



CLOCKWORK SOLUTIONS

## CASE STUDY

# USMC Total Life Cycle Systems Management Initiative (TLCSM)

### Problem Statement

Predict, maintain, and measure life cycle impacts on total ownership cost for fleets in relationship between chronological age, environmental operational conditions, utilization rates, increased maintenance requirements, etc.

### Background

Early in 2005 a review was initiated by the Office of the Secretary of Defense (OSD) to assess how harsh operating conditions and high utilization rates were affecting military equipment employed in combat operations in Iraq and Afghanistan. A “Demand/Stress on Equipment” study by OSD (PA&E), Land Forces Division, and a parallel effort by the Marine Corps in collecting data on maintenance demands in its major fleets helped establish a baseline understanding of the relationship between environment, operational tempo, and aging. It became clear that there was a certain relationship between chronological age and increased maintenance requirements that suggested accelerated aging of equipment under the much higher demands, much heavier usage rates, and harsher environments in combat operations – often three to six times higher than in routine peacetime missions.

With the increased logistical demands of the Global War on Terrorism (GWOT), the Marine Corps’ requirements for Total Life Cycle Management (TLCM) assessment and decision support capability were clear. The Marine Corps approached Clockwork Solutions, Inc. with a requirement for a Commercial-Off-The-Shelf (COTS) technology to address their need. Appropriately named, the Total Life Cycle Management Assessment Tool (TLCM-AT) was created to predict the short and long term effects of increasing wartime demands specifically for Marine Corps vehicles and other capital-equipment and weapons.

### Entrée ATLAST™

Using Clockwork Solutions ATLAST™ predictive management tool (Advanced Total Life Cycle Assessment Software Tool), the TLCM-AT was created to predict the short and long term effects of increasing wartime demands specifically for Marine Corps vehicles and other capital-equipment and weapons providing:

<ul style="list-style-type: none"> <li>• System Fleet Availability</li> </ul>	<ul style="list-style-type: none"> <li>• Number of unplanned Line Replaceable Unit (LRU) removals</li> </ul>	<ul style="list-style-type: none"> <li>• Number of LRU inductions for overhaul at the depot</li> </ul>	<ul style="list-style-type: none"> <li>• Counts of depot actions for each type of assembly</li> </ul>
<ul style="list-style-type: none"> <li>• Failure counts per type of assembly</li> </ul>	<ul style="list-style-type: none"> <li>• Expected component operating hours (life/half life)</li> </ul>	<ul style="list-style-type: none"> <li>• Expected Time on Vehicle (Mean Time Between Removal)</li> </ul>	<ul style="list-style-type: none"> <li>• Number of spares used/required</li> </ul>
<ul style="list-style-type: none"> <li>• Awaiting Parts status (AWP)</li> </ul>	<ul style="list-style-type: none"> <li>• Awaiting Maintenance (AWM)</li> </ul>	<ul style="list-style-type: none"> <li>• Shipment Volume between Operating and Repairing Locations</li> </ul>	<ul style="list-style-type: none"> <li>• Procurement maintenance and Logistics costs</li> </ul>

From a single TLCM-AT workstation, the life cycles of vehicles and weapon systems can be assessed individually and inclusive of the holistic analysis of the affects of equipment aging, operational tempo, the environment, and proposed maintenance, repair and overhaul policies and modernization initiatives. TLCM-AT enables a relational view to overall system effectiveness now and in the future; and, it identifies major system degraders, performs sensitivity analysis enabling a powerful capability to run “what if scenarios” at rapid speed in order to plan and minimize their effects on future missions.

## Results

Clockwork Solutions provided supporting data analysis and preparation, system model development within their proprietary ATLAST technology. The resulting predictive models were utilized to assess expected LAV equipment, maintenance and support performance, as well as for analyzing those support strategies and plans that result in improved predictive performance.

## Action

The TLCM-AT will be implemented as an enterprise-level decision support tool to provide quantitative back up for funding decisions in support of sustainment requirements, recovery (recap/reset), reconstitution of globally propositioned assets, new acquisitions, and disposal requirements.

A coordinated effort is underway focused on impact targeting and improving data collection, reporting, and analysis processes to maximize fidelity and effectiveness of the predictive modeling outputs.

**Contact:**      **Email:** [info@clockwork-solutions.com](mailto:info@clockwork-solutions.com)

**Website:** [www.clockwork-solutions.com](http://www.clockwork-solutions.com)