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**VIRGO Collaboration**

# MSC Commissioning Progress Report

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| 1.0 | 15/10/2010 | All | First release | A. Gennai |
| | | | | |
| | | | | |

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# 1. NEW DSP PERFORMANCES

New DSP installation was successfully completed last May 24th with installation at West End tower. The use of new DSP simplified implementation of global suspension control loops such as Gipsy (improved robustness to earthquake) thanks to simplified communication paths between DSPs controlling different suspensions and increased computational power.

**Figure 1. New DSP Board**

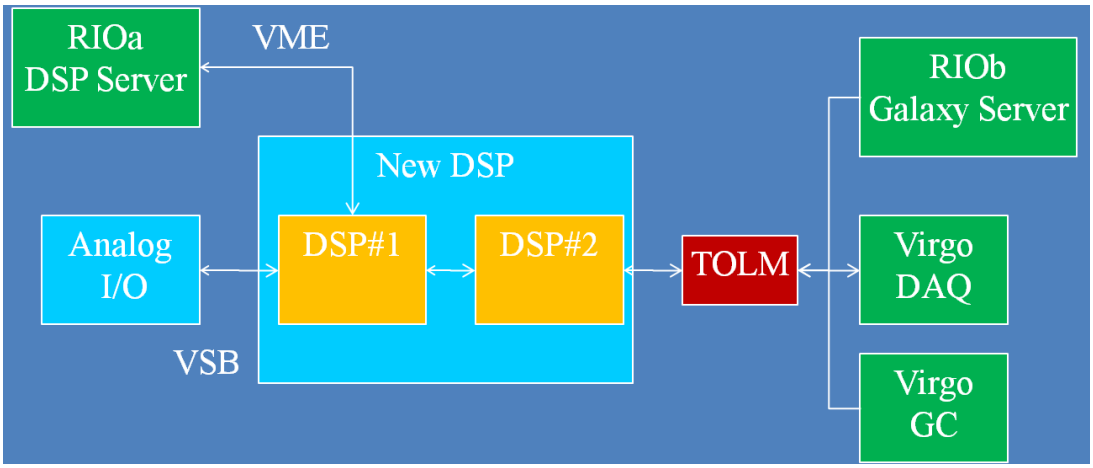


**Figure 2 New DSP (INFN Pisa) and its connections to Virgo subsystems**

The following table summarizes usage of new DSP (September 2010). A total computational power of about 270 MFLOPS sustained (1.3GFLOPS peak) is used today for the Suspension Control System. The distributed digital controller we implemented includes more than 2000 poles.

| | Ex. Time (usec) | Poles | Coeff | MFLOPS Sust. | MFLOPS Peak |
|---|---|---|---|---|---|
| contBS | 21,2 | 105 | 582 | 14,8 | 69,8 |
| contIB | 20,9 | 110 | 602 | 15,3 | 73,5 |
| contMC | 21,6 | 118 | 623 | 16,0 | 74,0 |
| contNE | 20,6 | 119 | 583 | 15,2 | 74,0 |
| contNI | 24,7 | 173 | 733 | 19,9 | 80,3 |
| contOB | 15,4 | 96 | 444 | 11,8 | 76,6 |
| contPR | 20,0 | 111 | 562 | 14,6 | 72,7 |
| contWE | 23,7 | 151 | 678 | 18,1 | 76,5 |
| contWI | 19,2 | 111 | 549 | 14,3 | 74,7 |
| dampBS | 20,4 | 131 | 582 | 15,6 | 76,2 |
| dampIB | 14,8 | 107 | 444 | 12,1 | 81,6 |
| dampMC | 17,5 | 126 | 519 | 14,2 | 80,8 |
| dampNE | 22,2 | 172 | 669 | 18,5 | 83,5 |
| dampNI | 17,9 | 124 | 522 | 14,2 | 78,9 |
| dampOB | 17,0 | 119 | 498 | 13,5 | 79,8 |
| dampPR | 19,5 | 124 | 559 | 14,9 | 76,4 |
| dampWE | 21,7 | 142 | 623 | 16,7 | 77,1 |
| dampWI | 17,7 | 124 | 518 | 14,1 | 79,7 |
| | | | Total | 273,7 | 1386,0 |

**Table 1 September 2010 Suspension Control DSPs Usage**

A comparison with old DSP usage during VSR2 (July 2009) is reported in the following table for few representative DSPs. Together with a huge reduction of computation time (a factor 3 to 4) we can notice a large increase in the number of floating point operations (50% more).

| | New DSP (Sep 2010) | | Old DSP (Jul 2009) | |
|---|---|---|---|---|
| | Exec Time (us) | MFLOPS Sust. | Exec Time (us) | MFLOPS Sust. |
| dampNE | 22 | 19 | 75 | 11 |
| contNE | 21 | 15 | 81 | 11 |
| contBS | 21 | 15 | 78 | 10 |

**Table 2 Comparison between old and new DSP**

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