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New generation brings its tech savvy to Newport News shipyard

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The aircraft carrier John F. Kennedy contains more than 9 million feet of cable. A single strand can generate 50 to 60 pieces of paper to document its route. That is, if you depend on paper.

Ryan Szanto would rather call up those plans on a laptop.

As he stands in a power distribution room on Kennedy, his laptop screen comes to life and lists dozens upon dozens of individual cables in a grid view, like line items in a budget. He taps one and up pops a drawing that highlights its 600-foot path through bulkheads and compartments.

“This is how I learned to pull cable,” he said.

A network electrician at Newport News Shipbuilding, Szanto started work last summer, part of a hiring wave that saw the company expand its workforce to step up production of nuclear-powered aircraft carriers and submarines.

Relying less on paper blueprints and more on digital plans is a way to pick up the pace, company officials say. As the christening of the Kennedy draws near, officials say this generational change will allow them to cut costs and increase speed without sacrificing quality or safety.

The high-tech approach has won over veteran shipbuilders who are not digital natives, and for whom reading blueprints was second nature.

“I’m an old salty dog,” said 37-year shipbuilder Jeff Gravely, the outfitting and construction superintendent. “I’m not supposed to embrace change. I resisted it because I just didn’t see where it would benefit me.”

But after witnessing digital-build techniques, Gravely said he was into it “hook, line and sinker.”

Odis Wesby, an electrical foreman with nine years of experience, said he didn't have digital plans when he started work. But the computer interface is as intuitive as it seems — touch the screen, highlight a section and look at it. Besides helping with installation, it allows electricians to troubleshoot.

A cable might have to be re-routed. Using the digital map, workers can submit an alternate path to someone in engineering. In previous years, they'd have to send an email, discuss the problem and perhaps arrange a visit with the engineer.

Another advantage: When a cable problem gets fixed on Kennedy, it becomes part of the amended plan for the third Ford-class carrier, the USS Enterprise, which is now under construction.

The Kennedy, like other carriers, is built via a modular construction process. Giant pieces are assembled in the yard, then lifted into a dry dock where the ship takes shape. The giant pieces are multideck, complicated structures called "superlifts."

Chelsie Baker, a pipefitting foreman, can call up an interactive image of a superlift on her laptop. As she pinches the screen and zooms in, more details appear. She taps the upper wall and the plates disappear to reveal the interior. It allows her and others to understand that puzzle piece in greater detail, which pays dividends.

Because her job is specialized and a carrier is so complex, she's spends more time on certain aspects of piping systems, less time on others.

"On this particular superlift, we worked on all different piping systems, even systems we weren't typically familiar with," she said. "We were able to familiarize ourselves with them using these models. We were able to communicate certain things to our people."

It cut down on do-overs and mistakes. And it saved time over traditional blueprints. She might need separate blueprints to visualize one piping system.

Chris Eckstein, another pipefitting foreman, said new workers have taken to the digital processes.

"The younger generation is more hands-on," he said. "If they can see it, they can do it."

To build its newest aircraft carrier, the John F. Kennedy, Newport News shipyard used lessons learned from Ford

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A few years ago, Mike Butler was all ears when a rigger suggested a way to cut construction costs on the aircraft carrier John F. Kennedy.

Instead of using cranes to assemble giant ship pieces in the yard at Newport News Shipbuilding, a forklift with an extendable boom could do some work faster and just as well, the rigger said.

After some thought, Butler went forklift shopping.

“If I don’t act on these kind of things, it’ll never happen,” Butler recalled thinking at the time. “We went out and did it. And today, five years later, we’ve probably got half a dozen of them out there.”

Butler is the program director for the Kennedy, or CVN-79. The ship will be christened Dec. 7 at the Newport News shipyard when Caroline Kennedy smashes a bottle of sparkling wine against a gray steel hulk that is longer than three football fields.

It is the only place in the country where a ceremony like this happens. The shipyard, a division of Huntington Ingalls Industries, is sole builder of nuclear-powered aircraft carriers for the U.S. Navy.

Kennedy’s christening is about three months ahead of schedule. Its price tag is about $11.4 billion, down from the $12.9 billion cost for the previous ship, the first-in-class Gerald R. Ford.

A few obvious factors account for some of that savings.

The Navy originally planned to phase in brand-new systems over several aircraft carriers. Then in the early 2000s, the decision was made to pack everything on the Ford.

The late Sen. John McCain once referred to that as “the original sin" of the Ford program. Putting so many new, untested components on a single ship increased the risk, and it showed. The Navy and shipyard struggled to refine Ford’s new catapults and arresting gear. Work continues on the ship’s advanced weapons elevators.

Ford’s construction also began before its design was complete, a move Navy leaders later came to regret. Former Navy Secretary Ray Mabus was famously quoted in an interview as saying the Ford was "a poster child for how not to build a ship.”

By contrast, Kennedy started with a completed design in hand. While the technology is still new, shipbuilders had been through it once with Ford.

But the biggest change from ship to ship, Butler said, was a transformation in culture that encouraged workers like that anonymous rigger to come forward and make a pitch. It happened over and over. Welders and wrench-turners. Designers and engineers. Even suppliers chipped in with suggestions.

“It came from the deck plate up,” he said. “But the deck plate is a lot of places.”

After working through so many challenges on Ford, the shipyard had a suggestion box of some 60,000 items when it turned to Kennedy. The company developed a business case for each one and ranked them. To be accepted, the idea had to have a clear payoff, said Lucas Hicks, vice president of new construction-aircraft carrier programs.

“If we had a great idea that cost $10,000, we would have to reap $10,000 on that single ship,” he said. “Each thing earns its way into the design based on the risk versus opportunity.”

Some suggestions came too late for Kennedy, but could be incorporated on the third and fourth ships of the Ford class, which are under contract.

The company will need those suggestions to pay dividends over the life of the Ford-class program. Despite progress, shipbuilders have a ways to go.

With the christening nearly at hand, there is good news to report on the efficiency front.

Labor costs on Kennedy are down 16% compared to Ford. That is unprecedented in nuclear-powered aircraft carrier construction, according to the U.S. Government Accountability Office. In fact, it’s not even close.

The next biggest drop is 9.3% between the first-in-class USS Nimitz, commissioned in 1975, and the follow-on ship, the USS Dwight D. Eisenhower.

But the yard isn’t celebrating. The contract stipulates an 18% labor cost reduction from ship to ship. Hicks said more opportunities for savings are ahead because the ship isn’t scheduled for delivery to the Navy until 2022.

“We’re at 16% — not where we want to be,” Hicks said. “We want to be at 18%. We’d love to be at 20%. We’re at 16 today and we do see opportunity going forward. The test program is the next step. There is probably upside once we get launched and into the river.”

The Navy expects the yard to continue finding efficiencies after Kennedy is delivered. The next two Ford-class carriers fall under a single contract — the first double-buy of aircraft carriers since the Reagan administration — and the company’s target is an 18% reduction over both ships.

Hicks said he expects to incorporate more lessons as it moves to the future USS Enterprise, also known as CVN-80, and the as-yet-unnamed CVN-81.

“The ships are not cookie cutters from Ford to Kennedy to 80 and 81,” Hicks said. “We learn more and more every day.”

Senior shipbuilders fondly remember the “old” Kennedy

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More than 3,200 people from Newport News Shipbuilding worked on the aircraft carrier John F. Kennedy, which will be christened Saturday.

But for some longtime shipbuilders, this isn't the only Kennedy that comes to mind.

The first USS John F. Kennedy was launched in 1967 at what was then called Newport News Shipbuilding & Dry Dock Co. James Clemons had started at the shipyard three years earlier and worked on the Kennedy as a shipfitter apprentice.

Today he's involved in production planning for the Virginia-class submarine program. Do the math: Clemons has been around the Newport News waterfront in one way or another for 55 years.

As a young shipbuilder working on his first carrier, Clemons came across a problem that still bedevils workers today.

"You could get lost very quickly," he said. "You would get used to walking in a certain path to your destination, but then they would close the hole and you'd have to figure out another way around."

Henry Famularo has a different attachment to the old Kennedy.

After joining the Navy out of high school in 1978, he was assigned to an F-14 squadron that deployed on the aircraft carrier. Famularo hadn't traveled much as a child, and the flight deck was a long way from his hometown of Jersey City, New Jersey.

"It was eye-opening," he said. "You got to meet people from all over the world. One of my best friends was a kid from Tennessee who didn't have a pair of shoes until he joined the Navy. That's a true story."

He remembered being amazed at the ship's capabilities: the movement of weapons and aircraft, the feeding of thousands of sailors, the feeling of being part of a floating city.

"I took it for granted back then," he said. "I had a no idea what went into building one of these things."

Short answer: It wasn't easy.

The Kennedy was America's last conventionally powered aircraft carrier. It was more than 1,000 feet long and could go to sea with nearly 80 aircraft, according to Navy data. The ship's crew topped 3,000. The air wing that sailed with the ship added about 2,500 more personnel.

Much has been made about the new construction tools employed on the new John F. Kennedy, the second ship of the Gerald R. Ford class. Shipbuilders now use iPads, digital imaging and augmented reality.

Back in the 1960s, Clemons had more basic tools as a young shipfitter. Even reading blueprints was a skill all its own.

"We didn't know what a computer was," he joked. "It was all paper. You had to go through it and figure out what went where. It was using your mind."

It didn’t seem to slow them down. The Navy awarded the contract for Kennedy in April 1964 and the keel was laid in October of that year. Following its May 1967 christening, the ship was commissioned into service in September 1968.

In April 1969 — less than one year later — the ship was deployed in the Atlantic and already being shadowed by Soviet reconnaissance aircraft. Navy records note that such monitoring would become commonplace.

The ship served through the Cold War and into the post-9/11 era, finally decommissioned in March 2007.

Famularo moved on from the Kennedy and retired from the Navy in 2008 as a lieutenant commander, promptly joining the shipyard. He now works in aviation ship integration. When he learned the Navy was naming a new carrier for President Kennedy, it brought back memories of his days as a young sailor.

“I grew up a lot," he said. “I learned a lot about the capabilities of the ship and what American engineering can do.”

Now he wonders how the Navy’s family tree will extend from one Kennedy to another. A sailor who served on his old ship might have raised a pilot that will be deployed on the new Kennedy.

“Maybe their son is going to be flying jets off there,” he said.