

# SAVOIR MASS Memory Day

TEC-ED – TEC-SW  
ESTEC  
14/02/2014

# On-going activities – 1 / 2



ESA funded activities applicable to CFDP, file systems and mass memories

Activity Title	Scope	End Date	ESA Program	Status
<b>Next Generation Solid State Mass Memory (EADS Astrium, IDA, Star Dundee)</b>	<ul style="list-style-type: none"> <li>- 6 Gbits record, 2 Gbits replay, 2Tbit capacity.</li> <li>- DDR-3 DRAM memory for mass storage</li> <li>- SpFi based architecture</li> <li>- CFDP Class 2 implementation</li> </ul>	<b>Q2 2015</b>	<b>TRP</b>	<b>Been on hold for entering phase 2 – currently in Detailed Design phase</b>
<b>Very High Speed Link Demonstrator – SpaceFiber (University of Dundee)</b>	<ul style="list-style-type: none"> <li>- Demonstrator</li> <li>- IP core development</li> <li>- Inputs to ECSS standard</li> </ul>	<b>2014</b>	<b>TRP</b>	<b>Beta Codec v2 (VHDL) available. ECSS process to start 2014</b>
<b>Technology Assessment of DRAM and Advanced Memory Products (Astrium SAS Satellites, Thales Security Solutions &amp; Services, IDA, Astrium ST, EADS Innovation Works)</b>	<ul style="list-style-type: none"> <li>- Assess commercial state-of-the-art DRAM memories and their robustness for space applications.</li> <li>- Conduct radiation assessment and technology evaluation of state of the art advanced memory technologies for space applications like FeRAM, MRAM, PCRAM.</li> </ul>	<b>2015+</b>	<b>TRP</b>	<b>Currently in parts selection for MRAM and DDR3. Delayed.</b>

# On-going Activities – 2 / 2



ESA funded activities applicable to CFDP, file systems and mass memories

Activity Title	Scope	End Date	ESA Program	Status
<b>Next Generation – Mass Memory Architecture (Syderal SA)</b>	<ul style="list-style-type: none"> <li>* 3Tbit Flash Based memory modules</li> <li>* CFDP - class 1</li> <li>* 6Gbps record, 2 Gbps record.</li> </ul>	<b>2014</b>	<b>STRIN</b>	<b>Detailed Design Phase</b>
<b>Radiation Hard Memory; Radiation Testing Of Candidate Memory Devices For Laplace Mission (EADS Astrium, IDA)</b>	<ul style="list-style-type: none"> <li>*Identify suitable candidate memory for Laplace</li> <li>*Evaluation Program of state of the art COTS memory</li> <li>*Assessment of emerging memory technologies (e.g. MRAM, FeRAM, PCRAM)</li> </ul>	<b>2014</b>	<b>TRP</b>	<p><b>TID tests done:</b></p> <ul style="list-style-type: none"> <li>- NAND (50krad SLC, MLC only a few 10s of Krad)</li> <li>- DDR3 (Hynix version shows very good TID performance - 400krad)</li> </ul> <p><b>Heavy-ion results:</b></p> <ul style="list-style-type: none"> <li>- Both nand and ddr3 show good SEE performance.</li> <li>- SEFIs are more prevalent but managable.</li> </ul>
<b>CFDP IP core development ( TU Braunschweig)</b>	<ul style="list-style-type: none"> <li>*VHDL IP core development</li> <li>*Technology mapping to e.g. DARE library</li> </ul>	<b>2014</b>	<b>TRP</b>	<b>Detailed Design / validation phase</b>

# Activities to be initiated 1/2



ESA funded activities applicable to CFDP, file systems and mass memories

Activity Title	Scope	End Date	ESA Program	Status
<b>Radiation testing of memory devices for JUICE</b>	<ul style="list-style-type: none"> <li>- <b>LPDDR3</b></li> <li>- <b>Latest FLASH generation</b> (not multi cell)</li> </ul>	TBD	CTP	Bid selection ongoing
<b>OBC Mass Memories (Solid State Mass Memory board/module integrated in OBC)</b>	<ul style="list-style-type: none"> <li>- <b>SSMM fully integrated</b> in the OBC shall be developed</li> <li>- <b>Incorporate from the several R&amp;D activities</b> already concluded or on-going as <b>OBC memory organization, NAND Flash technology</b> for space, and <b>services as CFDP and Flash file system.</b></li> <li>- <b>Objectives:</b> Define <b>redundancy architecture, high reliability, re-usability</b> and easy <b>upgradeability</b> are driving requirements</li> </ul>	2015	TRP	ITT to be issue in 1Q 2014

# Activities to be initiated 2/2



ESA funded activities applicable to CFDP, file systems and mass memories

Activity Title	Scope	End Date	ESA Program	Status
<b>Implementation of CFDP and integration into an onboard software application framework providing Time and Space Partitioning (TSP)</b>	<b>Software implementation of CFDP classes 1 and 2 and integration into an on-board software framework provided by Astrium.</b>	<b>TBD</b>	<b>Romanian Task Force</b>	<b>To be started Q1 2014</b>
<b>File Management Services interface standardisation</b>	<ul style="list-style-type: none"><li>- <b>The definition of a new standard interface for managing the data storage unit</b></li><li>- <b>Benefits in terms of flexibility through equipment interchangeability.</b></li><li>- <b>Standardise the mass memory interfaces and services for managing files in support of the new PUS file management service and File Based Operations concept.</b></li></ul>	<b>Q4 2015</b>	<b>TRP</b>	<b>ITT to be issued Q3 2014</b>