

# Scheduling Maintenance With Military Precision

Christopher D. Gates, Asst. Reactor Maintenance Officer on the USS Nimitz  
**In this Plant Practices, we take you offshore to a military application, where best practices around maintenance scheduling and planning can offer manufacturers some ideas.**

*This article originally appeared in the [March 2014 print edition](#) [1] of IMPO.*

The USS Nimitz is one of the Navy's nuclear powered aircraft carriers classified as a super carrier and the lead ship of its class. With a displacement of 100,000+ tons, a length of 1,000+ feet, a 4 acre deck, a crew 5,000 strong, and only two locations in the world that can handle its dry dock maintenance needs, the carrier needs to schedule maintenance activities over two years out.

### The Challenge



Christopher D. Gates, the Assistant Reactor Maintenance Officer, was tasked with improving a maintenance schedule system both in port and at sea for the USS Nimitz's power plants. Says Gates, "The problem I was trying to solve was level loading the over 26,000 tasks I receive from the preventive maintenance program, along with the immediate 5,000 corrective maintenance jobs that are outstanding. Both sets of tasks rely on common resources and I needed an easy and reliable method to level load and schedule (tasks) according to priority and finite capacity."

The maintenance and production demands came from disparate, proprietary databases which, due to security restrictions, could not be combined or integrated. The schedule extended two years out to accommodate dry dock cycles plus the maintenance inventory had to accommodate at-sea schedules averaging four to ten months.

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Gates was trying to schedule this data using ten separate master Excel files. Microsoft Project was used for Gantt charting, but was difficult to handle with all the importing and exporting requirements. Attempts with other systems still left Gates without capacity considerations.

Implementation was urgent so it would need to be easy and familiar enough for rapid adoption by some 400+ sailors. By leveraging Excel, Gates could avoid the required military quarantine and testing security process for proprietary systems.

## The Solution

“I found User Solutions while searching the internet for Finite Capacity Scheduling and ERP systems based in Excel,” Gates explained. “As soon as I started using their product Resource Manager for Excel (RMX), I could tell the flexibility of their product would be beneficial working with an at-sea schedule which changes almost by the hour.”

RMX from User Solutions is a resource management planning, scheduling, and tracking system that can perform intricate finite capacity scheduling combined with level loading and material requirements planning. Yet, with all that sophistication typically found in costly, cumbersome, and rigid systems, RMX has preserved all the integration options, flexibility, and analysis that are inherent in Excel, not to mention the rapid calculation speeds.

The new expanded version of RMX – v2014 – leverages the expanded version of Excel 2013, and supports 1,000,000 rows of data and 16k columns per sheet. This was perfectly positioned to accommodate the Nimitz’s needs.

“RMX is one of the fastest, if not the fastest, finite capacity scheduler combined with materials requirements planning (MRPII) due to its leveraging the speed with which Excel performs mathematical calculations,” states Jim Convis, Product Manager for User Solutions. “With the new expansion, in addition to our supporting small companies with no other production systems in place, RMX is now an ideal complement for traditional ERP systems at larger companies looking to drill down to optimize their production scheduling.”

RMX, fully implemented within weeks, generated two key reports. One report provides a top view of resources consolidated in monthly buckets for over two years and a second is a dispatch list for tasks by workcenter. This is distributed via a shared report, in which the 400 Navy personnel can update task completion status via the familiar Excel environment. This updated file automatically refreshes the master schedule in RMX.

Standard reports include graphical, Gantt, and calendar views. Additionally, all the custom reporting capabilities inherent in Excel are available in RMX.

## The Results

In the words of Gates, “Creation of feasible and optimal level loading in ‘near real-time,’ combined with finite capacity and resource requirements on a platform

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compatible with data from disparate, proprietary systems was achieved and rapidly adopted.”

Gates continues, “The benefits thus far are beyond what I ever thought could be achieved in this environment. Short notice schedule changes are no longer an issue. I have Resource Manager for Excel running all day and when needed, I only have to edit one cell of one page and I am off and running again.”

The changes that used to take hours to make in the previous system now takes minutes with RMX, reducing Gates’ daily scheduling routine tenfold. Plus, the long range (up to 2-3 years) planning for dry dock and other constraints that were done outside the system with manual spreadsheets once took hours, if not days to consolidate, and is now easily accomplished in just a few minutes with RMX. And best of all, the level loading details combined with finite capacity scheduling enables Gates to identify and fill gaps and reduce peak labor demand, which increases both well-being and performance of personnel plus longevity of equipment. Additionally, the cross training of sailors for dry dock contractor support can be determined well in advance of arrival, resulting in considerable direct cost savings for the Navy.

Gates states, “User Solutions has provided superior technical and professional support. This has allowed lightning fast implementation of the system. Plus, we were able to initiate implementation immediately since I only needed to use my discretionary funding.”

Gates used the full extent of RMX’s flexibility by customizing it on his own with the logo and headings to replicate what he had before, facilitating fast adoption. Although primarily used on Windows, RMX worked fine on Gates’ Excel for Mac.

Gates concludes, “For the first time, the USS Nimitz has a birds-eye view of exactly how to manage resources to meet demand. It’s critical in keeping our costs minimized while providing world class service by knowing what skills are required, how much, where, and when. Combined with an easy and accurate method for dispatching personnel and monitoring progress, Resource Manager for Excel provides us the core tools we need to keep the Navy operating at the highest level of efficiency, whether on land or at sea.”

*Christopher D. Gates is the Asst. Reactor Maintenance Officer on the USS Nimitz.*

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### **Links:**

[1] <http://www.impomag.com/digital-editions/2014/03/march-2014-minimizing-downtime>

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