ACCENT Work Packages

WP1 – Project Management

WP2 – Standardisation of Multi-dimensional processes

WP3 – Adaptive Control and Monitoring

WP4 – Component Integrity and data storage

WP5 – Exploitation and Dissemination
## Academic Progress Summary

<table>
<thead>
<tr>
<th>Academic Partner</th>
<th>Main competences and recognition before ACCENT project</th>
<th>ACCENT technical and scientific field of new experience and progresses</th>
<th>Perspectives and complementary work after ACCENT project</th>
</tr>
</thead>
</table>
| Partner N°2: WZL | 1) system developments for monitoring  
2) sensor development for machining  
3) construction of adaptive control system for machining | 1) Modelling & monitoring of machining (milling) operation  
2) Expertise on broaching trials and fundamental project | 1) Use of practical and theoretical progresses on other applications |
| Partner N°9: ENIT | 1) Influence of static and dynamic machining system behaviour on surface and sub-surface characteristics  
2) Chatter phenomena and influence on surface roughness  
3) Titanium and nickel based alloys machining | 1) hard material behaviour in turning and hole-making  
2) hard material surface integrity analysis after turning and hole-making  
3) hard material process monitoring strategies for drilling and turning | 1) Complementary work on Process Monitoring for turning operation  
2) Complementary work applied on Titanium alloy machining |
| Partner N°10: ARTS | 1) Hard material/refractory alloys machining  
2) Influence of cutting condition on tool wear and surface integrity  
3) Machining process instrumentation and software development | 1) Modelling & monitoring of milling operation  
2) Hard material surface integrity analysis after expertise on turning and milling trials  
3) Adaptive Control Solution for Milling of Inconel718 with Principal Component Analysis  
4) Hard material process monitoring strategies for turning & milling  
5) Residual stress condition and measurement on milling of Inconel 718 | 1) Complementary work on process Monitoring for milling & turning operation with Principal Component Analysis to correlate process monitoring and residual stresses  
2) Adapt the demonstrator for a real industrial environment  
3) Test the demonstrator for surface integrity process monitoring in a real industrial environment  
4) Extend research work to other machining operations: especially drilling (Inconel 718 and Titanium alloy Ti6242), |
| Partner N°11: TUKE | 1) method and procedure for machining process monitoring  
2) ceramic and coated carbide insert wear behaviour  
3) application of statistical methods and neural networks in data processing | 1) machining of titanium and nickel based alloys knowledge  
2) various statistical analysis and data processing applied on experimental results  
3) area of artificial neural network application of tool wear and surface roughness modelling and prediction for drilling, milling and turning operations | 1) Complementary research work on machining of Ti-base material in turning and drilling operations  
2) development of ANN applications for decision making process in monitoring system for drilling |
| Partner N°12: MUEP | 1) machining of hard to cut material (Inco718, titanium alloys)  
2) process monitoring of machining and chip formation modelling | 1) knowledge on turning of Inconel based on surface integrity data  
2) process monitoring strategies for turning of Inconel operations | 1) extend research work to other machining operations: drilling, broaching for Inconel 718 and Titanium alloys (Ti64, Ti6242), |
| Partner N°14: UNINA | 1) Micro and macro machining processes  
2) Sensors and signal analysis for intelligent monitoring systems  
3) Material characterization through non destructive & destructive methods  
4) Cognitive paradigms for manufacturing and materials engineering | 1) turning of Inconel718 knowledge  
2) multiple sensors system for monitoring of turning knowledge  
3) tool wear detection and measurement for turning of Inconel718 operation  
4) residual stress condition and measurement on turning of Inconel 718. | 1) develop multi sensor monitoring system approach in a real industrial environment. |
## Industrial Progress Summary

<table>
<thead>
<tr>
<th>Industrial Partner</th>
<th>Process Monitoring use into shop floor</th>
<th>Machining specification with process monitoring requirements</th>
<th>Process monitoring signal and surface integrity defect demonstrated correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before ACCENT</td>
<td>After ACCENT</td>
<td>Before ACCENT</td>
<td>After ACCENT</td>
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<tr>
<td>Partner N°1: RR</td>
<td>Mandated on high L/D ratio hole-making operations on critical parts</td>
<td>Mandated on high L/D ratio hole-making operations on critical parts</td>
<td>Limited to specific machines</td>
</tr>
<tr>
<td>Partner N°3: MTU</td>
<td>On critical parts (other OEM part) : - Hole-making</td>
<td>Drilling, milling, Broaching of new design parts</td>
<td>-</td>
</tr>
<tr>
<td>Partner N°4: AVIO</td>
<td>Hole-Making</td>
<td>Hole-Making Broaching</td>
<td>No process monitoring specification</td>
</tr>
<tr>
<td>Partner N°6: VOLVO</td>
<td>- Hole-making</td>
<td>- Hole-making - Broaching (tool life) - Turning (coolant only)</td>
<td>- Hole-making</td>
</tr>
<tr>
<td>Partner N°7: ITP</td>
<td>On critical parts : - Holes</td>
<td>Holes for critical and no critical parts</td>
<td>On critical parts : - Holes</td>
</tr>
<tr>
<td>Partner N°13: APR</td>
<td>-</td>
<td>Planned for incoming critical jobs: - Inco718 milling - Stainless steel deep hole drilling</td>
<td>-</td>
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</tbody>
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