our visit to USTUTT in June.</li> <li>• If we have to fit the laser source within our standard machine, then according to the description provided by USTUTT at the stage of the preparation of the proposal suggests this was not be possible.</li> <li>• We have designed a standard design that accepts the sizes of the satsuma sources which is being commercialised at AMP</li> </ul>
MAA JRdC	<ul style="list-style-type: none"> <li>• This is very small (in terms of size)</li> </ul> <p><b>(agreement)</b></p>
JRdC  DB	<ul style="list-style-type: none"> <li>• We were thinking we will fit the “table” with a positioning system as part of the optics because it won’t fit the standard</li> <li>• We have some standard dimensions for this and send over the standard dimensions to the USTUTT</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• At USTUTT we already have pre-dimensions for the amplifier</li> <li>• The satsuma box needs to stay on the same table.</li> <li>• The way this will be approached is to make 2 boxes, 1 box for the satsuma itself and the other one for multi-pass amplifier which is larger</li> <li>• The table for the multi-pass amplifier will have the length <b>1.8m x 1.2m</b></li> <li>• We need to find out how we can re-arrange the system so that the satsuma (the seed), is on the same table also with all the beam shaping and optics that have to be implemented between the two systems</li> <li>• The amplifier itself – after re-evaluation length - 1.8-2m - 1.2m Height from the optical table - approx:40/50cm</li> </ul>
JRdC	<ul style="list-style-type: none"> <li>• This seems to be the dimensions we are working with but we would like to confirm with BOSCH</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• It is not possible as part of the Hiperdias project to start to implement a “new design” or concept. It is about incorporating what we have learned so far and make simpler. We must bear this in mind</li> <li>• We need drawings as to what will be placed on the table</li> </ul>
DB	<ul style="list-style-type: none"> <li>• If we place the laser next to the machine we need to be sure that the vibrations will not cause any issues on the application</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• Beam stabilisation is sometimes added to the machines to counteract this, MAA asks LASEA if they have thought about this</li> </ul>

JRdC	<ul style="list-style-type: none"> <li>• We can look into this</li> <li>• We have produced an Interface Requirement document which will need populating</li> <li>• We have a number of machines and will chose a medium one then this gives up opportunity to make modifications</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• It would be a good idea to clarify the different sizes of machines available as this may effect where it can be installed</li> <li>• We need to discuss where the machine will be placed and where the applications will take place.</li> <li>• We decided at proposal that it could be at USTUTT so BOSCH could do their applications</li> <li>• We need to have a back up to eliminate risk</li> </ul>
JRdC	<ul style="list-style-type: none"> <li>• Space is not an issue at LASEA because a new building</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• We need to proceed in placing an order for the breadboard as soon as possible. Therefore the dimensions of the overall system has to be fixed as soon as possible</li> </ul>
DB	<ul style="list-style-type: none"> <li>• This will be three tables? (1 for the laser, 1 for the amplifier and the 1 for the system)</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• It will be one breadboard where everything will be put on top; 1 Block – The seed 2 Block – beam shaping optics (to adjust our beam to the multi-pass amplifier) 3 Block –The amplifier itself</li> </ul> <p>We don't want to make separate tables, it will be more stable on one</p>
DB	<ul style="list-style-type: none"> <li>• The Interface document contains a diagram / sketch in regards to the system.</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• The question is which device will control the machine?</li> <li>• We need to clarify this and the interface document will help.</li> </ul>
DB	<ul style="list-style-type: none"> <li>• We have tried to integrate everything from our software</li> </ul>
	<p><b>Joined by:</b></p> <ul style="list-style-type: none"> <li>➤ <b>Andreas Michalowski (BOSCH)</b></li> <li>➤ <b>Clemens Hoenninger (AMP)</b></li> </ul> <p>(technical difficulties prevented joining from the start)</p>
MAA	<ul style="list-style-type: none"> <li>• In the first part of the TC we discussed dimensions</li> <li>• Provides a summary to the joining partners on what was discussed so far</li> <li>• In terms of the modulation/switching of the beam do we want the possibility of single –pulses?</li> <li>• Marwan explains that we need this information from the partners developing the applications</li> </ul>
CH	<ul style="list-style-type: none"> <li>• In terms of hardware changes it makes sense to do these sooner rather than later</li> <li>• Any additional work needs to be considered</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• If you make it a seed Laser the modulation will have a high repetition rate</li> </ul>
MAA	<ul style="list-style-type: none"> <li>• With the 500w / 600w of laser output power, it is difficult to find commercial modulators that can handle such power (NL-effects because peak power, thermal lensing, etc...) at high-repetition rate. USTUTT has some concepts (pending IPs) to mitigate this issue. This has been discussed with AMP and will be discussed further.</li> <li>• However, we need to “survey” what is available (in terms of modulators) and whether there is a solution</li> </ul>

<b>AM</b>	<ul style="list-style-type: none"> <li>• Asks what is the state of the art? 200w?</li> <li>• AM states that a 150W, 400fs is possible at TRUMPF</li> <li>• It may be possible that the modulators can be purchased in 2 years' time</li> </ul>
<b>MAA</b>	<ul style="list-style-type: none"> <li>• Provides a summary and reiterates the meeting that is going ahead at USTUTT on the 2<sup>nd</sup> of June</li> <li>• AMP - Clemens should be available</li> <li>• LASEA – Will attend</li> <li>• BOSCH – Andreas will also attend and states that he will bring Mawuli Ametowobla and Stephanie Karg</li> </ul>
	Close of meeting