



## CARBON BASED SMART SYSTEM FOR WIRELESS APPLICATION



Start Date : 01/09/12  
Project n° 318352

Duration : 36 months

Topic addressed : Very advanced nanoelectronic components: design, engineering, technology and manufacturability

### WORK PACKAGE 7 : Project management

#### DELIVERABLE D7.12

#### Progress Management Reports #4 Covered period: T0+18 – T0+24

Due date : T0+24

Submission date : T0+26

Lead contractor for this deliverable: TRT

Dissemination level : PU – Public

|                                                                                   |                                               |      |
|-----------------------------------------------------------------------------------|-----------------------------------------------|------|
|  | <b>D7.12 : Progress Management Reports #4</b> | 2/18 |
|-----------------------------------------------------------------------------------|-----------------------------------------------|------|

## WORK PACKAGE 7: Project management

### PARTNERS ORGANISATION APPROVAL

|                 | Name         | Function                 | Date     | Signature |
|-----------------|--------------|--------------------------|----------|-----------|
| Prepared by:    | S.Xavier     | R&D Engineer             | 03/11/14 |           |
| Contribution by | All partners |                          |          |           |
| Approved by:    | Afshin Ziaei | Research Program Manager | 04/11/14 |           |

### DISTRIBUTION LIST

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| 1 ex     | Graphene Industries                                               | GI        | Peter BLAKE                |
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## CHANGE RECORD SHEET

| REVISION LETTER | DATE       | PAGE NUMBER | DESCRIPTION               |
|-----------------|------------|-------------|---------------------------|
| Template        |            |             |                           |
| V1              | 03/11/2014 | 18          | All partners contribution |
| V2              | 04/11/2014 | 18          | Final version             |
|                 |            |             |                           |

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# 1 JUSTIFICATION OF MAJOR COST ITEMS AND RESSOURCES

## 1.1 BRIEF DESCRIPTION OF WORK, MAJOR COST ITEMS AND RESSOURCES

### 1.1.1 TRT

#### Brief description of work

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> | TRT has participated to the design definition for the microwave CNT amplifier, CNT switch the graphène devices                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>WP 3</b> | TRT has been involved in the characterisation of CNT and graphene materials<br>It has also developed a process flow of the RF switch based on the CNT and the first fabrication run was started<br>Contribution the knowledge of CNT growth for filter fabrication                                                                                                                                                                                                                                               |
| <b>WP 4</b> | TRT has been strongly involved on test activities. Contribution for the characterization of different devices (CNT and Graphene FET, CNT RF switch, CNT based filter, CNT and graphene antenna, Graphene detector). Leading the task concerning the CNT interconnects characterization.                                                                                                                                                                                                                          |
| <b>WP 6</b> | TRT has put a lot of work on the construction of the Nano-RF website. The public area of the website describes the stakes of the project, the partners, the main lines of the project and links it to relevant references. The private area includes confidential information and allows the partners to exchange safely voluminous data.                                                                                                                                                                        |
| <b>WP 7</b> | TRT has been strongly involved in the establishment of the Grant Agreement and has driven the negotiations to find a commitment of all partners on a Consortium Agreement. As coordinator, TRT has launched the project with a successful Kick-Off Meeting organised in Paris area. Since, it closely manages the evolution of the project by following the costs, the delays of the deliverables, and by establishing correcting actions when necessary. Redaction of progress activity and management reports. |

#### Major Cost Items

- Personal costs : 32,85 person-months

#### Tables of costs

| M18-M24 |                    | Budget M18       | Type of Activity |          |               |          | TOTAL          | % Spent   | Remaining budget |
|---------|--------------------|------------------|------------------|----------|---------------|----------|----------------|-----------|------------------|
|         |                    |                  | RTD              | DEM      | MGT           | OTHER    |                |           |                  |
| TRT     | Personnel costs    | 415 283          | 194 351          | 0        | 49 752        | 0        | 244 103        | 59        | 171 180          |
|         | subcontracting     | 9 000            | 0                | 0        | 0             | 0        | 0              | 0         | 9 000            |
|         | other direct costs | 34 395           | 75 297           | 0        | 0             | 0        | 75 297         | 219       | -40 902          |
|         | indirects costs    | 685 409          | 189 104          | 0        | 0             | 0        | 189 104        | 28        | 496 305          |
|         | <b>total</b>       | <b>1 144 087</b> | <b>458 752</b>   | <b>0</b> | <b>49 752</b> | <b>0</b> | <b>508 504</b> | <b>44</b> | <b>635 583</b>   |

Table 1 : TRT Table of costs

|                                                                                   |                                               |      |
|-----------------------------------------------------------------------------------|-----------------------------------------------|------|
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### Table of Human Resources

| Partner | WP    | Planned PM | Actual Person-Months |          |          |          |          |          |       | % Total | Remaining PM |
|---------|-------|------------|----------------------|----------|----------|----------|----------|----------|-------|---------|--------------|
|         |       |            | Period 1             | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total |         |              |
| TRT     | WP 1  | 7,00       | 0,50                 | 0,00     | 0,00     | 0,00     |          |          | 0,50  | 7%      | 6,50         |
|         | WP 2  | 16,00      | 2,50                 | 2,98     | 0,60     | 2,00     |          |          | 8,08  | 51%     | 7,92         |
|         | WP 3  | 26,00      | 1,00                 | 5,00     | 15,51    | 23,64    |          |          | 45,15 | 174%    | -19,15       |
|         | WP 4  | 13,00      | 0,00                 | 0,00     | 0,30     | 2,00     |          |          | 2,30  | 18%     | 10,70        |
|         | WP 5  | 14,00      | 0,00                 | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 14,00        |
|         | WP 6  | 4,00       | 0,31                 | 0,60     | 0,50     | 2,00     |          |          | 3,41  | 85%     | 0,59         |
|         | WP 7  | 14,00      | 0,46                 | 0,40     | 0,70     | 3,21     |          |          | 4,77  | 34%     | 9,23         |
|         | Total | 94,00      | 4,77                 | 8,98     | 17,61    | 32,85    | 0,00     | 0,00     | 64,21 | 68%     | 29,79        |

Table 2 : TRT Table of Human Resources

### 1.1.2 CHALMERS

#### Brief description of work

|      |                                                                                                                                                               |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WP 2 |                                                                                                                                                               |
| WP 3 | CNT growth, TCVD graphene<br>Growth and transfer of CNT bundles into TSVs for 3D interconnection<br>Contribute knowledge about graphene growth for RF devices |
| WP 4 | Contribution for the task concerning the CNT interconnects characterization                                                                                   |
| WP 6 |                                                                                                                                                               |
| WP 7 |                                                                                                                                                               |

#### Major Cost Items

- Personal costs : 6.10 person-months

#### Tables of costs

| M18-M24  | Budget M18         | Type of Activity |        |     |       | TOTAL  | % Spent | Remaining budget |
|----------|--------------------|------------------|--------|-----|-------|--------|---------|------------------|
|          |                    | RTD              | DEM    | MGT | OTHER |        |         |                  |
| CHALMERS | Personnel costs    | 249 368          | 37 819 | 0   | 0     | 37 819 | 15%     | 211 549          |
|          | subcontracting     | 0                | 0      | 0   | 0     | 0      | 0%      | 0                |
|          | other direct costs | 100 347          | 19 150 | 0   | 851   | 20 001 | 20%     | 80 346           |
|          | indirects costs    | 209 829          | 34 181 | 0   | 511   | 34 692 | 17%     | 175 137          |
|          | total              | 559 544          | 91 150 | 0   | 1 362 | 92 512 | 17%     | 467 032          |

Table 3 : CHALMERS Table of costs

#### Table of Human Resources

| Partner  | WP    | Planned PM | Actual Person-Months |          |          |          |          |          |       | % Total | Remaining PM |
|----------|-------|------------|----------------------|----------|----------|----------|----------|----------|-------|---------|--------------|
|          |       |            | Period 1             | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total |         |              |
| CHALMERS | WP 1  | 4,00       | 3,50                 | 0,50     | 0,00     | 0,00     |          |          | 4,00  | 100%    | 0,00         |
|          | WP 2  | 0,00       | 0,00                 | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|          | WP 3  | 36,00      | 0,00                 | 7,30     | 7,00     | 7,25     |          |          | 21,55 | 60%     | 14,45        |
|          | WP 4  | 16,00      | 0,00                 | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 16,00        |
|          | WP 5  | 5,00       | 0,00                 | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 5,00         |
|          | WP 6  | 0,00       | 0,00                 | 0,00     | 0,50     | 0,50     |          |          | 1,00  | 0%      | -1,00        |
|          | WP 7  | 9,00       | 0,00                 | 2,00     | 0,50     | 0,25     |          |          | 2,75  | 31%     | 6,25         |
|          | Total | 70,00      | 3,50                 | 9,80     | 8,00     | 8,00     | 0,00     | 0,00     | 29,30 | 42%     | 40,70        |

Table 4: CHALMERS Table of Human Resources

|                                                                                   |                                               |      |
|-----------------------------------------------------------------------------------|-----------------------------------------------|------|
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### 1.1.3 FORTH

#### Brief description of work

|             |                                                                                                                          |
|-------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> |                                                                                                                          |
| <b>WP 3</b> | fabrication of supporting structures for the FET<br>develop fabrication modules for graphene devices, fabricate Schottky |
| <b>WP4</b>  | Contribution for the characterization of different devices : CNT and Graphene FET, Graphene detector                     |
| <b>WP 6</b> |                                                                                                                          |
| <b>WP 7</b> |                                                                                                                          |

#### Major Cost Items

- Personal costs : 9.76 person-months

#### Tables of costs

| M18-M24 |                    | Budget M18     | Type of Activity |          |              |          | TOTAL         | % Spent   | Remaining budget |
|---------|--------------------|----------------|------------------|----------|--------------|----------|---------------|-----------|------------------|
|         |                    |                | RTD              | DEM      | MGT          | OTHER    |               |           |                  |
| FORTH   | Personnel costs    | 154 736        | 17 247           | 0        | 5 181        | 0        | 22 428        | 14        | 132 308          |
|         | subcontracting     | 3 000          | 0                | 0        | 0            | 0        | 0             | 0         | 3 000            |
|         | other direct costs | 63 855         | 11 684           | 0        | 0            | 0        | 11 684        | 18        | 52 171           |
|         | indirects costs    | 154 231        | 13 080           | 0        | 3 989        | 0        | 17 069        | 11        | 137 162          |
|         | <b>total</b>       | <b>375 822</b> | <b>42 011</b>    | <b>0</b> | <b>9 170</b> | <b>0</b> | <b>51 181</b> | <b>14</b> | <b>324 641</b>   |

Table 5 : FORTH Table of costs

#### Table of Human Resources

| Partner | WP           | Planned PM   | Actual Person-Months |             |             |             |             |             |              | % Total    | Remaining PM |
|---------|--------------|--------------|----------------------|-------------|-------------|-------------|-------------|-------------|--------------|------------|--------------|
|         |              |              | Period 1             | Period 2    | Period 3    | Period 4    | Period 5    | Period 6    | Total        |            |              |
| FORTH   | WP 1         | 2,00         | 2,00                 | 0,00        | 0,00        | 0,00        |             |             | 2,00         | 100%       | 0,00         |
|         | WP 2         | 0,00         | 0,00                 | 0,00        | 0,00        | 0,00        |             |             | 0,00         | 0%         | 0,00         |
|         | WP 3         | 58,00        | 22,73                | 5,00        | 5,00        | 6,33        |             |             | 39,06        | 67%        | 18,94        |
|         | WP 4         | 3,00         | 0,00                 | 2,02        | 2,02        | 0,00        |             |             | 4,04         | 135%       | -1,04        |
|         | WP 5         | 4,00         | 0,00                 | 0,00        | 0,00        | 0,00        |             |             | 0,00         | 0%         | 4,00         |
|         | WP 6         | 0,00         | 0,00                 | 0,00        | 0,00        | 1,00        |             |             | 1,00         | 0%         | -1,00        |
|         | WP 7         | 5,00         | 0,00                 | 0,00        | 0,00        | 1,43        |             |             | 1,43         | 29%        | 3,57         |
|         | <b>Total</b> | <b>72,00</b> | <b>24,73</b>         | <b>7,02</b> | <b>7,02</b> | <b>8,76</b> | <b>0,00</b> | <b>0,00</b> | <b>47,53</b> | <b>66%</b> | <b>24,47</b> |

Table 6: FORTH Table of Human Resources

### 1.1.4 LAAS

#### Brief description of work

|             |                                                                                                                                                                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> | Design power switch<br>Design CNTfilter/oscillator<br>Design LNA                                                                                                                                                                                           |
| <b>WP 3</b> | RF graphene properties characterization employing graphene loaded CPW structure                                                                                                                                                                            |
| <b>WP 4</b> | LAAS is the WP4 leader and lead the task concerning the characterization of the CNT RF switch.<br>Contribution for the characterization of different devices (CNT and Graphene FET, CNT RF switch, CNT based filter, graphene antenna, graphene detector). |
| <b>WP 6</b> |                                                                                                                                                                                                                                                            |

|                                                                                   |                                               |      |
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|             |  |
|-------------|--|
| <b>WP 7</b> |  |
|-------------|--|

#### Major Cost Items

- Personal costs : 7.19 person-months

#### Tables of costs

| M18-M24 |                    | Budget M18     | Type of Activity |          |              |          | TOTAL         | % Spent   | Remaining budget |
|---------|--------------------|----------------|------------------|----------|--------------|----------|---------------|-----------|------------------|
|         |                    |                | RTD              | DEM      | MGT          | OTHER    |               |           |                  |
| LAAS    | Personnel costs    | 121 428        | 34 226           | 0        | 3 040        | 0        | 37 266        | 31%       | 84 162           |
|         | subcontracting     | 0              | 0                | 0        | 0            | 0        | 0             | 0%        | 0                |
|         | other direct costs | 83 300         | 2 361            | 0        | 504          | 0        | 2 865         | 3%        | 80 435           |
|         | indirects costs    | 122 837        | 0                | 0        | 0            | 0        | 0             | 0%        | 122 837          |
|         | <b>total</b>       | <b>327 565</b> | <b>36 587</b>    | <b>0</b> | <b>3 544</b> | <b>0</b> | <b>40 131</b> | <b>12</b> | <b>287 434</b>   |

Table 7: LAAS Table of costs

#### Table of Human Resources

| Partner | WP           | Planned PM   | Actual Person-Months M18 - 24 |              |             |             |             |             |              | % Total    | Remaining PM |
|---------|--------------|--------------|-------------------------------|--------------|-------------|-------------|-------------|-------------|--------------|------------|--------------|
|         |              |              | Period 1                      | Period 2     | Period 3    | Period 4    | Period 5    | Period 6    | Total        |            |              |
| LAAS    | WP 1         | 6,00         | 3,66                          | 0,00         | 0,00        | 0,00        |             |             | 3,66         | 61%        | 2,34         |
|         | WP 2         | 2,00         | 0,00                          | 2,00         | 0,00        | 0,00        |             |             | 2,00         | 100%       | 0,00         |
|         | WP 3         | 24,00        | 0,00                          | 6,22         | 4,56        | 4,45        |             |             | 15,23        | 63%        | 8,77         |
|         | WP 4         | 12,00        | 0,00                          | 0,00         | 1,84        | 2,22        |             |             | 4,06         | 34%        | 7,94         |
|         | WP 5         | 1,00         | 0,00                          | 0,00         | 0,00        | 0,00        |             |             | 0,00         | 0%         | 1,00         |
|         | WP 6         | 0,00         | 0,00                          | 0,00         | 0,00        | 0,40        |             |             | 0,40         | 0%         | -0,40        |
|         | WP 7         | 3,00         | 0,00                          | 2,00         | 0,56        | 0,12        |             |             | 2,68         | 89%        | 0,32         |
|         | <b>Total</b> | <b>48,00</b> | <b>3,66</b>                   | <b>10,22</b> | <b>6,96</b> | <b>7,19</b> | <b>0,00</b> | <b>0,00</b> | <b>28,03</b> | <b>58%</b> | <b>19,97</b> |

Table 8: LAAS Table of Human Resources

### 1.1.5 UPMC

#### Brief description of work

|             |                                                                                                                                                                                  |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> | Design the CNT antenna                                                                                                                                                           |
| <b>WP 3</b> | RF material test structures for classical material parameters (epsilon, mu, sigma and resistance/inductance/capacitance) characterisation                                        |
| <b>WP 4</b> | UPMC lead the activity concerning the characterization of the CNT based filter. Contribution also for the characterization of the CNT and graphene antenna and CNT/Graphene FET. |
| <b>WP 6</b> |                                                                                                                                                                                  |
| <b>WP 7</b> |                                                                                                                                                                                  |

#### Major Cost Items

- Personal costs : 0.8 person-months

#### Tables of costs



| M18-M24 | Budget             | Type of Activity |              |          |          | TOTAL        | % Spent  | Remaining budget |
|---------|--------------------|------------------|--------------|----------|----------|--------------|----------|------------------|
|         |                    | RTD              | DEM          | MGT      | OTHER    |              |          |                  |
| UPMC    | Personnel costs    | 125 851          | 0            | 0        | 0        | 0            | 0%       | 125 851          |
|         | subcontracting     | 39 043           | 0            | 0        | 0        | 0            | 0%       | 39 043           |
|         | other direct costs | 20 902           | 1 712        | 0        | 0        | 1 712        | 8%       | 19 190           |
|         | indirects costs    | 99 003           | 0            | 0        | 0        | 0            | 0%       | 99 003           |
|         | <b>total</b>       | <b>284 799</b>   | <b>1 712</b> | <b>0</b> | <b>0</b> | <b>1 712</b> | <b>1</b> | <b>283 087</b>   |

**Table 9 : UPMC Table of costs**
**Table of Human Resources**

| Partner | WP           | Planned PM   | Actual Person-Months M18 - 24 |             |             |             |             |             |             | % Total    | Remaining PM |
|---------|--------------|--------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|
|         |              |              | Period 1                      | Period 2    | Period 3    | Period 4    | Period 5    | Period 6    | Total       |            |              |
| UPMC    | WP 1         | 0,00         | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00        | 0%         | 0,00         |
|         | WP 2         | 17,00        | 2,60                          | 2,43        | 1,30        | 0,00        |             |             | 6,33        | 37%        | 10,67        |
|         | WP 3         | 6,00         | 0,00                          | 0,64        | 0,20        | 0,80        |             |             | 1,64        | 27%        | 4,36         |
|         | WP 4         | 15,00        | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00        | 0%         | 15,00        |
|         | WP 5         | 1,00         | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00        | 0%         | 1,00         |
|         | WP 6         | 0,00         | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00        | 0%         | 0,00         |
|         | WP 7         | 0,00         | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00        | 0%         | 0,00         |
|         | <b>Total</b> | <b>39,00</b> | <b>0,00</b>                   | <b>3,07</b> | <b>1,50</b> | <b>0,80</b> | <b>0,00</b> | <b>0,00</b> | <b>7,97</b> | <b>20%</b> | <b>31,03</b> |

**Table 10: UPMC Table of Human Resources**
**1.1.6 IMT**
**Brief description of work**

|             |                                                                                                                                                                                                                                                                                                             |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> | Design the CNT transistor<br>Design capacitive CNT switch<br>Design the parameters of the CNT array<br>Design graphene antenna<br>Design graphène FET, and graphène mixer/oscillator                                                                                                                        |
| <b>WP 3</b> | Contribute to technology nodes (opto litho mask fabrication)                                                                                                                                                                                                                                                |
| <b>WP 4</b> | IMT has been strongly involved on test activities. Contribution for the characterization of different devices (CNT and Graphene FET, CNT RF switch, CNT based filter, CNT and graphene antenna, Graphene detector). Leading the task concerning the task concerning the graphene detector characterization. |
| <b>WP 6</b> |                                                                                                                                                                                                                                                                                                             |
| <b>WP 7</b> |                                                                                                                                                                                                                                                                                                             |

**Major Cost Items**

- Personal costs : 8.47 person-months

**Tables of costs**

| M18-M24 | Budget M18         | Type of Activity |               |          |              | TOTAL    | % Spent   | Remaining budget |
|---------|--------------------|------------------|---------------|----------|--------------|----------|-----------|------------------|
|         |                    | RTD              | DEM           | MGT      | OTHER        |          |           |                  |
| IMT     | Personnel costs    | 136 861          | 35 562        | 0        | 860          | 0        | 27%       | 100 439          |
|         | subcontracting     | 0                | 0             | 0        | 0            | 0        | 0%        | 0                |
|         | other direct costs | 34 979           | 9 906         | 0        | 650          | 0        | 30%       | 24 423           |
|         | indirects costs    | 34 369           | 9 094         | 0        | 302          | 0        | 27%       | 24 973           |
|         | <b>total</b>       | <b>206 209</b>   | <b>54 562</b> | <b>0</b> | <b>1 812</b> | <b>0</b> | <b>27</b> | <b>149 835</b>   |

**Table 11 : IMT Table of costs**

|                                                                                   |                                               |       |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------|
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|-----------------------------------------------------------------------------------|-----------------------------------------------|-------|

**Table of Human Resources**

| Partner | WP    | Planned PM | Actual Person-Months M18 - 24 |          |          |          |          |          |       | % Total | Remaining PM |
|---------|-------|------------|-------------------------------|----------|----------|----------|----------|----------|-------|---------|--------------|
|         |       |            | Period 1                      | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total |         |              |
| IMT     | WP 1  | 2,00       | 0,00                          | 2,00     | 0,00     | 0,00     |          |          | 2,00  | 100%    | 0,00         |
|         | WP 2  | 25,00      | 4,90                          | 10,17    | 5,00     | 3,87     |          |          | 23,94 | 96%     | 1,06         |
|         | WP 3  | 5,00       | 1,00                          | 0,50     | 0,00     | 2,50     |          |          | 4,00  | 80%     | 1,00         |
|         | WP 4  | 15,00      | 0,00                          | 0,00     | 0,00     | 1,90     |          |          | 1,90  | 13%     | 13,10        |
|         | WP 5  | 2,50       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 2,50         |
|         | WP 6  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 7  | 1,50       | 0,10                          | 0,50     | 0,00     | 0,20     |          |          | 0,80  | 53%     | 0,70         |
|         | Total | 51,00      | 6,00                          | 13,17    | 5,00     | 8,47     | 0,00     | 0,00     | 32,64 | 64%     | 18,36        |

**Table 12: IMT Table of Human Resources**

### 1.1.7 GI

#### Brief description of work

|      |                                                                                              |
|------|----------------------------------------------------------------------------------------------|
| WP 2 |                                                                                              |
| WP 3 | Provide exfoliated graphene & transfer 2D material to arbitrary substrates or over Apertures |
| WP 4 |                                                                                              |
| WP 6 |                                                                                              |
| WP 7 |                                                                                              |

#### Major Cost Items

- Personal costs : 2,00 person-months

#### Tables of costs

|    | M18-M24            | Budget M18 | Type of Activity |     |       |       | TOTAL  | % Spent | Remaining budget |
|----|--------------------|------------|------------------|-----|-------|-------|--------|---------|------------------|
|    |                    |            | RTD              | DEM | MGT   | OTHER |        |         |                  |
| GI | Personnel costs    | 87 029     | 6 822            | 0   | 704   | 0     | 7 526  | 9%      | 79 503           |
|    | subcontracting     | 0          | 0                | 0   | 0     | 0     | 0      | 0%      | 0                |
|    | other direct costs | 37 558     | 43               | 0   | 10    | 0     | 53     | 0%      | 37 505           |
|    | indirects costs    | 24 268     | 15 671           | 0   | 2 302 | 0     | 17 973 | 74%     | 6 295            |
|    | total              | 148 855    | 22 536           | 0   | 3 016 | 0     | 25 552 | 17      | 123 303          |

**Table 13 : GI Table of costs**

#### Table of Human Resources

| Partner | WP    | Planned PM | Actual Person-Months M18 - 24 |          |          |          |          |          |       | % Total | Remaining PM |
|---------|-------|------------|-------------------------------|----------|----------|----------|----------|----------|-------|---------|--------------|
|         |       |            | Period 1                      | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total |         |              |
| GI      | WP 1  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 2  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 3  | 19,00      | 1,50                          | 2,50     | 1,50     | 2,00     |          |          | 7,50  | 39%     | 11,50        |
|         | WP 4  | 1,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 1,00         |
|         | WP 5  | 1,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 1,00         |
|         | WP 6  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 7  | 0,00       | 0,50                          | 0,50     | 0,50     | 0,00     |          |          | 1,50  | 0%      | -1,50        |
|         | Total | 21,00      | 2,00                          | 3,00     | 2,00     | 2,00     | 0,00     | 0,00     | 9,00  | 43%     | 12,00        |

**Table 14: GI Table of Human Resources**

### 1.1.8 TAS

#### Brief description of work

|             |                                                                                                                                                                            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> | Provide antenna parameters and help at graphene antenna design<br>Provide graphène parameters and design test devices to find graphene properties to be used in the design |
| <b>WP 3</b> |                                                                                                                                                                            |
| <b>WP 4</b> |                                                                                                                                                                            |
| <b>WP 6</b> |                                                                                                                                                                            |
| <b>WP 7</b> |                                                                                                                                                                            |

#### Major Cost Items

- Personal costs : 0,84 person-months

#### Tables of costs

| M12-M18 | Budget M12         | Type of Activity |       |     |       | TOTAL | % Spent | Remaining budget |
|---------|--------------------|------------------|-------|-----|-------|-------|---------|------------------|
|         |                    | RTD              | DEM   | MGT | OTHER |       |         |                  |
| TAS     | Personnel costs    | 29 015           | 1 301 | 0   | 0     | 1 301 | 4       | 27 714           |
|         | subcontracting     | 0                | 0     | 0   | 0     | 0     | 0       | 0                |
|         | other direct costs | 2 715            | 354   | 0   | 0     | 354   | 13      | 2 361            |
|         | indirects costs    | 35 818           | 1 005 | 0   | 0     | 1 005 | 3       | 34 813           |
|         | total              | 67 548           | 2 660 | 0   | 0     | 2 660 | 4       | 64 888           |

**Table 15 : TAS Table of costs**

#### Table of Human Resources

| Partner | WP    | Planned PM | Actual Person-Months M18 - 24 |          |          |          |          |          |       | % Total | Remaining PM |
|---------|-------|------------|-------------------------------|----------|----------|----------|----------|----------|-------|---------|--------------|
|         |       |            | Period 1                      | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total |         |              |
| TAS     | WP 1  | 2,00       | 0,00                          | 0,08     | 0,00     | 0,00     |          |          | 0,08  | 4%      | 1,92         |
|         | WP 2  | 1,00       | 0,00                          | 0,00     | 0,10     | 0,84     |          |          | 0,94  | 94%     | 0,06         |
|         | WP 3  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 4  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 5  | 2,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 2,00         |
|         | WP 6  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 7  | 2,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 2,00         |
|         | Total | 7,00       | 0,00                          | 0,08     | 0,10     | 0,84     | 0,00     | 0,00     | 1,02  | 15%     | 5,98         |

**Table 16: TAS Table of Human Resources**

### 1.1.9 SHT

#### Brief description of work

|                                                                                   |                                               |       |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------|
|  | <b>D7.12 : Progress Management Reports #4</b> | 12/18 |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------|

|             |                                                                                                                                                                                                                                                                                    |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> |                                                                                                                                                                                                                                                                                    |
| <b>WP 3</b> | optimization of PECVD growth process of single CNTs on conductive & non-conductive substrates<br>Contribution the knowledge of CNT growth<br>Growth of CNTs for filter fabrication<br>PECVD growth of CNTs for antenna fabrication<br>Contribution of knowledge on graphene growth |
| <b>WP 4</b> | Contribution for the characterization of the CNT interconnect                                                                                                                                                                                                                      |
| <b>WP 6</b> |                                                                                                                                                                                                                                                                                    |
| <b>WP 7</b> |                                                                                                                                                                                                                                                                                    |

### Major Cost Items

- Personal costs : 8.60 person-months

### Tables of costs

| M18-M24 |                    | Budget M18     | Type of Activity |          |            |          | TOTAL         | % Spent   | Remaining budget |
|---------|--------------------|----------------|------------------|----------|------------|----------|---------------|-----------|------------------|
|         |                    |                | RTD              | DEM      | MGT        | OTHER    |               |           |                  |
| SHT     | Personnel costs    | 63 965         | 26 921           | 0        | 0          | 0        | 26 921        | 42        | 37 044           |
|         | subcontracting     | 0              | 0                | 0        | 0          | 0        | 0             | 0         | 0                |
|         | other direct costs | 83 287         | 9 501            | 0        | 549        | 0        | 10 050        | 12        | 73 237           |
|         | indirects costs    | 88 351         | 21 853           | 0        | 329        | 0        | 22 182        | 25        | 66 169           |
|         | <b>total</b>       | <b>235 603</b> | <b>58 275</b>    | <b>0</b> | <b>878</b> | <b>0</b> | <b>59 153</b> | <b>25</b> | <b>176 450</b>   |

Table 17 : SHT Table of costs

### Table of Human Resources

| Partner | WP           | Planned PM   | Actual Person-Months |             |             |             |             |             |              | % Total    | Remaining PM |
|---------|--------------|--------------|----------------------|-------------|-------------|-------------|-------------|-------------|--------------|------------|--------------|
|         |              |              | Period 1             | Period 2    | Period 3    | Period 4    | Period 5    | Period 6    | Total        |            |              |
| SHT     | WP 1         | 1,00         | 0,60                 | 0,4         | 0           | 0           |             |             | 1,00         | 100%       | 0,00         |
|         | WP 2         | 0,00         | 0,00                 | 0,00        | 0,00        | 0,00        |             |             | 0,00         | 0%         | 0,00         |
|         | WP 3         | 29,00        | 3,50                 | 7,80        | 6,70        | 7,00        |             |             | 25,00        | 86%        | 4,00         |
|         | WP 4         | 4,00         | 0,00                 | 0,00        | 0,70        | 1,00        |             |             | 1,70         | 43%        | 2,30         |
|         | WP 5         | 0,00         | 0,00                 | 0,00        | 0,00        | 0,00        |             |             | 0,00         | 0%         | 0,00         |
|         | WP 6         | 0,00         | 0,30                 | 0,20        | 0,40        | 0,30        |             |             | 1,20         | 0%         | -1,20        |
|         | WP 7         | 4,00         | 0,30                 | 0,20        | 0,40        | 0,30        |             |             | 1,20         | 30%        | 2,80         |
|         | <b>Total</b> | <b>38,00</b> | <b>4,70</b>          | <b>8,60</b> | <b>8,20</b> | <b>8,60</b> | <b>0,00</b> | <b>0,00</b> | <b>30,10</b> | <b>79%</b> | <b>7,90</b>  |

Table 18: SHT Table of Human Resources

### 1.1.10 UNIVPM

#### Brief description of work

|             |                                                                                                                     |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> | Multiphysics simulation of CNT transistor<br>Multiphysics design of CNT NEMS switch<br>Design the graphene detector |
| <b>WP 3</b> |                                                                                                                     |
| <b>WP 4</b> | Contribution for the CNT/graphene antenna characterization                                                          |
| <b>WP 6</b> |                                                                                                                     |
| <b>WP 7</b> |                                                                                                                     |

**Major Cost Items**

- Personal costs : 11 person-months

**Tables of costs**

| M18-M24 | Budget M18         | Type of Activity |               |          |          | TOTAL         | % Spent   | Remaining budget |
|---------|--------------------|------------------|---------------|----------|----------|---------------|-----------|------------------|
|         |                    | RTD              | DEM           | MGT      | OTHER    |               |           |                  |
| UNIVPM  | Personnel costs    | 26 924           | 23 000        | 0        | 0        | 23 000        | 85%       | 3 924            |
|         | subcontracting     | 1 000            | 0             | 0        | 0        | 0             | 0%        | 1 000            |
|         | other direct costs | 6 760            | 5 528         | 0        | 0        | 5 528         | 82%       | 1 232            |
|         | indirects costs    | 47 624           | 16 943        | 0        | 0        | 16 943        | 36%       | 30 681           |
|         | <b>total</b>       | <b>82 308</b>    | <b>45 471</b> | <b>0</b> | <b>0</b> | <b>45 471</b> | <b>55</b> | <b>36 837</b>    |

**Table 19 : UNIVPM Table of costs**
**Table of Human Resources**

| Partner | WP           | Planned PM   | Actual Person-Months M18 - 24 |             |              |              |             |             |              | % Total    | Remaining PM |
|---------|--------------|--------------|-------------------------------|-------------|--------------|--------------|-------------|-------------|--------------|------------|--------------|
|         |              |              | Period 1                      | Period 2    | Period 3     | Period 4     | Period 5    | Period 6    | Total        |            |              |
| UNIVPM  | WP 1         | 0,00         | 0,00                          | 0,00        | 0,00         | 0,00         |             |             | 0,00         | 0%         | 0,00         |
|         | WP 2         | 24,00        | 2,00                          | 4,00        | 8,00         | 6,00         |             |             | 20,00        | 83%        | 4,00         |
|         | WP 3         | 0,00         | 0,00                          | 0,00        | 0,00         | 0,00         |             |             | 0,00         | 0%         | 0,00         |
|         | WP 4         | 10,00        | 0,00                          | 0,00        | 3,00         | 3,00         |             |             | 6,00         | 60%        | 4,00         |
|         | WP 5         | 0,00         | 0,00                          | 0,00        | 0,00         | 0,00         |             |             | 0,00         | 0%         | 0,00         |
|         | WP 6         | 5,00         | 0,50                          | 0,50        | 0,50         | 2,00         |             |             | 3,50         | 70%        | 1,50         |
|         | WP 7         | 5,00         | 0,00                          | 0,00        | 0,00         | 0,00         |             |             | 0,00         | 0%         | 5,00         |
|         | <b>Total</b> | <b>44,00</b> | <b>2,50</b>                   | <b>4,50</b> | <b>11,50</b> | <b>11,00</b> | <b>0,00</b> | <b>0,00</b> | <b>29,50</b> | <b>67%</b> | <b>14,50</b> |

**Table 20: UNIVPM Table of Human Resources**
**1.1.11 LiU**
**Brief description of work**

|             |                                                                                                                                                                                              |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WP 2</b> | Provide physical properties of graphene on SiC wafer and help at graphène antenna design<br>Will help to the design to all graphène devices to complay the graphene on wafer characteristics |
| <b>WP 3</b> | Graphene growth by high temperature decomposition of SiC                                                                                                                                     |
| <b>WP 4</b> |                                                                                                                                                                                              |
| <b>WP 6</b> |                                                                                                                                                                                              |
| <b>WP 7</b> |                                                                                                                                                                                              |

**Major Cost Items**

- Personal costs : 6,0 person-months

**Tables of costs**

| M18-M24 | Budget M18         | Type of Activity |               |          |          | TOTAL         | % Spent   | Remaining budget |
|---------|--------------------|------------------|---------------|----------|----------|---------------|-----------|------------------|
|         |                    | RTD              | DEM           | MGT      | OTHER    |               |           |                  |
| LiU     | Personnel costs    | 35 395           | 35 969        |          |          | 35 969        | 102%      | -574             |
|         | subcontracting     | 0                |               |          |          | 0             | 0%        | 0                |
|         | other direct costs | 41 714           | 1 504         |          |          | 1 504         | 4%        | 40 210           |
|         | indirects costs    | 46 264           | 22 483        |          |          | 22 483        | 49%       | 23 781           |
|         | <b>total</b>       | <b>123 373</b>   | <b>59 956</b> | <b>0</b> | <b>0</b> | <b>59 956</b> | <b>49</b> | <b>63 417</b>    |

**Table 21 : LiU Table of costs**

|                                                                                   |                                               |       |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------|
|  | <b>D7.12 : Progress Management Reports #4</b> | 14/18 |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------|

**Table of Human Resources**

| Partner | WP    | Planned PM | Actual Person-Months M18 - 24 |          |          |          |          |          |       | % Total | Remaining PM |
|---------|-------|------------|-------------------------------|----------|----------|----------|----------|----------|-------|---------|--------------|
|         |       |            | Period 1                      | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total |         |              |
| LiU     | WP 1  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 2  | 2,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 2,00         |
|         | WP 3  | 20,00      | 1,00                          | 5,50     | 6,00     | 6,00     |          |          | 18,50 | 93%     | 1,50         |
|         | WP 4  | 1,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 1,00         |
|         | WP 5  | 1,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 1,00         |
|         | WP 6  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 7  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | Total | 24,00      | 1,00                          | 5,50     | 6,00     | 6,00     | 0,00     | 0,00     | 18,50 | 77%     | 5,50         |

**Table 22: LiU Table of Human Resources**

### 1.1.12 ICN

#### Brief description of work

|      |                                                                                                                                                                                                                                                                              |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WP 1 |                                                                                                                                                                                                                                                                              |
| WP 2 | Design resistive switch                                                                                                                                                                                                                                                      |
| WP 3 | CNT: Micro-Raman and Brillouin scattering for structural and study of frequency ranges. Near-field optical/thermal microscope and 3-omega to study thermal loss mechanisms. Pump-and-probe experiments to study lifetimes of phonon and phonon dynamics affecting switching. |
| WP 4 |                                                                                                                                                                                                                                                                              |
| WP 6 |                                                                                                                                                                                                                                                                              |
| WP 7 |                                                                                                                                                                                                                                                                              |

#### Major Cost Items

- Personal costs : 4.28 person-months

#### Tables of costs

| M18-M24 |                    | Budget M18 | Type of Activity |     |       |       | TOTAL   | % Spent | Remaining budget |
|---------|--------------------|------------|------------------|-----|-------|-------|---------|---------|------------------|
|         |                    |            | RTD              | DEM | MGT   | OTHER |         |         |                  |
| ICN     | Personnel costs    | 66 504     | 50 943           | 0   | 2 258 | 0     | 53 201  | 80%     | 13 303           |
|         | subcontracting     | 1 499      | 0                | 0   | 0     | 0     | 0       | 0%      | 1 499            |
|         | other direct costs | 46 555     | 19 591           | 0   | 293   | 0     | 19 884  | 43%     | 26 671           |
|         | indirects costs    | 67 832     | 42 320           | 0   | 1 530 | 0     | 43 850  | 65%     | 23 982           |
|         | total              | 182 390    | 112 854          | 0   | 4 081 | 0     | 116 935 | 64      | 65 455           |

**Table 23 : ICN Table of costs**

**Table of Human Resources**

| Partner | WP    | Planned PM | Actual Person-Months M18 - 24 |          |          |          |          |          |       | % Total | Remaining PM |
|---------|-------|------------|-------------------------------|----------|----------|----------|----------|----------|-------|---------|--------------|
|         |       |            | Period 1                      | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total |         |              |
| ICN     | WP 1  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 2  | 1,00       | 0,00                          | 1,00     | 0,00     | 0,00     |          |          | 1,00  | 100%    | 0,00         |
|         | WP 3  | 18,00      | 0,00                          | 2,41     | 11,98    | 4,00     |          |          | 18,39 | 102%    | -0,39        |
|         | WP 4  | 0,00       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 0,00         |
|         | WP 5  | 10,00      | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 10,00        |
|         | WP 6  | 1,50       | 0,00                          | 0,00     | 0,00     | 0,00     |          |          | 0,00  | 0%      | 1,50         |
|         | WP 7  | 1,00       | 0,27                          | 0,27     | 0,26     | 0,28     |          |          | 1,08  | 108%    | -0,08        |
|         | Total | 31,50      | 0,27                          | 3,68     | 12,24    | 4,28     | 0,00     | 0,00     | 20,47 | 65%     | 11,03        |

|                                                                                   |                                               |       |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------|
|  | <b>D7.12 : Progress Management Reports #4</b> | 15/18 |
|-----------------------------------------------------------------------------------|-----------------------------------------------|-------|

**Table 24: ICN Table of Human Resources**

### 1.1.13 Tyndall

#### Brief description of work

|             |                                                       |
|-------------|-------------------------------------------------------|
| <b>WP 2</b> |                                                       |
| <b>WP 3</b> | High k oxide and dielectric technology implementation |
| <b>WP 4</b> |                                                       |
| <b>WP 6</b> |                                                       |
| <b>WP 7</b> |                                                       |

#### Major Cost Items

- Personal costs : 6,00 person-months

| Partner | WP           | Planned PM   | Actual Person-Months M18 - 24 |             |             |             |             |             |              | % Total    | Remaining PM |
|---------|--------------|--------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|--------------|------------|--------------|
|         |              |              | Period 1                      | Period 2    | Period 3    | Period 4    | Period 5    | Period 6    | Total        |            |              |
| Tyndall | WP 1         | 0,00         | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00         | 0%         | 0,00         |
|         | WP 2         | 0,00         | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00         | 0%         | 0,00         |
|         | WP 3         | 20,00        | 4,50                          | 2,88        | 4,50        | 5,00        |             |             | 16,88        | 84%        | 3,12         |
|         | WP 4         | 14,00        | 0,00                          | 2,00        | 1,00        | 0,00        |             |             | 3,00         | 21%        | 11,00        |
|         | WP 5         | 2,00         | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00         | 0%         | 2,00         |
|         | WP 6         | 0,00         | 0,00                          | 0,00        | 0,00        | 0,00        |             |             | 0,00         | 0%         | 0,00         |
|         | WP 7         | 8,50         | 0,00                          | 1,00        | 0,50        | 1,00        |             |             | 2,50         | 29%        | 6,00         |
|         | <b>Total</b> | <b>44,50</b> | <b>4,50</b>                   | <b>5,88</b> | <b>6,00</b> | <b>6,00</b> | <b>0,00</b> | <b>0,00</b> | <b>22,38</b> | <b>50%</b> | <b>22,12</b> |

#### Tables of costs

| M18-M24 |                    | Budget M18     | Type of Activity |          |          |          | TOTAL         | % Spent   | Remaining budget |
|---------|--------------------|----------------|------------------|----------|----------|----------|---------------|-----------|------------------|
|         |                    |                | RTD              | DEM      | MGT      | OTHER    |               |           |                  |
| Tyndall | Personnel costs    | 161 242        | 27 873           |          |          |          | 27 873        | 17%       | 133 369          |
|         | subcontracting     | 0              | 0                |          |          |          | 0             | 0%        | 0                |
|         | other direct costs | 52 241         | 2 800            |          |          |          | 2 800         | 5%        | 49 441           |
|         | indirects costs    | 128 089        | 18 404           |          |          |          | 18 404        | 14%       | 109 686          |
|         | <b>total</b>       | <b>341 572</b> | <b>49 077</b>    | <b>0</b> | <b>0</b> | <b>0</b> | <b>49 077</b> | <b>14</b> | <b>292 496</b>   |

**Table 25 : Tyndall Table of costs**

#### Table of Human Resources

| Partner | WP           | Planned PM   | Actual Person-Months |             |             |             |             |             |              | % Total    | Remaining PM |
|---------|--------------|--------------|----------------------|-------------|-------------|-------------|-------------|-------------|--------------|------------|--------------|
|         |              |              | Period 1             | Period 2    | Period 3    | Period 4    | Period 5    | Period 6    | Total        |            |              |
| Tyndall | WP 1         | 0,00         | 0,00                 | 0,00        | 0,00        |             |             |             | 0,00         | 0%         | 0,00         |
|         | WP 2         | 0,00         | 0,00                 | 0,00        | 0,00        |             |             |             | 0,00         | 0%         | 0,00         |
|         | WP 3         | 20,00        | 4,50                 | 2,88        | 4,50        |             |             |             | 11,88        | 59%        | 8,12         |
|         | WP 4         | 14,00        | 0,00                 | 2,00        | 1,00        |             |             |             | 3,00         | 21%        | 11,00        |
|         | WP 5         | 2,00         | 0,00                 | 0,00        | 0,00        |             |             |             | 0,00         | 0%         | 2,00         |
|         | WP 6         | 0,00         | 0,00                 | 0,00        | 0,00        |             |             |             | 0,00         | 0%         | 0,00         |
|         | WP 7         | 8,50         | 0,00                 | 1,00        | 0,50        |             |             |             | 1,50         | 18%        | 7,00         |
|         | <b>Total</b> | <b>44,50</b> | <b>4,50</b>          | <b>5,88</b> | <b>6,00</b> | <b>0,00</b> | <b>0,00</b> | <b>0,00</b> | <b>16,38</b> | <b>37%</b> | <b>28,12</b> |

**Table 26: Tyndall Table of Human Resources**

## 1.2 TABULAR OVERVIEW OF BUDGETED AND ACTUAL COSTS

| Partner    | Total Budget | Actual cost |            |              |              |          |          |              | % Total | Remaining Budget |
|------------|--------------|-------------|------------|--------------|--------------|----------|----------|--------------|---------|------------------|
|            |              | Period 1    | Period 2   | Period 3     | Period 4     | Period 5 | Period 6 | Total        |         |                  |
| TRT        | 1 735 664,00 | 82 384,00   | 162 193,00 | 347 000,00   | 508 504,00   | 0,00     | 0,00     | 1 100 081,00 | 63,38%  | 635 583,00       |
| CHALMERS   | 836 520,00   | 65 091,00   | 111 893,00 | 99 992,00    | 92 512,00    | 0,00     | 0,00     | 369 488,00   | 44,17%  | 467 032,00       |
| FORTH      | 512 250,00   | 36 507,93   | 50 003,07  | 49 917,00    | 51 181,00    | 0,00     | 0,00     | 187 609,00   | 36,62%  | 324 641,00       |
| LAAS       | 524 160,00   | 44 240,00   | 54 816,00  | 97 539,00    | 40 131,00    | 0,00     | 0,00     | 236 726,00   | 45,16%  | 287 434,00       |
| UPMC       | 306 560,00   | 1 416,40    | 18 930,60  | 1 414,00     | 1 712,00     | 0,00     | 0,00     | 23 473,00    | 7,66%   | 283 087,00       |
| IMT        | 332 760,00   | 42 124,21   | 165 655,79 | 39 824,00    | 56 374,00    | 0,00     | 0,00     | 303 978,00   | 91,35%  | 28 782,00        |
| GI         | 248 000,00   | 27 576,00   | 19 068,00  | 24 925,00    | 25 552,00    | 0,00     | 0,00     | 97 121,00    | 39,16%  | 150 879,00       |
| TSA        | 70 000,00    | 0,00        | 2 452,00   | 0,00         | 2 660,00     | 0,00     | 0,00     | 5 112,00     | 7,30%   | 64 888,00        |
| SHT        | 432 899,00   | 41 933,00   | 69 742,00  | 85 621,00    | 159 154,00   | 0,00     | 0,00     | 356 450,00   | 82,34%  | 76 449,00        |
| UNIVPM     | 246 787,00   | 29 396,98   | 16 293,02  | 118 789,00   | 45 471,00    | 0,00     | 0,00     | 209 950,00   | 85,07%  | 36 837,00        |
| LiU        | 272 000,00   | 19 476,92   | 63 258,08  | 65 892,00    | 59 956,00    | 0,00     | 0,00     | 208 583,00   | 76,68%  | 63 417,00        |
| ICN        | 335 901,00   | 15 511,63   | 21 063,37  | 116 935,00   | 120 935,00   | 0,00     | 0,00     | 274 445,00   | 81,70%  | 61 456,00        |
| Tyndall    | 395 694,00   | 45 990,40   | 70 085,60  | 54 122,00    | 49 077,00    | 0,00     | 0,00     | 219 275,00   | 55,42%  | 176 419,00       |
| Total Cost | 6 249 195,00 | 451 648,47  | 825 453,53 | 1 101 970,00 | 1 213 219,00 | 0,00     | 0,00     | 3 592 291,00 | 57,48%  | 2 656 904,00     |

Table 27 Tabular overview of budgeted and actual costs

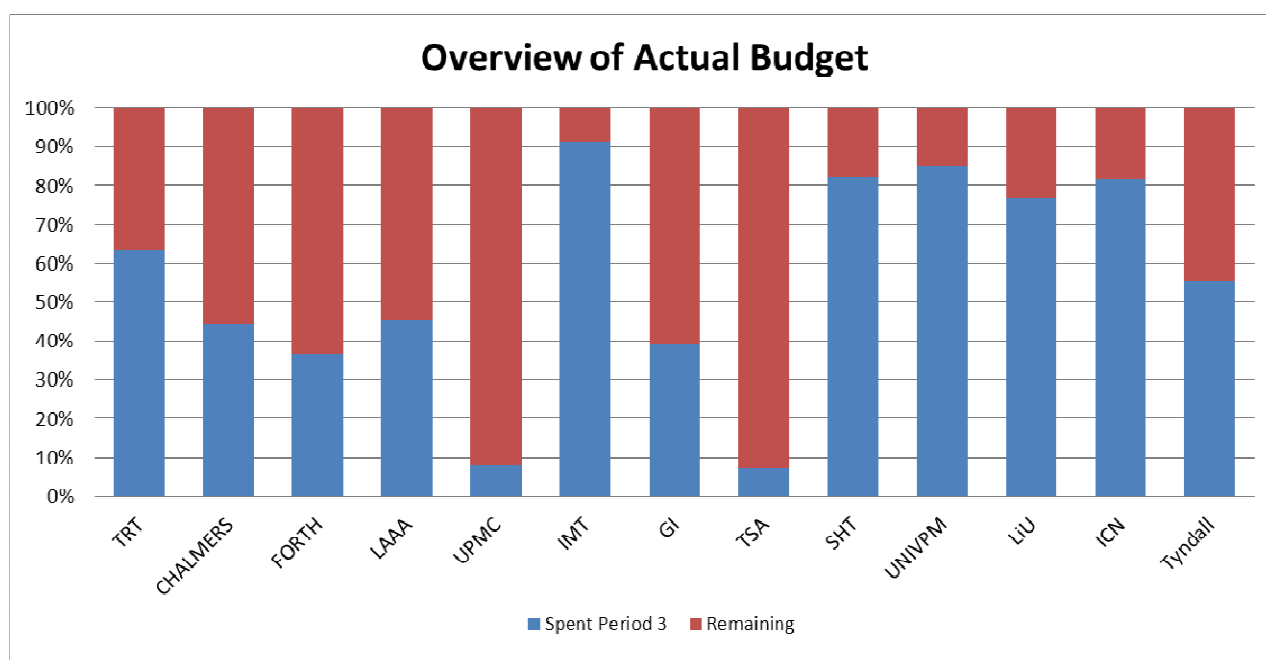


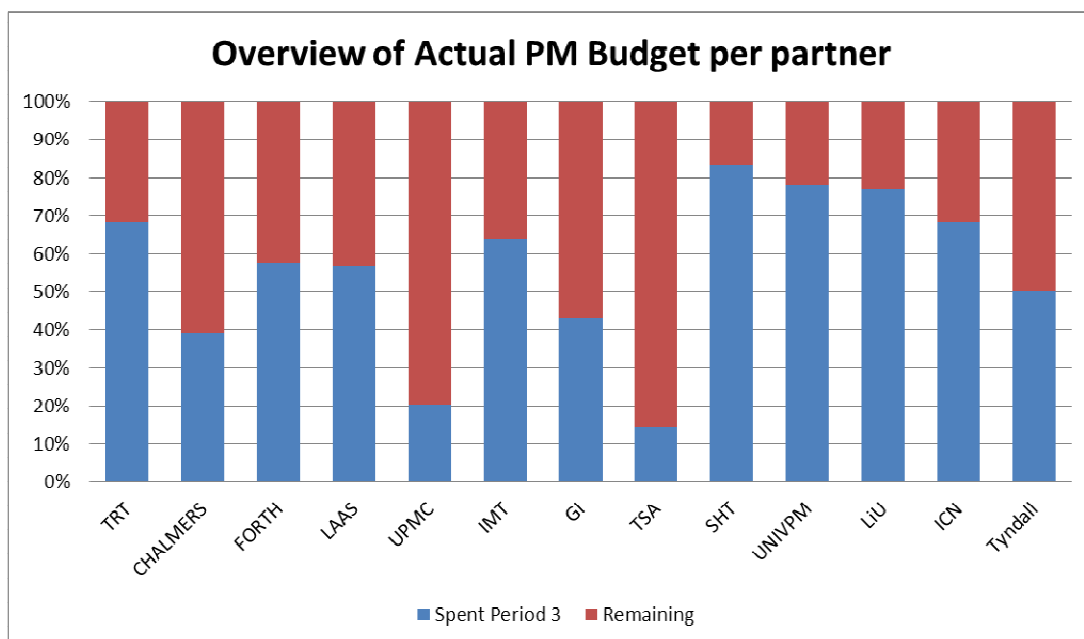
Figure 1 : Actual spent budget vs planned total budget for each partner

## 1.3 TABULAR OVERVIEW OF PLANNED AND ACTUAL HUMAN RESOURCES

| Partner  | Planned PM | Actual Person-Months |          |          |          |          |          |        | % Total | Remaining PM |
|----------|------------|----------------------|----------|----------|----------|----------|----------|--------|---------|--------------|
|          |            | Period 1             | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total  |         |              |
| TRT      | 94,00      | 4,77                 | 8,98     | 17,61    | 32,85    | 0,00     | 0,00     | 64,21  | 68,31%  | 29,79        |
| CHALMERS | 70,00      | 3,50                 | 9,80     | 6,10     | 8,00     | 0,00     | 0,00     | 27,40  | 39,14%  | 42,60        |
| FORTH    | 72,00      | 7,90                 | 16,83    | 7,02     | 9,76     | 0,00     | 0,00     | 41,51  | 57,65%  | 30,49        |
| LAAS     | 46,00      | 5,66                 | 6,22     | 6,96     | 7,19     | 0,00     | 0,00     | 26,03  | 56,59%  | 19,97        |
| UPMC     | 39,00      | 2,60                 | 3,07     | 1,50     | 0,80     | 0,00     | 0,00     | 7,97   | 20,44%  | 31,03        |
| IMT      | 51,00      | 6,00                 | 13,17    | 5,00     | 8,47     | 0,00     | 0,00     | 32,64  | 64,00%  | 18,36        |
| GI       | 21,00      | 2,00                 | 3,00     | 2,00     | 2,00     | 0,00     | 0,00     | 9,00   | 42,86%  | 12,00        |
| TSA      | 7,00       | 0,00                 | 0,08     | 0,10     | 0,84     | 0,00     | 0,00     | 1,02   | 14,57%  | 5,98         |
| SHT      | 36,00      | 4,70                 | 8,60     | 8,20     | 8,60     | 0,00     | 0,00     | 30,10  | 83,61%  | 5,90         |
| UNIVPM   | 39,00      | 2,50                 | 4,50     | 11,50    | 12,00    | 0,00     | 0,00     | 30,50  | 78,21%  | 8,50         |
| LiU      | 24,00      | 1,00                 | 5,50     | 6,00     | 6,00     | 0,00     | 0,00     | 18,50  | 77,08%  | 5,50         |
| ICN      | 31,50      | 0,27                 | 4,68     | 12,24    | 4,28     | 0,00     | 0,00     | 21,47  | 68,16%  | 10,03        |
| Tyndall  | 44,50      | 4,50                 | 5,88     | 6,00     | 6,00     | 0,00     | 0,00     | 22,38  | 50,29%  | 22,12        |
| Total    | 575,00     | 45,40                | 90,31    | 90,23    | 106,79   | 0,00     | 0,00     | 332,73 | 57,87%  | 242,27       |

Table 28 : Overview of planned and actual human resources per partner

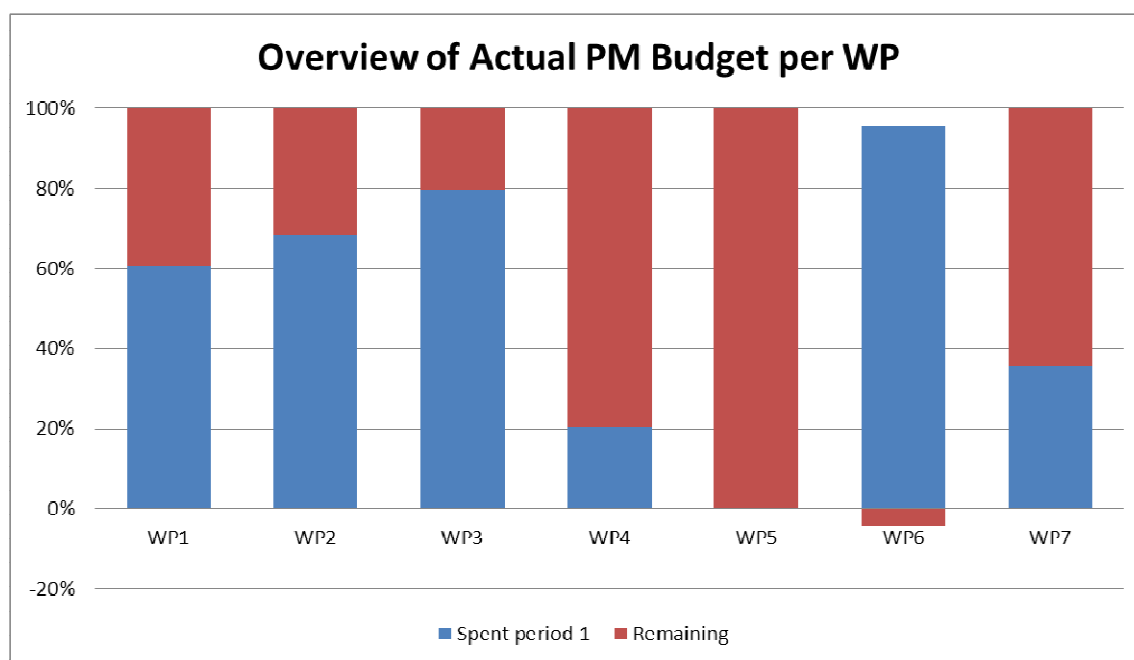




**Figure 2 : Actual spent PM vs total budgeted PM for each partner**

| Partner | Planned PM | Actual Person-Months |          |          |          |          |          |        | % Total | Remaining PM |
|---------|------------|----------------------|----------|----------|----------|----------|----------|--------|---------|--------------|
|         |            | Period 1             | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Total  |         |              |
| WP1     | 22,00      | 10,26                | 2,98     | 0,10     | 0,00     | 0,00     | 0,00     | 13,34  | 60,64%  | 8,66         |
| WP2     | 88,00      | 12,00                | 20,58    | 14,90    | 12,71    | 0,00     | 0,00     | 60,19  | 68,40%  | 27,81        |
| WP3     | 261,00     | 18,40                | 58,58    | 62,05    | 68,97    | 0,00     | 0,00     | 208,00 | 79,69%  | 53,00        |
| WP4     | 104,00     | 0,00                 | 2,00     | 8,86     | 10,12    | 0,00     | 0,00     | 20,98  | 20,17%  | 83,02        |
| WP5     | 43,50      | 0,00                 | 0,00     | 0,00     | 0,00     | 0,00     | 0,00     | 0,00   | 0,00%   | 43,50        |
| WP6     | 10,50      | 1,11                 | 1,30     | 1,40     | 7,20     | 0,00     | 0,00     | 11,01  | 104,86% | -0,51        |
| WP7     | 48,00      | 1,63                 | 4,87     | 2,92     | 7,79     | 0,00     | 0,00     | 17,21  | 35,85%  | 30,79        |
| Total   | 577,00     | 43,40                | 90,31    | 90,23    | 106,79   | 0,00     | 0,00     | 330,73 | 57,32%  | 246,27       |

**Table 29 : overview of planned and actual human resources per Workpackage**



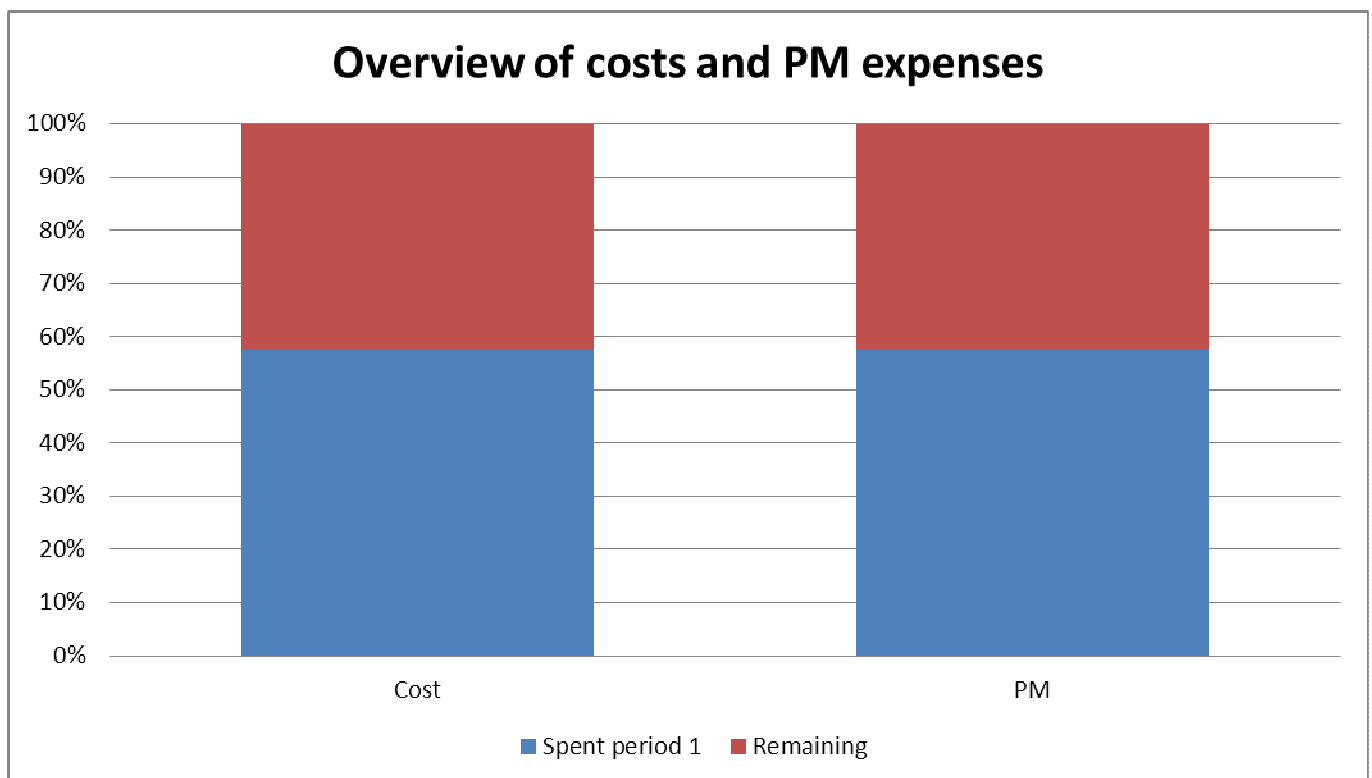
**Figure 3 : Actual spent PM vs total budgeted PM for each workpackage**

### 1.4 MAJOR DEVIATIONS

At this stage of the project, no major deviation has occurred in term of cost or human resources.

|      | Planned      | Actual     |            |              |              |          |          |              | % Total | Remaining    |
|------|--------------|------------|------------|--------------|--------------|----------|----------|--------------|---------|--------------|
|      |              | Period 1   | Period 2   | Period 3     | Period 4     | Period 5 | Period 6 | Total        |         |              |
| Cost | 6 249 195,00 | 451 648,47 | 825 453,53 | 1 101 970,00 | 1 213 219,00 | 0,00     | 0,00     | 3 592 291,00 | 57,48%  | 2 656 904,00 |
| PM   | 577,00       | 45,42      | 90,31      | 90,23        | 106,79       | 0,00     | 0,00     | 332,75       | 57,67%  | 244,25       |

**Table 30 : Summary of planned and actual costs and PM expenses**



**Figure 4 : Overview of cost and PM expenses**