

Aerospace Sustainable Manufacturing Workshop Template Draft

Life Cycle Tools for Value Creation

OBJECTIVE: 3 teams that will continue on going collaboration around defined project

DELIVERABLE: One project definition and template information that the team is willing to invest time and effort into pursuing. Identify potential funding sources and best plan of approaching that source. ID a team leader that will pull the team together on regular bases to continue collaboration on the project toward a White paper / Proposal and ultimate funding and execution.

Life Cycle Tools for Value Creation

Life Cycle Assessment (LCA) is a valuable methodology for evaluating the potential environmental and energy impacts of a product or service. LCA, however, is generally limited to making relative comparisons between alternatives. In addition, it may not be well integrated with product and process development for economic and societal benefits. Moreover, LCA is generally not capable of providing guidance into manufacturing-related decisions (processes, systems, process planning, etc.). There is a great opportunity to develop and compile a toolset that enables the real-time evaluation of product and process alternatives, the quantification of costs and impacts, and the optimization of decision process. Areas of particular focus include the selection, use, and substitution of materials (especially materials and chemicals that support manufacturing), the evaluation of processing alternatives, the definition of, and planning for, manufacturing operations, and the management of life-cycle operation, including end-of-life (EOL).

The participants in this small group session will survey the full scope of the development of a life-cycle toolset for value creation. Through the understanding the broad scope of the challenge, they will prioritize the critical elements of the toolset, and will select focus areas for which they will flesh out the needed capabilities, and will begin the process of project definition. The deliverable from this topic area will be the definition of a project, or set of projects, that will develop both the architecture and the toolset for life cycle value creation. An overview of some of the possible avenues is provided below:

PROJECT TEMPLATE

Project Title	Sustainability Toolkit and Metrics																																																																																																																																																																																														
Project Objective	Capability to Assess (Benchmark) Current State and Undertake Improvements into Trade-off Study Tool																																																																																																																																																																																														
The Need (Gap) (What is the business case for doing this project?)	<ul style="list-style-type: none"> • Limited, data intensive baseline and benchmarking tools <ul style="list-style-type: none"> ○ Allows relative assessment to where current state is compared to what is achievable • Total PLM perspective for sustainability assessment and improvement • Where should attention be directed to get the most effective results? • Business Case: Sustainability value creation <ul style="list-style-type: none"> ○ Cost reductions attributable to energy and resource reductions in addition to labor ○ Capability to remain competitive and deliver customer value 																																																																																																																																																																																														
Project Deliverable(s)	<ul style="list-style-type: none"> • Survey of existing commercial tools/down select key few • Identify available national/international process databases • Identify 3-5 key case studies, mine these for viable solutions • Identify gaps in tools and databases • Define a system level architecture (module structure) • Case-studies for validation on industrial components • 1st Generation Toolkit 																																																																																																																																																																																														
Project Workflow Steps and duration of each step	<table border="0"> <thead> <tr> <th colspan="2"></th> <th colspan="4">2016</th> <th colspan="4">2017</th> </tr> <tr> <th colspan="2"></th> <th>Q1</th> <th>Q2</th> <th>Q3</th> <th>Q4</th> <th>Q5</th> <th>Q6</th> <th>Q7</th> <th>Q8</th> </tr> </thead> <tbody> <tr> <td>#</td> <td><u>Tasks</u></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>Survey of existing commercial tools/down select key few</td> <td>█</td> <td>█</td> <td>█</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Identify available national/international process databases</td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Identify 3-5 key case studies, mine these for viable solutions</td> <td></td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Identify gaps in tools and databases</td> <td></td> <td></td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Define a system level architecture (module structure)</td> <td></td> <td></td> <td></td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td></td> </tr> <tr> <td>6</td> <td>Case-studies for validation on industrial components</td> <td></td> <td>█</td> <td>█</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>1st Generation Toolkit (semi-manual)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7.1</td> <td>Identification of Databases</td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td>█</td> <td></td> <td></td> <td></td> </tr> <tr> <td>7.2</td> <td>System to communicate with process databases</td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td>█</td> <td></td> <td></td> <td></td> </tr> <tr> <td>7.2.1</td> <td>Engage Primary Databases</td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td>█</td> <td></td> <td></td> <td></td> </tr> <tr> <td>7.2.2</td> <td>Fill in Gaps, Testing and Experimentation</td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td>█</td> <td></td> <td></td> <td></td> </tr> <tr> <td>7.3</td> <td>LCA capability</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7.3.1</td> <td>Engage LCA providers</td> <td></td> <td></td> <td></td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td></td> </tr> <tr> <td>7.3.2</td> <td>Engage Open Source LCA tools</td> <td></td> <td></td> <td></td> <td></td> <td>█</td> <td>█</td> <td>█</td> <td></td> </tr> <tr> <td>7.4</td> <td>Front End GUI</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>2nd Generation Toolkit (Semi-auto + LCA capability)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>█</td> <td>█</td> </tr> </tbody> </table>			2016				2017						Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	#	<u>Tasks</u>									1	Survey of existing commercial tools/down select key few	█	█	█						2	Identify available national/international process databases		█	█	█					3	Identify 3-5 key case studies, mine these for viable solutions			█	█	█				4	Identify gaps in tools and databases				█	█	█			5	Define a system level architecture (module structure)					█	█	█		6	Case-studies for validation on industrial components		█	█						7	1 st Generation Toolkit (semi-manual)									7.1	Identification of Databases		█	█	█	█				7.2	System to communicate with process databases		█	█	█	█				7.2.1	Engage Primary Databases		█	█	█	█				7.2.2	Fill in Gaps, Testing and Experimentation		█	█	█	█				7.3	LCA capability									7.3.1	Engage LCA providers					█	█	█		7.3.2	Engage Open Source LCA tools					█	█	█		7.4	Front End GUI									8	2nd Generation Toolkit (Semi-auto + LCA capability)							█	█
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<p>“Best Guess” Cost</p>	
<p>Team Members that are willing to continue working this project toward a funding source.</p>	<ul style="list-style-type: none"> • GE can contribute components and KPIs for assessment • Andrew Rak- Noblis • Sutherland -Purdue • Champion - Todd Rockstroh - GE • Todd Skowron-CTC • Brian Schmidt -NCDMM • Harry Zahn - Honeywell • Allan Hartong – Air Force • Jawa – UK, ISM • Shaw Feng – NIST
<p>Project Approach/ Guidelines</p>	
<p>Participant Names and contact info</p>	
<p>Capable Technology Providers</p>	