

Warehouse Renaissance

HOW HUGHES SPACE AND COMMUNICATIONS COMPANY
TURNED ITS WAREHOUSE OPERATION
FROM NO CLASS TO 1ST CLASS

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Hughes Space and Communications Company (HSC) is the world's leading manufacturer of geostationary communications satellites. For the past three years, HSC has averaged nearly one satellite launch per month, and at any given time has more than a dozen spacecraft in various stages of production. Every satellite is manufactured in Hughes' state-of-the-art El Segundo, California factory – the largest dedicated satellite factory in the world. HSC Property Management utilizes a variety of processes and disciplines to support this activity. Since the factory supports both government business and commercial business, processes have to be well defined, yet adaptive. They must be strong enough to meet strict FAR requirements, and flexible enough to meet the intense market demands of the competitive commercial marketplace. HSC's warehouse operation is no exception.

In order to meet rigorous and tight factory schedules as well as keep valuable and expensive production floor space clear, HSC warehouse operations must hold special tooling and test equipment until they're needed. Historically, one third of all special tools at HSC are in the warehouse at any given time. The numbers are impressive: more than 4,700 special tools, 1,700 pieces of test equipment, and hundreds of expensed items not serially identified are in storage. HSC's warehouse is used to store property with known future needs, and stage property pending disposition. This includes plant clearance of government-owned, or general disposal if company-owned. HSC warehouse operations include three buildings with just over 80,000 useable square feet. Additional yard areas total another 40,000 square feet. Special tooling used at HSC to build satellites varies from the size of a small pencil to larger than a manager's office. Special tools can cost from hundreds of dollars to millions. HSC's warehouse operation reports to Hughes' Property Management department and is staffed with five employees: one supervisor, one dock administrator, one exempt employee, and two hourly warehousemen.

Almost Unsat in 1992

In March 1992 during a Function 7 Storage audit, HSC's Government Property Administrator (GPA) notified Property Management that the warehouse was unsatisfactory. In fact, the operation was so bad that other functions could be impacted as well. Areas mentioned included Records, Movement, Physical Inventories, Utilization, and Disposition. The GPA was right. The warehouse was packed with property, aisles were clogged, dust was accumulating, packaging and preservation

was inconsistent, and access to individual pieces of property was difficult at best, and impossible in many cases. Property Management had little control over Business Unit personnel who wanted to retain everything. The mentality was, "We may need it someday." Utilization reviews were poor, physical inventories were sporadic, and disposition was slowed by the sheer volume of property in the pipeline, and in the way. To make matters worse, company fire officials documented fire hazards, and company insurance officials were threatening higher rates.

Not Evolution, but Revolution!

It was time to get serious! Soliciting the help of senior management, Property Management set out to revolutionize the way warehousing was perceived and executed at HSC. No longer would the warehouse become a "garage" filled with property that may or may not ever be used again. It would, though, become an integral part of the success of the factory – a place to retain property with known future needs. In fact, the first thing we implemented was a vision. Specifically:

Property Management's vision of the Integrated Satellite Factory includes the warehouse operation retaining, protecting and preserving special tooling, test equipment and ground support equipment not currently required on the production floor, in a laboratory, or at a launch site.

Then, we implemented a charter. Believe it or not, the operation had never defined a clear purpose or guiding light. Implementing the corrective actions and



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process improvements without a charter would have been like trying to build a house without a solid foundation. The warehouse's new charter was to:

- Provide HSC organizations with high quality, cost competitive warehouse services focusing on Business Unit and customer requirements,
- Maintain and enhance warehouse services through cycle time reductions and implementation of continuous measurable improvements,
- Protect and preserve company and customer property in storage or awaiting excess disposition,
- Support and contribute value added benefits to Property and Materiel Management activities related to company or customer property at HSC, and
- Provide a challenging, rewarding and safe work environment for warehouse employees.

All along the way, we kept our GPA informed and part of the process. Corrective action plans were approved by our GPA and schedules and milestones were closely maintained and statused. Communication with the customer was critical. The customer had the power to shut down the operation, and provided the support often necessary when dealing with other organizations within the enterprise.

Internal customer input was also vital to the turnaround. Without understanding what the factory wanted and needed, the reengineering effort would not have succeeded. Our factory customer wanted immediate response from their warehouse. Further review and prodding on Property's part revealed that immediate response amounted to four hours. In order to meet production schedules and build milestones, the factory must be able to retrieve an item from storage within four hours. To put this number in perspective, previous response time was measured in days! We now had our objective! Next, we went back to senior management and asked for help. For the warehouse operation to succeed, all of the property in storage had to be reviewed for future need. Efforts in the past to get Business Unit support had failed.

Open House – Come One, Come All, It's Mandatory!

The solution was a warehouse "open house" called by HSC's president, sponsored by Property Management, with invitations to all senior leadership within the enterprise. Business Unit leaders, Program Office managers, and Production Office managers were "invited" to tour the warehouse complex. The donuts and coffee got them in, what they saw when they got there was years of satellite history, and layers of dust! Each manager toured the warehouse building guided by a member

of Property Management and armed with a stack of bright red "surplus tags" made especially for the occasion. By day's end, more than 1,000 items had been marked as excess! It took weeks to sort through the information, initiate plant clearance on government items, and immediately dispose of company-owned property. Within months though, enough space was made available to implement the process controls necessary to finish the job.

Success is 5% Strategy, 95% Execution.

The key to implementation was threefold; 1) we knew what our customers wanted (4-hour response), 2) we knew the old way of doing business didn't work and 3) planning, planning, planning. First, the entire warehouse was reorganized and cleaned. Everything unnecessary to the success of the operation was eliminated. We created a place for everything, and put everything in its place. Layouts were prepared to ensure an orderly flow of material from dock to stock. Adequate work areas were designed in to facilitate employee efficiency. Incoming and outgoing staging areas were created to provide an area where warehousemen could "receive" property prior to sending it to its final resting place. Even the walls were painted white (improving light and general atmosphere), and a hose was purchased to wash off the dock. Next, every aisle, shelf and bin was labeled with a bar-code tag. Bar-code tracking technology was implemented (Telxon PT960 readers) and software developed to support data collection and upload to company tracking systems. Bulk floor storage areas were divided into sections, or grids, and designated with alpha-numeric codes for easy identification. A "dock administrator" position was created and made accountable for every piece of property passing across the dock. All property was scanned; incoming and outgoing. Digital cameras were purchased and used to take color photos of special tools to facilitate easy identification and to support retention and/or excess declarations. A series of meetings were held with all employees, including the warehousemen, and suggestions for process improvements were collected, categorized and logged. We discovered that 90% of the improvements implemented were offered by bargaining unit personnel who just wanted to do a better job.

Routine "warehouse reviews" were initiated. Each month, a warehouse supervisor and a warehouseman review warehouse buildings and yard areas. Inspection and attention is given to five general categories: house-keeping, hazardous materials, safety conditions, fire prevention, and quality. Quarterly, these reviews include personnel from the company Fire Department, SHEA and Product Assurance. Corrective action, if required, is taken immediately. Metrics were also introduced to reinforce positive results, monitor workload, and track performance to goals. The metric covering 4-hour response was published monthly and forwarded to factory managers for their review.

The 4-hour factory response time was met, and exceeded on average by 2 hours!

All Of A Sudden... Productivity Broke Out!

Before long, department and Business Unit management started to notice a change. No longer could items “not be found.” No longer were production control and task managers hoarding property within the factory because they did not trust the warehouse to deliver an item when needed. No longer was the warehouse considered a “garage” or a place to stow everything and anything in case it was needed “some day.” Rather, it

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was viewed by management as an important part of the overall factory process and flow. Soon, rewards and recognition began to mount as individual Business Unit customers acknowledged warehouse performance. Within the warehouse operation changes happened, as well. Warehouse employees took professional pride in the operation and insisted on professionalism from others. Each warehouse employee was now accountable for certain aspects of the operation and took pride in performing assignments. The 4-hour factory response time was met, and exceeded on average by two hours! More importantly, as service improved, more business was directed toward the warehouse. As business increased, performance metrics continued to improve! This phenomenon was direct evidence that the improvements were institutionalized.

Every audit of HSC’s warehouse operation, both company sponsored and those conducted by our government customers, has been rated “satisfactory” since corrective actions were implemented. Often, during exit briefings, the warehouse is singled out as a shining example of what’s working. Productivity is up, efficiency is up, and manpower has been cut 20% since implementing our new warehouse controls. Of special note is the fact that, with all this, morale has never been better and not a single grievance has been filed by bargaining unit personnel.

World Class Warehousing!

HSC Property Management and warehouse personnel continue to seek better and more efficient ways to support satellite manufacturing while adhering to customer and government regulations. Performance metrics are maintained and goals are stretched to push improvements. The 4-hour response chart now has a

goal of two hours. Monthly internal checks of warehouse operations ensure that location accuracy is maintained, plant clearance aging is in check, storage justifications are in order, and housekeeping, maintenance, and safety checks are routinely completed. Senior management is kept informed and visits the warehouse routinely.

In order to achieve a production-line process, HSC’s Integrated Satellite Factory is organized into areas of specialization, such as structures, propulsion, payload integration and test, antenna fabrication, solar array assembly, and spacecraft integration and test. As a spacecraft is constructed, it passes through each of these areas. These areas are supported by special tooling and test equipment often stored in the warehouse until time of need. Fortunately, HSC’s world class warehouse operation supports the factory in a unobtrusive manner. Behind the scenes and without fanfare, the personnel who run HSC’s warehouse operation specialize in warehousing – they do a world class job and are proud of it.

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